

bouw fysica  
bouw techniek  
installatietechniek



WOLF  
DIKKEN

adviseurs

Project  
Peperstraat – blok 3, Zaandam

Opdrachtgever  
Opportunity Vastgoed B.V.

Architect  
PPHP

Omschrijving  
Toets en advies Bouwbesluit

Datum  
30-06-2022

Gewijzigd: M: 01-08-2025

R820209aaA4

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Adviseur  
**ir. A. Huitema**  
**ing. J. Heiden**

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## **BIJLAGEN**

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## 1. INLEIDING

In opdracht van Opportunity Vastgoed B.V. is door PPHP een ontwerp gemaakt voor 9 woonblokken met in totaal circa 551 woningen en circa 530 m<sup>2</sup> aan commerciële ruimte. Het bouwplan staat bekend onder de naam Peperstraat en is gelegen te Zaandam. In figuur 1 is een situatietekening van het plan weergegeven. **Voorliggend rapport heeft betrekking op blok 3 met 88 woningen en circa 140 m<sup>2</sup> commerciële ruimte (rood gearceerd in onderstaand figuur).**



Figuur 1 - situatietekening

In opdracht van Opportunity Vastgoed B.V. is door Wolf Dikken adviseurs voor dit project een toets uitgevoerd aan de eisen volgens het Bouwbesluit, zijn bouwphysische berekeningen uitgevoerd en is advies gegeven hoe aan de gestelde eisen te voldoen.

In het voorliggende rapport worden de volgende onderwerpen behandeld (tussen haken zijn de betreffende afdelingen van het Bouwbesluit aangegeven):

- vloerafscheidingen (afd. 2.3);
- overbrugging hoogteverschillen (afd. 2.4 t/m 2.6);
- beweegbare constructie-onderdelen (afd. 2.7);
- brandveiligheid (afd. 2.8 t/m 2.13 en afd. 6.5 t/m 6.8);
- installatiegeluid (afd. 3.2);
- beperking van galm (afd. 3.3);
- geluidwering tussen ruimten (afd. 3.4);
- wering van vocht (afd. 3.5);
- luchtversing (afd. 3.6);
- spui ventilatie (afd. 3.7);



- daglichttoetreding (afd. 3.11);
- bruikbaarheid en toegankelijkheid (afd. 4.1 t/m 4.7, afd. 6.10 en 6.11);
- energiezuinigheid (afd. 5.1);
- milieu (afd. 5.2);

Het bouwplan is onderhevig aan wegverkeerslawaaï. Geluid van buiten en de geluidwering van de gevel is in een separate rapportage beschouwd. Dit onderdeel is in voorliggende rapportage dan ook buiten beschouwing gelaten.

Bij de uitvoering van het onderzoek en advies is het volgende toetsingskader aangehouden:

- alle op tekening aangegeven woningen zijn aangemerkt als woonfunctie gelegen in een woongebouw c.q. "andere" woonfunctie;
- de commerciële ruimte is aangemerkt als winkelfunctie met een bezetting van 1 persoon per 8 m<sup>2</sup>;
- de fietsenberging is aangemerkt als overige gebruiksfunctie;
- toetsing heeft plaats gevonden op basis van nieuwbouweisen.

Bij de totstandkoming van dit rapport is gebruik gemaakt van de tekeningen van de architect gewijzigd: M: 01-08-2025.

In een eerder stadium is reeds een "Toets en advies Bouwbesluit" (R820209aaA4 d.d. 29-09-2023) opgesteld. Wegens een wijziging van het bouwplan is voorliggende rapportage opgesteld en met het verschijnen van voorliggende rapportage komen eerder verschenen rapportages te vervallen.

In voorliggend rapport zijn een aantal aanvullingen gedaan ten opzichte van eerdere rapportages. De aanvullingen zijn in het rood aangegeven.

## 2. VEILIGHEID

### **Afdeling 2.3 Afscheiding van vloer, trap en hellingbaan**

Een te bouwen bouwwerk bevat voorzieningen waardoor het vallen van een vloer, een trap of hellingbaan zoveel mogelijk wordt voorkomen.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.17 | <p><i>Aanwezigheid</i></p> <p>Een voor personen bestemde vloer, of een in art. 2.27 bedoelde trap of hellingbaan, hoger dan 1 m boven de aansluitende vloer, terrein of water heeft bij een rand een niet beweegbare afscheiding.</p> <p>De eis voor de afscheiding van een vloer geldt niet ter plaatse van de aansluiting van de vloer aan een trap resp. een hellingbaan.</p> <p>Deze eis geldt niet voor de rand van een podium, een bassin, een laadvloer, een perron of daarmee gelijk te stellen rand van een vloer.</p>                                                                                                    |
| 2.18 | <p><i>Hoogte</i></p> <p>Deze vloerabscheiding heeft een minimale hoogte van:</p> <ul style="list-style-type: none"> <li>- 1.0 m bij vloeren tot 13 m boven aangrenzende vloer/terrein/water;</li> <li>- 1.2 m bij vloeren hoger dan 13 m boven aangrenzende vloer/terrein/water;</li> <li>- 0.85 m ter plaatse van een raam.</li> </ul>                                                                                                                                                                                                                                                                                            |
| 2.19 | <p><i>Openingen</i></p> <p>Een afscheiding heeft geen openingen waardoor een bol kan passeren met een doorsnede groter dan:</p> <ul style="list-style-type: none"> <li>- 0.1 meter tot een hoogte van 0.7 meter, daarboven 0.2 meter (woonfunctie);</li> <li>- 0.1 meter tot een hoogte van 0.7 meter, daarboven 0.5 meter (gebruiksfuncties mede bestemd voor kinderen jonger dan 12 jaar);</li> <li>- 0.5 meter.</li> </ul> <p>De horizontale afstand tussen een vloer, trap of hellingbaan en een afscheiding is niet groter dan 0.05 m.</p> <p>De bovenregel van een afscheiding heeft geen onderbreking groter dan 0.1 m.</p> |
| 2.20 | <p><i>Overklauterbaarheid</i></p> <p>Een afscheiding van een woongebouw, winkelfunctie of een constructieonderdeel dat, installatie die of onderdeel van een installatie dat aan of naast een dergelijke afscheiding is geplaatst, heeft ter voorkoming van overklauteren geen opstapmogelijkheid tussen 0.2 en 0.7 m boven de vloer.</p> <p>Bovengenoemde eis is niet van toepassing op een vloer of een gedeelte daarvan van een winkelfunctie dat niet bestemd is voor kinderen jonger dan 12 jaar.</p>                                                                                                                         |

#### *Voorzieningen*

Op tekening zijn de afscheidingen ter plaatse van de trappen niet aangegeven. Deze dienen aanwezig te zijn en een hoogte te hebben van minimaal 1.0 m boven de vloer. Tevens dient rekening te worden gehouden met de maximale afmeting van de openingen in deze afscheidingen.

#### Afdeling 2.4 Overbruggen van hoogteverschillen

Een te bouwen bouwwerk heeft voorzieningen voor het veilig overbruggen van hoogteverschillen door personen.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.27 | <p><i>Voorziening bij hoogteverschil</i></p> <p>Een hoogteverschil van meer dan 0.21 m tussen vloeren of tussen vloeren en het aansluitend terrein wordt overbrugd door een vaste trap of hellingbaan. Deze eis is van toepassing op vloeren waarover een vluchtroute voert en op vloeren tussen het aansluitende terrein, vloeren van verblijfsgebieden, verblijfsruimten, toiletruimten, badruimten, of voor bezoekers bestemde vloeren en vloeren van een verkeersroute die deze ruimten met elkaar verbindt.</p> |

#### *Voorzieningen*

Op basis van de tekeningen van de architect kan worden geconcludeerd dat aan de gestelde eisen wordt voldaan.

## Afdeling 2.5 Trap

Een te bouwen trap die een hoogteverschil als bedoeld in art. 2.27 overbrugt, kan veilig worden gebruikt.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.33 | <p><i>Afmetingen trap</i></p> <p>Een trap als bedoeld in art. 2.27 in een woonfunctie heeft afmetingen die voldoen aan:</p> <ul style="list-style-type: none"> <li>- breedte <math>\geq 0.8</math> m;</li> <li>- vrije hoogte <math>\geq 2.3</math> m;</li> <li>- aantrede <math>\geq 0.22</math> m (ter plaatse van de klimlijn);</li> <li>- optrede <math>\leq 0.188</math> m;</li> <li>- breedte tredevlak <math>\geq 0.05</math> m;</li> <li>- breedte tredevlak <math>\geq 0.23</math> m (ter plaatse van de klimlijn);</li> <li>- afstand klimlijn tot zijkanten trap <math>\geq 0.3</math> m.</li> </ul> <p>Een trap als bedoeld in art. 2.27 in niet-woonfuncties of een noodtrap heeft afmetingen die voldoen aan:</p> <ul style="list-style-type: none"> <li>- breedte <math>\geq 0.8</math> m;</li> <li>- vrije hoogte <math>\geq 2.1</math> m;</li> <li>- aantrede <math>\geq 0.185</math> m (ter plaatse van de klimlijn);</li> <li>- optrede <math>\leq 0.21</math> m;</li> <li>- breedte tredevlak <math>\geq 0.05</math> m;</li> <li>- breedte tredevlak <math>\geq 0.23</math> m (ter plaatse van de klimlijn);</li> <li>- afstand klimlijn tot zijkanten trap <math>\geq 0.3</math> m.</li> </ul> <p>Een trap overbrugt een hoogteverschil van maximaal 4 meter.</p> |
| 2.34 | <p><i>Trapbordes</i></p> <p>Een trap als bedoeld in art. 2.27 sluit bij de bovenste trede aan op een vloer met een oppervlakte van tenminste <math>0.8 \times 0.8</math> m.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 2.35 | <p><i>Leuning</i></p> <p>Een trap als bedoeld in art. 2.27 voor het overbruggen van een hoogteverschil van meer dan 1 m en met een helling groter dan 2:3 heeft een aan ten minste een zijkant een leuning. De bovenzijde van de leuning ligt op een hoogte van ten minste 0.8 m en ten hoogste 1.0 m boven de voorkant van het tredevlak.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2.36 | <p><i>Regenwerend</i></p> <p>Voor een winkelfunctie gelden geen eisen ten aanzien van de regenwerendheid.</p> <p>Een gemeenschappelijke verkeersruimte van een woonfunctie met een trap voor het overbruggen van een hoogteverschil meer dan 1.5 m is ter plaatse van de trap regenwerend.</p> <p>Dit geldt niet voor een trap die uitsluitend bestemd is om het bouwwerk te ontvluchten.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

### Voorzieningen

Geconcludeerd kan worden dat aan de gestelde eisen is voldaan.

## Afdeling 2.6 Hellingbaan

Een te bouwen hellingbaan die een hoogteverschil als bedoeld in art. 2.27 overbrugt, kan veilig worden gebruikt.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.43 | <p><i>Afmetingen hellingbaan</i></p> <p>Een hellingbaan als bedoeld in art. 2.27 en 6.49 heeft afmetingen die voldoen aan:</p> <ul style="list-style-type: none"> <li>- breedte <math>\geq 1.1</math> m;</li> <li>- hoogteverschil <math>\leq 1</math> m;</li> <li>- helling 1:12 voor hoogteverschil niet groter dan 0.25 m;</li> <li>- helling 1:16 voor hoogteverschil 0.25 m - 0.5 m;</li> <li>- helling 1:20 voor hoogteverschil 0.50 m - 1.0 m.</li> </ul> |
| 2.44 | <p><i>Hellingbaanbordes</i></p> <p>Een hellingbaan als bedoeld in art. 2.27 en 6.49 sluit aan de bovenzijde over de breedte van de hellingbaan aan op een vloeroppervlakte van tenminste 1.4 x 1.4 m.</p>                                                                                                                                                                                                                                                        |
| 2.45 | <p><i>Geleiderand</i></p> <p>De hellingbaan heeft aan de zijkant een aaneengesloten geleiderand met hoogte van ten minste 0.04 m.</p>                                                                                                                                                                                                                                                                                                                            |

### Voorzieningen

In het plan komen hellingbanen niet voor.

## Afdeling 2.7 Beweegbare constructie-onderdelen

Een te bouwen bouwwerk heeft zodanige beweegbare constructie-onderdelen dat deze geen hinder veroorzaken bij het vluchten door en bij het gebruik van een aangrenzende openbare ruimte.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.51 | <p><i>Hinder</i></p> <p>Een beweegbaar constructie-onderdeel dat zich in geopende toestand boven een:</p> <ul style="list-style-type: none"> <li>- weg voor motorvoertuigen of binnen 0.6 m van deze weg kan bevinden, ligt meer dan 4.2 m boven deze weg of strook;</li> <li>- niet voor motorvoertuigen openstaande weg kan bevinden, ligt meer dan 2.2 m boven deze weg. Deze eis geldt niet voor een nooddeur.</li> </ul> <p>Een beschermde vluchtroute die langs een beweegbaar constructieonderdeel voert, heeft met het constructieonderdeel in geopende stand, een vrije doorgang van ten minste 0.6 m en een hoogte van ten minste 2.2 m.</p> <p>Deze eisen gelden niet voor een deur van een ruimte met een vloeroppervlak van minder dan 0.5 m<sup>2</sup>.</p> |

### Voorzieningen

Met de getekende voorzieningen wordt aan de gestelde eisen voldaan.

## Afdeling 2.8 Beperking van het ontstaan van een brandgevaarlijke situatie

Een te bouwen bouwwerk is zodanig dat het ontstaan van een brandgevaarlijke situatie voldoende wordt beperkt.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.57 | <p><i>Stookplaats</i></p> <p>Materiaal ter plaatse van of nabij een stookplaats voldoet aan brandklasse A1 resp. A1fl indien:</p> <ul style="list-style-type: none"> <li>- op het materiaal een warmtestraling groter dan 2 kW/m<sup>2</sup> kan optreden, of;</li> <li>- in het materiaal een temperatuur hoger dan 90 °C kan optreden.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                     |
| 2.58 | <p><i>Schacht, koker of kanaal</i></p> <p>Materiaal aan de binnenzijde van een schacht, koker of kanaal, grenzend aan meer dan 1 (sub)brandcompartiment met een inwendige doorsnede groter dan 0.015 m<sup>2</sup> voldoet aan brandklasse A2.</p> <p>Deze eis geldt niet voor:</p> <ul style="list-style-type: none"> <li>- een schacht die uitsluitend bestemd is voor een of meer boven elkaar gelegen toilet- of badruimten en niet door andere ruimten voert;</li> <li>- maximaal 5% van het oppervlak van de binnenzijde van de schacht, koker of kanaal;</li> <li>- het materiaal van een constructie- of installatieonderdeel dat wordt omsloten door een schacht, koker of kanaal welke voldoet aan brandklasse A2.</li> </ul> |
| 2.59 | <p><i>Rookgasafvoer</i></p> <p>Een afvoervoorziening voor rookgas is brandveilig, bepaald volgens NEN 6062.</p> <p>De horizontale afstand tussen een rookgasafvoer van een op vaste brandstof gestookt toestel en een brandgevaarlijk dak is ten minste 15 m.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

### Voorzieningen

In het gebouw zijn geen stookplaatsen of rookgasafvoeren opgenomen. De binnenzijde van schachten voldoet aan brandklasse A2. Hiermee wordt aan de gestelde eisen voldaan.



## Afdeling 2.9 Beperking van het ontwikkelen van brand en rook

Een te bouwen bouwwerk is zodanig dat brand en rook zich niet snel kunnen ontwikkelen.

| Art.  | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.67  | <p><i>Binnenoppervlak</i></p> <p>Een zijde van een constructie-onderdeel die grenst aan de binnenlucht voldoet aan rookklasse s2 en aan:</p> <ul style="list-style-type: none"> <li>- brandklasse B in een beschermde vluchtroute in een woongebouw;</li> <li>- brandklasse D in een beschermde vluchtroute in een overige gebruiksfunctie;</li> <li>- brandklasse B in een extra beschermde vluchtroute;</li> <li>- brandklasse D bij de overige constructieonderdelen.</li> </ul> <p>In afwijking van het eerste lid, geldt in een overige gebruiksfunctie de eis aan de rookklasse uitsluitend bij een beschermde vluchtroute.</p>                                                                                                                                                                                                                                                                                     |
| 2.68  | <p><i>Buitenoppervlak</i></p> <p>Een zijde van een constructie-onderdeel die grenst aan de buitenlucht voldoet aan:</p> <ul style="list-style-type: none"> <li>- brandklasse C in een extra beschermde vluchtroute;</li> <li>- brandklasse C in een beschermde vluchtroute van een woongebouw;</li> <li>- brandklasse D in een beschermde vluchtroute van een overige gebruiksfunctie;</li> <li>- brandklasse D bij de overige constructie-onderdelen;</li> <li>- brandklasse B voor constructie-onderdeel hoger dan 13 m;</li> <li>- brandklasse B tot een hoogte van ten minste 2.5 m, mits een voor personen bestemde vloer &gt; 5 m boven het meetniveau ligt.</li> </ul> <p>Bovengenoemde eisen zijn niet van toepassing op de bovenzijde van een dak.</p> <p>In afwijking van bovengenoemde eisen voldoet een deur, een raam, een kozijn en daar aan gelijk te stellen constructie-onderdeel aan brandklasse D.</p> |
| 2.69  | <p><i>Beloopbaar vlak</i></p> <p>In afwijking van artikel 2.67 resp. 2.68 geldt voor de bovenzijde van een vloer, een trap en een hellingbaan:</p> <ul style="list-style-type: none"> <li>- brandklasse Cfl in een extra beschermde vluchtroute;</li> <li>- brandklasse Cfl in een beschermde vluchtroute in een woongebouw;</li> <li>- brandklasse Dfl in overige situaties;</li> <li>- rookklasse s1fl.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 2.69a | <p><i>Elektrische leidingen en pijpisolatie</i></p> <p>In afwijking van artikel 2.67 geldt voor een elektrische leiding die grenst aan de binnenlucht:</p> <ul style="list-style-type: none"> <li>- in extra beschermde vluchtroutes rookklasse s1(ca) en in overige ruimten rookklasse s2(ca), en;</li> <li>- brandklasse B2ca in een extra beschermde vluchtroute;</li> <li>- brandklasse B2ca in een beschermde vluchtroute in een woongebouw;</li> <li>- brandklasse Dca in een beschermde vluchtroute in een overige gebruiksfunctie;</li> <li>- brandklasse Dca bij de overige constructie-onderdelen.</li> </ul>                                                                                                                                                                                                                                                                                                   |

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      | <p>In afwijking van artikel 2.67 geldt voor pijpsolatie die grenst aan de binnenlucht:</p> <ul style="list-style-type: none"> <li>- in extra beschermde vluchtroutes rookklasse s1(L) en in overige ruimten rookklasse s2(L), en;</li> <li>- brandklasse BI in een extra beschermde vluchtroute;</li> <li>- brandklasse BI in een beschermde vluchtroute in een woongebouw;</li> <li>- brandklasse DI in een beschermde vluchtroute in een overige gebruiksfunctie;</li> <li>- brandklasse DI bij de overige constructie-onderdelen.</li> </ul> <p>In afwijking van artikel 2.68 geldt voor een elektrische leiding die grenst aan de buitenlucht:</p> <ul style="list-style-type: none"> <li>- brandklasse B2ca in een extra beschermde vluchtroute;</li> <li>- brandklasse Cca in een beschermde vluchtroute;</li> <li>- brandklasse Dca in een beschermde vluchtroute in een overige gebruiksfunctie;</li> <li>- brandklasse Dca bij de overige constructie-onderdelen.</li> </ul> <p>In afwijking van artikel 2.67 geldt voor pijpsolatie leiding die grenst aan de buitenlucht:</p> <ul style="list-style-type: none"> <li>- brandklasse CI in een extra beschermde vluchtroute;</li> <li>- brandklasse CI in een beschermde vluchtroute in een woongebouw;</li> <li>- brandklasse DI in een beschermde vluchtroute in een overige gebruiksfunctie;</li> <li>- brandklasse DI bij de overige constructie-onderdelen.</li> </ul> |
| 2.70 | <p><i>Vrijgesteld</i></p> <p>Op ten hoogste 5% van de totale oppervlakte van de constructie-onderdelen van elke afzonderlijke ruimte, waarvoor volgens de artikelen 2.67 tot en met 2.69 een eis geldt, is die eis niet van toepassing.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2.71 | <p><i>Dakoppervlak</i></p> <p>De bovenzijde van een dak van een bouwwerk is, bepaald volgens NEN 6063, niet brandgevaarlijk. Dit geldt niet indien het bouwwerk geen voor personen bestemde vloer heeft die hoger ligt dan 5 m boven het meetniveau, en de brandgevaarlijke delen van het dak ten minste 15 m vanaf de perceelsgrens liggen. Indien het perceel waarop het bouwwerk ligt, grenst aan een openbare weg, openbaar water, openbaar groen, of een perceel dat niet is bestemd voor bebouwing of voor een speeltuin, een kampeerterrein of opslag van brandgevaarlijke stoffen of van brandbare niet milieugevaarlijke stoffen wordt die afstand aangehouden tot het hart van de weg, dat water, dat groen of dat perceel.</p> <p>Bovengenoemde eis is niet van toepassing op een overige gebruiksfunctie met een gebruiksoppervlakte van ten hoogste 50 m<sup>2</sup>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

### Voorzieningen

De materialen zoals omschreven op de materiaallijst en/of de detailtekeningen voldoen aan de volgende brandklassen:

| TABEL – BRANDKLASSE                                       |                             |                       |        |
|-----------------------------------------------------------|-----------------------------|-----------------------|--------|
| Constructie-onderdeel                                     | Materiaal                   | Brandklasse           |        |
|                                                           |                             | materiaal             | eis    |
| <i>Binnenoppervlak gemeenschappelijke verkeersruimten</i> |                             |                       |        |
| wanden                                                    | beton<br>gipskartonplaat    | A1-s1<br>A2-s1        | B-s2   |
| vloeren                                                   | beton                       | A1fl-s1fl             | Cfl-s1 |
| plafond                                                   | beton<br>akoestisch plafond | A1-s1<br><b>B-s2*</b> | B-s2   |
| deuren / kozijnen                                         | hout                        | <b>B-s2*</b>          | B-s2   |
| <i>Buitenoppervlak</i>                                    |                             |                       |        |
| gevel                                                     | metselwerk                  | A1                    | B      |
| vloeren / galerijen                                       | beton                       | A1                    | Cfl    |
| deuren / kozijnen                                         | aluminium<br>hout           | D-s2<br>B-s2          | D      |

\*) Bij de genoemde materialen dient rekening gehouden te worden met het onderstaande.

Bij het bovenstaande gelden met name de volgende aandachtspunten:

- meterkast(deur)en zijn niet standaard verkrijgbaar in brandklasse B. Deze zijn echter wel op aanvraag leverbaar, bijvoorbeeld van het fabrikaat Jonka. Op voorhand dient derhalve in overleg met de fabrikant bepaald te worden op welke wijze aan deze eis voldaan kan worden;
- de hoofdentrees zijn aangemerkt als extra beschermde vluchtroute. Dit betekent dat postkasten en overige inventaris dienen te voldoen aan brandklasse B. Eventuele aankleding dient te voldoen aan de eisen uit art. 7.4 (de aankleding mag geen brandgevaar opleveren);
- bij de keuze van de woningentreedeuren in besloten gemeenschappelijke verkeersruimte (woningtypen C, E1, F1, I1, J1, E2, I2, F3, E4, I4 en J4) dient rekening gehouden te worden met de vereiste WBDBO en brandklasse (en de vereiste geluidwering). Met HPL woningentreedeuren kan aan brandklasse B-s2 worden voldaan (bijvoorbeeld door toepassing van Formica FR of GetaLit HPL), mits nadrukkelijk vermeld bij de leverancier. De leverancier dient bij de deuren een attest te leveren, waaruit blijkt dat aan de gestelde eis wordt voldaan. Hierbij dient rekening gehouden te worden met alle relevante eisen (brand- en rookwerendheid). Deuren waarmee aan de gestelde eisen kan worden voldaan zijn bijvoorbeeld Reinaerdt Entrance RC3, Reinaerdt Entrance RC 55 of Daloc S43 o.g.;
- tevens geldt dat de bovenzijde van een dak niet brandgevaarlijk mag zijn. Verwacht wordt dat aan de gestelde eisen zal worden voldaan. Indien de dakbedekking conform de verwerkingsvoorschriften wordt verwerkt of het platte dak is afgedekt met grind (dikte van ten minste 50 mm of een massa  $\geq 80 \text{ kg/m}^2$ ) wordt een dak niet geacht brandgevaarlijk te zijn. Op het dak van het bouwplan worden PV-panelen geplaatst. Een dak mag niet brandgevaarlijk zijn om te voorkomen dat het dak in brand vliegt door vlieg vuur uit de omgeving. Aangezien

- vliegvlam van boven komt en de bovenzijde van PV-panelen niet brandgevaarlijk is, zijn geen speciale voorzieningen vereist om aan de gestelde eisen te voldoen;
- elektrische leidingen in een gesloten extra beschermde vluchtroute (opbouw of boven verlaagd plafond) dienen te voldoen aan brandklasse B2ca en rookklasse s1(ca). In niet gesloten extra beschermde vluchtroutes dienen elektrische leidingen (opbouw of boven verlaagd plafond) te voldoen aan brandklasse B2ca;
  - pijpisolatie in een gesloten extra beschermde vluchtroute (opbouw of boven verlaagd plafond) dient te voldoen aan brandklasse BI en rookklasse s1(L). In niet gesloten extra beschermde vluchtroutes dient de pijpisolatie (opbouw of boven verlaagd plafond) te voldoen aan brandklasse CI.

Bij de verdere materiaalkeuzen dient rekening gehouden te worden met de maximaal toelaatbare bijdrage tot brandvoortplanting en rookdichtheid van materialen in met name vluchtroutes en de gevels nabij het aansluitend terrein.

## Afdeling 2.10 Beperking van uitbreiding van brand

Een te bouwen bouwwerk is zodanig dat de kans op een snelle uitbreiding van brand voldoende wordt beperkt.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.82 | <p><i>Ligging</i></p> <p>Een besloten ruimte ligt in een brandcompartiment. Dit is niet van toepassing op:</p> <ul style="list-style-type: none"> <li>- toiletruimte;</li> <li>- badruimte;</li> <li>- liftschaft (mits materialisatie voldoet aan brandklasse B en rookklasse s2);</li> <li>- technische ruimte niet groter dan 50 m<sup>2</sup> niet bestemd voor verbrandingstoestellen met een totale nominale belasting van meer dan 130 kW.</li> </ul> <p>In afwijking hiervan voert een extra beschermde vluchtroute niet door een brandcompartiment.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 2.83 | <p><i>Omvang</i></p> <p>Een brandcompartiment heeft een gebruiksoppervlak van maximaal 1.000 m<sup>2</sup>.</p> <p>Een brandcompartiment strekt zich uit over niet meer dan een perceel.</p> <p>In een brandcompartiment liggen ten hoogste een woonfunctie en nevenfuncties daarvan. In afwijking hiervan is een gemeenschappelijk verblijfsgebied een afzonderlijk brandcompartiment.</p> <p>Een technische ruimte met een GO van meer dan 50 m<sup>2</sup> of met verbrandingstoestellen met een totale nominale belasting van meer dan 130 kW is een afzonderlijk brandcompartiment.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2.84 | <p><i>Weerstand tegen branddoorslag en brandoverslag</i></p> <p>De WBDBO van een brandcompartiment naar een ander brandcompartiment, een besloten ruimte waardoor een extra beschermde vluchtroute voert, een niet besloten veiligheidsvluchtroute en een brandweerlift is minimaal 60 minuten.</p> <p>In afwijking hiervan volstaat bij een woonfunctie tussen een brandcompartiment en een besloten ruimte waardoor een extra beschermde vluchtroute voert een WBDBO van 30 minuten.</p> <p>In een woonfunctie volstaat een WBDBO van 30 minuten indien de permanente vuurbelasting niet groter is dan 500 MJ/m<sup>2</sup> en geen vloer van een verblijfsgebied hoger ligt dan 7 m boven het meetniveau.</p> <p>In afwijking hiervan kan in een winkelfunctie worden volstaan met een WBDBO van 30 minuten indien alle ruimten op hetzelfde perceel liggen en in het gebouw geen vloer van een gebruiksgebied hoger ligt dan 5 m boven meetniveau.</p> <p>In afwijking van bovengenoemde uitzonderingen is de WBDBO van een brandcompartiment naar een ruimte waardoor een veiligheidsvluchtroute voert minimaal 60 minuten.</p> |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Bij het bepalen van de weerstand tegen branddoorslag en brandoverslag van een brandcompartiment naar een ruimte van een op een aangrenzend perceel gelegen gebouw wordt voor het op het andere perceel gelegen gebouw uitgegaan van een identiek maar spiegelsymmetrisch ten opzichte van de perceelsgrens gelegen gebouw. Indien het perceel grenst aan een openbare weg, openbaar water, openbaar groen, of een perceel dat niet is bestemd voor bebouwing of voor een speeltuin, een kampeerterrein of opslag van brandgevaarlijke stoffen of van brandbare niet milieugevaarlijke stoffen vindt deze spiegeling plaats ten opzichte van het hart van die weg, dat water, dat groen of dat perceel.</p> |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

#### *Voorzieningen*

Onderstaand is samengevat welke maatregelen getroffen moeten worden om aan de gestelde eisen te voldoen.

#### Brandcompartimentering

Het bouwplan is als volgt in brandcompartimenten ingedeeld:

- iedere woning vormt een brandcompartiment;
- de commerciële ruimten vormen ieder een brandcompartiment;
- de techniekruimte op de vijfde verdieping vormt een brandcompartiment;
- de fietsenberging vormt een eigen brandcompartiment;
- de besloten gemeenschappelijke verkeersruimten liggen in een extra beschermde vluchtroute en zijn derhalve niet in een brandcompartiment gelegen;
- de liftschachten worden gematerialiseerd als extra beschermde vluchtroute en ligt niet in een brandcompartiment.

Ten aanzien van de WBDBO van de scheidingsconstructies geldt het volgende:

- brandcompartimenten onderling: 60 minuten;
- woningen / overige extra beschermde vluchtroutes: 30 minuten;
- overige brandcompartimenten / extra beschermde vluchtroutes: 60 minuten;
- besloten verkeersruimten onderling: 30 minuten;
- schachtwanden: 60 minuten eenzijdig (van woning naar schacht). Doorvoeringen dienen te worden voorzien van brandkleppen en/of -manchetten. Toegepaste brandkleppen dienen bereikbaar te zijn voor inspectie en onderhoud;
- alle deuren in brandwerende constructies dienen zelfsluitend uitgevoerd te worden;
- deuren van (meter)kasten en technische ruimten met een oppervlak groter dan 0.5 m<sup>2</sup> dienen zelfsluitend uitgevoerd te worden. Bij dubbele (meterkast)deuren dienen beide deuren voorzien te worden van een zelfsluitendheid met sluitvolgorde. (Meter)kasten welke niet groter zijn dan 0.5 m<sup>2</sup> hoeven niet zelfsluitend uitgevoerd te worden.

Woningentreedeuren in besloten gemeenschappelijke verkeersruimten dienen zelfsluitend uitgevoerd te worden met toepassing van vrijloopdeurdrangers. Deze dienen te worden gekoppeld aan de rookmelders in de woning.

| TABEL – ROOKWERENDHEIDSKLASSE                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| S200                                                                                                                                                                                                                                                                                                                                                                            | Sa                                                                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>- woningen onderling;</li> <li>- woningen / andere brandcompartimenten;</li> <li>- brandcompartiment / extra beschermde vluchtroute;</li> <li>- brandcompartiment / liftschacht;</li> <li>- besloten extra beschermde vluchtroute naar een in de vluchtrichting aansluitende extra beschermde vluchtroute in een trappenhuis.</li> </ul> | <ul style="list-style-type: none"> <li>- brandcompartimenten (niet-zijnde woningen) onderling;</li> <li>- besloten extra beschermde vluchtroutes naar een in de vluchtrichting aansluitende (extra) beschermde vluchtroute.</li> </ul> |

Schachten worden beschouwd als technische ruimte met een gebruiksoppervlakte kleiner dan 50 m<sup>2</sup>. In de schachten bevindt zich geen brandbaar materiaal. Om deze reden is het toegestaan dat schachten niet in een brandcompartiment liggen. Schachtwanden dienen 60 minuten brandwerend te zijn (zoals hierboven omschreven) om voldoende WBDBO tussen brandcompartimenten onderling te waarborgen.

Op het dak van het bouwplan worden PV-panelen geplaatst. De dakconstructie bestaat uit 250 mm beton en is 60 minuten brandwerend. Ook de brandwerende scheidingsconstructies zijn van beton. Het plaatsen van PV-panelen op het dak heeft geen invloed op de WBDBO van de brandwerende scheidingsconstructies. Geadviseerd wordt onder de PV-panelen materialen toe te passen met een lage vlamvoortplanting of rookontwikkeling, zoals grind of betontegels.

#### Brandoverslag

De ramen gelegen aan de binnengevel van woningtype F1 en F3 dienen 30 minuten brandwerend te worden uitgevoerd, vanwege de korte afstand tot aan de entreedeur. Op de in bijlage 1 opgenomen geveltekeningen is aangegeven welke gevelopeningen 30 minuten brandwerend uitgevoerd dienen te worden.

Ter bepaling van de benodigde voorzieningen ter voorkoming van brandoverslag is voor verschillende situaties een berekening uitgevoerd (zie bijlage 2).

Bij het uitvoeren van de berekeningen zijn de brandcompartimenten en bouwkundige constructies van de maatgevende woningtypen zo veel mogelijk geschematiseerd overeenkomstig de uitgangspunten van het rekenmodel.

De berekeningen zijn uitgevoerd met behulp van het computerprogramma Pintegraal V7.2 volgens NEN 6068:2020. In de berekeningen is niet uitgegaan van een gereduceerde brand.

Een van de voorwaarden voor toepassing van de in NEN 6068 opgenomen rekenmethode is dat de gevel voldoet aan brandklasse B. De berekeningsbladen zijn gezamenlijk met de berekeningen conform NEN 6068 in bijlage 2 opgenomen.

De resultaten van de uitgevoerde berekeningen zijn samengevat in onderstaande tabel. De in deze tabel aangegeven warmtestralingsflux is bepaald voor het uiterste moment dat aan de eis moet worden voldaan ter plaatse van het meest kritische punt. Overeenkomstig het rekenmodel wordt geacht aan de gestelde eis te zijn voldaan, indien de berekende stralingsflux, gedurende de tijd dat bescherming moet worden geboden, ter plaatse van gevelopeningen kleiner is dan 15 kW/m<sup>2</sup>.

| TABEL – STRALINGSFLUX |                |                                |                      |
|-----------------------|----------------|--------------------------------|----------------------|
| brandruimte           | observatiepunt |                                | flux                 |
|                       | nummer         | omschrijving                   | [kW/m <sup>2</sup> ] |
| woningtype B1         | V1             | onderkant bovenliggend kozijn  | 13.0                 |
|                       | V2             |                                | 14.6                 |
|                       | V3             |                                | 2.8                  |
| commercieel           | H1             | naar spiegelsymmetrisch gebouw | 6.0                  |
|                       | H2             |                                | 10.9                 |
| woningtype H1         | H1             | naar spiegelsymmetrisch gebouw | 4.0                  |
|                       | H2             |                                | 4.8                  |
|                       | H3             |                                | 5.5                  |
| woningtype D1         | H1             | naar spiegelsymmetrisch gebouw | 10.5                 |
|                       | H2             |                                | 5.1                  |

Het gebouw grenst aan de zuidoostzijde (zuidgevel tekeningen architect) tussen as 3.01 en as 3.04 aan een ander perceel, waarbij de afstand van de perceelsgrens vanaf de commerciële ruimte minimaal 1.8 meter bedraagt. De afstand tot spiegelsymmetrische brandruimte bedraagt derhalve 3.5 m. Deze afstand is kleiner dan drie maal de grootste afstand van enig punt van het vlamlichaam tot de geveloppervlakte betrokken op de desbetreffende gevelopeningen, gemeten loodrecht op de gevel ( $3 \times p_{v,i}$ ). Deze gevelopeningen in deze gevel dienen derhalve 30 minuten brandwerend uitgevoerd te worden. Op de in bijlage 1 opgenomen geveltekeningen is aangegeven welke gevelopeningen 30 minuten brandwerend uitgevoerd dienen te worden.

Het gebouw grenst aan de zuidoostzijde (zuidgevel tekeningen architect) tussen as 3.05 (halverwege) en as 3.07 aan een ander perceel (MSR-ruimte), waarbij de afstand van de perceelsgrens vanaf de 1.4 meter bedraagt. De afstand tot spiegelsymmetrische brandruimte bedraagt derhalve 2.8 m.

Ook voor deze gevelopeningen geldt derhalve dat ze 30 minuten brandwerend uitgevoerd dienen te worden. Op de in bijlage 1 opgenomen geveltekeningen is aangegeven welke gevelopeningen 30 minuten brandwerend uitgevoerd dienen te worden.

Het gebouw grenst aan de zuidoostzijde (oostgevel tekeningen architect) tussen as 3.D (halverwege) en as 3.J aan een ander perceel (MSR-ruimte). De afstand van de gevel en de MSR-ruimte is circa 7.1 meter. De afstand tot spiegelsymmetrische brandruimte bedraagt derhalve 14.2 m. Op basis van deze afstanden is geen risico op brandoverslag aanwezig. Hiermee wordt voldaan aan de eisen ter voorkoming van brandoverslag naar aangrenzende percelen



Het overige deel van de zuidoostzijde grenst aan een ander perceel, waarbij de afstand van de perceelsgrens vanaf de woningen minimaal 2.0 meter bedraagt. De afstand tot spiegelsymmetrische brandruimte bedraagt derhalve 4.0 m. Deze afstand is groter dan drie maal de grootste afstand van enig punt van het vlamlichaam tot de geveloppervlakte betrokken op de desbetreffende gevelopeningen, gemeten loodrecht op de gevel ( $3 \times p_{v,i}$ ). Aan de eisen ter voorkoming van brandoverslag naar aangrenzende percelen ter plaatse van de woningen wordt derhalve voldaan.

Het gebouw grenst aan de overige zijden aan openbaar terrein, waarbij de afstand van de gevels tot het hart van het openbaar terrein minimaal 5 meter bedraagt. Aan de eisen ter voorkoming van brandoverslag naar aangrenzende percelen wordt derhalve voldaan.

Op de in bijlage 1 opgenomen geveltekeningen is aangegeven welke gevelopeningen 30 minuten brandwerend uitgevoerd dienen te worden.

De binnenhoeken in het gebouw dienen brandwerend uitgevoerd ter voorkoming van brandoverslag. Er geldt:

- 30 minuten WBDBO over een lengte van 2.45 meter in een binnenhoek tussen een brandcompartiment en een extra beschermde vluchtroute;
- 60 minuten WBDBO over een lengte van minimaal 4.00 meter, (eerste meter 60 minuten WBDBO daarna 3 meter 30 minuten WBDBO) in een binnenhoek tussen brandcompartimenten.

## Afdeling 2.11 Verdere beperking van uitbreiding van brand en beperking van verspreiding van rook.

Een te bouwen bouwwerk is zodanig dat de uitbreiding van brand in verdergaande mate wordt beperkt en dat veilig kan worden gevlucht.

| Art.  | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.92  | <p><i>Ligging</i></p> <p>Een brandcompartiment van een woongebouw, winkelfunctie is ingedeeld in een of meer subbrandcompartimenten of verkeersruimten waardoor een beschermde vluchtroute voert.</p> <p>Een beschermde vluchtroute ligt niet in een subbrandcompartiment.</p> <p>In afwijking van het eerste lid kan een verblijfsgebied voor bewaking van een woongebouw, winkelfunctie buiten een subbrandcompartiment liggen, indien de constructie-onderdelen in dat gebied voldoen aan brandklasse B en de aankleding in dat gebied voldoet aan de eisen voor een beschermde vluchtroute volgens art. 7.4.</p> <p>Een verblijfsgebied ligt in een beschermd subbrandcompartiment.</p> |
| 2.93  | <p><i>Omvang</i></p> <p>Een beschermd subbrandcompartiment van een andere woonfunctie heeft een GO van maximaal 500 m<sup>2</sup>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 2.94  | <p><i>Weerstand tegen branddoorslag en brandoverslag en rookdoorgang</i></p> <p>De WBDBO van een subbrandcompartiment naar een andere ruimte in hetzelfde brandcompartiment is ten minste 20 minuten, waarbij alleen het criterium vlamdichtheid met betrekking op afdichting wordt gehanteerd.</p> <p>De WBDBO van een beschermd subbrandcompartiment naar een andere ruimte in hetzelfde brandcompartiment is ten minste 30 minuten.</p> <p>Bij ministeriele regeling kunnen voorschriften worden gegeven over de rookdoorgang van een al dan niet beschermd subbrandcompartiment naar een andere ruimte.</p>                                                                             |
| 2.94a | <p><i>Weerstand tegen rookdoorgang: subbrandcompartiment</i></p> <p>De WRD van een subbrandcompartiment naar een ander subbrandcompartiment is Ra.</p> <p>De WRD van een subbrandcompartiment naar een besloten ruimte waardoor een beschermde vluchtroute voert, is Ra.</p> <p>De WRD van een subbrandcompartiment naar een beschermd subbrandcompartiment, gelegen in een ander subbrandcompartiment, is R200.</p> <p>De WRD van een subbrandcompartiment naar een besloten ruimte waardoor een extra beschermde vluchtroute voert en naar een liftschacht als bedoeld in artikel 2.84, eerste lid, is R200.</p>                                                                          |
| 2.94b | <p><i>Weerstand tegen rookdoorgang: beschermd subbrandcompartiment</i></p> <p>De WRD van een beschermd subbrandcompartiment naar een ander beschermd subbrandcompartiment is R200.</p> <p>De WRD van een beschermd subbrandcompartiment naar een subbrandcompartiment is Ra.</p> <p>De WRD van een beschermd subbrandcompartiment naar een besloten ruimte waardoor een (extra) beschermde vluchtroute voert is R200.</p>                                                                                                                                                                                                                                                                   |

#### *Voorzieningen*

Met de in afdeling 2.10 omschreven maatregelen wordt aan de eisen voldaan.

Om rookdoorslag door luchtkanalen van ventilatiesystemen in het appartementencomplex te voorkomen worden in de kanalen motorgestuurde rookkleppen toegepast welke aangesloten zijn op de rookmelder van de woning.

## Afdeling 2.12 Vluchtroutes

Een te bouwen bouwwerk heeft zodanige vluchtroutes dat bij brand een veilige plaats kan worden bereikt.

| Art.  | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.102 | <p><i>Vluchtroute</i></p> <p>Op elk punt van een voor personen bestemde vloer begint een vluchtroute die leidt naar het aansluitende terrein en vandaar naar de openbare weg.</p> <p>De gecorrigeerde loopafstand tussen een punt in een gebruiksgebied en ten minste een uitgang van het subbrandcompartiment is niet groter dan 30 m.</p> <p>In afwijking van het bovenstaande wordt bij een niet nader in te delen gebruiksgebied en bij een verblijfsruimte in plaats van de gecorrigeerde loopafstand uitgegaan van een maximaal toelaatbare loopafstand van 30 m.</p> <p>In afwijking van lid 4 en 5 geldt bij een bezetting van minder dan 1 persoon per 12 m<sup>2</sup> GO van het subbrandcompartiment een waarde van maximaal 45 m.</p> <p>In afwijking van lid 4 en 5 geldt bij een bezetting van minder dan 1 persoon per 30 m<sup>2</sup> GO van het subbrandcompartiment een waarde van maximaal 60 m.</p> <p>Op elk punt van een voor personen bestemde vloer van een winkelfunctie in een subbrandcompartiment begint ten minste een vluchtroute met een op die vluchtroute te overbruggen hoogteverschil naar een uitgang van het subbrandcompartiment van maximaal 4 m.</p> <p>Een subbrandcompartiment of daarin gelegen ruimte in een winkelfunctie bestemd voor meer dan 150 personen, heeft ten minste twee uitgangen waardoor een vluchtroute loopt. De onderlinge afstand tussen de uitgangen is minimaal 5 m.</p> |
| 2.103 | <p><i>Beschermde vluchtroute</i></p> <p>Een vluchtroute waarop maximaal 37 personen zijn aangewezen is vanaf de uitgang van het subbrandcompartiment waarin de vluchtroute begint in een winkelfunctie een beschermde vluchtroute, tenzij die uitgang direct grenst aan het aansluitende terrein.</p> <p>De loopafstand door een besloten ruimte waardoor een beschermde vluchtroute voert is vanaf de uitgang van een subbrandcompartiment tot de volgende uitgang op de vluchtroute niet groter dan 30 meter. Dit geldt niet voor zo ver de vluchtroute door een trappenhuis voert.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 2.104 | <p><i>Extra beschermde vluchtroute</i></p> <p>Een vluchtroute is vanaf de uitgang van het brandcompartiment waarin de vluchtroute begint in een woongebouw een extra beschermde vluchtroute, tenzij die uitgang direct grenst aan het aansluitende terrein.</p> <p>Een extra beschermde vluchtroute voert niet langs een beweegbaar constructie-onderdeel van een andere woonfunctie dan de woonfunctie waarin de vluchtroute begint. Dit geldt niet bij de toegang van een woonfunctie die recht tegenover de toegang ligt van de woonfunctie waarin de vluchtroute begint.</p> <p>Een extra beschermde vluchtroute voert niet door een trappenhuis.</p> <p>De vluchtroute mag wel door een trappenhuis of langs een beweegbaar constructie-onderdeel van een andere woonfunctie voeren als:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

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|       | <ul style="list-style-type: none"> <li>- de uitgangen van de op die route aangewezen woonfuncties direct grenzen aan het trappenhuis, en;</li> <li>- op die route uitsluitend woonfuncties of nevenfuncties daarvan zijn aangewezen, en;</li> <li>- de uitgang van het trappenhuis direct grenst aan het aansluitende terrein, en;</li> <li>- er wordt voldaan aan één van de volgende voorwaarden: <ul style="list-style-type: none"> <li>- niet meer dan 6 woonfuncties en nevengebruiksfuncties daarvan voor personen bereikbaar zijn door het trappenhuis, en;</li> <li>- geen vloer van een verblijfsgebied ligt hoger dan 6 m boven het meetniveau.</li> </ul> </li> </ul> <p>of:</p> <ul style="list-style-type: none"> <li>- het totale GO van die woonfuncties en nevengebruiksfuncties daarvan die voor personen bereikbaar zijn door het trappenhuis is maximaal 800 m<sup>2</sup>, en;</li> <li>- geen vloer van een verblijfsgebied ligt hoger dan 12.5 m boven het meetniveau, en;</li> <li>- geen van de woonfuncties heeft een GO van meer dan 150 m<sup>2</sup>.</li> </ul> <p>Een vluchtroute waarop 38 -150 personen zijn aangewezen, is vanaf de uitgang van een subbrandcompartiment waarin de vluchtroute begint in een winkelfunctie een extra beschermde vluchtroute, tenzij die uitgang direct grenst aan het aansluitende terrein.</p> <p>De loopafstand door een besloten ruimte waardoor een extra beschermde vluchtroute voert is vanaf de uitgang van het subbrandcompartiment waarin de vluchtroute begint tot het punt waar een tweede vluchtroute, of een veiligheidsvluchtroute, of het aansluitende terrein maximaal:</p> <ul style="list-style-type: none"> <li>- 30 m voor een winkelfunctie;</li> </ul> <p>Een vluchtroute in een trappenhuis waarin een hoogteverschil van meer dan 8 meter wordt overbrugd is een extra beschermde vluchtroute.</p> |
| 2.105 | <p><b>Veiligheidsvluchtroute</b></p> <p>Een vluchtroute van een winkelfunctie waarop meer dan 150 personen zijn aangewezen is vanaf de uitgang van het subbrandcompartiment waarin de vluchtroute begint een veiligheidsvluchtroute, tenzij die uitgang direct grenst aan het aansluitende terrein.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 2.106 | <p><b>Tweede vluchtroute</b></p> <p>Indien op een vluchtroute een tweede vluchtroute begint zijn de artikelen 2.103, 2.104 en 2.105 niet van toepassing vanaf het punt dat de beide vluchtroutes door verschillende ruimten voeren.</p> <p>Buiten het brandcompartiment waarin de bovengenoemde tweede vluchtroute begint, voeren de twee vluchtroutes niet door eenzelfde brandcompartiment.</p> <p>In afwijking van bovengenoemde eis, kunnen de twee vluchtroutes vanaf de uitgang van het subbrandcompartiment waarin de eerste vluchtroute begint wel door dezelfde ruimte voeren als:</p> <ul style="list-style-type: none"> <li>- die ruimte aan de uitgang van het subbrandcompartiment grenst;</li> <li>- de vluchtroutes in die ruimte beschermde vluchtroutes en voor zover buiten een brandcompartiment extra beschermde vluchtroutes zijn;</li> <li>- de loopafstand in die ruimte maximaal 30 m indien de ruimte besloten is, en;</li> <li>- de vluchtroutes in verschillende richtingen voeren.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

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|        | <p>Twee vluchtroutes van een woonfunctie kunnen door dezelfde ruimte voeren voor zover de vluchtroute een veiligheidsvluchtroute is.</p> <p>Deze veiligheidsvluchtroute voert uitsluitend door een trappenhuis.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 2.107  | <p><i>Inrichting vluchtroute</i></p> <p>De WBDBO tussen twee onafhankelijke vluchtroutes is ten minste 30 minuten.</p> <p>De permanente vuurlast van een trappenhuis waardoor een (extra) beschermde vluchtroute voert, bedraagt met inbegrip van de vanuit dat trappenhuis direct bereikbare ruimten maximaal 3500 MJ per bouwlaag. Indien de WBDBO naar deze ruimte minimaal 30 minuten bedraagt blijft deze ruimte hierbij buiten beschouwing. Bij de in rekening te brengen vuurlast van de dakconstructie op de bovenste bouwlaag van het trappenhuis waardoor geen veiligheidsvluchtroute voert, wordt een reductie van 50% toegepast. Dit geldt niet voor een trappenhuis als bedoeld in art. 2.104 lid 4.</p> <p>De permanente vuurlast van een besloten ruimte waardoor een veiligheidsvluchtroute voert, met inbegrip van de vanuit die ruimte direct bereikbare besloten ruimten, bedraagt maximaal 3500 MJ per bouwlaag. Indien de WBDBO naar deze ruimte minimaal 30 minuten bedraagt blijft deze ruimte hierbij buiten beschouwing.</p> <p>Een besloten trappenhuis waarin een hoogte van meer dan 20 m wordt overbrugd, wordt in de vluchtrichting uitsluitend bereikt door een afzonderlijke beschermde vluchtroute met een looplengte van ten minste 2 m.</p> <p>Een uitgang van een woonfunctie grenst niet aan deze afzonderlijke beschermde vluchtroute.</p> <p>Vrije doorgang vluchtroute, voor zover deze niet over een trap voert:</p> <ul style="list-style-type: none"> <li>- breedte vluchtroute <math>\geq 0.85</math> m;</li> <li>- hoogte <math>\geq 2.3</math> m.</li> </ul> <p>Indien op een trap meer dan 600 m<sup>2</sup> verblijfsgebied is aangewezen heeft de trap een breedte van minimaal 1.2 m.</p> <p>Een niet besloten ruimte waardoor een vluchtroute voert heeft voldoende afvoer van rook en warmte en toevoer van verse lucht dat die ruimte gedurende langere tijd gebruikt kan worden om te vluchten en het uitvoeren van reddings- en bluswerkzaamheden.</p> |
| 2.107a | <p><i>Inrichting vluchtroute: weerstand tegen rookdoorgang</i></p> <p>De weerstand tegen rookdoorgang van een besloten ruimte waardoor een beschermde vluchtroute voert naar een in de vluchtrichting aansluitende besloten ruimte waardoor een beschermde vluchtroute voert is <math>R_a</math>.</p> <p>De weerstand tegen rookdoorgang van een besloten ruimte waardoor een beschermde vluchtroute voert naar een in de vluchtrichting aansluitende besloten ruimte waardoor een extra beschermde vluchtroute voert is <math>R_{200}</math>.</p> <p>De weerstand tegen rookdoorgang van een besloten ruimte waardoor een extra beschermde vluchtroute voert naar een in de vluchtrichting aansluitende besloten ruimte waardoor een beschermde of extra beschermde vluchtroute voert is <math>R_a</math>.</p> <p>De weerstand tegen rookdoorgang van een besloten ruimte waardoor een extra beschermde vluchtroute voert naar een in de vluchtrichting aansluitend besloten trappenhuis waardoor een extra beschermde vluchtroute voert is <math>R_{200}</math>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

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| 2.108 | <p><i>Capaciteit van een vluchtroute</i></p> <p>De doorstroomcapaciteit van een gedeelte van een vluchtroute van een winkelfunctie uitgedrukt in personen, is tenminste het aantal personen dat op dat gedeelte is aangewezen. Bij de bepaling van de doorstroomcapaciteit wordt uitgegaan van:</p> <ul style="list-style-type: none"> <li>a 45 personen per meter breedte van een trap hoger dan 1 meter en 90 personen per meter vrije breedte bij een trap tot 1 meter (aantrede <math>\geq 0.17</math> m);</li> <li>b 90 personen per meter vrije breedte van een ruimte;</li> <li>c 90 personen per meter vrije breedte van een doorgang, indien zich in de doorgang een dubbele deur of vergelijkbaar beweegbaar constructieonderdeel bevindt (maximale openingshoek <math>&lt; 135^\circ</math>);</li> <li>d 110 personen per meter vrije breedte van een doorgang, indien zich in de doorgang een enkele deur of vergelijkbaar beweegbaar constructieonderdeel bevindt (maximale openingshoek <math>&lt; 135^\circ</math>), en</li> <li>e 135 personen per meter vrije breedte van een andere doorgang.</li> </ul> <p>De doorstroomcapaciteit van een gedeelte van een vluchtroute van een winkelfunctie uitgedrukt in personen, is tenminste het aantal personen dat op dat gedeelte is aangewezen.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 2.108 | <p><i>Doorstroomcapaciteit bij opvangcapaciteit</i></p> <p>Op een gedeelte van een vluchtroute van een winkelfunctie gelegen buiten het subbrandcompartiment waarin de vluchtroute begint, kan van artikel 2.108 worden afgeweken als de personen die zijn aangewezen op dat gedeelte en eventueel daarop volgende gedeelten van de vluchtroute het aansluitende terrein kunnen bereiken binnen:</p> <ul style="list-style-type: none"> <li>a 30 minuten als dat gedeelte van de vluchtroute een veiligheidsvluchtroute is;</li> <li>b 20 minuten als dat gedeelte van de vluchtroute een extra beschermde vluchtroute is die in de vluchtrichting alleen wordt bereikt door een afzonderlijke ruimte waardoor een beschermde of extra beschermde vluchtroute voert met een lengte van ten minste 2 m; of</li> <li>c 15 minuten als dat gedeelte van de vluchtroute een andere vluchtroute is.</li> </ul> <p>De opvang- en doorstroomcapaciteit van de in het eerste lid bedoelde gedeelten van de vluchtroute is zodanig dat het bedreigde subbrandcompartiment waarin een vluchtroute begint binnen 1 minuut na aanvang van het vluchten kan worden verlaten.</p> <p>De opvang- en doorstroomcapaciteit van de in het eerste lid bedoelde gedeelten van de vluchtroute is zodanig dat elke ruimte, maar geen trappenhuis, op dezelfde bouwlaag als het bedreigde subbrandcompartiment:</p> <ul style="list-style-type: none"> <li>a binnen 3,5 minuten na aanvang van het vluchten kan worden verlaten; of</li> <li>b binnen 6 minuten als: <ul style="list-style-type: none"> <li>de WBDBO naar deze ruimte vanuit het bedreigde subbrandcompartiment ten minste 30 minuten is; en</li> <li>de WRD naar deze ruimte vanuit het bedreigde subbrandcompartiment, of vanuit elke ruimte waardoor een beschermde of extra beschermde vluchtroute voert die in de vluchtrichting uitkomt in deze ruimte, R200 is.</li> </ul> </li> </ul> <p>Bij toepassing van het eerste tot en met derde lid gelden de volgende uitgangspunten:</p> <ul style="list-style-type: none"> <li>a berekeningen worden uitgevoerd in tijdstappen van 30 seconden;</li> </ul> |

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|  | <p>b bij het begin van het vluchten wordt aangenomen dat alle personen in het subbrandcompartiment zich nabij de uitgangen van dat compartiment bevinden en tegelijkertijd beginnen te vluchten;</p> <p>c vluchtroutes worden tijdens het vluchten alleen in een richting benut;</p> <p>d door doorgangen en over trappen voeren de vluchtroutes niet in tegenovergestelde richting;</p> <p>e bij samenkomende vluchtroutes wordt de beschikbare doorstroom- en opvangcapaciteit op de volgende wijze verdeeld:<br/>         bij samenkomst in een trappenhuis wordt 50% van de beschikbare capaciteit toegedeeld aan het bovengelegen deel van het trappenhuis. De resterende 50% wordt verdeeld over de doorstroomcapaciteit van de toegangen op die bouwlaag tot het trappenhuis;<br/>         bij samenkomst in een ruimte, maar geen trappenhuis, wordt de capaciteit evenredig verdeeld over de doorstroomcapaciteit van de toegangen tot die ruimte; en<br/>         als de beschikbare opvang- en doorstroomcapaciteit van de ruimte vanuit een of meer toegangen van die ruimte of het bovengelegen deel van het trappenhuis niet volledig wordt benut, wordt de restcapaciteit op de onder 1° en 2° beschreven wijze verdeeld over de resterende toegangen en het bovengelegen deel van het trappenhuis;</p> <p>f het hoogteverschil tussen bouwlagen in het trappenhuis is ten minste 2.1 m en ten hoogste 4 m;</p> <p>g de daalsnelheid is 30 seconden per bouwlaag voor zover de vluchtroute over een trap of door een trappenhuis voert;</p> <p>h de opvangcapaciteit van een trap is 0.5 persoon per trede (breedte trap maximaal 1.1 m);</p> <p>i de opvangcapaciteit van een trap is 0.9 persoon per trede per m breedte van die trede (breedte trap &gt; 1.1 m en breedte tredevlak &gt; 0.17 m);</p> <p>j de opvangcapaciteit van een vloer of hellingbaan is ten hoogste 4 personen per m<sup>2</sup> vrije vloeroppervlakte;</p> <p>k het gestelde in artikel 2.108, waarbij voor «personen» wordt gelezen: personen per minuut;</p> <p>l het gestelde in artikel 6.25, derde lid, waarbij voor «37 personen» wordt gelezen: 37 personen per minuut;</p> <p>m in afwijking van onderdeel I geldt het gestelde in artikel 6.25, derde lid, onverkort als in de ruimte voor de deur tijdens een tijdstap meer dan 37 personen aanwezig zijn;</p> <p>n brand ontstaat niet op twee of meer plaatsen tegelijk;</p> <p>o in ieder subbrandcompartiment kan brand ontstaan; en</p> <p>p de opvang- en doorstroomcapaciteit van vluchtroutes die door het bedreigde subbrandcompartiment voeren blijven buiten beschouwing.</p> |
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### *Voorzieningen*

Elke woning heeft twee onafhankelijke vluchtroutes. Geconcludeerd kan worden dat aan de gestelde eisen wordt voldaan.

Aangetekend wordt dat de vluchtroutes voor de woningtype H (appartementen A 1.14, A 2.32 en A 3.50) langs de woningentreedeur voert van woningtype G (appartementen A 1.15, A 2.33 en A 3.51). Dit is in principe niet toegestaan. In onderhavige situatie is een gelijkwaardige mate van veiligheid gerealiseerd door de woningentreedeur van woningtype G (appartementen A 1.15, A 2.33 en A 3.51) aan te sluiten op een vrijloophdrager die is gekoppeld aan de rookmelder (conform NEN 2555) in de woning. Tevens wordt de gevel, inclusief gevelopeningen, van woningtypen G (appartementen A 1.15, A 2.33 en A 3.51) en F (appartementen S 1.16, S 2.34 en S 3.52) 60 minuten brandwerend uitgevoerd aan de galerijzijde. Met deze maatregel wordt een voldoende veilige situatie gerealiseerd.

Voor de winkelfunctie wordt aan de eisen voldaan.

### Afdeling 2.13 Hulpverlening bij brand

Een te bouwen bouwwerk is zodanig dat hulpverlening binnen redelijke tijd personen kan redden en brand kan bestrijden.

| Art.  | Eis                                                                                                                                                                                                                                                                                                                                                                    |
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| 2.120 | <p><b>Brandweerlift</b></p> <p>Vanaf een lifttoegang van een brandweerlift is vanaf een verdieping de lifttoegang op de verdieping daarboven bereikbaar via een extra beschermde vluchtroute.</p> <p>Een uitgang van een woonfunctie grenst niet aan deze extra beschermde vluchtroute voor zo ver die voert door een ruimte die direct grenst aan de lifttoegang.</p> |
| 2.121 | <p><b>Loopafstand</b></p> <p>De loopafstand tussen een punt in een gebruiksgebied en ten minste een toegang van een trappenhuis is niet groter dan 75 m.</p> <p>De loopafstand tussen een punt in een gebruiksgebied en ten minste een toegang van een brandweerlift is niet groter dan 120 m.</p>                                                                     |

#### Voorzieningen

Vanwege de hoogte van het gebouw is een brandweerlift niet vereist. Geconcludeerd kan worden dat aan de gestelde eisen wordt voldaan.

### 3. GEZONDHEID

#### Afdeling 3.2 Bescherming tegen geluid van installaties

Een te bouwen bouwwerk biedt bescherming tegen geluid van installaties.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| 3.8  | <p><i>Aangrenzend perceel</i></p> <p>Het karakteristiek installatiegeluidsniveau <math>L_{i,A,k}</math> ten gevolge van een toilet, kraan, mechanisch ventilatiesysteem, warmwatertoestel, installatie voor verhoging van waterdruk of lift in een op een aangrenzend perceel gelegen verblijfsgebied bedraagt maximaal 30 dB. Dit geldt niet voor een op een aangrenzend perceel gelegen lichte industriefunctie of overige gebruiksfunctie.</p> <p>De buitenunit van een installatie voor warmte- of koudeopwekking van een woonfunctie veroorzaakt op de perceelgrens met een perceel voor een andere woonfunctie een geluidsniveau van ten hoogste 40 dB.</p>                                                                                                                                                                                                                                                                                                                  |
| 3.9  | <p><i>Zelfde perceel</i></p> <p>Het karakteristiek installatiegeluidsniveau <math>L_{i,A,k}</math> ten gevolge van een toilet, kraan, mechanische voorziening voor luchtverversing, warmwatertoestel, installatie voor verhoging van waterdruk of lift in een niet-gemeenschappelijke verblijfsruimte van een aangrenzende woonfunctie op hetzelfde perceel bedraagt maximaal 30 dB.</p> <p>Het karakteristiek installatiegeluidsniveau <math>L_{i,A,k}</math> ten gevolge van een mechanische voorziening voor luchtverversing, warmteopwekking of warmteterugwinning in een niet-gemeenschappelijke verblijfsruimte van de gebruiksfunctie bedraagt maximaal 30 dB.</p> <p>De buitenunit van een installatie voor warmte- of koudeopwekking van een woonfunctie veroorzaakt ter plaatse van een te openen raam of deur van een niet-gemeenschappelijk verblijfsgebied van een aangrenzende op hetzelfde perceel gelegen woonfunctie een geluidsniveau van ten hoogste 40 dB.</p> |

#### Voorzieningen

Met de aangegeven voorzieningen wordt in principe aan de in het Bouwbesluit gestelde eisen voldaan.

Hierbij worden de volgende kanttekeningen geplaatst:

- toiletputten dienen trillingsisolerend te zijn bevestigd aan de bouwkundige constructie. De afvoerleidingen van het toilet dienen trillingsisolerend door de schachtwand gevoerd te worden;
- leidingen dienen met de trillingsisolerende bevestigingsmiddelen op bouwkundige constructies met een massa van ten minste 400 kg/m<sup>2</sup> te worden bevestigd;
- scheidingsconstructies tussen verblijfsruimten en leidingschachten bestaan uit 70 mm Gibo GZ (massa minimaal 75 kg/m<sup>2</sup>). Deze constructie dient akoestisch ontkoppeld van het plafond te zijn;
- scheidingsconstructies tussen verblijfsruimten en natte cellen bestaan uit 100 mm Gibo Hydro (massa minimaal 50 kg/m<sup>2</sup>, akoestisch ontkoppeld van de draagconstructie). Opgemerkt wordt

dat op een aantal plekken 70 mm is ingetekend. Dit is niet mogelijk wanneer de douche / wastafel aan de wand grenst;

- de ventilatie-unit voor woningtypen J1 en J4 zijn in een technische ruimte geplaatst. De deur van deze technische ruimte grenst direct aan een verblijfsruimte:
  - de wand tussen de verblijfsruimte en de technische ruimte bestaat uit 70 mm Gibo GN (massa ten minste 75 kg/m<sup>2</sup>);
  - toepassing van een verzwaarde deur tussen de technische ruimte en de verblijfsruimte met een laboratorium geluidsisolatiewaarde van het deurblad  $R_{w,p} \geq 36$  dB, bijvoorbeeld een Svedex-deur of Berkvens-deur met 3-laags spaanvulling o.g.. Toepassing van een goede 3-zijdige kierdichting en een valdorpel;
  - ventilatie van de technische ruimte middels gebalanceerde ventilatie;
- de ventilatie-unit voor de overige woningtypen zijn in een technische ruimte geplaatst waar de deur van deze technische ruimte grenst aan een verkeersruimte:
  - wanden bestaan uit 70 mm Gibo GN (massa ten minste 50 kg/m<sup>2</sup>);
  - deuren van technische ruimte en verblijfsruimten zijn standaard honingraatdeuren met een laboratorium geluidsisolatiewaarde van de afgehangen deurset  $R_{w,p} \geq 17$  dB. Spleet aan de onderzijde maximaal 20 mm (in ingerichte situatie met vloerafwerking);
- bovengenoemde voorzieningen zijn mede gebaseerd op de ventilatievoorzieningen zoals toegepast in de BENG-berekeningen (met een geluidvermogen van ca. 50 dB(A)) en een kanaalontwerp met gladde kanalen, een kort leidingtraject, zo min mogelijk bochten en met flexibele slangen (of dempers). In een later dient de installateur aan te tonen dat aan de gestelde eisen wordt voldaan;
- de ventilatie-unit dient te worden gemonteerd op een steenachtige constructie met een minimale massa van 200 kg/m<sup>2</sup>, bijvoorbeeld op een woningscheidende wand of op de vloerconstructie;
- aan zowel de zuig- als de afblaaszijde van de ventilatie-unit dienen geluiddempers te worden geplaatst met een lengte van 1.0 meter;
- leidingschachten dienen op vloerniveau te worden dichtgestort (toepassing van mantelbuizen ten behoeve van akoestische onderbreking). De overgebleven stelruimte dient te worden dichtgezet met minerale wol;
- leidingen ten behoeve van vuilwater dienen te worden uitgevoerd in Dykastil of Geberit Silent-2B20 o.g.;
- wanden van liftschachten welke grenzen aan woningen dienen te worden opgebouwd uit minimaal 250 mm beton. Indien de liftschacht grenst aan een verblijfsruimte, dient een buigslappe voorzetwand in de woning gerealiseerd te worden (bijvoorbeeld vrijstaande metalstud wand met 75 mm minerale wol voorzien van een gipskartonplaat of Isover Calibel 85+10). Opgemerkt wordt dat deze nog niet overal binnen in de woningen is ingetekend. Ophanging van de lift niet aan de woningzijde.

In een later stadium dient door de installateur op basis van de geselecteerde installatie de geluidbelasting te worden berekend. Hierbij dient gewaarborgd te worden dat aan bovengenoemde eisen wordt voldaan.

Om geluidproductie van de liftinstallatie zelf te beperken dienen de volgende maatregelen te worden getroffen:

- indien metaalplaat wordt toegepast in de liftkooi, dient deze gedempt ("ontdreund") uitgevoerd te worden, voor zo ver directe aanstoting van de metaalplaat vanuit de kooi mogelijk is;
- de geleiding van de liftkooi en van het tegengewicht langs de geleiderails moet plaatsvinden met leidsloffen voorzien van kunststofvoering (of eventueel geleiderollen met rubber of kunststof loopvlak);
- de geleiderails moet nastelbaar worden uitgevoerd en nauwkeurig worden gesteld;
- voor het sluiten en vergrendelen van de schuifdeuren van de lift moet een systeem worden toegepast, dat geen overmatig geluid produceert. Het sluitsysteem van de deuren dient een geleidelijk snelheidsverloop te hebben.

### Afdeling 3.3 Beperking van galm

Een te bouwen woongebouw heeft in een gemeenschappelijke verkeersruimte een zodanige geluidsabsorptie, dat geluidhinder door galm wordt beperkt.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                      |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.13 | <p><i>Geluidsabsorptie</i></p> <p>Een besloten gemeenschappelijke verkeersruimte, voor het ontsluiten van een woonfunctie, die grenst aan een niet-gemeenschappelijke ruimte van een woonfunctie heeft een totale geluidsabsorptie, bepaald volgens NEN-EN 12354-6, die niet kleiner is dan 1/8 van de inhoud van die ruimte in de octaafbanden met middenfrequenties van 250, 500, 1000 en 2000 Hz.</p> |

#### Voorzieningen

Om aan bovengenoemde eis te voldoen is het noodzakelijk om geluidabsorberende voorzieningen in de trappenhuizen, gemeenschappelijke verkeersruimten en lifthallen aan te brengen. In bijlage 3 zijn de berekeningen opgenomen ter bepaling van de benodigde voorzieningen.

In de alle verkeersruimtes dient de helft van het plafond voorzien te worden van geluidsabsorberende voorzieningen zoals Ecophon Master M-40 mm o.g. De aangeven geluidsabsorberende maatregelen dienen redelijk gelijkmatig verdeeld over de diverse ruimten / verdiepingen te worden aangebracht.

### Afdeling 3.4 Geluidwering tussen ruimten

Een te bouwen bouwwerk biedt bescherming tegen geluidoverlast tussen gebruiksfuncties en tussen ruimten in een woonfunctie voor zover in het bouwwerk een woonfunctie ligt.

| Art.  | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.16  | <p><i>Ander perceel</i></p> <p>Het karakteristieke lucht-geluidniveauverschil (<math>D_{nT,A,k}</math>) voor de geluidsoverdracht van een besloten ruimte naar een aangrenzende gebruiksfunctie is minimaal:</p> <ul style="list-style-type: none"> <li>- 52 dB ter plaatse van een verblijfsgebied;</li> <li>- 47 dB ter plaatse van overige ruimten in een woonfunctie.</li> </ul> <p>Het gewogen contactgeluidniveau (<math>L_{nT,A}</math>) van een besloten ruimte naar een aangrenzende gebruiksfunctie is maximaal:</p> <ul style="list-style-type: none"> <li>- 54 dB tussen een woonfunctie en een verblijfsgebied van een woonfunctie;</li> <li>- 54 dB tussen een woonfunctie en een verblijfsgebied van een niet-woonfunctie;</li> <li>- 59 dB tussen een woonfunctie en een overige ruimten van een woonfunctie;</li> <li>- 59 dB tussen een niet-woonfunctie en een verblijfsgebied van een woonfunctie;</li> <li>- 64 dB tussen een niet-woonfunctie en een overige ruimten van een woonfunctie;</li> <li>- 59 dB tussen een niet-woonfunctie en een verblijfsgebied van een niet-woonfunctie.</li> </ul>                                                                                                                                          |
| 3.17  | <p><i>Hetzelfde perceel</i></p> <p>Het karakteristieke luchtgeluidniveauverschil (<math>D_{nT,A,k}</math>) voor de geluidsoverdracht van een besloten ruimte naar een aangrenzende woonfunctie is minimaal:</p> <ul style="list-style-type: none"> <li>- 52 dB ter plaatse van een verblijfsgebied;</li> <li>- 47 dB ter plaatse van overige ruimten.</li> </ul> <p>Het gewogen contactgeluidniveau (<math>L_{nT,A}</math>) van een besloten ruimte naar een aangrenzende woonfunctie is maximaal:</p> <ul style="list-style-type: none"> <li>- 54 dB tussen een woonfunctie en een verblijfsgebied van een woonfunctie;</li> <li>- 59 dB tussen een woonfunctie en een overige ruimten van een woonfunctie;</li> <li>- 59 dB tussen een niet-woonfunctie en een verblijfsgebied van een woonfunctie;</li> <li>- 64 dB tussen een niet-woonfunctie en een overige ruimten van een woonfunctie.</li> </ul> <p>Bovengenoemde eisen zijn niet van toepassing op de geluidsoverdracht bij een woonfunctie:</p> <ul style="list-style-type: none"> <li>- van een nevenfunctie naar die woonfunctie;</li> <li>- tussen gemeenschappelijke ruimten;</li> <li>- van een gemeenschappelijke verkeersruimte naar een niet in een verblijfsgebied gelegen ruimte.</li> </ul> |
| 3.17a | <p><i>Verblijfsruimten van dezelfde woonfunctie</i></p> <p>Het karakteristieke luchtgeluidniveauverschil <math>D_{nT,A,k}</math> van een verblijfsruimte naar een andere verblijfsruimte van dezelfde woonfunctie bedraagt minimaal 32 dB.</p> <p>Het gewogen contactgeluidniveau <math>L_{nT,A}</math> van een verblijfsruimte naar een andere verblijfsruimte van dezelfde woonfunctie bedraagt maximaal 79 dB.</p> <p>Deze eisen gelden niet indien de verblijfsruimten met elkaar in open verbinding staan, of indien de ene verblijfsruimte vanuit de andere rechtstreeks bereikbaar is door een deur.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

### Voorzieningen

Met de aangegeven voorzieningen wordt aan de gestelde eisen voldaan. Onderstaand is een overzicht gegeven van de belangrijkste toe te passen constructies:

- begane grondvloer: massa minimaal 250 kg/m<sup>2</sup> met oplegging naast de bouwmuur op akoestisch oplegmateriaal en vrijgehouden van de woningscheiding (onderbreking - ook ter plaatse van de dekvloer - met 5 mm foamband of 10 mm EPS). Plint loshouden van de vloer;
- verdiepingsvloeren: betonvloer (massa minimaal 400 kg/m<sup>2</sup>) met zwevende dekvloer ( $\Delta L_{lin} \geq 13$  dB, bijvoorbeeld met 20 mm WTH Variso Akoestisch, 25 mm Uponor isolatierol EPS 045 DES of Rockwool zwevende vloerplaat RockFloor Base (501);
- woningscheidende wanden: 250 mm beton (massa minimaal 525 kg/m<sup>2</sup>);
- dragende binnenspouwbladen en dragende binnenwanden massa minimaal 350 kg/m<sup>2</sup>, bijvoorbeeld met 214 mm kalkzandsteen of 150 mm beton;
- niet-dragende binnenwanden (massa < 350 kg/m<sup>2</sup>) dienen akoestisch ontkoppeld worden aangesloten op de bovenliggende vloer en woningscheidende wand;
- niet-dragende binnenspouwbladen uitvoeren als HSB-element (massa minimaal 20 kg/m<sup>2</sup>), of als steenachtige constructie welke akoestisch ontkoppeld is aangesloten op de bovenliggende vloer en woningscheidende wand;
- wanden tussen woning en gemeenschappelijke ruimte 250 mm beton (massa ten minste 575 kg/m<sup>2</sup>) voorzien van buigslappe voorzetwand;
- gevelelementen ter plaatse van de woningscheidende wand niet star koppelen en voorzien van minerale wol;
- de isolatie ter plaatse van woningscheidende vloer en wanden dient in minerale wol uitgevoerd te worden;
- schachten ten behoeve van woninginstallaties moeten op vloerniveau worden dichtgestort onder toepassing van mantelbuizen. De schachtwanden moeten worden uitgevoerd in minimaal 70 mm Gibo GZ (massa 75 kg/m<sup>2</sup>);
- platte daken: betonconstructie (massa minimaal 300 kg/m<sup>2</sup>);
- hellende daken:
  - boven de woningscheidende wand dient tussen de dakelementen minerale wol te worden aangebracht die de ruimte tussen de bovenzijde van de bouwmuur en de bovenzijde van de dakelementen vult;
  - wanneer een verblijfsruimte op de bovenste verdieping wordt gerealiseerd, dienen de dakelementen een akoestische prestatie van  $D_{nT,A,k} \geq 52$  dB te hebben;
  - de dakelementen dienen afgedicht m.b.v. gesloten-cellig voegband en een afdeklathet ter plaatse van de bouwmuren;
  - de panlatten dienen per woning ontkoppeld te worden;
  - eventueel plaatwerk dient per woning ontkoppeld te worden;
- tussen de woningentreedeur en de verblijfsruimten van woningtypen C, D1, E1, E2, E4, F1, F3, I1, I2, I4, J1 en J4 is een besloten gang aanwezig. Er kan aan de eisen worden voldaan met een verzwaarde woningentreedeur met zeer goede kierdichting en een laboratorium geluidsisolatiewaarde van de afgehangen deurset  $R_{w,p} \geq 38$  dB, bijvoorbeeld Reinaerdt Entrance RC3, Reinaerdt Entrance RC2 55 of Daloc S43 o.g..



De deur is rondom voorzien van een enkelvoudige kierdichting en met een knevelende 3-puntssluiting. De kierdichting aan de onderzijde van de deur vindt bij voorkeur plaats middels een vaste aanslag en kierdichting, maar kan ook worden gerealiseerd met een valdorpel. De inverting van de kierdichting bedraagt minimaal 4 mm. Een eventueel bovenlicht moet worden voorzien van glas met  $R_a \geq 42$  dB (oppervlak maximaal 0.5 m<sup>2</sup>).

De binnendeuren tussen de gang en de verblijfsruimten kunnen standaard opdekdeuren zijn. De spleet onder de deur dient maximaal 20 mm (in ingerichte situatie met vloerafwerking) te bedragen (in verband met de ventilatie-eisen);

Bij de realisatie dient voor de woningentreedeuren rekening gehouden te worden met de eisen ten aanzien van brandwerendheid (WBDBO  $\geq 30$  minuten, brandklasse B) en energiezuinigheid ( $U \leq 1.65$  W/m<sup>2</sup>K).

Voor binnenwanden dient het volgende in acht te worden genomen:

- inwendige scheidingsconstructies tussen verblijfsruimten onderling: 70 mm Gibo GZ (massa minimaal 75 kg/m<sup>2</sup>);
- naden wandaansluitingen zorgvuldig afdichten conform attest;
- eventuele doorvoeren vloerverwarmingsleidingen zorgvuldig afdichten;
- deuren in flankerende constructies zodanig afhangen dat de spleet aan de onderzijde kleiner is dan 20 mm (in ingerichte situatie met vloerafwerking) en de overige spleten kleiner zijn dan 5 mm;
- inbouwdozen van elektrische installaties in een betonwand één wanddikte verspringend ten opzichte van elkaar aanbrengen.

Aanvullend advies ten aanzien van de zwevende vloerconstructies:

- oneffenheden in de draagvloer mogen niet hoger zijn dan 0.3 maal de dikte van de verende laag in onbelaste toestand. Het aanbrengen van een uitvlaklaag kan wenselijk zijn;
- de platen van de verende laag moeten goed op elkaar en op de kantstroken aansluiten. De dynamische stijfheid van de verende laag mag maximaal 15 MN/m<sup>3</sup> bedragen;
- op de verende laag moet een waterdichte laag worden aangebracht (bijv. 0.2 mm folie). De stroken moeten waterdicht op elkaar en op de kantstroken aansluiten;
- binnenwanden moeten (bij voorkeur) worden geplaatst op de constructieve vloer. De dekvloer dient in dat geval een massa te bezitten van ten minste 85 kg/m<sup>2</sup> (anhydriet) resp. 125 kg/m<sup>2</sup> (zandcement). In overleg met de constructeur is een dunnere zandcementdekvloer mogelijk mits de massa ten minste 85 kg/m<sup>2</sup> bedraagt;
- bij plaatsing van wanden op een verend opgelegde dekvloer behoort de massa van de dekvloer ten minste 100 kg/m<sup>2</sup> te bedragen;
- kantstroken met een dikte van ten minste 5 mm en een dynamische stijfheid van minimaal 100 MN/m<sup>3</sup> moeten worden toegepast tussen de dekvloer en het opgaande werk. De kantstroken moeten minimaal 30 mm uitsteken boven de bovenzijde van de dekvloer. De kantstroken kunnen op de eventuele uitvlaklaag worden gesitueerd. De kantstroken moeten bij voorkeur in een zo laat mogelijk stadium worden afgesneden;

- vloerverwarmingsleidingen mogen in de dekvloer worden opgenomen, mits voorzieningen tegen opdrijven worden getroffen. Het is ook mogelijk de leidingen in de verende laag op te nemen (nauwkeurig uitsnijden). Over de leidingen en over de verende laag dan circa 100 mm aan weerszijden een dunne verende laag aanbrengen met een dynamische stijfheid van maximaal ca. 40 MN/m<sup>3</sup>;
- harde vloerafwerkingen (parket, tegels e.d.) mogen het opgaande werk niet raken (ca. 10 mm vrijhouden). Ook de plinten moeten worden vrijgehouden van de harde vloerafwerking;
- verankeringen voor balkons en kozijnen e.d. dienen niet op, maar in de constructieve vloer te worden aangebracht. Een alternatief is dat inkassingen in de constructieve vloer gerealiseerd worden, waarbij gewaarborgd wordt dat de verankeringen niet in contact met de dekvloer komen.

### Afdeling 3.5 Wering van vocht

Een te bouwen bouwwerk heeft zodanige scheidingsconstructies dat de vorming van allergenen door vocht in verblijfsgebieden, toiletruimten en badruimten voldoende wordt beperkt.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.21 | <p><i>Wering van vocht van buiten</i></p> <p>Een uitwendige constructie van een verblijfsgebied, een toiletruimte of een badruimte is waterdicht.</p> <p>Een scheidingconstructie tussen een verblijfsgebied, een toiletruimte of een badruimte, en een kruipruimte, inclusief de aansluitingen die van invloed zijn op het kunnen binnendringen van vocht, is waterdicht.</p> <p>Een inwendige scheidingsconstructie van een verblijfsgebied, een toiletruimte of een badruimte, voor zover deze niet grenst aan een ander verblijfsgebied, toiletruimte of badruimte, is waterdicht.</p> <p>Een scheidingconstructie tussen een verblijfsgebied, een toiletruimte of een badruimte, en een kruipruimte, inclusief de aansluitingen die van invloed zijn op de specifieke luchtvolumestroom naar het verblijfsgebied, de toiletruimte of de badruimte, heeft een specifieke luchtvolumestroom van maximaal <math>20 \times 10^{-6} \text{ m}^3/\text{m}^2\text{s}</math>.</p> |
| 3.22 | <p><i>Factor van de temperatuur</i></p> <p>De temperatuurfactor van een scheidingsconstructie waarvoor een eis voor de warmteweerstand geldt, is aan de zijde die grenst aan een verblijfsgebied minimaal gelijk aan 0.65 in een woonfunctie.</p> <p>De temperatuurfactor van een scheidingsconstructie waarvoor een eis voor de warmteweerstand geldt, is aan de zijde die grenst aan een verblijfsgebied minimaal gelijk aan 0.5 in een winkelfunctie.</p> <p>Deze eis geldt niet voor ramen, deuren, kozijnen en daarmee gelijk te stellen constructieonderdelen.</p>                                                                                                                                                                                                                                                                                                                                                                                                       |
| 3.23 | <p><i>Wateropname</i></p> <p>Een scheidingsconstructie van een toiletruimte of een badruimte heeft aan de zijde die grenst aan die ruimte tot 1.2 m hoogte boven de vloer van die ruimte een wateropname die gemiddeld niet groter is dan <math>0.01 \text{ kg}/(\text{m}^2\text{s}^{1/2})</math> en op geen enkele plaats groter dan <math>0.2 \text{ kg}/(\text{m}^2\text{s}^{1/2})</math>.</p> <p>Voor een badruimte gelden de in lid 1 genoemde waarden ter plaatse van een bad of een douche over een lengte van ten minste 3 m tot een hoogte van 2.1 m boven de vloer van die ruimte.</p>                                                                                                                                                                                                                                                                                                                                                                               |

#### Voorzieningen

Een uitwendige scheidingsconstructie dient voldoende waterdicht te zijn.

Op basis van de ter beschikking staande gegevens wordt verwacht dat bij de verdere planuitwerking aan de gestelde eisen zal worden voldaan. Het verdient daarbij aanbeveling om de constructies en hun onderlinge aansluitingen uit te voeren conform de voorbeelden in NPR 2652. Bij goede en correcte uitvoering zijn deze constructies dan waterdicht en regenwerend bij beproeving conform NEN 2778 en kan worden voldaan aan de eisen voor luchtdichtheid volgens NEN 2690.

Aandachtspunten bij de volgende fasen van het ontwerp zijn:

- tegelwerk aanbrengen op vloer en wanden van toilet- en badruimten tot een hoogte van 1.2 m boven de vloer;
- ter plaatse van een bad of douche dient tegelwerk tot een hoogte van 2.1 m te worden aangebracht over een lengte van minimaal 3 m;
- dampremmende laag en waterkerende laag op alle details aangeven;
- geprefabriceerde steenachtige constructies, zoals vloeren en balkons, dienen gedetailleerd en aangebracht te worden volgens het certificaat van de leverancier waarin is aangetoond dat aan de gestelde eisen ter beperking van koudebruggen is voldaan. Indien geen certificaten beschikbaar zijn, dient aannemelijk te worden gemaakt dat aan deze eisen is voldaan;
- ter plaatse van de hellende daken gelden de volgende aandachtspunten:
  - de hellende daken sluiten aan op de woningscheidende wand. Aan de binnenzijde van de daken dient een doorlopende dampremmende laag te worden aangebracht. Deze dampremmende laag dient boven de scheidingswand door te lopen;
  - boven de woningscheidende wand dient tussen de dakelementen (tussen klossen) isolatie te worden aangebracht. Op de isolatie dient een goot gerealiseerd te worden;
  - op de gootbodem dient een waterdichte laag te worden aangebracht, welke doorloopt tot onder de waterkerende slabbe van de dakelementen.

### Afdeling 3.6 Luchtverversing

Een te bouwen bouwwerk heeft zodanige voorziening voor luchtverversing dat het ontstaan van een voor de gezondheid nadelige kwaliteit van de binnenlucht wordt voorkomen.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| 3.29 | <p><i>Luchtverversing verblijfsgebied, verblijfsruimte, toiletruimte en badruimte</i></p> <p>Een verblijfsgebied van een woonfunctie heeft een capaciteit voor luchtverversing van ten minste 0.9 dm<sup>3</sup>/s per m<sup>2</sup> vloeroppervlakte met een minimum van 7 dm<sup>3</sup>/s.</p> <p>Een verblijfsruimte van een woonfunctie heeft een capaciteit voor luchtverversing van ten minste 0.7 dm<sup>3</sup>/s per m<sup>2</sup> vloeroppervlakte met een minimum van 7 dm<sup>3</sup>/s.</p> <p>Een verblijfsgebied en een verblijfsruimte heeft een voorziening voor luchtverversing met een capaciteit van ten minste:</p> <ul style="list-style-type: none"> <li>- 4 dm<sup>3</sup>/s per persoon voor een winkelfunctie;</li> </ul> <p>Een verblijfsruimte of een verblijfsgebied met een opstelplaats voor een kooktoestel heeft een voorziening voor luchtverversing met een capaciteit van ten minste 21 dm<sup>3</sup>/s.</p> <p>Een voorziening voor luchtverversing voor meer dan een verblijfsgebied heeft een capaciteit die niet kleiner is dan de hoogste waarde die geldt voor elk afzonderlijk verblijfsgebied. Tevens is deze capaciteit niet kleiner dan 70% van de som van de waarden die gelden voor de op die voorziening aangewezen verblijfsgebieden.</p> <p>Een toiletruimte heeft een voorziening voor luchtverversing met een capaciteit van ten minste 7 dm<sup>3</sup>/s, bepaald volgens NEN 1087.</p> <p>Een badruimte heeft een voorziening voor luchtverversing met een capaciteit van ten minste 14 dm<sup>3</sup>/s, bepaald volgens NEN 1087.</p> |
| 3.30 | <p><i>Thermisch comfort</i></p> <p>De toevoer van verse lucht veroorzaakt in de leefzone van een verblijfsgebied een luchtsnelheid die niet groter is dan 0.2 m/s.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 3.31 | <p><i>Regelbaarheid</i></p> <p>Een voorziening voor natuurlijke toevoer van verse lucht is regelbaar. De voorziening heeft de volgende standen:</p> <ul style="list-style-type: none"> <li>- laagste stand van ten hoogste 10% van de capaciteit;</li> <li>- hoogste stand van 100% van de capaciteit;</li> <li>- twee tussenliggende standen tussen de laagste stand en 30% van de capaciteit. Deze standen verschillen in capaciteit ten opzichte van de nulstand en onderling ten minste 10%.</li> </ul> <p>Een voorziening voor mechanische toevoer van verse lucht heeft een dichtstand en is regelbaar. De voorziening heeft de volgende standen:</p> <ul style="list-style-type: none"> <li>- laagste stand van ten hoogste 10% van de capaciteit;</li> <li>- hoogste stand van 100% van de capaciteit;</li> <li>- een tussenliggende stand tussen de laagste stand en 100% van de capaciteit.</li> </ul> <p>Een voorziening voor toevoer van verse lucht mag zelfregelend zijn in het regelgebied.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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| 3.32 | <p><i>Luchtverversing overige ruimten</i></p> <p>Een gemeenschappelijke verkeersruimte van een woonfunctie heeft een niet afsluitbare voorziening voor luchtverversing met een capaciteit ten minste 0.5 dm<sup>3</sup>/s per m<sup>2</sup>.</p> <p>Een ruimte met een opstelplaats voor een gasmeter heeft een niet afsluitbare voorziening voor luchtverversing met een capaciteit van ten minste 1 dm<sup>3</sup>/s per m<sup>2</sup> met een minimum van 2 dm<sup>3</sup>/s.</p> <p>Een liftschacht heeft een niet afsluitbare voorziening voor luchtverversing met een capaciteit van ten minste 3.2 dm<sup>3</sup>/s per m<sup>2</sup> vloeroppervlak van de schacht.</p> <p>Een opslagruimte voor huishoudelijk afval (&gt; 1.5 m<sup>2</sup>) heeft een niet afsluitbare voorziening voor luchtverversing met een capaciteit van ten minste 10 dm<sup>3</sup>/s per m<sup>2</sup>.</p>                                                                                                                                                                                                                                                                                                                                               |
| 3.33 | <p><i>Plaats van de opening</i></p> <p>De verdunningsfactor van de uitstoot van een afvoervoorziening voor luchtverversing heeft ter plaatse van de instroomopening voor de toevoer van verse lucht een waarde die niet groter is dan 0.01.</p> <p>De verdunningsfactor van de uitstoot van een afvoervoorziening voor rook bij gasgestookte toestellen heeft ter plaatse van de instroomopening voor de toevoer van verse lucht een waarde die niet groter is dan 0.01.</p> <p>De verdunningsfactor van de uitstoot van een afvoervoorziening voor rook bij niet-gasgestookte toestellen heeft ter plaatse van de instroomopening voor de toevoer van verse lucht een waarde die niet groter is dan 0.0015.</p> <p>Een instroomopening en een uitmonding van een voorziening voor luchtverversing liggen op een afstand van minimaal 2 m van de perceelgrens. Dit geldt niet ter plaatse van een dak. Voor zo ver de voorziening aan een openbaar gebied grenst, wordt die afstand aangehouden tot het hart van dat gebied.</p>                                                                                                                                                                                                             |
| 3.34 | <p><i>Luchtkwaliteit</i></p> <p>De toevoer van verse lucht naar een verblijfsgebied vindt rechtstreeks van buiten plaats. In afwijking hiervan mag ten hoogste 50% van de benodigde hoeveelheid van de toevoer van verse lucht naar een niet-gemeenschappelijk verblijfsgebied via een niet-gemeenschappelijk verblijfsgebied of niet-gemeenschappelijke verkeersruimte van dezelfde gebruiksfunctie worden aangevoerd.</p> <p>De toevoer van verse lucht naar en de afvoer van binnenlucht uit een gemeenschappelijke verkeersruimte vindt rechtstreeks van en naar buiten plaats.</p> <p>De toevoer van verse lucht naar en de afvoer van binnenlucht uit een liftschacht vindt rechtstreeks via de liftmachineruimte of rechtstreeks van en naar buiten plaats.</p> <p>De toevoer van verse lucht naar en de afvoer van binnenlucht uit een opslagruimte voor huishoudelijk afval vindt rechtstreeks van en naar buiten plaats.</p> <p>Minimaal 21 dm<sup>3</sup>/s van de afvoercapaciteit van een verblijfsruimte of verblijfsgebied met een opstelplaats voor een kooktoestel vindt rechtstreeks naar buiten plaats.</p> <p>De afvoer van binnenlucht uit een toiletruimte of een badruimte vindt rechtstreeks naar buiten plaats.</p> |

### *Voorzieningen*

De berekeningen ter bepaling van de minimaal vereiste toe- en afvoercapaciteiten en de benodigde voorzieningen zijn opgenomen in bijlage 4. De toevoer van verse lucht en afvoer van binnenlucht vindt plaats middels gebalanceerde ventilatie.

Aan de bepaling van de benodigde capaciteiten liggen de volgende uitgangspunten ten grondslag:

- toevoer van ventilatielucht vindt plaats middels mechanische toevoer in de verblijfsruimten;
- de afvoer van binnenlucht vindt plaats middels mechanische afzuiging in (ten minste) de keuken en de toilet- en badruimten;
- luchtstroming vindt plaats via verblijfsgebieden of verkeersruimten naar het verblijfsgebied met een kooktoestel en de overige ruimten met mechanische afzuiging;
- om deze luchtstroming mogelijk te maken, is onder de binnendeuren een spleet aanwezig met een hoogte van minimaal 20 mm (in ingerichte situatie met vloerafwerking).

Bij de realisatie dienen de volgende bepalingen in acht genomen te worden:

- ventilatievoorzieningen moeten zodanig zijn geconstrueerd en gemonteerd dat zij (van binnen uit) reinigbaar zijn. De voorzieningen moeten goed bereikbaar zijn voor onderhoud;
- het absorptiemateriaal in geluidgedempte ventilatievoorzieningen moet verwisselbaar zijn;
- de bediening van de ventilatievoorzieningen moet goed bereikbaar zijn, bij voorkeur op een hoogte van 1.05 m boven de vloer;
- de aannemer dient de onderhoudsvoorschriften van de ventilatievoorzieningen ter hand te stellen aan de opdrachtgever.

De verdeling van de afvoercapaciteiten binnen de woningen dient in overleg met de W-adviseur plaats te vinden. Daarbij dient de afzuigcapaciteit in het verblijfsgebied met een opstelplaats voor het kooktoestel minimaal 21.0 dm<sup>3</sup>/s te bedragen, in de badruimte minimaal 14.0 dm<sup>3</sup>/s en in de toiletruimte minimaal 7.0 dm<sup>3</sup>/s. Geadviseerd wordt om in de bergingen met opstelplaatsen voor was- en droogmachines tevens ten minste 7.0 dm<sup>3</sup>/s af te zuigen. Hier is in de berekeningen rekening mee gehouden.

De luchtverversing van de commerciële ruimte is gebaseerd op 23 personen waarbij per persoon een capaciteit wordt aangehouden van 4.0 dm<sup>3</sup>/s. Hieruit volgt een totale toevoercapaciteit voor de commerciële ruimte van 325 m<sup>3</sup>/h.

De gemeenschappelijke verkeersruimten, fietsenberging en technische ruimten worden voorzien van natuurlijke toevoer en mechanische afvoer. Voor de luchtverversing van deze ruimten wordt een capaciteit van ten minste 0.5 dm<sup>3</sup>/s per m<sup>2</sup> vloeroppervlak aangehouden. Voor liftschachten dient rekening te worden gehouden met ten minste 3.2 dm<sup>3</sup>/s per m<sup>2</sup> vloeroppervlak.

### Afdeling 3.7 Spuivoorziening

Een te bouwen bouwwerk heeft een voorziening voor het zo nodig snel kunnen afvoeren van verontreinigde binnenlucht.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.42 | <p><i>Capaciteit</i></p> <p>Een verblijfsgebied van een woongebouw heeft in een uitwendige scheidingsconstructie beweegbare constructieonderdelen met een spuicapaciteit van ten minste 6 dm<sup>3</sup>/s per m<sup>2</sup>.</p> <p>Een verblijfsruimte van een woongebouw heeft in een uitwendige scheidingsconstructie beweegbare constructieonderdelen met een spuicapaciteit van ten minste 3 dm<sup>3</sup>/s per m<sup>2</sup>. Ten minste een van die onderdelen is een raam.</p> |
| 3.43 | <p><i>Plaats van de opening</i></p> <p>Een opening van een spuivoorziening ligt op een afstand van ten minste 2 m van de perceelgrens of het hart van het openbaar gebied.</p>                                                                                                                                                                                                                                                                                                            |

#### Voorzieningen

Ten behoeve van de spuiventilatie moet in de gevel van elke verblijfsruimte een te openen deel aanwezig zijn. Met de op tekening aangegeven bewegende delen wordt voldaan aan de vereiste capaciteiten.



### Afdeling 3.11 Daglicht

Een te bouwen bouwwerk is zodanig dat daglicht in voldoende mate kan toetreden.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.75 | <p><i>Daglichtoppervlakte</i></p> <p>Een verblijfsgebied heeft een equivalente daglichtoppervlakte van minimaal:</p> <ul style="list-style-type: none"> <li>- 10% van de vloeroppervlakte van het verblijfsgebied van een woonfunctie;</li> </ul> <p>Een verblijfsruimte van een woongebouw heeft een equivalente daglichtoppervlakte van minimaal 0.5 m<sup>2</sup>.</p> <p>Bij de berekening blijven belemmeringen op andere percelen buiten beschouwing, blijven daglichtopeningen op minder dan 2 meter van de perceelsgrens buiten beschouwing en is de in rekening te brengen belemmeringshoek ten minste 20°.</p> |

#### Voorzieningen

Op de in bijlage 4 opgenomen rekenbladen is per woningtype aangegeven hoeveel equivalent daglichtoppervlak per verblijfsgebied en verblijfsruimte wordt gerealiseerd. Op basis van de uitgevoerde berekeningen kan worden geconcludeerd dat wordt voldaan aan de gestelde eisen.

Bij het uitvoeren van de berekeningen is gebruik gemaakt van de krijtstreepmethode. Hierbij worden oppervlaktes van verblijfsgebieden gereduceerd. Deze reductie is niet van toepassing op de luchtverversingseisen. Daar waar noodzakelijk wordt tevens de oppervlakte van het verblijfsgebied vergroot (toevoeging verblijfsgebied).

Na toepassing van de krijtstreepmethode wordt nog steeds voldaan aan de eis dat ten minste 55% van de gebruiksoppervlakte moet zijn aangemerkt als verblijfsgebied.

In onderstaande tabel is aangegeven welke reducties (en eventueel toevoegingen) hebben plaatsgevonden. De uitgevoerde reducties (en eventuele toevoegingen) dienen duidelijk te worden aangegeven op de indienings- en eventuele verkooptekeningen.

| TABEL - SAMENVATTING KRIJTSSTREEPMETHODE |                 |                               |                                  |                              |
|------------------------------------------|-----------------|-------------------------------|----------------------------------|------------------------------|
| woning                                   | verblijfsgebied | reductie /<br>toevoeging [m2] | resulterende<br>oppervlakte [m2] | opmerkingen                  |
| A4                                       | VG2             | -1.1                          | 9.2                              | reductie i.v.m. daglicht-eis |
| B                                        | VG2             | -2.9                          | 10.3                             |                              |
| B1                                       | VG2             | -3.2                          | 7.1                              |                              |
| B1z                                      | VG2             | -2.8                          | 7.5                              |                              |
| B4                                       | VG2             | -1.1                          | 9.2                              |                              |
| C1                                       | VG2             | -3.2                          | 7.1                              |                              |
| E1                                       | VG1             | +1.1                          | 21.7                             | toevoeging i.v.m. 55%-eis    |
|                                          | VG2             | -5.6                          | 5.6                              | reductie i.v.m. daglicht-eis |
| E4                                       | VG1             | +1.1                          | 17.7                             | toevoeging i.v.m. 55%-eis    |
| F1                                       | VG1             | -4.7                          | 33.5                             | reductie i.v.m. daglicht-eis |
| F3                                       | VG1             | -5.0                          | 28.1                             |                              |
| I4                                       | VG1             | -1.3                          | 15.6                             |                              |
| J4                                       | VG2             | +0.7                          | 5.7                              | toevoeging i.v.m. 55% eis    |

#### **4. BRUIKBAARHEID EN TOEGANKELIJKHEID**

##### **Afdeling 4.1 Verblijfsgebied en verblijfsruimte**

Een te bouwen bouwwerk heeft een verblijfsgebied waarin de voor de gebruiksfunctie kenmerkende activiteiten in een of meer verblijfsruimten kunnen plaatsvinden.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.2  | <p><i>Aanwezigheid</i></p> <p>Ten minste 18 m<sup>2</sup> vloeroppervlakte is niet-gemeenschappelijk verblijfsgebied.</p> <p>Ten minste 55% van de gebruiksoppervlakte van een gebruiksfunctie is verblijfsgebied.</p>                                                                                                                                                                                                                                                                                                                                                                           |
| 4.3  | <p><i>Afmetingen</i></p> <p>De afmetingen van de verblijfsgebieden en verblijfsruimten voldoen aan:</p> <ul style="list-style-type: none"> <li>- vloeroppervlakte verblijfsgebied <math>\geq 5 \text{ m}^2</math>;</li> <li>- breedte verblijfsgebied <math>\geq 1.8 \text{ m}</math>;</li> <li>- breedte verblijfsruimte <math>\geq 1.8 \text{ m}</math>.</li> </ul> <p>Ten minste één verblijfsruimte heeft een vloeroppervlakte van ten minste 11 m<sup>2</sup> bij een breedte van ten minste 3 m.</p> <p>De vrije hoogte in een verblijfsgebied en verblijfsruimte is ten minste 2.6 m.</p> |

##### *Voorzieningen*

Op de in bijlage 4 opgenomen overzichtsbladen zijn de oppervlakten van de ruimten en opstelplaatsen weergegeven. Uit deze overzichtsbladen kan worden afgeleid dat het bouwplan aan de gestelde eisen voldoet.

#### Afdeling 4.2 Toiletruimte

Een te bouwen bouwwerk heeft voldoende toiletruimten.

| Art. | Eis                                                                                                                                                                                                                                                                                                                             |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.9  | <p><i>Aanwezigheid</i></p> <p>Een gebruiksfunctie van een woongebouw, winkelfunctie heeft ten minste 1 toilet.</p> <p>Op een toiletruimte zijn maximaal 5 woonfuncties aangewezen (uitsluitend woonfuncties of een nevenfunctie daarvan).</p>                                                                                   |
| 4.10 | <p><i>Bereikbaarheid</i></p>                                                                                                                                                                                                                                                                                                    |
| 4.11 | <p><i>Afmetingen</i></p> <p>De afmetingen van de vereiste toiletruimte voldoen aan:</p> <ul style="list-style-type: none"> <li>- vloeroppervlakte minimaal 0.9 m x 1.2 m;</li> <li>- vloeroppervlakte minimaal 1.65 m x 2.2 m voor een integraal toegankelijke toiletruimte;</li> <li>- vrije hoogte minimaal 2.3 m.</li> </ul> |

#### Voorzieningen

Op basis van de tekeningen van de architect kan worden geconcludeerd dat aan de gestelde eisen wordt voldaan ten behoeve van de woonfunctie. Voor de commerciële ruimte dient rekening gehouden te worden met een integraal toegankelijke toiletruimte.

#### Afdeling 4.3 Badruimte

Een te bouwen bouwwerk heeft voldoende badruimten.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                  |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.18 | <i>Aanwezigheid</i><br>Een woongebouw heeft ten minste 1 badruimte.                                                                                                                                                                                                                                                                                                                  |
| 4.19 | <i>Afmetingen</i><br>De afmetingen van deze badruimte voldoen aan: <ul style="list-style-type: none"> <li>- vloeroppervlakte minimaal 1.6 m<sup>2</sup> en breedte minimaal 0.8 m;</li> <li>- vloeroppervlakte minimaal 2.2 m<sup>2</sup> en breedte minimaal 0.9 m, voor een badruimte die is samengevoegd met een toiletruimte;</li> <li>- vrije hoogte minimaal 2.3 m.</li> </ul> |

#### Voorzieningen

Geconcludeerd kan worden dat aan de gestelde eisen wordt voldaan.

#### Afdeling 4.4 Bereikbaarheid en toegankelijkheid

Een te bouwen bouwwerk heeft voldoende bereikbare en toegankelijke ruimten.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.22 | <p><i>Vrije doorgang</i></p> <p>Een doorgang naar een verblijfsgebied, een verblijfsruimte, een toiletruimte, een badruimte, een bergruimte, een buitenruimte en een ruimte voor het bereiken van een lift heeft de volgende afmetingen:</p> <ul style="list-style-type: none"> <li>- vrije breedte <math>\geq 0.85</math> m;</li> <li>- vrije hoogte <math>\geq 2.3</math> m.</li> </ul> <p>Dit geldt ook voor een doorgang op een route vanaf het aansluitende terrein naar een van bovengenoemde ruimten.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 4.23 | <p><i>Vrije doorgang verkeersroute</i></p> <p>De afmetingen van een ruimte waardoor een verkeersroute loopt die begint bij een doorgang (als bedoeld in art 4.22) voldoen, zover de verkeersroute niet over een trap loopt, aan:</p> <ul style="list-style-type: none"> <li>- vrije breedte <math>\geq 0.85</math> m;</li> <li>- vrije hoogte <math>\geq 2.3</math> m.</li> </ul> <p>Een gemeenschappelijke verkeersruimte (gelegen in bovengenoemde verkeersroute) heeft, behoudens ter plaatse van een trap, een breedte van minimaal 1.2 m.</p> <p>Vloeroppervlakte minimaal 1.5 m x 1.5 m, grenzend aan de toegang van een woongebouw.</p> <p>Vloeroppervlakte minimaal 1.5 m x 1.5 m, grenzend aan een doorgang van een liftschacht.</p> <p>Een gemeenschappelijk verkeersruimte (die deel uitmaakt van bovengenoemde verkeersroute) heeft een vloeroppervlakte van minimaal 1.5 m x 1.5 m, indien een rolstoelgebruiker vanuit die verkeersruimte zonder te keren het aansluitend terrein niet kan bereiken.</p> <p>Een ruimte die deel uitmaakt van bovengenoemde verkeersroute heeft een vrije breedte van minimaal 1.2 m, indien de ruimte in een toegankelijkheidssector ligt.</p> |
| 4.24 | <p><i>Aanwezigheid toegankelijkheidssector</i></p> <p>Een woongebouw heeft een gemeenschappelijke toegankelijkheidssector, indien:</p> <ul style="list-style-type: none"> <li>- de vloer van een verblijfsgebied in het woongebouw hoger dan 12.5 m boven het meetniveau ligt, of;</li> <li>- het woongebouw een gebruiksoppervlakte heeft van ten minste 3500 m<sup>2</sup> die hoger dan 1.5 m boven het meetniveau ligt.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 4.25 | <p><i>Integraal toegankelijke toilet- en badruimte</i></p> <p>Een gebruiksfunctie met een toegankelijkheidssector (als bedoeld in art. 4.24) heeft ten minste 1 integraal toegankelijke toiletruimte.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 4.26 | <p><i>Bereikbaarheid toegankelijkheidssector</i></p> <p>Een ruimte die in een toegankelijkheidssector ligt, is rechtstreeks bereikbaar vanaf het aansluitende terrein of langs een verkeersroute die uitsluitend door een toegankelijkheidssector voert.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

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|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      | <p>Deze verkeersroute voert niet door een niet-gemeenschappelijke ruimte van een andere gebruiksfunctie.</p> <p>De toegang van een woonfunctie gelegen in een woongebouw met een gemeenschappelijke toegankelijkheidssector (als bedoeld in art. 4.24 lid 1) grenst aan een gemeenschappelijke toegankelijkheidssector.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 4.27 | <p><i>Hoogteverschillen</i></p> <p>Op ten minste een route tussen een punt in een toegankelijkheidssector en het aansluitende terrein is een hoogteverschil groter dan 0.02 m, gemeten vanaf de afgewerkte vloer, overbrugd door een lift of een hellingbaan. Het hoogteverschil tussen de op die route gelegen toegang van de toegankelijkheidssector en het aansluitende terrein is maximaal 1 m.</p> <p>Op ten minste een route tussen de vloer ter plaatse van de toegang van een woongebouw zonder een toegankelijkheidssector en het aansluitende terrein is een hoogteverschil groter dan 0.02 m, gemeten vanaf de afgewerkte vloer, overbrugd door een lift of een hellingbaan. Het hoogteverschil tussen de op die route gelegen toegang van de toegankelijkheidssector en het aansluitende terrein is maximaal 1 m.</p> <p>Bij alle toegangen van een woonfunctie is een hoogteverschil op de route tussen een niet-gemeenschappelijke vloer en de aangrenzende vloer van een gemeenschappelijke verkeersruimte of het aansluitende terrein groter dan 0.02 m, gemeten vanaf de afgewerkte vloer, overbrugd door een hellingbaan. Het hoogteverschil tussen die toegang en het aansluitende terrein of de gemeenschappelijke verkeersruimte is maximaal 1 m.</p> <p>Op ten minste een route tussen ten minste een uitgang van een woonfunctie en een gemeenschappelijke buitenruimte is het hoogteverschil groter dan 0.02 m, gemeten vanaf de afgewerkte vloer, overbrugd door een lift of een hellingbaan.</p> <p>Een woongebouw waarin de vloer ter plaatse van de toegang van een woonfunctie hoger ligt dan 3 m boven het meetniveau heeft op elke bouwlaag een opstelplaats voor een lift, met een liftkooi van ten minste 1.05 m x 2.05 m.</p> <p>Op ten minste een route tussen de vloer ter plaatse van de toegang van een gebouw zonder een toegankelijkheidssector en het aansluitende terrein is een hoogteverschil groter dan 0.02 m, gemeten vanaf de afgewerkte vloer, overbrugd door een hellingbaan. Het hoogteverschil tussen die toegang en het aansluitende terrein is niet groter dan 1 m.</p> <p>Op ten minste een route tussen de vloer ter plaatse van de toegang van een gebouw met een bijeenkomstfunctie voor het aanschouwen van sport en / of alcoholgebruik, winkelfunctie of gezondheidszorgfunctie, zonder een toegankelijkheidssector en het aansluitende terrein is een hoogteverschil groter dan 0,02 m, gemeten vanaf de afgewerkte vloer, overbrugd door een hellingbaan. Het hoogteverschil tussen die toegang en het aansluitende terrein is niet groter dan 1 m.</p> |
| 4.28 | <p><i>Afmetingen liftkooi</i></p> <p>De afmetingen van een liftkooi (als bedoeld in art. 4.27) voldoen aan:</p> <ul style="list-style-type: none"> <li>- vloeroppervlakte minimaal 1.05 m x 1.35 m.</li> <li>- vloeroppervlakte minimaal 1.05 m x 2.05 m, in een woongebouw met meer dan 6 woonfuncties.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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|  | De loopafstand tussen de toegang van een woonfunctie en de toegang van ten minste een lift is maximaal 90 m. Indien het woongebouw minimaal 6 woonfuncties heeft, wordt de loopafstand bepaald tussen de woonfunctie en de bovenbedoelde lift. |
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#### *Voorzieningen*

De afmetingen van de toegangen en verkeersrouten voldoen aan de gestelde eisen. Op basis van de tekeningen kan worden geconcludeerd dat aan de gestelde eisen wordt voldaan.

Vanwege de hoogte van het woongebouw is een toegankelijkheidssector in het plan vereist.



#### Afdeling 4.5 Buitenberging

Een te bouwen bouwwerk heeft een bergruimte om fietsen beschermd tegen weer en wind te kunnen opbergen.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.31 | <p><i>Aanwezigheid, bereikbaarheid en afmetingen</i></p> <p>Een woonfunctie heeft als nevenfunctie een niet-gemeenschappelijke afsluitbare bergruimte met de volgende afmetingen:</p> <ul style="list-style-type: none"> <li>- vloeroppervlakte minimaal 5 m<sup>2</sup>, breedte minimaal 1.8 m en vrije hoogte minimaal 2.3 m.</li> </ul> <p>Voor een woonfunctie met een GO van maximaal 50 m<sup>2</sup> kan een bergruimte gemeenschappelijk zijn, indien de vloeroppervlakte van de bergruimte ten minste 1.5 m<sup>2</sup> per woonfunctie bedraagt.</p> <p>Een bergruimte is vanaf de openbare weg rechtstreeks bereikbaar via het aansluitende terrein of een gemeenschappelijke verkeersruimte.</p> <p>Bovenstaande eisen zijn niet van toepassing op een woonfunctie waarin door het Centraal Orgaan opvang asielzoekers opvang aan asielzoekers wordt geboden.</p> |
| 4.32 | <p><i>Regenwerendheid</i></p> <p>De uitwendige scheidingsconstructie van een bergruimte is, bepaald volgens NEN 2778, regenwerend.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 9.2  | <p><i>Stallingsruimte voor fietsen</i></p> <p>Een gemeenschappelijke stallingsruimte voor fietsen voor een gebruiksfunctie heeft een vloeroppervlakte van circa 0.1 m<sup>2</sup> per persoon van de op die stallingsruimte aangewezen gebruiksfuncties, met een minimum van 2 m<sup>2</sup>. De vloeroppervlakte heeft een breedte van ten minste 0.8 m en een hoogte boven de vloer van ten minste 2.1 m. Dit geldt niet indien in het bestemmingsplan voorschriften over stallingsruimte voor fietsen zijn opgenomen.</p> <p>Een gemeenschappelijke stallingsruimte is vanaf de toegang van de gebruiksfunctie rechtstreeks bereikbaar vanaf de openbare weg via het aansluitende terrein.</p>                                                                                                                                                                              |

#### Voorzieningen

Voor de in het plan aanwezige woonfuncties is een niet-gemeenschappelijke afsluitbare bergruimte vereist. Volgens de gelijkwaardigheid van de gemeente Zaandam kan een gemeenschappelijke fietsenberging gerealiseerd worden voor de appartementen, waarbij in de woning een berging, vrij van installaties, van minimaal 2.7 m<sup>2</sup> gerealiseerd moet worden. Daarnaast geldt dat in de algemene fietsenbergingen per 25 m<sup>2</sup> GBO van de woningen een fietsparkeerplaats gerealiseerd moet worden. Het is toegestaan om dubbele fietsenrekken toe te passen. De algemene fietsenbergingen moet vanaf de openbare weg makkelijk toegankelijk zijn. Aan de gestelde eisen wordt voldaan.

#### Afdeling 4.6 Buitenruimte

Een te bouwen bouwwerk heeft een rechtstreeks bereikbare buitenruimte.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.35 | <p><i>Aanwezigheid, bereikbaarheid en afmetingen</i></p> <p>Een woonfunctie heeft een niet-gemeenschappelijke buitenruimte, die rechtstreeks bereikbaar is vanuit een niet-gemeenschappelijk verblijfsgebied van die woonfunctie, met de volgende afmetingen:</p> <p>vloeroppervlakte minimaal 4 m<sup>2</sup> en breedte minimaal 1.5 m.</p> <p>In afwijking hiervan kan bij een woonfunctie met een GO van maximaal 50 m<sup>2</sup> de buitenruimte gemeenschappelijk zijn, indien de vloeroppervlakte aan buitenruimte ten minste 1 m<sup>2</sup> per op die buitenruimte aangewezen woonfunctie bedraagt, met een minimum van 4 m<sup>2</sup> en een breedte van minimaal 1.3 m. De buitenruimte is rechtstreeks vanuit de woning bereikbaar of via gemeenschappelijke ruimten.</p> <p>Het bovenstaande is niet van toepassing op een woonfunctie waarin door het Centraal Orgaan opvang asielzoekers opvang aan asielzoekers wordt geboden.</p> |

#### Voorzieningen

De individuele buitenruimten voldoen alle aan de minimaal vereiste afmetingen. Voor de woningen zonder een individuele buitenruimten is voldoende rekening gehouden met gemeenschappelijke buitenruimte, er wordt derhalve aan de gestelde eisen voldaan.

#### Afdeling 4.7 Opstelplaatsen

Een te bouwen bouwwerk heeft opstelplaatsen voor een aanrecht, een kooktoestel, een verwarmingstoestel en een warmwatertoestel.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.38 | <p><i>Aanwezigheid</i></p> <p>Een woonfunctie heeft in ten minste een verblijfsgebied een opstelplaats voor een aanrecht en een opstelplaats voor een kooktoestel.</p> <p>Een gebruiksfunctie heeft een opstelplaats voor een verwarmingstoestel, waarvan de afmetingen zijn afgestemd op het te plaatsen toestel. Dit geldt niet indien de gebruiksfunctie wordt aangesloten op een publieke voorziening voor verwarming.</p> <p>Een gebruiksfunctie heeft een opstelplaats voor een warmwatertoestel, waarvan de afmetingen zijn afgestemd op het te plaatsen toestel. Dit geldt niet indien de gebruiksfunctie wordt aangesloten op een publieke voorziening voor warm water.</p> |
| 4.39 | <p><i>Afmetingen</i></p> <p>De afmetingen van een opstelplaats voldoen aan:</p> <ul style="list-style-type: none"> <li>- vloeroppervlakte minimaal 1.5 m x 0.6 m, voor een aanrecht;</li> <li>- vloeroppervlakte minimaal 0.6 m x 0.6 m, voor een kooktoestel.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                            |

#### Voorzieningen

Voor zover van tekening is te controleren wordt aan de gestelde eisen voldaan.

## 5. ENERGIEZUINIGHEID EN MILIEU

### Afdeling 5.1 Energiezuinigheid

Een te bouwen bouwwerk is energiezuinig.

| Art.                   | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                      |               |               |               |               |            |             |    |    |    |            |                        |                                     |    |    |            |            |                                      |    |    |               |         |                                     |    |    |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|---------------|---------------|---------------|---------------|------------|-------------|----|----|----|------------|------------------------|-------------------------------------|----|----|------------|------------|--------------------------------------|----|----|---------------|---------|-------------------------------------|----|----|
| 5.2                    | <p><i>Bijna energieneutraal</i></p> <p>Een gebruiksfunctie heeft, bepaald volgens NTA 8800, de volgende maximum waarden voor BENG 1 (energiebehoefte in kWh/m2/jaar) en BENG 2 (primair fossiel energiegebruik in kWh/m2/jaar) en minimum waarde voor BENG 3 (het aandeel hernieuwbare energie in %):</p> <table><tr><th><i>gebruiksfunctie</i></th><th><math>A_{ls}/A_g</math></th><th><i>BENG 1</i></th><th><i>BENG 2</i></th><th><i>BENG 3</i></th></tr><tr><td>woongebouw</td><td><math>\leq 1.83</math></td><td>65</td><td>50</td><td>40</td></tr><tr><td>woongebouw</td><td><math>&gt; 1.83</math><br/><math>\leq 3.0</math></td><td><math>55 + 30 \times (A_{ls}/A_g - 1.5)</math></td><td>50</td><td>40</td></tr><tr><td>woongebouw</td><td><math>\geq 3.0</math></td><td><math>100 + 50 \times (A_{ls}/A_g - 3.0)</math></td><td>50</td><td>40</td></tr><tr><td>winkelfunctie</td><td><math>&gt; 1.8</math></td><td><math>70 + 30 \times (A_{ls}/A_g - 1.8)</math></td><td>60</td><td>30</td></tr></table> <p>Voor een gebouw met meerdere gebruiksfuncties gelden naar gebruiksoppervlakte gewogen waarden. Bij het bepalen van die waarden wordt van bovengenoemde waarden uitgegaan.</p> <p>In afwijking hiervan hoeft een woongebouw niet te voldoen aan de minimumwaarde voor het aandeel hernieuwbare energie, voor zover het als gevolg van locatiegebonden omstandigheden niet mogelijk is daaraan te voldoen.</p> <p>Voor de nevenfunctie van een woonfunctie gelden de eisen aan de woonfunctie.</p> <p>Indien een gebruiksfunctie in een gebouw of een gedeelte daarvan, een volgens NTA 8800 naar gebruiksoppervlakte gewogen gemiddelde specifieke warmtecapaciteit van maximaal 180 kJ/m2K heeft, wordt bovengenoemde maximumwaarde voor de energiebehoefte met 5 kWh/m2/jaar verhoogd.</p> <p>Voor een woonfunctie, niet zijnde een woonwagen of een drijvend bouwwerk, geldt <math>TO_{juli} \leq 1.20</math>. Indien in een woongebouw voor een of meer woningen <math>TO_{juli} &gt; 1.20</math> geldt, wordt bij de woning met de hoogst berekende waarde met een berekening aangetoond dat het totaal aantal gewogen overschrijdingsuren in die woonfunctie op jaarbasis niet meer dan 450 is.</p> | <i>gebruiksfunctie</i>               | $A_{ls}/A_g$  | <i>BENG 1</i> | <i>BENG 2</i> | <i>BENG 3</i> | woongebouw | $\leq 1.83$ | 65 | 50 | 40 | woongebouw | $> 1.83$<br>$\leq 3.0$ | $55 + 30 \times (A_{ls}/A_g - 1.5)$ | 50 | 40 | woongebouw | $\geq 3.0$ | $100 + 50 \times (A_{ls}/A_g - 3.0)$ | 50 | 40 | winkelfunctie | $> 1.8$ | $70 + 30 \times (A_{ls}/A_g - 1.8)$ | 60 | 30 |
| <i>gebruiksfunctie</i> | $A_{ls}/A_g$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <i>BENG 1</i>                        | <i>BENG 2</i> | <i>BENG 3</i> |               |               |            |             |    |    |    |            |                        |                                     |    |    |            |            |                                      |    |    |               |         |                                     |    |    |
| woongebouw             | $\leq 1.83$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 65                                   | 50            | 40            |               |               |            |             |    |    |    |            |                        |                                     |    |    |            |            |                                      |    |    |               |         |                                     |    |    |
| woongebouw             | $> 1.83$<br>$\leq 3.0$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $55 + 30 \times (A_{ls}/A_g - 1.5)$  | 50            | 40            |               |               |            |             |    |    |    |            |                        |                                     |    |    |            |            |                                      |    |    |               |         |                                     |    |    |
| woongebouw             | $\geq 3.0$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | $100 + 50 \times (A_{ls}/A_g - 3.0)$ | 50            | 40            |               |               |            |             |    |    |    |            |                        |                                     |    |    |            |            |                                      |    |    |               |         |                                     |    |    |
| winkelfunctie          | $> 1.8$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | $70 + 30 \times (A_{ls}/A_g - 1.8)$  | 60            | 30            |               |               |            |             |    |    |    |            |                        |                                     |    |    |            |            |                                      |    |    |               |         |                                     |    |    |
| 5.3                    | <p><i>Thermische isolatie</i></p> <p>Een verticale uitwendige scheidingconstructie van een verblijfsgebied, toiletruimte of badruimte voldoet aan <math>R_c \geq 4.7</math> m2K/W.</p> <p>Een horizontale of schuine uitwendige scheidingconstructie van een verblijfsgebied, toiletruimte of badruimte voldoet aan <math>R_c \geq 6.3</math> m2K/W.</p> <p>Een constructie die de scheiding vormt tussen een verblijfsgebied, toiletruimte of badruimte en een kruipruimte, grond of water voldoet aan <math>R_c \geq 3.7</math> m2K/W.</p> <p>Een inwendige scheidingconstructie tussen een ruimte die niet wordt verwarmd of die wordt verwarmd voor uitsluitend een ander doel dan het verblijven van personen en een verblijfsgebied, toiletruimte of badruimte voldoet aan <math>R_c \geq 4.7</math> m2K/W.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                      |               |               |               |               |            |             |    |    |    |            |                        |                                     |    |    |            |            |                                      |    |    |               |         |                                     |    |    |

|     |                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | <p>Ramen, deuren en kozijnen voldoen gemiddeld aan <math>U \leq 1.65 \text{ W/m}^2\text{K}</math> en per onderdeel <math>U \leq 2.2 \text{ W/m}^2\text{K}</math>.</p> <p>Met ramen, deuren, kozijnen gelijk te stellen onderdelen voldoen gemiddeld aan <math>U \leq 1.65 \text{ W/m}^2\text{K}</math>.</p> <p>Een oppervlakte ter grootte van maximaal 2% van het GO vrijgesteld van bovengenoemde eisen.</p> |
| 5.4 | <p><i>Luchtvolumestroom</i></p> <p>De luchtvolumestroom voor een gebruiksfunctie bedraagt niet meer dan <math>0.2 \text{ m}^3/\text{s}</math>.</p>                                                                                                                                                                                                                                                             |

#### *Voorzieningen*

Onderstaand is aangegeven welke maatregelen noodzakelijk zijn om aan de gestelde eisen te voldoen. Als uitgangspunt is gehanteerd dat de gemeenschappelijke verkeersruimten binnen de thermische schil liggen. De (onverwarmde) fietsenstalling ligt binnen de thermische schil maar buiten de thermische zone. De thermische isolatie (Rc-waarden en U-waarden) van de genoemde constructies is bepaald conform NTA 8800.

Bij de verdere ontwikkeling en realisatie dient rekening gehouden te worden met toepassing van bouwkundige voorzieningen en installaties welke zijn voorzien van een kwaliteitsverklaring conform NTA 8800 welke is opgenomen in het register van Bureau CRG.

In het rapport "Voorlopige Energielabels appartementen" (R820209aaA7 d.d. 29-09-2023) zijn de berekeningsbladen en bijbehorende kwaliteitsverklaringen opgenomen ter bepaling van de energieprestatie.

#### Inwendige scheidingsconstructies

Tussen de woningen/commerciële ruimten enerzijds en de niet-verwarmde ruimten anderzijds (de fietsenstalling, het trappenhuis) dienen constructies met  $R_c \geq 4.7 \text{ m}^2\text{K/W}$  gerealiseerd te worden. Op basis van NTA 8800 is het mogelijk een equivalente Rc-waarde voor deze scheidingsconstructies te berekenen. Uit dergelijke berekeningen (opgenomen in bijlage 6) blijkt dat de scheidingsconstructies tussen de woningen/commerciële ruimten en de onverwarmde ruimten uitgevoerd kunnen worden met  $R_c < 4.7 \text{ m}^2\text{K/W}$ .

Met de volgende maatregelen ter plaatse van de inwendige scheidingsconstructies kan aan de gestelde eisen worden voldaan:

- ter plaatsen van de verkeersruimte (as 3.02-3.04) en de fietsenstalling kan worden volstaan met  $R_c \geq 2.4 \text{ m}^2\text{K/W}$ . Deze wanden voorzien van bijvoorbeeld:
  - 90 mm houten stijlen, waartussen 90 mm minerale wol (max. 15% hout), voorzien van gipskartonplaat o.g.;
  - 50 mm Kingspan Kooltherm K17, voorzien van gipskartonplaat o.g.;
- ter plaatsen van de verkeersruimte (as 3.16-3.17) kan worden volstaan met  $R_c \geq 0.8 \text{ m}^2\text{K/W}$ . Deze wanden voorzien van bijvoorbeeld:
  - 40 mm houten stijlen, waartussen 40 mm minerale wol (max. 15% hout), voorzien van gipskartonplaat o.g.;
  - 20 mm Kingspan Kooltherm K17, voorzien van gipskartonplaat o.g.

De op tekening aangegeven thermische lagen zijn voldoende dik om aan bovengenoemde eisen te voldoen. De vereiste thermische lagen tussen de woningen en verkeersruimte zijn echter overal op tekening aangegeven. Dit dient in een later stadium correct op tekening aangegeven te worden.

#### Bouwkundige voorzieningen

- begane grondvloer  $R_c \geq 3.7 \text{ m}^2\text{K/W}$ , bijvoorbeeld Dycore ribbenvloer 350L-3.5 o.g.;
- hellend dak  $R_c \geq 6.3 \text{ m}^2\text{K/W}$ , bijvoorbeeld toepassing van 240 mm Isover systemroll 1000 tussen 245 mm sporen (houtpercentage max. 8%) o.g. of Kingspan Unidek Aero 6.0 o.g.;
- plat dak en balkons boven woningen  $R_c \geq 6.3 \text{ m}^2\text{K/W}$ , bijvoorbeeld beton aan de bovenzijde voorzien van:
  - 210 mm EPS 250-SE ( $\lambda \leq 0.034 \text{ W/mK}$ ) o.g.;
  - 140 mm Kingspan Therma TR26 FM Platdak Plaat met 4 st/m<sup>2</sup> RVS bevestigigers o.g.;
- gevels  $R_c \geq 4.7 \text{ m}^2\text{K/W}$ , bijvoorbeeld:
  - steenachtige spouwconstructie voorzien van 150 mm Isover Mupan Plus met 4 st/m<sup>2</sup> RVS spouwankers o.g.;
  - HSB-constructie met steenachtig buitenspouwblad, bijvoorbeeld 255 mm houten stijlen en dorpels, voorzien van 255 mm Isover Systemroll 1000 o.g. (stijlen h.o.h. 600 mm, houtpercentage 25%);
- zijwangen van dakkapellen worden uitgevoerd met een  $R_c \geq 2.5 \text{ m}^2\text{K/W}$ , bijvoorbeeld voorzien van 100 mm Kooldtherm K12 (max. 25% hout) o.g.;
- houten platte daken van dakkapellen worden uitgevoerd met een  $R_c \geq 6.3 \text{ m}^2\text{K/W}$ , bijvoorbeeld toepassing van 240 mm Systemroll 1000 tussen 260 mm sporen (600 mm h.o.h.) voorzien van 22 mm dakbeschot:
  - stijl en regelwerk2 laags isolatie met stijl-en regelwerk van 75
- ramen voor woongebouw met  $U_{\text{window}} \leq 1.4 \text{ W/m}^2\text{K}$ , bijvoorbeeld toepassing van:
  - aluminium kozijnen met  $U_{\text{frame}} \leq 1.5 \text{ W/m}^2\text{K}$
  - HR++-glas met  $U_{\text{glas}} \leq 1.1 \text{ W/m}^2\text{K}$ , g-waarde = 0.6 en 0.4 en voorzien van een standaard aluminium afstandhouder met  $\psi \leq 0.080 \text{ W/mK}$ ;
- ramen voor commerciële ruimte met  $U_{\text{window}} \leq 1.2 \text{ W/m}^2\text{K}$ , bijvoorbeeld toepassing van:
  - aluminium kozijnen met  $U_{\text{frame}} \leq 1.1 \text{ W/m}^2\text{K}$ , bijvoorbeeld Schüco AWS 90SI+;
  - HR++-glas met  $U_{\text{glas}} \leq 1.0 \text{ W/m}^2\text{K}$  g-waarde = 0.6 en g-waarde = 0.35 (zonwerende beglazing ter plaatse van de zuidgevel) en een warm edge afstandhouder met  $\psi \leq 0.080 \text{ W/mK}$  o.g.;
- toepassing van geïsoleerde woningentreedeeuren grenzend aan buiten;
- alle uitwendige scheidingsconstructies kier- en naaddicht detailleren conform SBR 360 klasse 2 (verbeterde kier- en naaddichting). Er is gerekend met  $q_{v10} \leq 0.4 \text{ dm}^3/\text{sm}^2$ , bij de detaillering dient extra aandacht te worden besteed aan de luchtdichting;
- bewegende delen voorzien van knevelsluitingen en een goed functionerende kierdichting middels rondgaande, ingefreesde rubberprofielen;
- lineaire koudebruggen forfaitair;
- geen buitenzonwering vereist (mogelijk wel vereist op basis woningborg/SWK).

#### Algemene installatietechnische maatregelen

- verwarming middels collectieve elektrische luchtwarmtepomp (buitenlucht als bron) met een COP = 3.45 voor verwarming, met aanvoertemperatuur van maximaal 50 °C;
- warmtapwater middels een individuele boosterwarmtepomp met een COP = 3.45;
- leidingdiameter warmtapwater aanrecht ≤ 10 mm;
- ventilatie middels gebalanceerde ventilatie op basis van CO<sub>2</sub>-sturing voorzien van warmterugwinning met een systeemrendement van  $\eta = 95\%$ , 100% bypass mogelijk, uitschakeling niet mogelijk, bijvoorbeeld toepassing van Duco Energy System 325S (no heater);
- luchtdichtheidsklasse ventilatiekanalen LUKA C;
- collectieve koeling middels compressiekoelmachine met een opwekkingsrendement EER ≥ 7.20 en temperatuurtraject 17 °C / 21 °C.

#### Installatietechnische maatregelen commerciële ruimte

- toepassing van 5 PV-panelen (370 Wp/paneel, oppervlak ca. 1.65 m<sup>2</sup> per paneel) oriëntatie op het zuidoost (onbelemmerd), geplaatst op een sterk geventileerde constructie onder een hoek van 12°;
- regeling verlichting middels centraal aan/uit;
- maximaal geïnstalleerd vermogen verlichting 8.0 W/m<sup>2</sup> GBO.

#### *Berekeningsresultaat*

In het rapport "Voorlopige energielabels" (R820209aaA7 d.d. 01-08-2025) zijn de BENG-berekeningen opgenomen. Uit deze berekeningen blijkt dat aan de gestelde eisen wordt voldaan, indien bovengenoemde maatregelen worden getroffen en meerdere woningen worden voorzien van zonwerende beglazing. In de berekeningen, en op de tekeningen in bijlage 1 is aangegeven welke gevelopeningen moeten worden voorzien van dergelijke beglazing.

## Afdeling 5.2 Milieu

Een te bouwen bouwwerk is zodanig dat de belasting van het milieu door de in het bouwwerk toe te passen materialen wordt beperkt.

| Art. | Eis                                                                                                                                                                |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5.9  | <i>Duurzaam bouwen</i><br>Een woongebouw heeft een milieuprestatie van ten hoogste 0.8 bepaald volgens de Bepalingsmethode Milieuprestatie Gebouwen en GWW-werken. |

### Voorzieningen

In bijlage 7 zijn berekeningen volgens de bepalingmethode Milieuprestatie Gebouwen en GWW werken opgenomen<sup>1</sup>. Hieruit blijkt dat voor het woongebouw de schaduwkosten € 0.62 / m<sup>2</sup> BVO per jaar bedragen.

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<sup>1</sup> De rekensoftware geeft aan dat diverse elementen niet in de berekening zijn ingevoerd (bijvoorbeeld verzwaringen, bevestigingsmiddelen e.d.). Deze elementen zijn echter nog niet in de database opgenomen en kunnen derhalve niet ingevoerd worden.



## 6. INSTALLATIES

### Afdeling 6.5 Tijdig vaststellen van brand

Een bouwwerk heeft zodanige voorzieningen dat brand tijdig kan worden ontdekt zodat veilig kan worden gevlucht.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                         |       |                  |                  |              |                               |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------|------------------|--------------|-------------------------------|
| 6.20 | <b>Brandmeldinstallatie</b>                                                                                                                                                                                                                                                                                                                 |       |                  |                  |              |                               |
|      | Een gebruiksfunctie heeft een brandmeldinstallatie met een omvang van bewaking en doormelding volgens onderstaande tabel.                                                                                                                                                                                                                   |       |                  |                  |              |                               |
|      | TABEL - BRANDMELDINSTALLATIES                                                                                                                                                                                                                                                                                                               |       |                  |                  |              |                               |
|      |                                                                                                                                                                                                                                                                                                                                             | GO    | hoogste vloer    | omvang bewaking  | door-melding | inspectie-certificaat vereist |
|      | andere woonfunctie                                                                                                                                                                                                                                                                                                                          | -     | -                | -                | -            | -                             |
|      | winkelfunctie                                                                                                                                                                                                                                                                                                                               | -     | > 4,1            | niet-automatisch | -            | -                             |
|      |                                                                                                                                                                                                                                                                                                                                             | -     | > 50             | volledig         | -            | ja                            |
|      | > 500                                                                                                                                                                                                                                                                                                                                       | > 1,5 | niet-automatisch | -                | -            |                               |
|      | > 1000                                                                                                                                                                                                                                                                                                                                      | -     | niet-automatisch | -                | -            |                               |
|      | > 5000                                                                                                                                                                                                                                                                                                                                      | > 13  | gedeeltelijk     | -                | ja           |                               |
|      | > 10000                                                                                                                                                                                                                                                                                                                                     | -     | gedeeltelijk     | -                | ja           |                               |
|      | > 10000                                                                                                                                                                                                                                                                                                                                     | > 13  | volledig         | -                | ja           |                               |
| 6.21 | <b>Rookmelders</b>                                                                                                                                                                                                                                                                                                                          |       |                  |                  |              |                               |
|      | Een te bouwen woonfunctie en bij functiewijziging naar een woonfunctie heeft in een besloten ruimte, waardoor een vluchtroute voert tussen de uitgang van een verblijfsruimte en de uitgang van de woonfunctie, rookmelders volgens primaire inrichtingseisen van NEN 2555, tenzij de woonfunctie is voorzien van een brandmeldinstallatie. |       |                  |                  |              |                               |

#### Voorzieningen

Alle woonfuncties dienen te worden voorzien van rookmelders conform NEN 2555. Indien de rookmelders worden aangesloten conform NEN 2555 wordt aan de gestelde eisen voldaan. In elke ruimte waar doorheen gevlucht wordt vanuit een verblijfsruimte dient een rookmelder geplaatst te worden (zie plattegronden in bijlage 1).

Voor de winkelfunctie is een brandmeldinstallatie niet vereist.

## Afdeling 6.6 Vluchten bij brand

Een bouwwerk heeft zodanige voorzieningen dat het ontvluchten goed kan verlopen.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.25 | <p><i>Deuren in vluchtroutes</i></p> <p>Een deur op een gemeenschappelijke vluchtroute die toegang geeft tot een trappenhuis van een te bouwen woongebouw draait bij het openen niet tegen de vluchtrichting in. Een automatische deur en een voorziening voor toegangs- of uitgangscntrole in een vluchtroute mogen het vluchten niet belemmeren.</p> <p>Een toegangsdeur van een overdruktrappenhuis heeft een aanduiding waaruit blijkt dat hard duwen noodzakelijk kan zijn.</p> <p>Aan de aan de buitenlucht grenzende zijde van een nooddeur is het opschrift «nooddeur vrijhouden» of «nooduitgang» aangebracht. Dit opschrift voldoet aan de eisen voor aanvullende tekens in NEN 3011.</p> |
| 6.26 | <p><i>Zelfsluitende deuren</i></p> <p>Een beweegbaar constructieonderdeel in een inwendige scheidingsconstructie waarvoor een eis aan branddoorslag, weerstand tegen branddoorslag of weerstand tegen rookdoorgang geldt, is zelfsluitend.</p> <p>Dit geldt niet voor een niet-gemeenschappelijke doorgang in een bestaand gebouw.</p> <p>Een toegangsdeur van een woonfunctie is alleen zelfsluitend bij brand in de woonfunctie of het woongebouw waarin de woonfunctie is gelegen.</p>                                                                                                                                                                                                           |

### Voorzieningen

Met de in het vorige hoofdstuk genoemde voorzieningen voldoet het plan verder aan de bovengenoemde eisen.

## Afdeling 6.7 Bestrijden van brand

Een bouwwerk heeft zodanige voorzieningen voor het bestrijden van brand, dat brand binnen redelijke tijd kan worden bestreden.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.30 | <p><i>Bluswatervoorziening</i></p> <p>Een bouwwerk heeft een toereikende bluswatervoorziening. Dit geldt niet indien de aard, ligging of het gebruik van het bouwwerk dat naar het oordeel van het bevoegd gezag niet vereist.</p> <p>De afstand tussen een bluswatervoorziening en een brandweeringang is ten hoogste 40 m.</p> <p>Een bluswatervoorziening is onbeperkt toegankelijk voor bluswerkzaamheden.</p> |
| 6.33 | <p><i>Aanduiding blusmiddelen</i></p> <p>Een voorziening voor het bestrijden van brand is duidelijk zichtbaar opgehangen of gemarkeerd met een pictogram als bedoeld in NEN 3011.</p>                                                                                                                                                                                                                              |

### Voorzieningen

Geconcludeerd kan worden dat aan de gestelde eisen is voldaan, mits de volgende voorzieningen worden getroffen:

- de winkelfunctie dient te worden voorzien van ten minste één draagbare blustoestel (in bijvoorbeeld de kantine). De plaats van het blustoestel dient op tekening te worden aangegeven;
- de fietsenstalling en technische ruimten worden voorzien van draagbare blustoestellen;
- op de situatietekening dient een bluswatervoorziening te worden opgenomen:
  - voor het appartementengebouw ligt de bluswatervoorziening ten hoogste 15 m van de opstelplaats voor het brandweervoertuig;
  - voor de winkelfunctie ligt de bluswatervoorziening ten hoogste 40 m van de opstelplaats voor het brandweervoertuig;
- de brandmeldinstallatie, ontruimingsinstallatie, en brandblusinstallatie te zijn voorzien van de vereiste inspectiecertificaten.

Voor zover daarin niet reeds voldoende door de aanwezigheid van brandslanghaspels is voorzien, is een gebouw voorzien van voldoende draagbare of verrijdbare blustoestellen om een beginnende brand zo snel mogelijk door in het gebouw aanwezige personen te laten bestrijden. De fietsenstalling, scooter- en autobluisteruimtes en technische ruimten worden voorzien van een handbrandblusser. Deze ruimten zijn allen kleiner dan 150 m<sup>2</sup>. In de fietsenstalling wordt 1 blustoestel met inhoud 6 kg of 6 liter geplaatst. In commerciële ruimte (C 0.01) (begane grond) worden 2 blustoestellen met inhoud 6 kg of 6 liter geplaatst of 1 blustoestel met inhoud 9 kg of 9 liter. De loopafstand van enig punt binnen de projecteringszone tot het dichtstbijzijnde blustoestel is niet meer dan 20 meter.

Vanwege de hoogte van het gebouw is een droge blusleiding niet vereist.

## Afdeling 6.8 Bereikbaarheid voor hulpverleningsdiensten

Een bouwwerk is zodanig bereikbaar voor hulpverleningsdiensten dat tijdig bluswerkzaamheden kunnen worden uitgevoerd en hulpverlening kan worden geboden.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.36 | <p><i>Brandweeringang</i></p> <p>Een bouwwerk voor het verblijven van personen heeft een brandweeringang. Dit geldt niet indien de aard, de ligging of het gebruik van het bouwwerk dat naar het oordeel van het bevoegd gezag niet vereist.</p> <p>Indien een bouwwerk meerdere toegangen heeft, worden in overleg met de brandweer een of meer van die toegangen als brandweeringang aangewezen.</p> <p>Een brandweeringang van een gebouw met een brandmeldinstallatie met doormelding wordt automatisch ontsloten of ontsloten met een systeem bepaald in overleg met de brandweer.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 6.37 | <p><i>Bereikbaarheid bouwwerk voor hulpverleningsdiensten</i></p> <p>Tussen de openbare weg een toegang van een bouwwerk ligt een verbindingsweg die geschikt is voor voertuigen van hulpverleningsdiensten.</p> <p>Lid 1 geldt niet voor een gebruiksfunctie met een gebruiksoppervlakte van maximaal 1000 m<sup>2</sup> en een vuurbelasting van ten hoogste 500 MJ/m<sup>2</sup>.</p> <p>Lid 1 geldt niet voor een gebruiksfunctie met een gebruiksoppervlakte van maximaal 50 m<sup>2</sup>.</p> <p>Lid 1 geldt niet indien de toegang tot het bouwwerk ten hoogste 10 m van de openbare weg ligt.</p> <p>Lid 1 geldt niet indien bevoegd gezag dit op grond van de ligging, de aard of het gebruik niet nodig acht.</p> <p>Een bovenbedoelde verbindingsweg heeft een breedte van minimaal 4.5 m, is verhard over een breedte van ten minste 3.25 m en geschikt voor voertuigen van ten minste 14600 kg, heeft een vrijgehouden hoogte van ten minste 4.2 m en heeft een doeltreffende afwatering. Dit geldt niet als het bestemmingsplan of een gemeentelijke verordening anderszins bepaalt.</p> <p>Een bovenbedoelde verbindingsweg wordt vrijgehouden over een breedte van minimaal 4.5 m en een hoogte van minimaal 4.2 m.</p> <p>Hekwerken die een verbindingsweg als bedoeld in het eerste lid afsluiten, kunnen door hulpdiensten snel en gemakkelijk worden geopend of worden ontsloten met een systeem dat in overleg met de brandweer is bepaald.</p> |
| 6.38 | <p><i>Opstelplaatsen voor brandweervoertuigen</i></p> <p>Bij een bouwwerk voor het verblijven van personen zijn zodanige opstelplaatsen voor brandweervoertuigen dat een doeltreffende verbinding tussen die voertuigen en de bluswatervoorziening kan worden gelegd.</p> <p>Lid 1 geldt niet voor een gebruiksfunctie met een gebruiksoppervlakte van maximaal 1000 m<sup>2</sup> en een vuurbelasting van ten hoogste 500 MJ/m<sup>2</sup>.</p> <p>Lid 1 geldt niet voor een gebruiksfunctie met een gebruiksoppervlakte van maximaal 50 m<sup>2</sup>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      | <p>Lid 1 geldt niet indien bevoegd gezag dit op grond van de ligging, de aard of het gebruik niet nodig acht.</p> <p>De afstand tussen een opstelplaats en een brandweeringang is ten hoogste 40 m.</p> <p>Een opstelplaats voor brandweervoertuigen is vrijgehouden over een breedte van 4.5 m en een hoogte van 4.2 m.</p> <p>Hekwerken die een opstelplaats afsluiten kunnen snel en gemakkelijk worden geopend door hulpdiensten.</p> |
| 6.39 | <p><i>Brandweerlift</i></p> <p>Een te bouwen gebouw waarvan een vloer van een verblijfsgebied hoger ligt dan 20 m boven het meetniveau heeft een brandweerlift.</p>                                                                                                                                                                                                                                                                       |
| 6.40 | <p><i>Mobiele radiocommunicatie hulpverleningsdiensten</i></p> <p>Een voor grote aantallen bezoekers bestemd bouwwerk waarbij het goed functioneren van hulpverleningsdiensten afhankelijk is van mobiele radiocommunicatie heeft indien dat voor die communicatie nodig is een door het bevoegd gezag goedgekeurde installatie voor mobiele radiocommunicatie tussen hulpverleningsdiensten binnen en buiten dat bouwwerk.</p>           |

#### Voorzieningen

De voorzieningen voor de hulpverleningsdiensten dienen in overleg met de brandweer te worden bepaald en op tekening te worden aangegeven. Hierbij dient met het volgende rekening gehouden te worden:

- tussen de openbare weg en ten minste een toegang van een bouwblok ligt een verbindingsweg die geschikt is voor de brandweer en andere hulpverleningsdiensten, tenzij de afstand tot de openbare weg minder dan 10 m bedraagt;
- deze verbindingsweg heeft een breedte van ten minste 4.5 meter, is verhard over een breedte van minimaal 3.25 m, heeft een vrije hoogte van 4.2 meter en is geschikt voor voertuigen met een massa van ten minste 14.600 kg en heeft een doeltreffende afwatering;
- op de situatietekening dient een opstelplaats voor brandweervoertuigen te worden opgenomen:
  - voor het appartementengebouw ligt de opstelplaats ten hoogste 10 m van de hoofdentree;
  - een opstelplaats heeft een breedte van ten minste 4.5 m, een lengte van ten minste 10 m en een vrije hoogte van ten minste 4.2 m;
- de opstelplaats voor brandweervoertuigen bevindt zich op een afstand van maximaal 15 m van de brandweeringang en op een afstand van maximaal 20 m van de bluswatervoorziening.

#### Afdeling 6.10 Bereikbaarheid van gebouwen voor gehandicapten

Een bouwwerk met een toegankelijkheidssector, een woongebouw zonder een toegankelijkheidssector (art. 4.27, lid 3) en een gebouw zonder een toegankelijkheidssector (art. 4.27, lid 6), zijn vanaf de openbare weg toegankelijk voor personen met een functiebeperking.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.49 | <p><i>Bereikbaarheid van gebouwen voor personen met een functiebeperking</i></p> <p>Ten minste een route tussen de openbare weg en ten minste een toegang van een toegankelijkheidssector van een gebouw, een woongebouw zonder een toegankelijkheidssector (art. 4.27, lid 3), of een gebouw zonder een toegankelijkheidssector (art. 4.27, lid 6), loopt over een weg, pad of steiger met een breedte van ten minste 1.1 m waarbij een te overbruggen hoogteverschil van meer dan 0.02 m met een hellingbaan wordt overbrugd.</p> <p>Een doorgang in deze route heeft een vrije breedte van ten minste 0.85 m en een vrije hoogte van ten minste 2 m.</p> |

#### Voorzieningen

Geconcludeerd kan worden dat aan de gestelde eisen wordt voldaan, indien de in afdeling 2.6 en afdeling 4.4 genoemde voorzieningen worden getroffen.

#### Afdeling 6.11 Tegengaan van veel voorkomende criminaliteit

Een woongebouw heeft zodanige voorzieningen dat veel voorkomende criminaliteit wordt voorkomen.

| Art. | Eis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.51 | <p><i>Voorkomen van veel voorkomende criminaliteit in een woongebouw</i></p> <p>Een toegang van een te bouwen woongebouw heeft een zelfsluitende deur die van buitenaf niet zonder sleutel geopend kan worden.</p> <p>Ten minste een toegang van een te bouwen woongebouw heeft een voorziening aan de buitenkant waarmee een signaal kan worden afgegeven dat in een niet-gemeenschappelijk verblijfsgebied van een op die toegang aangewezen woonfunctie waarneembaar is.</p> <p>Ten minste een toegang van een te bouwen woongebouw heeft een spreekinstallatie die vanuit een niet-gemeenschappelijke ruimte van een op die toegang aangewezen woonfunctie kan worden bediend.</p> <p>Ten minste een toegang van een te bouwen woongebouw kan vanuit een niet-gemeenschappelijke ruimte van een op die toegang aangewezen woonfunctie worden geopend.</p> <p>Een afsluitbare toegang van een bestaand woongebouw heeft een zelfsluitende deur die van buitenaf niet zonder sleutel geopend kan worden.</p> <p>Indien een woonfunctie in een bestaand woongebouw uitsluitend bereikbaar is via een afsluitbare gemeenschappelijke verkeersruimte, heeft ten minste een toegang van het woongebouw aan de buitenkant een voorziening waarmee een signaal kan worden gegeven dat in een niet-gemeenschappelijke ruimte van die woonfunctie waarneembaar is.</p> |

#### Voorzieningen

Geconcludeerd kan worden dat aan de gestelde eisen wordt voldaan, mits de onderstaande aandachtspunten in acht worden gehouden:

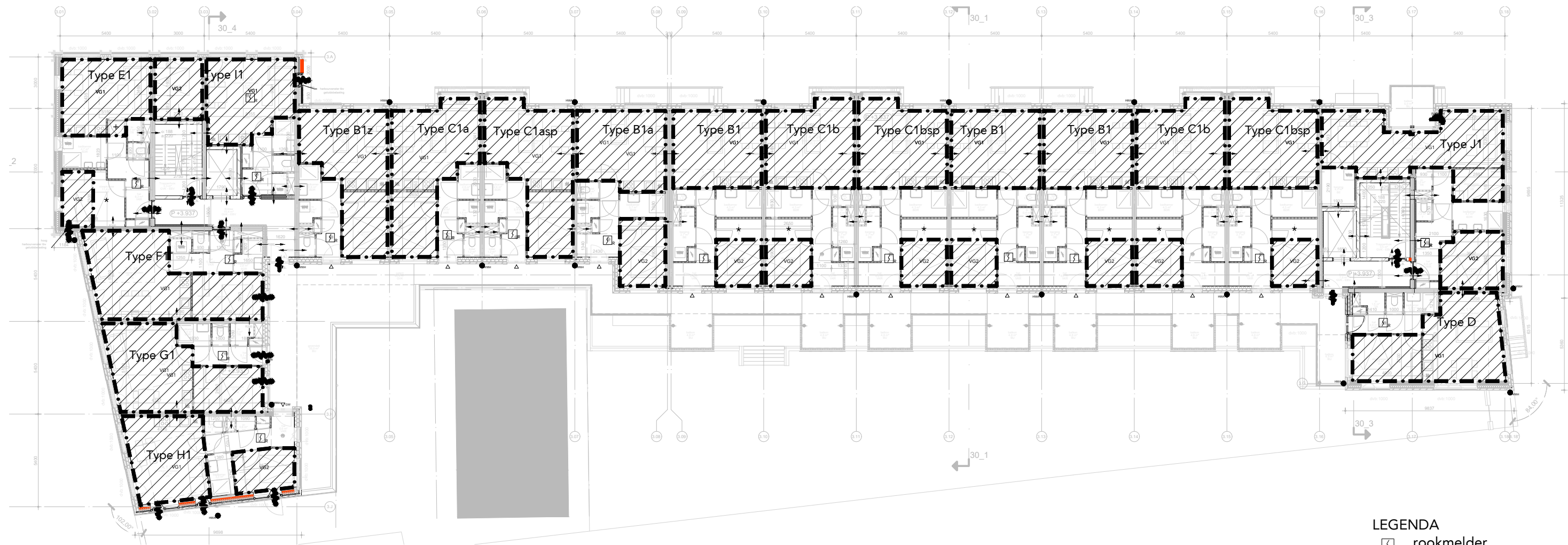
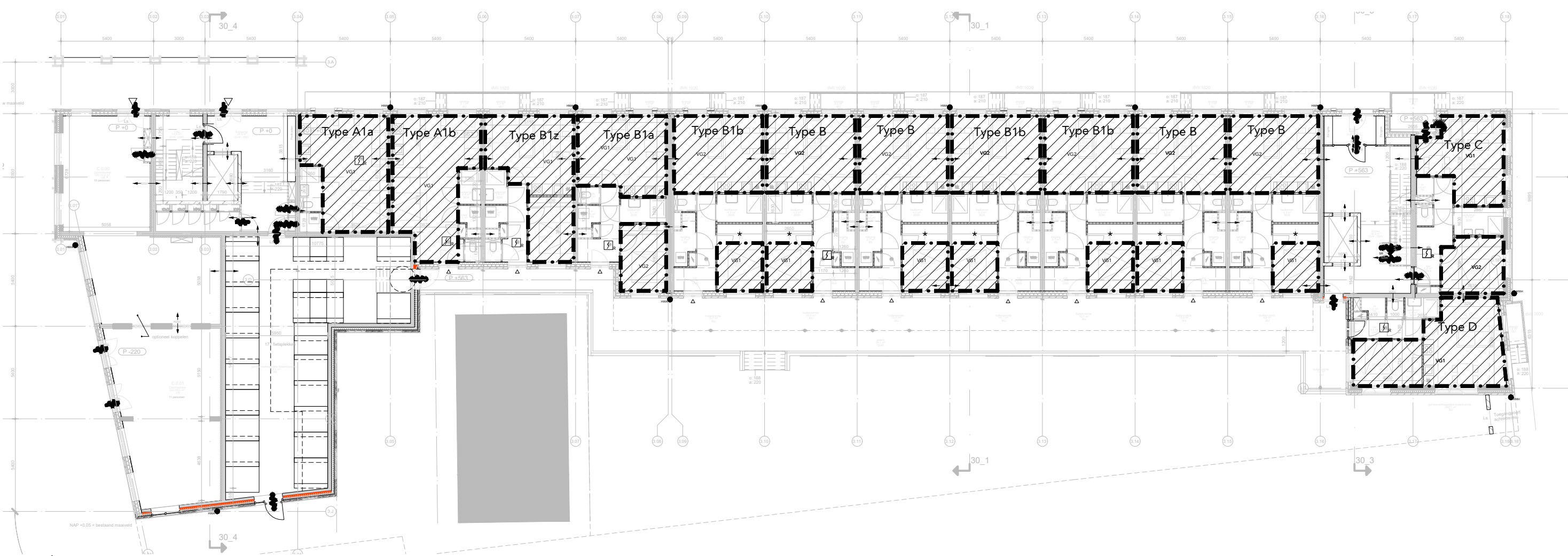
- ter plaatse van de hoofdentree dient een beltableau te worden gerealiseerd;
- de hoofdentree dient te worden voorzien van een intercominstallatie;
- de hoofdentree dient te kunnen worden geopend vanuit de appartementen;
- de entreedeur van het woongebouw dient zelfsluitend te zijn.

## BIJLAGE 1 – GEVELS EN PLATTEGRONDEN

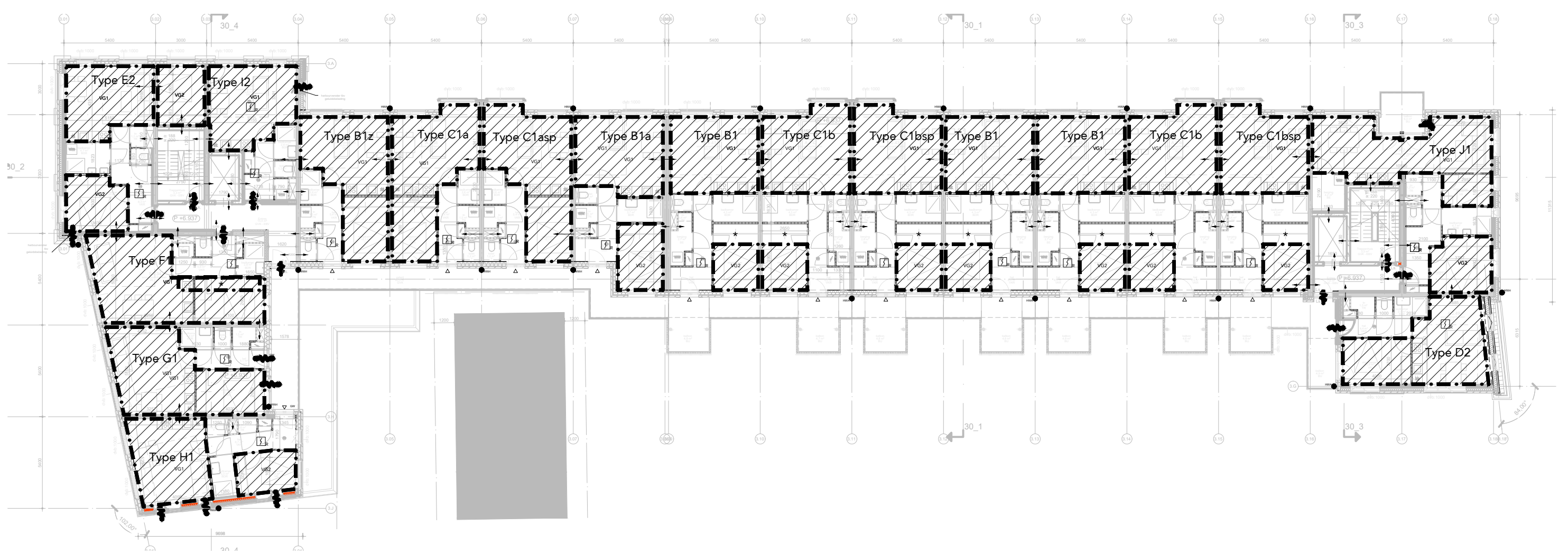


begane grond

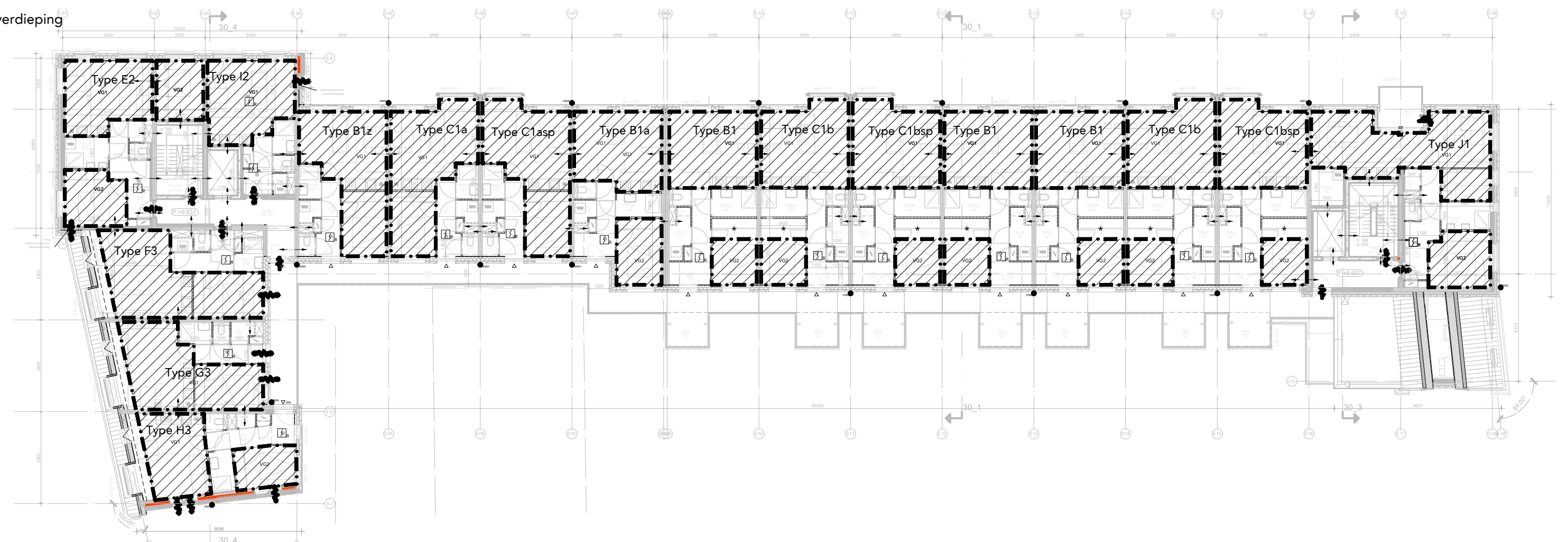
1e verdieping  
plattegronden met indeling verblijfsgebied



- LEGENDA
- rookmelder
  - reductie VG
  - toevoeging VG



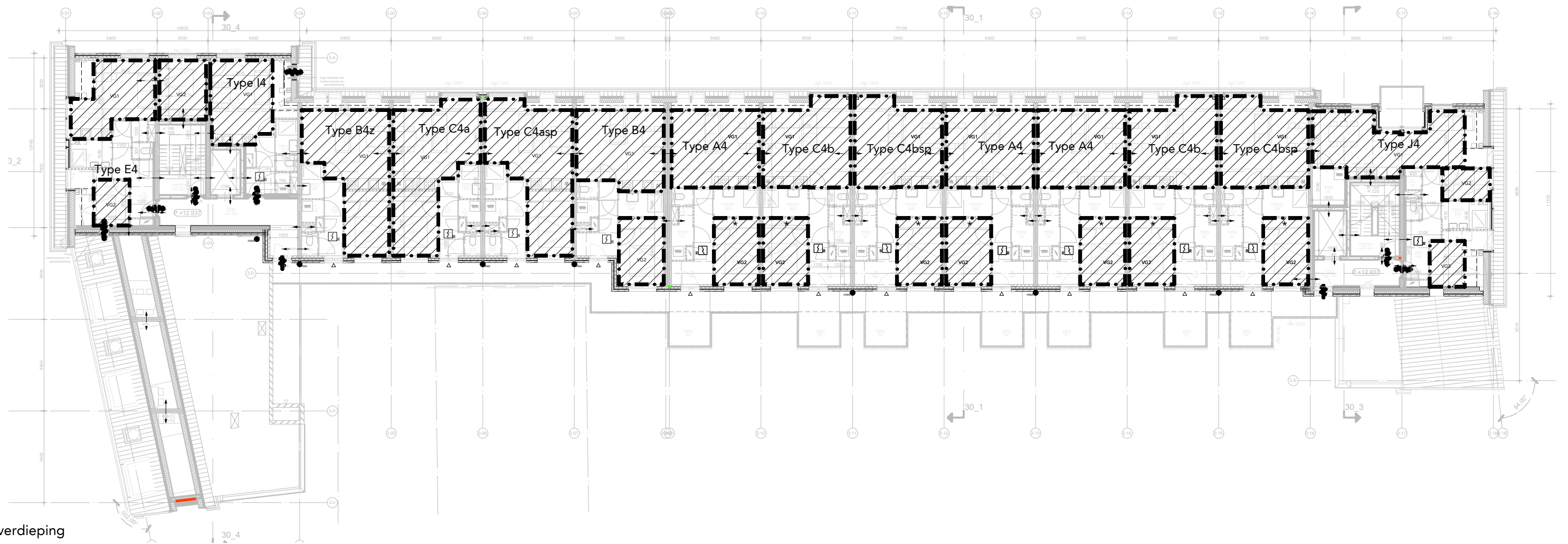
2e verdieping



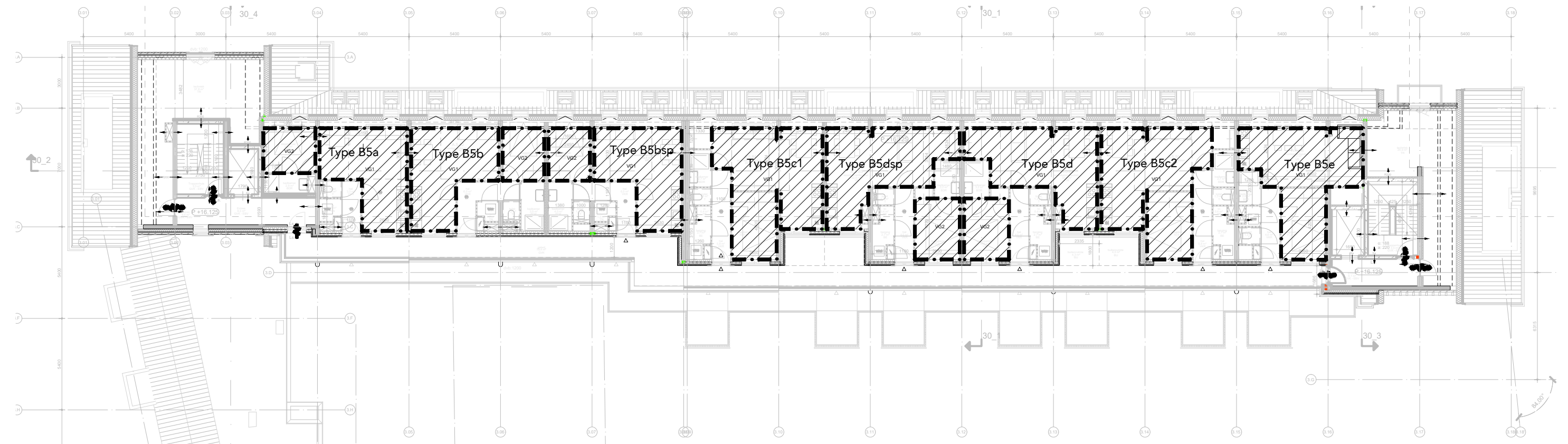
3e verdieping

- LEGENDA
- rookmelder
  - reductie VG
  - toevoeging VG



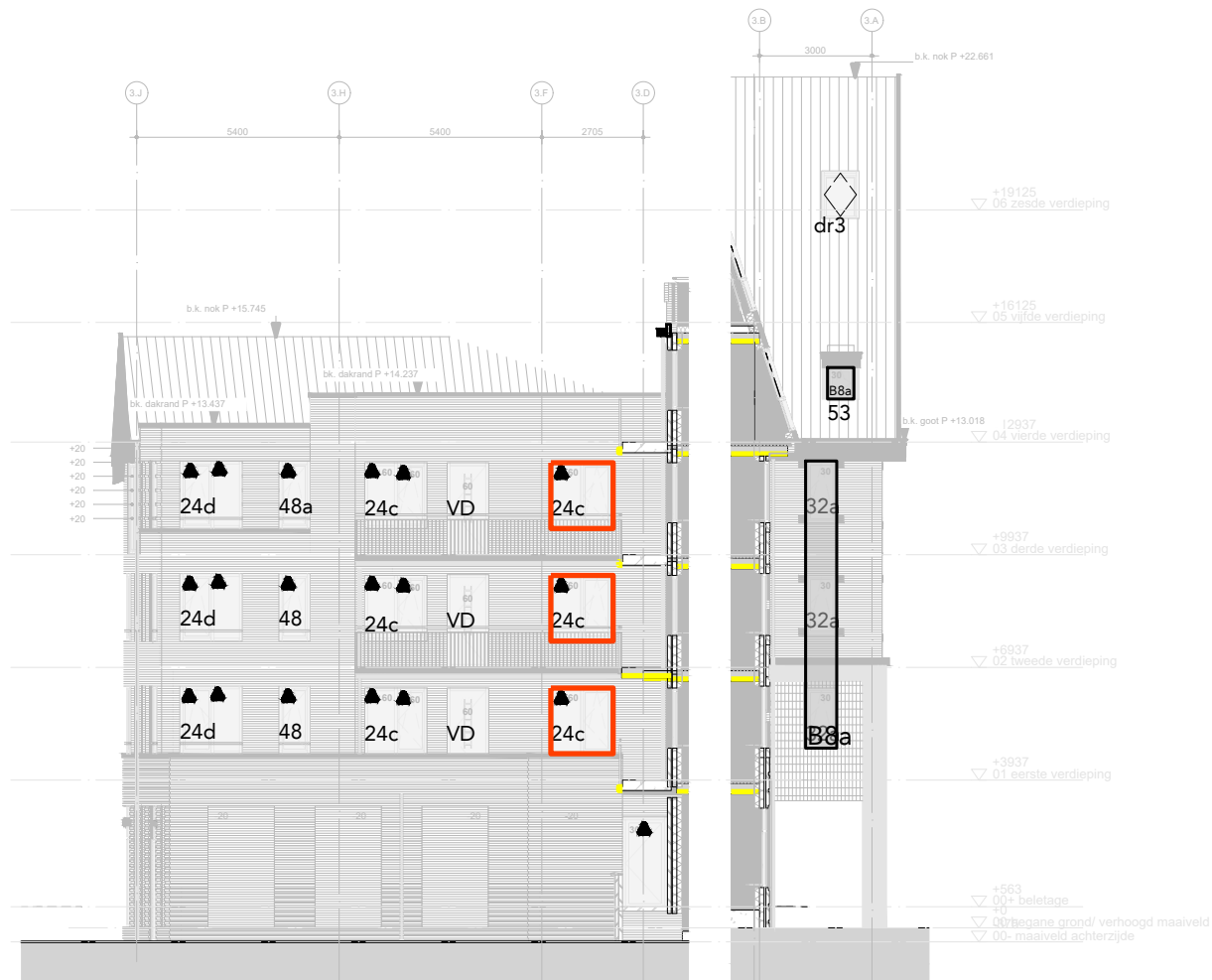


4e verdieping

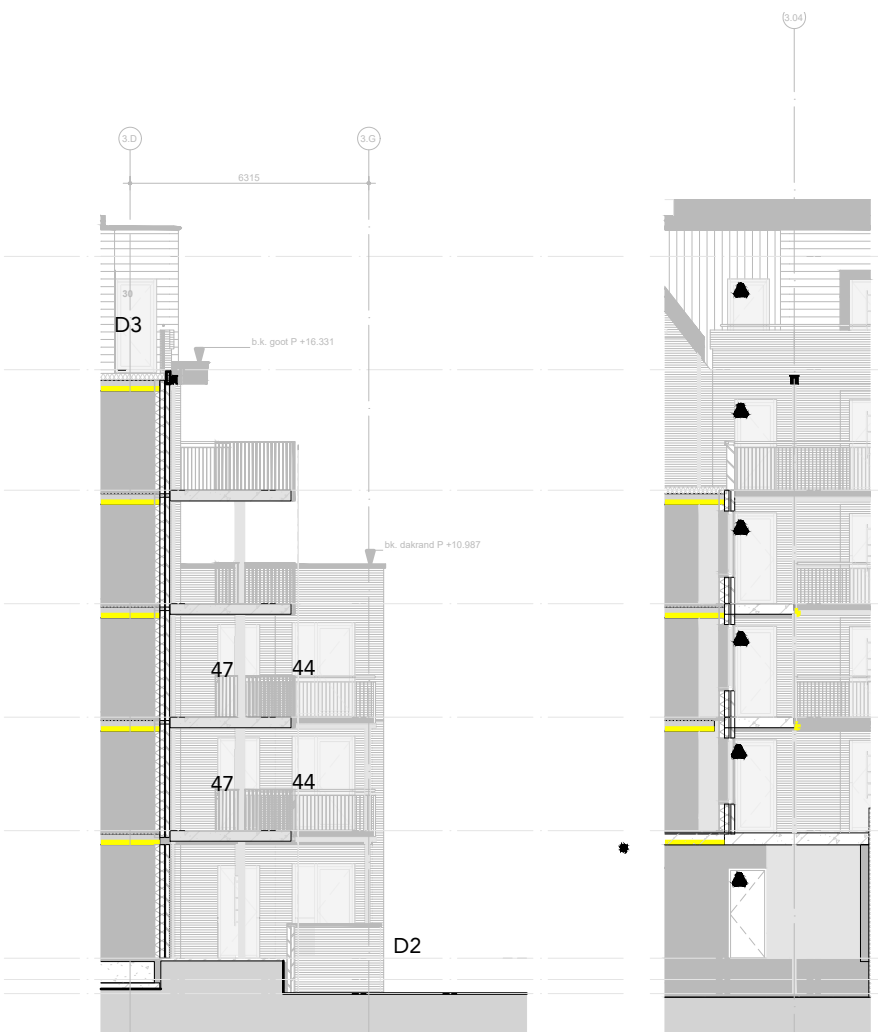


5e verdieping

- LEGENDA
-  rookmelder
  -  reductie VG
  -  toevoeging VG



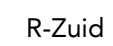
Binnen-Noordoost



Binnen-Zuidwest

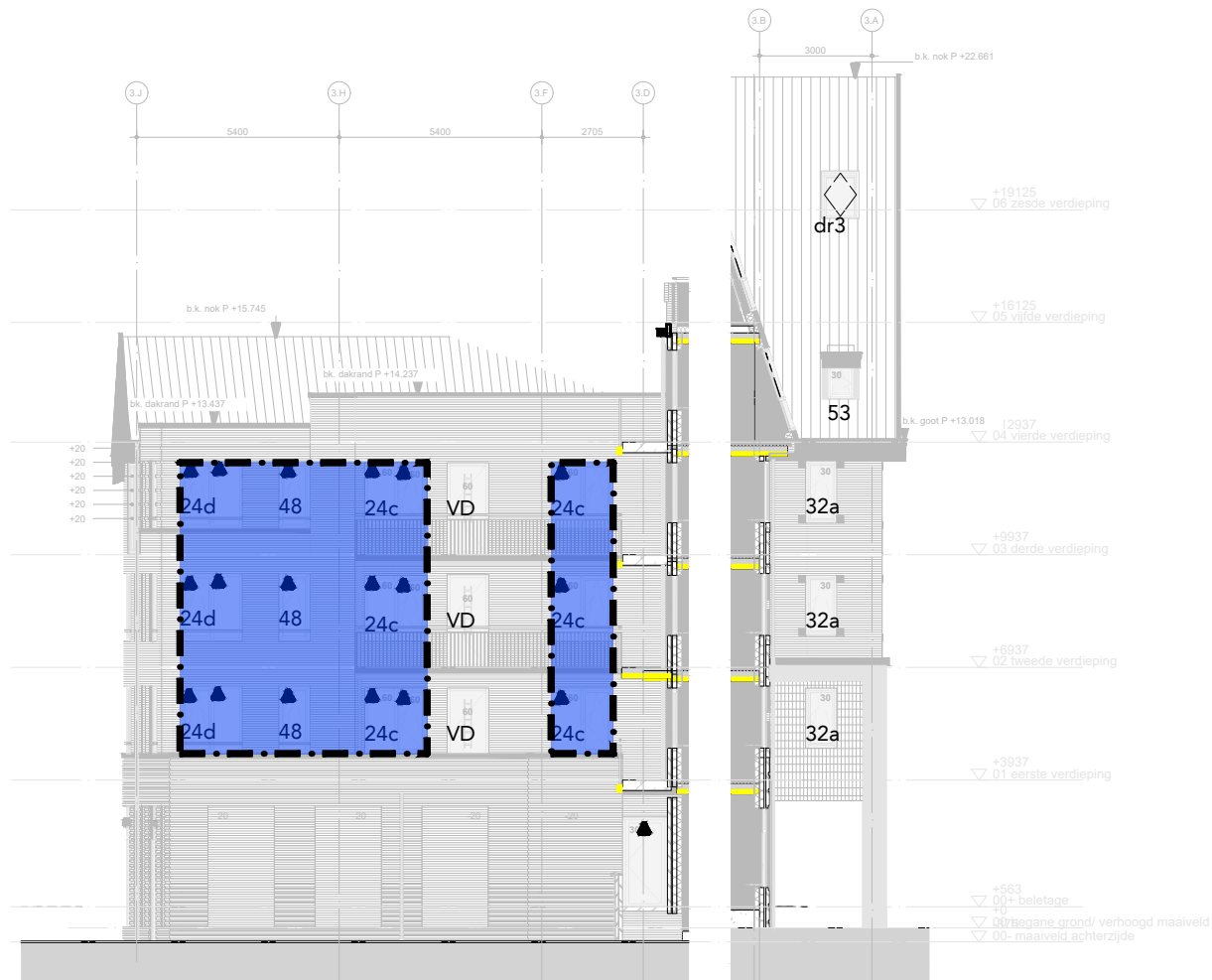
binnengevels  
geveltekeningen met kozijnmerken

LEGENDA  
30 minuten brandwerend

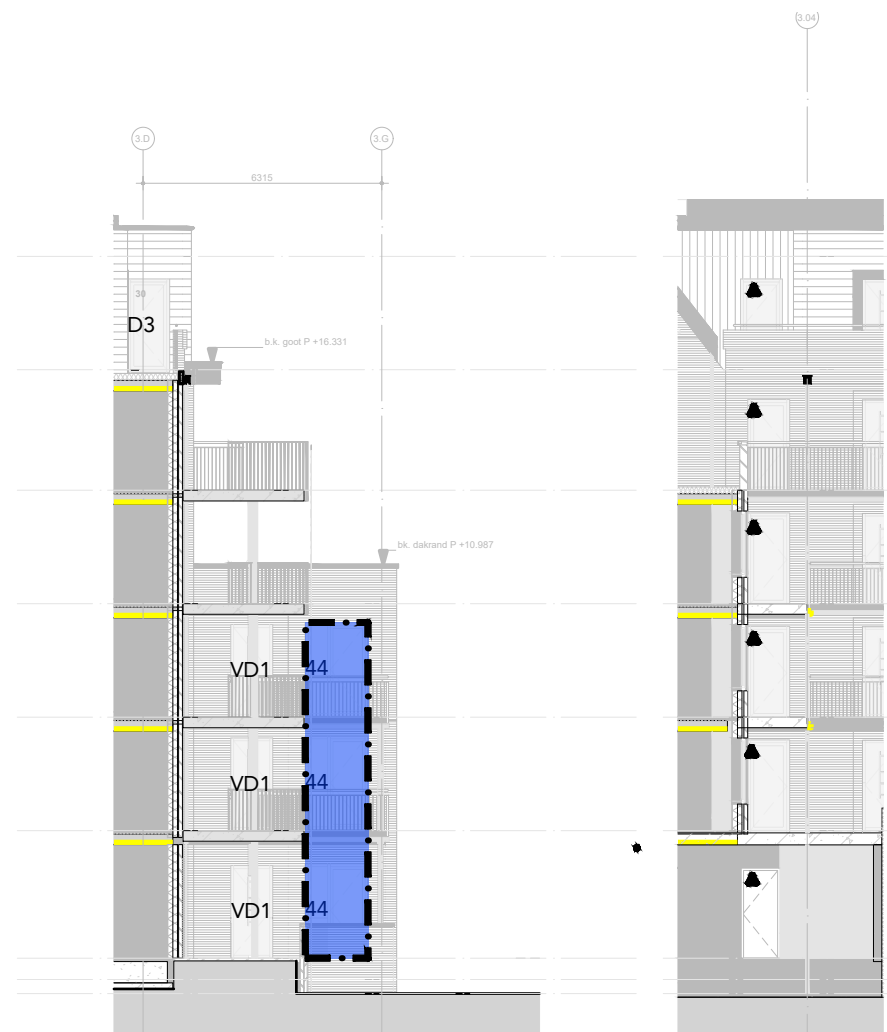








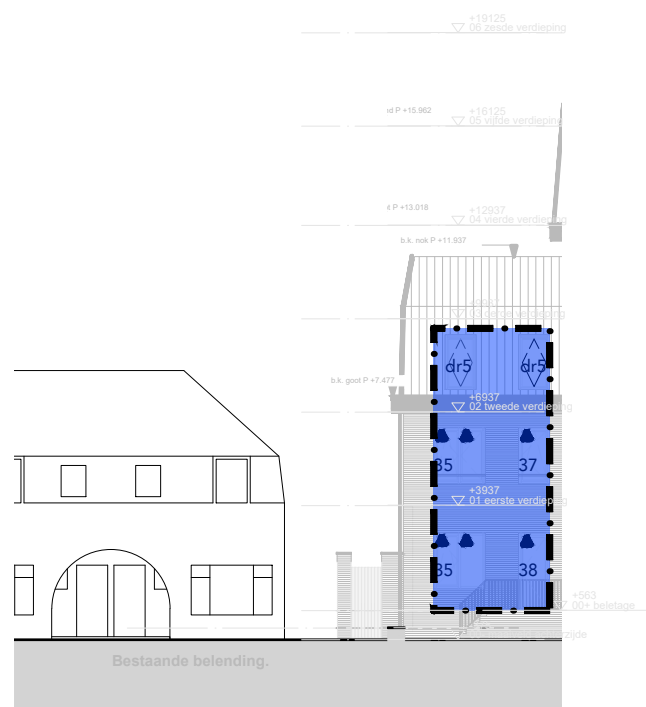
Binnen-Noordoost



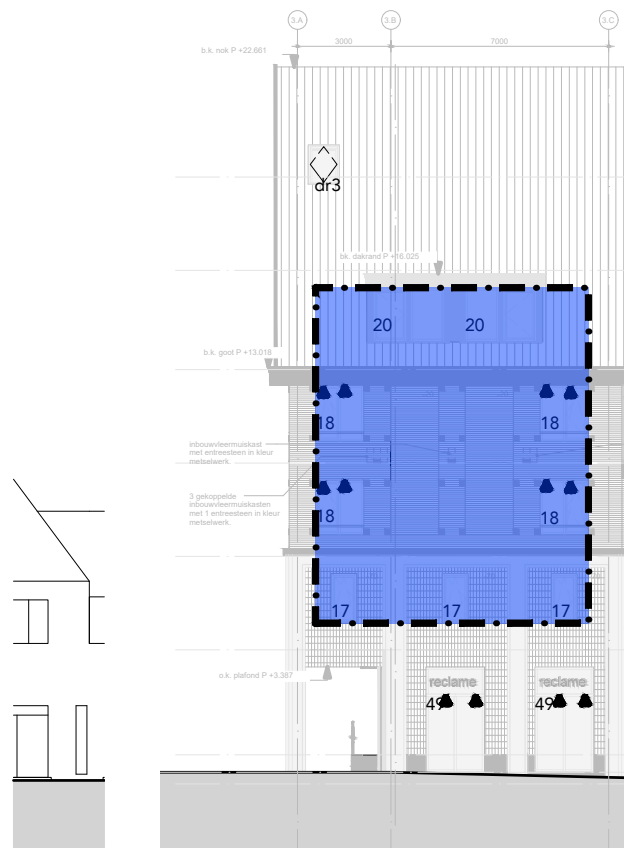
Binnen-Zuidwest

binnengevels met zonwerende beglazing  
geveltekeningen met kozijnmerken





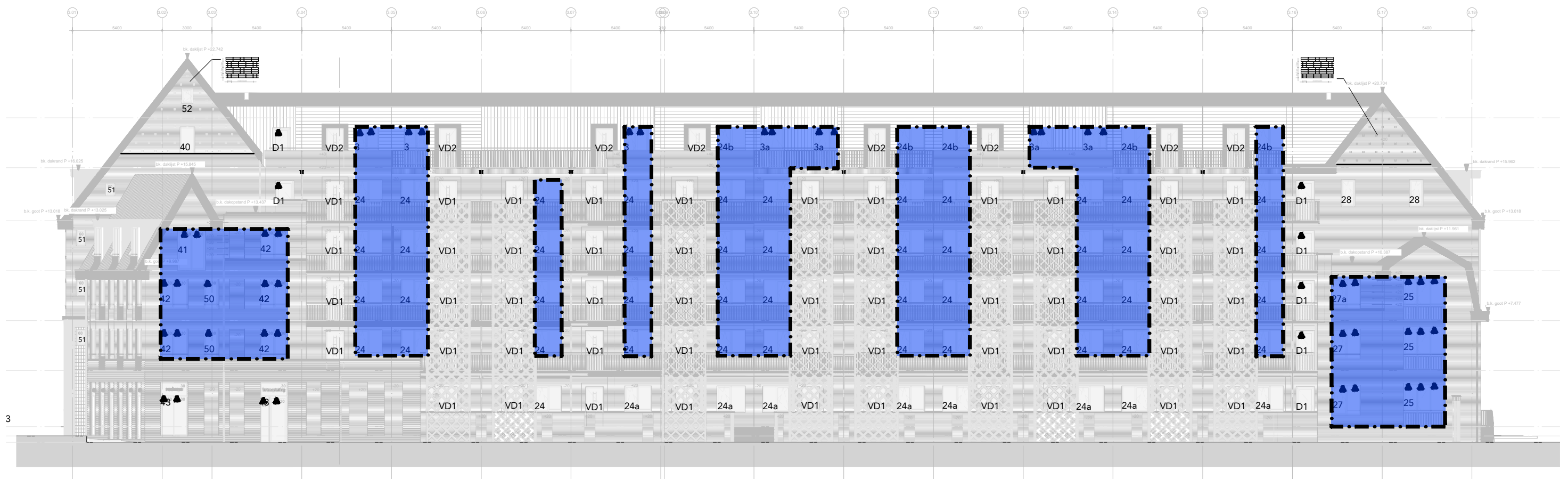
L-Noordoost



R-Zuidwest

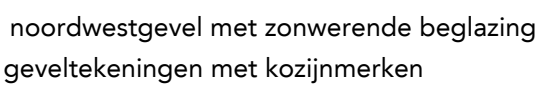


R-Zuid



3

zuidoostgevel met zonwerende beglazing  
geveltekeningen met kozijnmerken



## BIJLAGE 2 – BEREKENINGEN BRANDOVERSLAG

Met de "gereduceerde brand" mag worden gerekend als het brandcompartiment van waaruit de brandoverslag wordt bepaald, zich bevindt in een gebouw waarvan geen vloer van een gebruiksgebied op meer dan 20 m ligt boven het meetniveau.

Indien niet aan deze randvoorwaarde is voldaan, is gerekend met het brandtype "volledige brand".

Volgens de norm zijn de berekeningen alleen van toepassing als wordt voldaan aan de volgende voorwaarden:

### *Brandgedrag gevel*

De gevel van het gebouw waarin de ruimte is gelegen van waaruit de weerstand tegen brandoverslag wordt bepaald én het gebouw waarin de ruimte is gelegen van waar naartoe de weerstand tegen brandoverslag wordt bepaald, mag niet in belangrijke mate bijdragen aan de voortplanting over de gevel. Hieraan wordt geacht te worden voldaan als de buitenzijde voor tenminste 95% bestaat uit bouwmaterialcombinaties die ten minste voldoen aan klasse B, bepaald volgens NEN EN 13501-1.

### *Brandgevaarlijkheid van daken*

Het dak van de ruimte van waaruit de weerstand tegen brandoverslag wordt bepaald, mag niet brandgevaarlijk zijn zoals bepaald in NEN 6063.

### *Brandwerendheid van gevels en daken*

Gevels en daken moeten, uitgezonderd de gevel- en dakopeningen en de mogelijk als gevelopeningen aan te merken constructie-onderdelen als bedoeld in 6.4.3, in de richting waarin de brandoverslag wordt beschouwd een brandwerendheid, bepaald volgens NEN 6069 of volgens NEN-EN 1992-1-2, NEN-EN 1994-1-2, NEN-EN 1995-1-2 of NEN-EN 1996-1-2, hebben van ten minste 30 minuten, zij het dat met 20 minuten mag zijn volstaan in die situaties waarbij een weerstand tegen branddoorslag en brandoverslag geldt van ten minste 20 minuten.

De brandwerendheid met betrekking tot de scheidende functie van een constructiedeel is ten hoogste gelijk aan de brandwerendheid met betrekking tot bezwijken van de onlosmakelijk met het constructiedeel verbonden bouwconstructie. Hierbij geldt tevens het volgende:

- bij een wbdbo-eis van 60 minuten geldt een deel van gevel of dak niet als opening als de brandwerendheid met betrekking tot de scheidende functie groter is dan 30 minuten;
- indien aan een beweegbaar constructieonderdeel, toegepast in de gevel of het dak, een brandwerendheid met betrekking tot de scheidende functie wordt toegekend, geldt niet gelijktijdig het vereiste van zelfsluitendheid.

### *Opslag brandgevaarlijke stoffen*

De brandruimte wordt niet gebruikt voor opslag waarvoor op basis van de Wet Milieubeheer voorgeschreven is dat deze moeten worden opgeslagen in een apart brandcompartiment.

| BRANDSCENARIO'S |       |         |             |        |        |       |      |              |       |             |       |      |       |      |      |
|-----------------|-------|---------|-------------|--------|--------|-------|------|--------------|-------|-------------|-------|------|-------|------|------|
| Naam            | Brand | Opening | Positie     | Rechts | Omhoog | Terug | Hoek | Versie       | kW/m2 | Beoordeling | Tf    | R    | Deff  | Hn   | Opp  |
| V1              | BC1   | to_0    | Middenboven | 0,00   | 0,42   | 0,00  | 0,0  | NEN6068_2020 | 13,0  | Ok          | 957,1 | 0,81 | 11,85 | 0,95 | 55,1 |
| V2              | BC1   | to_4    | Middenboven | 0,00   | 0,42   | 0,00  | 0,0  | NEN6068_2020 | 14,6  | Ok          | 957,1 | 0,81 | 11,85 | 0,95 | 55,1 |
| V3              | BC1   | to_1    | Middenboven | 0,00   | 1,40   | 0,00  | 0,0  | NEN6068_2020 | 3,1   | Ok          | 957,1 | 0,81 | 11,85 | 0,95 | 55,1 |

BRANDRUIMTEN

| Naam | Hoog | Gereduceerd | Nivo | Ruimtesoort | WBDBO | Plafond | Samen | Blok                          |
|------|------|-------------|------|-------------|-------|---------|-------|-------------------------------|
| BC1  | 2,70 | Nee         | 0,00 | brandruimte | 60    | 0,30    |       | tg_6 tg_1 tg_2 tg_3 tg_4 tg_5 |

GEVELS

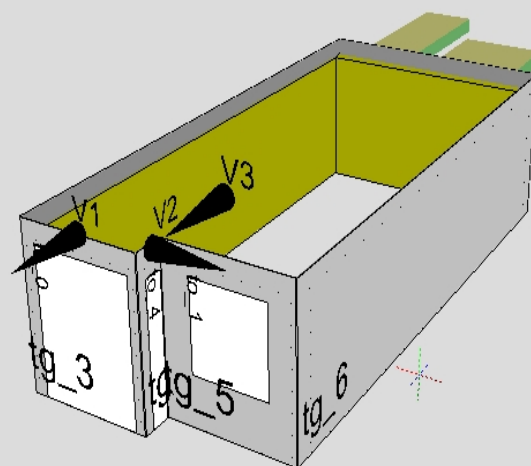
| Naam | LO_x | LO_y  | RO_x | RO_y  | Hoogte | Hoek  | Omhoog | Wanddikte |
|------|------|-------|------|-------|--------|-------|--------|-----------|
| tg_1 | ,60  | -7,60 | 6,00 | -7,60 | 3,00   | 90,00 | ,00    | ,400      |
| tg_2 | 6,00 | -7,60 | 6,00 | 4,10  | 3,00   | 90,00 | ,00    | ,100      |
| tg_3 | 6,00 | 4,10  | 3,40 | 4,10  | 3,00   | 90,00 | ,00    | ,200      |
| tg_4 | 3,40 | 4,10  | 3,40 | 3,45  | 3,00   | 90,00 | ,00    | ,100      |
| tg_5 | 3,40 | 3,45  | ,65  | 3,45  | 3,00   | 90,00 | ,00    | ,400      |
| tg_6 | ,65  | 3,45  | ,60  | -7,60 | 3,00   | 90,00 | ,00    | ,100      |

OPENINGEN

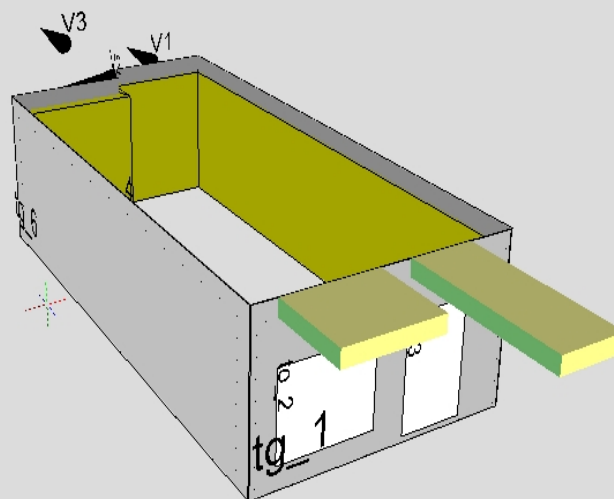
| Naam | Rechts | Omhoog | Breedte | Hoogte | Brandwerend | Balkon/Overstek | Opgaand/type | Gevel(s) | Brandruimte |
|------|--------|--------|---------|--------|-------------|-----------------|--------------|----------|-------------|
| to_0 | ,30    | ,00    | 2,10    | 2,60   | ,00         | ,00             | Opgaand      | tg_3     | BC1         |
| to_1 | ,60    | ,90    | 1,60    | 1,60   | ,00         | ,00             | Opgaand      | tg_5     | BC1         |
| to_2 | ,50    | ,40    | 2,00    | 1,55   | ,00         | ,00             | Opgaand      | tg_1     | BC1         |
| to_3 | 3,15   | ,10    | 1,29    | 2,00   | ,00         | ,00             | Opgaand      | tg_1     | BC1         |
| to_4 | ,20    | ,00    | ,40     | 2,50   | ,00         | ,00             | Opgaand      | tg_4     | BC1         |



2022-03-25 tussen 3.10-3.11\_3\_0001.jpg



2022-03-25 tussen 3.10-3.11\_3\_0002.jpg



## BIJLAGE 3 – BEREKENINGEN NAGALMTIJD

project : Peperstraat, Blok 3  
projectnummer : 820209  
opdrachtgever : Opportunity Vastgoed B.V.  
architect : PPHP

onderwerp : nagalm VR1- entree + trappe  
filenummer : X820209aaAH  
datum : 28-06-2022  
gewijzigd : 30-07-2025

| GEGEVENS RUIMTE                                                      |            |                          |                             |                                                            |      |      |      |      |  |
|----------------------------------------------------------------------|------------|--------------------------|-----------------------------|------------------------------------------------------------|------|------|------|------|--|
| omschrijving                                                         | :          | VR1 entree + trappenhuis |                             |                                                            |      |      |      |      |  |
| oppervlakte                                                          | :          | 114.3 m <sup>2</sup>     | trap+bordes+ vloeren        |                                                            |      |      |      |      |  |
| omtrek                                                               | :          | 48.9 m                   |                             |                                                            |      |      |      |      |  |
| hoogte                                                               | :          | m                        |                             |                                                            |      |      |      |      |  |
| volume                                                               | :          | 284.9 m <sup>3</sup>     |                             |                                                            |      |      |      |      |  |
| oktaafbandmiddenfrequentie [Hz]                                      |            |                          |                             | 125                                                        | 250  | 500  | 1000 | 2000 |  |
| locatie                                                              | categorie  | omschrijving constructie | oppervlak [m <sup>2</sup> ] | absorptiecoëfficiënten [m <sup>2</sup> OR/m <sup>2</sup> ] |      |      |      |      |  |
| vloer                                                                | : algemeen | gladde vloerafwerking    | 43.8                        | 0.01                                                       | 0.01 | 0.02 | 0.02 | 0.03 |  |
| trap/bordes                                                          | : algemeen | gladde vloerafwerking    | 70.5                        | 0.01                                                       | 0.01 | 0.02 | 0.02 | 0.03 |  |
| wand                                                                 | : algemeen | gladde wandafwerking     | 343.4                       | 0.01                                                       | 0.01 | 0.02 | 0.02 | 0.02 |  |
| wandopening                                                          | : algemeen | ramen en deuren          | 11.0                        | 0.10                                                       | 0.04 | 0.03 | 0.02 | 0.02 |  |
| plafond/bordes                                                       | : algemeen | gladde plafondafwerking  | 75.3                        | 0.01                                                       | 0.01 | 0.02 | 0.02 | 0.03 |  |
| plafond                                                              | : plafond  | Ecophon Master B - 40mm  | 39.0                        | 0.25                                                       | 0.80 | 0.95 | 0.95 | 1.00 |  |
| BEREKENING NAGALMTIJD                                                |            |                          |                             | totale absorptie [m <sup>2</sup> OR]                       |      |      |      |      |  |
| vloer                                                                | : algemeen | gladde vloerafwerking    |                             | 0.4                                                        | 0.4  | 0.9  | 0.9  | 1.3  |  |
| wand                                                                 | : algemeen | gladde wandafwerking     |                             | 3.4                                                        | 3.4  | 6.9  | 6.9  | 6.9  |  |
| wandopening                                                          | : algemeen | ramen en deuren          |                             | 1.1                                                        | 0.4  | 0.3  | 0.2  | 0.2  |  |
| plafond/bordes                                                       | : algemeen | gladde plafondafwerking  |                             | 0.8                                                        | 0.8  | 1.5  | 1.5  | 2.3  |  |
| plafond                                                              | : plafond  | Ecophon Master B - 40mm  |                             | 9.8                                                        | 31.2 | 37.1 | 37.1 | 39.0 |  |
| totale absorptie [m <sup>2</sup> OR]                                 |            |                          |                             | 15.5                                                       | 36.3 | 46.6 | 46.5 | 49.7 |  |
| gerealiseerde nagalmtijd T [s]                                       |            |                          |                             | 3.07                                                       | 1.31 | 1.02 | 1.02 | 0.96 |  |
| vereiste absorptie volgens Bouwbesluit art. 3.13 [m <sup>2</sup> OR] |            |                          |                             |                                                            | 35.6 | 35.6 | 35.6 | 35.6 |  |
| vereiste nagalmtijd volgens Bouwbesluit art. 3.13 [s]                |            |                          |                             |                                                            | 1.33 | 1.33 | 1.33 | 1.33 |  |

project : Peperstraat, Blok 3  
projectnummer : 820209  
opdrachtgever : Opportunity Vastgoed B.V.  
architect : PPHP

onderwerp : nagalm VR2 entreehal  
filenummer : X820209aaAH  
datum : 28-06-2022  
gewijzigd : 30-07-2025

| GEGEVENS RUIMTE                                                      |            |                          |                             |                                                            |                                      |      |      |      |      |
|----------------------------------------------------------------------|------------|--------------------------|-----------------------------|------------------------------------------------------------|--------------------------------------|------|------|------|------|
| omschrijving                                                         | :          | VR2 Entreehal            |                             |                                                            |                                      |      |      |      |      |
| oppervlakte                                                          | :          | 27.2 m <sup>2</sup>      |                             |                                                            |                                      |      |      |      |      |
| omtrek                                                               | :          | 27.8 m                   |                             |                                                            |                                      |      |      |      |      |
| hoogte                                                               | :          | 3.7 m                    |                             |                                                            |                                      |      |      |      |      |
| volume                                                               | :          | 100.6 m <sup>3</sup>     |                             |                                                            |                                      |      |      |      |      |
| oktaafbandmiddenfrequentie [Hz]                                      |            |                          |                             |                                                            | 125                                  | 250  | 500  | 1000 | 2000 |
| locatie                                                              | categorie  | omschrijving constructie | oppervlak [m <sup>2</sup> ] | absorptiecoëfficiënten [m <sup>2</sup> OR/m <sup>2</sup> ] |                                      |      |      |      |      |
| vloer                                                                | : algemeen | gladde vloerafwerking    | 27.2                        | 0.01                                                       | 0.01                                 | 0.02 | 0.02 | 0.03 |      |
| wand                                                                 | : algemeen | gladde wandafwerking     | 89.7                        | 0.01                                                       | 0.01                                 | 0.02 | 0.02 | 0.02 |      |
| wandopening                                                          | : algemeen | ramen en deuren          | 13.2                        | 0.10                                                       | 0.04                                 | 0.03 | 0.02 | 0.02 |      |
| plafond/bordes                                                       | : algemeen | gladde plafondafwerking  | 13.2                        | 0.01                                                       | 0.01                                 | 0.02 | 0.02 | 0.03 |      |
| plafond                                                              | : plafond  | Ecophon Master B - 40mm  | 14.0                        | 0.25                                                       | 0.80                                 | 0.95 | 0.95 | 1.00 |      |
| BEREKENING NAGALMTIJD                                                |            |                          |                             |                                                            | totale absorptie [m <sup>2</sup> OR] |      |      |      |      |
| vloer                                                                | : algemeen | gladde vloerafwerking    |                             | 0.3                                                        | 0.3                                  | 0.5  | 0.5  | 0.8  |      |
| wand                                                                 | : algemeen | gladde wandafwerking     |                             | 0.9                                                        | 0.9                                  | 1.8  | 1.8  | 1.8  |      |
| wandopening                                                          | : algemeen | ramen en deuren          |                             | 1.3                                                        | 0.5                                  | 0.4  | 0.3  | 0.3  |      |
| plafond/bordes                                                       | : algemeen | gladde plafondafwerking  |                             | 0.1                                                        | 0.1                                  | 0.3  | 0.3  | 0.4  |      |
| plafond                                                              | : plafond  | Ecophon Master B - 40mm  |                             | 3.5                                                        | 11.2                                 | 13.3 | 13.3 | 14.0 |      |
| totale absorptie [m <sup>2</sup> OR]                                 |            |                          |                             | 6.1                                                        | 13.0                                 | 16.3 | 16.2 | 17.3 |      |
| gerealiseerde nagalmtijd T [s]                                       |            |                          |                             | 2.74                                                       | 1.29                                 | 1.03 | 1.04 | 0.97 |      |
| vereiste absorptie volgens Bouwbesluit art. 3.13 [m <sup>2</sup> OR] |            |                          |                             |                                                            | 12.6                                 | 12.6 | 12.6 | 12.6 |      |
| vereiste nagalmtijd volgens Bouwbesluit art. 3.13 [s]                |            |                          |                             |                                                            | 1.33                                 | 1.33 | 1.33 | 1.33 |      |

project : Peperstraat, Blok 3  
 projectnummer : 820209  
 opdrachtgever : Opportunity Vastgoed B.V.  
 architect : PPHP

onderwerp : nagalm VR2 trappenhuis  
 filenummer : X820209aaAH  
 datum : 28-06-2022  
 gewijzigd : 30-07-2025

| GEGEVENS RUIMTE                                                      |                   |                          |                             |                                                            |      |      |      |      |  |
|----------------------------------------------------------------------|-------------------|--------------------------|-----------------------------|------------------------------------------------------------|------|------|------|------|--|
| omschrijving                                                         | : VR2 trappenhuis |                          |                             |                                                            |      |      |      |      |  |
| oppervlakte                                                          | :                 | 94.4 m <sup>2</sup>      | trap+bordes+ vloeren        |                                                            |      |      |      |      |  |
| omtrek                                                               | :                 | 15.0 m                   |                             |                                                            |      |      |      |      |  |
| hoogte                                                               | :                 | 16.0 m                   |                             |                                                            |      |      |      |      |  |
| volume                                                               | :                 | 208.0 m <sup>3</sup>     |                             |                                                            |      |      |      |      |  |
| oktaafbandmiddenfrequentie [Hz]                                      |                   |                          |                             | 125                                                        | 250  | 500  | 1000 | 2000 |  |
| locatie                                                              | categorie         | omschrijving constructie | oppervlak [m <sup>2</sup> ] | absorptiecoëfficiënten [m <sup>2</sup> OR/m <sup>2</sup> ] |      |      |      |      |  |
| vloer + plafond dak                                                  | : algemeen        | gladde vloerafwerking    | 26.2                        | 0.01                                                       | 0.01 | 0.02 | 0.02 | 0.03 |  |
| trap/bordes                                                          | : algemeen        | gladde vloerafwerking    | 68.2                        | 0.01                                                       | 0.01 | 0.02 | 0.02 | 0.03 |  |
| wand                                                                 | : algemeen        | gladde wandafwerking     | 226.8                       | 0.01                                                       | 0.01 | 0.02 | 0.02 | 0.02 |  |
| wandopening                                                          | : algemeen        | ramen en deuren          | 13.2                        | 0.10                                                       | 0.04 | 0.03 | 0.02 | 0.02 |  |
| plafond/bordes                                                       | : algemeen        | gladde plafondaafwerking | 66.4                        | 0.01                                                       | 0.01 | 0.02 | 0.02 | 0.03 |  |
| plafond                                                              | : plafond         | Ecophon Master B - 40mm  | 28.0                        | 0.25                                                       | 0.80 | 0.95 | 0.95 | 1.00 |  |
| BEREKENING NAGALMTIJD                                                |                   |                          |                             | totale absorptie [m <sup>2</sup> OR]                       |      |      |      |      |  |
| vloer + plafond dak                                                  | : algemeen        | gladde vloerafwerking    |                             | 0.3                                                        | 0.3  | 0.5  | 0.5  | 0.8  |  |
| wand                                                                 | : algemeen        | gladde wandafwerking     |                             | 2.3                                                        | 2.3  | 4.5  | 4.5  | 4.5  |  |
| wandopening                                                          | : algemeen        | ramen en deuren          |                             | 1.3                                                        | 0.5  | 0.4  | 0.3  | 0.3  |  |
| plafond/bordes                                                       | : algemeen        | gladde plafondaafwerking |                             | 0.7                                                        | 0.7  | 1.3  | 1.3  | 2.0  |  |
| plafond                                                              | : plafond         | Ecophon Master B - 40mm  |                             | 7.0                                                        | 22.4 | 26.6 | 26.6 | 28.0 |  |
| totale absorptie [m <sup>2</sup> OR]                                 |                   |                          |                             | 11.5                                                       | 26.1 | 33.4 | 33.3 | 35.6 |  |
| gerealiseerde nagalmtijd T [s]                                       |                   |                          |                             | 3.01                                                       | 1.33 | 1.04 | 1.04 | 0.97 |  |
| vereiste absorptie volgens Bouwbesluit art. 3.13 [m <sup>2</sup> OR] |                   |                          |                             |                                                            | 26.0 | 26.0 | 26.0 | 26.0 |  |
| vereiste nagalmtijd volgens Bouwbesluit art. 3.13 [s]                |                   |                          |                             |                                                            | 1.33 | 1.33 | 1.33 | 1.33 |  |

project : Peperstraat, Blok 3  
projectnummer : 820209  
opdrachtgever : Opportunity Vastgoed B.V.  
architect : PPHP

onderwerp : nagalm  
filenummer : X820209aaAH  
datum : 28-06-2022  
gewijzigd : 30-07-2025

| GEGEVENS RUIMTE                                                      |            |                                       |                             |                                                            |                                      |      |      |      |      |
|----------------------------------------------------------------------|------------|---------------------------------------|-----------------------------|------------------------------------------------------------|--------------------------------------|------|------|------|------|
| omschrijving                                                         | :          | entree as 3.02-3.04, 1e-4e verdieping |                             |                                                            |                                      |      |      |      |      |
| oppervlakte                                                          | :          | 15.3 m <sup>2</sup>                   |                             |                                                            |                                      |      |      |      |      |
| omtrek                                                               | :          | 23.0 m                                |                             |                                                            |                                      |      |      |      |      |
| hoogte                                                               | :          | 2.6 m                                 |                             |                                                            |                                      |      |      |      |      |
| volume                                                               | :          | 40.2 m <sup>3</sup>                   |                             |                                                            |                                      |      |      |      |      |
| oktaafbandmiddenfrequentie [Hz]                                      |            |                                       |                             |                                                            | 125                                  | 250  | 500  | 1000 | 2000 |
| locatie                                                              | categorie  | omschrijving constructie              | oppervlak [m <sup>2</sup> ] | absorptiecoëfficiënten [m <sup>2</sup> OR/m <sup>2</sup> ] |                                      |      |      |      |      |
| vloer                                                                | : algemeen | gladde vloerafwerking                 | 15.3                        | 0.01                                                       | 0.01                                 | 0.02 | 0.02 | 0.03 |      |
| wand                                                                 | : algemeen | gladde wandafwerking                  | 49.5                        | 0.01                                                       | 0.01                                 | 0.02 | 0.02 | 0.02 |      |
| wandopening                                                          | : algemeen | ramen en deuren                       | 11.0                        | 0.10                                                       | 0.04                                 | 0.03 | 0.02 | 0.02 |      |
| plafond                                                              | : algemeen | gladde plafondafwerking               | 10.3                        | 0.01                                                       | 0.01                                 | 0.02 | 0.02 | 0.03 |      |
| plafond                                                              | : plafond  | Ecophon Master B - 40mm               | 5.0                         | 0.25                                                       | 0.80                                 | 0.95 | 0.95 | 1.00 |      |
| BEREKENING NAGALMTIJD                                                |            |                                       |                             |                                                            | totale absorptie [m <sup>2</sup> OR] |      |      |      |      |
| vloer                                                                | : algemeen | gladde vloerafwerking                 |                             | 0.2                                                        | 0.2                                  | 0.3  | 0.3  | 0.5  |      |
| wand                                                                 | : algemeen | gladde wandafwerking                  |                             | 0.5                                                        | 0.5                                  | 1.0  | 1.0  | 1.0  |      |
| wandopening                                                          | : algemeen | ramen en deuren                       |                             | 1.1                                                        | 0.4                                  | 0.3  | 0.2  | 0.2  |      |
| plafond                                                              | : algemeen | gladde plafondafwerking               |                             | 0.1                                                        | 0.1                                  | 0.2  | 0.2  | 0.3  |      |
| plafond                                                              | : plafond  | Ecophon Master B - 40mm               |                             | 1.3                                                        | 4.0                                  | 4.8  | 4.8  | 5.0  |      |
| totale absorptie [m <sup>2</sup> OR]                                 |            |                                       |                             | 3.1                                                        | 5.2                                  | 6.6  | 6.5  | 7.0  |      |
| gerealiseerde nagalmtijd T [s]                                       |            |                                       |                             | 2.16                                                       | 1.29                                 | 1.02 | 1.04 | 0.96 |      |
| vereiste absorptie volgens Bouwbesluit art. 3.13 [m <sup>2</sup> OR] |            |                                       |                             |                                                            | 5.0                                  | 5.0  | 5.0  | 5.0  |      |
| vereiste nagalmtijd volgens Bouwbesluit art. 3.13 [s]                |            |                                       |                             |                                                            | 1.33                                 | 1.33 | 1.33 | 1.33 |      |

project : Peperstraat, Blok 3  
projectnummer : 820209  
opdrachtgever : Opportunity Vastgoed B.V.  
architect : PPHP

onderwerp : nagalm  
filenummer : X820209aaAH  
datum : 28-06-2022  
gewijzigd : 30-07-2025

| GEGEVENS RUIMTE                                                      |            |                          |                             |                                                            |                                      |      |      |      |      |
|----------------------------------------------------------------------|------------|--------------------------|-----------------------------|------------------------------------------------------------|--------------------------------------|------|------|------|------|
| omschrijving                                                         | :          | entree as 3.16-3.17      |                             |                                                            |                                      |      |      |      |      |
| oppervlakte                                                          | :          | 7.6 m <sup>2</sup>       |                             |                                                            |                                      |      |      |      |      |
| omtrek                                                               | :          | 13.1 m                   |                             |                                                            |                                      |      |      |      |      |
| hoogte                                                               | :          | 2.6 m                    |                             |                                                            |                                      |      |      |      |      |
| volume                                                               | :          | 20.0 m <sup>3</sup>      |                             |                                                            |                                      |      |      |      |      |
| oktaafbandmiddenfrequentie [Hz]                                      |            |                          |                             |                                                            | 125                                  | 250  | 500  | 1000 | 2000 |
| locatie                                                              | categorie  | omschrijving constructie | oppervlak [m <sup>2</sup> ] | absorptiecoëfficiënten [m <sup>2</sup> OR/m <sup>2</sup> ] |                                      |      |      |      |      |
| vloer                                                                | : algemeen | gladde vloerafwerking    | 7.6                         | 0.01                                                       | 0.01                                 | 0.02 | 0.02 | 0.03 |      |
| wand                                                                 | : algemeen | gladde wandafwerking     | 25.7                        | 0.01                                                       | 0.01                                 | 0.02 | 0.02 | 0.02 |      |
| wandopening                                                          | : algemeen | ramen en deuren          | 8.8                         | 0.10                                                       | 0.04                                 | 0.03 | 0.02 | 0.02 |      |
| plafond                                                              | : algemeen | gladde plafondafwerking  | 5.1                         | 0.01                                                       | 0.01                                 | 0.02 | 0.02 | 0.03 |      |
| plafond                                                              | : plafond  | Ecophon Master B - 40mm  | 2.5                         | 0.25                                                       | 0.80                                 | 0.95 | 0.95 | 1.00 |      |
| BEREKENING NAGALMTIJD                                                |            |                          |                             |                                                            | totale absorptie [m <sup>2</sup> OR] |      |      |      |      |
| vloer                                                                | : algemeen | gladde vloerafwerking    |                             | 0.1                                                        | 0.1                                  | 0.2  | 0.2  | 0.2  |      |
| wand                                                                 | : algemeen | gladde wandafwerking     |                             | 0.3                                                        | 0.3                                  | 0.5  | 0.5  | 0.5  |      |
| wandopening                                                          | : algemeen | ramen en deuren          |                             | 0.9                                                        | 0.4                                  | 0.3  | 0.2  | 0.2  |      |
| plafond                                                              | : algemeen | gladde plafondafwerking  |                             | 0.1                                                        | 0.1                                  | 0.1  | 0.1  | 0.2  |      |
| plafond                                                              | : plafond  | Ecophon Master B - 40mm  |                             | 0.6                                                        | 2.0                                  | 2.4  | 2.4  | 2.5  |      |
| totale absorptie [m <sup>2</sup> OR]                                 |            |                          |                             |                                                            | 1.9                                  | 2.7  | 3.4  | 3.3  | 3.6  |
| gerealiseerde nagalmtijd T [s]                                       |            |                          |                             |                                                            | 1.76                                 | 1.22 | 0.98 | 1.00 | 0.93 |
| vereiste absorptie volgens Bouwbesluit art. 3.13 [m <sup>2</sup> OR] |            |                          |                             |                                                            |                                      | 2.5  | 2.5  | 2.5  | 2.5  |
| vereiste nagalmtijd volgens Bouwbesluit art. 3.13 [s]                |            |                          |                             |                                                            |                                      | 1.33 | 1.33 | 1.33 | 1.33 |



project : Peperstraat, Blok 3  
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filenummer : X820209aaAH  
datum : 28-06-2022  
gewijzigd : 30-07-2025

| GEGEVENS RUIMTE                                                      |            |                                    |                             |                                                            |                                      |      |      |      |      |
|----------------------------------------------------------------------|------------|------------------------------------|-----------------------------|------------------------------------------------------------|--------------------------------------|------|------|------|------|
| omschrijving                                                         | :          | entree as 3.02-3.04, 5e verdieping |                             |                                                            |                                      |      |      |      |      |
| oppervlakte                                                          | :          | 13.0 m <sup>2</sup>                |                             |                                                            |                                      |      |      |      |      |
| omtrek                                                               | :          | 19.5 m                             |                             |                                                            |                                      |      |      |      |      |
| hoogte                                                               | :          | 2.6 m                              |                             |                                                            |                                      |      |      |      |      |
| volume                                                               | :          | 34.2 m <sup>3</sup>                |                             |                                                            |                                      |      |      |      |      |
| oktaafbandmiddenfrequentie [Hz]                                      |            |                                    |                             |                                                            | 125                                  | 250  | 500  | 1000 | 2000 |
| locatie                                                              | categorie  | omschrijving constructie           | oppervlak [m <sup>2</sup> ] | absorptiecoëfficiënten [m <sup>2</sup> OR/m <sup>2</sup> ] |                                      |      |      |      |      |
| vloer                                                                | : algemeen | gladde vloerafwerking              | 13.0                        | 0.01                                                       | 0.01                                 | 0.02 | 0.02 | 0.03 |      |
| wand                                                                 | : algemeen | gladde wandafwerking               | 40.3                        | 0.01                                                       | 0.01                                 | 0.02 | 0.02 | 0.02 |      |
| wandopening                                                          | : algemeen | ramen en deuren                    | 11.0                        | 0.10                                                       | 0.04                                 | 0.03 | 0.02 | 0.02 |      |
| plafond                                                              | : algemeen | gladde plafondafwerking            | 8.5                         | 0.01                                                       | 0.01                                 | 0.02 | 0.02 | 0.03 |      |
| plafond                                                              | : plafond  | Ecophon Master B - 40mm            | 4.5                         | 0.25                                                       | 0.80                                 | 0.95 | 0.95 | 1.00 |      |
| BEREKENING NAGALMTIJD                                                |            |                                    |                             |                                                            | totale absorptie [m <sup>2</sup> OR] |      |      |      |      |
| vloer                                                                | : algemeen | gladde vloerafwerking              |                             | 0.1                                                        | 0.1                                  | 0.3  | 0.3  | 0.4  |      |
| wand                                                                 | : algemeen | gladde wandafwerking               |                             | 0.4                                                        | 0.4                                  | 0.8  | 0.8  | 0.8  |      |
| wandopening                                                          | : algemeen | ramen en deuren                    |                             | 1.1                                                        | 0.4                                  | 0.3  | 0.2  | 0.2  |      |
| plafond                                                              | : algemeen | gladde plafondafwerking            |                             | 0.1                                                        | 0.1                                  | 0.2  | 0.2  | 0.3  |      |
| plafond                                                              | : plafond  | Ecophon Master B - 40mm            |                             | 1.1                                                        | 3.6                                  | 4.3  | 4.3  | 4.5  |      |
| totale absorptie [m <sup>2</sup> OR]                                 |            |                                    |                             | 2.8                                                        | 4.7                                  | 5.8  | 5.7  | 6.2  |      |
| gerealiseerde nagalmtijd T [s]                                       |            |                                    |                             | 2.00                                                       | 1.22                                 | 0.98 | 0.99 | 0.92 |      |
| vereiste absorptie volgens Bouwbesluit art. 3.13 [m <sup>2</sup> OR] |            |                                    |                             |                                                            | 4.3                                  | 4.3  | 4.3  | 4.3  |      |
| vereiste nagalmtijd volgens Bouwbesluit art. 3.13 [s]                |            |                                    |                             |                                                            | 1.33                                 | 1.33 | 1.33 | 1.33 |      |

## BIJLAGE 4 – BEREKENINGEN DAGLICHTTOETREDING EN LUCHTVERVERSING

|                                                                                                                                                              |                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>project</b> : Peperstraat blok 3, Zaandam<br><b>projectnummer</b> : 820209<br><b>opdrachtgever</b> : Opportunity Vastgoed B.V.<br><b>architect</b> : PPHP | <b>woningtype</b> : B<br><b>filenummer</b> : X820209aaA3<br><b>datum</b> : 29-09-2023<br><b>gewijzigd</b> : 30-07-2025 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|

| OMSCHRIJVING         |  |                   |  | OPPERVLAKKEN      |  |        |  | LUCHTVERVERSING      |  |                       |  | DAGLICHTTOETREDING |  |                      |  |                        |  |                   |    |         |  |      |  |      |  |       |  |                   |  |
|----------------------|--|-------------------|--|-------------------|--|--------|--|----------------------|--|-----------------------|--|--------------------|--|----------------------|--|------------------------|--|-------------------|----|---------|--|------|--|------|--|-------|--|-------------------|--|
| verblijfsgebied      |  | GO                |  | VG                |  | kozijn |  | cap.                 |  | ventilatievoorziening |  | Ae                 |  | Ad                   |  | belemmering / overstek |  |                   | Ae |         |  |      |  |      |  |       |  |                   |  |
| verblijfsruimte      |  |                   |  | VR                |  | merk   |  | eis                  |  | type                  |  | lengte             |  | cap.                 |  | eis                    |  | $\alpha$          |    | $\beta$ |  | Cb   |  | Cu   |  | aanw. |  |                   |  |
|                      |  | [m <sup>2</sup> ] |  | [m <sup>2</sup> ] |  |        |  | [dm <sup>3</sup> /s] |  |                       |  | [m]                |  | [dm <sup>3</sup> /s] |  | [m <sup>2</sup> ]      |  | [m <sup>2</sup> ] |    | [°]     |  | [°]  |  | [-]  |  | [-]   |  | [m <sup>2</sup> ] |  |
| BEGANE GROND         |  |                   |  | 34.8              |  |        |  |                      |  |                       |  |                    |  |                      |  |                        |  |                   |    |         |  |      |  |      |  |       |  |                   |  |
| VG1                  |  |                   |  | 29.6              |  |        |  | 45.4                 |  |                       |  | 45.4               |  |                      |  | 2.96                   |  |                   |    | 3.65    |  |      |  |      |  |       |  |                   |  |
| vr1 - studio         |  | 29.6              |  | 4e                |  | 21.0   |  | G                    |  | -                     |  | 45.4               |  | 0.50                 |  | 2.23                   |  | 20                |    | 25      |  | 0.77 |  | 1.00 |  | 1.72  |  |                   |  |
|                      |  |                   |  | 10                |  |        |  |                      |  |                       |  |                    |  |                      |  | 2.51                   |  | 20                |    | 24      |  | 0.77 |  | 1.00 |  | 1.93  |  |                   |  |
|                      |  |                   |  |                   |  |        |  | afvoer               |  |                       |  | toevoer            |  |                      |  |                        |  |                   |    |         |  |      |  |      |  |       |  |                   |  |
| VENTILATIECAPACITEIT |  |                   |  | 45.4              |  |        |  | dm <sup>3</sup> /s   |  |                       |  | 45.4               |  |                      |  | dm <sup>3</sup> /s     |  |                   |    |         |  |      |  |      |  |       |  |                   |  |
| badkamer             |  |                   |  | 14.0              |  |        |  | dm <sup>3</sup> /s   |  |                       |  | 163                |  |                      |  | m <sup>3</sup> /h      |  |                   |    |         |  |      |  |      |  |       |  |                   |  |
| keuken               |  |                   |  | 24.4              |  |        |  | dm <sup>3</sup> /s   |  |                       |  |                    |  |                      |  |                        |  |                   |    |         |  |      |  |      |  |       |  |                   |  |
| berging              |  |                   |  | 7.0               |  |        |  | dm <sup>3</sup> /s   |  |                       |  |                    |  |                      |  |                        |  |                   |    |         |  |      |  |      |  |       |  |                   |  |
| GEBR. OPP. (GO)      |  |                   |  | 34.8              |  |        |  | m <sup>2</sup>       |  |                       |  |                    |  |                      |  |                        |  |                   |    |         |  |      |  |      |  |       |  |                   |  |
| VERBL. GEB. (VG)     |  |                   |  | 29.6              |  |        |  | m <sup>2</sup>       |  |                       |  |                    |  |                      |  |                        |  |                   |    |         |  |      |  |      |  |       |  |                   |  |
| VG/GO*100%           |  |                   |  | 85.1              |  |        |  | %                    |  |                       |  |                    |  |                      |  |                        |  |                   |    |         |  |      |  |      |  |       |  |                   |  |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

project : Peperstraat blok 3, Zaandam  
 projectnummer : 820209  
 opdrachtgever : Opportunity Vastgoed B.V.  
 architect : PPHP

woningtype : B  
 filenummer : X820209aaA3  
 datum : 29-09-2023  
 gewijzigd : 30-07-2025

| OMSCHRIJVING         |                   |                   |        | OPPERVLAKKEN         |                       |         |                      | LUCHTVERVERSING    |                   |                        |         | DAGLICHTTOETREDING |      |                   |  |  |  |  |
|----------------------|-------------------|-------------------|--------|----------------------|-----------------------|---------|----------------------|--------------------|-------------------|------------------------|---------|--------------------|------|-------------------|--|--|--|--|
| verblijfsgebied      | GO                | VG                | kozijn | cap.                 | ventilatievoorziening |         |                      | Ae                 | Ad                | belemmering / overstek |         |                    |      | Ae                |  |  |  |  |
| verblijfsruimte      |                   | VR                | merk   | eis                  | type                  | lengte  | cap.                 | eis                |                   | $\alpha$               | $\beta$ | Cb                 | Cu   | aanw.             |  |  |  |  |
|                      | [m <sup>2</sup> ] | [m <sup>2</sup> ] |        | [dm <sup>3</sup> /s] |                       | [m]     | [dm <sup>3</sup> /s] | [m <sup>2</sup> ]  | [m <sup>2</sup> ] | [°]                    | [°]     | [-]                | [-]  | [m <sup>2</sup> ] |  |  |  |  |
| BEGANE GROND         | 49.7              |                   |        |                      |                       |         |                      |                    |                   |                        |         |                    |      |                   |  |  |  |  |
| VG1                  |                   | 23.0              |        | 38.8                 |                       |         | 38.8                 | 2.30               |                   |                        |         |                    |      | 3.32              |  |  |  |  |
| vr1 - wk/k           |                   | 23.0              | 4c     | 21.0                 | G                     | -       | 38.8                 | 0.50               | 1.74              | 20                     | 21      | 0.78               | 1.00 | 1.36              |  |  |  |  |
|                      |                   |                   | 10     |                      |                       |         |                      |                    | 2.51              | 20                     | 21      | 0.78               | 1.00 | 1.96              |  |  |  |  |
| VG2                  |                   | 7.4               |        | 9.3                  |                       |         | 9.3                  | 0.74               |                   |                        |         |                    |      | 0.74              |  |  |  |  |
|                      | reductie          | -2.9              |        |                      |                       |         |                      |                    |                   |                        |         |                    |      |                   |  |  |  |  |
| vr2 - sk1            |                   | 10.3              | 24a    | 7.2                  | G                     | -       | 9.3                  | 0.50               | 1.96              | 33                     | 57      | 0.38               | 1.00 | 0.74              |  |  |  |  |
|                      |                   |                   |        | afvoer               |                       | toevoer |                      |                    |                   |                        |         |                    |      |                   |  |  |  |  |
| VENTILATIECAPACITEIT |                   |                   |        | 48.1                 | dm <sup>3</sup> /s    |         | 48.1                 | dm <sup>3</sup> /s |                   |                        |         |                    |      |                   |  |  |  |  |
| toilet               |                   |                   |        | 7.0                  | dm <sup>3</sup> /s    |         | 173                  | m <sup>3</sup> /h  |                   |                        |         |                    |      |                   |  |  |  |  |
| badkamer             |                   |                   |        | 14.0                 | dm <sup>3</sup> /s    |         |                      |                    |                   |                        |         |                    |      |                   |  |  |  |  |
| keuken               |                   |                   |        | 27.1                 | dm <sup>3</sup> /s    |         |                      |                    |                   |                        |         |                    |      |                   |  |  |  |  |
| berging              |                   |                   |        | 0.0                  | dm <sup>3</sup> /s    |         |                      |                    |                   |                        |         |                    |      |                   |  |  |  |  |
| GEBR. OPP. (GO)      | 49.7              | m <sup>2</sup>    |        |                      |                       |         |                      |                    |                   |                        |         |                    |      |                   |  |  |  |  |
| VERBL. GEB. (VG)     | 30.4              | m <sup>2</sup>    |        |                      |                       |         |                      |                    |                   |                        |         |                    |      |                   |  |  |  |  |
| VG/GO*100%           | 61.3              | %                 |        |                      |                       |         |                      |                    |                   |                        |         |                    |      |                   |  |  |  |  |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

project : Peperstraat blok 3, Zaandam  
 projectnummer : 820209  
 opdrachtgever : Opportunity Vastgoed B.V.  
 architect : PPHP

woningtype : D  
 filenummer : X820209aaA3  
 datum : 29-09-2023  
 gewijzigd : 30-07-2025

| OMSCHRIJVING    |                   |                   |        | OPPERVLAKKEN         |                       |        |                      | LUCHTVERVERSING   |                   |                        |         | DAGLICHTTOETREDING |     |                   |  |         |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 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| VG1             |                   |                   |        | 31.0                 |                       |        |                      | 49.0              |                   |                        |         | 49.0               |     |                   |  | 3.10    |  |  |  | 3.71 |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 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| vr1 - wk/k      |                   |                   |        | 20.9                 |                       |        |                      | 6                 |                   |                        |         | 21.0               |     |                   |  | G       |  |  |  | -    |  |  |  | 40.0 |  |  |  | 0.50 |  |  |  | 1.92 |  |  |  | 25 |  |  |  | 28   |  |  |  | 0.72 |  |  |  | 1.00 |  |  |  | 1.38 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 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| vr2 - sk1       |                   |                   |        | 10.1                 |                       |        |                      | 24                |                   |                        |         | 7.1                |     |                   |  | G       |  |  |  | -    |  |  |  | 9.1  |  |  |  | 0.50 |  |  |  | 1.93 |  |  |  | 32 |  |  |  | 53   |  |  |  | 0.46 |  |  |  | 1.00 |  |  |  | 0.89 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 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#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

|                      |                               |                   |               |
|----------------------|-------------------------------|-------------------|---------------|
| <b>project</b>       | : Peperstraat blok 3, Zaandam | <b>woningtype</b> | : D           |
| <b>projectnummer</b> | : 820209                      | <b>filenummer</b> | : X820209aaA3 |
| <b>opdrachtgever</b> | : Opportunity Vastgoed B.V.   | <b>datum</b>      | : 29-09-2023  |
| <b>architect</b>     | : PPHP                        | <b>gewijzigd</b>  | : 30-07-2025  |

| OMSCHRIJVING         |  |                   |  | OPPERVLAKKEN      |  |        |  | LUCHTVERVERSING      |  |                       |  | DAGLICHTTOETREDING |  |                      |  |                        |  |                   |  |         |  |     |  |                   |  |                    |  |                   |  |      |  |
|----------------------|--|-------------------|--|-------------------|--|--------|--|----------------------|--|-----------------------|--|--------------------|--|----------------------|--|------------------------|--|-------------------|--|---------|--|-----|--|-------------------|--|--------------------|--|-------------------|--|------|--|
| verblijfsgebied      |  | GO                |  | VG                |  | kozijn |  | cap.                 |  | ventilatievoorziening |  | Ae                 |  | Ad                   |  | belemmering / overstek |  |                   |  | Ae      |  |     |  |                   |  |                    |  |                   |  |      |  |
| verblijfsruimte      |  |                   |  | VR                |  | merk   |  | eis                  |  | type                  |  | lengte             |  | cap.                 |  | eis                    |  | $\alpha$          |  | $\beta$ |  | Cb  |  | Cu                |  | aanw.              |  |                   |  |      |  |
|                      |  | [m <sup>2</sup> ] |  | [m <sup>2</sup> ] |  |        |  | [dm <sup>3</sup> /s] |  |                       |  | [m]                |  | [dm <sup>3</sup> /s] |  | [m <sup>2</sup> ]      |  | [m <sup>2</sup> ] |  | [°]     |  | [°] |  | [-]               |  | [-]                |  | [m <sup>2</sup> ] |  |      |  |
| BEGANE GROND         |  |                   |  | 49.9              |  |        |  |                      |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |                   |  |                    |  |                   |  |      |  |
| VG1                  |  |                   |  | 37.6              |  |        |  | 51.6                 |  |                       |  | 51.6               |  |                      |  | 3.76                   |  |                   |  | 4.10    |  |     |  |                   |  |                    |  |                   |  |      |  |
| vr1 - wk/k           |  |                   |  | 26.7              |  |        |  | 22                   |  | 21.0                  |  | G                  |  | -                    |  | 41.8                   |  | 0.50              |  | 1.88    |  | 20  |  | 25                |  | 0.77               |  | 1.00              |  | 1.45 |  |
|                      |  |                   |  |                   |  |        |  | 21                   |  |                       |  |                    |  |                      |  |                        |  | 2.14              |  | 20      |  | 17  |  | 0.79              |  | 1.00               |  | 1.69              |  |      |  |
| vr2 - sk1            |  |                   |  | 10.9              |  |        |  | 24c                  |  | 7.6                   |  | G                  |  | -                    |  | 9.8                    |  | 0.50              |  | 2.34    |  | 25  |  | 61                |  | 0.41               |  | 1.00              |  | 0.96 |  |
| VENTILATIECAPACITEIT |  |                   |  |                   |  |        |  | afvoer               |  |                       |  | toevoer            |  |                      |  |                        |  |                   |  |         |  |     |  |                   |  |                    |  |                   |  |      |  |
|                      |  |                   |  |                   |  |        |  |                      |  | 51.6                  |  | dm <sup>3</sup> /s |  |                      |  |                        |  |                   |  |         |  |     |  | 51.6              |  | dm <sup>3</sup> /s |  |                   |  |      |  |
|                      |  |                   |  |                   |  |        |  | toilet               |  | 7.0                   |  | dm <sup>3</sup> /s |  | 186                  |  |                        |  |                   |  |         |  |     |  | m <sup>3</sup> /h |  |                    |  |                   |  |      |  |
|                      |  |                   |  |                   |  |        |  | badkamer             |  | 14.0                  |  | dm <sup>3</sup> /s |  |                      |  |                        |  |                   |  |         |  |     |  |                   |  |                    |  |                   |  |      |  |
|                      |  |                   |  |                   |  |        |  | keuken               |  | 23.6                  |  | dm <sup>3</sup> /s |  |                      |  |                        |  |                   |  |         |  |     |  |                   |  |                    |  |                   |  |      |  |
|                      |  |                   |  |                   |  |        |  | berging              |  | 7.0                   |  | dm <sup>3</sup> /s |  |                      |  |                        |  |                   |  |         |  |     |  |                   |  |                    |  |                   |  |      |  |
| GEBR. OPP. (GO)      |  | 49.9              |  | m <sup>2</sup>    |  |        |  |                      |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |                   |  |                    |  |                   |  |      |  |
| VERBL. GEB. (VG)     |  | 37.6              |  | m <sup>2</sup>    |  |        |  |                      |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |                   |  |                    |  |                   |  |      |  |
| VG/GO*100%           |  | 75.4              |  | %                 |  |        |  |                      |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |                   |  |                    |  |                   |  |      |  |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

|                                                                                                                                                              |                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>project</b> : Peperstraat blok 3, Zaandam<br><b>projectnummer</b> : 820209<br><b>opdrachtgever</b> : Opportunity Vastgoed B.V.<br><b>architect</b> : PPHP | <b>woningtype</b> : G1<br><b>filenummer</b> : X820209aaA3<br><b>datum</b> : 29-09-2023<br><b>gewijzigd</b> : 30-07-2025 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|

| OMSCHRIJVING    |                   |                   |        | OPPERVLAKKEN         |                       |        |                      | LUCHTVERVERSING   |                   |                        |         | DAGLICHTTOETREDING |     |                   |  |         |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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| VG1             |                   |                   |        | 33.8                 |                       |        |                      | 48.3              |                   |                        |         | 48.3               |     |                   |  | 3.38    |  |  |  | 3.91 |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 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| vr1 - wk/k      |                   |                   |        | 23.1                 |                       |        |                      | 21                |                   |                        |         | 21.0               |     |                   |  | G       |  |  |  | -    |  |  |  | 38.7 |  |  |  | 0.50 |  |  |  | 2.14 |  |  |  | 20 |  |  |  | 17   |  |  |  | 0.79 |  |  |  | 1.00 |  |  |  | 1.69 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 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| vr2 - sk1       |                   |                   |        | 10.7                 |                       |        |                      | 24c               |                   |                        |         | 7.5                |     |                   |  | G       |  |  |  | -    |  |  |  | 9.6  |  |  |  | 0.50 |  |  |  | 2.34 |  |  |  | 30 |  |  |  | 62   |  |  |  | 0.33 |  |  |  | 1.00 |  |  |  | 0.77 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 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|                 |                   |                   |        |                      |                       |        |                      | afvoer            |                   |                        |         |                    |     |                   |  | toevoer |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 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#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

project : Peperstraat blok 3, Zaandam  
 projectnummer : 820209  
 opdrachtgever : Opportunity Vastgoed B.V.  
 architect : PPHP

woningtype : A5  
 filenummer : X820209aaA3  
 datum : 29-09-2023  
 gewijzigd : 30-07-2025

| OMSCHRIJVING     |                   |                   |        | OPPERVLAKKEN         |                       |        |                      | LUCHTVERVERSING   |                   |                        |         | DAGLICHTTOETREDING |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|------------------|-------------------|-------------------|--------|----------------------|-----------------------|--------|----------------------|-------------------|-------------------|------------------------|---------|--------------------|-----|-------------------|--|---------|--|--|--|--------------------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|----|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|
| verblijfsgebied  | GO                | VG                | kozijn | cap.                 | ventilatievoorziening |        |                      | Ae                | Ad                | belemmering / overstek |         |                    |     | Ae                |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| verblijfsruimte  |                   | VR                | merk   | eis                  | type                  | lengte | cap.                 | eis               |                   | $\alpha$               | $\beta$ | Cb                 | Cu  | aanw.             |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  | [m <sup>2</sup> ] | [m <sup>2</sup> ] |        | [dm <sup>3</sup> /s] |                       | [m]    | [dm <sup>3</sup> /s] | [m <sup>2</sup> ] | [m <sup>2</sup> ] | [°]                    | [°]     | [-]                | [-] | [m <sup>2</sup> ] |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| 5e VERDIEPING    |                   |                   |        | 49.5                 |                       |        |                      |                   |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| VG1              |                   |                   |        | 23.8                 |                       |        |                      | 35.0              |                   |                        |         | 35.0               |     |                   |  | 2.38    |  |  |  | 2.96               |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| vr1 - wk/k       |                   |                   |        | 23.8                 |                       |        |                      | dr1               |                   |                        |         | 21.0               |     |                   |  | G       |  |  |  | -                  |  |  |  | 35.0 |  |  |  | 0.50 |  |  |  | 1.70 |  |  |  | 20 |  |  |  | 0    |  |  |  | 0.87 |  |  |  | 1.00 |  |  |  | 1.48 |  |  |  |
|                  |                   |                   |        |                      |                       |        |                      | dr1               |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  | 1.70 |  |  |  | 20   |  |  |  | 0  |  |  |  | 0.87 |  |  |  | 1.00 |  |  |  | 1.48 |  |  |  |      |  |  |  |
| VG1              |                   |                   |        | 7.6                  |                       |        |                      | 14.0              |                   |                        |         | 14.0               |     |                   |  | 0.76    |  |  |  | 1.48               |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| vr2 - sk1        |                   |                   |        | 7.6                  |                       |        |                      | dr1               |                   |                        |         | 14.0               |     |                   |  | G       |  |  |  | -                  |  |  |  | 14.0 |  |  |  | 0.50 |  |  |  | 1.70 |  |  |  | 20 |  |  |  | 0    |  |  |  | 0.87 |  |  |  | 1.00 |  |  |  | 1.48 |  |  |  |
|                  |                   |                   |        |                      |                       |        |                      | afvoer            |                   |                        |         |                    |     |                   |  | toevoer |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |                   |                   |        | VENTILATIECAPACITEIT |                       |        |                      | 49.0              |                   |                        |         | dm <sup>3</sup> /s |     |                   |  | 49.0    |  |  |  | dm <sup>3</sup> /s |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |                   |                   |        | toilet               |                       |        |                      | 7.0               |                   |                        |         | dm <sup>3</sup> /s |     |                   |  | 176     |  |  |  | m <sup>3</sup> /h  |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |                   |                   |        | badkamer             |                       |        |                      | 14.0              |                   |                        |         | dm <sup>3</sup> /s |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |                   |                   |        | keuken               |                       |        |                      | 21.0              |                   |                        |         | dm <sup>3</sup> /s |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |                   |                   |        | berging              |                       |        |                      | 7.0               |                   |                        |         | dm <sup>3</sup> /s |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| GEBR. OPP. (GO)  |                   |                   |        | 49.5                 |                       |        |                      | m <sup>2</sup>    |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| VERBL. GEB. (VG) |                   |                   |        | 31.4                 |                       |        |                      | m <sup>2</sup>    |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| VG/GO*100%       |                   |                   |        | 63.4                 |                       |        |                      | %                 |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie



project : Peperstraat blok 3, Zaandam  
 projectnummer : 820209  
 opdrachtgever : Opportunity Vastgoed B.V.  
 architect : PPHP

woningtype : C  
 filenummer : X820209aaA3  
 datum : 29-09-2023  
 gewijzigd : 30-07-2025

| OMSCHRIJVING     |  |                   |  | OPPERVLAKKEN         |  |        |  | LUCHTVERVERSING      |  |                       |  | DAGLICHTTOETREDING |  |                      |  |                        |  |                   |  |         |  |     |  |                    |  |       |  |                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|------------------|--|-------------------|--|----------------------|--|--------|--|----------------------|--|-----------------------|--|--------------------|--|----------------------|--|------------------------|--|-------------------|--|---------|--|-----|--|--------------------|--|-------|--|-------------------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|
| verblijfsgebied  |  | GO                |  | VG                   |  | kozijn |  | cap.                 |  | ventilatievoorziening |  | Ae                 |  | Ad                   |  | belemmering / overstek |  |                   |  | Ae      |  |     |  |                    |  |       |  |                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| verblijfsruimte  |  |                   |  | VR                   |  | merk   |  | eis                  |  | type                  |  | lengte             |  | cap.                 |  | eis                    |  | $\alpha$          |  | $\beta$ |  | Cb  |  | Cu                 |  | aanw. |  |                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |  | [m <sup>2</sup> ] |  | [m <sup>2</sup> ]    |  |        |  | [dm <sup>3</sup> /s] |  |                       |  | [m]                |  | [dm <sup>3</sup> /s] |  | [m <sup>2</sup> ]      |  | [m <sup>2</sup> ] |  | [°]     |  | [°] |  | [-]                |  | [-]   |  | [m <sup>2</sup> ] |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| BEGANE GROND     |  |                   |  | 49.7                 |  |        |  |                      |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |                    |  |       |  |                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| VG1              |  |                   |  | 20.9                 |  |        |  | 38.8                 |  |                       |  |                    |  |                      |  | 2.09                   |  |                   |  |         |  |     |  | 6.84               |  |       |  |                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| vr1 - wk/k       |  |                   |  | 20.9                 |  |        |  | 1                    |  |                       |  | 21.0               |  |                      |  | G                      |  |                   |  | -       |  |     |  | 38.8               |  |       |  | 0.50              |  |  |  | 3.73 |  |  |  | 20   |  |  |  | 21   |  |  |  | 0.78 |  |  |  | 1.00 |  |  |  | 2.91 |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |  |                   |  |                      |  |        |  | 2                    |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |                    |  |       |  |                   |  |  |  | 1.41 |  |  |  | 20   |  |  |  | 21   |  |  |  | 0.78 |  |  |  | 1.00 |  |  |  | 1.10 |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |  |                   |  |                      |  |        |  | 29                   |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |                    |  |       |  |                   |  |  |  |      |  |  |  | 2.30 |  |  |  | 20   |  |  |  | 21   |  |  |  | 0.78 |  |  |  | 1.00 |  |  |  | 1.79 |  |  |  |      |  |  |  |      |  |  |  |
|                  |  |                   |  |                      |  |        |  | 39                   |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |                    |  |       |  |                   |  |  |  |      |  |  |  |      |  |  |  | 0.90 |  |  |  | 20   |  |  |  | 21   |  |  |  | 0.78 |  |  |  | 1.00 |  |  |  | 0.70 |  |  |  |      |  |  |  |
|                  |  |                   |  |                      |  |        |  | 32                   |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |                    |  |       |  |                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  | 0.43 |  |  |  | 20   |  |  |  | 21   |  |  |  | 0.78 |  |  |  | 1.00 |  |  |  | 0.34 |  |  |  |
| VG2              |  |                   |  | 11.5                 |  |        |  | 10.4                 |  |                       |  |                    |  |                      |  | 1.15                   |  |                   |  |         |  |     |  |                    |  |       |  |                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  | 1.56 |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| vr2 - sk1        |  |                   |  | 11.5                 |  |        |  | 29                   |  |                       |  | 8.1                |  |                      |  | G                      |  |                   |  | -       |  |     |  | 10.4               |  |       |  | 0.50              |  |  |  | 2.30 |  |  |  | 33   |  |  |  | 21   |  |  |  | 0.68 |  |  |  | 1.00 |  |  |  | 1.56 |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |  |                   |  |                      |  |        |  | afvoer               |  |                       |  |                    |  |                      |  | toevoer                |  |                   |  |         |  |     |  |                    |  |       |  |                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |  |                   |  | VENTILATIECAPACITEIT |  |        |  | 49.2                 |  |                       |  | dm <sup>3</sup> /s |  |                      |  |                        |  |                   |  | 49.2    |  |     |  | dm <sup>3</sup> /s |  |       |  |                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |  |                   |  | toilet               |  |        |  | 7.0                  |  |                       |  | dm <sup>3</sup> /s |  |                      |  |                        |  |                   |  | 177     |  |     |  | m <sup>3</sup> /h  |  |       |  |                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |  |                   |  | badkamer             |  |        |  | 14.0                 |  |                       |  | dm <sup>3</sup> /s |  |                      |  |                        |  |                   |  |         |  |     |  |                    |  |       |  |                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |  |                   |  | keuken               |  |        |  | 28.2                 |  |                       |  | dm <sup>3</sup> /s |  |                      |  |                        |  |                   |  |         |  |     |  |                    |  |       |  |                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |  |                   |  | berging              |  |        |  | 0.0                  |  |                       |  | dm <sup>3</sup> /s |  |                      |  |                        |  |                   |  |         |  |     |  |                    |  |       |  |                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| GEBR. OPP. (GO)  |  |                   |  | 49.7                 |  |        |  | m <sup>2</sup>       |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |                    |  |       |  |                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| VERBL. GEB. (VG) |  |                   |  | 32.4                 |  |        |  | m <sup>2</sup>       |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |                    |  |       |  |                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| VG/GO*100%       |  |                   |  | 65.2                 |  |        |  | %                    |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |                    |  |       |  |                   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

|                                                                                                                                                              |                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>project</b> : Peperstraat blok 3, Zaandam<br><b>projectnummer</b> : 820209<br><b>opdrachtgever</b> : Opportunity Vastgoed B.V.<br><b>architect</b> : PPHP | <b>woningtype</b> : D<br><b>filenummer</b> : X820209aaA3<br><b>datum</b> : 29-09-2023<br><b>gewijzigd</b> : 30-07-2025 |
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| OMSCHRIJVING    |  |                   |  | OPPERVLAKKEN      |        |                      |  | LUCHTVERVERSING       |        |                      |                   | DAGLICHTTOETREDING     |          |         |     |         |                   |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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| BEGANE GROND    |  |                   |  | 44.1              |        |                      |  |                       |        |                      |                   |                        |          |         |     |         |                   |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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| VG1             |  |                   |  | 33.9              |        |                      |  | 49.0                  |        |                      |                   | 49.0                   |          |         |     | 3.39    |                   |  |  | 7.07 |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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| vr1 - wk/k      |  |                   |  | 22.5              |        |                      |  | 38                    |        |                      |                   | 21.0                   |          |         |     | G       |                   |  |  | -    |  |  |  | 38.8 |  |  |  | 0.50 |  |  |  | 1.22 |  |  |  | 20   |  |  |  | 27 |  |  |  | 0.76 |  |  |  | 1.00 |  |  |  | 0.93 |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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| vr2 - sk1       |  |                   |  | 11.4              |        |                      |  | 27                    |        |                      |                   | 8.0                    |          |         |     | G       |                   |  |  | -    |  |  |  | 10.3 |  |  |  | 0.50 |  |  |  | 2.20 |  |  |  | 20   |  |  |  | 25 |  |  |  | 0.77 |  |  |  | 1.00 |  |  |  | 1.69 |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

project : Peperstraat blok 3, Zaandam  
 projectnummer : 820209  
 opdrachtgever : Opportunity Vastgoed B.V.  
 architect : PPHP

woningtype : H1  
 filenummer : X820209aaA3  
 datum : 29-09-2023  
 gewijzigd : 30-07-2025

| OMSCHRIJVING    |                   |                   |        | OPPERVLAKKEN         |                       |        |                      | LUCHTVERVERSING   |                   |                        |         | DAGLICHTTOETREDING |     |                   |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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| VG1             |                   |                   |        | 36.0                 |                       |        |                      | 53.1              |                   |                        |         | 53.1               |     |                   |  | 3.60 |  |  |  | 8.49 |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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| vr1 - wk/k      |                   |                   |        | 25.6                 |                       |        |                      | 50                |                   |                        |         | 21.0               |     |                   |  | G    |  |  |  | -    |  |  |  | 41.7 |  |  |  | 0.50 |  |  |  | 0.97 |  |  |  | 20 |  |  |  | 29 |  |  |  | 0.75 |  |  |  | 1.00 |  |  |  | 0.73 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

|                                                                                                                                                              |                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>project</b> : Peperstraat blok 3, Zaandam<br><b>projectnummer</b> : 820209<br><b>opdrachtgever</b> : Opportunity Vastgoed B.V.<br><b>architect</b> : PPHP | <b>woningtype</b> : E1<br><b>filenummer</b> : X820209aaA3<br><b>datum</b> : 29-09-2023<br><b>gewijzigd</b> : 30-07-2025 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|

| OMSCHRIJVING         |                   | OPPERVLAKKEN      |        | LUCHTVERVERSING      |                       |                    |                      | DAGLICHTTOETREDING |                   |                        |         |      |      |                   |      |      |      |      |      |      |
|----------------------|-------------------|-------------------|--------|----------------------|-----------------------|--------------------|----------------------|--------------------|-------------------|------------------------|---------|------|------|-------------------|------|------|------|------|------|------|
| verblijfsgebied      | GO                | VG                | kozijn | cap.                 | ventilatievoorziening |                    |                      | Ae                 | Ad                | belemmering / overstek |         |      |      | Ae                |      |      |      |      |      |      |
| verblijfsruimte      |                   | VR                | merk   | eis                  | type                  | lengte             | cap.                 | eis                |                   | $\alpha$               | $\beta$ | Cb   | Cu   | aanw.             |      |      |      |      |      |      |
|                      | [m <sup>2</sup> ] | [m <sup>2</sup> ] |        | [dm <sup>3</sup> /s] |                       | [m]                | [dm <sup>3</sup> /s] | [m <sup>2</sup> ]  | [m <sup>2</sup> ] | [°]                    | [°]     | [-]  | [-]  | [m <sup>2</sup> ] |      |      |      |      |      |      |
| 1e VERDIEPING        |                   |                   |        | 48.5                 |                       |                    |                      |                    |                   |                        |         |      |      |                   |      |      |      |      |      |      |
| VG1                  |                   | 21.7              |        | 32.0                 |                       | 32.0               |                      | 2.17               |                   |                        |         |      |      |                   | 5.87 |      |      |      |      |      |
| toevoeging           |                   | 1.1               |        |                      |                       |                    |                      |                    |                   |                        |         |      |      |                   |      |      |      |      |      |      |
| vr1 - wk/k           |                   | 20.6              |        | 17                   |                       | 21.0               |                      | G                  |                   | -                      |         | 32.0 |      | 0.50              | 0.82 | 20   | 31   | 0.75 | 1.00 | 0.62 |
|                      |                   |                   |        | 14                   |                       |                    |                      |                    |                   |                        |         |      |      |                   | 3.46 | 20   | 26   | 0.76 | 1.00 | 2.63 |
|                      |                   |                   |        | 14                   |                       |                    |                      |                    |                   |                        |         |      |      |                   | 3.46 | 20   | 26   | 0.76 | 1.00 | 2.63 |
| VG2                  |                   | 5.6               |        | 10.1                 |                       | 17.1               |                      | 0.56               |                   |                        |         |      |      |                   | 0.56 |      |      |      |      |      |
| reductie             |                   | -5.6              |        |                      |                       |                    |                      |                    |                   |                        |         |      |      |                   |      |      |      |      |      |      |
| vr2 - sk1            |                   | 11.2              |        | 17                   |                       | 7.8                |                      | G                  |                   | -                      |         | 10.1 |      | 0.50              | 0.82 | 33   | 31   | 0.64 | 1.00 | 0.52 |
|                      |                   | 51                |        | 7.0                  |                       | G                  |                      | -                  |                   | 7.0                    |         | 0.50 | 0.23 | 67                | 46   | 0.17 | 1.00 | 0.04 |      |      |
|                      |                   |                   |        | afvoer               |                       | toevoer            |                      |                    |                   |                        |         |      |      |                   |      |      |      |      |      |      |
| VENTILATIECAPACITEIT |                   |                   |        | 42.0                 |                       | dm <sup>3</sup> /s |                      | 49.0               |                   | dm <sup>3</sup> /s     |         |      |      |                   |      |      |      |      |      |      |
| toilet               |                   |                   |        | 7.0                  |                       | dm <sup>3</sup> /s |                      | 177                |                   | m <sup>3</sup> /h      |         |      |      |                   |      |      |      |      |      |      |
| badkamer             |                   |                   |        | 14.0                 |                       | dm <sup>3</sup> /s |                      |                    |                   |                        |         |      |      |                   |      |      |      |      |      |      |
| keuken               |                   |                   |        | 21.0                 |                       | dm <sup>3</sup> /s |                      |                    |                   |                        |         |      |      |                   |      |      |      |      |      |      |
| berging              |                   |                   |        | 0.0                  |                       | dm <sup>3</sup> /s |                      |                    |                   |                        |         |      |      |                   |      |      |      |      |      |      |
| GEBR. OPP. (GO)      |                   | 48.5              |        | m <sup>2</sup>       |                       |                    |                      |                    |                   |                        |         |      |      |                   |      |      |      |      |      |      |
| VERBL. GEB. (VG)     |                   | 27.3              |        | m <sup>2</sup>       |                       |                    |                      |                    |                   |                        |         |      |      |                   |      |      |      |      |      |      |
| VG/GO*100%           |                   | 56.4              |        | %                    |                       |                    |                      |                    |                   |                        |         |      |      |                   |      |      |      |      |      |      |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

project : Peperstraat blok 3, Zaandam  
 projectnummer : 820209  
 opdrachtgever : Opportunity Vastgoed B.V.  
 architect : PPHP

woningtype : I1  
 filenummer : X820209aaA3  
 datum : 29-09-2023  
 gewijzigd : 30-07-2025

| OMSCHRIJVING         |  |            |      | OPPERVLAKKEN |         |                       |        | LUCHTVERVERSING |         |      |                        | DAGLICHTTOETREDING |     |     |       |      |      |  |
|----------------------|--|------------|------|--------------|---------|-----------------------|--------|-----------------|---------|------|------------------------|--------------------|-----|-----|-------|------|------|--|
| verblijfsgebied      |  | GO         | VG   | kozijn       | cap.    | ventilatievoorziening |        |                 | Ae      | Ad   | belemmering / overstek |                    |     |     | Ae    |      |      |  |
| verblijfsruimte      |  |            | VR   | merk         | eis     | type                  | lengte | cap.            | eis     |      | $\alpha$               | $\beta$            | Cb  | Cu  | aanw. |      |      |  |
|                      |  | [m²]       | [m²] |              | [dm³/s] |                       | [m]    | [dm³/s]         | [m²]    | [m²] | [°]                    | [°]                | [-] | [-] | [m²]  |      |      |  |
| 1e VERDIEPING        |  | 43.3       |      |              |         |                       |        |                 |         |      |                        |                    |     |     |       |      |      |  |
| VG1                  |  | 20.9       |      |              | 35.0    |                       | 35.0   |                 | 2.09    |      |                        |                    |     |     | 2.69  |      |      |  |
| vr1 - wk/k           |  | 20.9 12 13 |      |              | 21.0    |                       | G      | -               | 35.0    |      | 0.50                   | 1.34               | 20  | 30  | 0.75  | 1.00 | 1.01 |  |
|                      |  |            |      |              |         |                       |        |                 |         |      |                        | 2.24               | 20  | 30  | 0.75  | 1.00 | 1.68 |  |
| VG2                  |  | 9.6        |      |              | 8.6     |                       | 14.0   |                 | 0.96    |      |                        |                    |     |     | 1.52  |      |      |  |
| vr2 - sk1            |  | 9.6 15     |      |              | 7.0     |                       | G      | -               | 14.0    |      | 0.50                   | 2.05               | 20  | 33  | 0.74  | 1.00 | 1.52 |  |
|                      |  |            |      |              | afvoer  |                       |        |                 | toevoer |      |                        |                    |     |     |       |      |      |  |
| VENTILATIECAPACITEIT |  |            |      |              | 49.0    | dm³/s                 | 49.0   |                 | dm³/s   |      |                        |                    |     |     |       |      |      |  |
| toilet               |  |            |      |              | 7.0     | dm³/s                 | 177    |                 | m³/h    |      |                        |                    |     |     |       |      |      |  |
| badkamer             |  |            |      |              | 14.0    | dm³/s                 |        |                 |         |      |                        |                    |     |     |       |      |      |  |
| keuken               |  |            |      |              | 21.0    | dm³/s                 |        |                 |         |      |                        |                    |     |     |       |      |      |  |
| berging              |  |            |      |              | 7.0     | dm³/s                 |        |                 |         |      |                        |                    |     |     |       |      |      |  |
| GEBR. OPP. (GO)      |  | 43.3       | m²   |              |         |                       |        |                 |         |      |                        |                    |     |     |       |      |      |  |
| VERBL. GEB. (VG)     |  | 30.5       | m²   |              |         |                       |        |                 |         |      |                        |                    |     |     |       |      |      |  |
| VG/GO*100%           |  | 70.4       | %    |              |         |                       |        |                 |         |      |                        |                    |     |     |       |      |      |  |

RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

project : Peperstraat blok 3, Zaandam  
projectnummer : 820209  
opdrachtgever : Opportunity Vastgoed B.V.  
architect : PPHP

woningtype : B1  
filenummer : X820209aaA3  
datum : 29-09-2023  
gewijzigd : 30-07-2025

| OMSCHRIJVING         |                   |                   |        | LUCHTVERVERSING      |                       |        |                      | DAGLICHTTOETREDING |                   |                        |         |      |      |                   |
|----------------------|-------------------|-------------------|--------|----------------------|-----------------------|--------|----------------------|--------------------|-------------------|------------------------|---------|------|------|-------------------|
| verblijfsgebied      | GO                | VG                | kozijn | cap.                 | ventilatievoorziening |        |                      | Ae                 | Ad                | belemmering / overstek |         |      |      | Ae                |
| verblijfsruimte      |                   | VR                | merk   | eis                  | type                  | lengte | cap.                 | eis                |                   | $\alpha$               | $\beta$ | Cb   | Cu   | aanw.             |
|                      | [m <sup>2</sup> ] | [m <sup>2</sup> ] |        | [dm <sup>3</sup> /s] |                       | [m]    | [dm <sup>3</sup> /s] | [m <sup>2</sup> ]  | [m <sup>2</sup> ] | [°]                    | [°]     | [-]  | [-]  | [m <sup>2</sup> ] |
| BEGANE GROND         | 51.7              |                   |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |
| <b>VG1</b>           |                   | <b>23.1</b>       |        | <b>39.8</b>          |                       |        | <b>39.8</b>          | <b>2.31</b>        |                   |                        |         |      |      | <b>3.34</b>       |
| vr1 - wk/k           |                   | 23.1              | 6      | 21.0                 | G                     | -      | 39.8                 | 0.50               | 1.92              | 20                     | 21      | 0.78 | 1.00 | 1.50              |
|                      |                   |                   | 11     |                      |                       |        |                      |                    | 2.36              | 20                     | 21      | 0.78 | 1.00 | 1.84              |
| <b>VG2</b>           |                   | <b>7.1</b>        |        | <b>9.3</b>           |                       |        | <b>9.3</b>           | <b>0.71</b>        |                   |                        |         |      |      | <b>0.71</b>       |
| vr2 - sk1            |                   | reductie -3.2     |        | 7.2                  | G                     | -      | 9.3                  | 0.50               | 1.93              | 31                     | 59      | 0.37 | 1.00 | 0.71              |
|                      |                   | 10.3              | 24     |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |
|                      |                   |                   |        | afvoer               |                       |        | toevoer              |                    |                   |                        |         |      |      |                   |
| VENTILATIECAPACITEIT |                   |                   |        | 49.0                 | dm <sup>3</sup> /s    |        | 49.0                 | dm <sup>3</sup> /s |                   |                        |         |      |      |                   |
| toilet               |                   |                   |        | 7.0                  | dm <sup>3</sup> /s    |        | 177                  | m <sup>3</sup> /h  |                   |                        |         |      |      |                   |
| badkamer             |                   |                   |        | 14.0                 | dm <sup>3</sup> /s    |        |                      |                    |                   |                        |         |      |      |                   |
| keuken               |                   |                   |        | 21.0                 | dm <sup>3</sup> /s    |        |                      |                    |                   |                        |         |      |      |                   |
| berging              |                   |                   |        | 7.0                  | dm <sup>3</sup> /s    |        |                      |                    |                   |                        |         |      |      |                   |
| GEBR. OPP. (GO)      | 51.7              | m <sup>2</sup>    |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |
| VERBL. GEB. (VG)     | 30.2              | m <sup>2</sup>    |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |
| VG/GO*100%           | 58.5              | %                 |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

project : Peperstraat blok 3, Zaandam  
 projectnummer : 820209  
 opdrachtgever : Opportunity Vastgoed B.V.  
 architect : PPHP

woningtype : C1  
 filenummer : X820209aaA3  
 datum : 29-09-2023  
 gewijzigd : 30-07-2025

| OMSCHRIJVING         |  |                   |  | OPPERVLAKKEN      |  |        |  | LUCHTVERVERSING      |  |                       |  | DAGLICHTTOETREDING |  |                      |  |                        |  |                   |  |         |  |     |  |      |  |       |  |                   |  |  |  |                    |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|----------------------|--|-------------------|--|-------------------|--|--------|--|----------------------|--|-----------------------|--|--------------------|--|----------------------|--|------------------------|--|-------------------|--|---------|--|-----|--|------|--|-------|--|-------------------|--|--|--|--------------------|--|--|--|------|--|--|--|----|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|
| verblijfsgebied      |  | GO                |  | VG                |  | kozijn |  | cap.                 |  | ventilatievoorziening |  | Ae                 |  | Ad                   |  | belemmering / overstek |  |                   |  | Ae      |  |     |  |      |  |       |  |                   |  |  |  |                    |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| verblijfsruimte      |  |                   |  | VR                |  | merk   |  | eis                  |  | type                  |  | lengte             |  | cap.                 |  | eis                    |  | $\alpha$          |  | $\beta$ |  | Cb  |  | Cu   |  | aanw. |  |                   |  |  |  |                    |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                      |  | [m <sup>2</sup> ] |  | [m <sup>2</sup> ] |  |        |  | [dm <sup>3</sup> /s] |  |                       |  | [m]                |  | [dm <sup>3</sup> /s] |  | [m <sup>2</sup> ]      |  | [m <sup>2</sup> ] |  | [°]     |  | [°] |  | [-]  |  | [-]   |  | [m <sup>2</sup> ] |  |  |  |                    |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| 1e VERDIEPING        |  |                   |  | 53.7              |  |        |  |                      |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |      |  |       |  |                   |  |  |  |                    |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| VG1                  |  |                   |  | 25.2              |  |        |  | 39.7                 |  |                       |  |                    |  |                      |  | 39.7                   |  |                   |  | 2.52    |  |     |  |      |  |       |  | 3.73              |  |  |  |                    |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| vr1 - wk/k           |  |                   |  | 25.2              |  |        |  | 6                    |  |                       |  | 21.0               |  |                      |  | G                      |  |                   |  | -       |  |     |  | 39.7 |  |       |  | 0.50              |  |  |  | 1.92               |  |  |  | 20   |  |  |  | 52 |  |  |  | 0.60 |  |  |  | 1.00 |  |  |  | 1.15 |  |  |  |      |  |  |  |
|                      |  |                   |  |                   |  |        |  | 8                    |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |      |  |       |  |                   |  |  |  | 2.62               |  |  |  | 20   |  |  |  | 21 |  |  |  | 0.78 |  |  |  | 1.00 |  |  |  | 2.04 |  |  |  |      |  |  |  |
|                      |  |                   |  |                   |  |        |  | 45                   |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |      |  |       |  |                   |  |  |  |                    |  |  |  | 0.68 |  |  |  | 20 |  |  |  | 21   |  |  |  | 0.78 |  |  |  | 1.00 |  |  |  | 0.53 |  |  |  |
| VG2                  |  |                   |  | 7.1               |  |        |  | 9.3                  |  |                       |  |                    |  |                      |  | 9.3                    |  |                   |  | 0.71    |  |     |  |      |  |       |  |                   |  |  |  |                    |  |  |  | 0.71 |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                      |  |                   |  | reductie          |  |        |  | -3.2                 |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |      |  |       |  |                   |  |  |  |                    |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| vr2 - sk1            |  |                   |  | 10.3              |  |        |  | 24                   |  |                       |  | 7.2                |  |                      |  | G                      |  |                   |  | -       |  |     |  | 9.3  |  |       |  | 0.50              |  |  |  | 1.93               |  |  |  | 31   |  |  |  | 59 |  |  |  | 0.37 |  |  |  | 1.00 |  |  |  | 0.71 |  |  |  |      |  |  |  |
|                      |  |                   |  |                   |  |        |  | afvoer               |  |                       |  |                    |  |                      |  | toevoer                |  |                   |  |         |  |     |  |      |  |       |  |                   |  |  |  |                    |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| VENTILATIECAPACITEIT |  |                   |  |                   |  |        |  | 49.0                 |  |                       |  |                    |  |                      |  | dm <sup>3</sup> /s     |  |                   |  |         |  |     |  | 49.0 |  |       |  |                   |  |  |  | dm <sup>3</sup> /s |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| toilet               |  |                   |  |                   |  |        |  | 7.0                  |  |                       |  |                    |  |                      |  | dm <sup>3</sup> /s     |  |                   |  |         |  |     |  | 176  |  |       |  |                   |  |  |  | m <sup>3</sup> /h  |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| badkamer             |  |                   |  |                   |  |        |  | 14.0                 |  |                       |  |                    |  |                      |  | dm <sup>3</sup> /s     |  |                   |  |         |  |     |  |      |  |       |  |                   |  |  |  |                    |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| keuken               |  |                   |  |                   |  |        |  | 21.0                 |  |                       |  |                    |  |                      |  | dm <sup>3</sup> /s     |  |                   |  |         |  |     |  |      |  |       |  |                   |  |  |  |                    |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| berging              |  |                   |  |                   |  |        |  | 7.0                  |  |                       |  |                    |  |                      |  | dm <sup>3</sup> /s     |  |                   |  |         |  |     |  |      |  |       |  |                   |  |  |  |                    |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| GEBR. OPP. (GO)      |  |                   |  | 53.7              |  |        |  | m <sup>2</sup>       |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |      |  |       |  |                   |  |  |  |                    |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| VERBL. GEB. (VG)     |  |                   |  | 32.3              |  |        |  | m <sup>2</sup>       |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |      |  |       |  |                   |  |  |  |                    |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| VG/GO*100%           |  |                   |  | 60.2              |  |        |  | %                    |  |                       |  |                    |  |                      |  |                        |  |                   |  |         |  |     |  |      |  |       |  |                   |  |  |  |                    |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

project : Peperstraat blok 3, Zaandam  
 projectnummer : 820209  
 opdrachtgever : Opportunity Vastgoed B.V.  
 architect : PPHP

woningtype : J1  
 filenummer : X820209aaA3  
 datum : 29-09-2023  
 gewijzigd : 30-07-2025

| OMSCHRIJVING     |                   |                   |        | OPPERVLAKKEN         |                       |        | LUCHTVERVERSING      |                   |                   | DAGLICHTTOETREDING     |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|------------------|-------------------|-------------------|--------|----------------------|-----------------------|--------|----------------------|-------------------|-------------------|------------------------|---------|--------------------|-----|-------------------|--|---------|--|--|--|--------------------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|
| verblijfsgebied  | GO                | VG                | kozijn | cap.                 | ventilatievoorziening |        |                      | Ae                | Ad                | belemmering / overstek |         |                    |     | Ae                |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| verblijfsruimte  |                   | VR                | merk   | eis                  | type                  | lengte | cap.                 | eis               |                   | $\alpha$               | $\beta$ | Cb                 | Cu  | aanw.             |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  | [m <sup>2</sup> ] | [m <sup>2</sup> ] |        | [dm <sup>3</sup> /s] |                       | [m]    | [dm <sup>3</sup> /s] | [m <sup>2</sup> ] | [m <sup>2</sup> ] | [°]                    | [°]     | [-]                | [-] | [m <sup>2</sup> ] |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| 1e VERDIEPING    |                   |                   |        | 71.9                 |                       |        |                      |                   |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| VG1              |                   |                   |        | 38.0                 |                       |        |                      | 43.3              |                   |                        |         | 43.3               |     |                   |  | 3.80    |  |  |  | 8.88               |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| vr1 - wk/k       |                   |                   |        | 32.6                 |                       |        |                      | 5                 |                   |                        |         | 22.8               |     |                   |  | G       |  |  |  | -                  |  |  |  | 29.3 |  |  |  | 0.50 |  |  |  | 3.04 |  |  |  | 20   |  |  |  | 27   |  |  |  | 0.76 |  |  |  | 1.00 |  |  |  | 2.31 |  |  |  |      |  |  |  |
|                  |                   |                   |        |                      |                       |        |                      | 2a                |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  | 1.36 |  |  |  | 20   |  |  |  | 20   |  |  |  | 0.78 |  |  |  | 1.00 |  |  |  | 1.06 |  |  |  |      |  |  |  |      |  |  |  |
|                  |                   |                   |        |                      |                       |        |                      | 2a                |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  | 1.36 |  |  |  | 20   |  |  |  | 20   |  |  |  | 0.78 |  |  |  | 1.00 |  |  |  | 1.06 |  |  |  |      |  |  |  |
|                  |                   |                   |        |                      |                       |        |                      | 5a                |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  | 3.29 |  |  |  | 20   |  |  |  | 28   |  |  |  | 0.76 |  |  |  | 1.00 |  |  |  | 2.50 |  |  |  |      |  |  |  |
|                  |                   |                   |        |                      |                       |        |                      | 30                |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  | 1.70 |  |  |  | 20   |  |  |  | 27   |  |  |  | 0.76 |  |  |  | 1.00 |  |  |  | 1.29 |  |  |  |
| vr2 - sk1        |                   |                   |        | 5.4                  |                       |        |                      | 39                |                   |                        |         | 7.0                |     |                   |  | G       |  |  |  | -                  |  |  |  | 14.0 |  |  |  | 0.50 |  |  |  | 0.90 |  |  |  | 20   |  |  |  | 35   |  |  |  | 0.73 |  |  |  | 1.00 |  |  |  | 0.66 |  |  |  |      |  |  |  |
| VG2              |                   |                   |        | 5.1                  |                       |        |                      | 7.0               |                   |                        |         | 7.0                |     |                   |  | 0.51    |  |  |  | 1.29               |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| vr3 - sk2        |                   |                   |        | 5.1                  |                       |        |                      | 30                |                   |                        |         | 7.0                |     |                   |  | G       |  |  |  | -                  |  |  |  | 7.0  |  |  |  | 0.50 |  |  |  | 1.70 |  |  |  | 20   |  |  |  | 27   |  |  |  | 0.76 |  |  |  | 1.00 |  |  |  | 1.29 |  |  |  |      |  |  |  |
|                  |                   |                   |        |                      |                       |        |                      | afvoer            |                   |                        |         |                    |     |                   |  | toevoer |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |                   |                   |        | VENTILATIECAPACITEIT |                       |        |                      | 50.3              |                   |                        |         | dm <sup>3</sup> /s |     |                   |  | 50.3    |  |  |  | dm <sup>3</sup> /s |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |                   |                   |        | toilet               |                       |        |                      | 7.0               |                   |                        |         | dm <sup>3</sup> /s |     |                   |  | 181     |  |  |  | m <sup>3</sup> /h  |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |                   |                   |        | badkamer             |                       |        |                      | 14.0              |                   |                        |         | dm <sup>3</sup> /s |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |                   |                   |        | keuken               |                       |        |                      | 22.3              |                   |                        |         | dm <sup>3</sup> /s |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |                   |                   |        | berging              |                       |        |                      | 7.0               |                   |                        |         | dm <sup>3</sup> /s |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| GEBR. OPP. (GO)  |                   |                   |        | 71.9                 |                       |        |                      | m <sup>2</sup>    |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| VERBL. GEB. (VG) |                   |                   |        | 43.1                 |                       |        |                      | m <sup>2</sup>    |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| VG/GO*100%       |                   |                   |        | 59.9                 |                       |        |                      | %                 |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie



project

projectnummer

opdrachtgever

architect

: Peperstraat blok 3, Zaandam

: 820209

: Opportunity Vastgoed B.V.

: PPHP

woningtype

filenummer

datum

gewijzigd

: D1

: X820209aaA3

: 29-09-2023

: 30-07-2025

| OMSCHRIJVING         |                   | OPPERVLAKKEN      |        | LUCHTVERVERSING      |                       |         |                      | DAGLICHTTOETREDING |                   |                        |         |      |      |                   |
|----------------------|-------------------|-------------------|--------|----------------------|-----------------------|---------|----------------------|--------------------|-------------------|------------------------|---------|------|------|-------------------|
| verblijfsgebied      | GO                | VG                | kozijn | cap.                 | ventilatievoorziening |         |                      | Ae                 | Ad                | belemmering / overstek |         |      |      | Ae                |
| verblijfsruimte      |                   | VR                | merk   | eis                  | type                  | lengte  | cap.                 | eis                |                   | $\alpha$               | $\beta$ | Cb   | Cu   | aanw.             |
|                      | [m <sup>2</sup> ] | [m <sup>2</sup> ] |        | [dm <sup>3</sup> /s] |                       | [m]     | [dm <sup>3</sup> /s] | [m <sup>2</sup> ]  | [m <sup>2</sup> ] | [°]                    | [°]     | [-]  | [-]  | [m <sup>2</sup> ] |
| 1e VERDIEPING        | 44.1              |                   |        |                      |                       |         |                      |                    |                   |                        |         |      |      |                   |
| VG1                  |                   | 33.9              |        | 49.0                 |                       |         | 49.0                 | 3.39               |                   |                        |         |      |      | 3.74              |
| vr1 - wk/k           |                   | 22.5              | 30     | 21.0                 | G                     | -       | 38.7                 | 0.50               | 1.70              | 20                     | 59      | 0.51 | 1.00 | 0.87              |
|                      |                   |                   | 30     |                      |                       |         |                      |                    | 1.70              | 20                     | 59      | 0.51 | 1.00 | 0.87              |
|                      |                   |                   | 26     |                      |                       |         |                      |                    | 0.84              | 20                     | 31      | 0.75 | 1.00 | 0.63              |
|                      |                   |                   | 26     |                      |                       |         |                      |                    | 0.84              | 20                     | 31      | 0.75 | 1.00 | 0.63              |
| vr2 - sk1            |                   | 11.4              | 44     | 8.0                  | G                     | -       | 10.3                 | 0.50               | 2.27              | 30                     | 62      | 0.33 | 1.00 | 0.75              |
|                      |                   |                   |        | afvoer               |                       | toevoer |                      |                    |                   |                        |         |      |      |                   |
| VENTILATIECAPACITEIT |                   |                   |        | 49.0                 | dm <sup>3</sup> /s    |         | 49.0                 | dm <sup>3</sup> /s |                   |                        |         |      |      |                   |
| toilet               |                   |                   |        | 7.0                  | dm <sup>3</sup> /s    |         | 176                  | m <sup>3</sup> /h  |                   |                        |         |      |      |                   |
| badkamer             |                   |                   |        | 14.0                 | dm <sup>3</sup> /s    |         |                      |                    |                   |                        |         |      |      |                   |
| keuken               |                   |                   |        | 21.0                 | dm <sup>3</sup> /s    |         |                      |                    |                   |                        |         |      |      |                   |
| berging              |                   |                   |        | 7.0                  | dm <sup>3</sup> /s    |         |                      |                    |                   |                        |         |      |      |                   |
| GEBR. OPP. (GO)      | 44.1              | m <sup>2</sup>    |        |                      |                       |         |                      |                    |                   |                        |         |      |      |                   |
| VERBL. GEB. (VG)     | 33.9              | m <sup>2</sup>    |        |                      |                       |         |                      |                    |                   |                        |         |      |      |                   |
| VG/GO*100%           | 76.9              | %                 |        |                      |                       |         |                      |                    |                   |                        |         |      |      |                   |

RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

project : Peperstraat blok 3, Zaandam  
 projectnummer : 820209  
 opdrachtgever : Opportunity Vastgoed B.V.  
 architect : PPHP

woningtype : D1  
 filenummer : X820209aaA3  
 datum : 29-09-2023  
 gewijzigd : 30-07-2025

| OMSCHRIJVING    |                   |                   |        | OPPERVLAKKEN         |                       |        |                      | LUCHTVERVERSING   |                   |                        |         | DAGLICHTTOETREDING |     |                   |  |         |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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| verblijfsgebied | GO                | VG                | kozijn | cap.                 | ventilatievoorziening |        |                      | Ae                | Ad                | belemmering / overstek |         |                    |     | Ae                |  |         |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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| verblijfsruimte |                   | VR                | merk   | eis                  | type                  | lengte | cap.                 | eis               |                   | $\alpha$               | $\beta$ | Cb                 | Cu  | aanw.             |  |         |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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| VG1             |                   |                   |        | 33.9                 |                       |        |                      | 49.0              |                   |                        |         | 49.0               |     |                   |  | 3.39    |  |  |  | 3.74 |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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| vr1 - wk/k      |                   |                   |        | 22.5                 |                       |        |                      | 30                |                   |                        |         | 21.0               |     |                   |  | G       |  |  |  | -    |  |  |  | 38.7 |  |  |  | 0.50 |  |  |  | 1.70 |  |  |  | 20   |  |  |  | 59 |  |  |  | 0.51 |  |  |  | 1.00 |  |  |  | 0.87 |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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| vr2 - sk1       |                   |                   |        | 11.4                 |                       |        |                      | 44                |                   |                        |         | 8.0                |     |                   |  | G       |  |  |  | -    |  |  |  | 10.3 |  |  |  | 0.50 |  |  |  | 2.27 |  |  |  | 30   |  |  |  | 62 |  |  |  | 0.33 |  |  |  | 1.00 |  |  |  | 0.75 |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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|                 |                   |                   |        |                      |                       |        |                      | afvoer            |                   |                        |         |                    |     |                   |  | toevoer |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

project : Peperstraat blok 3, Zaandam  
 projectnummer : 820209  
 opdrachtgever : Opportunity Vastgoed B.V.  
 architect : PPHP

woningtype : H3  
 filenummer : X820209aaA3  
 datum : 29-09-2023  
 gewijzigd : 30-07-2025

| OMSCHRIJVING         |                   |                   |        | LUCHTVERVERSING      |                       |         |                      | DAGLICHTTOETREDING |                   |                        |         |      |      |                   |
|----------------------|-------------------|-------------------|--------|----------------------|-----------------------|---------|----------------------|--------------------|-------------------|------------------------|---------|------|------|-------------------|
| verblijfsgebied      | GO                | VG                | kozijn | cap.                 | ventilatievoorziening |         |                      | Ae                 | Ad                | belemmering / overstek |         |      |      | Ae                |
| verblijfsruimte      |                   | VR                | merk   | eis                  | type                  | lengte  | cap.                 | eis                |                   | $\alpha$               | $\beta$ | Cb   | Cu   | aanw.             |
|                      | [m <sup>2</sup> ] | [m <sup>2</sup> ] |        | [dm <sup>3</sup> /s] |                       | [m]     | [dm <sup>3</sup> /s] | [m <sup>2</sup> ]  | [m <sup>2</sup> ] | [°]                    | [°]     | [-]  | [-]  | [m <sup>2</sup> ] |
| BEGANE GROND         | 46.9              |                   |        |                      |                       |         |                      |                    |                   |                        |         |      |      |                   |
| VG1                  |                   | 30.7              |        | 42.0                 |                       |         | 42.0                 | 3.07               |                   |                        |         |      |      | 7.63              |
| vr1 - wk/k           |                   | 20.3              | dr4    | 21.0                 | G                     | -       | 32.7                 | 0.50               | 1.25              | 20                     | 0       | 0.92 | 1.00 | 1.15              |
|                      |                   |                   | 41     |                      |                       |         |                      |                    | 2.06              | 20                     | 27      | 0.76 | 1.00 | 1.57              |
|                      |                   |                   | 21a    |                      |                       |         |                      |                    | 2.14              | 20                     | 20      | 0.78 | 1.00 | 1.67              |
| vr2 - sk1            |                   | 10.4              | 24c    | 7.3                  | G                     | -       | 9.4                  | 0.50               | 2.34              | 24                     | 29      | 0.72 | 1.00 | 1.68              |
|                      |                   |                   | 42     |                      |                       |         |                      |                    | 2.08              | 20                     | 29      | 0.75 | 1.00 | 1.56              |
|                      |                   |                   |        | afvoer               |                       | toevoer |                      |                    |                   |                        |         |      |      |                   |
| VENTILATIECAPACITEIT |                   |                   |        | 42.0                 | dm <sup>3</sup> /s    | 42.0    | dm <sup>3</sup> /s   |                    |                   |                        |         |      |      |                   |
| toilet               |                   |                   |        | 7.0                  | dm <sup>3</sup> /s    | 151     | m <sup>3</sup> /h    |                    |                   |                        |         |      |      |                   |
| badkamer             |                   |                   |        | 14.0                 | dm <sup>3</sup> /s    |         |                      |                    |                   |                        |         |      |      |                   |
| keuken               |                   |                   |        | 21.0                 | dm <sup>3</sup> /s    |         |                      |                    |                   |                        |         |      |      |                   |
| berging              |                   |                   |        | 0.0                  | dm <sup>3</sup> /s    |         |                      |                    |                   |                        |         |      |      |                   |
| GEBR. OPP. (GO)      | 46.9              | m <sup>2</sup>    |        |                      |                       |         |                      |                    |                   |                        |         |      |      |                   |
| VERBL. GEB. (VG)     | 30.7              | m <sup>2</sup>    |        |                      |                       |         |                      |                    |                   |                        |         |      |      |                   |
| VG/GO*100%           | 65.5              | %                 |        |                      |                       |         |                      |                    |                   |                        |         |      |      |                   |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

|                      |                               |                   |               |
|----------------------|-------------------------------|-------------------|---------------|
| <b>project</b>       | : Peperstraat blok 3, Zaandam | <b>woningtype</b> | : G3          |
| <b>projectnummer</b> | : 820209                      | <b>filenummer</b> | : X820209aaA3 |
| <b>opdrachtgever</b> | : Opportunity Vastgoed B.V.   | <b>datum</b>      | : 29-09-2023  |
| <b>architect</b>     | : PPHP                        | <b>gewijzigd</b>  | : 30-07-2025  |

| OMSCHRIJVING    |                   |                   |        | OPPERVLAKKEN         |                       |        |                      | LUCHTVERVERSING   |                   |                        |         | DAGLICHTTOETREDING |     |                   |  |         |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 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| VG1             |                   |                   |        | 28.3                 |                       |        |                      | 42.0              |                   |                        |         | 42.0               |     |                   |  | 2.83    |  |  |  | 2.94 |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 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| vr2 - sk1       |                   |                   |        | 11.4                 |                       |        |                      | 48                |                   |                        |         | 8.0                |     |                   |  | G       |  |  |  | -    |  |  |  | 10.3 |  |  |  | 0.50 |  |  |  | 1.03 |  |  |  | 49 |  |  |  | 26   |  |  |  | 0.54 |  |  |  | 1.00 |  |  |  | 0.56 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 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|                 |                   |                   |        |                      |                       |        |                      | afvoer            |                   |                        |         |                    |     |                   |  | toevoer |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 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#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

project : Peperstraat blok 3, Zaandam  
 projectnummer : 820209  
 opdrachtgever : Opportunity Vastgoed B.V.  
 architect : PPHP

woningtype : F3  
 filenummer : X820209aaA3  
 datum : 29-09-2023  
 gewijzigd : 30-07-2025

| OMSCHRIJVING         |                   |                   |        | OPPERVLAKKEN                     |                       |        |                      | LUCHTVERVERSING          |                   |                        |         | DAGLICHTTOETREDING        |     |                   |  |  |  |  |
|----------------------|-------------------|-------------------|--------|----------------------------------|-----------------------|--------|----------------------|--------------------------|-------------------|------------------------|---------|---------------------------|-----|-------------------|--|--|--|--|
| verblijfsgebied      | GO                | VG                | kozijn | cap.                             | ventilatievoorziening |        |                      | Ae                       | Ad                | belemmering / overstek |         |                           |     | Ae                |  |  |  |  |
| verblijfsruimte      |                   | VR                | merk   | eis                              | type                  | lengte | cap.                 | eis                      |                   | $\alpha$               | $\beta$ | Cb                        | Cu  | aanw.             |  |  |  |  |
|                      | [m <sup>2</sup> ] | [m <sup>2</sup> ] |        | [dm <sup>3</sup> /s]             |                       | [m]    | [dm <sup>3</sup> /s] | [m <sup>2</sup> ]        | [m <sup>2</sup> ] | [°]                    | [°]     | [-]                       | [-] | [m <sup>2</sup> ] |  |  |  |  |
| 3e VERDIEPING        |                   |                   |        | 47.2                             |                       |        |                      |                          |                   |                        |         |                           |     |                   |  |  |  |  |
| VG1                  |                   |                   |        | 28.1                             |                       |        |                      | 47.8                     |                   |                        |         | 47.8                      |     |                   |  |  |  |  |
| reductie             |                   |                   |        | -5.0                             |                       |        |                      | 2.81                     |                   |                        |         | 2.81                      |     |                   |  |  |  |  |
| vr1 - studio         |                   |                   |        | 33.1 21a                         |                       |        |                      | 23.2 G -                 |                   |                        |         | 47.8                      |     |                   |  |  |  |  |
|                      |                   |                   |        | dr4                              |                       |        |                      | 0.50                     |                   |                        |         | 2.14 20 20 0.78 1.00 1.67 |     |                   |  |  |  |  |
|                      |                   |                   |        |                                  |                       |        |                      | 1.25 20 0 0.92 1.00 1.15 |                   |                        |         |                           |     |                   |  |  |  |  |
|                      |                   |                   |        | afvoer                           |                       |        |                      | toevoer                  |                   |                        |         |                           |     |                   |  |  |  |  |
| VENTILATIECAPACITEIT |                   |                   |        | 47.8 dm <sup>3</sup> /s          |                       |        |                      | 47.8 dm <sup>3</sup> /s  |                   |                        |         |                           |     |                   |  |  |  |  |
|                      |                   |                   |        | toilet 7.0 dm <sup>3</sup> /s    |                       |        |                      | 172 m <sup>3</sup> /h    |                   |                        |         |                           |     |                   |  |  |  |  |
|                      |                   |                   |        | badkamer 14.0 dm <sup>3</sup> /s |                       |        |                      |                          |                   |                        |         |                           |     |                   |  |  |  |  |
|                      |                   |                   |        | keuken 26.8 dm <sup>3</sup> /s   |                       |        |                      |                          |                   |                        |         |                           |     |                   |  |  |  |  |
|                      |                   |                   |        | berging 0.0 dm <sup>3</sup> /s   |                       |        |                      |                          |                   |                        |         |                           |     |                   |  |  |  |  |
| GEBR. OPP. (GO)      |                   |                   |        | 47.2 m <sup>2</sup>              |                       |        |                      |                          |                   |                        |         |                           |     |                   |  |  |  |  |
| VERBL. GEB. (VG)     |                   |                   |        | 28.1 m <sup>2</sup>              |                       |        |                      |                          |                   |                        |         |                           |     |                   |  |  |  |  |
| VG/GO*100%           |                   |                   |        | 59.6 %                           |                       |        |                      |                          |                   |                        |         |                           |     |                   |  |  |  |  |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

project : Peperstraat blok 3, Zaandam  
 projectnummer : 820209  
 opdrachtgever : Opportunity Vastgoed B.V.  
 architect : PPHP

woningtype : B1z  
 filenummer : X820209aaA3  
 datum : 29-09-2023  
 gewijzigd : 30-07-2025

| OMSCHRIJVING         |                   |                   |        | LUCHTVERVERSING      |                       |        |                      | DAGLICHTTOETREDING |                   |                        |         |      |      |                   |
|----------------------|-------------------|-------------------|--------|----------------------|-----------------------|--------|----------------------|--------------------|-------------------|------------------------|---------|------|------|-------------------|
| verblijfsgebied      | GO                | VG                | kozijn | cap.                 | ventilatievoorziening |        |                      | Ae                 | Ad                | belemmering / overstek |         |      |      | Ae                |
| verblijfsruimte      |                   | VR                | merk   | eis                  | type                  | lengte | cap.                 | eis                |                   | $\alpha$               | $\beta$ | Cb   | Cu   | aanw.             |
|                      | [m <sup>2</sup> ] | [m <sup>2</sup> ] |        | [dm <sup>3</sup> /s] |                       | [m]    | [dm <sup>3</sup> /s] | [m <sup>2</sup> ]  | [m <sup>2</sup> ] | [°]                    | [°]     | [-]  | [-]  | [m <sup>2</sup> ] |
| BEGANE GROND         | 51.6              |                   |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |
| <b>VG1</b>           |                   | <b>23.1</b>       |        | <b>39.8</b>          |                       |        | <b>39.8</b>          | <b>2.31</b>        |                   |                        |         |      |      | <b>2.89</b>       |
| vr1 - wk/k           |                   | 23.1              | 6      | 21.0                 | G                     | -      | 39.8                 | 0.50               | 1.92              | 20                     | 21      | 0.78 | 1.00 | 1.50              |
|                      |                   |                   | 11     |                      |                       |        |                      |                    | 2.36              | 20                     | 53      | 0.59 | 1.00 | 1.39              |
| <b>VG2</b>           |                   | <b>7.5</b>        |        | <b>9.3</b>           |                       |        | <b>9.3</b>           | <b>0.75</b>        |                   |                        |         |      |      | <b>0.75</b>       |
| reductie             |                   | -2.8              |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |
| vr2 - sk1            |                   | 10.3              | 24     | 7.2                  | G                     | -      | 9.3                  | 0.50               | 1.93              | 30                     | 59      | 0.39 | 1.00 | 0.75              |
|                      |                   |                   |        | afvoer               |                       |        | toevoer              |                    |                   |                        |         |      |      |                   |
| VENTILATIECAPACITEIT |                   |                   |        | 49.0                 | dm <sup>3</sup> /s    |        | 49.0                 | dm <sup>3</sup> /s |                   |                        |         |      |      |                   |
| toilet               |                   |                   |        | 7.0                  | dm <sup>3</sup> /s    |        | 177                  | m <sup>3</sup> /h  |                   |                        |         |      |      |                   |
| badkamer             |                   |                   |        | 14.0                 | dm <sup>3</sup> /s    |        |                      |                    |                   |                        |         |      |      |                   |
| keuken               |                   |                   |        | 21.0                 | dm <sup>3</sup> /s    |        |                      |                    |                   |                        |         |      |      |                   |
| berging              |                   |                   |        | 7.0                  | dm <sup>3</sup> /s    |        |                      |                    |                   |                        |         |      |      |                   |
| GEBR. OPP. (GO)      | 51.6              | m <sup>2</sup>    |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |
| VERBL. GEB. (VG)     | 30.6              | m <sup>2</sup>    |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |
| VG/GO*100%           | 59.4              | %                 |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

project : Peperstraat blok 3, Zaandam  
projectnummer : 820209  
opdrachtgever : Opportunity Vastgoed B.V.  
architect : PPHP

woningtype : E4  
filenummer : X820209aaA3  
datum : 29-09-2023  
gewijzigd : 30-07-2025

| OMSCHRIJVING         |                   |                   |        | LUCHTVERVERSING      |                       |        |                      | DAGLICHTTOETREDING |                   |                        |         |      |      |                   |
|----------------------|-------------------|-------------------|--------|----------------------|-----------------------|--------|----------------------|--------------------|-------------------|------------------------|---------|------|------|-------------------|
| verblijfsgebied      | GO                | VG                | kozijn | cap.                 | ventilatievoorziening |        |                      | Ae                 | Ad                | belemmering / overstek |         |      |      | Ae                |
| verblijfsruimte      |                   | VR                | merk   | eis                  | type                  | lengte | cap.                 | eis                |                   | $\alpha$               | $\beta$ | Cb   | Cu   | aanw.             |
|                      | [m <sup>2</sup> ] | [m <sup>2</sup> ] |        | [dm <sup>3</sup> /s] |                       | [m]    | [dm <sup>3</sup> /s] | [m <sup>2</sup> ]  | [m <sup>2</sup> ] | [°]                    | [°]     | [-]  | [-]  | [m <sup>2</sup> ] |
| 4e VERDIEPING        | 44.5              |                   |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |
| <b>VG1</b>           |                   | <b>17.7</b>       |        | <b>42.0</b>          |                       |        | <b>42.0</b>          | <b>1.77</b>        |                   |                        |         |      |      | <b>3.82</b>       |
|                      | <i>toevoeging</i> | <i>1.1</i>        |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |
| vr1 - wk/k           |                   | 16.6              | 13     | 21.0                 | G                     | -      | 42.0                 | 0.50               | 2.24              | 20                     | 25      | 0.77 | 1.00 | 1.72              |
|                      |                   |                   | 20     |                      |                       |        |                      |                    | 2.72              | 20                     | 22      | 0.77 | 1.00 | 2.09              |
| <b>VG2</b>           |                   | <b>6.8</b>        |        | <b>7.0</b>           |                       |        | <b>7.0</b>           | <b>0.68</b>        |                   |                        |         |      |      | <b>0.71</b>       |
| vr2 - sk1            |                   | 6.8               | 20     | 7.0                  | G                     | -      | 7.0                  | 0.50               | 2.72              | 33                     | 63      | 0.26 | 1.00 | 0.71              |
|                      |                   |                   |        | <i>afvoer</i>        |                       |        | <i>toevoer</i>       |                    |                   |                        |         |      |      |                   |
| VENTILATIECAPACITEIT |                   |                   |        | 49.0                 | dm <sup>3</sup> /s    |        | 49.0                 | dm <sup>3</sup> /s |                   |                        |         |      |      |                   |
| toilet               |                   |                   |        | 7.0                  | dm <sup>3</sup> /s    |        | 176                  | m <sup>3</sup> /h  |                   |                        |         |      |      |                   |
| badkamer             |                   |                   |        | 14.0                 | dm <sup>3</sup> /s    |        |                      |                    |                   |                        |         |      |      |                   |
| keuken               |                   |                   |        | 21.0                 | dm <sup>3</sup> /s    |        |                      |                    |                   |                        |         |      |      |                   |
| berging              |                   |                   |        | 7.0                  | dm <sup>3</sup> /s    |        |                      |                    |                   |                        |         |      |      |                   |
| GEBR. OPP. (GO)      | 44.5              | m <sup>2</sup>    |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |
| VERBL. GEB. (VG)     | 24.5              | m <sup>2</sup>    |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |
| VG/GO*100%           | 55.1              | %                 |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

project

: Peperstraat blok 3, Zaandam

woningtype

: I4

projectnummer

: 820209

filenummer

: X820209aaA3

opdrachtgever

: Opportunity Vastgoed B.V.

datum

: 29-09-2023

architect

: PPHP

gewijzigd

: 30-07-2025

| OMSCHRIJVING         |      | OPPERVLAKKEN |        | LUCHTVERVERSING |                       |            |         | DAGLICHTTOETREDING |      |                        |         |      |      |       |
|----------------------|------|--------------|--------|-----------------|-----------------------|------------|---------|--------------------|------|------------------------|---------|------|------|-------|
| verblijfsgebied      | GO   | VG           | kozijn | cap.            | ventilatievoorziening |            |         | Ae                 | Ad   | belemmering / overstek |         |      |      | Ae    |
| verblijfsruimte      |      | VR           | merk   | eis             | type                  | lengte     | cap.    | eis                |      | $\alpha$               | $\beta$ | Cb   | Cu   | aanw. |
|                      | [m²] | [m²]         |        | [dm³/s]         |                       | [m]        | [dm³/s] | [m²]               | [m²] | [°]                    | [°]     | [-]  | [-]  | [m²]  |
| 4e VERDIEPING        |      | 41.2         |        |                 |                       |            |         |                    |      |                        |         |      |      |       |
| VG1                  |      | 15.7         |        | 33.4            |                       |            | 33.4    | 1.57               |      |                        |         |      |      | 1.70  |
| vr1 - wk/k           |      | 15.7         | 13     | 21.0            | G                     | -          | 33.4    | 0.50               | 2.24 | 20                     | 26      | 0.76 | 1.00 | 1.70  |
| VG2                  |      | 9.6          |        | 8.6             |                       |            | 8.6     | 0.96               |      |                        |         |      |      | 1.37  |
| vr2 - sk1            |      | 9.6          | 15     | 7.0             | G                     | -          | 8.6     | 0.50               | 2.05 | 33                     | 25      | 0.67 | 1.00 | 1.37  |
|                      |      |              |        | afvoer          |                       | toevoer    |         |                    |      |                        |         |      |      |       |
| VENTILATIECAPACITEIT |      |              |        | 42.0            | dm³/s                 | 42.0 dm³/s |         |                    |      |                        |         |      |      |       |
| toilet               |      |              |        | 7.0             | dm³/s                 | 151 m³/h   |         |                    |      |                        |         |      |      |       |
| badkamer             |      |              |        | 14.0            | dm³/s                 |            |         |                    |      |                        |         |      |      |       |
| keuken               |      |              |        | 21.0            | dm³/s                 |            |         |                    |      |                        |         |      |      |       |
| berging              |      |              |        | 0.0             | dm³/s                 |            |         |                    |      |                        |         |      |      |       |
| GEBR. OPP. (GO)      | 41.2 | m²           |        |                 |                       |            |         |                    |      |                        |         |      |      |       |
| VERBL. GEB. (VG)     | 25.3 | m²           |        |                 |                       |            |         |                    |      |                        |         |      |      |       |
| VG/GO*100%           | 61.4 | %            |        |                 |                       |            |         |                    |      |                        |         |      |      |       |

RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie



project : Peperstraat blok 3, Zaandam  
 projectnummer : 820209  
 opdrachtgever : Opportunity Vastgoed B.V.  
 architect : PPHP

woningtype : A4  
 filenummer : X820209aaA3  
 datum : 29-09-2023  
 gewijzigd : 30-07-2025

| OMSCHRIJVING     |                   |                   |        | OPPERVLAKKEN         |                       |        |                      | LUCHTVERVERSING   |                   |                        |         | DAGLICHTTOETREDING |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|------------------|-------------------|-------------------|--------|----------------------|-----------------------|--------|----------------------|-------------------|-------------------|------------------------|---------|--------------------|-----|-------------------|--|---------|--|--|--|--------------------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|----|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|--|
| verblijfsgebied  | GO                | VG                | kozijn | cap.                 | ventilatievoorziening |        |                      | Ae                | Ad                | belemmering / overstek |         |                    |     | Ae                |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| verblijfsruimte  |                   | VR                | merk   | eis                  | type                  | lengte | cap.                 | eis               |                   | $\alpha$               | $\beta$ | Cb                 | Cu  | aanw.             |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  | [m <sup>2</sup> ] | [m <sup>2</sup> ] |        | [dm <sup>3</sup> /s] |                       | [m]    | [dm <sup>3</sup> /s] | [m <sup>2</sup> ] | [m <sup>2</sup> ] | [°]                    | [°]     | [-]                | [-] | [m <sup>2</sup> ] |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| 5e VERDIEPING    |                   |                   |        | 53.6                 |                       |        |                      |                   |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| VG1              |                   |                   |        | 23.9                 |                       |        |                      | 40.3              |                   |                        |         | 40.3               |     |                   |  | 2.39    |  |  |  | 4.44               |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| vr1 - wk/k       |                   |                   |        | 23.9                 |                       |        |                      | dr1               |                   |                        |         | 21.0               |     |                   |  | G       |  |  |  | -                  |  |  |  | 40.3 |  |  |  | 0.50 |  |  |  | 1.70 |  |  |  | 20   |  |  |  | 0  |  |  |  | 0.87 |  |  |  | 1.00 |  |  |  | 1.48 |  |  |  |      |  |  |  |
|                  |                   |                   |        |                      |                       |        |                      | dr1               |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  | 1.70 |  |  |  | 20   |  |  |  | 0  |  |  |  | 0.87 |  |  |  | 1.00 |  |  |  | 1.48 |  |  |  |      |  |  |  |
|                  |                   |                   |        |                      |                       |        |                      | dr1               |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  | 1.70 |  |  |  | 20 |  |  |  | 0    |  |  |  | 0.87 |  |  |  | 1.00 |  |  |  | 1.48 |  |  |  |
| VG2              |                   |                   |        | 9.2                  |                       |        |                      | 9.3               |                   |                        |         | 9.3                |     |                   |  | 0.92    |  |  |  | 0.92               |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |                   |                   |        | reductie             |                       |        |                      | -1.1              |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| vr2 - sk1        |                   |                   |        | 10.3                 |                       |        |                      | 24a               |                   |                        |         | 7.2                |     |                   |  | G       |  |  |  | -                  |  |  |  | 9.3  |  |  |  | 0.50 |  |  |  | 1.96 |  |  |  | 33   |  |  |  | 51 |  |  |  | 0.47 |  |  |  | 1.00 |  |  |  | 0.92 |  |  |  |      |  |  |  |
|                  |                   |                   |        |                      |                       |        |                      | afvoer            |                   |                        |         |                    |     |                   |  | toevoer |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |                   |                   |        | VENTILATIECAPACITEIT |                       |        |                      | 49.5              |                   |                        |         | dm <sup>3</sup> /s |     |                   |  | 49.5    |  |  |  | dm <sup>3</sup> /s |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |                   |                   |        | toilet               |                       |        |                      | 7.0               |                   |                        |         | dm <sup>3</sup> /s |     |                   |  | 178     |  |  |  | m <sup>3</sup> /h  |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |                   |                   |        | badkamer             |                       |        |                      | 14.0              |                   |                        |         | dm <sup>3</sup> /s |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |                   |                   |        | keuken               |                       |        |                      | 21.5              |                   |                        |         | dm <sup>3</sup> /s |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
|                  |                   |                   |        | berging              |                       |        |                      | 7.0               |                   |                        |         | dm <sup>3</sup> /s |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| GEBR. OPP. (GO)  |                   |                   |        | 53.6                 |                       |        |                      | m <sup>2</sup>    |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| VERBL. GEB. (VG) |                   |                   |        | 33.1                 |                       |        |                      | m <sup>2</sup>    |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |
| VG/GO*100%       |                   |                   |        | 61.8                 |                       |        |                      | %                 |                   |                        |         |                    |     |                   |  |         |  |  |  |                    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

project : Peperstraat blok 3, Zaandam  
 projectnummer : 820209  
 opdrachtgever : Opportunity Vastgoed B.V.  
 architect : PPHP

woningtype : B4  
 filenummer : X820209aaA3  
 datum : 29-09-2023  
 gewijzigd : 30-07-2025

| OMSCHRIJVING         |                   |                   |        | LUCHTVERVERSING      |                       |         |                      | DAGLICHTTOETREDING |                   |                        |         |      |      |                    |
|----------------------|-------------------|-------------------|--------|----------------------|-----------------------|---------|----------------------|--------------------|-------------------|------------------------|---------|------|------|--------------------|
| verblijfsgebied      | GO                | VG                | kozijn | cap.                 | ventilatievoorziening |         |                      | Ae                 | Ad                | belemmering / overstek |         |      |      | Ae                 |
| verblijfsruimte      |                   | VR                | merk   | eis                  | type                  | lengte  | cap.                 | eis                |                   | $\alpha$               | $\beta$ | Cb   | Cu   | aanw.              |
|                      | [m <sup>2</sup> ] | [m <sup>2</sup> ] |        | [dm <sup>3</sup> /s] |                       | [m]     | [dm <sup>3</sup> /s] | [m <sup>2</sup> ]  | [m <sup>2</sup> ] | [°]                    | [°]     | [-]  | [-]  | [m <sup>2</sup> ]  |
| 5e VERDIEPING        | 54.7              |                   |        |                      |                       |         |                      |                    |                   |                        |         |      |      |                    |
| <b>VG1</b>           |                   | <b>25.6</b>       |        | <b>40.1</b>          |                       |         | <b>40.1</b>          | <b>2.56</b>        |                   |                        |         |      |      | <b>4.44</b>        |
| vr1 - wk/k           |                   | 25.6              | dr1    | 21.0                 | G                     | -       | 40.1                 | 0.50               | 1.70              | 20                     | 0       | 0.87 | 1.00 | 1.48               |
|                      |                   |                   | dr1    |                      |                       |         |                      |                    | 1.70              | 20                     | 0       | 0.87 | 1.00 | 1.48               |
|                      |                   |                   | dr1    |                      |                       |         |                      |                    | 1.70              | 20                     | 0       | 0.87 | 1.00 | 1.48               |
| <b>VG1</b>           |                   | <b>9.2</b>        |        | <b>9.3</b>           |                       |         | <b>9.3</b>           | <b>0.92</b>        |                   |                        |         |      |      | <b>0.92</b>        |
|                      | reductie          | -1.1              |        |                      |                       |         |                      |                    |                   |                        |         |      |      |                    |
| vr2 - sk1            |                   | 10.3              | 24a    | 7.2                  | G                     | -       | 9.3                  | 0.50               | 1.96              | 33                     | 51      | 0.47 | 1.00 | 0.92               |
|                      |                   |                   |        | afvoer               |                       | toevoer |                      |                    |                   |                        |         |      |      |                    |
| VENTILATIECAPACITEIT |                   |                   |        | 49.4                 |                       |         | dm <sup>3</sup> /s   | 49.4               |                   |                        |         |      |      | dm <sup>3</sup> /s |
| toilet               |                   |                   |        | 7.0                  |                       |         | dm <sup>3</sup> /s   | 178                |                   |                        |         |      |      | m <sup>3</sup> /h  |
| badkamer             |                   |                   |        | 14.0                 |                       |         | dm <sup>3</sup> /s   |                    |                   |                        |         |      |      |                    |
| keuken               |                   |                   |        | 21.4                 |                       |         | dm <sup>3</sup> /s   |                    |                   |                        |         |      |      |                    |
| berging              |                   |                   |        | 7.0                  |                       |         | dm <sup>3</sup> /s   |                    |                   |                        |         |      |      |                    |
| GEBR. OPP. (GO)      | 54.7              | m <sup>2</sup>    |        |                      |                       |         |                      |                    |                   |                        |         |      |      |                    |
| VERBL. GEB. (VG)     | 34.8              | m <sup>2</sup>    |        |                      |                       |         |                      |                    |                   |                        |         |      |      |                    |
| VG/GO*100%           | 63.6              | %                 |        |                      |                       |         |                      |                    |                   |                        |         |      |      |                    |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

project : Peperstraat blok 3, Zaandam  
 projectnummer : 820209  
 opdrachtgever : Opportunity Vastgoed B.V.  
 architect : PPHP

woningtype : J4  
 filenummer : X820209aaA3  
 datum : 29-09-2023  
 gewijzigd : 30-07-2025

| OMSCHRIJVING         |                   |                   |        | LUCHTVERVERSING      |                       |        |                      | DAGLICHTTOETREDING |                   |                        |         |      |      |                   |
|----------------------|-------------------|-------------------|--------|----------------------|-----------------------|--------|----------------------|--------------------|-------------------|------------------------|---------|------|------|-------------------|
| verblijfsgebied      | GO                | VG                | kozijn | cap.                 | ventilatievoorziening |        |                      | Ae                 | Ad                | belemmering / overstek |         |      |      | Ae                |
| verblijfsruimte      | [m <sup>2</sup> ] | VR                | merk   | eis                  | type                  | lengte | cap.                 | eis                |                   | $\alpha$               | $\beta$ | Cb   | Cu   | aanw.             |
|                      |                   | [m <sup>2</sup> ] |        | [dm <sup>3</sup> /s] |                       | [m]    | [dm <sup>3</sup> /s] | [m <sup>2</sup> ]  | [m <sup>2</sup> ] | [°]                    | [°]     | [-]  | [-]  | [m <sup>2</sup> ] |
| 4e VERDIEPING        | 68.5              |                   |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |
| <b>VG1</b>           |                   | <b>26.8</b>       |        | <b>35.0</b>          |                       |        | <b>35.0</b>          | <b>2.68</b>        |                   |                        |         |      |      | <b>2.80</b>       |
| vr1 - wk/k           |                   | 26.8              | 7a     | 21.0                 | G                     | -      | 35.0                 | 0.50               | 1.50              | 20                     | 55      | 0.56 | 1.00 | 0.84              |
|                      |                   |                   | 7a     |                      |                       |        |                      |                    | 1.50              | 20                     | 55      | 0.56 | 1.00 | 0.84              |
|                      |                   |                   | 2b     |                      |                       |        |                      |                    | 1.36              | 28                     | 59      | 0.41 | 1.00 | 0.56              |
|                      |                   |                   | 2b     |                      |                       |        |                      |                    | 1.36              | 28                     | 59      | 0.41 | 1.00 | 0.56              |
| <b>VG2</b>           |                   | <b>5.7</b>        |        | <b>7.0</b>           |                       |        | <b>7.0</b>           | <b>0.57</b>        |                   |                        |         |      |      | <b>1.07</b>       |
| toevoeging           |                   | 0.7               |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |
| vr2 - sk1            |                   | 5.0               | 34d    | 7.0                  | G                     | -      | 7.0                  | 0.50               | 1.39              | 20                     | 23      | 0.77 | 1.00 | 1.07              |
| <b>VG3</b>           |                   | <b>5.2</b>        |        | <b>7.0</b>           |                       |        | <b>7.0</b>           | <b>0.52</b>        |                   |                        |         |      |      | <b>0.70</b>       |
| vr3 - sk2            |                   | 5.2               | 28     | 7.0                  | G                     | -      | 7.0                  | 0.50               | 0.81              | 20                     | 51      | 0.61 | 1.00 | 0.49              |
|                      |                   |                   | 34d    |                      |                       |        |                      |                    | 1.39              | 37                     | 65      | 0.15 | 1.00 | 0.21              |
|                      |                   |                   |        | afvoer               |                       |        | toevoer              |                    |                   |                        |         |      |      |                   |
| VENTILATIECAPACITEIT |                   |                   |        | 49.0                 | dm <sup>3</sup> /s    |        | 49.0                 | dm <sup>3</sup> /s |                   |                        |         |      |      |                   |
| toilet               |                   |                   |        | 7.0                  | dm <sup>3</sup> /s    |        | 176                  | m <sup>3</sup> /h  |                   |                        |         |      |      |                   |
| badkamer             |                   |                   |        | 14.0                 | dm <sup>3</sup> /s    |        |                      |                    |                   |                        |         |      |      |                   |
| keuken               |                   |                   |        | 21.0                 | dm <sup>3</sup> /s    |        |                      |                    |                   |                        |         |      |      |                   |
| berging              |                   |                   |        | 7.0                  | dm <sup>3</sup> /s    |        |                      |                    |                   |                        |         |      |      |                   |
| GEBR. OPP. (GO)      | 68.5              | m <sup>2</sup>    |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |
| VERBL. GEB. (VG)     | 37.7              | m <sup>2</sup>    |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |
| VG/GO*100%           | 55.0              | %                 |        |                      |                       |        |                      |                    |                   |                        |         |      |      |                   |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

|                                                                                                                                                              |                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>project</b> : Peperstraat blok 3, Zaandam<br><b>projectnummer</b> : 820209<br><b>opdrachtgever</b> : Opportunity Vastgoed B.V.<br><b>architect</b> : PPHP | <b>woningtype</b> : B5<br><b>filenummer</b> : X820209aaA3<br><b>datum</b> : 29-09-2023<br><b>gewijzigd</b> : 30-07-2025 |
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| OMSCHRIJVING     |  |                   |  | OPPERVLAKKEN         |        |                      | LUCHTVERVERSING |                       |                    |                      | DAGLICHTTOETREDING |                        |          |         |      |      |                   |
|------------------|--|-------------------|--|----------------------|--------|----------------------|-----------------|-----------------------|--------------------|----------------------|--------------------|------------------------|----------|---------|------|------|-------------------|
| verblijfsgebied  |  | GO                |  | VG                   | kozijn | cap.                 |                 | ventilatievoorziening |                    | Ae                   | Ad                 | belemmering / overstek |          |         |      | Ae   |                   |
| verblijfsruimte  |  |                   |  | VR                   | merk   | eis                  |                 | type                  | lengte             | cap.                 | eis                |                        | $\alpha$ | $\beta$ | Cb   | Cu   | aanw.             |
|                  |  | [m <sup>2</sup> ] |  | [m <sup>2</sup> ]    |        | [dm <sup>3</sup> /s] |                 |                       | [m]                | [dm <sup>3</sup> /s] | [m <sup>2</sup> ]  | [m <sup>2</sup> ]      | [°]      | [°]     | [-]  | [-]  | [m <sup>2</sup> ] |
| 5e VERDIEPING    |  |                   |  | 33.1                 |        |                      |                 |                       |                    |                      |                    |                        |          |         |      |      |                   |
| VG1              |  | 18.2              |  |                      |        | 42.0                 |                 |                       |                    | 42.0                 | 1.82               |                        |          |         |      |      | 2.40              |
| vr1 - wk/k       |  | 18.2              |  | 16                   |        | 21.0                 |                 | G                     | -                  | 42.0                 | 0.50               | 3.04                   | 20       | 16      | 0.79 | 1.00 | 2.40              |
|                  |  |                   |  |                      |        |                      |                 |                       |                    |                      |                    |                        |          |         |      |      |                   |
|                  |  |                   |  |                      |        |                      | afvoer          |                       |                    |                      | toevoer            |                        |          |         |      |      |                   |
|                  |  |                   |  | VENTILATIECAPACITEIT |        |                      | 42.0            |                       | dm <sup>3</sup> /s | 42.0                 |                    | dm <sup>3</sup> /s     |          |         |      |      |                   |
|                  |  |                   |  | toilet               |        |                      | 7.0             |                       | dm <sup>3</sup> /s | 151                  |                    | m <sup>3</sup> /h      |          |         |      |      |                   |
|                  |  |                   |  | badkamer             |        |                      | 14.0            |                       | dm <sup>3</sup> /s |                      |                    |                        |          |         |      |      |                   |
|                  |  |                   |  | keuken               |        |                      | 21.0            |                       | dm <sup>3</sup> /s |                      |                    |                        |          |         |      |      |                   |
|                  |  |                   |  | berging              |        |                      | 0.0             |                       | dm <sup>3</sup> /s |                      |                    |                        |          |         |      |      |                   |
| GEBR. OPP. (GO)  |  | 33.1              |  | m <sup>2</sup>       |        |                      |                 |                       |                    |                      |                    |                        |          |         |      |      |                   |
| VERBL. GEB. (VG) |  | 18.2              |  | m <sup>2</sup>       |        |                      |                 |                       |                    |                      |                    |                        |          |         |      |      |                   |
| VG/GO*100%       |  | 55.0              |  | %                    |        |                      |                 |                       |                    |                      |                    |                        |          |         |      |      |                   |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

|                                                                                                                                                              |                                                                                                                         |
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| <b>project</b> : Peperstraat blok 3, Zaandam<br><b>projectnummer</b> : 820209<br><b>opdrachtgever</b> : Opportunity Vastgoed B.V.<br><b>architect</b> : PPHP | <b>woningtype</b> : A5<br><b>filenummer</b> : X820209aaA3<br><b>datum</b> : 29-09-2023<br><b>gewijzigd</b> : 30-07-2025 |
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| OMSCHRIJVING    |                   |                   |        | OPPERVLAKKEN         |                       |        |                      | LUCHTVERVERSING   |                   |                        |         | DAGLICHTTOETREDING |     |                   |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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| VG1             |                   |                   |        | 28.7                 |                       |        |                      | 42.0              |                   |                        |         | 42.0               |     |                   |  | 2.87 |  |  |  | 5.56 |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |    |  |  |  |   |  |  |  |      |  |  |  |      |  |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 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| vr1 - wk/k      |                   |                   |        | 19.2                 |                       |        |                      | dr1               |                   |                        |         | 21.0               |     |                   |  | G    |  |  |  | -    |  |  |  | 33.5 |  |  |  | 0.50 |  |  |  | 1.70 |  |  |  | 20 |  |  |  | 0 |  |  |  | 0.87 |  |  |  | 1.00 |  |  |  | 1.48 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

|                                                                                                                                                              |                                                                                                                                           |
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| <b>project</b> : Peperstraat blok 3, Zaandam<br><b>projectnummer</b> : 820209<br><b>opdrachtgever</b> : Opportunity Vastgoed B.V.<br><b>architect</b> : PPHP | <b>woningtype</b> : winkelfunctie C 0.00<br><b>filenummer</b> : X820209aaA3<br><b>datum</b> : 29-09-2023<br><b>gewijzigd</b> : 30-07-2025 |
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| OMSCHRIJVING    |                   |                   |        | OPPERVLAKKEN |                      |                       |      | LUCHTVERVERSING |                      |                        |                   | DAGLICHTTOETREDING |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|-----------------|-------------------|-------------------|--------|--------------|----------------------|-----------------------|------|-----------------|----------------------|------------------------|-------------------|--------------------|---------|-----|-----|-------------------|--|--|--|---|--|--|--|---|--|--|--|------|--|--|--|
| verblijfsgebied | GO                | VG                | kozijn | aantal       | cap. vereist         | ventilatievoorziening |      | Ae              | Ad                   | belemmering / overstek |                   |                    |         | Ae  |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
| verblijfsruimte |                   | VR                | merk   | pers.        | p.p.                 | totaal                | type | lengte          | cap.                 | eis                    |                   | $\alpha$           | $\beta$ | Cb  | Cu  | aanw              |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 | [m <sup>2</sup> ] | [m <sup>2</sup> ] |        |              | [dm <sup>3</sup> /s] | [dm <sup>3</sup> /s]  |      | [m]             | [dm <sup>3</sup> /s] | [m <sup>2</sup> ]      | [m <sup>2</sup> ] | [°]                | [°]     | [-] | [-] | [m <sup>2</sup> ] |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
| BEGANE GROND    |                   |                   |        | 72.5         |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
| VG1             |                   |                   |        | 72.5         |                      |                       |      | 36.3            |                      |                        |                   | 36.3               |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
| winkelfunctie   |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
| vr1 - winkel    |                   |                   |        | 72.5         |                      |                       |      | 9               |                      |                        |                   | 4.0                |         |     |     | 36.3              |  |  |  | G |  |  |  | - |  |  |  | 36.3 |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |
|                 |                   |                   |        |              |                      |                       |      |                 |                      |                        |                   |                    |         |     |     |                   |  |  |  |   |  |  |  |   |  |  |  |      |  |  |  |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

|                                                                                                                                                              |                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>project</b> : Peperstraat blok 3, Zaandam<br><b>projectnummer</b> : 820209<br><b>opdrachtgever</b> : Opportunity Vastgoed B.V.<br><b>architect</b> : PPHP | <b>woningtype</b> : winkelfunctie C 0.00<br><b>filenummer</b> : X820209aaA3<br><b>datum</b> : 29-09-2023<br><b>gewijzigd</b> : 30-07-2025 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|

| OMSCHRIJVING     |                   |                   |        | OPPERVLAKKEN            |                      |                      |                       | LUCHTVERVERSING                              |                      |                   |                        | DAGLICHTTOETREDING         |         |     |     |                   |  |  |
|------------------|-------------------|-------------------|--------|-------------------------|----------------------|----------------------|-----------------------|----------------------------------------------|----------------------|-------------------|------------------------|----------------------------|---------|-----|-----|-------------------|--|--|
| verblijfsgebied  | GO                | VG                | kozijn | aantal                  | cap. vereist         |                      | ventilatievoorziening |                                              | Ae                   | Ad                | belemmering / overstek |                            |         |     | Ae  |                   |  |  |
| verblijfsruimte  |                   | VR                | merk   | pers.                   | p.p.                 | totaal               | type                  | lengte                                       | cap.                 | eis               |                        | $\alpha$                   | $\beta$ | Cb  | Cu  | aanw.             |  |  |
|                  | [m <sup>2</sup> ] | [m <sup>2</sup> ] |        |                         | [dm <sup>3</sup> /s] | [dm <sup>3</sup> /s] |                       | [m]                                          | [dm <sup>3</sup> /s] | [m <sup>2</sup> ] | [m <sup>2</sup> ]      | [°]                        | [°]     | [-] | [-] | [m <sup>2</sup> ] |  |  |
| BEGANE GROND     |                   |                   |        | 59.0                    |                      |                      |                       |                                              |                      |                   |                        |                            |         |     |     |                   |  |  |
| VG1              |                   |                   |        | 59.0                    |                      |                      |                       | 29.5                                         |                      |                   |                        | 29.5                       |         |     |     |                   |  |  |
| winkelfunctie    |                   |                   |        |                         |                      |                      |                       |                                              |                      |                   |                        |                            |         |     |     |                   |  |  |
| vr1 - winkel     |                   |                   |        | 59.0                    |                      |                      |                       | 7      4.0      29.5      G      -      29.5 |                      |                   |                        |                            |         |     |     |                   |  |  |
|                  |                   |                   |        |                         |                      |                      |                       |                                              |                      |                   |                        |                            |         |     |     |                   |  |  |
|                  |                   |                   |        | afvoer                  |                      |                      |                       | toevoer                                      |                      |                   |                        |                            |         |     |     |                   |  |  |
|                  |                   |                   |        | VENTILATIECAPACITEIT    |                      |                      |                       | 29.5    dm <sup>3</sup> /s                   |                      |                   |                        | 29.5    dm <sup>3</sup> /s |         |     |     |                   |  |  |
|                  |                   |                   |        | toilet                  |                      |                      |                       | 7.0    dm <sup>3</sup> /s                    |                      |                   |                        | 106    m <sup>3</sup> /h   |         |     |     |                   |  |  |
|                  |                   |                   |        | verblijfsruimten        |                      |                      |                       | 7.0    dm <sup>3</sup> /s                    |                      |                   |                        |                            |         |     |     |                   |  |  |
| GEBR. OPP. (GO)  |                   |                   |        | 59.0    m <sup>2</sup>  |                      |                      |                       |                                              |                      |                   |                        |                            |         |     |     |                   |  |  |
| VERBL. GEB. (VG) |                   |                   |        | 180.2    m <sup>2</sup> |                      |                      |                       |                                              |                      |                   |                        |                            |         |     |     |                   |  |  |
| VG/GO*100%       |                   |                   |        | 305.4    %              |                      |                      |                       |                                              |                      |                   |                        |                            |         |     |     |                   |  |  |

#### RENVOOI VOORZIENINGEN

G Gebalanceerde ventilatie

## BIJLAGE 5 – BEREKENING MILIEUPRESTATIE





# Rapportage

# Milieuprestatieberekening

Naam berekening: Peperstraat, blok 3

## Projectkenmerken

### Projectlocatie

ADRES  
Peperstraat

POSTCODE

PLAATS

### Projectorganisatie

CLIËNT  
Breevast

ARCHITECT  
PHPP

DATUM VERGUNNINGSAANVRAAG  
18 maart 2022

## Gebouwkenmerken

### Gebouw

GEBRUIKSFUNCTIE  
Woonfunctie

BRUTO VLOEROPPERVLAK (BVO)  
6377 m<sup>2</sup>

GEBOUWLEVENSDUUR  
75 jaar

## Verantwoording

Deze berekening is gemaakt met GPR Materiaal versie 5. Er is voor de berekening gebruik gemaakt van de productendatabase met datum 03 december 2021 van de nationale milieudatabase versie 3.0

# MPG Resultaten

|                                             |  |        |                                           |  |         |
|---------------------------------------------|--|--------|-------------------------------------------|--|---------|
| MPG                                         |  | 0,619  | MKI                                       |  | 296.069 |
| Berekend per m2 BVO, per jaar               |  |        | Berekend over de totale BVO en levensduur |  |         |
| A. Productiefase                            |  | 0,289  | A. Productiefase                          |  | 137.983 |
| A. Constructiefase                          |  | 0,008  | A. Constructiefase                        |  | 3.841   |
| B. Gebruiksfas                              |  | 0,257  | B. Gebruiksfas                            |  | 122.884 |
| C. Afdankfas                                |  | 0,096  | C. Afdankfas                              |  | 45.860  |
| D. Buiten gebouwlevensloop                  |  | -0,030 | D. Buiten gebouwlevensloop                |  | -14.499 |
| Klimaatverandering - GWP 100 jaar           |  |        |                                           |  |         |
| Berekend in kg CO2 eq, per m2 BVO, per jaar |  | 4,660  |                                           |  |         |

# MPG Resultaten Per Hoofdelement

|                  |       |                          |       |
|------------------|-------|--------------------------|-------|
| MPG              |       | 0,619                    |       |
| Fundering        | 0,012 | Klimaatinstallaties      | 0,071 |
| Vloeren          | 0,152 | Elektrische installaties | 0,180 |
| Draagconstructie | 0,068 | Toe- en afvoeren         | 0,002 |
| Gevel            | 0,065 | Verkeersruimte           | 0,005 |
| Daken            | 0,036 | Vaste voorzieningen      | 0,013 |
| Binnenwanden     | 0,014 | Terrein                  | 0,000 |

# Elementen

## Bodemvoorzieningen

0,001

### Bodemvoorzieningen; grond

Cat. 3 Grondaanvullingen, Zand

1.206 m<sup>3</sup>

0,001

## Funderingsvoeten en -balken

0,004

### Funderingsconstructies; voetenenbalken

Cat. 2 Fundatiebalken, Betonhuis; beton, in het werk gestort, C30/37,CEMIII;  
incl.wapening+eps

breedte 400 mm dikte 600 mm

313 m

0,004

## Funderingspalen

0,007

### Paalfunderingen; geheid

Cat. 2 Funderingspalen, Heipaal; beton, prefab; AB-FAB

breedte 350 mm dikte 350 mm

905 m

0,007

## Vrijdragende vloeren

0,129

### Vloeren; niet-constructief

Cat. 2 Vrijdragende Vloeren, Kanaalplaat, prefab beton; incl. isolatie, eps,Rc:4.0; AB-FAB

804 m<sup>2</sup>

0,007

Cat. 3 Dekvloeren, Zandcement

dikte 90 mm

1.041 m<sup>2</sup>

0,009

Cat. 3 Afwerklagen, Keramische tegels; ongeglazuurd/gelijmd

368 m<sup>2</sup>

0,002

Cat. 3 Dekvloeren, Zandcement

dikte 90 mm

4.890 m<sup>2</sup>

0,041

tbv verdiepingsvloeren

### Vloeren; constructief

Cat. 2 Vrijdragende Vloeren, Breedplaat, excl. druklaag, 60mm; prefab beton; AB-FAB

4.890 m<sup>2</sup>

0,027

Cat. 2 Vrijdragende Vloeren, Betonhuis; druklaag breedplaatvloer; betonmortel  
C20/25,CEMIII,20%betongranulaat CEMIII; incl. wapening

dikte 220 mm

4.890 m<sup>2</sup>

0,043

## Vloeren, balkon en galerij

0,023

### Balustradesenleuningen; balustrades

Cat. 3 Balustrades, Staal; gepoedercoat; glasplaat vulling

518 m

0,006

### Vloeren; constructief

Cat. 2 Balkon- en galerijvloeren, Beton, prefab; AB-FAB

dikte 250 mm

768 m<sup>2</sup>

0,017

## Binnenwanden, constructief

0,068

### Binnenwanden; constructie


 Massieve wanden, dragend, Beton, in het werk gestort, C30/37; incl.wapening

dikte 220 mm

2.780 m<sup>2</sup>

0,068

## Buitenwandopeningen, gevuld met ramen

0,041

### Buitenwandopeningen; gevuld met ramen

|        |                                                                              |                            |                    |       |
|--------|------------------------------------------------------------------------------|----------------------------|--------------------|-------|
| Cat. 3 | Buitenkozijnen, Aluminium vast en/of draaiend, geanodiseerd                  |                            | 342 m <sup>2</sup> | 0,002 |
| Cat. 3 | Buitenbeglazing, HR++ (dubbel) glas; coating / gasvulling (argon), 6/16/6 mm |                            | 657 m <sup>2</sup> | 0,032 |
| Cat. 3 | Stelkozijnen, Onverduurzaamd hout; geverfd                                   |                            | 278 st             | 0,000 |
| Cat. 3 | Waterslagen, Aluminium; gemoffeld                                            | breedte 100 mm hoogte 2 mm | 622 m              | 0,001 |
| Cat. 3 | Vensterbanken, Spaanplaat; plaat                                             | dikte 30 mm                | 288 m              | 0,006 |
| Cat. 3 | Waterkeringen, Polyetheen; folie                                             | dikte 50 mm dikte 1 mm     | 1.055 m            | 0,000 |

## Buitenwanden

0,024

### Buitenwanden; niet-constructief

|        |                                                                                      |                    |                      |       |
|--------|--------------------------------------------------------------------------------------|--------------------|----------------------|-------|
| Cat. 2 | Systeemwanden, Houten buitenwandelement, HSB prefab; incl. isolatie; duurz.bosbeheer |                    | 2.246 m <sup>2</sup> | 0,005 |
| Cat. 2 | Baksteenmetselwerk buitenwanden KNB                                                  | dikte 100 mm       | 2.541 m <sup>2</sup> | 0,015 |
| Cat. 3 | Isolatielagen, Steenwol MWA 2012; platen;                                            | r-waarde 3.5 m2k/w | 295 m <sup>2</sup>   | 0,000 |

### Buitenwanden; constructief,

|        |                                                                                                                     |              |                    |       |
|--------|---------------------------------------------------------------------------------------------------------------------|--------------|--------------------|-------|
| Cat. 2 | Massieve wanden dragend, Betonhuis; beton, in het werk gestort, C30/37, CEM III, 20% betongranulaat; incl. wapening | dikte 250 mm | 295 m <sup>2</sup> | 0,003 |
|--------|---------------------------------------------------------------------------------------------------------------------|--------------|--------------------|-------|

## Platte daken

0,030

### Daken; constructief

|        |                                                                            |              |                    |       |
|--------|----------------------------------------------------------------------------|--------------|--------------------|-------|
| Cat. 2 | Platte daken, Breedplaat, excl. druklaag, 60mm; prefab beton; AB-FAB       |              | 803 m <sup>2</sup> | 0,004 |
| Cat. 3 | Platte daken, Druklaag breedplaatvloer; betonmortel C20/25; incl. wapening | dikte 190 mm | 803 m <sup>2</sup> | 0,014 |

### Daken; niet-constructief

|        |                    |                    |                    |       |
|--------|--------------------|--------------------|--------------------|-------|
| Cat. 3 | Isolatielagen, EPS | r-waarde 6.3 m2k/w | 830 m <sup>2</sup> | 0,004 |
|--------|--------------------|--------------------|--------------------|-------|

### Dakafwerkingen; bekledingen

|        |                                                                                               |  |                    |       |
|--------|-----------------------------------------------------------------------------------------------|--|--------------------|-------|
| Cat. 2 | Plat dakbedekkingen, DAK en MILIEU Bitumen gemod. tweelaags mech. bevestigd incl. bevestigers |  | 803 m <sup>2</sup> | 0,002 |
|--------|-----------------------------------------------------------------------------------------------|--|--------------------|-------|

### Dakafwerkingen; afwerkingen

|        |                                                                                |  |                    |       |
|--------|--------------------------------------------------------------------------------|--|--------------------|-------|
| Cat. 3 | Afwerklagen, Begroend dak; drainage+filter+substraat+sedum (excl dakbedekking) |  | 803 m <sup>2</sup> | 0,006 |
|--------|--------------------------------------------------------------------------------|--|--------------------|-------|

## **Hellende daken** 0,006

### Daken; constructief

Cat. 3 Hellende daken, Europees naaldhouten balken met europees naaldhout delenn; duurzame bosbouw 650 m<sup>2</sup> 0,001

### Daken; niet-constructief

Cat. 3 Isolatielagen, EPS r-waarde 6.3 m2k/w 650 m<sup>2</sup> 0,003

### Dakafwerkingen; bekledingen

Cat. 1 Bekledingen, Madura geglazuurde keramische dakpan 650 m<sup>2</sup> 0,002

## **Binnenwanden, niet-constructief** 0,009

### Binnenwanden; niet-constructief

Cat. 3 Afwerklagen, Keramische tegels; geglazuurd/gelijmd 830 m<sup>2</sup> 0,003

Cat. 3 Bekledingen systeemwanden niet dragend, Gipskartonplaat dikte 70 mm 570 m<sup>2</sup> 0,006

## **Binnenwandopeningen, gevuld met deuren** 0,005

### Binnenwandopeningen; gevuldmetsdeuren

Cat. 3 Binnenkozijnen, Hout; geschilderd:alkyd 1.200 m<sup>2</sup> 0,002

Cat. 2 Binnendeuren, Houten vlakke binnendeur; honingraat, duurz. bosbeheer hoogte 2315 mm breedte 854 mm 67 st 0,000

Cat. 2 Binnendeuren, Houten vlakke binnendeur; honingraat, duurz. bosbeheer hoogte 2315 mm breedte 954 mm 453 st 0,003

## **Verwarming** 0,053

### Warmte opwekking; hoofverdelingwarmte

Cat. 3 Warmtedistributiesystemen, Polyetheen/polybuteen; cv-leidingen; incl. koppelingen + verdeling 4.524 m<sup>2</sup>gbo 0,009

### Warmtedistributie; verwarmingslichamen

Cat. 3 Warmteafgiftesystemen, Vloerverwarming 95 W/m2; leidingen:kunststof 4.524 m<sup>2</sup>gbo 0,004

### Warmte opwekking; bijzonder

Cat. 3 Warmteopwekkinginstallaties W-bouw, Warmtepomp lucht - water hybride 24 kW, CW5 92 st 0,038

### warmte opwekking; centraal

Cat. 3 Warmtapwaterinstallaties, Elektrische boiler; CW:4-6, 120 liter 4 st 0,002

## **Ventilatie** 0,010

### Luchtbehandeling; luchtbehandelingskasten

Cat. 2 Luchtdistributiesystemen, VLA Ventilatiesysteem, type D met centrale wtw; W-bouw, individueel 4.524 m<sup>2</sup>gbo 0,010

## Warm tapwater 0,000

### Water; verwarmd tapwater

Cat. 3 Waterleidingen, Polyvinylchloride, incl. mantelbuis, 15 mm, warmtapwater; W-bouw 4.524 m<sup>2</sup>gbo 0,000

## Koeling 0,009

### Koude-opwekking; centraal

Cat. 3 Koudeopwekkingsinstallaties, Compressiekoelmachine 4.524 m<sup>2</sup>gbo 0,009

## Elektrotechnische voorzieningen 0,180

### Beveiliging: Aarding en bliksembeveiliging

Cat. 3 Aarding, aarding woningen 4.524 m<sup>2</sup>gbo 0,004

### Centrale elektrotechnische voorzieningen; energiedistributie, laagspanning,

Cat. 3 Elektriciteitsleidingen, Geïsoleerde installatiedraad + mantelbuis:pvc 4.524 m<sup>2</sup>gbo 0,003

### Centrale elektrotechnische voorzieningen; energie, opwekking

Cat. 4 Centrale elektrotechnische voorz.; energie, laagspanning, algemeen, Netstroom; NL-mix, 1 kWh (forfaitair) 225.510 kWh 0,107

Cat. 3 Elektriciteitsopwekkingsystemen, PV,multi-Si; plat dak; incl. inverter+steun+kabels 225 m<sup>2</sup> 0,066

## Afvoeren 0,002

### Afvoeren; regenwater

Cat. 3 Binnenrioleringen, Pvc; gerecycled; leiding 4.524 m<sup>2</sup>gbo 0,001

Cat. 3 Buitenrioleringen kavel, Pvc; gerecycled; leiding 5.758 m<sup>2</sup>gbo 0,001

Cat. 3 Hemelwaterafvoeren, Pvc; gerecycled; diameter:80mm; d:1.8mm 200 m 0,000

## Waterdistributie 0,000

### Water; drinkwater

Cat. 3 Waterleidingen, Polyetheen; leiding+mantelbuis 4.524 m<sup>2</sup>gbo 0,000

## Trappen en hellingen 0,002

### Trappen en hellingen; trappen

Cat. 3 Centrale trappen, Prefab beton; h:2.7.b:1.1m; incl. bordes 12 st 0,002

## Liften 0,003

### Transport; liften

Cat. 3 Liftcabines, Staal; personenlift; gemoffeld 2 st 0,001

Cat. 3 Liftinstallaties, Staal; hefconstructie+contragewicht; 1 bouwlaag 12 st 0,003

## Keuken 0,011

**Vastekeukenvoorzieningen; standaard**

|        |                                            |             |       |       |
|--------|--------------------------------------------|-------------|-------|-------|
| Cat. 3 | Keukenkasten, Multiplex; geschilderd:alkyd |             | 193 m | 0,005 |
| Cat. 3 | Aanrechtbladen, Kunstharsgebonden; massief | dikte 30 mm | 193 m | 0,005 |

 **Sanitair**

0,002

**Vastesanitairevoorzieningen; standaard**

|        |                                                                       |  |       |       |
|--------|-----------------------------------------------------------------------|--|-------|-------|
| Cat. 3 | Toiletten, Wandcloset + fontein, porselein; incl. kunststof reservoir |  | 92 st | 0,001 |
| Cat. 3 | Wasvoorzieningen, Keramiek; wastafel                                  |  | 92 st | 0,000 |
| Cat. 3 | Douchevoorzieningen, Keramiek; tegels                                 |  | 92 st | 0,001 |

## BIJLAGE 6 – BEREKENINGEN EQUIVALENTE RC-WAARDE



project : Peperstraat - blok 3, Zaandam      locatie : gemeenschappelijke verkeersruimten NO  
 projectnummer : 820209      onderwerp : bepaling equivalente warmteweerstand  
 opdrachtgever : Opportunity Vastgoed B.V.      filenummer : X820209aaA7  
 architect : PPHP      datum : 30-7-2025

| Onverwarmde ruimte Noordoost                                    |        |        |
|-----------------------------------------------------------------|--------|--------|
| Volume [V]                                                      | 518.14 | 518.14 |
| Ventilatievoud [n]                                              | 0.30   |        |
| for fatair mag worden uitgegaan van 0.3 voor het ventilatievoud |        |        |

| inwendige scheidingsconstructie |        |            |
|---------------------------------|--------|------------|
|                                 | A      | Req<br>eis |
|                                 | m2     | m2K/W      |
| Wanden                          | 379.26 | 4.70       |
| Entredeuren woningen            | 20.00  | 0.61       |
| Plafond onder woning            | 0.00   | 6.30       |
| Totaal                          | 399.26 |            |

| uitwendige scheidingsconstructie |                  |                   |                   |                |         |
|----------------------------------|------------------|-------------------|-------------------|----------------|---------|
|                                  | Rc;uitw<br>m2K/W | Rsi;uitw<br>m2K/W | Rse;uitw<br>m2K/W | Uuitw<br>W/m2K | A<br>m2 |
| BG vloer                         | 3.70             | 0.17              | 0.04              | 0.26           | 50.40   |
| Dak                              | 6.30             | 0.10              | 0.04              | 0.16           | 25.90   |
| Wanden                           | 4.70             | 0.13              | 0.04              | 0.21           | 88.14   |
| Gevelopeningen naar buiten toe   |                  |                   |                   | 1.65           | 9.60    |

$$R_{iu;eq} = \frac{\sum A_i}{\sum (A_{e;k} \times U_{e;k}) + 0.33 \times n \times V}$$

= 3.91 m2K/W

De vereiste Rc-waarde van de scheidingsconstructie bedraagt derhalve minimaal 0.79 m2K/W.

project : Peperstraat - blok 3, Zaandam      locatie : gemeenschappelijke verkeersruimten ZW + stalling  
 projectnummer : 820209      onderwerp : bepaling equivalente warmteweerstand  
 opdrachtgever : Opportunity Vastgoed B.V.      filenummer : X820209aaA7  
 architect : PPHP      datum : 30-7-2025

| Onverwarmde ruimte ZW                                          |        |        |
|----------------------------------------------------------------|--------|--------|
| Volume [V]                                                     | 757.38 | 757.38 |
| Ventilatievoud [n]                                             | 0.30   |        |
| forfatair mag worden uitgegaan van 0.3 voor het ventilatievoud |        |        |

| inwendige scheidingsconstructie              |        |       |        |        |
|----------------------------------------------|--------|-------|--------|--------|
|                                              | A      | Req   |        |        |
|                                              | m2     | eis   |        |        |
|                                              |        | m2K/W |        |        |
| Wand                                         | 471.34 | 4.70  | 492.04 | 471.34 |
| entree deuren woningen en gemeenschapsruimte | 20.70  | 0.61  | 20.7   |        |
| Totaal                                       | 492.04 |       |        |        |

| uitwendige scheidingsconstructie |         |          |          |       |        |        |
|----------------------------------|---------|----------|----------|-------|--------|--------|
|                                  | Rc;uitw | Rsi;uitw | Rse;uitw | Uuitw | A      |        |
|                                  | m2K/W   | m2K/W    | m2K/W    | W/m2K | m2     |        |
| BG vloer                         | 3.70    | 0.17     | 0.04     | 0.26  | 160.80 |        |
| Dak 5e verdieping                | 6.30    | 0.10     | 0.04     | 0.16  | 30.80  |        |
| Dak 4e verdieping                | 6.30    | 0.10     | 0.04     | 0.16  | 6.50   |        |
| Dak fietsenstalling              | 6.30    | 0.10     | 0.04     | 0.16  | 113.60 |        |
| Wand                             | 4.70    | 0.13     | 0.04     | 0.21  | 141.14 | 168.14 |
| Deuren naar buiten toe           |         |          |          | 1.65  | 27.00  | 27.00  |

$$R_{iu;eq} = \frac{\sum A_i}{\sum (A_{e;k} \times U_{e;k}) + 0.33 \times n \times V} = 2.31 \text{ m2K/W}$$

De vereiste Rc-waarde van de scheidingsconstructie bedraagt derhalve minimaal 2.39 m2K/W.