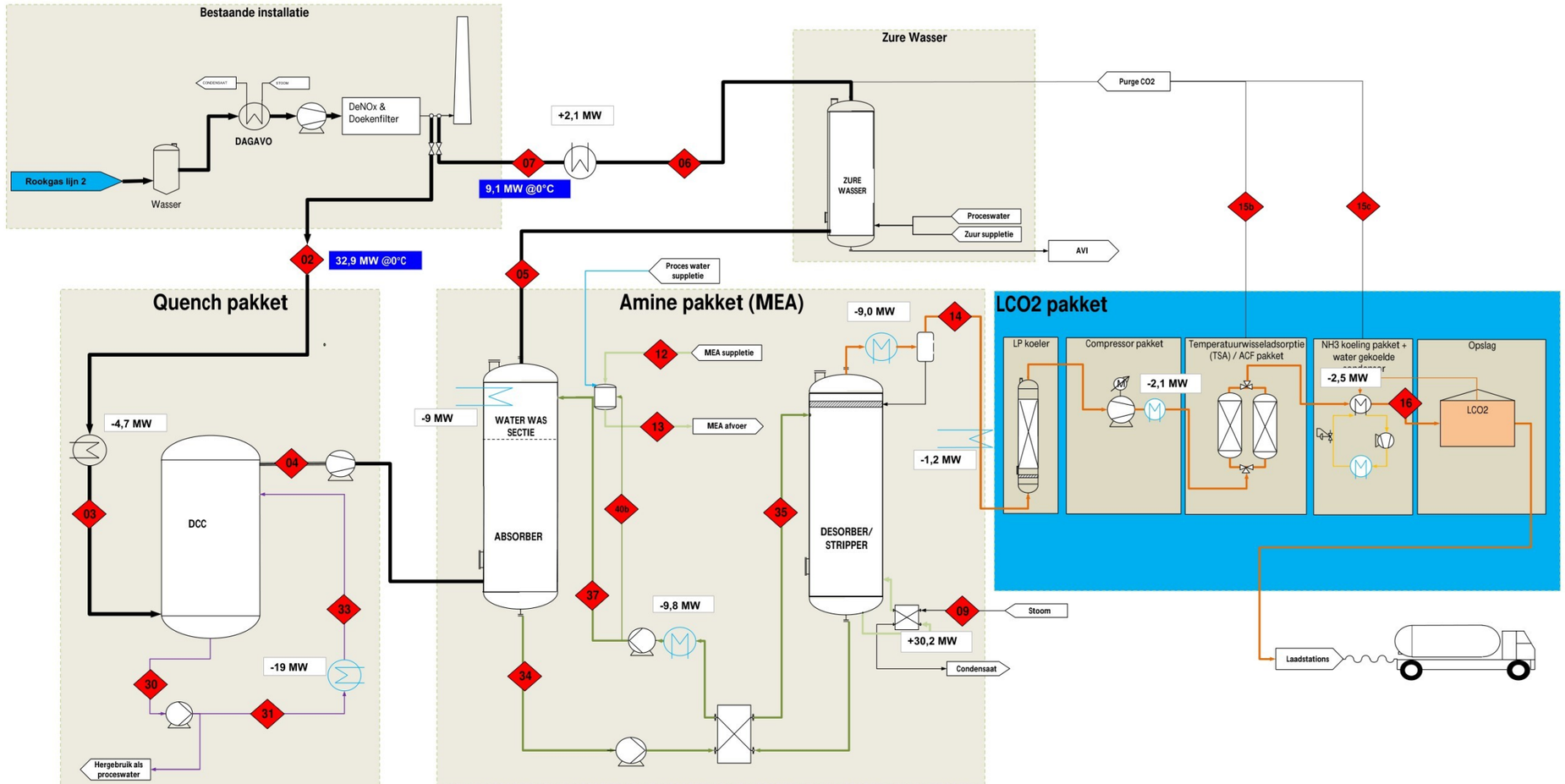


Rev.	Date	Description/ Issued for	Drawn by	Ckd	Seen by
D	27/03/2025	For Permit Application			
C	24/09/2024	For Information			
B	24/05/2024	For comments			
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Client: ARN draft CCU starting points

Project: LCO2 capture and storage

Title: PFD ARN CCU PROJECT

BILFINGER TEBODIN

Office	Dept.	Scale	Size	Ordernumber	Sub	Drawingnumber	Sht	of	Rev.
Schiedam	32	- / -	A3	57615	00	3242002	1	2	D

Number		02	03	04	05	06	07	14	30	33	34	35	37	15	16
Aspen tag															
Medium	-	Flue gas	Flue gas	Flue gas	Off gas	Off gas	Off gas	CO2	Water	Water	Rich MEA	Rich MEA	Lean MEA	CO2	CO2
Vapour Fraction	-	1,0	1,0	1,0	1,0	1,0	1,0	1,0	0,0	0,0	0,0	0,0	0,0	1,0	0,0
Mass flow	kg/h	224.367	224.367	198.765	170.909	171.616	171.616	27.642	570.602	545.000	481.578	481.578	453.700	709	25.540
Volume flow [note 1]	m³/hr	277.211	244592	177742	149248	149665	172069	12735	582	548	454	460	425	14	25
Temperature	°C	130,0	65,0	40,0	40,0	40,1	80,0	55,0	63,7	35,0	49,7	100,0	40,0	-20,4	-20,4
Pressure	bara	1,0	0,9	1,0	1,1	1,1	1,1	1,4	1,0	3,5	1,1	3,4	3,5	19,8	19,8
Density	kg/m³	0,81	0,92	1,12	1,15	1,15	1,00	2,17	981,16	994,24	1.060,49	1.046,07	1.067,64	50,75	1.032,06
Energy content [note 2]	MW	32,9					9,1								
Composition															
MEAmine	mol%	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,00	0,0000	0,0000	13,8703	13,8703	14,3984	0,00	0,00
H2O	mol%	23,3722	23,3722	7,4610	6,9216	6,9034	6,9034	11,15	99,9972	100,0000	79,5562	79,5562	82,0917	0,00	0,01
CO2	mol%	7,7907	7,7907	9,3998	0,7236	0,9792	0,9792	86,69	0,0021	0,0000	6,5679	6,5679	3,5099	97,84	99,90
O2	mol%	6,5706	6,5706	7,9356	8,8141	8,7909	8,7909	0,03	0,0001	0,0000	0,0009	0,0009	0,0000	0,00	0,00
N2	mol%	62,2654	62,2654	75,2023	83,5394	83,3252	83,3252	0,13	0,0005	0,0000	0,0047	0,0047	0,0000	2,16	0,09

Notes

Note 1: This is the actual volumetric flowrate [m3/h], not normal volumetric flowrate [Nm3/h @ 0°C and 1 bar(a)]

Note 2: Energy content of the gas when cooled to 0 °C

Energy balance

		Zomer	Winter	Zomer To district heating	Winter						
Cooling Duty	**tag**	**MWth**	**MWth**	**MWth**	**MWth**	**Heating duty**	**Tag**	**MWth**	**Power duty**	**Tag**	**kWe**
Q precooler	HE-010	4,7	4,7	2,6	2,8	Q Reboiler	HE-004	30	Q lean pump	AP-101/2	40
Q DCC cooler	HE-001	19,0	19,0	3,4	8,4	Q Offgas reheater		2	Q Rich pump	AP-201/2	50
Q Abs. top cooler	HE-002	9,0	9,0			Q precooler -> offgas		-2	Q Booster Blower	AF-001	605
Q Lean trimcooler	HE-003	9,8	9,8								
Q Str. top condenser	HE-006	9,0	9,0	6	6				Q CO2 compressor	AF-101	1834
Q Chiller LP cooler		1,2	1,2						Q refrigeration plant	Ref-001	800
Q compressor interstage	-	2,1	2,1						Q Cooling water pumps	AP-301/2	300
Q Refrigeration		2,5	2,5						Q Cooling tower ventilation	AH-001/2	1200
Total		**57**	**57**	**12**	**17**			**30**			**4829**
District heating		-12	-17								
Offgas reheating		-2	-2								
Total		**43**	**38**								

Interstage van absorber is buiten beschouwing gelaten

Analyse energie inhoud van rookgas/afgas stroom 02 en 07 (splitsing in voelbare en latente warmte)

Stroom		02	07
Mass flow	kg/s	62,3	47,7
Temperature	°C	130,0	80,0
Heat capacity	kJ/kg.°C	1,2	1,1
Sensible heat	MW	9,4	4,1
Latent heat	MW	23,5	5,0
Energy content [note 2]	MW	32,9	9,1

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