

## PART A: Planning Stage Checklist

This part of the checklist should be completed in the planning stage of an LNG bunker operation.  
It is a recommended guideline for the, in advance, exchange of information necessary for the preparation of the actual operation.

Planned date and time: \_\_\_\_\_

Designated LNG bunker location: \_\_\_\_\_

LNG receiving ship: \_\_\_\_\_

LNG supplying bunker truck: \_\_\_\_\_

	Check	Ship	LNG Truck	Terminal	Code	Remarks
1	Competent authorities have granted permission for LNG transfer operations for the specific location and time.				P	
2	The terminal has granted permission for LNG transfer operations for the specific location and time.				P	
3	Competent authorities have been notified of the start of LNG bunker operations as per local regulations.					Day/time notification: _____ Day time notified: _____
4	The terminal has been notified of the start of LNG bunker operations as per terminal requirements.					Day/time notification: _____ Day time notified: _____
5	Competent authorities requirements are being observed.					e.g. Port byelaws.
6	Local terminal requirements are being observed.					e.g. Terminal regulations
7	All personnel involved in the LNG bunker operation have the appropriate training and have been instructed on the specific LNG bunker equipment and procedures.	For the Ship:	For the Truck	For the Terminal		
8	The bunker location is accessible for the LNG supplying tank truck and the total truck weight does not exceed the maximum permitted load of the quay or jetty.					

9	The bunker operation area can be sufficiently illuminated					
10	All LNG transfer and gas detection equipment is certified, in good condition and appropriate for the service intended.	For the Ship:	For the Truck			
11	The procedures for bunkering, cooling down and purging operations have been agreed upon.				A	Reference to procedures::
12	The system and method of electrical insulation have been agreed upon by ship and truck.				A	Method:
13	The restricted area on the shore has been agreed upon by ship, truck and terminal				A	Safety zone: _____ mtr / ft
14	Regulations with regards to ignition sources can be observed.	For the Ship:	For the Truck	For the terminal		
15	All in local requirements required firefighting equipment is ready for immediate use.	For the Ship:	For the Truck	For the terminal		If applicable

**For registration of the, in the planning, involved representatives:.**

Ship	LNG Truck	Terminal
Name	Name	Name
Rank	Position	Position
Date	Date	Date
Time	Time	Time

## PART B: Pre Transfer Checklist

(This mandatory part should be completed before actual transfer operations start)

Date and time: \_\_\_\_\_

Designated LNG bunker location: \_\_\_\_\_

LNG receiving ship: \_\_\_\_\_

LNG supplying tank truck: \_\_\_\_\_

	Check	Ship	LNG Truck	Terminal	Code	Remarks
16	Part A is used prior and preparatory of the actual operation	For the Ship:	For the Truck	For the Terminal		If applicable
17	Present weather and wave conditions are within the agreed limits.				A R	
18	The LNG receiving ship is securely moored. Regulations with regards to mooring arrangements are observed. Sufficient fendering is in place.				R	
19	There is a safe means of access between the ship and shore. When mandatory, there is a safe emergency escape route between ship and shore				R	
20	All mandatory firefighting equipment is ready for immediate use	For the Ship:	For the Truck	For the Terminal		
21	The bunker operation area is sufficiently illuminated.				A R	
22	The ship and truck are able to move under their own power in a safe and non-obstructed direction.	For the Ship:	For the Truck		R	
23	Adequate supervision of the bunker operation is in place both on the ship and at the LNG tank truck and an effective watch is being kept at all time.					
24	An effective means of communication between the responsible operators and supervisors on the ship and at truck has been established and tested. The communication language has been agreed upon.				A R	VHF / UHF Channel: _____ Language: _____ Primary System: _____ Backup System: _____
25	The emergency stop signal and shutdown procedures have been agreed upon, tested,				A	Emergency Stop Signal:

	Check	Ship	LNG Truck	Terminal	Code	Remarks
	and explained to all personnel involved. Emergency procedures and plans and the contact numbers are known to the persons in charge.					
26	The predetermined restricted area zone has been established. Appropriate signs mark this area.				A	
27	The restricted area is free of unauthorized persons, objects and ignition sources.				R	
28	External doors, portholes and accommodation ventilation inlets are closed as per operations manual.				R	At no time they should be locked
29	The gas detection equipment has been operationally tested and found to be in good working order.					
30	Material Safety Data Sheets (MSDS) for the delivered LNG fuel are available.				A	
31	Regulations with regards to ignition sources are observed.				R	
32	Appropriate and sufficient suitable protective clothing and equipment is ready for immediate use.					
33	Personnel involved in the connection and disconnection of the bunker hoses and personnel in the direct vicinity of these operations make use of sufficient and appropriate protective clothing and equipment.					
34	A (powered) emergency release coupling {(P)ERC} is installed and is ready for immediate use					If applicable
35	The water spray system has been tested and is ready for immediate use.					If applicable.
36	Spill containment arrangements are of an appropriate material and volume, in position, and empty.					
37	Hull and deck protection against low temperature is in place.					If applicable.
38	Bunker pumps and compressors are in good working order.				A	If applicable.
39	All control valves are well maintained and in good working order.					
40	Bunker system gauges, high level alarms and high-pressure alarms are operational, correctly set and in good working order.					
41	The ship's bunker tanks are protected against inadvertent overfilling at all times, tank content is constantly monitored and alarms are correctly set.				R	Intervals not exceeding _____ minutes
42	All safety and control devices on the LNG installations are checked, tested and found to					

	Check	Ship	LNG Truck	Terminal	Code	Remarks
	be in good working order.					
43	Pressure control equipment and boil off or re-liquefaction equipment is operational and in good working order.					If applicable
44	Both on the ship and at the tank truck the ESDs, automatic valves or similar devices have been tested, have found to be in good working order, and are ready for use. The both ESD systems are linked. The closing rates of the ESDs have been exchanged.				A	ESD Ship: _____ seconds ESD Truck: _____ seconds
45	Initial LNG bunker line up has been checked. Unused connections are closed, blanked and fully bolted.					
46	LNG bunker hoses, fixed pipelines and manifolds are in good condition, properly rigged, supported, properly connected, leak tested and certified for the LNG transfer.					
47	The LNG bunker connection between the ship and the truck is provided with dry disconnection couplings.					If applicable.
48	The LNG bunker connection between the ship and the LNG bunker truck has adequate electrical insulating means in place.					
49	Dry breakaway couplings in the LNG bunker connections are in place, have been visually inspected for functioning and found to be in a good working order.				A	
50	The tank truck is electrically grounded and the wheels are chocked.					
51	The tank truck engine is off during the connection and disconnection of the LNG bunker hoses.					
52	The tank truck engine is switched off during purging or LNG transfer.					Unless the truck engine is required for the purging or transfer of LNG.
53	If mandatory the ship's emergency fire control plans are located externally.					Location: _____
54	An International Shore Connection has been provided.					If applicable
55	Competent authorities have been informed that bunker transfer operations are commencing and have been requested to inform other vessels in the vicinity.					Date /time of the notification _____

## PART C: LNG Transfer Data

(This part should be completed before actual transfer operations start)

### Agreed starting temperatures and pressures

Note the agreed Physical Quantity Unit (PQU):     m3     Tonnes     \_\_\_\_\_

	Ship		Truck		
LNG tank: start temperature:					°C / °F*
LNG tank: start pressure:					bar / psi* (rel)
LNG tank: available (rest) capacity					PQU

\*: delete as appropriate

### Agreed bunker operations

Note the agreed Physical Quantity Unit (PQU):     m<sup>3</sup>     Tonnes     \_\_\_\_\_

	Tank 1	Tank 2	
Agreed quantity to be transferred:			PQU
Starting pressure at the manifold:			bar / psi* (rel)
Starting rate:			PQU per hour
Max transfer rate:			PQU per hour
Topping up rate:			PQU per hour
Max pressure at manifold:			bar / psi* (rel)

\*: delete as appropriate

### Agreed maximums and minimums

	Maximum	Minimum	
Pressures during bunkering:			bar / psi* (rel)
Pressures in the LNG bunker tanks:			bar / psi* (rel)
Temperatures of the LNG:			°C / °F*
Filling limit of the LNG bunker tanks:			%

\*: delete as appropriate

**Declaration**

We, the undersigned, have checked the above items in chapter I parts A, B and C in accordance with the instructions and have satisfied ourselves that the entries we have made are correct.

We have also made arrangements to carry out repetitive checks as necessary and agreed that those items coded 'R' in the checklist should be re-checked at intervals not exceeding \_\_\_\_\_ hours.

If, to our knowledge, the status of any item changes, we will immediately inform the other party.

Ship	LNG Truck	Terminal
Name	Name	Name
Rank	Position	Position
Signature	Signature	Signature
Date	Date	Date
Time	Time	Time

Record of repetitive checks								
Date								
Time								
Initials for ship								
Initials for truck								
Initials for terminal								

**Guideline for completing this checklist**

The presence of the letters 'A' or 'R' in the column entitled 'Code' indicates the following:

- A ('Agreement').  
This indicates an agreement or procedure that should be identified in the 'Remarks' column of the checklist or communicated in some other mutually acceptable form.
- R ('Re-check').  
This indicates items to be re-checked at appropriate intervals, as agreed between both parties, at periods stated in the declaration.
- P ('Permission')  
This indicates that permission is to be granted by authorities.

The joint declaration should not be signed until both parties have checked and accepted their assigned responsibilities and accountabilities. When duly signed, this document is to be kept on board of the LNG receiving vessel conform applicable regulations or company requirements.

## Part D: After LNG Transfer Checklist

(This part should be completed after transfer operations have been completed)

	Check	Ship	LNG Truck	Terminal	Code	Remarks
57	LNG bunker hoses, fixed pipelines and manifolds have been purged and are ready for disconnection.				A	
58	Remote and manually controlled valves are closed and ready for disconnection.				A	
59	After disconnection the restricted area has been deactivated. Appropriate signs have been removed.				A	
60	Competent authorities have been notified that LNG bunker operations have been completed.					Time of notification _____ hrs
61	The terminal has been notified that LNG bunker operations have been completed.					Time of notification: _____ hrs
62	Competent authorities have been informed that bunker transfer operations have ceased and have been requested to inform other vessels in the vicinity.					
63	If applicable near misses and incidents have been reported to competent authorities.					Report nr: _____

### Declaration

We, the undersigned, have checked the above items in chapter II in accordance with the instructions and have satisfied ourselves that the entries we have made are correct.

Ship	LNG Truck	Terminal
Name	Name	Name
Rank	Position	Position
Signature	Signature	Signature
Date	Date	Date
Time	Time	Time



## **Guideline for completing this checklist**

The presence of the letters 'A' or 'R' in the column entitled 'Code' indicates the following:

- A ('Agreement').  
This indicates an agreement or procedure that should be identified in the 'Remarks' column of the checklist or communicated in some other mutually acceptable form.
- R ('Re-check').  
This indicates items to be re-checked at appropriate intervals, as agreed between both parties, at periods stated in the declaration.
- P ('Permission')  
This indicates that permission is to be granted by authorities.

The joint declaration should not be signed until both parties have checked and accepted their assigned responsibilities and accountabilities. When duly signed, this document is to be kept at least one year on board of the LNG receiving vessel.

## **GUIDELINES**

### **GENERAL**

The responsibility and accountability for the safe conduct of operations while a ship is performing an LNG bunkering is shared jointly between the ship's master, the LNG bunker truck operator and, if applicable, the terminal representative. Before the LNG bunker operations commence, the ship's master, the LNG bunker truck operator and, if applicable, the terminal representative should:

- Agree in writing on the transfer procedures, including the maximum loading or unloading rates;
- Agree in writing on the action to be taken in the event of an emergency, and
- Complete and sign the LNG bunker checklist Truck to Ship.

The term "terminal" must be understood as any organization responsible of the location of the bunkering

For Inland navigation, the term "ship" must be understood as an inland waterway vessel and the term "ship's master" must be understood as the boat master according to navigational regulations

For the checks which are not applicable for all ships, "if applicable" is added in the last column. The "if applicable" marked checks are not mandatory, users can skip these checks by mentioning N.A. in the remark column.

### **STRUCTURE OF THE CHECKLIST**

The LNG Bunker Checklist – Truck to Ship comprises of four parts.

The first part: **PART A: Planning Stage Checklist** addresses the considerations to be made during the planning stage of LNG bunker operations. This part of the checklist can be used as a guideline for an exchange of knowledge and agreements on safety items during the planning stage of a LNG bunkering. The advised time of processing this part of the checklist is during the order placement for the bunkering.

The second part: **Part B: Pre Transfer Checklist**, identifies the required physical checks and elements that are verified verbally just before the LNG bunkering commences. The safety of operations requires that all relevant statements are considered and the associated responsibility and accountability for compliance is accepted, either jointly or singly. Where either party is not prepared to accept an assigned accountability, a comment must be made in the remarks column and due consideration should be given to assessing whether operations can proceed. Where a particular item is considered to be not applicable to the ship, the LNG bunker truck or to the planned operation, a note to this effect should be entered in the 'Remarks' column.

The third part: **Part C: LNG Transfer Data** contains the transfer data to be agreed upon. In this section the information on temperature, density, volume, transfer rate, pressure and the physical quantity unit to be used for the LNG bunkering, are exchanged and agreed upon.

The final part of the checklist **Part D: After LNG Transfer Checklist** contains the considerations to be made after the LNG bunker operations for the disconnecting of the bunker connections and finishing the total operations.

## **USAGE OF THE TRUCK TO SHIP LNG BUNKERING CHECKLIST**

The following guidelines have been produced to assist in the joint use of LNG Bunker Checklist – Truck to Ship:

The ship's master and all under his command must adhere strictly to these requirements throughout the ship's stay alongside. The LNG bunker truck operator and, if applicable, the terminal representative must ensure that truck personnel and if applicable shore personnel do likewise. Each party commits to co-operate fully in the mutual interest of achieving safe and efficient operations.

The ship's master, the LNG bunker truck operator and, if applicable, the terminal representative, can designate responsible persons in charge of bunkering operations and authorize them to complete and sign the LNG bunker checklist.

Responsibility and accountability for the statements within the LNG Bunker Checklist – Truck to Ship is assigned within the document. The acceptance of responsibility is confirmed by ticking or initialling the appropriate box and finally signing the declaration at the end of the checklist. Once signed, this details the minimum basis for safe operations that has been agreed upon through the mutual exchange of critical information.

Some of the checklist statements are directed to considerations for which the ship has sole responsibility and accountability. For some checklist statements either the LNG bunker truck or terminal has sole responsibility and accountability. Some checklist statements assign a joint responsibility and accountability. Greyed-out boxes are used to identify statements that generally may not be applicable to one party, although the ship, truck or terminal may tick or initial such sections if they so wish.

Where mentioned in the box; "for the ship", "for the truck" or "for the terminal", the involved parties only check and sign for their own responsibilities

The assignment of responsibility and accountability does not mean that the other party is excluded from carrying out checks in order to confirm compliance. It is intended to ensure clear identification of the party responsible for initial and continued compliance throughout the ship's stay at the bunker location.

The ship's master should personally check all considerations lying within the responsibility of the LNG fuelled ship. Similarly, all considerations which are the LNG bunker truck or, if applicable, the terminal's responsibility should be personally checked by the LNG bunker truck operator or, if applicable, the terminal representative. In fulfilling these responsibilities, representatives should assure themselves that the standards of safety on both sides of the operation are fully acceptable.

This can be achieved by means such as:

- Confirming that a competent person has satisfactorily completed the checklist;
- Sighting appropriate records;
- By joint inspection, where deemed appropriate.

Before the start of operations, and from time to time thereafter for mutual safety, the LNG bunker truck operator and, if applicable, a member of the terminal's staff and, where appropriate, a responsible ship's officer, may conduct an inspection of the ship and truck to ensure that the vessel and truck are effectively managing their obligations, as accepted in the LNG Bunker Checklist – Truck to Ship. Where basic safety requirements are found to be out of compliance, either party may require that the LNG bunker operations are stopped until corrective action is satisfactorily implemented.

## **CODING OF ITEMS**

The presence of the letters 'A', 'P' or 'R' in the column entitled 'Code' indicates the following:

- A 'Agreement' - This indicates that the referenced consideration should be addressed by an agreement or procedure that should be identified in the 'Remarks' column of the checklist or communicated in some other mutually acceptable form.
- P 'Permission' - In the case of a negative answer to the statements coded 'P', no operations are to be conducted without the written permission from the appropriate authority.
- R 'Re-check' - This indicates items to be re-checked at appropriate intervals, as agreed between both parties and stated in the declaration.

The joint declaration should not be signed until all parties have checked and accepted their assigned responsibilities and accountabilities.

## EXPLANATION OF THE CHECKS

### Part A: Planning Stage Checklist

- 1 Competent authorities have granted permission for LNG transfer operations for the specific location and time.**  
Port authority may be consulted about which other authorities need to approve the bunker operations for the specific location, time and parties involved.
- 2 The terminal has granted permission for LNG transfer operations for the specific location and time.**  
Port authority may be consulted if in doubt of whom to contact at the terminal.
- 3 Competent authorities have been notified of the start of LNG bunker operations as per local regulations.**  
Port authority may be consulted if in doubt of whom to contact as per local regulations.
- 4 The terminal has been notified of the start of LNG bunker operations as per terminal regulations.**  
The terminal may be consulted if in doubt about the terminal regulations.
- 5 Competent authorities requirements are being observed.**  
Ports have specific port regulations and port byelaws. Port authority may be consulted if in doubt about the local regulations. In states that are signatories to SOLAS, the ISPS Code requires for seagoing vessels that the Ship Security Officer and the Port Facility Security Officer co-ordinate the implementation of their respective security plans with each other.
- 6 Local terminal requirements are being observed.**  
The terminal may be consulted if in doubt about the terminal regulations.
- 7 All personnel involved in the LNG bunker operation have the appropriate training and have been instructed on the particular LNG bunker equipment and procedures.**  
Although all personnel that are involved in LNG bunker operations should comply with mandatory training requirements, they should also be familiarized with the specific LNG bunker equipment and procedures for this bunker operation. For this item, the involved parties only check and sign for their own responsibilities
- 8 The bunker location is accessible for the LNG supplying tank truck and the total truck weight does not exceed the maximum permitted load of the quay or jetty.**  
If in doubt contact the terminal or the port authority to inquire about the maximum permitted load of the place in question.
- 9 The bunker operation area can be sufficiently illuminated.**  
The manifold areas, both on board and ashore, should be safely and properly illuminated during darkness. If this requirement is not met, additional lightening must be provided.

**10 All LNG transfer- and gas detection equipment is certified, in good condition and appropriate for the service intended.**

A list of certification dates, expiry dates and next upcoming intermediate certification dates for the bunkering used equipment should be provided and exchanged. The validation of the certificates has to be performed before LNG bunkering commences. For this item, the involved parties only check and sign for their own responsibilities

**11 The procedures for bunkering, cooling down and purging operations have been agreed upon.**

The procedures for the intended LNG bunker operation should be pre planned. They should be discussed and agreed upon by the ship, truck and if applicable shore representatives prior to the start of the operations. Agreed arrangements should be formally recorded and signed by the ship, LNG bunker truck and if applicable the terminal representatives. Any change in the agreed procedure that could affect the operation should be discussed by the involved parties and agreed upon. After agreement by the involved parties, the substantial changes should be laid down in writing as soon as possible and in sufficient time before the change in procedure takes place.

**12 The system and method of electrical insulation have been agreed upon by ship and truck.**

The system and method of electrical insulation in de LNG bunker connection should be pre planned. They should be discussed and agreed upon by the ship, truck and if applicable shore representatives prior to the start of the operations.

**13 The restricted area on the shore has been agreed upon by ship, truck and terminal.**

The risk assessment for the LNG bunkering of the LNG fuelled ship provide safety distances and a restricted area. The restricted area are required in the ship's operational documentation. If applicable restricted area requirements from the LNG bunker truck operator, terminal operator and local authorities should be taken into account and incorporated.

The requirements for the restricted area around the LNG bunker location on board of the ship and on the shore should be exchanged, agreed upon and designated between the parties involved in the LNG bunkering.

**14 Regulations with regards to ignition sources can be observed.**

These include but are not limited to smoking restrictions and regulations with regards to naked light, mobile phones, pagers, VHF and UHF equipment, radar and AIS equipment.

Smoking on board the ship may only take place in places specified by the master in consultation with the truck and terminal representative.

No smoking is allowed on the shore except in places specified by the terminal representative in consultation with the master and truck operator.

For this item, the involved parties only check and sign for their own responsibilities

Places that are directly accessible from the outside should not be designated as places where smoking is permitted. Buildings, places and rooms designated as areas where smoking is permitted should be clearly marked as such.

A naked light or open fire comprises the following: flame, spark formation, naked electric light or any surface with a temperature that is equal to or higher than the minimum ignition temperature of the products handled in the operation.

The use of naked lights or open fires on board the ship is prohibited in the exclusion zone, unless all applicable regulations have been met and it has been agreed upon by the port authority, LNG tank truck operator, the ship's master and the terminal representative.

In the exclusion zone:

- Telephones should comply with the requirements for explosion-proof construction.
- Mobile phones and pagers should not be used unless approved for such use by a competent authority.

- Damaged units, even though they may be capable of operation, should not be used.
- The use of portable electrical equipment and wandering leads is not allowed during LNG bunkering and the equipment should be excluded from the zone.
- Telephone cables in use in the ship/shore communication system should preferably be routed outside the exclusion zone. Wherever this is not feasible, the cable should be so positioned and protected that no danger arises from its use.
  
- Unless the master, in consultation with the truck operator and terminal representative, has established the conditions under which the installation may be used safely, fixed VHF/UHF and AIS equipment should be switched off or on low power (1 watt or less) and the ship's main radio station should not be used during the ship's stay in port, except for receiving purposes. The main transmitting aerials should be disconnected and earthed.
- Portable VHF/UHF sets should be of a safe type which is approved by a competent authority.
- VHF radio-telephone sets may only operate in the internationally-agreed wave bands.
- Satellite communications equipment may be used normally, unless advised otherwise.
- The ship's radar installation should not be used unless the master, in consultation with the truck operator and the terminal representative, has established the conditions under which the installation may be used safely.
- Window type air conditioning units should be disconnected from their power supply.

**15 All in local requirements required firefighting equipment is ready for immediate use.**

Firefighting equipment on board should be correctly positioned and ready for immediate use.

Adequate and suitable units of fixed or portable equipment should be stationed conform ship's operational documents. The ship's fire main systems should be pressurised or be capable of being pressurised at short notice.

For this item, the involved parties only check and sign for their own responsibilities

For seagoing vessels a set of fire control plans should be permanently stored in a prominently marked weather-tight enclosure outside the deckhouse for the assistance of shore side fire fighting personnel. A crew list should also be included in this enclosure.

If applicable both ship and shore should ensure that their fire main systems can be inter-connected in a quick and easy way utilising, if necessary, the international shore fire connection.

Underneath the items of the planning stage checklist, a register form is included for the registration of the representatives involved in the planning.

**Part B: Pre Transfer Checklist**

**16 Part A is used prior and preparatory of the actual operation**

PART A: Planning Stage Checklist addresses the considerations to be made during the planning stage of LNG bunker operations. This part of the checklist can be used as a guideline for an exchange of knowledge and agreements on safety items during the planning stage of a LNG bunkering. The advised time of processing this part of the checklist is during the order placement for the bunkering.

The use of Part A is not mandatory. In this item, the involved parties only check if Part A is used for their own planning

**17 Present weather and wave conditions are within the agreed limits.**

There are numerous factors that will help determine whether LNG bunker operations should continue.

Discussion between the ship, the truck operator and if applicable the terminal should identify limiting factors which could include:

- Wind speed/direction and the effect on the bunker connections.

- Wind speed/direction and the effect on mooring integrity.
- Wind speed/direction and the effect on gangways.
- Swell effects at exposed locations on mooring integrity or gangway safety.

Such limitations should be clearly understood by all parties. The criteria for stopping bunkering, disconnecting hoses or arms and vacating the berth should be written in the 'Remarks' column of the checklist.

The bunker operations should be suspended on the approach of an electrical storm.

In case of a strong gale warning or deteriorating weather conditions emergency towing pennants should be prepared and a proper look out to the mooring lines is required.

**18 The LNG receiving ship is securely moored. Regulations with regards to mooring arrangements are observed. Sufficient fendering is in place.**

In answering this question, due regard should be given to the need for adequate fendering arrangements. The ship should remain adequately secured in her moorings. Alongside piers or quays, ranging of the ship should be prevented by keeping all mooring lines taut. Attention should be given to the movement of the ship caused by wind, currents, tides or passing ships and the operation in progress.

Wire ropes and fibre ropes should not be used together in the same direction (i.e. as breast lines, spring lines, head or stern lines) because of the difference in their elastic properties.

Once moored, ships fitted with automatic tension winches should not use such winches in the automatic mode. Irrespective of the mooring method used, the emergency release operation in case of an emergency should be agreed upon, taking into account the possible risks involved.

Anchors not in use should be properly secured.

**19 There is a safe means of access between the ship and shore.**

The access should be positioned as far away from the LNG bunker manifolds as practicable.

The means of access to the ship should be safe and may consist of an appropriate gangway or accommodation ladder with a properly secured safety net fitted to it.

Particular attention to safe access should be given where the difference in level between the point of access on the vessel and the jetty or quay is large, or is likely to become large.

When shore access facilities are not available and a ship's gangway is used, there should be an adequate landing area on the berth so as to provide the gangway with a sufficient clear run of space and so maintain safe and convenient access to the ship at all states of tide and changes in the ship's freeboard.

A lifebuoy should be available on board the ship near the gangway or accommodation ladder.

The access should be safely and properly illuminated during darkness.

Persons who have no legitimate business on board, or who do not have the master's permission, should be refused access to the ship.

The LNG truck operator or if applicable the terminal should control access to the jetty or berth in agreement with the ship.

In addition to the means of access, a safe and quick emergency escape route should be available both on board and ashore. On board the ship, it may consist of a lifeboat ready for immediate use, preferably near the accommodation of the ship

**20 All mandatory firefighting equipment is ready for immediate use**

Firefighting equipment on board should be correctly positioned and ready for immediate use.

Adequate and suitable units of fixed or portable equipment should be stationed conform ship's operational documents. The ship's fire main systems should be pressurised or be capable of being pressurised at short notice.

For seagoing vessels a set of fire control plans should be permanently stored in a prominently marked weather-tight enclosure outside the deckhouse for the assistance of shore side firefighting personnel. A crew list should also be included in this enclosure.

The LNG bunker truck mandatory firefighting equipment should be correctly positioned and ready for immediate use.

If applicable both ship and shore should ensure that their fire main systems can be inter-connected in a quick and easy way utilising, if necessary, the international shore fire connection.

If applicable firefighting equipment on the shore should be correctly positioned and ready for immediate use. The shore fire main systems should be pressurised or be capable of being pressurised at short notice. For this item, the involved parties only check and sign for their own responsibilities

**21 The bunker operation area is sufficiently illuminated.**

The bunker location should be safely and properly illuminated during darkness.

**22 The ship and truck are able to move under their own power in a safe and non-obstructed direction.**

The ship should be able to move under its own power at short notice, unless the ship has been granted permission to immobilise by the Port Authority. Certain conditions may have to be met for permission to be granted. All involved parties of the LNG bunkering should be informed and agree.

The LNG bunker truck should be able to move under its own power at short notice. It should be possible in case of an emergency to remove the shocks under the wheels immediately.

For this item, the involved parties only check and sign for their own responsibilities

**23 Adequate supervision of the bunker operation is in place both on the ship and at the LNG tank truck and an effective watch is being kept at all time.**

The LNG bunker operation should be under constant control and supervision on the ship and at the LNG bunker vessel. Supervision should be aimed at preventing the development of hazardous situations. However, if such a situation arises, the controlling personnel should have adequate knowledge and the means available to take corrective action.

The controlling personnel on the ship and at the truck should maintain effective communications with their respective supervisors.

All personnel connected with the operations should be familiar with the dangers of the substances handled. At all times during the ship's stay at the bunker location, a sufficient number of personnel should be present on board the ship and near the LNG bunker truck to deal with an emergency.

**24 An effective means of communication between the responsible operators and supervisors on the ship and at the truck has been established and tested. The communication language has been agreed upon.** Communication should be maintained in the most efficient way between the responsible officer on duty on the ship and the LNG truck operator.

When telephones are used, the telephone both on board and ashore should be continuously manned by a person who can immediately contact his respective supervisor. Additionally, the supervisor should have a facility to override all calls. When RT/VHF systems are used, the units should preferably be portable and carried by the supervisor or a person who can get in touch with his respective supervisor immediately. Where fixed systems are used, the guidelines for telephones should apply.

The selected primary and back-up systems of communication should be recorded on the checklist and necessary information on telephone numbers and/or channels to be used should be exchanged and recorded.

The telephone and portable RT/VHF systems should comply with the appropriate (explosion proof) safety requirements.

**25 The emergency stop signal and shutdown procedures have been agreed upon, tested, and explained to all personnel involved. Emergency procedures and plans and the contact numbers are known to the persons in charge.**

The agreed signal to be used in the event of an emergency arising ashore or on board should be clearly understood by shore and ship personnel and the truck operator.

An emergency shutdown procedure should be agreed upon between ship and the LNG bunker truck and



should be formally recorded and signed by both the ship and LNG bunker truck representative. The agreement should state the circumstances in which operations have to be stopped immediately. Due regard should be given to the possible introduction of dangers associated with the emergency shutdown procedure.

**26 The predetermined restricted area has been established. Appropriate signs mark this area.**

The risk assessment for the LNG bunkering of the LNG fuelled ship provide safety distances and exclusion zones. The safety zones are addressed in the ship's operational documentation. If applicable safety zone requirements from the LNG bunker truck operator, terminal operator and local authorities should be taken into account and incorporated.

The requirements for the safety zone around the LNG bunker location on board of the ship and on the shore should be established and clearly marked.

**27 The restricted area is free of unauthorized persons, objects and ignition sources.**

Prior to operations all unauthorised persons should be directed to leave the marked exclusion zone.

Unauthorised objects or ignition sources should be removed from the zone. During bunker operations this should be re-checked at regular intervals.

**28 External doors, portholes and accommodation ventilation inlets are closed as per operation manual.**

External doors, windows and portholes in the accommodation should be closed during LNG bunker operations when required in the operational documentation of the ship. These doors should be clearly marked as being required to be closed during such operations, but at no time should they be locked. This requirement does not prevent reasonable access to spaces during operations, but doors should not be left open unattended.

Engine Room vents may be left open. However, consideration should be given to closing them where such action would not adversely impact the safe and efficient operation of the engine room spaces served.

**29 The gas detection equipment has been operationally tested and found to be in good working order.**

The equipment provided should be capable of measuring natural gas.

Suitable equipment should be available to calibrate the gas detection and measuring equipment.

A bump test (quick test on proper working) or calibration should be carried out before the operation commences.

Span gas should be available to enable calibration of gas detection equipment. Fixed gas detection equipment should be calibrated for natural gas prior to commencement of operations. The alarm function should have been tested and the details of the last test should be exchanged.

Portable gas detection instruments, suitable and calibrated for natural gas, capable of measuring flammable levels, should be available.

**30 Material Safety Data Sheets (MSDS) for the delivered LNG fuel are available.**

MSDS should be available on request to the LNG fuelled ship, terminal and LNG bunker truck.

As a minimum, such information sheets should provide the constituents of the product by chemical name, name in common usage, UN number and the maximum concentration of any toxic components, expressed as a percentage by volume or as ppm, as appropriate.

**31 Regulations with regards to ignition sources are observed.**

These include but are not limited to smoking restrictions and regulations with regards to naked light, mobile phones, pagers, VHF and UHF equipment, radar and AIS equipment.

Smoking on board the ship, if allowed, may only take place in places specified by the master in consultation with the truck and terminal representative.

Smoking on the shore, if allowed, may only take place in places specified by the terminal representative in consultation with the master and truck operator.

Places, which are directly accessible from the outside, should not be designated as places where smoking is permitted. Buildings, places and rooms designated as areas where smoking is permitted are clearly marked as such.

A naked light or open fire comprises the following: flame, spark formation, naked electric light or any surface with a temperature that is equal to or higher than the minimum ignition temperature of the products handled in the operation. There are no naked lights or open fires in the restricted area.

In the restricted area:

- Battery operated hand torches (flashlights) should be of a safe type which is approved by a competent authority. Telephones comply with the requirements for explosion-proof construction.
- Mobile phones and pagers are not used unless approved for such use by a competent authority.
- Damaged units, even though they may be capable of operation, are not used.
- The use of portable electrical equipment and wandering leads is not allowed during LNG bunkering and the equipment should be excluded from the zone.
- Telephone cables in use in the ship/shore communication system are routed outside the exclusion zone. Wherever this is not feasible, the cable is positioned and protected in such way that no danger arises from its use.
- Unless the master, in consultation with the truck operator and terminal representative, has established the conditions under which the installation may be used safely, fixed VHF/UHF and AIS equipment should be switched off or on low power (1 watt or less) and the ship's main radio station should not be used during the ship's stay in port, except for receiving purposes. The main transmitting aerials should be disconnected and earthed.
- Portable VHF/UHF sets are of a safe type that is approved by a competent authority.
- VHF radio-telephone sets will only operate in the internationally-agreed wave bands.
- Satellite communications equipment may be used normally, unless advised otherwise.
- The ship's radar installation is not in use, unless the master, in consultation with the truck operator and the terminal representative, has established the conditions under which the installation may be used safely.
- Window type air conditioning units are disconnected from their power supply.

**32 Appropriate and sufficient suitable protective clothing and equipment is ready for immediate use.**

Suitable protective equipment, eye protection and protective clothing appropriate to the specific dangers of LNG, should be available in sufficient quantity for operational personnel, both on board and ashore for the truck operator.

Storage places for this equipment on board of the ship should be protected from the weather and be clearly marked.

Personnel required to use a breathing apparatus during operations or emergency response should be trained in its safe use. Untrained personnel and personnel with facial hair should not be selected for activities involving the use of breathing apparatus.

**33 Personnel involved in the connection and disconnection of the bunker hoses and personnel in the direct vicinity of these operations make use of sufficient and appropriate protective clothing and equipment.**

All personnel directly involved in the operation should utilise appropriate equipment and clothing whenever the situation requires.

**34 A (powered) emergency release coupling {(P)ERC} is installed and is ready for immediate use.**

If applicable an emergency release coupling is installed and ready for immediate use. This (P)ERC can be activated by ESD or by forces on- or movements of the bunker connection outside a predetermined range. The (P)ERC should be of a dry disconnect type, during the emergency release the line will be closed by a valve on both sides of the coupling. After an emergency release of the coupling, a check of the system, and after solving the problem that caused the release, the coupling can be reinstalled. A freefall of the coupling after an emergency release should be avoided.

**35 The water spray system has been tested and is ready for immediate use.**

Water spray systems should be regularly tested. Details of the last tests should be exchanged. During operations the systems should be kept ready for immediate use.

**36 Spill containment arrangements are of an appropriate volume, in position, and empty.**

The ship's manifolds should ideally be provided with fixed and for LNG suitable drip trays. In the absence of fixed containment, suitable portable drip trays should be used.

All drip trays should be emptied in an appropriate manner whenever necessary.

In all cases LNG must be prevented to affect the deck in case of a spill. This can, for example, be achieved by using a low temperature resistance gutter, suitable drip trays or pouring water on deck. When LNG is handled the scuppers may be kept open, provided that an ample supply of water is available at all times in the vicinity of the manifolds.

**37 Hull and deck protection against low temperature is in place.**

When a hull or deck protection is required in the ship's operational documentation, it shall be used conform the operational documentation.

**38 Bunker pumps and compressors are in good working order.**

Agreement in writing should be reached on the maximum allowable working pressure in the LNG bunker line system during operations.

**39 All control valves are well maintained and in good working order.**

All ship and tank truck LNG transfer system control valves and their position-indicating systems should be regularly tested. Details of the last tests should be exchanged.

**40 Bunker system gauges, high level alarms and high-pressure alarms are operational, correctly set and in good working order.**

Ship and LNG bunker truck LNG transfer system gauges and alarms should be regularly checked to ensure they are in good working order.

In cases where it is possible to set alarms to different levels, the alarm should be set to the required level.

**41 The ship's bunker tanks are protected against inadvertent overfilling at all times, tank content is monitored constantly and alarms are correctly set.**

Owing to the reliance placed on gauging systems for LNG bunker operations, it is important that such systems are fully operational and that back-up is provided in the form of an independent overfill alarm arrangement. The alarm should provide audible and visual indication and should be set at a level which will enable operations to be shut down prior to the tank being overfilled. Under normal operations, the bunker tank should not be filled higher than the level at which the overfill alarm is set.

Individual overfill alarms should be tested at the tank to ensure their proper operation prior to commencing bunkering unless the system is provided with an electronic self-testing capability which monitors the condition of the alarm circuitry and sensor and confirms the instrument set point.

**42 All safety and control devices on the LNG installations are checked, tested and found to be in good working order.**

Automatic shutdown systems are designed to shut the liquid valves and trip the bunker pumps if the liquid level or pressure in the bunker tank should rise above the maximum permitted levels. These levels must be accurately set and the operation of the device should be tested before bunker operations commence. If the ship and LNG bunker truck shutdown systems are to be inter-connected, then their operation must be checked before LNG transfer begins.

**43 Pressure control equipment and boil off or re-liquefaction equipment is operational and in good working order.**

Pressure control is one of the most critical processes during LNG bunker operations. It is important that

such systems are fully operational and that back up is provided in case of a failure of the system.

There are many pressure control systems: spray lines in the top of the tank, vapour return, re-liquefaction, CNG storage or vapour processing. The used pressure control system should be exchanged and be agreed upon. It should be verified that re-liquefaction and boil off control systems, if required, are functioning correctly prior to commencement of operations.

The pressure alarms should provide audible and visual indication and should be set at a level which will enable operations to be shut down prior to the opening of the PV valves to avoid natural gas emission. Under normal operations, the pressure in the bunker tank should not exceed the pressure limits in the ship's operational documentation.

Individual high and low pressure alarms should be tested at the tank to ensure their proper operation prior to commencing bunkering unless the system is provided with an electronic self-testing capability which monitors the condition of the alarm circuitry and sensor and confirms the instrument set point.

**44 Both on the ship and at the tank truck the ESDs, automatic valves or similar devices have been tested, have been found to be in good working order, and are ready for use.**

**The closing rates of the ESDs have been exchanged.**

Automatic shutdown valves may be fitted in the ship and the systems of the LNG bunker truck. Among other parameters, the action of these valves can be automatically initiated by a certain level being reached in the tank being loaded, either on board or ashore.

The closing rate of any automatic valves should be known and this information should be exchanged.

Where automatic valves are fitted and used, the cargo-handling rate should be so adjusted that a pressure surge evolving from the automatic closure of any such valve does not exceed the safe working pressure of either the LNG bunker system.

A written agreement should be made between the ship and tank truck operator indicating whether the cargo-handling rate will be adjusted or alternative systems will be used. The safe cargo-handling rate should be noted in the agreement.

Where possible, ship and truck emergency shutdown systems should be tested before commencing the LNG bunkering.

**45 Initial LNG bunker line up has been checked. Unused connections are closed, blanked and fully bolted.**

Before connection both the ship and truck LNG bunker systems must be isolated and empty, checked and found to be safe to remove blank flanges.

Both ship and truck LNG bunker systems should be isolated from other ship and truck systems.

Unused bunker line connections should be closed and blanked. Blank flanges should be fully bolted and other types of fittings, if used, properly secured.

**46 LNG bunker hoses, fixed pipelines and manifolds are in good condition, properly rigged, supported, properly connected, leak tested and certified for the LNG transfer.**

Hoses should be in a good condition and properly fitted and rigged so as to prevent strain and stress beyond design limitations.

All flange connections should be fully bolted and any other types of connections should be properly secured.

It should be ensured that the hoses and pipelines are constructed of a material suitable for the substance to be handled, taking into account its temperature and the maximum operating pressure. LNG Bunker hoses should be indelibly marked so as to allow the identification of the products for which they are suitable, specified maximum working pressure, the test pressure and last date of testing at this pressure, and, if used at temperatures other than ambient, maximum and minimum service temperatures.

**47 The LNG bunker connection between the ship and the LNG bunker truck is provided with dry**

**disconnection couplings.**

The LNG bunker connection should be provided with means to avoid release of LNG or natural gas during regular disconnection after the bunkering.

The means should provide protection against:

- Spill or emission due to unexpected and uncontrolled release of product from the bunker system during disconnecting in case the bunkering system is not properly emptied after use.
- Injury to personnel due to pressure in the system suddenly being released in an uncontrolled manner during disconnecting.

**48 The LNG bunker connection between the ship and the LNG bunker truck has adequate electrical insulating means in place.**

Unless measures are taken to break the continuous electrical path between ship and truck pipework provided by the ship/truck hoses, stray electric currents can cause electric sparks at the flange faces when hoses are being connected and disconnected.

The passage of these currents is usually prevented by an insulating flange inserted at the ship line to the manifold and/or in the line of the truck. Alternatively, the electrical discontinuity may be provided by the inclusion of one length of electrically discontinuous hose in each hose string.

It should be ascertained that the means of electrical discontinuity is in place, that it is in good condition and is not being by-passed by contact with an electrically conductive material.

**49 Dry breakaway couplings in the LNG bunker connections are in place, have been visually inspected for functioning and found to be in a good working order.**

To mitigate on an event which approaches the limits of the design-operating envelope of the bunker connection, means should be in place to ensure that the mechanical integrity of the LNG bunker connection is not compromised. These means should provide protection against:

- Spill or emission due to unexpected and uncontrolled release of product from the bunker system due to overstretching the bunker connection.
- Injury to personnel due to pressure in the system suddenly being released in an uncontrolled manner.

The dry breakaway coupling will break due to forces on- or movements of the bunker connection outside a predetermined range. The coupling should be of a dry disconnect type, during the emergency break the line will be closed by a valve on both sides of the coupling. After the emergency break of the coupling, and when the problem that caused the break is solved, the broken parts should be replaced. A freefall of the coupling after an emergency break should be avoided.

**50 The tank truck is electrically grounded and the wheels are chocked.**

Before the connection of the LNG bunker line, the LNG bunker truck must be electrically grounded to an suitable earth wire connection point. To avoid an inadvertent movement of the tank truck the wheels should be chocked.

**51 The tank truck engine is off during the connection or disconnection of the LNG bunker hoses.**

In all cases the engine should be switched off during connection or disconnection of the bunker line.

**52 The tank truck engine is switched off during purging or LNG transfer.**

During the LNG bunkering or purging, the tank truck engine must be switched off, unless the running of the engine is necessary for running the bunker pump or compressor.

**53 The ship's emergency fire control plans are located externally.**

For seagoing vessels a set of fire control plans should be permanently stored in a prominently marked weather-tight enclosure outside the deckhouse for the assistance of shore side fire-fighting personnel. A crew list should also be included in this enclosure.

**54 An International Shore Connection has been provided.**

If applicable both ship and shore should ensure that their fire main systems can be inter-connected in a quick and easy way utilising, if necessary, the international shore fire connection.

**55 Competent authorities have been informed that bunker transfer operations are commencing and have been requested to inform other vessels in the vicinity.**

When local regulations or the port byelaws enforce the notification of vessels in the direct vicinity, these ships have to be informed of the LNG bunker activity. When the involved parties are not obliged to inform ships in the vicinity, they can, upon reporting the commence of the LNG bunker operations, advise the port authority to do so.

**Part C: LNG Transfer Data**

In order to agree upon the quantity of LNG that is to be transferred, parties should agree upon a 'Physical Quantity Unit'; e.g. cubic meters, tonnes.

**Agreed starting temperatures and pressures**

Parties should agree upon the LNG transfer data and the condition of the LNG and atmosphere in the truck tank and ship's bunker tanks.

**Agreed bunker operations**

Parties should agree upon the LNG bunker procedure

**Agreed maximums and minimums**

Parties should agree upon all maximum and minimum LNG pressures and fuelling limits.

**Part D: After LNG Transfer Checklist**

**57 LNG bunker hoses, fixed pipelines and manifolds have been purged and are ready for disconnection.**

Before the bunker connection is disconnected, it must be ensured that no liquid is left in the bunker system. The pressure in the bunker connection should be released into the ship's bunker tank or into the tank of the truck as per ship's operational manual.

**58 Remote and manual controlled valves are closed and ready for disconnection.**

Before the bunker connection is disconnected, it must be ensured that all valves are closed, or operated as per ship's operational manual.

**59 After disconnection the restricted area has been deactivated. Appropriate signs have been removed.**

After the disconnection and securing of the LNG bunker connection, the restricted area can be deactivated and the signs can be removed. The status of the restricted area can be restored to the status required in the ship's operational manual.

**60 Competent authorities have been notified that LNG bunker operations have been completed and have been requested to inform other vessels in the vicinity.**

Where required, authorities should be informed of completion of the LNG bunker operation  
When local regulations or the port byelaws enforce the notification of vessels in the direct vicinity, these ships have to be informed of completion of the LNG bunker activity. When the involved parties are not obliged to inform ships in the vicinity, they can, upon reporting the completion of the LNG bunker operations, advise the port authority to do so

**61 The terminal has been notified that LNG bunker operations have been completed.**

Where required, the terminal should be informed of completion of the LNG bunker operation.

- 62 If applicable, near misses and incidents have been reported to competent authorities.**  
Authorities must be informed of near misses and incidents directly when the event occurs.

### **Abbreviations and definitions**

Bunker operation area:	The area with operational LNG bunker activity. Including connections on both side of the bunker line, the bunker line and the bunker control and watch keeping area.
ESD	Emergency Shut Down Device
Leak tested	Procedure to check the integrity of the LNG bunker line up
Line up	The system of all pipes, hoses, bunker arms, connections and valves that are positioned and used for an LNG bunker transfer
(P)ERC	(Powered) Emergency release Coupling
Physical Quantity Unit (PQU)	The predetermined unit for the agreement on the quantity to bunker
Purging	To blow or pressurise a line up with Nitrogen to leak test, dry and inert the line up before bunkering or to empty, and gas free the line up before disconnecting.
Rel:	Relative, In this document used to agree the mentioned pressures are relative (overpressure) and not absolute
restricted area	The safety zone where ignition sources are not allowed
Terminal	In this document terminal also referred to any organization responsible of the location of the bunkering
Topping up	The last phase of the LNG bunkering where the maximum filling percentage is nearly reached. During this phase the bunker rate is reduced