Ship/Shore Compatibility Checklist (bunkering)

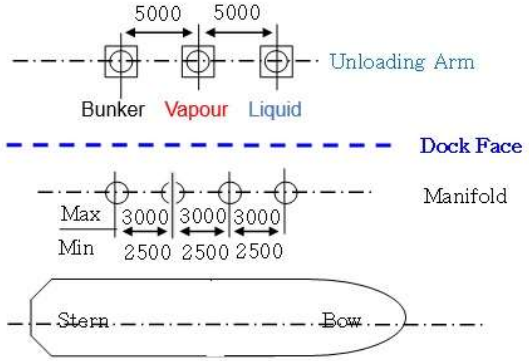
HAMINA LNG LTD.

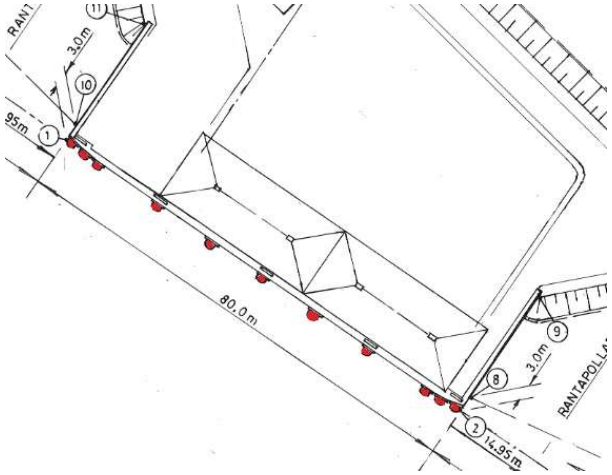
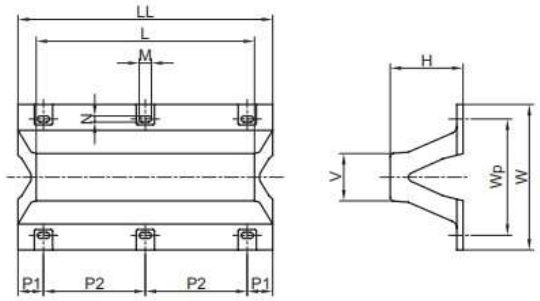
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Ship/Shore Compatibility Study. Name of ship:

Items	Shore Specification	Ship Specification	Remarks
1. General Port Information 1.1. General	▪ **Port name**: Port of HaminaKotka -Tel: + 358 20 790 8800 -Address: Satamantie 4, 49460 HAMINA -E-mail: office@haminakotka.fi ▪ **Name of operating company**: Hamina LNG Ltd -24/7 Control Room Tel: + 358 40 772 4555 -Address: Terminaaliranta 5, 49460 HAMINA **60° 51′ N, 27° 16′ E** ▪ **Person to contact regarding terminal information** -Name: Loading Masters / LNG Terminal Plant -Tel: + 358 40 772 4555 -E-mail: loadingmaster@haminalng.fi **Note! Berth Ö3 is shared with other local operators**		
1.2. Weather Limits (1) Max Wind Speed	(1) Berthing (TBA m/sec) / Stop cargo (17m/sec)		**Weather information from terminal**
(2) SVT vendors wind limits	(2) Maneuvering / connected (17m/sec)		
(3) Thunder	(3) Hold loading if electrical activity		
1.3. Port Water Level (1) Tide Level	(1) Tide Level: Unit (m) **High : EL + 0,05 m** **Low : EL – 0,05 m**		

Items	Shore Specification	Ship Specification	Remarks
2. Vessel Limitations (1) Type of Vessel (2) Breadth (3) Tank Capacity (Min/Max) (4) Draught (Design) (5) LOA (Length Overall) (6) DWT(Deadweight) (7) DT(Displacement) (8) ~ (11) Ship Side	Investigation objective vessel result of port capacity (1) Membrane or Moss (2) 30 m (3) 5,000 m^3 (Min) / 25,000 m^3 (Max) (4) 12 m (Membrane) / 12 m (Moss) (5) 180 m (6) N/A (7) N/A (8) Name of Operator (9) Cargo Arrival Date (dd/mm/yy) (10) Cargo Port of Loading (Port/Nationality) (11) Expected Unloading Volume (m^3) (12) **Ship using vapour return line: yes/no**	**2. Vessel Limitations** 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12.	If Breadth over 32m, contact pilot for more information. If LOA 181m – 220m, contact Loading Master for more information.
3. Manifold Arrangement	**3. Manifold arrangement (Unit: mm)** 	**3. Manifold Arrangement**	
	a. Berthing: Portside alongside (Main) b. Distance between manifold deck and SDP: more than 1 m	a) b)	

Items	Shore Specification	Ship Specification	Remarks
4. Fender / Flat Body 4.1 Fender Arrangement 4.2 Maximum Design	**4.1 Fender Arrangement**  **4.2 Maximum Design**  Type: Lambda LMD (CL1) - Fender size: H = 800 mm, L = 2000 mm - Effective area: 1,04 m^2, total: 3,12 m^2 - Distance between fenders: 11.0 m - Reaction force: 52,5%: 589 kN / 55%: 645 kN - Energy absorption: 52,5%: 198 kN/m, 55%: 210 kN/m	**4. Fender / Flat Body**	See attach file 1 Vessel responsible to berth safely

<table>
<tr><th>Items</th><th>Shore Specification</th><th>Ship Specification</th><th>Remarks</th></tr>
<tr>
<td>4.3 Mooring Arrangement

4.4 Optimooring</td>
<td>4.3 Mooring Facilities

<table>
<tr><th>No.</th><th>MD-1</th><th>MD-2</th><th>MD-3</th><th>MD-4</th><th>MD-5</th><th>MD-6</th><th>MD-7</th><th>Remarks</th></tr>
<tr><td>Hooks x Set</td><td>2x1</td><td>2x1</td><td>2x1</td><td>1x1</td><td>2x1</td><td>2x1</td><td>2x1</td><td></td></tr>
<tr><td>Hook capa.</td><td>100tn</td><td>100tn</td><td>100tn</td><td>100tn</td><td>100tn</td><td>100tn</td><td>100tn</td><td></td></tr>
<tr><th>No.</th><th>BD-1</th><th>BD-2</th><th>BD-3</th><th>BD-4</th><th>BD-5</th><th>BD-6</th><th></th><th>Remarks</th></tr>
<tr><td>Hooks x Set</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td></td><td></td></tr>
<tr><td>Hook capa.</td><td>75tn</td><td>75tn</td><td>75tn</td><td>75tn</td><td>75tn</td><td>75tn</td><td></td><td></td></tr>
</table>

QRH (Quick Release Hook): Manual QRH

See attach file 3; Optimooring</td>
<td>4.3 Mooring Arrangement</td>
<td>See attach file 2

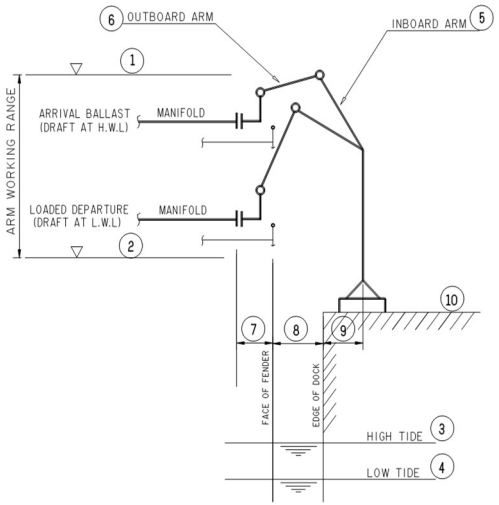
See attach file 3

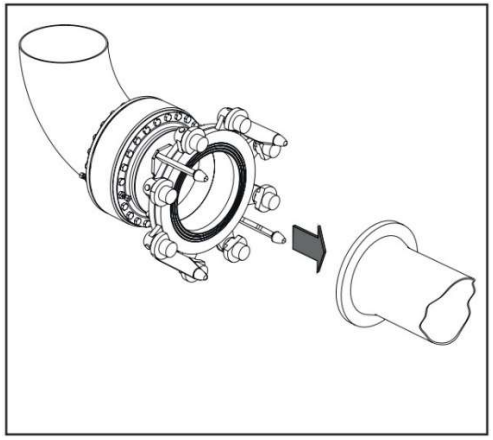
See attach file 4

Normal sea level from jetty surface -2,4m (Working range of unloading arm 16,0m from jetty surface)</td>
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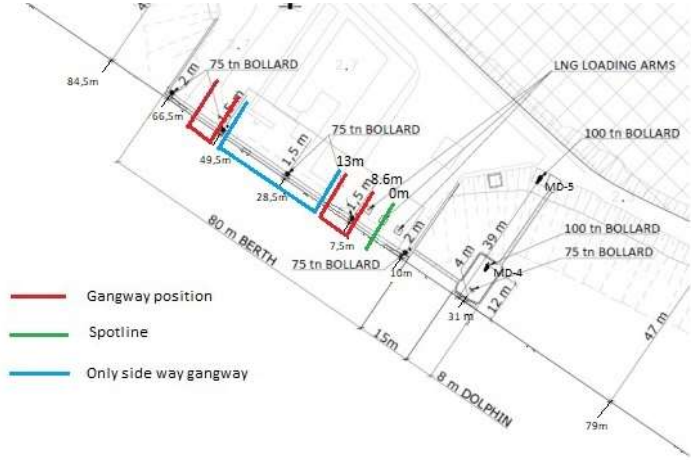
Items	Shore Specification	Ship Specification	Remarks
5 Bunkering Arm L481	5 Bunker Arm Working Range L481 (Liquid & Vapour)		See attach file 5 Normal sea level from jetty surface -2,4m (Working range of unloading arm 16,0m from jetty surface)

Item			(m)
Working range of unloading arm (From sea level)	High	1	18,4
	Low	2	2,4
Tide level	High	3	+ 0,05
	Low	4	-0,05
Heave & List			
Unloading arm length	Inboard arm	5	8,3
	Outboard arm	6	9,6
Distance		7	5,125
		8	1,0
		9	5,0
	Above datum	10	9,0



Items	Shore Specification	Ship Specification	Remarks
(1) Flow rate (max)	(1) Bunker: 1000 m^3/h / 1 arm	(1)	
(2) Number	(2) Liquid: 1 arm, Vapour: 1 arm, Bunker: 1 arm	(2)	
(3) Size	(3) Bunker arm: 8″ (≈200mm), Vapour return hose 6” (≈150mm)	(3)	
(4) Quick Release Coupler	(4) Type: ERS (Emergency Release System) Double Ball Valve with PERC (Powered Emergency Release Coupler)	(4)	
(5) Design Pressure	(5) Design Pressure a. Liquid / bunker: 19 bar b. NG Vapour Return (Free flow): 19 bar	(5)	
(6) Flange Specification a. Flange b. Connection Type c. Gasket	(6) Flange Specification a. Bunker: 8" 150 lbs RF b. Manual QC/DC c. Not required. Double seal fitted on flange face.	(6) a. b. c.	
(7) Condition of Manifold	(7) Shiny and undamaged / Ra=3,2-12,5μm (EN 1092-1:2001 (E)  *Picture of manifold and arm connection*	(7)	

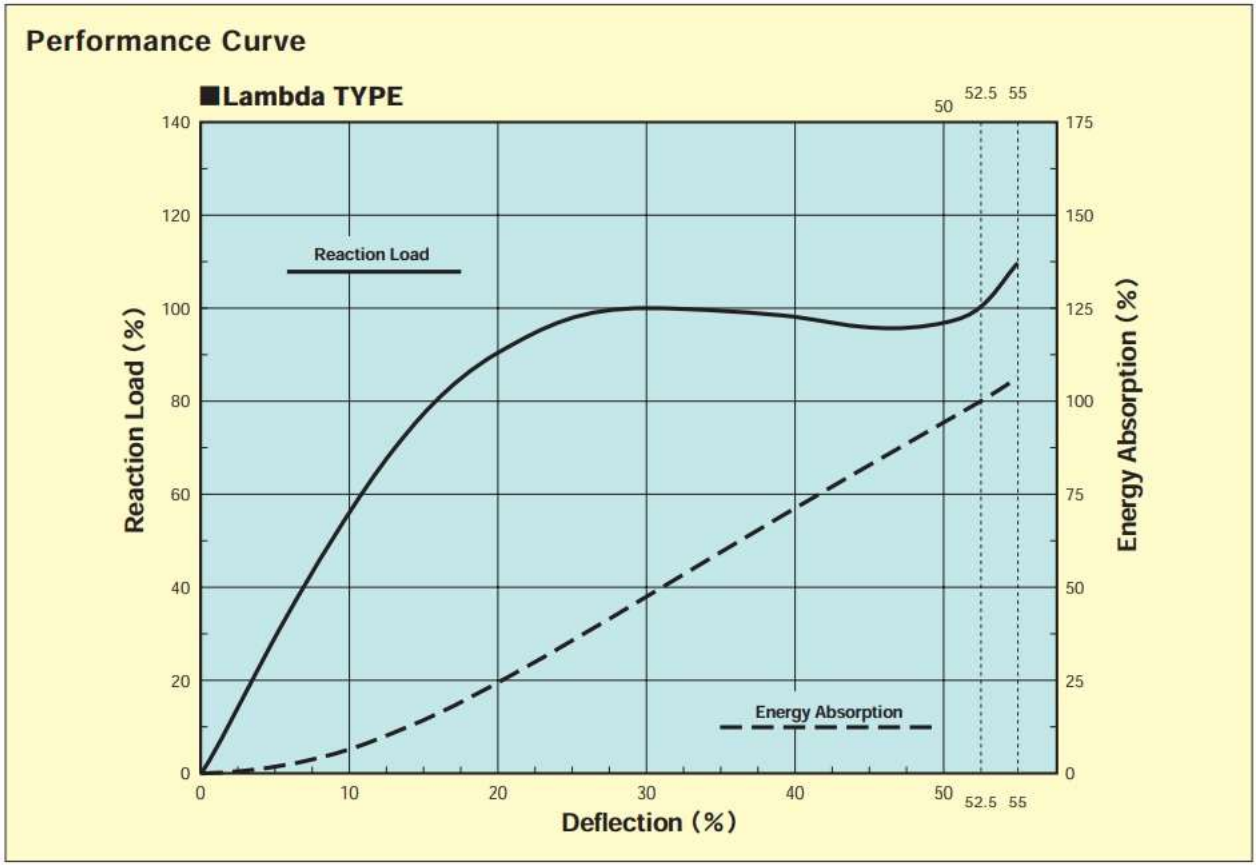
Items	Shore Specification	Ship Specification	Remarks
6. ESD / Communication System			See attach file 6
6.1 Optical Fiber System	6.1 Optical Fiber System	6.1 Optical Fiber System	
a. Manufacturer	a. TRELLEBORG (USL-8815-V3)	a.	
b. Connector Type	b. 2-way Expanded-Beam Hermaphroditic Fibre Connector	b.	
c. Connection Box Position	c. Infront Loading Arm L102 (USL-8812-V3-801)	c.	
d. Cable Length	d. 50 m	d.	
e. Pin Allocation	e. Optical System (Attachment)	e.	
f. Connection	f. Are you able to connect? **YES / NO**	f.	f. See attach file 6
6.2 Electric System	6.2 Electric System	6.2 Electric System	
a. Manufacturer	a. TRELLEBORG (USL-8817-V2)	a.	
b. Connector type	b. 5-way SeaTechnik SIGTTO Type Female Connector	b.	
c. Connector Position	c. Infront Loading Arm L102 (USL-8812-V3-801)	c.	
d. Cable Length	d. 50 m	d.	
e. Pin Allocation	e. Electrical System (Attachment)	e.	
f. Connection	f. Are you able to connect? **YES / NO**	f.	f. See attach file 6
6.3 Pneumatic System	6.3 Pneumatic Hose	6.3 Pneumatic System	
a. Manufacturer	a. TRELLEBORG (USL-8823-V0)	a.	
b. Connector Type	b. SNAP-TITE PHC8-8H 1/2”	b.	
c. Connector Position	c. Infront Loading Arm L102 (USL-8812-V3-801)	c.	
d. Hose Length	d. 50 m	d.	
e. Air Pressure	e. Air Pressure * Normal Pressure: 6.0 - 10.0 bar * Trip Pressure: 3,0 bar	e.	
f. Connection	f. Are you able to connect? **YES / NO**	f.	f. See attach file 6

Items	Shore Specification	Ship Specification	Remarks
6.4 Pendant System a. Manufacturer b. Connector Type c. Connector Position d. Cable Length	6.4 Pendant System a. TRELLEBORG (USL-8818) b. 5-way SeaTechnik SIGTTO Type Female Connector c. Infront Loading Arm L102 (USL-8812-V3-801) d. 25 m	6.4 Pendant System a. b. c. d.	
7. Gangway 7.1 Position of gangway	7.1 Gangway Position 	7.1 Position of gangway	
a. Connector Position	a. Location: ~8,6-13 m or 49,5-66,5 m from spotting line. Side way gangway 13-49,5 m from spotting line.		
b. Specification	b. Specification (Using vessel own gangway)		

Items	Shore Specification	Ship Specification	Remarks
8. Support Craft (1) Tugboats	(1) Found more information: https://www.haminakotka.com/ • Suggestion to use tug, wind min. 8 m/s • Recommendation to use tug, wind min. 13 m/s • Order to use tug, wind min. 17 m/s		See attach file 7
(2) Zone management	(2) Moving at LNG jetty/process area are forbidden. Zone security area is 30m around ship based on SFS 3355 standard.		
9. Other	(1) Vessel should inform the Terminal about need of Vapour arm before berthing.	9. Others	

Attachments:

1.Performance Curve

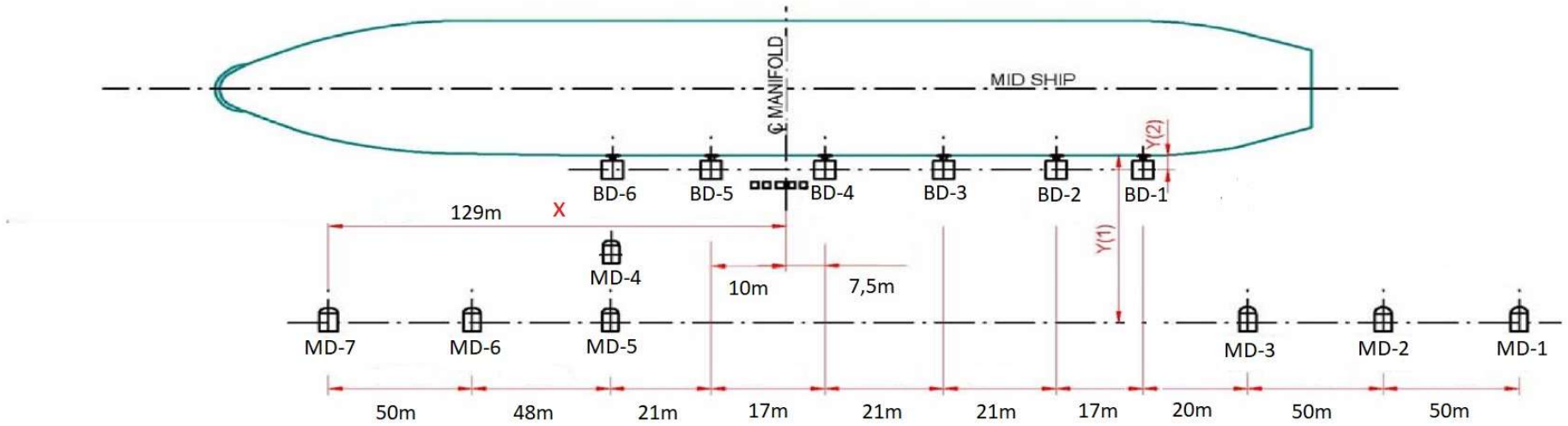


2. Mooring Facilities



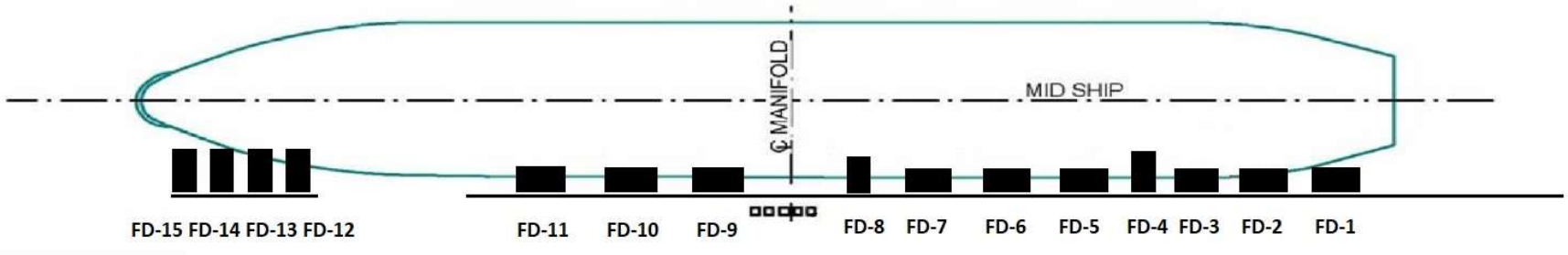
3. Optimooring (0-point vapour arm), Left to Right of Screen Site Plane Points: **304°**

Optimoor	Terminal	X	Y
A	MD-1	184,5m	57m Y(1)
B	MD-2	134,5m	49m Y(1)
C	MD-3	84,5m	40m Y(1)
D	BD-1	66,5m	2m Y(2)
E	BD-2	49,5m	1,5m Y(2)
F	BD-3	28,5m	1,5m Y(2)
G	BD-4	7,5m	1,5m Y(2)
H	BD-5	-10m	2m Y(2)
I	BD-6	-31m	2m Y(2)
J	MD-4	-31m	12m Y(1)
K	MD-5	-31m	39m Y(1)
L	MD-6	-79m	47m Y(1)
M	MD-7	-129m	55m Y(1)

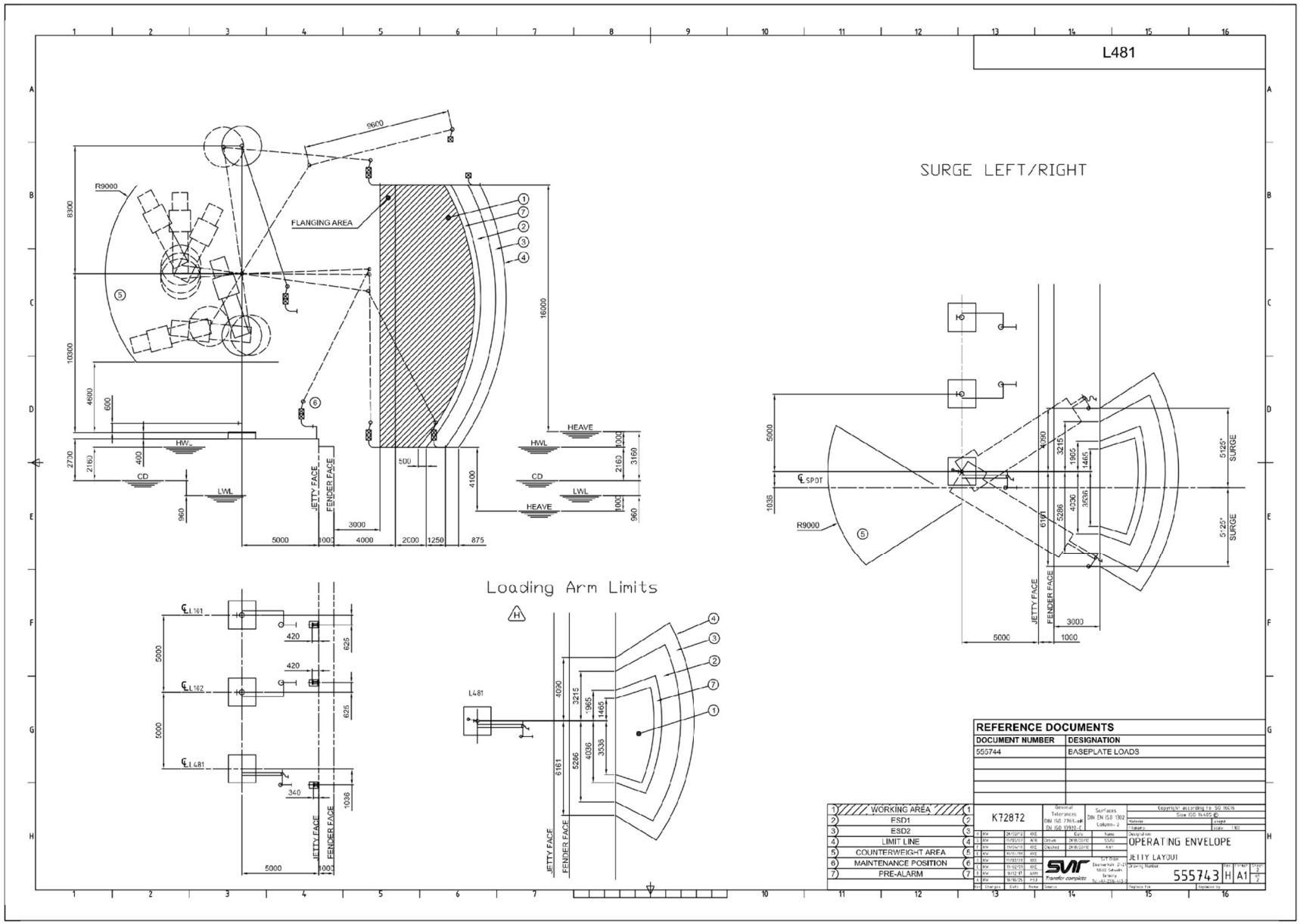


3.1 Fenders position for optimooring

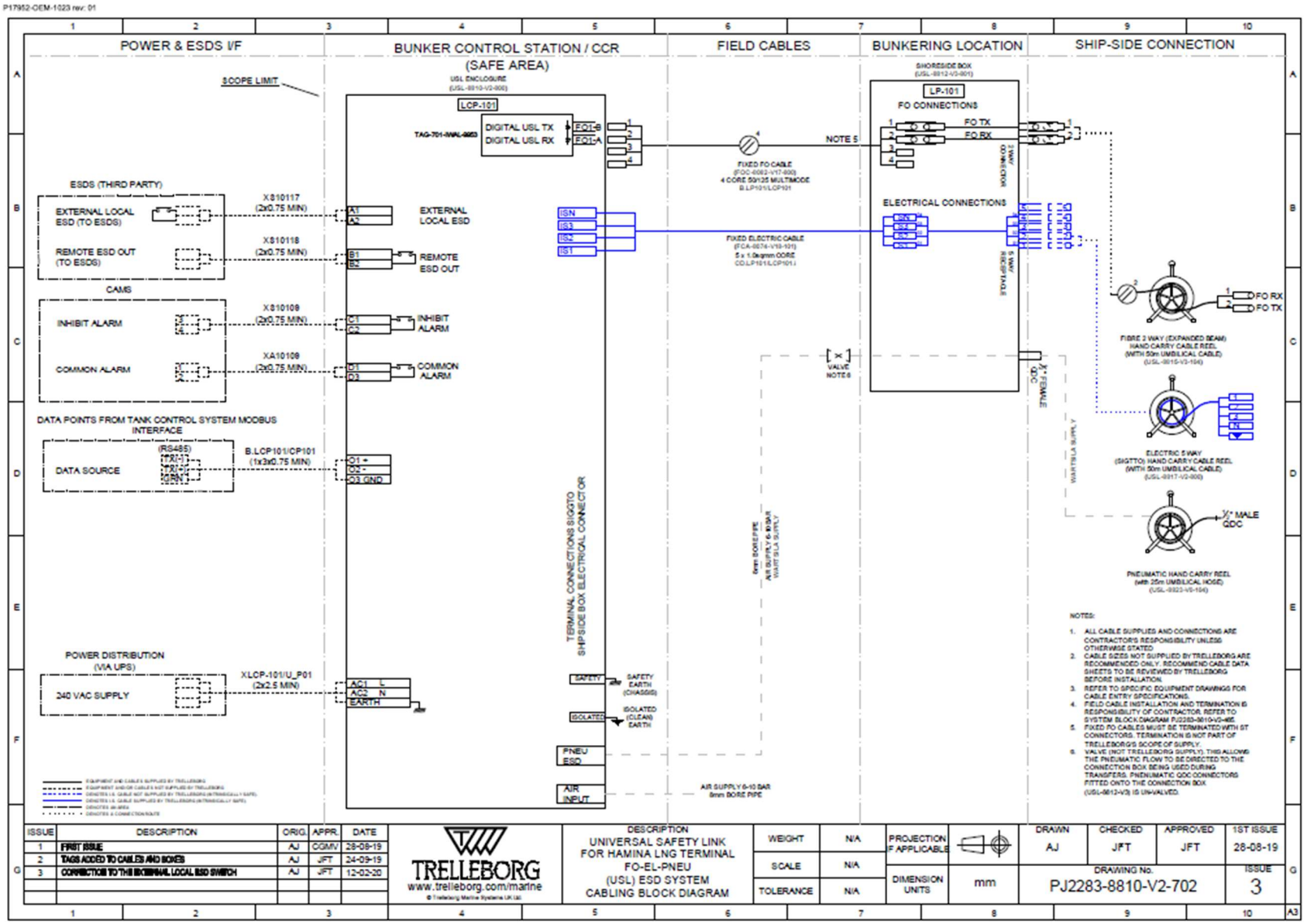
	Terminal	X
A	FD-1	-33.6m
B	FD-2	-31,6m
C	FD-3	-29,6m
D	FD-4	-27,8m
E	FD-5	-10,1m
F	FD-6	-7,7m
G	FD-7	-5,3m
H	FD-8	7,2m
I	FD-9	15,8m
J	FD-10	28,6m
K	FD-11	41,3m
L	FD-12	49,8m
M	FD-13	62,5m
N	FD-14	64,7m
O	FD-15	66,9m

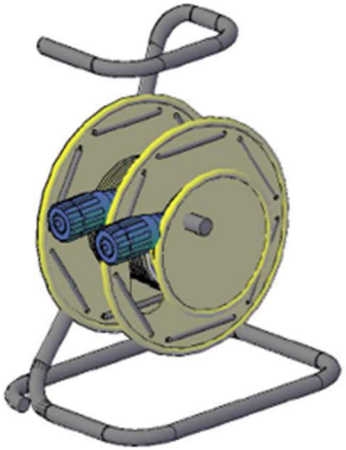


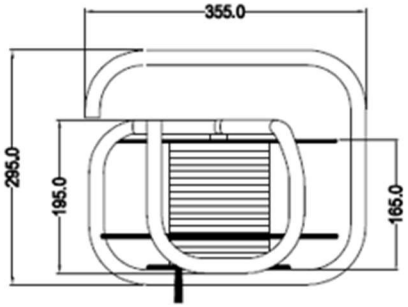
5. Bunker Arm Working Range L481 (Liquid & Vapour)



6. ESD / Communication System

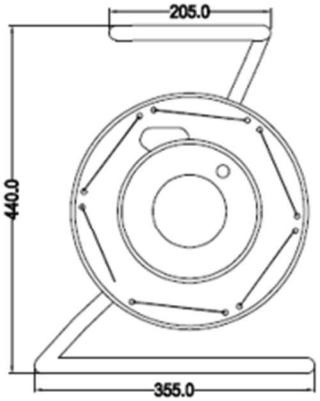


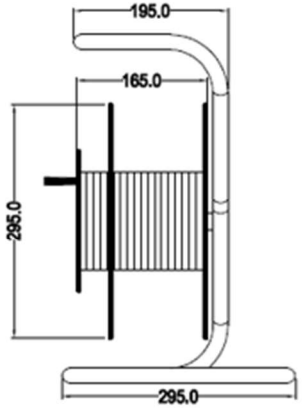




DRAWING No.

USL-8817-V2-800

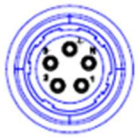




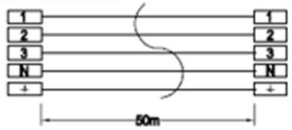
SIGTTO Connector

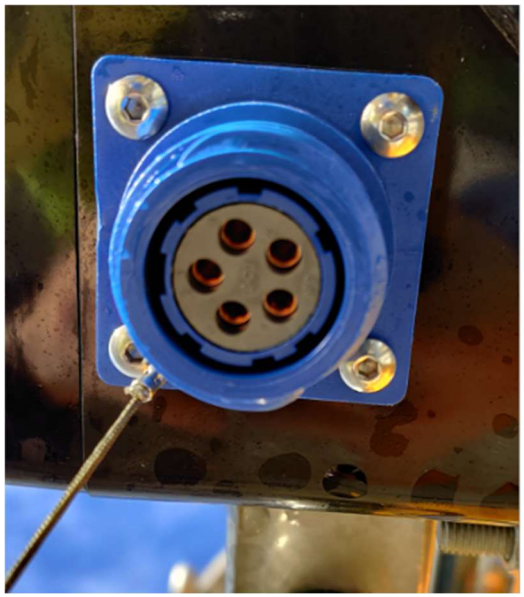


PIN LAYOUT DIAGRAM:



CONNECTION DIAGRAM:





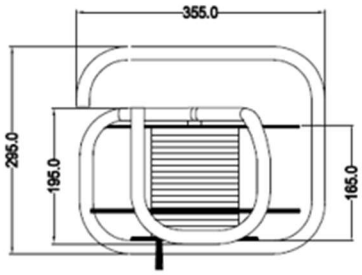
Connector notes:
Connector and Protective cap supplied
IP65 Rated Ingress Protection

PVC Cable notes:
Number of Cores: 5
Conductor size of each core: 1.0mm²
Cable Outer Diam: 7.1mm
Min. Bending Radius: 15 x OD
External Colour: Blue (RAL 5015)

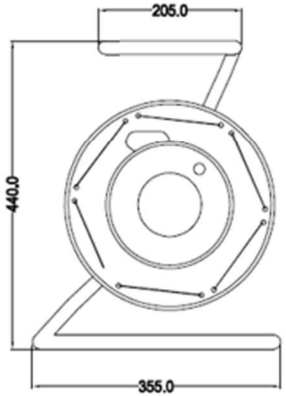
Carry on SIGTTO reel notes:
Material: 316 SS
Finish: Powder coat
Drum Colour :Yellow
Frame Colour : Black
Cable length : 50m

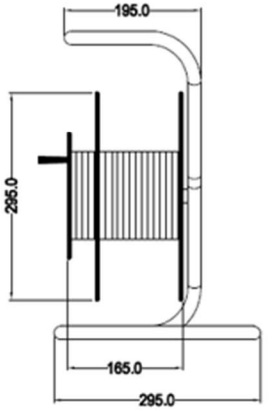
All dimensions in mm



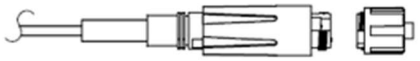


USL-8815-V3-104

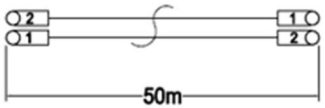




2 Way Expanded Beam F.O Connector



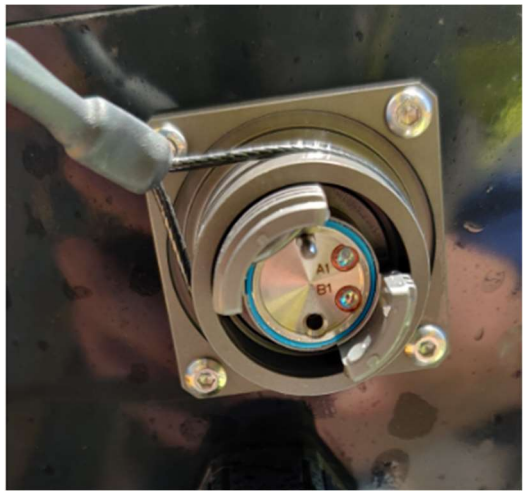
CONNECTION DIAGRAM:

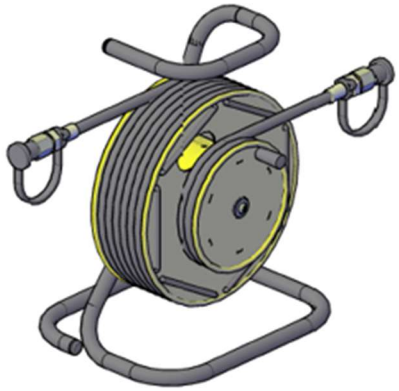


Connector notes:
Connector and Protective cap supplied
Cross-over type connector
Hermaphroditic MIL-DTL-83526 type connector
IP65 Rated Ingress Protection

Cable notes:
Multimode 50 / 125 Military Tactical Deployment Cable
Outer Jacket : Core- Locked Flame Retardant Polyurethane
Maximum Attenuation 3.5/1.5dB/km @ 800/1300 nm
Bandwith 500MHz-km @ 800/1300 nm
Cable Weight: 29kg/km
Cable Diameter (Nominal) : 5.6mm
Max Operating Tensile Load :1,800N
Min Operating Bend Radius : 4.5 cm
Operating Temperature : -55°C to +71°C

Carry on F.O reel notes:
Material: 316 S.S
Finish: Powder coat
Drum Colour :Yellow
Frame Colour : Black
Cable length : 50m





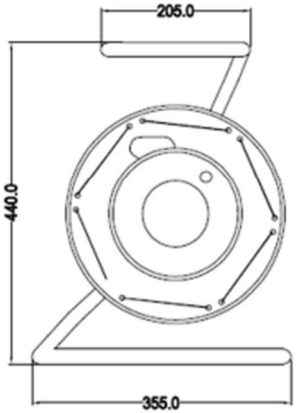
NOTE: ISOMETRIC VIEW NOT TO SCALE

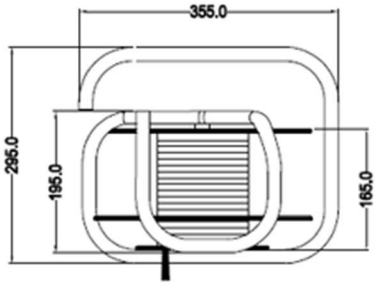
Connector Notes (At Both Ends):
QDC Nipple Cap (Stockit - 500028)
QDC Open Male Nipple (Stockit - 500012)
1/2" Fibre Washer (Stockit 500007)

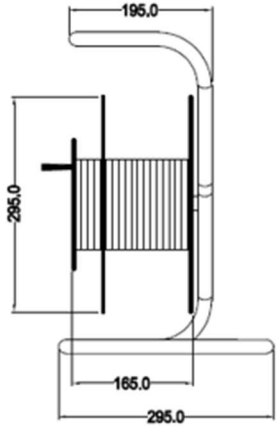
Hose notes:
1/4" Antiststic air hose with
1/2" BSPP St/Steel fittings
Stockit - 500078

Carry on SIGTTO reel notes:
Material: 316 SS
Finish: Powder coat
Drum Colour :Yellow
Frame Colour : Black
Cable length : 25m

USL-8823-V0-104









7. Jetty/Tugboat information

Hamina Ö FG

Berth Information Ö													Port guidelines for the use of tug(s) concidering wind direction and speed			
Cargo type:	Berth:	Length m:	Max draught:	Max vessel length:	Safe clearance depth:	Fender type:	Fender size:	Distance betw. Fenders m:	Bollard type:	Bollard design SWL:	Distance betw. Bollards m:	Height above sea level (m):	Heading angle:	Affecting wind directions	Suggestion to use tug	Recommendation to use tug	Order to use tug
Liquid Bulk / Gas	Ö1	35	*	130 m	10.0	Sumitomo lateral rubber cylinder Beta type vertical/lateral	300 H x 2 000 L 600 H x 2 000 L x 1 000 W	6.5	Big-T Vinch hook	750 kN 600 kN	Adequate	2.4	338 degrees	N, NE, E, SE, S, SW, W	10 m/s	15 m/s	20 m/s
	Ö2	75	*	185 m	11.2	Sumitomo lateral rubber cylinder Beta type vertical/lateral	300 H x 2 000 L 600 H x 2 000 L x 1 000 W	9.5	Big-T Vinch hook	750 kN 750 kN	15	2.4	338 degrees	N, NE, E, SE, S, SW, W	10 m/s	15 m/s	20 m/s
	Ö3	80	12.0	260 m	13.2	Sumitomo Lambda type vertical/lateral	800H x 2 000 L x 1 000 W	11.0	Tube Vinch hook	1 000 kN	21 50	2.4	304 degrees	NE, E, SE, S, SW, W, NW	8 m/s	13 m/s	17 m/s
			* Please see Principles for Depth Practice in Harbour Basins (HaminaKotka 2020)														