

11 Other Operations and Systems



3 Guidelines for Sea Trials of Motor Vessels

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Alterations to the preceding Edition are marked by beams at the text margin.

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Section 1

Sea Trials of Motor Vessels

A. General

1. Scope

Before being commissioned, each vessel classified by Germanischer Lloyd (GL) has to undergo sea trials in the presence of a competent Surveyor of GL. Main objective of this guideline is to give all parties involved, like ship owners, shipyards, design offices and their subcontractors an overview of the scope of trials/measurements in order to fulfil the sea trials requirements of GL and the SOLAS-Convention.

2. Besides the GL Rules for Classification and Construction and the relevant SOLAS-Convention requirements further national and international rules, regulations, technical standards and relevant recommendations from competent bodies have been taken into consideration.

3. The structure of these guidelines is based on typical, up-to-date trial programs for motor ships performed by major shipyards and shipping companies.

4. The final scope of trials and measurements should be laid down in each case individually, considering the building contracts and the flag state requirements.

5. A sea trial program in written form with all required tests has to be issued by the shipyard. That sea trial program has to be submitted to GL-Head Office for perusal and handed over to the GL-Surveyor in charge.

6. The sea trial report, issued by the shipyard and signed by the GL-Surveyor in charge and the owner's representative, has to be submitted to GL-Head Office for review.

B. Typical Sea Trials/Measurements Program

The following form "List of Trials/Measurements" gives an overview on the typical trials and measurements conducted during the sea trials of a motor ship including

- cross references to the forms in [Annex A](#) (Column "Form")
- information, where the requirement for the particular test comes from (Column "Required by")
- additional information on the particular test, cross references, clarifications (Column "Remarks")

The form is subdivided into the following 6 groups:

- general data
- hull equipment
- navigation equipment and radio communication equipment
- nautical trials
- machinery and electrical installations
- inspection after sea trial

Item No.	Item	Form	Statutory	Class	Recommended	Required by	Remarks
0.	GENERAL DATA	F 0.					
1.	HULL EQUIPMENT						
1.1	Anchor Equipment	F 1.1		×		Rules I-1-2, Sec. 14, D. and IACS Rec. No. 10	
1.2	Steering gear	F 1.2	×	×		Rules I-1-2, Sec. 14, A. and SOLAS II-1, Reg. 29 IACS UR M42 IACS UI SC246	The proper function has to be confirmed by: • Manual control locally • Remote control from bridge
1.3	Bow / stern thrusters unit	F 1.3	×	×		If applicable, Rules I-1-2, Sec. 14, C. and SOLAS II-1, Reg. 28	The critical ship's speed is to be evaluated (Thruster unit inoperative)
1.4	Water jets	F 1.4	×	×		IACS UR M25, SOLAS II-1, Reg. 29 and 28	
2.	NAVIGATION EQUIPMENT AND RADIO COMMUNICATION EQUIPMENT	F 2.	×			SOLAS V, Reg. 17 to 20; SOLAS IV, Reg. 6 to 11 and 18	
3.	NAUTICAL TRIALS						
3.0	General data sheet	F 3.0					
3.1	Speed trial	F 3.1			×	In accordance with IMO Res. 601(15), MSC 137(76) and the regulations of the National Ship Safety Authority	The influences of shallow water and rudder helms to be avoided
3.2	Turning circles with shaft generator operating, if applicable	F 3.2	×				Included in Bridgeposter acc. to IMO Res. A 601(15) proposed to be carried out during sea trial
3.3	Z-manoeuvre	F 3.3	×				
3.4	Spiral manoeuvre	F 3.4					
3.5	Pull-out manoeuvre	F 3.5					
3.6	Williamson turn	F 3.6	×				Included in Bridgeposter acc. to IMO Res. A 601(15) proposed to be carried out during sea trial
3.7	Stopping manoeuvre with shaft generator operating, if applicable	F 3.7	×	×		Rules I-1-4, Sec. 7, D. and SOLAS II-1, Reg. 28. Shaft generator: Rules I-1-3, Sec. 3, B.	All runs with different speeds, if requested
3.8	Propulsion particulars	F 3.8		×		Rules I-1-4, Sec. 7,D. and SOLAS II-1, Reg. 28	
3.9	Backwards manoeuvre	F 3.9		×		Rules I-1-2, Sec. 2, E. and IACS UR M25 + M51	
3.10	Minimum on-load speed	F 3.10		×		Rules I-1-2, Sec. 2, E. and IACS UR M51	
Shipyard:					Newbuilding No.:		
Ship's name:					GL Reg.-No.:		
for Yard		for Germanischer Lloyd			for Owners		
(Name)		(Name)			(Name)		
GL  List of Trials / Measurements							Date:
							Page 1 of 2

Item No.	Item	Form	Statutory	Class	Recommended	Required by	Remarks
4.	MACHINERY AND ELECTRICAL INSTALLATIONS						
4.1	Combinator curves	F 4.1		×	×	Rules I-1-2, Sec. 2, E.	if applicable
4.2.1	Starting/reversing manoeuvres	F 4.2.1		×		Rules I-1-2, Sec. 2, E. and Sec. 2, H. as well as IACS UR M51	For ships with "Polar Class" observe also Rules I-1-22, Sec. 3, H.
4.2.2	Starting air capacity	F 4.2.2		×			
4.3	Torsional / axial vibrations	F 4.3		×	×	Rules I-1-2, Sec. 16, D. and IACS UR M68 -	Only on the first ship of a series. Axial vibr. recommended
4.4	Safety system						
4.4.1	Standby operations and sequential starts at full ahead	F 4.4.1		×		Rules I-1-4, Sec. 4, H. no influence on M.E. operation Rules I-1-4, Sec. 3, A. verification of proper adjustment of main propulsion plant and SOLAS II-1, Reg. 53.3	See also Rules I-1-4, Sec. 7, D.4
4.4.2	Automatic slow down & shut down criteria	F 4.4.2		×		Rules I-1-4, Sec. 8, and 4, D. and SOLAS II-1, Reg. 31 and Reg. 52	
4.4.3	Black-out test	F 4.4.3	×	×		Rules I-1-3, Sec. 21, D. and SOLAS II-1, Reg. 26 + 41 and IACS UI SC 157	
4.4.4	Dead ship recovery test	no form necess.	×	×		Rules I-1-3, Sec. 21, D. and Sec. 3, B. + C. and SOLAS II-1, Reg. 26, 41 and 43	
4.5.1	Remote control - final adjustment	F 4.5.1		×			
4.5.2	Function test - control stations / AUT-manoeuve	F 4.5.2		×		Rules I-1-3, Sec. 21 and I-1-4, Sec. 5, A. - Final adjustment and SOLAS II-1, Reg. 49. Test manoeuvre acc. to GL-progr.	
4.6	Endurance trial			×			
4.6.1	Operational data recording	F 4.6.1		×			
4.6.2	Propulsion plant - fuel consumption measurements	F 4.6.2			×	verification of contract F.O.C.	
4.6.3	Exhaust gas boiler (steam heating)-performance test	F 4.6.3		×		Rules I-1-2, Sec. 7a, F. if applicable	
4.6.4	Exhaust gas heater, thermal oil heating-performance test	F 4.6.4		×		Rules I-1-2, Sec. 7b, G. if applicable	
4.6.5	Evaporator-performance test	F 4.6.5			×		
4.6.6	Alarms in machinery spaces-performance test at full ahead	F 4.6.6		×		Rules I-1-4, Sec. 4, A. audibility/ visibility and SOLAS II-1, Reg. 51	See also Rules I-1-4, Sec. 7, D.4.
4.6.7	Fire pumps - function test at full ahead	F 4.6.7		×		Rules I-1-2, Sec. 12, E. suction of pumps, Table 12.3 and SOLAS II-2, Reg. 10	
4.6.8	Noise level measurements	F 4.6.8	×			SOLAS II-1, Reg. 36, see IMO Res. A.468(XII), Rules I-1-1, Sec. 1 F.	"Attention ... to regulations ... of the flag administration."
4.6.9	Vibration measurements M.E. and A.E.	F 4.6.9		×		as necessary, Rules I-1-2, Sec. 1, C. and IACS M68	
4.6.10	Air flow - capacity measurements	F 4.6.10			×	Rules I-1-21, Annex A, B.	"Where so agreed ..."
4.6.11	Propeller shaft/hull - electric potential measurements	F 4.6.11		×		Rules I-1-2, Sec. 2, E., Point 6.4 and Sec. 4, D., Point 5.10	
4.7	Astern speed trial	F 4.7		×		Rules I-1-2, Sec. 2, E. and IACS UR M25 and M51 with at least $0.7 \times n_0$ for at least 10 min.	
4.8	Redundant Propulsion Systems	F 4.8		×		if applicable, Rules I-1-14	
4.9	Dynamic Positioning Systems	F 4.9		×		if applicable, Rules I-1-15	
5.	INSPECTION AFTER SEA TRIAL						
5.1	Propulsion plant	F 5.1		×		to be decided to local surveyor's satisfaction	
5.2	Auxiliaries	F 5.2		×			
Shipyard:					Newbuilding No.:		
Ship's name:					GL Reg.-No.:		
for Yard		for Germanischer Lloyd			for Owners		
(Name)		(Name)			(Name)		
		List of Trials/Measurements				Date:	
						Page 2 of 2	

C. Background Information

Experience gained over years has shown that explanatory notes, as given in the following Table 1.1, are of help for all parties involved.

The notes clarify what particular manoeuvres are meant to achieve and whether they are to be demonstrated for each ship or for the first ship of a series only. They give a quick overview and description of the scope of trials necessary in order to fulfil the requirements of GL and SOLAS-Convention.

The following abbreviations are used in Table 1.1 – Explanatory notes (examples):

SOLAS II-1, Reg. 28: SOLAS 74/78 Convention
(Consolidated Edition 2004)
Chapter II-1, Regulation 28

Res. MSC.137(76): IMO Resolution MSC.137 (76)

Res. A.601(15): IMO Resolution A.601 (15)

UR M25: IACS Unified Requirement M25

UR M51: IACS Unified Requirement M51

UI SC 157: IACS Unified Interpretation SC157

UR M25: IACS Unified Requirement M25

UR M68: IACS Unified Requirement M68

UI SC 242: IACS Unified Interpretation SC242

UI SC 246: IACS Unified Interpretation SC246

In many cases the precise wording of the relevant requirements is given for convenience.

Table 1.1 Explanatory notes

Sea trial manoeuvre	GL Rules	IACS	Statutory requirements
Stopping manoeuvre <i>To be demonstrated at each GL classified vessel.</i> <i>However, manoeuvres as part of Res. MSC.137(76) and Res. A.601(15) for the first ship of a series of GL classified vessels, only</i>	Rules I-1-4, Sec. 7, D.3. and 4. Part of Rules I-1-4, Sec. 7, D.3. and 4. Part of form MA3 (Form F 228). In accordance with survey type "Unattended Machinery Spaces Initial".	UR M 25 "... to be capable of reversing the direction of thrust so as to bring the ship to rest from the maximum service speed."	SOLAS II-1, Reg. 28 "Means of going astern" "... to bring the ship to rest within a reasonable distance from maximum ahead service speed, shall be demonstrated and recorded." See also Res. MSC.137(76) applicable for ships > 100 m and all chemical tankers and gas carriers. Stopping ability at test speed (85 % of the maximum engine output): "The track reach in the full astern stopping test should not exceed 15 ship lengths. However, this value may be modified by the administration where ships of large displacement make this criterion impracticable, but should in no case exceed 20 ship lengths."
Anchor equipment <i>To be demonstrated at each GL classified vessel</i>	Rules I-1-2, Sec. 14, D.	Rec. No. 10 "... speed shall be not less than 0,15 m/sec. The speed is to be measured over two shots of chain cable during the total trip; the trial should be commenced with 3 shots (82,5m) of chain fully submerged."	
Backwards manoeuvre <i>To be demonstrated at each GL classified vessel</i>	Rules I-1-2, Sec. 2, E. In accordance with survey type "Unattended Machinery Spaces Initial". Part of form MA3 (Form F 228).	UR M25 "... astern at least 70 % of the ahead revolutions. For steam turbines ... for a period of at least 15 minutes. The astern trial is to be limited to 30 minutes." UR M51 "In reverse direction of propeller rotation during the dock or sea trials at a minimum engine speed of $n = 70\%$ of nominal propeller speed for 10 minutes." UR M51	

Table 1.1 Explanatory notes (continued I)

Sea trial manoeuvre	GL Rules	IACS	Statutory requirements
Main steering gear (Caution: different regulations for passenger vessels and tankers above 10 000 GT and cargo vessels above 70000 GT to be considered in each individual case) <i>To be demonstrated at each GL classified vessel</i>	Rules I-1-2, Sec. 14, A.	UR M42 "... including demonstration of the performances required by Regulation 29.3.2 and 29.4.2" "If the vessel cannot be tested on the deepest seagoing draught ..." UI SC246 + UI SC242	SOLAS II-1, Reg. 29, "Steering gear": a) Main: ... at maximum ahead service speed ... from 35° on either side to 30° on the other side in not more than 28 s ...
Auxiliary steering gear (Caution: different regulations for passenger vessels and tankers above 10 000 GT and cargo vessels above 70000 GT to be considered in each individual case) <i>To be demonstrated at each GL classified vessel</i>	Rules I-1-2, Sec. 14, A.	UR M42 "... including demonstration of the performances required by Regulation 29.3.2 and 29.4.2" UI SC246 + UI SC242	SOLAS II-1, Reg. 29, "Steering gear": b) Auxiliary ... from 15° on one side to 15° on the other side in not more than 60 s with the ship at its deepest seagoing draught and running ahead at one half of the maximum ahead service speed or 7 knots, whichever is the greater ...
Bow/stern thrusters unit <i>To be demonstrated at each GL classified vessel</i>	Rules I- 1- 2, Sec. 14, C.		SOLAS II-1, Reg. 28, "Means of going astern": "... with supplementary means for manoeuvring or stopping, the effectiveness of such means shall be demonstrated ..."
Minimum on-load speed <i>To be demonstrated at each GL classified vessel</i>	Rules I-1-2, Sec. 2, E.	UR M 51 "... At minimum on-load speed ..."	Res. A.601(15). Quoted in SOLAS II-1, Reg. 28, "Means of going astern": "dead slow ahead"
Starting/reversing manoeuvres <i>To be demonstrated at each GL classified vessel</i>	Rules I-1-2, Sec. 2, E. Rules I-1-2, Sec. 2, H. Rules I-1-22, Sec. 3, H.	Unified Requirement M 51 "Starting and reversing manoeuvres"	
Endurance trial/operational data recording: 4 hours at rated speed and 2 hours at engine speed corresponding to normal continuous cruise power <i>To be demonstrated at each GL classified vessel</i>	Rules I-1-2, Sec. 2, E.	UR M 51 "... At rated engine speed: At least 4 hours" "... and at engine speed $n = 103\%$ of nominal propeller speed: 30 minutes (where the engine adjustment permits." furthermore "At engine speed corresponding to normal continuous cruise power: At least 2 hours."	

Table 1.1 Explanatory notes (continued II)

Sea trial manoeuvre	GL Rules	IACS	Statutory requirements
Dead ship recovery test (preferably to be performed at the berth) <i>To be demonstrated at each GL classified vessel</i>	Rules I-1-3, Sec. 21, D. Rules I-1-2, Sec. 2, H. Rules I-1-2, Sec. 1, D. Rules I-1-3, Sec. 3, B + C. Rules I-1-3, Sec. 21, D.	UI SC 124 "Emergency Source of Power in Passenger and Cargo Ships"	SOLAS II-1, Reg. 26, "Machinery Installations", Point 4 "General": "... into operation from the dead ship condition without external aid." as well as Regulation 42 + 43, "Emergency source ... passenger and cargo ships", Point 3.4 "... from a dead ship condition within 30 min after blackout." Regulation 41, Point 1.4
Black out test: Simulation of failure of main power supply <i>To be demonstrated at each GL classified vessel</i>	Rules I-1-3, Sec. 21, D. Rules I-1-3, Sec. 3, B + C.	UI SC 157 "Main Source of Electrical Power" Refers to SOLAS UI SC 134 "Essential Services and Arrangements of Sources of Power ..."	SOLAS II-1, Reg. 26, "Machinery Installations", Point 3 "General": "All parts of machinery ... shall be subjected to appropriate tests .. before being put into service for the first time. Special consideration shall be given to the malfunctioning of ... a generating set which serves as a main source of electrical power." additionally SOLAS II-1, Reg. 41, Point 1.2 + 5 "Main source of electrical power and lighting system": "Where the main source of electrical power is necessary for propulsion and steering of the ship, the system shall be so arranged that the electrical ... will be ... immediately restored in case of loss of any one of the generators in service."
Black out test for ships with periodically unattended machinery space (AUT): Simulation of failure of main power supply <i>To be demonstrated at each GL classified vessel</i>	Rules I-1-4, Sec. 4, H. Rules I-1-4, Sec. 6, A.	UR M30.2.4 "In order to avoid undesirable interruption in the operation of machinery, the system is to intervene sequentially after the operation of alarm system by: Starting of standby units, load reduction or shutdown, such that the least drastic action is taken first."	SOLAS II-1, Reg. 51, "Alarm System": "The alarm system ... shall have an automatic change over to a stand-by power supply in case of loss of normal power supply."

Table 1.1 Explanatory notes (continued III)

Sea trial manoeuvre	GL Rules	IACS	Statutory requirements
Black out test for ships with periodically unattended machinery space (AUT): Simulation of failure of main power supply <i>To be demonstrated at each GL classified vessel</i>	Rules I-1-4, Sec. 4, H.	UR M31 "adequate provisions for automatic starting and connecting to the main switchboard of a stand-by generator of sufficient capacity to permit propulsion and steering and to ensure the safety of the ship with automatic re-starting of the essential auxiliaries including, where necessary, sequential operations"	SOLAS II-1, Reg. 53 "Special requirements for machinery, boiler and electrical installations": "... provision shall be made for automatic starting and connecting to the main switchboard of a stand-by generator of sufficient capacity to permit propulsions and steering and to ensure the safety of the ship with automatic restarting ..."
Torsional/axial vibrations <i>To be demonstrated, presuming satisfactory results, at the first ship of a series of GL classified vessels, only</i>	Rules I-1-2, Sec. 16, D.	UR M68 "Permissible limits of stresses due to torsional vibrations for intermediate, thrust and propeller shafts"	
Noise level measurements <i>To be demonstrated, presuming satisfactory results, at the first ship of a series of GL classified vessels, only</i>	Rules I-1-1, Sec. 1, F.	UI SC 82 "Protection against noise" "Operating condition at sea": "The propulsion machinery shall be run at normal service speed and at not less than 80 % of the maximum continuous rating MCR." For new ships of 1600 GT and over. For new ships of less than 1600 GT and existing ships limits acc. to Ch. 5 and Ch. 7 of the IMO Resolution. With reference to Res. A.468(XII)	Res. A.468(XII) Quoted in SOLAS II-1, Reg. 36 "Protection against noise"
Turning circles and Z-manoeuvres <i>Manoeuvres as part of Res. MSC.137(76) and Res. A.601(15) for the first ship of a series of GL classified vessels, only</i>			Res. MSC.137(76) applicable for ships > 100 m and all chemical tankers and gas carriers. Quoted in SOLAS II-1, Reg. 28, "Means of going astern" * Refer to the Recommendation on the provision and the display of manoeuvring information on board ships (Res. A.601(15)), the standards for ship manoeuvrability (Res. MSC.137(76)): Turning ability: Advance not more than 4,5 ship lengths and tactical diameter not more than 5 ship lengths. Zig-zag test with 10°/10° and 20°/20°, measuring of the overshoot angle.

Table 1.1 Explanatory notes (continued IV)

Sea trial manoeuvre	GL Rules	IACS	Statutory requirements
Turning circles and stopping manoeuvres for ships with remote control from the bridge equipped with shaft generator(s): To be demonstrated while the shaft generator is engaged and solely supplying the main switchboard. <i>To be demonstrated at each GL classified vessel</i>	Rules I-1-3, Sec. 3, B. Rules I-1-3, Sec. 21, D. Turning circles as part of GL-Form F228, point 2.7 for each GL-classified ship.		Res. MSC.137(76) Quoted in SOLAS II-1, Reg. 28, "Means of going astern" * Refer to the Recommendation on the provision and the display of manoeuvring information on board ships (Res. A.601(15)), the standards for ship manoeuvrability (Res. MSC.137(76))
Endurance trial/operational data recording for ships with periodically unattended machinery space (AUT): 4 hours testing of automation equipment <i>To be demonstrated at each GL classified vessel</i>	Rules I-1-4, Sec. 7, D.		SOLAS II-1, Reg. 46, "General": "... routine tests to ensure continuous reliable operation."
Dynamic positioning systems for ships assigned the Class Notation DP: Test of the complete DP system showing following ability of the vessel: – position keeping (auto control) – manual control via joystick <i>To be demonstrated at each GL classified vessel</i>	Rules I-1-15, Sec. 3, B.		SOLAS II-1, Reg. 28, "Means of going astern": "... with supplementary means for manoeuvring or stopping, the effectiveness of such means shall be demonstrated ..."
Redundant propulsion systems for ships assigned the Class Notation RP: Test that: a) ship meets the requirements b) redundancy of propulsion and steering systems is given c) conclusions drawn in FMEA are correct and adequate <i>To be demonstrated at each GL classified vessel</i> <i>Facilitations with written consent of GL-HO only</i>	Rules I-1-14, Sec. 4, A.		

Annex A

Forms

A. General

1. The following forms can be used during preparation and conducting of the sea trials of motor ships. The numbering follows the item no. as given in the form "List of Trials/Measurements" in [Section 1, B](#).

2. Copying of the forms contained in these Guidelines and serving as samples is permissible and does not require the explicit permission of GL. However, the labelling field, including the GL logo shall not be deleted or altered.

F 0. GENERAL DATA

Owner:		
Flag:	Port of Registry:	
Call sign:	IMO No.:	
Character of Class:	Hull:	
Machinery:		
1. Ship's Data		
Ship type		
Length o.a.	[m]	
Length pp.	[m]	
Moulded breadth	[m]	
Depth	[m]	
Gross tonnage	[GT]	
Deadweight	[tdw]	
Draught (max.)	[m]	
Draught (actual)		
– fore	[m]	
– aft	[m]	
– midship	[m]	
2. Sea Trial Area		
Depth of water	[m]	
Direction / state of wind	[°; Bf]	
Direction / wave height H $\frac{1}{3}$	[°; m]	
Direction / state of current	[°; m/s (kn)]	
Location		
Shipyard:		Newbuilding No.:
Ship's name:		GL Reg.-No.:
for Yard	for Germanischer Lloyd	for Owners
(Name)	(Name)	(Name)
	General Data	Date:
		F 0. Page 1 of 2

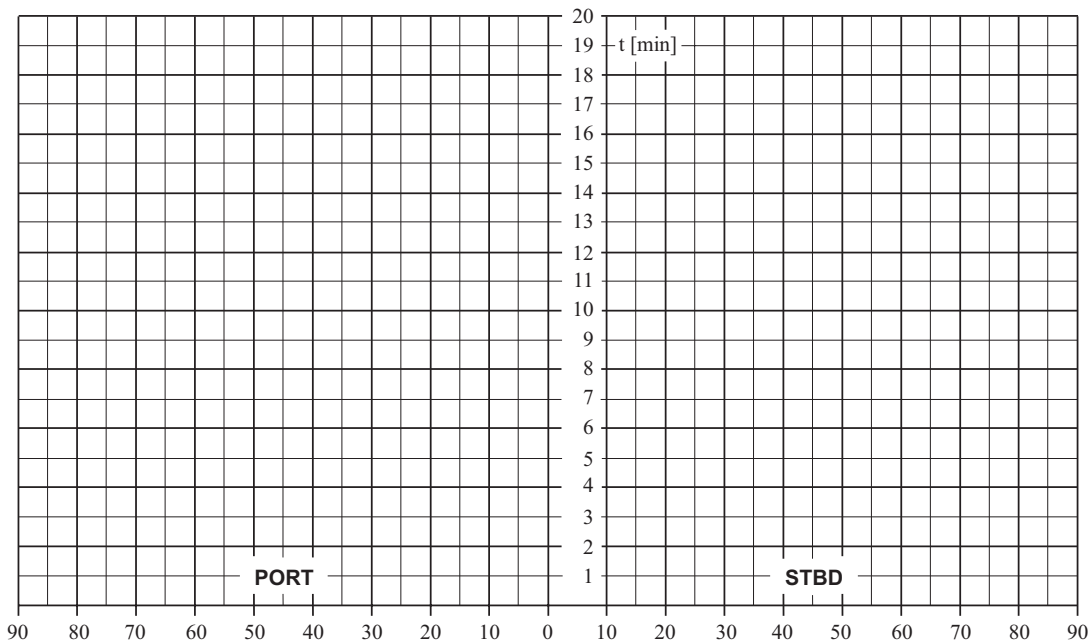
3. Propulsion plant		
3.1 Main engine(s)		
Manufacturer		
Number / type		
Serial No.		
Rated output	[kW]	
Nominal revolutions	[min ⁻¹]	
3.2 Gearing		
Design		
Manufacturer		
Number / type		
Gear-ratio		
3.3 Propeller		
Design		
Manufacturer		
No. of blades		
Diameter / pitch	[m]	
4. Main electric power supply		
4.1 Diesel prime mover		
Manufacturer		
Number / type		
Rated output	[kW]	
Nominal revolutions	[min ⁻¹]	
4.2 Generators		
Manufacturer / type		
Frequency	[c/s]	
Voltage / power	[V; kVA]	
4.3 Shaft generator(s)		
Number / voltage power	[V; kVA]	
Shipyard:		Newbuilding No.:
Ship's name:		GL Reg.-No.:
for Yard	for Germanischer Lloyd	for Owners
(Name)	(Name)	(Name)
	General Data	Date:
		F 0.
		Page 2 of 2

F 1. HULL EQUIPMENT

	Minimum requirements: – 3 shackles to water ($\hat{=}$ 82,5 m) – Hoisting speed 9 m/min (to be measured over 2 shackles, $\hat{=}$ 55 m)			
Anchor/ Anchor windlass	Port	Stbd.	Port + Stbd.	Stern
Criteria				
Shackles to water				
Measurements				
– Electric current [A]				
– Hydraulic pressure [bar]				
– Shackle sequence [No.>No.]				
– Time from – to [min; s]				
Hoisting speed [m/min]				
Function test				
– Remote anchor drop SOC/BR				
– Brakes				
– Chain stopper				
– Miscellaneous				
Remarks: SOC – Ship operation centre BR – Bridge				
Shipyard:		Newbuilding No.:		
Ship's name:		GL Reg.-No.:		
for Yard	for Germanischer Lloyd		for Owners	
(Name)	(Name)		(Name)	
	Anchor Equipment		Date:	
			F 1.1	

Water depth [m]: Draught fore [m]: aft [m]: midship [m]: Rudder emerged: ☐ Yes ☐ No			Minimum requirements: Time limit for rudder "hard over": – only main steering gear running 28 s with contractual speed from 35 °P (S) to 30 °S (P) – Emerg. rudder 60 s at 50 % ship's speed, min. 7 kn from 15 °P (S) to 15 °S (P) Passenger vessels: 28 s with contractual speed from 35 °P (S) to 30 °S (P) – Emerg. rudder P (port) S (starboard)		
Criteria	Shift the helm	Time	Max. hydr. pressure	Max. electric current	
Pump/Unit	from - to	[s]	[bar]	[A]	
Ship's speed	Propeller revolutions [min ⁻¹]:		Pitch []:		
I					
Ship's speed	Propeller revolutions [min ⁻¹]:		Pitch []:		
I + II					
Ship's speed	Propeller revolutions [min ⁻¹]:		Pitch []:		
II					
Ship's speed	Propeller revolutions [min ⁻¹]:		Pitch []:		
Emerg. rudder					
Remarks:					
Shipyard:		Newbuilding No.:			
Ship's name:		GL Reg.-No.:			
for Yard	for Germanischer Lloyd		for Owners		
(Name)	(Name)		(Name)		
	Steering Gear			Date:	
				F 1.2	

Water depth [m]:
 Draught fore [m]:
 aft [m]:
 midship [m]:
 State of wind: direction/force [°, Bf]:
 State of sea: direction/wave height H $\frac{1}{3}$ [°, m]:



Measurements	No.	1	2	3	Remarks:
Ship's speed (reference)	[kn]				
Max. thrust attained after	[min; s]				
Defined course deviation attained, reversing to opposite direction	[min; s]				
Max. back-thrust attained after	[min; s]				
Ship on initial course	[min; s]				
Defined course deviation attained, reversing	[min; s]				
Electric current I. Step	[A]				
II. Step	[A]				
III. Step	[A]				
Hydr. pressure	[bar]				
Shipyard:		Newbuilding No.:			
Ship's name:		GL Reg.-No.:			
for Yard		for Germanischer Lloyd		for Owners	
(Name)		(Name)		(Name)	
		Bow / Stern Thruster Unit		Date:	
				F 1.3	

	Test item:	Confirmed:	Criterion to be achieved:
1	Load tests with all waterjet units in operation at 110 % power for 30 min.	Speed: rpm Power: kW Starboard Unit: Speed: rpm Power: kW	(acc. to IACS UR M51)
2	Load and endurance tests with all waterjet units in operation at 100 % MCR for at least 4 hours and continuous rating for at least 2 hours.		(acc. to IACS UR M51)
3	Astern trial with approx. 70 % speed for at least 10 minutes. Test of waterjet reversing function.		The moving direction has to be changed and kept, and the steering function has to be controlled. (astern trial acc. to IACS UR M25)
4	Steering capability of waterjet unit PORT	from - to: ° time: s from - to: ° time: s	Time of 28 s with contractual speed for moving rudder from 35° port (stb.) to 30° stb. (port) for only main drive running in case of main steering gear. (SOLAS Chapter II-1, Reg. 29)
5	Steering capability of waterjet unit STB	from - to: ° time: s from - to: ° time: s	Time of 28 s with contractual speed for moving rudder from 35° port (stb.) to 30° stb. (port) for 1 hydr. pump in case of main steering gear. (SOLAS Chapter II-1, Reg. 29)
6	Crash stop test from full ahead is to be carried out.	Initial speed: kn Stopping time: s Stopping distance: m	Stopping ability at test speed (100 % of the max. engine output): The stopping distance should not exceed 15 ship lengths. (SOLAS Chapter II-1, Reg. 28)
7	Simulation of blackout condition		Prime mover engine must stay in service or steering capability shall be regained within 45 s and must be verified.
8	Max. working pressure in hydraulic system	Steering: MPa Reversing: MPa	Reliable operation in full operation range of the unit. The specified figures must be achieved.
9	Lubrication system	Max. working pressure: MPa LO temperature: °C	Reliable operation in full operation range of the unit. The specified figures must be achieved.
10	Final testing of control, monitoring and safety systems		The functions of all operator stations as well as emergency steering to be verified.

Installation requirement:

- Two independent waterjet units are required per vessel which act at least as one main and one auxiliary unit.

Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	
		Date:	
		F 1.4	
Waterjets			

F 2. NAVIGATION EQUIPMENT

	Installed	Tested by	Remarks
Gyro compass master	☐		
– Repeater	☐		
– Heading repeater	☐		
– Bearing repeater	☐		
Magnetic compass	☐		
– Emerg. compass	☐		
– Compass bearing device	☐		
– Means of correcting heading and bearings	☐		
Heading indicator at emerg. steering position	☐		
Radar units	☐		
3 GHz radar	☐		
9 GHz radar	☐		
– ARPA (automatic radar plotting aid)	☐		
– ATA (automatic tracking aid)	☐		
– EPA (electronic plotting aid)	☐		
Echo sounder	☐		
Speed log (SME)	☐		
Rudder indicator	☐		
Rudder indicator in steering gear room	☐		
Operation indicators for propulsion plant	☐		
– Engine speed, direction rotation engine/propeller	☐		
– CPP pitch / thrust direction	☐		
Bow- / stern thrusters operation indicator	☐		
– Load step / pitch / thrust direction	☐		
Rate of turn indicator (ROT)	☐		
Sound reception system (only for closed wings)	☐		
Heading control system	☐		
Track control system	☐		
ECDIS (electronic chart display and information system)	☐		
Back up for ECDIS (electronic chart display and information system)	☐		
Shipyard:	Newbuilding No.:		
Ship's name:	GL Reg.-No.:		
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	
	Navigation Equipment		Date:
			F 2. Page 1 of 2

	Installed	Tested by	Remarks
Electronic Position Finding System (EPFS)	☐		
– Loran C, - Chayka	☐		
– AIS (automatic identification system)	☐		
– VDR (voyage data recorder)	☐		
– Transmitting heading device (THD)	☐		
– Satellite navigation (GPS, DGPS)	☐		
– Satellite navigation (Glonass, DGlionass)	☐		
Communication / Information	☐		
– Telephone	☐		
– Telephone to emergency steering position	☐		
– Weatherfax and Navtex	☐		
– VHF sets (fixed)	☐		
– VHF sets (portable)	☐		
– Course recorder	☐		
– Ship clock	☐		
– Public address system	☐		
– General alarm system	☐		
– Manoeuvre recorder	☐		
– Radio station / GMDSS	☐		
– Sea Area A1	☐		
– Sea Area A1 + A2	☐		
– Sea Area A1 + A2 + A3	☐		
– Sea Area A1 + A2 + A3 (MF HF)	☐		
– Sea Area A1 + A2 + A3 + A4	☐		
– Nautical publications for the sea trial area	☐		
Shipyard:	Newbuilding No.:		
Ship's name:	GL Reg.-No.:		
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	
	Navigation Equipment		Date:
			F 2. Page 2 of 2

F 3. NAUTICAL TRIALS

Water depth	[m]:	Output	P/S	[kW]:
Draught	fore [m]:	Propeller revolutions	P/S	[min ⁻¹]:
	aft [m]:	Propeller pitch	P/S	[-]:
	midship [m]:	Ship's mains - electronic power supply		
State of wind:	direction/force [°; Bf]:	– Shaft gen. operation ☐ load [kW]:		
State of sea:	direction/ wave height H ⅓ [°, m]:	– A.E. operation ☐ load [kW]:		

Measure- ment No.	Time [min; s]	Position		Distance [sm; m]	True course [°]	Turning speed [°/min]	Rudder angle [°]	Remarks
		Longitude L	Latitude B					
1	0 – 00							
2	20							
3	40							
4	1 – 00							
5	20							
6	40							
7	2 – 00							
8	20							
9	40							
10	3 – 00							
11	20							
12	40							
13	4 – 00							
14	20							
15	40							
16	5 – 00							
17	20							
18	40							
19	6 – 00							
20	20							
21	40							
22	7 – 00							
23	20							
24	40							
25	8 – 00							
26	20							
27	40							
28	9 – 00							
29	20							
30	40							
31	10 – 00							

Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	

Water depth [m]: Draught fore [m]: aft [m]: midship [m]:	Max. rudder angle [°]: ± Data log acc. to general data sheet F 3.0
---	---



Approach run
Test run
Approach run

Run	1	2	Average	3	4	Average
Criteria						
Rated output (acc. to contact) [kW]						
Output P [kW]						
S [kW]						
Propeller revolutions P						
S						
Propeller pitch P []						
S []						
State of wind - direction [°]	➡	➡		➡	➡	
- force [Bf]						
State of sea - direction [°]	➡	➡		➡	➡	
- water height H 1/3 [m]						
Approach run [sm]						
Course [°]						
Test run [sm]						
Time [min; s]						
Ship's speed [kn]						
Remarks:						
Shipyard:			Newbuilding No.:			
Ship's name:			GL Reg.-No.:			
for Yard		for Germanischer Lloyd		for Owners		
(Name)		(Name)		(Name)		
GL		Speed Trial			Date:	
					F 3.1	

Water depth [m]: Draught fore [m]: aft [m]: midship [m]: State of wind: direction/force [°;Bf]: State of sea: direction/wave height H ⅓ [°;m]:	Data log acc. to general data sheet F 3.0
---	---

Port

Starboard

Turning circles	Starboard		Port	
Parameter	1	2	1	2
Initial course [°]				
Ship's speed (initial/final) [kn]				
Final rudder engine attained after [°; min, s]				
Output P/S [kW]				
Propeller revolutions P/S [kW]				
Propeller pitch P/S []				
Turning time to 90° [min; s]				
180° [min; s]				
270° [min; s]				
360° [min; s]				
Way ahead incl. stern-/bow-track A [m]				
Tactical diameter B [m]				
Turning circle diameter C [m]				

Remarks:

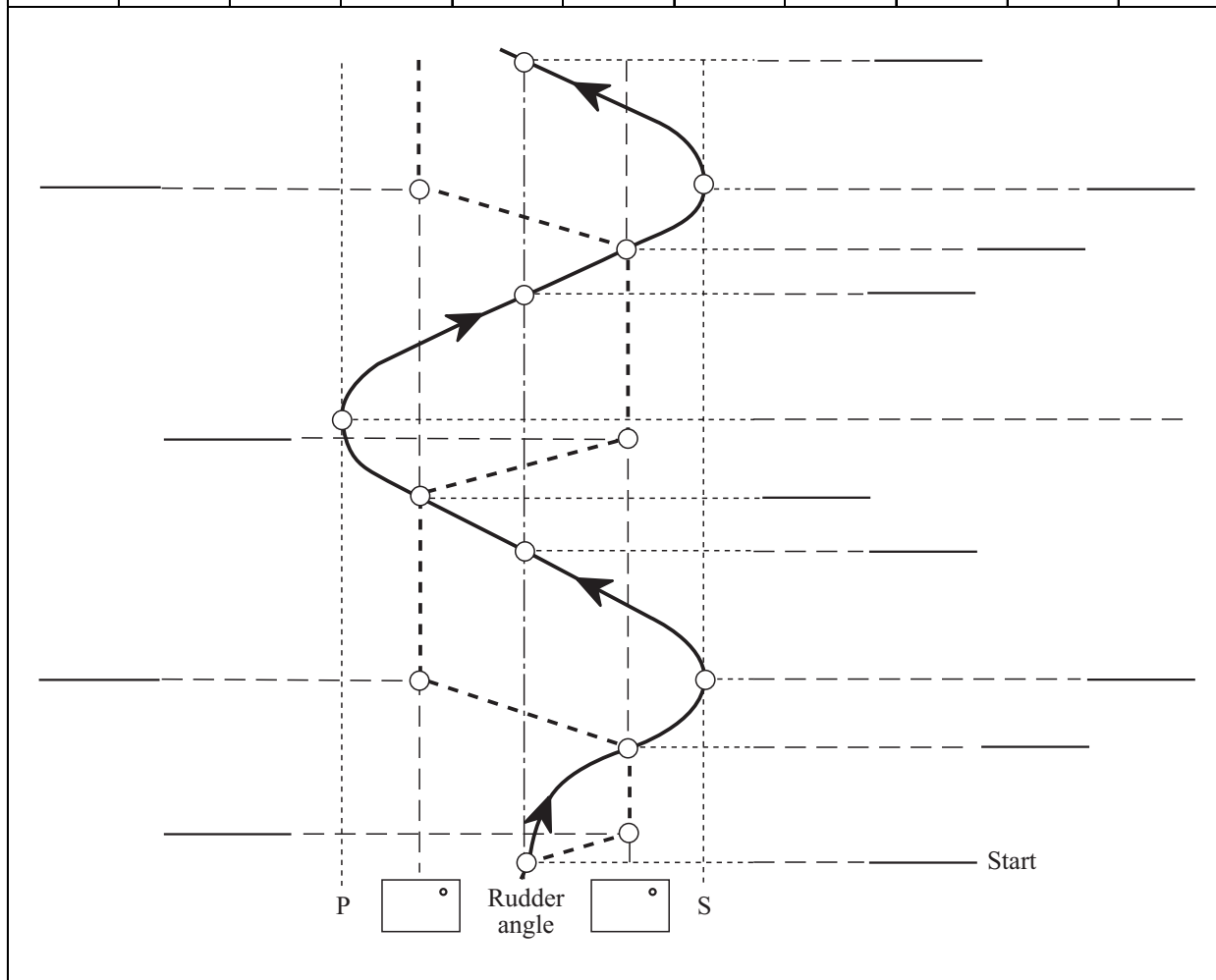
 Turning circles to be carried out in P and S direction and vice versa,
 at contractual speed of the ship.

Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	

GL	Turning Circles	Date: F 3.2
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Water depth		[m]:	Output	P/S	[kW]:
Draught	fore	[m]:	Propeller revolutions	P/S	[min ⁻¹]:
	aft	[m]:	Propeller pitch	P/S	[-]:
	midship	[m]:	Ship's speed (reference)		[kn]:
State of wind:	direction/force	[°, Bf]:	Initial course		[°]:
State of sea:	direction/ wave height H ½	[°, m]:	Characteristic:		
			Rudder angle/course deviation		[°/°]:

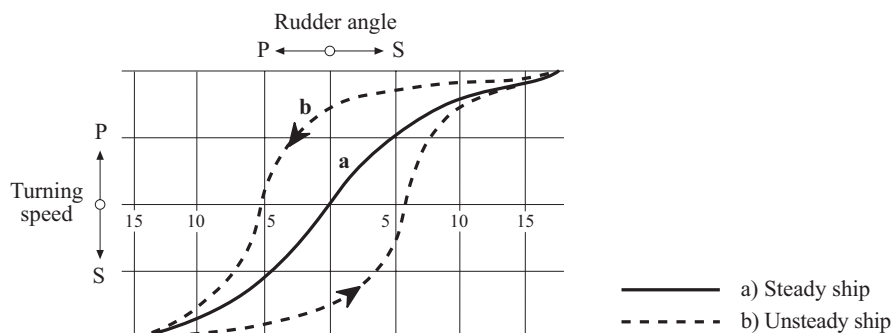
Action time (rudder)		Course					Reaction time (ship)			
		Deviation		True	Deviation		Deviation Port	on course	Deviation Stbd.	max. yaw
P	S	max.	P		S	max.				
		°	°	°	°	°				



Remarks:

Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	

Water depth	[m]:	Output	P/S	[kW]:
Draught	fore [m]:	Propeller revolutions	P/S	[min ⁻¹]:
	aft [m]:	Propeller pitch	P/S	[-]:
	midship [m]:	Ship's speed (reference)		[kn]:
State of wind:	direction/force [°; Bf]:			
State of sea:	direction/ wave height H ⅓ [°, m]:			



Readings	Rudder angle P / S [°]		Constant turning speed [°/s]	Clock [h, min., s]	Elapsed time [min., s]
1	15	S			
2	10	S			
3	5	S			
4	3	S			
5	1	S			
6	0				
7	1	P			
8	3	P			
9	5	P			
10	10	P			
11	15	P			
12	10	P			
13	5	P			
14	3	P			
15	1	P			
16	0				
17	1	S			
18	3	S			
19	5	S			
20	10	S			
21	15	S			

Remarks:

Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	

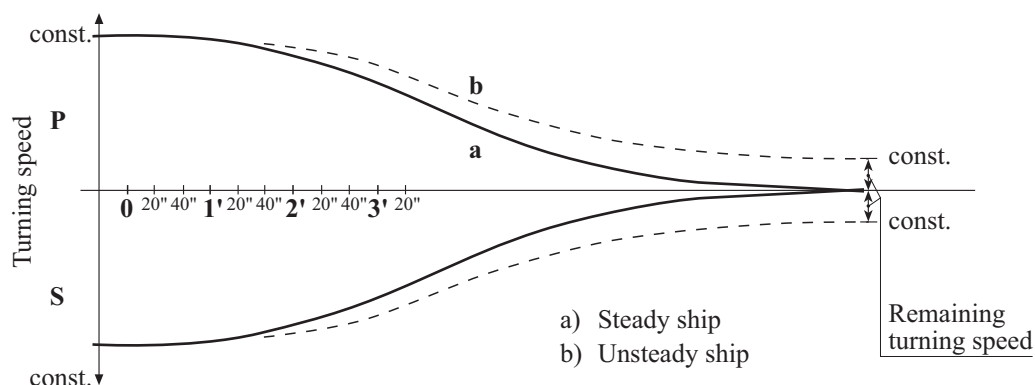


Spiral Manoeuvre

Date:

F 3.4

Water depth		[m]:	Data log acc. to general data sheet F 3.0
Draught	fore	[m]:	
	aft	[m]:	
	midship	[m]:	
State of wind:	direction/force	[°;Bf]:	
State of sea:	direction/wave height H $\frac{1}{3}$	[°;m]:	



Run No.		1	2	3
Output	P/S [kW]			
Propeller revolutions	P/S [min ⁻¹]			
Propeller pitch	P/S []			
Ship speed (defined)	[kn]			
Rudder angle (defined)	[°]			
Resulting turning speed	[°/min]			
Start of pull-out manoeuvre by rudder helm to midship				
Steady course attained after	[min; s]			
Remaining turning speed	[°/min]			
– attained after	[min; s]			

Remarks:

Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	

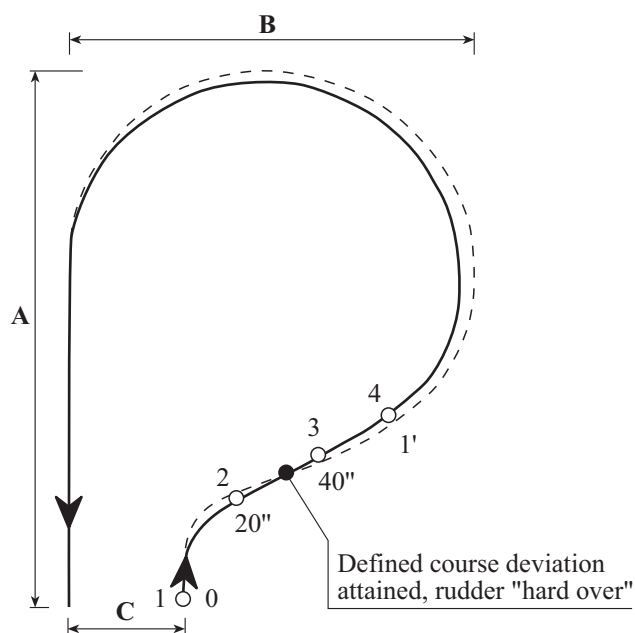


Pull-out Manoeuvre

Date:

F 3.5

Water depth		[m]:	Data log acc. to general data sheet F 3.0
Draught	fore	[m]:	
	aft	[m]:	
	midship	[m]:	
State of wind:	direction/force	[°; Bf]:	
State of sea:	direction/wave height H 1/3	[°; m]:	



Criterion		Run No. 1 Course deviation: 60°	Run No. 2 Course deviation: ____°
Initial course	[°]		
Ship's speed (initial/final)	[kn]		
Output	P/S [kW]		
Propeller revolutions	P/S [min ⁻¹]		
Propeller pitch	P/S []		
Def. course deviation attained after	[min; s]		
Rudder at "hard over" after	[min; s]		
Ship on opposite course, engine stopped	[min; s]		
Way ahead incl. stern track	A [m]		
Traverse drift incl. stern track	B [m]		
Pass-by-distance incl. stern track	C [m]		

Remarks:

Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	



Williamson Turn

Date:

F 3.6

Water depth [m]: Draught fore [m]: aft [m]: midship [m]: State of wind: direction/force [°; Bf]: State of sea: direction/wave height H 1/3 [°; m]:	Data log acc. to general data sheet F 3.0
---	---

Manoeuvre Course

1. Reading

Course n

Criterion	Run 1	Run 2	Run down trial
Output P/S [kW]/[%]			
Propeller revolutions P/S [min ⁻¹]			
Propeller pitch P/S []			
Initial ship's speed [kn]			
Rudder angle [°]			
Initial course [°]			
Control console			
Defined manoeuvre	Full AH – full AS	Full AH – full AS	Full AH – Stop
Reversal initiated after [s]			
Engine starts to run on reverse direction after [s]			
Revolution at full AS [min ⁻¹]			
– attained after [s]			
Pitch at full AS []			
– attained after [s]			
Ship is insteerable after [min; s]			
Final course [°]			
Stopping time [min; s]			
Stopping distance [m]			
Remarks: AH – ahead, AS – astern			
Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	

GL	Stopping Manoeuvre	Date: F 3.7
--	--	--

Water depth [m]: Draught fore [m]: aft [m]: midship [m]:			Fixed propeller ☐ or Contr. pitch propeller • Combinator mode ☐ • Operation with n = const. ☐		
Manoeuvre	Control lever position	Revolutions		Pitch (P/S) []	Ship's speed [kn]
		Engine (P/S) [min ⁻¹]	Propeller (P/S) [min ⁻¹]		
Full (sea speed) AH					
Full (manoeuvre speed) AH					
Half AH					
Slow AH					
Dead slow AH					
Stop					
Dead slow AS					
Slow AS					
Half AS					
Full AS					
Remarks: AH – ahead, AS – astern					
Shipyard:			Newbuilding No.:		
Ship's name:			GL Reg.-No.:		
for Yard		for Germanischer Lloyd		for Owners	
(Name)		(Name)		(Name)	
		Propulsion Particulars		Date:	
				F 3.8	

Water depth [m]: Draught fore [m]: aft [m]: midship [m]:			Fixed propeller ☐ or Contr. pitch propeller • Combinator mode ☐ • Operation with n = const. ☐		
Manoeuvre	Control lever position	Revolutions		Pitch (P/S) []	Ship's speed [kn]
		Engine (P/S) [min ⁻¹]	Propeller (P/S) [min ⁻¹]		
70 % of nominal speed AS for 10 minutes					
Remarks: AH – ahead, AS – astern					
Shipyard:		Newbuilding No.:			
Ship's name:		GL Reg.-No.:			
for Yard	for Germanischer Lloyd		for Owners		
(Name)	(Name)		(Name)		
	Backwards Manoeuvre			Date:	
				F 3.9	

Water depth [m]: Draught fore [m]: aft [m]: midship [m]:			Fixed propeller ☐ or Contr. pitch propeller • Combinator mode ☐ • Operation with n = const. ☐		
Manoeuvre	Control lever position	Revolutions		Pitch (P/S) []	Ship's speed [kn]
		Engine (P/S) [min ⁻¹]	Propeller (P/S) [min ⁻¹]		
Minimum on-load speed AH					
Remarks: AH – ahead, AS – astern					
Shipyard:			Newbuilding No.:		
Ship's name:			GL Reg.-No.:		
for Yard		for Germanischer Lloyd		for Owners	
(Name)		(Name)		(Name)	
		Minimum On-load Speed		Date:	
				F 3.10	

F 4. MACHINERY AND ELECTRICAL INSTALLATIONS

Water depth [m]: Draught fore [m]: aft [m]: midship [m]: State of wind: direction/force [°; Bf]: State of sea: direction/wave height H 1/3 [°; m]:	Characteristics of Propulsion - Idle speed [min⁻¹]: - Nominal speed [min⁻¹]: - Output [kW]: - Propeller diameter [m]:
--	---

Propeller pitch
H []
Propeller power
P [%]

Engine revolutions [%]

↑

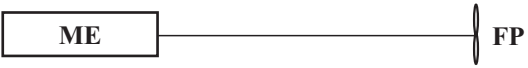
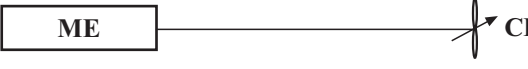
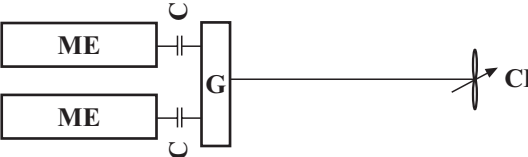
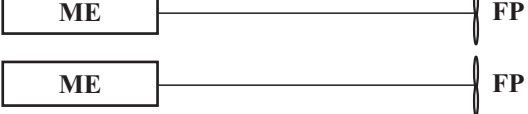
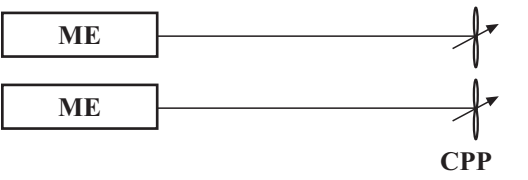
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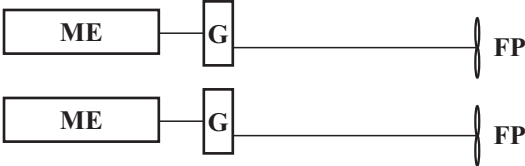
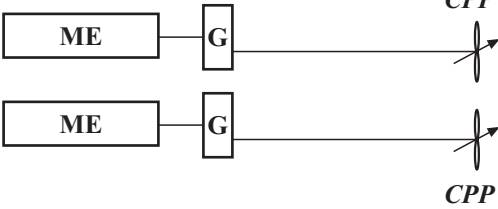
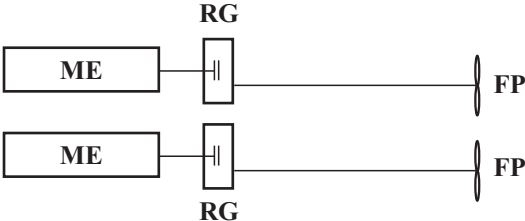
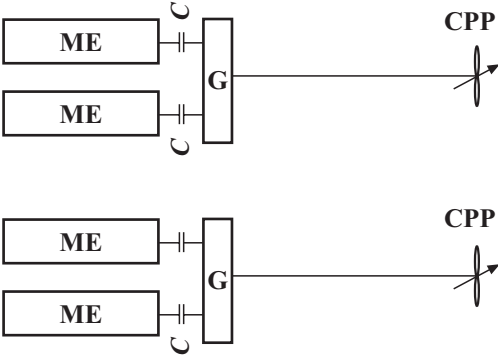
Reading No.	Control lever position	Manoeuvre step	Run 1			Run 2			Remarks
			n [min ⁻¹]	H []	P [kW]	n [min ⁻¹]	H []	P [kW]	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

Shipyard:	Newbuilding No.:	
Ship's name:	GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners
(Name)	(Name)	(Name)

GL	Combinator Curves	Date: F 4.1
--	---	---

Main engine • reversible ☐ • not reversible ☐ Main engine • fixed propeller ☐ • CPP ☐		Starting air receiver • Numbers • Volume [1]: • Working pressure [bar]:	
Manoeuvre • starting test ☐ • comb. revers./starting test ☐	Starting air receiver [bar]		Remarks
Initial Pressure		Receiver No.:	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
Safe starting on engine is given with a pressure of _____ bar. A sufficient control air supply from relevant systems is guaranteed ☐			
Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	
	Starting- / Reversing Manoeuvres		Date:
			F 4.2.1

No.	Installation Concept	Minimum Start Manoeuvres	Min. Reverse and Start Manoeuvres	Remarks	
1		—	12	Legend: ME Main engine G Gear RG Reversing Gear C Clutch FP Fixed Propeller CPP Controllable Pitch Propeller	
2		6	—		
3		—	12		
4		6	—		
5		6	—		
6		each 6	—		
7		—	each 12		
8		each 6	—		
Shipyard:		Newbuilding No.:			
Ship's name:		GL Reg.-No.:			
for Yard		for Germanischer Lloyd		for Owners	
(Name)		(Name)		(Name)	
		Starting Air Capacity: 1- and 2-Shaft Systems acc. to GL Rules, Edition 2006, I – Ship Technology, Part 1 – Seagoing Ships, Chapter 2 – Machinery Installations, Section 2, H.2.3/2.5		Date:	
				F 4.2.2 Page 1 of 2	

No.	Installation Concept	Minimum Start Manoeuvres	Min. Reverse and Start Manoeuvres	Remarks
9		—	each 12	Legend: ME Main engine G Gear RG Reversing Gear C Clutch FP Fixed Propeller CPP Controllable Pitch Propeller
10		each 6	—	
11		each 6	—	
12		each 6	—	
Shipyard:		Newbuilding No.:		
Ship's name:		GL Reg.-No.:		
for Yard		for Germanischer Lloyd		for Owners
(Name)		(Name)		(Name)
		Starting Air Capacity: 1- and 2-Shaft Systems acc. to GL Rules, Edition 2006, I – Ship Technology, Part 1 – Seagoing Ships, Chapter 2 – Machinery Installations, Section 2, H.2.3/2.5		Date:
				F 4.2.2 Page 2 of 2

1. PROPULSION PLANT			
CHARACTERISTICS / CONFIGURATION			
Main Engine(s)		Power Turbine	
• Manufacturer		• Manufacturer	
• Number / type		• Type	
• Rated output [kW]		• Output delivery to	• PTI → crankshaft ☐
• Nominal speed [min ⁻¹]			• Shaft generator drive ☐
Flexible Coupling			
• Manufacturer / type			
Gearing		PTO	
• Manufacturer		• Shaft generator(s)	
• Number / type		• Number / Manufacturer	
• Ratio		• Type / power [kVA]	
Propeller			
• Number / Manufacturer			
• Construction			
• Number of blades			
• Diameter / pitch [m]			
2. VIBRATION CALCULATIONS			
• Calculated by			
• Torsional vibr. calc. existing	☐	Approved with Ref.-No.:	
• Axial vibr. calc. existing	☐	Approved with Ref.-No.:	
• Critical speed range(s)			
• evaluated	☐		
• for the operation speed range from ... to [min ⁻¹]			
3. VIBRATION MEASUREMENTS			
• Performed by			
• Arrangement of measuring points			
• Measuring program			
• normal operation	☐		
• ignition failure operation	☐		
4. RESULTS			
• Preliminary evaluation (date)			
• Final evaluation (date)			
• Critical speed range(s)			
• quoted	☐		
• for the operation speed range from ... to [min ⁻¹]			
• critical speed ranges marked permanently		☐	
Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	
	Torsional-/Axial Vibrations		Date:
			F 4.3

Water depth	[m]:	Legend: LT – Low temperature system HT – High temperature system ME – Main engine AE – Auxiliary engine MG – Main gear CPP – Controllable pitch propeller			
Draught fore	[m]:				
aft	[m]:				
midship	[m]:				
State of wind: direction/force	[°; Bf]:				
State of sea: direction/ wave height H 1/3:	[°; m]:				

System	Pumps			Standby	Remarks
	Items	Total Numbers	thereof attached		
Seawater cooling	Main pumps				
	Scoop pump				
	Aux. pumps				
Freshwater cooling	Main pumps - LT				
	Aux. pumps - LT				
	Main pumps - HT				
	Aux. pumps - HT				
Piston cooling	ME				
Nozzle cooling	ME				
	AE				
Lub. oil	ME circulating				
	ME crosshead				
	ME camshaft				
	AE pre-lubrication				
	MG Lub. oil				
	CPP control oil				
Fuel oil	ME feeder pumps				
	ME booster pumps				
	AE feeder pumps				
	AE booster pumps				
Thermal oil	Circulating pumps				
Steam	Condensate pumps				
	Feedwater pumps				
	Circulating pumps				
Shipyard:		Newbuilding No.:			
Ship's name:		GL Reg.-No.:			
for Yard	for Germanischer Lloyd		for Owners		
(Name)	(Name)		(Name)		
	Standby Operations and Sequential Starts at Full Ahead			Date:	
				F 4.4.1	

Legend: CS – Cam shaft TC – Turbo charger PTO – Power take off PTI – Power take in					CPP – Controllable pitch propeller EG – Exhaust gas ↑ – High limit ↓ – Low limit × – Fault				
Criteria	Status	Automatic control		Alarm printer	Criteria	Status	Automatic control		Alarm printer
		shut down	slow down				shut down	slow down	
1. Propulsion Unit 1.1 Main Engine(s) • Over speed protection ↑ • Oil mist detection ↑ • Circulating oil - pressure ↓ - temperature ↑ • Cooling oil system - pressure ↓ - temperature ↑ • CS lubrication - pressure ↓ - temperature ↑ • Cyl. lubrication - flow ↓ - level ↓ • Fuel pressure ↓ • Cyl. cooling - pressure ↓ - temperature ↑ • Piston cooling - pressure ↓ - temperature ↑ - flow ↓ • Exhaust gas - temperature cylinder ↑ ↓ - average deviation ↑ ↓ • TC vibration ↑ • Main bearing temp. ↑					1.3 Power Turbine Unit • Turbine / gearing - lub. oil pressure ↓ - lub. oil temperature ↑ • Turbo coupling - temperature ↑ • PTI gearing - lub. oil pressure ↓ - lub. oil temperature ↑ 1.4 Main gear • Lub. oil pressure ↓ • Lub. oil temperature ↑ • Bearing temperature ↑ 1.5 Shaft Generator • Bearing temperature ↑ 1.6 CPP - Unit • Servo oil pressure ↓ 1.7 EG Boiler / Heater • Steam pressure ↑ • Thermal oil temp. ↑ • Thermal oil leakage ↑ • Fire in EG boiler/heater ×				
1.2 Thrust Bearing Temp. ↑					2. Diesel Generators • Over speed ↑ • Oil mist detection ↑ • Main bearing temp. ↑ • Lub. oil pressure ↓ • Cool. water pressure ↓ • Cool. water temp. ↑ • Exh. gas temp. max. ↑				
Shipyard:					Newbuilding No.:				
Ship's name:					GL Reg.-No.:				
for Yard		for Germanischer Lloyd			for Owners				
(Name)		(Name)			(Name)				
		Automatic Slow Down & Shut Down Criteria				Date:			
						F 4.4.2			

Water depth	[m]:	Legend: ME – Main engine AE – Auxiliary engine DG – Diesel generator SG – Shaft generator SOC/BR – Ship operation centre / bridge BMC/ECR – Board management centre/ Engine control room ER – Engine room		
Draught fore	[m]:			
aft	[m]:			
midship	[m]:			
State of wind: direction/force	[°; Bf]:			
State of sea: direction/ wave height H 1/3:	[°; m]:			
1. Operation mode before "black-out"				Remarks
1.1 Propulsion unit ME				
• Power	P/S [kW]			
• Revolutions	P/S [min ⁻¹]			
Propeller				
• Revolutions	P/S [min ⁻¹]			
• Pitch	P/S []			
1.2 Ship's mains electric power supply				
• DG in operation (number)				
• SG in operation (number)				
• Ship's main electric load	[kW]			
2. Black-out				
2.1 Tripping by				
• Emerg. stop ME, SG in operation	[h; min; s]			
• AE safety system				
• Gen. overload trip				
2.2 Time sequence (Time)			Sec.	
• Tripping				
• Start of standby DG				
• Standby DG connected				
• Power supply re-established				
3. (Sequential) re-start of main components				
		Sequence		
• Steering gear				
• Pumps				
• Compressors				
• ER fans				
• Miscellaneous				
Shipyard:		Newbuilding No.:		
Ship's name:		GL Reg.-No.:		
for Yard	for Germanischer Lloyd		for Owners	
(Name)	(Name)		(Name)	
	Black-out Test		Date:	
			F 4.4.3	

Water depth [m]: Draught fore [m]: aft [m]: midship [m]: State of wind: direction/force [°; Bf]: State of sea: direction/ wave height H 1/3 [°, m]:							Yard ☐ BMC ☐ SOC ☐ Control station: local ☐ Status: Sea Mode I ☐ (ECR) ☐ Man. Mode II ☐ (Bridge) ☐ Emerg. Mode III ☐												
TEST-MANOEUVRE		Full AH - Dead Slow AS (II)					Full AS - Dead Slow AS (II)				Full AH *) - Dead Slow AS (I)				Full AH - Full AS (III)				
Adjustment Reversing [rpm]																			
(Set Point); Starting [rpm]																			
Remarks	Time [rpm]	RPM	Speed [kn]	Revers-ing	Running astern	RPM	Speed [kn]	Revers-ing	Running astern	RPM	Speed [kn]	Revers-ing	Running astern	RPM	Speed [kn]	Revers-ing	Running astern		
*) alternatively Full Away	0																		
	1																		
	2																		
	3																		
	4																		
Shipyard:							Newbuilding No.:												
Ship's name:							GL Reg.-No.:												
for Yard					for Germanischer Lloyd					for Owners									
(Name)					(Name)					(Name)									
GL		Remote Control - Final Adjustment (for fixed Propeller Propulsion Units)												Date:					
														F 4.5.1					

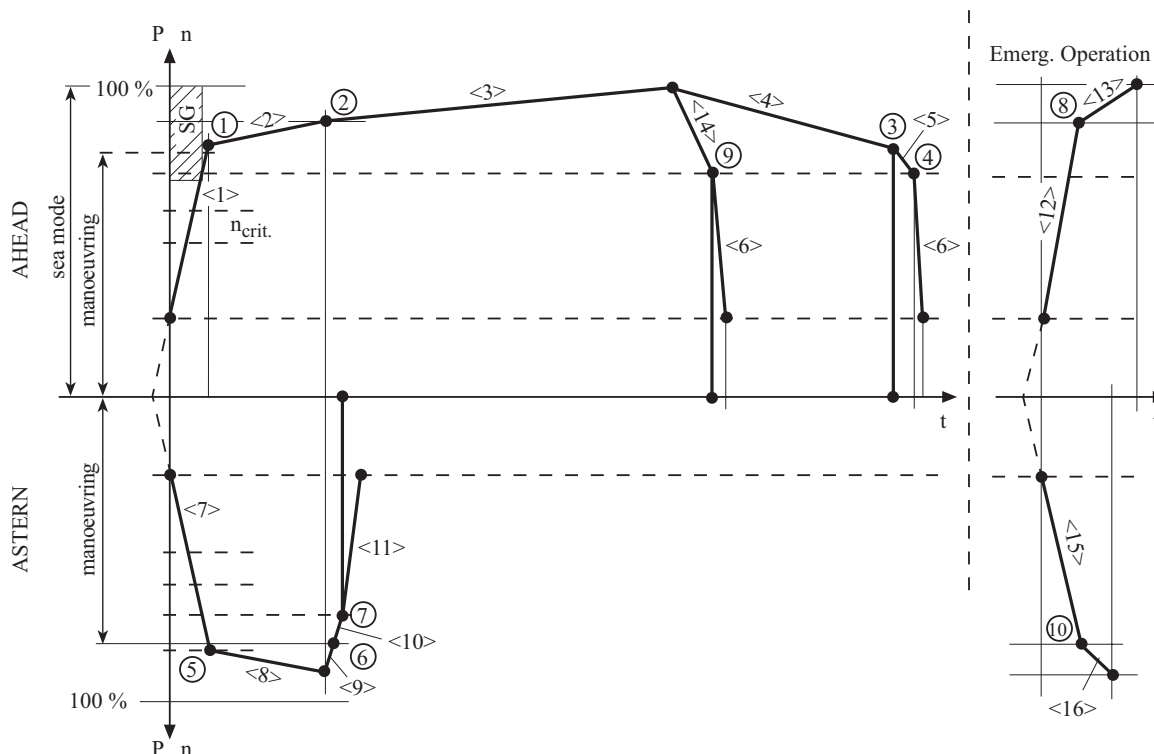
Activated Control Console: SOC/BR Ship operation centre / bridge BW P Bridge wing P BW S Bridge wing S BMC/ECR Board management centre / Engine control room ECC Emergency control console		Conditions: Final adjustment carried out and accepted Automatic control ☐ Remote control ☐ Operation mode: • Sea voyage ☐ • Manoeuvring ☐ • Emerg. operation ☐	
Code	Activated control station	Manoeuvre	Remarks
0325	SOC/BR	Full AH – Dead slow AS ¹⁾ ☐	– All manoeuvres (0319 to 0332) to be carried out with automatic control / remote control – ¹⁾ with rudder hard to P (S) – ²⁾ manoeuvres 0319 – 0322 are to be carried out from station (BW P + BW S)
0326	SOC/BR	Dead slow AS – Full AS ☐	
0323	SOC/BR	Full AS – Dead slow AH ☐	
0324	SOC/BR	Dead slow AH – Full AH ☐	
0319 ²⁾	SOC/BR	Full AH – Dead slow AH ☐	
0320 ²⁾	SOC/BR	Dead slow AH – Stop ☐	
0321 ²⁾	SOC/BR	Stop – Dead slow AH ¹⁾ ☐	
0322 ²⁾	SOC/BR	Dead slow AH – Full AS ☐	
0327	SOC/BR	Full AS – Full AH ☐	
0328	SOC/BR	Full AH – Full AS ☐	
0329	SOC/BR	Full AS – Stop ☐	
0330	SOC/BR	Stop – Dead slow AS ☐	
0331	SOC/BR	Dead slow AS – Stop ☐	
0332	SOC/BR	Stop – Full AH ☐	
0354	change over: SOC/BR → BMC/ECR ☐		
–	BMC/ECR	Full AH – Stop ☐	
–	BMC/ECR	Stop – Dead slow AH ☐	
–	BMC/ECR	Dead slow AH – Slow AH ☐	
–	BMC/ECR	Slow AH – Full AH ☐	
–	BMC/ECR	Dead slow AS – Full AS ☐	
–	BMC/ECR	Full AS – Dead slow AH ☐	
–	BMC/ECR	Dead slow AH – Stop ☐	
–	BMC/ECR	Stop – Full AH ☐	
			Continuation next pages
Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard		for Germanischer Lloyd	for Owners
(Name)		(Name)	(Name)
		Function Test Control Stations/AUT-Manoeuvre	Date:
			F 4.5.2 Page 1 of 4

Activated Control Console: SOC/BR Ship operation centre / bridge BW P Bridge wing P BW S Bridge wing S BMC/ECR Board management centre / Engine control room ECC Emergency control console		Conditions: Final adjustment carried out and accepted Automatic control ☐ Remote control ☐ Operation mode: • Sea voyage ☐ • Manoeuvring ☐ • Emerg. operation ☐	
Code	Activated control station	Manoeuvre	Remarks
0353	change over:	Full AH – Dead slow AS ¹⁾ ☐	
–	ECC	Dead slow AS – Full AS ☐	
–	ECC	Full AS – Dead slow AH ☐	
–	ECC	Dead slow AH – Full AH ☐	
–	ECC	Full AH – Dead slow AH ☐	
–	ECC	Dead slow AH – Stop ☐	
0353	change over:	ECC → BMC/ECR ☐	
Check of the reliable minimum revolutions			
–	SOC/BR	Full AS – Full AH ☐	
–	SOC/BR	Full AH – Full AS ☐	
0354	change over:	SOC/BR → BMC/ECR ☐	
Starting limitation			
0338	– to 3 start failures ☐		
0344	– with control lever kept in start position ☐		
0333		Half AH – Half AS ☐	Reversing to AS, without starting Reversing to AH, without starting Reversing to AS → starting
0334		Half AS – Half AH ☐	Reversing to AH, without starting Reversing to AS, without starting Reversing to AH → starting
Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	
		Function Test (Cont.) Control Stations/AUT-Manoeuvre	

Legend: ME – Main engine DG – Diesel generator SG – Shaft generator		Conditions: Final adjustment carried out and accepted Automatic control ☐ Remote control ☐ Operation mode: • Sea voyage ☐ • Manoeuvring ☐ • Emerg. operation ☐	
Function test of efficiency booster control			
Set points	Starting	Stopping	
Revolution ME [min ⁻¹]			
ME fuel rack pos. [marks]			
Scav. air pressure [bar]			
Operating time – exhaust flaps • Bypass-flap open [s] closed [s] • Inlet-flap open [s] closed [s]			
Function test of automatic change-over SG – to DG-operation			
Operation mode n _{const} ☐ n _{const} ☐ Speed range [min ⁻¹]: to n _{changeable} ☐ Speed range [min ⁻¹]: to			
Manoeuvre order		Time recording	
Minimum revolutions for SG operation [min ⁻¹]		Attained after [s].	
DG Start		Attained after [s].	
DG connected		Attained after [s].	
SG disconnected		Attained after [s].	
ME speed reduced		Attained after [s].	
Ordered manoeuvre		Attained after [s].	
Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	
		Function Test (Cont.) Control Stations/AUT-Manoeuvre	

Manoeuvre rates	Revolutions [min ⁻¹]	Output P [kW]	Conditions:
Dead slow AH / AS			Final adjustment carried out and accepted
Slow AH / AS			Automatic control ☐ Remote control ☐
Half AH / AS			Operation mode:
Full man. mode / sea mode	/	/	• Sea voyage ☐
Critical speed range [min ⁻¹]	from	to	• Manoeuvring ☐
			• Emerg. operation ☐

ME Automatic control, Speed-up program (sequence)



Set point 0				Time < >							
ahead		astern		ahead				astern			
No.	min ⁻¹ ; kW	No.	min ⁻¹ ; kW	No.	min ⁻¹ ; kW	No.	min ⁻¹ ; kW	No.	min ⁻¹ ; kW	No.	min ⁻¹ ; kW
1		5		<1>		<12>		<7>		<15>	
2		6		<2>		<13>		<8>		<16>	
3		7		<3>		<14>		<9>			
4		10		<4>				<10>			
8				<5>				<11>			
9				<6>							

Shipyard:				Newbuilding No.:							
Ship's name:				GL Reg.-No.:							
for Yard				for Germanischer Lloyd				for Owners			
(Name)				(Name)				(Name)			



Function Test (Cont.)

Control Stations/AUT-Manoeuvre

Date:

F 4.5.2

Page 4 of 4

Water depth [m]: Draught fore [m]: aft [m]: midship [m]: State of wind: direction/force [°; Bf]: State of sea: direction/ wave height H 1/3 [°; m]:			Legend: ME – Main engine LT – Low temperature system CAC – Charge air cooler MG – Main gearing SS – Suction side DS – Discharge side			
Reading No.						
Date / Time						
Criteria	Dimen- sion	Limit				
Rating						
ME – fuel rack position	marks					
– revolutions	min ⁻¹					
– scav. air/charge air press.	bar					
Propeller – revolutions	min ⁻¹					
– pitch						
0. Sea cooling water						
0.1 Temperature	°C					
1. LT fresh cooling water						
1.1 Press. SS pump	bar					
1.2 Press. DS pump	bar					
1.3 Temp. inlet central cooler	°C					
1.4 Temp. outlet central cooler	°C					
1.5 Temp. inlet lub. oil cooler	°C					
1.6 Temp. outlet lub. oil cooler	°C					
1.7 Temp. inlet CAC-LT	°C					
1.8 Temp. outlet CAC-LT	°C					
1.9 Temp. inlet MG oil cooler	°C					
1.10 Temp. outlet MG oil cooler	°C					
1.11 Temp. SS pump	°C					
Shipyard:			Newbuilding No.:			
Ship's name:			GL Reg.-No.:			
for Yard		for Germanischer Lloyd		for Owners		
(Name)		(Name)		(Name)		
		Operational Data Recording			Date:	
					F 4.6.1	
					Page 1 of 8	

Water depth [m]: Draught fore [m]: aft [m]: midship [m]: State of wind: direction/force [°; Bf]: State of sea: direction/ wave height H 1/3: [°; m]:			Legend: ME – Main engine LT – Low temperature system CAC – Charge air cooler MG – Main gearing SS – Suction side DS – Discharge side			
Reading No.						
Date / Time						
Criteria	Dimen- sion	Limit				
2. HT fresh cooling water						
2.1 Pressure SS pump	bar					
2.2 Pressure DS pump	bar					
2.3 Pressure inlet ME	bar					
2.4 Temp. inlet cooler	°C					
2.5 Temp. outlet cooler	°C					
2.6 Temp. inlet CAC-HT	°C					
2.7 Temp. outlet CAC-HT	°C					
2.8 Temp. inlet ME	°C					
2.9 Temp. outlet ME	°C					
3. Piston cooling						
3.1 Medium / grade	–					
3.2 Pressure SS pump	bar					
3.3 Pressure DS pump	bar					
3.4 Temp. inlet cooler	°C					
3.5 Temp. outlet cooler	°C					
3.6 Temp. inlet pistons	°C					
3.7 Temp. outlet pistons	°C					
Shipyard:			Newbuilding No.:			
Ship's name:			GL Reg.-No.:			
for Yard	for Germanischer Lloyd		for Owners			
(Name)	(Name)		(Name)			
			Operational Data Recording			Date:
						F 4.6.1
						Page 2 of 8

Water depth [m]: Draught fore [m]: aft [m]: midship [m]: State of wind: direction/force [°; Bf]: State of sea: direction/ wave height H 1/3: [°; m]:			Legend: ME – Main engine LT – Low temperature system CAC – Charge air cooler MG – Main gearing SS – Suction side DS – Discharge side			
Reading No.						
Date / Time						
Criteria	Dimen- sion	Limit				
4. Lub. oil / Cooling Oil						
4.1	Grade of oil					
4.2	Circ. tank level	cm				
4.3	Pressure DS pump	bar				
4.4	Temp. inlet oil cooler	bar				
4.5	Temp. outlet oil cooler	bar				
4.6	Temp. inlet auto-filter	bar				
4.7	Temp. outlet auto-filter	bar				
4.8	Temp. inlet indicator filter	bar				
4.9	Temp. outlet indicator filter	bar				
4.10	Lub. oil press. inlet ME	bar				
4.11	Press inlet last bearing	bar				
4.12	Cooling oil press. inlet ME	bar				
4.13	Lub. oil press. inlet TC	bar				
4.14	Temp. inlet cooler	°C				
4.15	Temp. outlet cooler	°C				
4.16	Temp. inlet ME	°C				
4.17	Temp. outlet TC	°C				
4.18	CS press. DS pump	bar				
4.19	CS press. inlet ME	bar				
4.20	CS temp. inlet cooler	°C				
4.21	CS temp. outlet cooler	°C				
Shipyard:			Newbuilding No.:			
Ship's name:			GL Reg.-No.:			
for Yard		for Germanischer Lloyd		for Owners		
(Name)		(Name)		(Name)		
		Operational Data Recording			Date:	
					F 4.6.1 Page 3 of 8	

Water depth	[m]:	Legend: ME – Main engine LT – Low temperature system CAC – Charge air cooler MG – Main gearing SS – Suction side DS – Discharge side				
Draught fore	[m]:					
aft	[m]:					
midship	[m]:					
State of wind: direction/force	[°; Bf]:					
State of sea: direction/ wave height H 1/3:	[°; m]:					
Reading No.						
Date / Time						
Criteria	Dimension	Limit				
5. Fuel Oil						
5.1 Grade of fuel (ISO 8217)	mm ² /s at 40 °C					
5.2 Sulphur content	% m/m					
5.3 Level service tank	m ³					
5.4 Temp. service tank	°C					
5.5 Press. SS feeder pump	bar					
5.6 Press. DS feeder pump	bar					
5.7 Press. inlet auto-filter	bar					
5.8 Press. outlet auto-filter	bar					
5.9 Press. mixing tank	bar					
5.10 Temp. mixing tank/standpipe	°C					
5.11 Press. SS booster pump	bar					
5.12 Press. DS booster pump	bar					
5.13 Temp. outlet endheater	°C					
5.14 Temp. outlet viscosity control unit	°C					
5.15 Viscosity	cSt					
5.16 Temp. inlet ME	°C					
5.17 Pressure inlet ME	bar					
5.18 Temp. outlet ME	°C					
Shipyard:			Newbuilding No.:			
Ship's name:			GL Reg.-No.:			
for Yard	for Germanischer Lloyd		for Owners			
(Name)	(Name)		(Name)			
	Operational Data Recording					Date:
						F 4.6.1
						Page 4 of 8

Water depth [m]: Draught fore [m]: aft [m]: midship [m]: State of wind: direction/force [°; Bf]: State of sea: direction/ wave height H $\frac{1}{3}$: [°; m]:			Legend: ME – Main engine LT – Low temperature system CAC – Charge air cooler MG – Main gearing SS – Suction side DS – Discharge side			
Reading No.						
Date / Time						
Criteria	Dimen- sion	Limit				
6. Combustion Air						
6.1 Ambient temperature	°C					
6.2 Barometric press.	hPa					
6.3 Relative humidity	%					
6.4 ER temperature	°C					
6.5 Temp. inlet TC	°C					
6.6 TC revolutions	bar					
6.7 Temp. outlet TC, inlet CAC	°C					
6.8 Temp. outlet CAC	°C					
6.9 Temp. inlet ME	°C					
6.10 Diff. pressure CAC	mm WG					
6.11 Press. inlet ME	bar					
7. Nozzle Cooling						
7.1 Medium / brand						
7.2 Press. SS pump	bar					
7.3 Press. DS pump	bar					
7.4 Temp. inlet cooler	°C					
7.5 Temp. outlet cooler	°C					
7.6 Temp. inlet ME	°C					
Shipyard:			Newbuilding No.:			
Ship's name:			GL Reg.-No.:			
for Yard		for Germanischer Lloyd		for Owners		
(Name)		(Name)		(Name)		
		Operational Data Recording			Date:	
					F 4.6.1 Page 5 of 8	

Water depth	[m]:	Legend: ME – Main engine LT – Low temperature system CAC – Charge air cooler MG – Main gearing SS – Suction side DS – Discharge side			
Draught fore	[m]:				
aft	[m]:				
midship	[m]:				
State of wind: direction/force	[°; Bf]:				
State of sea: direction/ wave height H 1/3:	[°; m]:				
Reading No.					
Date / Time					
Criteria	Dimension	Limit			
8. Exhaust Gas					
8.1 Cyl. 1 A/B	°C				
8.2 Cyl. 2 A/B	°C				
8.3 Cyl. 3 A/B	°C				
8.4 Cyl. 4 A/B	°C				
8.5 Cyl. 5 A/B	°C				
8.6 Cyl. 6 A/B	°C				
8.7 Cyl. 7 A/B	°C				
8.8 Cyl. 8 A/B	°C				
8.9 Cyl. 9 A/B	°C				
8.10 Cyl. 10 A/B	°C				
8.11 Cyl. 11	°C				
8.12 Cyl. 12	°C				
8.13 Average value	°C				
8.14 Temp. inlet/outlet TC 1/2/3/4	°C				
8.15 Press. outlet TC	mm WG				
8.16 Soot No.	SN/Bosch				
8.17 Temp. inlet/outlet EGB	°C				
Shipyard:			Newbuilding No.:		
Ship's name:			GL Reg.-No.:		
for Yard	for Germanischer Lloyd		for Owners		
(Name)	(Name)		(Name)		
	Operational Data Recording			Date:	
				F 4.6.1	
				Page 6 of 8	

Water depth [m]: Draught fore [m]: aft [m]: midship [m]: State of wind: direction/force [°; Bf]: State of sea: direction/ wave height H $\frac{1}{3}$: [°; m]:			Legend: ME – Main engine LT – Low temperature system CAC – Charge air cooler MG – Main gearing SS – Suction side DS – Discharge side			
Reading No.						
Date / Time						
Criteria	Dimen- sion	Limit				
9. Gearing						
9.1 Lub. oil press. inlet MG	bar					
9.2 Lub. oil temp. inlet cooler	°C					
9.3 Lub. oil temp. inlet MG	°C					
10. Shafting / Stern Tube						
10.1 Temp. thrust bearing	°C					
10.2 Temp. interm. bearing	°C					
10.3 Temp. stern tube	°C					
11. Power Turbine Unit, EBS						
Power Turbine						
11.1 Revolutions	min ⁻¹					
11.2 Exhaust gas inlet	°C					
11.3 Exhaust gas outlet	°C					
Planetary Gear						
11.4 Lub. oil pressure	bar					
11.5 Lub. oil temp. inlet gear	°C					
11.6 Lub. oil temp. outlet gear	°C					
PTI-Gear						
11.7 Lub. oil pressure	bar					
11.8 Lub. oil temp. inlet gear	°C					
11.9 Lub. oil temp. outlet gear	°C					
Shipyard:			Newbuilding No.:			
Ship's name:			GL Reg.-No.:			
for Yard		for Germanischer Lloyd		for Owners		
(Name)		(Name)		(Name)		
		Operational Data Recording			Date:	
					F 4.6.1 Page 7 of 8	

Water depth	[m]:	Legend: ME – Main engine LT – Low temperature system CAC – Charge air cooler MG – Main gearing SS – Suction side DS – Discharge side				
Draught fore	[m]:					
aft	[m]:					
midship	[m]:					
State of wind: direction/force	[°; Bf]:					
State of sea: direction/ wave height H 1/3:	[°; m]:					
Reading No.						
Date / Time						
Criteria	Dimen- sion	Limit				
12. Steam System						
Boiler Operation Mode						
• AB	☐					
• EGB	☐					
12.1 Feed water temp.	°C					
12.2 Press. feed wter pump	bar					
12.3 Steam pressure	bar					
13. Thermal Oil System						
Heater Operation Mode						
• AB	☐					
• EGB	☐					
13.1 Press. SS circ. pump	bar					
13.2 Press. DS circ. pump	bar					
13.3 Temp. supply line	°C					
13.4 Temp. return line	°C					
13.5 Temp. expansion tank	°C					
Shipyard:			Newbuilding No.:			
Ship's name:			GL Reg.-No.:			
for Yard	for Germanischer Lloyd		for Owners			
(Name)	(Name)		(Name)			
	Operational Data Recording					Date:
						F 4.6.1
						Page 8 of 8

Water depth [m]:			Legend: EH – End heater ME – Main engine MGO – Marine Gas Oil MDO – Marine Diesel Oil IF – Intermediate Fuel				
Draught	fore	[m]:					
	aft	[m]:					
	midship	[m]:					
State of wind:	direction/force	[°; Bf]:					
State of sea:	direction/ wave height H 1/3:	[°; m]:					
Fuel specification - Fuel brand - Density (15 °C) [g/m] - Viscosity (50 °C) [cSt] - Calorific value [kJ/kg]			Flow meter - Maker - Type / design - Serial No. - Accuracy - Last calibration				
Criteria			Reading No.				
			1	2	3	4	5
ME – fuel rack position		marks					
– revolutions		min ⁻¹					
Fuel treatment							
• Temp. viscosimeter / viscosity		°C/cSt					
• Temp. inlet ME		°C					
• Pressure inlet ME		bar					
Fuel consumption measurement							
• Temp. inlet flow meter		°C					
• Time		Min, s					
• Flow meter reading: start							
• Flow meter reading: finish							
• Consumption							
Specific fuel consumption							
• ME output		kW					
• Correction factors							
• Spec. consumption – contractual		g/kWh					
• Spec. consumption – actual		g/kWh					
Shipyard:			Newbuilding No.:				
Ship's name:			GL Reg.-No.:				
for Yard		for Germanischer Lloyd			for Owners		
(Name)		(Name)			(Name)		
		Propulsion Plant – Fuel Consumption Measurements –				Date:	
						F 4.6.2	

Water depth	[m]:	Output	P/S	[kW]
Draught fore	[m]:	Propeller revolutions	P/S	[min ⁻¹]
aft	[m]:	Propeller pitch	P/S	[]
midship	[m]:			

1. Boiler data					
Manufacturer		Rating • Power • Heating surface • Design pressure • Test pressure • Working pressure	MJ/h		
Design			[kW]		
Type			m ²		
Serial No.			bar		
			bar		
			bar		

2. Operational data					
2.1 Temperature			2.2 Pressures		
• Exhaust gas inlet	°C		• Feed pump's press. head	mWG	
• Exhaust gas outlet	°C		• Circ. pump's press. head	mWG	
• Feedwater inlet	°C		• Steam pressure	bar	

3. Performance Test					
3.1 Flow Meter Characteristics					
• Maker		• Accuracy	± %		
• Design		• Last calibration			
• Serial No.		• Correction factor			
3.2 Measurement No.	Clock	Time	Level boiler water	Flow meter reading	Volume [m³]
0					
1					
2					
3					

3.3 Evaluation					
• Correction factor					
• Capacity (actual)	m ³ /h		• Capacity (nominal)	m ³ /h	

Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	

	Exhaust Gas Boiler (steam heating) – Performance Test (no Class matter) –	Date:
		F 4.6.3

Water depth	[m]:	Output	P/S	[kW]
Draught fore	[m]:	Propeller revolutions	P/S	[min ⁻¹]
aft	[m]:	Propeller pitch	P/S	[]
midship	[m]:			

1. Heater data				
Manufacturer		Rating • Power • Heating surface • Design pressure • Test pressure • Working pressure	MJ/h [kW] m ² bar bar bar	
Design				
Type				
Serial No.				

2. Operational data				
2.1 Temperature			2.2 Pressures	
• Exhaust gas inlet	°C		• Feed pump's press. head	mWG
• Exhaust gas outlet	°C		• Circ. pump's press. head	mWG
• Thermal oil supply	°C		• Steam pressure	bar
• Thermal oil return	°C			

3. Performance Test				
3.1 Flow Meter Characteristics				
• Maker		• Accuracy	± %	
• Design		• Orifice diameter	mm	
• Serial No.		• Correction factor		
3.2 Measurement No.	1	2	3.3 Evaluation	1
Time			Density	kg/m ³
Diff. pressure	bar		Specific heat	kJ/kgK
Oil inlet temp.	°C		Flow (vol.)	kg/m ³
Oil outlet temp.	°C		Flow (mass)	kg/h
			Power	MJ/h
			Power	kW

Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	

	Exhaust Gas Heater (thermal oil heating) – Performance Test –	Date:
		F 4.6.4

Water depth	[m]:	Output	P/S	[kW]
Draught fore	[m]:	Propeller revolutions	P/S	[min ⁻¹]
aft	[m]:	Propeller pitch	P/S	[]
midship	[m]:			

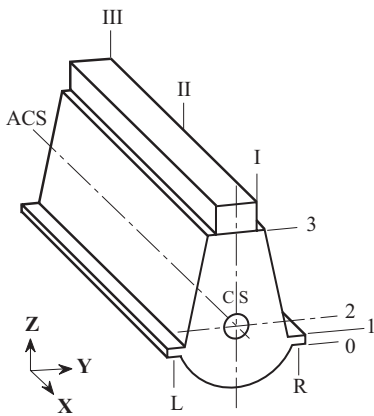
1. Manufacturer					
Design					
Type					
Serial No.					
2. Operational data					
• Seawater			• Heating water		
– temperature	°C		– inlet temperature	°C	
• Driving water			– outlet temperature	°C	
– temperature	°C		– pressure	bar	
– pressure	bar		• Cooling water		
• Vacuum	%/bar		– inlet temperature	°C	
• Feedwater			– outlet temperature	°C	
– temperature	°C		– pressure	bar	
3. Measurement of distillate					
• Chloride content	ppm				
• Measurement	No.	Clock	Time	Reading	Quantity [m ³]
	0				
	1				
	2				
	3				
4. Evaluation					
• Correction factor					
• Measured capacity	m ³ /h		m ³ /24h		
• Nominal capacity	m ³ /h		m ³ /24h		
Shipyard:			Newbuilding No.:		
Ship's name:			GL Reg.-No.:		
for Yard	for Germanischer Lloyd		for Owners		
(Name)	(Name)		(Name)		
			Evaporator – Performance Test –		Date:
					F 4.6.5

Manoeuvre step: Full ahead Output P/S [kW]: DG in operation ☐ DG in operation ☐				Legend: a/v – audible / visual ME – Main engine DG – Diesel generator AB – Auxiliary boiler BMC – Board management centre ECR – Engine control room								
Test under seagoing conditions												
		Area / Room										
Kind of Alarm	a/v	ME-Control console	DG-Area	AB-Control console	Purifiers	Pumps	Compressors	Workshop/ Stores	BMC/ECR	Duty mess	Steering gear room	Miscellaneous
General alarm		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Fire alarm		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
General machinery alarm		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CO ₂ -alarm		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Telephone		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Telegraph		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Remarks:												
Shipyard:				Newbuilding No.:								
Ship's name:				GL Reg.-No.:								
for Yard		for Germanischer Lloyd				for Owners						
(Name)		(Name)				(Name)						
		Alarms in Machinery Spaces – Performance Test –							Date:			
									F 4.6.6			

Water depth [m]: Draught fore [m]: aft [m]: midship [m]: State of wind: direction/force [°; Bf]: State of sea: direction/ wave height H 1/3: [°; m]:		Rate of speed: Legend: SOC – Ship operation centre BR – Bridge BMC – Board management centre ECR – Engine control room	
Fire fighting pump No.	1	2	Emergency fire fighting pump
1. Characteristics			
Manufacturer			
Design			
Type			
Serial No.			
Kind of drive			
Nominal capacity [m³/h]			
Pressure head [bar]			
Location			
2. Function test			
Start			
• SOC/BR			
• Safety station			
• BMC/ECR			
• Local			
Measure press. head [bar]			
Remarks:			
Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	
	Fire Pumps – Function at Full Ahead Test –		Date:
			F 4.6.7

[illegible]

Water depth [m]: Draught fore [m]: aft [m]: midship [m]: State of wind: direction/force [°; Bf]: State of sea: direction/ wave height H 1/3 [°; m]:	Particulars for the Trial Propulsion power P/S [kW] : Propeller revolutions P/S [min ⁻¹] : Propeller pitch P/S [] : Ship's speed P/S [kn] :
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Measuring side L (left) ☐
 R (right) ☐

Measurement

- vertical V 0 Foundation top plate
 1 Engine base plate
 2 Crank shaft level
 3 Upper edge of frame casing
- longitudinal L I CS (coupling side)
 II Middle position
 III ACS (anti coupling side)

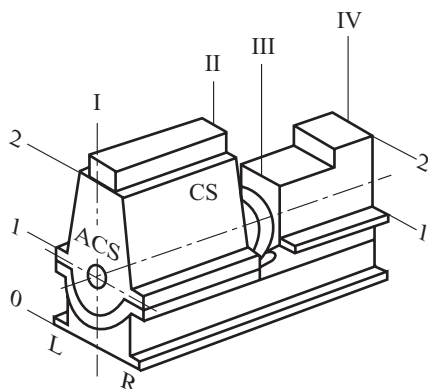
Measuring Points		X				Y				Z			
V	L	s [mm]	V [mm/s]	V _{eff} [mm/s]	â [9,81/s ²]	s [mm]	V [mm/s]	V _{eff} [mm/s]	â [9,81/s ²]	s [mm]	V [mm/s]	V _{eff} [mm/s]	â [9,81/s ²]
0	I												
	II												
	III												
1	I												
	II												
	III												
2	I												
	II												
	III												
3	I												
	II												
	III												

Components													
Turbo-charger													
Governor													
Tacho													
Miscellaneous													

Shipyard:					Newbuilding No.:								
Ship's name:					GL Reg.-No.:								
for Yard (Name)					for Germanischer Lloyd (Name)					for Owners (Name)			

GL 	Vibration Measurements – Main Engine –	Date: F 4.6.9 Page 1 of 2
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Water depth	[m]:	Particulars for the Trial
Draught	fore [m]:	Propulsion power P/S [kW] :
	aft [m]:	Propeller revolutions P/S [min ⁻¹] :
	midship [m]:	Propeller pitch P/S [] :
State of wind:	direction/force [°; Bf]:	Ship's speed P/S [kn] :
State of sea:	direction/ wave height H ⅓ [°; m]:	



Measuring side L (left) ☐
R (right) ☐

Measurement

- vertical V 0 Foundation top plate
 1 Base plate
 2 Upper edge cyl. block generator
- longitudinal L I ACS (anti coupling side)
 II CS (coupling side)
 III CS (generator)
 IV ACS (generator)

Measuring Points		X				Y				Z			
V	L	s [mm]	V [mm/s]	V _{eff} [mm/s]	â [9,81/s ²]	s [mm]	V [mm/s]	V _{eff} [mm/s]	â [9,81/s ²]	s [mm]	V [mm/s]	V _{eff} [mm/s]	â [9,81/s ²]
0	I												
	II												
	III												
	IV												
1	I												
	II												
	III												
	IV												
2	I												
	II												
	III												
	IV												

Components

Turbo-charger													
Governor													
Tacho													
Miscellaneous													

Shipyard:					Newbuilding No.:								
Ship's name:					GL Reg.-No.:								
for Yard (Name)					for Germanischer Lloyd (Name)					for Owners (Name)			



**Vibration Measurements
– Auxiliary Engine –**

Date: _____
F 4.6.9
Page 2 of 2

Ambient conditions: Outside temperature [°C] Barometric press. [hPa] Rel. humidity [%]			Rate of speed: Harbour ☐ Manoeuvring ☐ Sea ☐		
Rooms:		Room No.:	Room No.:	Room No.:	Room No.:
1. Room data					
• Volume	m ³				
• Temperature	°C				
• Rel. humidity	%				
2. Ventilators					
• Number					
• Design					
• Operation mode					
• Capacity	m ³ /h				
3. Measurements					
• Meter (gauge)					
– Maker					
– Design					
– Calibration					
• Nominal capacity	m ³ /h				
• Measured capacity	m ³ /h				
• Air change ratio	m ³ /h				
Remarks: 					
Shipyard:			Newbuilding No.:		
Ship's name:			GL Reg.-No.:		
for Yard		for Germanischer Lloyd		for Owners	
(Name)		(Name)		(Name)	
		Air Flow – Capacity Measurements –		Date:	
				F 4.6.10	

Water depth [m]: Draught fore [m]: aft [m]: midship [m]: State of wind: direction/force [°; Bf]: State of sea: direction/ wave height H $\frac{1}{3}$ [°; m]:			
1	Earthing device(s) Propeller shafting/hull		
	• Manufacturer		
	• Brush cross - sectional area [mm ²]		
	• Cable cross - sectional area [mm ²]		
	• Rating limit (given data) [mV]		
	• Local indication	☐	
	• Limit monitoring	☐	
2	Limiting conditions		
	• Sea water	☐	
	• Brackish water	☐	
	• Fresh water	☐	
3	Electric potential measurement		
	• Position of measuring point		
	• Carried out by		
	• Prop. shaft revolutions P/S [min ⁻¹]		
4	Results		
	• Earthing device(s) engaged [mV]		
	• Earthing device(s) disengaged [mV]		
Remarks: 			
Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	
		Propeller Shaft / Hull – Electric Potential Measurements –	

Water depth [m]: Draught fore [m]: aft [m]: midship [m]: State of wind: direction/force [°; Bf]: State of sea: direction/ wave height H 1/3 [°; m]:	Minimum Requirements: – Duration 10 min. – Propeller revolutions: 70 % of n_{nominal}	
1. Relevant operational data		Remarks:
• Output P/S [kW]		
• Engine revolutions P/S [min ⁻¹]		
• Propeller revolutions P/S [min ⁻¹]		
• Propeller pitch P/S []		
• Ship's speed [kn]		
2. Data recording		Remarks:
• Main engine(s)		
– level of exhaust gas temperature [°C]		
– max. exhaust gas temperature [°C]		
• Thrust bearing temperature [°C]		
• Stern tube temperature [°C]		
3. Vibration behaviour (visual assessment)	Results	Remarks:
• Propulsion unit		
• Shaft generator(s)		
• Piping systems		
• Auxiliary boiler		
• Exhaust gas boiler / heater		
• Steering gear		
• Other relevant components		
Shipyard:		Newbuilding No.:
Ship's name:		GL Reg.-No.:
for Yard	for Germanischer Lloyd	for Owners
(Name)	(Name)	(Name)
	Astern Speed Trial	Date:
		F 4.7

Class Notation		Specification of Redundancy	
RP1 x%		- At least 2 independent propulsion machines and auxiliary systems. - No redundancy for propeller, shaft system, gearbox and steering system.	
RP2 x%		At least 2 independent complete propulsion and steering systems.	
RP3 x%		At least 2 independent complete propulsion and steering systems installed in separate compartments.	
The index x% defines what percentage of the main propulsion power is available as redundancy (the engine with the lower power value to be taken into account).			
	Test Item:	Confirmed:	Criterion to be achieved:
1	Speed test with one propulsion machine/system in service. (If power ratings are not identical, the test to be performed with propulsion machine/system with lower power rating)	_____ kn	≥ 7 kn or ½ design speed (the lower value to be applied)
2	Load test with one propulsion machine/system in service. (If power ratings are not identical, the test to be performed with propulsion machine/system with lower power rating)	_____ kW = _____ %	Specified index x%
3	Emergency operation from local engine room control panel. (cut-off remote control system)		Capability of local emergency operation
4	Starting up of redundant propulsion machine/system in stand-by. (failure simulation and break-down of one propulsion machine/system)		Starting-up of redundant machine/system within 3 minutes
5	Blackout simulation and re-starting up of one propulsion machine/system.		Independent capability of re-start of redundant machine/system
6	For redundant steering systems only: One redundant steering system must be blocked at maximum deflection.		Steering capability at maximum deflection
Note: - Further tests to be performed during sea trials. - The test program based on failure mode and effects analysis (FMEA) to be submitted for approval prior to sea trials.			
Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	
		Redundant Propulsion Systems	
		Date: F 4.8	

	Test Item:	Confirmed:	Criterion to be achieved:
1	For any ship with DP notation, tests to be performed during sea trial according to DP system maker's program.		Accordance
2	Performance of dynamic positioning system in case of failure. To be demonstrated for DP 2 and DP 3 ships only. (failure simulation and break down of any propulsion machine/system and generator/switchboard)		Not interrupt
Note: For DP 2 and DP 3 ships the test program based on failure mode and effects analysis (FMEA) is to be submitted for approval prior to sea trials.			
Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	
	Dynamic Positioning Systems		Date:
			F 4.9

F 5. INSPECTION AFTER SEA TRIAL

Draught fore [m]: aft [m]: midship [m]:			
	Date	Results	Remarks
1. Main engine(s)		P/S	
• Crank web deflection (hot engine) • Crank case inspection • Cams and rollers • Pistons/Piston rods (con. rods) • Exh. valves • Lub. oil filter • Crank pin bearings • Main bearings • Cross head bearings			
2. Main gear			
• Tooth contact patterns • Lub. oil filter			
3. Shafting			
• Bearing reaction forces or gap and sag measurements • Lub. oil sample of stern tube(s)			
Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	
	Inspection after Sea Trial – Propulsion Plant –		Date:
			F 5.1
		Page 1 of 1	

Draught fore [m]: aft [m]: midship [m]:			
	Date	Results	Remarks
1. Diesel generator(s)			
• Crank web deflection (hot engine) • Crank case inspection • Lub. oil filter • Miscellaneous			
2. Auxiliary boiler unit			
• Feedwater/condensate sample • Thermal oil sample • Miscellaneous			
3. Shafting			
Shipyard:		Newbuilding No.:	
Ship's name:		GL Reg.-No.:	
for Yard	for Germanischer Lloyd	for Owners	
(Name)	(Name)	(Name)	
	Inspection after Sea Trial – Auxiliaries –		Date:
			F 5.2
		Page 1 of 1	