


FUEL TYPE	EXECUTIONS		
	HFO & MDO & MGO	X	
	MDO & MGO only		X
MGO only with ≤ 0.1 % sulphur			X

(A)
(A)

Net Weight			0,001	0,001	0,001	006	107.246.880.500	CONCEPT GUIDANCE Fuel Oil Treatment	107.246.880		0,001
0,001	0,001	0,001									
1	1	1	005	107.428.377.500	DISTILLATE FUELS CONCEPT GUIDANCE	107.428.377		0,001			
1	1	1	004	107.341.454.500	INSTRUCTION FOR FLUSHING	107.341.454		0,001			
-	-	1	003	PAAD310409	FUEL OIL SYSTEM MGO only, int. pilot fuel supply	DAAD107657		0,001			
-	1	-	002	PAAD310410	FUEL OIL SYSTEM MDO&MGO only, int. pilot fuel supply	DAAD107658		0,001			
1	-	-	001	PAAD907968	FUEL OIL SYSTEM HFO&MDO&MGO	DAAD908559		0,001			

Quantity PER ENGINE	SEQ NO	Material ID	Material Name	Dimension, Occ	Standard or Drawing	Basic Material Material Standard	Weight GR./NET
PAAD907969	Free space for lic.	PAAD310600	Q-Code XXXXX	Standard ISO; JIS	Main Drw. H		
PAAD310599	Modif.	(A) EAAD090034	23.11.2018				
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number



Product
W5-8X72DF

FUEL OIL SYSTEM
Brennstoffsystem

Units mm kg NX

Basic Material

Net Weight

SURFACE PROTECTION SEE GROUP 0344	Made	01.04.2015 mhu019 M.Hug	Scale	-	Size	A3	Page	1/1	Material ID	
TOLERANCING PRINCIPLE ISO8015	Chkd	19.06.2015 ihe003 Herceg	Design Group	9723	Drawing ID	DAAD908534			Rev.	A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	19.06.2015 abr030 Brückl								

Approved
10D - DIMENSIONAL DRAWING - Confidential

SPECIFICATION which must be met

(76) INLET - Pilot fuel oil
 Fuel oil quality at engine inlet: MDO or MGO
 Pressure at engine inlet: 7.0 - 8.0 bar
 Volume flow: according to GTD
 Viscosity:
 - Viscosity MDO/MGO: 2-17 cSt
 Filtration:
 - One filter unit with max. 10 micron (absolute, sphere passing mesh) close to engine inlet.

(77) OUTLET - Pilot fuel oil
 - Normal operation condition: Returning to feed pump.
 - Back pressure at engine outlet: max. 1.5 bar(g)

(49) INLET - Fuel oil
 Fuel oil quality at engine inlet: according to specification in Marine Installation Manual (MIM)
 Pressure at engine inlet: stopped engine: 10 bar
 running engine: 7-10 bar
 Volume flow: according to GTD
 Viscosity:
 - Viscosity for HFO: 10-20 cSt (recommendation: 13-17 cSt)
 - Viscosity MDO/MGO : 2-20 cSt
 Filtration:
 - At least one filter unit close to the engine inlet.
 - One filter unit with max. 10 micron (absolute, sphere passing mesh) in the fuel system (either in feed- or booster circuit)
 - Bypass filter in parallel to the main fuel oil filter with max. 25 micron (absolute, sphere passing mesh)
 Fuel change-over:
 - Max. temperature gradient during fuel change-over: 2 °C/min
 - Fuel amount on engine side: mentioned in table 1 on page 2.
 - Fuel amount on system side: according to project specific system layout.

(50) OUTLET - Fuel return
 - Normal operation condition: Returning to mixing unit.
 - Fuel oil change over while engine not in service: Returning to service tank.

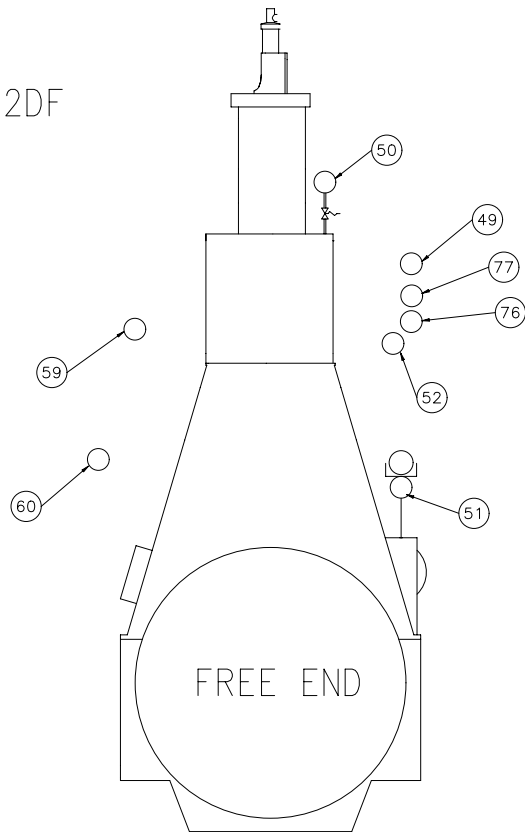
(51) OUTLET - Drain rail-unit (dirty)
 - Dirty fuel: Mixed drain (LO,FQ) from rail-unit, not for re-use
 - Free flow by gravity to sludge oil tank or appropriate tank.
 - Pipe insulated and heated up (50-95 °C)

(52) OUTLET - Fuel return, pressureless (clean)
 - This pressureless fuel return consists of the following 2 types of clean fuel, namely:
 'Normal drainage'
 Expected (design) fuel return from the fuel pump and injection control side during normal operation.
 'Leakage'
 Unexpected fuel return from an emergency situation only (e.g. high pressure pipe damage).
 - Clean fuel must be collected in a drain tank (or appropriate tank) by gravity free flow
 - Piping must be insulated and heated (50-95°C)

(59) INLET - Heating medium for fuel oil trace heating
 - Connected to steam or thermal oil supply

(60) OUTLET - Heating medium for fuel oil trace heating
 - Connected to condensate manifold or thermal oil return

X72DF



1	008	PAAD103066	MIXING UNIT	DAAD032414	0,001							
QTY	SEQ NO	Material ID	Material Name	Standard or Drawing	Basic Material Material Standard	Weight GR./NET						
Free space for lic.				Q-Code	Main Drw.							
				XXXXXX								
				Standard ISO; JIS								
Modif.	A	EAAD089573	01.10.2018	B	EAAD090034	08.07.2019	C	EAAD091789	24.09.2020	D	EAAD095177	21.10.2020
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date		
Product			5-8X72DF			FUEL OIL SYSTEM			HFO&MDO&MGO			
WINGD			Winterthur Gas & Diesel			Brennstoffsystem						
Units	mm	kg	NX	Basic Material	Net Weight 0,001							
SURFACE PROTECTION SEE GROUP 0344			Made	01.04.2015	mhu019	M.Hug	Scale	-	Size	A2	Page	1/3
TOLERANCING PRINCIPLE ISO8015			Chkd	19.06.2015	ihe003	Herceg	Design Group	Material ID			PAAD907968	
GENERAL TOLERANCES ACCORDING TO ISO2768-mK			Appd	19.06.2015	abr030	Brückl	9723	Drawing ID	DAAD908559			
									Rev. D			

SYSTEM PROPOSAL - Main fuel oil supply and fuel oil treatment

Pos.	ENGINE COMPONENTS *3)
EC01	Fuel rail unit
EC02	Fuel supply unit

Possible tank arrangements:

Option 1)
HFO: 1 settling tank, 1 service tank
LSHFO: 1 settling tank, 1 service tank
MDO: 1 settling tank, 1 service tank

Option 2)
HFO: 2 settling tanks, 1 service tank
LSHFO: 2 settling tanks, 1 service tank
MDO: 1 settling tank, 1 service tank

Option 3)
HFO & LSHFO combined: 2 settling tanks
HFO: 1 service tank
LSHFO: 1 service tank
MDO: 1 settling tank, 1 service tank

Pos.	ENGINE COMPONENTS *2)
(49)	INLET - Fuel oil
(50)	OUTLET - Fuel return
(51)	OUTLET - Drain rail-unit (dirty)
(52)	OUTLET - Fuel return, pressureless (clean)
(53)	INLET - Heating medium for fuel oil trace heating
(54)	OUTLET - Heating medium for fuel oil trace heating

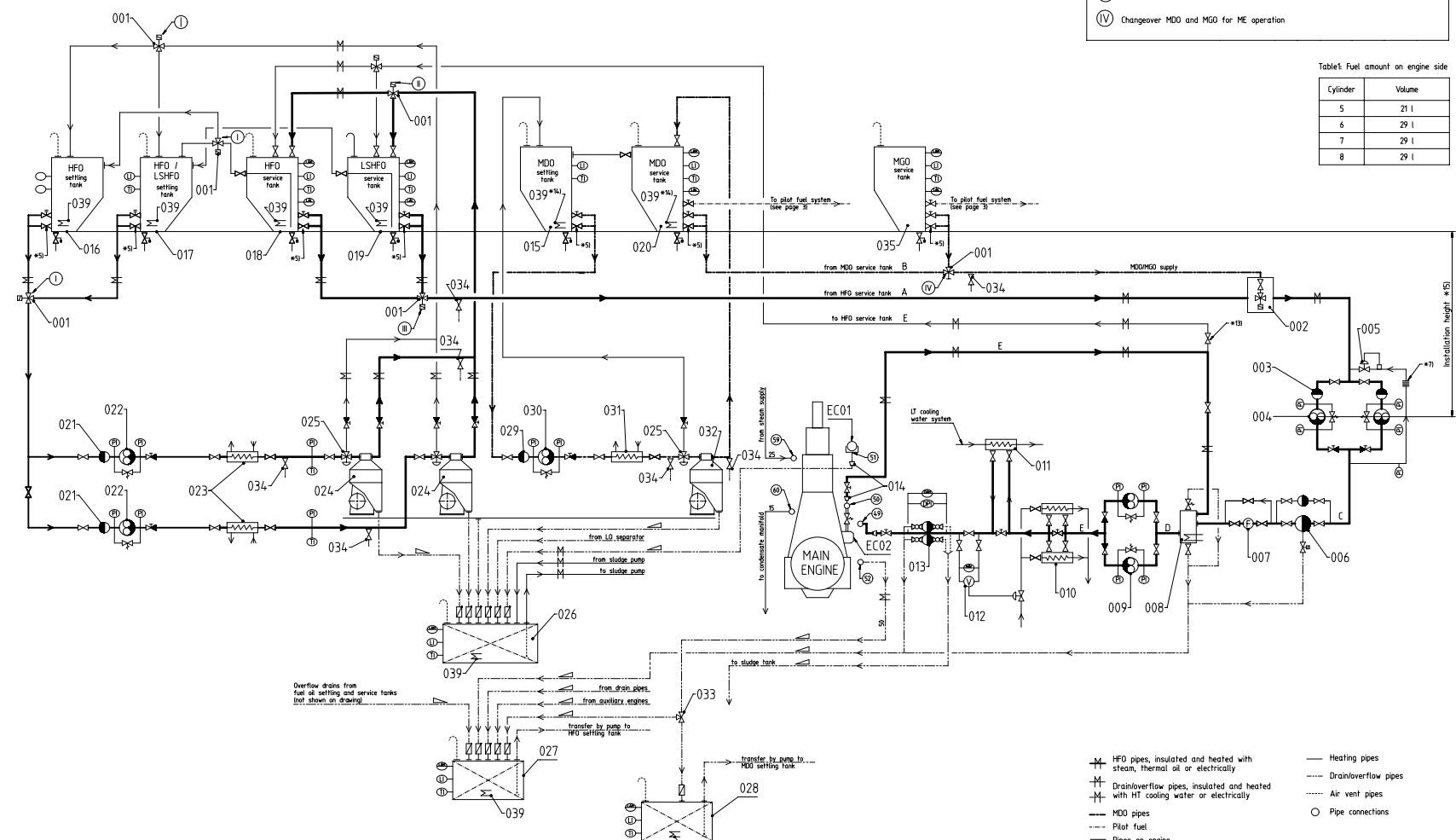
Number of cylinders	5	6	7	8	
Main engine W-X72DF (R1)	power (kW)	16125	19350	22572	25800
	speed (rpm)	89			

Proposal for dimensioning *4)					
Mixing unit	volume (l)	acc. to separate drawing			
HFO settling tank	volume (m³)	26	31	36	41
HFO service tank	volume (m³)	26	31	36	41
MDO/MGO service tank	volume (m³)	26	31	36	41
MDO/MGO drain tank *11)	volume (m³)	2.6	3.1	3.6	4.1
Nominal pipe diameter	A	DN 50	50	50	50
	B	DN 4.0	50	50	50
	C	DN 50	50	50	50
	D	DN 80	80	80	100
	E	DN 65	65	80	80

- I Both valves to be interconnected
- II Changeover LSHFO and HFO for fuel treatment
- III Changeover LSHFO and HFO for ME operation
- V Changeover MDO and MGO for ME operation

Table's Fuel amount on engine side

Cylinder	Volume
5	21 l
6	29 l
7	29 l
8	29 l



- | | |
|------|--|
| Pos. | SYSTEM COMPONENTS *1) |
| 001 | Three-way valve, manually or remotely operated |
| 002 | Automatic fuel change-over unit |
| 003 | Suction strainer (mesh size acc. to pump suppliers requirement) |
| 004 | Low pressure feed pump |
| 005 | Pressure regulating valve |
| 006 | Automatic self-cleaning filter, 10 micron, heated (trace heating acceptable) |
| 007 | Flowmeter |
| 008 | Mixing unit, heated and insulated (according to separate drawing as linked on page 1) |
| 009 | High pressure booster pump |
| 010 | Fuel oil end-heater |
| 011 | MDO/MGO heat exchanger |
| 012 | Viscosimeter |
| 013 | Fuel oil filter, 25 micron, heated (trace heating acceptable) |
| 014 | Transition Piece (adapter) *10) |
| 015 | MDO settling tank, heated and insulated |
| 016 | HFO settling tank, heated and insulated |
| 017 | LSHFO settling tank, heated and insulated |
| 018 | HFO service tank, heated and insulated |
| 019 | LSHFO service tank, heated and insulated |
| 020 | MDO service tank |
| 021 | Suction strainer (mesh size acc. to pump suppliers requirement) |
| 022 | HFO/LSHFO separator supply pump, with safety valve |
| 023 | HFO/LSHFO pre-heater |
| 024 | Self-cleaning HFO/LSHFO separator *6) |
| 025 | Three-way valve, diaphragm operated |
| 026 | Sludge tank |
| 027 | Fuel oil drain tank *12) |
| 028 | MDO/MGO drain tank *11) *12) |
| 029 | Suction strainer (mesh size acc. to pump suppliers requirement) |
| 030 | MDO separator supply pump, with safety valve |
| 031 | MDO pre-heater |
| 032 | Self-cleaning MDO separator *6) |
| 033 | Three-way valve for switching between fuel drain tank and MDO/MGO clean leakage tank *9) |
| 034 | Fuel sampling cock *8) |
| 035 | MGO service tank |
| 039 | Heating coil |

- Remarks
- All heaters to be fitted with thermometers, relief valves, drains and drip trays. Not shown on drawing.
 - Suction strainers on main engine are laid out for 7 bar saturated steam.
 - Air vent and drain pipes must be fully functional at all inclination angles of the ship at which the engine must be operational.
 - Overflow and drain pipes for fuel oil tanks are not shown
- *1) To be delivered by external suppliers and to be installed by the shipyard.
 - *2) Refer to the "Pipe Connection Plan" for the execution and location of the engine pipe connections.
 - *3) To be delivered by the engine manufacturer, i.e. already equipped on engine side.
 - *4) All capacities and the given diameters are valid for the mentioned engine rating and serve just as an example. The given tank capacities are based on 8 h settling tank change-over intervals. To make the layout for the project specific rating please refer to design group 9739 "Fluid velocities and flow rates, recommended values for pipelines of diesel plants". Rating specific flow rates are provided by GTU.
 - *5) Valve to be kept closed during normal engine operation. For draining only.
 - *6) Separator capacity related to viscosity; layout according to certified flow rate (CFR) recommended.
 - *7) The return line must be fully exposed to air without any insulation and equipped with cooling ribs or other type of radiative cooler.
 - *8) Recommended position for fuel oil sampling to check fuel oil quality.
 - *9) Just to be applied if in addition to the fuel drain tank a separate tank for collection of clean MDO/MGO is installed to enable the switching between the different tanks depending on the fuel in use.
 - *10) Installed as required check with "Pipe Connection Plan".
 - *11) The normal drainage rate of MDO/MGO is significantly higher than the normal drainage rate of HFO. Therefore during long-term operation on MDO/MGO the collection of clean MDO/MGO in a separate drain tank is highly recommended. Regarding the tank size we recommend a volume which is approx. 10% of the volume of the MDO/MGO service tank. The design volume of the MDO/MGO drain tank considers a combination of normal drainage and unexpected emergency leakage.
 - *12) The tank inlet only to be equipped with a swing check valve to avoid inadmissible backpressure.
 - *13) Close during normal engine operation.
 - *14) A heating coil in the MDO tank is required when DMB is used. Target heating temperature: 40 °C.
 - *15) The location of pump's installation must comply with the supplier's requirements by considering the relative height between the pump and the service tank, in combination with the pressure drop of the piping.

- HFO pipes, insulated and heated with steam, thermal oil or electrically
- Heating pipes
- Drain/overflow pipes
- Drain/overflow pipes, insulated and heated with HT cooling water or electrically
- Air vent pipes
- MDO pipes
- Pilot fuel
- Pipes on engine
- Pipe connections

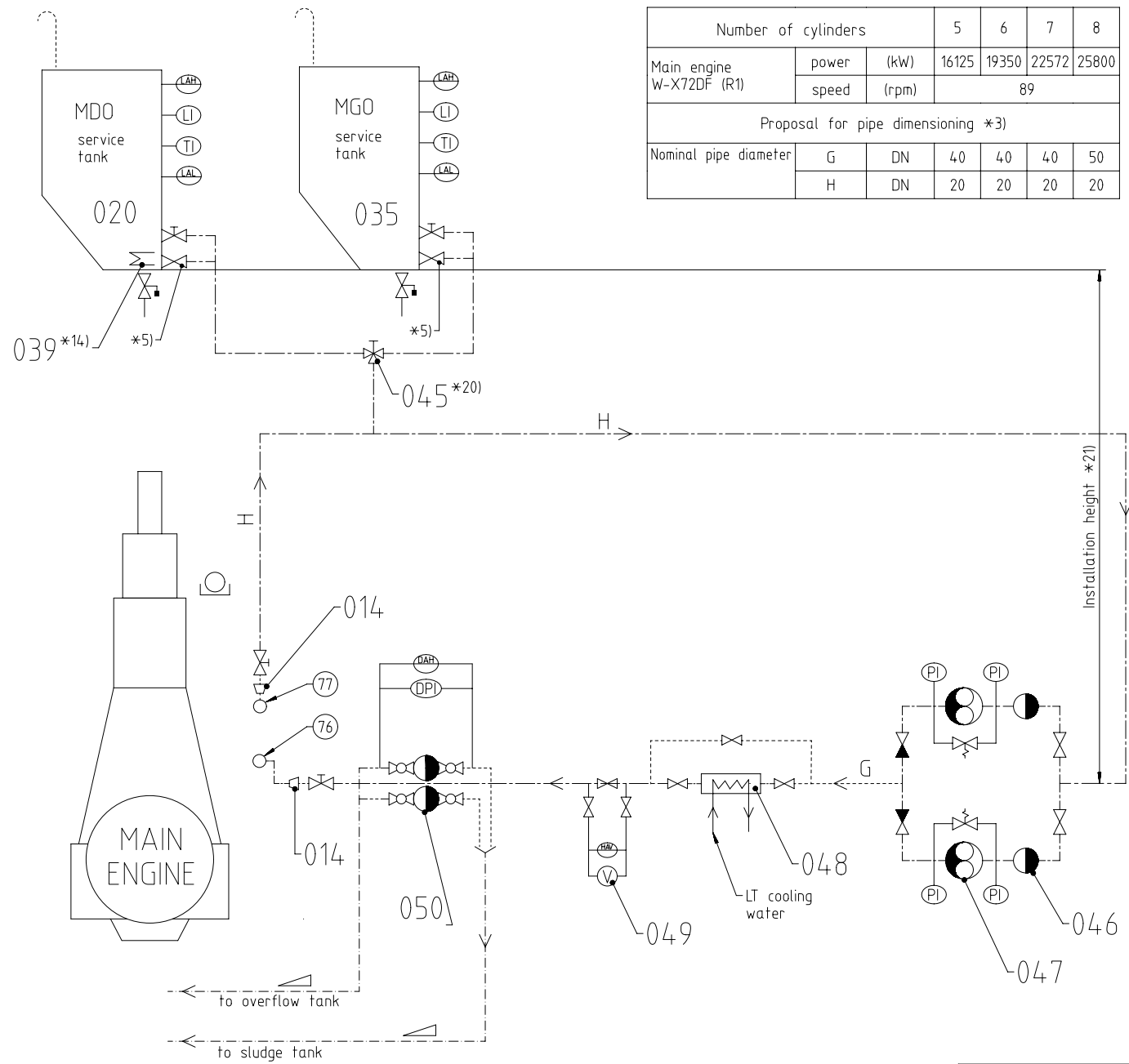
WIND Member of the Group		FUEL OIL SYSTEM HFO/MDO/MGO Brennstoffsystem	
Date: 01.03.2019 Drawn: [Signature] Checked: [Signature]	Date: 01.03.2019 Drawn: [Signature] Checked: [Signature]	Date: 01.03.2019 Drawn: [Signature] Checked: [Signature]	Date: 01.03.2019 Drawn: [Signature] Checked: [Signature]
Scale: 1/2 P Drawing No: PAAD907968		Drawing No: PAAD908559	

SYSTEM PROPOSAL - Pilot fuel supply

Pos.	ENGINE CONNECTIONS *2)
76	INLET - Pilot fuel
77	OUTLET - Pilot fuel

Number of cylinders		5	6	7	8	
Main engine W-X72DF (R1)	power (kW)	16125	19350	22572	25800	
	speed (rpm)	89				
Proposal for pipe dimensioning *3)						
Nominal pipe diameter	G	DN	40	40	40	50
	H	DN	20	20	20	20

Pos.	SYSTEM COMPONENTS *1)
014	Transition Piece (adapter) *10)
020	MDO service tank
035	MGO service tank
039	Heating coil
045	Three-way valve, pilot fuel supply, manually or remotely operated
046	Suction strainer (mesh size acc. to pump suppliers requirement)
047	Pilot fuel feed pump
048	Pilot fuel cooler and/or heater
049	Viscometer
050	Fuel oil filter, max. 10 micron (absolute, sphere passing mesh)



Remarks

- Air vent and drain pipes must be fully functional at all inclination angles of the ship at which the engine must be operational.
- Overflow and drain pipes for fuel oil tanks are not shown
- *1) To be delivered by external supplier and to be installed by the shipyard.
- *2) Refer to the "Pipe Connection Plan" for the execution and location of the engine pipe connections.
- *3) All capacities and the given diameters are valid for the mentioned engine rating and serve just as an example. To make the layout for the project specific rating please refer to design group 9730 "Fluid velocities and flow rates, recommended values for pipework of diesel plants" Rating specific flow rates are provided by GTD.
- *5) Valve to be kept closed during normal engine operation. For draining only.
- *10) Installed as required (check with the "Pipe Connection Plan").
- *14) A heating coil in the MDO tank is required when DMB is used. Target heating temperature: 40 °C.
- *20) Only to be installed if different pilot fuel qualities are used to enable the changeover.
- *21) The location of the pump's installation must comply with the supplier's requirements by considering the relative height between the pump and the service tank, in combination with the pressure drop of the piping

Free space for lic.	Q-Code XXXXXX	Main Drw.
Standard ISO; JIS		
Modif. A	EAAD089573	01.10.2018
Modif. B	EAAD090034	08.07.2019
Modif. C	EAAD091789	24.09.2020
Modif. D	EAAD095177	21.10.2020
Number	Drawn date	Number
Number	Drawn date	Number
Number	Drawn date	Number
Number	Drawn date	Number

Product: 5-8X72DF

WINGD
Winterthur Gas & Diesel

FUEL OIL SYSTEM
HFO&MDO&MGO
Brennstoffsystem

Units: mm kg NX

Basic Material: [Symbol]

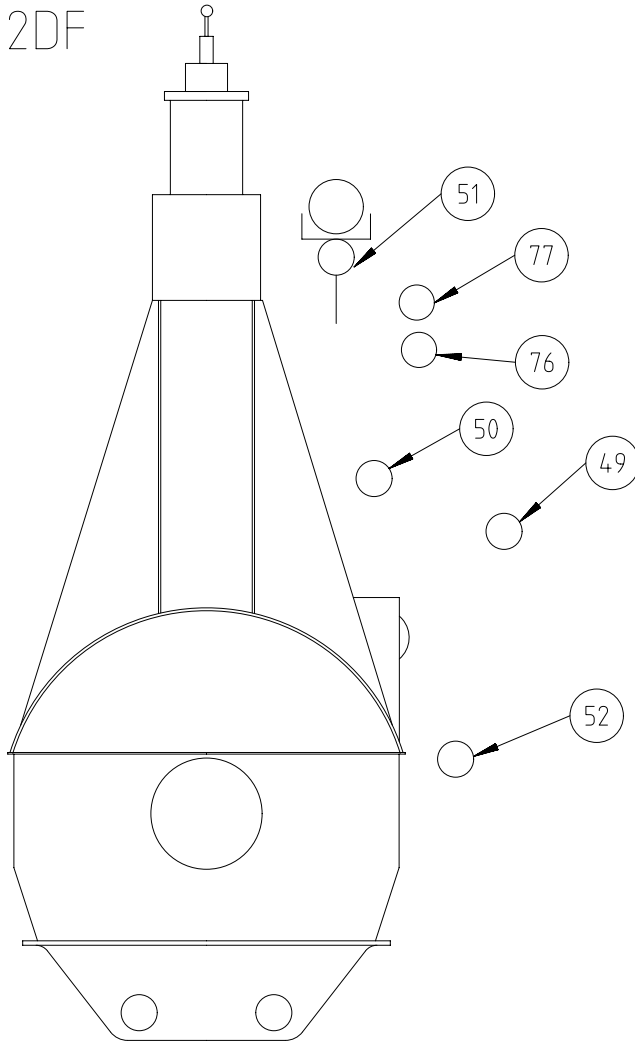
Net Weight: 0,001

SURFACE PROTECTION SEE GROUP 0344	Made	01.04.2015	mhu019	M.Hug	Scale	-	Size	A2	Page	3/3	Material ID	PAAD907968
TOLERANCING PRINCIPLE ISO8015	Chkd	19.06.2015	ihe003	Herzog	Design Group		Drawing ID	DAAD908559	Rev.	D		
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	19.06.2015	abr030	Brückl	9723							

SPECIFICATION which must be met

- 76 INLET - Pilot fuel oil
 - Fuel quality, pressure and viscosity: same as the main fuel oil. (connection 49)
 - Volume flow: according to GTD.
- 77 OUTLET - Pilot fuel oil return
 - Normal operation condition: returning to FO supply pump suction.
 - Back pressure at ME outlet: max. 1.5 bar(g)

X72DF



- 49 INLET - Fuel oil
 - Fuel oil quality: MDO with sulphur content: $\leq 0.5\%$
AND
MGO with sulphur content: $\leq 0.1\%$
 - Pressure at engine inlet: stopped engine: 10 bar
running engine: 7-10 bar
 - Volume flow: according to GTD
 - Viscosity MDO/MGO: 2-17 cSt
 - Filtration:
 - Main fuel oil filter with max. 10 micron (absolute, sphere passing mesh) close to engine inlet.
 - Bypass filter in parallel to the main fuel oil filter with max. 25 micron (absolute, sphere passing mesh).
 - Fuel change-over:
 - Max. temperature gradient during fuel change-over: 2 °C/min
 - Fuel amount on engine side: mentioned in table 1 on page 2.
 - Fuel amount on system side: According to project specific system layout.
- 50 OUTLET - Fuel return
 - Normal operation condition: returning to upstream of the FO supply pump.
- 51 OUTLET - Drain rail-unit (dirty)
 - Dirty fuel: Mixed drain (LO,FO) from rail-unit, not for re-use
 - Free flow by gravity to sludge oil tank or appropriate tank.
- 52 OUTLET - Fuel return, pressureless (clean)
 - This pressureless fuel return consists of the following 2 types of clean fuel, namely:
 - 'Normal drainage'
Expected (design) fuel return from the fuel pump and injection control side during normal operation.
 - 'Leakage'
Unexpected fuel return from an emergency situation only (e.g. high pressure pipe damage).
 - Clean fuel must be collected in a drain tank (or appropriate tank) by gravity free flow
 - Piping must be insulated and heated (50-95°C)

Free space for lic.	Q-Code XXXXXX							Main Drw.
	Standard ISO; JIS							
Modif.	A	EAAD091789	02.12.2019					
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
		Product 5-8X72DF		FUEL OIL SYSTEM MDO&MGO only, int. pilot FO supply Brennstoffsystem Hauptkreislauf				
Units	mm kg	NX		Basic Material			Net Weight 0,001	
SURFACE PROTECTION SEE GROUP 0344		Made	24.10.2018 Sudant Deogade		Scale	-		Design Group 9723
TOLERANCING PRINCIPLE ISO8015		Chkd	05.07.2019 wwa008 Wang		Size	A3	Page 1/2	
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd	05.07.2019 mhu019 Hug		Material ID	PAAD310410		Drawing ID DAAD107658
					Rev.	A		

UID - DIMENSIONAL DRAWING - Confidential

SYSTEM PROPOSAL - Combined main fuel oil and pilot fuel supply + MDO treatment

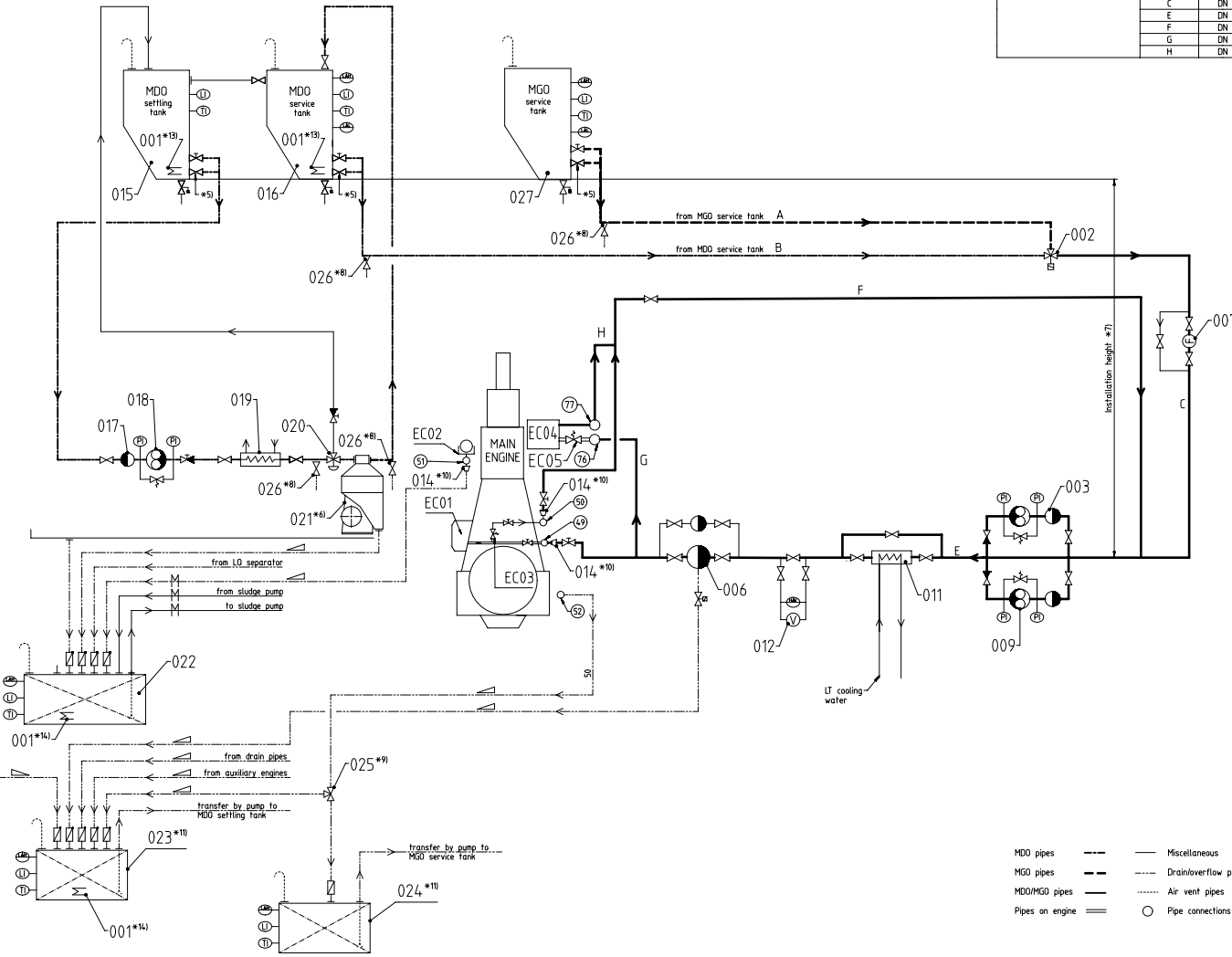
Pos.	ENGINE COMPONENTS *3)
EC01	Fuel supply unit
EC02	Fuel rail unit
EC03	Pressure retaining valve
EC04	Pilot fuel supply unit
EC05	Pressure reduction valve

Pos.	ENGINE CONNECTIONS *2) (A)
(49)	INLET - Fuel oil
(50)	OUTLET - Fuel return
(51)	OUTLET - Drain rail-unit (dirty)
(52)	OUTLET - Fuel return, pressureless (clean)
(76)	INLET - Pilot fuel oil
(77)	OUTLET - Pilot fuel oil return

Number of cylinders		5	6	7	8
Main engine X72DF (R1 rated)	power (kW)	16125	19350	22572	25800
	speed (rpm)	89			

Proposal for dimensioning *4)						
Mixing unit	volume (l)	acc. to separate drawing				
MDO service tank	volume (m³)	26	31	36	41	
MGO service tank	volume (m³)	26	31	36	41	
MDO/MGO drain tank	volume (m³)	2.6	3.1	3.6	4.1	
Nominal pipe diameter	A	DN	40	50	50	50
	B	DN	40	50	50	50
	C	DN	40	50	50	50
	E	DN	40	4.0	4.0	50
	F	DN	40	4.0	4.0	50
	G	DN	20	20	20	20
	H	DN	20	20	20	20

Cylinder	Volume
5	21 l
6	29 l
7	29 l
8	29 l



Pos.	SYSTEM COMPONENTS *1)
001	Heating coil *14)
002	Change-over valve
003	Suction strainer (mesh size according to pump suppliers requirement)
006	Automatic self-cleaning filter, 10 micron (absolute sphere passing mesh size)
007	Flowmeter
009	FO supply pump
011	MDO/MGO heat exchanger (A)
012	Viscometer
014	Transition piece (adapter) *10)
015	MDO settling tank, heated and insulated
016	MDO service tank
017	Suction strainer (mesh size acc. to pump suppliers requirement)
018	MDO separator supply pump, with safety valve
019	MDO pre-heater
020	Three-way valve, diaphragm operated
021	Self-cleaning MDO separator *6)
022	Sludge tank
023	Fuel oil drain tank *11)
024	MGO clean leakage tank *11)
025	Three-way valve for switching between fuel drain tank and MDO/MGO clean leakage tank *9)
026	Fuel sampling cock *8)
027	MGO service tank

- Remarks**
- Air vent and drain pipes must be fully functional at all inclination angles of the ship at which the engine must be operational.
 - Overflow and drain pipes for fuel oil tanks are not shown.
- *1) To be delivered by external suppliers and to be installed by the shipyard.
 *2) Refer to the "Pipe Connection Plan" for the execution and location of the engine pipe connections.
 *3) To be delivered by the engine manufacturer, i.e. already equipped on engine side.
 *4) All capacities and the given diameters are valid for the mentioned engine rating and serve just as an example. The given tank capacities are based on 8 h settling tank change-over intervals. To make the layout for the project specific rating please refer to design group 9730. Fluid velocities and flow rates, recommended values for pipework of diesel plants. Rating specific flow rates are provided by GTO.
 *5) Valve to be kept closed during normal engine operation. For draining only.
 *6) Separator capacity related to viscosity; layout according to certified flow rate (CFR) recommended.
 *7) The location of the pump's installation must comply with the supplier's requirements by considering the relative height between the pump and the service tank, in combination with the pressure drop of the piping.
 *8) Recommended position for fuel oil sampling to check fuel oil quality.
 *9) Just to be applied if in addition to the fuel drain tank a separate tank for collection of clean MGO is installed to enable the switching between the different tanks depending on the fuel in use.
 *10) Installed as required (check with "Pipe Connection Plan").
 *11) The tank inlet only to be equipped with a swing check valve to avoid inadmissible backpressure.
 *13) A heating coil in the MDO tank is required when DMB is used. Target heating temperature: 40 °C.

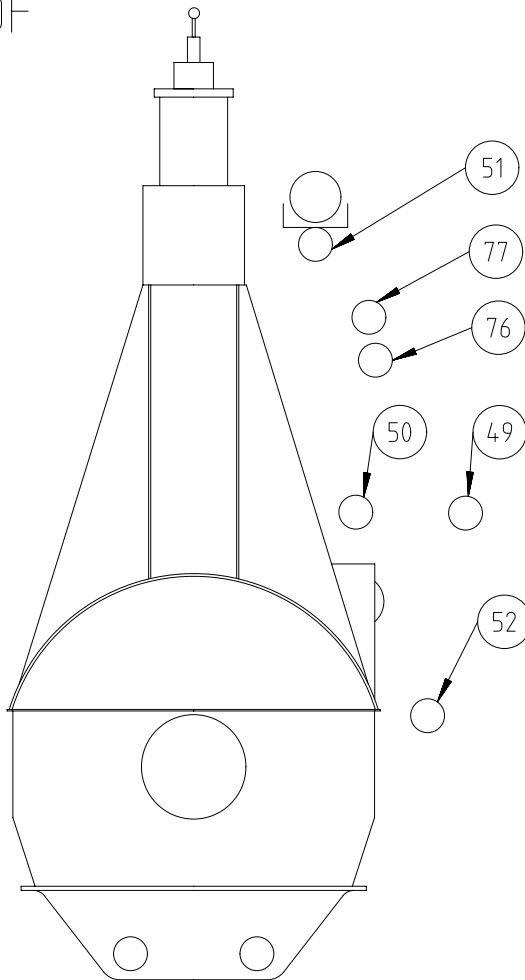
- MDO pipes - - - - - Miscellaneous
- MGO pipes - - - - - Drain/overflow pipes
- MDO/MGO pipes - - - - - Air vent pipes
- Pipes on engine - - - - - Pipe connections

Overflow drains from fuel oil settling and service tanks (not shown on drawing)

WINGO Fuel Oil System MDO/MGO only, int. pilot FO supply Brennstoffsystem Hauptkreislauf		Scale: 1:22.5 Sheet: 1/2 Title: PAAD3104.10 Drawing Group: PAAD107658
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SPECIFICATION which must be met

X72DF



- (76) INLET - Pilot fuel oil
 - Fuel quality, pressure, and viscosity: same as specified for the main fuel oil (connection 49)
 - Volume flow: according to GTD.
- (77) OUTLET - Pilot fuel oil return
 - Normal operation condition: returning to FO supply pump suction.
 - Back pressure at ME outlet: max. 1.5 bar(g).

- (49) INLET - Fuel oil
 - Fuel oil quality: MGO
 - Sulphur content: $\leq 0.1\%$
 - Pressure at engine inlet: stopped engine: 10 bar
running engine: 7-10 bar
 - Volume flow: according to GTD
 - Viscosity MGO: 2-17 cSt
 - Filtration:
 - Main fuel oil filter with max. 10 micron (absolute, sphere passing mesh) close to engine inlet.
 - Bypass filter in parallel to the main fuel oil filter with max. 25 micron (absolute, sphere passing mesh).

- (50) OUTLET - Fuel return
 - (A) - Normal operation condition: Returning to service tank.

- (51) OUTLET - Drain rail-unit (dirty)
 - (A) - Dirty fuel: Mixed drain (LO,FO) from rail-unit, not for re-use
 - Free flow by gravity to sludge oil tank or appropriate tank.

- (52) OUTLET - Fuel return, pressureless (clean)
 - (A) - This pressureless fuel return consists of the following 2 types of clean fuel, namely:
 - 'Normal drainage'
 - Expected (design) fuel return from the fuel pump and injection control side during normal operation.
 - 'Leakage'
 - Unexpected fuel return from an emergency situation only (e.g. high pressure pipe damage).
 - Clean fuel must be collected in a drain tank (or appropriate tank) by gravity free flow
 - Piping must be insulated and heated (50-95°C)

Free space for lic.	Q-Code XXXXXX							Main Drw.
	Standard ISO; JIS							
Modif.	A	EAAD091789	02.12.2019					
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
		Product 5-8X72DF		FUEL OIL SYSTEM MGO only Brennstoffsystem				
Units	mm kg	NX		Basic Material		Net Weight 0,001		
SURFACE PROTECTION SEE GROUP 0344		Made	24.10.2018 Sudant Deogade		Scale	-		Material ID PAAD310409
TOLERANCING PRINCIPLE ISO8015		Chkd	05.07.2019 wwa008 Wang		Design Group	9723		
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd	05.07.2019 mhu019 Hug		Drawing ID	DAAD107657		Rev. A

SYSTEM PROPOSAL - Combined main fuel oil and pilot fuel supply (for operation on MGO only)

Pos.	Engine Components *3)
EC01	Fuel supply unit
EC02	Fuel rail unit
EC03	Pressure retaining valve
EC04	Pilot fuel supply unit
EC05	Pressure reduction valve

Pos.	System Components *2)
001	Suction strainer (mesh size according to pump suppliers requirement)
002	Supply pump
004	Flowmeter
005	MGO heat exchanger (A)
006	Viscometer
007	Automatic self-cleaning filter, 10 micron (absolute sphere passing mesh size)
008	Fuel oil sampling cock *8)
009	Transition piece (adapter) *7)
010	Fuel drain tank
011	Sludge tank
012	MGO service tank

Pos.	Engine Connections *1) (A)
(49)	INLET - Fuel oil
(50)	OUTLET - Fuel return
(51)	OUTLET - Drain rail-unit (dirty)
(52)	OUTLET - Fuel return, pressureless (clean)
(76)	INLET - Pilot fuel oil
(77)	OUTLET - Pilot fuel oil return

- Remarks:**
- Air vent and drain pipes must be fully functional at all inclination angles of the ship of which the engine must be operational.
 - Overflow and drain pipes for fuel oil tanks are not shown
- *1) Refer to the "Pipe Connection Plan" for the execution and location of the engine pipe connections.
- *2) To be delivered by external supplier and to be installed by the shipyard.
- *3) To be delivered by the engine builder, i.e. already equipped on engine side
- *4) All capacities and the given diameters are valid for the mentioned engine rating and serve just as an example. To make the layout in regard to the project specific rating please refer to design group 9730 "Fluid velocities and flow rates, recommended values for pipework of diesel plants" for selecting the appropriate pipe diameter. Rating specific flow rates are provided by GTD.
- *6) To be kept closed during normal engine operation. For draining only.
- *7) Installed as required (check with the "Pipe Connection Plan")
- *8) Recommended position for fuel oil sampling to check fuel oil quality.
- *9) The location of the pump's installation must comply with the supplier's requirements by considering the relative height between the pump and the service tank, in combination with the pressure drop of the piping.

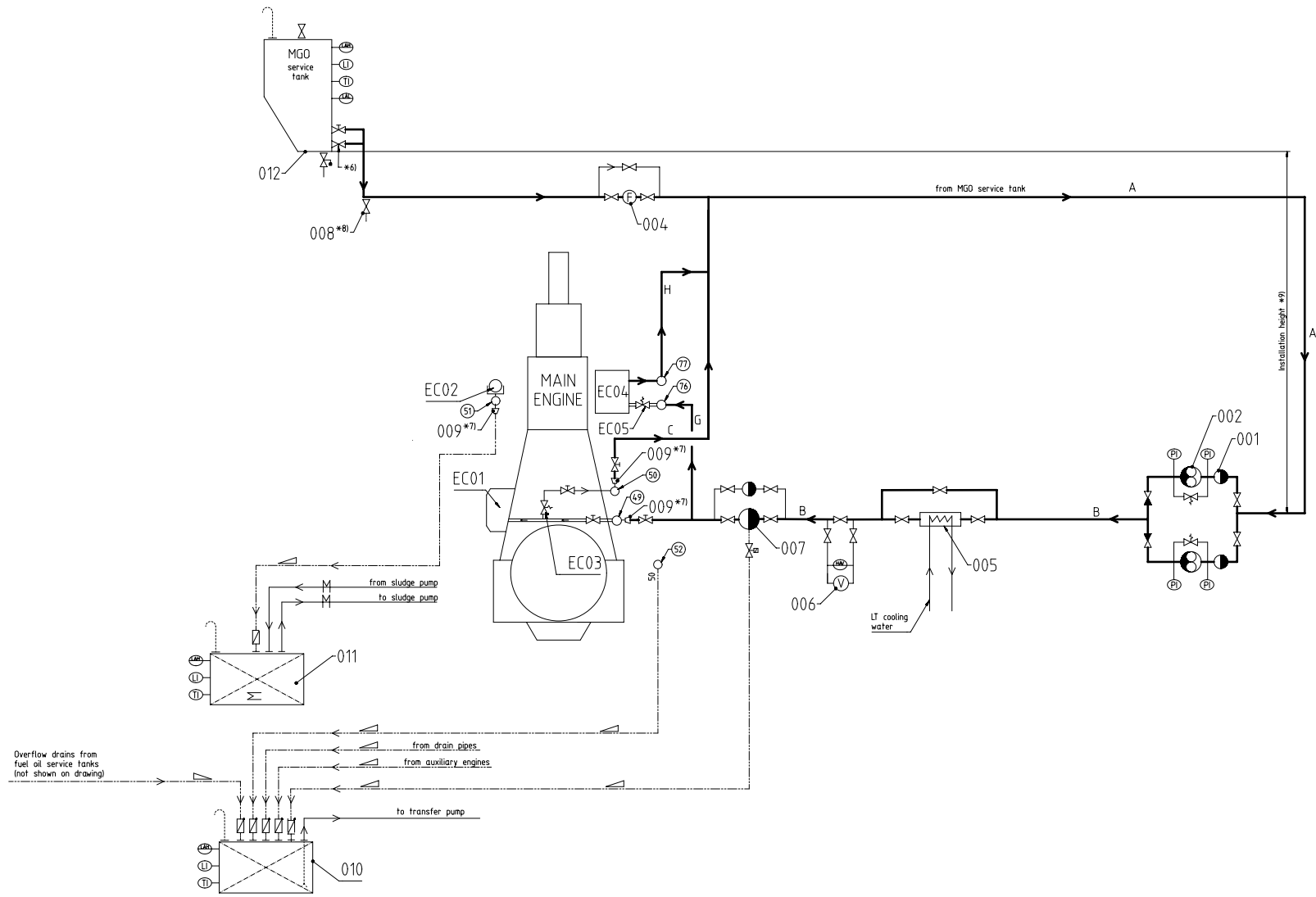
Number of cylinders		5	6	7	8
Main engine X72DF (R1 rated)	power (kW)	16125	19350	22572	25800
	speed (rpm)	89			

Proposal for dimensioning *4)

MDO service tank	volume (m³)	26	31	36	41
MDO drain tank	volume (m³)	2.6	3.1	3.6	4.1

Nominal pipe diameter	A	DN 65	65	65	65
	B	DN 50	50	50	65
	C	DN 50	50	50	65
	G	DN 20	20	20	20
	H	DN 20	20	20	20

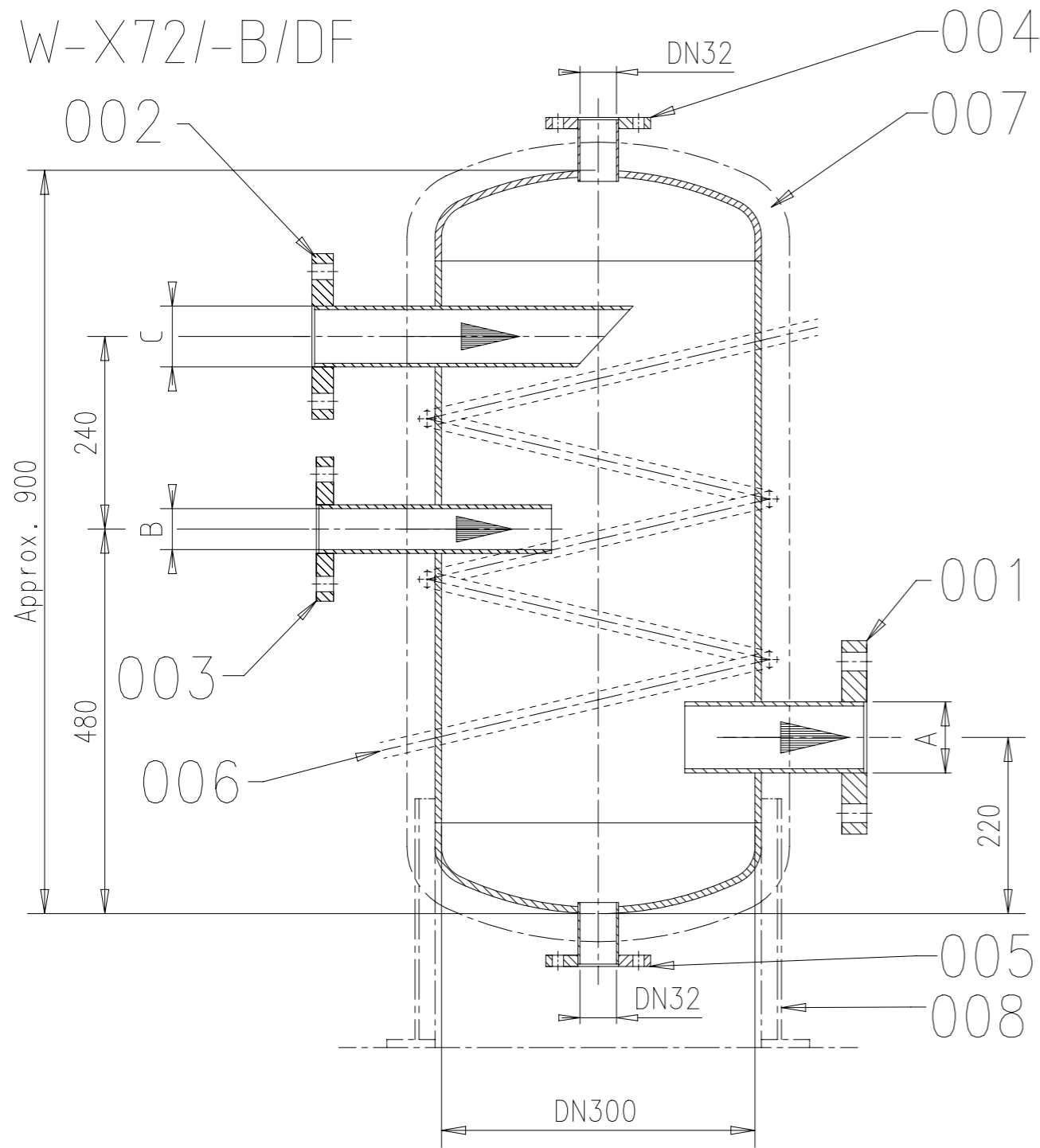
- MGO pipes
- Pipes on engine
- Drain / overflow pipes
- Air vent pipes
- Pipe connections



Overflow drains from fuel oil service tanks (not shown on drawing)

WIND WIND GmbH Industriestraße 1 42699 Solingen, Germany Phone: +49 (0)212 649-1000 Fax: +49 (0)212 649-1001 Email: info@wind.de		FUEL OIL SYSTEM MGO only Brennstoffsystem		Scale: 1/2 Sheet: 10 of 10 Date: 12.12.2019 Design: PAAD3104.09 Drawing: DAAD107657
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W-X72/-B/DF



Nominal pipe diameters (DN)

No. of cyl.	A	B	C
	DN	DN	DN
4	65	50	65
5	80	50	65
6	80	50	65
7	100	65	80
8	100	65	80

Capacity: 65 l
 Design pressure: 10 bar
 Service temperature: 150 °C

Pos.	Description
001	Outlet
002	Inlet, return line
003	Inlet, from feed pump
004	Outlet safety valve
005	Drain
006	Heating coil
007	Insulation
008	Mounting brackets *1)

(A)

Remarks:

- Configuration and dimensioning of the mixing unit have to comply with the relevant classification society/rules.
- *1) Mounting brackets for fixation on floor plate. The mixing unit must not be fitted unsupported under any circumstances.

Free space for litc.	Q-Code		Main Drw.
	XXXXXX		
Standard		ISO; JIS	

Modif.	(A) EAAD087849	14.06.2017					
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number

<p>Winterthur Gas & Diesel</p>	Product	W-72	MIXING UNIT TO FUEL OIL SYSTEM
	Basic Material		

SURFACE PROTECTION SEE GROUP 0344		Scale -	Size A3	Page 1/1	Material ID PAAD103066
TOLERANCING PRINCIPLE ISO8015	Chkd 07.12.2012 wwr001 Wroblewski	Design Group 9723	Drawing ID DAAD032414		Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd 10.12.2012 bha009 Haag			

Approved
 DIMENSIONAL DRAWING - Confidential

MIDS - WinGD X72DF/X72DF-2.0 FUEL-OIL-SYSTEM (DG9723)

TRACK CHANGES

DATE	SUBJECT	DESCRIPTION
2016-11-02	DRAWING SET	First web upload
2017-08-18	DAAD032414	Mixing unit drg - new revision
2018-10-02	DAAD908559	System drg - new revision
2019-07-18	DAAD908534 DAAD908559	Main and system drg - new execution
	DAAD107658 DAAD107657	System drg (MDO&MGO only) - added
2020-09-30	DAAD908559 DAAD107658 DAAD107657	System drgs - new revision
2020-11-25	DAAD908559	System drg - new revision

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