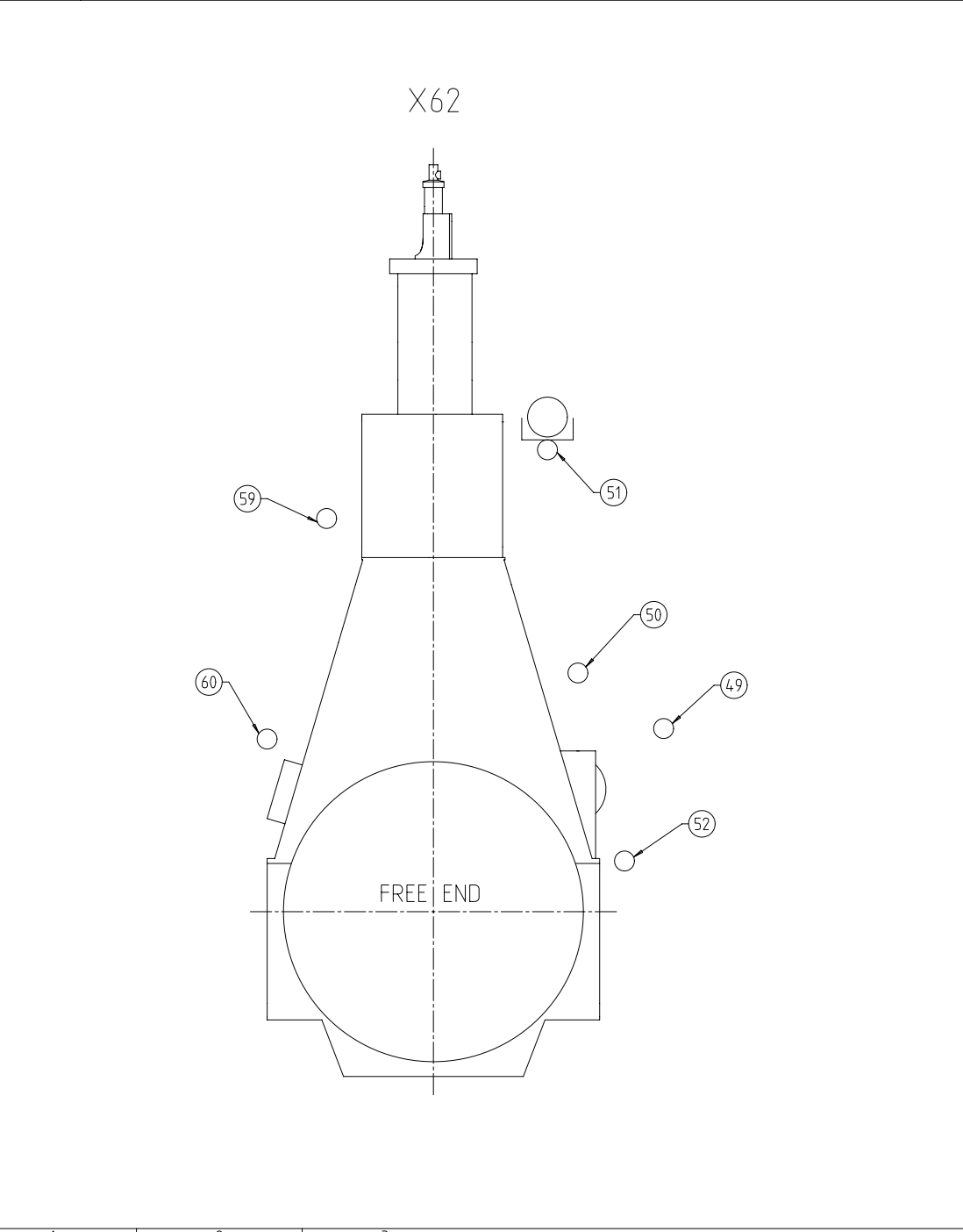




DID - DIMENSIONAL DRAWING - Confidential

SPECIFICATION which must be met

60	OUTLET - Heating medium for fuel oil trace heating - Connected to condensate manifold or thermal oil return
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49	INLET - Fuel oil
E	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
E	- Normal operation condition: Returning to mixing unit. - During fuel change-over while engine is not in service: returning to service tank.
51	OUTLET - Drain rail-unit (dirty)
E	- Dirty fuel: Mixed drain (LO,FO) 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)
E	- 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

1	008	PAAD100322		MIXING UNIT		DAAD031429				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		EAAD084543		09.08.2013		B		EAAD085468		05.02.2015		C		EAAD085894		16.07.2015		D		EAAD089659		27.09.2018	
			Number		Drawn date				Number		Drawn date				Number		Drawn date				Number		Drawn date	
						Product 5-8X62			FUEL OIL SYSTEM HFO&MDO&MGO Brennstoffsystem															
Units		mm kg		NX				Basic Material										Net Weight 0,001						
Made	17.09.2012		asex06		A.Sekulic		Scale -		Size A2		Page 1/2		Material ID		PAAD080259									
Chkd	30.11.2012		sfe006		Feuerstein		Design Group		Drawing ID		DAAD026383						Rev. E							
Appd	30.11.2012		wwr001		Wroblewski		9723																	

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 & LSFO combined: 2 settling tanks
HFO: 1 service tank
LSHFO: 1 service tank
MDO: 1 settling tank, 1 service tank

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

Number of cylinders			5	6	7	8
Main engine X62 (R1 rated)	power	(kW)	13300	15960	18620	21280
	speed	(rpm)	97			

Proposal for dimensioning *4)						
Mixing unit	volume	(l)	acc. to separate drawing			
HFO settling tank	volume	(m³)	19	23	27	31
HFO service tank	volume	(m³)	19	23	27	31
MDMIMO service tank	volume	(m³)	21	25	29	33
MDMIMO drain tank *1)	volume	(m³)	2.1	2.5	2.9	3.3
Nominal pipe diameter	A	DN	50	65	65	65
	B	DN	40	40	40	50
	C	DN	40	50	50	50
	D	DN	65	80	80	80
	E	DN	50	65	65	65

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

Cylinder	Volume
5	21 l
6	21 l
7	21 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 (E)
011	MDO/MGO heat exchanger (E)
012	Viscometer
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) (E)
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	Heathco coil

Remarks

- All heaters to be fitted with thermometers, relief valves, drains and drip trays. Not shown on drawings.
- Steam tracers 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 lines for fuel oil tanks are not shown.

*1) To be delivered by external suppliers and to be installed by the shipyard.

*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 GTD.

*5) Valve to be kept closed during normal engine operation. For draining only.

*7) The return line must be fully exposed to air without any insulation and equipped with cooling ribs

*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.

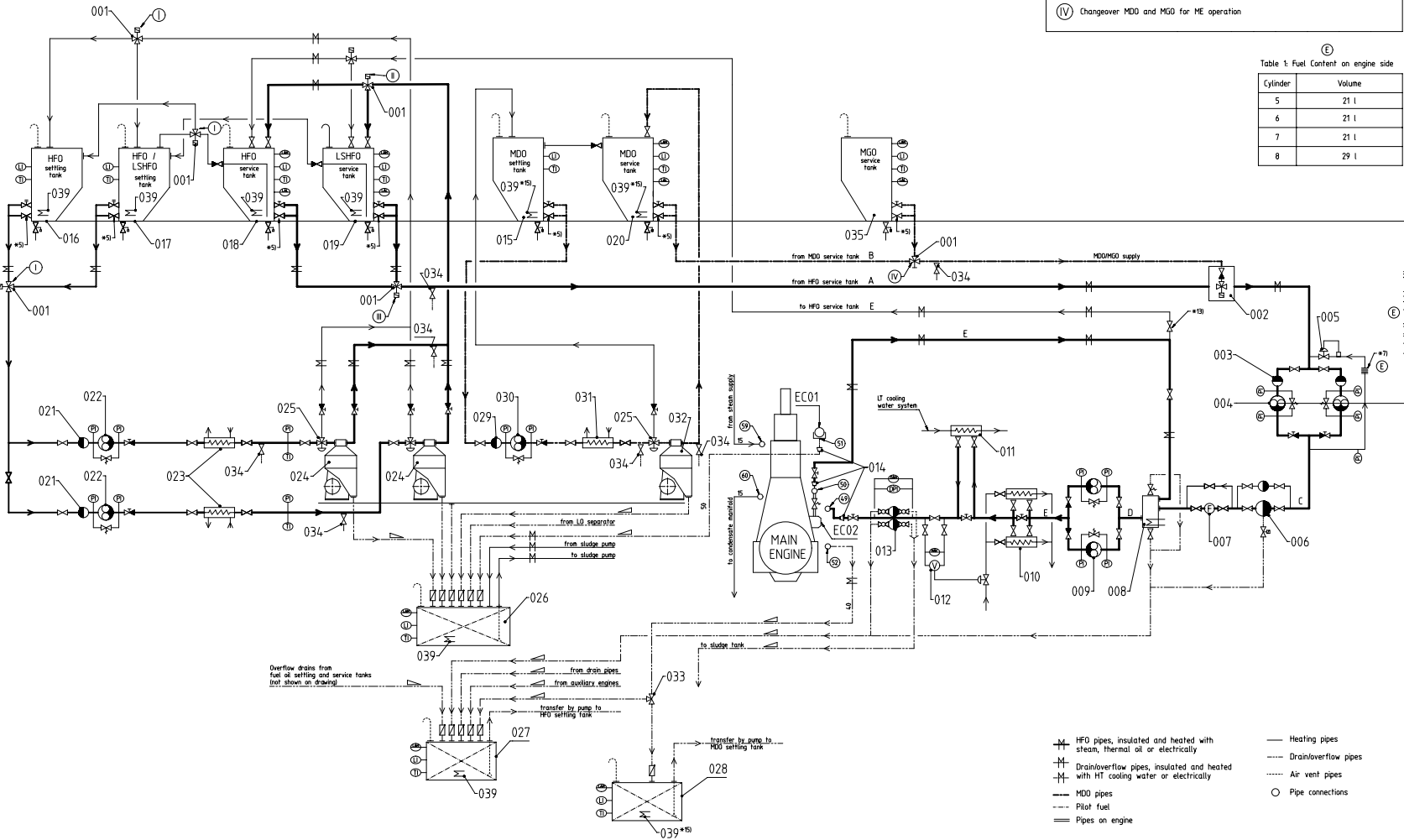
*11) The normal drainage rate of MD/MEQ is significantly higher than that of MD/MDQ.










A10) The normal drainage rate of wastewater is 100% (slightly higher) than the normal drainage rate of H₂O. 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.

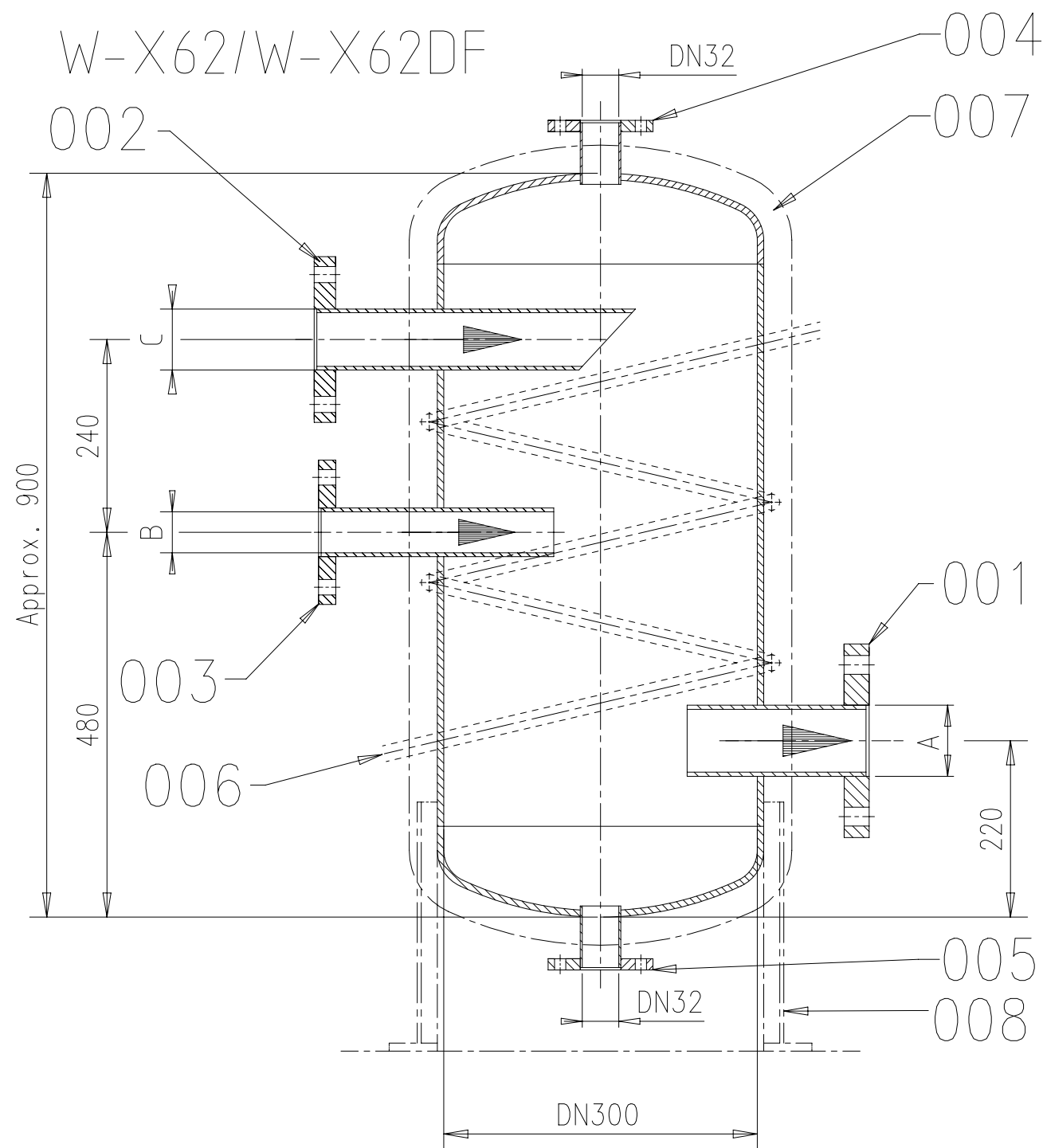
*15) A heating coil in the MDO tank is required when DMB is used. Target heating temperature: 40 °C.

*16) 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, insulated and heated with HT cooling water or electrically |  | Drain/overflow pipes |
|  | MDO pipes |  | Air vent pipes |
|  | Pilot fuel |  | Pipe connections |
|  | Pipes on engine | | |

Date issued 26.07.2018						G-Code XXXXXX Standard ISO, JIS	Net Gtw.				
A	EAND085448	09.08.2018	B	EAND085448	05.02.2018	C	EAND085448	06.07.2018	D	EAND085448	27.09.2018
	Number	Drawn date		Number	Drawn date		Number	Drawn date		Number	Drawn date
			FUEL OIL SYSTEM HF08MD08MGO Brennstoffsystem								



Nominal pipe diameters (DN)

No. of cyl.	A	B	C
	DN	DN	DN
4	65	40	50
5	65	40	50
6	80	50	65
7	80	50	65
8	80	50	65



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

SURFACE PROTECTION SEE GROUP 0344
TOLERANCING PRINCIPLE ISO8015
GENERAL TOLERANCES ACCORDING TO ISO2768-mK

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)

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.
- *2) Shown on drawing.

Free space for lic.								Q-Code XXXXXX	Main Drw.
								Standard ISO; JIS	
Modif.	A	EAAD087849	14.06.2017						
		Number	Drawn date		Number	Drawn date		Number	Drawn date
 Winterthur Gas & Diesel			Product W-62		MIXING UNIT TO FUEL OIL SYSTEM				
Units	mm kg	NX		Basic Material					Net Weight 0.001
Made	17.09.2012	asex06	A.Sekulic	Scale	-	Size	A3	Page	1/1
Chkd	30.11.2012	sfe006	Feuerstein	Design Group 9723		Material ID	PAAD100322		
Appd	30.11.2012	wwr001	Wroblewski			Drawing ID	DAAD031429		

MIDS WinGD X62 FUEL-OIL-SYSTEM

TRACK CHANGES

DATE	SUBJECT	DESCRIPTION
2016-11-04	DRAWING SET	First web upload
2017-08-18	DAAD031429	Mixing unit drg - new revision
2018-10-02	DAAD031642 DAAD026383	Main drg - new revision System drg - new revision
2020-09-30	DAAD026383	System drg – new revision

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