Available executions

Execution No.	Material ID
001	PAAD380513

NOTE
The above executions can be configured using the Engine Configurator.
Detailed guidance for the executions is provided within the Marine Installation Manual (MIM). If a specific execution of interest is not shown in the above table, then it may still be under development or not available. For further information or in case of a project-specific request, WinGD must be contacted directly.

Prod. X52-S2.0

Change History

Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis	Activity Code	E	C
–	sna102				new Design			

WIN GD
Winterthur Gas & Diesel

FUEL OIL SYSTEM
MIDS master drawing

separate BOM available

Dimension

Scale – NX | Units [mm] [kg] | Basic Material | Net Weight 0.001

Main Design	Design Group 9723	Q-Code XXXXX	Standard WDS
Qty per	A4	Item ID PTAA025641	Drawing Page/s 1/1

SEQ NO	QTY	Item ID	Item Name Dimension	Standard-ID	Basic Material	Net Weight
001	1	PAAD380510	FUEL OIL SYSTEM HFO&MDO&MGO			0.001
002	1	107.341.454.500	INSTRUCTION FOR FLUSHING			0.001
003	1	107.428.377.500	DISTILLATE FUELS			0.001
004	1	107.246.880.500	CONCEPT GUIDANCE			0.001

Prod.				
	5,6,7,8 X52-S2.0			

Change History

Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis	Activity Code	E	C
A	sna102	mhu019	22.11.2022	CNAA002783	Main Design/Drawing Introduced		4	3
-	dki021	mhu019	23.04.2021	EAAD787396	-		-	-

WIN GD
Winterthur Gas & Diesel

FUEL OIL SYSTEM

Bill **O**f **M**aterial

Dimension

Units	[m] [kg]	Basic Material				Net Weight	0.003
Main Design	Yes	Design Group	9723	Q-Code	XXXXX	Standard	WDS
Qty per	Engine	A4	Item ID	PAAD380513		BOM Page/s	01/01

SEQ NO	QTY	Item ID	Item Name / Dimension	Standard-ID	Basic Material	Net Weight
008	1	PAAD222763	MIXING UNIT			0.001

Prod.	X52-S2.0							

Change History

Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis	Approved	Activity Code	E	C
B	npa101	mhu019	23.11.2023	CNAA004296	Drawing Updated			4	3
A	sde101	mhu019	01.09.2021	CNAA000231	drawing updated			4	3
-	dki021	mhu019	23.04.2021	EAAD787396	-			-	-

WIN GD
Winterthur Gas & Diesel

FUEL OIL SYSTEM

HFO&MDO&MGO

Bill Of Material

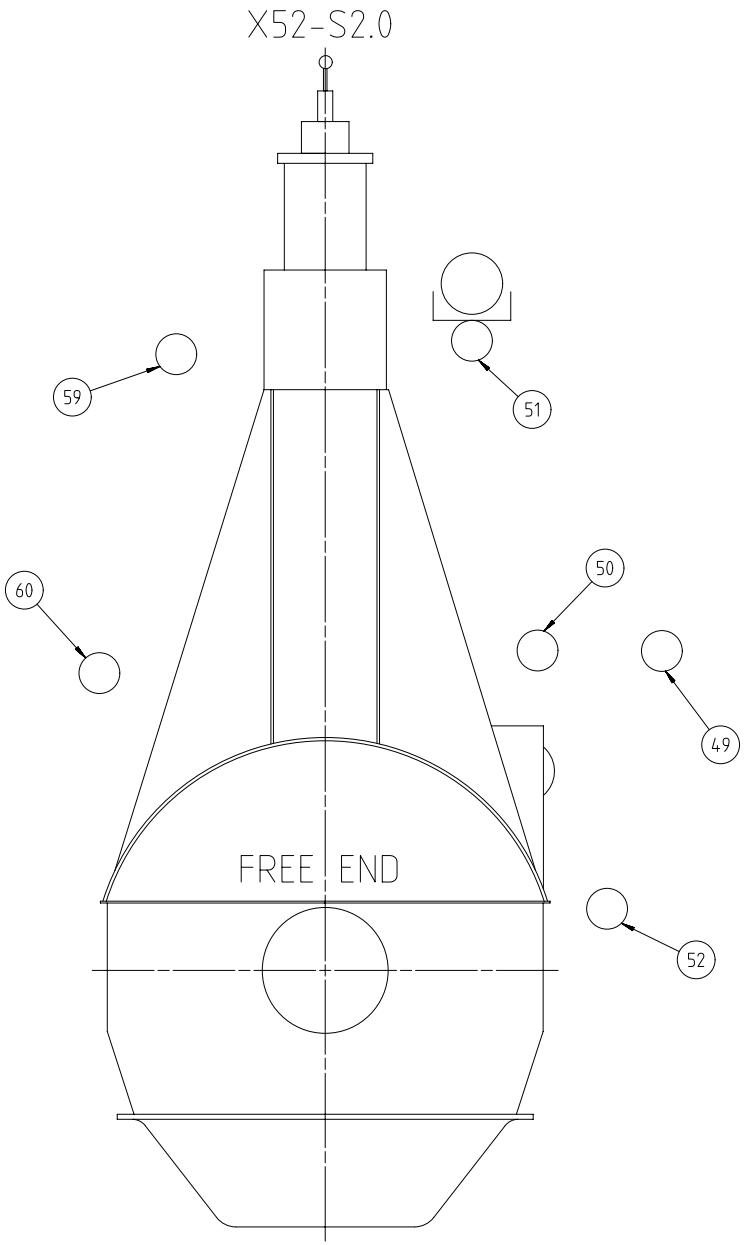
Dimension

Units [m] [kg]	Basic Material			Net Weight	0.001
Main Design	Design Group	9723	Q-Code X X M	Standard	WDS
Qty per	A4	Item ID	PAAD380510	BOM Page/s	01/01

SPECIFICATION which must be met:

(60) OUTLET - Heating medium for fuel oil trace heating

- Connected to condensate manifold or thermal oil return



(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.
- During fuel change-over while engine is not in service: returning to service tank.

(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.
- 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

Prod. X52-S2.0

Change History

Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis	Activity Code	E	C
B	npa101	mhu019	23.11.2023	CNAA004296	Drawing Updated		4	3
A	sde101	mhu019	01.09.2021	CNAA000231	drawing updated		4	3
–	dki021	mhu019	23.04.2021	EAAD787396	–		–	–

Approved

WIN GD Winterthur Gas & Diesel

FUEL OIL SYSTEM
HFO&MDO&MGO

separate BOM available | Dimension

Scale – | NX | Units [mm] [kg] | Basic Material | Net Weight 0.001

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

Main Design | Design Group 9723 | Q-Code X X M | Standard WDS

Qty per | A2 | Item ID PAAD380510 | Drawing Page/s 1/2

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)
(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 X52-S2.0 (R1 rated)	power	(kW)	9550	11460	13370	15280
	speed	(rpm)	120			
Proposal for dimensioning *4)						
Mixing unit	volume	(l)	acc. to separate drawing			
HFO settling tank	volume	(m³)	13	16	19	21
HFO service tank	volume	(m³)	13	16	19	21
MDO service tank	volume	(m³)	15	17	20	23
MDO/MGO drain tank *11)	volume	(m³)	1.5	1.7	2	2.3
Nominal pipe diameter	A	DN	40	50	50	50
	B	DN	32	32	40	40
	C	DN	40	40	40	50
	D	DN	65	65	65	65
	E	DN	50	50	50	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

Table 1: Fuel Content on engine side

Cylinder	Volume
5	8 l
6	11 l
7	11 l
8	11 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	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)
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.
- 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 pipes for fuel oil tanks are not shown

*1) 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 GTD.

*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").

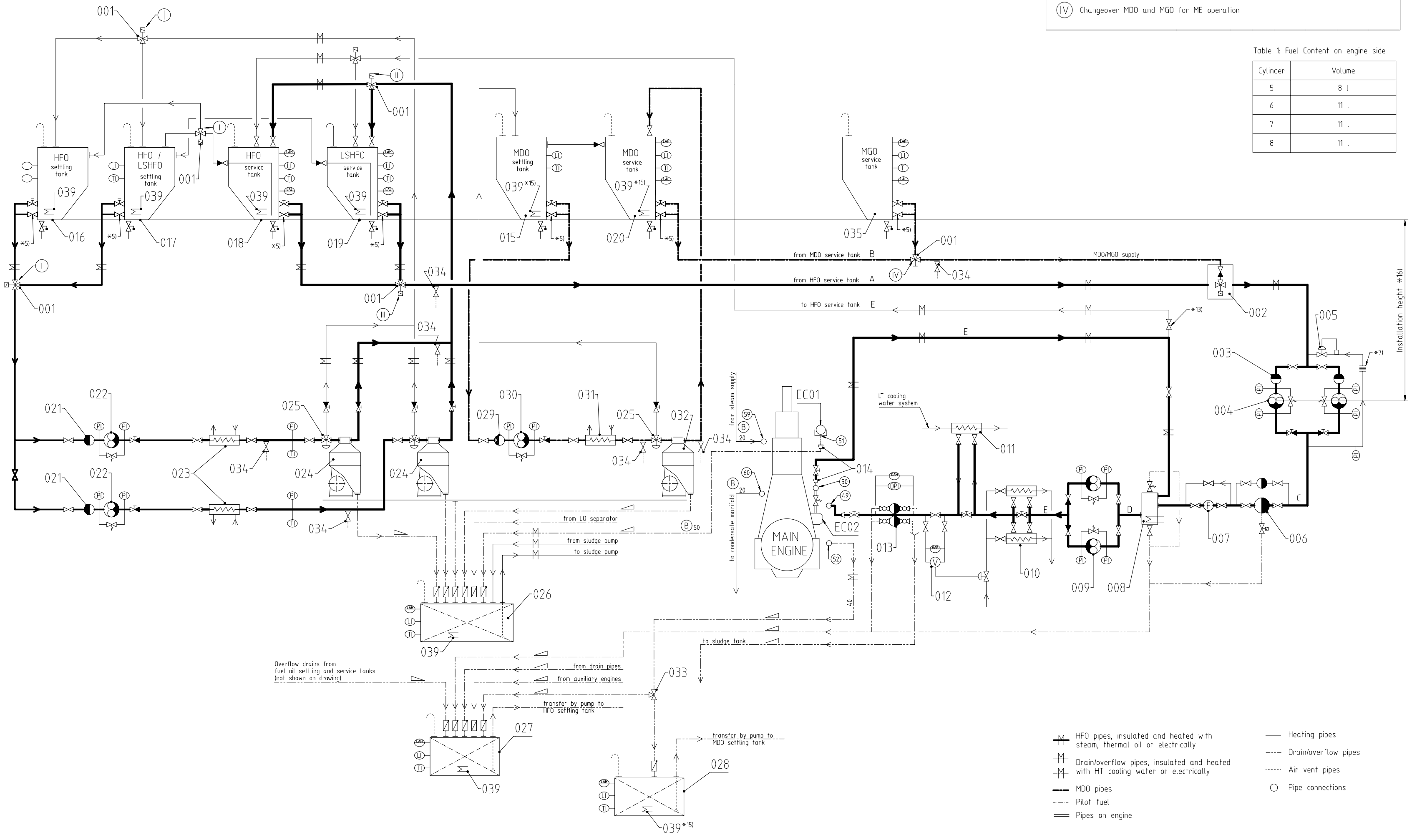
*11) The normal drainage rate of MDO/MGO is significantly higher than the normal drainage rate of HFO. Therefore during long-term operation on MDO/MGO the collection of clean MDO/MGO in a separate drain tank is highly recommended. Regarding the tank size we recommend a volume which is approx. 10% of 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.

*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.



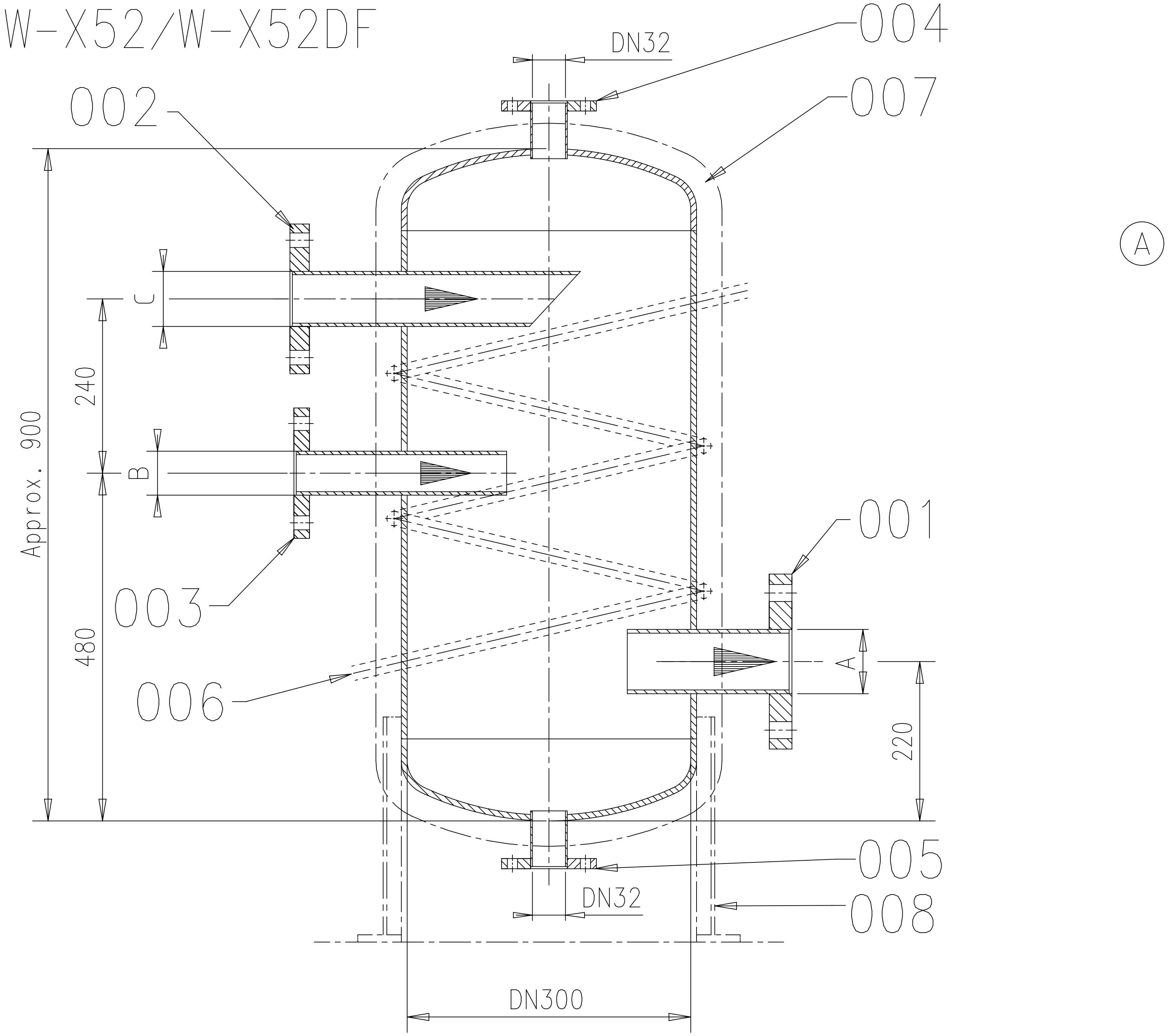
SURFACE PROTECTION SEE GROUP 0344
TOLERANCING PRINCIPLE ISO8015
GENERAL TOLERANCES ACCORDING TO ISO2768-mK

Change	Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis
	B	npa101	mhu019	23.11.2023	CNAA004296	Drawing Updated

Approved | Activity Code | 4 E | 3 C

[mm] [kg] | - | NX | A0 | Item ID PAAD380510 | Drawing Page/s 2/2

W-X52/W-X52DF



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.

Nominal pipe diameters (DN)

No. of cyl.	A	B	C	
	DN	DN	DN	
4	50	32	50	
5	50	40	50	
6	50	40	50	*2)
7	50	40	50	
8	65	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

Free space for lic.

Q-Code XXXXX
Standard ISO; JIS
Main Drw.

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

WIN GD Winterthur Gas & Diesel

Product W-52

MIXING UNIT
TO FUEL OIL SYSTEM

Units mm kg	NX		Basic Material		Net Weight 0.001
Made	17.03.2016	dki021 DH.Kim	Scale -	Size A3 / Page 1/1	Material ID PAAD222763
Chkd	30.03.2016	mhu019 Hug	Design Group 9723	Drawing ID DAAD076916	Rev. A
Appd	30.03.2016	dst009 Strödecke			

Approved

DID - DIMENSIONAL DRAWING - Confidential

MIDS - Fuel System (DG9723)

WinGD X52-S2.0

TRACK CHANGES

DATE	SUBJECT	DESCRIPTION
2021-05-10	DRAWING SET	First web upload
2021-11-03	PAAD380510	new revision
2023-11-27	PAAD380510-B	new revision

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