	EXECUTIONS		
FUEL TYPE	HFO & MDO & MGO	X		
	MDO & MGO only		X		(A)
	MGO only with ⪕ 0.1 % sulphur			X	(A)

	Net Weight								
0,001	0,001	0,001							
1	1	1	006	107.246.880.500	CONCEPT GUIDANCE Fuel Oil Treatment	107.246.880		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	PAAD310413	FUEL OIL SYSTEM MGO only, int. pilot fuel supply	DAAD107660		0,001
–	1	–	002	PAAD310411	FUEL OIL SYSTEM MDO&MGO only, int. pilot fuel supply	DAAD107659		0,001
1	–	–	001	PAAD283317	FUEL OIL SYSTEM HFO&MDO&MGO	DAAD096234		0,001

Quantity PER ENGINE	SEQ NO	Material ID	Material Name Dimension, Occ	Standard or Drawing	Basic Material Material Standard	Weight GR./NET

PAAD283340	PAAD310710	PAAD310708	Free space for lic.	

Q-Code XXXXX
Standard ISO; JIS
Main Drw. H

Material ID

Modif.	(A) EAAD090034	23.11.2018								
	Number	Drawn date		Number	Drawn date		Number	Drawn date		Number	Drawn date

Product
W6-12X92DF

FUEL OIL SYSTEM

Brennstoffsystem

WIN GD
Winterthur Gas & Diesel

Units	mm kg	NX		Basic Material					Net Weight

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

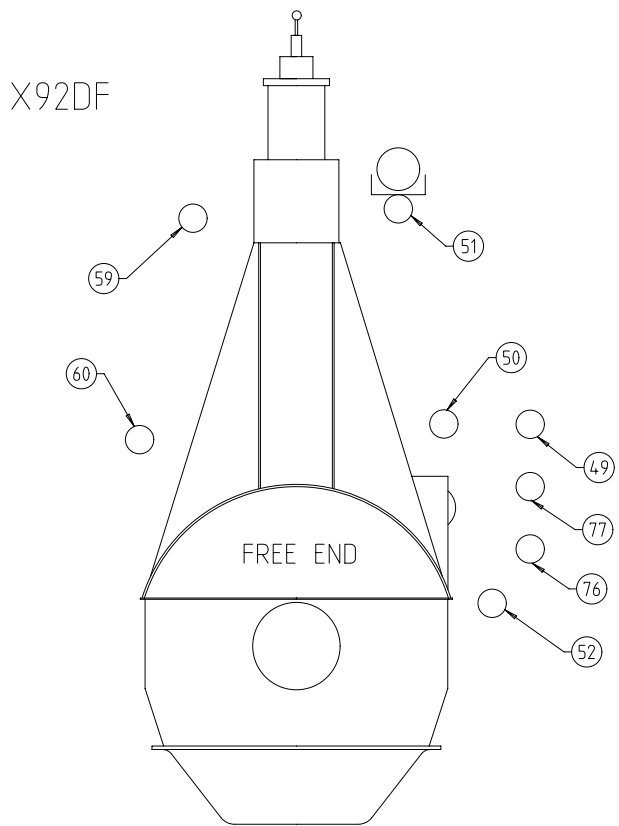| Made	16.01.2018	dki021 DH.Kim	Scale –	Size A3	Page 1/1	Material ID
Chkd	22.01.2018	wwa008 Wang	Design Group 9723			
Appd	22.01.2018	mhu019 Hug		Drawing ID DAAD096250		Rev. A

Approved

DID – DIMENSIONAL DRAWING – Confidential

SPECIFICATIONS 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 pilot fuel feed tank.
- 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,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

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

X92DF

FREE END

QTY	SEQ NO	Material ID	Material Name	Dimension, Occ	Standard or Drawing	Basic Material Material Standard	Weight GR./NET
1	008	PAAD142316	MIXING UNIT		DAAD044290		0,001

Q-Code: XXXXX — Main Drw.
Standard: ISO; JIS

Modif.	B EAAD090034	08.07.2019	C EAAD091789	24.09.2020	D EAAD095177	12.11.2020	E EAAD095731	11.12.2020
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date

Product: 6-12X92DF

FUEL OIL SYSTEM
HFO&MDO&MGO

Brennstoffsystem

Units	mm kg	NX	Basic Material	Net Weight 0,001

Made	16.01.2018	dki021 DH.Kim	Scale -
Chkd	22.01.2018	wwa008 Wang	Design Group
Appd	22.01.2018	mhu019 Hug	9723

Size A2 Page 1/3 Material ID   **PAAD283317**
Drawing ID **DAAD096234**   Rev. **E**

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

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			6	7	8	9	10	11	12
Main engine X92DF (R1 rated)	power	(kW)	31920	37240	42560	47880	53200	58520	63840
	speed	(rpm)				80			

Proposal for dimensioning *4

Mixing unit	volume	(l)				acc. to separate drawing			
HFO settling tank	volume	(m³)	49	57	66	74	82	90	98
HFO service tank	volume	(m³)	49	57	66	74	82	90	98
MDO service tank	volume	(m³)	49	57	66	74	82	90	98
MDO darin tank *11	volume	(m³)	4,9	5,7	6,6	7,4	8,2	9	9,8
Nominal pipe diameter	A	DN	80	80	80	100	100	100	100
	B	DN	50	65	65	65	65	80	80
	C	DN	65	65	65	80	80	80	80
	D	DN	100	100	100	100	125	125	125
	E	DN	80	100	100	100	100	100	100

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

Table1: Fuel amount on engine side

Cylinder	Volume
6	109 l
7	109 l
8	109 l
9	111 l
10	126 l
11	126 l
12	126 l
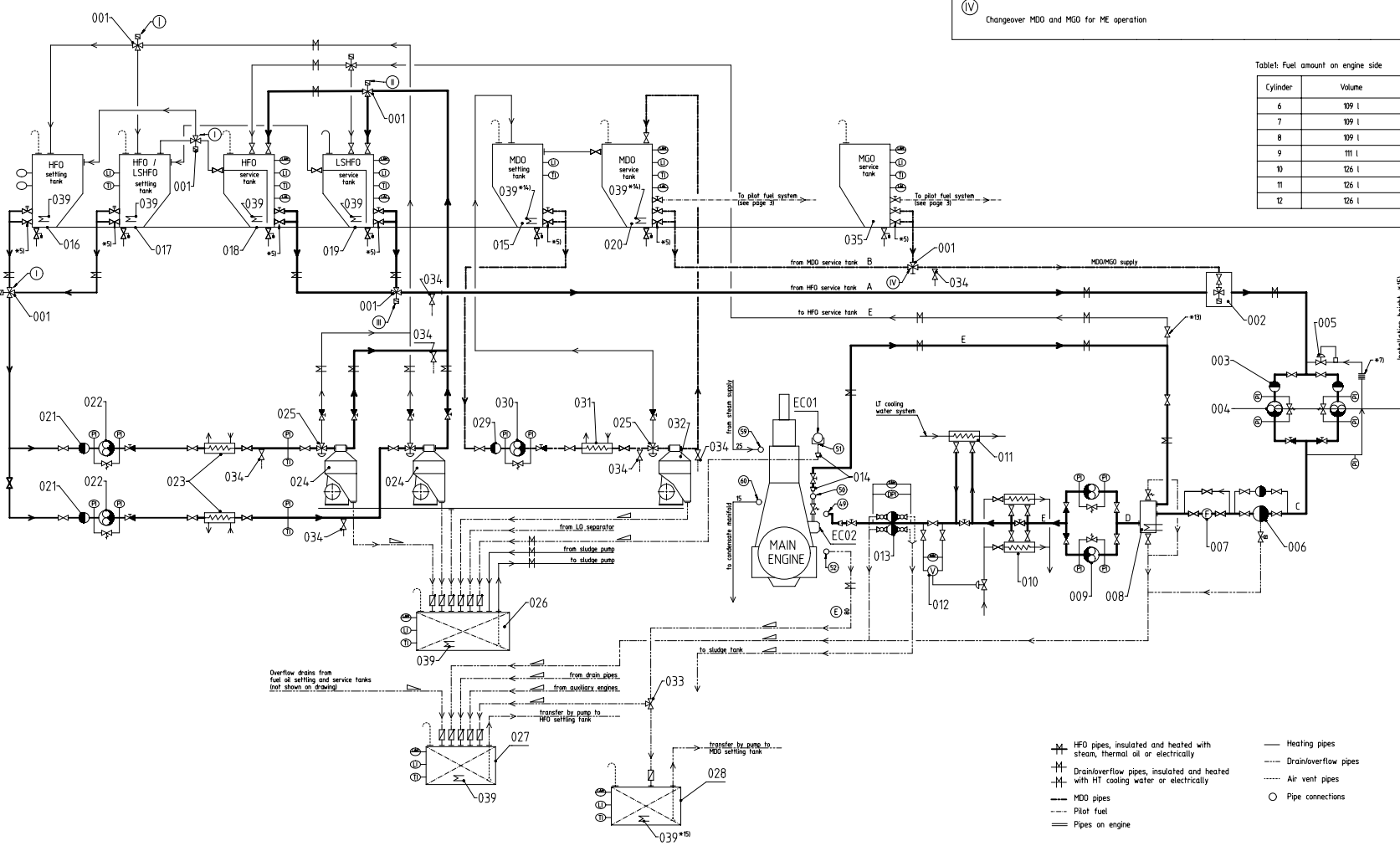
Pos.	SYSTEM COMPONENTS *1
001	Three-way valve, manually or remotely operated
002	Automatic fuel change-over unit
003	Suction strainer (mesh size acc. to pump suppliers requirement)
004	Low pressure feed pump
005	Pressure regulating valve
006	Automatic self-cleaning filter, 10 micron, heated (trace heating 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 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 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.

*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.

Legend:

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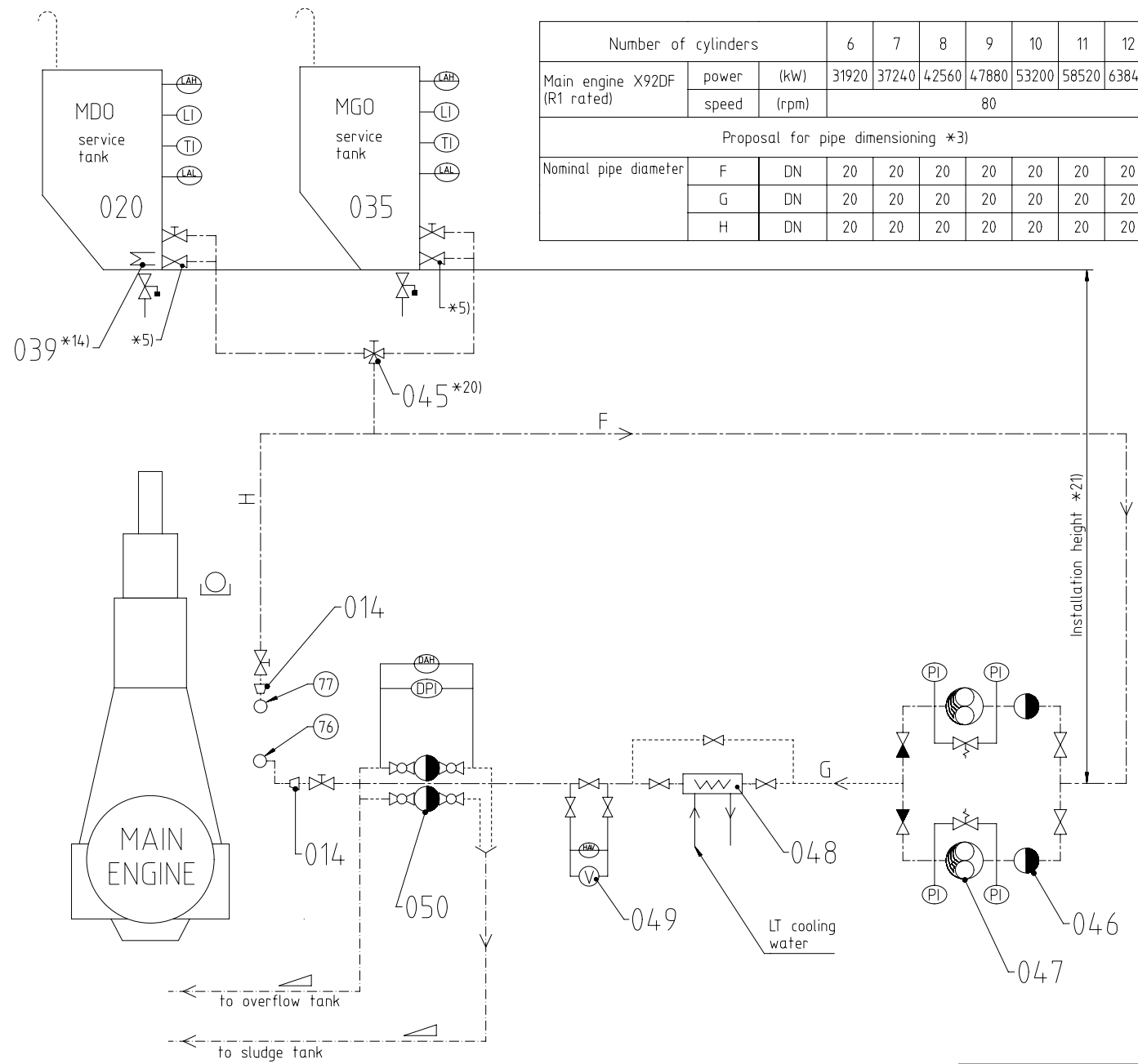- Air vent pipes
- ○ Pipe connections

MAIN ENGINE

EC01
EC02

LT cooling water system

To pilot fuel system (see page 3)

MDO/MGO supply

from MDO service tank B
from HFO service tank A
to HFO service tank E

Installation height *15

from LO separator
from sludge pump
to sludge pump
to sludge tank

from steam supply
to condensate manifold

Overflow drains from fuel oil settling and service tanks (not shown on drawing)
from drain pipes
from auxiliary engines
transfer by pump to HFO settling tank
transfer by pump to MDO settling tank

SYSTEM PROPOSAL – Pilot fuel supply

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

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)

Number of cylinders			6	7	8	9	10	11	12
Main engine X92DF (R1 rated)	power	(kW)	31920	37240	42560	47880	53200	58520	63840
	speed	(rpm)				80			
Proposal for pipe dimensioning *3)									
Nominal pipe diameter	F	DN	20	20	20	20	20	20	20
	G	DN	20	20	20	20	20	20	20
	H	DN	20	20	20	20	20	20	20

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 deliverd 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 pipewor 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.

MDO service tank 020

MGO service tank 035

039 *14)   *5)   *5)

045 *20)

F

H

Installation height *21)

G

014

77

76

DAH
DPI

050

049

HAV
V

LT cooling water

048

046

047

PI PI
PI PI

MAIN ENGINE

014

to overflow tank
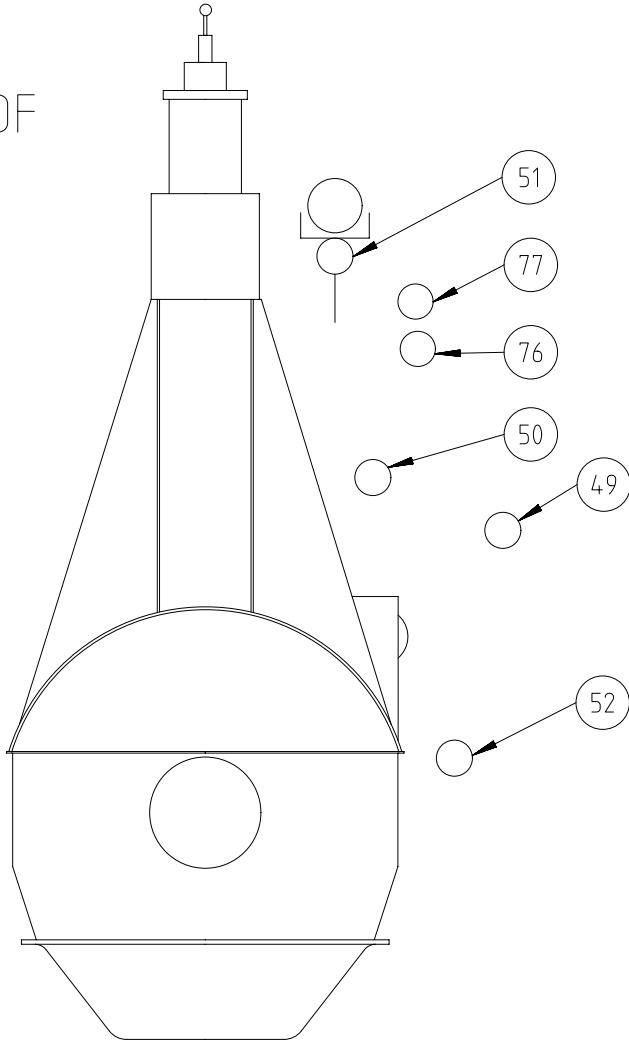
to sludge tank

DID – DIMENSIONAL DRAWING – Confidential

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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)

X92DF

(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)

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)
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

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
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

Number of cylinders			6	7	8	9	10	11	12
Main engine X92DF (R1 rated)	power	(kW)	31920	37240	42560	47880	53200	58520	63840
	speed	(rpm)				80			

Proposal for dimensioning *4)

					acc. to separate drawing				
Mixing unit	volume	(l)							
MDO service tank	volume	(m³)	49	57	66	74	82	90	98
MGO service tank	volume	(m³)	49	57	66	74	82	90	98
MDO/MGO drain tank	volume	(m³)	4.9	5.7	6.6	7.4	8.2	9	9.8
Nominal pipe diameter	A	DN	50	65	65	65	65	80	80
	B	DN	50	65	65	65	65	80	80
	C	DN	50	65	65	65	65	80	80
	E	DN	50	50	65	65	65	65	80
	F	DN	50	65	65	65	65	65	80
	G	DN	20	20	20	20	20	20	20
	H	DN	20	20	20	20	20	20	20

Table1: Fuel amount on engine side

Cylinder	Volume
6	109 l
7	109 l
8	109 l
9	111 l
10	126 l
11	126 l
12	126 l

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

*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.

*12) 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

MDO settling tank

MDO service tank

MGO service tank

MAIN ENGINE

from MGO service tank A

from MDO service tank B

from LO separator

from sludge pump

to sludge pump

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

from drain pipes

from auxiliary engines

transfer by pump to MDO settling tank

transfer by pump to MGO service tank

LT cooling water

Installation height *12)

MDO pipes	--- ---
MGO pipes	-- --
MDO/MGO pipes	——
Pipes on engine	═══

Miscellaneous	——
Drain/overflow pipes	-·-·-
Air vent pipes	······
Pipe connections	○

|---|---|---|---|---|---|---|
| A | EAAD097789 | 24.09.2020 | B | EAAD095731 | 11.12.2020 | |

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

WinGD

Units mm kg — NX
Made 25.10.2018 Sudant Deogade
Chkd 05.07.2019 wwa008 Wang
Apprd 05.07.2019 mhu019 Hug

Product 6-12X92DF

FUEL OIL SYSTEM
MDO&MGO only, int. pilot FO supply
Brennstoffsystem
Hauptkreislauf

G-Code XXXXX
Standard ISO, JIS

Scale – Size A0 Page 2/2

Design Group 9723

Net Weight 0,001

PAAD310.411

DAAD107659 Rev. B

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SPECIFICATION which must be met
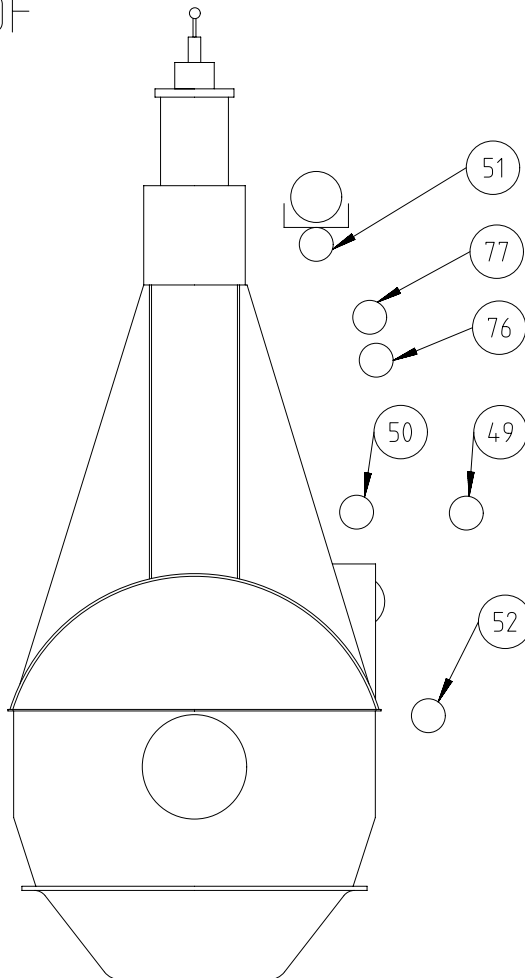
(76) INLET – Pilot fuel oil
- Fuel quality, pressure, and viscosity: same as specified for the main fuel oil (connection 49)
- Volume flow: according to GTD.

(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).

X92DF

(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
- Normal operation condition: 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.

(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)

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
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)
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 at 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 by 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.

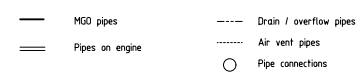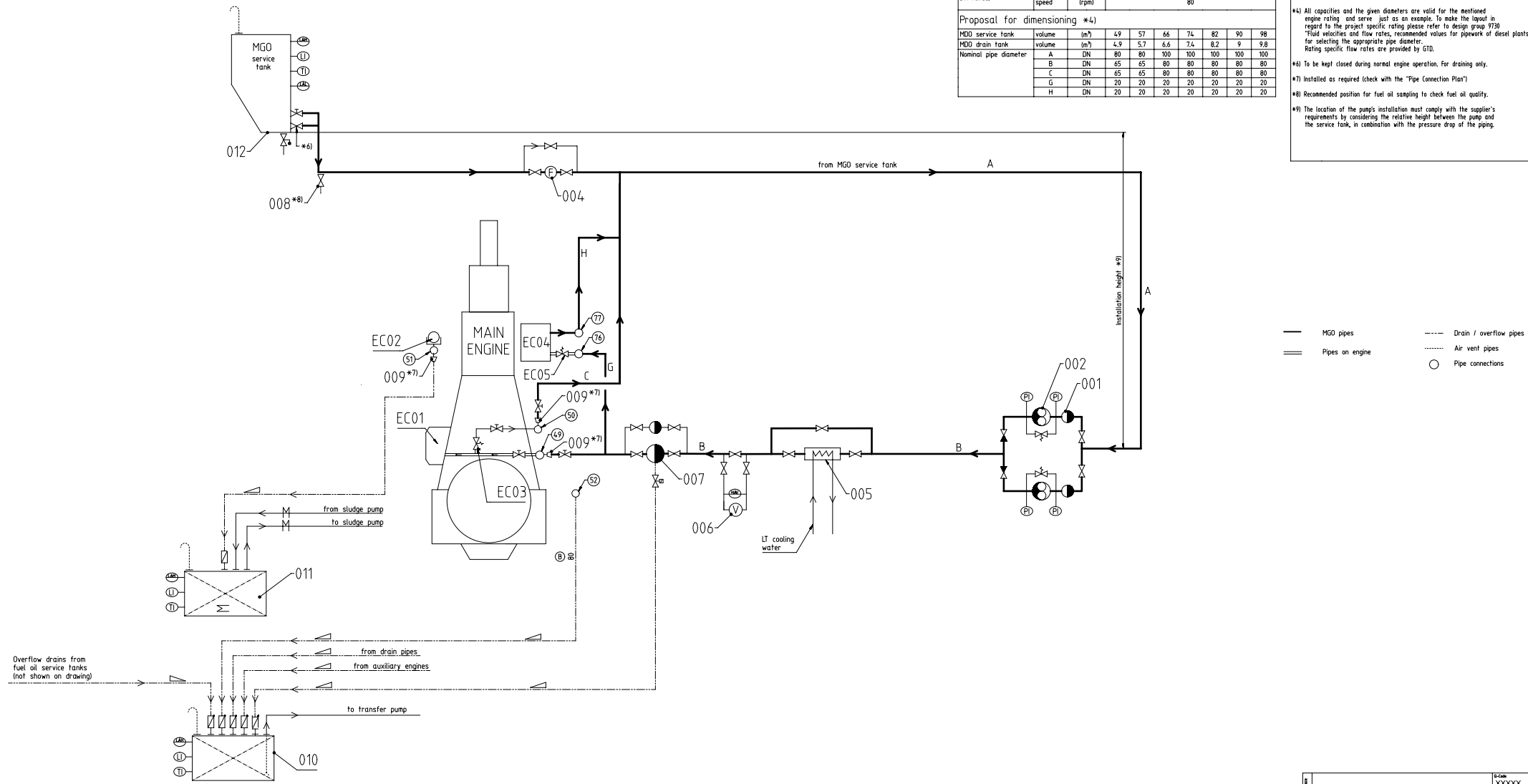*6) To be kept closed during normal engine operation. For draining only.

*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			6	7	8	9	10	11	12
Main engine X92DF (R1 rated)	power	(kW)	31920	37240	42560	47880	53200	58520	63840
	speed	(rpm)				80			

Proposal for dimensioning *4)

MDO service tank	volume	(m³)	49	57	66	74	82	90	98
MDO drain tank	volume	(m³)	4.9	5.7	6.6	7.4	8.2	9	9.8
Nominal pipe diameter	A	DN	80	80	100	100	100	100	100
	B	DN	65	65	80	80	80	80	80
	C	DN	65	65	80	80	80	80	80
	G	DN	20	20	20	20	20	20	20
	H	DN	20	20	20	20	20	20	20

MGO service tank — 012

008 *8)

004

from MGO service tank — A

MAIN ENGINE

EC01, EC02, EC03, EC04, EC05

009 *7)

002 — 001

007

006 — 005

LT cooling water

011

010

from sludge pump / to sludge pump

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

from drain pipes

from auxiliary engines

to transfer pump

Installation height *9)

Legend:
— MGO pipes
--- Drain / overflow pipes
= Pipes on engine
··· Air vent pipes
○ Pipe connections

W-X92/W-X92DF

DN50 — 004
002 — 007

Approx. 900

240
B
480
220
C
003
006
A
001
DN50
005
008
DN400

Nominal pipe diameters (DN)

No. of cyl.	A	B	C
	DN	DN	DN
6	100	65	80
7	100	80	100
8	125	80	100
9	125	80	100
10	125	80	100
11	125	80	100
12	125	100	100

Capacity: 100 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 lic.

Q-Code
XXXXX

Main Drw.

Standard
ISO; JIS

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-92

MIXING UNIT
TO FUEL OIL SYSTEM

Units	mm kg	NX			Basic Material				Net Weight 0.001

Made | 24.09.2013 mhu019   M.Hug | Scale – | Size A3 | Page 1/1 | Material ID | PAAD142316
Chkd | 05.03.2014   achx13 Chiwacumar | Design Group 9723 | Drawing ID DAAD044290 | Rev. A

SURFACE PROTECTION SEE GROUP 0344
TOLERANCING PRINCIPLE ISO8015
GENERAL TOLERANCES ACCORDING TO ISO2768-mK
Appd | 05.03.2014   wwr001 Wroblewski

Approved

DID DIMENSIONAL DRAWING - Confidential

MIDS - WinGD-X92DF – FUEL OIL SYSTEM (DG9723)

TRACK CHANGES

DATE	SUBJECT	DESCRIPTION
2018-01-22	DRAWING SET	First web upload
2019-01-15	DAAD096234	System drg.- new revision
2019-07-18	DAAD096234 DAAD096250	System and main drg – new revision
	DAAD107659 DAAD107660	System drg (MDO&MGO only) - added
2020-09-30	DAAD096234 DAAD107659 DAAD107660	System drgs – new revision
2020-11-25	DAAD096234	System drg – new revision
2021-04-22	DAAD096234 DAAD107659 DAAD107660	System drgs – new revision