OPTIONS			EXECUTIONS			
iCAT		WITH			X	X
		WITHOUT	X	X		
Turbocharger lubrication		INTERNAL	X		X	
		EXTERNAL		X		X
Net Weight			106	106	106	106

Quantity PER ENGINE				SEQ NO	Material ID	Material Name / Dimension, Occ	Standard or Drawing	Basic Material / Material Standard	Weight GR./NET
1	1	1	1	006	PAAD181146	LUBRICATING OIL DRAIN TANK Filling Guideline	DAAD062728		0,001
1	1	1	1	005	107.341.455.500	INSTRUCTION FOR FLUSHING	107.341.455		0,001
1	1	1	1	004	PAAD212314	LUBRICATING OIL DRAIN TANK	DAAD072770		106
-	1	-	1	003	PAAD245338	LUBRICATING OIL SYSTEM external turbocharger LO system	DAAD083642		0,001
1	1	-	-	002	PAAD332991	LUBRICATING OIL SYSTEM without iCAT	DAAD118566		0,001
-	-	1	1	001	PAAD332990	LUBRICATING OIL SYSTEM with iCAT	DAAD118565		0,001

Material ID			
PAAD333103	PAAD333102	PAAD333101	PAAD333100

Free space for lic.

Q-Code: XXXXX

Standard: ISO; JIS

Main Drw.: H

Modif.	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
A	EAAD091970	29.06.2020	B EAAD095915	04.02.2021				

WIN GD Winterthur Gas & Diesel

Product: W5X40DF

LUBRICATING OIL SYSTEM

Schmieroelsystem

Units	mm kg	NX	Basic Material	Net Weight
Made	08.07.2019 Sudant Deogade		Scale -	Size A3 / Page 1/1 / Material ID
Chkd	06.09.2019 cku010 Claudio		Design Group 9722	Drawing ID DAAD118640 / Rev. B
Appd	06.09.2019 mhu019 Hug			

SURFACE PROTECTION SEE GROUP 0344

TOLERANCING PRINCIPLE ISO8015

GENERAL TOLERANCES ACCORDING TO ISO2768-mK

Approved

DID - DIMENSIONAL DRAWING - Confidential

OPTIONS			EXECUTIONS			
	iCAT	WITH			X	X
		WITHOUT	X	X		
	Turbocharger lubrication	INTERNAL	X		X	
		EXTERNAL		X		X
		Net Weight	106	106	106	106

				SEQ NO	Material ID	Material Name / Dimension, Occ	Standard or Drawing	Basic Material / Material Standard	Weight GR./NET
1	1	1	1	006	PAAD181146	LUBRICATING OIL DRAIN TANK Filling Guideline	DAAD062728		0,001
1	1	1	1	005	107.341.455.500	INSTRUCTION FOR FLUSHING	107.341.455		0,001
1	1	1	1	004	PAAD060891	LUBRICATING OIL DRAIN TANK	DAAD020633		106
-	1	-	1	003	PAAD245338	LUBRICATING OIL SYSTEM external turbocharger LO system	DAAD083642		0,001
1	1	-	-	002	PAAD332991	LUBRICATING OIL SYSTEM without iCAT	DAAD118566		0,001
-	-	1	1	001	PAAD332990	LUBRICATING OIL SYSTEM with iCAT	DAAD118565		0,001
Quantity PER ENGINE									
PAAD332997	PAAD332996	PAAD332995	PAAD332994						
Material ID									

Approved

Free space for lic.

Q-Code XXXXX

Standard ISO; JIS

Main Drw. H

Modif.		Number	Drawn date		Number	Drawn date		Number	Drawn date		Number	Drawn date
	A	EAAD091970	29.06.2020	B	EAAD095915	04.02.2021						

WIN GD Winterthur Gas & Diesel

Product W6X40DF

LUBRICATING OIL SYSTEM

Schmieroelsystem

Units	mm kg	NX	Basic Material	Net Weight
Made	08.07.2019 Ravi Rathod		Scale -	Size A3 / Page 1/1 / Material ID
Chkd	06.09.2019 cku010 Claudio		Design Group 9722	Drawing ID DAAD118567 / Rev. B
Appd	06.09.2019 mhu019 Hug			

SURFACE PROTECTION SEE GROUP 0344

TOLERANCING PRINCIPLE ISO8015

GENERAL TOLERANCES ACCORDING TO ISO2768-mK

DID - DIMENSIONAL DRAWING - Confidential

OPTIONS			Executions			
	iCAT	WITH			X	X
		WITHOUT	X	X		
	Turbocharger lubrication	INTERNAL	X		X	
		EXTERNAL		X		X

Net Weight										
152	152	152	152							
1	1	1	1	006	PAAD181146	LUBRICATING OIL DRAIN TANK Filling Guideline	DAAD062728		0,001
1	1	1	1	005	107.341.455.500	INSTRUCTION FOR FLUSHING	107.341.455		0,001
1	1	1	1	004	PAAD340882	LUBRICATING OIL DRAIN TANK	DAAD122196		152
-	1	-	1	003	PAAD245338	LUBRICATING OIL SYSTEM external turbocharger LO system	DAAD083642		0,001
1	1	-	-	002	PAAD332991	LUBRICATING OIL SYSTEM without iCAT	DAAD118566		0,001
-	-	1	1	001	PAAD332990	LUBRICATING OIL SYSTEM with iCAT	DAAD118565		0,001
Quantity PER ENGINE				SEQ NO	Material ID	Material Name Dimension, Occ	Standard or Drawing	Basic Material Material Standard	Weight GR./NET

Material ID				Free space for lic.	Q-Code	Main Drw.
PAAD341098	PAAD341097	PAAD341096	PAAD341095		XXXXX	H
					Standard ISO; JIS	

Modif.										
A	EAAD095915	04.02.2021								
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date

WIN GD Winterthur Gas & Diesel

Product W7X40DF-1.0

LUBRICATING OIL SYSTEM

Schmieroelsystem

Units	mm kg	NX	Basic Material	Net Weight

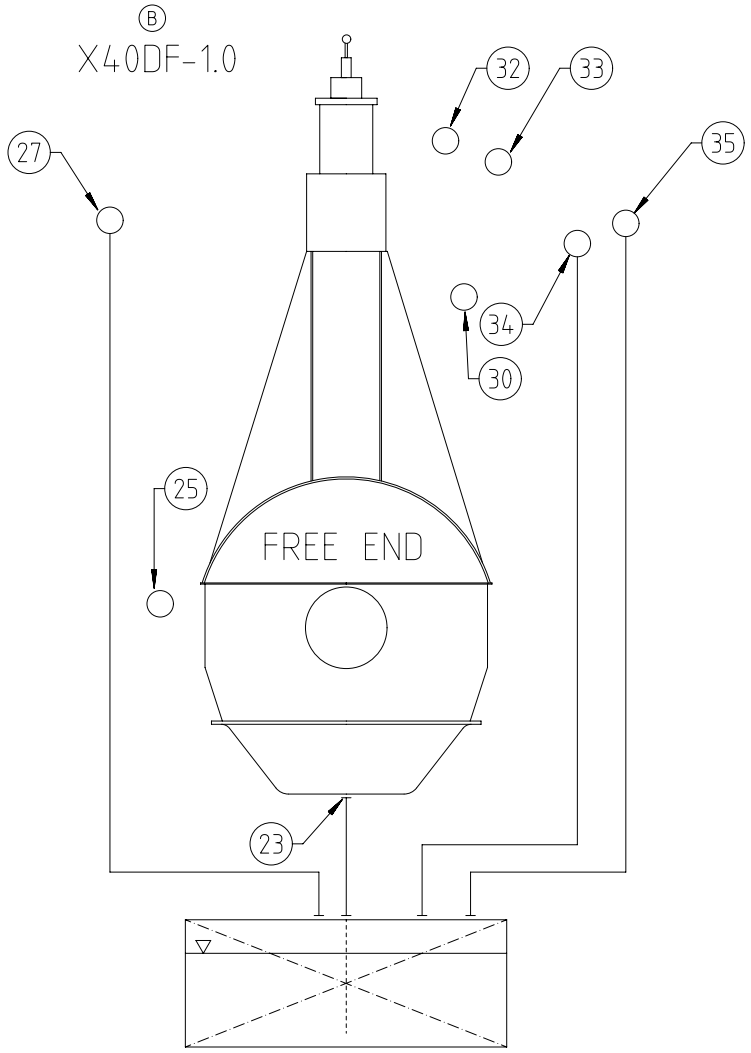
SURFACE PROTECTION SEE GROUP 0344	Made	14.10.2019 Sudant Deogade	Scale -	Size A2	Page 1/1	Material ID
TOLERANCING PRINCIPLE ISO8015	Chkd	10.02.2020 jpi101 Pickup	Design Group 9722	Drawing ID DAAD122371		Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	11.02.2020 mhu019 Hug				

Approved

DID - DIMENSIONAL DRAWING - Confidential

SPECIFICATION WHICH MUST BE MET

(33) (B)	INLET - Low BN cylinder lubricating oil - Cylinder lubricating oil temperature: 40^{+10}_{-5} °C - Trace heating to be applied on the cylinder LO feed line on ship side. - Cylinder lubricating oil static pressure: min. 0.32 bar
(34)	OUTLET- Servo system oil return (engine driving end) - Free flow by gravity to lubricating oil drain tank.
(35)	OUTLET- Servo system oil return (engine free end) - Free flow by gravity to lubricating oil drain tank.



(23)	OUTLET - Lubricating oil from bedplate - Oil return via vertical oil drain to lubricating oil drain tank: Vertical oil drain position must be within the permissible range as specified on the LO drain tank drawing The shipyard is to inform the engine manufacturer of the final position.
(25)	INLET - Lubricating oil - Lubricating oil temperature: - Controller set-point: 45 °C (controller type: PI) - Steady state condition: 45 ± 2 °C - Transient condition: 45 ± 4 °C - Lubricating oil pressure: 4-5 bar *) *) A pressure control devise (e.g. a bypass line with a pressure regulating valve or pump flow adjustment, or a frequency converter to adjust the pump speed) is needed. - Lubricating oil volume flow: according to GTD - LO amount on engine side: mentioned in table 1 on page 2 - Lubricating oil cleanliness: - Full flow filtered by a 35 micron (absolute sphere passing mesh) automatic self-cleaning filter. - Bypass flow of the automatic self-cleaning filter (only active during maintenance of the automatic self-cleaning filter) filtered by a 35 micron (absolute sphere passing mesh) filter. - Offline cleaning of the lubricating oil in the drain tank by self-cleaning centrifugal separators.
(27)	OUTLET - Turbocharger lubricating oil - Must be not connected to other oil return lines. - Pipe outlet above the oil level in the LO drain tank or drain pipe with venting holes above max. oil level to be installed. - Connected to the lubricating oil drain tank, opposite to the main lubricating oil pump, i.e. - on tank's forward end if main lubricating oil pump suction is on tank's aft end. - on tank's aft end if main lubricating oil pump suction is on tank's forward end. - on tank's forward or aft end if main lubricating oil pump suction is in middle of tank.
(30)	INLET - Crosshead Lubricating oil - Lubricating oil temperature: - Controller set-point: 45 °C (controller type: PI) - Steady state condition: 45 ± 2 °C - Transient condition: 45 ± 4 °C - Lubricating oil pressure: 11-13 bar *) *) A pressure control devise (e.g. a bypass line with a pressure regulating valve or pump flow adjustment, or a frequency converter to adjust the pump speed) is needed. - Lubricating oil volume flow: according to GTD - Lubricating oil cleanliness: - Full flow filtered by a 35 micron (absolute sphere passing mesh) automatic self-cleaning filter - Bypass flow of the automatic self-cleaning filter (only active during maintenance of the automatic self-cleaning filter) filtered by a 35 micron (absolute sphere passing mesh) filter. - Offline cleaning of the lubricating oil in the drain tank by self-cleaning centrifugal separators.
(32) (B)	INLET - High BN cylinder lubricating oil - Cylinder lubricating oil temperature: 40^{+10}_{-5} °C - Trace heating to be applied on the cylinder LO feed line on ship side. - Cylinder lubricating oil static pressure: min. 0.32 bar

QTY	SEQ NO	Material ID	Material Name / Dimension, Occ	Standard or Drawing	Basic Material / Material Standard	Weight GR/NET
1	016	PAAD308926	HEATING ELEMENT 10QTVR2-CT	DAAD106761		0,126

Free space for lic.

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

Modif.	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
A	EAAD091970	29.06.2020	B EAAD095915	20.01.2021				

WIN GD Winterthur Gas & Diesel

Product: X40DF-1.0

LUBRICATING OIL SYSTEM
with iCAT
Schmieroelsystem

Units mm kg | NX | Basic Material | Net Weight 0,001

SURFACE PROTECTION SEE GROUP 0344	Made	08.07.2019 Sudant Deogade	Scale –	Size A2	Page 1/3	Material ID PAAD332990
TOLERANCING PRINCIPLE ISO8015	Chkd	06.09.2019 cku010 Claudio	Design Group 9722	Drawing ID DAAD118565		Rev. B
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	06.09.2019 mhu019 Hug				

Approved

DID - DIMENSIONAL DRAWING - Confidential

SYSTEM PROPOSAL
System oil and cylinder LO supply

Pos.	ENGINE COMPONENTS *3)
EC01	iCAT (integrated cylinder lubricant auto transfer)
EC02	Trace heating cable control box
EC03	Supply Unit

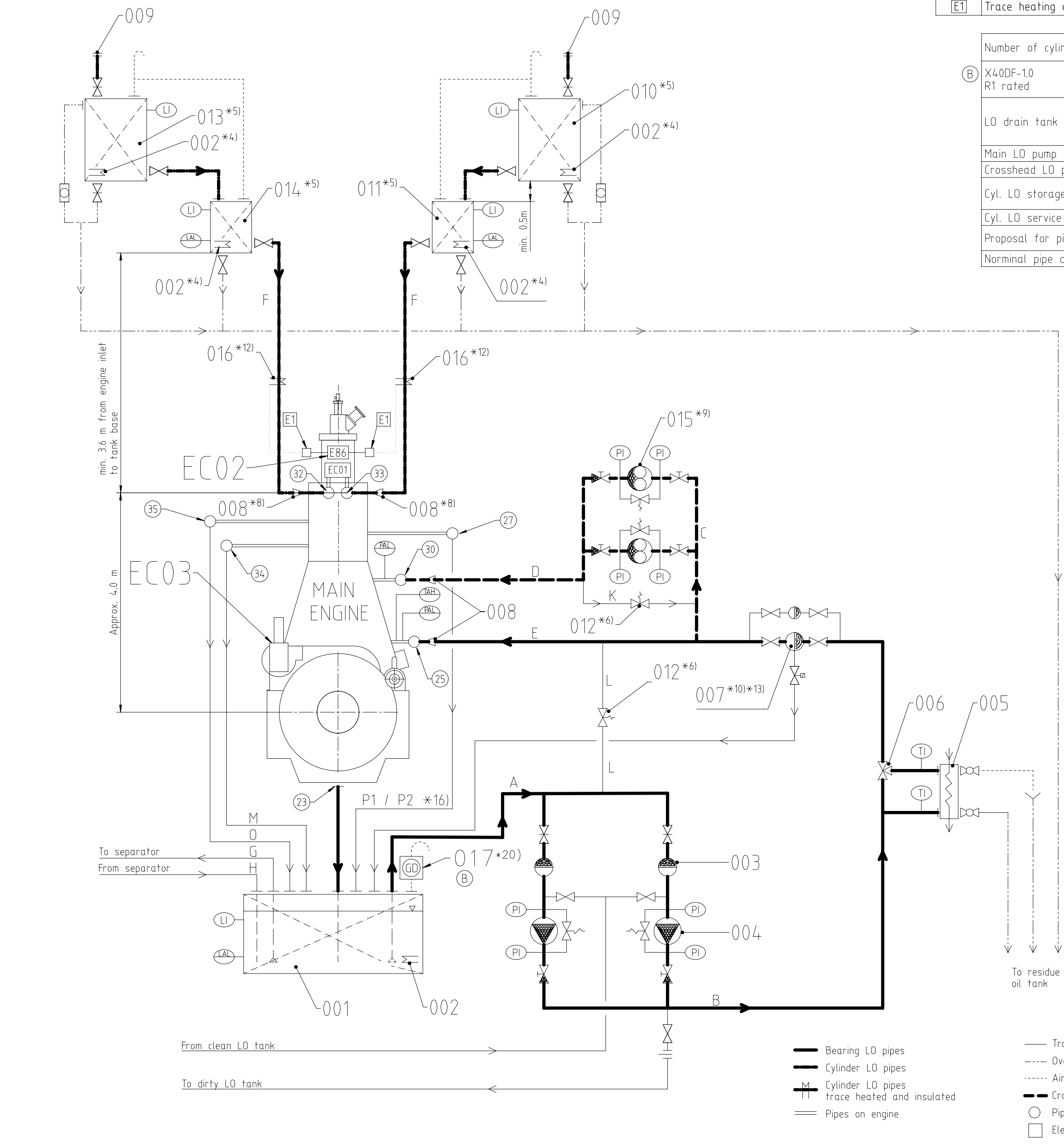
Pos.	ENGINE CONNECTIONS *2)
23	OUTLET - Lubricating oil from bedplate
25	INLET - Lubricating oil
27	OUTLET - Turbocharger lubricating oil *10) *14) *16)
30	INLET - Crosshead lubricating oil
32	INLET - High BN cylinder lubricating oil *5)
33	INLET - Low BN cylinder lubricating oil *5)
34	OUTLET- Servo system oil return (engine driving end)
35	OUTLET- Servo system oil return (engine free end)
E1	Trace heating cable control box connection

Pos.	SYSTEM COMPONENTS *1)
001	Lubricating oil drain tank (sump tank)
002	Heating device
003	Suction strainer *17)
004	Lubricating oil pump
005	Lubricating oil cooler
006	Autom. temperature control valve, constant temp. at engine inlet: 45°C
007	Automatic self-cleaning filter, 35 micron, with backflushing oil treatment *10) *13)
008	Transition piece (adaptor) *8)
009	Deck connection
010 (B)	Low BN (grade 1) cylinder lubricating oil storage tank *5) *7)
011 (B)	Low BN (grade 1) cylinder lubricating oil service tank *5) *7)
012	Pressure regulating valve
013 (B)	High BN (grade 2) cylinder lubricating oil storage tank *5) *7)
014 (B)	High BN (grade 2) cylinder lubricating oil service tank *5) *7)
015	Crosshead lubricating oil pump *9)
016	Electrical trace heating cable (detailed spec. are linked on page 1)
017 (B)	Gas detector *20)

			5	6	7	8
Number of cylinders			5	6	7	8
(B) X40DF-1.0 R1 rated	power	(kW)	4675	5610	6545	7480
	speed	(rpm)	146			
LO drain tank	capacity	(m³)	For capacities refer to drawing "LO drain tank-Filling Guideline"			
Main LO pump / Crosshead LO pump	capacity	(m³/h)	refer to GTD			
Cyl. LO storage tank	capacity	(m³)	Based on a feed rate of 1 g/kWh (pulse)			
Cyl. LO service tank *15)	capacity	(m³)	0.4	0.4	0.5	0.6
Proposal for pipe dimensioning *11)						
Norminal pipe diameter	A	DN	200	200	200	250
	B	DN	150	200	200	200
	C	DN	80	80	100	100
	D	DN	65	65	80	80
	E	DN	150	150	200	200
	F	DN	40	40	40	40
	G		The pipe diameters for LO separator are sized acc. to the effective throughput capacity of the separator and according to the separator manufacturer's recommendations.			
	H					
	K	DN	32	32	40	40
	L	DN	80	80	100	100
	M	DN	65	65	65	65
	O	DN	65	65	65	65
	P1	DN	65	65	65	65
	P2	DN	80	80	80	80

Table 1: LO content on engine side

Cylinder	Volume
5	936 l
6	1064 l
7	1214 l
8	1341 l



Remarks:

- Air vent pipes and drain valves where necessary.
- Air vent and drain pipes must be fully functional at all inclination angles of the ship at which the engine must be operational.

*1) To be delivered by external supplier and to be installed by the shipyard.
*2) Refer to "Pipe Connection Plan" for exact position and execution of the pipe connection.
*3) To be delivered by the engine manufacturer, i.e. already equipped on engine side.
*4) Optional heating coil
*5) The cylinder LO service tank with measuring device provides the possibility to supervise the cylinder LO consumption of the engine. Alternatively, if the cylinder LO service tank is omitted so that the engine is fed directly from the cylinder LO storage tank, the height of the storage tank must match the minimum height specified for the service tank. If additional elements are installed in the supply line to the engine (e.g. a flowmeter) this height must be increased to compensate the pressure drop.
*6) The bypass line with pressure regulating valve can be omitted if one of the following conditions is fulfilled:
- The pump speed is adjusted according to the required pressure at engine inlet, (e.g. by a frequency controller)
- The pumps have built-in pressure regulating valves.
- The pump built-in safety valve is in any case mandatory and not to be used for pressure regulation (pure safety function).
*7) Switching between the different oil qualities (high BN or low BN) is done on engine side by iCAT.
*8) Installed as required (check with the "Pipe Connection Plan").
*9) The LO pumps (pos. 004) and the crosshead LO pumps (pos. 015) are to be interlocked. The crosshead LO are not to be opperated without the LO pumps.
*10) The oil return pipe must not be connected to other drain pipes. If the oil is returned to the LO drain tank it is recommended to connect the oil outlet
- as close as possible to the separator suction pipe
- opposite to the main LO pump, i.e.
- on tanks' forward end if the main LO pump is on tanks' aft end
- on tanks' aft end if the main LO pump is on tanks' forward end
- on tanks' forward or aft end if the main LO pump is in the middle of the tank.
*11) All capacities and the given diameters are valid for the mentioned rating including the integrated turbocharger lubrication, but excluding any possibly installed damper and PTO gears. and serve just as an example. To make the layout for the project specific rating please refer to DG9730 "Fluid velocities and flow rates, recommended values for pipework of diesel plants" for selecting the approriate pipe diameter. Rating specific flow rates are provided by GTD.
*12) To be connected to the control box (EC02) on engine side.
*13) If the back-flushing process is driven by compressed air and the back-flushing oil is returned to the LO drain tank the oil outlet must be above the max. oil level. Alternatively, a drain pipe with venting holes above the max. oil level needs to be installed to avoid back-flushing air blowing into the oil. Back-flushing oil must be treated.
*14) The oil outlet in the LO drain tank must be above the max. oil level or as an alternative a drain pipe with venting holes above the max. oil level needs to be installed.
*15) The proposed cylinder LO services tank capacity takes into account a filling interval of 2 days based on the above mentioned feed rate.
*16) The pipe diameter varies depending on the installed TC type.
Project-specific values are provided in the relavant pipe connection plan of DG8020.
As rough guidance please observe the following values:
P1: Pipe diameter for engines equipped with ABB turbocharger
P2: Pipe diameter for engines equipped with MHI turbocharger
*17) Mesh size according to pump suppliers recommendation.
(B) *20) Conditional, if requested be the flag state and/or class to achieve compliance. This must be installed in accordance with all associated requirements, e.g. maximum distance from the tank venting outlet connection.

Modif.	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
	(A) EAAD091970	29.06.2020	(B) EAAD095915	20.01.2021				

Q-Code: XXXXX
Standard: ISO; JIS

WIN GD Winterthur Gas & Diesel

Product: X40DF-1.0

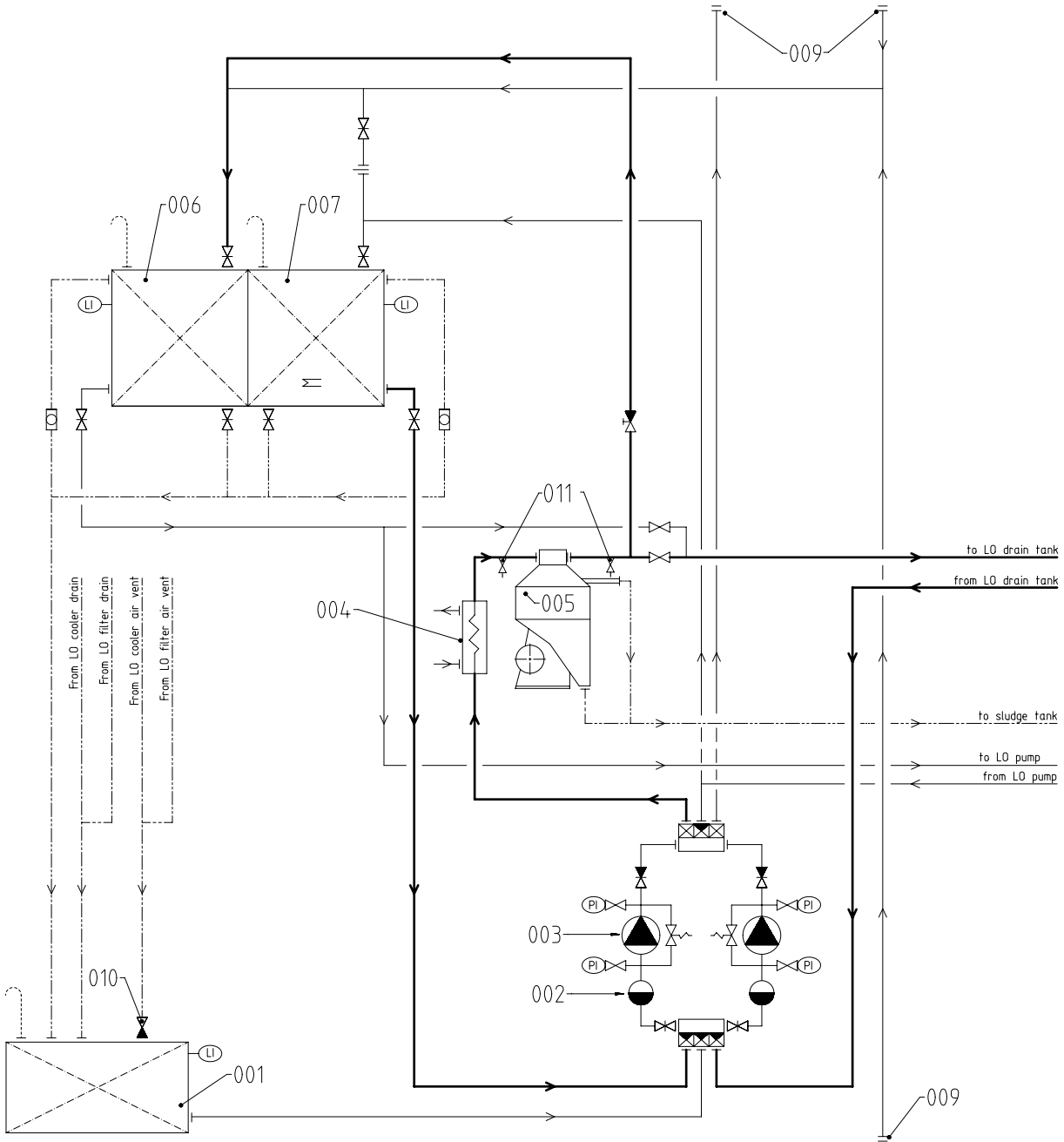
LUBRICATING OIL SYSTEM with iCAT
Schmieroelsystem

SURFACE PROTECTION SEE GROUP 0344	Made 08.07.2019 Sudant Deogade	Scale -	Size A1	Page 2/3	Material ID PAAD332990
TOLERANCING PRINCIPLE ISO8015	Chkd 06.09.2019 cku010 Claudio	Design Group 9722	Drawing ID DAAD118565	Rev. B
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 06.09.2019 mhu019 Hug		

Units mm kg NX — Basic Material — Net Weight 0,001

3D - DIMENSIONAL DRAWING - Confidential - Approved

SYSTEM PROPOSAL - LO treatment system



Pos.	SYSTEM COMPONENTS *1)
001	Residue oil tank
002	Suction strainer *17)
003	Lubricating oil pump — one for transfer and separator service / one for separator service
004	Lubricating oil heater with relief valve and temperature control
005	Self-cleaning centrifugal separator
006	Clean lubricating oil tank
007	Dirty lubricating oil tank
009	Deck connection
010	Float non-return valve
011	LO sampling cock *18)

(B) X40DF-1.0		Number of cylinders			
		5	6	7	8
Clean LO tank volume	(m^3)	equal or bigger than LO drain tank volume			
Dirty LO tank volume	(m^3)	equal or bigger than LO drain tank volume			
(B) LO separator *19)	(l/h)	640	770	900	1030
Residue oil tank volume	(m^3)	Depending on ship's requirements			

Remark:

- Air vents and drain valves where necessary
- Air vent and drain pipes must be fully functional at all inclination angles of the ship at which the engine must be operational (check Class rules)
- Pipe diameters to be designed according to shipyards' practice and component suppliers' recommendation

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

*17) Mesh size according to pump suppliers recommendation.

*18) Recommended position for LO sampling to check LO quality / treatment efficiency.

(B) *19) Based on the min. recommended tank filling level (h1) as mentioned in the "Filling Guideline" drawing. If a larger tank volume is applied, LO separators capacity needs to be increased accordingly (it is recommended that the oil is circulated at least two times per day).

Main separating piping
Transfer / dirty LO pipes
Overflow / drain pipes
Air vent pipes

Free space for lic.
Q-Code XXXXX
Standard ISO; JIS
Main Drw.

Modif. | Number | Drawn date | Number | Drawn date | Number | Drawn date | Number | Drawn date
A | EAAD091970 | 29.06.2020 | B | EAAD095915 | 20.01.2021

WIN GD Winterthur Gas & Diesel

Product X40DF-1.0

LUBRICATING OIL SYSTEM
with iCAT
Schmieroelsystem

Units mm kg | NX | Basic Material | Net Weight 0,001

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

Made 08.07.2019 Sudant Deogade
Chkd 06.09.2019 oku010 Claudio
Appd 06.09.2019 mhu019 Hug

Scale - | Design Group 9722 | Size A1 | Page 3/3 | Material ID PAAD332990
Drawing ID DAAD118565 | Rev. B

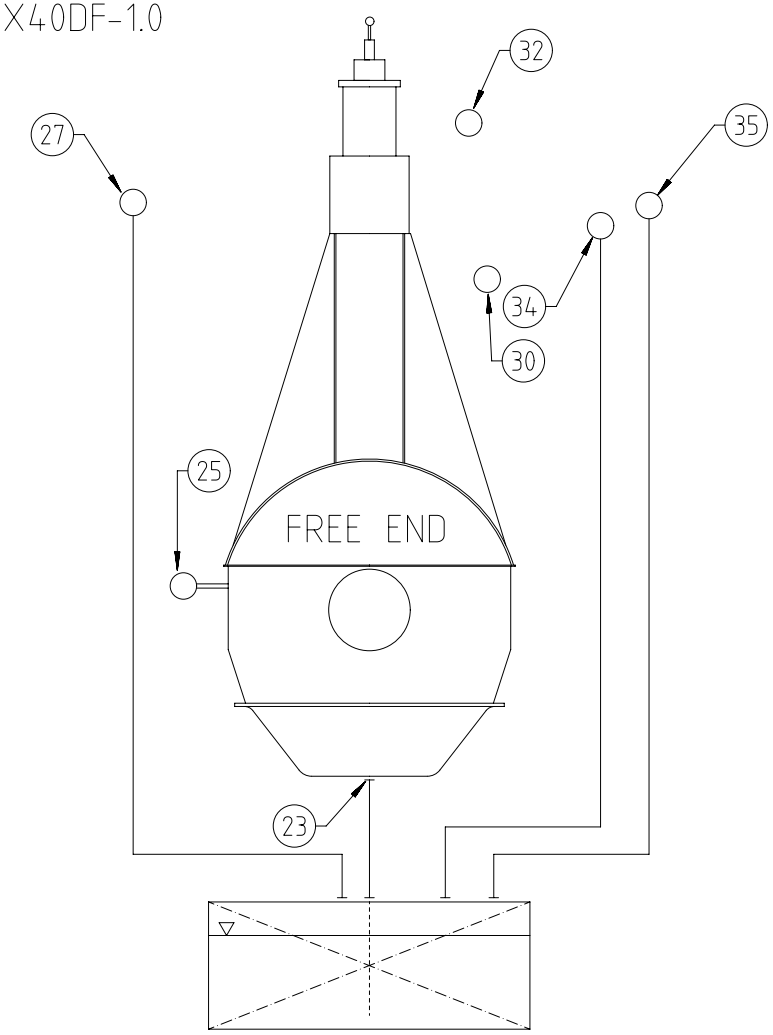
Approved

DD - DIMENSIONAL DRAWING - Confidential

SPECIFICATION which must be met

(34) (A)	OUTLET- Servo system oil return (engine driving end) - Free flow by gravity to lubricating oil drain tank.
(35) (A)	OUTLET- Servo system oil return (engine free end) - Free flow by gravity to lubricating oil drain tank.

(A)
X40DF-1.0



(23) (A)	OUTLET - Lubricating oil from bedplate - Oil return via vertical oil drain to lubricating oil drain tank: Vertical oil drain position must be within the permissible range as specified on the LO drain tank drawing The shipyard is to inform the engine manufacturer of the final position.
(25) (A)	INLET - Lubricating oil - Lubricating oil temperature: - Controller set-point: 45 °C (controller type: PI) - Steady state condition: 45 ± 2 °C - Transient condition: 45 ± 4 °C - Lubricating oil pressure: 4 - 5 bar *) *) A pressure control devise (e.g. a bypass line with a pressure regulating valve or pump flow adjustment, or a frequency converter to adjust the pump speed) is needed. - Lubricating oil volume flow: according to GTD - LO amount on engine side: mentioned in table 1 on page 2 - Lubricating oil cleanliness: - Full flow filtered by a 35 micron (absolute sphere passing mesh) automatic self-cleaning filter. - Bypass flow of the automatic self-cleaning filter (only active during maintenance of the automatic self-cleaning filter) filtered by a 35 micron (absolute sphere passing mesh) filter. - Offline cleaning of the lubricating oil in the drain tank by self-cleaning centrifugal separators.
(27) (A)	OUTLET - Turbocharger lubricating oil - Must be not connected to other oil return lines. - Pipe outlet above the oil level in the LO drain tank or a drain pipe with venting holes above the max. oil level to be installed. - Connected to the lubricating oil drain tank, opposite to the main lubricating oil pump, i.e. - on tank's forward end if main lubricating oil pump suction is on tank's aft end. - on tank's aft end if main lubricating oil pump suction is on tank's forward end. - on tank's forward or aft end if main lubricating oil pump suction is in middle of tank.
(30) (A)	INLET - Crosshead Lubricating oil - Lubricating oil temperature: - Controller set-point: 45 °C (controller type: PI) - Steady state condition: 45 ± 2 °C - Transient condition: 45 ± 4 °C - Lubricating oil pressure: 10 - 13 bar *) *) A pressure control devise (e.g. a bypass line with a pressure regulating valve or pump flow adjustment, or a frequency converter to adjust the pump speed) is needed. - Lubricating oil volume flow: according to GTD - Lubricating oil cleanliness: - Full flow filtered by a 35 micron (absolute sphere passing mesh) automatic automatic self-cleaning filter - Bypass flow of the automatic self-cleaning filter (only active during maintenance of the automatic self-cleaning filter) filtered by a 35 micron (absolute sphere passing mesh) filter. - Offline cleaning of the lubricating oil in the drain tank by self-cleaning centrifugal separators.
(32) (A)	INLET - Cylinder lubricating oil - Cylinder lubricating oil temperature: 40^{+10}_{-5} °C - Cylinder lubricating oil static pressure: min. 0.32 bar - Trace heating to be applied on the cylinder LO feed line on ship side.

1	016	PAAD308926	HEATING ELEMENT 10QTVR2-CT	DAAD106761			
QTY	SEQ NO	Material ID	Material Name Dimension, Occ	Standard or Drawing	Basic Material Material Standard		Weight GR./NET
Free space for lic.					Q-Code XXXXX		Main Drw.
					Standard ISO; JIS		
Modif.	A	EAAD095915	04.02.2021				
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date

Approved

WIN GD Winterthur Gas & Diesel

Product X40DF-1.0

LUBRICATING OIL SYSTEM
without iCAT
Schmieroelsystem

Units mm kg	NX		Basic Material			Net Weight 0.001
SURFACE PROTECTION SEE GROUP 0344	Made	07.07.2019	Sudant Deogade	Scale -	Size A2	Page 1/3	Material ID PAAD332991
TOLERANCING PRINCIPLE ISO8015	Chkd	06.09.2019	cku010 Claudio	Design Group 9722	Drawing ID DAAD118566		Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	06.09.2019	mhu019 Hug				

DID - DIMENSIONAL DRAWING - Confidential

SYSTEM PROPOSAL - System oil and cylinder LO supply

Pos.	ENGINE COMPONENTS *2)
EC01	Trace heating cable control box
EC02	Supply Unit

	Pos.	ENGINE CONNECTIONS *2)
A	23	OUTLET - Lubricating oil from bedplate
	25	INLET - Lubricating oil
A	27	OUTLET - Turbocharger lubricating oil *10) *14) *15)
	30	INLET - Crosshead lubricating oil *10) *14)
	32	INLET - Cylinder lubricating oil
A	34	OUTLET- Servo system oil return (engine driving end)
A	35	OUTLET- Servo system oil return (engine free end)
A	38	OUTLET- Supply unit oil return
	E1	Trace heating cable control box connection

	Pos.	SYSTEM COMPONENTS *1)
A	001	Lubricating oil drain tank (sump tank)
A	002	Heating device *4)
A	003	Suction strainer *16)
	004	Lubricating oil pump
	005	Lubricating oil cooler
	006	Autom. temperature control valve, constant temp. at engine inlet: 45°C
A	007	Automatic self-cleaning filter, 35 micron, with backflushing oil treatment *10) *13)
	008	Transition piece (adaptor) *8)
	009	Deck connection
A	010	Grade 1 Cylinder lubricating oil storage tank *5)
A	011	Grade 1 Cylinder lubricating oil service tank *5)
	012	Pressure regulating valve
	015	Crosshead lubricating oil pump *9)
	016	Electrical trace heating cable (detailed spec. are linked on page 1)
A	017	Three-way valve, manually or remotely operated
A	018	Grade 2 Cylinder lubricating oil storage tank *5) *18)
A	019	Grade 2 Cylinder lubricating oil service tank *5) *18)
A	020	Gas detector *19)

	Number of cylinders			5	6	7	8
A	X40DF-1.0 R1 rated	power	(kW)	4675	5610	6545	7480
		speed	(rpm)	146			
	LO drain tank		(m^3)	For capacities refer to drawing "LO drain tank-Filling Guideline"			
	Main LO pump	capacity	(m^3/h)	refer to GTD			
	Crosshead LO pump	capacity					
	Cyl. LO storage tank	capacity	(m^3)	based on a feed rate of 1g/kWh (pulse)			
	Cyl. LO service tank *7)	capacity	(m^3)	0.4	0.4	0.5	0.6
	Proposal for pipe dimensioning *10)						
	Norminal pipe diameter	A	DN	200	200	200	250
		B	DN	150	200	200	200
		C	DN	80	80	100	100
		D	DN	65	65	80	80
		E	DN	150	150	200	200
		F	DN	40	40	40	40
		G	The pipe diameters for LO separator are sized acc. to the effective throughput capacity of the separator and according to the separator manufacturer's recommendations.				
		H					
		K	DN	32	32	40	40
		L	DN	80	80	100	100
		M	DN	65	65	65	65
		O	DN	65	65	65	65
		P1	DN	65	65	65	65
		P2	DN	80	80	80	80

Table 1: LO content on engine side

Cylinder	Volume
5	936 l
6	1064 l
7	1214 l
8	1341 l

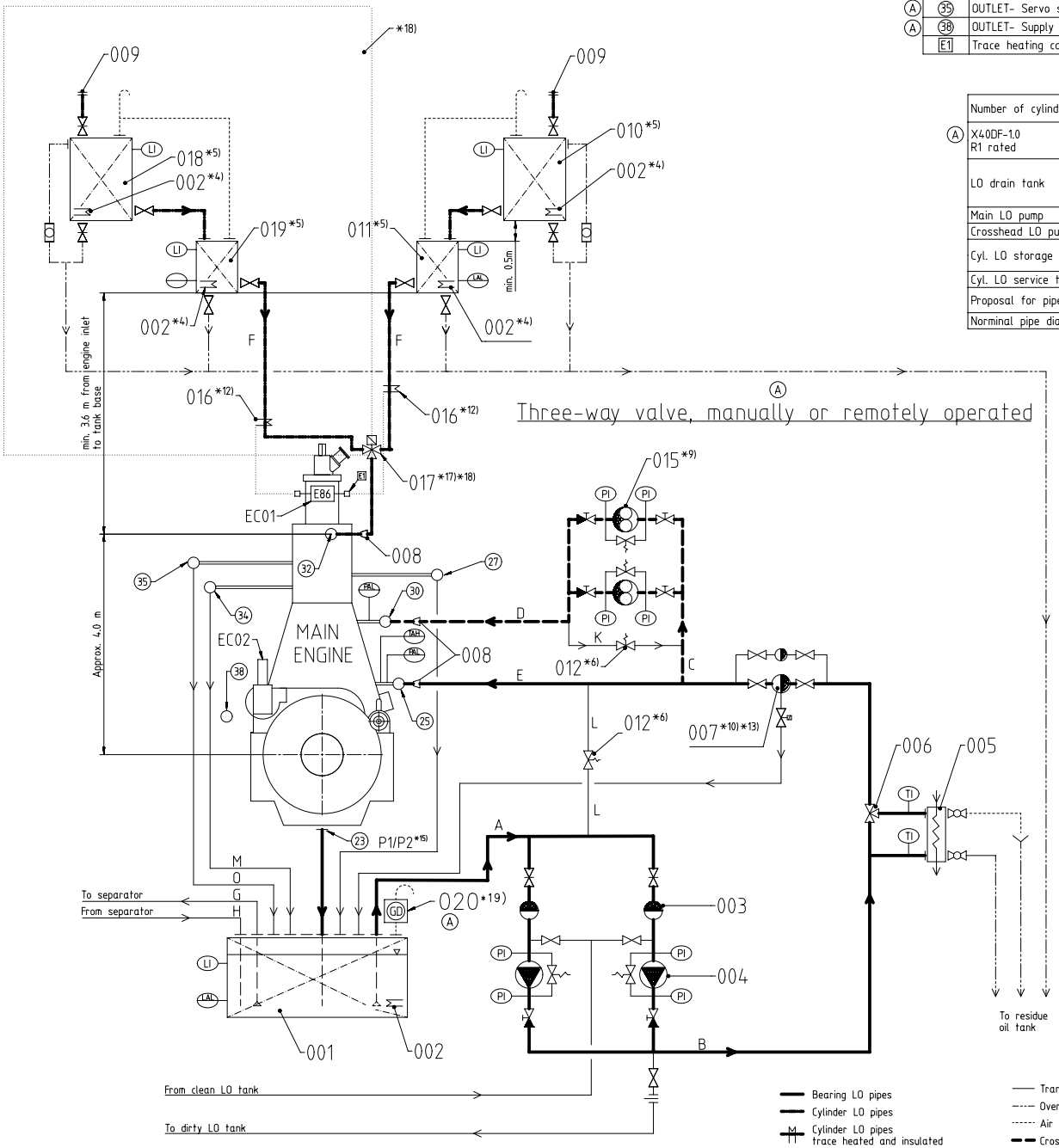
Remarks:

- Air vent pipes and drain valves where necessary.
- Air vent and drain pipes must be fully functional at all inclination angles of the ship at which the engine must be operational.

*1) To be delivered by external supplier and to be installed by the shipyard.
*2) Refer to "Pipe Connection Plan" for exact position and execution of the pipe connection.
*3) To be delivered by the engine manufacturer, i.e. already equipped on engine side.
*4) Optional heating coil
A *5) The cylinder LO service tank with measuring device provides the possibility to supervise the cylinder LO consumption of the engine. Alternatively, if the cylinder LO service tank is omitted so that the engine is fed directly from the cylinder LO storage tank, the height of the storage tank must match the minimum height specified for the service tank. If additional elements are installed in the supply line to the engine (e.g. a flowmeter) this height must be increased to compensate the pressure drop.
A *6) The bypass line with the pressure regulating valve can be omitted if one of the following conditions is fulfilled:
- The pump speed is adjusted according to the required pressure at engine inlet, e.g. by a frequency controller
- The pumps have built-in pressure regulating valves.
- The pump built-in safety valve is in any case mandatory and not to be used for pressure regulation (pure safety function).

*7) The proposed cylinder LO services tank capacity takes into account a filling interval of 2 days based on the above mentioned feed rate.
*8) Installed as required (check with the "Pipe Connection Plan")
*9) The LO pumps (pos. 004) and the crosshead LO pumps (pos. 015) are to be interlocked. The crosshead LO are not to be operated without the LO pumps.
*10) The oil return pipe must not be connected to other drain pipes. If the oil is returned to the LO drain tank it is recommended to connect the oil outlet
- as close as possible to the separator suction pipe
- opposite to the main LO pump, i.e.
  - on tanks' forward end if the main LO pump is on tanks' aft end
  - on tanks' aft end if the main LO pump is on tanks' forward end
  - on tanks' forward or aft end if the main LO pump is in the middle of the tank.

*11) All capacities and the given diameters are valid for the mentioned rating including the integrated turbocharger lubrication, but excluding any possibly installed damper and PTO gears, and serve just as an example. To make the layout for the project specific rating please refer to DG9730 "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.
*12) To be connected to the control box (EC01) on engine side.
A *13) If the back-flushing process is driven by compressed air and the back-flushing oil is returned to the LO drain tank the oil outlet must be above the max. oil level. Alternatively, a drain pipe with venting holes above the max. oil level needs to be installed to avoid back-flushing air blowing into the oil. Back-flushing oil must be treated.
*14) The oil outlet in the LO drain tank must be above the max. oil level or as an alternative a drain pipe with venting holes above the max. oil level needs to be installed.
*15) The pipe diameter varies depending on the installed TC type. Project-specific values are provided in the relavant pipe connection plan of DG8020. As rough guidance please observe the following values:
P1: Pipe diameter for engines equipped with ABB turbocharger
P2: Pipe diameter for engines equipped with MHI turbocharger
A *16) Mesh size according to pump suppliers recommendation.
A *17) Three-way valve has to be fitted as close as possible to the engine inlet. This is to reduce the volume of remaining oil in the system (with the previous BN) after the chnage-over.
A *18) Optional, only to be installed if two different cylinder lubrication oil grades instead of a single grade cylinder lubricating oil is selected (e.g. for commercial reasons).
A *19) Conditional, if requested be the flag state and/or class to achieve compliance. This must be installed in accordance with all associated requirements, e.g. maximum distance from the tank venting outlet connection.



Free space for Sc.						Q-Code XXXXX	Main Drw.
						Standard ISO; JIS	
Modif.	A EAAD095915	04.02.2021					
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date

Product: X40DF-1.0

LUBRICATING OIL SYSTEM without iCAT

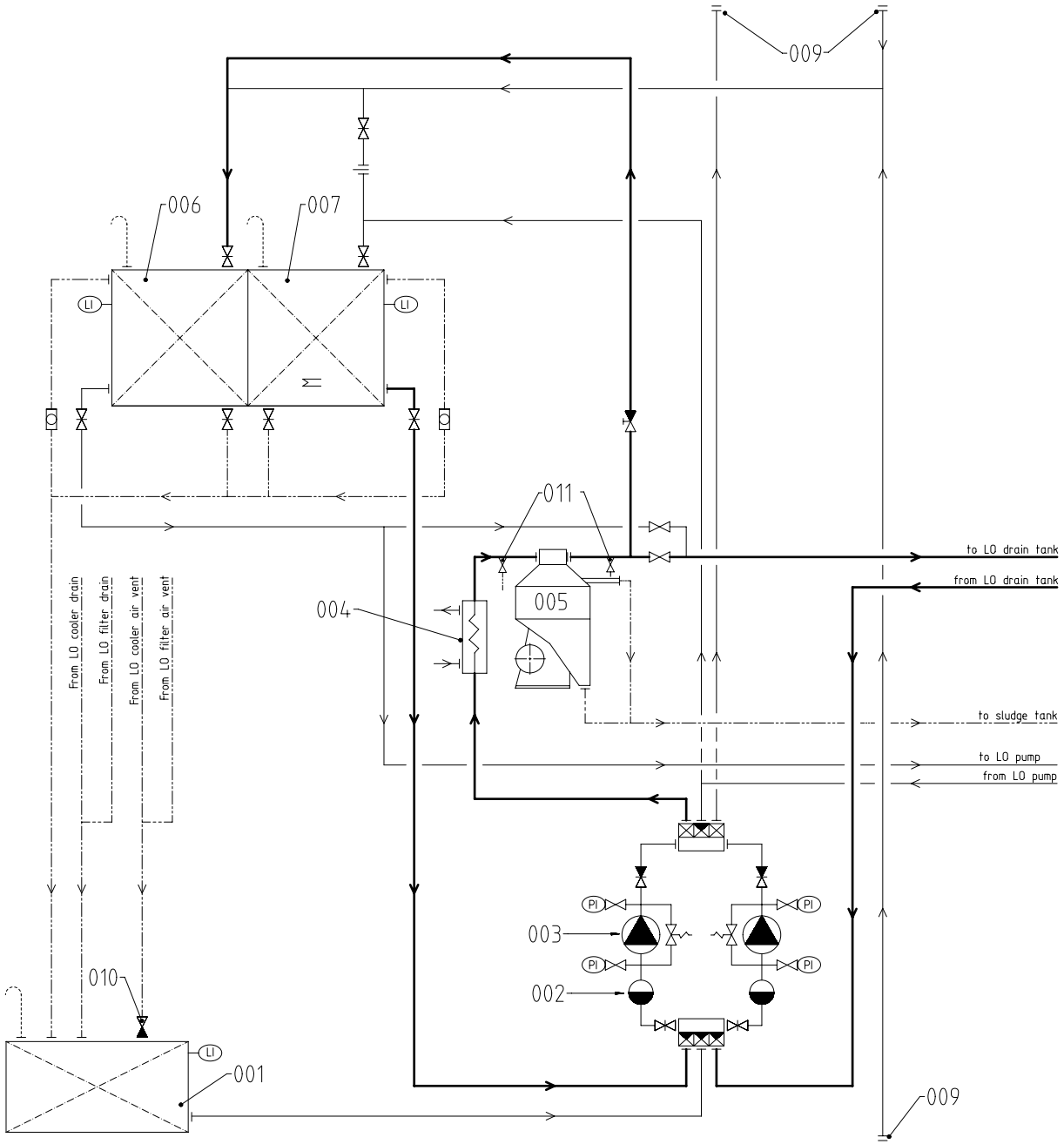
Schmieroelsystem

Units	mm kg	NX	Basic Material			Net Weight 0.001	
SURFACE PROTECTION SEE GROUP 0344	Made	07.07.2019	Sudant Deogade	Scale	-	Size A1	Page 2/3	Material ID PAAD332991
TOLERANCING PRINCIPLE ISO8015	Chkd	06.09.2019	oku010 Claudio	Design Group	9722	Drawing ID DAAD118566	Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	06.09.2019	mhu019 Hug				

DD - DIMENSIONAL DRAWING - confidential

Approved

SYSTEM PROPOSAL - LO treatment system



Pos.	SYSTEM COMPONENTS *1)	
001	Residue oil tank	
(A) 002	Suction strainer *16)	
003	Lubricating oil pump	one for transfer and separator service one for separator service
004	Lubricating oil heater with relief valve and temperature control	
005	Self-cleaning centrifugal separator	
006	Clean lubricating oil tank	
007	Dirty lubricating oil tank	
009	Deck connection	
010	Float non-return valve	
(A) 011	LO sampling cock *20)	

X40DF-1.0 (A)			Number of cylinders			
			5	6	7	8
Clean LO tank	capacity	(m^3)	equal or bigger than LO drain tank volume			
Dirty LO tank	capacity	(m^3)	equal or bigger than LO drain tank volume			
LO separator *21)	capacity	(l/h)	640	770	900	1030
Residue oil tank	capacity	(m^3)	Depending on ship's requirements			

Remark:

- Air vents and drain valves where necessary
- Air vent and drain pipes must be fully functional at all inclination angles of the ship at which the engine must be operational (check Class rules)
- Pipe diameters to be designed according to shipyards' practice and component suppliers' recommendation

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

(A) *16) Mesh size according to pump suppliers recommendation.

(A) *20) Recommended position for LO sampling to check LO quality / treatment efficiency.

(A) *21) Based on the min. recommended tank filling level (h1) as mentioned in the "Filling Guideline" drawing. If a larger tank volume is applied, LO separators capacity needs to be increased accordingly (it is recommended that the oil is circulated at least two times per day).

Main separating piping
Transfer / dirty LO pipes
Overflow / drain pipes
Air vent pipes

Free space for Nr.

Q-Code XXXXX

Standard ISO; JIS

Main Drw.

Modif.		Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
	A	EAAD095915	04.02.2021						

WIN GD Winterthur Gas & Diesel

Product X40DF-1.0

LUBRICATING OIL SYSTEM
without iCAT
Schmieroelsystem

Units mm kg | NX | Basic Material | Net Weight 0.001

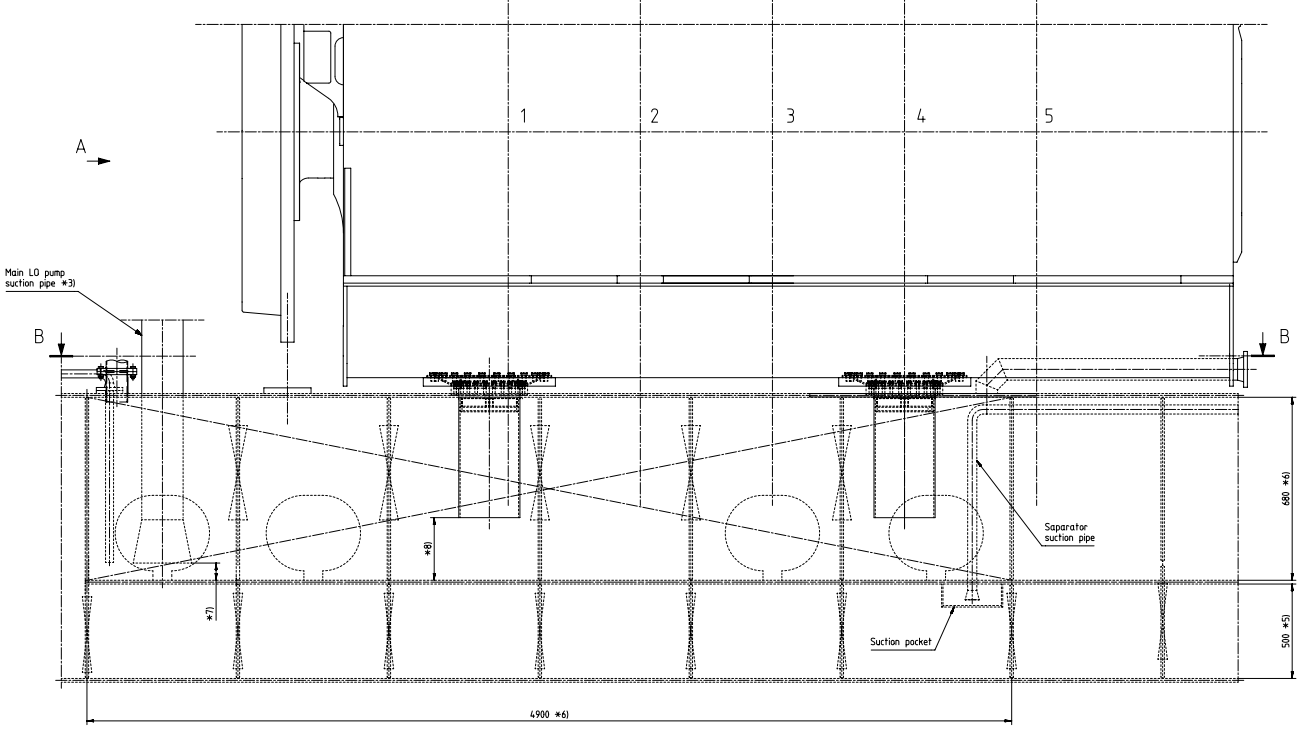
SURFACE PROTECTION SEE GROUP 0344	Made	07.07.2019	Sudant Deogade	Scale -	Size A1	Page 3/3	Material ID PAAD332991
TOLERANCING PRINCIPLE ISO8015	Chkd	06.09.2019	oku010 Claudio	Design Group 9722	Drawing ID DAAD118566		Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	06.09.2019	mhu019 Hug				

DIN - DIMENSIONAL DRAWING - confidential

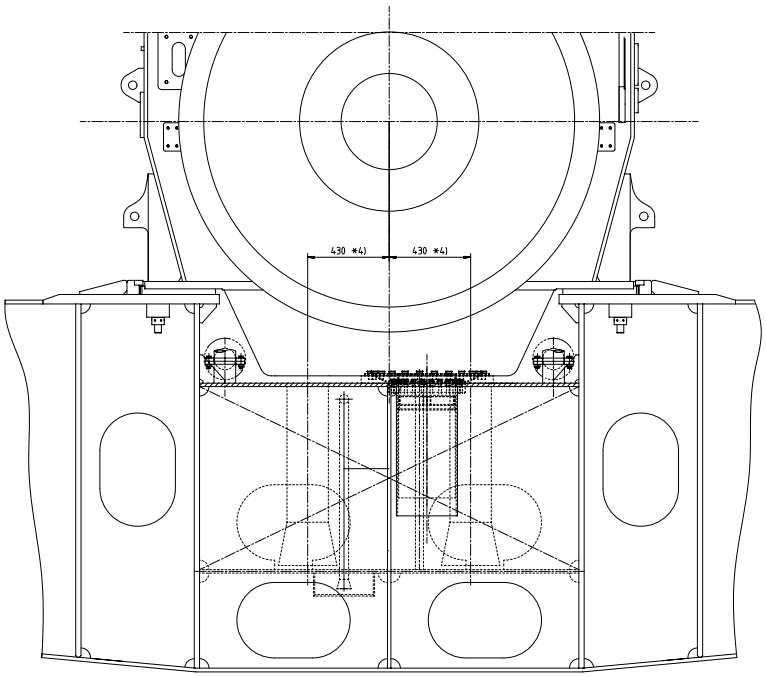
Approved

TANK PROPOSAL

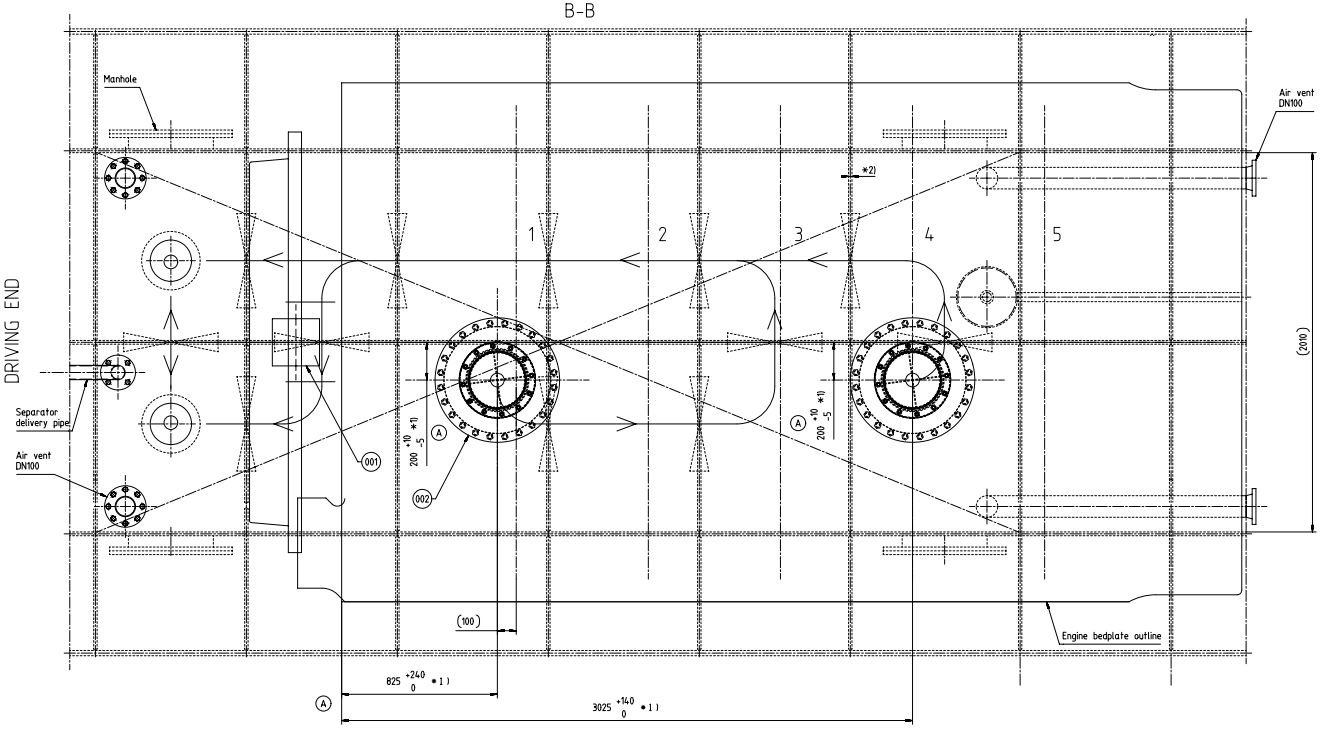
5X40-B



A (DRIVING END)



B-B



(A) REMARKS:

*1) Drains must be arranged by the shipyard in accordance with the shiphull structure and within the specified tolerance range. As soon as the final positions are determined the engine manufacturer must be informed so that the bedplate (oil pan) holes can be machined in compliance with the engine builder drawing "BEDPLATE OIL DRAIN" (DG1110).

*2) Recommendation regarding plate thickness is given in the Marine Installation Drawing Set (MIDS) "ENGINE / SEATING FOUNDATION" (foundation arrangement drawing, DG9710).

*3) Recommendation regarding the pipe size is given in the system proposal as provided in the MIDS "LUBRICATING OIL SYSTEM" (LO system drawing, DG9722).

*4) Final position depends on the size of the flywheel casing and required space for the main LO pump.

*5) Final height must be in accordance with the rules of the relevant classification society.

*6 Proposal, final tank dimensions are to be determined by the shipyard in accordance with the shiphull structure, minimum required filling / circulation volume, pump suction requirements and rules of the relevant classification society. Requirements / design criteria for the tank layout are provided in the MIDS "LUBRICATING OIL DRAIN TANK - Filling Guidelines" (DG9722).

*7) Distance according to pump makers specification.

*8) The drain pipe outlet must be below the min. LO level (LO low level alarm height) though a gap of min. half of the drain pipe diameter (min. 1/2*DN) to the drain tank bottom has to be maintained.

Pos	Qty	IGD No	Material ID	Material Name / Dimension, Acc	Standard or Drawing	Basic Material / Material Standard	Weight / GR/NET
2	002	PAAD060920		VERTICAL OIL DRAIN	DAAD020647		45,7
1	001	107.246.799.200		PLATE	107.246.799		15,0

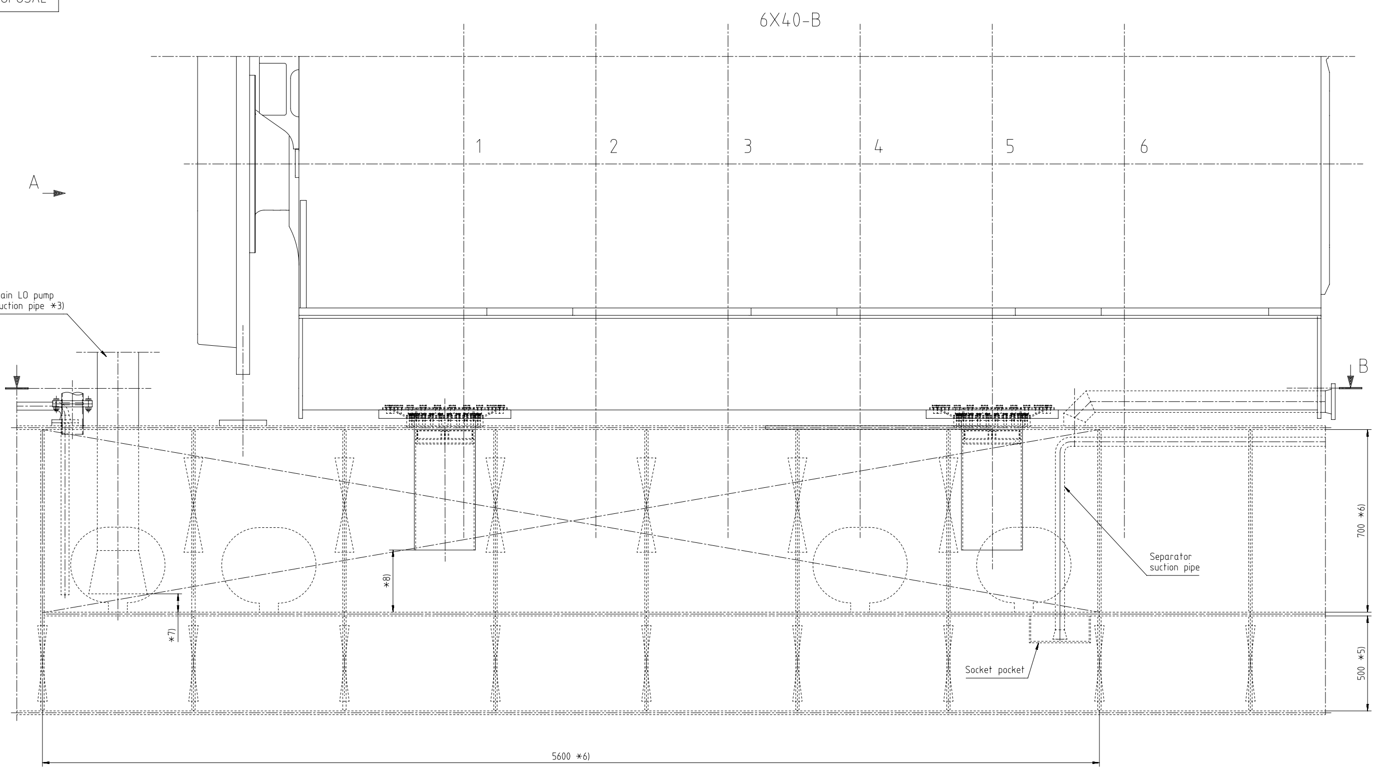
Rev	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
A	PAAD069095	13.12.2018						

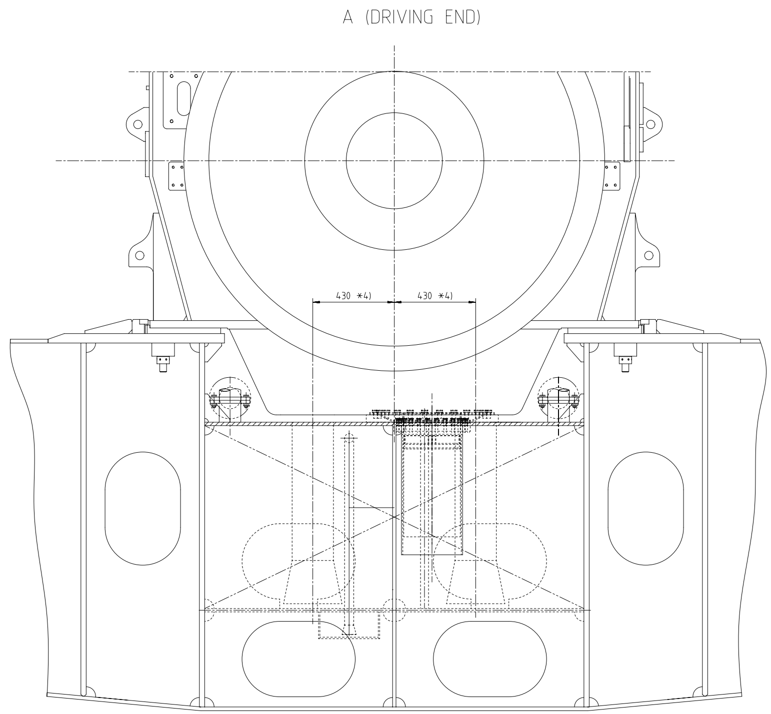
Product: 5X40-B

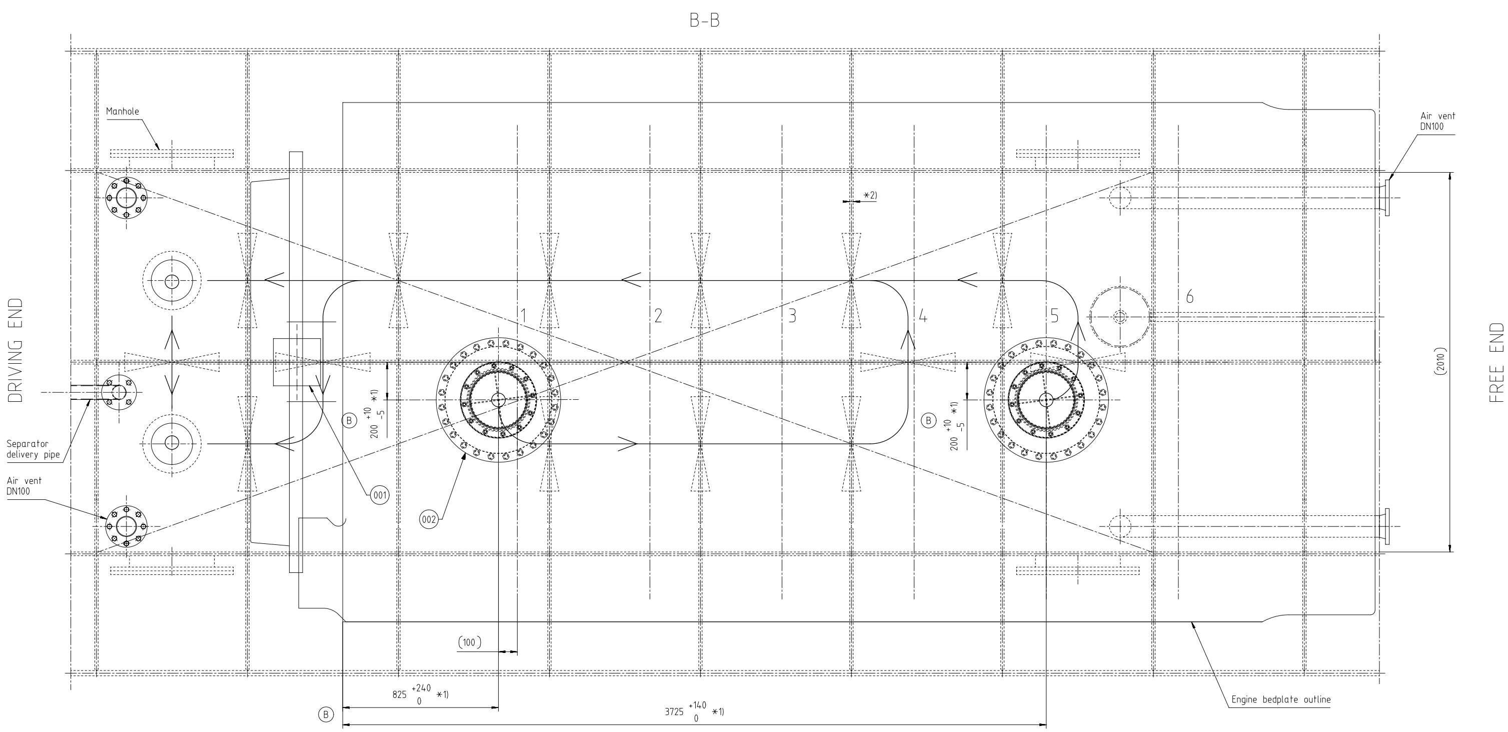
LUBRICATING OIL DRAIN TANK WITH VERTICAL DRAINS

Units	mm kg	NX	Basic Material:			Net Weight 106	
SURFACE PROTECTION: SEE GROUP 8744	Made	18.11.2015	dki021 DH.Kim	Scale 1:10	Size A0	Page 1/1	Material ID PAAD212314
TOLERANCING PRINCIPLE: ISO8015	Chkd	24.11.2015	mtu019 Haig	Design Group 9722	Drawing ID DAAD072770		Rev. A
GENERAL TOLERANCES ACCORDING TO: ISO2768-mK	Appd	24.11.2015	bha009 Haig				

TANK PROPOSAL







Ⓑ REMARKS:

*1) Drains must be arranged by the shipyard in accordance with the shiphull structure and within the specified tolerance range. As soon as the final positions are determined the engine manufacturer must be informed so that the bedplate (oil pan) holes can be machined in compliance with the engine builder drawing "BEDPLATE OIL DRAIN" (DG1110).

*2) Recommendation regarding plate thickness is given in the Marine Installation Drawing Set (MIDS) "ENGINE / SEATING FOUNDATION" (foundation arrangement drawing, DG9710).

*3) Recommendation regarding the pipe size is given in the system proposal as provided in the MIDS "LUBRICATING OIL SYSTEM" (LO system drawing, DG9722).

*4) Final position depends on the size of the flywheel casing and required space for the main LO pump.

*5) Final height must be in accordance with the rules of the relevant classification society.

*6 Proposal, final tank dimensions are to be determined by the shipyard in accordance with the shiphull structure, minimum required filling / circulation volume, pump suction requirements and rules of the relevant classification society. Requirements / design criteria for the tank layout are provided in the MIDS "LUBRICATING OIL DRAIN TANK - Filling Guidelines" (DG9722).

*7) Distance according to pump makers specification.

*8) The drain pipe outlet must be below the min. LO level (LO low level alarm height) though a gap of min. half of the drain pipe diameter (min. 1/2*DN) to the drain tank bottom has to be maintained.

QTY	SEQ NO	Material ID	Material Name / Dimension, Occ	Standard or Drawing	Basic Material / Material Standard	Weight GR./NET
2	002	PAAD060920	VERTICAL OIL DRAIN	DAAD020647		45,7
1	001	107.246.799.200	PLATE	107.246.799		15,0

Free space for lic. | Q-Code: XXXXX | Standard: ISO; JIS | Main Drw.

Modif.	Number	Drawn date
A	EAAD086293	25.11.2015
B	EAAD090135	13.12.2018

WIN GD Winterthur Gas & Diesel

Product: 6X40-B

LUBRICATING OIL DRAIN TANK
WITH VERTICAL DRAINS

Units	mm kg	NX
Basic Material		Net Weight 106
Made	16.09.2011	sth017 S.Thalmann
Chkd	27.10.2011	wwr001 Wroblewski
Appd	27.10.2011	dst009 Strödecke
Scale	1:10	
Design Group	9722	
Size	A0	
Page	1/1	
Material ID	PAAD060891	
Drawing ID	DAAD020633	Rev. B

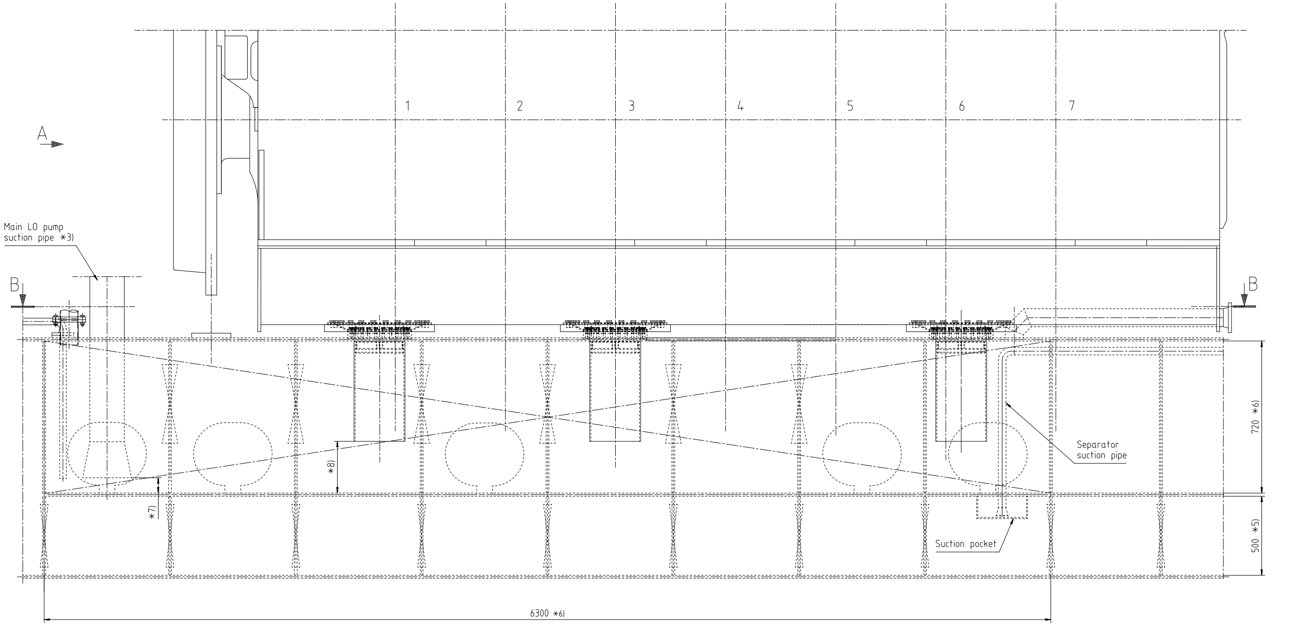
SURFACE PROTECTION SEE GROUP 0344
TOLERANCING PRINCIPLE ISO8015
GENERAL TOLERANCES ACCORDING TO ISO2768-mK

Approved

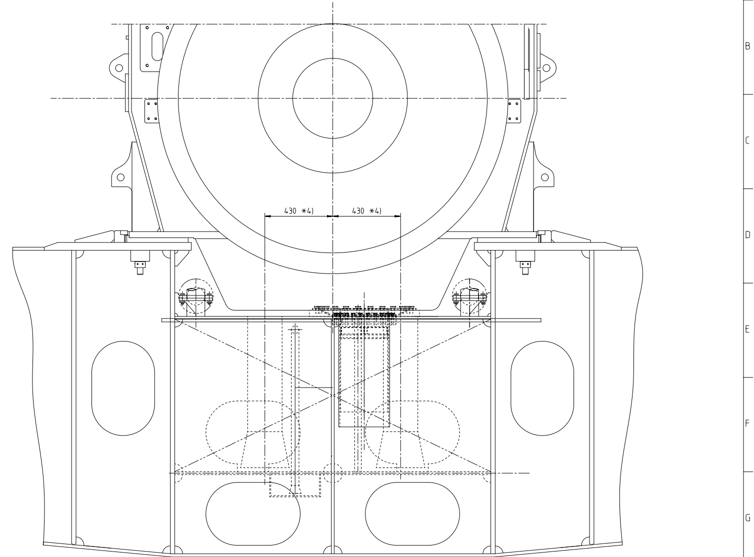
DID - DIMENSIONAL DRAWING - Confidential

TANK PROPOSAL

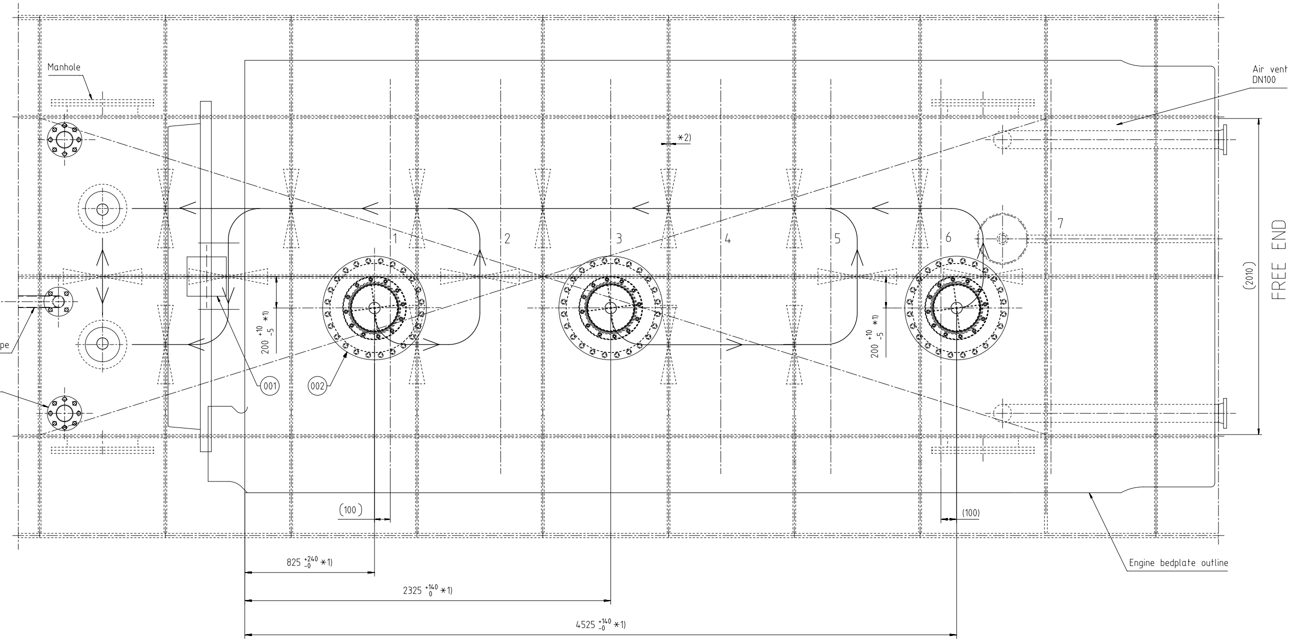
7X40-B/DF-1.0



A (DRIVING END)



B-B



REMARKS:

*1) Drains must be arranged by the shipyard in accordance with the shiphull structure and within the specified tolerance range. As soon as the final positions are determined the engine manufacturer must be informed so that the bedplate (oil pan) holes can be machined in compliance with the engine builder drawing "BEDPLATE OIL DRAIN" (DG1110).

*2) Recommendation regarding plate thickness is given in the Marine Installation Drawing Set (MIDS) "ENGINE / SEATING FOUNDATION" (foundation arrangement drawing, DG9710).

*3) Recommendation regarding the pipe size is given in the system proposal as provided in the MIDS "LUBRICATING OIL SYSTEM" (LO system drawing, DG9722).

*4) Final position depends on the size of the flywheel casing and required space for the main LO pump.

*5) Final height must be in accordance with the rules of the relevant classification society.

*6 Final tank dimensions are to be determined by the shipyard in accordance with the shiphull structure, minimum required filling / circulation volume, pump suction requirements and rules of the relevant classification society. Requirements / design criteria for the tank layout are provided in the MIDS "LUBRICATING OIL DRAIN TANK - Filling Guidelines" (DG9722).

*7) Distance according to pump makers specification.

*8) The bottom (outlet) of the drain pipe must be below the LO low level alarm height, however, it must also be above the bottom of the drain tank by a minimum distance of half the drain pipe's diameter (1/2 DN).

QTY	SEQ NO	Material ID	Material Name / Dimension, Occ	Standard or Drawing	Basic Material / Material Standard	Weight GR./NET
3	002	PAAD060920	VERTICAL OIL DRAIN	DAAD020647		45,7
1	001	107.246.799.200	PLATE	107.246.799		15,0

Free space for lic.

Q-Code: XXXXX

Standard: ISO; JIS

Main Drw.

Modif. — Number — Drawn date — Number — Drawn date — Number — Drawn date — Number — Drawn date

WIN GD Winterthur Gas & Diesel

Product: W7X40-B, W7X40DF-1.0

LUBRICATING OIL DRAIN TANK

Units: mm kg	NX	Basic Material	Net Weight 152
Made: 10.10.2019 Sudant Deogade	Scale 1:10	Size A0	Page 1/1
Chkd: 10.02.2020 jpi101 Pickup	Design Group 9722	Material ID	PAAD340882
Appd: 11.02.2020 mhu019 Hug		Drawing ID	DAAD122196

Rev. –

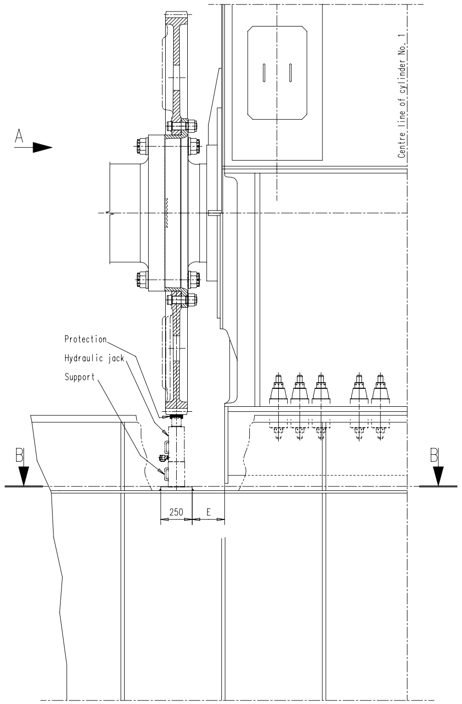
SURFACE PROTECTION SEE GROUP 0344

TOLERANCING PRINCIPLE ISO8015

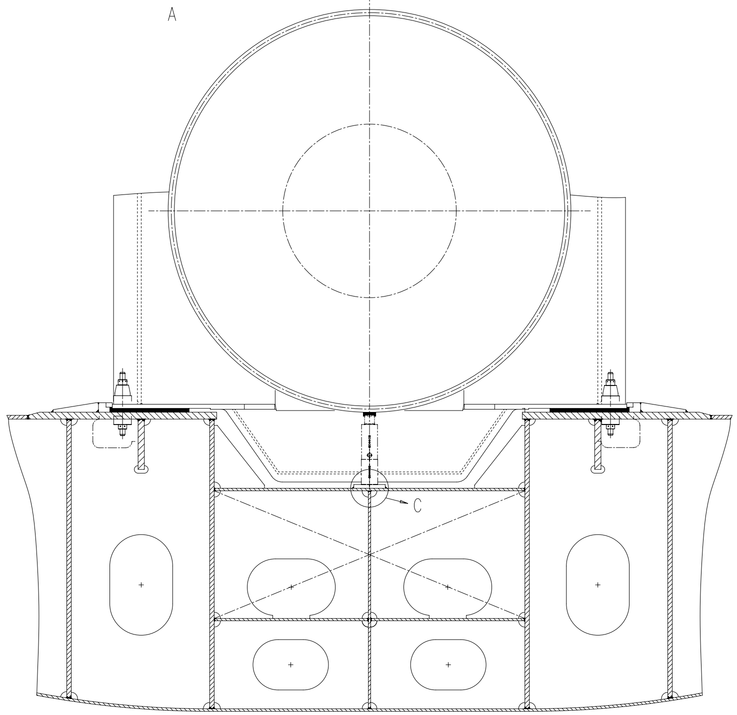
GENERAL TOLERANCES ACCORDING TO ISO2768-mK

Approved

DID - DIMENSIONAL DRAWING - Confidential



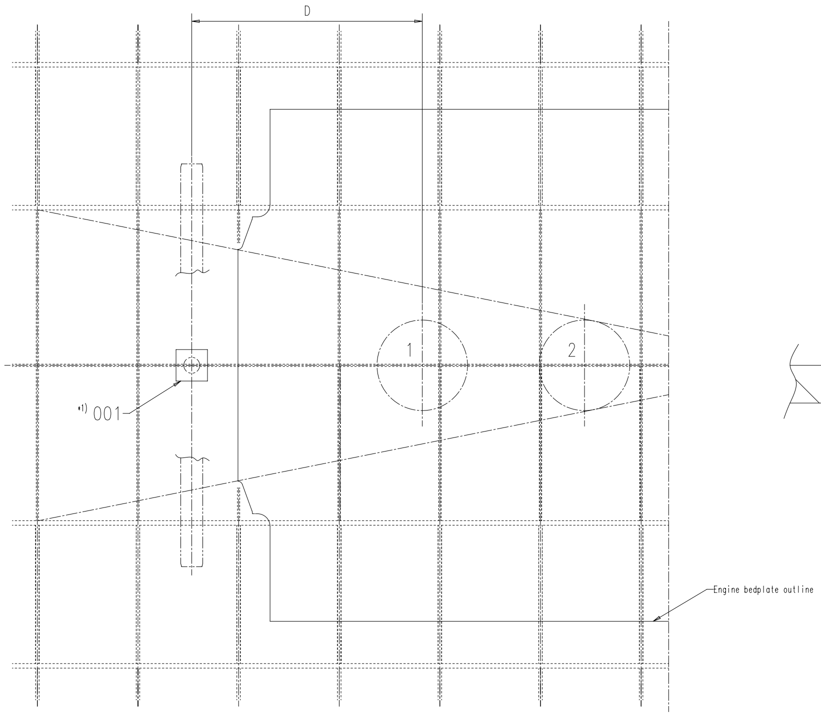
A



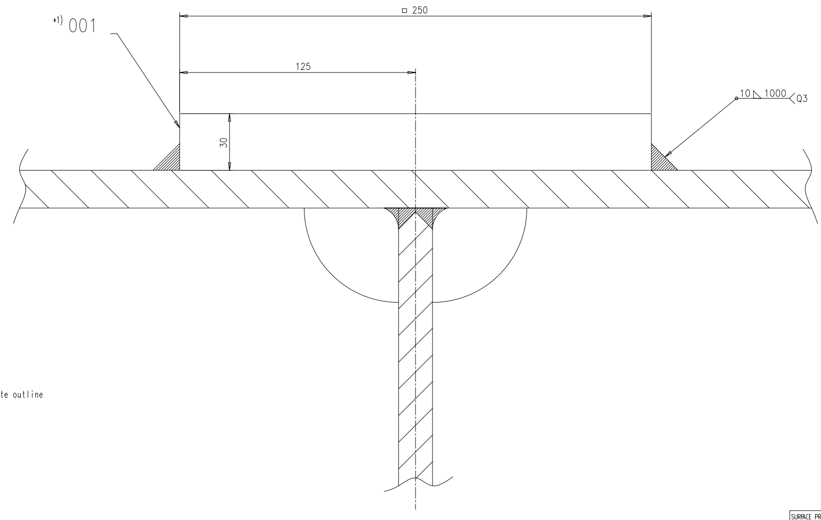
ⓘ

ENGINE TYPE	D	E approx.
RT-flex50-D/DF	1387	165
X82-B	2395	460
X35-B	1015	124
X40-B	1170	172
X52/X52DF/X52DF-1.0/X52DF-2.1	1630	325
X62-B/X62DF/X62DF-1.1/X62DF-2.1	1888	343
X72-B/X72DF/X72DF-1.1&1.2/X72DF-2.1&2.2	2131	370
X82-2.0/X82DF-1.0	2395	460
X92-B/-X92DF	2677	334

B-B



C 1:5



REMARKS:

*1) Access to the plate has to be kept clear for the hydraulic jack, to lift up the flywheel, during removal of lower main bearing shell.

Quantity	SEQ NO	Material ID	Material Name / Dimension, Occ	Standard or Drawing	Basic Material / Material Standard	Weight GR./NET
1	001	107.246.799.001	FLAT BAR	107.246.799		15,0

NetWeight: 15

MaterialID: 107.246.799.200

Free space for lic.

Q-Code: XXXXX

Standard: ISO; JIS

Main Drw.

Modif.	Number	Drawn date
F	EAAD084725	18.09.2013
G	EAAD084974	20.03.2014
H	EAAD086107	11.09.2015
I	EAAD095725	18.01.2021

WIN GD Winterthur Gas & Diesel

Product: W-2S

PLATE
TO HYDRAULIC JACK
Blech

Units: mm kg | NX | Basic Material | Net Weight

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

Made: 09.11.2000 S.Stylianou
Chkd:
Appd: 09.11.2000 WCH001 Service User

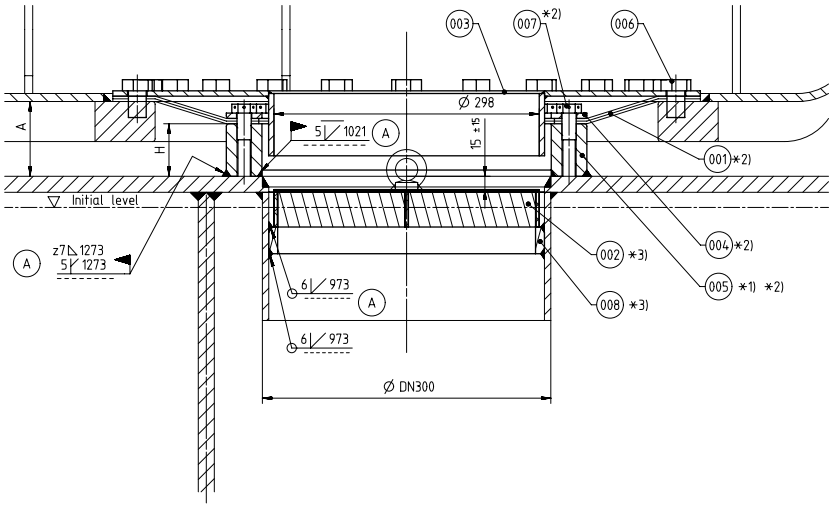
Scale: 1:14 | Size: A0 | Page: 1/1 | Material ID:
Design Group: 9722

Drawing ID: 107.246.799 | Rev. I

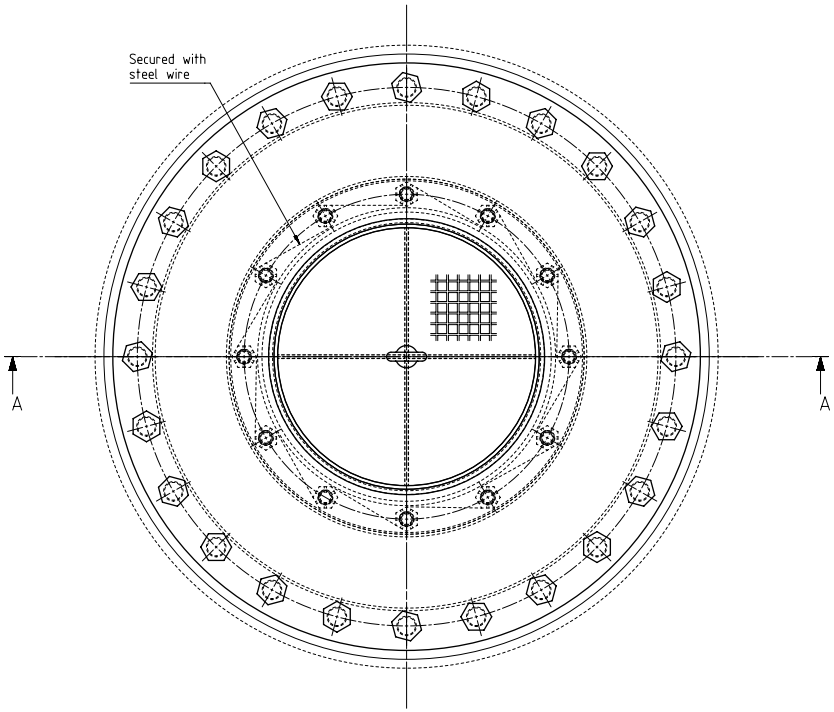
Approved

ASD - ASSEMBLY DRAWING - Internal

SECTION A-A



SHIP



REMARKS:

*1) To be aligned after engine is in final position.

*2) Pos. 001, 004, 005 and 007 to be pre-assembled prior to alignment. After alignment the Pos. 005 (flange) can be welded in place.

*3) Designed for pipe Ø 323.9 x 7.1

	A	To be measured after alignment of the engine
(A)	H	A - 25 mm

Items 001 to 008 are yard delivery.

QTY	SEQ NO	Material ID	Material Name / Dimension, Occ	Standard or Drawing	Basic Material / Material Standard	Weight GR./NET
1	008	PAAD031395	RING	DAAD013903	S235JRG2 SS400	2,07
12	007	015.151.372.201	HEXAGON HEAD SCREW M16x30		8.8	0,071
24	006	015.151.044.201	HEXAGON HEAD SCREW M20x30	ISO 4017	8.8	0,134
1	005	PAAD060685	WELDING FLANGE	DAAD020574	W-FU-235-JR	20,0
1	004	PAAD030945	RING	DAAD013763	W-FU-235-JR	2,4
1	003	PAAD060918	COVER	DAAD020639		15,2
1	002	PAAD031429	OIL STRAINER	DAAD013848		3,02
2	001	PAAD031317	RUBBER GASKET	DAAD013764	NBR Perbunan	1,2

Free space for Mc. | Q-Code XXXXX | Standard ISO; JIS | Main Drw.

Modif. A EAAD091530 17.02.2020

Product W-25

VERTICAL OIL DRAIN

Oelablauf vertikal

Units mm kg | NX | Basic Material | Net Weight 49,2

SURFACE PROTECTION SEE GROUP 0344

TOLERANCING PRINCIPLE ISO8015

GENERAL TOLERANCES ACCORDING TO ISO2768-mK

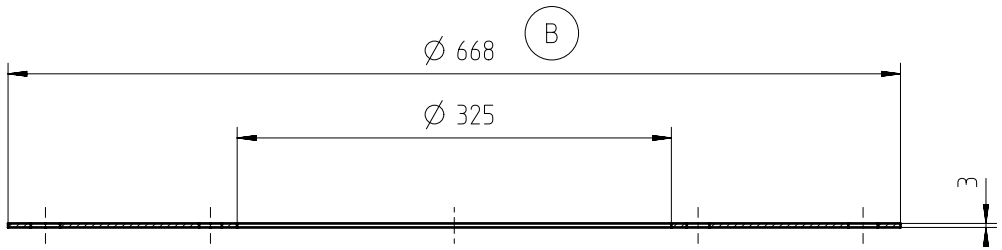
Made 20.09.2011 lmux02 L.Müller | Chkd 27.10.2011 wwr001 Wroblewski | Appd 27.10.2011 dst009 Strödecke

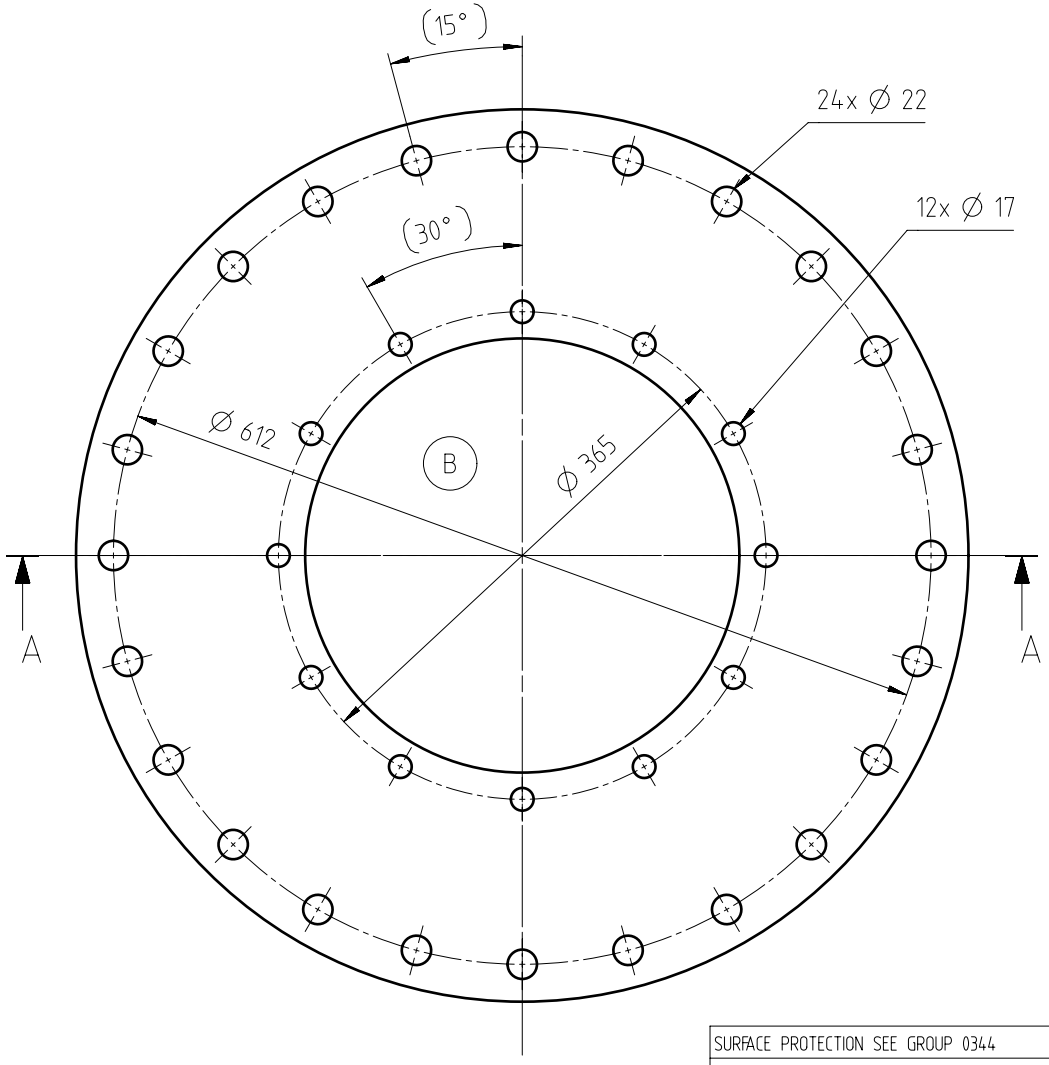
Scale 1:3 | Design Group 9722 | Size A1 | Page 1/1 | Material ID PAAD060920 | Drawing ID DAAD020647 | Rev. A

Approved

3D - DIMENSIONAL DRAWING - Confidential

SECTION A-A





Free space for lic.								Q-Code XXXXX		Main Drw.	
								Standard ISO; JIS			
Modif.	A	EAAD083145	25.01.2012	B	EAAD091530	12.11.2019					
		Number	Drawn date		Number	Drawn date		Number	Drawn date	Number	Drawn date

WIN GD Winterthur Gas & Diesel

Product W-2S

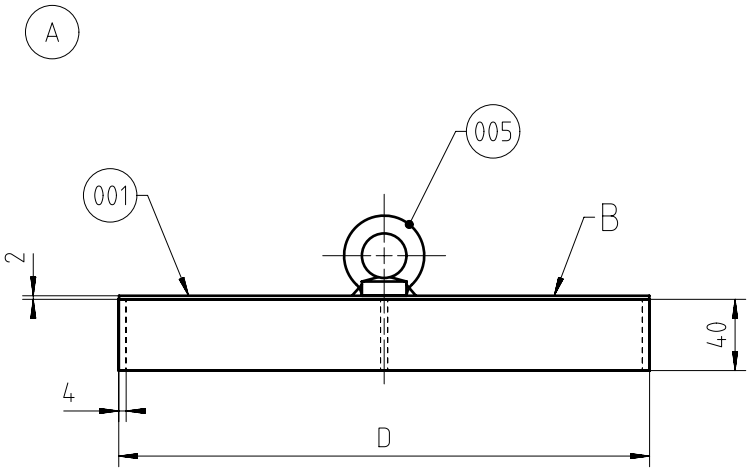
RUBBER GASKET
VERTICAL OIL DRAIN
Gummidichtung
Oelablauf vertikal

Units mm kg	NX	Basic Material NBR Perbunan			Net Weight 1,2
Made 21.01.2011 mhu019 M.Hug		Scale 1:4	Size A3	Page 1/1	Material ID PAAD031317
Chkd 31.01.2011 sfe006 Feuerstein		Design Group 9722	Drawing ID DAAD013764		Rev. B
Appd 31.01.2011 dst009 Strödecke					

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

Approved

DID - DIMENSIONAL DRAWING - Confidential



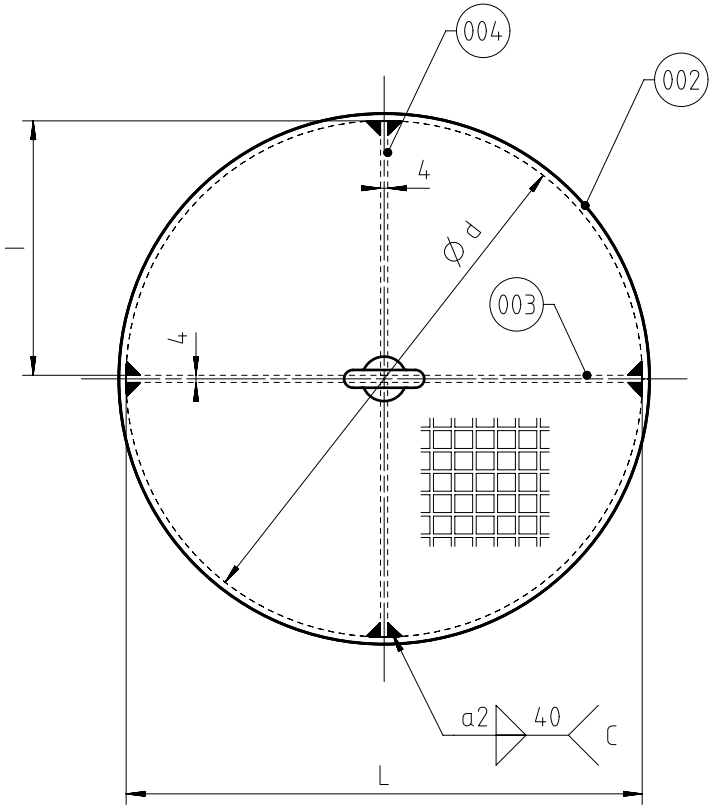
Parameter D and d related to inner pipe diameter (DN300) inside of drain tank

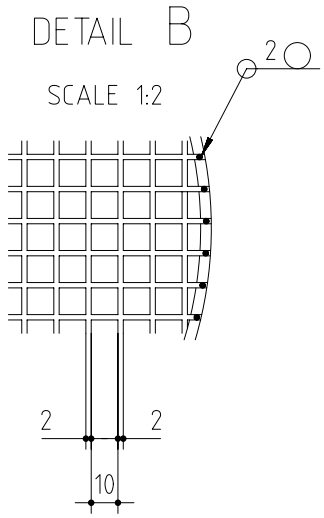
d = pipe inner diameter - 20 mm

D = d + 8 mm

L = d

l = d/2 - 2 mm





1	005	015.201.531.730	EYE NUT M10	DIN 582	C15;S15C	0,09
2	004	PAAD031427	FLAT BAR	DAAD127677	W-FU-235-JR	0,17
1	003	PAAD031426	FLAT BAR	DAAD127674	W-FU-235-JR	0,36
1	002	PAAD031396	RING	DAAD013964	W-FU-235-JR	1,15
1	001	PAAD031425	PERFORATED SHEET	DAAD127672	W-FU-235-JR	1,08
QTY	SEQ NO	Material ID	Material Name / Dimension, Occ	Standard or Drawing	Basic Material / Material Standard	Weight GR./NET

Approved

Free space for lic.

Q-Code XXXXX

Standard ISO; JIS

Main Drw.

Modif.		Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
	A	EAAD091530	25.02.2020						

WIN GD Winterthur Gas & Diesel

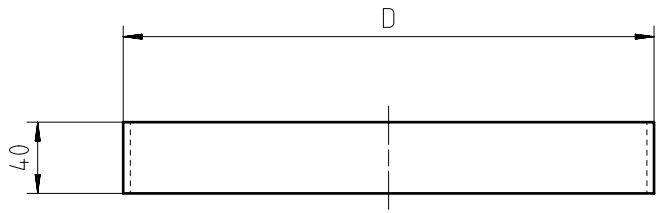
Product W-2S

OIL STRAINER
VERTICAL OIL DRAIN
Oelsieb

Units mm kg	NX		Basic Material			Net Weight 3,02
SURFACE PROTECTION SEE GROUP 0344	Made	27.01.2011 mhu019 M.Hug	Scale 1:3	Size A3	Page 1/1	Material ID PAAD031429
TOLERANCING PRINCIPLE ISO8015	Chkd	31.01.2011 sfe006 Feuerstein	Design Group 9722	Drawing ID DAAD013848		Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	31.01.2011 dst009 Strödecke				

DID - DIMENSIONAL DRAWING - Confidential

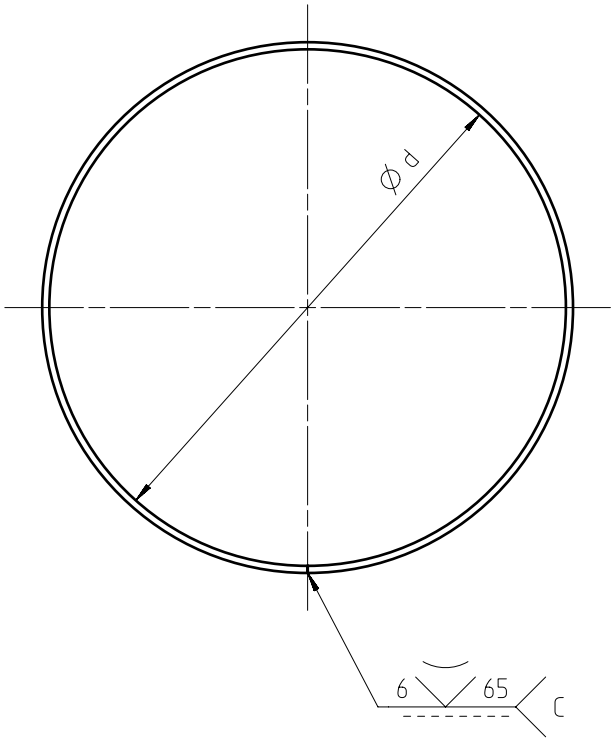
A

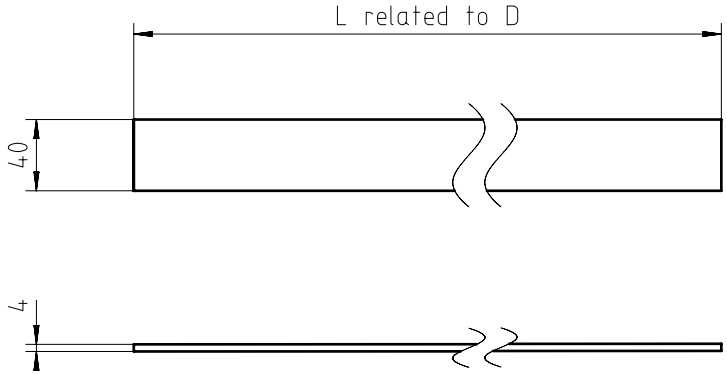


Parameter D and d related to inner pipe diameter (DN300) inside of drain tank

d = pipe inner diameter - 20 mm

D = d + 8 mm





Approved

Free space for lic.									Q-Code XXXXX	Standard ISO; JIS	Main Drw.
Modif.	A	EAAD091530	17.02.2020								
		Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date		

WIN GD Winterthur Gas & Diesel

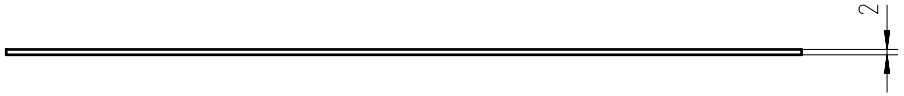
Product W-2S

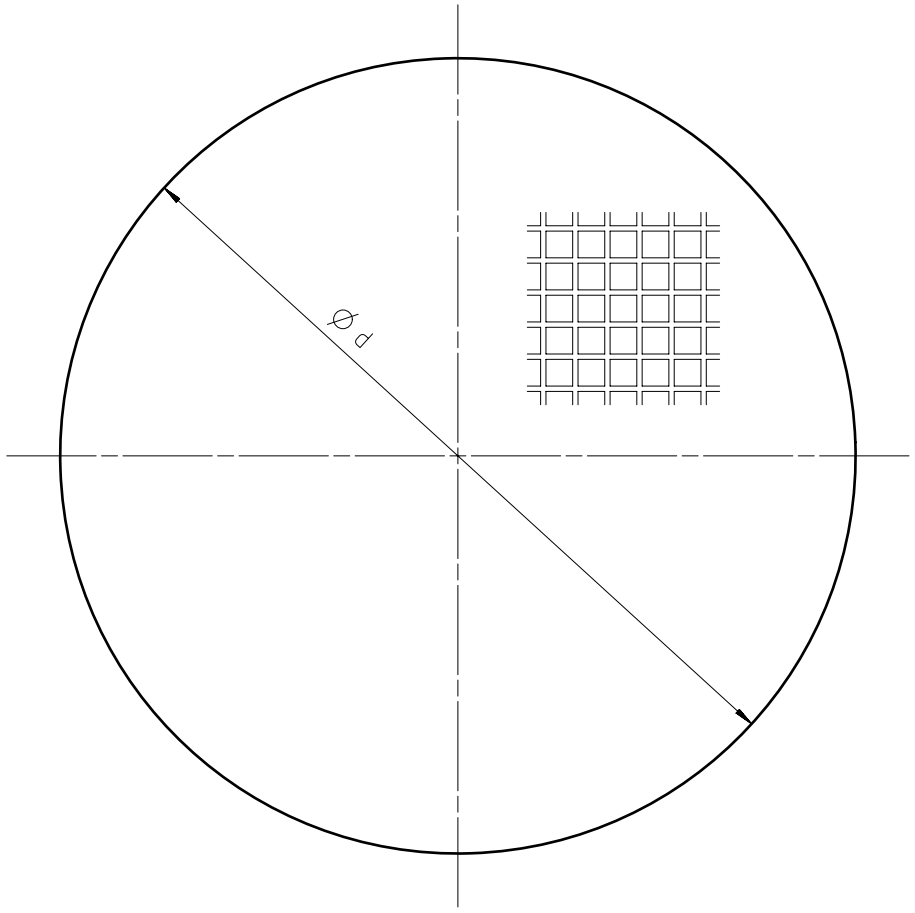
RING

Ring

Units mm kg	NX		Basic Material W-FU-235-JR		Net Weight 1,15
SURFACE PROTECTION SEE GROUP 0344	Made 31.01.2011 mhu019 M.Hug	Scale 1:3	Size A3	Page 1/1	Material ID PAAD031396
TOLERANCING PRINCIPLE ISO8015	Chkd 31.01.2011 sfe006 Feuerstein	Design Group 9722	Drawing ID DAAD013964		Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 31.01.2011 dst009 Strödecke				

DID - DIMENSIONAL DRAWING - Confidential





Parameter d related to inner pipe diameter (DN300) inside of drain tank
d = Pipe diameter inside - 20 mm

Free space for lic.									Q-Code XXXXX	Standard ISO; JIS	Main Drw.
Modif.		Number	Drawn date		Number	Drawn date		Number	Drawn date		Number	Drawn date

WIN GD Winterthur Gas & Diesel

Product W-2S

PERFORATED SHEET

Lochblech

Units mm kg	NX		Basic Material W-FU-235-JR		Net Weight 1,08
SURFACE PROTECTION SEE GROUP 0344	Made	25.02.2020 dki021 dh.Kim	Scale 1:2	Size A3 / Page 1/1	Material ID PAAD031425
TOLERANCING PRINCIPLE ISO8015	Chkd	02.09.2020 jpi101 Pickup	Design Group 9722	Drawing ID DAAD127672	Rev. –
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	04.09.2020 mhu019 Hug			

Approved

DID - DIMENSIONAL DRAWING - Confidential

Parameter L related to inner pipe diameter (DN300) inside of drain tank
L = Pipe diameter inside - 20 mm

Free space for lic.								Q-Code XXXXX		Main Drw.	
								Standard ISO; JIS			
Modif.		Number	Drawn date		Number	Drawn date		Number	Drawn date		Number	Drawn date

WIN GD Winterthur Gas & Diesel	Product W-2S	FLAT BAR Flachstahl			
Units mm kg	NX		Basic Material W-FU-235-JR		Net Weight 0,36
SURFACE PROTECTION SEE GROUP 0344	Made 25.02.2020 dki021 DH.Kim	Scale 1:1	Size A3	Page 1/1	Material ID PAAD031426
TOLERANCING PRINCIPLE ISO8015	Chkd 02.09.2020 jpi101 Pickup	Design Group 9722	Drawing ID DAAD127674		Rev. –
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 04.09.2020 mhu019 Hug				

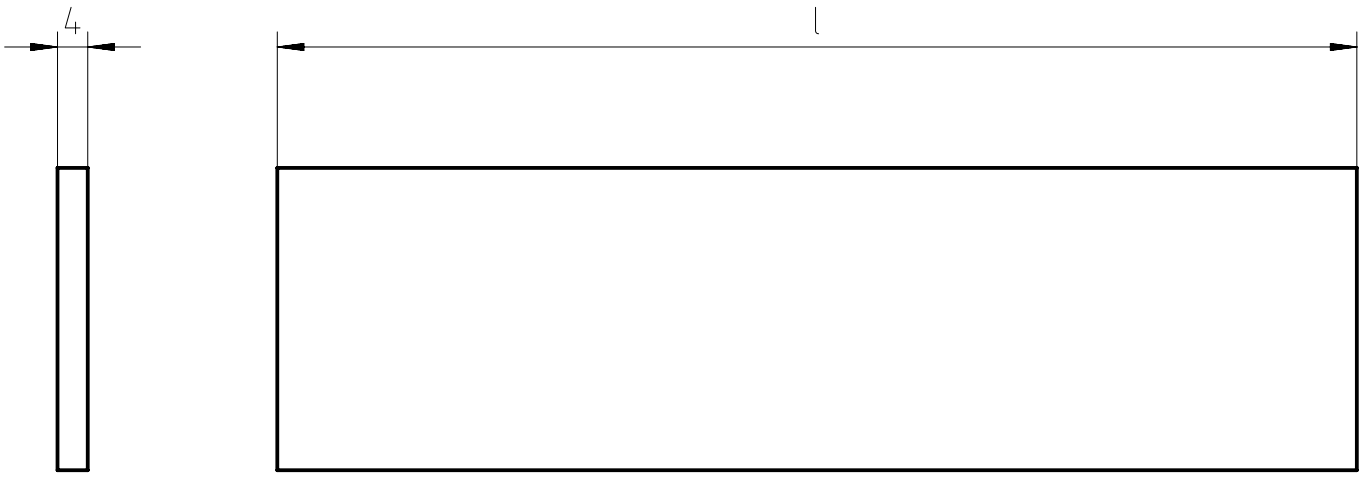
Approved

DID - DIMENSIONAL DRAWING - Confidential

SURFACE PROTECTION SEE GROUP 0344

TOLERANCING PRINCIPLE ISO8015

GENERAL TOLERANCES ACCORDING TO ISO2768-mK



Parameter l related to inner pipe diameter (DN300) inside of drain tank
l = Pipe radius inside - 20 mm

Approved

Free space for lic.

Q-Code: XXXXX

Standard: ISO; JIS

Main Drw.

Modif.	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date

WIN GD
Winterthur Gas & Diesel

Product: W-2S

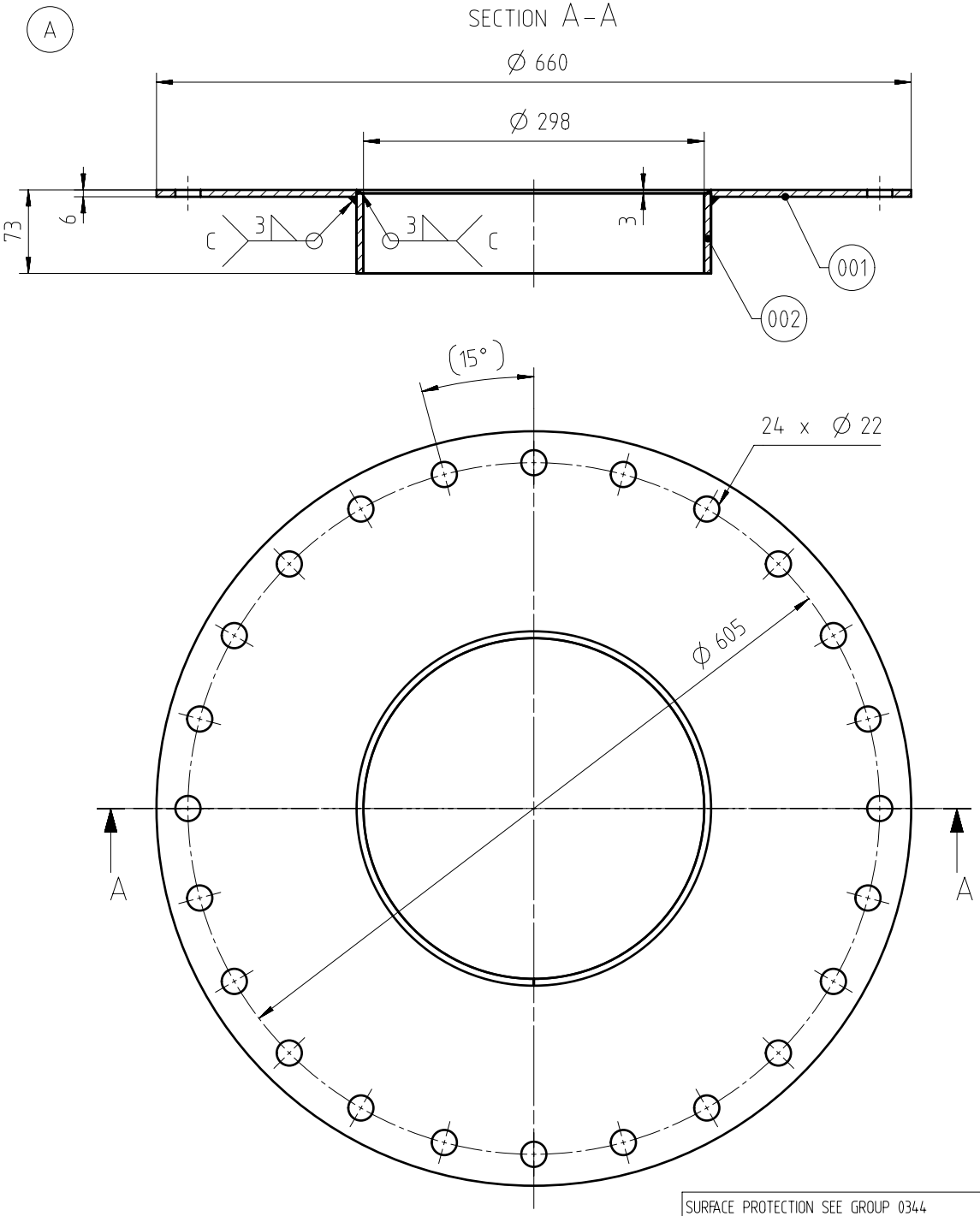
FLAT BAR

Flachstahl

Units	mm kg	NX	Basic Material	W-FU-235-JR	Net Weight	0,17

Made	25.02.2020 dki021 DH.Kim	Scale 1:1	Size A4	Page 1/1	Material ID	PAAD031427
Chkd	02.09.2020 jpi101 Pickup	Design Group 9722	Drawing ID	DAAD127677	Rev.	–
Appd	04.09.2020 mhu019 Hug					

DID - DIMENSIONAL DRAWING - Confidential



1	002	PAAD060683	RING	DAAD020573	W-FU-235-JR	3,13
1	001	PAAD031020	PLATE	DAAD013657	W-FU-235-JR	12,1
QTY	SEQ NO	Material ID	Material Name / Dimension, Occ	Standard or Drawing	Basic Material / Material Standard	Weight GR./NET

Free space for lic.

Q-Code: XXXXX

Standard: ISO; JIS

Main Drw.

Modif.		Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
	A	EAAD091530	17.02.2020						

WIN GD Winterthur Gas & Diesel

Product: W-2S

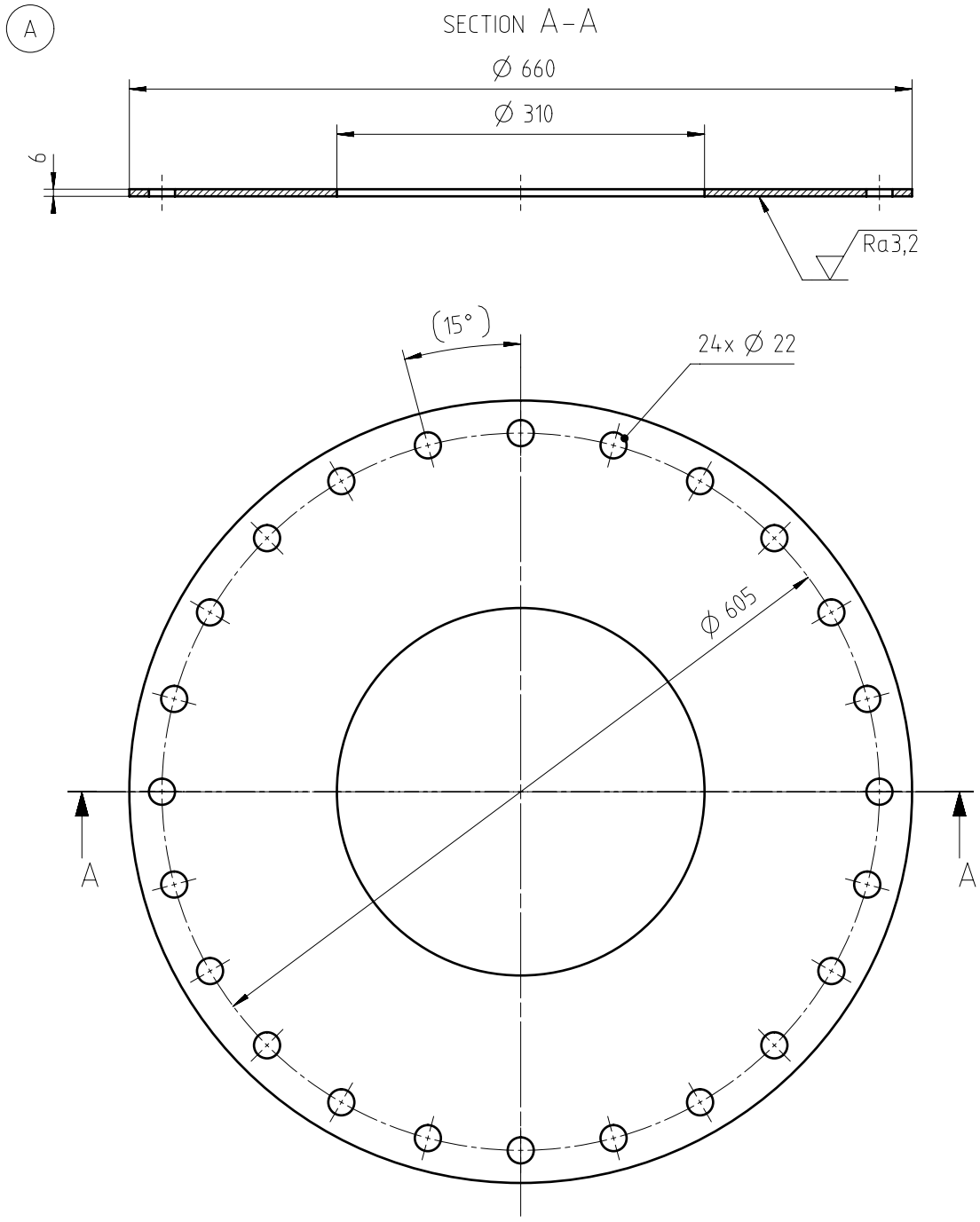
COVER
VERTICAL OIL DRAIN
Abdeckung

Units: mm kg | NX | Basic Material | Net Weight 15,2

SURFACE PROTECTION SEE GROUP 0344	Made	19.09.2011	lmux02 L.Müller	Scale 1:4	Size A3 / Page 1/1	Material ID PAAD060918
TOLERANCING PRINCIPLE ISO8015	Chkd	27.10.2011	wwr001 Wroblewski	Design Group 9722	Drawing ID DAAD020639	Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	27.10.2011	dst009 Strödecke			

Approved

DID - DIMENSIONAL DRAWING - Confidential



Free space for lic.									Q-Code XXXXX		Main Drw.
									Standard ISO; JIS		
Modif.	A	EAAD091530	17.02.2020								
		Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date

WIN GD Winterthur Gas & Diesel

Product W-2S

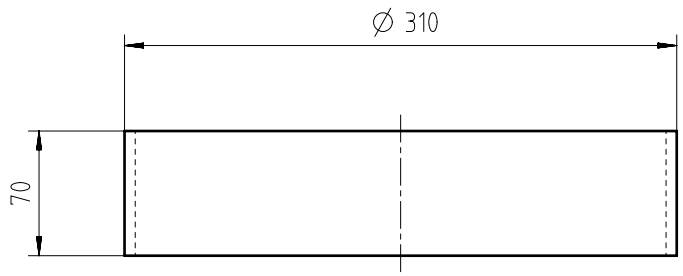
PLATE

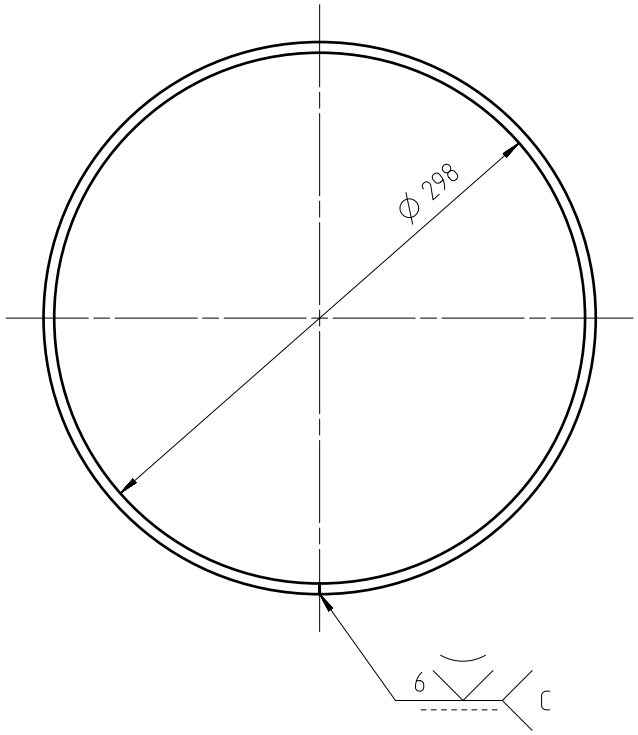
Blech

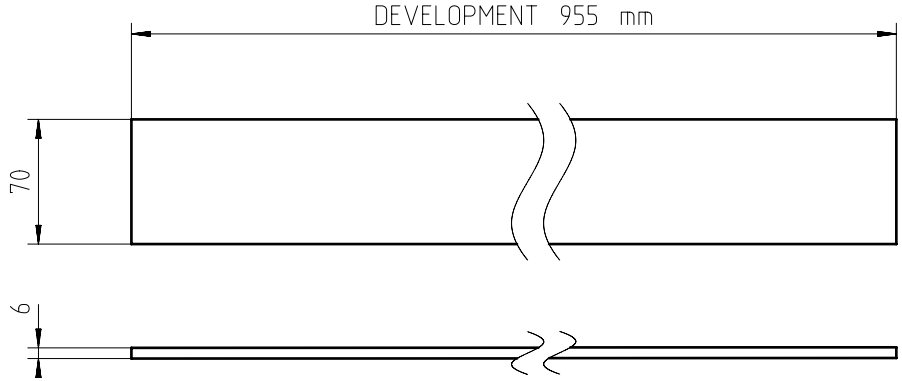
Units mm kg	NX	Basic Material W-FU-235-JR			Net Weight 12,1
SURFACE PROTECTION SEE GROUP 0344	Made 20.01.2011 mhu019 M.Hug	Scale 1:4	Size A3	Page 1/1	Material ID PAAD031020
TOLERANCING PRINCIPLE ISO8015	Chkd 31.01.2011 sfe006 Feuerstein	Design Group 9722	Drawing ID DAAD013657		Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 31.01.2011 dst009 Strödecke				

Approved

DID - DIMENSIONAL DRAWING - Confidential







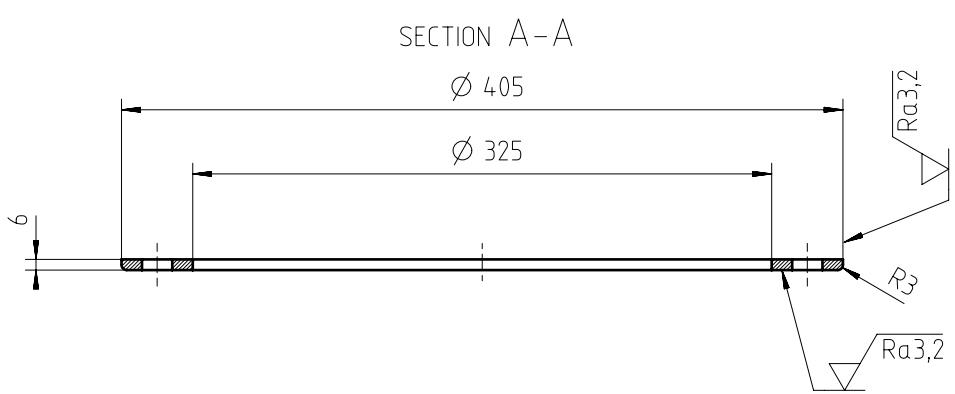
Free space for lic.									Q-Code XXXXX		Main Drw.
									Standard ISO; JIS		
Modif.	A	EAAD091530	17.02.2020								
		Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date

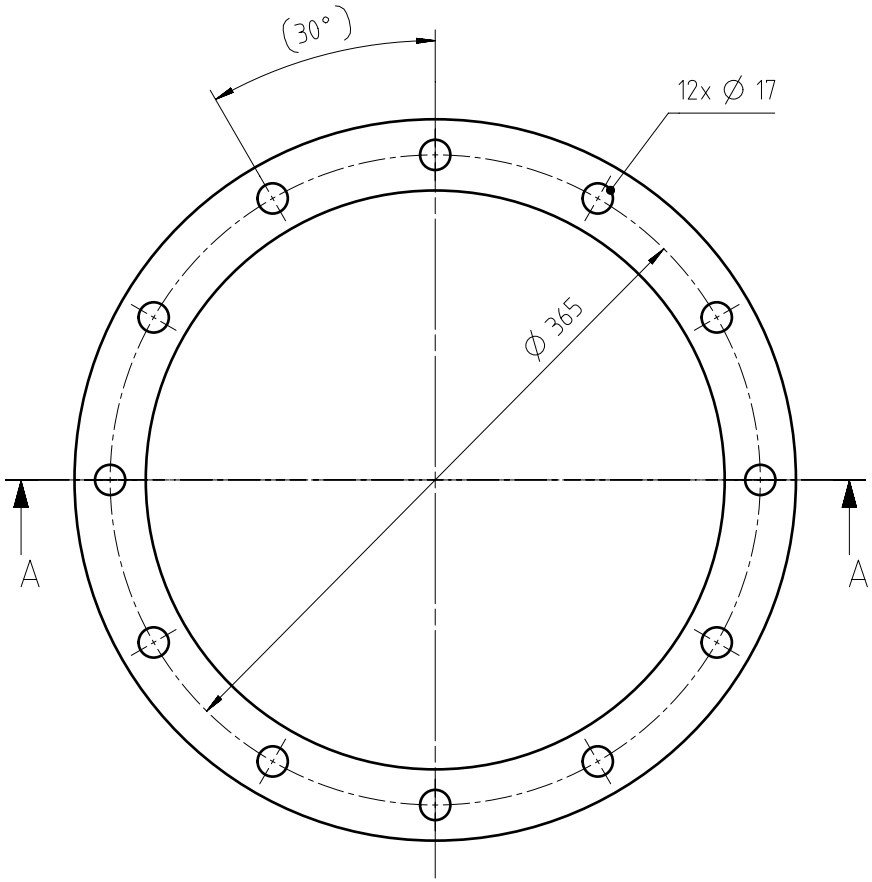
WIN GD Winterthur Gas & Diesel

Product W-2S	RING Ring				
Units mm kg	NX	Basic Material W-FU-235-JR			Net Weight 3,13
SURFACE PROTECTION SEE GROUP 0344	Made 19.09.2011 lmux02 L.Müller	Scale 1:3	Size A3	Page 1/1	Material ID PAAD060683
TOLERANCING PRINCIPLE ISO8015	Chkd 27.10.2011 wwr001 Wroblewski	Design Group 9722	Drawing ID DAAD020573		Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 27.10.2011 dst009 Strödecke				

Approved

DID - DIMENSIONAL DRAWING - Confidential





Ra12,5 (√) SHARP EDGES REMOVED

Free space for lic.								Q-Code XXXXX		Main Drw.	
								Standard ISO; JIS			
Modif.	A	EAAD091530	17.02.2020								
		Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date		

WIN GD Winterthur Gas & Diesel

Product W-2S

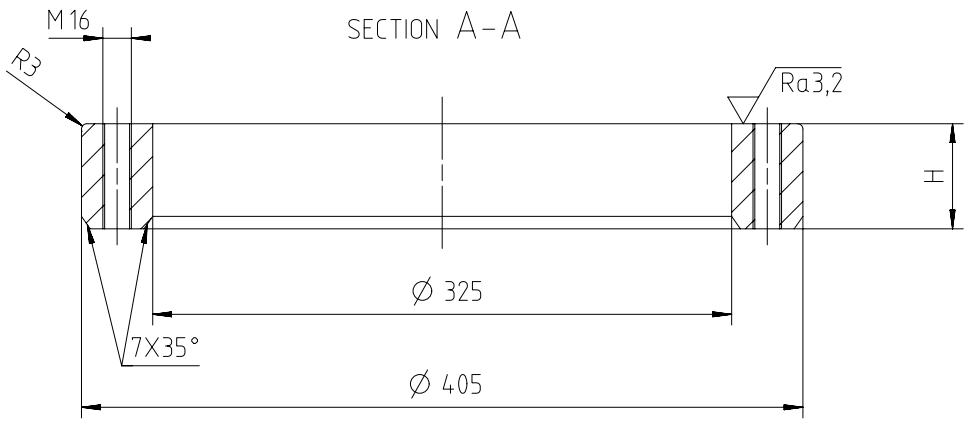
RING

Ring

Units mm kg	NX	Basic Material W-FU-235-JR			Net Weight 2,4
SURFACE PROTECTION SEE GROUP 0344	Made 21.01.2011 mhu019 M.Hug	Scale 1:3	Size A3	Page 1/1	Material ID PAAD030945
TOLERANCING PRINCIPLE ISO8015	Chkd 31.01.2011 sfe006 Feuerstein	Design Group 9722	Drawing ID DAAD013763		Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 31.01.2011 dst009 Strödecke				

Approved

DID - DIMENSIONAL DRAWING - Confidential

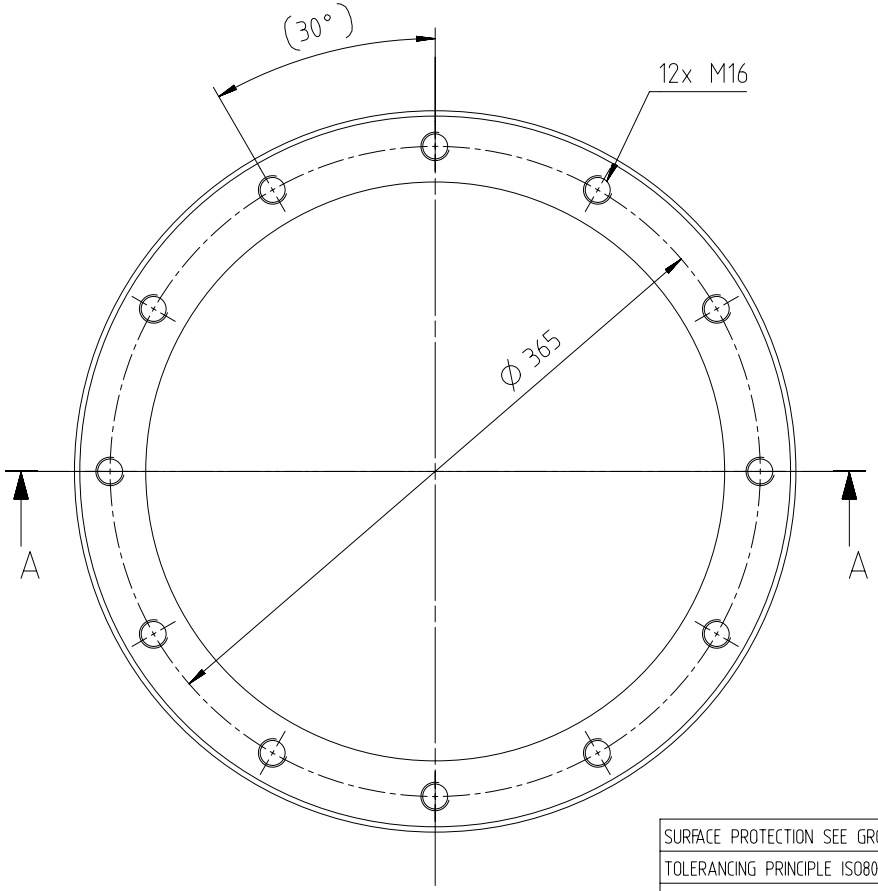


Ra12,5 (✓) SHARP EDGES REMOVED

H depends on chock thickness.

(A) H = A - 25 mm

for the relation of A, see Drawing DAAD020647



Free space for lic.								Q-Code XXXXX		Main Drw.	
								Standard ISO; JIS			
Modif.	A	EAAD091530	17.02.2020								
		Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date		

WIN GD Winterthur Gas & Diesel

Product W-2S

WELDING FLANGE

Anschweissflansch

Units mm kg	NX		Basic Material W-FU-235-JR			Net Weight 20
Made 19.09.2011 lmux02 L.Müller		Scale 1:3	Size A3	Page 1/1	Material ID PAAD060685	
Chkd 27.10.2011 wwr001 Wroblewski		Design Group 9722	Drawing ID DAAD020574			Rev. A
Appd 27.10.2011 dst009 Strödecke						

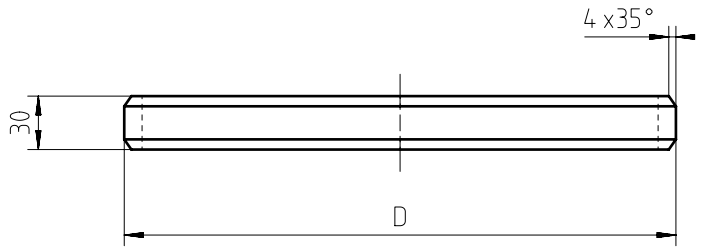
SURFACE PROTECTION SEE GROUP 0344

TOLERANCING PRINCIPLE ISO8015

GENERAL TOLERANCES ACCORDING TO ISO2768-mK

Approved

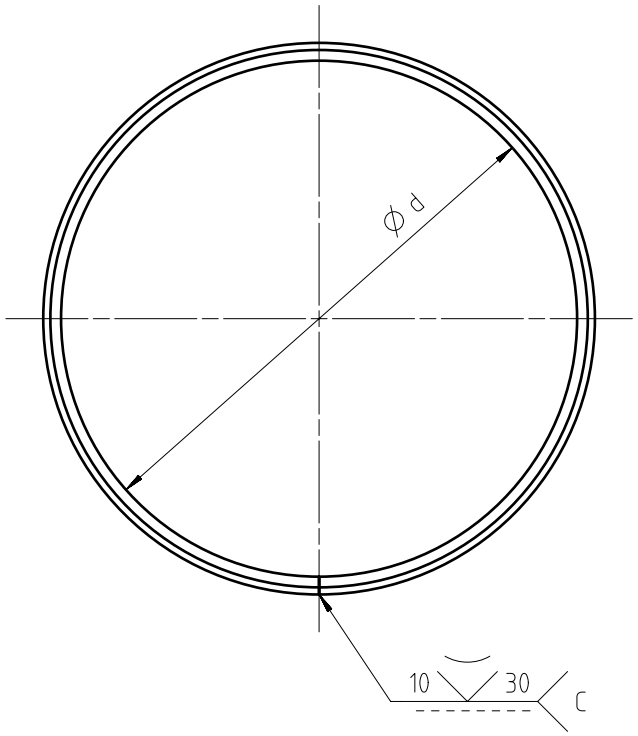
DID - DIMENSIONAL DRAWING - Confidential

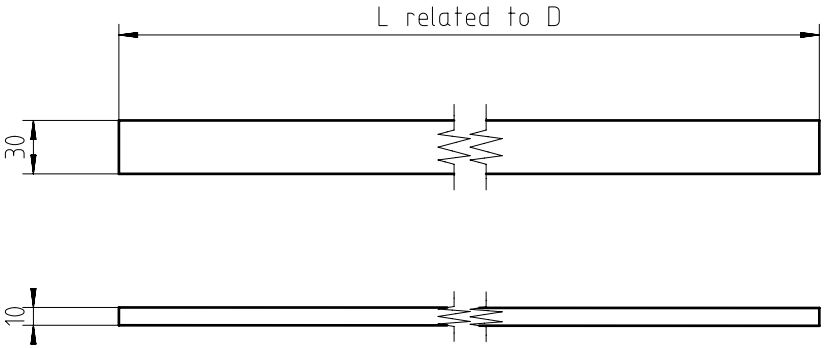


Parameter D and d related to inner pipe diameter (DN300) inside of drain tank

D = Pipe diameter inside

d = D - 20 mm





Free space for lic.									Q-Code XXXXX		Main Drw.
									Standard ISO; JIS		
Modif.	A	EAAD091530	18.02.2020								
		Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date

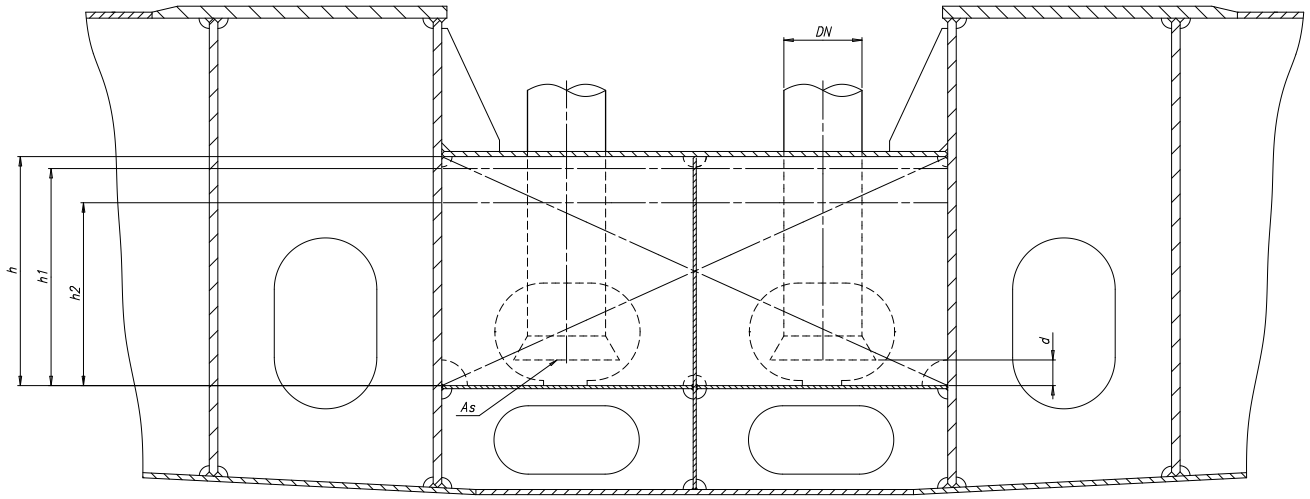
WIN GD Winterthur Gas & Diesel

Product W-2S	RING Ring				
Units mm kg	NX	Basic Material W-FU-235-JR			Net Weight 4,3
SURFACE PROTECTION SEE GROUP 0344	Made 27.01.2011 mhu019 M.Hug	Scale 1:3	Size A3	Page 1/1	Material ID PAAD031395
TOLERANCING PRINCIPLE ISO8015	Chkd 31.01.2011 sfe006 Feuerstein	Design Group 9722	Drawing ID DAAD013903		Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 31.01.2011 dst009 Strödecke				

Approved

DID - DIMENSIONAL DRAWING - Confidential

W-X40/-B



Specifications that need to be met:

Dimensioning guidelines and capacities for tank design

	No. of cylinders			5	6	7	8
Ⓒ	h	Recommended total tank height	(mm)	according to installation requirements			
		Recommended total tank volume: 105% *4)	(m3)	8	9	10	11
Ⓒ	h1	Recommended filling level	(mm)	according to installation requirements			
		Recommended volume: 100% *4)	(m3)	8	9	10	11
	h2	Low-level alarm	(mm)	*2)			
		Volume	(m3)				
Ⓒ	Vr	Min. retention volume *5)	(m3)	6	7	7	8
	d	Distance between suction pipe and bottom of tank	(mm)	*3)			
	As	Suction area		min. 1.5 x suction pipe area (DN)			

REMARKS:

*1) Level after filling of external system. Volume and level in the LO drain tank depend on capacity of pipes, coolers, filters, etc. The oil volume in tank contains a part of the oil quantity, which drains back when the pumps are stopped.

*2) The low-level alarm (h2) has to be positioned in such a way that a proper pump suction is ensured under the conditions defined by the classification societies.

Minimum inclination angles comply with the rules of classification societies:

Heel to each side	15°
Rolling to each side	±22.5
Trim	500/L, max. 5° L: ship length in meter Example L = 250 m Trim = 500/250 = 2°
Pitching	± 7.5°

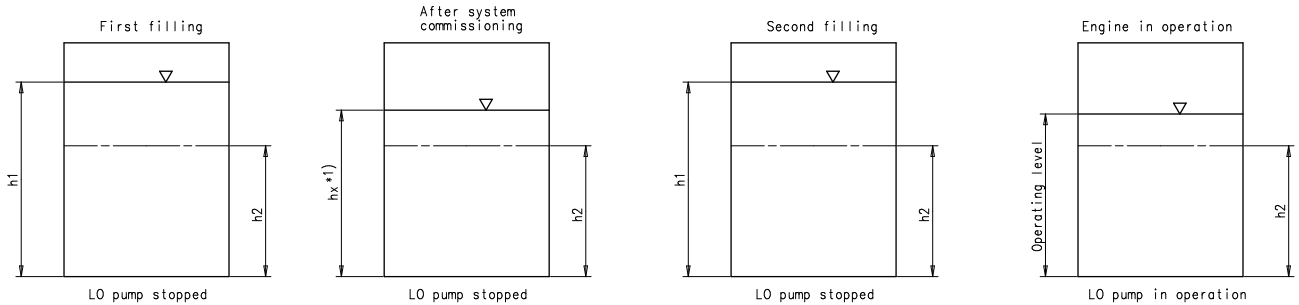
Additionally this level has to be above or equal to the minimum retention volume (Vr) for M/E operation.

*3) Distance (d) between suction pipe inlet of main LO pumps and LO drain tank bottom has to be in accordance with the requirements of the pump manufacturer. As guideline the following formula can be applied: d = DN/4 + 40, d = min. 80 mm.

Ⓒ *4) The stated tank volume represent the min. requirement. Final tank dimensions have to be aligned in regard to dimensional restricions by ship and engine structure and the pump suction requirement.

Ⓒ *5) To be maintained during engine operation (LO pump suction without LO drain back-flow (emergency case) is ensured for at least 3 minutes).

LO DRAIN TANK - FILLING PROCESS

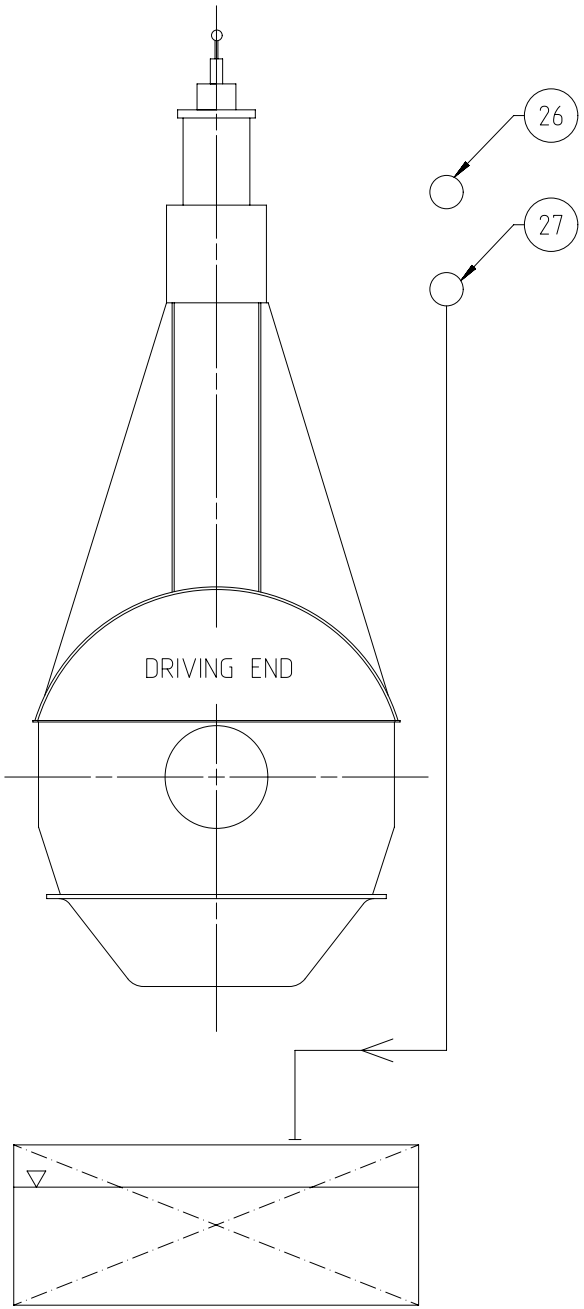


Free space for i.c.										Q-Code XXXXX	Main Drw.
										Standard ISO JIS	
Modif.	A	EAAD086020	15.07.2015	B	EAAD086282	16.11.2015	C	EAAD086531	24.03.2016		
	Number		Drawn date	Number		Drawn date	Number		Drawn date	Number	Drawn date

WIN GD Winterthur Gas & Diesel	Product W-40	LUBRICATING OIL DRAIN TANK FILLING GUIDELINE			
Units mm kg	IDE	Basic Material			Net Weight 0.001
SURFACE PROTECTION SEE GROUP 0344	Mode 23.01.2015 wwa008 W.Wang	Scale 1:25	Size A1	Page 1/1	Material ID PAAD181146
TOLERANCING PRINCIPLE ISO8015	Chkd 20.04.2015 mhu019 Hug	Design Group 9722	Drawing ID DAAD062728		Rev. C
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 13.05.2015 bha009 Haag				

Approved

DIN - DIMENSIONAL DRAWING - Confidential



SPECIFICATION which must be met

(26) INLET - Turbocharger lubricating oil

- Lubricating oil temperature:
  - ABB: 30 ~ 85 °C
  - MHI: 35 ~ 50 °C
- Lubricating oil pressure
  - ABB: 0.8 ~ 2.5 bar
  - MHI: 0.6 ~ 1.5 bar
- Lubricating oil volume flow: according to the turbocharger maker's recommendation
- Lubricating oil cleanliness:
  - Full flow filtered by a 50 micron (absolute sphere passing mesh) automatic self-cleaning filter
  - Offline cleaning of the oil return (including back-flushing oil)

(27) OUTLET - Turbocharger lubricating oil

- Oil return to lubricating oil drain tank
- Oil return pipe must not be connected to other drain pipes.
- Oil outlet must be above the max. oil level in the tank or as an alternative a drain pipe with venting holes above the max. oil level needs to be installed.

Free space for lic.

Q-Code: XXXXX

Standard: ISO; JIS

Main Drw.

Modif.	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
A	EAAD091530	20.11.2019						

WIN GD Winterthur Gas & Diesel

Product: W-2S

LUBRICATING OIL SYSTEM
Separated TC lubricating
Schmieroelsystem

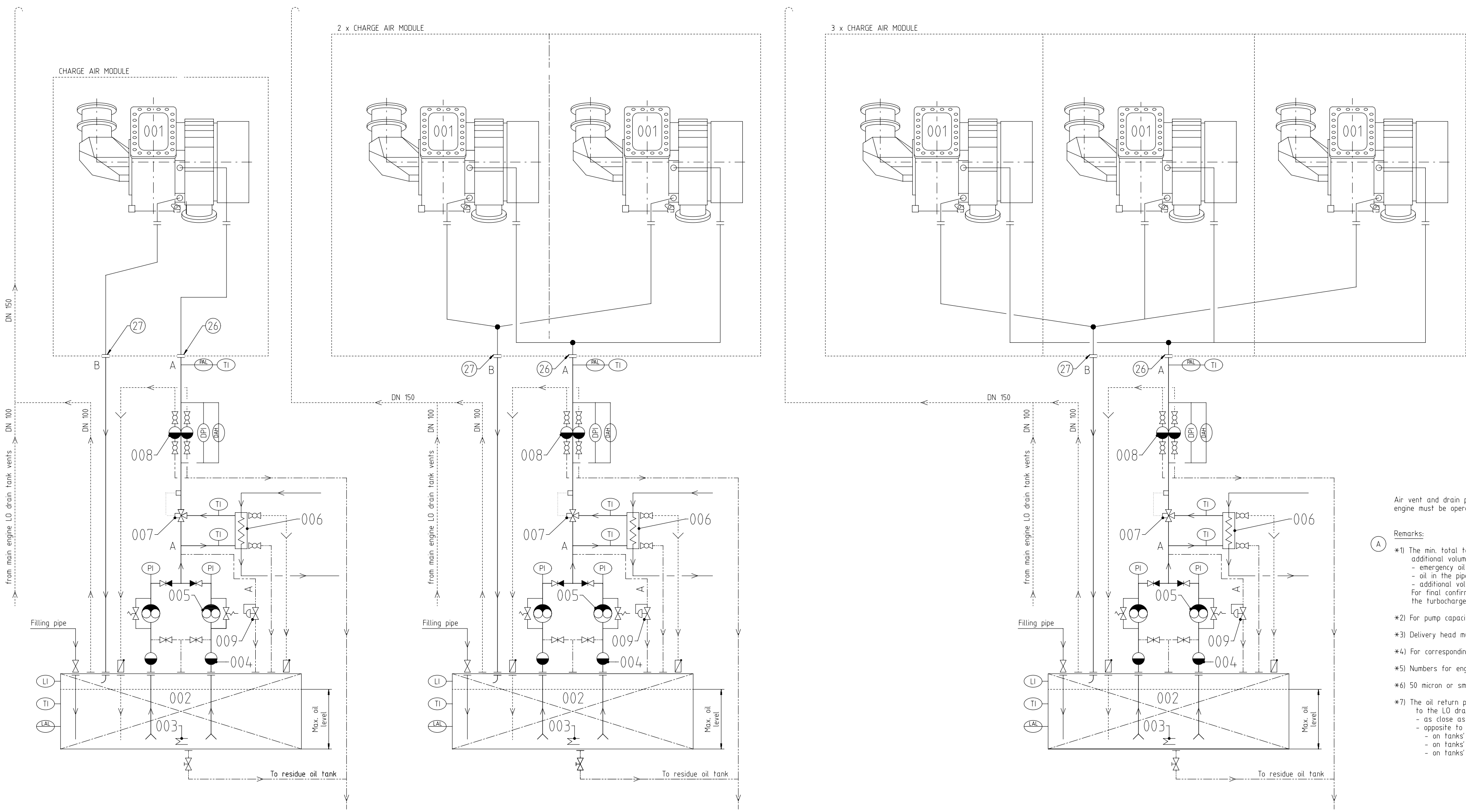
Units	mm kg	NX	Basic Material	Net Weight 0,001

SURFACE PROTECTION SEE GROUP 0344	Made	05.12.2016	dki021	DH Kim	Scale -	Size A3 / Page 1/5 / Material ID PAAD245338
TOLERANCING PRINCIPLE ISO8015	Chkd	16.12.2016	wwa008	Wang	Design Group 9722	Drawing ID DAAD083642 / Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	16.12.2016	bha009	Haag		

Approved

DID - DIMENSIONAL DRAWING - Confidential

Pos.	Description
001	ABB-Turbocharger
002	Lubricating oil drain tank
003	Heating coil
004	Suction filter
005	Lubricating oil pump
006	Lubricating oil cooler
007	Automatic temperature control valve
008	Lubricating oil filter *6)
009	Pressure regulating valve
(26)	INLET - Turbocharger lubricating oil *5)
(27)	OUTLET - Turbocharger lubricating oil *5) *7)



Air vent and drain pipes must be fully functional at all inclination angles of the ship at which the engine must be operational.

(A) Remarks:

*1) The min. total tank capacity must consider the min. retention volume, plus the following additional volume:
- emergency oil in the integrated head tank
- oil in the pipeline which drains back, when pump is stopped
- additional volume for air

For final confirmation of the min. total tank capacity, please contact the turbocharger manufacturer.

*2) For pump capacity, temperature and oil viscosity, please refer to the GTD program.

*3) Delivery head must be according to the actual piping layout.

*4) For corresponding data, please refer to manufacturer of turbocharger.

*5) Numbers for engine pipe connections, please refer to the pipe connection plan for specific engine.

*6) 50 micron or smaller (absolute, sphere passing mesh).

*7) The oil return pipe must not be connected to other drain pipes. If the oil is returned to the LO drain tank it is recommended to connect the oil outlet
- as close as possible to the separator suction pipe
- opposite to the main LO pump, i.e.
  - on tanks' forward end if the main LO pump is on tanks' aft end
  - on tanks' aft end if the main LO pump is on tanks' forward end
  - on tanks' forward or aft end if the main LO pump is in the middle of the tank.

1 SET OF TURBOCHARGER				A165-L / A265-L	A170-L / A270-L	A175-L / A275-L	A180-L / A280-L	A185-L / A285-L	A190-L
LO tank	min. retention volume		m³	*4)					
	min. total tank capacity		m³	*1)					
LO pump *2)	capacity		m³	Refer to GTD					
	capacity		l/min						
	delivery *3)		bar	4.0					
Nominal pipe diameter		A	DN	32	32	32	40	40	40
		B	DN	65	65	65	80	80	80
		C	DN	65	65	65	80	80	80

2 SETS OF TURBOCHARGERS				A165-L / A265-L	A170-L / A270-L	A175-L / A275-L	A180-L / A280-L	A185-L / A285-L	A190-L
LO tank	min. retention volume		m³	*4)					
	min. total tank capacity		m³	*1)					
LO pump *2)	capacity		m³	Refer to GTD					
	capacity		l/min						
	delivery *3)		bar	4.0					
Nominal pipe diameter		A	DN	40	50	50	50	65	65
		B	DN	80	100	100	100	125	125
		C	DN	80	100	100	100	125	125

(A)

3 SETS OF TURBOCHARGERS				A175-L / A275-L	A180-L / A280-L	A185-L / A285-L	A190-L
LO tank	min. retention volume		m³	*4)			
	min. total tank capacity		m³	*1)			
LO pump *2)	capacity		m³	Refer to GTD			
	capacity		l/min				
	delivery *3)		bar	4.0			
Nominal pipe diameter		A	DN	65	65	65	80
		B	DN	125	125	150	150
		C	DN	125	125	150	150

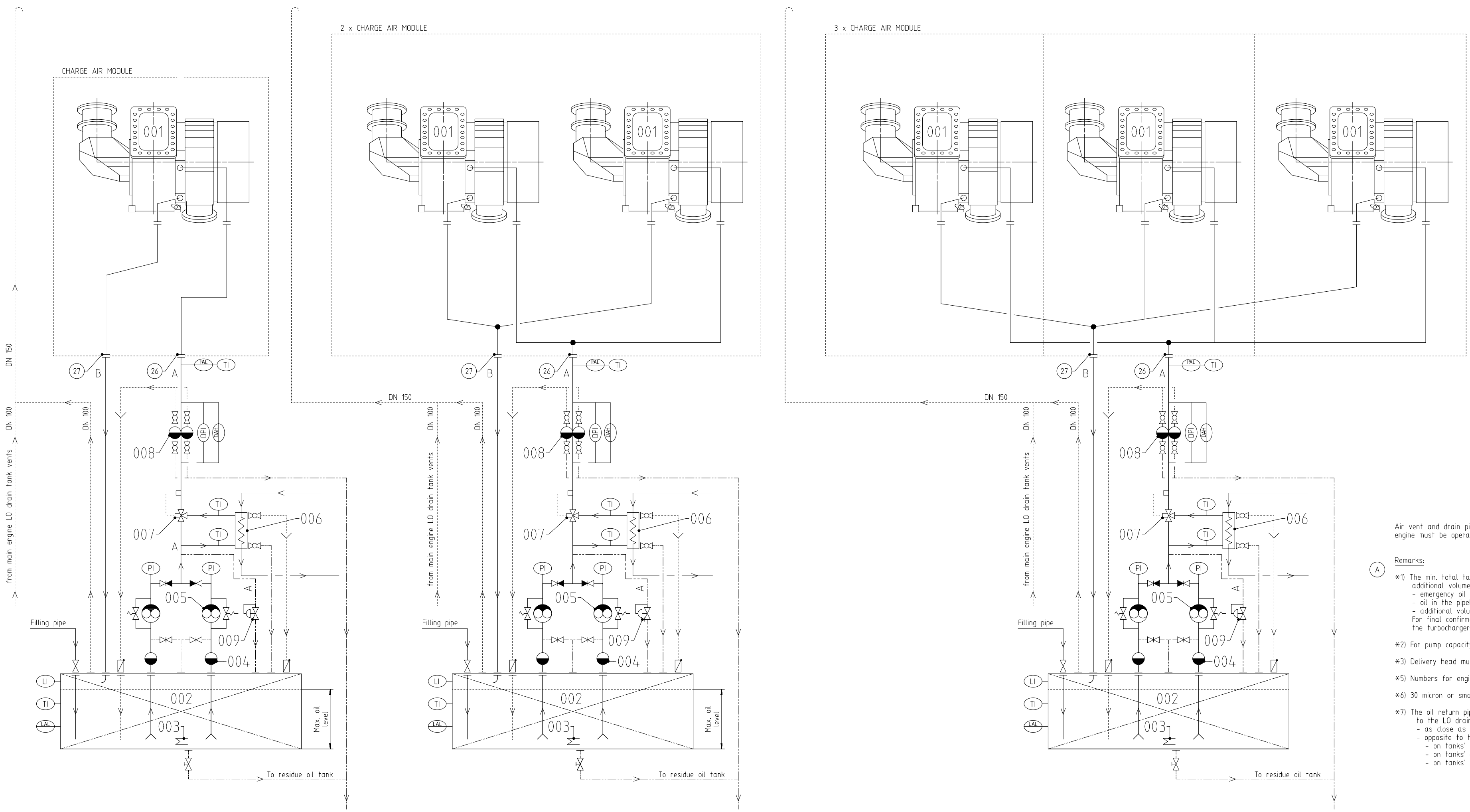
- Bearing LO pipes
- Transfer/dirty LO pipes
- Overflow/drain pipes
- Air vent pipes
- Pipe connections
- Pipes on engine

Free space for lic.						Q-Code XXXXX Standard ISO; JIS	Main Drw.
Modif.	(A) EAAD091530 (Number)	20.11.2019 (Drawn date)	Number	Drawn date	Number	Drawn date	Number / Drawn date
WIN GD Winterthur Gas & Diesel	Product W-2S	LUBRICATING OIL SYSTEM Separated TC lubricating Schmieroelsystem					
Units mm kg	NX		Basic Material			Net Weight 0,001	
SURFACE PROTECTION SEE GROUP 0344	Made 05.12.2016 dki021 DH Kim	Scale -	Size A0	Page 2/5	Material ID PAAD245338		
TOLERANCING PRINCIPLE ISO8015	Chkd 16.12.2016 wwa008 Wang	Design Group 9722	Drawing ID DAAD083642			Rev. A	
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 16.12.2016 bha009 Haag						

Approved

DID - DIMENSIONAL DRAWING - Confidential

Pos.	Description
001	MHI-Turbocharger (MET-MA)
002	Lubricating oil drain tank
003	Heating coil
004	Suction filter
005	Lubricating oil pump
006	Lubricating oil cooler
007	Automatic temperature control valve
008	Lubricating oil filter *6)
009	Pressure regulating valve
26	INLET - Turbocharger lubricating oil *5)
27	OUTLET - Turbocharger lubricating oil *5) *7)



Air vent and drain pipes must be fully functional at all inclination angles of the ship at which the engine must be operational.

(A) Remarks:

*1) The min. total tank capacity must consider the min. retention volume, plus the following additional volume:
- emergency oil in the integrated head tank
- oil in the pipeline which drains back, when pump is stopped
- additional volume for air

For final confirmation of the min. total tank capacity, please contact the turbocharger manufacturer.

*2) For pump capacity, temperature and oil viscosity, please refer to the GTD program.

*3) Delivery head must be according to the actual piping layout.

*5) Numbers for engine pipe connections, please refer to the pipe connection plan for specific engine.

*6) 30 micron or smaller (absolute, sphere passing mesh).

*7) The oil return pipe must not be connected to other drain pipes. If the oil is returned to the LO drain tank it is recommended to connect the oil outlet
- as close as possible to the separator suction pipe
- opposite to the main LO pump, i.e.
  - on tanks' forward end if the main LO pump is on tanks' aft end
  - on tanks' aft end if the main LO pump is on tanks' forward end
  - on tanks' forward or aft end if the main LO pump is in the middle of the tank.

(A)

1 SET OF TURBOCHARGER				MET33MA	MET42MA	MET53MA	MET60MA	MET66MA	MET71MA	MET83MA	MET90MA
LO tank	min. retention volume		m^3	0.18	0.27	0.43	0.53	0.67	0.88	1.07	1.30
	min. total tank capacity		m^3	*1)							
LO pump *2)	capacity		m^3	Refer to GTD							
	capacity		l/min								
	delivery *3)		bar	4.0							
Nominal pipe diameter		A	DN	25	32	40	50	50	50	50	65
		B	DN	40	50	65	80	80	100	100	125
		C	DN	40	50	65	80	80	80	100	100

(A)

2 SETS OF TURBOCHARGERS				MET33MA	MET42MA	MET53MA	MET60MA	MET66MA	MET71MA	MET83MA	MET90MA
LO tank	min. retention volume		m^3	0.36	0.54	0.86	1.06	1.33	1.76	2.14	2.60
	min. total tank capacity		m^3	*1)							
LO pump *2)	capacity		m^3	Refer to GTD							
	capacity		l/min								
	delivery *3)		bar	4.0							
Nominal pipe diameter		A	DN	32	40	50	65	65	65	80	100
		B	DN	100	125	125	150	150	200	200	200
		C	DN	50	65	80	100	100	100	125	125

(A)

3 SETS OF TURBOCHARGERS				MET53MA	MET60MA	MET66MA	MET71MA	MET83MA	MET90MA
LO tank	min. retention volume		m^3	1.29	1.59	2.00	2.64	3.21	3.90
	min. total tank capacity		m^3	*1)					
LO pump *2)	capacity		m^3	Refer to GTD					
	capacity		l/min						
	delivery *3)		bar	4.0					
Nominal pipe diameter		A	DN	65	80	80	80	100	100
		B	DN	150	200	200	250	250	250
		C	DN	100	125	125	125	150	150

Bearing LO pipes
Transfer/dirty LO pipes
Overflow/drain pipes
Air vent pipes
Pipe connections
Pipes on engine

Free space for lic.	
Q-Code	XXXXX
Standard	ISO; JIS
Main Drw.	
Modif.	(A) EAAD091530 (Number) 20.11.2019 (Drawn date)
Product	W-2S
Title	LUBRICATING OIL SYSTEM Separated TC lubricating Schmieroelsystem
Units	mm kg
	NX
Basic Material	
Net Weight	0,001
	SURFACE PROTECTION SEE GROUP 0344
	TOLERANCING PRINCIPLE ISO8015
	GENERAL TOLERANCES ACCORDING TO ISO2768-mK
Made	05.12.2016 dki021 DH Kim
Chkd	16.12.2016 wwa008 Wang
Appd	16.12.2016 bha009 Haag
Scale	-
Design Group	9722
Size	A0
Page	3/5
Material ID	PAAD245338
Drawing ID	DAAD083642
Rev.	A

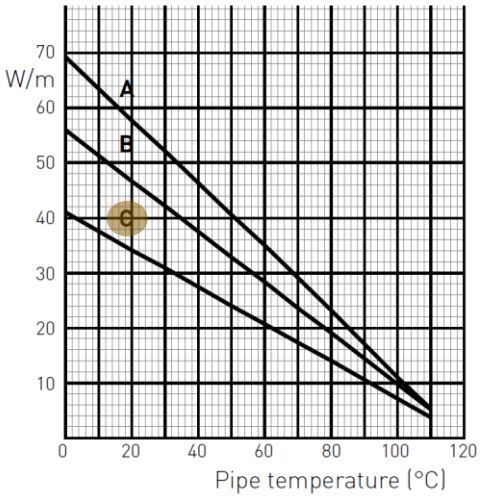
WIN GD Winterthur Gas & Diesel

Approved

DID - DIMENSIONAL DRAWING - Confidential

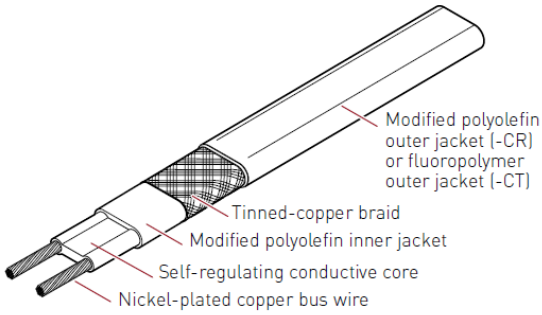
Self-Regulating Heating Cable 10QTVR2-CT

Order drawing



C 10QTVR2-CT

Heating cable construction



Specification:

Description:	10QTVR2-CT
Order No.:	391991-000
Area Classification:	Non-hazardous and hazardous locations
Traced surface type:	Metal and plastic
Chemical Resistance:	Exposure to aqueous inorganic chemicals: Use -CR (modified polyolefin outer jacket) Exposure to organic chemicals or corrosives: Use -CT (fluoropolymer outer jacket)
Supply Voltage:	200-277 VAC
Temperature Rating:	Maximum maintain or continuous exposure temperature (power on) 225°F (110°C) Maximum intermittent exposure temperature, 1000 hours (power on) 225°F (110°C) Minimum installation temperature –76°F (–60°C)
Minimum Bending Radius:	13 mm at 20°C 35 mm at -60°C
Height:	4.5 mm
Width:	11.8 mm
Weight:	0.126 kg/m

Supplier: PENTAIR
www.pentairthermal.com

MAXIMUM CIRCUIT LENGHT BASED ON TYPE 'C' CIRCUIT BREAKERS ACCORDING TO EN60898
SUPPLY VOLTAGE 230 VAC

Electrical protection sizing	Start-up temperature	Maximum heating cable length per circuit [m]
16A	-20°C	65
	+10°C	80
25A	-20°C	95
	+10°C	115
32A	-20°C	115
	+10°C	115
40A	-20°C	115
	+10°C	115

Substitute for:												PC	Q-Code	X	S	X	X	X
Modif	A	EAAD090454	05.03.2019															
		Number	Drawn Date		Number	Drawn Date		Number	Drawn Date		Number	Drawn Date						

WIN GD Winterthur Gas & Diesel

Product **W-2S**

Heating Element
Order Drawing

Made	24.10.2018	P. Kowalski	Main Drw.	Page 1 / 1	Material ID **PAAD308926**
Chkd	24.10.2018	R. Leutwyler	Design Group **0009**		
Appd	24.10.2018	W. Östreicher		Drawing ID **DAAD106761**	Rev **A**

MIDS - WinGD X40DF-1.0 LUBRICATING-OIL-SYSTEM (DG9722)

TRACK CHANGES

DATE	SUBJECT	DESCRIPTION
2019-09-09	DRAWING SET	First web upload
2020-02-13	DAAD122371 DAAD122196	Main and tank drg for 7 cyl.- added
2020-09-21	DAAD118640 DAAD118567 DAAD118565 DAAD020647 DAAD013764 DAAD013848 DAAD013964 DAAD020639 DAAD013657 DAAD020573 DAAD013763 DAAD020574 DAAD013903 DAAD083642 DAAD127677 DAAD127674 DAAD127672	System and tank assembly drgs – new revision
2021-05-04	DAAD118640 DAAD118567 DAAD122371 DAAD118565 DAAD118566 107.246.799	Main and system drgs – new revision Hydraulic jack plate position drg – new revision