Options			Executions			
Turbocharger lubrication		INTERNAL	X		X	
		EXTERNAL		X		X
Booster pumps for crosshead lubrication		WITH	X	X		
		WITHOUT			X	X
		Net Weight	169	169	169	169

Ⓒ

Rating Field A	Engine rated with CMCR speed 95 ≤ rpm ≤ 115	Booster pumps for crosshead lubrication: NEEDED	PAAD251314 PAAD251315
Rating Field C	Engine rated with CMCR speed 115 ≤ rpm ≤ 124	Booster pumps for crosshead lubrication: NOT NEEDED	PAAD251312 PAAD251313
		Booster pumps for crosshead lubrication: OPTIONAL	PAAD251314 PAAD251315

	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	107.341.455.500	INSTRUCTION FOR FLUSHING	107.341.455			0,001
	1	1	1	1	005	107.402.236.500	LUBRICATING OIL DRAIN TANK Filling Guideline	107.402.236			0,001
Ⓒ	1	1	1	1	004	PAAD314009	LUBRICATING OIL DRAIN TANK	DAAD109763			169
	-	1	-	1	003	PAAD245338	LUBRICATING OIL SYSTEM external turbocharger LO system	DAAD083642			0,001
	1	1	-	-	002	PAAD169153	LUBRICATING OIL SYSTEM with HP pumps	DAAD053658			0,001
	-	-	1	1	001	107.340.984.500	LUBRICATING OIL SYSTEM without HP pumps	107.340.984			0,001
Material ID	PAAD251315	PAAD251314	PAAD251313	PAAD251312							

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
-	EAAD084051	22.01.2013	A EAAD085355	26.08.2014	B EAAD087222	09.02.2017	C EAAD090692	20.05.2019

WIN GD Winterthur Gas & Diesel

Product 5RT-flex50-D 5RT-flex50-E

LUBRICATING OIL SYSTEM

Schmieroelsystem

Units mm kg	NX	Basic Material			Net Weight
SURFACE PROTECTION SEE GROUP 0344	Made 22.08.2012 sfe006 Feuerstein	Scale -	Size A3	Page 1/1	Material ID
TOLERANCING PRINCIPLE ISO8015	Chkd	Design Group 9722	Drawing ID DAAD030723		Rev. C
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd				

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(E)

Options			Executions			
Turbocharger lubrication		INTERNAL	X		X	
		EXTERNAL		X		X
Booster pumps for crosshead lubrication		WITH	X	X		
		WITHOUT			X	X
		Net Weight	154	154	154	154

Rating Field A	Engine rated with CMCR speed 95 ≤ rpm ≤ 115	Booster pumps for crosshead lubrication: NEEDED	PAAD251331 PAAD251332
Rating Field C	Engine rated with CMCR speed 115 ≤ rpm ≤ 124	Booster pumps for crosshead lubrication: NOT NEEDED	PAAD251328 PAAD251330
		Booster pumps for crosshead lubrication: OPTIONAL	PAAD251331 PAAD251332

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	107.351.598.500	INSTRUCTION FOR FLUSHING	107.351.598		0,001
1	1	1	1	005	107.402.236.500	LUBRICATING OIL DRAIN TANK Filling Guideline	107.402.236		0,001
1	1	1	1	004	107.341.301.201	LUBRICATING OIL DRAIN TANK	107.341.301		154
-	1	-	1	003	PAAD245338	LUBRICATING OIL SYSTEM external turbocharger LO system	DAAD083642		0,001
1	1	-	-	002	PAAD169153	LUBRICATING OIL SYSTEM with HP pumps	DAAD053658		0,001
-	-	1	1	001	107.340.984.500	LUBRICATING OIL SYSTEM without HP pumps	107.340.984		0,001

Material ID			
PAAD251332	PAAD251331	PAAD251330	PAAD251328

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
	B	EAAD085078	08.08.2014	C	EAAD085355	26.08.2014	D	EAAD087222	09.02.2017	E	EAAD090692	20.05.2019

WIN GD Winterthur Gas & Diesel

Product 6RT-flex50-D 6RT-flex50-E

LUBRICATING OIL SYSTEM

Schmieroelsystem

Units mm kg	NX		Basic Material		Net Weight
SURFACE PROTECTION SEE GROUP 0344	Made	22.08.2012 sfe006 Feuerstein	Scale -	Size A3	Page 1/1
TOLERANCING PRINCIPLE ISO8015	Chkd		Design Group 9722	Material ID	
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd			Drawing ID DAAD030730	Rev. E

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Options			Executions			
Turbocharger lubrication		INTERNAL	X		X	
		EXTERNAL		X		X
Booster pumps for crosshead lubrication		WITH	X	X		
		WITHOUT			X	X
		Net Weight	154	154	154	154
		Quantity	1	1	1	1
		Material ID	PAAD251391	PAAD251390	PAAD251389	PAAD251388

Ⓒ

Rating Field A	Engine rated with CMCR speed 95 ≤ rpm ≤ 115	Booster pumps for crosshead lubrication: NEEDED	PAAD251390 PAAD251391
Rating Field C	Engine rated with CMCR speed 115 ≤ rpm ≤ 124	Booster pumps for crosshead lubrication: NOT NEEDED	PAAD251388 PAAD251389
		Booster pumps for crosshead lubrication: OPTIONAL	PAAD251390 PAAD251391

SEQ NO	Material ID	Material Name / Dimension, Occ	Standard or Drawing	Basic Material / Material Standard	Weight GR./NET
006	107.351.598.500	INSTRUCTION FOR FLUSHING	107.351.598		0,001
005	107.402.236.500	LUBRICATING OIL DRAIN TANK Filling Guideline	107.402.236		0,001
004	107.342.995.200	LUBRICATING OIL DRAIN TANK	107.342.995		154
003	PAAD245338	LUBRICATING OIL SYSTEM external turbocharger LO system	DAAD083642		0,001
002	PAAD169153	LUBRICATING OIL SYSTEM with HP pumps	DAAD053658		0,001
001	107.340.984.500	LUBRICATING OIL SYSTEM without HP pumps	107.340.984		0,001

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
–	EAAD084051	22.01.2013	A EAAD085355	26.08.2014	B EAAD087222	09.02.2017	C EAAD090692	20.05.2019

WIN GD Winterthur Gas & Diesel

Product: 7RT-flex50-D, 7RT-flex50-E

LUBRICATING OIL SYSTEM

Schmieroelsystem

Units mm kg	NX		Basic Material		Net Weight
SURFACE PROTECTION SEE GROUP 0344	Made	22.08.2012 sfe006 Feuerstein	Scale –	Size A3	Page 1/1
TOLERANCING PRINCIPLE ISO8015	Chkd		Design Group 9722	Material ID	
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd			Drawing ID DAAD030737	Rev. C

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Options			Executions			
Turbocharger lubrication		INTERNAL	X		X	
		EXTERNAL		X		X
Booster pumps for crosshead lubrication		WITH	X	X		
		WITHOUT			X	X
		Net Weight	246	246	246	246

(C)

Rating Field A	Engine rated with CMCR speed 95 ≤ rpm ≤ 115	Booster pumps for crosshead lubrication: NEEDED	PAAD251394 PAAD251395
Rating Field C	Engine rated with CMCR speed 115 ≤ rpm ≤ 124	Booster pumps for crosshead lubrication: NOT NEEDED	PAAD251392 PAAD251393
		Booster pumps for crosshead lubrication: OPTIONAL	PAAD251394 PAAD251395

	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	107.351.598.500	INSTRUCTION FOR FLUSHING	107.351.598			0,001
	1	1	1	1	005	107.402.236.500	LUBRICATING OIL DRAIN TANK Filling Guideline	107.402.236			0,001
(C)	1	1	1	1	004	PAAD314142	LUBRICATING OIL DRAIN TANK	DAAD109845			246
	-	1	-	1	003	PAAD245338	LUBRICATING OIL SYSTEM external turbocharger LO system	DAAD083642			0,001
	1	1	-	-	002	PAAD169153	LUBRICATING OIL SYSTEM with HP pumps	DAAD053658			0,001
	-	-	1	1	001	107.340.984.500	LUBRICATING OIL SYSTEM without HP pumps	107.340.984			0,001
Material ID	PAAD251395	PAAD251394	PAAD251393	PAAD251392							

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
	-	EAAD084051	22.01.2013	A	EAAD085355	26.08.2014	B	EAAD087222	09.02.2017	C	EAAD090692	20.05.2019

WIN GD Winterthur Gas & Diesel

Product 8RT-flex50-D 8RT-flex50-E

LUBRICATING OIL SYSTEM

Schmieroelsystem

Units mm kg	NX		Basic Material		Net Weight
SURFACE PROTECTION SEE GROUP 0344	Made	22.08.2012 sfe006 Feuerstein	Scale -	Size A3	Page 1/1
TOLERANCING PRINCIPLE ISO8015	Chkd		Design Group 9722	Material ID	
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd			Drawing ID DAAD030739	Rev. C

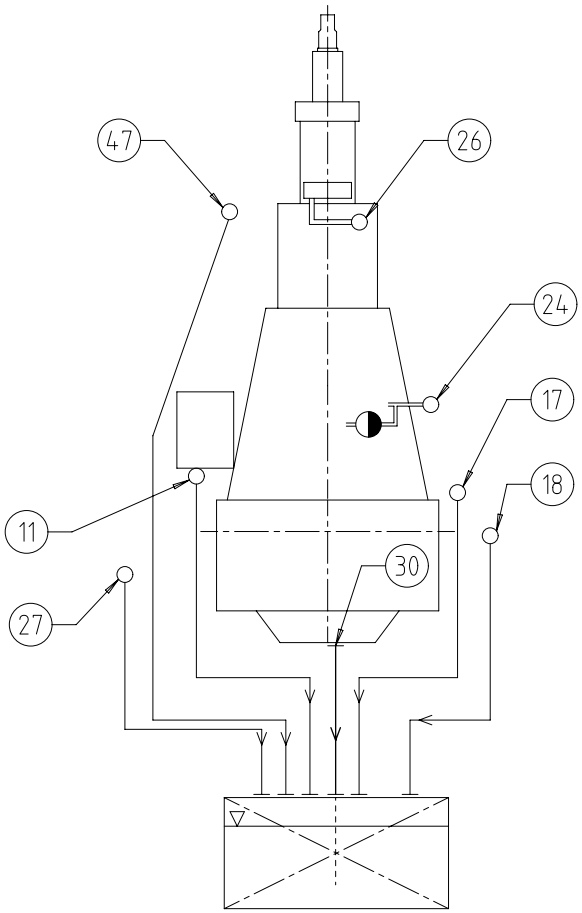
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SPECIFICATION WHICH MUST BE MET

(26) (Q)	INLET - Cylinder lubricating oil - Cylinder lubricating oil temperature: 40^{+10}_{-5} °C - Cylinder lubricating oil static pressure: min. 0.4 bar.
(27)	OUTLET - Flushing oil from automatic filter - Back-flushing oil to be returned to the lubricating oil drain tank. - The back-flushing pipe must not be connected to other drain pipes.
(30) (Q)	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.
(47) (Q)	OUTLET- Servo system oil return (engine free end) - Free flow by gravity to lubricating oil drain tank.

RT-flex50-D/E rated with CMCR speed 115 rpm and above (≧ 115 rpm)



(Q) (11)	OUTLET- Supply unit oil return - Free flow by gravity to lubricating oil drain tank.
(17)	OUTLET - Oil leakage exhaust valve, oil return from driving end - Free flow by gravity to lubricating oil drain tank.
(Q) (18)	OUTLET - Turbocharger lubricating oil - Oil return to lubricating oil drain tank - Oil 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.
(Q) (24)	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: 5-6 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 50 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 50 micron (absolute sphere passing mesh) filter. - Offline cleaning of the lubricating oil in the drain tank by self-cleaning centrifugal separators.

Approved

Modif.	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
	N EAAD088812	08.05.2018	O EAAD089872	19.10.2018	P EAAD090692	23.07.2019	Q EAAD091970	30.12.2019

Free space for lic.

Q-Code XXXXX

Standard ISO; JIS

Main Drw.

WIN GD Winterthur Gas & Diesel

Product RT-flex50-D RT-flex50-E

LUBRICATING OIL SYSTEM

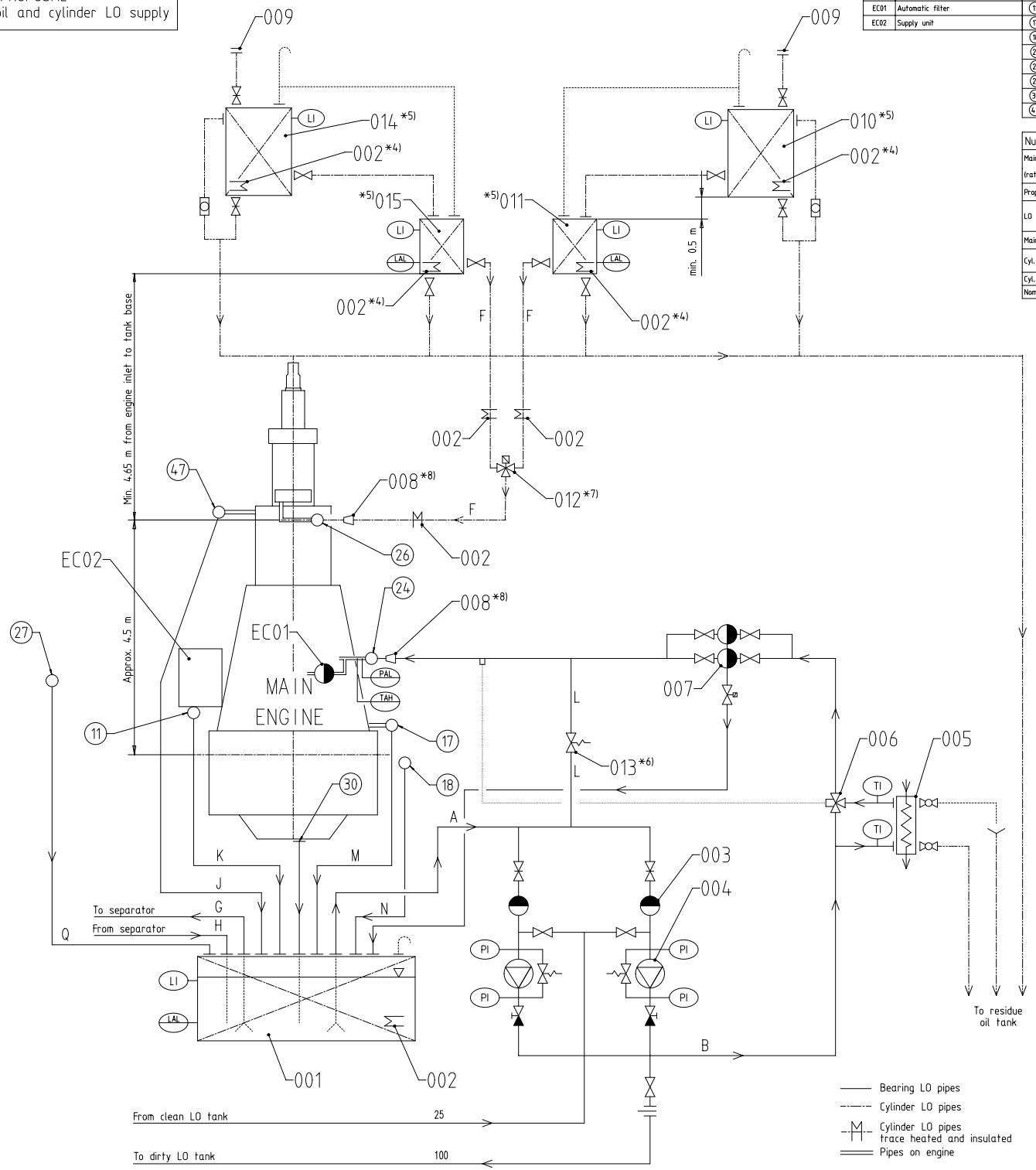
Schmieroelsystem

Units mm kg	NX	Basic Material			Net Weight 0,001	
SURFACE PROTECTION SEE GROUP 0344	Made 26.03.2004 S.Natali	Scale -	Size A3	Page 1/3	Material ID 107.340.984.500	
TOLERANCING PRINCIPLE ISO8015	Chkd	Design Group 9722	Drawing ID 107.340.984		Rev. Q	
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 26.07.2004 SNA001					

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SYSTEM PROPOSAL
System oil and cylinder LO supply



Pos.	ENGINE COMPONENTS *3)
EC01	Automatic filter
EC02	Supply unit

Pos.	ENGINE CONNECTIONS *2)
(11)	OUTLET- Supply unit oil return (Q)
(17)	OUTLET - Oil leakage exhaust valve, oil return from driving end
(18)	OUTLET - Turbocharger lubricating oil (Q)
(24)	INLET - Lubricating oil
(26)	INLET - Cylinder lubricating oil
(27)	OUTLET - Flushing oil from automatic filter *14)
(30)	OUTLET - Lubricating oil from bedplate (Q)
(47)	OUTLET- Servo system oil return (engine free end) (Q)

Pos.	SYSTEM COMPONENTS *1)
001	Lubricating oil drain tank (sump tank)
002	Heating device
003	Suction strainer *13) (Q)
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, 50 micron, with backflushing oil treatment *9) *14)
008	Transition piece (adaptor) *8)
009	Deck connection
010	Low BN cylinder lubricating oil storage tank *5)
011	Low BN cylinder lubricating oil service tank *5)
012	Three-way valve, manually or remotely operated
013	Pressure regulating valve *6)
014	High BN cylinder lubricating oil storage tank *5)
015	High BN cylinder lubricating oil service tank *5)

Number of cylinders			5	6	7	8
Main engine RT-flex50-D RT-flex50-E (rated with CMCR speed ≥115 rpm)	power	(kW)	8725	10470	12215	13960
	speed	(rpm)	124 (R1)			
Proposal for dimensioning *12)						
LO drain tank	capacity	(m^3)	For capacities refer to drawing "LO drain tank-Filling Guideline"			
Main LO pump	capacity	(m^3/h)	refer to GTD			
Cyl. LO storage tank	capacity	(m^3)	Based on a feed rate of 1g/kWh (pulse)			
Cyl. LO service tank *15)	capacity	(m^3)	0.6	0.7	0.8	0.9
Nominal pipe diameter	A	DN	200	200	200	250
	B	DN	150	200	200	200
	F	DN	32	32	40	40
	G		*The pipe diameters for the LO separator are sized according to the effective throughput capacity of the separator and according to the separator manufacturer's recommendations.*			
	H					
	J	J	50	50	50	50
	K	K	40	40	40	40
	L	L	65	65	65	65
	M	M	65	65	80	80
	N	N	65	65	80	80
	Q	Q	50	50	50	50

(Q)

Table 1: LO content on engine side

Cylinder	Volume
5	1272 l
6	1445 l
7	1618 l
8	1792 l

Remarks: (Q)

- 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 manufactirer, i.e. already equipped on engine side.

*4) Optional heating coil

*5) The cylinder LO service tank with metering 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) 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 change-over.

*8) Installed as required (check with the "Pipe Connection Plan")

*9) 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.

*11) All capacities and the given diameters are valid for the mentioned rating 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) All capacities and the given pipe diameters are valid for the mentioned engine rating, including the oil amount for integrated TC lubrication, but excluding additional required oil for applied damper and/or PTO gear and/or all other externally installed ancillaries which are fed by system oil. To make the project specific layout, under consideration of the actual required flow rates / capacities, the guideline as given within DG9730 - "Fluid velocities and flow rates, recommended values for pipework of diesel plants" has to be observed.

*13) Mesh size according to pump suppliers recommendation.

*14) The back-flushing 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.

*15) The proposed cylinder LO services tank capacity takes into account a filling interval of 2 days based on the above mentioned feed rate.

Rev.	Rev. No.	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
Appd	(N)	EAAD089972	08.05.2018	(Q) EAAD089972	19.10.2018	(P) EAAD089970	23.07.2019	(Q) EAAD089970	30.12.2019

G-Code: XXXXX
Standard: ISO, JIS
Main Drw.

Product: RT-flex50-D RT-flex50-E

LUBRICATING OIL SYSTEM

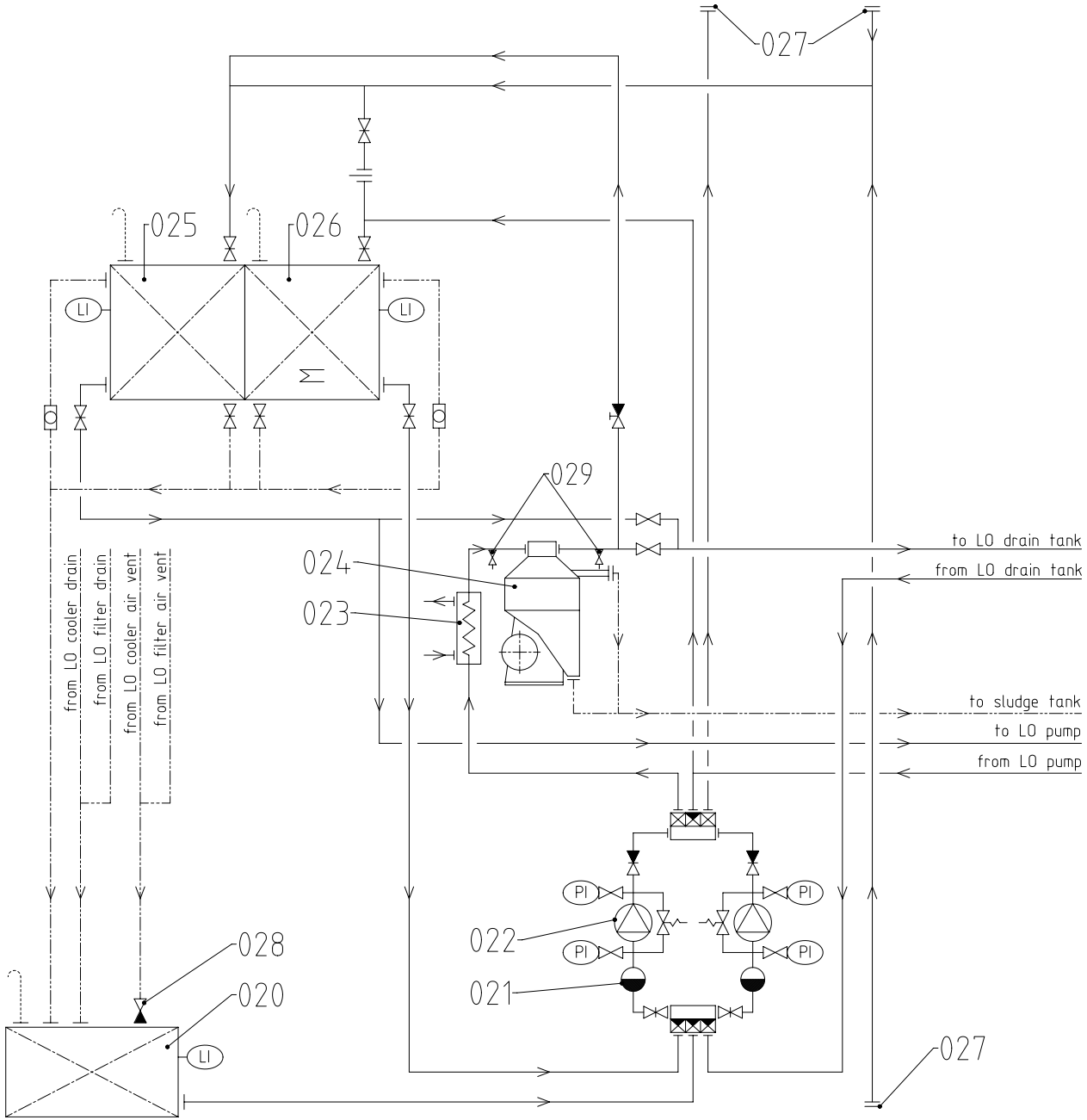
Schmieroelsystem

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

SURFACE PROTECTION SEE GROUP 9344	Made	26.03.2004 S.Natali	Scale -	Size A0	Page 2/3	Material No.	107.340.984.500
TOLERANCING PRINCIPLE ISO8015	Chkd		Design Group 9722	Drawing No.			107.340.984
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	26.07.2004 SNA001				Rev.	Q

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SYSTEM PROPOSAL - LO treatment system



Pos.	SYSTEM COMPONENTS *1)	
020	Residue oil tank	
021	Suction strainer *13)	
022	Lubricating oil pump	one for transfer and separator service
		one for separator service
023	Lubricating oil heater with relief valve and temperature control	
024	Self-cleaning centrifugal separator	
025	Clean lubricating oil tank	
026	Dirty lubricating oil tank	
027	Deck connection	
028	Float non-return valve	
029	LO sampling cock *20)	

RT-flex50-D RT-flex50-E			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	capacity	(l/h)	990	1180	1380	1580
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' recommendations

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

*13) Mesh size according to pump suppliers recommendation.

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

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

Free space for Nr.								Q-Code XXXXX	Main Drw.
								Standard ISO; JIS	
Modif.	N EAAD088812	08.05.2018	O EAAD089872	19.10.2018	P EAAD090692	23.07.2019	Q EAAD091970	30.12.2019	
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date	

WIN GD Winterthur Gas & Diesel

Product: RT-flex50-D, RT-flex50-E

LUBRICATING OIL SYSTEM

Schmieroelsystem

Units	mm kg	NX	Basic Material	Net Weight 0,001
SURFACE PROTECTION SEE GROUP 0344	Made 26.03.2004 S.Natali	Scale -	Size A1	Page 3/3	Material ID 107.340.984.500
TOLERANCING PRINCIPLE ISO8015	Chkd	Design Group 9722	Drawing ID 107.340.984	Rev. Q
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 26.07.2004 SNA001			

Approved

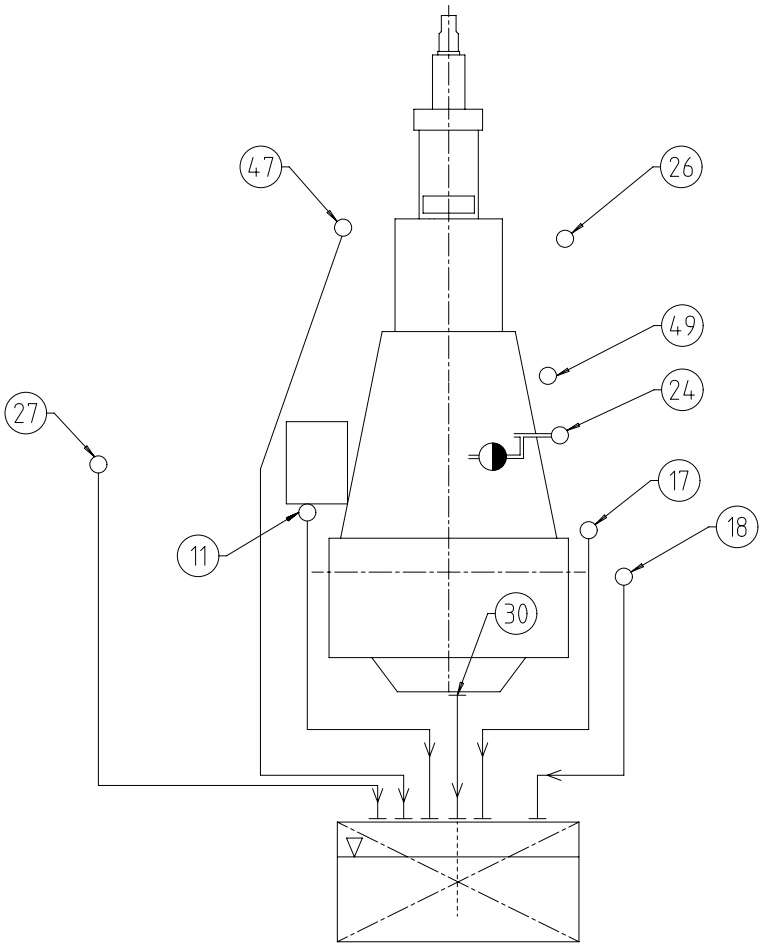
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SPECIFICATION WHICH MUST BE MET

(49) (G)	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: 10-12 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 50 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 50 micron (absolute sphere passing mesh) filter.
	- Offline cleaning of the lubricating oil in the drain tank by self-cleaning centrifugal separators.

RT-flex50-D/E rated with CMCR speed below 115 rpm (< 115 rpm)



(G) (11)	OUTLET- Supply unit oil return - Free flow by gravity to lubricating oil drain tank.
(17)	OUTLET - Oil leakage exhaust valve, oil return from driving end - Free flow by gravity to lubricating oil drain tank.
(G) (18)	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.

(G) (24)	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: 5-6 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 50 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 50 micron (absolute sphere passing mesh) filter.
	  - Offline cleaning of the lubricating oil in the drain tank by self-cleaning centrifugal separators.

(26)	INLET - Cylinder lubricating oil - Cylinder lubricating oil temperature: 40^{+10}_{-5} °C. - Cylinder lubricating oil static pressure: min. 0.4 bar.
(27)	OUTLET - Flushing oil from automatic filter - Oil return to lubricating oil drain tank. - Pipe outlet must end up above max. oil level in the tank to avoid back-flushing air blowing into the LO.

(G) (30)	OUTLET - Lubricating oil from bedplate vertical oil drain
	- 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.

(G) (47)	OUTLET- Servo system oil return (engine free end) - Free flow by gravity to lubricating oil drain tank.

Approved

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
	(D) EAAD088812	08.05.2018	(E) EAAD089872	19.10.2018	(F) EAAD090692	23.07.2019	(G) EAAD091970	30.12.2019

WIN GD Winterthur Gas & Diesel

Product: RT-flex50-D, RT-flex50-E

LUBRICATING OIL SYSTEM
with crosshead HP LO pumps
Schmieroelsystem

Units	mm kg	NX	Basic Material	Net Weight 0,001

SURFACE PROTECTION SEE GROUP 0344	Made	12.08.2014 mhu019 M.Hug	Scale -	Size A2	Page 1/3	Material ID PAAD169153
TOLERANCING PRINCIPLE ISO8015	Chkd	21.08.2014 bha009 Haag	Design Group 9722	Drawing ID DAAD053658		Rev. G
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	21.08.2014 bha009 Haag				

DID - DIMENSIONAL DRAWING - Confidential

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SYSTEM PROPOSAL
System oil and cylinder LO supply

Pos.	ENGINE COMPONENTS *3)
EC01	Automatic filter
EC02	Supply unit

Pos.	ENGINE CONNECTIONS *2)
(11)	OUTLET- Supply unit oil return (G)
(17)	OUTLET - Oil leakage exhaust valve, oil return from driving end
(18)	OUTLET - Turbocharger lubricating oil (G)
(24)	INLET - Lubricating oil
(26)	INLET - Cylinder lubricating oil (low BN)
(27)	OUTLET - Flushing oil from automatic filter *10)
(30)	OUTLET - Lubricating oil from bedplate (G)
(47)	OUTLET- Servo system oil return (engine free end) (G)
(49)	INLET - Crosshead lubricating oil

Pos.	SYSTEM COMPONENTS *1)
001	Lubricating oil drain tank (sump tank)
002	Heating device
003	Suction strainer *13) (G)
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, 50 micron, with backflushing oil treatment *10) *14)
008	Transition piece (adaptor) *9)
009	Deck connection
010	Low BN cylinder lubricating oil storage tank *5)
011	Low BN cylinder lubricating oil service tank *5)
012	Crosshead lubricating oil pump *7)
013	Pressure regulating valve
014	High BN cylinder lubricating oil storage tank *5)
015	High BN cylinder lubricating oil service tank *5)
016	Three-way valve, manually or remotely operated *8)

Number of cylinders			5	6	7	8
Main Engine RT-flex50-D / RT-flex50-E (rated with CMCR speed < 115 rpm)	power	(kW)	8090	9707	11325	12943
	speed	(rpm)	114.9			
Proposal for dimensioning *12)						
LO drain tank	capacity	(m³)	For capacities refer to drawing "LO drain tank-Filling Guideline"			
Main LO pump	capacity	(m³/h)	refer to GTD			
Crosshead LO pump	capacity	(m³/h)	refer to GTD			
Cylinder LO storage tank	capacity	(m³)	Based on a feed rate of 1g/kWh (pulse)			
Cylinder LO service tank *16)	capacity	(m³)	0.6	0.7	0.8	0.9
Nominal pipe diameter	A	DN	200	200	250	250
	B	DN	150	200	200	200
	C	DN	150	150	200	200
	D	DN	125	125	150	150
	E	DN	125	125	150	150
	F	DN	32	32	32	32
	G, H	The pipe diameters for the LO separator are sized according to the effective throughput capacity of the separator and according to the separator manufacturer's recommendations.				
	J	DN	50	50	50	50
	K	DN	40	40	40	40
	L	DN	80	80	80	80
	M	DN	65	65	65	65
	N	DN	65	65	80	80
	P	DN	65	65	80	80
	Q	DN	50	50	50	50

(G)

Table 1: LO content on engine side

Cylinder	Volume
5	1272 l
6	1445 l
7	1618 l
8	1792 l

Remarks: (G)

- 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 metering 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 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 LO pumps (pos. 004) and the crosshead LO pumps (pos. 012) are to be interlocked so that the crosshead LO pumps never can run alone.

*8) 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 change-over.

*9) Installed as required (check with the "Pipe Connection Plan")

*10) 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.

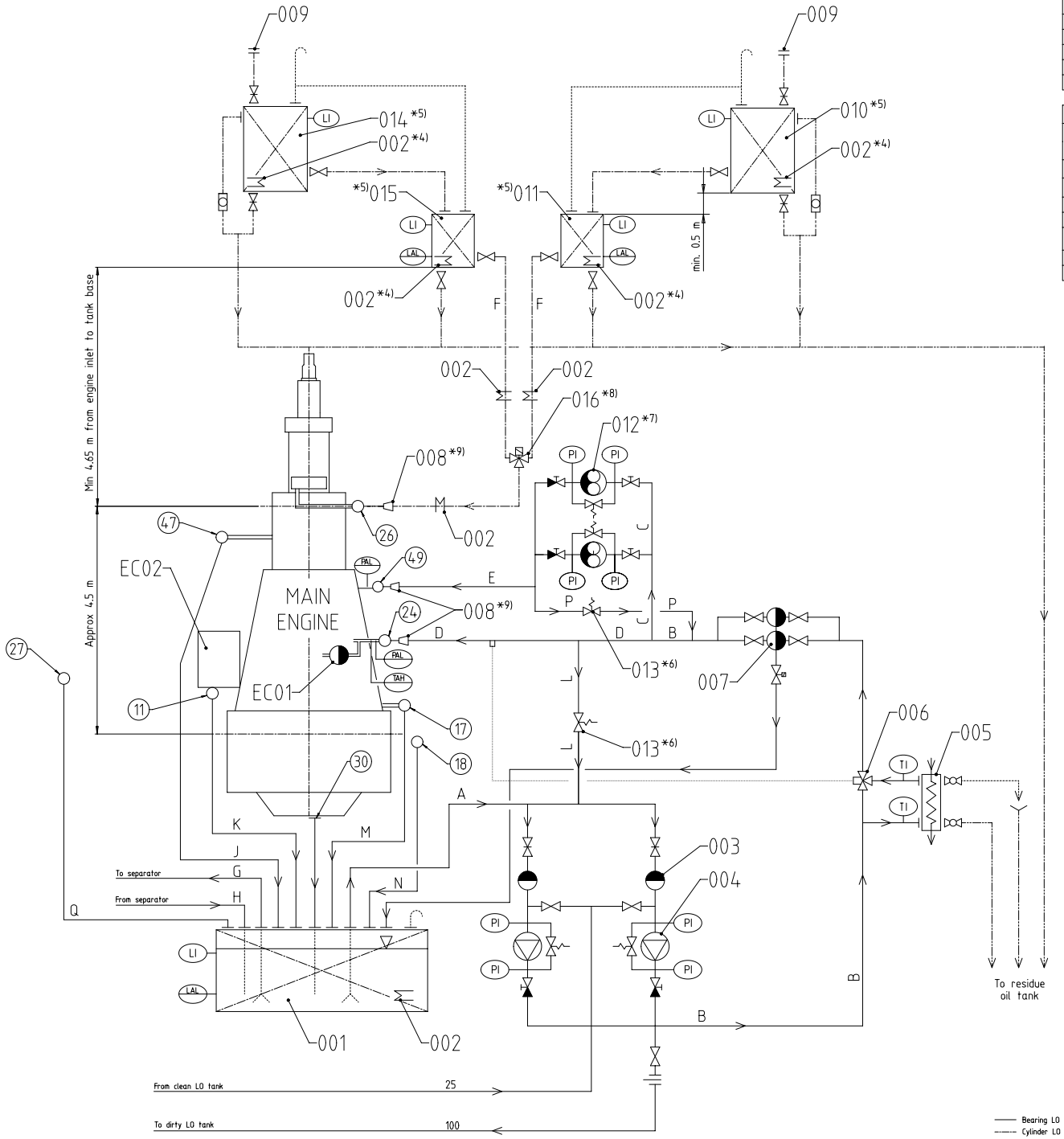
*12) All capacities and the given pipe diameters are valid for the mentioned engine rating, including the oil amount for integrated TC lubrication, but excluding additional required oil for applied damper and/or PTO gear and/or all other externally installed ancillaries which are fed by system oil. To make the project specific layout, under consideration of the actual required flow rates / capacities, the guideline as given within DG9730 - "Fluid velocities and flow rates, recommended values for pipework of diesel plants" has to be observed.

*13) Mesh size according to pump suppliers recommendation.

*14) 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.

*15) 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.

*16) The proposed cylinder LO services tank capacity takes into account a filling interval of 2 days based on the above mentioned feed rate.



Bearing LO pipes
Cylinder LO pipes
Cylinder LO pipes trace heated and insulated
Pipes on engine
Crosshead LO pipes
Transferldirty LO pipes
Overflowdrain pipes
Air vent pipes
Pipe connections

Rev. reason by_dc						G-Code XXXXX	Main Drv.
						Standard ISO; JIS	
Ind.	D AAD088812	08.05.2018	E AAD089672	19.10.2018	F AAD094692	23.07.2019	G AAD099970 30.12.2019
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number Drawn date

WINGD Winterthur Gas & Diesel

Project: RT-flex50-D / RT-flex50-E

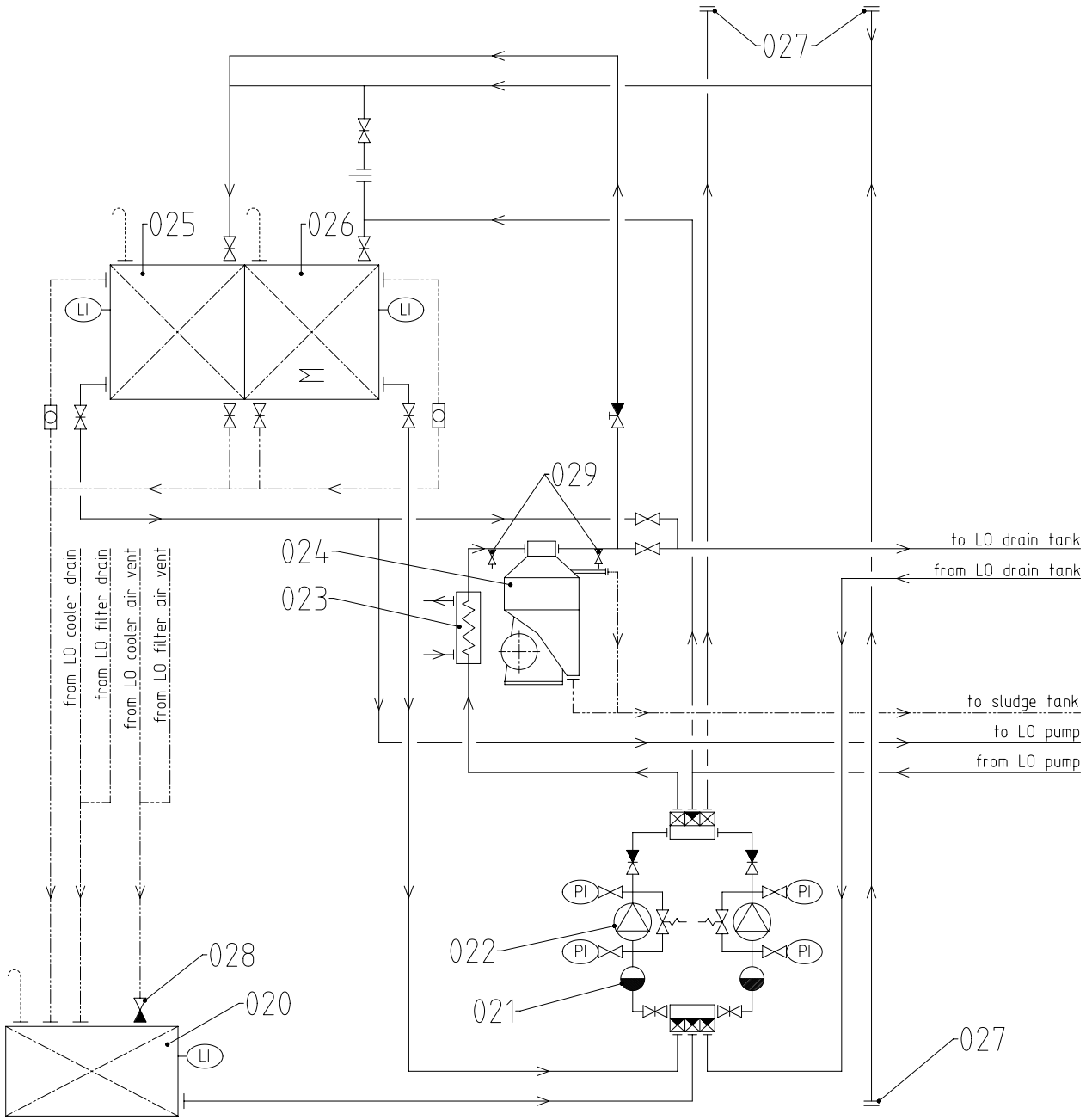
LUBRICATING OIL SYSTEM with crosshead HP LO pumps
Schmieroelsystem

Units	mm kg	NX	Basic Material:					Net weight 0,001	
Made	12.08.2014	mhu019 M.Hug	Scale	-	Size	A0	Page 2/3	Material ID	PAAD169153
Chkd	21.08.2014	bha009 Haag	Design Group						
Appd	21.08.2014	bha009 Haag	Drawing ID	9722	DAAD053658			Rev.	G

SURFACE PROTECTION SEE GROUP 9744
TOLERANCING PRINCIPLE ISO8015
GENERAL TOLERANCES ACCORDING TO ISO2768-mK

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SYSTEM PROPOSAL - LO treatment system



Pos.	SYSTEM COMPONENTS *1)	
020	Residue oil tank	
021	Suction strainer *13) Ⓖ	
022	Lubricating oil pump	one for transfer and separator service
		one for separator service
023	Lubricating oil heater with relief valve and temperature control	
024	Self-cleaning centrifugal separator	
025	Clean lubricating oil tank	
026	Dirty lubricating oil tank	
027	Deck connection	
028	Float non-return valve	
029	LO sampling cock *20)	

RT-flex50-D RT-flex50-E			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	capacity	(l/h)	990	1180	1380	1580
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' recommendations

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

*13) Mesh size according to pump suppliers recommendation.

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

——— 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
	D	EAAD088812	08.05.2018	E	EAAD089872	19.10.2018	F	EAAD090692	23.07.2019	G	EAAD091970	30.12.2019

WIN GD Winterthur Gas & Diesel

Product RT-flex50-D RT-flex50-E

LUBRICATING OIL SYSTEM
with crosshead HP LO pumps
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

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Chkd	21.08.2014	bha009	Haag
Appd	21.08.2014	bha009	Haag

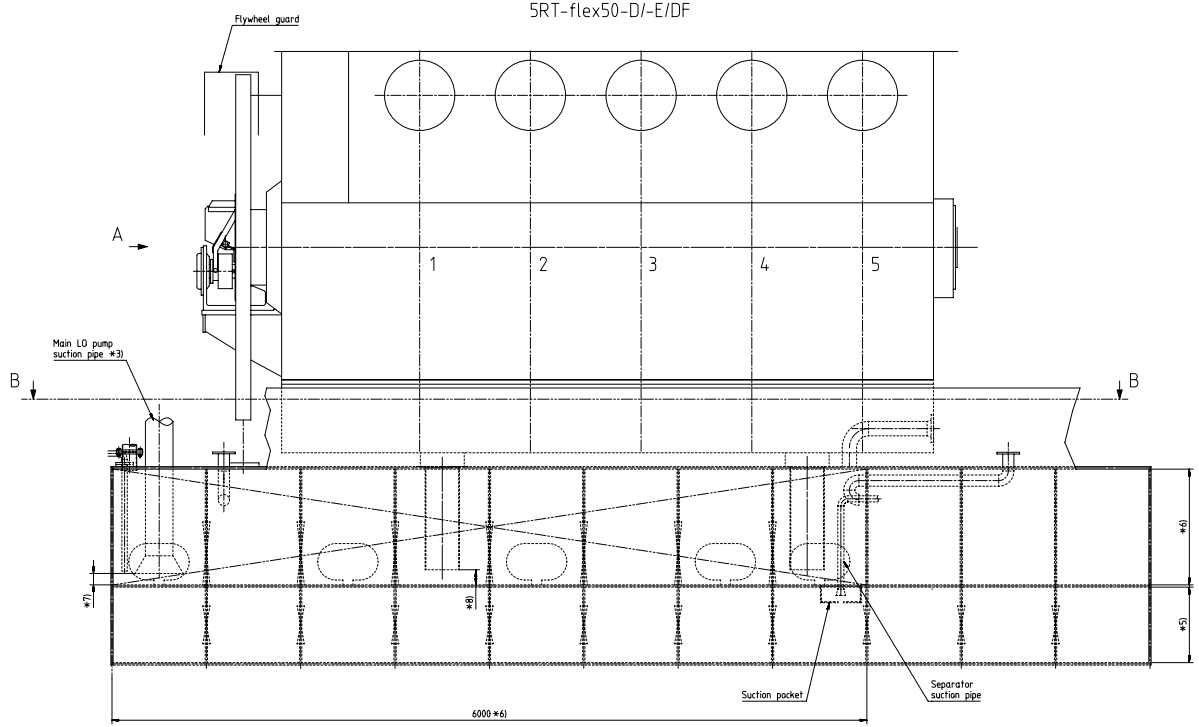
Scale -
Design Group 9722
Size A1 | Page 3/3 | Material ID PAAD169153
Drawing ID DAAD053658 | Rev. G

DD - DIMENSIONAL DRAWING - Confidential
Approved

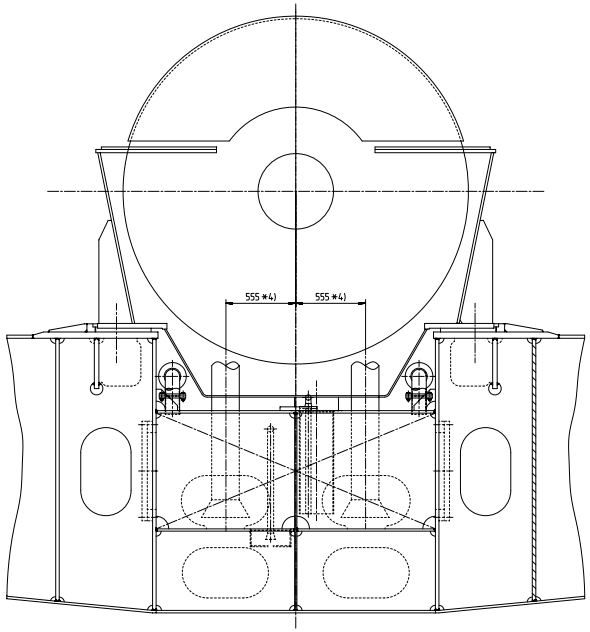
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TANK PROPOSAL

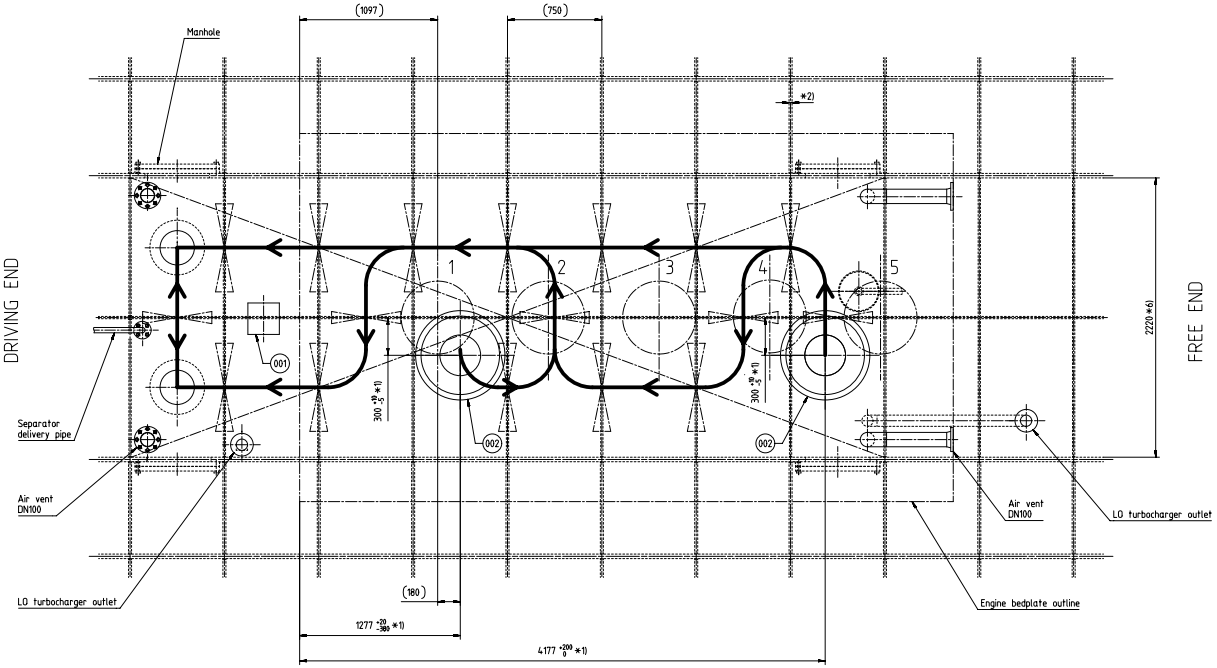
5RT-flex50-D/-E/DF



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 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	Material ID	Material Name / Dimension, Qu	Standard or Drawing	Basic Material / Material Standard	Weight / GR.NET
2	002	107.246.182.200	VERTICAL OIL DRAIN	107.246.182		76,9
1	001	107.246.799.200	PLATE	107.246.799		15,0

Prev. issue for ref.: D-Code XXXXX; Standard ISO, JIS; Main Drv.

Appr.	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date

WINGD Winterthur Gas & Diesel

Product: 5RT-flex50-D, 5RT-flex50-E, 5RT-flex50DF

LUBRICATING OIL DRAIN TANK WITH VERTICAL DRAINS

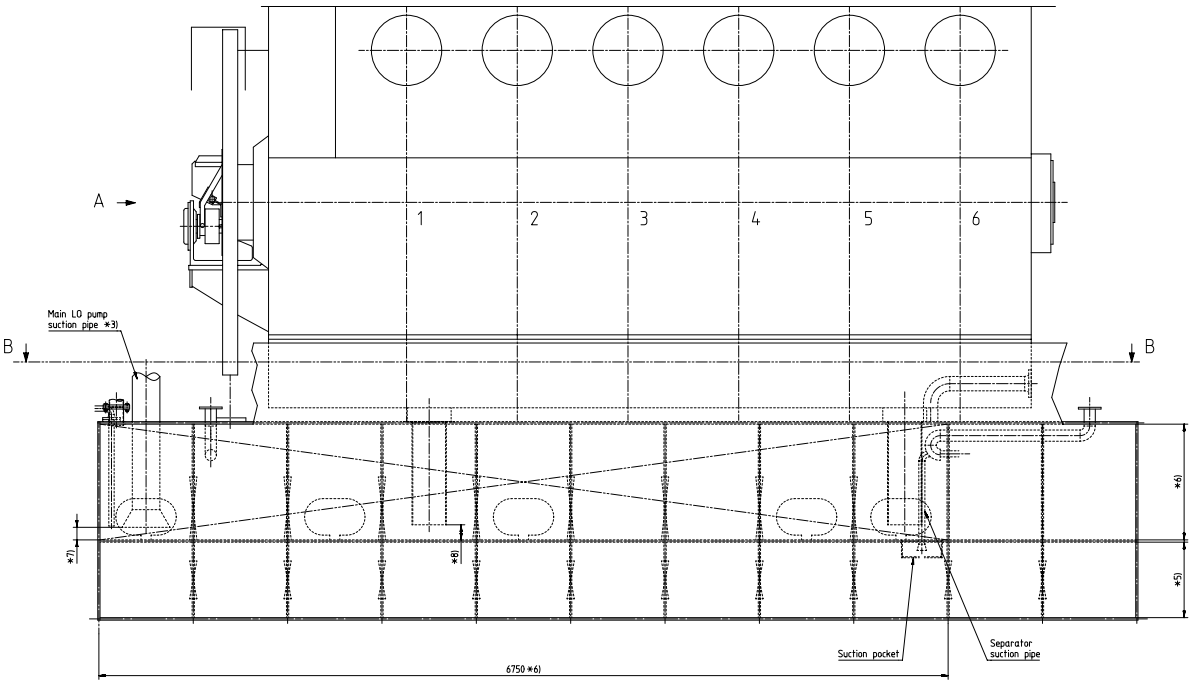
Units	mm kg	NX	Basic Material	Net Weight 169
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TOLERANCING PRINCIPLE ISO8015	Chkd	16.05.2019 wwa008 Wang	Design Group 9722	Drawing ID PAAD109763 Rev. –
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	16.05.2019 mhu019 Hug		

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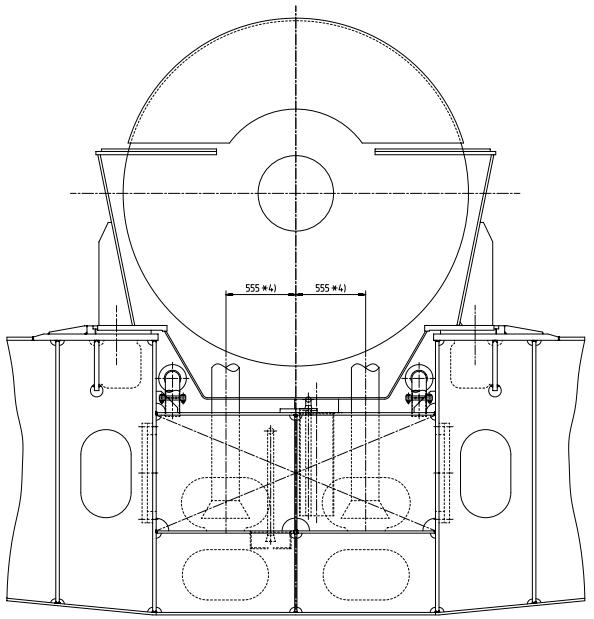
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TANK PROPOSAL

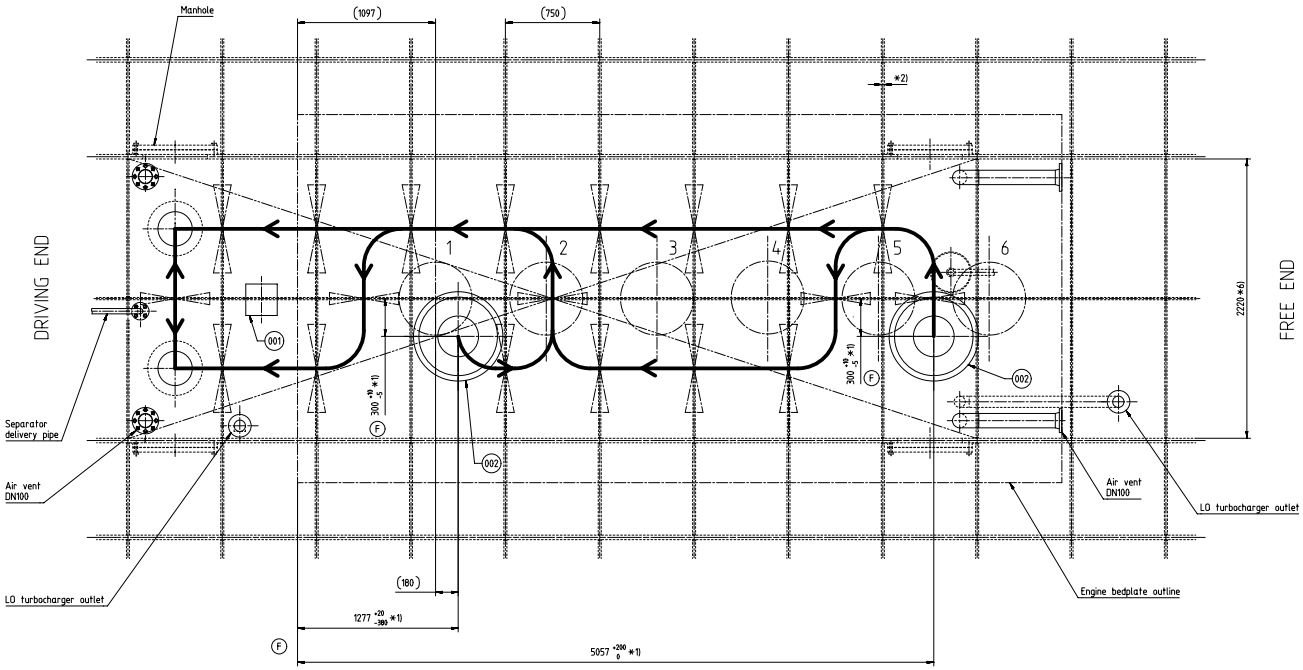
6RT-flex50-D/-E/DF



A (DRIVING END)



B-B



(F) 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	Item No.	Material ID	Material Name / Dimension, Qu.	Drawing or Standard	Basic Material: Material Standard	Weight GR/NET
2		002	107.246.182.200	VERTICAL OIL DRAIN	107.246.182		76,9
1		001	107.246.799.200	PLATE	107.246.799		15,0
						G-Code: XXXXX	Main Drw.:
						Standard: ISO, JIS	

Rev. status	Rev. letter	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
last	C	7-45276	25.07.2008	D EAADB86020	11.09.2015	E EAADB86020	04.11.2015	F EAADB90195	25.03.2019

WINGD Winterthur Gas & Diesel

Product: 6RT-flex50-D, 6RT-flex50-E, 6RT-flex50DF

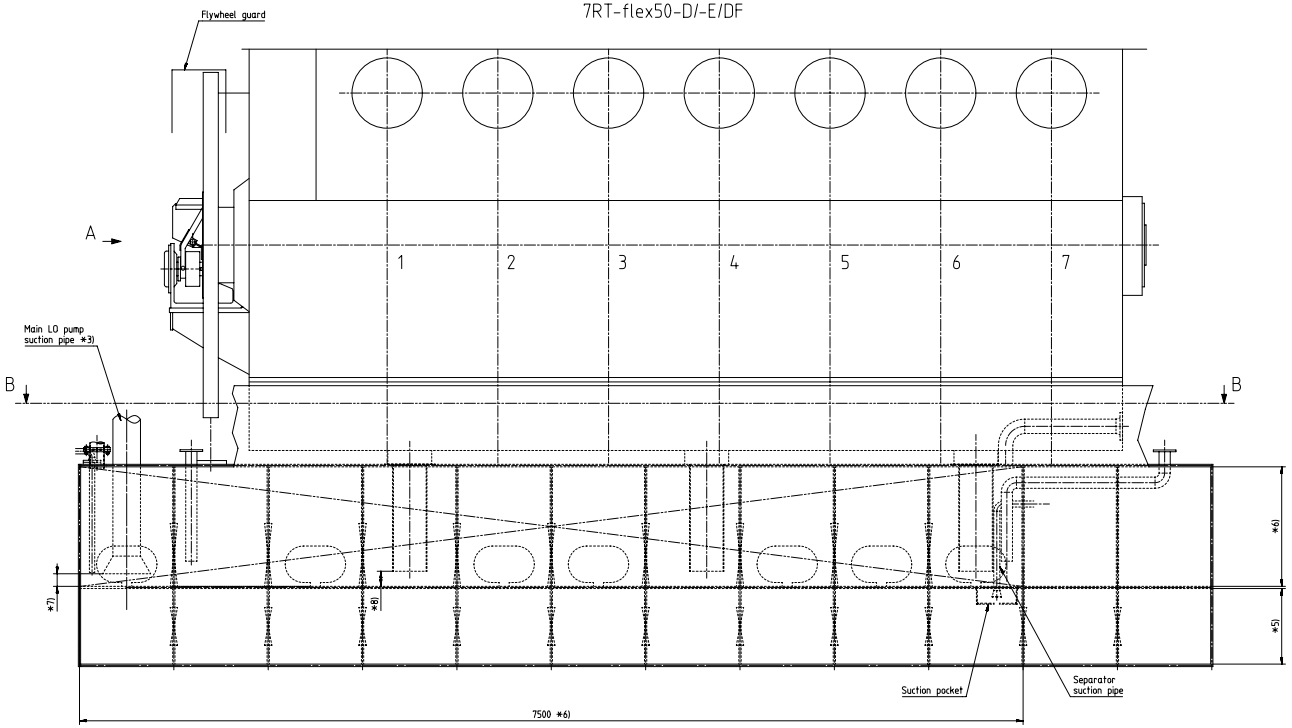
LUBRICATING OIL DRAIN TANK WITH VERTICAL DRAINS

Units: mm kg	NX	Basic Material:				Net Weight 169	
SURFACE PROTECTION: SEE GROUP 8744	Made: 07.04.2004 S.STYLIANOU	Scale: 1:15	Size: A0	Page: 1/1	Material ID: 107.341.301.200		
TOLERANCING PRINCIPLE: ISO8015	Chkd:	Design Group: 9722	Drawing ID: 107.341.301			Rev.: F	
GENERAL TOLERANCES ACCORDING TO: ISO2768-mK	Appd: 26.07.2004 SNA001						

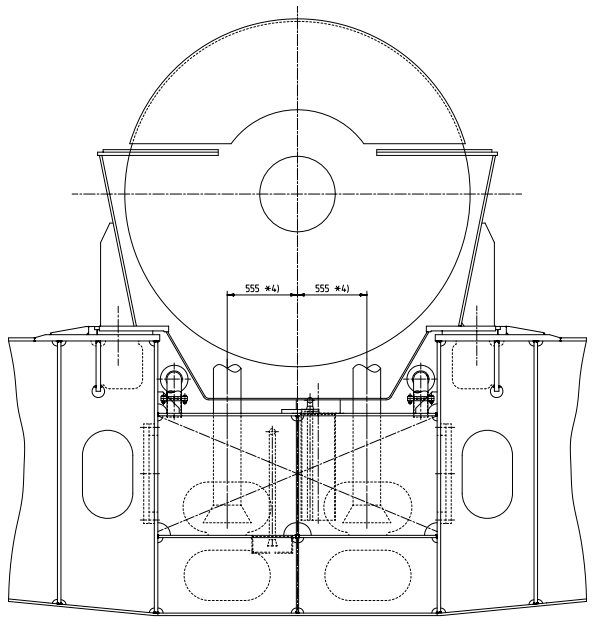
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TANK PROPOSAL

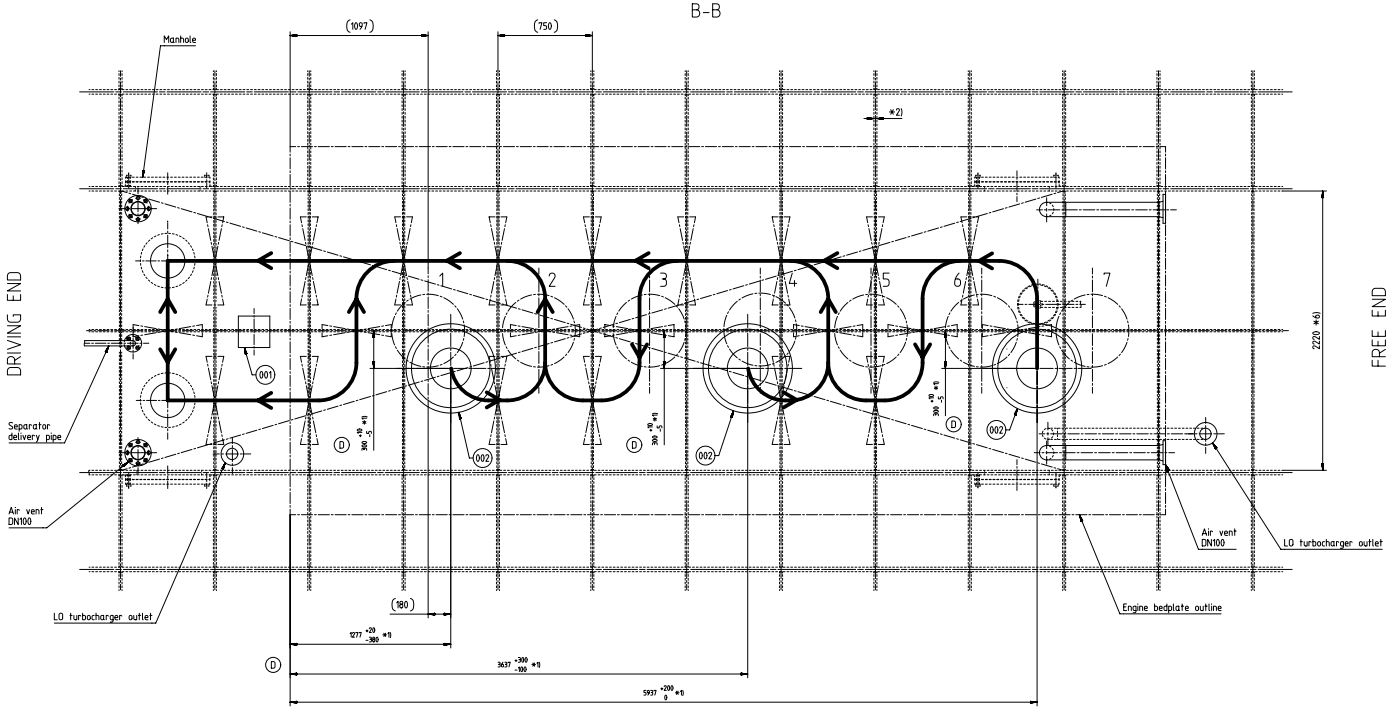
7RT-flex50-D/-E/DF



A (DRIVING END)



B-B



(D) 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	Item No.	Material ID	Material Name / Dimension, Qlt.	Drawing or Standard	Basic Material / Material Standard	Weight / GR.NET
3	002	107.246.182.200	VERTICAL OIL DRAIN	107.246.182		76,9
1	001	107.246.799.200	PLATE	107.246.799		15,0
					G-Code: XXXXX	Main Dim.
					Standard: ISO, JIS	

Rev.	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
A	7-30.060	21.10.2004	B 7-30.478	18.02.2005	C 7-45.276	25.07.2008	D EA4D89095	28.03.2019

Product: 7RT-flex50-D, 7RT-flex50-E, 7RT-flex50DF

LUBRICATING OIL DRAIN TANK WITH VERTICAL DRAINS

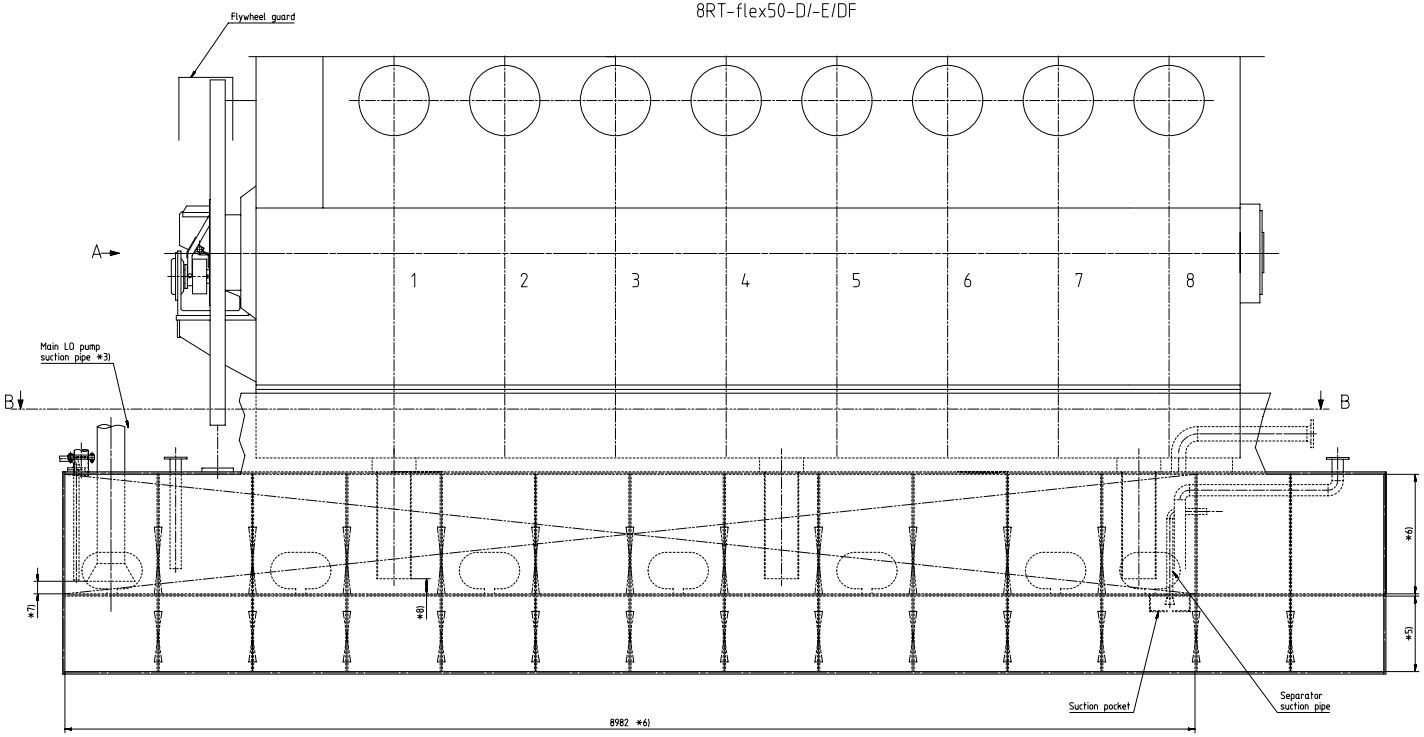
Units: mm kg NX | Basic Material: | Net Weight 246

SURFACE PROTECTION: SEE GROUP 9344	Made	27.05.2004	S.STYLIANOU	Scale 1:15	Size A0	Page 1/1	Material ID 107.342.995.200
TOLERANCING PRINCIPLE: ISO8015	Chkd			Design Group 9722	Drawing ID 107.342.995		Rev. D
GENERAL TOLERANCES ACCORDING TO: ISO2768-mK	Appd	26.07.2004	SNA001				

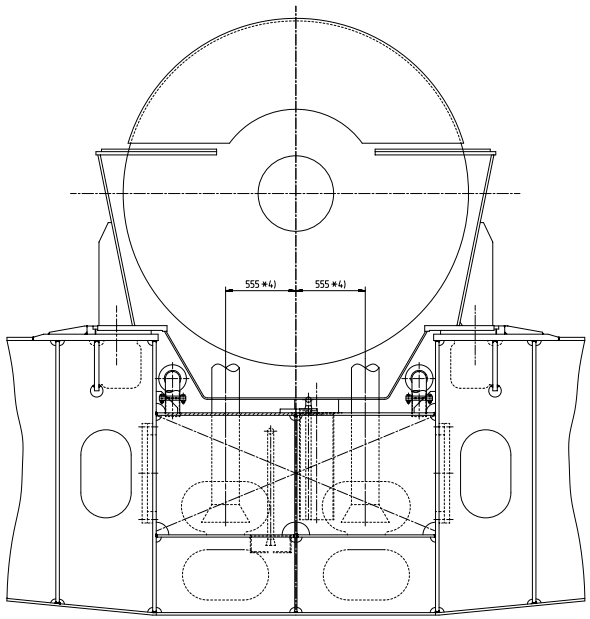
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TANK PROPOSAL

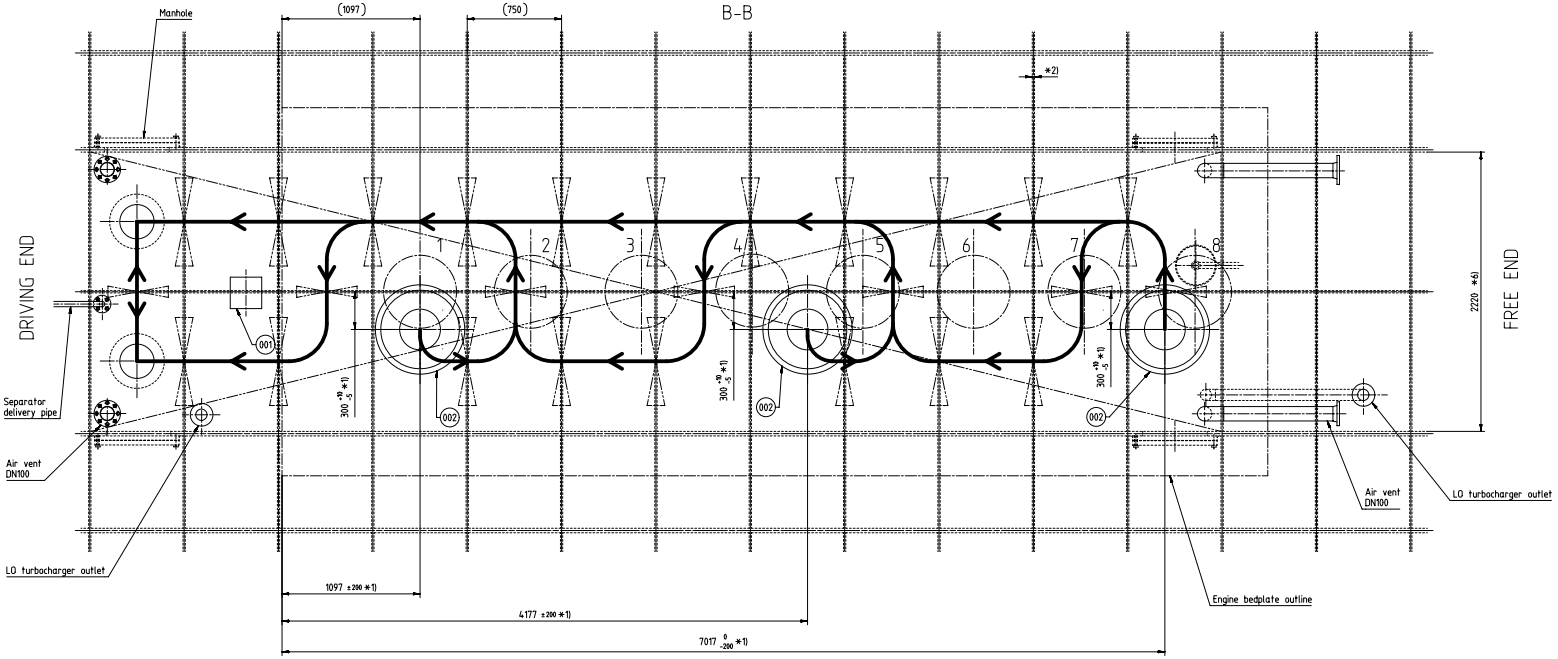
8RT-flex50-D/-E/DF



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 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	Material ID	Material Name / Dimension, Qu	Standard or Drawing	Basic Material / Material Standard	Weight / GR.NET
3	002	107.246.182.200	VERTICAL OIL DRAIN	107.246.182		76,9
1	001	107.246.799.200	PLATE	107.246.799		15,0

D-Code: XXXXX
Standard: ISO, JIS
Main Drw.:
Prev. issue for ref.:
Appr.: Number / Drawn date

Product: 8RT-flex50-D, 8RT-flex50-E, 8RT-flex50DF
LUBRICATING OIL DRAIN TANK WITH VERTICAL DRAINS

Units: mm kg | NX | Basic Material | Net Weight 246

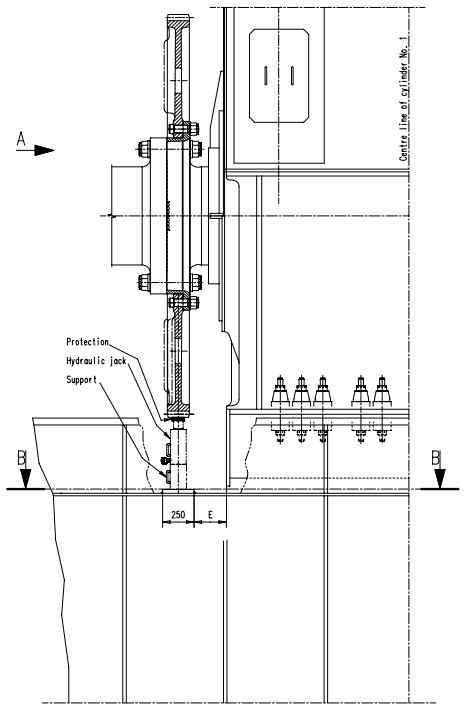
SURFACE PROTECTION SEE GROUP 9344
TOLERANCING PRINCIPLE ISO8015
GENERAL TOLERANCES ACCORDING TO ISO2768-mK

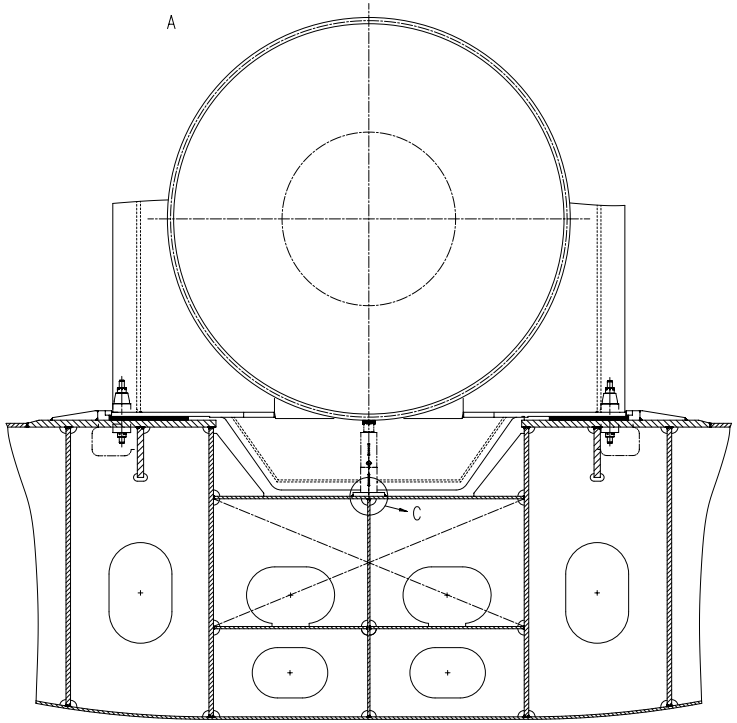
Made 28.03.2019 dkv021 DH.Kim
Chkd 16.05.2019 wwa008 Wang
Appd 16.05.2019 mtu019 Hug

Scale 1:15 | Size A0 | Page 1/1 | Material ID | Drawing B PAAD109845 | Rev. –
Design Group 9722

PAAD314142

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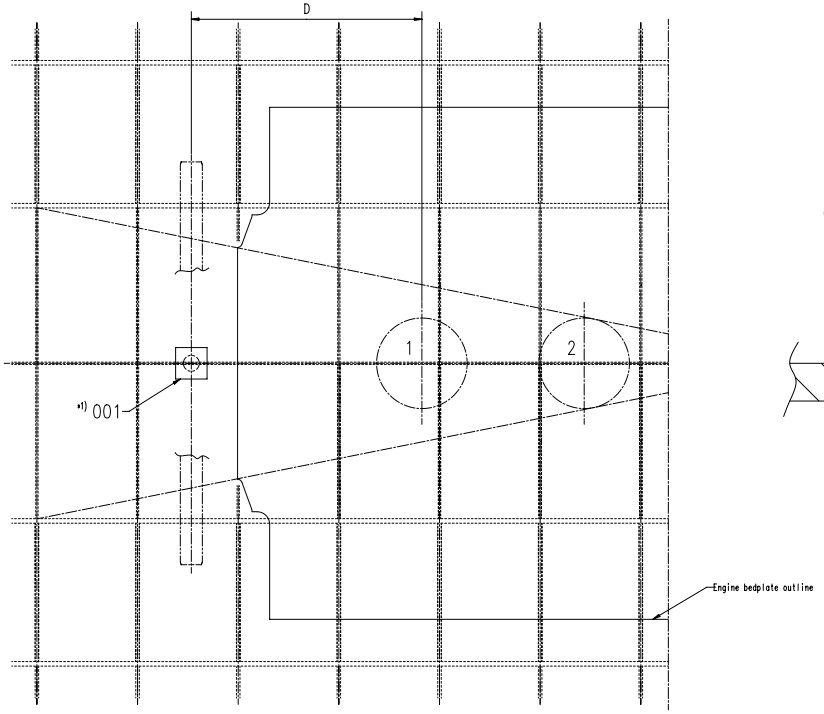




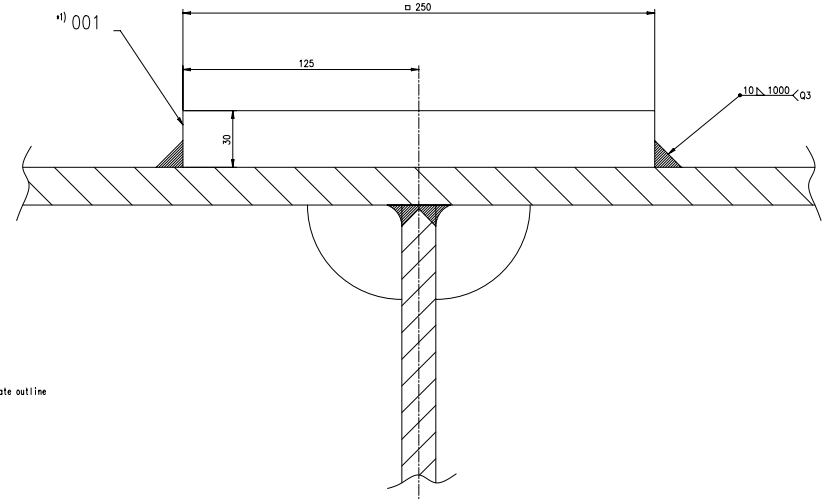
①

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.

Partlist							
WO							
1	001	107.246.799.001	FLAT BAR		107.246.799		15.0
Quantity	SDD NO	Material ID	Material Name Dimension, Qty		Drawboard or Drawing	Basic Material Material Standard	Weight GR/NET
						G-Code XXXXX	Main Dr.
107.246.799.000 Type Approval Ref. No.						Standard ISO, JIS	
Material	Draft	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
		F EAAD086725	18.09.2013	G EAAD086974	20.03.2014	H EAAD086107	11.09.2015	I EAAD095725	18.01.2021

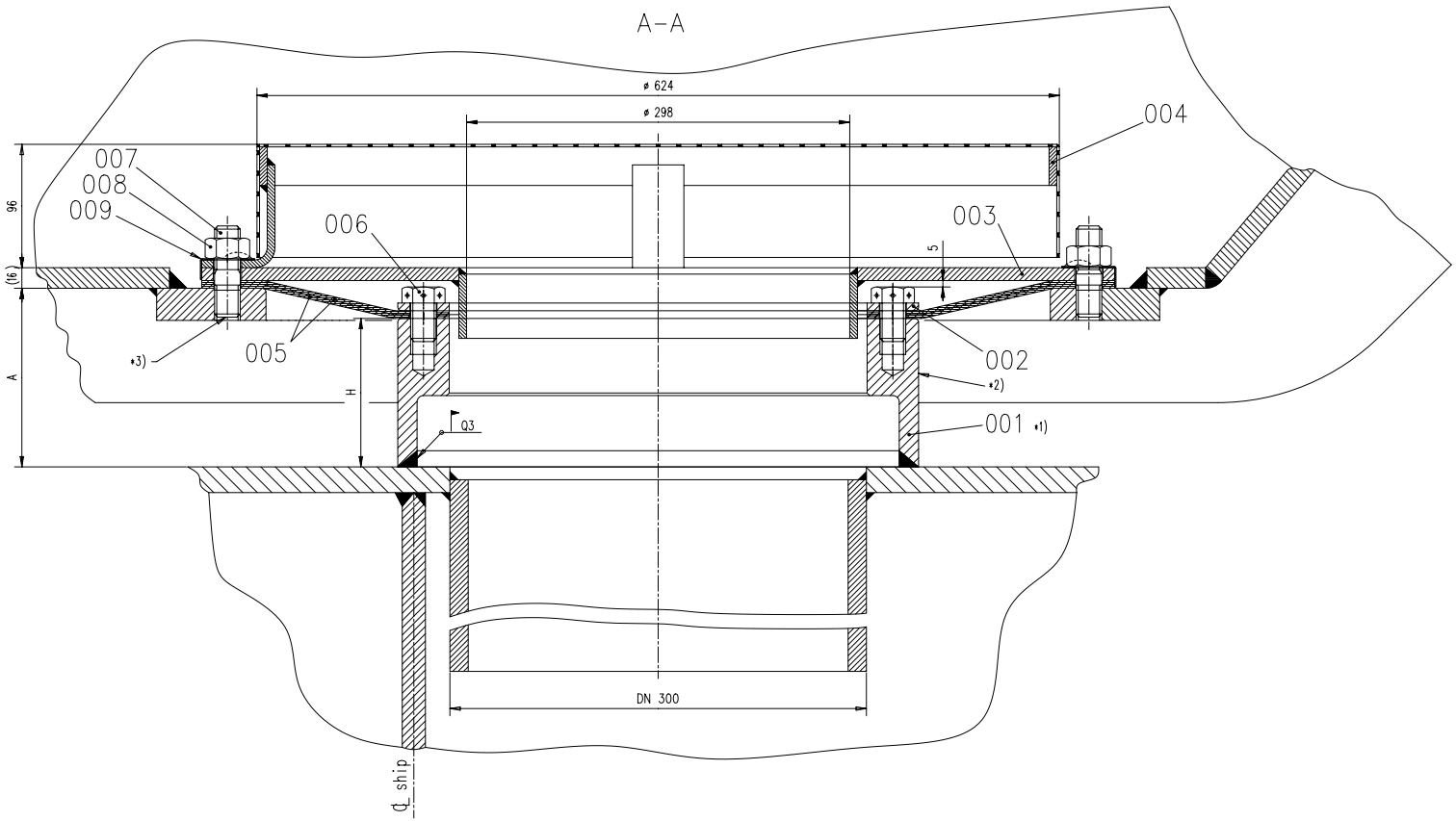
WINGD Winterthur Gas & Diesel

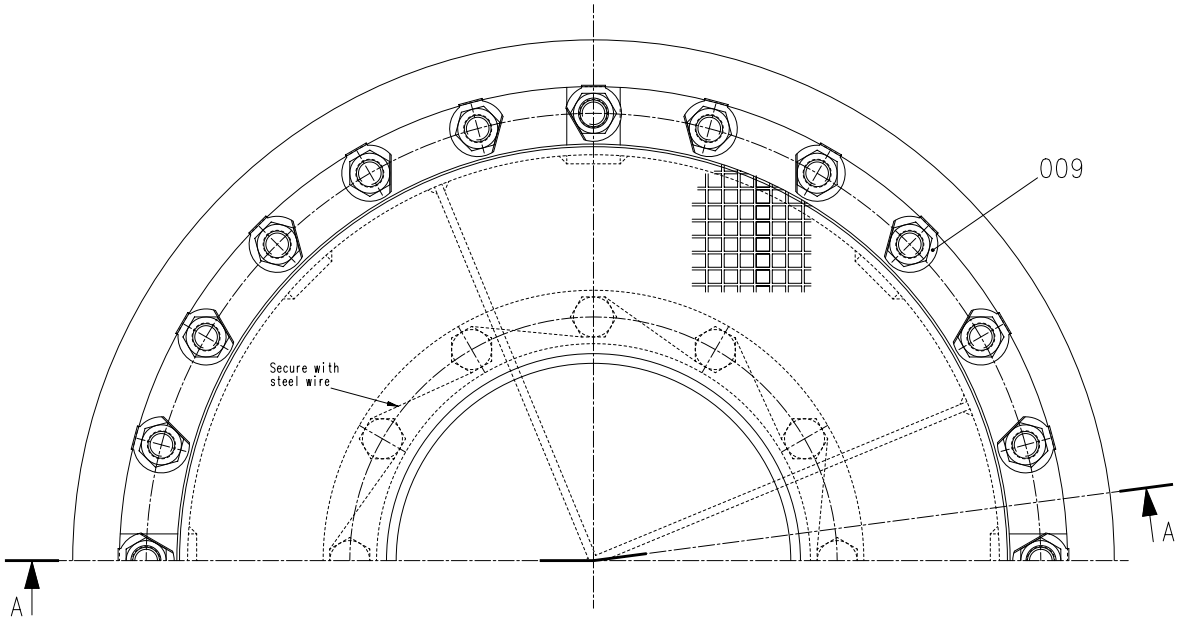
Product W-2S

PLATE TO HYDRAULIC JACK Blech

Units	mm kg	NX		Basic Material			Net Weight
SURFACE PROTECTION SEE GROUP 0744	Made	09.11.2000	S.Stylianou	Scale	1:14	Size A0	Page 1/1	Material ID
TOLERANCING PRINCIPLE ISO8015	Chkd			Design Group			
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	09.11.2000	WCH001 Service User	Drawing ID	9722	107.246.799	Rev. I

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REMARKS:

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

*2) Pos. 001, 002, 005 and 006 to be pre-assembled prior to alignment. After alignment the Pos. 001 (flange) can be welded in place.

*3) Driven in oil tight with jointing compound.

A	To be measured after alignment of the engine
H	A–23.5mm

Items 001 to 009 are yard delivery

QTY	SEQ NO	Material ID	Material Name / Dimension, Occ	Standard or Drawing	Basic Material / Material Standard	Weight GR./NET
24	009	015.507.360.910	TAB WASHER 21	DIN 93	Steel Zn 5 bk	0,1
24	008	015.201.012.510	HEXAGON NUT M20	ISO 4032	8	0,064
24	007	015.101.214.271	STUD M20x45		8.8	0,17
12	006	015.151.374.201	HEXAGON HEAD SCREW M20x30		8.8	0,12
2	005	107.246.190.001	RUBBER GASKET	107.246.190	NBR 70 Sh	1,2
1	004	107.049.681.200	OIL STRAINER	107.049.681		8,3
1	003	107.246.187.200	COVER	107.246.187		26,6
1	002	107.246.186.001	RING	107.246.186	W-FU-235-JR	2,0
1	001	107.246.183.001	WELDING FLANGE	107.246.183	W-FU-235-JR	28,0

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

Modif.	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
B	EAAD014378	10.07.1998	C EAAD014420	25.01.1999	D EAAD091567	20.11.2019		

Approved

WIN GD Winterthur Gas & Diesel

Product W-25

VERTICAL OIL DRAIN ASSEMBLY DRAWING

Oelablauf vertikal

Units mm kg | NX | Basic Material | Net Weight 76,7

SURFACE PROTECTION SEE GROUP 0344

TOLERANCING PRINCIPLE ISO8015

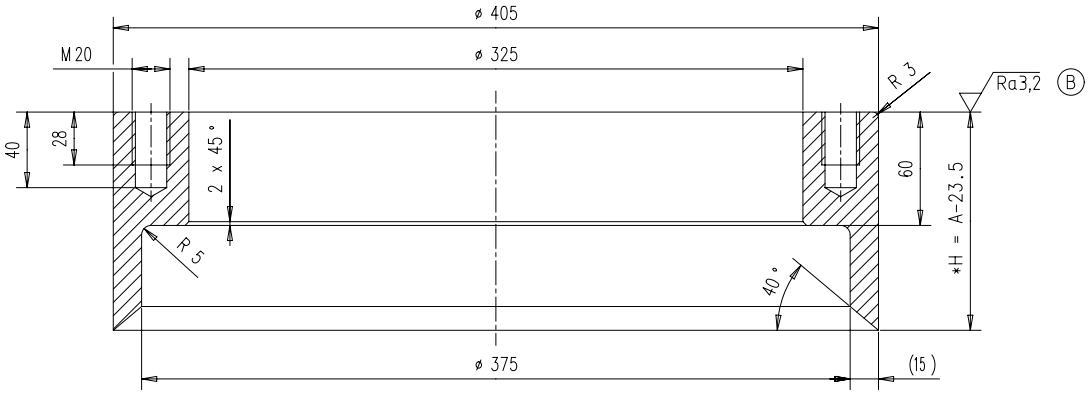
GENERAL TOLERANCES ACCORDING TO ISO2768-mK

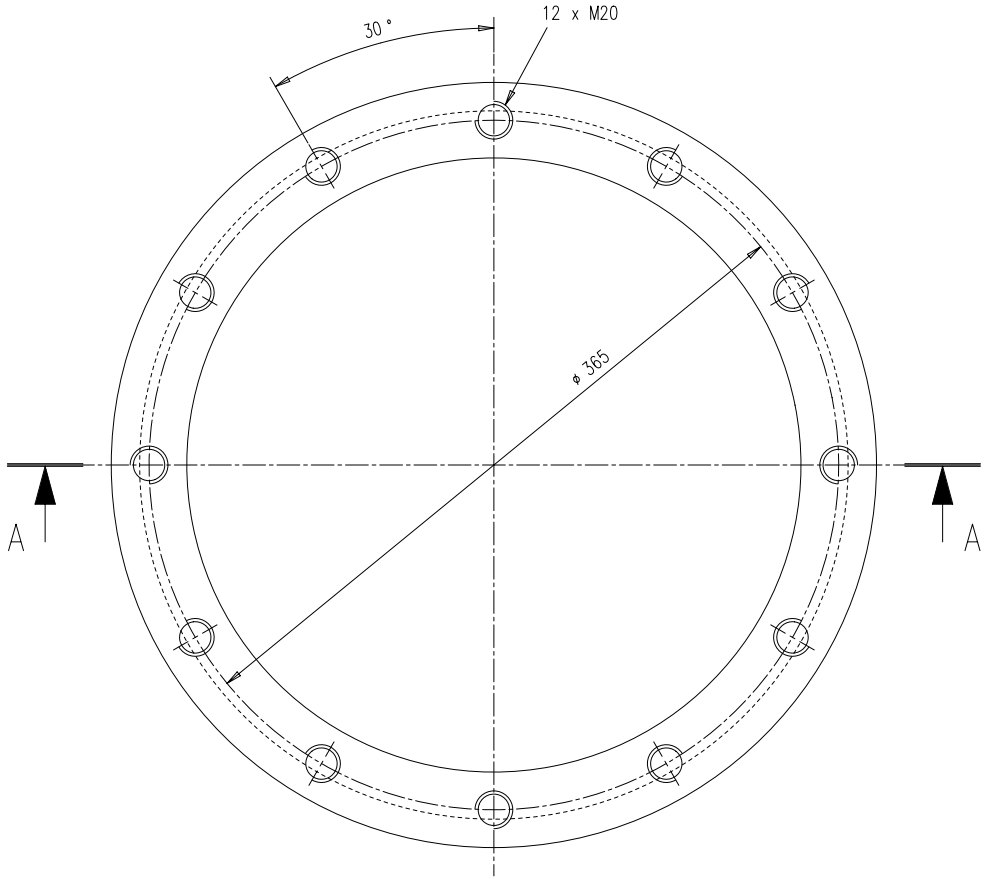
Made 17.08.1995 A. Horsfjord | Chkd | Appd 06.02.1996 MLU011 Lüthi

Scale 1:2 | Design Group 9722 | Size A1 | Page 1/1 | Material ID 107.246.182.200

Drawing ID 107.246.182 | Rev. D

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B Ra12,5 (✓) SHARP EDGES REMOVED

*For dimension <H> see drawing 1-107.246.182

Modif.												
	A	EAAD014378	10.07.1998	B	EAAD091567	18.11.2019						
		Number	Drawn date		Number	Drawn date		Number	Drawn date		Number	Drawn date

Free space for lic.

Q-Code XXXXX

Standard ISO; JIS

Main Drw.

Approved

WIN GD Winterthur Gas & Diesel

Product W-2S

WELDING FLANGE

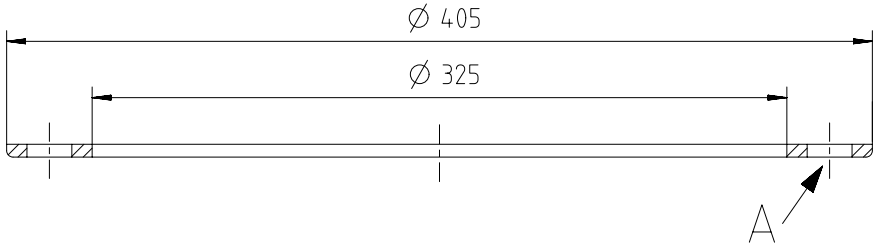
Anschweissflansch

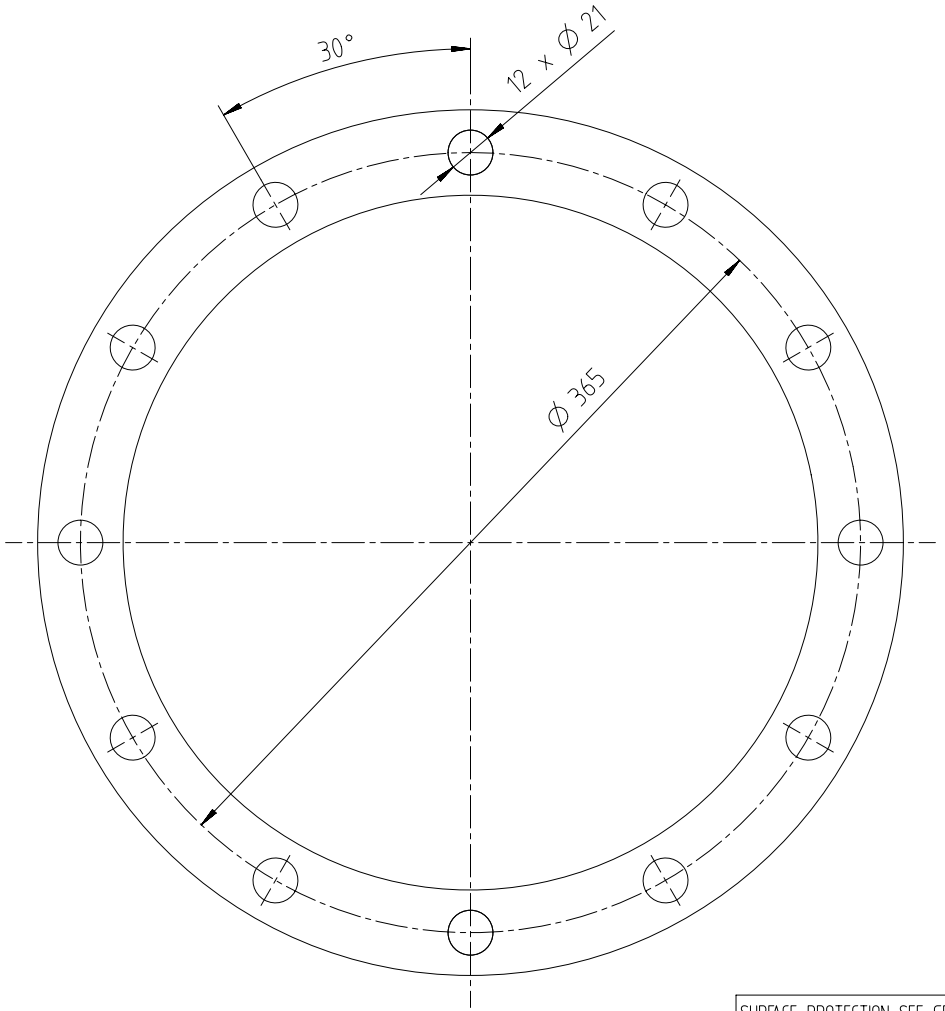
Units	mm kg	NX	Basic Material	W-FU-235-JR	Net Weight 28

SURFACE PROTECTION SEE GROUP 0344	Made	21.08.1995 A. Horsfjord	Scale 1:2	Size A2	Page 1/1	Material ID	107.246.183.001
TOLERANCING PRINCIPLE ISO8015	Chkd		Design Group 9722	Drawing ID	107.246.183	Rev.	B
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	17.10.1995 MLU011 Lüthi					

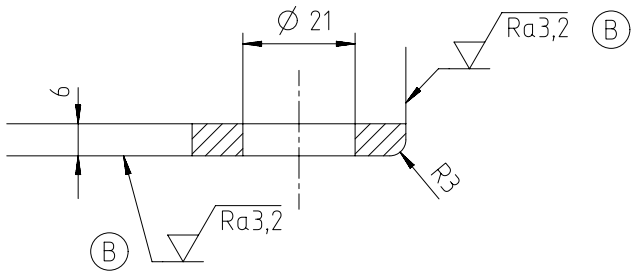
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A 1:1



B Ra12,5 (√) SHARP EDGES REMOVED

Free space for lic.								Q-Code XXXXX		Main Drw.	
								Standard ISO; JIS			
Modif.	A	EAAD014378	10.07.1998	B	EAAD091567	18.11.2019					
		Number	Drawn date		Number	Drawn date		Number	Drawn date	Number	Drawn date

WIN GD Winterthur Gas & Diesel

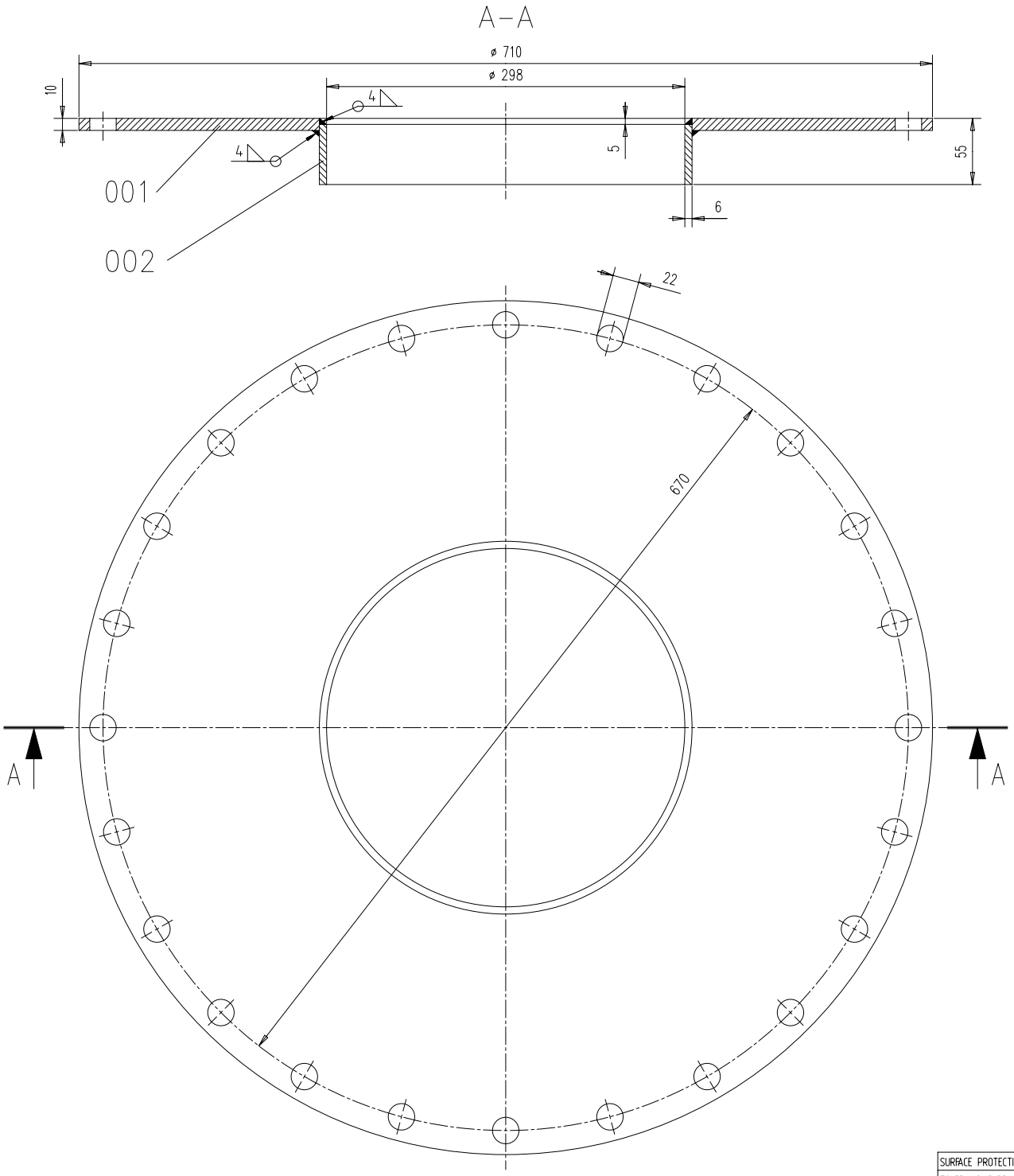
Product W-2S	RING		
	Ring		
Units mm kg	NX	Basic Material W-FU-235-JR	Net Weight 2

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TOLERANCING PRINCIPLE ISO8015	Chkd	Design Group 9722	Drawing ID 107.246.186		Rev. B
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 17.10.1995 MLU011 Lüthi				

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Ⓐ WELD QUALITY LEVEL D (SEE DAAD007749: PAAD013544)

QTY	SEQ NO	Material ID	Material Name / Dimension, Occ	Standard or Drawing	Basic Material / Material Standard	Weight GR./NET
1	002	107.246.189.001	RING	107.246.189	W-FU-235-JR	2,2
1	001	107.246.188.001	PLATE	107.246.188	W-FU-235-JR	24,4

Free space for lic.

Q-Code: XXXXX

Standard: ISO; JIS

Main Drw.

Modif.: A EAAD091567 18.11.2019

Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date

WIN GD Winterthur Gas & Diesel

Product: W-2S

COVER

Deckel

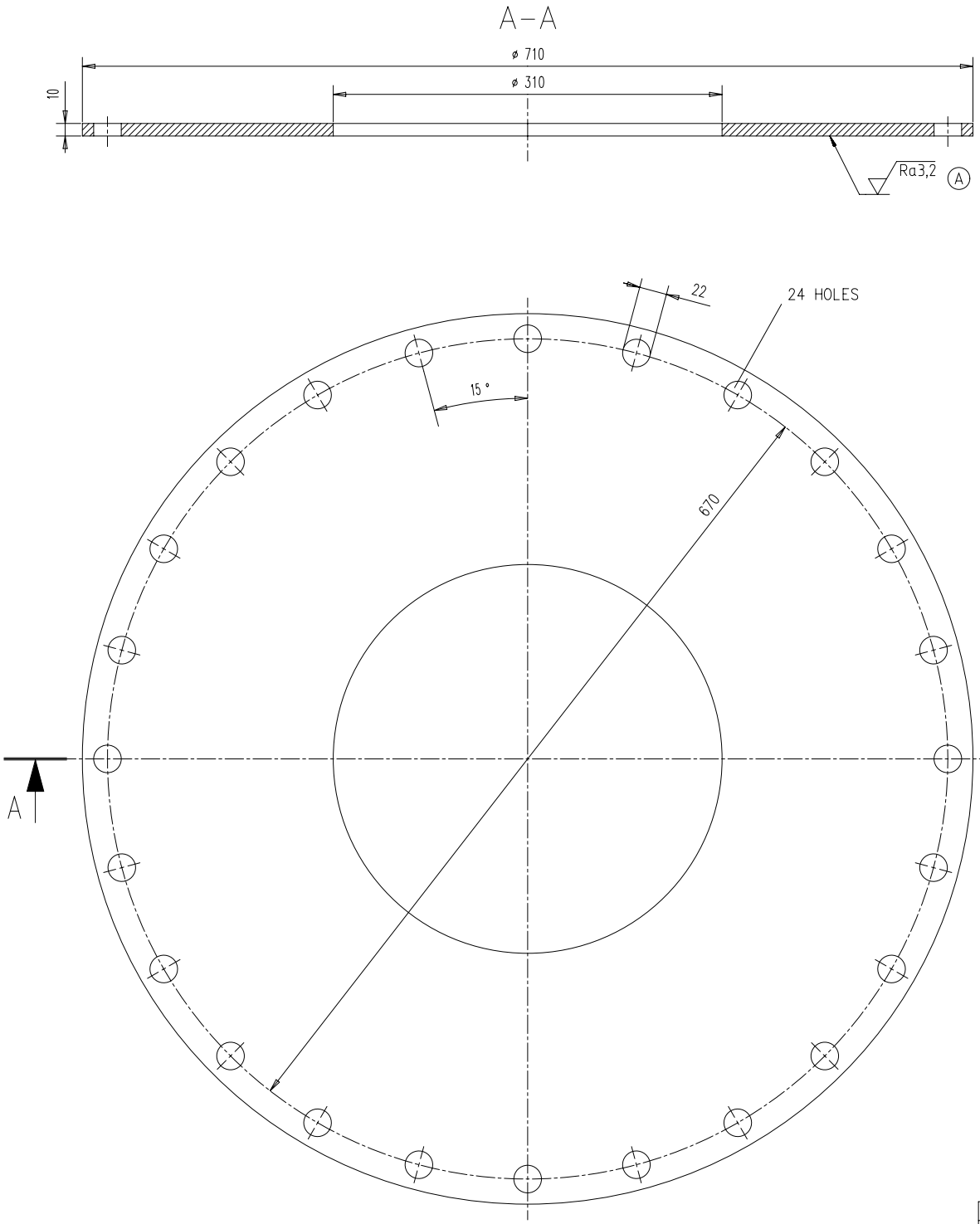
Units: mm kg | NX | Basic Material | Net Weight 26,6

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TOLERANCING PRINCIPLE ISO8015	Chkd	Design Group 9722	Drawing ID 107.246.187		Rev. A	
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 17.10.1995 MLU011 Lüthi					

Approved

ASD - ASSEMBLY DRAWING - Internal

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Free space for lic.								Q-Code XXXXX		Main Drw.
								Standard ISO; JIS		
Modif.	A	EAAD091567	18.11.2019							
		Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date	

WIN GD Winterthur Gas & Diesel

Product W-2S

PLATE

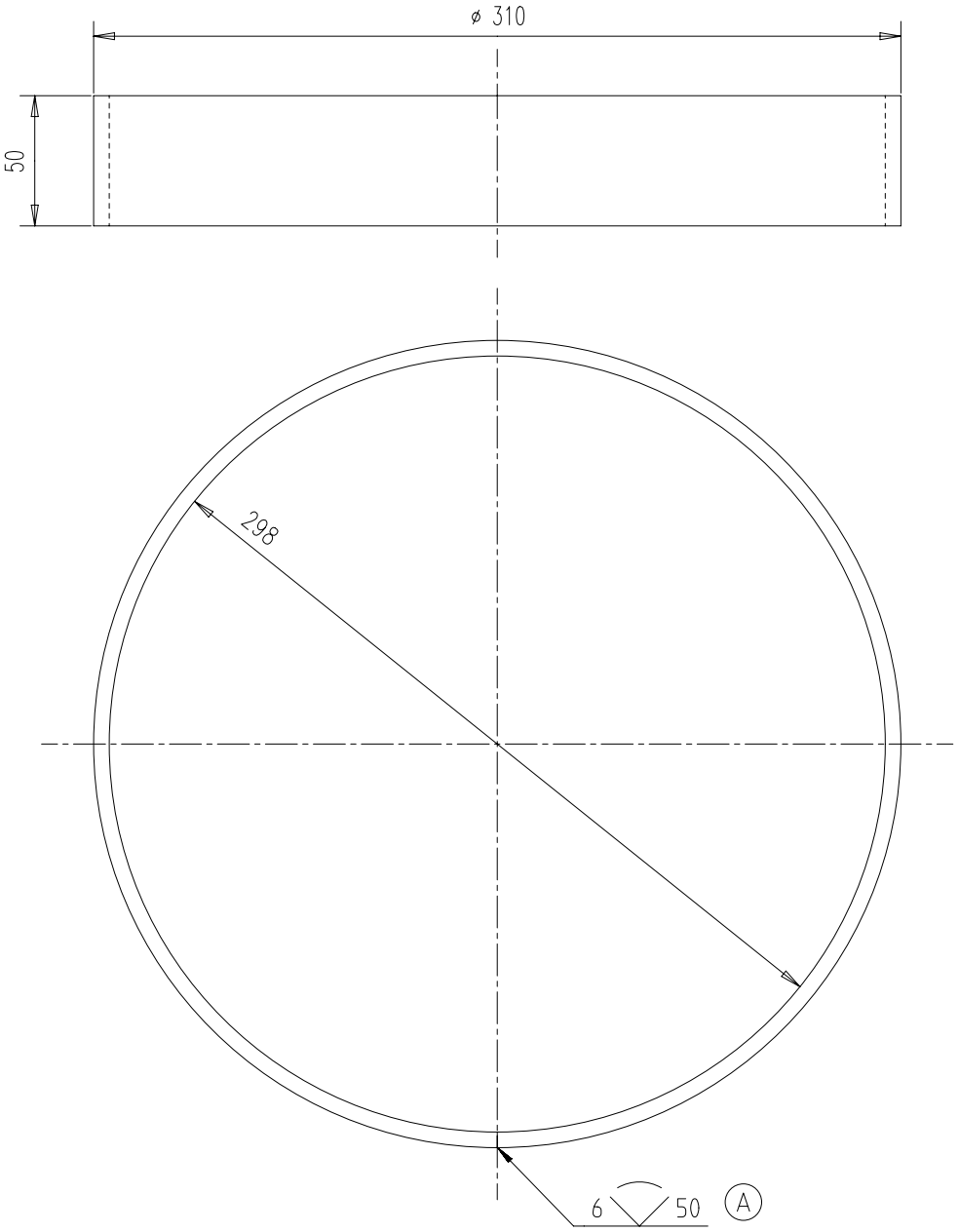
Blech

Units mm kg	NX		Basic Material W-FU-235-JR		Net Weight 24,4
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TOLERANCING PRINCIPLE ISO8015	Chkd	Design Group 9722	Drawing ID 107.246.188		Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 17.10.1995 MLU011 Lüthi				

Approved

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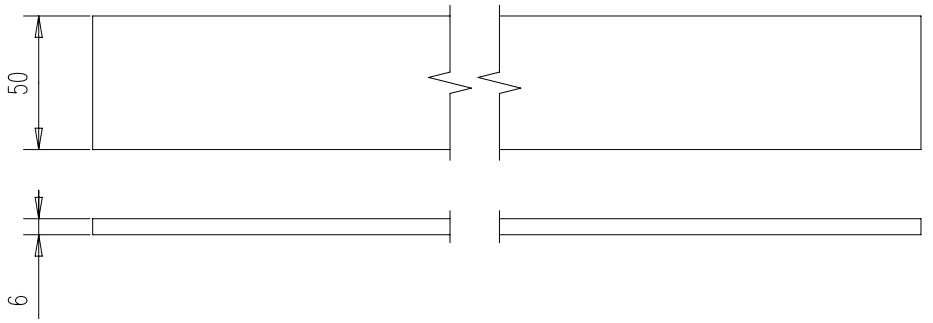
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A

WELD QUALITY LEVEL D (SEE DAAD007749: PAAD013544)

STRAIGHT LENGTH 955



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

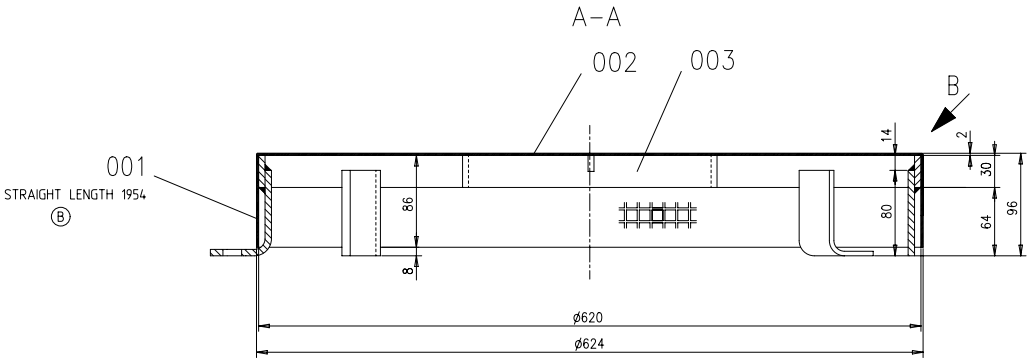
WIN GD Winterthur Gas & Diesel

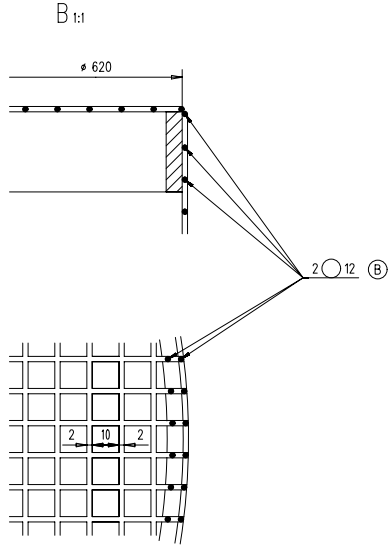
Product W-2S	RING Ring				
Units mm kg	NX	Basic Material W-FU-235-JR			Net Weight 2,2
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TOLERANCING PRINCIPLE ISO8015	Chkd	Design Group 9722	Drawing ID 107.246.189		Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 17.10.1995 KOSM M.Kosovsky				

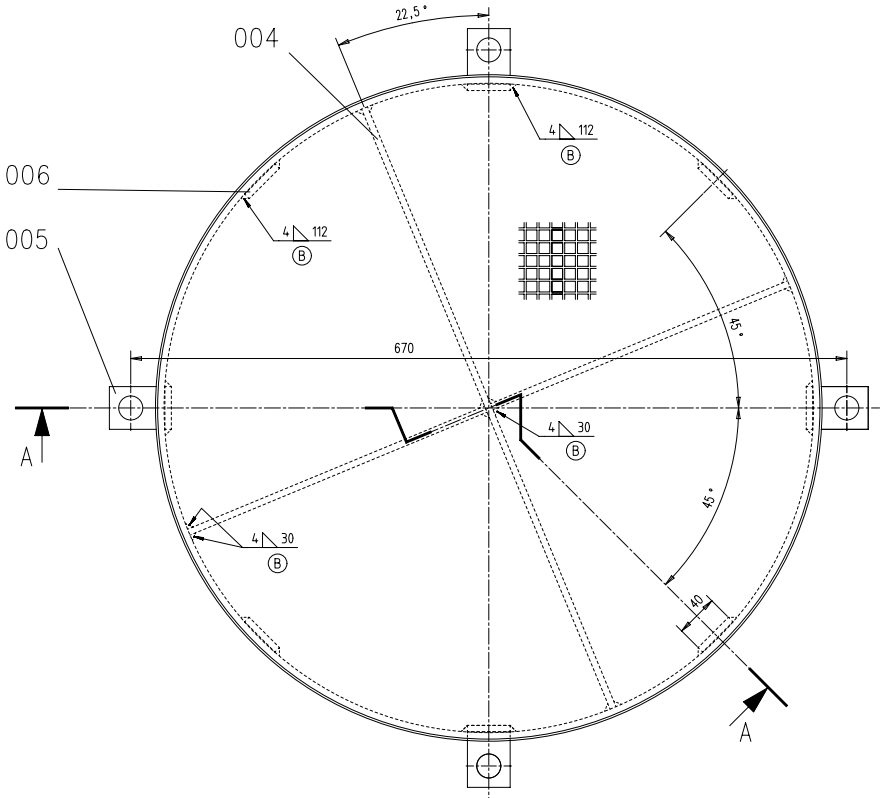
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ROUGH CLEANED

Ⓑ WELD QUALITY LEVEL D (SEE DAAD007749: PAAD013544)

QTY	SEQ NO	Material ID	Material Name / Dimension, Occ	Standard or Drawing	Basic Material / Material Standard	Weight GR./NET
4	006	107.049.681.006	FLAT BAR	107.049.681	W-FU-235-JR	0,15
4	005	107.049.665.001	HOLDER	107.049.665	W-FU-235-JR	0,24
2	004	107.049.666.001	FLAT BAR	107.049.666	W-FU-235-JR	0,85
1	003	107.049.664.001	RING	107.049.664	W-FU-235-JR	2,7
1	002	107.049.681.002	PERFORATED SHEET	107.049.681	W-FU-235-JR	1,4
1	001	107.049.681.001	PERFORATED SHEET	107.049.681	W-FU-235-JR	0,9

Free space for Inc. | Q-Code XXXXX | Standard ISO | Main Drw.

Modif.	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
	A EAAD028037	04.02.2002	B EAAD091567	19.11.2019				

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Product W-25

OIL STRAINER

Oelsieb

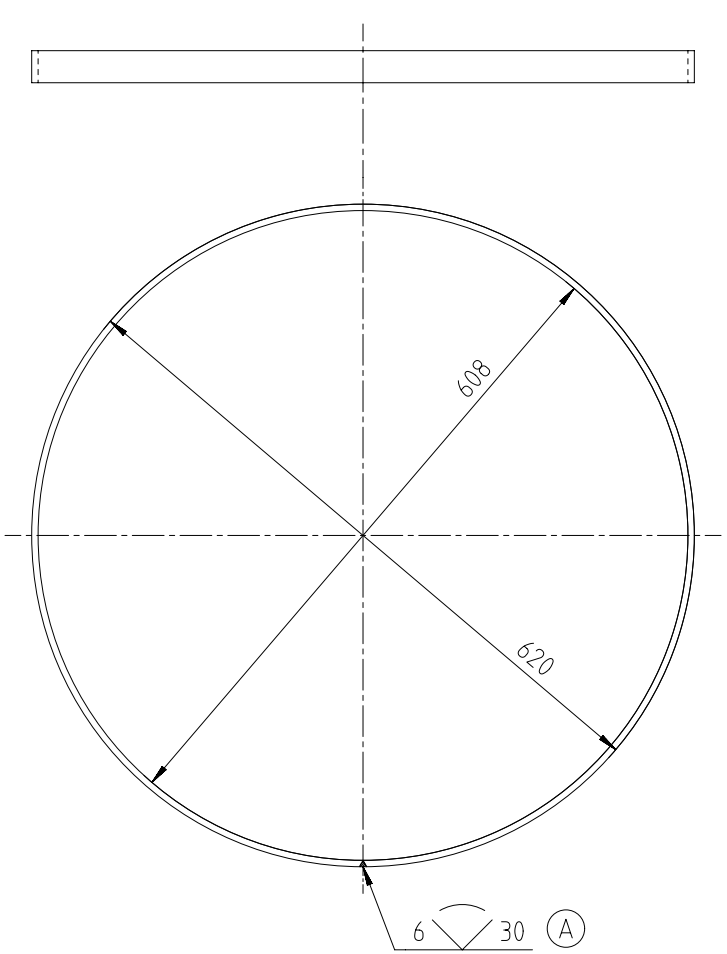
Units mm kg | NX | Basic Material | Net Weight 8,3

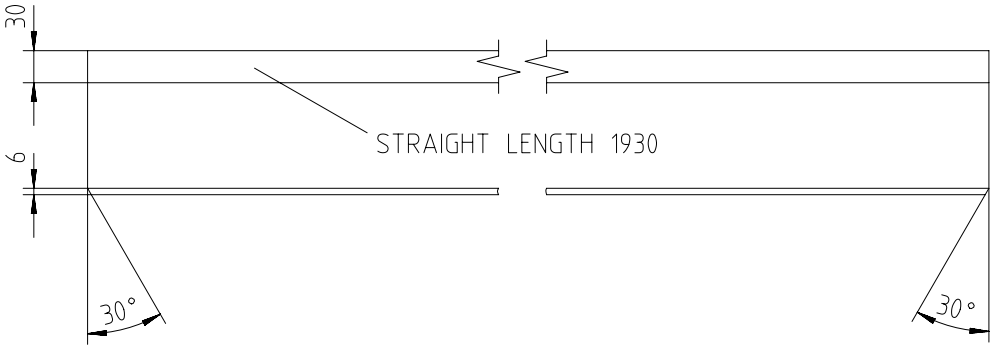
SURFACE PROTECTION SEE GROUP 0344	Made	19.06.1978 S.NATALI	Scale 1:2.5	Size A1	Page 1/1	Material ID	107.049.681.200
TOLERANCING PRINCIPLE ISO8015	Chkd		Design Group 9722	Drawing ID	107.049.681	Rev.	B
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	19.06.1978 WCH001 Service User					

ASD - ASSEMBLY DRAWING - Internal

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(A) WELD QUALITY LEVEL D (SEE DAAD007749: PAAD013544)

Free space for lic.									Q-Code XXXXX	Main Drw.	
									Standard ISO; JIS		
Modif.	(A)	EAAD091567	15.11.2019								
		Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date		

WIN GD Winterthur Gas & Diesel

Product W-2S

RING
ON FRAME FOR OIL STRAINER

Units mm kg	NX		Basic Material W-FU-235-JR		Net Weight 2,7
SURFACE PROTECTION SEE GROUP 0344	Made 20.03.1995 M. Winiger		Scale 1:5	Size A3 / Page 1/1	Material ID 107.049.664.001
TOLERANCING PRINCIPLE ISO8015	Chkd		Design Group 1110	Drawing ID 107.049.664	Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 13.06.1978 WCH001 Service User				

Approved

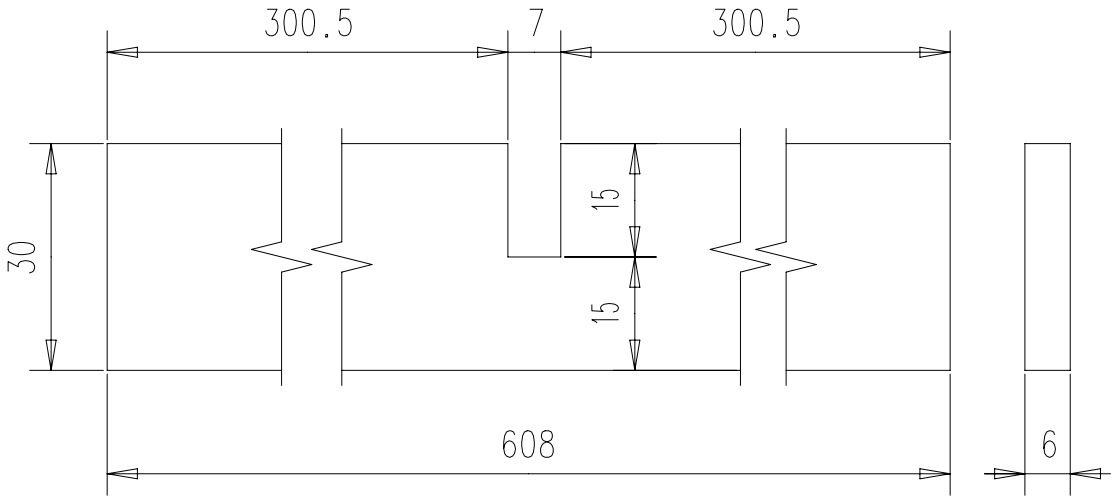
DID - DIMENSIONAL DRAWING - Confidential

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SURFACE PROTECTION SEE GROUP 0344

TOLERANCING PRINCIPLE ISO8015

GENERAL TOLERANCES ACCORDING TO ISO2768-mK



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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	EAAD091567	15.11.2019						

WIN GD
Winterthur Gas & Diesel

Product: W-2S

FLAT BAR

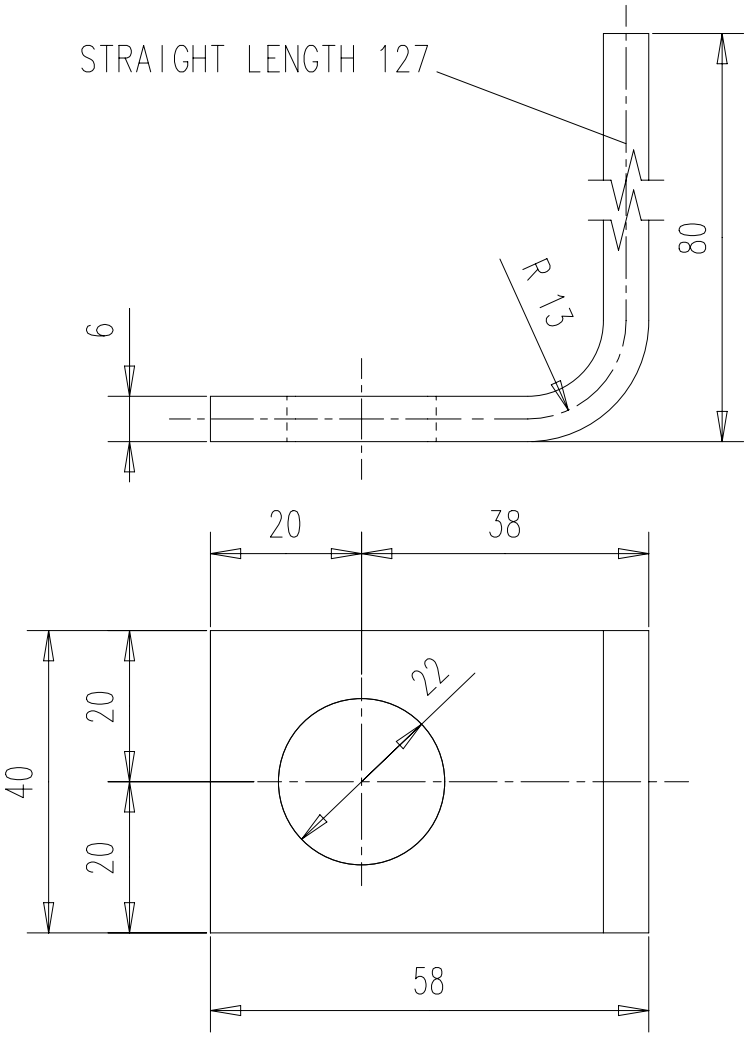
Units	mm kg	NX	Basic Material	W-FU-235-JR	Net Weight	0,85
Made	20.03.1995 M. Winiger		Scale	1:1	Size A4 / Page 1/1	Material ID 107.049.666.001
Chkd			Design Group	1110	Drawing ID 107.049.666	Rev. A
Appd	13.06.1978 WCH001 Service User					

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SURFACE PROTECTION SEE GROUP 0344

TOLERANCING PRINCIPLE ISO8015

GENERAL TOLERANCES ACCORDING TO ISO2768-mK



Approved

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
A	EAAD091567	15.11.2019						

WIN GD
Winterthur Gas & Diesel

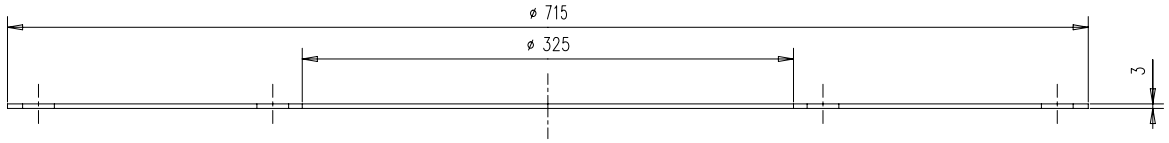
Product W-2S

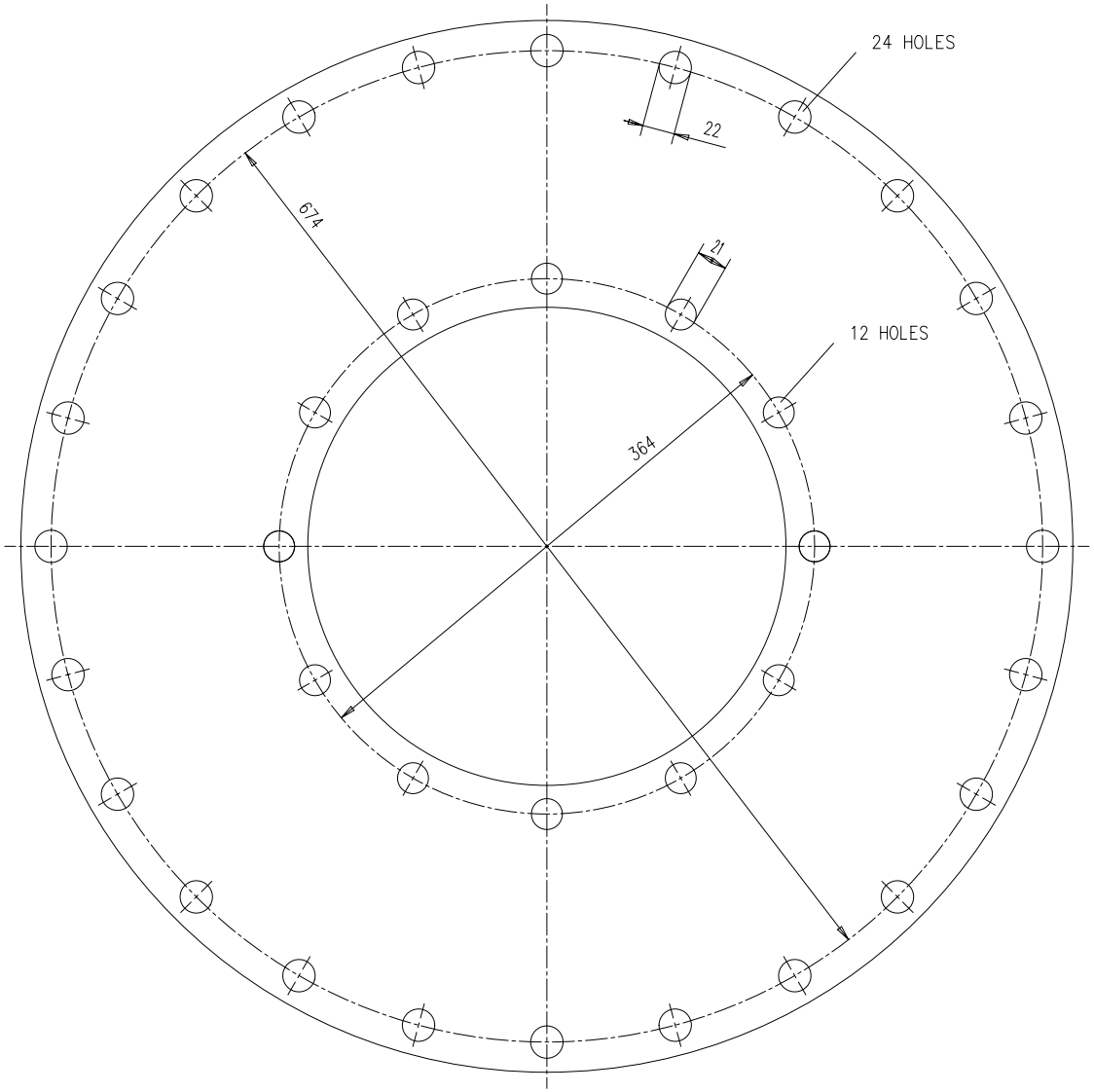
HOLDER

Units	mm kg	NX	Basic Material	W-FU-235-JR	Net Weight	0,24
Made	20.03.1995 M. Winiger		Scale	1:1	Size A4	Page 1/1
Chkd			Design Group	1110	Material ID	107.049.665.001
Appd	13.06.1978 WCH001 Service User				Drawing ID	107.049.665
					Rev.	A

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Free space for lic.									Q-Code XXXXX		Main Drw.
									Standard ISO; JIS		
Modif.	A	EAAD091567	19.11.2019								
		Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date		

WIN GD Winterthur Gas & Diesel

Product W-2S

RUBBER GASKET

Gummidichtung

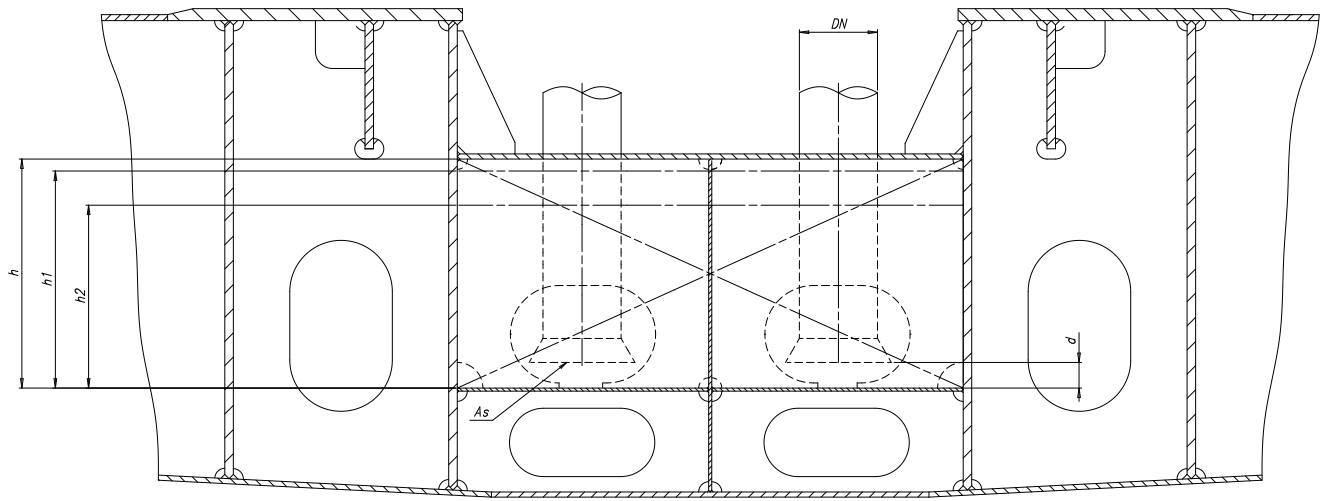
Units mm kg	NX		Basic Material NBR 70 Sh		Net Weight 1,2
SURFACE PROTECTION SEE GROUP 0344	Made 21.08.1995 A. Horsfjord	Scale 1:2.5	Size A2	Page 1/1	Material ID 107.246.190.001
TOLERANCING PRINCIPLE ISO8015	Chkd	Design Group 9722	Drawing ID 107.246.190		Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 17.10.1995 KOSM M.Kosovsky				

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RT-flex50-D/50DF



Specifications that need to be met:

Dimensioning guidelines and capacities for tank design

				5	6	7	8
(B)	h	Recommended total tank height	(mm)	acc. to installation requirements			
		Recommended total tank volume: 105% *5)	(m3)	9	11	12	14
(B)	h1	Recommended filling level	(mm)	acc. to installation requirements			
		Recommended volume: 100% *5)	(m3)	9	10	12	14
	h2	Low-level alarm	(mm)	*2)			
		Volume	(m3)				
(B)	Vr	Min. retention volume *3)	(m3)	6	7	8	9
	d	Distance between suction pipe and bottom of tank	(mm)	*4)			
	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°

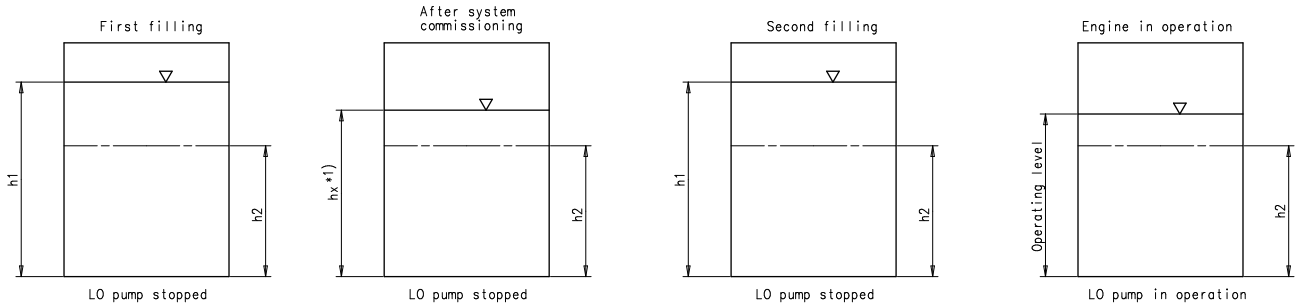
Additionally this level has to be above or equal to the minimum retention volume (Vr) for M/E operation.

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

*4) 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.

(B) *5) 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.

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	EAAD086531	06.04.2016					
	Number		Drawn date	Number		Drawn date	Number		Drawn date	Number	Drawn date

WIN GD Winterthur Gas & Diesel

Product W-50

LUBRICATING OIL DRAIN TANK
FILLING GUIDELINE

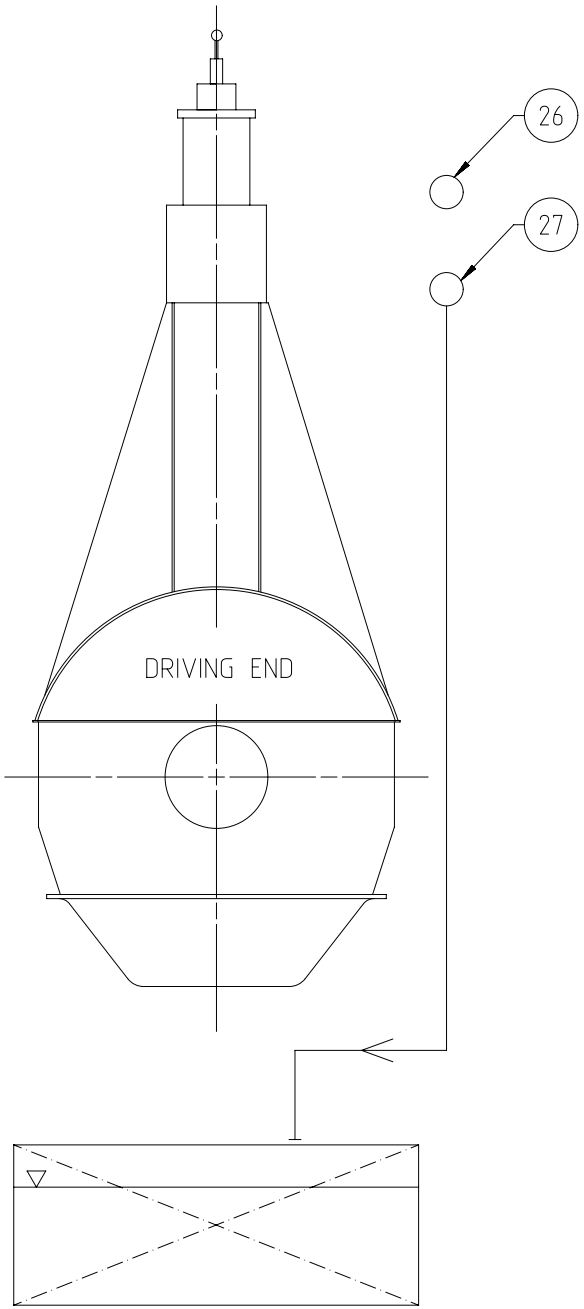
Units mm kg	IDE		Basic Material				Net Weight 0.001
Mode 08.07.2008	W.WROBLEWSKI	Scale 1:25	Size A1	Page 1/1	Material ID 107.402.236.500		
Chkd		Design Group 9722	Drawing ID 107.402.236			Rev. B	
Appd 25.07.2008	WWR001 Wroblewski						

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

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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

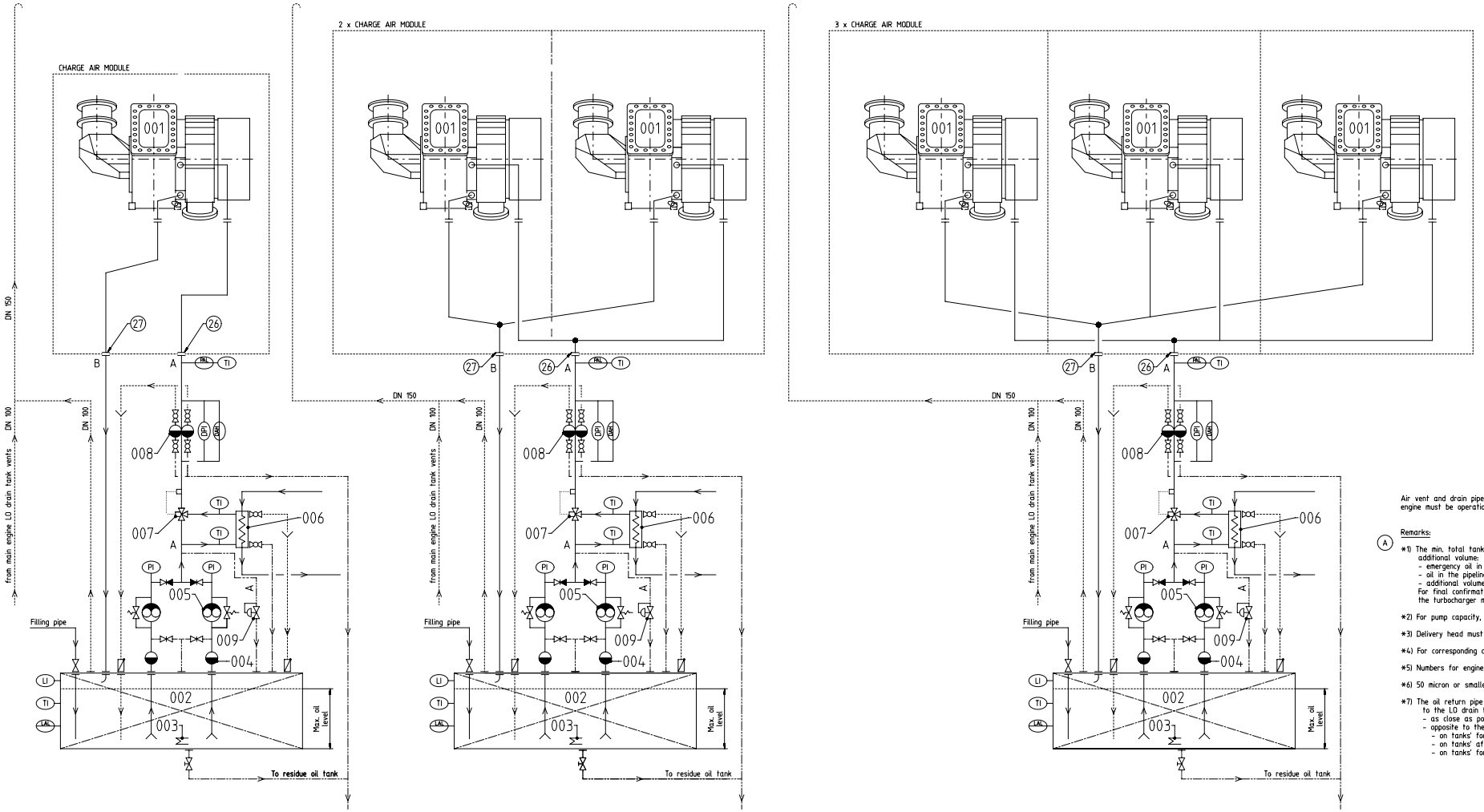
SURFACE PROTECTION SEE GROUP 0344	Made	05.12.2016	dki021	DH Kim	Scale -	Size A3 / Page 1/5 / Material ID PAAD245338
TOLERANCING PRINCIPLE ISO8015	Chkd	16.12.2016	wwa008	Wang	Design Group 9722	Drawing ID DAAD083642 / Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	16.12.2016	bha009	Haag		

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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.

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
- Transferdirty LO pipes
- Overflowdrain pipes
- Air vent pipes
- Pipe connections
- Pipes on engine

Approved

Rev.	Rev. no. / By	G-Code	Main Drw.
		XXXXX	
		Standard ISO, JIS	

Mod.	A	AAD09530	20.11.2019							
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date

WinGD Winterthur Gas & Diesel

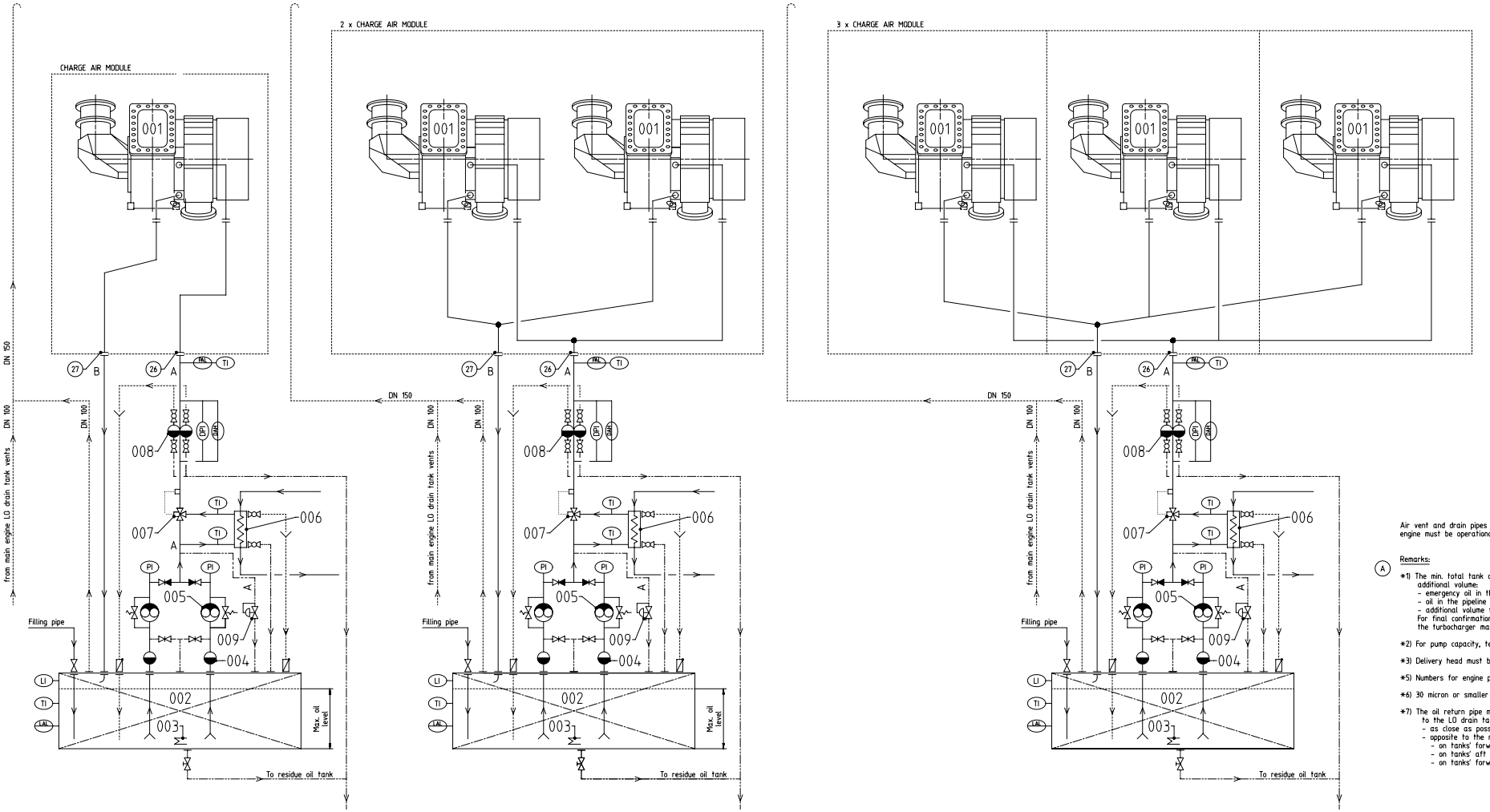
Product W-2S

LUBRICATING OIL SYSTEM
Separated TC lubricating
Schmieroelsystem

Units	mm kg	NX	Basic Material:	Net Weight 0,001
SURFACE PROTECTION SEE GROUP 8344	Made	05.12.2016	dki021 DH Kim	Scale -	Size A0	Page 2/5	Material ID PAAD245336
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			

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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		m³	0.18	0.27	0.43	0.53	0.67	0.88	1.07	1.30
	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	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		m³	0.36	0.54	0.86	1.06	1.33	1.76	2.14	2.60
	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	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		m³	1.29	1.59	2.00	2.64	3.21	3.90
	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	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

Rev.	Rev. appr. by, dc.	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
A	KAAD09530	20.11.2019							

G-Code: XXXXX
Standard: ISO, JIS
Main Dr.:

Product: W-2S

LUBRICATING OIL SYSTEM
Separated TC lubricating
Schmieroelsystem

Units	mm kg	NX		Basic Material			Net Weight 0,001
Made	05.12.2016	dki021	DH Kim	Scale	-	Size A0	Page 3/5
Chkd	16.12.2016	www008	Wang	Design Group ID	9722	Drawing ID	DAAD083642
Appd	16.12.2016	bha009	Haag				Rev. A

SURFACE PROTECTION: SEE GROUP 9744
TOLERANCING PRINCIPLE: ISO8015
GENERAL TOLERANCES ACCORDING TO: ISO2768-mK

Material ID: PAAD245336

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MIDS - WinGD-RT-flex50-D/E - LUBRICATING-OIL-SYSTEM (DG9722)

TRACK CHANGES

DATE	SUBJECT	DESCRIPTION
2017-02-24	DRAWING SET	First web upload
2018-05-24	DAAD053658 107.340.984	System drgs – new revision
2018-10-18	DAAD053658 107.340.984	System drgs – new revision
2019-07-18	DAAD030723 DAAD030730 DAAD030737 DAAD030739 DAAD053658 107.340.984 107.341.301 DAAD030737 107.342.995	Main, system and tank drgs – new revision
2020-09-21	107.340.984 DAAD053658 107.246.182 107.246.183 107.246.186 107.246.187 107.246.188 107.246.189 107.049.681 107.049.664 107.049.666 107.049.665 107.246.190 DAAD083642	System and tank assembly drgs – new revision
2021-05-19	107.246.799	Hydraulic jack plate positioning drawing – new revision

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