


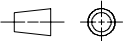
Available executions

Execution No.	Material ID	Cylinder No.	Attribute 1: Turbocharger lubrication		Attribute 2: Booster pumps for crosshead lubrication.	
			INTERNAL	EXTERNAL	WITH	WITHOUT
001	PAAD250906	5		X	X	
002	PAAD250907	5	X		X	
003	PAAD250908	5		X		X
004	PAAD250910	5	X			X
005	PAAD251068	6		X	X	
006	PAAD251069	6	X		X	
007	PAAD251070	6		X		X
008	PAAD251071	6	X			X
009	PAAD341004	7		X	X	
010	PAAD341005	7	X		X	
011	PAAD341006	7		X		X
012	PAAD341007	7	X			X

NOTE

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

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Prod.	X40-B											
Change History												
	-	sna102				new Design						
	Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis				Activity Code	E	C
<div> Winterthur Gas & Diesel</div>					LUBRICATING OIL SYSTEM MIDS master drawing							
separate BOM available					Dimension							
Scale -				NX	Units [mm] [kg]		Basic Material			Net Weight 0.001		
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					Qty per		A3	Item ID PTAA024743		Drawing Page/s 1/1		


SURFACE PROTECTION SEE GROUP 0344

TOLERANCING PRINCIPLE ISO8015

SEQ NO	QTY	Item ID	Item Name	Dimension	Standard-ID	Basic Material	Net Weight
1	1	PAAD181046	LUBRICATING OIL SYSTEM				0.001
3	1	PAAD245338	LUBRICATING OIL SYSTEM				0.001
4	1	PAAD212314	LUBRICATING OIL DRAIN TANK				0.001
5	1	107.341.455.500	INSTRUCTION FOR FLUSHING				0.001
6	1	PAAD181146	LUBRICATING OIL DRAIN TANK				0.001

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Prod	5 X40-B										
Change History											
	-	dkl021	mhu019	09.02.2017	EAAD087222	Legacy information. See corresponding ChangeNotice				4	-
	Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis			Activity Code	E	C

				LUBRICATING OIL SYSTEM					
Bill Of Material				Dimension					
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				[m] [kg]				0.001	
				Main Design		Design Group		Standard	
				Yes		9722		Q-Code XXXXX	
				Qty per		Engine		BOM Page/s	
				A4		Item ID		01/01	
						PAAD250906			

SEQ NO	QTY	Item ID	Item Name	Dimension	Standard-ID	Basic Material	Net Weight
2	1	PAAD218151	LUBRICATING OIL SYSTEM				0.001
3	1	PAAD245338	LUBRICATING OIL SYSTEM				0.001
4	1	PAAD212314	LUBRICATING OIL DRAIN TANK				0.001
5	1	107.341.455.500	INSTRUCTION FOR FLUSHING				0.001
6	1	PAAD181146	LUBRICATING OIL DRAIN TANK				0.001

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Prod	5 X40-B										
Change History											
	-	dkl021	mhu019	09.02.2017	EAAD087222	Legacy information. See corresponding ChangeNotice				4	-
	Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis			Activity Code	E	C

				LUBRICATING OIL SYSTEM					
Bill Of Material				Dimension					
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				[m] [kg]				0.001	
				Main Design		Design Group		Standard	
				Yes		9722		Q-Code XXXXX	
				Qty per		Engine		BOM Page/s	
				A4		Item ID		01/01	
						PAAD250908			

SEQ NO	QTY	Item ID	Item Name	Dimension	Standard-ID	Basic Material	Net Weight
2	1	PAAD218151	LUBRICATING OIL SYSTEM				0.001
4	1	PAAD212314	LUBRICATING OIL DRAIN TANK				0.001
5	1	107.341.455.500	INSTRUCTION FOR FLUSHING				0.001
6	1	PAAD181146	LUBRICATING OIL DRAIN TANK				0.001

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Prod.	5 X40-B						
Change History							
	-	dkl021	mhu019	09.02.2017	EAAD087222	Legacy information. See corresponding ChangeNotice	4 -
	Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis	Activity Code E C

<div>  <div> WIN GD Winterthur Gas & Diesel </div> </div>	LUBRICATING OIL SYSTEM				
Bill Of Material				Dimension	
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				Basic Material	
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				9722	Q-Code
				XXXXX	Standard
				WDS	
Qty per				Engine	A4
				Item ID	PAAD250910
				BOM Page/s	01/01

SEQ NO	QTY	Item ID	Item Name	Dimension	Standard-ID	Basic Material	Net Weight
1	1	PAAD181046	LUBRICATING OIL SYSTEM				0.001
4	1	PAAD060891	LUBRICATING OIL DRAIN TANK				0.001
5	1	107.341.455.500	INSTRUCTION FOR FLUSHING				0.001
6	1	PAAD181146	LUBRICATING OIL DRAIN TANK				0.001

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Prod	6 X40-B										
Change History											
	-	dki021	mhu019	09.02.2017	EAAD087222	Legacy information. See corresponding ChangeNotice				4	-
	Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis			Activity Code	E	C

				LUBRICATING OIL SYSTEM					
Bill Of Material				Dimension					
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								Item ID	
								PAAD251069	
								BOM Page/s	
								01/01	

SEQ NO	QTY	Item ID	Item Name	Dimension	Standard-ID	Basic Material	Net Weight
2	1	PAAD218151	LUBRICATING OIL SYSTEM				0.001
3	1	PAAD245338	LUBRICATING OIL SYSTEM				0.001
4	1	PAAD060891	LUBRICATING OIL DRAIN TANK				0.001
5	1	107.341.455.500	INSTRUCTION FOR FLUSHING				0.001
6	1	PAAD181146	LUBRICATING OIL DRAIN TANK				0.001

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Prod	6 X40-B										
Change History											
	-	dki021	mhu019	09.02.2017	EAAD087222	Legacy information. See corresponding ChangeNotice				4	-
	Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis			Activity Code	E	C

				LUBRICATING OIL SYSTEM					
Bill Of Material				Dimension					
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				[m] [kg]				0.001	
				Main Design		Design Group		Standard	
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				Qty per		A4		Item ID	
				Engine		PAAD251070		BOM Page/s	
								01/01	

SEQ NO	QTY	Item ID	Item Name Dimension	Standard-ID	Basic Material	Net Weight
2	1	PAAD218151	LUBRICATING OIL SYSTEM			0.001
3	1	PAAD245338	LUBRICATING OIL SYSTEM			0.001
4	1	PAAD340882	LUBRICATING OIL DRAIN TANK			152
5	1	107.341.455.500	INSTRUCTION FOR FLUSHING			0.001
6	1	PAAD181146	LUBRICATING OIL DRAIN TANK			0.001


Prod.	7 X40-B			
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 <p>WIN GD Winterthur Gas & Diesel</p>	<p>LUBRICATING OIL SYSTEM</p>
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Technical drawing of a mechanical assembly, likely a pump or valve, showing a cross-section. The drawing includes several numbered callouts: 23, 25, 27, 33, 34, and 35. The assembly features a central vertical shaft with a flange at the top, a conical section, and a large circular component (25) in the middle. The bottom section is a rectangular base with a central opening (23) and a triangular symbol. The drawing is oriented vertically with a dashed centerline.

(23)	<p>OUTLET - Lubricating oil from bedplate</p> <ul style="list-style-type: none"> - Oil return via vertical oil drain to lubricating oil drain tank: Vertical oil drain position must be within permissible range as specified on the LO drain tank drawing. Final position to be informed by the shipyard to the engine manufacturer.
(25)	<p>INLET - Lubricating oil</p> <ul style="list-style-type: none"> - Lubricating oil temperature: <ul style="list-style-type: none"> - Controller set-point: 45 °C (controller type: PI) - Steady state condition: 45 ± 2 °C - Transient condition: 45 ± 4 °C - Lubricating oil pressure: 3.8 - 5.0 bar *) *) A pressure control device, e.g. a bypass line with a pressure regulating valve or equipment for pump flow adjustment, e.g. 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: <ul style="list-style-type: none"> - 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)	<p>OUTLET - Turbocharger lubricating oil</p> <ul style="list-style-type: none"> - 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.
(33)	<p>INLET - Cylinder lubricating oil</p> <ul style="list-style-type: none"> - Cylinder lubricating oil temperature: 40⁺¹⁰₋₅ °C - Cylinder lubricating oil static pressure: min. 0.32 bar
(34)	<p>OUTLET- Servo system oil return (engine driving end)</p> <ul style="list-style-type: none"> - Free flow to lubricating oil drain tank.
(35)	<p>OUTLET- Servo system oil return (engine free end)</p> <ul style="list-style-type: none"> - Free flow to lubricating oil drain tank.

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

- Bearing LO pipes
- Cylinder LO pipes
-  Cylinder LO pipes trace heated and insulated
- Transfer/dirty LO pipes
- - - - - Overflow/drain pipes
- Air vent pipes
- ===== Pipes on engine
- Pipe connections

SYSTEM PROPOSAL - LO treatment system

The diagram illustrates the LO treatment system architecture. It includes a main separating tank (025) with two sections, a residue oil tank (020), a suction strainer (021), a lubricating oil pump (022), a lubricating oil heater (023), a self-cleaning centrifugal separator (024), a clean lubricating oil tank (026), a dirty lubricating oil tank (027), a deck connection (028), a float non-return valve (029), and an LO sampling cock (020). The system is connected to an LO drain tank, a sludge tank, and an LO pump. Piping is color-coded: blue for main separating piping, green for transfer/dirty LO pipes, red for overflow/drain pipes, and yellow for air vent pipes. Level indicators (LI) are shown on several tanks.

Pos.	SYSTEM COMPONENTS *1)
020	Residue oil tank
021	Suction strainer *11)
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)

X40-B		Number of cylinders			
		5	6	7	8
Clean LO tank	capacity (m³)	equal or bigger than LO drain tank volume			
Dirty LO tank	capacity (m³)	equal or bigger than LO drain tank volume			
LO separator *21)	capacity (l/h)	640	770	900	1030
Residue oil tank	capacity (m³)	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.
 *11) Mesh size according to pump suppliers recommendation.
 *20) Recommended position for LO sampling to check LO quality / treatment efficiency.
 *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

SURFACE PROTECTION SEE GROUP 0344		Change	E	dk021	redu10	28.09.2022	CMA002532	Drawing Updated	Approved	Activity Code	A	3
TOLERANCING PRINCIPLE ISO8015		Revis	Creator	Approver	Approval Date	Change ID	Change System				E	C
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		[mm] [kg]		—	mm	°	NX	A1	PAAD218151		Drawing Pages 3/3	

SYSTEM PROPOSAL - LO treatment system

The diagram illustrates the LO treatment system. It includes a main separating tank (025) with a sludge collector (026) and a residue oil tank (020). Oil flows from the separating tank to the residue tank or through a sludge filter (024) to a sludge tank. A pump (022) with a suction strainer (021) circulates oil from the residue tank back to the separating tank. Air vents (023) are located on the overflow and drain pipes. Level indicators (LI) are shown on the tanks. Piping is color-coded: solid blue for main separating piping, solid red for transfer/dirty LO pipes, dashed red for overflow/drain pipes, and dotted red for air vent pipes.

SYSTEM COMPONENTS *1)				
Pos.				
020	Residue oil tank			
021	Suction strainer *11)			
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)			

X40-B		Number of cylinders				
		5	6	7	8	
Clean LO tank	capacity	(m³)	equal or bigger than LO drain tank volume			
Dirty LO tank	capacity	(m³)	equal or bigger than LO drain tank volume			
LO separator *21)	capacity	(l/h)	640	770	900	1030
Residue oil tank	capacity	(m³)	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.
 ***11)** Mesh size according to pump suppliers recommendation.
 ***20)** Recommended position for LO sampling to check LO quality / treatment efficiency.
 ***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).

SURFACE PROTECTION SEE GROUP 0344										TOLERANCING PRINCIPLE ISO8015		GENERAL TOLERANCES ACCORDING TO ISO2768-mK	
Change	Rev.	Creator	Approved	Approval Date	Change ID	Change System	mm	kg	mm	kg			
E	dk021	mhud10	28.09.2022	CMAA002532	Drawing Updated								
						NX		A1		PAAD218151			
										3/3			

SYSTEM PROPOSAL - LO treatment system

Pos.	SYSTEM COMPONENTS *1)
020	Residue oil tank
021	Suction strainer *11)
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)

X40-B		capacity	(m³)	Number of cylinders			
Clean LO tank	capacity	(m³)	equal or bigger than LO drain tank volume	5	6	7	8
Dirty LO tank	capacity	(m³)	equal or bigger than LO drain tank volume				
LO separator *21)	capacity	(l/h)	640	770	900	1030	
Residue oil tank	capacity	(m³)	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.
*11) Mesh size according to pump suppliers recommendation.
*20) Recommended position for LO sampling to check LO quality / treatment efficiency.
*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

SURFACE PROTECTION SEE GROUP 0344		Change	E	dk021	mhu010	28.09.2022	CMAA002532	Drawing Updated	Approved	Activity Code	A	3
TOLERANCING PRINCIPLE ISO8015												
GENERAL TOLERANCES ACCORDING TO ISO2768-mK												
Drawing ID: PAAD218151 Drawing Pages: 3/3												

SYSTEM PROPOSAL - LO treatment system

The diagram illustrates the LO treatment system layout. Key components include:

- 020**: Residue oil tank
- 021**: Suction strainer
- 022**: Lubricating oil pump
- 023**: Self-cleaning centrifugal separator
- 024**: Clean lubricating oil tank
- 025**: Dirty lubricating oil tank
- 026**: Deck connection
- 027**: Float non-return valve
- 028**: LO sampling cock
- 029**: LO sampling cock

The system shows the flow of LO from the residue tank through pumps and separators into clean and dirty tanks, with various drains and air vents indicated.

Pos.	SYSTEM COMPONENTS *1)
020	Residue oil tank
021	Suction strainer *11)
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)

X40-B		Number of cylinders				
			5	6	7	8
Clean LO tank	capacity	(m³)	equal or bigger than LO drain tank volume			
Dirty LO tank	capacity	(m³)	equal or bigger than LO drain tank volume			
LO separator *21)	capacity	(l/h)	640	770	900	1030
Residue oil tank	capacity	(m³)	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.
*11) Mesh size according to pump suppliers recommendation.
*20) Recommended position for LO sampling to check LO quality / treatment efficiency.
*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).

Legend:

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

Change Log:

Change	Rev.	Creator	Approved	Approval Date	Change ID	Change System	Approved	Activity Code	Rev.	Page
E	dk021	mh010	28.09.2022	CMA002532	Drawing Updated				4	3

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

PAAD218151
Drawing
3/3

- SYSTEM PROPOSAL - LO treatment system

027

025

026

LI

029

024

023

to LO drain tank

from LO drain tank

to sludge tank

to LO pump

from LO pump

022

021

028

020

LI

027

from LO cooler drain

from LO filter drain

from LO cooler air vent

from LO filter air vent

027

Pos.	SYSTEM COMPONENTS *1)
020	Residue oil tank
021	Suction strainer *11)
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)

X40-B		Number of cylinders				
			5	6	7	8
Clean LO tank	capacity	(m³)	equal or bigger than LO drain tank volume			
Dirty LO tank	capacity	(m³)	equal or bigger than LO drain tank volume			
LO separator *21)	capacity	(l/h)	640	770	900	1030
Residue oil tank	capacity	(m³)	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.
*11) Mesh size according to pump suppliers recommendation.
*20) Recommended position for LO sampling to check LO quality / treatment efficiency.
*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

Change	E	dk021	redu10	28.09.2022	CMA002532	Drawing Updated	Approved	Activity Code	A	3
SURFACE PROTECTION SEE GROUP 0344										
TOLERANCING PRINCIPLE ISO8015										
GENERAL TOLERANCES ACCORDING TO ISO2768-mK										

PAAD218151

3/3

- SYSTEM PROPOSAL - LO treatment system

027

025

026

LI

LI

029

024

023

to LO drain tank

from LO drain tank

to sludge tank

to LO pump

from LO pump

022

021

028

020

LI

027

from LO cooler drain

from LO filter drain

from LO cooler air vent

from LO filter air vent

Pos.	SYSTEM COMPONENTS *1)
020	Residue oil tank
021	Suction strainer *11)
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)

X40-B		Number of cylinders				
			5	6	7	8
Clean LO tank	capacity	(m³)	equal or bigger than LO drain tank volume			
Dirty LO tank	capacity	(m³)	equal or bigger than LO drain tank volume			
LO separator *21)	capacity	(l/h)	640	770	900	1030
Residue oil tank	capacity	(m³)	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

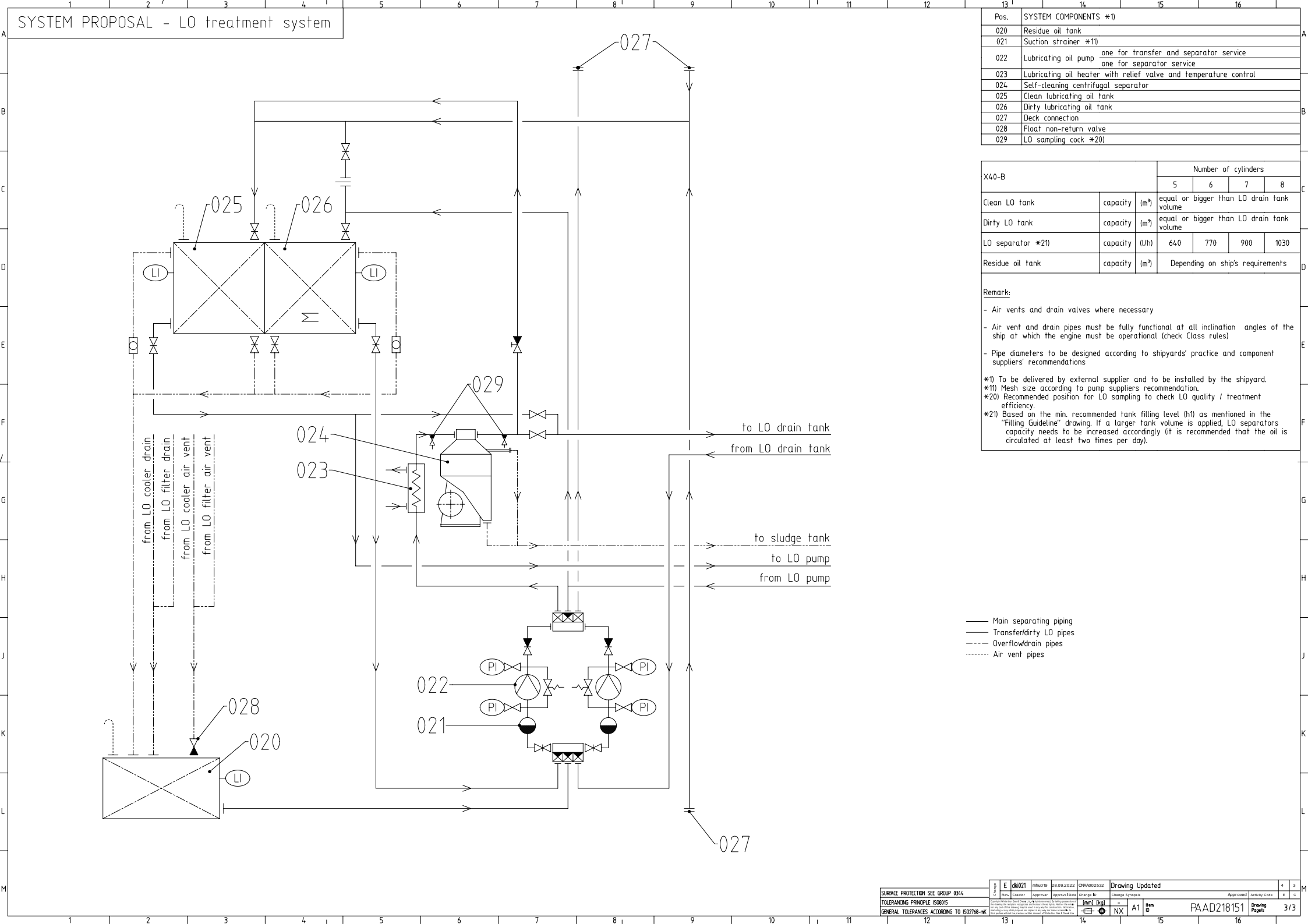
*1) To be delivered by external supplier and to be installed by the shipyard.
*11) Mesh size according to pump suppliers recommendation.
*20) Recommended position for LO sampling to check LO quality / treatment efficiency.
*21) Based on the min. recommended tank filling level (h1) as mentioned in the "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

Change	E	dk021	redu10	28.09.2022	CMA4002532	Drawing Updated	Approved	Activity Code	A	3
SURFACE PROTECTION SEE GROUP 0344										
TOLERANCING PRINCIPLE ISO8015										
GENERAL TOLERANCES ACCORDING TO ISO2768-mK										

PAAD218151

3/3

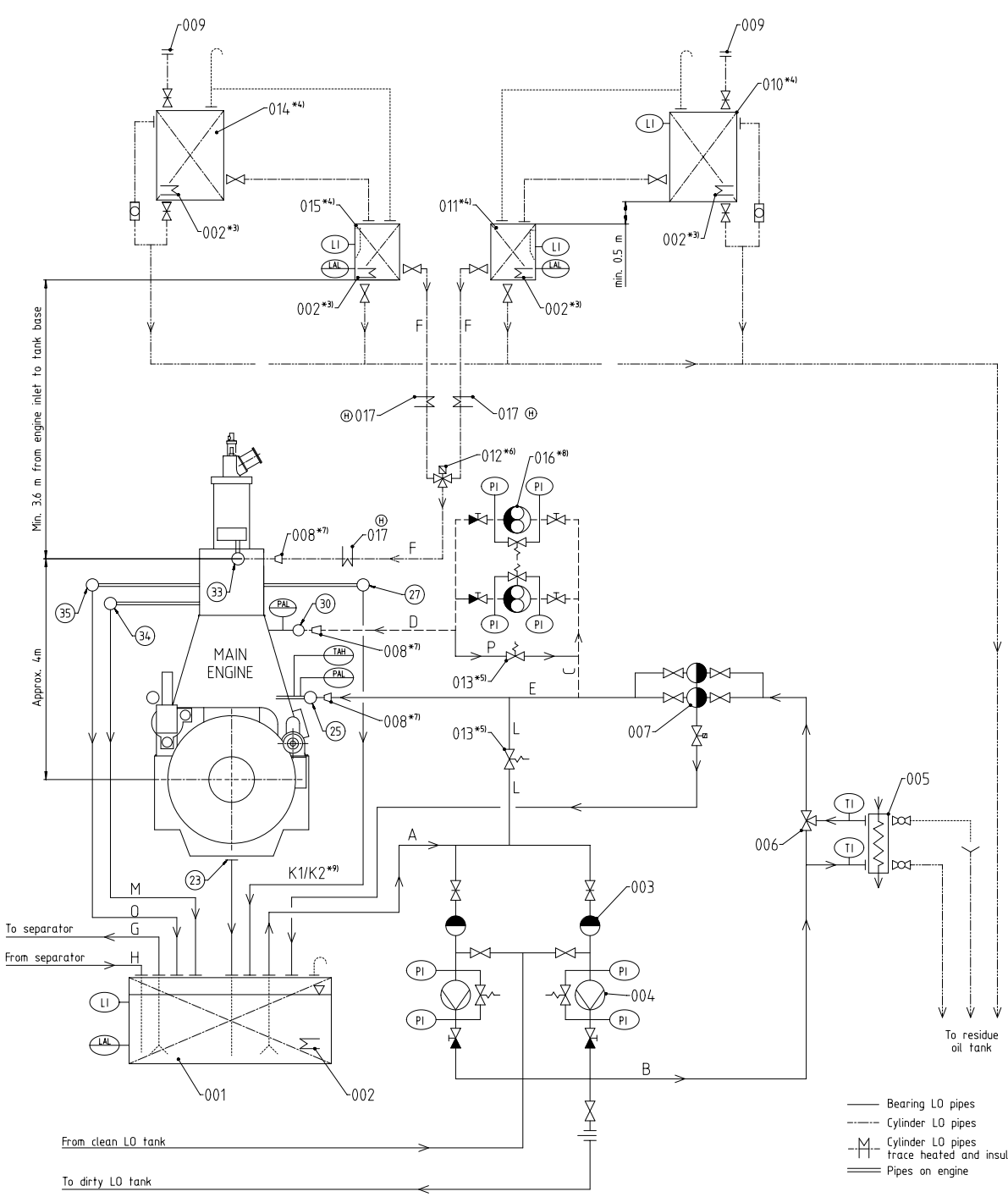


A schematic diagram of a vacuum furnace system. The central component is a furnace with a large circular chamber labeled "FREE END". Above the chamber is a tapered section and a vertical neck with a flange and a small top component. Below the chamber is a base unit, represented as a rectangle with a dashed 'X' and a dashed vertical line. Arrows indicate the flow of gas or vacuum from the furnace to the base unit. On the left, a line from a circle labeled 27 leads to a circle labeled 25, which then connects to the base unit. On the right, a line from a circle labeled 35 leads to a circle labeled 34, which then connects to the base unit. A central line from the bottom of the furnace chamber leads to a circle labeled 23, which also connects to the base unit. A line from a circle labeled 30 leads to a circle labeled 33, which then connects to the base unit. The base unit has four vertical lines extending upwards, each with an arrow pointing towards the furnace chamber, indicating the direction of gas flow or vacuum.

23	<p>OUTLET - Lubricating oil from bedplate vertical oil drain</p> <ul style="list-style-type: none"> - Drain to lubricating oil drain tank: Drain pipe position must within the permissible range as specified on the LO drain tank drawing Final position to be informed by the shipyard to the engine manufacturer.
25	<p>INLET - Lubricating oil</p> <ul style="list-style-type: none"> - Lubricating oil temperature: <ul style="list-style-type: none"> - Controller set-point: 45 °C (controller type: PI) - Steady state condition: 45±2 °C - Transient condition: 45±4 °C - Lubricating oil pressure: 3.8-5.0 bar *) *) An active pressure control device is needed, which could be either a bypass via pressure control valve or frequency controlled pumps, working with a closed loop control circle. - Lubricating oil volume flow: according to GTD - Lubricating oil cleanliness: <ul style="list-style-type: none"> - Full flow filtered by 35 micron filter (absolute sphere passing mesh). - Bypass cleaning of lubricating oil in drain tank by self-cleaning centrifugal separator.
27	<p>OUTLET - Lubricating oil turbocharger</p> <ul style="list-style-type: none"> - 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.
30	<p>INLET - Crosshead Lubricating oil</p> <ul style="list-style-type: none"> - Lubricating oil temperature: <ul style="list-style-type: none"> - Controller set-point: 45 °C (controller type: PI) - Steady state condition: 45±2 °C - Transient condition: 45±4 °C - Lubricating oil pressure: in speed range A: 10-13 bar in speed range B: 7-9 bar - Lubricating oil volume flow: according to GTD - Lubricating oil cleanliness: <ul style="list-style-type: none"> - Full flow filtered by 35 micron filter (absolute sphere passing mesh). - Bypass cleaning of lubricating oil in drain tank by self-cleaning centrifugal separator.
33	<p>INLET - Cylinder lubricating oil</p> <ul style="list-style-type: none"> - Cylinder lubricating oil temperature: 40⁺¹⁰₋₅ °C. - Cylinder lubricating oil static pressure: min. 0.32 bar
H	
34	<p>OUTLET- Oil drain servo system, oil return from engine driving end</p> <ul style="list-style-type: none"> - Free flow by gravity to lubricating oil drain tank.
35	<p>OUTLET- Oil drain servo system, oil return from engine free end</p> <ul style="list-style-type: none"> - Free flow by gravity to lubricating oil drain tank.

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

SYSTEM PROPOSAL
System oil and cylinder LO supply



Pos.	ENGINE CONNECTIONS *2)	Pos.	SYSTEM COMPONENTS *1)
23	OUTLET - Lubrication oil from bedplate vertical oil drain	001	Lubricating oil drain tank (sump tank)
25	INLET - Lubricating oil	002	Heating device
27	OUTLET - Lubricating oil turbocharger *9) *14) *15)	003	Suction strainer *12)
30	INLET - Crosshead lubricating oil	004	Lubricating oil pump
33	INLET - Cylinder lubricating oil	005	Lubricating oil cooler
34	OUTLET - Oil drain servo system, oil return from engine driving end	006	Autom. temperature control valve, constant temp. at engine inlet, 45°C
35	OUTLET - Oil drain servo system, oil return from engine free end	007	Automatic self-cleaning filter, 35 micron, with backflushing oil treatment *13) *14)

Number of cylinders	5	6	7	8
Main Engine X4.0-B rated with CMCR speed 120 rpm	power (kW) 4469	5603	6537	7470
	speed (rpm) 120			
Main Engine X4.0-B rated with CMCR speed 135 rpm	power (kW) 5249	6299	7349	8399
	speed (rpm) 135			

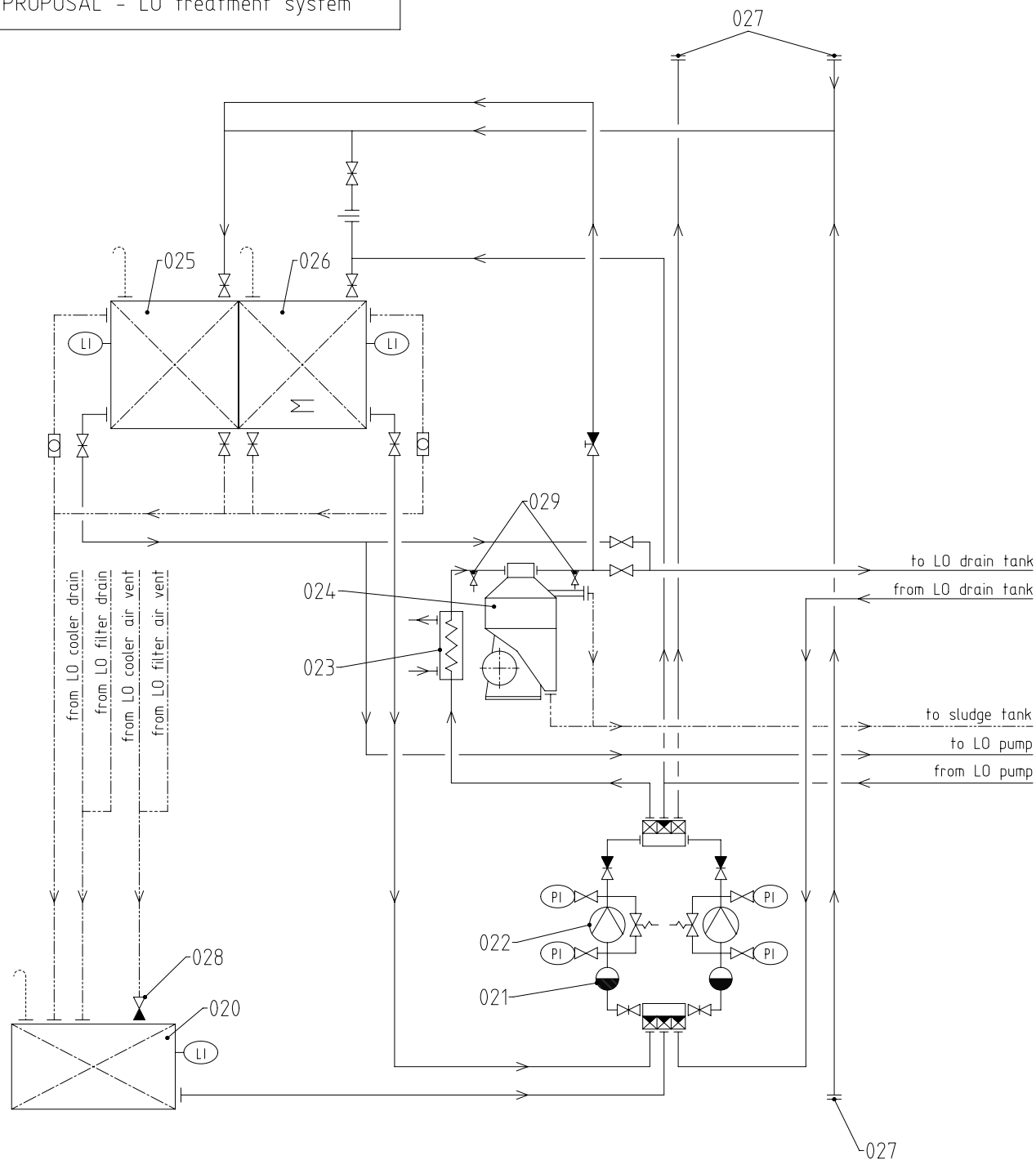
Proposal for dimensioning *11)		
LO drain tank	capacity (m³)	For capacities refer to drawing "LO drain tank-filling guideline"
Main LO pump	capacity (m³/h)	refer to GTD
Crosshead LO pump	capacity (m³/h)	refer to GTD
Cyl. LO storage tank	capacity (m³)	Based on a feed rate of 1g/kWh (pulse)
Cyl. LO service tank *16)	capacity (m³)	0.4 0.4 0.5 0.6
Nominal pipe diameter		

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
DN	200	200	200	250	150	200	200	200	120 rpm	50	65	65	65	65	65	65
DN	150	200	200	200	150	200	200	200	135 rpm	50	65	65	65	65	65	65
DN	120 rpm	50	65	65	65	65	65	65	120 rpm	50	50	50	50	50	50	50
DN	135 rpm	50	50	50	50	50	50	50	135 rpm	50	50	50	50	50	50	50
DN	150	150	200	200	150	200	200	200	150	150	200	200	200	200	200	200
DN	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
DN	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
DN	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
DN	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
DN	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
DN	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32

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) Optional heating coil
- *4) 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, i.e. the engine is fed directly from the cylinder LO storage tank, the storage tank has to be located at the same minimum installation height as specified for the service tank, respectively a certain level higher if additional elements are installed in the supply line to the engine (e.g. a flowmeter) to compensate the pressure drop created.
- *5) 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).
- *6) Three-way valve has to be fitted as close as possible to the engine inlet. The reason is that the oil volume after the change-over valve has to be kept small in order to allow a swift change-over between the cylinder oils of different BN.
- *7) Installed as required (check with the "Pipe Connection Plan")
- *8) The LO pumps (pos. 004) and the crosshead LO pumps (pos. 016) are to be interlocked so that the crosshead LO pumps never can run alone.
- *9) The pipe diameter varies depending on the installed TC type. Project-specific values are provided in the relevant pipe connection plan of D68020. As rough guidance please observe the following values:
 - K1: Pipe diameter for engines equipped with ABB turbocharger
 - K2: Pipe diameter for engines equipped with P88 turbocharger
- *10) 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 PTD gear and/or all other externally installed auxiliaries 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 D69730 - "Fluid velocities and flow rates, recommended values for pipework of diesel plants" has to be observed.
- *12) Mesh size according to pump suppliers recommendation.
- *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 or as an alternative 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 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 and if the main LO pump is on tanks aft end
 - on tanks aft end and if the main LO pump is on tanks forward end
 - on tanks forward and 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.

SYSTEM PROPOSAL - LO treatment system



Pos.	SYSTEM COMPONENTS *1)
020	Residue oil tank
021	Suction strainer *2)
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 *3)

X40-B			Number of cylinders			
			5	6	7	8
Clean L0 tank	capacity	(m³)	equal or bigger than L0 drain tank volume			
Dirty L0 tank	capacity	(m³)	equal or bigger than L0 drain tank volume			
L0 separator	capacity	(l/h)	640	770	900	1030
Residue oil tank	capacity	(m³)	Depending on ship's requirements			

Remarks:

- 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.

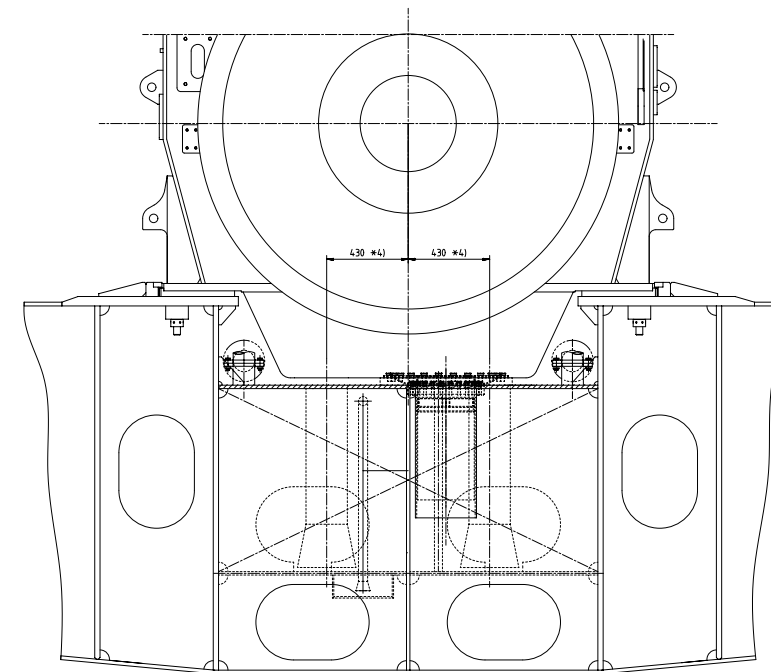
*1) To be delivered by external supplier and to be installed by the shipyard.

*2) Mesh size according to pump suppliers recommendation.

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

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

A (DRIVING END)

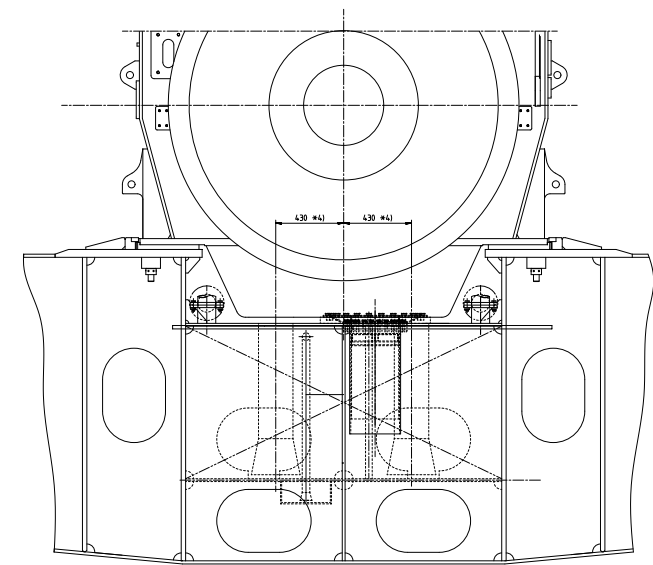


- *4) Drains must be arranged by the shipyard in accordance with the shipul structure and within the specified location range. As soon as the final position is determined, the engine manufacturer must be informed so that the bedplate (or pot) holes can be positioned in compliance with the engine builder drawing "BEDPLATE OIL DRAIN" (DG101).
- *5) Recommendation regarding plate thickness is given in the Marine Installation Drawing Set (MDS) "ENGINE / SEATING FOUNDATION" (foundation arrangement) (DG572).
- *6) Recommendation regarding the plate size is given in the system proposal as provided in the MDS "LUBRICATING OIL SYSTEM / LIO system drawing" (DG722).
- *6) 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 shipul structure, minimum required filling / circulation volume, pump section requirements and rules of the relevant classification society. Requirements / design criteria for the tank layout are provided in the MDS "LUBRICATING OIL DRAIN NAK - Filling Guidelines" (DG572).
- *7) Distance according to pump makers specification.
- *8) The drain pipe outlet must be below the min. LO level (LO 12% down alarm) though a gap of min. half of the drain pipe diameter (min. 172 mm) to the drain tank bottom has to be maintained and the drain pipe must be secured.

SURFACE PROTECTION SEE GROUP 0344	Make	18.11.2015	dhk021 DH.Kim	Scale	E-10	Size	A0	Page	1/1	Material	PAAD212314	Net weight	100
TOLERANCING PRINCIPLE ISO8015	Chd	24.11.2015	mbu019 Hug	Design	Group	9722	Grading	DAAD072770			Rev.		
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	24.11.2015	bha009 Pappas										

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A	7X40-B/DF-1.0	A
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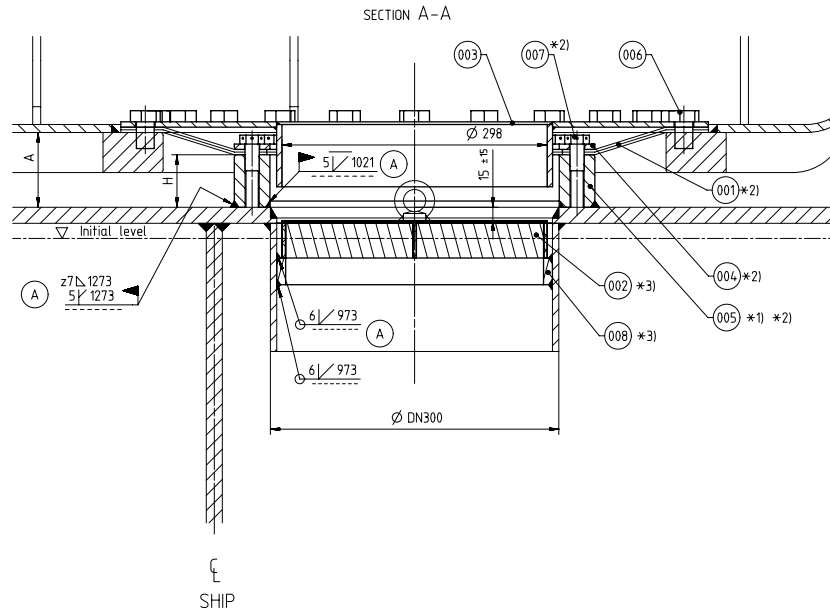


FREE END



- *1 Drains must be arranged by the shipyard in accordance with the ship hull 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 and pump holes can be machined in compliance with the engine builder drawing "BEDPLATE AND DRAIN" (DG170).
- *2 Recommendation regarding plate thickness is given in the Marine Installation Drawing Set (MDS) ENGINE / SEATING FOUNDATION (foundation arrangement drawing) (DG177).
- *3 Recommendation regarding the pipe size is given in the system proposal as provided in the MDS "LUBRICATING OIL SYSTEM" (ILO system drawing) (DG722).
- *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 ship hull structure, minimum required filling / circulation volume, pump requirements and rules of the relevant classification society. Requirements / design criteria for the tank layout are provided in the MDS "LUBRICATING OIL DRAIN TANK" - Filling Guidelines" (DG722).
- *7 Distance according to pump maker specification.
- *8 The bottom (outlet) of the drain pipe must be below the LO level alarm height, however, it must not be below the LO level tank by a minimum distance of half the drain pipe's diameter (1/2 DN).

3	002	FRAD060920	VERTICAL OIL DRAIN	DAAD002647		4,5
1	001	107214.799.200	PLATE	107214.799		15
07	122	NO	Material Name	Chemicals, Oil or Grease	Part Number Material Name Q-ty XXXXXX 107214.799 122, JS	Oil Drain
1	001		Number	Oil drain date	Number	Oil drain date
			Part No. WTX40-B WTX40-BDF-1			
			LUBRICATING OIL DRAIN TANK			



REMARKS:

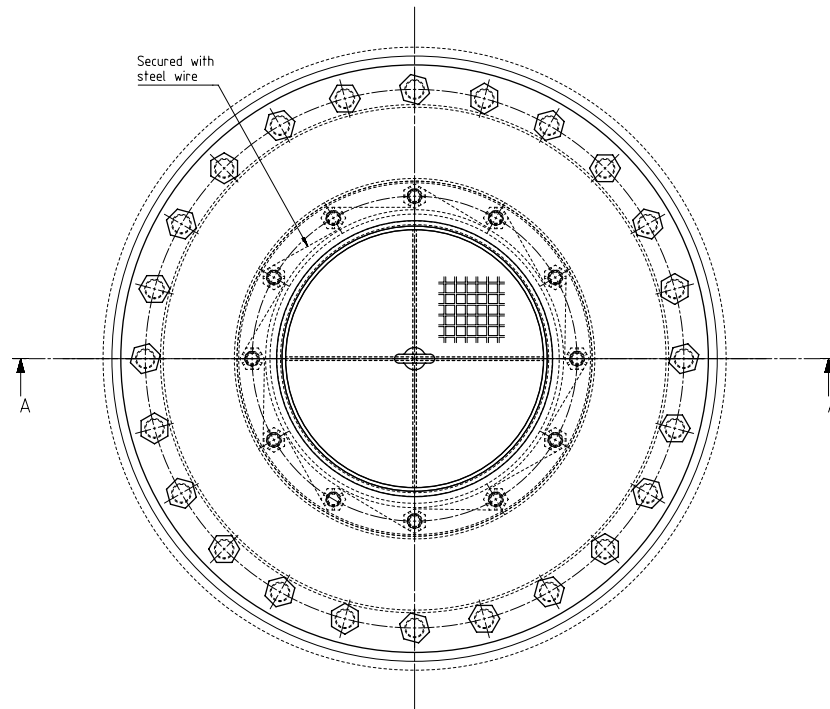
*1) To be aligned after engine is in final position.

*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.

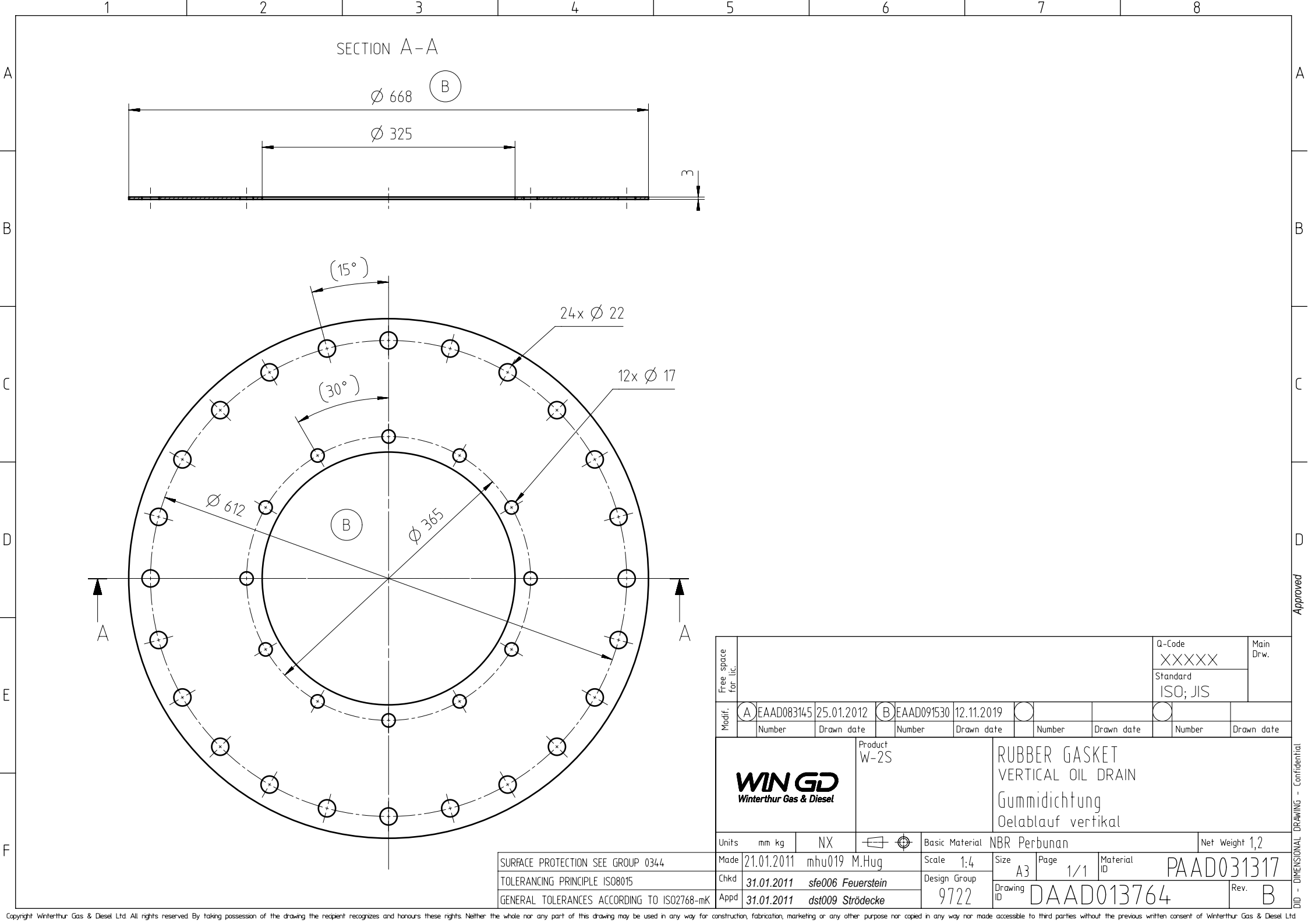
*3) Designed for pipe $\varnothing 323.9 \times 7.1$

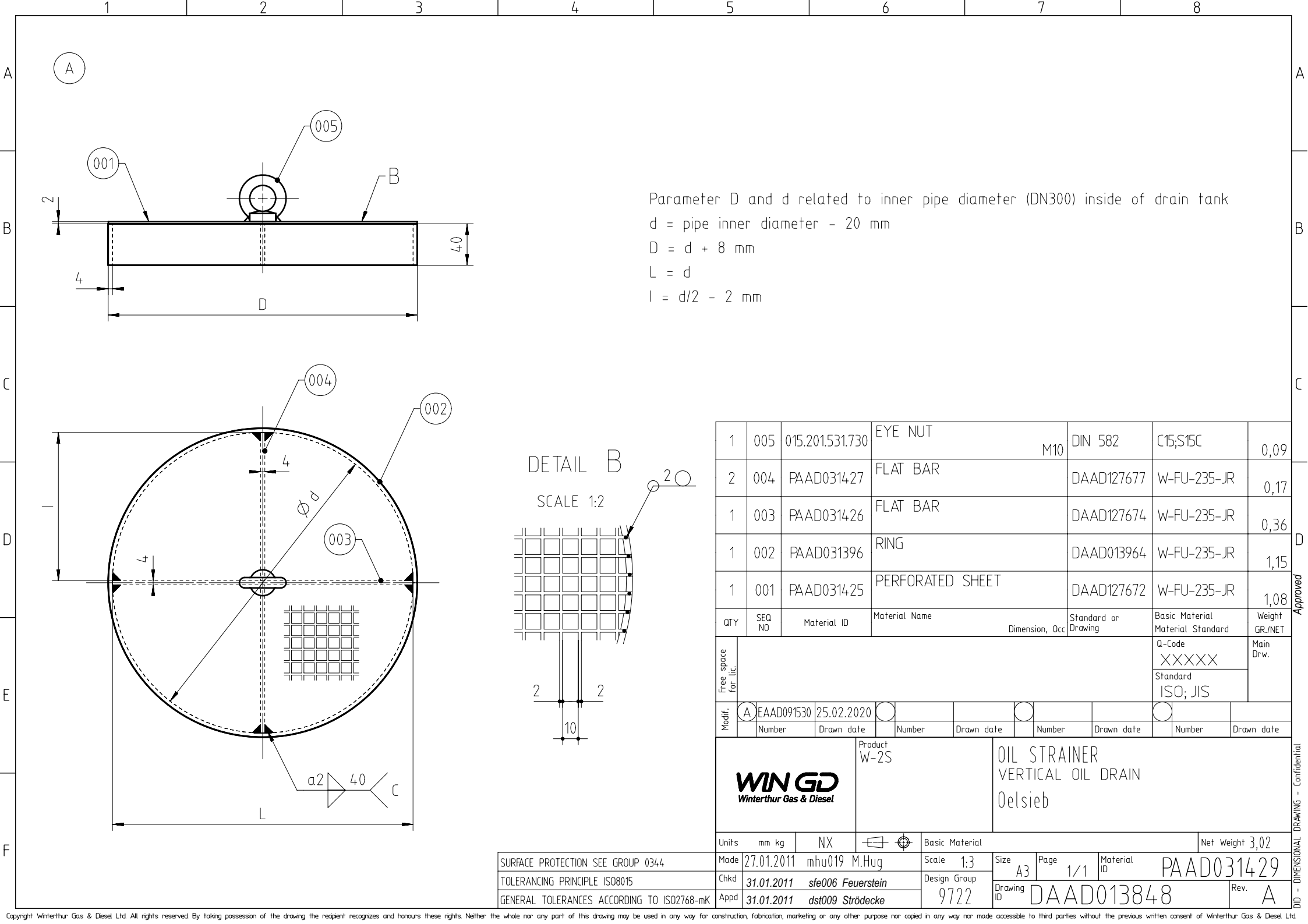
A	A	To be measured after alignment of the engine
	H	A - 25 mm

Items 001 to 008 are yard delivery.

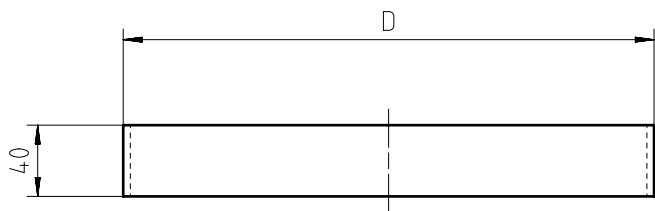


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24	006	015.151.044.201	HEXAGON HEAD SCREW M20x30	ISO 4017	8,8	0,134
1	005	PAAD060685	WELDING FLANGE	DAAD020574	W-FU-235-JR	20,0
1	004	PAAD030945	RING	DAAD013763	W-FU-235-JR	2,4
1	003	PAAD060918	COVER	DAAD020639		15,2
1	002	PAAD031429	OIL STRAINER	DAAD013848		3,02
2	001	PAAD031317	RUBBER GASKET	DAAD013764	NBR Perbunan	1,2
QTY	SEQ NO	Material ID	Material Name Dimension, Qty	Standard or Drawing	Basic Material Material: Standard Q-Code XXXXXX Standard ISO, JIS	Weight GRUNET Main Dwg.
Mod.	Free space for file	EAAD091530	17.02.2020			
Number	Drawn date	Number	Drawn date	Number	Drawn date	Number
WINGO Wielochow Gas & Diesel Ltd			Product W-25	VERTICAL OIL DRAIN Oelablauf vertikal		
Units	mm kg	NX	Basic Material	Size	Page	Material ID
Surface PROTECTION SEE GROUP 0344	Made	20.09.2011	Imux02 L.Müller	Scale	1:3	Size
TOLERANCING PRINCIPLE ISO8015	Chd	27.10.2011	wart01 Wroblewski	Design Group	9722	Material ID
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	27.10.2011	ds009 Strödelcke	Drawing ID	DAAD020647	Rev.
			Net Weight 4,92			PAAD060920
			A			A





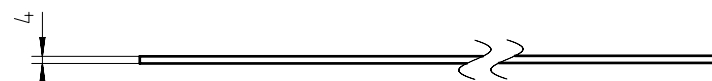
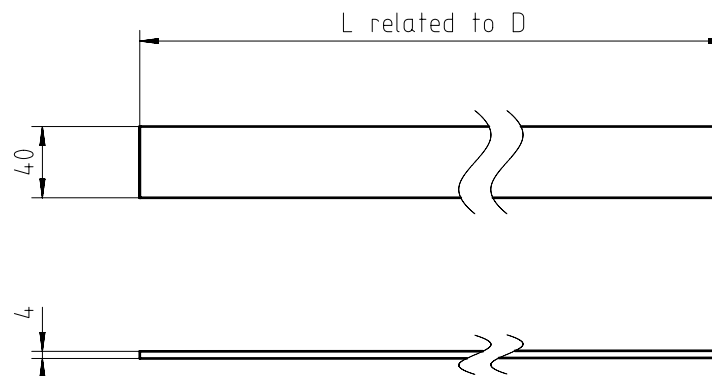
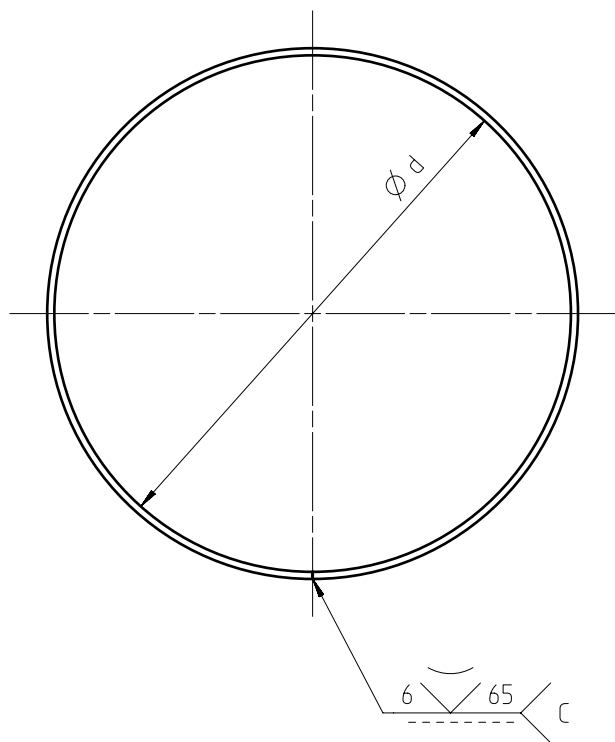
A



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

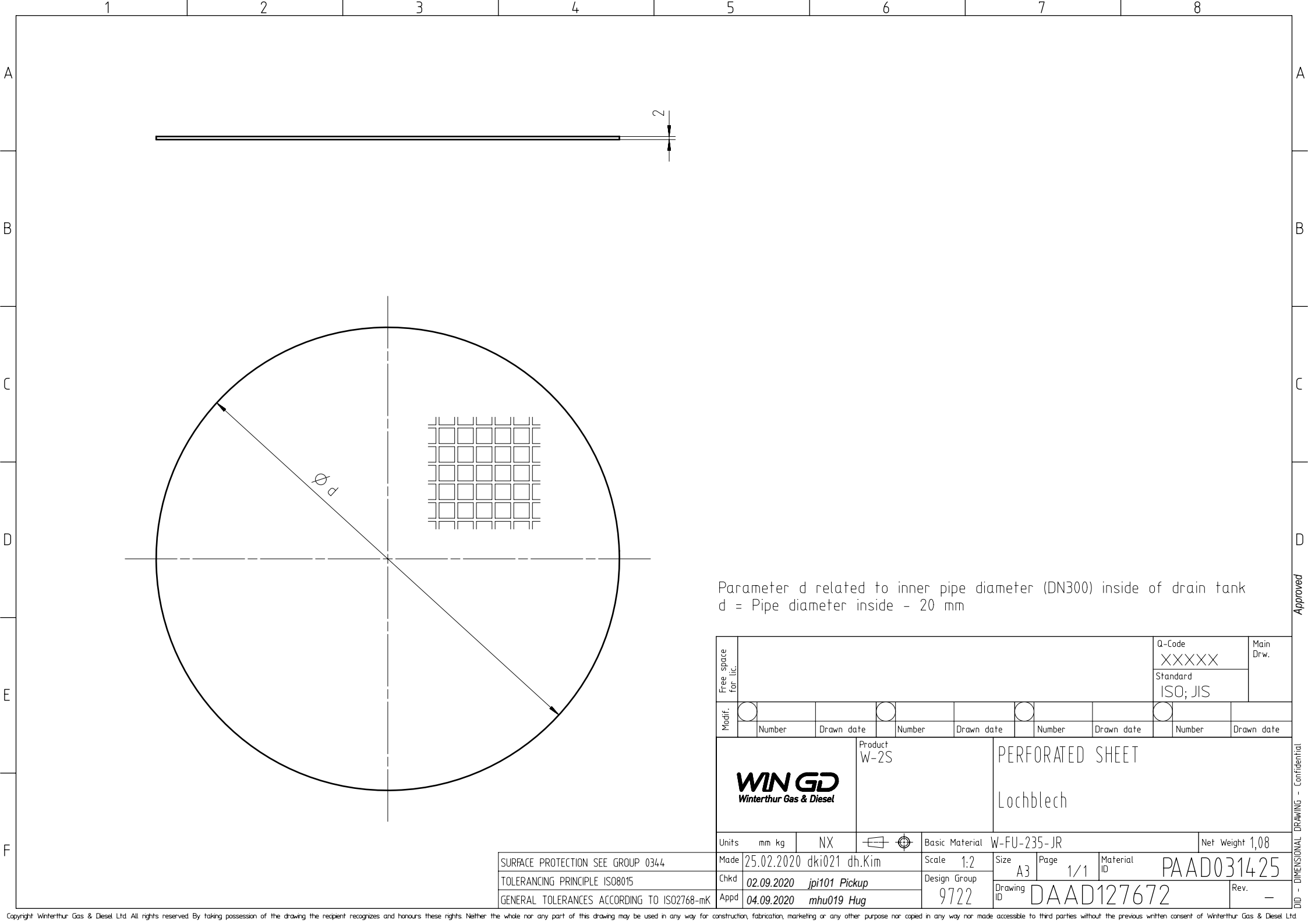
$d = \text{pipe inner diameter} - 20 \text{ mm}$

$D = d + 8 \text{ mm}$





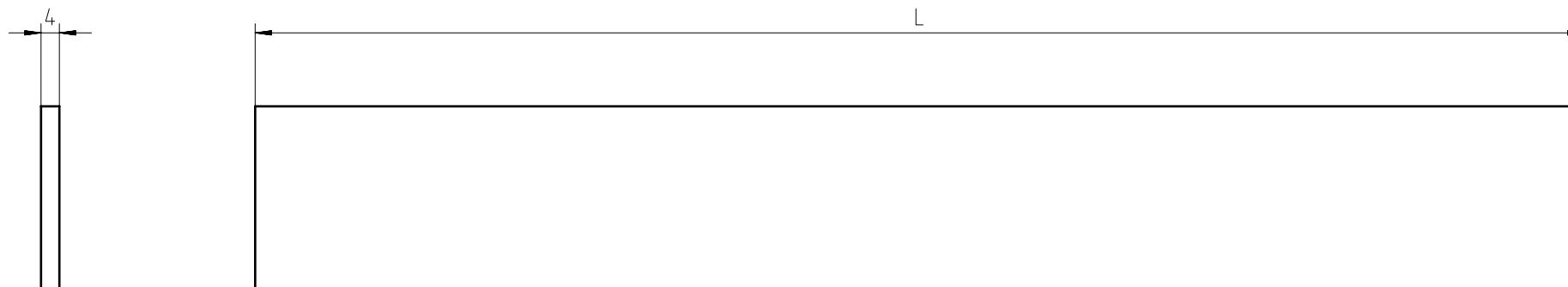
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	Standard ISO; JIS								
Modif.	A	EAAD091530	17.02.2020						
	Number	Drawn date		Number	Drawn date		Number	Drawn date	
WIN GD Winterthur Gas & Diesel		Product W-2S		RING Ring					
Units	mm kg	NX		Basic Material		W-FU-235-JR		Net Weight 1,15	
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TOLERANCING PRINCIPLE ISO8015		Chkd	31.01.2011 sfe006 Feuerstein		Design Group	9722		Page	1/1
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd	31.01.2011 dst009 Strödecke		Drawing ID	DAAD013964		Rev.	A

UD - DIMENSIONAL DRAWING - Confidential










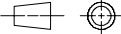

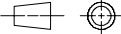

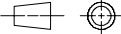
Parameter d related to inner pipe diameter (DN300) inside of drain tank
d = Pipe diameter inside - 20 mm

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								Standard ISO; JIS				
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		Number	Drawn date		Number	Drawn date		Number	Drawn date			
		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									



Parameter L related to inner pipe diameter (DN300) inside of drain tank
 $L = \text{Pipe diameter inside} - 20 \text{ mm}$

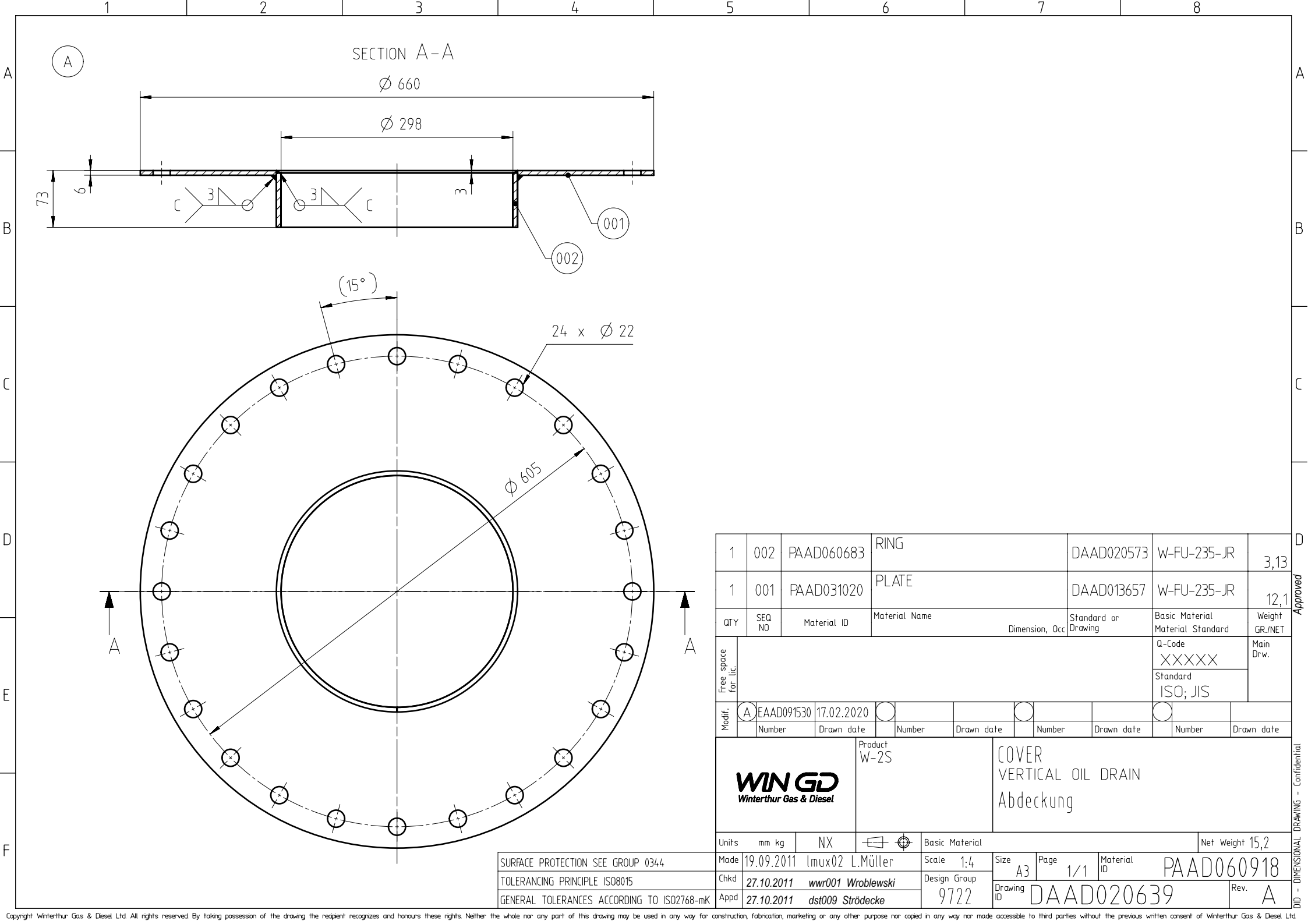
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											Standard ISO; JIS	
Modif.												
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Units	mm kg	NX				Basic Material W-FU-235-JR				Net Weight 0,36		
Made	25.02.2020 dki021 DH.Kim					Scale 1:1		Size A3	Page 1/1	Material ID PAAD031426		
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Appd	04.09.2020 mhu019 Hug					9722						

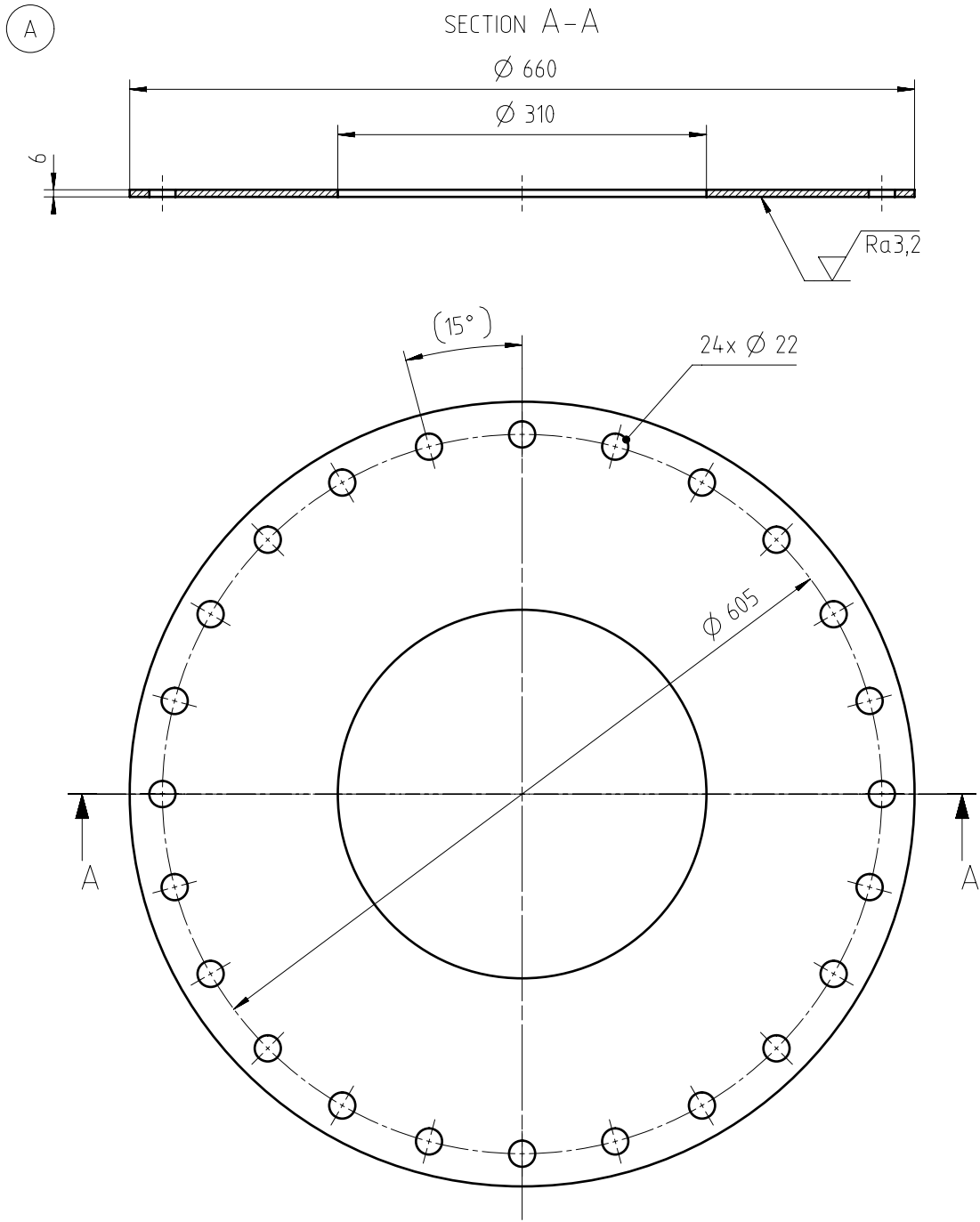
	1	2	3	4																																																																														
A	SURFACE PROTECTION SEE GROUP 03/44																																																																																	
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	GENERAL TOLERANCES ACCORDING TO ISO2768-mK																																																																																	
C	<div><div><div>4</div><div></div></div><div><div>l</div><div></div></div></div>																																																																																	
D	<p>Parameter l related to inner pipe diameter (DN300) inside of drain tank</p> <p>l = Pipe radius inside - 20 mm</p>																																																																																	
E	<table><tr><td rowspan="2">Free space for lic.</td><td colspan="8"></td><td>Q-Code</td><td rowspan="2">Main Drw.</td></tr><tr><td colspan="8"></td><td>XXXXXX</td></tr><tr><td rowspan="2">Modif.</td><td><input type="radio"/></td><td></td><td></td><td><input type="radio"/></td><td></td><td></td><td><input type="radio"/></td><td></td><td><input type="radio"/></td><td></td><td></td></tr><tr><td></td><td>Number</td><td>Drawn date</td><td></td><td>Number</td><td>Drawn date</td><td></td><td>Number</td><td>Drawn date</td><td></td><td>Number</td></tr></table>				Free space for lic.									Q-Code	Main Drw.									XXXXXX	Modif.	<input type="radio"/>			<input type="radio"/>			<input type="radio"/>		<input type="radio"/>				Number	Drawn date		Number	Drawn date		Number	Drawn date		Number																																			
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F	<table><tr><td colspan="2"></td><td colspan="2">Product</td><td colspan="2">W-2S</td><td colspan="2">FLAT BAR</td></tr><tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2">Flachstahl</td></tr><tr><td>Units</td><td>mm kg</td><td colspan="2">NX</td><td colspan="2"></td><td colspan="2">Basic Material</td><td colspan="2">W-FU-235-JR</td><td colspan="2">Net Weight</td><td colspan="2">0,17</td></tr><tr><td>Made</td><td colspan="3">25.02.2020 dki021 DH.Kim</td><td colspan="2">Scale</td><td colspan="2">1:1</td><td>Size</td><td colspan="2">A4</td><td>Page</td><td colspan="2">1/1</td><td>Material</td><td colspan="2">ID</td><td colspan="2">PAAD031427</td></tr><tr><td>Chkd</td><td colspan="3">02.09.2020 jpi101 Pickup</td><td colspan="2">Design Group</td><td colspan="2">9722</td><td rowspan="2">Drawing ID</td><td colspan="4" rowspan="2">DAAD127677</td><td colspan="4" rowspan="2">Rev.</td><td colspan="4" rowspan="2">-</td></tr><tr><td>Appd</td><td colspan="3">04.09.2020 mhu019 Hug</td><td colspan="2"></td><td colspan="2"></td></tr></table>						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						
		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																																																																																	
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Approved

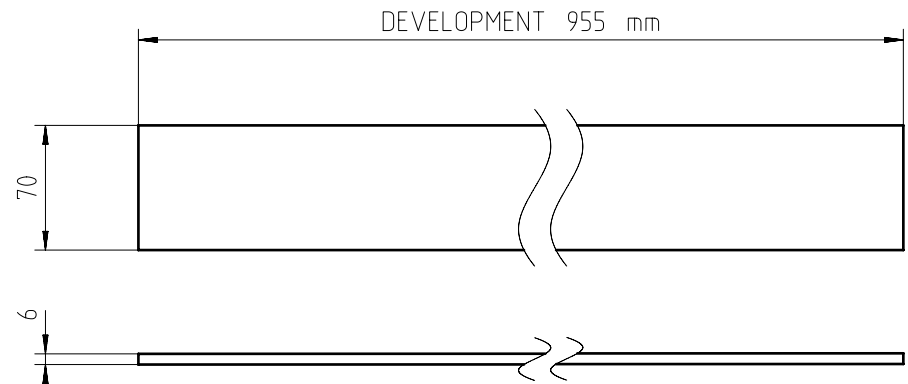
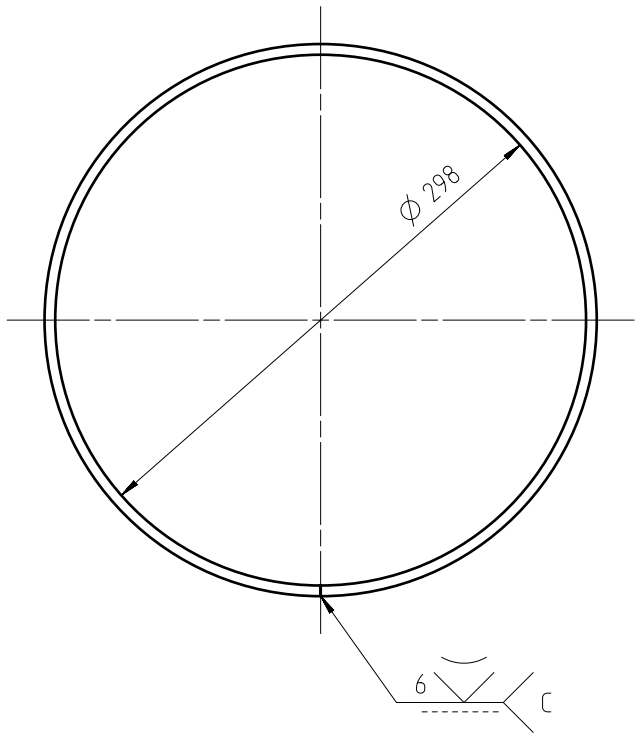
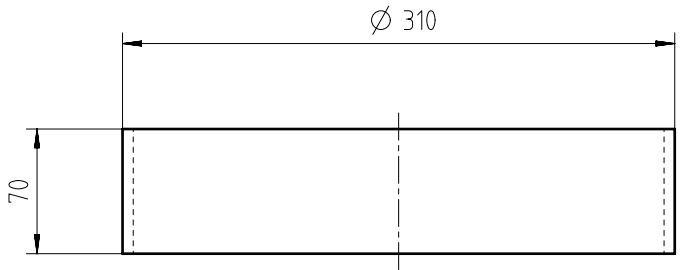
DID - DIMENSIONAL DRAWING - Confidential





Free space for lic.	Q-Code XXXXXX								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		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											

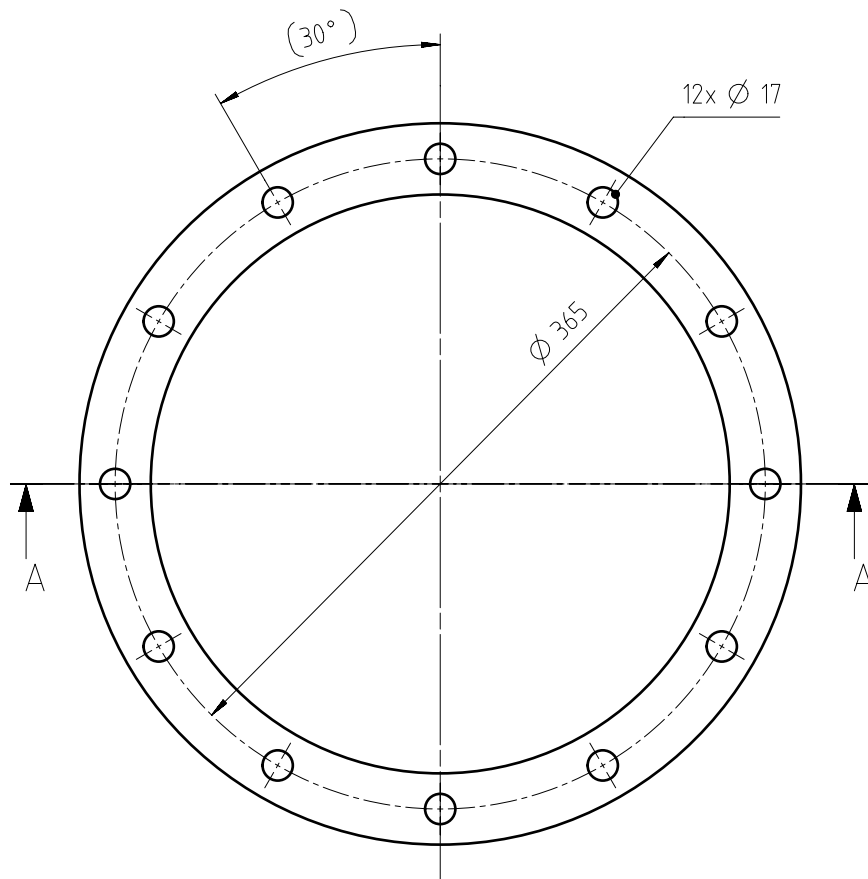
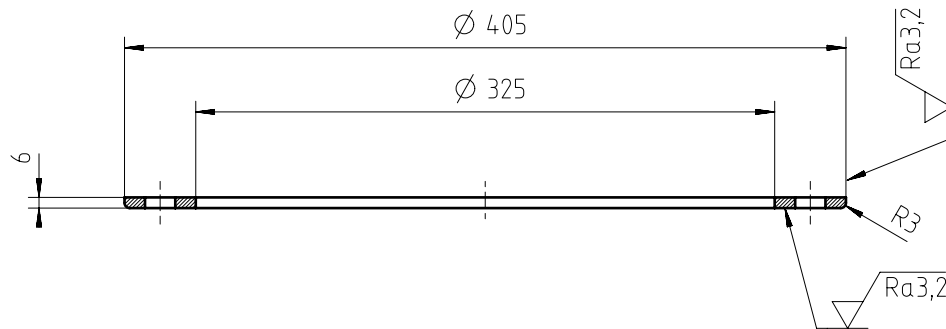
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Free space for lic.	Q-Code XXXXX								Main Drw.				
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Modif.	A	EAAD091530	17.02.2020										
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date					
WIN GD Winterthur Gas & Diesel				Product W-2S		RING Ring							
Units	mm kg	NX		Basic Material		W-FU-235-JR			Net Weight 3,13				
SURFACE PROTECTION SEE GROUP 0344		Made	19.09.2011 Imux02 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										

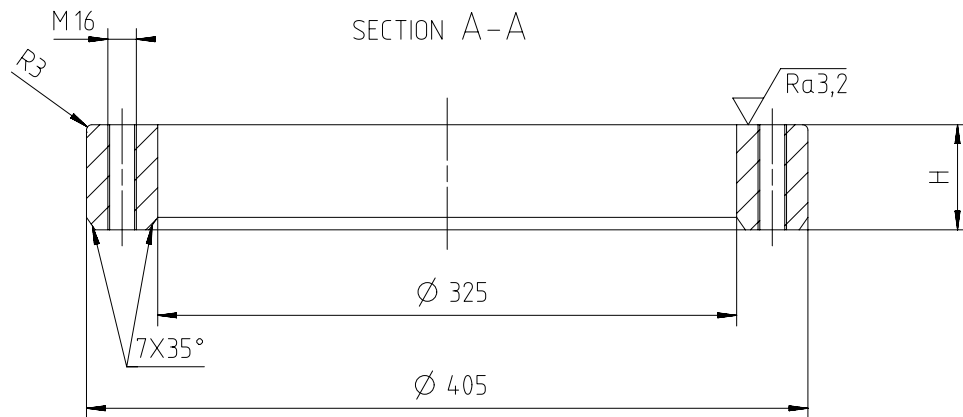
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SECTION A-A



$\sqrt{Ra12,5}$ (✓) SHARP EDGES REMOVED

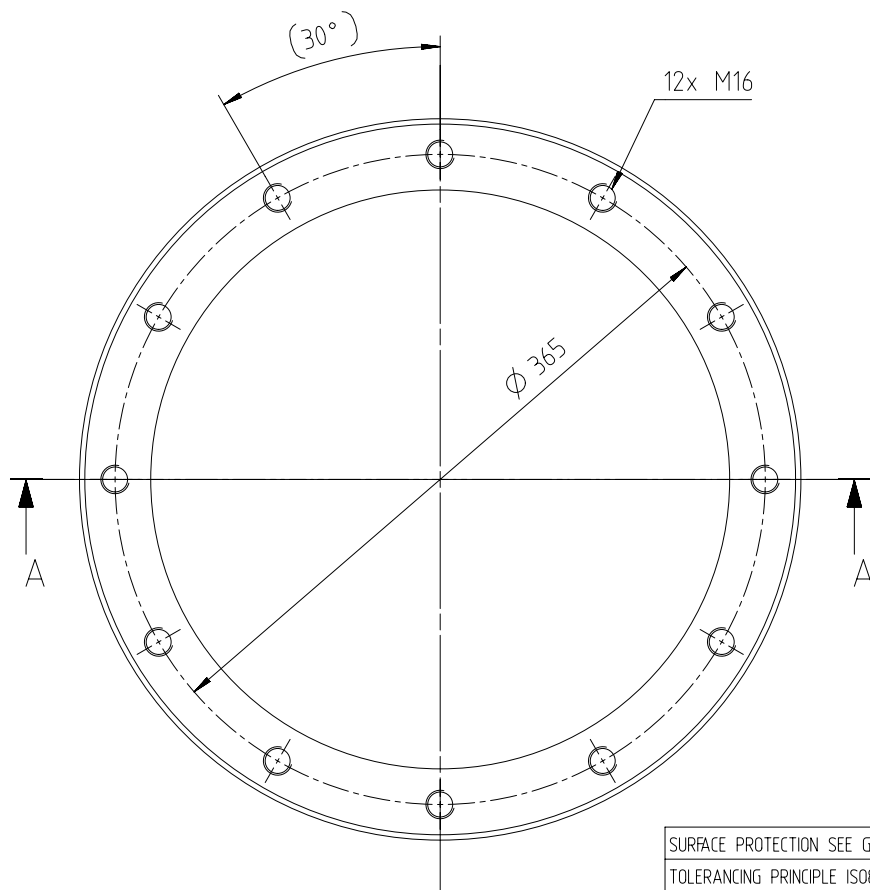
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								Standard ISO; JIS	
Modif.	A	EAAD091530	17.02.2020						
	Number	Drawn date		Number	Drawn date		Number	Drawn date	
WIN GD Winterthur Gas & Diesel		Product W-2S		RING Ring					
Units	mm kg	NX		Basic Material		W-FU-235-JR		Net Weight 2,4	
SURFACE PROTECTION SEE GROUP 0344		Made	21.01.2011 mhu019 M.Hug		Scale	1:3		Size	A3
TOLERANCING PRINCIPLE ISO8015		Chkd	31.01.2011 sfe006 Feuerstein		Design Group	9722		Page	1/1
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd	31.01.2011 dst009 Strödecke		Drawing ID	DAAD013763		Rev.	A



✓ Ra12,5 (✓) SHARP EDGES REMOVED

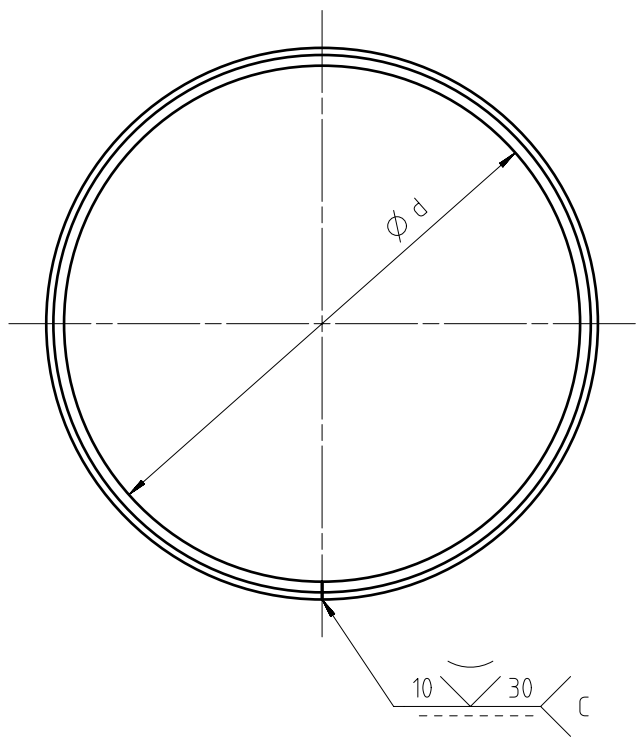
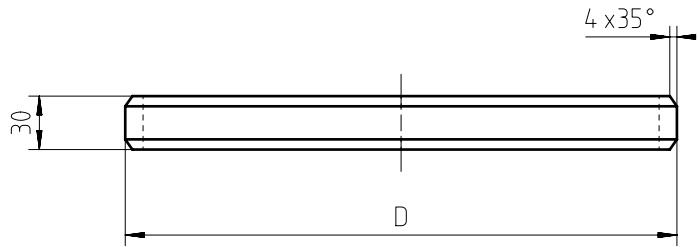
H depends on chock thickness.

Ⓐ H = A - 25 mm
for the relation of A, see Drawing DAAD020647

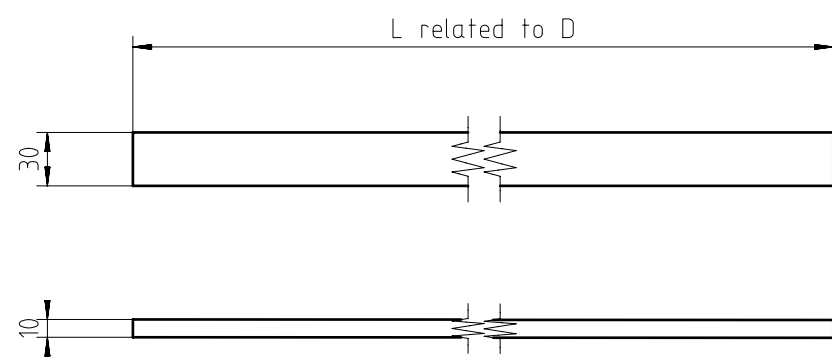


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								Standard ISO; JIS				
Modif.	A	EAAD091530	17.02.2020									
		Number	Drawn date		Number	Drawn date		Number	Drawn date		Number	
			Product W-2S			WELDING FLANGE						
WIN GD Winterthur Gas & Diesel						Anschweisssflansch						
Units		mm kg	NX			Basic Material				W-FU-235-JR		Net Weight 20
Made	19.09.2011	Imux02	L.Müller		Scale	1:3		Size	A3	Page	1/1	
Chkd	27.10.2011	wwr001	Wroblewski		Design Group	9722		Material ID	PAAD060685			
Appd	27.10.2011	dst009	Strödecke		Drawing ID	DAAD020574				Rev. A		

A

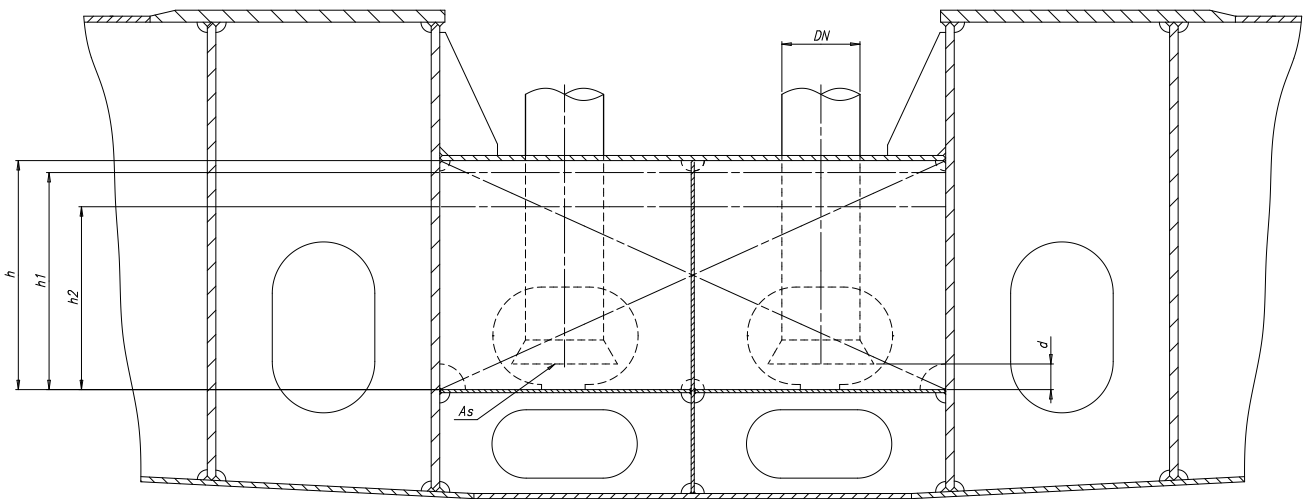


Parameter D and d related to inner pipe diameter (DN300) inside of drain tank
D = Pipe diameter inside
d = D - 20 mm

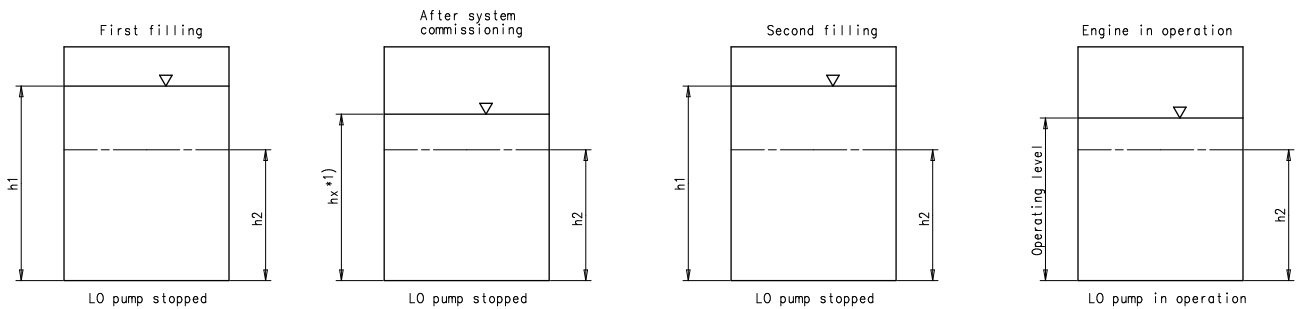


Free space for lic.	Q-Code XXXXX								Main Drw.					
	Standard ISO; JIS													
Modif.	A	EAAD091530	18.02.2020											
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number					
WIN GD Winterthur Gas & Diesel				Product W-2S		RING Ring								
Units	mm kg	NX		Basic 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	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									

W-X40/-B



LO DRAIN TANK - FILLING PROCESS



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°

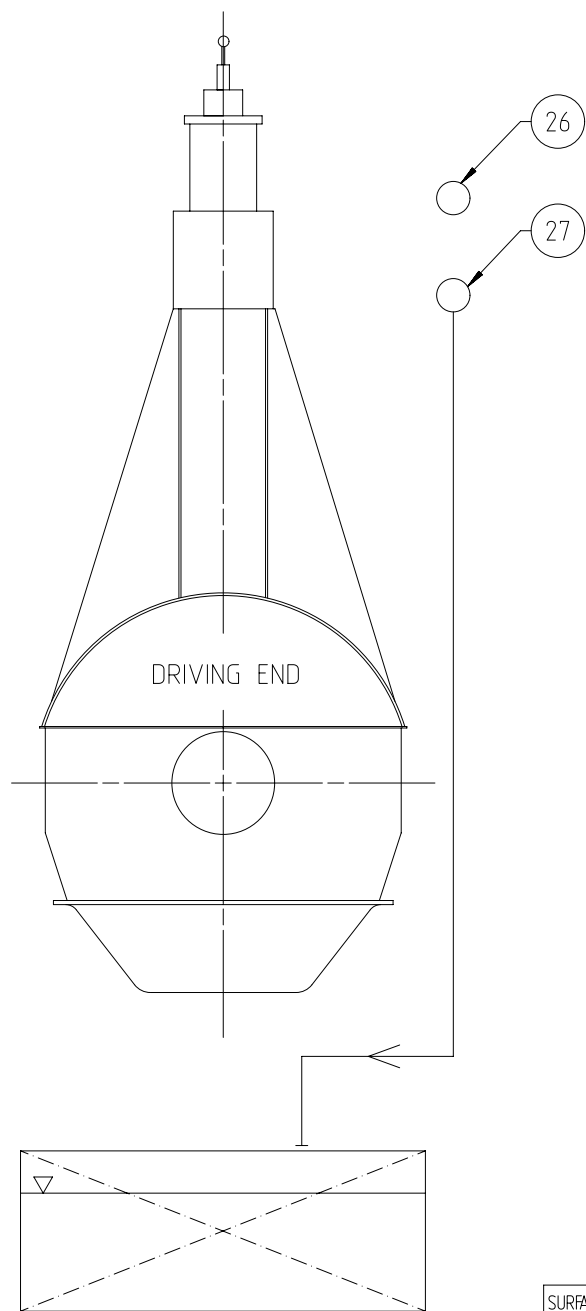
Additionally this level has to be above or equal to the minimum retention volume (Vr) for M/E operation.

*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: $d = DN/4 + 40$, $d = \text{min. } 80 \text{ mm}$.

*4) The stated tank volume represent the min. requirement. Final tank dimensions have to be aligned in regard to dimensional restrictions 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).



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Standard	ISO	JIS			
Mod. 1	EAAD086020	15.07.2015			
Mod. 2	EAAD086282	16.11.2015			
Mod. 3	EAAD086531	24.03.2016			
Number	Drawn date	Number	Drawn date	Number	Drawn date
Product W-40					
LUBRICATING OIL DRAIN TANK FILLING GUIDELINE					
Units	mm kg	IDE	Basic Material	Page	Net Weight 0,001
Mode	23.07.2015	W-40	Scale 1:25	Size A1	Material PAAD181146
Chkd	20.04.2015	mhu019 Hug	Design Group	1/1	Rev. C
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	13.05.2015	bha009 Haag	9722	DAAD062728



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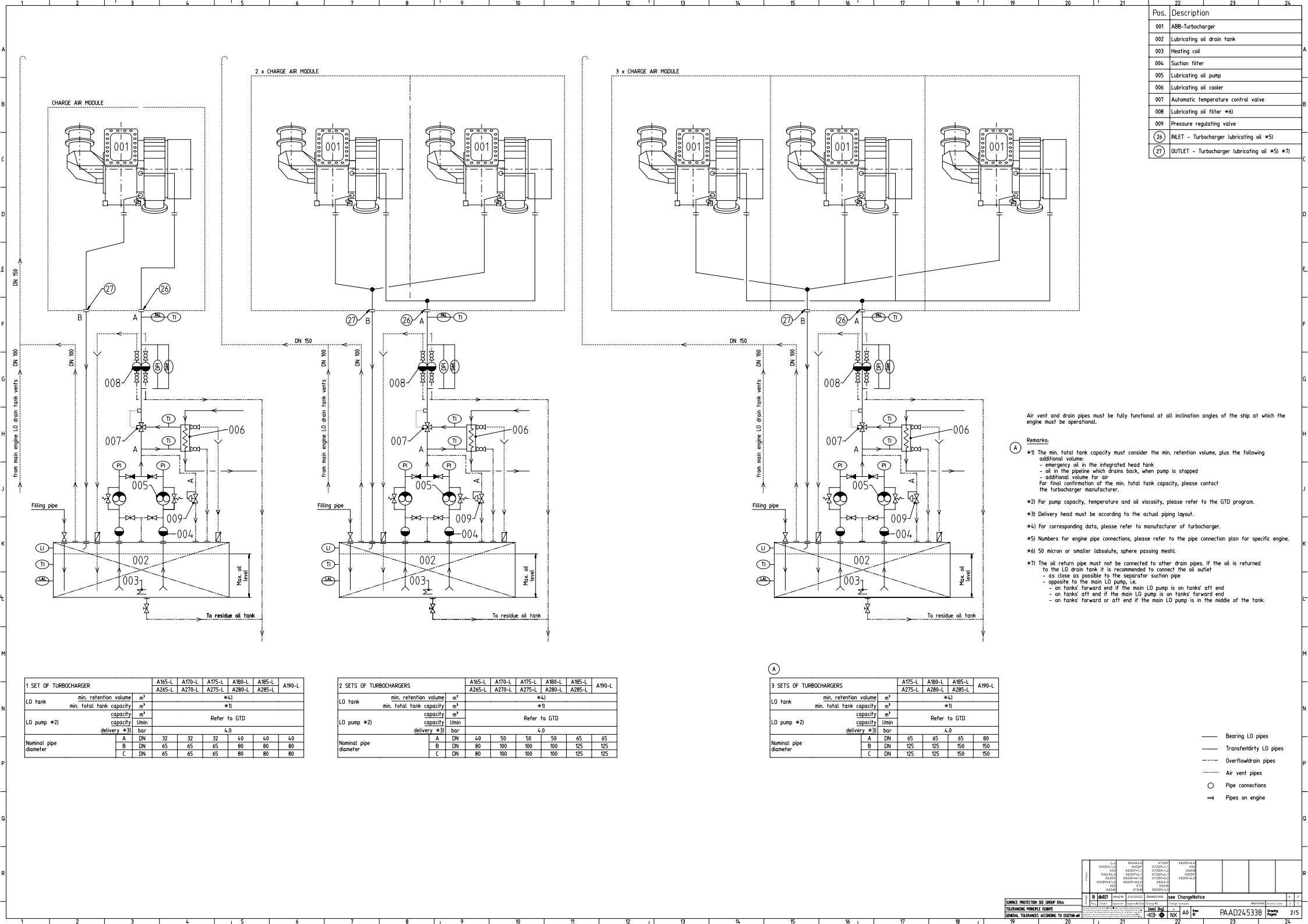
SPECIFICATION which must be met

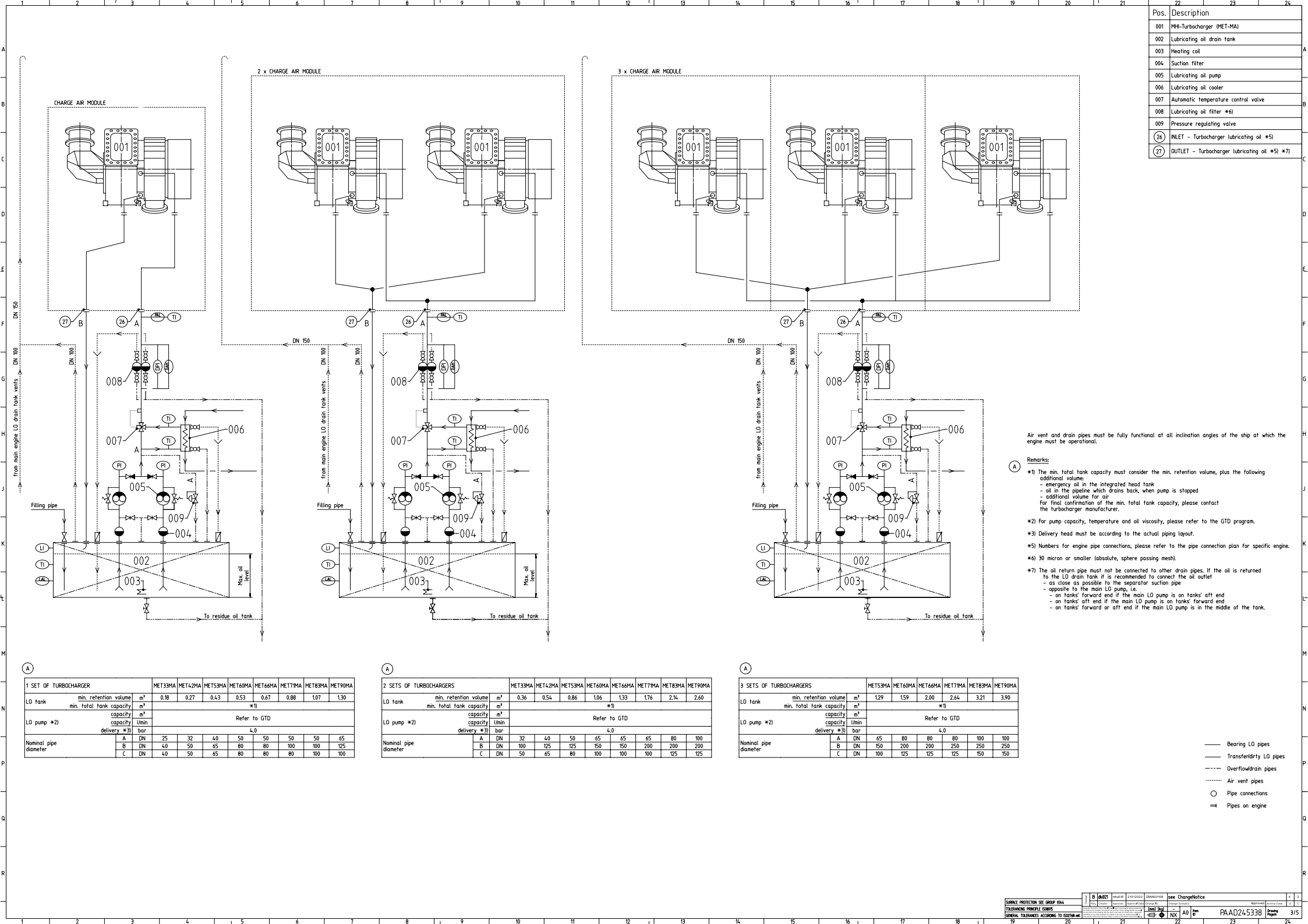
- 26 INLET - Turbocharger lubricating oil
- Lubricating oil temperature:
 - ABB: 30 ~ 85 °C
 - MHI: 35 ~ 50 °C
 - Lubricating oil pressure
 - ABB: 0.8 ~ 2.5 bar
 - MHI: 0.6 ~ 1.5 bar
 - Lubricating oil volume flow: according to the turbocharger maker's recommendation
 - Lubricating oil cleanliness:
 - 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.

Prod.	CX40DF CX52	RT-flex48T-D RT-flex50-B	RT-flex50-D RT-flex50DF	RT-flex58T-B RT-flex58T-D	RT-flex58T-D V1 RT-flex58T-D V2	RT-flex58T-ES RT-flex58TD ER-3	CR-HHM-PILOT X35-B	X40-B [...]		
Change History	B	dkl021	mhu019	21.01.2022	CNAA001108	see ChangeNotice		4	3	
	A	dkl021	mhu019	08.09.2020	EAAD091530	Legacy information. See corresponding ChangeNotice		4	-	
	-	dkl021	bha009	16.12.2016	-	-		-	-	
	Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis		Approved	Activity Code	E
<div> Winterrhur Gas & Diesel</div>					LUBRICATING OIL SYSTEM FOR SEPARATED TC LUBRICATING					
Dimension										
Scale	-		NX	Units [mm] [kg]	Basic Material			Net Weight	0.000	
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				Qty per	A3	Item ID	PAAD245338		Drawing Page/s	1/5

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

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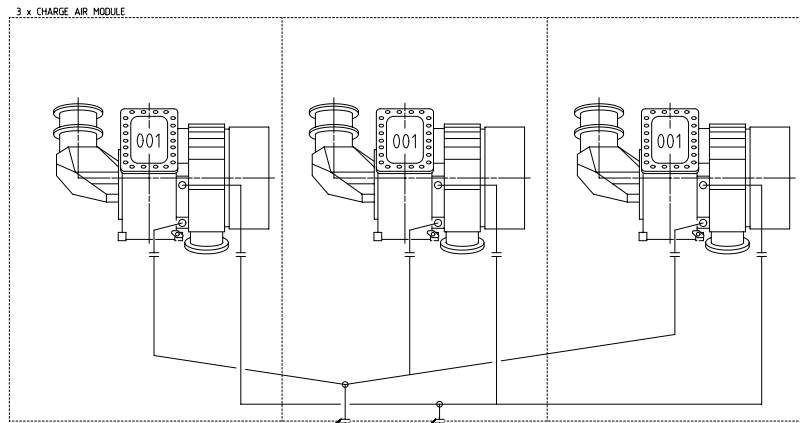
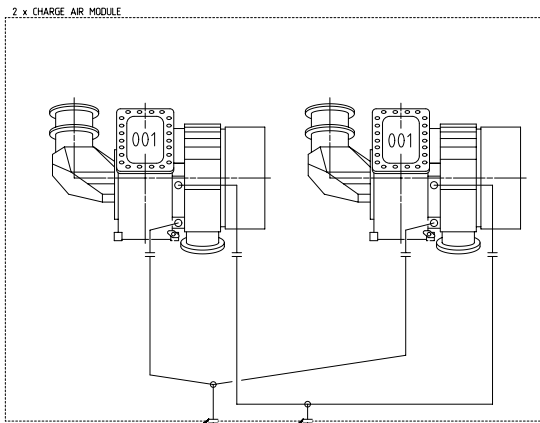
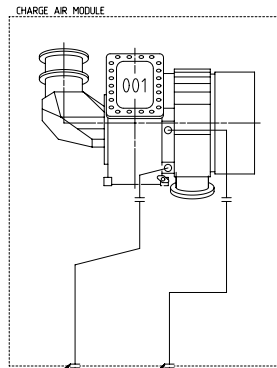
Pos.	Description
001	M4-Turbocharger (MET-MA)
002	Lubricating oil drain tank
003	Heating coil
004	Suction filter
005	Lubricating oil pump
006	Lubricating oil cooler
007	Automatic temperature control valve
008	Lubricating oil filter #6)
009	Pressure regulating valve
26	INLET - Turbocharger lubricating 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.
- 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 airFor 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.

1 SET OF TURBOCHARGER		MET33MA	MET42MA	MET53MA	MET60MA	MET66MA	MET77MA	MET83MA	MET90MA
LO tank	min. retention volume	m³	0.18	0.27	0.43	0.53	0.67	0.88	1.07
	min. total tank capacity	m³	*)						
LO pump #2)	capacity	m³	Refer to GTD						
	delivery #3)	l/min	4.0						
Nominal pipe diameter	A	DN	25	32	40	50	50	50	65
	B	DN	40	50	65	80	80	100	125
	C	DN	40	50	65	80	80	80	100

2 SETS OF TURBOCHARGERS		MET33MA	MET42MA	MET53MA	MET60MA	MET66MA	MET77MA	MET83MA	MET90MA
LO tank	min. retention volume	m³	0.36	0.54	0.86	1.06	1.33	1.76	2.14
	min. total tank capacity	m³	*)						
LO pump #2)	capacity	m³	Refer to GTD						
	delivery #3)	l/min	4.0						
Nominal pipe diameter	A	DN	32	40	50	65	65	80	100
	B	DN	100	125	125	150	150	200	200
	C	DN	50	65	80	100	100	100	125

3 SETS OF TURBOCHARGERS		MET53MA	MET60MA	MET66MA	MET77MA	MET83MA	MET90MA
LO tank	min. retention volume	m³	1.29	1.59	2.00	2.64	3.21
	min. total tank capacity	m³	*)				
LO pump #2)	capacity	m³	Refer to GTD				
	delivery #3)	l/min	4.0				
Nominal pipe diameter	A	DN	65	80	80	80	100
	B	DN	150	200	200	250	250
	C	DN	100	125	125	125	150



Pos.	Description
001	M4-Turbocharger (MET-MB)
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)

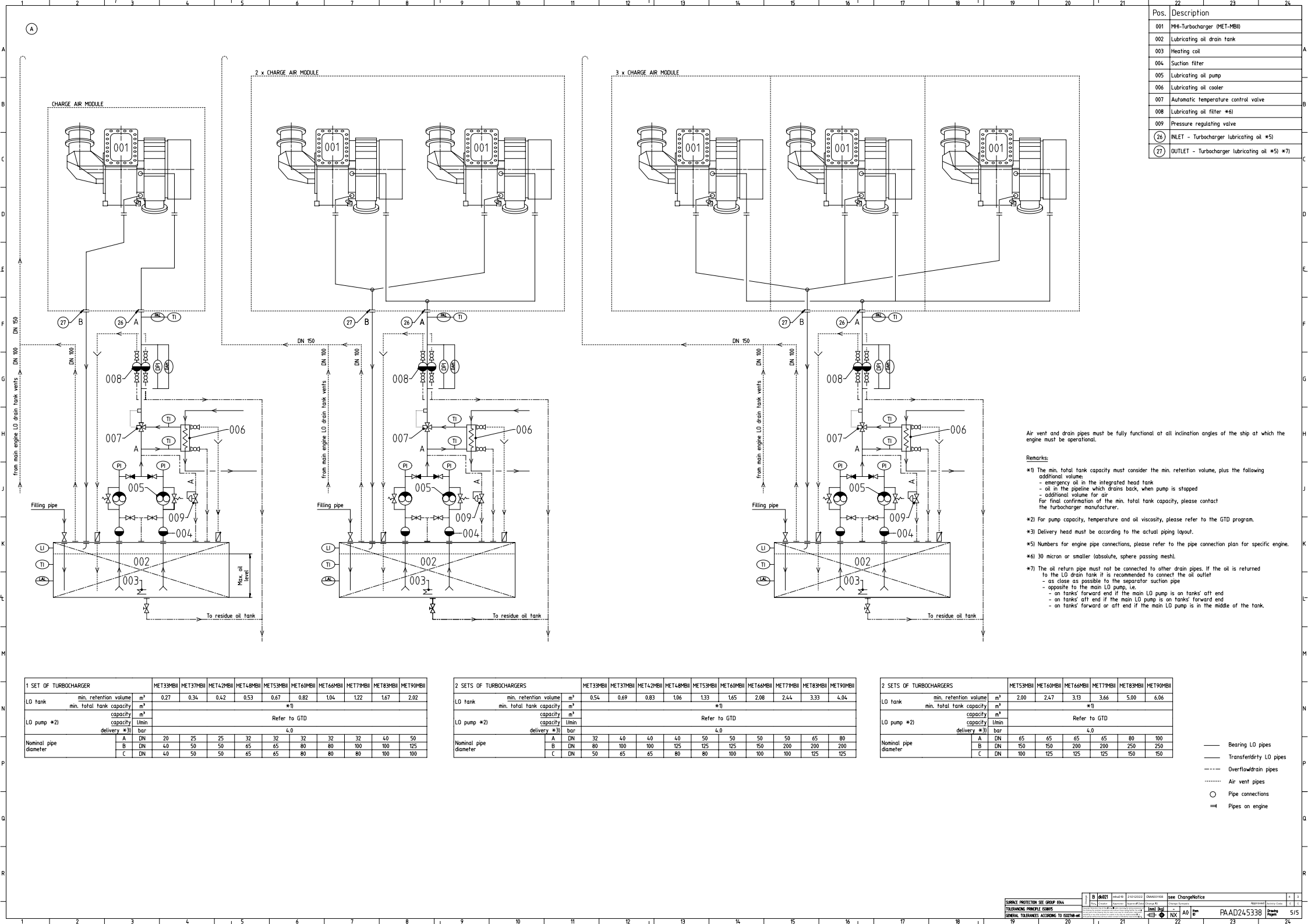
- Remarks:
- *1) The min. total tank capacity must consider the min. retention volume, plus the following additional volume:
 - emergency oil in the integrated head tank
 - oil in the pipeline which drains back, when pump is stopped
 - additional volume for air
 For final confirmation of the min. total 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			MET33MB	MET37MB	MET42MB	MET48MB	MET53MB	MET60MB	MET66MB	MET77MB	MET83MB	MET90MB
LO tank	min. retention volume	m ³	0.21	0.26	0.31	0.41	0.49	0.61	0.77	1.01	1.23	1.50
	min. total tank capacity	m ³	*)									
LO pump *)	capacity	m ³	Refer to GTD									
	capacity	l/min	4.0									
Nominal pipe diameter	delivery **)	bar	A	DN 20	25	25	32	32	32	32	40	50
		B	DN 40	50	50	65	65	80	80	100	100	125
		C	DN 40	50	50	65	65	80	80	80	100	100

A												
2 SETS OF TURBOCHARGERS			MET33MB	MET37MB	MET42MB	MET48MB	MET53MB	MET60MB	MET66MB	MET77MB	MET83MB	MET90MB
LO tank	min. retention volume	m³	0.41	0.52	0.62	0.82	0.99	1.22	1.53	2.02	2.46	2.99
	min. total tank capacity	m³	*)									
LO pump *)	capacity	m³	Refer to GTD									
	capacity	l/min										
	delivery #3)	bar	4.0									
Nominal pipe diameter	A	DN	32	4.0	4.0	4.0	50	50	50	50	65	80
	B	DN	80	100	100	125	125	125	150	200	200	200
	C	DN	50	65	65	80	80	100	100	100	125	125

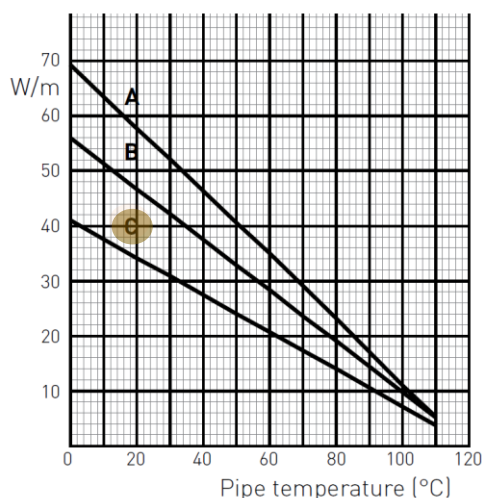
3 SETS OF TURBOCHARGERS		MET53MB	MET60MB	MET66MB	MET77MB	MET83MB	MET90MB	
LO tank	min. retention volume	m ³	0.41	0.52	0.62	0.82	0.99	1.22
	min. total tank capacity	m ³	*1)					
LO pump *2)	capacity	m ³	Refer to GTD					
	capacity	l/min	4.0					
Nominal pipe diameter	delivery *3)	bar						
	A	DN 65	65	65	65	65	80	100
	B	DN 150	150	150	200	200	250	250
	C	DN 100	100	125	125	125	150	150
		DN 150	150	150	200	200	250	250

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



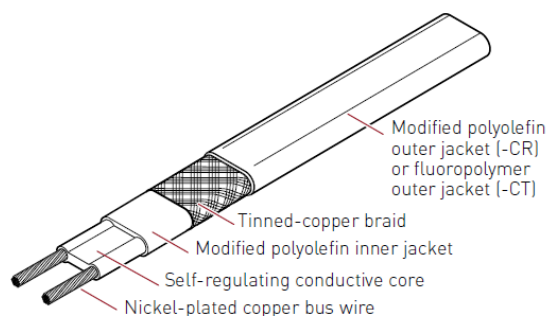
Self-Regulating Heating Cable 10QTVR2-CT

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 LENGTH 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		
		Product		Heating Element										
		W-2S		Order Drawing										
Made	24.10.2018	P. Kowalski		Main Drw.	Page	Material ID								
Chkd	24.10.2018	R. Leutwyler		Design Group	1 / 1	PAAD308926								
Appd	24.10.2018	W. Östreicher		0009	Drawing ID	DAAD106761							Rev	A

MIDS - WinGD X40-B LUBRICATING-OIL-SYSTEM (DG9722)

TRACK CHANGES

DATE	SUBJECT	DESCRIPTION
2017-02-20	DRAWING SET	First web upload
2018-05-22	DAAD075220 DAAD062692	System drgs – new revision
2019-07-17	DAAD072770 DAAD020633	Drain tank drgs – new revision
2019-09-26	DAAD062692	System drg – new revision
2020-02-12	DAAD122303 DAAD122196	Main and system drg for 7 cyl. - added
2020-09-21	DAAD075220 DAAD072770 DAAD020633 DAAD020647 DAAD013764 DAAD013848 DAAD013964 DAAD020639 DAAD013657 DAAD020573 DAAD013763 DAAD020574 DAAD013903 DAAD083642 DAAD127677 DAAD127674 DAAD127672	System and tank assembly drgs – new revision
2021-05-19	107.246.799	Hydraulic jack plate positioning drawing – new revision
2022-07-12	PAAD181046 PAAD218151	System drgs – new revision

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2023-01-05	PAAD181046 PAAD218151	System drgs – new revision
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