

PAAD360995	HT CW static pressure adjustment: with separate buffer-unit
PAAD060175	HT CW static pressure adjustment: with separate expansion tank
PAAD060174	HT CW static pressure adjustment: with common HT/LT expansion tank

Approved

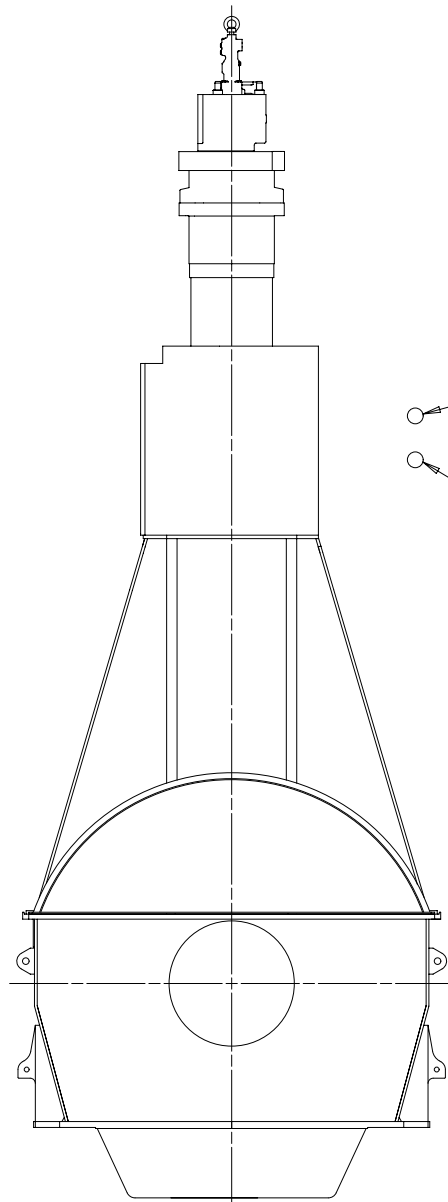
SEE TABLE

QUID - DIMENSIONAL DRAWING - Confidential

 WIN GD <i>Winterthur Gas & Diesel</i>		Product		W5-8X40-B		COOLING WATER SYSTEMS		INSTALLATION DRAWINGS		Kuehlwassersystem					
		Units mm kg		NX				Basic Material		Net Weight					
SURFACE PROTECTION SEE GROUP 0344		Made		08.09.2011 tmux02 L.Müller		Scale -		Size A3		Page 1/1		Material ID			
TOLERANCING PRINCIPLE ISO8015		Chkd		04.10.2011 wwr001 Wroblewski		Design Group		9721		Drawing ID		DAAD020444		Rev. B	
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd		04.10.2011 dst009 Strödecke											

X40-B
DRIVING END

FUEL SIDE



EXHAUST SIDE

SPECIFICATION which must be met:

1	INLET - Cylinder cooling water (HT water) - Cooling water pressure: 2.0 - 4.0 bar - Cooling water volume flow: according to GTD specification. - Cooling water (freshwater) has to be treated according to WinGD's specification. - A buffer unit must be installed - The static pressure at engine inlet must be adjusted by buffer unit pressure setting . - Pre-heating: The engine must be warmed-up by means of heated HT water to min. 60°C before engine start. - HT cooling water amount on engine side: Given in table1 on page 2
3	OUTLET - Cylinder cooling water (HT water) - Cooling water temperature set point: 90 °C - Controller set-point: 90 °C (controller type: PI) - Steady state condition: 90 ± 2 °C - Transient condition: 90 ± 4 °C - A venting devise (air separator) must be installed as close as possible after the outlet connection to remove accumulated air from the system.
7	INLET - Scavenge air cooler (SAC) cooling water (LT water) - Cooling water pressure: 2.0 - 4.0 bar - Cooling water temperature: 10 - 36 °C - Cooling water volume flow: according to GTD specification. - Cooling water (freshwater) has to be treated according to WinGD's specification. - LT cooling water amount on engine side: Given in table1 on page 2
8	OUTLET - Scavenge air cooler (SAC) cooling water (LT water) - Cooling water volume flow: according to GTD specification. - adjusted by an orifice in the outlet pipe on shipside.

1	029	PAAD297120	AIR SEPARATOR		DAAD101945		0,001			
1	021	107.245.419.500	EXPANSION TANK		107.245.419		0,001			
1	020	107.245.626.500	BUFFER		107.245.626		0,001			
QTY	SEQ NO	Material ID	Material Name		Dimension, Occ	Standard or Drawing	Basic Material Material Standard	Weight GR./NET		
Free space for lic.							Q-Code	Main Drw.		
							XXXXXX			
							Standard ISO; JIS			
Modif.	☐	Number	Drawn date	☐	Number	Drawn date	☐	Number	Drawn date	
WINGD Winterthur Gas & Diesel			Product 5-8X40-B		CENTRAL COOLING WATER SYSTEM HT_static-pressure: Buffer-unit Zentralkuehlwassersystem					
Units mm kg			NX				Basic Material		Net Weight 0,001	
Made	15.07.2020		Sudant Deogade		Scale	-		Size	A2	
Chkd	30.09.2020		jpi101 Pickup		Design Group	9721		Page	1/2	
Appd	30.09.2020		mhu019 Hug		Drawing ID	DAAD132911		Material ID	PAAD360665	
mK									Rev.	-

SYSTEM PROPOSAL

Pos.	ENGINE CONNECTIONS *2)
①	INLET - Cylinder cooling water (HT water)
③	OUTLET - Cylinder cooling water (HT water)
⑦	INLET - Scavenge air cooler (SAC) cooling water (LT water) *7)
⑧	OUTLET - Scavenge air cooler (SAC) cooling water (LT water) *7)

Pos.	ENGINE COMPONENTS *3)
EC01	Scavenge air cooler (SAC)
EC02	Manual vent valve, for each cylinder *16)

Number of cylinders		5	6	7	8
Main engine X40-B (R1 rated)	power (kW)	5675	6810	7945	9080
	speed (rpm)	146			
Buffer unit for HT circuit	Cap. (m³)	0.8	0.8	0.8	0.8
Cylinder cooling water feed tank only min.	Cap. (m³)	1.5	1.5	1.5	1.5
CCW feed and drain tank (combined) min.	Cap. (m³)	4	4	4	4
Cooling water expansion tank (LT)	Cap. (m³)	Depending on ancillary plants			

PROPOSAL for pipe dimensioning *11)						
Nominal pipe diameter	A	DN	Yard determination, suitable for main engine and ancillary plants			
	B	DN				
	C	DN				
	D	DN	150	150	150	150
	E	DN	100	100	100	100
	F	DN	100	100	100	125
	I	DN	80	80	100	100
	J	DN	65	80	80	100
K	DN	20	20	20	20	20

Pos.	SYSTEM COMPONENTS *1)
001	Low sea chest
002	High sea chest
003	Seawater strainer
004	Air vent (air vent pipe or equal venting system acc. to shipyard's design)
005	Seawater circulating pump
006	Central cooler (LT cooling water)
007	Automatic temperature control valve for LT circuit *13)
008	LT water temperature sensor *13)
009	Cooling water pump for LT circuit
010	Lubricating oil cooler
011	Automatic temperature control valve for HT circuit *14)
012	HT water temperature sensor *14)
013	Cylinder cooling water pump for HT circuit
014	Pre-heating circulating pump (optional), cap. 10% from cylinder cooling pump *8)
015	Pre-heater for main engine (HT circuit)
016	Solenoid valve (air inlet to be interlocked with min. water level)
017	Control air valve with air release function *15) (to be adjusted to ensure CW pressure at ME inlet 4 - 5 bar(g))
018	Throttling disc *5)
019	Freshwater generator
020	Buffer unit for HT circuit (link to detail drawing on page 1)
021	LT water expansion tank (link to detail drawing on page 1) *18)
022	Filling pipe / inlet chemical treatment
023	Cylinder cooling water feed & drain tank (or feed tank only)
024	Cylinder cooling water cooler
025	Supply pump, automatic level control (0.5 m³/h at 4 bar)
026	Chemical treatment refill unit *4)
027	Transition piece (adapter) *9)
028	MDO/MGO cooler
029	Air separator (link to detail drawing on page 1)
030	Automatic venting unit

- Remarks:**
- 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 the "Pipe Connection Plan" for the execution and location of the engine pipe connection.
 - *3) To be delivered by the engine manufacturer, i.e. already equipped on engine side.
 - *4) To be installed for cooling water after-treatment during regular engine operation. Convenient dimensions are provided in view 'A'. Other designs are possible.
 - *5) When using a valve, lock in proper position to avoid mishandling.
 - *6) Only when pos. 014 is installed.
 - *7) The inlet and outlet pipes to SAC must be designed to allow engine thermal expansion, or be fitted with expansion pieces.
 - *8) For guidance only, final layout according to actual engine pre-heating requirements.
 - *9) Installed as required (check with "Pipe Connection Plan")
 - *10) Optional filling line to enable fast system re-filling (e.g. after a complete system drainage) by means of the pre-heating pumps.
 - *11) All 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 appropriate pipe diameter. Rating specific flow rates are provided by GTD.
 - *13) A constant temperature at engine inlet must be maintained. Temperature set-point can be selected between 10 - 36 °C. WinGD recommends a set-point of 25 °C. A lower LT water temperature assists the main engine to reach lower BSFC. If the ancillary plants require a temperature lower or greater than the LT water set-point, a separate water supply system with different temperature set-point has to be installed (please refer to the system proposal in MIM).
 - *14) A constant temperature at engine outlet must be maintained. Required controller set-point for main engine operation is 90 °C.
 - *15) If the selected control air valve does not have the integrated air release functionality a separate air release valve can be installed as alternative on the top of the buffer unit.
 - *16) Only to be used for manual venting of isolated cylinders after maintenance. To be kept close during engine operation.
 - *17) Optional, only to be installed if needed for hydraulic balancing.
 - *18) If gas driven auxiliaries are connected to the LT circuit, the LT expansion tank must be gas tight and has to be vented to a safe area outside of engine room.

- Seawater pipes ---
- LT freshwater pipes —
- HT freshwater pipes —
- Balance pipes ---
- Ancillary equipment pipes —
- Drain/overflow pipes ----
- Air vent pipes ---
- Control/feed back
 - Pipes on Engine ==
 - Pipe connections ○

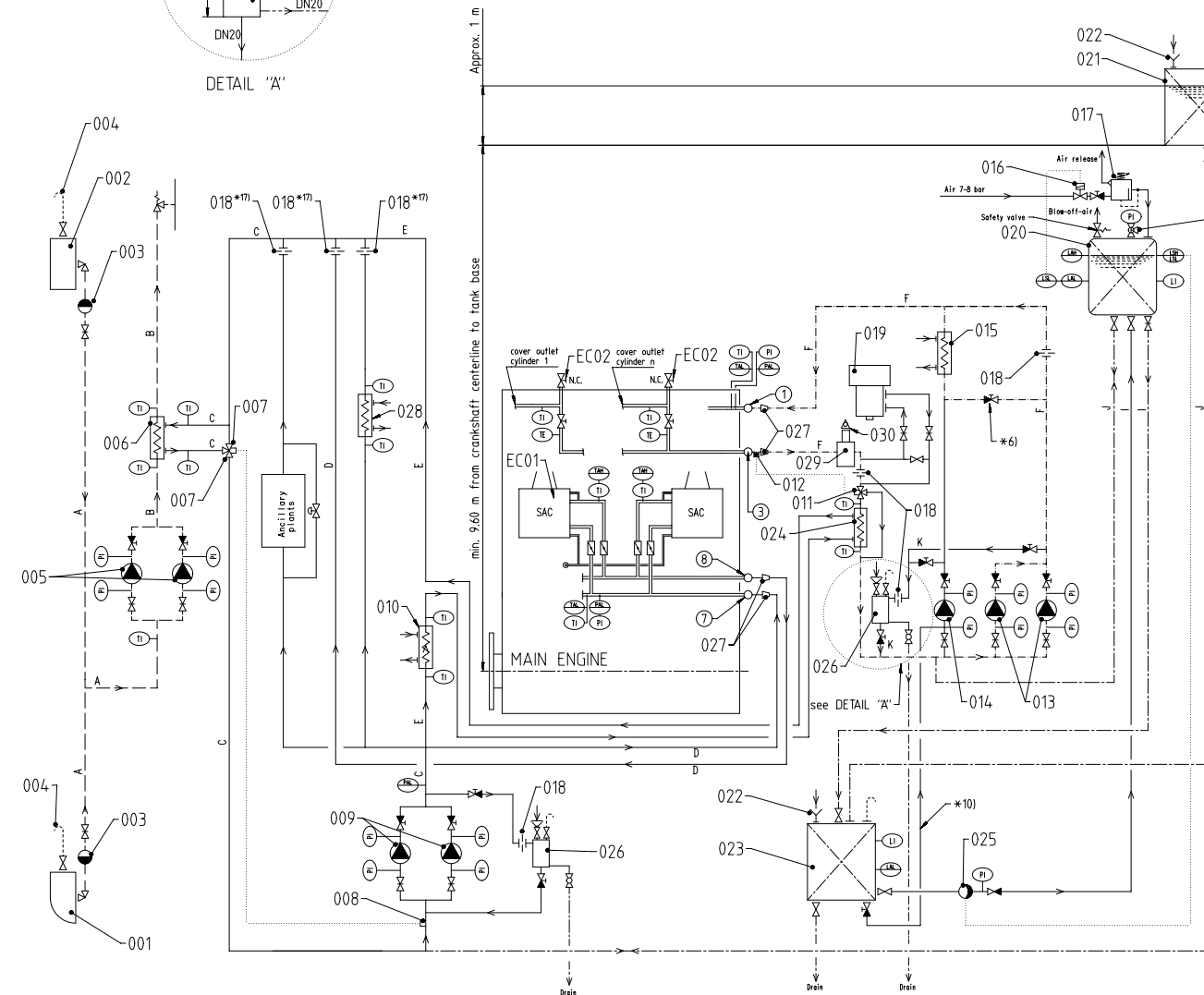
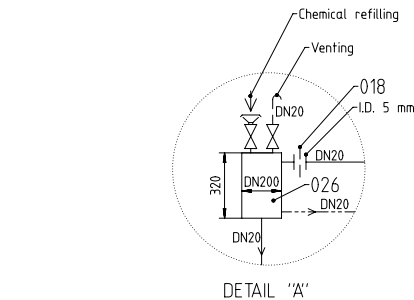


Table 1: Water content on engine side

Cylinder	HT circuit Cyl. C.W. Volume (l)	LT circuit SAC Volume (l)
5	160 l	190 l
6	190 l	190 l
7	220 l	220 l
8	250 l	220 l

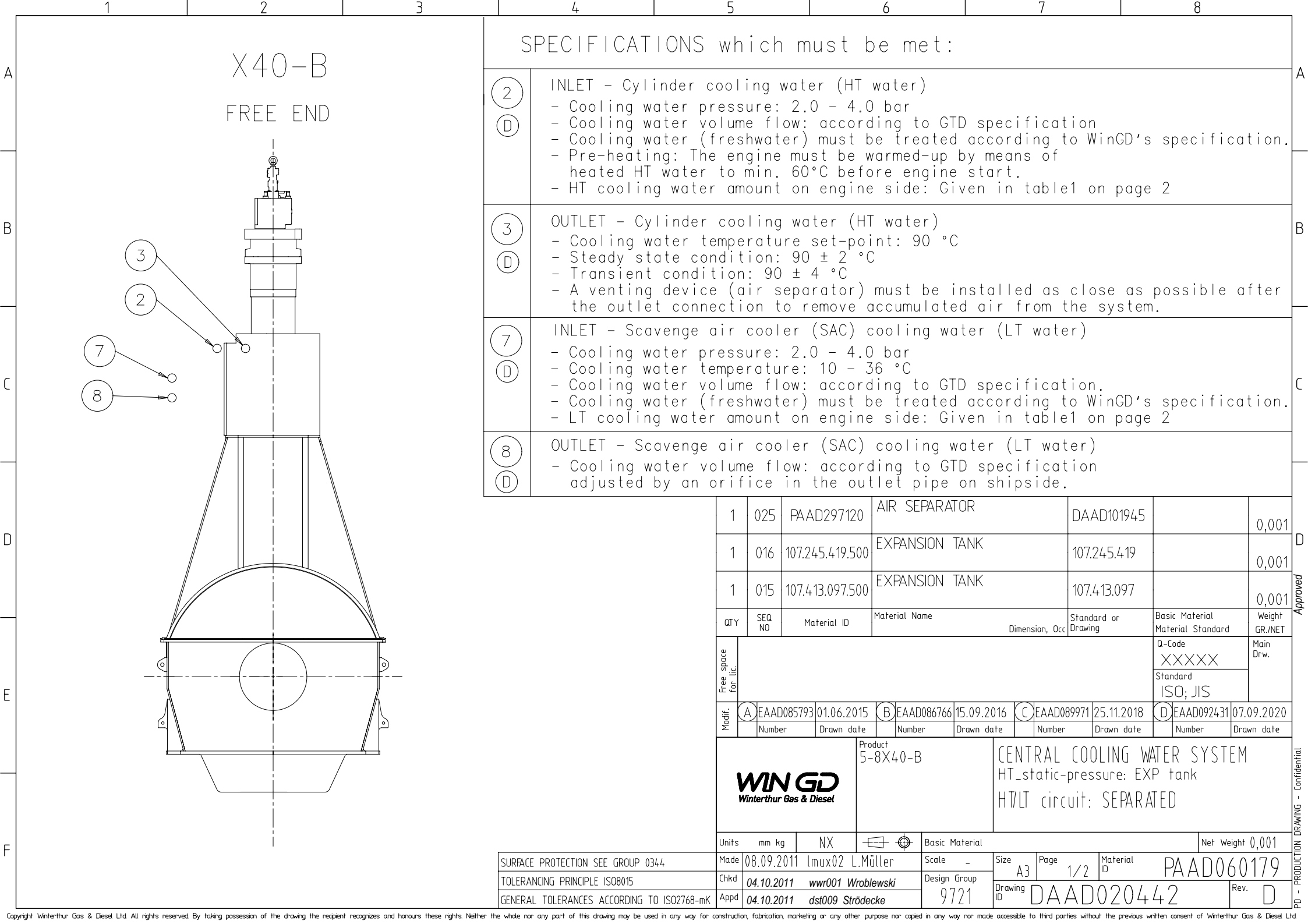

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(F)



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SYSTEM PROPOSAL

Pos.	ENGINE COMPONENTS *3) ①
EC01	Scavenge air cooler (SAC)
EC02	Manual vent valve, for each cylinder *15)

Pos.	ENGINE CONNECTIONS *2) ①
②	INLET - Cylinder cooling water (HT water)
③	OUTLET - Cylinder cooling water (HT water)
⑦	INLET - Scavenge air cooler (SAC) cooling water (LT water) *7)
⑧	OUTLET - Scavenge air cooler (SAC) cooling water (LT water) *7)

Pos.	SYSTEM COMPONENTS *1)
001	Low sea chest
002	High sea chest
003	Seawater strainer
004	Air vent (air vent pipe or equal venting system acc. to shipyard's design)
005	Seawater circulating pump
006	Central cooler (LT cooling water)
007	Automatic temperature control valve for LT circuit *13)
008	LT water temperature sensor *13)
009	Cooling water pump for LT circuit *13)
010	Lubricating oil cooler
011	Automatic temperature control valve for HT circuit *14)
012	HT water temperature sensor *14)
013	Cylinder cooling water pump for HT circuit
014	Pre-heating circulating pump (optional), cap. 10% from cylinder cooling pump *8)
015	HT water expansion tank (link to detail drawing on page 1)
016	LT water expansion tank (link to detail drawing on page 1)
017	Pre-heater for main engine (HT circuit)
018	Throttling disc *5)
019	Freshwater generator
020	Chemical treatment refill unit *4)
021	HT cooling water cooler
022	Transition piece (adapter) *9)
023	MDO /MGO cooler
024	Filling pipe / inlet chemical treatment
025	Air separator (link to details drawing on page 1)
026	Automatic venting unit

Remarks: ①

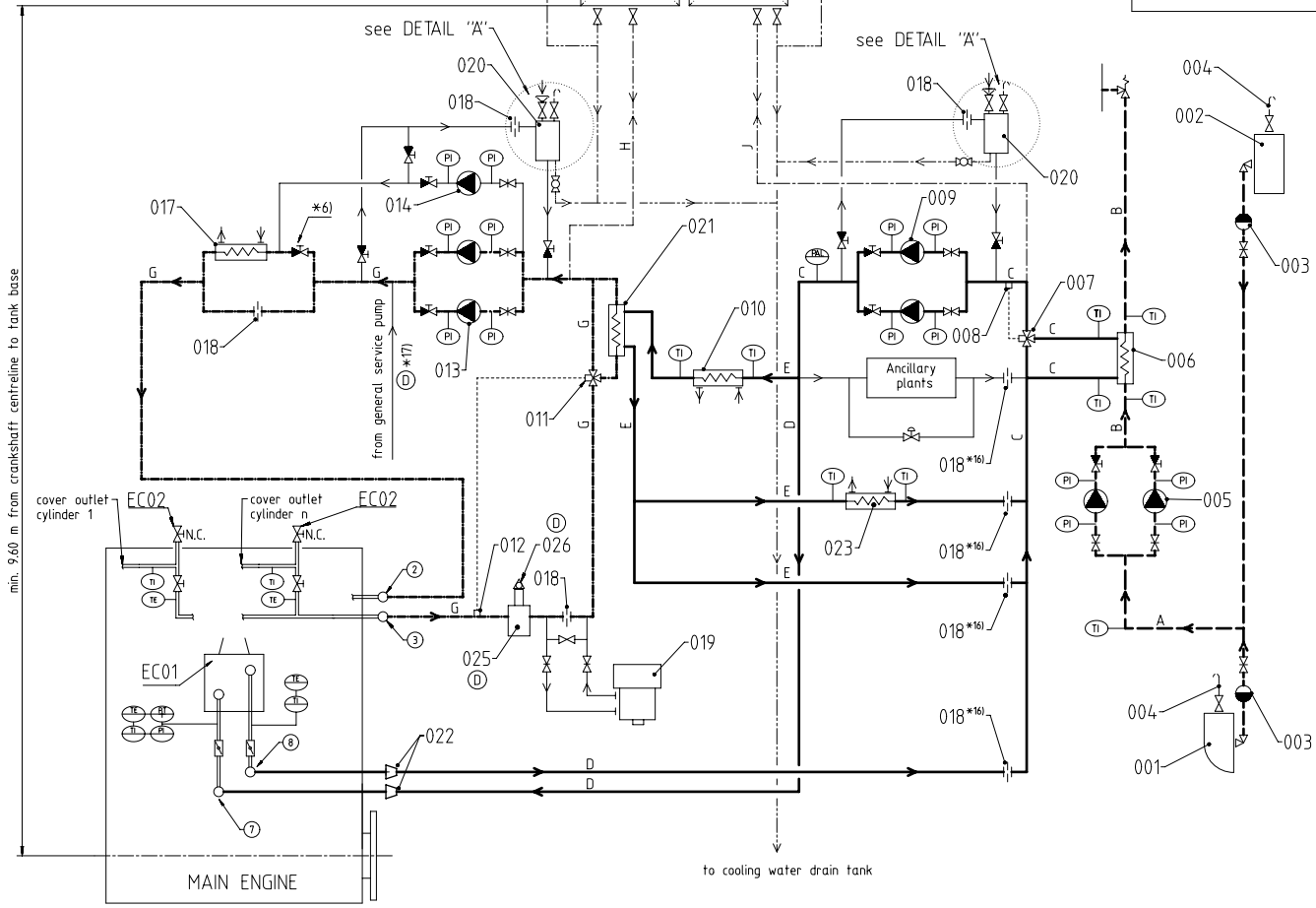
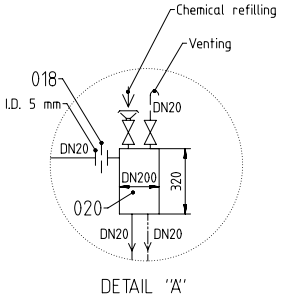
- Air vent and drain pipes not shown on drawing. Shall be installed where required.
- Air vent and drain pipes must be fully functional at all inclination angles of the ship at which the engine must be operational.

- *1) To be delivered by external supplier and to be installed by the shipyard.
*2) Refer to the "Pipe Connection Plan" for the execution and location of the engine pipe connection.
*3) To be delivered by the engine manufacturer, i.e. already equipped on engine side.
*4) To be installed for cooling water after-treatment during regular engine operation. Convenient dimensions are provided in view "A". Other designs are possible.
*5) When using a valve, lock in proper position to avoid mishandling.
*6) Only when pos. 014 is installed.
*7) The inlet and outlet pipes to SAC must be designed to allow engine thermal expansion, or be fitted with expansion pieces.
*8) For guidance only, final layout according to actual engine pre-heating requirements.
*9) Installed as required (check with "Pipe Connection Plan")
*10) All 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 appropriate pipe diameter. Rating specific flow rates are provided by GTD.
*13) A constant temperature at engine inlet must be maintained. Temperature set-point can be selected between 10 - 36 °C. WinGD recommends a set-point of 25 °C. A lower LT water temperature assists the main engine to reach lower BSFC. If the ancillary plants require a temperature lower or greater than the LT water set-point, a separate water supply system with different temperature set-point has to be installed (please refer to the system proposal in MIM)
*14) A constant temperature at engine outlet must be maintained. Required controller set-point for main engine operation is 90 °C.
*15) Only to be used for manual venting of isolated cylinders after maintenance. To be kept close during engine operation.
*16) Optional, only to be installed if needed for hydraulic balancing.
*17) Optional connection, To be installed if requested by class rules for emergency engine cooling.

Table 1: Water content on engine side

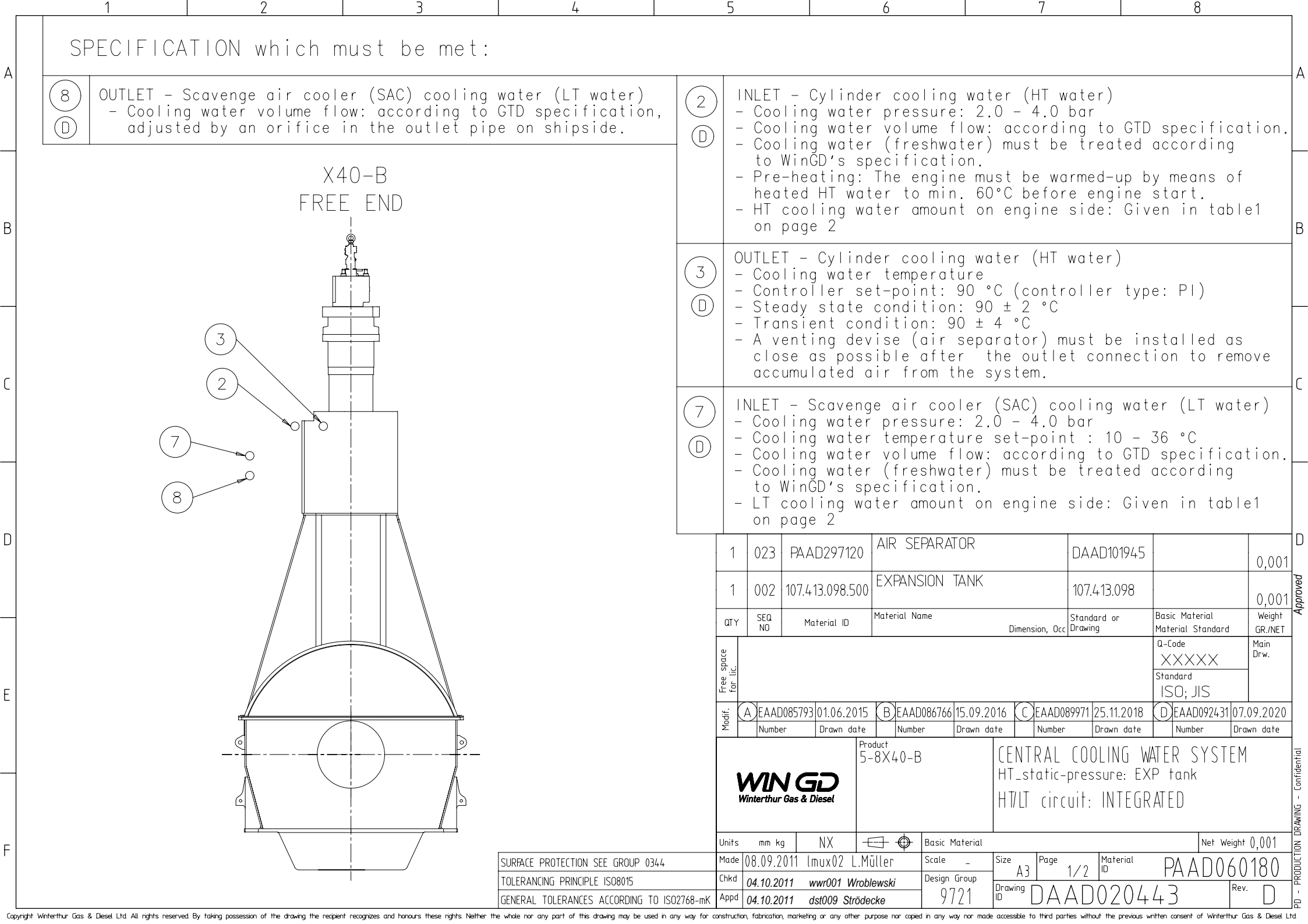
Cylinder	HT circuit Cyl. C.W. Volume (l)	LT circuit SAC Volume (l)
5	160 l	190 l
6	190 l	190 l
7	220 l	220 l
8	250 l	220 l

- Seawater pipes ---
LT freshwater pipes —
HT freshwater pipes —
Balance pipes ---
Ancillary equipment pipes —
Drain/overflow pipes ----
Air vent pipes --
Control/feed back -----
Pipes on Engine ==
Pipe connections ○



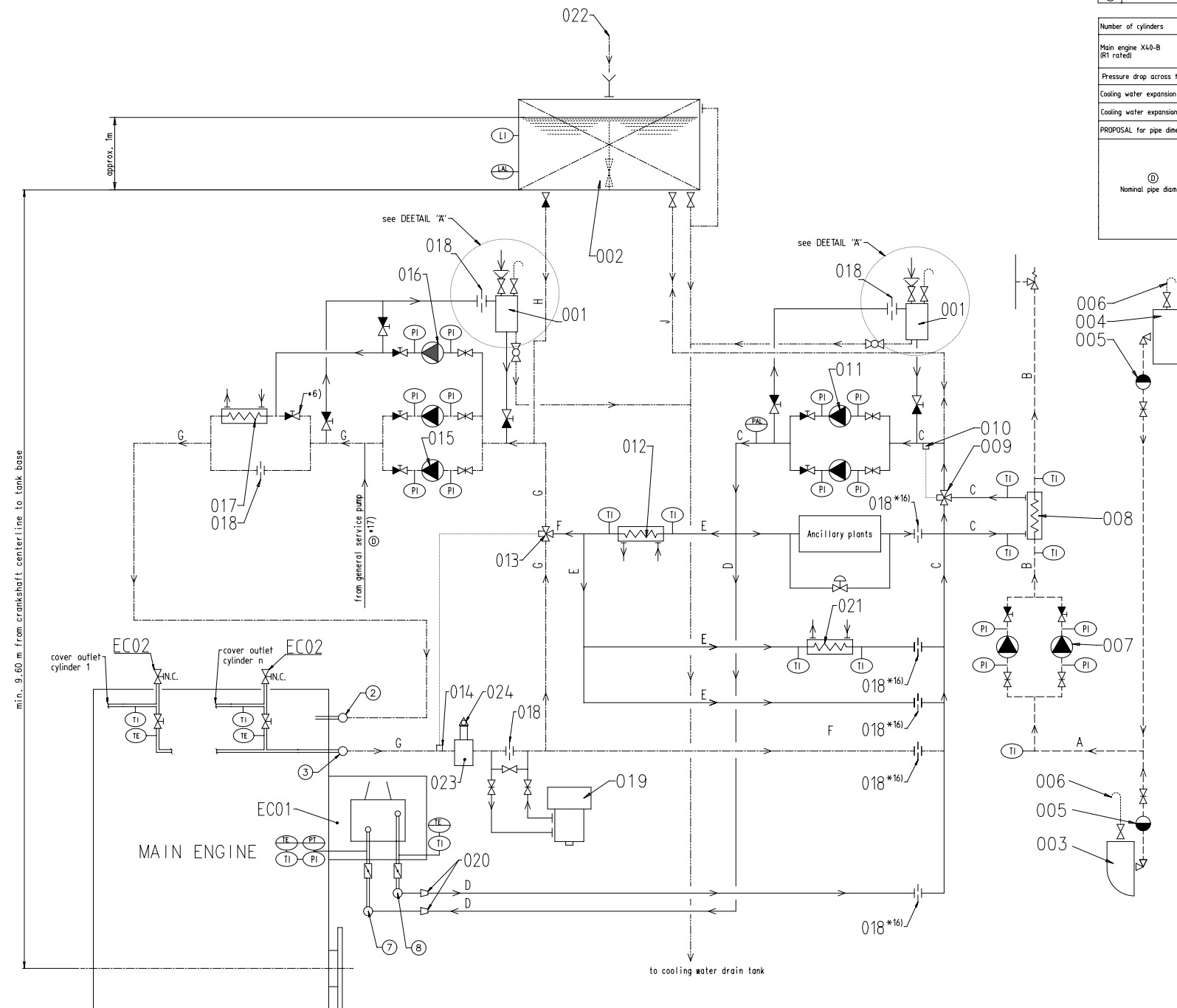
G-Code XXXXX		Main Drw.
Standard ISO: JIS		
Model	Free space for all	
Number	Drawn date	Number
① EAAD085793 01.06.2015	② EAAD086766 15.09.2016	③ EAAD089971 25.11.2018
④ EAAD092431 07.09.2020		
Product 5-BX40-B		
CENTRAL COOLING WATER SYSTEM		
HT static-pressure: EXP tank		
HT/LT circuit: SEPARATED		
Units mm kg NX	Basic Material	Net Weight 0,001
Made 08.09.2011	Imux02 L.Müller	Scale -
Size A1	Page 2/2	Material PAAD060179
Chid 04.10.2011	war001 Wroblewski	Design Group
Appd 04.10.2011	ds009 Strödelcke	9721
DAAD020442		
Rev. D		

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



SYSTEM PROPOSAL

min. 9,60 m from crankshaft centerline to tank base



Pos.	ENGINE COMPONENTS *3
EC01	Scavenge air cooler (SAC)
EC02	Manual vent valve, each cylinder *15

Pos.	ENGINE CONNECTIONS *2
②	INLET - Cylinder cooling water (HT water)
③	OUTLET - Cylinder cooling water (HT water)
⑦	INLET - Scavenge air cooler (SAC) cooling water (LT water) *7
⑧	OUTLET - Scavenge air cooler (SAC) cooling water (LT water) *7

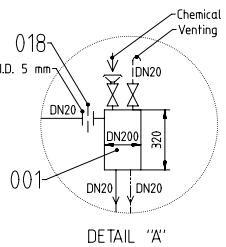
Number of cylinders		5	6	7	8	
Main engine X40-B (RT rated)	power (kW)	5675	6810	7945	9080	
	speed (rpm)	146				
Pressure drop across the engine		1.3				
Cooling water expansion tank (HT)	Cap. (m³)	Recommended: 0.5 m³ min. 10% of HT cooling water				
Cooling water expansion tank (LT)	Cap. (m³)	Depending on ancillary plant min. 10% of LT cooling water				
PROPOSAL for pipe dimensioning *11)						
① Nominal pipe diameter	A	DN	Yard determination, suitable for main engine and ancillary plants			
	B	DN				
	C	DN				
	D	DN	150	150	150	150
	E	DN	100	100	100	100
	F	DN	65	80	80	80
	G	DN	100	100	100	125
	H	DN	80	80	100	100
	I	DN	65	80	80	100
	J	DN	65	80	80	100

Table 1: Water content on engine side			
Cylinder	HT circuit Cyl. C.W. Volume (l)	LT circuit SAC Volume (l)	
5	160 l	190 l	
6	190 l	190 l	
7	220 l	220 l	
8	250 l	220 l	

Pos.	SYSTEM COMPONENTS *1
001	Chemical treatment refill unit *4
002	HT / LT water expansion tank (link to detail drawing on page 1)
003	Low sea chest
004	High sea chest
005	Seawater strainer
006	Air vent (air vent pipe or equal venting system acc. to shipyard's design)
007	Seawater circulating pump
008	Central cooler (LT cooling water)
009	Automatic temperature control valve for LT circuit *13
010	LT water temperature sensor *13
011	Cooling water pump for LT circuit
012	Lubricating oil cooler
013	Automatic temperature control valve for HT circuit *14
014	HT water temperature sensor *14
015	Cylinder cooling water pump for HT circuit
016	Pre-heating circulating pump (optional, cap. 10% from cylinder cooling pump *8)
017	Heater for main engine (HT circuit)
018	Throttling disc *5
019	Freshwater generator
020	Transition piece (adapter) *9
021	MDG/MSD cooler
022	Filling pipe / inlet chemical treatment
023	Air separator (link to details drawing on page 1)
024	Automatic venting unit

Remarks:

- *1 Air vent and drain pipes not shown on drawing. Shall be installed where required.
- *2 Refer to the "Pipe Connection Plan" for the execution and location of the engine pipe connection.
- *3 To be delivered by the engine manufacturer, i.e. already equipped on engine side.
- *4 To be installed for cooling water after-treatment during regular engine operation. Convenient dimensions are provided in view "A". Other designs are possible.
- *5 When using a valve, lock in proper position to avoid mishandling.
- *6 Only when pos. 016 is installed.
- *7 The inlet and outlet pipes to SAC must be designed to allow engine thermal expansion, or be fitted with expansion pieces.
- *8 For guidance only, final layout according to actual engine pre-heating requirements.
- *9 Installed as required (check with "Pipe Connection Plan").
- *10 All 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 D09730 "Fluid velocities and flow rates, recommended values for pipework of diesel plants" for selecting the appropriate pipe diameter. Rating specific flow rates are provided by GTD.
- *13 A constant temperature of engine inlet must be maintained. Temperature set-point can be selected between 10 - 36 °C. WinGD recommends a set-point of 25 °C. A lower LT water temperature assists the main engine to reach lower BSFC. If the ancillary plants require a temperature lower or greater than the LT water set-point, a separate water supply system with different temperature set-point has to be installed (please refer to the system proposal in MP).
- *14 A constant temperature at engine outlet must be maintained. Required controller set-point for main engine operation is 90 °C.
- *15 Only to be used for manual venting of isolated cylinders after maintenance. To be kept close during engine operation.
- *16 Optional, only to be installed if needed for hydraulic balancing.
- *17 Optional connection, to be installed if requested by class rules for emergency engine cooling.



- Seawater pipes ---
- LT freshwater pipes ---
- HT freshwater pipes ---
- Balance pipes ---
- Ancillary equipment pipes ---
- Drain/overflow pipes ---
- Air vent pipes ---
- Control/feed back - - - - -
- Pipes on Engine =
- Pipe connections ○

WINGD

Wärtsilä

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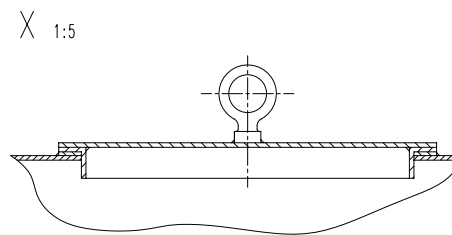
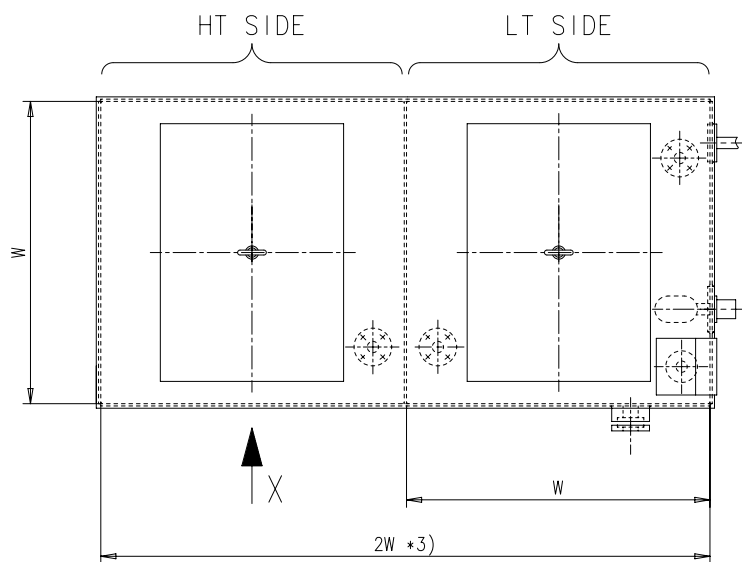
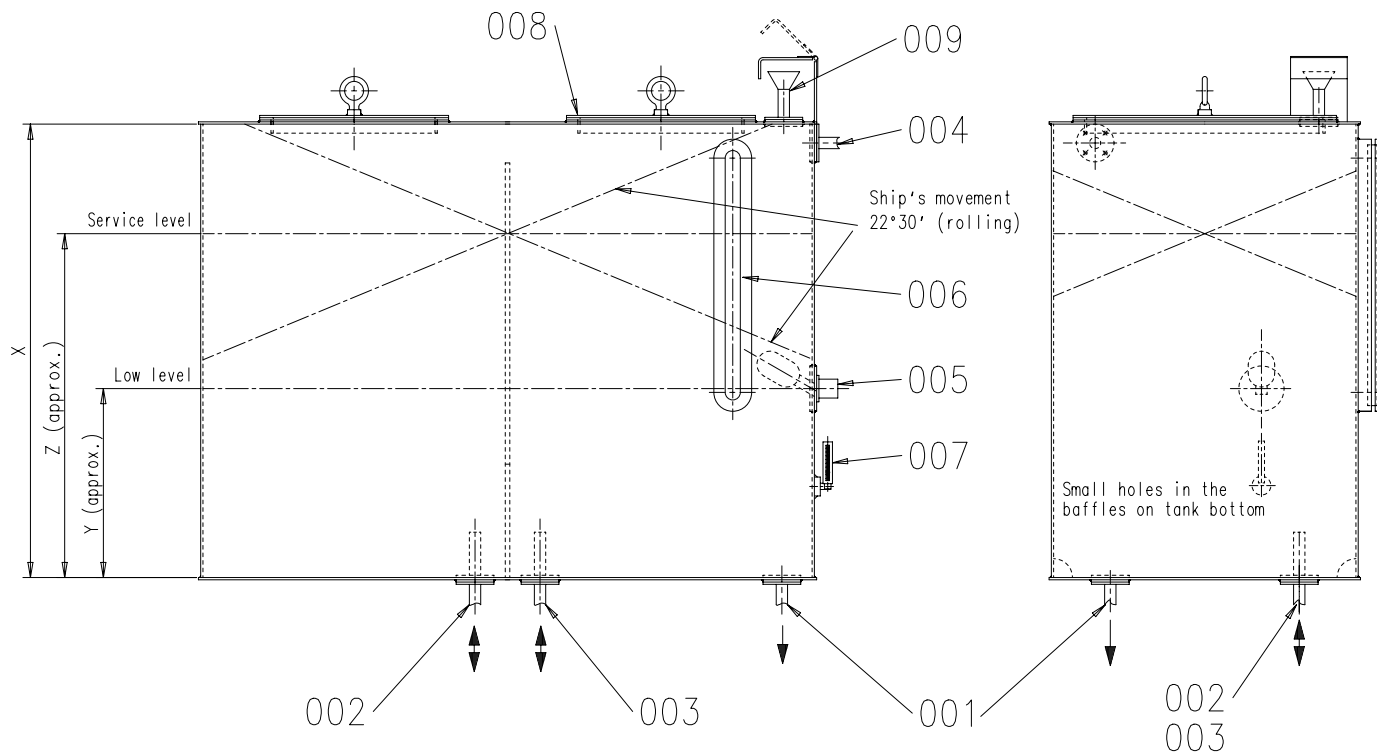
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Drawn for 1.5 m³ capacity

Pos.	Description
001	Drain
002	Balance pipe from HT circuit
003	Balance pipe from LT circuit
004	Overflow/air vent
005	Low level alarm
006	Level indicator *1)
007	Thermometer
008	Inspection cover *2)
009	Filling pipe/inlet chemical treatment *2)

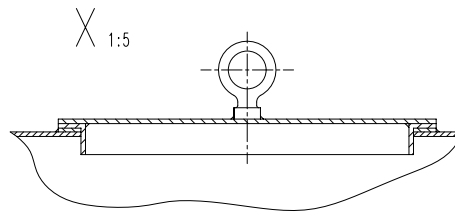
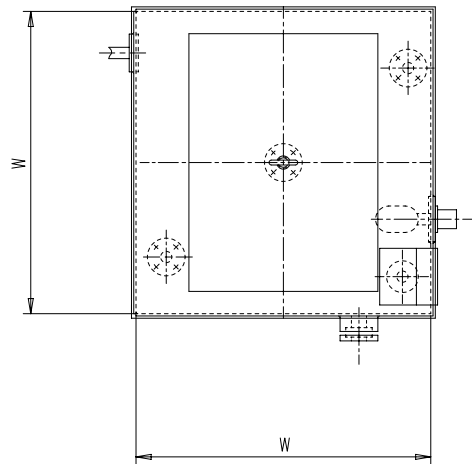
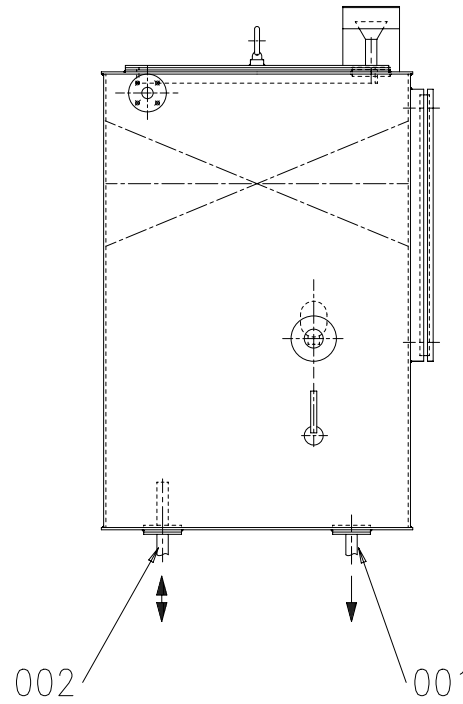
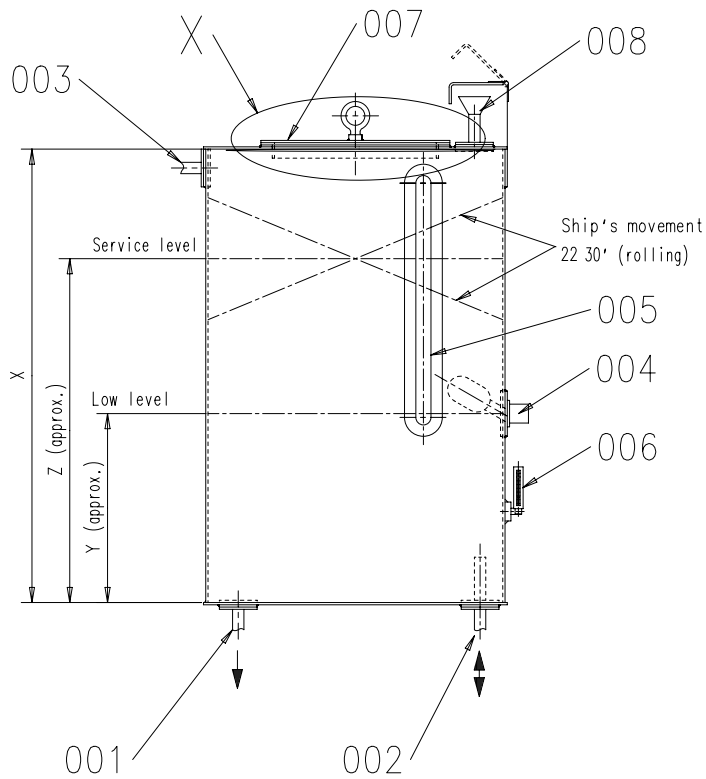
Remarks:

- *1) Level indicator can be omitted if an alternative is fitted.
- *2) Other designs like hinged covers, etc. are also possible
- *3) Depending on actual ancillary plants, LT tank capacity to be increased accordingly
- For required tank capacity and pipe diameters refer to drawing 'Central cooling water system'

Table 1: Tank dimensions

Total capacity *3)	W	X	Y	Z
(m ³)	(mm)	(mm)	(mm)	(mm)
1.0	800	800	330	640
1.5	800	1200	500	960
2.0	800	1600	670	1280
2.5	1000	1250	530	1000
3.0	1000	1500	630	1200
3.5	1000	1750	730	1400
4.0	1000	2000	830	1600

Free space for file	Q-Code XXXXX				Main Drw.				
	Standard ISO: JIS								
Modif.	A	EAAD095237	29.10.2020						
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date	
Product		W-25		EXPANSION TANK		Ausgleichstank			
Units		mm kg	NX	Basic Material		Net Weight 0,001			
SURFACE PROTECTION SEE GROUP 0344		Made	16.04.2009	M. PRSTEC	Scale	-	Size	A2	Page 1/1
TOLERANCING PRINCIPLE ISO8015		Chkd			Design Group		Material ID	107.413.098.500	Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd	30.04.2009	MPR002	7921	Drawing ID		107.413.098	



drawing view shows dimensioning scale for 0.75 m³ capacity

Pos.	Description
001	Drain from HT circuit
002	Balance pipe from HT circuit
003	Overflow/air vent
004	Low level alarm
005	Level indicator *1)
006	Thermometer
007	Inspection cover *2)
008	Filling pipe/inlet chemical treatment *2)

Remarks:

- *1) Level indicator can be omitted if an alternative is fitted.
- *2) Other designs like hinged covers, etc. are also possible

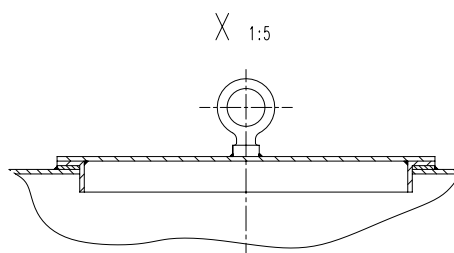
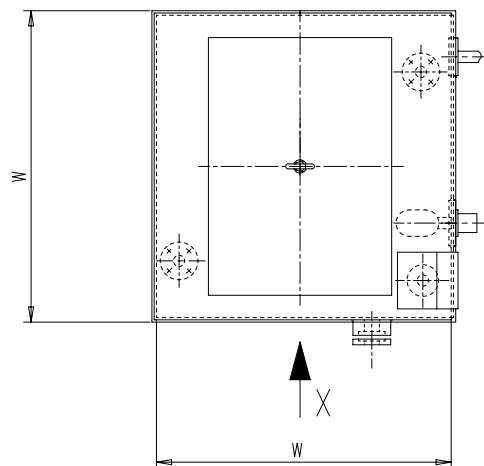
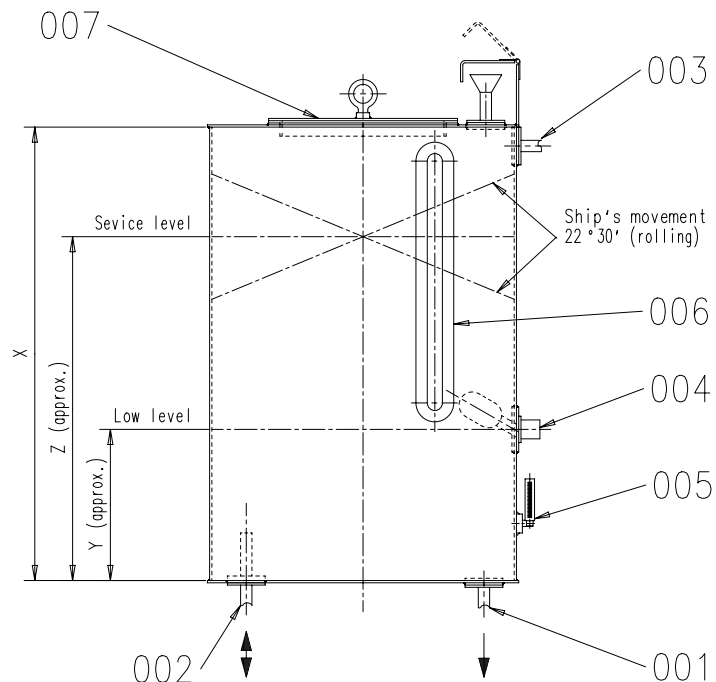
- Ⓐ - Tank dimensions are defined by the Tank capacity, as seen in Table 1.
For capacity and pipe diameter, refer to drawing 'Central cooling water system'.

Table 1: Tank dimensions

HT Tank capacity	W	X	Y	Z
(m ³)	(mm)	(mm)	(mm)	(mm)
0.5	800	800	330	640
0.75	800	1200	500	960
1.0	800	1600	670	1280
1.25	1000	1250	530	1000
1.5	1000	1500	630	1200
1.75	1000	1750	730	1400
2.0	1000	2000	830	1600

Modif.	A	EAAD091567	15.11.2019	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date	Q-Code XXXXXX Standard ISO; JIS	Main Drw.

WIN GD Winterthur Gas & Diesel		Product W-25	EXPANSION TANK CENTRAL COOLING WATER HT CIRCUIT Ausgleichstank Zentralkuehlwassersystem HT circuit	
Units	mm kg	NX	Basic Material	Net Weight 0,001
Surface protection	SEE GROUP 0344	Made	16.04.2009 M.PRSTEC	Scale 1:10
Tolerancing principle	ISO8015	Chkd		Size A2
General tolerances	ACCORDING TO ISO2768-mK	Appd	30.04.2009 MPR002 Prstec	Page 1/1
			7921	Material ID 107.413.097.500
				Drawing ID 107.413.097
				Rev. A



Drawn for 0.75 m³ capacity

Pos.	Description
001	Drain
002	Balance pipe from LT circuit
003	Overflow/air vent
004	Low level alarm
005	Thermometer
006	Level indicator *1)
007	Inspection cover *2)
008	Filling pipe/inlet chemical treatment *2)

Remarks:

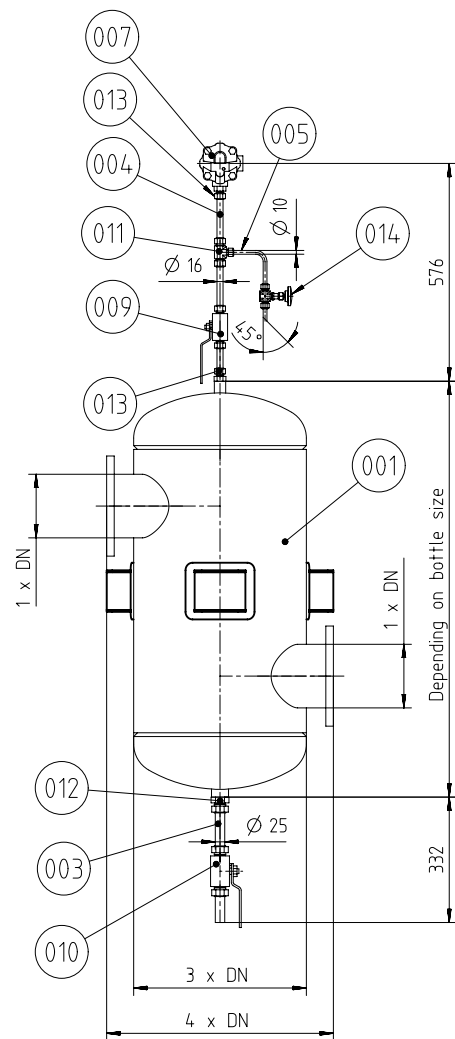
- *1) Level indicator can be omitted if an alternative is fitted.
- *2) Other designs like hinged covers, etc. are also possible

- For required tank capacity and pipe diameters refer to drawing 'Central cooling water system'

Table 1: Tank dimensions

LT tank capacity	W	X	Y	Z
(m ³)	(mm)	(mm)	(mm)	(mm)
0.5	800	800	330	640
0.75	800	1200	500	960
1.0	800	1600	670	1280
1.25	1000	1250	530	1000
1.5	1000	1500	630	1200
1.75	1000	1750	730	1400
2.0	1000	2000	830	1600

Modif.	Free space for lic.						Q-Code XXXXXX Standard ISO; JIS	Main Drw.			
	A	EAAD014356	16.06.1997	B	7-37.090	16.08.2007	C	EAAD083145	25.01.2012	D	EAAD091029
Number		Drawn date		Number		Drawn date		Number		Drawn date	
								Product W-25		EXPANSION TANK CENTRAL COOLING WATER LT CIRCUIT Ausgleichstank Zentralkuehlwassersystem LT	
Units		mm kg		NX		Basic Material		Net Weight		0,001	
SURFACE PROTECTION SEE GROUP 0344		Made		11.06.1997		T.LANDERT		Scale		1:10	
TOLERANCING PRINCIPLE ISO8015		Chkd						Size		A2	
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd		11.06.1997		WCH001 Service User		Design Group		9721	
		Drawing ID						Material ID		107.245.419.500	
		Rev.						Drawing ID		107.245.419	



PIPE LENGTHS TO BE DECIDED BY SHIPYARD

1	014	107.324.704.001	NEEDLE VALVE DN7	107.324.704	Steel	0,438
2	013	107.324.101.017	SCREW-IN UNION DN12xG1/2	107.324.101	Steel	0,125
1	012	107.324.101.021	SCREW-IN UNION DN20xG1	107.324.101	Steel	0,329
1	011	107.324.131.007	TEE UNION DN12 x DN7	107.324.131	Steel	0,25
1	010	107.324.703.005	BALL VALVE DN20	107.324.703	Steel	1,24
1	009	107.324.703.003	BALL VALVE DN12	107.324.703	Steel	
1	007	PAAD185947	AUTOMATIC VENTING UNIT Rp1/2	DAAD065150		2,5
1m	005	005.405.131.043	PIPE DN7 / 10 x 1.5		W-FU-235-N-T	0,31
1m	004	005.405.131.087	PIPE DN12 / 16 x 2		W-FU-235-N-T	0,69
0,25m	003	005.405.131.131	PIPE DN20 / 25 x 2		W-FU-235-N-T	1,13
1	001	PAAD297112	AIR SEPARATOR	DAAD101890		139

QTY	SEQ NO	Material ID	Material Name	Dimension, Occ	Standard or Drawing	Basic Material Material Standard	Weight GR./NET
						Q-Code XXXXXX Standard ISO; JIS	Main Drw.
Modif.	A	EAAD090871	26.09.2019	B	EAAD096344	10.03.2021	
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number

WIN GD Winterthur Gas & Diesel		Product W-25		AIR SEPARATOR	
		Units mm kg NX		Basic Material	
Made	06.06.2018	Kashyap Patel	Scale	1:10	Size A2
Chkd	17.07.2018	www008 Wang	Design Group	1/1	Material ID PAAD297120
Appd	17.07.2018	mhu019 Hug	9721	Drawing ID DAAD101945	Rev. B

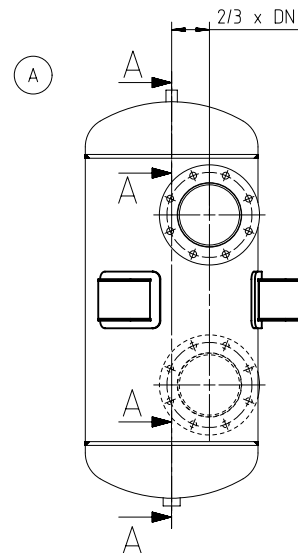
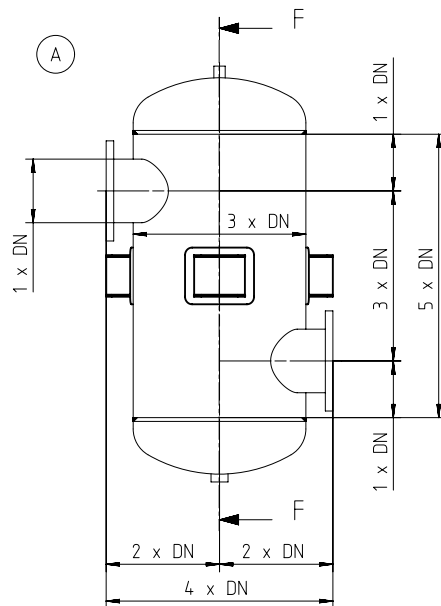
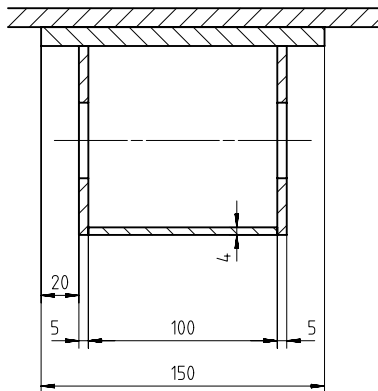
SURFACE PROTECTION SEE GROUP 0344

TOLERANCING PRINCIPLE ISO8015

Rohrklasse PIPE CLASS	III MEDIUM	Wasser WATER	Pruefueberdruck TEST OVERPRESSURE	7.5 bar
Schweiss Qualitaet WELDING QUALITY LEVEL	D	Toleranzklasse TOLERANCE GRADE	B	Befr.druck OPER. PRESS.
				5 bar

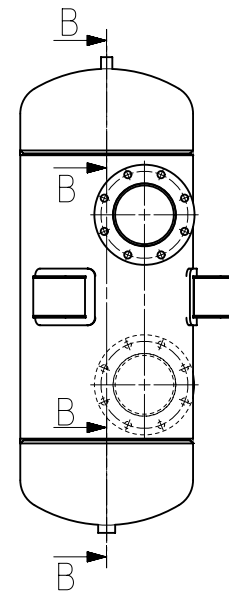
AIR SEPARATOR PROPOSAL

SECTION H-H
SCALE 1:2



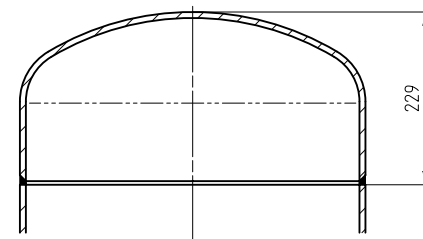
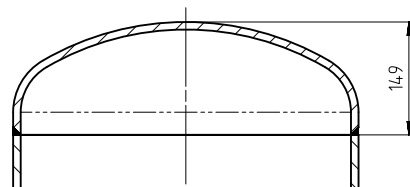
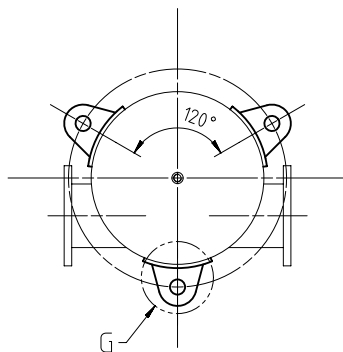
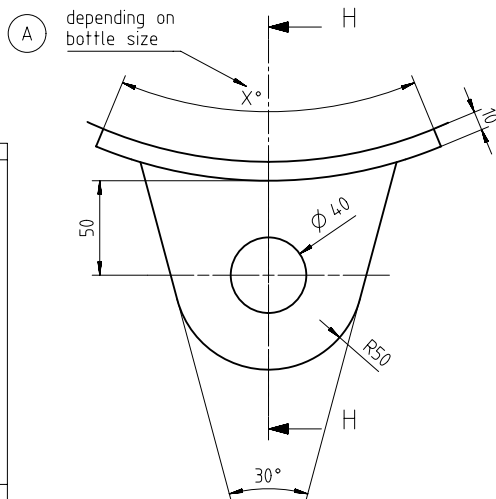
SECTION A-A
SCALE 1:5

JIS

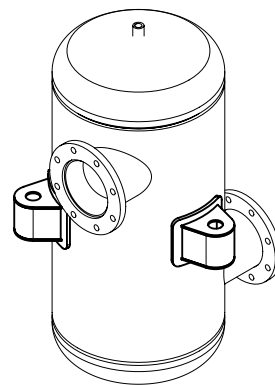


SECTION B-B
SCALE 1:5

DETAIL G
SCALE 1:2



Qualitätsstufe D (siehe 4-107.345.444)
WELD QUALITY LEVEL D (SEE 4-107.345.444)



Free space for file		Q-Code XXXXX		Main Drw.	
Modif. A		EAAD090871		09.09.2019	
Number		Drawn date		Number	
Drawn date		Number		Drawn date	
Number		Drawn date		Number	
Drawn date		Number		Drawn date	
Product W-2S		AIR SEPARATOR		Net Weight 0.001	
Units mm kg NX		Basic Material		Material PAAD297112	
Made 05.06.2018 Kashyap patel		Scale 1:10		Size A2	
Chkd 17.07.2018 wwa008 Wang		Design Group		Page 1/1	
Appd 17.07.2018 mhu019 Hug		Drawing ID DAAD101890		Rev. A	

SURFACE PROTECTION SEE GROUP 0344

TOLERANCING PRINCIPLE ISO8015

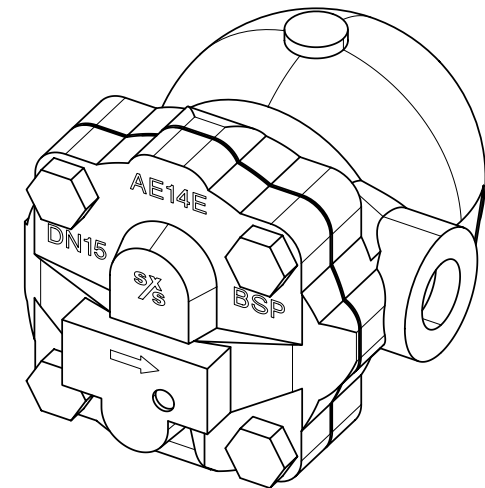
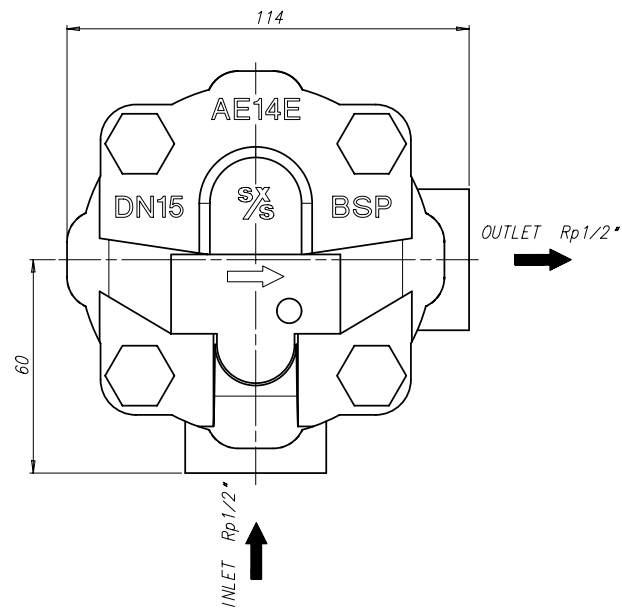
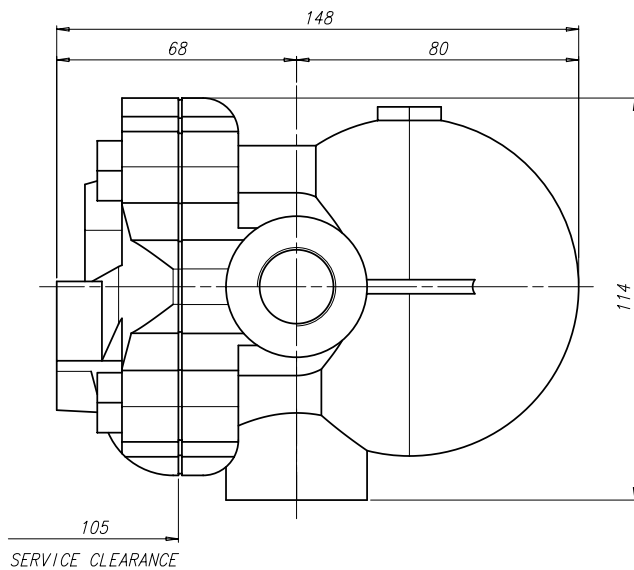
Rohrklasse	III	Medium	Wasser	Pruefueberdruck	7.5	bar
PIPE CLASS	III	MEDIUM	WATER	TEST OVERPRESSURE	7.5	bar
Schweiss Qualitaet	D	Toleranzklasse	B	Betr.druck	5	bar
WELDING QUALITY LEVEL	D	TOLERANCE GRADE	B	OPER. PRESS.	5	bar

ISO 150

ISO 150

TOL.	DIMENSION NO.	1	2	3	4	5	6
GRADE	1	2	3	4	5	6	
A	±1.0	*	±2.0	±2.0	±0.5	±0.5	
B	±3.0	*	±3.0	±2.0	±0.5	±0.5	
C	±6.0	*	±3.0	±2.0	±0.5	±0.5	
A	±2.0	*	±2.0	±2.0	±1.0	±1.0	
B	±4.0	*	±3.0	±3.0	±1.0	±1.0	
C	±6.0	*	±3.0	±3.0	±1.0	±1.0	

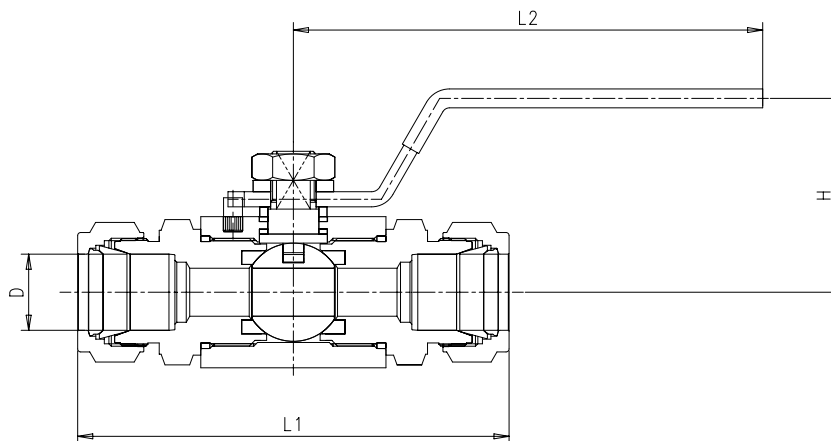
* for these tolerances see chapter 22 of the piping instruction 4-107.354.915



SUPPLIER:
SPIRAX SARCO AG
www.SpiraxSarco.com

SPECIFICATIONS:
AUTOMATIC AIR VENT SPIRAX SARCO TYPE AE14E, PN16, SIZE Rp1/2"
PRESSURE LEVEL : PN16
MAX. OPERATING PRESSURE (PMO): 14 bar
MAX. OPERATING TEMPERATURE (TMO): 127° C
MAX. PRESSURE DIFFERENCE: 14 bar

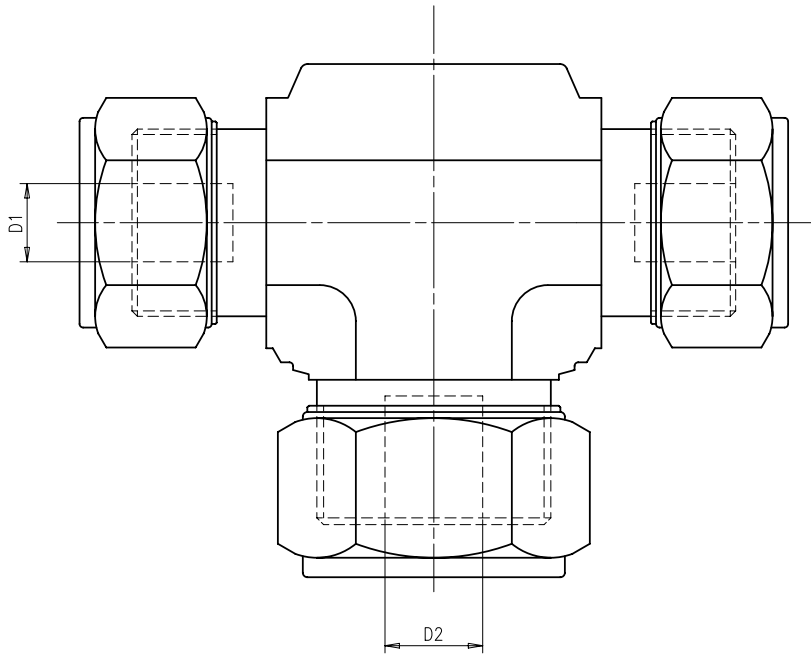
Free space for lib.		Q-Code		Main	
		XQXXX		Drw.	
		Standard		ISO	
				JIS	
Modif.	Number	Drawn date	Number	Drawn date	Number
Product		W-2S			
WIN GD		AUTOMATIC VENTING UNIT			
Winterthur Gas & Diesel		ORDER DRAWING			
		Entlüftungsautomat			
		Bestellzeichnung			
Units	mm kg	IDE	Basic Material	Net Weight 2.5	
SURFACE PROTECTION SEE GROUP 0344		Made	08.04.2015	Aditya Gole	Scale 1:1
TOLERANCING PRINCIPLE ISO8015		Chkd	27.05.2015	ast044 Stephan	Size A2
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd	27.05.2015	bha009 Haag	Page 1/1
		Design Group		8611	Material ID PAAD185947
		Drawing ID		DAAD065150	Rev. -



Artikel Nummer	DN	TUBE D	L1	L2	H	MAX. WORKING PRESSURE	OPERATING TEMPERATURE (°C)	Seat Material
107.324.703.001	DN07	10	104.91	108.75	38.41	6000 (413bar)	-30 to +180	PCTFE
107.324.703.002	DN09	12	109.71	108.75	38.41			
107.324.703.003	DN12	16	114.96	124.2	51.3			
107.324.703.004	DN15	20	114.16	124.2	53.1			
107.324.703.005	DN20	25	134.08	149.2	58.1			

siehe Hauptzeichnung für Spezifikation
SEE MAIN DRAWING FOR SPECIFICATION

1	005	107.324.703.005	BALL VALVE	DN20	107.324.703	Steel	1,24
1	004	107.324.703.004	BALL VALVE	DN15	107.324.703	Steel	1,03
1	003	107.324.703.003	BALL VALVE	DN12	107.324.703	Steel	0,55
1	002	107.324.703.002	BALL VALVE	DN9	107.324.703	Steel	0,511
1	001	107.324.703.001	BALL VALVE	DN7	107.324.703	Steel	0,494
QTY	SEQ NO	Material ID	Material Name	Dimension, Occ	Standard or Drawing	Basic Material Material Standard	Weight GR./NET
Modif.		Free space for lic.				Q-Code XXXXXX Standard ISO; JIS	Main Drw.
		A EAAD700077	13.04.2011	B EAAD083575	01.10.2012	C EAAD096344	12.03.2021
		Number	Drawn date	Number	Drawn date	Number	Drawn date
WIN GD Winterthur Gas & Diesel			Product W-2S		BALL VALVE		
					Kugelhahn		
Units	mm kg	NX			Basic Material	Net Weight	
SURFACE PROTECTION SEE GROUP 0344		Made	29.04.2005	sga006	S.GASSER	Scale	1:1
TOLERANCING PRINCIPLE ISO8015		Chkd	S.Gasser		Design Group	Size	A2
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd	04.05.2005	MFR001	Frei	0333	1/1
		Drawing ID		107.324.703		Material ID	Rev.
							C



Artikel Nummer	DN	TUBE D1	TUBE D2
107.324.131.001	DN07	10	6
107.324.131.002	DN09	12	8
107.324.131.003	DN09	12	10
107.324.131.004	DN09	12	16
107.324.131.005	DN12	16	6
107.324.131.006	DN12	16	8
107.324.131.007	DN12	16	10
107.324.131.008	DN12	16	12
107.324.131.009	DN12	16	20
107.324.131.010	DN15	20	10
107.324.131.011	DN15	20	12
107.324.131.012	DN15	20	16
107.324.131.013	DN15	20	25
107.324.131.014	DN20	25	16
107.324.131.015	DN20	25	20

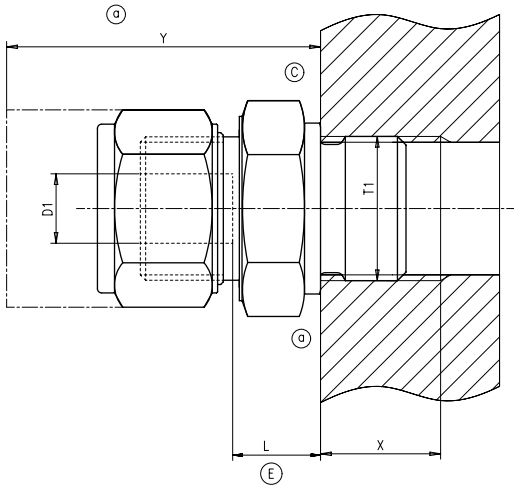
Ⓑ siehe Hauptzeichnung für Spezifikation
SEE MAIN DRAWING FOR SPECIFICATION

1	015	107.324.131.015	TEE UNION	25 x 20 x 25	107.324.131	Steel Steel	0.642
1	014	107.324.131.014	TEE UNION	25 x 16 x 25	107.324.131	Steel Steel	0.615
1	013	107.324.131.013	TEE UNION	20 x 25 x 20	107.324.131	Steel Steel	0.592
1	012	107.324.131.012	TEE UNION	20 x 16 x 20	107.324.131	Steel Steel	0.471
1	011	107.324.131.011	TEE UNION	20 x 12 x 20	107.324.131	Steel Steel	0.443
1	010	107.324.131.010	TEE UNION	20 x 10 x 20	107.324.131	Steel Steel	0.46
1	009	107.324.131.009	TEE UNION	16 x 20 x 16	107.324.131	Steel Steel	0.442
1	008	107.324.131.008	TEE UNION	16 x 12 x 16	107.324.131	Steel Steel	0.262
1	007	107.324.131.007	TEE UNION	16 x 10 x 16	107.324.131	Steel Steel	0.25
1	006	107.324.131.006	TEE UNION	16 x 8 x 16	107.324.131	Steel Steel	0.243
1	005	107.324.131.005	TEE UNION	16 x 6 x 16	107.324.131	Steel Steel	0.241
1	004	107.324.131.004	TEE UNION	12 x 16 x 12	107.324.131	Steel Steel	0.271
1	003	107.324.131.003	TEE UNION	12 x 10 x 12	107.324.131	Steel Steel	0.195
1	002	107.324.131.002	TEE UNION	12 x 8 x 12	107.324.131	Steel Steel	0.19
1	001	107.324.131.001	TEE UNION	10 x 6 x 10	107.324.131	Steel Steel	0.127

QTY	SEQ NO	Material ID	Material Name	Dimension/Occ	Dimension	Standard or Drawing	Basic Material Material Standard	Q-Code XXXXX	Weight DR /NET	Main Drw.
								Standard ISO JIS		

WIN GD Winterthur Gas & Diesel		Product W-2S	TEE UNION T-Verschraubung	
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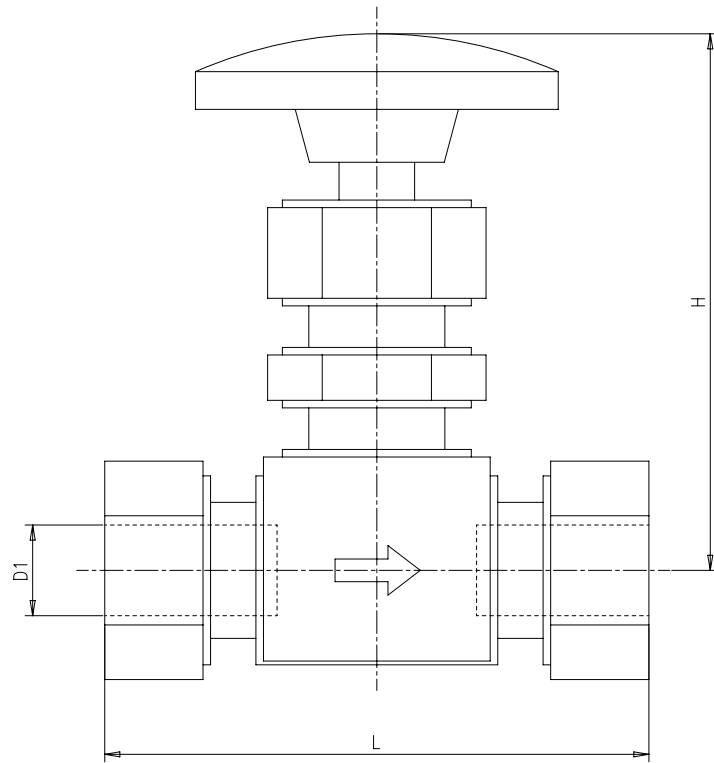
SURFACE PROTECTION SEE GROUP 0344	Made	17.12.2004 W.DOERIG	Scale	1:1	Size	A1	Page	1/1	Material ID		
TOLERANCING PRINCIPLE ISO8015	Chkd		Design Group	0333	Drawing ID	107.324.131				Rev.	B
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	28.04.2005 mfr001 Frei									



	(G)						(E)	
	Material ID	DN	TUBE D1	T1	X	Y	L	Order Number
(a)	107.324.101.001	DN04	6	G1/8	9	45	9.9	DMC 6M-2GB-C
	107.324.101.002	DN04	6	G1/4	14	50	11.1	DMC 6M-4GB-C
	107.324.101.003	DN04	6	G3/8	14	50	12.4	DMC 6M-6GB-C
	107.324.101.004	DN04	6	G1/2	17	55	15.2	DMC 6M-8GB-C
(a)	107.324.101.005	DN06	8	G1/8	9	45	9.9	DMC 8M-2GB-C
	107.324.101.006	DN06	8	G1/4	14	50	11.1	DMC 8M-4GB-C
	107.324.101.007	DN06	8	G3/8	14	50	12.4	DMC 8M-6GB-C
	107.324.101.008	DN06	8	G1/2	17	55	15.2	DMC 8M-8GB-C
(a)	107.324.101.009	DN07	10	G1/4	14	50	11	DMC 10M-4GB-C
	107.324.101.010	DN07	10	G3/8	14	50	12.2	DMC 10M-6GB-C
	107.324.101.011	DN07	10	G1/2	17	60	15.1	DMC 10M-8GB-C
	107.324.101.012	DN09	12	G1/4	14	55	8.6	DMC 12M-4GB-C
(a)	107.324.101.013	DN09	12	G3/8	14	55	9.1	DMC 12M-6GB-C
	107.324.101.014	DN09	12	G1/2	17	60	12	DMC 12M-8GB-C
	107.324.101.015	DN09	12	G3/4	19	65	14.3	DMC 12M-10GB-C
	107.324.101.016	DN12	16	G3/8	14	55	8.3	DMC 16M-6GB-C
(a)	107.324.101.017	DN12	16	G1/2	17	60	10.4	DMC 16M-8GB-C
	107.324.101.018	DN15	20	G1/2	17	65	10.3	DMC 20M-8GB-C
	107.324.101.019	DN15	20	G3/4	19	65	11.1	DMC 20M-12GB-C
	107.324.101.020	DN20	25	G3/4	19	70	10.5	DMC 25M-12GB-C
(a)	107.324.101.021	DN20	25	G1	21	70	10.5	DMC 25M-16GB-C
(b)	107.324.101.022	DN20	25	G1 1/4	23	75	12.9	DMC 25M-20GB-C
(b)	107.324.101.023	DN20	25	G1 1/2	25	80	14.5	DMC 25M-24GB-C

Drawn for Dk-Lok
Material: Steel
PN needs to meet the working
pressure of Dk-Lok products.

(D) siehe Hauptzeichnung für Spezifikation SEE MAIN DRAWING FOR SPECIFICATION									
1	023	107.324.101.023	SCREW-IN UNION	25xG1 1/2	107.324.101	Steel		0,733	
1	022	107.324.101.022	SCREW-IN UNION	25xG1 1/4	107.324.101	Steel		0,543	
1	021	107.324.101.021	SCREW-IN UNION	25xG1	107.324.101	Steel		0,329	
1	020	107.324.101.020	SCREW-IN UNION	25xG3/4	107.324.101	Steel		0,247	
1	019	107.324.101.019	SCREW-IN UNION	20xG3/4	107.324.101	Steel		0,223	
1	018	107.324.101.018	SCREW-IN UNION	20xG1/2	107.324.101	Steel		0,173	
1	017	107.324.101.017	SCREW-IN UNION	16xG1/2	107.324.101	Steel		0,125	
1	016	107.324.101.016	SCREW-IN UNION	16xG3/8	107.324.101	Steel		0,094	
1	015	107.324.101.015	SCREW-IN UNION	12xG3/4	107.324.101	Steel		0,195	
1	014	107.324.101.014	SCREW-IN UNION	12xG1/2	107.324.101	Steel		0,126	
1	013	107.324.101.013	SCREW-IN UNION	12xG3/8	107.324.101	Steel		0,084	
1	012	107.324.101.012	SCREW-IN UNION	12xG1/4	107.324.101	Steel		0,076	
1	011	107.324.101.011	SCREW-IN UNION	10xG1/2	107.324.101	Steel		0,116	
1	010	107.324.101.010	SCREW-IN UNION	10xG3/8	107.324.101	Steel		0,069	
1	009	107.324.101.009	SCREW-IN UNION	10xG1/4	107.324.101	Steel		0,056	
1	008	107.324.101.008	SCREW-IN UNION	8xG1/2	107.324.101	Steel		0,112	
1	007	107.324.101.007	SCREW-IN UNION	8xG3/8	107.324.101	Steel		0,063	
1	006	107.324.101.006	SCREW-IN UNION	8xG1/4	107.324.101	Steel		0,043	
1	005	107.324.101.005	SCREW-IN UNION	8xG1/8	107.324.101	Steel		0,031	
1	004	107.324.101.004	SCREW-IN UNION	6xG1/2	107.324.101	Steel		0,111	
1	003	107.324.101.003	SCREW-IN UNION	6xG3/8	107.324.101	Steel		0,063	
1	002	107.324.101.002	SCREW-IN UNION	6xG1/4	107.324.101	Steel		0,045	
1	001	107.324.101.001	SCREW-IN UNION	6xG1/8	107.324.101	Steel		0,028	
QTY	SEQ NO	Material ID	Material Name	Dimension, Dec	Standard or Drawing	Basic Material	Weight GRUNET	Standard	Main Drw.
						Q-Code XXXXXX		ISO: JIS	
Werkz.	7-34.170	18.07.2005	C 7-54.378	08.06.2007	D EAAD083575	01.10.2012	E EAAD099104	28.11.2019	
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date	
WINGO		Product W-25		SCREW-IN UNION					
Wingothur Gas & Diesel				Einschraubverschraubung					
Units	mm kg	NX		Basic Material	Scale	1:1	Size	A1	Page
MADE	17.12.2004	Wdo001	W.Daerig	Scale	1:1	Size	A1	1/1	Material ID
TOLERANCING PRINCIPLE	ISO8015	Design Group		0333	Drawing ID	107.324.101			Rev.
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 28.02.2005	PST007							E



siehe Hauptzeichnung für Spezifikation
SEE MAIN DRAWING FOR SPECIFICATION

Artikel Nummer	DN	TUBE D1	L	H(open)
107.324.704.001	DN07	10	66	71
107.324.704.002	DN09	12	72	71
107.324.704.003	DN12	16	94	99
107.324.704.004	DN15	20	97	99
107.324.704.005	DN20	25	97	99
107.324.704.006	DN06	8	59,2	60

1	006	107.324.704.006	NEEDLE VALVE	DN6	107.324.704	Steel	0,304		
1	005	107.324.704.005	NEEDLE VALVE	DN20	107.324.704	Steel	1,34		
1	004	107.324.704.004	NEEDLE VALVE	DN15	107.324.704	Steel	1,19		
1	003	107.324.704.003	NEEDLE VALVE	DN12	107.324.704	Steel	0,903		
1	002	107.324.704.002	NEEDLE VALVE	DN9	107.324.704	Steel	0,495		
1	001	107.324.704.001	NEEDLE VALVE	DN7	107.324.704	Steel	0,438		
QTY	SEQ NO	Material ID	Material Name	Dimension, Occ	Standard or Drawing	Basic Material Material Standard	Weight GR./NET		
Free space for file						Q-Code	Main Drw.		
						XXXXXX			
						Standard ISO; JIS			
Modif.	(B) 7-61981	12.03.2008	(C) EAAD700013	19.01.2011	(D) EAAD083575	01.10.2012	(E) EAAD096344	12.03.2021	
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date	
 Winterthur Gas & Diesel			Product W-2S		NEEDLE VALVE				
					Nadelventil				
Units	mm kg	NX				Basic Material		Net Weight	
Made	19.05.2005	sga006	S.GASSER		Scale	2:1			
Chkd					Size	A2	Page	1/1	
					Material ID				
Appd	19.05.2005	MFR001 Frei		Design Group					
mK					0333	Drawing ID	107.324.704		Rev. E

MIDS - WinGD X40-B - Cooling Water System (DG9721)

TRACK CHANGES

DATE	SUBJECT	DESCRIPTION
2017-02-20	DRAWING SET	First web upload
2018-12-12	DAAD020444 DAAD020442 DAAD020443	Main and system drgs. – new revision
2020-09-02	107.245.419 107.413.097	System drgs – new revision
2020-10-05	DAAD020444 DAAD020442 DAAD020443 DAAD132911 DAAD101945 107.245.626 DAAD101890 DAAD065150 107.324.131 107.324.101 107.324.703	Main and system drgs – new revision
2021-02-24	107.324.101 107.413.098	System drgs – new revision
2021-03-30	DAAD101945 107.324.703 107.324.704	System drgs – new revision

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