



Ⓐ

PAAD361000	HT CW static pressure adjustment: with separate buffer-unit
PAAD332801	HT CW static pressure adjustment: with separate expansion tank

SEE TABLE

Net Weight													
0,001	0,001												
1	1	003	107.429.532.500	CONCEPT GUIDANCE Freshwater generation				107.429.532		0,001			
1	-	002	PAAD360765	CENTRAL COOLING WATER SYSTEM HT_static-pressure: Buffer-unit				DAAD132980		0,001			
-	1	001	PAAD332800	CENTRAL COOLING WATER SYSTEM HT_static-pressure: EXP tank				DAAD118517		0,001			
Quantity PER ENGINE		SEQ NO	Material ID		Material Name Dimension, Occ			Standard or Drawing		Basic Material Material Standard		Weight GR./NET	
PAAD361000	PAAD332801	Free space for lic.										Q-Code XXXXXX	Main Drw.
												Standard ISO; JIS	H
Material ID	Modif.	A	EAAD092431	20.07.2020									
		Number	Drawn date		Number	Drawn date		Number	Drawn date		Number	Drawn date	
			 Winterthur Gas & Diesel		Product W5-8X40DF		COOLING WATER SYSTEMS INSTALLATION DRAWINGS Kuehlwassersystem						
Units		mm kg	NX				Basic Material					Net Weight	
344	Made	05.07.2019 Sudant Deogade			Scale -		Size A3	Page 1/1	Material ID				
	Chkd	06.09.2019 cku010 Claudio			Design Group		9721						
0 ISO2768-mK	Appd	06.09.2019 mhu019 Hug					Drawing ID DAAD118518					Rev. A	





# SYSTEM PROPOSAL

Pos.	ENGINE COMPONENTS *3)
EC01	Scavenge air cooler (SAC)
EC02	Manual vent valve, for each cylinder *15)
EC03	Air separator
EC04	Automatic venting unit

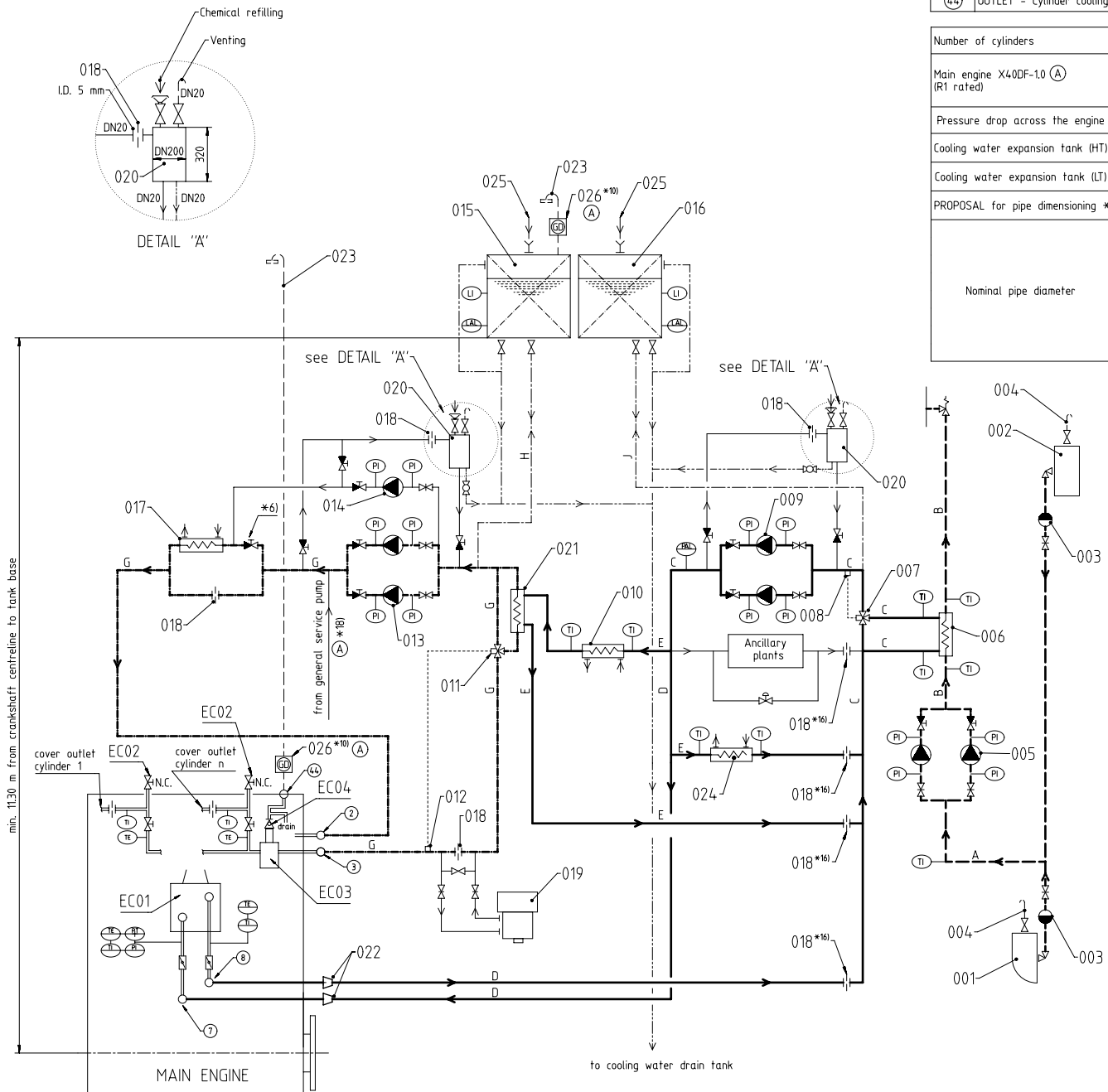
Pos.	ENGINE CONNECTIONS *2) (A)
②	INLET - Cylinder cooling water (HT water)
③	OUTLET - Cylinder cooling water (HT water)
⑦	INLET - Scavenge air cooler (SAC) cooling water (LT water) *7)
⑧	OUTLET - Scavenge air cooler (SAC) cooling water (LT water) *7)
④④	OUTLET - Cylinder cooling water air venting *10)

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) (A)
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	HT water expansion tank (link to detail drawing on page 1) *17) (A)
016	LT water expansion tank (link to detail drawing on page 1) *17) (A)
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	Cylinder cooling water air venting line *10)
024	MDO/MGO cooler
025	Filling pipe / inlet chemical treatment
026	Gas detector *10) (A)

Number of cylinders		5	6	7	8	
Main engine X40DF-1.0 (A) (R1 rated)	power (kW)	4675	5610	6545	7480	
	speed (rpm)	146				
Pressure drop across the engine		(bar) 1.3				
Cooling water expansion tank (HT)	Cap. (m³)	Depending on ancillary plants min. 10% of HT cooling water				
Cooling water expansion tank (LT)	Cap. (m³)	Depending on ancillary plants min. 10% of LT cooling water				
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	200	200	200	200
	E	DN	100	100	100	100
	G	DN	100	100	100	125
	H	DN	40	40	40	40
	J	DN	40	40	40	40

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 ○

**Remarks: (A)**

- 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) To be vented to a safe area outside of engine room. In addition, depending on flag state and/or class requirement, the venting line may also be equipped with a gas detector in order to achieve IGC compliance.
- \*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 D9730 "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 (SAC) inlet must be maintained. Recommended controller set-point for main engine operation is 25 °C. 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 NMI).
- \*14) A constant temperature at engine outlet must be maintained. Recommended 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) 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.
- \*18) Optional connection. To be installed if requested by class rules for emergency engine cooling.

Model: A		EAD09243119.02.2020		Number		Drawn date		Number		Drawn date		Number		Drawn date		Number		Drawn date	
Units		mm kg		NX		Basic Material		Scale		-		Size		A1		Page		2/2	
Made		04.07.2019		Sudant		Deagode		Scale		-		Size		A1		Page		2/2	
Chd		06.09.2019		cku010		Claudio		Design Group		9721		Drawing ID		DAAD118517		Rev.		A	
Appd		06.09.2019		mhu019		Hug		Design Group		9721		Drawing ID		DAAD118517		Rev.		A	

Product: 5-BX40DF-1.0

CENTRAL COOLING WATER SYSTEM

HT\_static-pressure: EXP tank

WINGD Waterpower Gas & Diesel

Net Weight 0,001

PAAD332800

DAAD118517

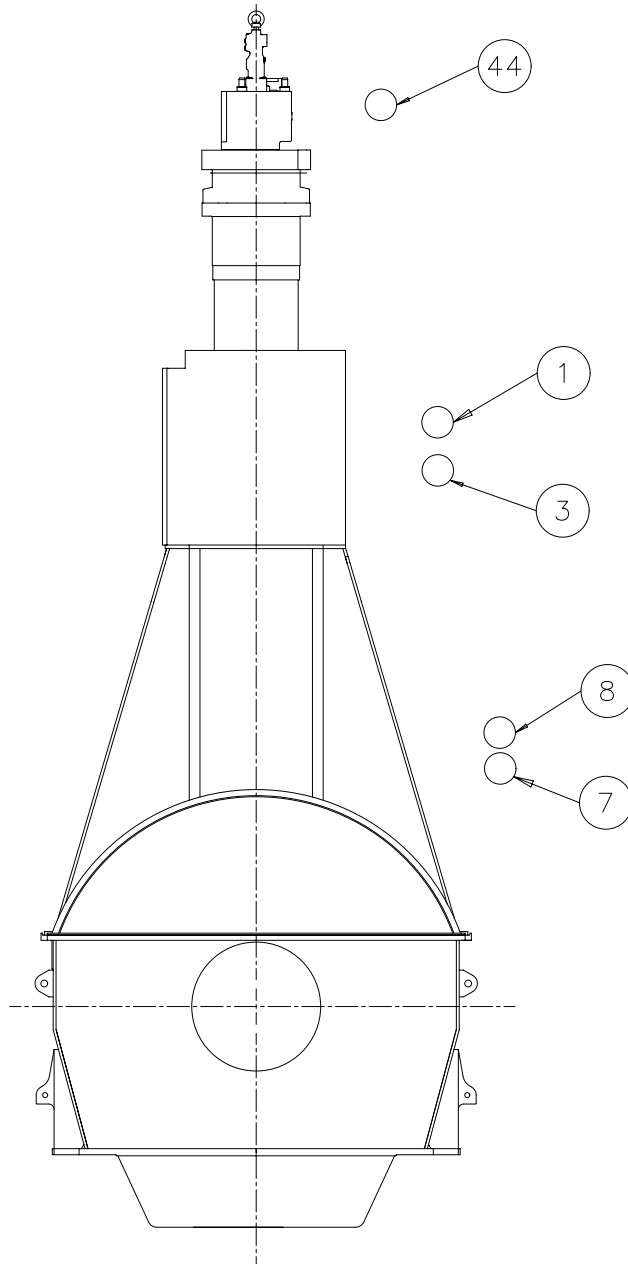
Rev. A

min. 1130 m from crankshaft centreline to tank base

X40DF-1.0

DRIVING END


FUEL SIDE



EXHAUST SIDE

## Specifications which must be met:

1	INLET - Cylinder cooling water (HT water) <ul style="list-style-type: none"><li>- Cooling water pressure: 3.0 - 5.0 bar</li><li>- Cooling water volume flow: according to GTD specification</li><li>- Cooling water (freshwater) must be treated according to WinGD's specification.</li><li>- Pre-heating: The engine must be warmed-up by means of heated HT water to min. 60°C before engine start.</li><li>- HT cooling water amount on engine side: Given in table1 on page 2</li></ul>
3	OUTLET - Cylinder cooling water (HT water) <ul style="list-style-type: none"><li>- Cooling water temperature</li><li>- Controller set-point: 90 °C (controller type: PI)</li><li>- Steady state condition: 90 ± 2 °C</li><li>- Transient condition: 90 ± 4 °C</li></ul>
7	INLET - Scavenge air cooler (SAC) cooling water (LT water) <ul style="list-style-type: none"><li>- Cooling water pressure: 2.0 - 4.0 bar</li><li>- Cooling water temperature set point: 25 °C, max. 36 °C when seawater temperature at 32 °C.</li><li>- Cooling water volume flow: according to GTD specification.</li><li>- Cooling water (freshwater) must be treated according to WinGD's specification.</li><li>- LT cooling water amount on engine side: Given in table1 on page 2.</li></ul>
8	OUTLET - Scavenge air cooler (SAC) cooling water (LT water) <ul style="list-style-type: none"><li>- Cooling water volume flow: according to GTD specification, adjusted by an orifice in the outlet pipe on shipside.</li></ul>
44	OUTLET - Cylinder cooling water air venting <ul style="list-style-type: none"><li>- To be vented to a safe area outside of engine room.</li></ul>

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 XXXXXX		Main Drw.
						Standard ISO; JIS		
Modif.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
<div>WIN GD Winterthur Gas &amp; Diesel</div>			Product 5-8X40DF-1.0		CENTRAL COOLING WATER SYSTEM HT_static-pressure: Buffer-unit Zentralkuehlwassersystem			
Units	mm kg	NX				Basic Material		Net Weight 0,001
Made	16.09.2020	Sudant Deogade		Scale	-	Size	A2	Page 1/2
Chkd	30.09.2020	jpi101 Pickup		Design Group	PAAD360765			
Appd	30.09.2020	mhu019 Hug		9721	Drawing ID	DAAD132980		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)
④④	OUTLET - Cylinder cooling water air venting *10)

Pos.	ENGINE COMPONENTS *3)
EC01	Scavenge air cooler
EC02	Manual vent valve, for each cylinder *16)
EC03	Air separator
EC04	Automatic venting unit

Number of cylinders	power (kW)	5	6	7	8
Main engine X40DF-10 (R1 rated)	speed (rpm)	4675	5610	6545	7480
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	B	C	D	E	F	I	J	K
	DN	DN	DN	DN	DN	DN	DN	DN	DN
	200	200	200	200	100	100	100	40	20
	200	100	100	100	100	100	40	40	20
	200	100	100	100	100	100	40	40	20
	200	100	100	100	100	100	40	40	20
	200	100	100	100	100	100	40	40	20
	200	100	100	100	100	100	40	40	20
	200	100	100	100	100	100	40	40	20
	200	100	100	100	100	100	40	40	20
	200	100	100	100	100	100	40	40	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	Temperature sensor of regulating system *13)
009	Cooling water pump for LT circuit
010	Lubricating oil cooler
011	Automatic temperature control valve for HT circuit *14)
012	Temperature sensor of regulating system *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) *17)
021	LT water expansion tank (link to detail drawing on page 1) *20)
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	Gas detector *10)

- Remarks:**
- 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) To be vented to a safe area outside of engine room. In addition, depending on flag state and/or class requirement, the venting line may also be equipped with a gas detector in order to achieve IGC compliance.
  - \*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 (SAC) inlet must be maintained. Required controller set-point for main engine operations is 25 °C. 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 M/M).
  - \*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) If instead of the buffer unit an expansion tank of enclosed type is installed it must be located at min. 23 m above the crankshaft centerline.
  - \*18) Optional, only to be installed if needed for hydraulic balancing.
  - \*19) Optional filling line to enable fast system re-filling (e.g. after complete system drainage) by means of the pre-heating pumps.
  - \*20) 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.

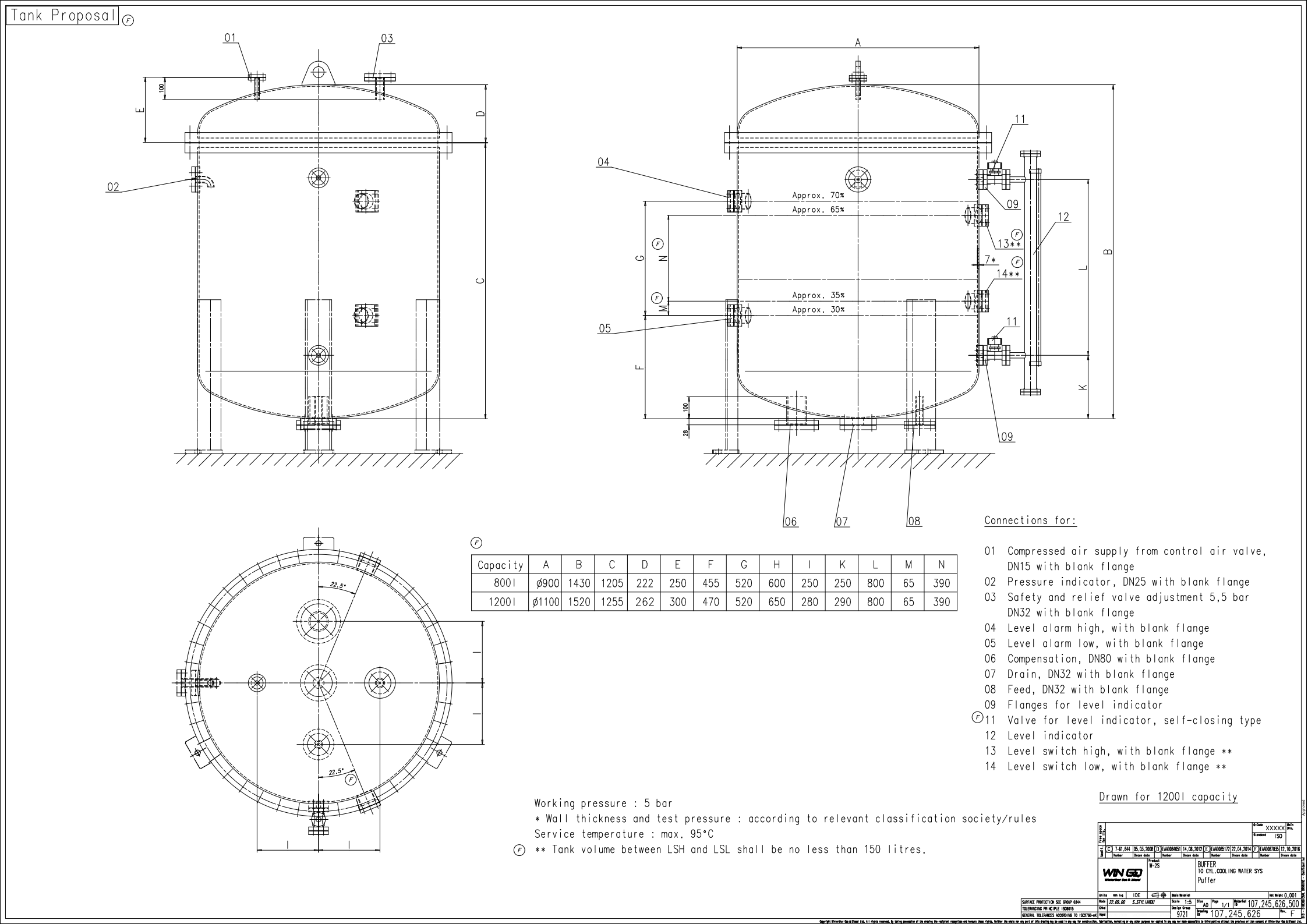
Table 1: Water content on engine side

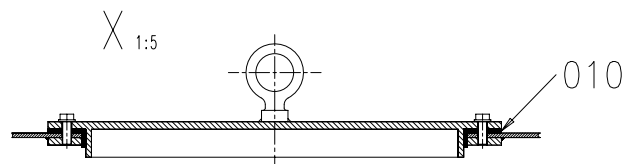
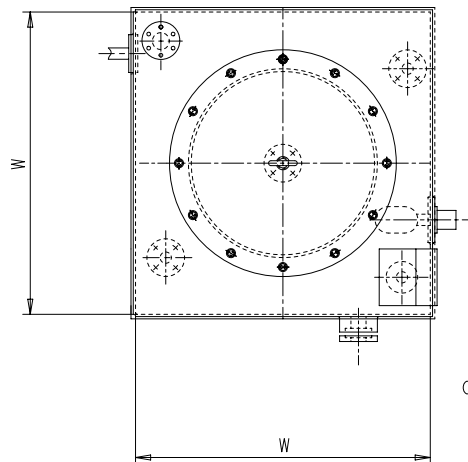
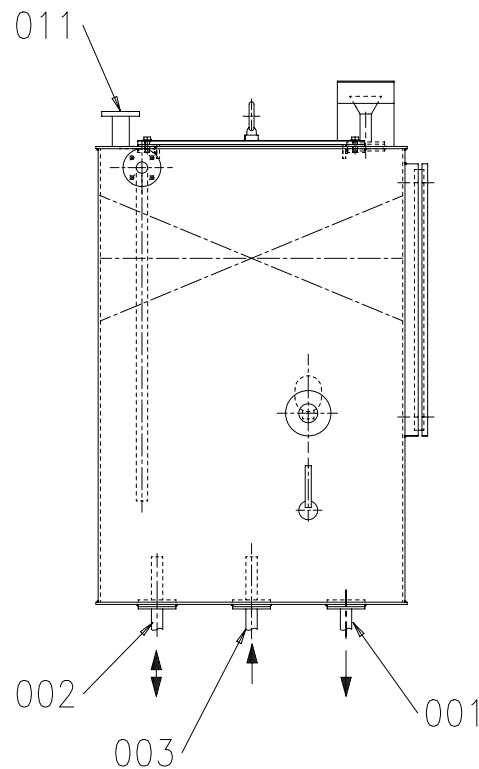
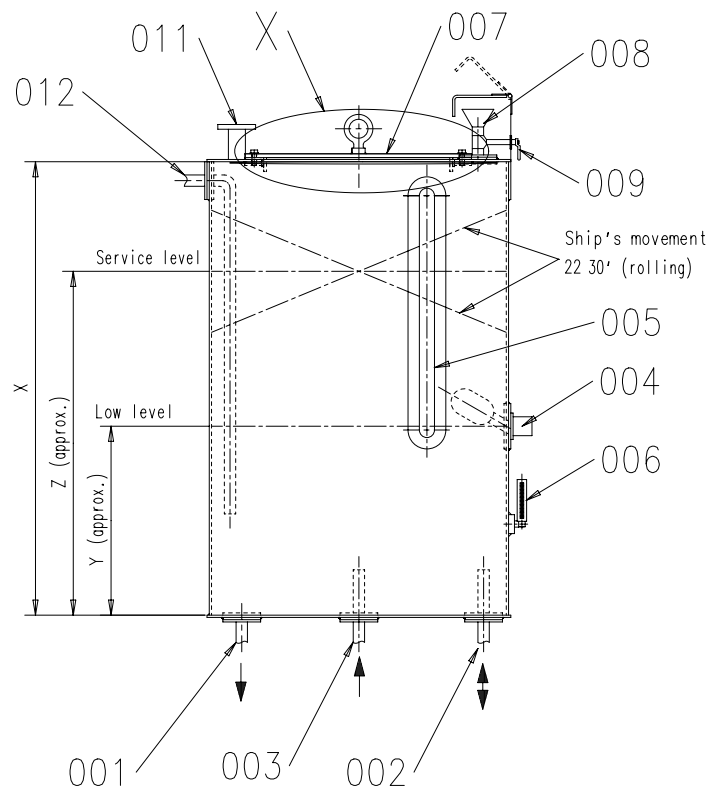
Cylinder	HT circuit Cyl. C.W. Volume (l)	LT circuit SAC Volume (l)
5	160 l	190 l
6	190 l	190 l
7	220 l	220 l
8	250 l	220 l

- 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 ○

Model: Free space for ID		G-Code: XXXXXX		Main Drw.	
Number	Drawn date	Number	Drawn date	Number	Drawn date
001	30.09.2020	002	30.09.2020	003	30.09.2020
Product: 5-BX40DF-10		CENTRAL COOLING WATER SYSTEM		HT-static-pressure: Buffer-unit	
WINGO		Zentralkühlwassersystem		Zentralkühlwassersystem	
Units: mm kg NX	Basic Material	Scale: -	Size: A1	Page: 2/2	Material ID: PAAD360765
Made: 16.09.2020	Subant: Deagode	Design Group: 9721	Drawing ID: DAAD132980	Rev: -	
Chkd: 30.09.2020	gjd101 Pickup	Design Group: 9721	Drawing ID: DAAD132980	Rev: -	
Appd: 30.09.2020	mhu019 Hug	Design Group: 9721	Drawing ID: DAAD132980	Rev: -	

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





drawing view shows dimensioning scale for 0.75 m³ capacity

Pos.	Description
001	Drain from HT circuit
002	Balance pipe from HT circuit
003	Air vent from HT circuit *5)
004	Low level alarm *4)
005	Level indicator *1) *4)
006	Thermometer *4)
007	Inspection cover (manhole) *2)
008	Filling pipe/inlet chemical treatment *2)
009	Cock *3)
010	Sealing
011	Venting *6)
012	Overflow/air vent

#### Remarks: (A)

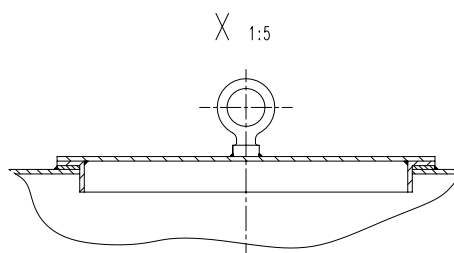
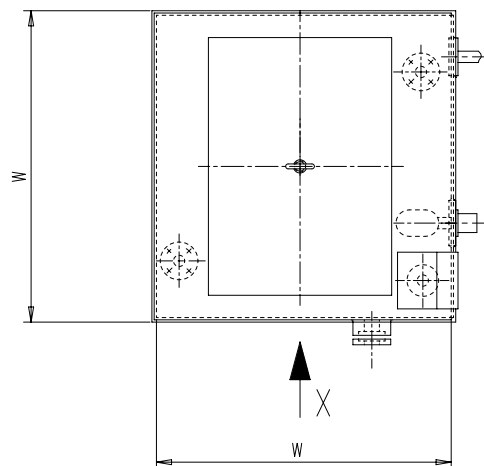
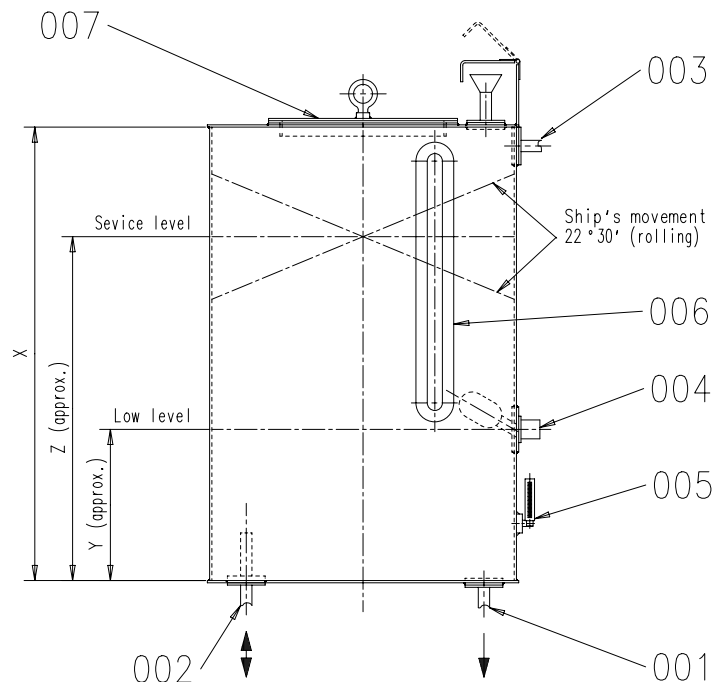
- \*1) Level indicator can be omitted if an alternative is fitted.
- \*2) Other gas tight solutions are also possible.
- \*3) Has to be closed always after treatment.
- \*4) Any instrumentation installed in the system has to be certified explosion proof apparatus.
- \*5) This connection is only needed if the HT cooling water system venting is done via the expansion tank.
- \*6) To be vented outside of engine room

- 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
(m³)	(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

Free space for lic.		Q-Code XXXXXX Standard ISO; JIS		Main Drw.	
Modif.	EAAD091567	15.11.2019			
Number		Drawn date	Number	Drawn date	Number
Product W-25		EXPANSION TANK CENTRAL COOLING WATER HT CIRCUIT Ausgleichstank Zentralkuehlwassersystem HT circuit			
Units mm kg		NX		Net Weight 0,001	
SURFACE PROTECTION SEE GROUP 0344		Made 07.07.2014 mhu019 M.Hug		Scale 1:10	
TOLERANCING PRINCIPLE ISO8015		Chkd 08.08.2014 bha009 Haag		Size A2 Page 1/1	
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd 08.08.2014 bha009 Haag		Drawing ID 9721	
				Material ID PAAD166922	
				Rev. A	
				DAAD052664	



Drawn for 0.75 m<sup>3</sup> 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 <sup>3</sup> )	( 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	



## MIDS - WinGD X40DF-1.0 - Cooling Water System (DG9721)

### TRACK CHANGES

DATE	SUBJECT	DESCRIPTION
2019-09-09	DRAWING SET	First web upload
2020-09-02	107.245.419 DAAD052664	System drgs – new revision
2020-10-06	DAAD118518 DAAD118517 DAAD132980 107.245.626	Main and system drgs – new revision

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