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E	<table><tr><td colspan="4">Quantity PER ENGINE</td><td>SEQ NO</td><td>Material ID</td><td>Material Name</td><td>Dimension, Occ</td><td>Standard or Drawing</td><td>Basic Material Material Standard</td><td>Weight GR./NET</td></tr><tr><td>PAAD294147</td><td>PAAD294146</td><td>PAAD294145</td><td>PAAD294144</td><td>PAAD294143</td><td>PAAD294142</td><td>Free space for lic.</td><td colspan="4">Q-Code XXXXX Standard ISO; JIS</td><td>Main Drw. H</td></tr><tr><td>Modif.</td><td>A</td><td>EAAD090535</td><td>10.04.2019</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>Number</td><td>Drawn date</td><td>Number</td><td>Drawn date</td><td>Number</td><td>Drawn date</td><td>Number</td><td>Drawn date</td><td>Number</td><td>Drawn date</td><td></td></tr></table>								Quantity PER ENGINE				SEQ NO	Material ID	Material Name	Dimension, Occ	Standard or Drawing	Basic Material Material Standard	Weight GR./NET	PAAD294147	PAAD294146	PAAD294145	PAAD294144	PAAD294143	PAAD294142	Free space for lic.	Q-Code XXXXX Standard ISO; JIS				Main Drw. H	Modif.	A	EAAD090535	10.04.2019										Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date							
Quantity PER ENGINE				SEQ NO	Material ID	Material Name	Dimension, Occ	Standard or Drawing	Basic Material Material Standard	Weight GR./NET																																																			
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F	<table><tr><td colspan="2"></td><td colspan="2"></td><td colspan="2">Product W5-8X62-B</td><td colspan="4">Exhaust System Abgassystem</td></tr><tr><td>Units</td><td>mm kg</td><td>NX</td><td colspan="2"></td><td colspan="4">Basic Material</td><td colspan="2">Net Weight</td></tr><tr><td colspan="2">SURFACE PROTECTION SEE GROUP 0344</td><td>Made</td><td colspan="3">30.04.2018 Sudant Deogade</td><td>Scale</td><td>-</td><td>Size A3</td><td>Page 1/1</td><td>Material ID</td></tr><tr><td colspan="2">TOLERANCING PRINCIPLE ISO8015</td><td>Chkd</td><td colspan="3">11.06.2018 mhu019 Hug</td><td>Design Group</td><td colspan="2">9726</td><td colspan="2">Drawing ID DAAD100093</td></tr><tr><td colspan="2">GENERAL TOLERANCES ACCORDING TO ISO2768-mK</td><td>Appd</td><td colspan="3">11.06.2018 dst009 Strödecke</td><td colspan="2"></td><td colspan="2">Rev. A</td></tr></table>												Product W5-8X62-B		Exhaust System Abgassystem				Units	mm kg	NX			Basic Material				Net Weight		SURFACE PROTECTION SEE GROUP 0344		Made	30.04.2018 Sudant Deogade			Scale	-	Size A3	Page 1/1	Material ID	TOLERANCING PRINCIPLE ISO8015		Chkd	11.06.2018 mhu019 Hug			Design Group	9726		Drawing ID DAAD100093		GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd	11.06.2018 dst009 Strödecke					Rev. A	
				Product W5-8X62-B		Exhaust System Abgassystem																																																							
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Specifications which must be met:

- 72

OUTLET - Exhaust gas by-pass

- The installation of a by-pass line between exhaust gas manifold and turbocharger may be requested by owner and class if only one turbocharger is installed.
Its purpose is to allow engine operation even after a turbocharger failure.

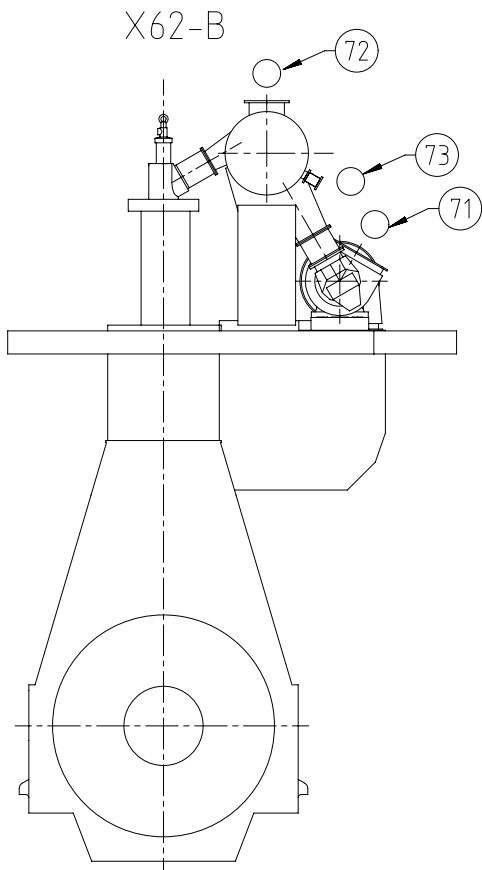
- Blinded off during normal operation.
- 73

OUTLET - Exhaust gas manifold waste gate

- Size and layout of connection flange is provided in the "Pipe Connection Plan"

- Pipe diameter according to parameter "B" on page 2.

- Waste gate connection pipe to main exhaust gas pipe must be kept as short as possible to avoid swirl and extensive back pressure.



- 71

OUTLET - Exhaust gas turbocharger

- Exhaust gas temperature and volume flow: according to GTD

- The total back pressure of the exhaust gas system must be kept in the admissible range of:
Design maximum (new condition) without exhaust gas treatment system: 30 mbar
Design maximum (new condition) with exhaust gas treatment system: 60 mbar

Operational maximum (fouled condition) without exhaust gas treatment system: 50 mbar
Operational maximum (fouled condition) with exhaust gas treatment system: 80 mbar

- Pipe dimensions laid out according to the recommended gas velocities provided in the the Marine Installation Manual (MIM) and by GTD.

- The exhaust piping must be arranged in a way to avoid gases from accumulating.



- The piping layout must consider the thermal expansion and vibration from turbocharger (TC) and main engine (ME).
Thermal expansion of the ME to be calculated according to the formula in MIM, TC specific thermal expansion are provided by the TC supplier.

- Supports (fixation points) for carrying piping and exhaust gas system components deadweight must be installed in sufficient size and amount.
Inadmissible tensions in the piping and forces acting on the turbocharger are not acceptable.

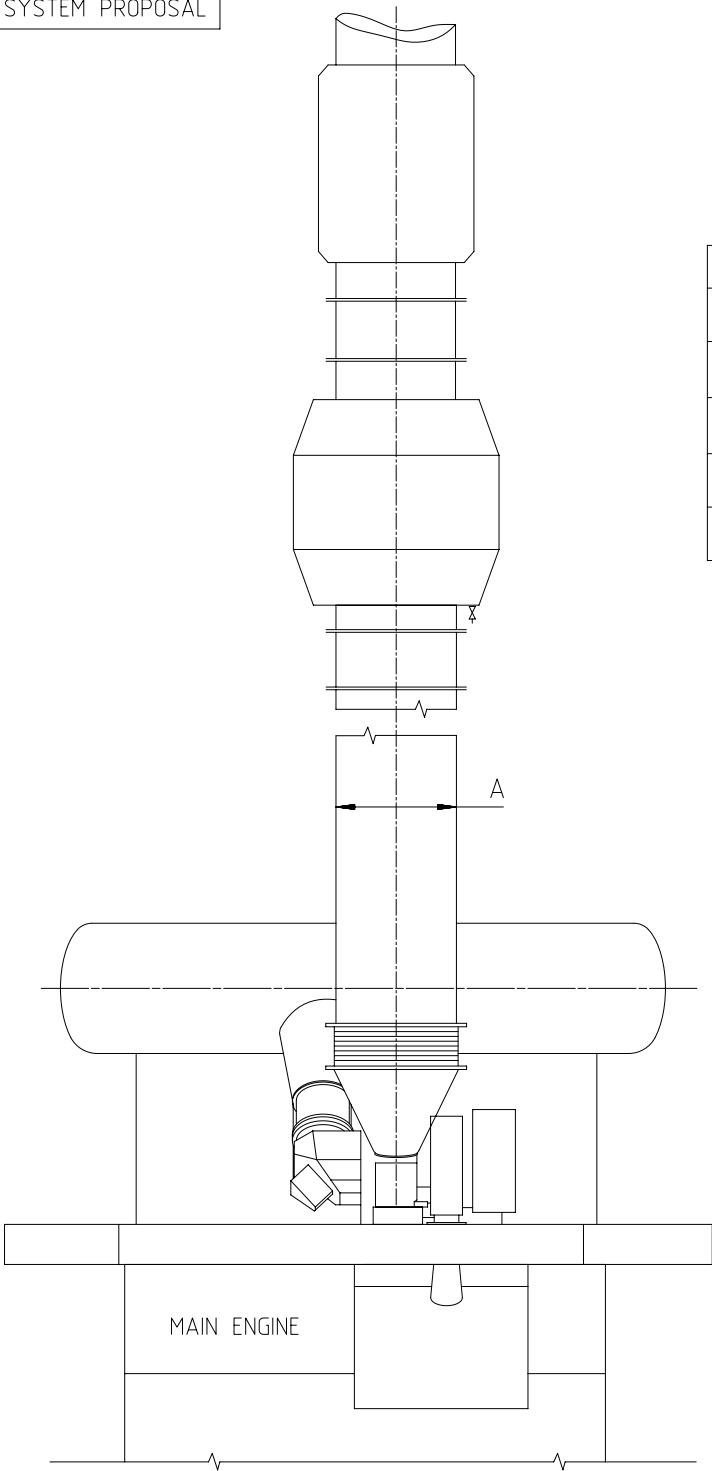
- Exhaust gas pipes of several engines must not be connected.

- Drains in adequate size and amount must be installed in the exhaust gas piping.

- When the noise level on the bridge wing exceeds the class requirement (normally 60 - 70 dB(A)) a silencer must be applied.

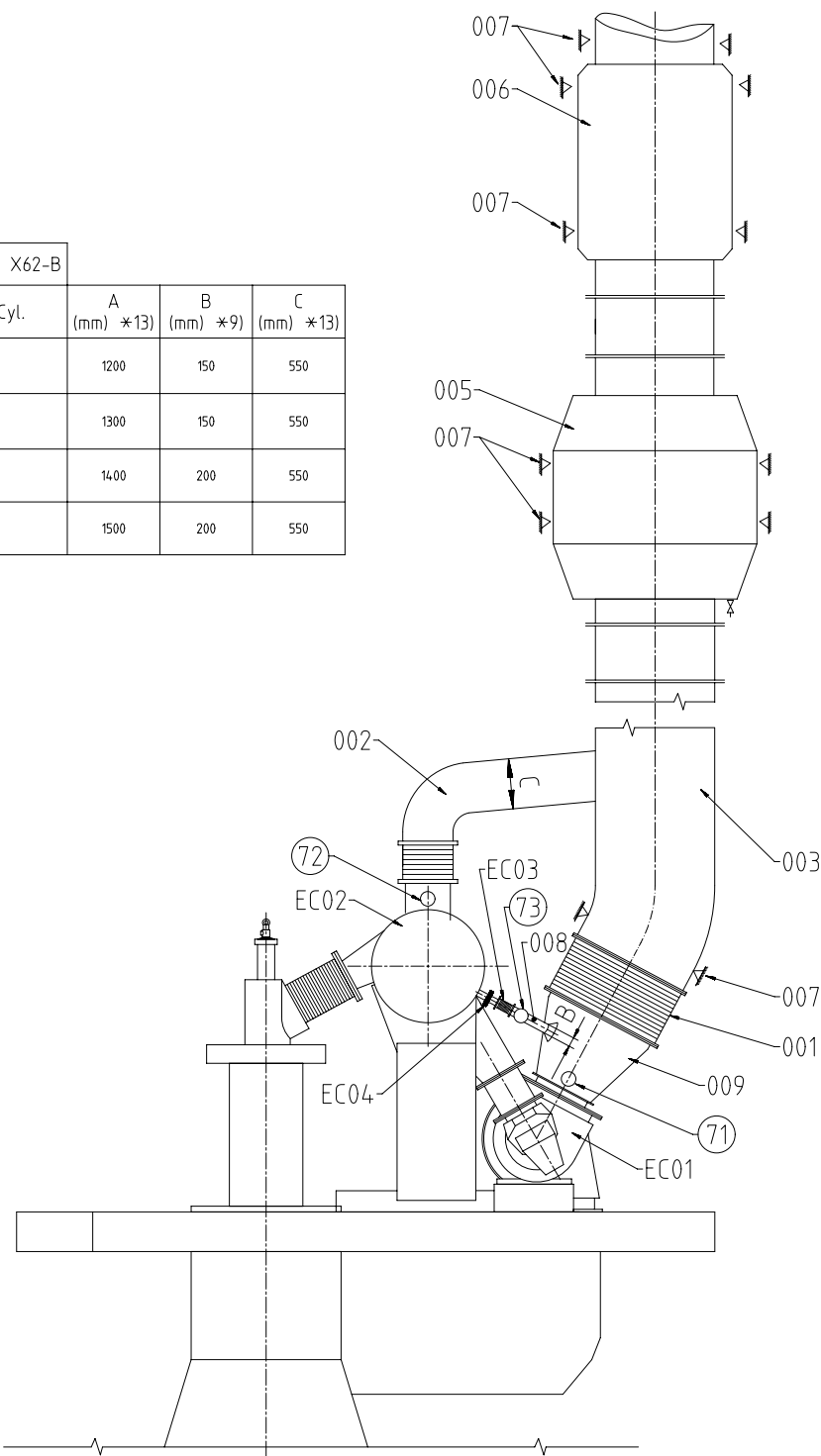
Free space for lic.								Q-Code XXXXX	Main Drw.					
								Standard ISO; JIS						
Modif.	A	EAAD090471	25.03.2019	B	EAAD090535	05.04.2019								
		Number	Drawn date		Number	Drawn date		Number	Drawn date					
 Winterthur Gas & Diesel		Product 5-8X62-B		Exhaust System with one turbocharger										
Units	mm kg	NX				Basic Material			Net Weight 0,001					
SURFACE PROTECTION SEE GROUP 0344		Made	30.04.2018 Sudant Deogade			Scale	-		Size	A3	Page	1/2	Material ID	PAAD294132
TOLERANCING PRINCIPLE ISO8015		Chkd	11.06.2018 mhu019 Hug			Design Group			Drawing ID	DAAD100086			Rev.	B
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd	11.06.2018 dst009 Strödecke			9726								

SYSTEM PROPOSAL



Ⓑ

Main engine X62-B			
No of Cyl.	A (mm) *13)	B (mm) *9)	C (mm) *13)
5	1200	150	550
6	1300	150	550
7	1400	200	550
8	1500	200	550



Pos.	SYSTEM COMPONENTS *1)
001	Compensator *4)
002	Exhaust gas by-pass line *8)
003	Exhaust gas pipe *12)
005	Boiler *11)
006	Silencer (with spark arrester) *10)
007	Support *6)
008	Waste gate pipe
009	Transition piece *7)

Pos.	ENGINE CONNECTIONS *2)
Ⓐ	OUTLET - Exhaust gas turbocharger
Ⓑ	OUTLET - Exhaust gas by-pass
Ⓒ	OUTLET - Exhaust gas manifold waste gate

Pos.	ENGINE COMPONENTS *3)
EC01	Turbocharger
EC02	Exhaust gas manifold
EC03	Waste gate compensator *4) *9)
EC04	Waste gate valve

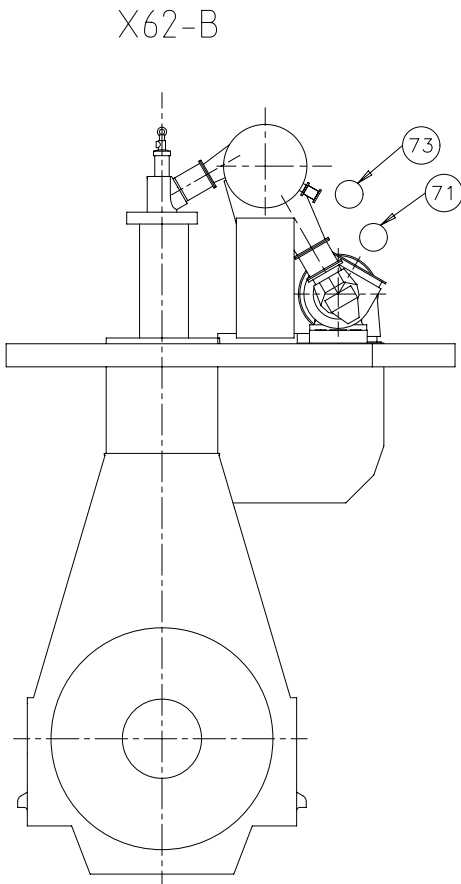
Remarks:

- Drain plugs and drain cocks to be installed where necessary.
- *1) Refer to the "Pipe Connection Plan" for the execution and location of the engine pipe connections.
- *2) To be delivered by external supplier and to be installed by the shipyard.
- *3) To be delivered by the engine builder, i.e. already equipped on engine side
- *4) Dimension of expansion piece (compensator) must be defined by the shipyard taking into account the thermal growth of exhaust manifold and exhaust pipe.
Vibrations of the pipe after the compensator must be lower than 45 mm/s RMS (root mean square).
- *6) Installed as fixed or sliding type in accordance with the requirements. Final amount and position have to be defined by the shipyard under consideration of system layout and requirements based on installation specific calculation.
- *7) Area ratio between outlet/inlet diameter = 1.1..1.6
Taper angle $\leq 40^\circ$
- *8) Optional, needs just to be installed if requested by owner and class to ensure engine operation even after a turbocharger failure.
- *9) Pipe dimension on engine side (before compensator) is one nominal pipe size smaller.
- *10) Optional, installed as required to meet noise requirements.
- *11) Optional.
- *12) The radius of pipe bends should be not smaller than 1.5 x DN.
- *13) The provided dimensions refer to an R1 rated engine and serve just as proposal. To make the project specific layout, data as provided by GTD and by the turbocharger supplier must be taken into account.

Model	Free space for ID	Q-Code	XXXXXX	Main Drw.
Mod.	EAAD090471	25.03.2019	EAAD090535	05.04.2019
Number	Drawn date	Number	Drawn date	Number
Units	mm kg	NX	Basic Material	Net Weight 0,001
Surface Protection	SEE GROUP 0344	Made	30.04.2018	Sudant Deogade
TOLERANCING PRINCIPLE	ISO8015	Chd	11.06.2018	mhu019 Hug
GENERAL TOLERANCES	ACCORDING TO ISO2768-mK	Appd	11.06.2018	ds009 Strödske
Product	5-BX62-B	Design Group	9726	Material ID
Exhaust System	with one turbocharger	Size	A1	Page 2/2
WINGD	Wärthner Gas & Diesel	Material ID	PAAD294132	Rev. B
DAAD100086				

Specifications which must be met:

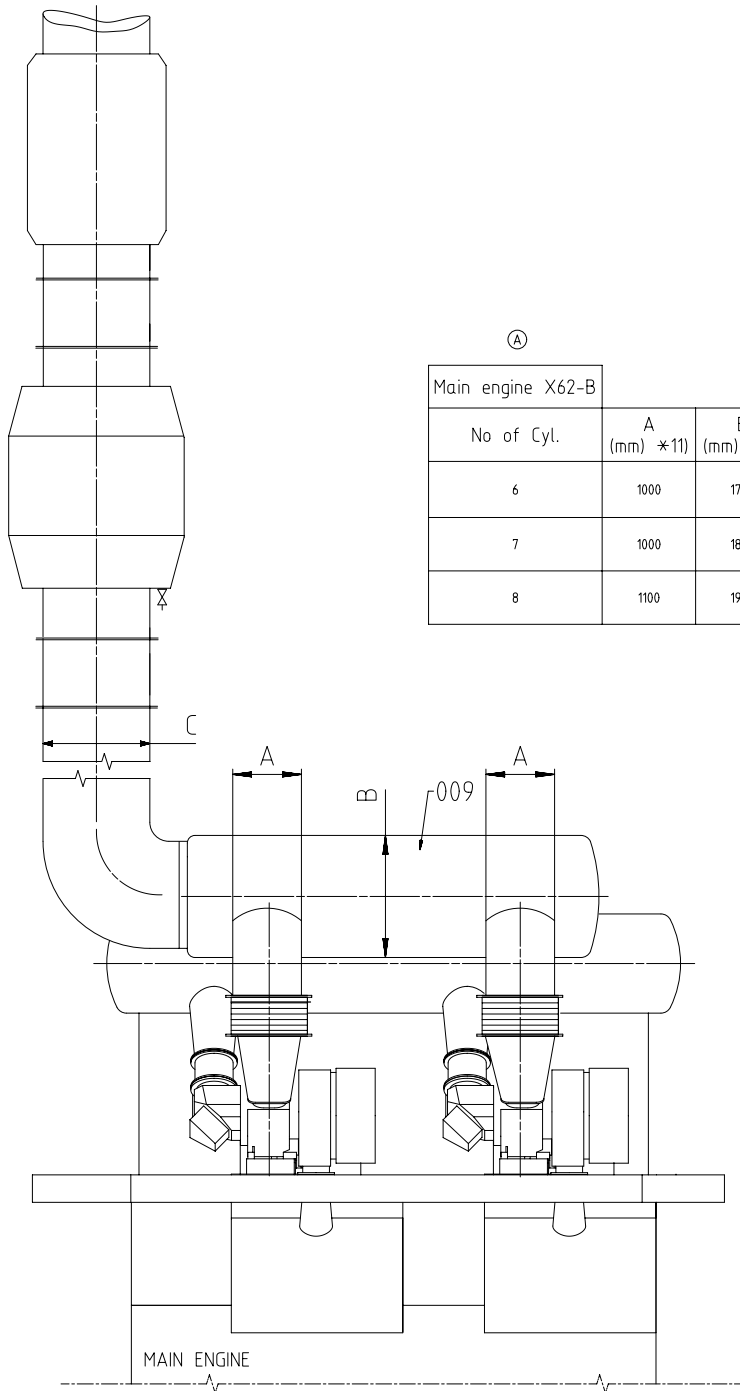
- 73 OUTLET - Exhaust gas manifold waste gate
- Size and layout of connection flange is provided in the "Pipe Connection Plan".
 - Pipe diameter according to value "D" defined on page 2.
 - Waste gate connection pipe to main exhaust gas pipe should be kept as short as possible to avoid swirl and extensive back pressure.



- 71 OUTLET - Exhaust gas turbocharger
- A
- Exhaust gas temperature and volume flow: according to GTD
 - The total back pressure of the exhaust gas system must be kept in the admissible range of:
Design maximum (new condition) without exhaust gas treatment system: 30 mbar
Design maximum (new condition) with exhaust gas treatment system: 60 mbar
Operational maximum (fouled condition) without exhaust gas treatment system: 50 mbar
Operational maximum (fouled condition) with exhaust gas treatment system: 80 mbar
 - Pipe dimensions laid out according to the recommended gas velocities provided in the the Marine Installation Manual (MIM) and by GTD.
 - The exhaust piping must be arranged in a way to avoid gases from accumulating.
 - The piping layout must consider the thermal expansion and vibration from turbocharger (TC) and main engine (ME).
Thermal expansion of the ME to be claculated according to the formula in MIM, TC specific thermal expansion are provided by the TC supplier.
 - Supports (fixation points) for carrying piping and exhaust gas system components deadweight must be installed in sufficient size and amount.
Inadmissible tensions in the piping and forces acting on the turbocharger are not acceptable.
 - Exhaust gas pipes of several engines must not be connected.
 - Drains in adequate size and amount must be installed in the exhaust gas piping.
 - An exhaust gas collector after the turbocharger must be installed.

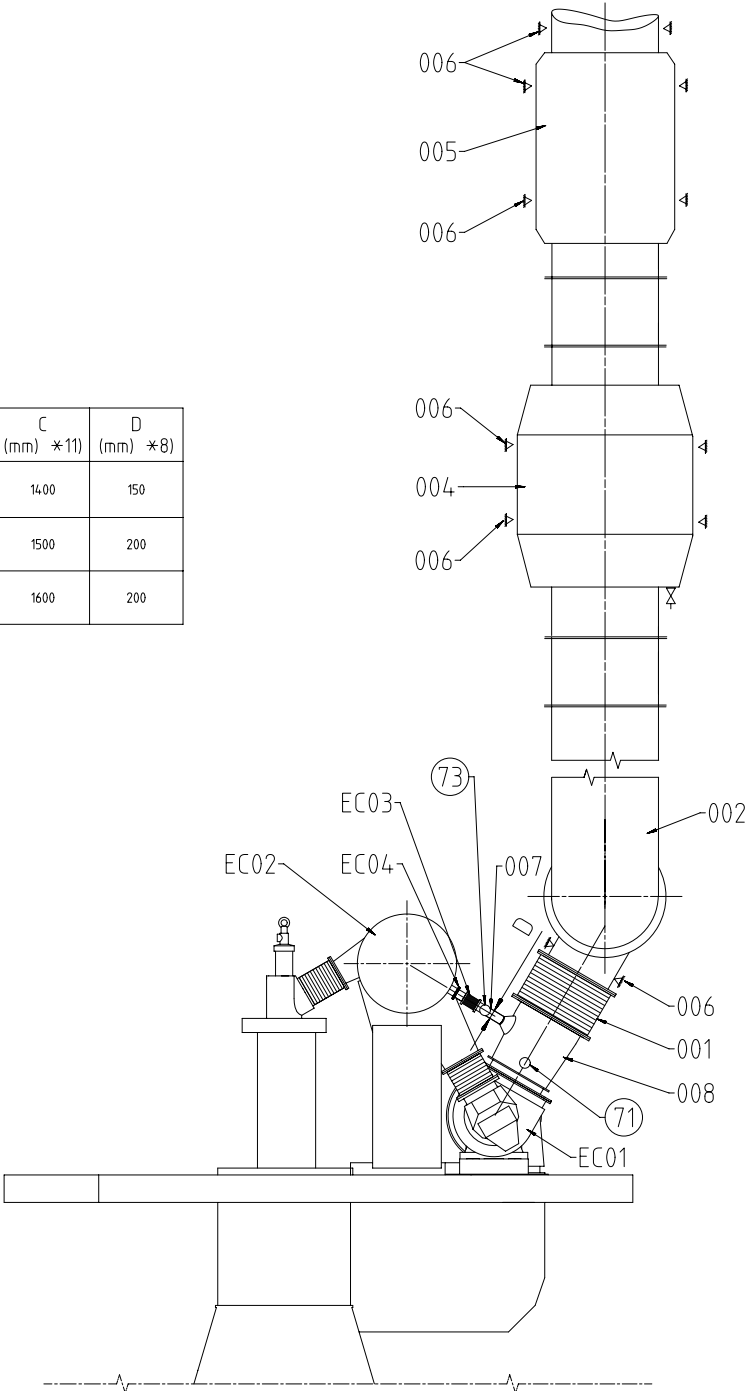
Free space for lic.	Q-Code XXXXXX							Main Drw.		
	Standard ISO; JIS									
Modif.	A	EAAD090535	05.04.2019							
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date		
WIN GD Winterthur Gas & Diesel		Product 5-8X62-B		Exhaust System with two turbochargers						
Units	mm kg	NX				Basic Material			Net Weight 0,001	
SURFACE PROTECTION SEE GROUP 0344		Made	30.04.2018 Sudant Deogade		Scale	-		Size A3	Page 1/2	Material ID PAAD294135
TOLERANCING PRINCIPLE ISO8015		Chkd	11.06.2018 mhu019 Hug		Design Group	9726		Drawing ID DAAD100087	Rev.	A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd	11.06.2018 dst009 Strödecke							

SYSTEM PROPOSAL



(A)

Main engine X62-B				
No of Cyl.	A (mm) *11)	B (mm) *11)	C (mm) *11)	D (mm) *8)
6	1000	1700	1400	150
7	1000	1800	1500	200
8	1100	1900	1600	200



Pos.	SYSTEM COMPONENTS *1)
001	Compensator *4)
002	Exhaust gas pipe *12)
004	Boiler *10)
005	Silencer (with spark arrester) *9)
006	Support *6)
007	Waste gate pipe
008	Transition piece *7)
009	Exhaust gas collector
Pos.	ENGINE CONNECTIONS *2)
(71)	OUTLET - Exhaust gas turbocharger
(73)	OUTLET - Exhaust gas manifold waste gate
Pos.	ENGINE COMPONENTS *3)
EC01	Turbocharger
EC02	Exhaust gas manifold
EC03	Waste gate compensator *4) *8)
EC04	Waste gate valve
Remarks:	(A)
	- Drain plugs and drain cocks to be installed where necessary.
	*1) Refer to the "Pipe Connection Plan" for the execution and location of the engine pipe connections.
	*2) To be delivered by external supplier and to be installed by the shipyard.
	*3) To be delivered by the engine builder, i.e. already equipped on engine side
	*4) Dimension of expansion piece (compensator) must be defined by the shipyard taking into account the thermal growth of exhaust manifold and exhaust pipe. Vibrations of the pipe after the compensator must be lower than 45 mm/s RMS (root mean square).
	*6) Installed as fixed or sliding type in accordance with the requirements. Final amount and position have to be defined by the shipyard under consideration of system layout and requirements based on installation specific calculation.
	*7) Area ratio between outlet/inlet diameter = 1.1...1.6 Taper angle $\leq 40^\circ$
	*8) Pipe dimension on engine side (before compensator) is one nominal pipe size smaller.
	*9) Optional, installed as required to meet noise requirements.
	*10) Optional.
	*11) The provided dimensions refer to an R1 rated engine and serve just as proposal. To make the project specific layout, data as provided by GTD and by the turbocharger supplier must be taken into account.
	*12) The radius of pipe bends should be not smaller than 15 x DN

Mod.	EAAD090535	05.04.2019	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date	Q-Code	XXXXXX	Standard	ISO, JIS	Main	Drw.														
WINGD												Product		5-BX62-B		Exhaust System		with two turbochargers												
Units												mm	kg	NX	Basic Material		Scale	-	Size	A1	Page	2/2	Material	PAAD294135	Net Weight	0,001				
SURFACE PROTECTION SEE GROUP 0344												Made		30.04.2018		Sudant		Deagode		Design Group		9726		Drawing		DAAD100087		Rev.		A
TOLERANCING PRINCIPLE ISO8015												Chd		11.06.2018		mhu019		Hug		Design Group		9726		Drawing		DAAD100087		Rev.		A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK												Appd		11.06.2018		ds009		Strödske		Design Group		9726		Drawing		DAAD100087		Rev.		A

MIDS - WinGD X62-B – Exhaust System (DG9726)

TRACK CHANGES

DATE	SUBJECT	DESCRIPTION
2018-06-15	DRAWING SET	First web upload
2019-03-28	DAAD100086	System drg – new revision
2019-09-18	DAAD100093 DAAD100086 DAAD100087	Main and system drgs – new revision

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