

1

2

3

4

5

6

7

8

A

B


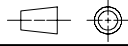
C

D

E

F

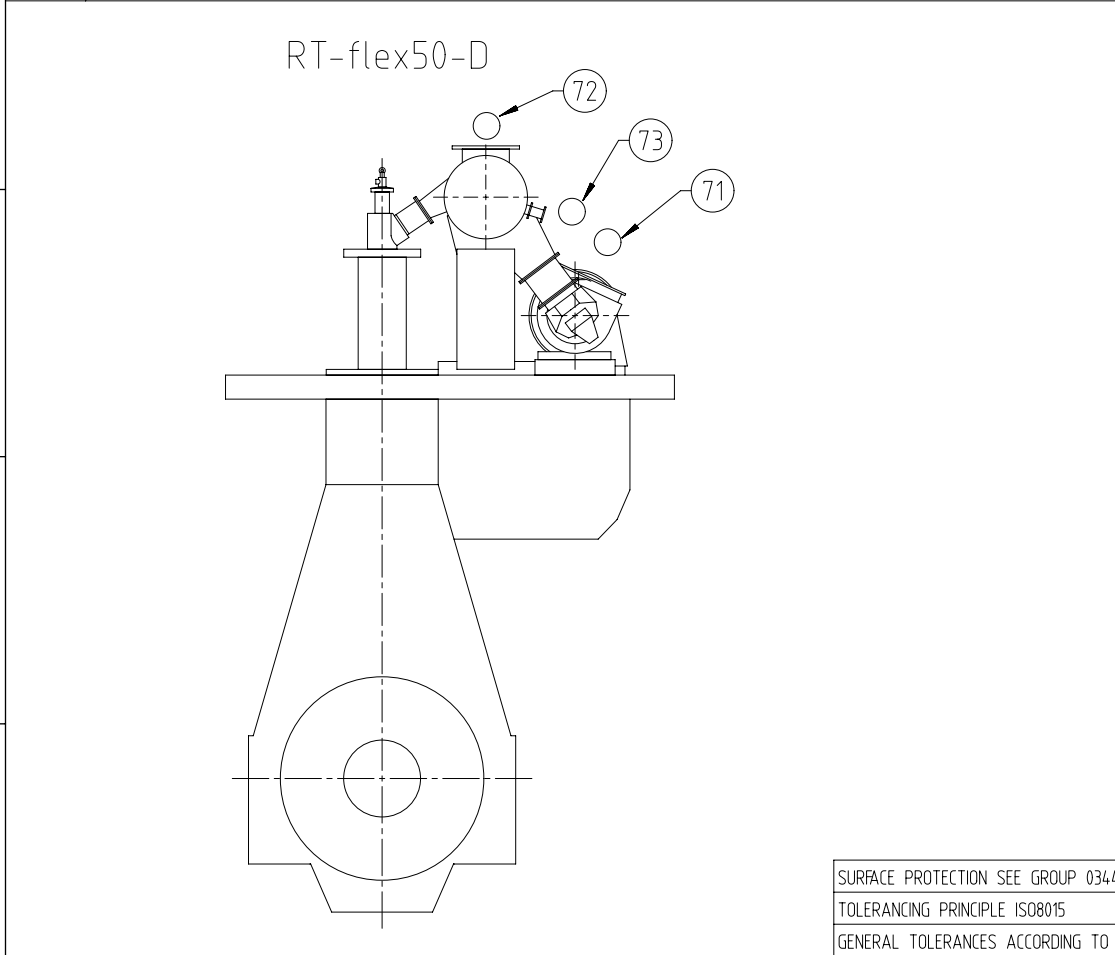
TC Amount	1			X	X
	2	X	X		
SCR	Without		X		X
	LP SCR	X		X	

Net Weight															
0,001	0,001	0,001	0,001												
1	1	-	-	002	PAAD283895	Exhaust System with two turbochargers	DAAD096575		0,001						
-	-	1	1	001	PAAD283818	Exhaust System with one turbocharger	DAAD096541		0,001						
Quantity PER ENGINE				SEQ NO	Material ID	Material Name Dimension, Occ	Standard or Drawing	Basic Material Material Standard	Weight GR./NET						
PAAD284297	PAAD284296	PAAD284295	PAAD284294	Free space for ltc.							Q-Code XXXXXX	Main Drw. H			
											Standard ISO; JIS				
Modif.															
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date					
					 Winterthur Gas & Diesel		Product 5-8RT-flex50-D	Exhaust System Abgassystem							
Units		mm kg	NX				Basic Material			Net Weight					
SURFACE PROTECTION SEE GROUP 0344					Made	06.03.2018 dki021 DH.Kim		Scale	-	Size A3	Page 1/1	Material ID			
TOLERANCING PRINCIPLE ISO8015					Chkd			Design Group	9726		Drawing ID	DAAD096545		Rev.	-
GENERAL TOLERANCES ACCORDING TO ISO2768-mK					Appd										

DID - DIMENSIONAL DRAWING - Confidential

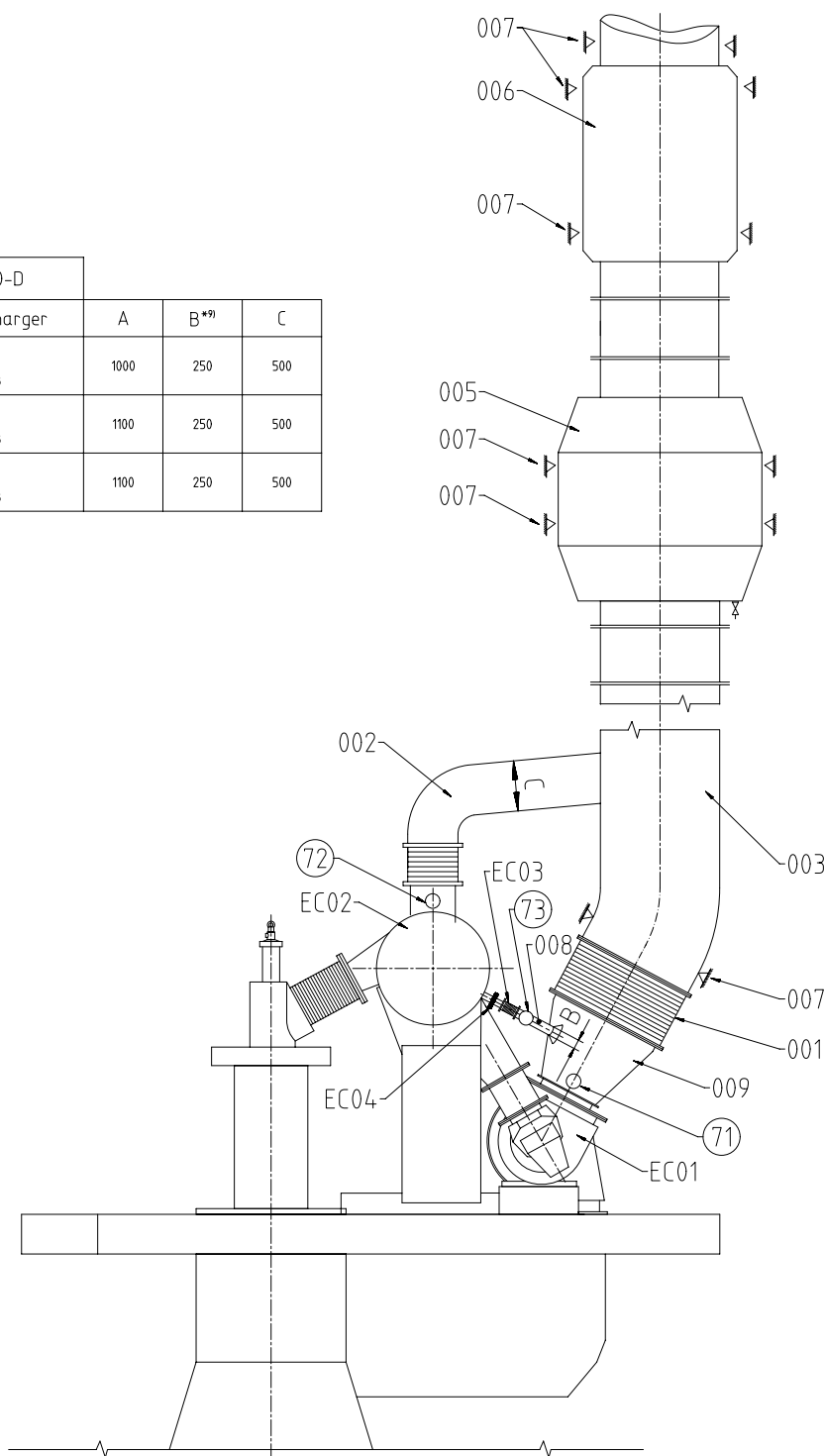
Specifications which must be met:

A	<p>72 OUTLET - Exhaust gas by-pass</p> <ul style="list-style-type: none"> - 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.
B	<p>73 OUTLET - Exhaust gas manifold waste gate</p> <ul style="list-style-type: none"> - 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.



A	<p>71 OUTLET - Exhaust gas turbocharger</p> <p>B</p> <ul style="list-style-type: none"> - 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
B	<p>Operational maximum (fouled condition) without exhaust gas treatment system: 50 mbar Operational maximum (fouled condition) with exhaust gas treatment system: 80 mbar</p> <ul style="list-style-type: none"> - 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 XXXXXX	Main Drw.
							Standard ISO; JIS	
Modif.	A	EAAD089374	11.05.2018	B	EAAD090105	12.11.2018		
		Number	Drawn date		Number	Drawn date		
 Winterthur Gas & Diesel		Product 5-8RT-flex50-D		Exhaust System with one turbocharger				
Units	mm kg	NX				Basic Material		Net Weight 0,001
SURFACE PROTECTION SEE GROUP 0344		Made	31.01.2018	dk1021	DH.Kim		Scale -	Size A3
TOLERANCING PRINCIPLE ISO8015		Chkd	14.02.2018	wwa008 Wang		Design Group		Page 1/2
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd	28.02.2018	mhu019 Hug		9726		Material ID PAAD283818
						Drawing ID DAAD096541		Rev. B





Main engine RT-flex50-D				
No of cyl.	Turbocharger	A	B ^{*)}	C
5	1 x A170-L 1 x A265-L 1 x MET53MB	1000	250	500
6	1 x A175-L 1 x A270-L 1 x MET60MB	1100	250	500
7	1 x A175-L 1 x A270-L 1 x MET60MB	1100	250	500

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)
71	OUTLET - Exhaust gas turbocharger
72	OUTLET - Exhaust gas by-pass
73	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

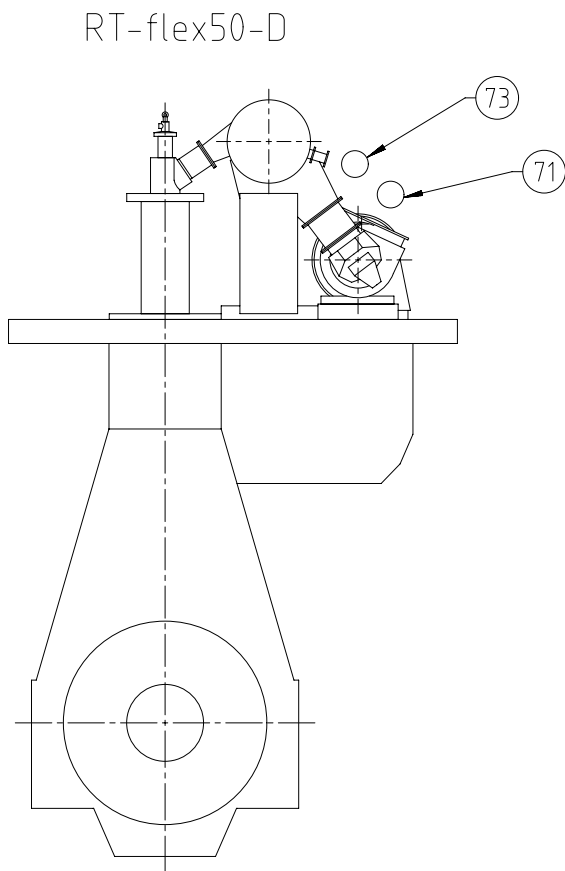
- Drain plugs and drain cocks to be installed where necessary.
- *1) Refer to the "Pipe Connection Plan" for the execution and location of the engine pipe connections.
- *2) To be delivered by external supplier and to be installed by the shipyard.
- *3) To be delivered by the engine builder, i.e. already 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 DN100.
- *10) Optional, installed as required to meet noise requirements.
- *11) Optional.
- *12) The radius of pipe bends should be not smaller than $1.5 \times DN$.

Time taken for iss.					G-code XXXXXX		Mn Dn
					Standard ISO; JIS		
Model	A	EAD089374	11.05.2018	B	EAD09005	12.11.2018	
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number
Product 5-BRT-flex50-D		Exhaust System with one turbocharger					
							
Units	mm kg	NX	 Basic Material	Net weight 0,001			
Model	31.01.2018	dk021	DH.Kim	Scale	Size	Page 2/2	Material ID PAAD283818
Chase	14.02.2018	www.008	Wing	Design Group	9726		
X	28.02.2018	mbu019	Hug	Drawing ID	DAAD096541		Rev. B

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 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

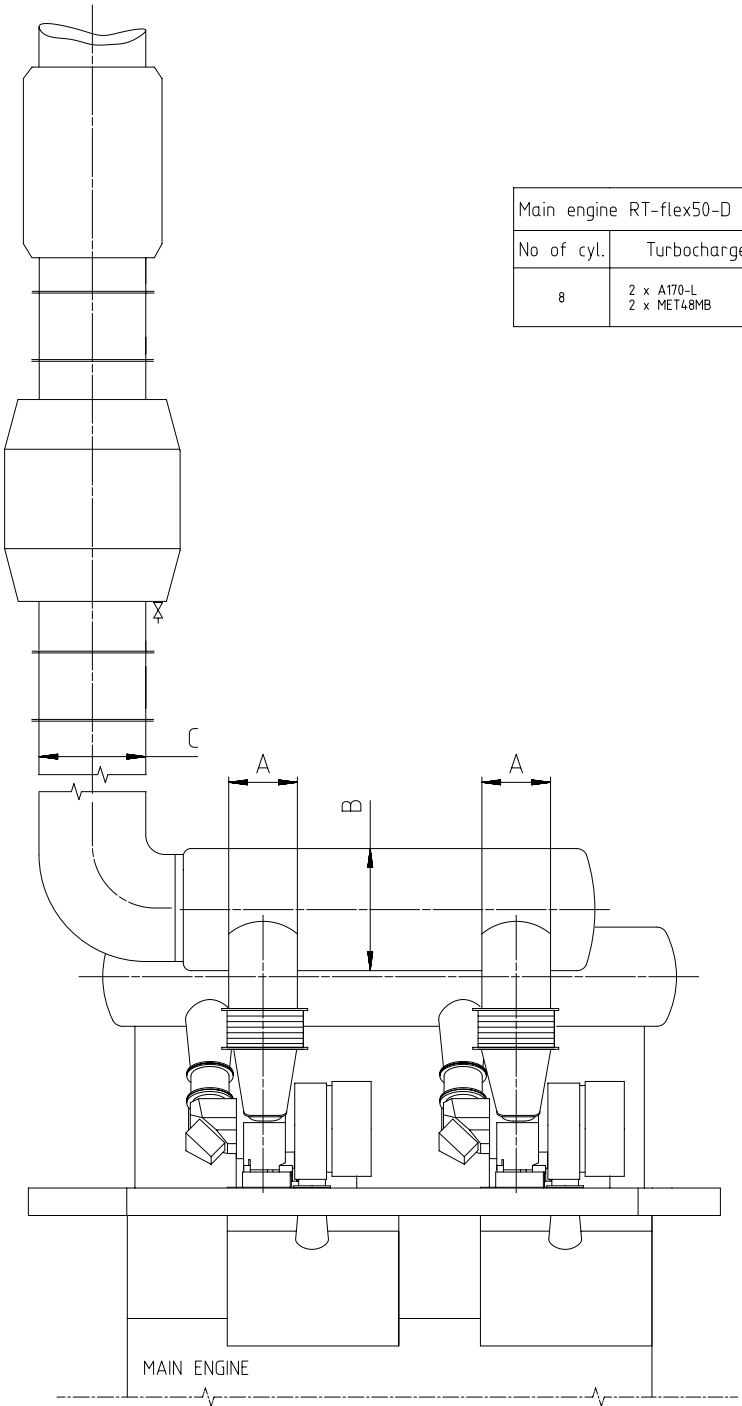
OUTLET - Exhaust gas turbocharger

B

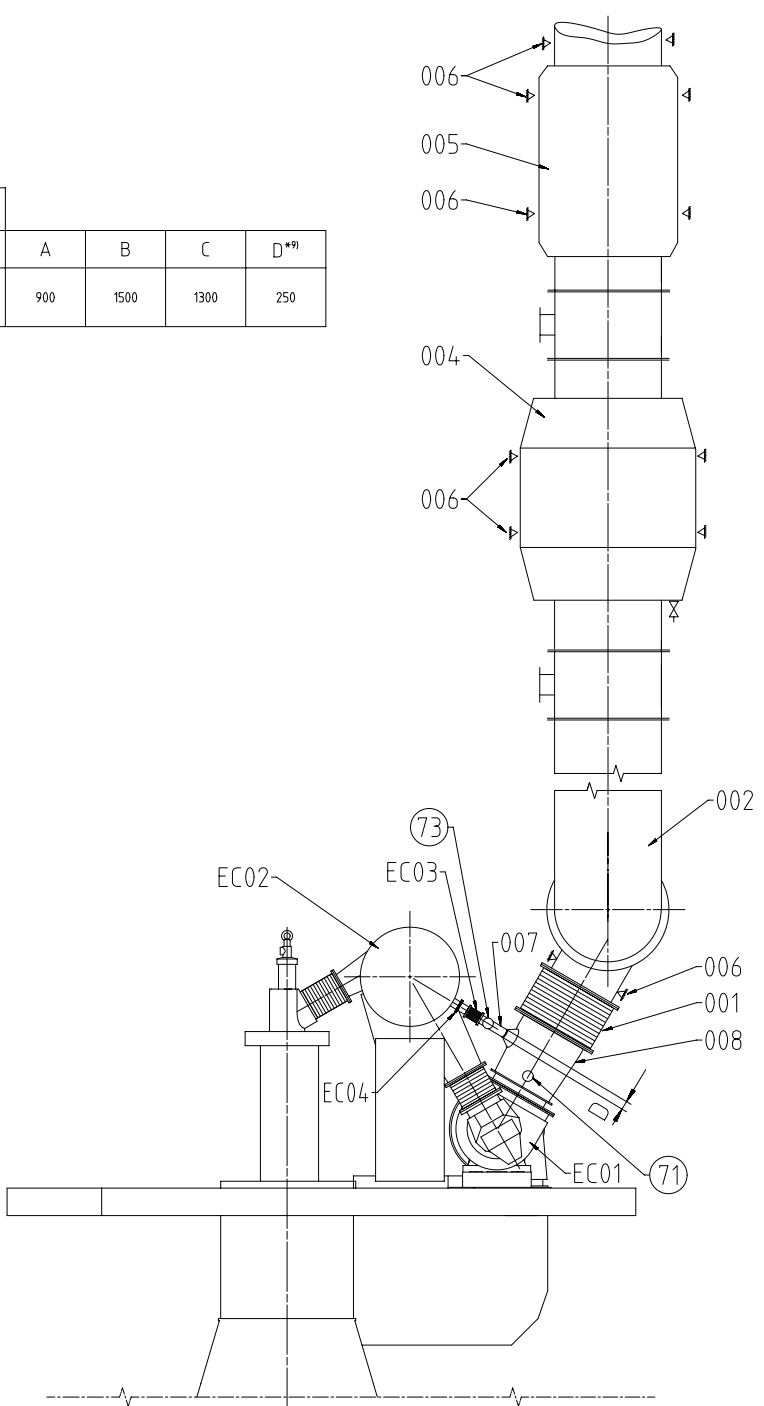
- Exhaust gas temperature and volume flow: according to GTD
- The total back pressure of the exhaust gas system must be kept in the admissible range of:
Design maximum (new condition) without exhaust gas treatment system: 30 mbar
Design maximum (new condition) with exhaust gas treatment system: 60 mbar

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 XXXXXX		Main Drw.						
							Standard ISO; JIS								
Modif.	A	EAAD089374	11.05.2018	B	EAAD090105	12.11.2018									
		Number	Drawn date		Number	Drawn date		Number	Drawn date						
		Product 5-8RT-flex50-D		Exhaust System with two turbochargers											
Units	mm kg	NX				Basic Material			Net Weight 0,001						
SURFACE PROTECTION SEE GROUP 0344		Made	24.01.2018	dk1021	DH.Kim		Scale	-	Size	A3	Page	1/2	Material ID	PAAD283895	
TOLERANCING PRINCIPLE ISO8015		Chkd	14.02.2018	wwa008 Wang			Design Group		9726		Drawing ID		DAAD096575	Rev.	B
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd	28.02.2018	mhu019 Hug											



Main engine RT-flex50-D					
No of cyl.	Turbocharger	A	B	C	D ^{*9)}
8	2 x A170-L 2 x MET48MB	900	1500	1300	250



Pos.	SYSTEM COMPONENTS *1)
001	Compensator *4)
002	Exhaust gas pipe *12)
004	Boiler *11)
005	Silencer (with spark arrester) *10)
006	Support *6)
007	Waste gate pipe
008	Transition piece *7)
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) *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 ≤ 40°	
*9) Pipe dimension on engine side (before compensator) is DN100.	
*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.	

Mod. Free space for file		Q-Code XXXXX Standard ISO, JIS		Main Drw.
EAAD089374	11.05.2018	EAAD090805	12.11.2018	
Number	Drawn date	Number	Drawn date	Number
Product		Exhaust System with two turbochargers		
S-RT-flex50-D				
Units		Basic Material		Net Weight 0,001
mm	kg	NX		
Made		Scale	Size	Page
24.01.2018		dk1021	OH.Kim	2/2
Chd		14.02.2018	wwa008	Wang
Appd		28.02.2018	mtu019	Hug
SURFACE PROTECTION SEE GROUP 0344		Design Group		Material ID
TOLERANCING PRINCIPLE ISO8015		9726		PAAD283895
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Drawing ID		Rev.
		DAAD096575		B

MIDS WinGD RT-flex50-D - EXHAUST SYSTEM (DG9726)

TRACK CHANGES

DATE	SUBJECT	DESCRIPTION
2018-04-20	DRAWING SET	First web upload
2018-05-24	DAAD096541 DAAD096575	System drawings - new revision
2019-01-15	DAAD096541 DAAD096575	System drawings - new revision

DISCLAIMER

© Copyright by Winterthur Gas & Diesel Ltd.

All rights reserved. No part of this document may be reproduced or copied in any form or by any means (electronic, mechanical, graphic, photocopying, recording, taping or other information retrieval systems) without the prior written permission of the copyright owner.

THIS PUBLICATION IS DESIGNED TO PROVIDE AN ACCURATE AND AUTHORITATIVE INFORMATION WITH REGARD TO THE SUBJECT-MATTER COVERED AS WAS AVAILABLE AT THE TIME OF PRINTING. HOWEVER, THE PUBLICATION DEALS WITH COMPLICATED TECHNICAL MATTERS SUITED ONLY FOR SPECIALISTS IN THE AREA, AND THE DESIGN OF THE SUBJECT-PRODUCTS IS SUBJECT TO REGULAR IMPROVEMENTS, MODIFICATIONS AND CHANGES. CONSEQUENTLY, THE PUBLISHER AND COPYRIGHT OWNER OF THIS PUBLICATION CAN NOT ACCEPT ANY RESPONSIBILITY OR LIABILITY FOR ANY EVENTUAL ERRORS OR OMISSIONS IN THIS BOOKLET OR FOR DISCREPANCIES ARISING FROM THE FEATURES OF ANY ACTUAL ITEM IN THE RESPECTIVE PRODUCT BEING DIFFERENT FROM THOSE SHOWN IN THIS PUBLICATION. THE PUBLISHER AND COPYRIGHT OWNER SHALL UNDER NO CIRCUMSTANCES BE HELD LIABLE FOR ANY FINANCIAL CONSEQUENTIAL DAMAGES OR OTHER LOSS, OR ANY OTHER DAMAGE OR INJURY, SUFFERED BY ANY PARTY MAKING USE OF THIS PUBLICATION OR THE INFORMATION CONTAINED HEREIN.