

Available executions

Execution No.	Material ID	Attribute 1: Emission class (Tier)			
		Tier II without SCR	Tier III HP-SCR on-engine	Tier III HP-SCR off-engine	Tier III LP-SCR off-engine
001	PAAD379487	X			
002	PAAD379488		X		
003	PTAA066955			X	
004	PTAA066969				X

NOTE

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

This publication is designed to provide accurate and authoritative information with regard to the subject-matter covered as it 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 cannot accept any responsibility or liability for any eventual errors or omissions in this document 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.

Prod.	X52-S2.0											
Change History												
	-	sna102	mhu019	24.05.2023	CNAA003753	new Design				-	-	
	Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis				Approved	Activity Code	E



EXHAUST SYSTEM
 MIDS master drawing

separate BOM available


Dimension

Scale	-		NX	Units [mm] [kg]	Basic Material			Net Weight	0.001	
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Qty per	A4		Item ID	PTAA025645			Drawing Page/s	1/1		

SEQ NO	QTY	Item ID	Item Name	Dimension	Standard-ID	Basic Material	Net Weight
1	1	PAAD379401	Exhaust System	with one turbocharger			0.001
3	1	PAAD327310	SPECIFICATION				0.001

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Prod.	5,6,7,8 X52-S2.0						
Change History							
	-	dki021	mhu019	23.04.2021	EAAD787399	-	-
Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis	Activity Code	E C


	Exhaust System
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Bill Of Material		Dimension					
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	Main Design	Yes	Design Group	9726	Q-Code	XXXXX	Standard WDS
	Qty per	Engine	A4	Item ID	PAAD379487		BOM Page/s

SEQ NO	QTY	Item ID	Item Name	Dimension	Standard-ID	Basic Material	Net Weight
001	1	PAAD379408	Exhaust System	with one turbocharger			0.001
002	1	DTAA001497	iSCR INSTALLATION GUIDELINE				

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Proc.	5,6,7,8 X52-S2.0						
Change History	B	mhu019	dst009	17.05.2024	CNAA005823	... Drawing update	4 3
	A	sna102	mhu019	21.07.2023	CNAA004127	Main Design updated	4 3
	-	dkl021	mhu019	23.04.2021	EAAD787399	-	- -
	Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis	Activity Code


	<h1>Exhaust System</h1>
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Bill Of Material		Dimension							
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	Main Design	Yes	Design Group		9726	Q-Code	X X M	Standard	WDS
	Qty per	Engine	A4	Item ID	PAAD379488		BOM Page/s	01/01	

SEQ NO	QTY	Item ID	Item Name	Dimension	Standard-ID	Basic Material	Net Weight
1	1	PAAD379401	Exhaust System	with one turbocharger			0.001
2	1	PAAD327310	SPECIFICATION				0.001
3	1	DAAD064155	SCR PIPING GUIDE				
4	1	DAAD075623	SCR TURBOCHARGER PROTECTION				

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Prod.	5,6,7,8 X52						
Change History							
	-	npa101	nm1019	23052023	DAAD003752	New MainDesign	-
Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis	Approved	Activity Code E C


	<h1>Exhaust System</h1>
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Bill Of Material		Dimension	
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Main Design	Yes	Design Group 9726	Q-Code XXXXX Standard WDS
Qty per	Engine A4	Item ID	PTAA066955 BOM Page/s 01/01

SEQ NO	QTY	Item ID	Item Name	Dimension	Standard-ID	Basic Material	Net Weight
1	1	PAAD379401	Exhaust System	with one turbocharger			0.001
3	1	PAAD327310	SPECIFICATION				0.001

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Prod.	5,6,7,8 X52-S2.0						
Change History							
	-	npa101	nm1019	23052023	01A003752	New MainDesign	-
Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis	Approved	Activity Code E C

	<h1>Exhaust System</h1>
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Bill Of Material		Dimension					
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	Main Design	Yes	Design Group	9726	Q-Code	XXXXX	Standard WDS
	Qty per	Engine	A4	Item ID	PTAA066969		BOM Page/s

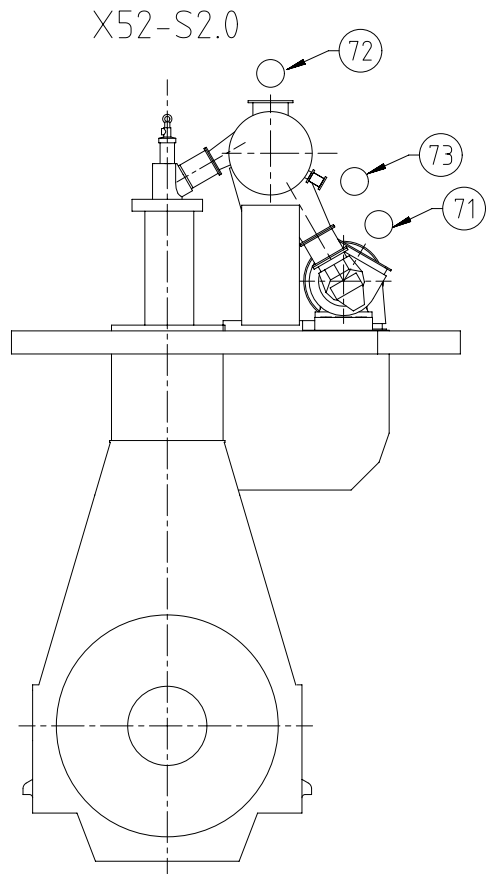
Specifications which must be met:

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.

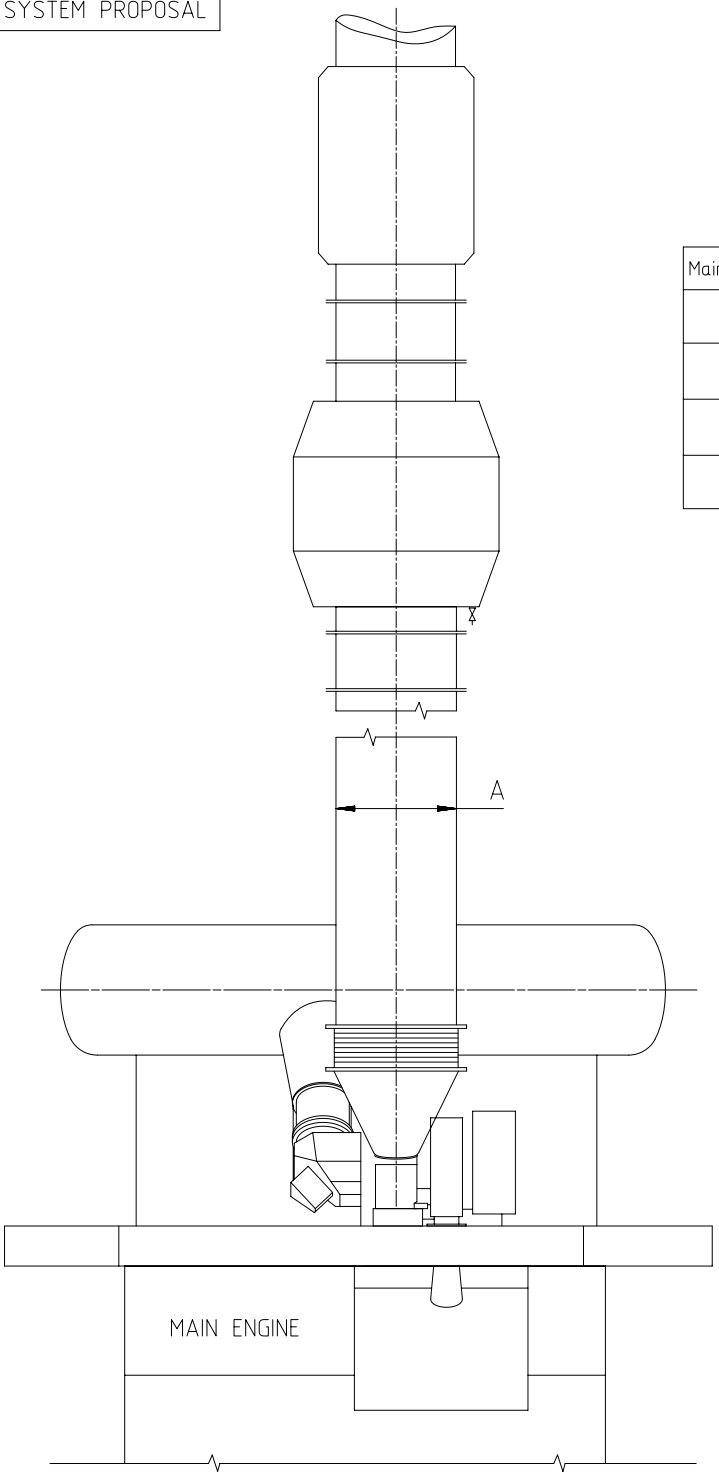


71 OUTLET - Exhaust gas turbocharger

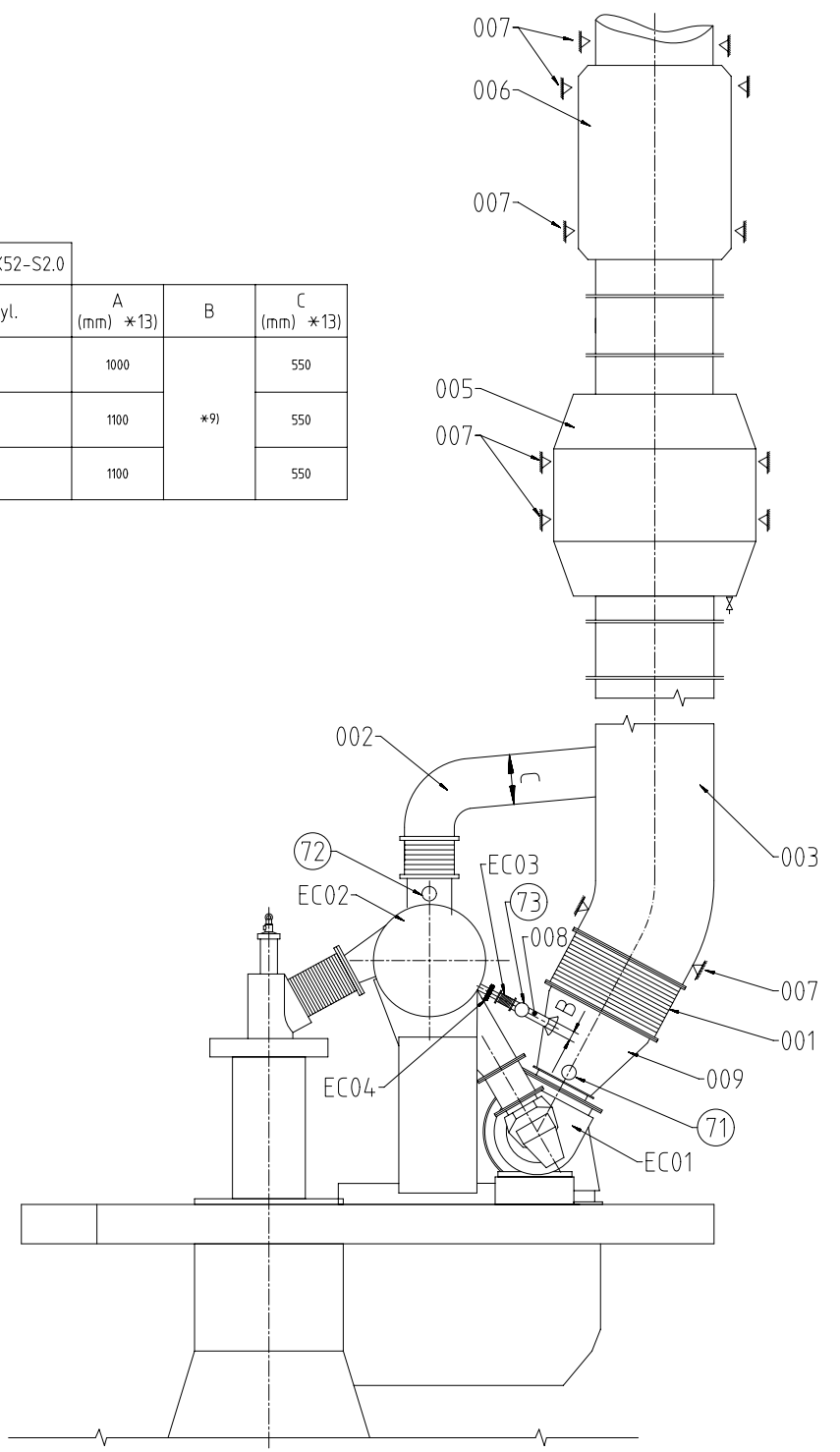
- Exhaust gas temperature and volume flow: according to GTD
- The total back pressure of the exhaust gas system must be kept in the admissible range of:
Design maximum (new condition) without exhaust gas treatment system: 30 mbar
Design maximum (new condition) with low pressure exhaust gas treatment system: 60 mbar
- Operational maximum (fouled condition) without exhaust gas treatment system: 50 mbar
Operational maximum (fouled condition) with low pressure exhaust gas treatment system: 80 mbar
- Pipe dimensions laid out according to the recommended gas velocities provided in the Marine Installation Manual (MIM) and by GTD.
- The exhaust piping with cones, bends and pipe connections must be flow optimised and 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 is to be calculated according to the formula in MIM, TC specific thermal expansion are provided by the TC supplier.
- A continuous (extensive) exhaust gas leakage must be avoided.
- 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.	○		○		○		○						
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date					
		Product 5-7X52-S2.0		Exhaust System with one turbocharger									
Units	mm kg	NX		Basic Material				Net Weight 0,001					
SURFACE PROTECTION SEE GROUP 0344		Made	08.04.2021 dki021 DH.Kim		Scale	-	Size	A3	Page	1/2	Material ID	PAAD379401	
TOLERANCING PRINCIPLE ISO8015		Chkd	23.04.2021 jpi101 Pickup		Design Group		9726		Drawing ID	DAAD142440		Rev.	-
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd	23.04.2021 mhu019 Hug										

SYSTEM PROPOSAL



Main engine X52-S2.0			
No of Cyl.	A (mm) *13	B	C (mm) *13
5	1000	*9)	550
6	1100		550
7	1100		550

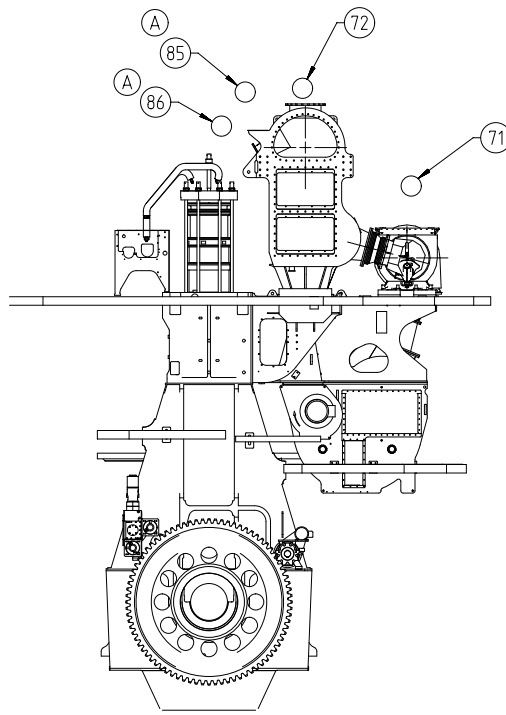


- | Pos. | SYSTEM COMPONENTS *1) |
|------|-------------------------------------|
| 001 | Compensator *4) |
| 002 | Exhaust gas by-pass line *8) |
| 003 | Exhaust gas pipe *12) |
| 005 | Boiler *11) |
| 006 | Silencer (with spark arrester) *10) |
| 007 | Support *6) |
| 008 | Waste gate pipe |
| 009 | Transition piece *7) |
-
- | Pos. | ENGINE CONNECTIONS *2) |
|------|--|
| 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 |
- 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 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) The piping of the exhaust gas system must be structurally supported to withstand the mass and to minimise vibrations across the system. It is suggested that this is achieved by supports which are connected to the ship hull or otherwise. The type of these supports (fixed or sliding type), their final amount, and position must 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) Guidance regarding the selection of the waste gate pipe size is provided by the drawing "DAAD116727" as linked on the main drawing of this design group. The waste gate pipe on the shipside is one nominal pipe size larger than the waste gate pipe on the engine side (before the compensator).
 - *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.

Q-Code	XXXXX	Main Drw.
Standard	ISO, JIS	
Model	Number	Drawn date
Model	Number	Drawn date
Model	Number	Drawn date
Model	Number	Drawn date
		Product: 5-7X52-S2.0 Exhaust System with one turbocharger
Units	mm kg	NX
Scale	-	
Size	A1	Page 2/2
Material	PAAD379401	
Net Weight	0,001	
Made	08.04.2021 dk1021 DH.Kim	
Chkd	23.04.2021 jst101 Pickup	
Appd	23.04.2021 mhu019 Hug	
Design Group	9726	
Drawing ID	DAAD142440	
Rev.	-	

Minimum specification to be met:

85	INLET - Urea for SCR injection system
A	<ul style="list-style-type: none"> - Urea quality: According to ISO 18611-1:2014 - Urea consumption: According to GTD - Urea pressure: - Operating pressure: 8 - 9 bar <li style="padding-left: 20px;">- Maximum pressure: 10 bar - Urea Temperature: 5 - 50 °C
86	OUTLET - Urea backflow from SCR injection system
A	<ul style="list-style-type: none"> - Urea backflow from urea dosing unit to SCR pump unit - Urea pressure: 0 - 10 bar



71	<p>OUTLET - Exhaust gas turbocharger</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: <p style="margin-left: 20px;">Design maximum (new condition) without exhaust gas treatment system: 30 mbar Design maximum (new condition) with exhaust gas treatment system: 60 mbar</p> <p style="margin-left: 20px;">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 in relation to permissible design velocities are provided 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
72	<p>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

Prod.	X52-S2.0												
Change History	A	npa101	nhu019	09.07.2024	04005646	Drawing updated				4	3		
	-	dkl021	mhu019	23.04.2021	EAAD787399	-				-	-		
	Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis				Approved	Activity Code	E	C
WIN GD		Exhaust System with iSCR											
Winterthur Gas & Diesel													
Dimension													
Scale	-		NX	Units	[mm]	[kg]	Basic Material				Net Weight	0.001	
SURFACE PROTECTION SEE GROUP 0344		Copyright Winterthur Gas & Diesel Ltd. All rights reserved. By taking possession of the drawing the recipient recognizes and warrants these rights, neither the whole nor any part of this drawing may be used in any way for construction, fabrication, marketing or any other purpose nor copied in any way nor made accessible to third parties without the previous written consent of Winterthur Gas & Diesel Ltd.											
TOLERANCING PRINCIPLE ISO8015		Main Design		Design Group		9726		Q-Code		X X M		Standard	WDS
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Qty per		Item ID		A2		PAAD379408		Drawing Page/s		1/2	

MIDS - Exhaust System (DG9726)

WinGD X52-S2.0

TRACK CHANGES

DATE	SUBJECT	DESCRIPTION
2021-05-10	DRAWING SET	First web upload
2023-05-25	PTAA066955- PTAA066969-	New revision
2023-07-27	PAAD379488-A	New revision
2024-06-04	PAAD379488-B	New revision
2024-07-18	PAAD379408A	New execution

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