TC Amount	2				X	X	X
	3	X	X	X			
SCR	Without			X			X
	LP SCR		X			X	
	HP SCR	X			X		

Net Weight											
0,001	0,001	0,001	0,001	0,001	0,001	SEQ NO	Material ID	Material Name / Dimension, Occ	Standard or Drawing	Basic Material / Material Standard	Weight GR./NET
1	-	-	1	-	-	004	PAAD219316	SCR TURBOCHARGER PROTECTION	DAAD075623		0,001
1	1	1	-	-	-	003	PAAD303418	Exhaust System with three turbochargers	DAAD104420		0,001
-	-	-	1	1	1	002	PAAD303417	Exhaust System with two turbochargers	DAAD104419		0,001
1	-	-	1	-	-	001	PAAD219883	SCR PIPING GUIDE	DAAD064155		0,001
Quantity PER ENGINE											
PAAD303426	PAAD303424	PAAD303423	PAAD303422	PAAD303421	PAAD303420						
Material ID											
(A)			(A)								

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Q-Code XXXXX

Standard ISO; JIS

Main Drw. H

Modif.		Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
	A	EAAD091567	14.11.2019						

WIN GD Winterthur Gas & Diesel

Product W6-12X92-B

Exhaust System

Units mm kg	NX		Basic Material		Net Weight
Made 02.06.2018 Sudant Deogade		Scale -	Size A3	Page 1/1	Material ID
Chkd 21.03.2019 wwa008 Wang		Design Group 9726	Drawing ID DAAD104421		Rev. A
Appd 21.03.2019 mhu019 Hug					

SURFACE PROTECTION SEE GROUP 0344

TOLERANCING PRINCIPLE ISO8015

GENERAL TOLERANCES ACCORDING TO ISO2768-mK

DID - DIMENSIONAL DRAWING - Confidential

Specifications which must be met:

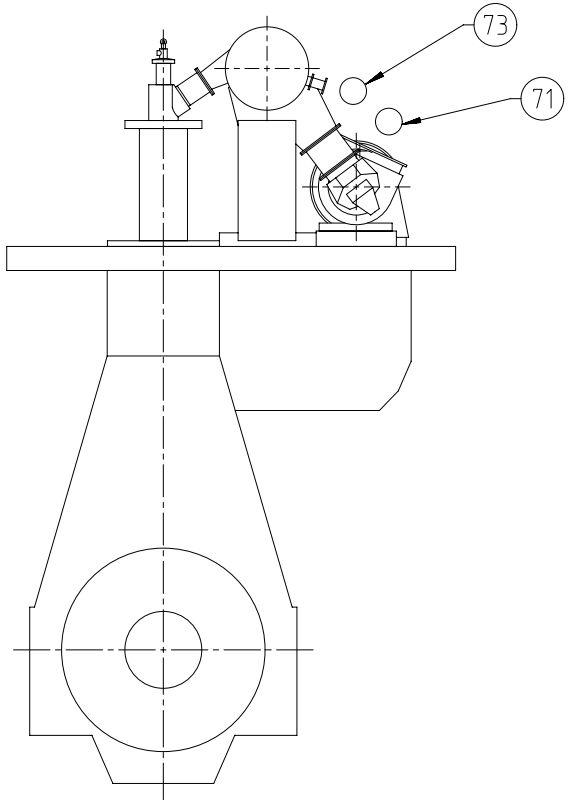
(73) OUTLET - Exhaust gas manifold waste gate

- Size of connection flange described in the pipe connection plan.
- Pipe diameter according to value B, 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

- 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 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. In admissible 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.
- An exhaust gas collector after the turbocharger must be installed.

X-92-B



Approved

Free space for lic.								Q-Code XXXXX		Main Drw.	
								Standard ISO; JIS			
Modif.	A	EAAD091567	14.11.2019								
		Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date		

WIN GD Winterthur Gas & Diesel

Product 6-12X92-B

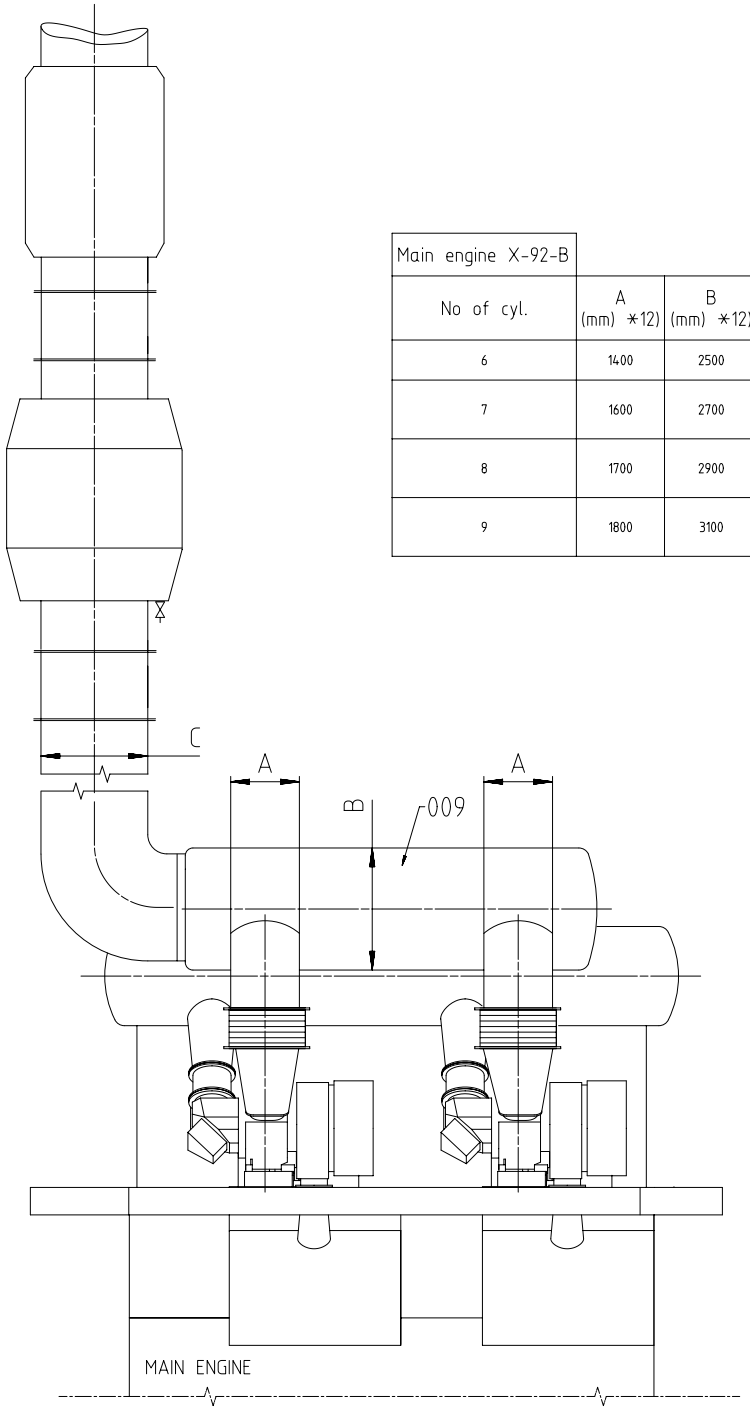
Exhaust System with two turbochargers

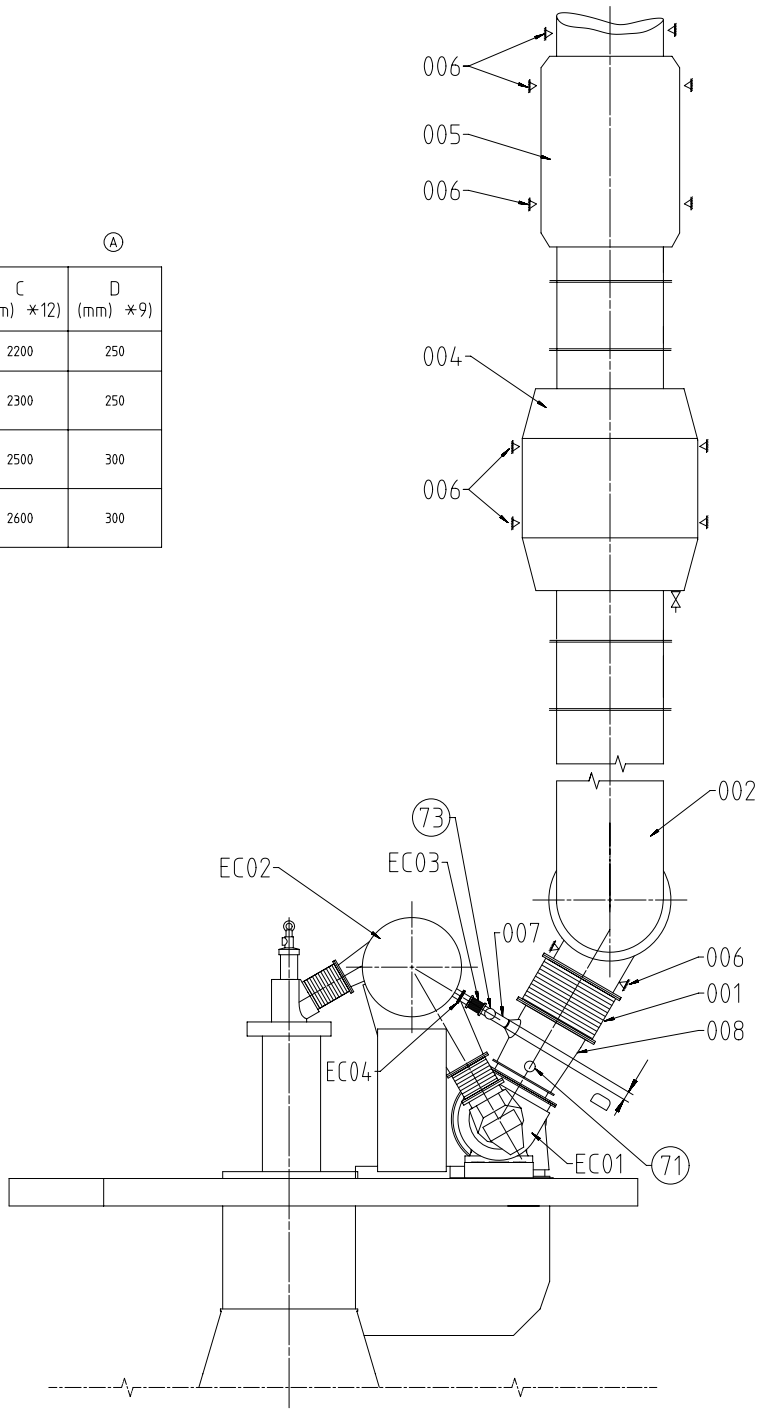
Units mm kg	NX	Basic Material			Net Weight 0,001
SURFACE PROTECTION SEE GROUP 0344	Made 27.07.2018 Sudant Deogade	Scale -	Size A3	Page 1/2	Material ID PAAD303417
TOLERANCING PRINCIPLE ISO8015	Chkd 26.03.2019 mhu019 Hug	Design Group 9726	Drawing ID DAAD104419		Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd 26.03.2019 mhu019 Hug				

DID - DIMENSIONAL DRAWING - Confidential

SYSTEM PROPOSAL

Main engine X-92-B				Ⓐ
No of cyl.	A (mm) *12)	B (mm) *12)	C (mm) *12)	D (mm) *9)
6	1400	2500	2200	250
7	1600	2700	2300	250
8	1700	2900	2500	300
9	1800	3100	2600	300





Pos.	SYSTEM COMPONENTS *1)
001	Compensator *4)
002	Exhaust gas pipe
004	Boiler *11)
005	Silencer (with spark arrester) *10)
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) *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 one nominal pipe size smaller.

*10) Optional, installed as required to meet noise requirements.

*11) Optional.

*12) 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.

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Q-Code XXXXX
Standard ISO; JIS
Main Drw.

Modif.	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
A	EAAD091567	14.11.2019						

WIN GD Winterthur Gas & Diesel

Product 6-12X92-B

Exhaust System with two turbochargers

Units	mm kg	NX	Basic Material	Net Weight 0,001

SURFACE PROTECTION SEE GROUP 0344	Made	27.07.2018	Sudant Deogade	Scale	-	Size A1	Page 2/2
TOLERANCING PRINCIPLE ISO8015	Chkd	26.03.2019	mhu019 Hug	Design Group	9726	Material ID	PAAD303417
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	26.03.2019	mhu019 Hug	Drawing ID	DAAD104419	Rev.	A

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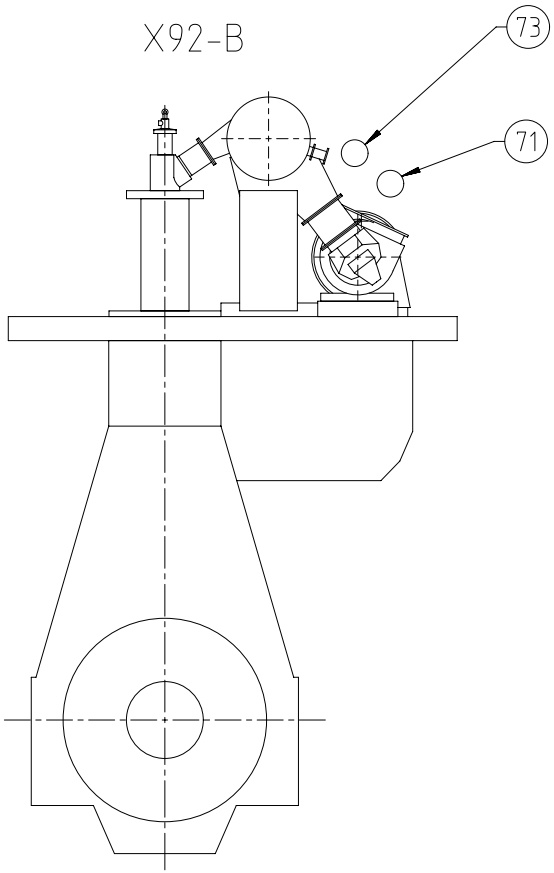
Specifications which must be met:

(73) OUTLET - Exhaust gas manifold waste gate

- Size of connection flange described in the pipe connection plan.
- Pipe diameter according to value B, 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

- 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 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. In admissible 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.
- An exhaust gas collector after the turbocharger must be installed.



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Modif.	A	EAAD091567	14.11.2019								
		Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date		

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Q-Code XXXXX

Standard ISO; JIS

Main Drw.

WIN GD Winterthur Gas & Diesel

Product 6-12X92-B

Exhaust System with three turbochargers

Units mm kg	NX	Basic Material			Net Weight 0,001
Made 27.07.2018 Sudant Deogade		Scale -	Size A3	Page 1/2	Material ID PAAD303418
Chkd 26.03.2019 mhu019 Hug		Design Group 9726	Drawing ID DAAD104420		Rev. A
Appd 26.03.2019 mhu019 Hug					

SURFACE PROTECTION SEE GROUP 0344

TOLERANCING PRINCIPLE ISO8015

GENERAL TOLERANCES ACCORDING TO ISO2768-mK

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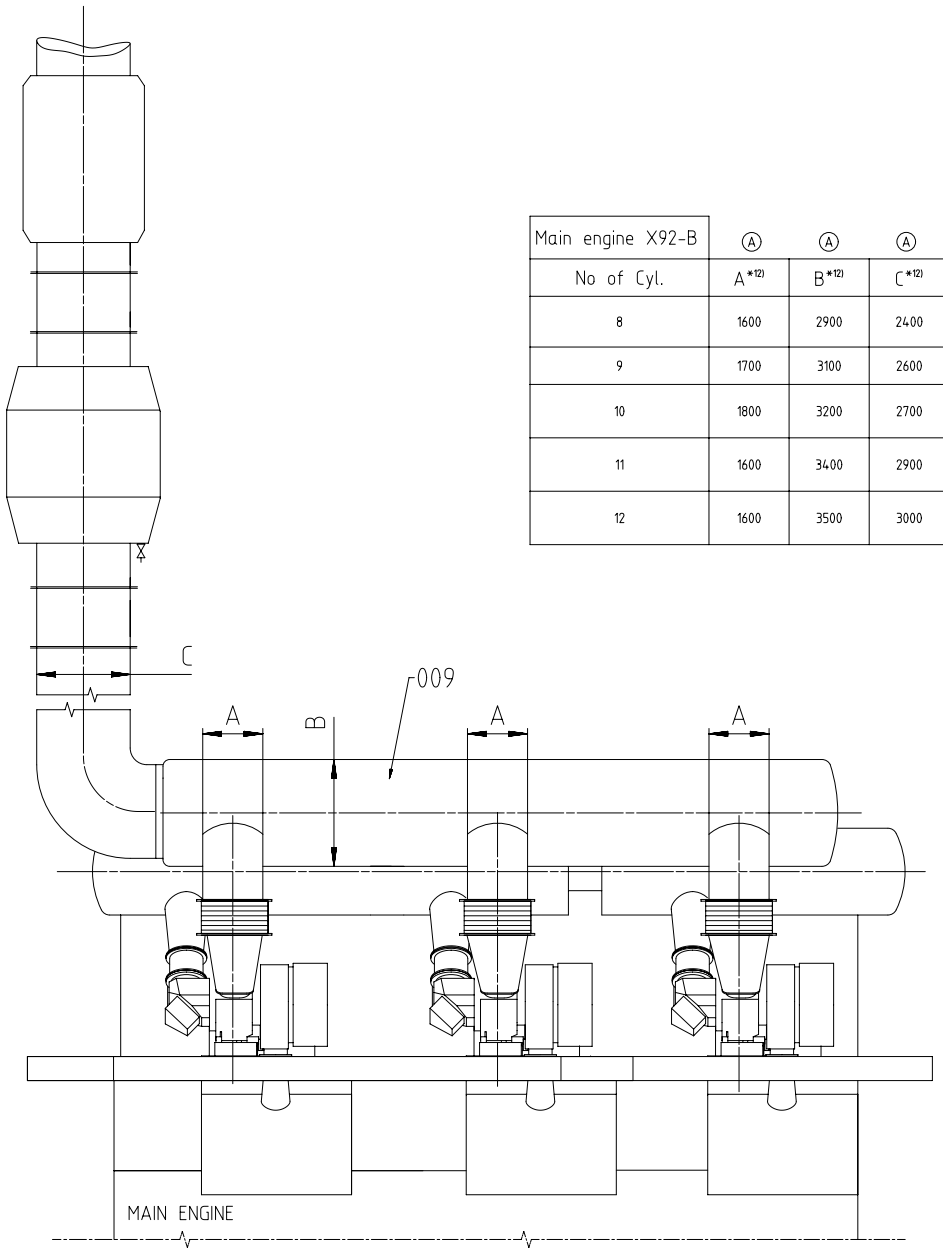
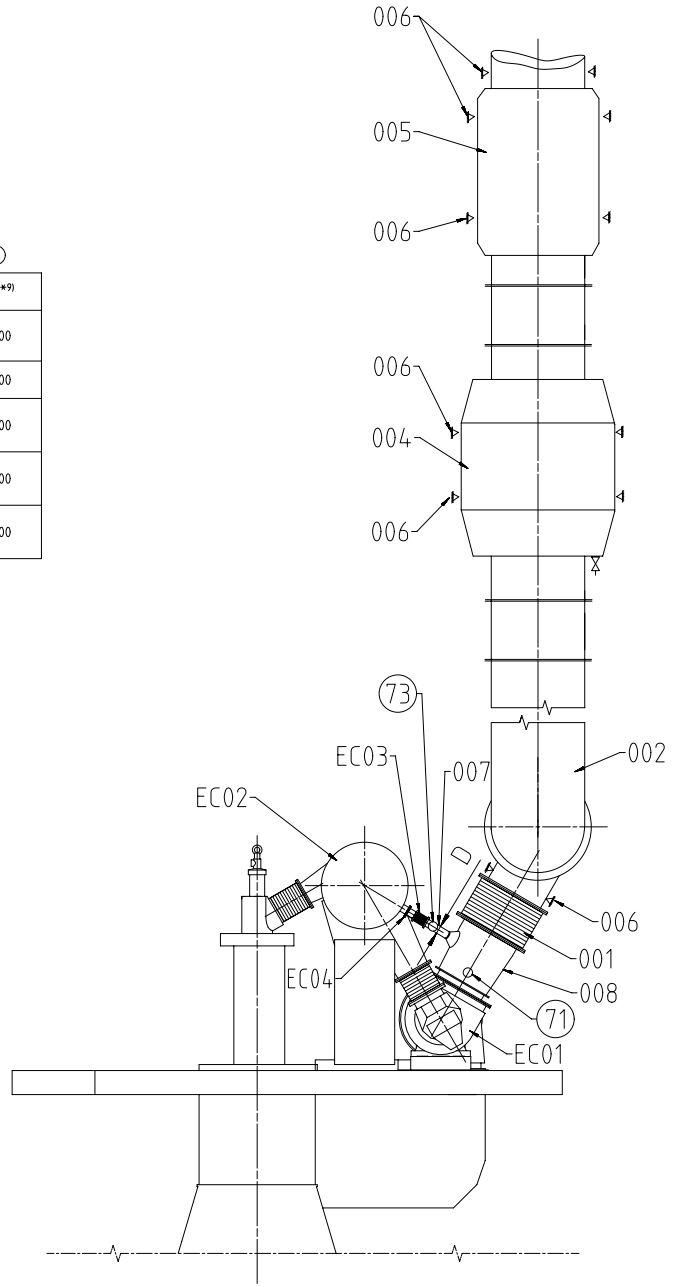
SYSTEM PROPOSAL



Main engine X92-B	Ⓐ	Ⓐ	Ⓐ	Ⓐ
No of Cyl.	A*12)	B*12)	C*12)	D*9)
8	1600	2900	2400	300
9	1700	3100	2600	300
10	1800	3200	2700	300
11	1600	3400	2900	300
12	1600	3500	3000	300



Pos.	SYSTEM COMPONENTS *1)
001	Compensator *4)
002	Exhaust gas pipe
004	Boiler *11)
005	Silencer (with spark arrester) *10)
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) *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°

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Q-Code XXXXX

Standard ISO; JIS

Main Drw.

Modif.	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number	Drawn date
A	EAAD091567	14.11.2019						

WIN GD Winterthur Gas & Diesel

Product 6-12X92-B

Exhaust System with three turbochargers

Units	mm kg	NX	Basic Material	Net Weight 0,001

SURFACE PROTECTION SEE GROUP 0344	Made	27.07.2018	Sudant Deogade	Scale -	Size A1	Page 2/2	Material ID PAAD303418
TOLERANCING PRINCIPLE ISO8015	Chkd	26.03.2019	mhu019 Hug	Design Group 9726	Drawing ID DAAD104420		Rev. A
GENERAL TOLERANCES ACCORDING TO ISO2768-mK	Appd	26.03.2019	mhu019 Hug				

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WinGD X92-B – Exhaust System (DG9726)

TRACK CHANGES

DATE	SUBJECT	DESCRIPTION
2019-03-22	DRAWING SET	First web upload
2020-09-01	DAAD104421 DAAD104420 DAAD104419	Main and system drgs – new revision

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