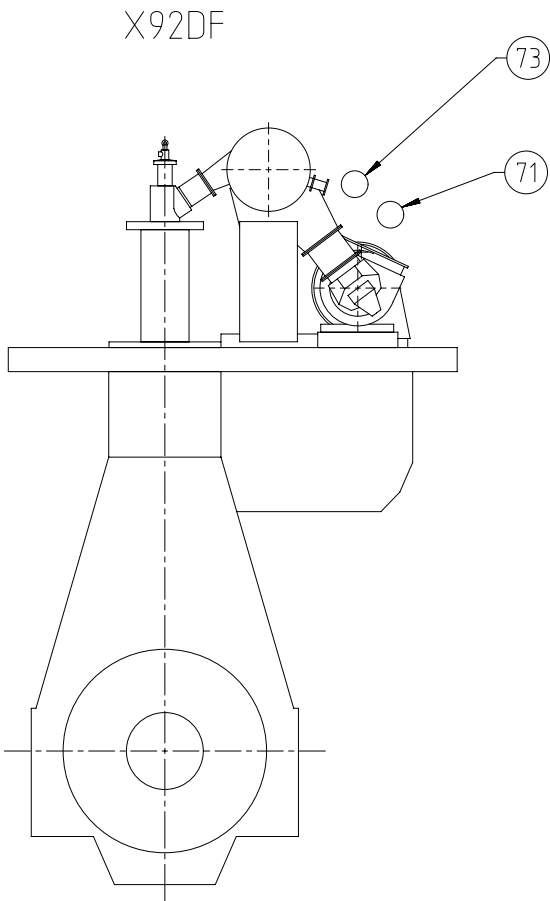




# Specifications which must be met:

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

B

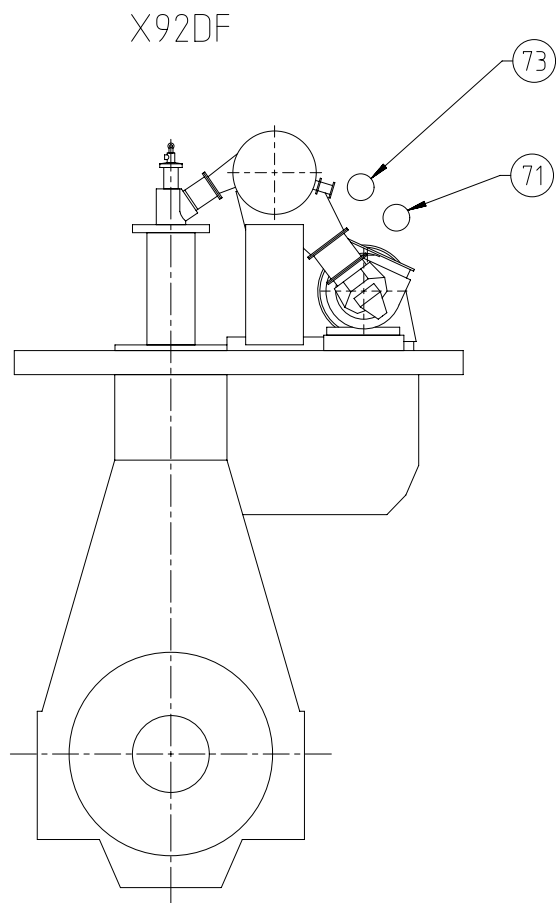
- OUTLET - Exhaust gas turbocharger
- Exhaust gas temperature and volume flow: according to GTD
  - The total back pressure of the exhaust gas system must be kept in the admissible range of:  
Design maximum (new condition) in gas mode and in diesel mode without exhaust gas treatment system: 30 mbar  
Design maximum (new condition) in diesel mode with exhaust gas treatment system: 60 mbar  
Operational maximum in gas mode: 45 mbar  
Operational maximum (fouled condition) in diesel mode without exhaust gas treatment system: 50 mbar  
Operational maximum (fouled condition) in diesel mode 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.
  - Explosion relief devices with flameless pressure relief (rupture discs or spring loaded valves) must be installed in accordance with class requirements.
  - A continuous (extensive) exhaust gas flow into the engine room must be avoided.
  - 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 tourbocharger must be installed.

Free space for lic.								Q-Code XXXXXX	Main Drw.
								Standard ISO; JIS	
Modif.	A	EAAD089573	01.10.2018	B	EAAD090535	07.04.2019			
		Number	Drawn date		Number	Drawn date		Number	Drawn date
		Product 6-12X92DF		Exhaust System with two turbochargers					
Units	mm kg	NX				Basic Material			Net Weight 0,001
SURFACE PROTECTION SEE GROUP 0344		Made	01.02.2018 dki021 DH.Kim		Scale	-		Size A3	Page 1/2
TOLERANCING PRINCIPLE ISO8015		Chkd	15.01.2018 jba039 Bae		Design Group	9726		Material ID	PAAD282443
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd	15.01.2018 mhu019 Hug		Drawing ID	DAAD095849		Rev.	B



# Specifications which must be met:

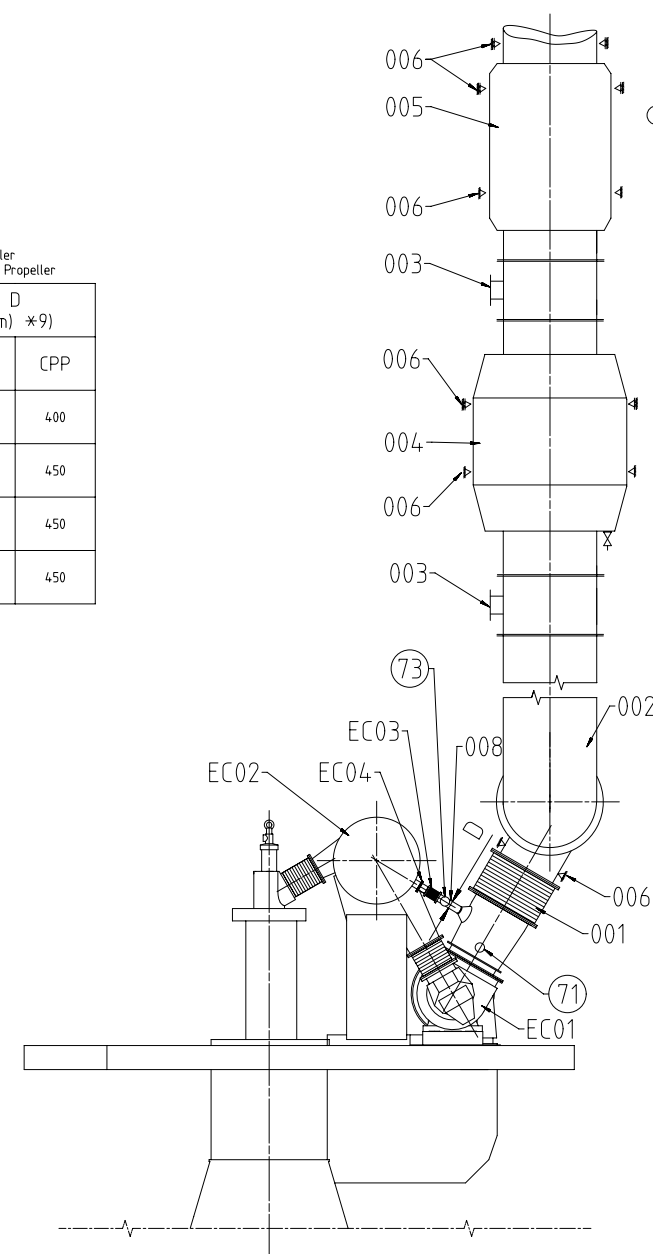
- 73
- OUTLET - Exhaust gas manifold waste gate
- Size of connection flange described in the pipe connection plan.
  - Pipe diameter according to value B, defined on page 2.
  - Waste gate connection pipe to main exhaust gas pipe should be kept as short as possible to avoid swirl and extensive back pressure.





- 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) in gas mode and in diesel mode without exhaust gas treatment system: 30 mbar  
Design maximum (new condition) in diesel mode with exhaust gas treatment system: 60 mbar  
Operational maximum in gas mode: 45 mbar  
Operational maximum (fouled condition) in diesel mode without exhaust gas treatment system: 50 mbar  
Operational maximum (fouled condition) in diesel mode 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 calculated according to the formula in MIM, TC specific thermal expansion are provided by the TC supplier.
  - Explosion relief devices with flameless pressure relief (rupture discs or spring loaded valves) must be installed in accordance with class requirements.
  - A continuous (extensive) exhaust gas flow into the engine room must be avoided.
  - 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.

Free space for lic.	Q-Code XXXXXX								Main Drw.	
	Standard ISO; JIS									
Modif.	A	EAAD089573	01.10.2018	B	EAAD090535	07.04.2019				
		Number	Drawn date		Number	Drawn date		Number	Drawn date	
		Product 6-12X92DF		Exhaust System with three turbochargers						
Units	mm kg	NX				Basic Material			Net Weight 0,001	
SURFACE PROTECTION SEE GROUP 0344		Made	01.02.2018 dki021 DH.Kim		Scale -		Size A3	Page 1/2	Material ID PAAD282462	
TOLERANCING PRINCIPLE ISO8015		Chkd	15.01.2018 jba039 Bae		Design Group 9726		Drawing ID DAAD095873		Rev. B	
GENERAL TOLERANCES ACCORDING TO ISO2768-mK		Appd	15.01.2018 mhu019 Hug							

13		14		15		16
Pos.	SYSTEM COMPONENTS *1)					
001	Compensator *8)					
002	Exhaust gas pipe *10)					
003	Explosion relief device (rupture discs or spring loaded valves) *5)					
004	Boiler *12)					
005	Silencer (with spark arrester) *11)					
006	Support *4)					
008	Waste gate pipe					
009	Transition piece *7)					
010	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 *8) *9)					
EC04	Waste gate valve					
Remarks: 8)						
- 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) Installed as fixed or sliding type in accordance with requirements. In between fixed supports a compensator (below) must be installed. Final amount and position have to be determined by the shipyard under consideration of the system layout and requirements based on installation specific calculation.						
*5) Type of device (rupture discs or self-closing spring loaded valve) to be selected in accordance with class requirements and/or specification of the shipowner. Final amount and position must be defined by the system designer/shipyard under consideration of the system layout and requirements determined by calculation. For installation with rupture discs it is required to either send an opening control signal to the safety system, which trigger an engine shutdown to avoid a continuous exhaust gas flow into the engine room, or to apply a duct leading the exhaust to the outside.						
*7) Area ratio between outlet/inlet diameter = 1.1...1.6 Taper angle = ≤ 40°						
*8) 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).						
*9) Pipe dimension on engine side (before compensator) is one nominal pipe size smaller.						
*10) To be laid out and installed according to the requirements. The radius of bends must not be smaller than 1.5 x DN.						
*11) Optional, installed as required to meet noise requirements.						
*12) Optional.						
*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 turbocharger supplier must be taken into account.						



Free space for file					G-code XXXXXX		Main Drv.
					Standard ISO; JIS		
Mod.	<input checked="" type="radio"/> A	EAAD089573	01.10.2018	<input checked="" type="radio"/> B	EAAD095535	07.04.2019	<input type="radio"/> C
	Number	Drawn date	Number	Drawn date	Number	Drawn date	Number
 Wing Motorenbau GmbH		Product 6-12X92DF		Exhaust System with three turboschargers			
Units	mm	kg	NX		Basic Material		Net Weight 0,001
Model	01.02.2018		dk021 DH.Kim		Scale	-	Size
Chkd	15.01.2018		jba039 Bas		Design Group	A1	Page 2/2
Appt	15.01.2018		mhu019 Hag		9726	Drawing No	DAAD095873
						Rev.	B

## MIDS\_WinGD-X92DF\_EXHAUST-SYSTEM (DG9726)

### TRACK CHANGES

DATE	SUBJECT	DESCRIPTION
2018-01-15	DRAWING SET	First web upload
2018-10-01	DAAD282443 DAAD282462	System drgs – new revision
2019-09-19	DAAD282443 DAAD282462	System drgs – new revision

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