
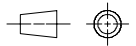


	1	2	3	4																			
A	SURFACE PROTECTION SEE GROUP 03/44				A																		
B	TOLERANCING PRINCIPLE ISO8015				B																		
	GENERAL TOLERANCES ACCORDING TO ISO2768-mK																						
	<div>Available executions</div> <table><thead><tr><th rowspan="2">Execution No.</th><th rowspan="2">Material ID</th><th rowspan="2">Cylinder No.</th><th colspan="2">Attribute 1: Gas pressure regulation</th><th colspan="2">Attribute 2: Gas supply system</th></tr><tr><th>iGPR</th><th>GVU</th><th>NG</th><th>NG+VOC</th></tr></thead><tbody><tr><td>1</td><td>PAAD283526</td><td>6-12</td><td>X</td><td></td><td>X</td><td></td></tr></tbody></table>				Execution No.	Material ID	Cylinder No.	Attribute 1: Gas pressure regulation		Attribute 2: Gas supply system		iGPR	GVU	NG	NG+VOC	1	PAAD283526	6-12	X		X		
Execution No.	Material ID	Cylinder No.	Attribute 1: Gas pressure regulation					Attribute 2: Gas supply system															
			iGPR	GVU	NG	NG+VOC																	
1	PAAD283526	6-12	X		X																		
C					C																		
	<div>NOTE</div> <p>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.</p> <p>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.</p>																						
D					D																		
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E																							
		-	sde101	mhu019	10.11.2021	CNAA000934	new Design	-	-														
		Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis	Approved	Activity Code	E	C												
			FUEL GAS SYSTEM MIDS master drawing																				
	separate BOM available		Dimension																				
F	Scale	-		NX	Units [mm] [kg]	Basic Material		Net Weight		0.001													
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					Qty per	A4	Item ID	PTAA016715		Drawing Page/s	1/1												
	1	2	3	4																			

SEQ NO	QTY	Item ID	Item Name	Dimension	Standard-ID	Basic Material	Net Weight
1	1	PAAD282495	FUEL GAS SYSTEM				0.001
2	1	PAAD278947	FLUSHING INSTRUCTION PIPING				0.001
3	1	PAAD149646	ENGINE SAFETY CONCEPT DF ENGINE SAFETY CONCEPT				0.001
Prod.	6,7,8,9,10,11,12 X92DF 6,7,8,9,10,11,12 X92DF-2.0						
Change History							
	A	sde101	nmh019	10.11.2021	01X0000939	Main Design/Drawing Introduced	43
	-	dkl021	mhu019	26.01.2018		-	-
	Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis	ApprovedActivity CodeE C
<div>WIN GD</div> <div>Winterthur Gas & Diesel</div>			FUEL GAS SYSTEM				
Bill Of Material			Dimension				
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			Main Design	Yes	Design Group	9727Q-CodeXXXXX	StandardWDS
			Qty per	Engine	A4	Item IDPAAD283526	BOM Page/s01/01

NOTE (K)
Further installation details and variants can be found listed in the Marine Installation Manual (MIM), which provides also the acronyms used in this drawing set. The piping symbols are explained by the piping symbol key as included in the drawing set "Various Installation Items".

ENGINE ROOM

MAIN ENGINE AREA

Cylinder	Volume of inner pipe (l)*	Volume of annular space (l)*
6 cyl.	615 l	220 l
7 cyl.	685 l	245 l
8 cyl.	760 l	270 l
9 cyl.	810 l	290 l
10 cyl.	880 l	315 l
11 cyl.	950 l	340 l
12 cyl.	1020 l	365 l

from compressed air supply

air suction *12

ventilation

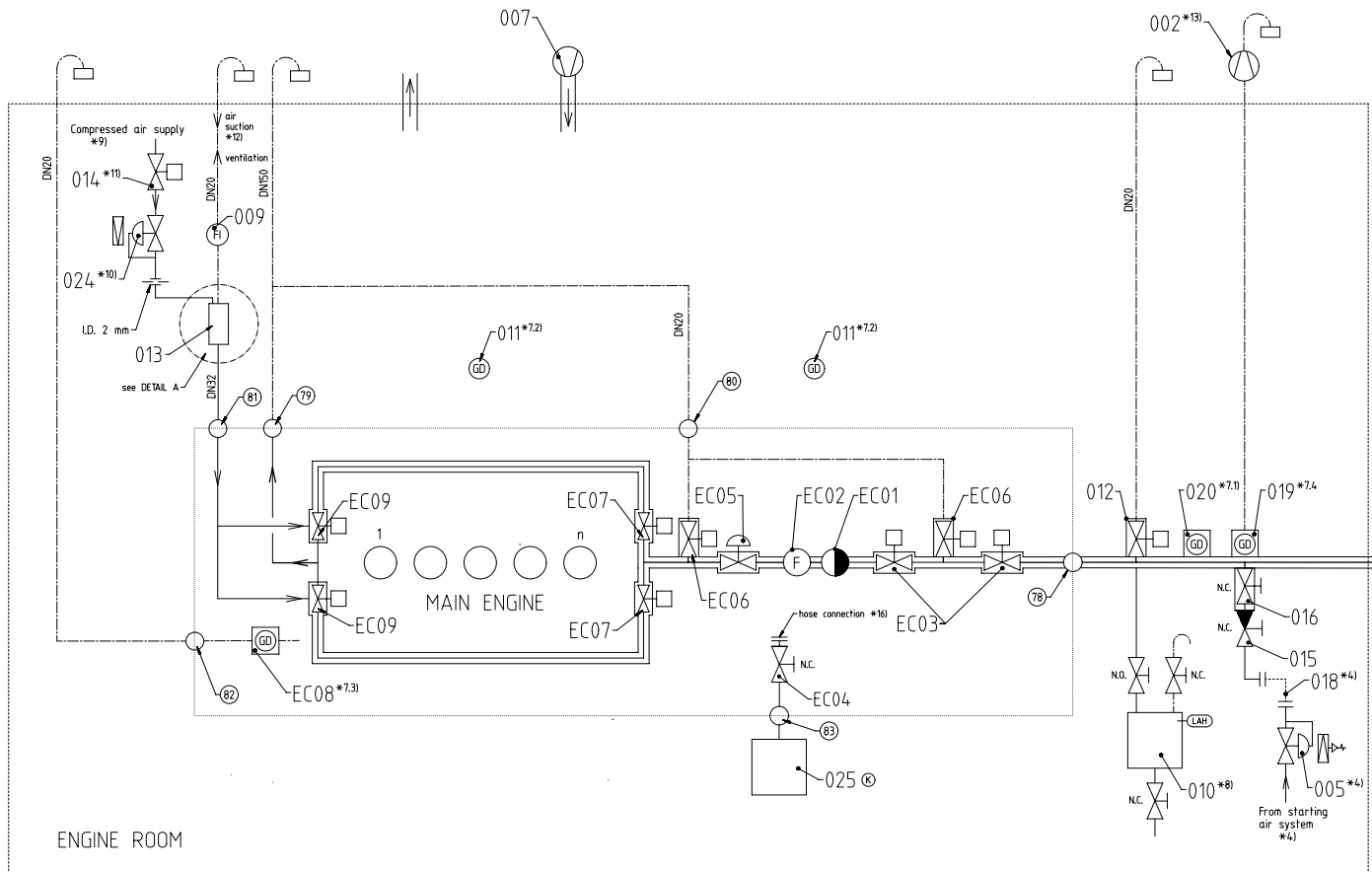
DN100

3000

013

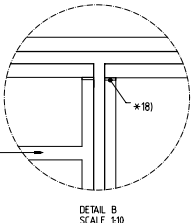
to ME "BT"

DETAIL A
SCALE 1:5



Pos.	System Components *2) (K)
001	Gas handling room/cargo machinery room
002	Extraction fan
003	Master gas fuel supply valve
004	Adjustable orifice
005	Pressure regulating valve air supply for pressure test
(K) 006	Master gas fuel engine valve *22) *14)
007	Engine room ventilation fan
008	Purging valve
009	Flow indicator
010	Condensate water trap
011	Gas detector engine room *7.2)
012	Venting valve
013	Venting box
014	Shut-off valve, compressed air supply
015	Non-return valve
016	Shut-off valve (double well execution)
018	Intermediate piece
019	Gas detector ship side *7.4)
020	Gas detector engine side *7.1)
(K) 021	Manual shut-off valve engine gas supply *20)
(K) 022	Manual shut-off valve ancillary gas supply
023	Pressure regulating valve ancillary gas supply
024	Pressure regulating valve annular space air supply
(K) 025	Inert gas supply system *17)

Pos.	Engine Components *3) (X)
EC01	Gas filter
EC02	Flowmeter
EC03	Shut-off valve
EC04	Inert gas shut-off valve
EC05	Pressure regulating valve
EC06	Vent / purging valve
EC07	Shut-off valve gas rail pipe
EC08	Gas detector piston underside
EC09	Vent valve



Engine Connections¹⁾

76	INLET – Gas Supply
79	OUTLET – Gas / inert gas release, engine driving end
80	OUTLET – Gas / inert gas release, engine free end
81	INLET – Ventilation air annular space
82	OUTLET – Gas monitoring, piston underside
83	INLET – Inert gas filling flowmeter *16)

Notes: (K)

1) For the exact position and pipe connection execution, please refer to the "Pipe Connection Plan".

2) To be installed by the shipyard.

3) To be delivered by the engine builder, i.e. already equipped on the engine side.

4) Compressed air supply is required for leakproof testing of the gas and super pipeline systems and components. Air is supplied from the starting or control air system, the pressure is reduced by the regulator to the design gas pressure. The intermediate piece (IR) must be removed during normal ME operation only! It is installed for commissioning / maintenance and the connection is blocked off.

5) Piping between the gas handling / cargo room and engine is supplied by the shipyard and is connected to the inlet flange on the engine side liquid of the counter-flange is provided in the "Pipe Connection Plan".

6) Gas line is installed below the main deck. In the engine shaft or cargo machinery space:

Double-wall pipe with inner pipe diameter of DN80 and outer pipe diameter of DN80 is recommended.

See section installed above the main deck and weather deck.

Single-wall pipe with diameter of DN80 is recommended, if the position fulfills the rule requirements of the non-hazard zone.

4) Inert gas supply: According to the specification in the NMR.

7) Gas detection for annular space with feedback to the engine control system: Mandatory. Must be equipped with a distance of max. 2m to engine side.

8) Gas detection in the engine room above the ME and the GPR: Required according to the "WinG2 2.0 Dual-Fuel Engine Safety Concept".

9) Gas detection in the engine room below the ME: Recommended.

10) Gas detection for annular space on the ship side (optional) – To distinguish between gas and engine side leaks. If the optional gas detector is not installed, the ventilation line with the extraction fan must be connected to gas detector 82B.

11) Conditional requirement: If the gas temperature is not always higher than the ambient air temperature, condensate may accumulate in the annular space. In this case, condensate traps must be arranged at the low points of the ship side gas piping. If the condensate water trap is not installed, the condensate must be normally drained. In this case, the ship side ducted N2 on the downhaul must be closed. Then the venting valve and drain valve (marked N2 on the drawing) is opened. When the trap has been drained completely, all valves are to be returned to their normal position for the tank side, if it is recommended to connect the volume under tropical conditions, the larger the tank capacity, the lower the drain requirement. Recommended draining is two times per day.

12) Conditional requirement: No condensate is allowed in the main engine's gas supply. Therefore, if the gas temperature is not higher than the ambient air temperature, a dedicated dry air supply must be arranged instead.

13) The control air supply must comply with the ISO 8573-1, class 4+5, i.e. dew point $\leq -3^{\circ}\text{C}$.

14) From the air dryer (must comply with the ISO 8573-1, class 4+5, i.e. dew point $\leq -3^{\circ}\text{C}$).

15) From the working air supply (as long as the gas temperature is always above 20°C).

16) Adjustable pressure regulating valve range 0.5 – 8 bar(g).
Pre-setting procedure: The pressure regulating valve must be adjusted so that the flow indicator 89P shows just a small flow outside when the extraction fan is in operation.

17) The on / off signal of the gas mode from the remote control system is used to open / close the valve.

18) It is cases that the compressed air supply is deactivated, an air supply supply must care for a safe fire.

19) The extraction fan must have the capacity to evacuate the ventilation air of a minimum of 38 times per hour. Please consider the annular space volume according to the Table 1 and the additional annular volume from the ship side piping. The suction pressure must cover the pressure drop over the piping on the ship side (known by the system designer) and the pressure drop over the piping and GPR on the ME side as provided in Table 2 on page 3

20) To restrict the amount of vented gas, it is recommended that valve DN60 is a reasonably short line.

21) The purging valve must be located as close as possible and downstream of the master engine valve (pos. 006). The purging valve can be connected inside or outside of the engine room. Due to class rules and/or flag state, it may be necessary to install a different arrangement, with the control air supply (marked N2) and the engine valve (006) same, an extended arrangement (e.g. with a double-blow and bleed valve in addition). In this case, the non-return functionality and the remote control function must be integrated accordingly.

22) Connection only temporarily used to opened for maintenance of the flowmeter. To be disconnected during normal operation.

23) It includes all components for inert gas storage and handling, i.e. the tank, the pressure regulation, etc.)

24) The annular space of the piping for the other gas consumers must be disconnected from the annular space of the ME gas piping, e.g. separated air suction for the other gas consumers are required.

25) Inert gas consumers (calculated according to the formula as provided in the NMR. It must consider the volume of the main engine's internal gas piping, as provided in Table 1.

Inert gas pressure: can be installed between 3 and 6 bar(g). Once set-pressure is selected, deviation of $\pm 10\%$ is allowed, though not below 3 bar(g).

26) If the "Manual shut-off valve engine supply 037B" is fitted, then it must be installed outside of the machinery space which contains gas consumers and not just before the gas handling machinery. Alternatively, a combined manually and automatically operated "Manual shut-off valve engine supply 038B" can be installed and may replace it in this regard the separate "Manual shut-off valve engine supply 037B". If the "Manual shut-off valve engine supply 037B" or the "Master gas fuel engine valve 036B" are not fitted, then a combined manually and automatically operated "Master gas fuel supply valve 035B" must be installed.

27) Air suction must be from a safe zone with an adjustable air filter fitted to the air inlet. The engine is regulated to ensure adequate ventilation for the main engine's gas piping.

28) Conditional requirement – The master gas fuel engine valve must only be installed if there is a branch pipe to the other gas consumers.

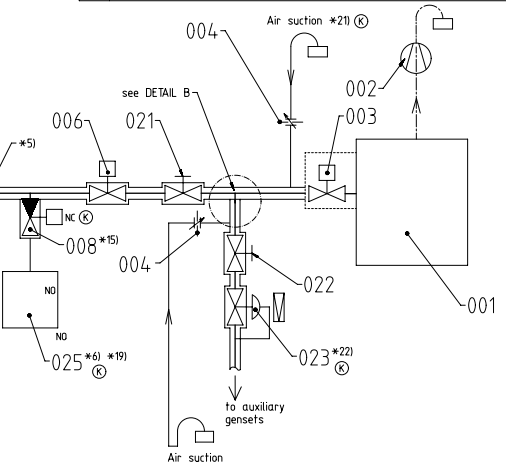
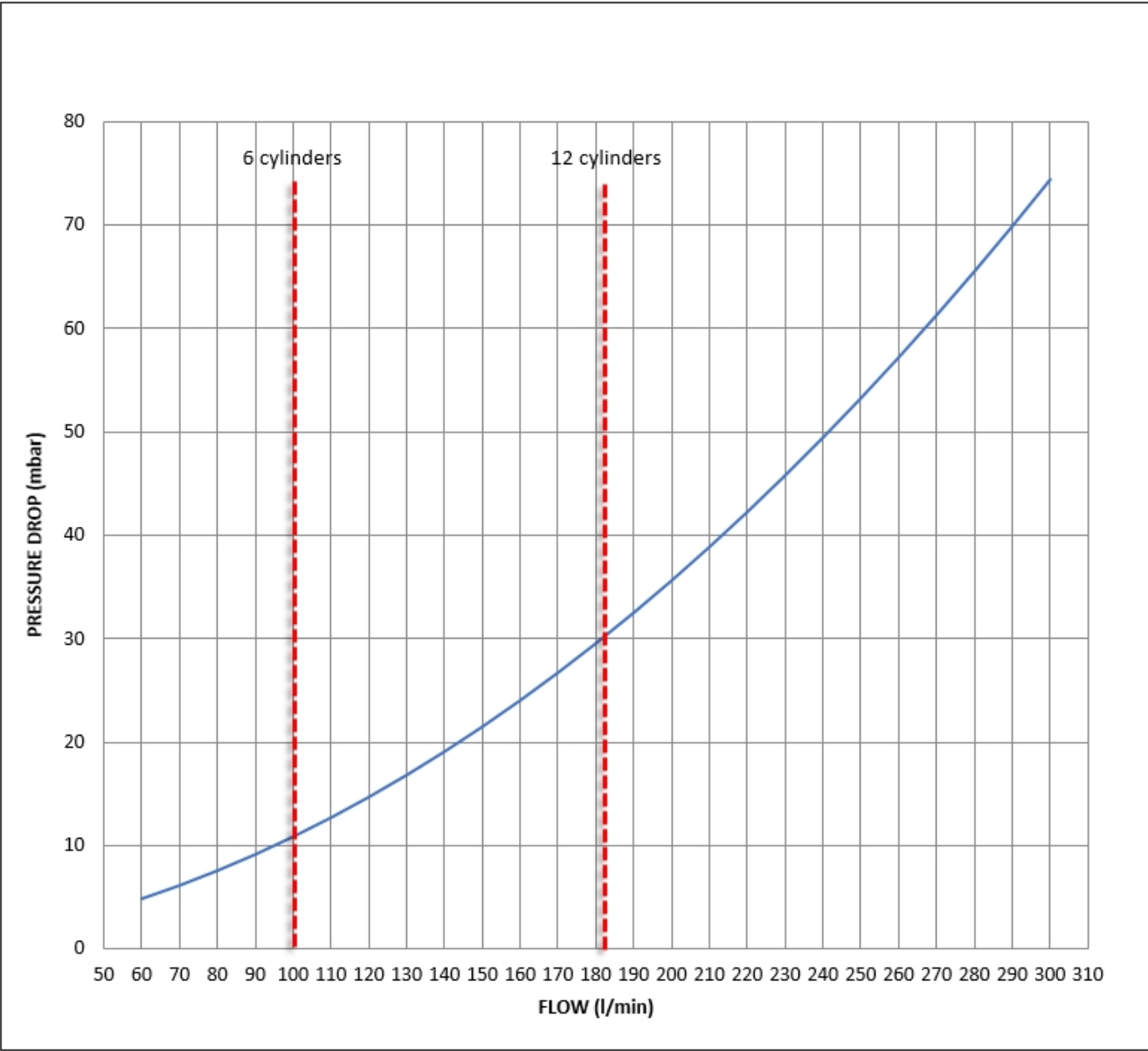




Table 2: Pressure drop over the annular space on engine side (iGPR + piping)



	Change	K	sde101	mhu019	10.11.2021	CNAA000939	Drawing Updated				4	3	
SURFACE PROTECTION SEE GROUP 0344		Rev.	Creator	Approver	Approval Date	Change ID	Change Synopsis			Approved	Activity Code	E	C
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GENERAL TOLERANCES ACCORDING TO ISO2768-mK									NX				

MIDS - WinGD-X92DF - FUEL-GAS-SYSTEM (DG9727)

TRACK CHANGES

DATE	SUBJECT	DESCRIPTION
2018-01-29	DRAWING SET	First web upload
2018-04-25	DAAD095893	System drg - new revision
2018-10-01	DAAD095893	System drg - new revision
2019-01-31	DAAD095893	System drg - new revision
2019-04-10	DAAD095893	System drg - new revision
2019-08-23	DAAD095893	System drg - new revision
2020-02-28	DAAD095893	System drg - new revision
2020-08-19	DAAD095893	System drg - new revision
2020-09-08	DAAD095893	System drg - new revision
2020-10-21	DAAD095893	System drg - new revision
2021-04-27	DAAD095893	System drg - new revision
2021-12-06	PAAD283526 PAAD282495	Main and system drgs - new revision

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