Flushing Instruction

Guidelines for the Gas Fuel Piping System

16.09.2020

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Abbreviation

DF	Dual-Fuel
DW	Double-Walled
GVU	Gas Valve Unit
GVU-ED	Gas Valve Unit - Enclosed Design
GVU-OD	Gas Valve Unit - Open Design
iGPR	Integrated Gas Pressure Regulation
ME	Main Engine, specifically refers to WinGD DF engines in this document
WinGD	Winterthur Gas & Diesel Ltd.

1 Introduction

The gas fuel piping system for the WinGD Dual-Fuel (DF) Main Engine (ME) in the engine room must be Double-Walled (DW) according to the relevant IMO rules (i.e. the IGC and IGF code). Prior to ME operation, the gas fuel piping system must be cleaned. This is for the purpose of preventing any foreign particles and/or fluid from the inner pipe from causing potential damages to the ME. Equipment such as the Gas Valve Unit (GVU) and the ME are delivered clean and protected.

The gas fuel piping system is required to contain a series of valves for the purposes of gas pressure regulation, gas release, gas segregation, as well as air ventilation functions for proper ME work and system safety. For WinGD DF engines, there are three options, including a Gas Valve Unit – Enclosed Design (GVU-ED), a Gas Valve Unit – Open Design (GVU-OD) or an ME Integrated Gas Pressure Regulation (iGPR) unit. The GVU-ED is typically installed in the middle of the gas fuel piping system and flushing is generally divided into at least two parts. The GVU-OD is installed in a similar position to the GVU-ED, however it may be closer to the fuel gas supply system. The iGPR is mounted on the ME.

Flushing of the inner gas fuel piping system must be performed using oil-free, dry compressed air or oil-free, dry nitrogen and for a duration of approximately 10 – 15 minutes at a supply pressure of 7 – 9 bar(g) as recommended by the manufacturer of the gas fuel piping system and/or the equipment. Since the vent air in the annular space is not directly injected to the ME, it is not necessary to flush the outer pipe (i.e. the annular space).

If the manufacturer of the gas fuel piping system and/or the equipment has provided specific flushing instructions, then WinGD recommends following these specific instructions.

2 Air flushing of the gas fuel piping system with the GVU-ED

The WinGD DF engines with the GVU-ED (see Figure 1) can be connected to the gas fuel piping by welded joints.

After the gas fuel piping system, the GVU-ED and any other associated equipment have been fully welded and installed, WinGD recommends flushing the system from the open pipe connection next to the engine inlet. More specifically, since the connection between the engine and the GVU is a special flange connection, flushing from the GVU inlet may cause contaminants to accumulate in this special flange connection.

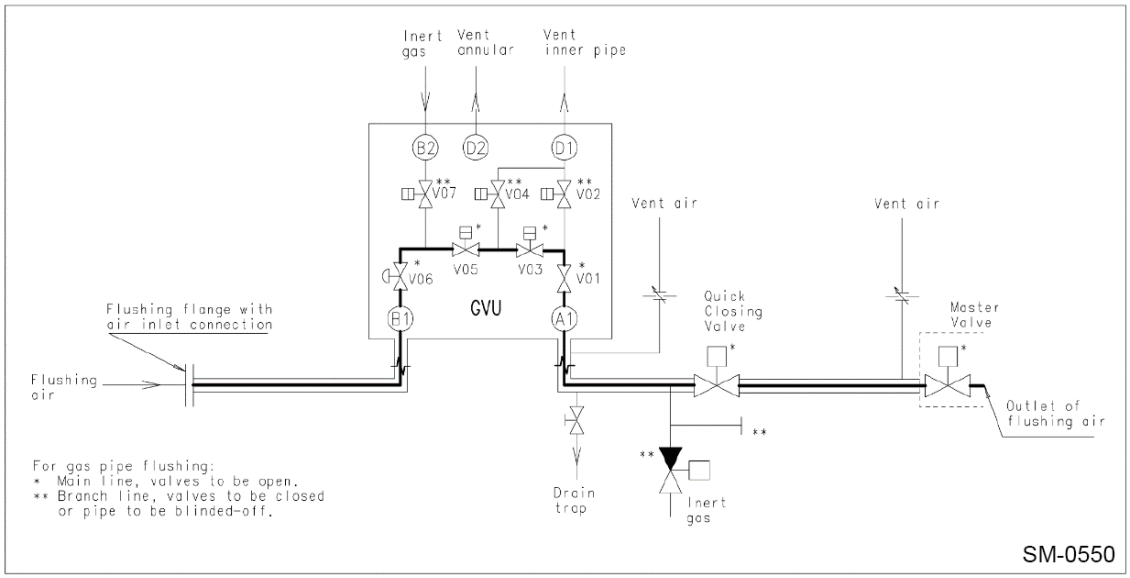

Figure 1: Flushing guideline for the welded piping with GVU-ED

Before flushing, make sure that the pipeline assembly work has been completed and that no further modifications to the piping are required.

After flushing the gas supply piping system, the expansion bellow is used to connect the engine to the gas supply piping.

Note: After the final section of pipe is welded, if the manufacturer of the gas fuel piping system and/or the equipment has specific flushing instructions for cleaning potential contaminants after welding, WinGD recommends following these specific flushing instructions.

The following includes a list of basic gas fuel pipe flushing guidelines as provided by WinGD:

1. For flushing the gas fuel piping system only (without the equipment), make sure to seal the inlet and outlet of the equipment to prevent contaminants from entering it and to avoid potential damages from happening to the equipment during the air flushing of the piping. The air flushing process must not affect the equipment.

2. If it is necessary to include the GVU in the flushing of the gas fuel piping system, then it is strongly recommended to set the flushing point at the outlet of the GVU (see Figure 1).

According to experience, the valve inside the GVU may not be opened or closed before completing system commissioning.
Consequently, the only way to complete the flushing of the entire system is to flush it during the commissioning phase (i.e. when the GVU is fully functioning and the valve can be opened or closed by the controller of the GVU).

3. The flushing medium must be oil-free, dry compressed air or oil-free, dry nitrogen. The recommended dew point temperature is less than or equal to zero degrees Celsius (0 °C).

4. The temporary flushing outlets must be positioned away from the operators in order to prevent potential injury to personnel

5. If the DW pipe manufacturer does not provide the specific flushing air flow rate, then WinGD recommends a duration of approximately 10 – 15 minutes of flushing of the inner gas fuel piping system using a supply pressure of 7 – 9 bar(g).

6. The standard solutions for testing cleanliness include the check bag, the target plate test method, or the inspection method as recommended by the DW pipe manufacturer. The cleanliness testing (i.e. flushing) which will be recognised as acceptable includes 1.0 – 1.5 minutes of flushing with no obvious moisture or debris (i.e. no rust or dust) in the target plate or check bag.

7. Any gas fuel piping or equipment that is not required for immediate use must be kept clean and protected with dry air or inert gas. If the manufacturer of the gas fuel piping system and/or the equipment has provided documentation that includes specific flushing instructions to the shipyard, then WinGD recommends following these specific instructions. This is to avoid potential conflicts or misunderstandings in flushing instructions between WinGD and the manufacturer of the gas fuel piping system and/or the equipment.

3 Air flushing of the gas fuel piping system with the GVU-OD

The gas fuel piping system with the GVU-OD (see Figure 2) typically includes a dedicated GVU room and a welded gas pipe. WinGD recommends flushing the system from the open pipe connection next to the engine inlet. More specifically, since the connection between the engine and the GVU is a special flange connection, flushing from the GVU inlet may cause contaminants to accumulate in this special flange connection.

The inner gas pipe must be flushed as shown in the guidelines provided in chapter 2.

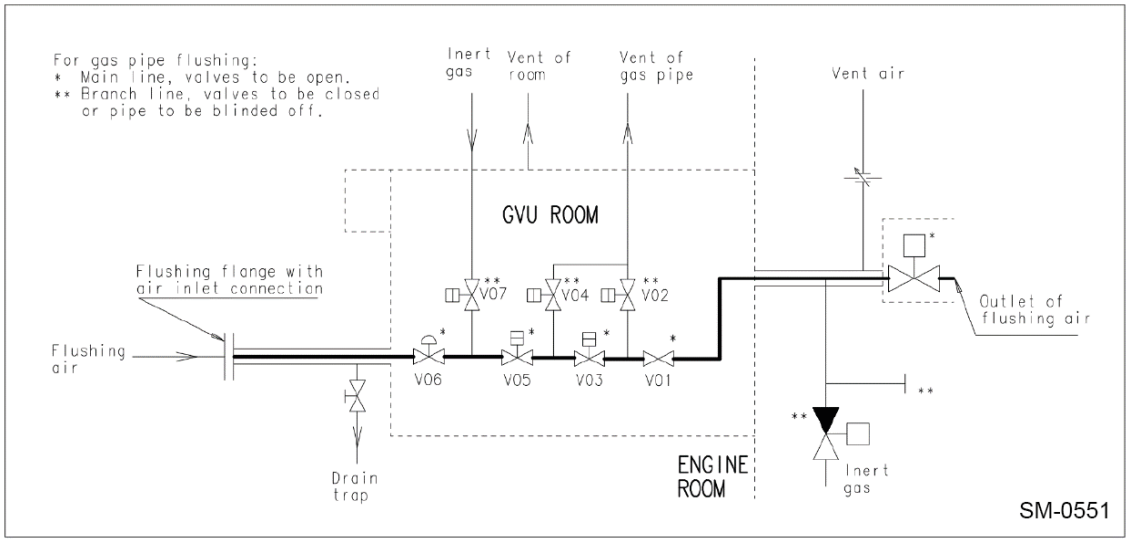

Figure 2: Flushing guideline for the welded piping with GVU-OD

After flushing the gas fuel piping system, the expansion bellow is used to connect the engine to the gas supply piping.

4 Air flushing of the gas fuel piping system with the iGPR

The WinGD DF engines with the iGPR (see Figure 3) have a more simplified gas fuel piping layout at the ship plant side as there is no need to install the GVU and its accessory components. WinGD recommends flushing the system from the open pipe connection next to the iGPR inlet. After completing the welding and flushing of the gas fuel piping system, the final section of the DW pipe must be connected to the iGPR inlet. This will complete the flushing.

The inner gas pipe must be flushed as shown in the guidelines provided in chapter 2.

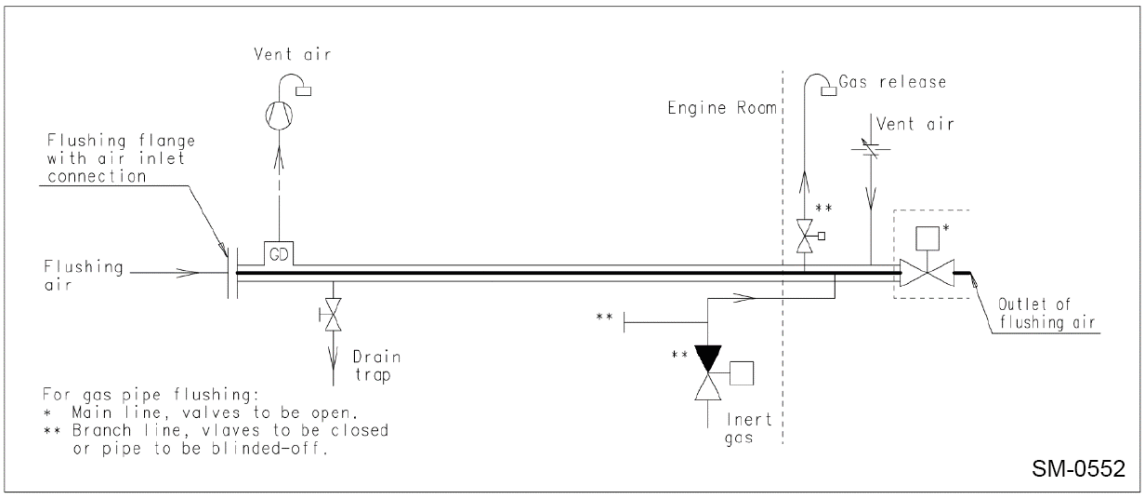

Figure 3: Flushing guideline for the welded piping with iGPR

After flushing the gas fuel piping system, the expansion bellow is used to connect the engine to the gas supply piping.

FLUSHING-INSTRUCTION_WinGD-2S_GAS-FUEL-SYSTEM

TRACK CHANGES

DATE	SUBJECT	DESCRIPTION
2017-11-03	INSTRUCTION	First web upload
2017-01-12	DAAD094163	New revision

DISCLAIMER

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