Kashiwa Tech Co., Ltd.

System:

HIGH EXPANSION FOAM FIRE EXTINGUISHING SYSTEM

(For Engine room and Car hold deck)

Title:

System's reliability brief check list

SHIP's Name :

IMO No.:

SHIPYARD:

SHIP No.:

Signature (Fill in as necessary.)

Date: _____ Inspector: _____

This checklist is prepared to briefly assess the condition of our high expansion foam fire extinguishing system on your ship and maintain its soundness.

Our system is supposed be maintained according to the instructions in MSC/Circ.1432. We have found recently, however, that not a few systems are poorly maintained. Proper inspection and maintenance are essential for the system to function as designed. To ensure the reliability of the system, you are kindly requested to use this checklist to ensure that the system is kept in good working order.

Please note that the foam generators installed in car holds on vehicle carrier ships have two types: cone-shaped and panel-shaped. The inspection procedure for the dampers in this document is specifically for the cone-shaped foam generators. On the other hand, the inspection procedure for the foam proportioning device is applicable to both types of the system.

To ensure the dependability and soundness of our fire extinguishing system on your ship, the collaboration among the shipowner, ship management company, and Kashiwa as the manufacturer is vital. To that end, it would be appreciated if you inform us of the inspection result from the following email address below,

support@kashiwa-tech.co.jp

The shared information is kept under one umbrella in an inspection log and utilized to offer you a timely and tailored support including technical advices and arrangement of necessary replacement parts.

CONTENTS

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The inspection procedure for the foam proportioning device applies to both engine room and vehicle deck systems.

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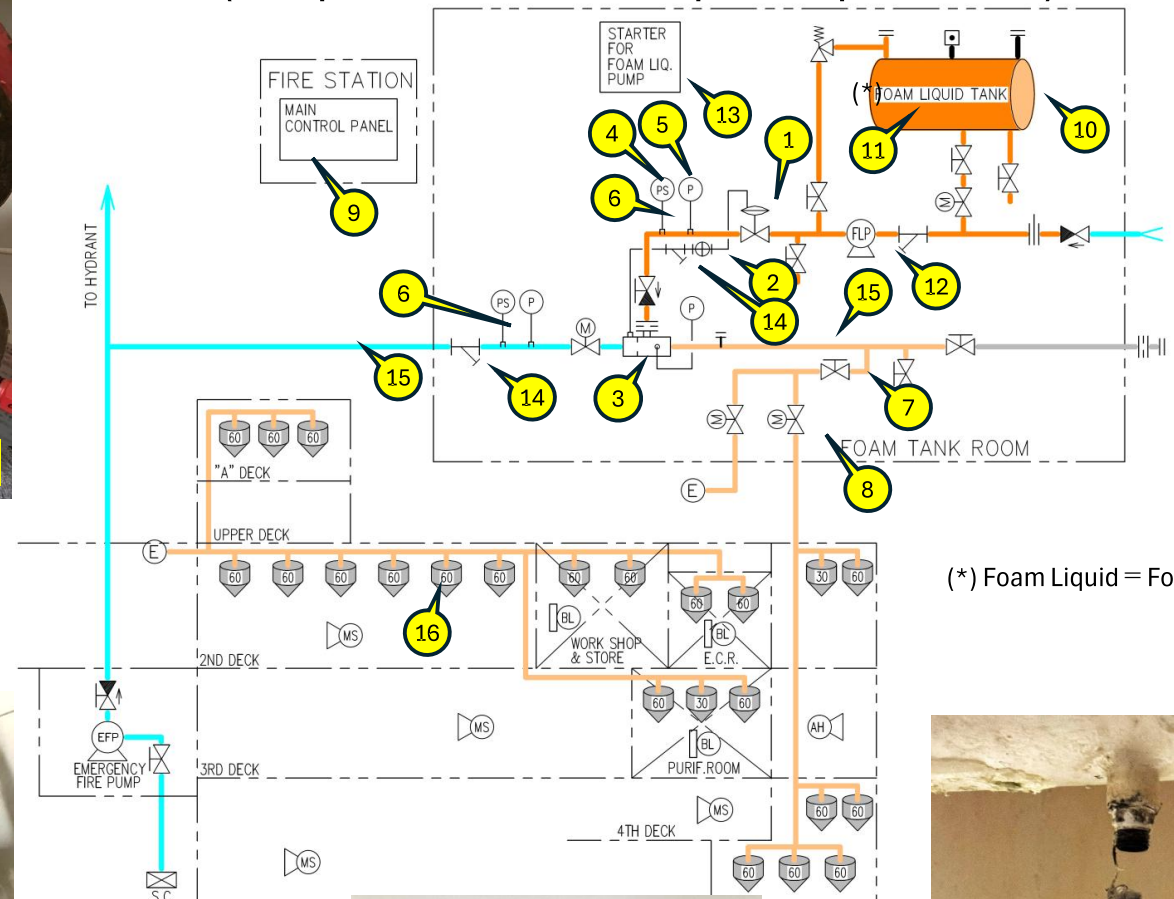
1. Check list for foam proportioning device in E/R.

A typical arrangement

(The photos show examples of problems.)

1

RUSTED AND DAMAGED INSIDE



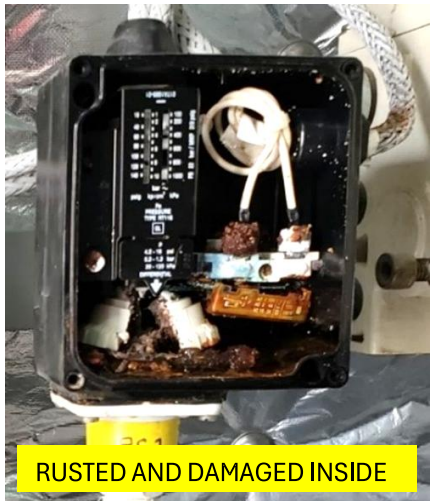
3

CLOGGED TUBING/PIPING

AFTER CLEANING

(*) Foam Liquid = Foam Concentrate

4



RUSTED AND DAMAGED INSIDE

1

TORNED RUBBER SHEET

6

CLOGGED TUBING/PIPING

Note: The numbers in this piping diagram refer to the numbers shown in the check list.

Brief system reliable check list for HIGH EXPANSION FOAM FIRE FIGHTING SYSTEM

Ship Name: **IMO NO.:** **Inspection date:** **Inspected by:**

No.	Item	Check point	How to check	Trouble reference	Result		Special Note
					GOOD	BAD	
1	Diaphragm Control Valve (DCV)	*Inside condition *Diaphragm sheet condition *Years in service (less than 5 years).	Disassembly inspection	Deterioration / hardening / cracking	☐	☐	*The diaphragm sheet is a consumable item; therefore, it should be replaced if its condition is not satisfactory or on a periodic basis every five years. *The diaphragm sheet has a defined installation orientation.
2a	DCV Pilot V. (Manual valve type)	Valve in open position (system ready condition)	Visual check of valve position	Valve in closed position	☐	☐	If the pilot valve is closed, foam liquid proportioning will not operate.
2b	DCV Pilot V. (Motor operated type)	Valve in close position (system ready condition)	Visual check of valve position	Valve in opened position	☐	☐	The motor operated valve opens automatically when system started.
3	Eductor	*Clogging *Damage, Corrosion	Check the orifice plates and sampling boss	*Clogging *Damage, Corrosion	☐	☐	
4	Pressure switch	Function	By simulator such as hand pump, etc.	Physical damage Corrosion (rust) Clogging Micro switch malfunction Poor electrical continuity	☐	☐	System will not start if pressure switch is not normal.
5	Pressure gauge	Function	By simulator such as hand pump, etc.	Malfunction	☐	☐	Incorrect pressure indication may cause confusion in emergency situation.
6	Cupper tube condition for Pressure switch / Pressure gauge / Pilot sampling line	*Clogging *Damage, Corrosion *Water accumulation on cupper tube	By air blowing and visual appearance checking	Water accumulate in the tube. Clogged by sediment.	☐	☐	System will not start if sampling is not possible.
7	Manual valves	Valve position check	Visual check of valve position	Valve in incorrect position.	☐	☐	The required position differs depending on the valve, so please check the final drawing. (Some valves not shown in the drawing might be installed; please check the entire line.)
8	Motor operated valves	Function	Operation via manual switch in control panel.	Mulfunction Poor electrical continuity	☐	☐	Check for any accumulated water in the pipeline where the valves are installed before the confirmation. If water is inside, it may flow out into the protected space when the valve is opened. Return the simulation switch to its original position after confirmation.
9a	Control panel	Power supply	Power is continuously supplied.	No power supplied	☐	☐	A continuous power supply is required.
9b	Control panel	Indication lamps and buzzer on the panel. Functional check of the local alarm device	Operate the lamp & buzzer test button	Malfunction Mechanical failure Poor electrical continuity	☐	☐	

Note: The numbers in this check list refer to the numbers shown in the piping diagram.

No.	Item	Check point	How to check	Trouble reference	Result		Special Note
					GOOD	BAD	
9c	Control panel (Programmable Logic Controller if applied)	*Function *Model (Discontinued) *Years in service (less than 10 years).	*No error message on the PLC. *Model type (C200H series is discontinued and no longer supported.). *Years in service.	*Malfunction (Error condition) *Out of battery service life	☐	☐	The design service life of the battery is 5 years, and that of the PLC is 10 years, as officially announced by the PLC manufacturer. If the PLC is out of order, the system does not work at all and needs to be operated manually. Note) If a Programmable Logic Controller is not applied, skip this checkpoint.
10	Foam liquid tank	Leakage Corrosion	Visual inspection	Leakage Corrosion	☐	☐	Note) Foam liquid" refers to "Foam concentrate" in this checklist. This definition applies throughout this document.
11a	Foam liquid	Remaining foam liquid amount	Visual inspection by level gauge	Insufficient foam liquid amount	☐	☐	The insufficient amount fails to meet regulatory requirements and is highly likely to result in the vessel being placed off-hire if identified during a PSC inspection.
11b	Foam liquid (The physical properties test)	Physical property test	The physical properties of the foam liquid must be analyzed periodically as required by regulations.	Out of acceptable performance range.	☐	☐	Failure to analyze the foam liquid constitutes non-compliance with regulations.
11c	Foam liquid (PFOS regulation)	Verification is required to ensure that foam liquid containing PFOS above the IMO-regulated level is not being used.	If this is unfamiliar, please consult KASHIWA TECH CO., LTD.	With out verification cert. or analysis report.	☐	☐	
12a	Foam liquid pump (Centrifugal pump)	Leakage Corrosion	Visual inspection	*Leakage *Corrosion	☐	☐	
12b	Foam liquid pump (Gear pump)	Turning smoothness	Turning	Pump seized	☐	☐	
13	Foam liquid pump sterter	Operation mode	Checking if the mode is properly set at remote position	The mode was set at manual position wrongly	☐	☐	If the mode is set at manual operation position, pump cannot be started automatically in system operation. Note: As the function and configuration depend on the ship, check the final drawing and operation manual for details.
14	Strainer (Foam liquid line and pilot line for DCV)	Screen	*Visual inspection *Cleaning	*Clogging	☐	☐	
15	Piping (Sea water line, Foam liquid line, Foam solution line)	*Leakage *Corrosion *damage	Hammer sounding test or ship's designated procedure	Burst water supply pipe during operation	☐	☐	
16	Foam generators	*Corrosion *Damage / deformation *Cleanliness (dust or clogging)	Visual inspection	*Deformation *Clogging	☐	☐	

Note: The numbers in this check list refer to the numbers shown in the piping diagram.

DEFECT REMARKS ENTRY SHEET

Ship Name: **IMO NO.:** **Inspection date:** **Inspected by:**

No.	Item	Check Item Reference	Defect Category	Symptom Description	Expected root cause analysis	Remarks
ex.	Pressure switch for sea water line	Item 4	Function Error	The micro switch does not respond to simulation test. Besides, visible rust is confirmed.	Internal microswitch may have damaged due to corrosion.	Replacement is required.
ex.	Pressure gauge for foam concentrate line	Item 5	Indication Error	Gauge reading shows 0.3 MPa deviation compared to calibrated reference gauge.	Possible internal mechanism wear or malfunctioning.	Replacement is required.
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Kashiwa Tech Co., Ltd.
January 2, 2026

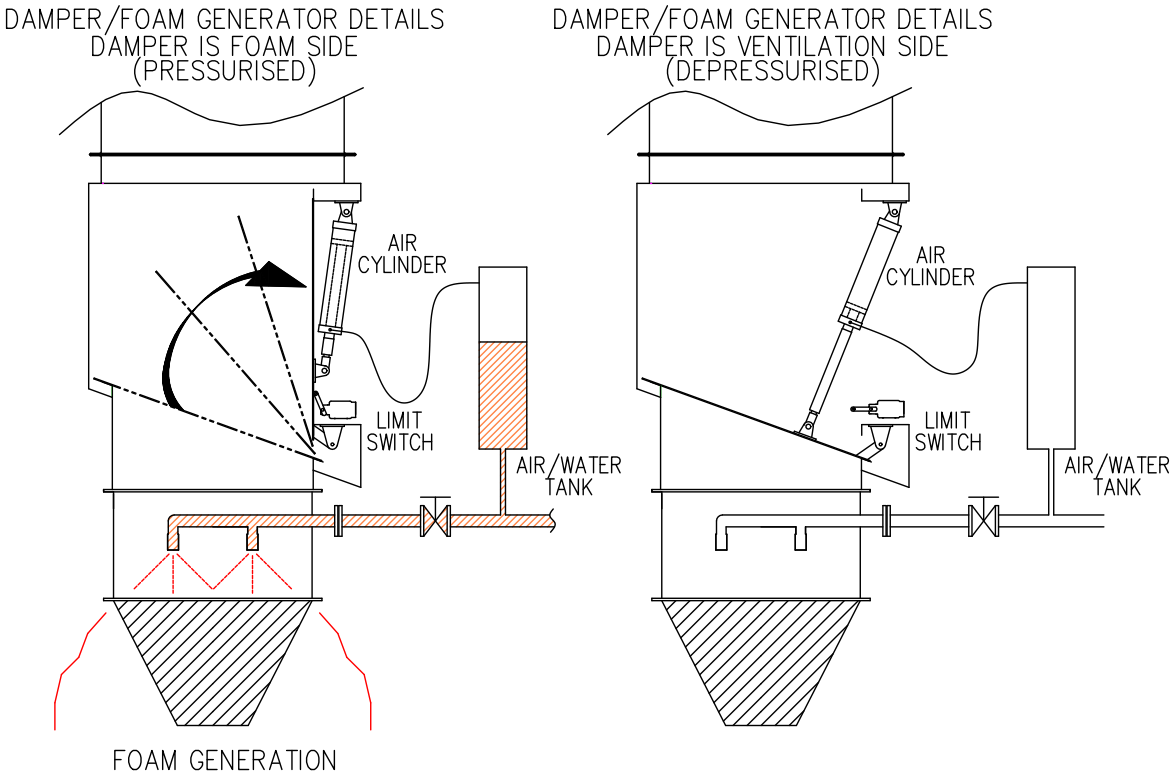
Inspection of Foam Dampers of High Expansion Foam Fire-fighting System for Vehicle Carrier Ships

To whom it may concern,

This is to request you to check the foam dampers of our high expansion foam fire-fighting system installed in car holds of your vehicle carrier ship at the earliest opportunity to ensure its reliable operation.

The inspection by our service engineers have found on some ships that the said dampers are poorly maintained and have significant defects that could render the dampers inoperable in case of emergency, but its seriousness is not recognized by the crew or relevant personnel.

The foam damper usually blocks an air flow path to the foam generator in a normal voyage and ensures ventilation. In case of fire, the foam solution (a mixture of sea water and the foam liquid) running in the discharge line for a relevant zone applies pressure to the air/water tank, which actuates the air cylinder to promptly (with a slight time-lag) activate each foam damper in the zone to open the air flow path to the foam generator. This action presses the limit switch to send a signal to the fan starter panel to start running the fan.



Mechanism of typical damper (one of the variations)

Malfunction of the foam dampers and limit switches could render the system inoperable, resulting in a disastrous consequence in case of fire.

Please follow the inspection procedure outlined below for the foam dampers and limit switches to check their proper operation.

The foam dampers require annual check. You are kindly requested to ensure that they are properly maintained.

You can have your crew perform the inspection, or delegate us or one of our certified agencies to perform the work. Please feel free to contact us for any technical advice on the inspection.

Contact for inspection service and quotation for replacement parts:

E-mail: sales@kashiwa-tech.co.jp

Please include IMO No. and ship name.

Contact for technical advice for inspection and inspection results:

E-mail: support@kashiwa-tech.co.jp

Please include IMO No. and ship name.

We have found on quite a few ships that the limit switches have stuck or jammed, or have no contact with the dampers. If they have not been replaced so far, it is strongly recommended to procure the spares for all the switches and their levers for replacement before the inspection begins.

You can check the operation by either: a) using general service air to pressurize the discharge line to activate the foam dampers in a given zone altogether, or b) locally activating each foam damper manually.

The method a) is preferable for the inspection in repair docking because it takes considerable time to pressurize a large volume of air to fill the entire zone discharge line, and requires checking the foam dampers in the relevant zone all at once.

The method b) employs a portable motor-driven air pump or utilizes compressed air taken from the general service air line in the vicinity of the foam damper to check to directly apply pressure to the cylinder. The inspection in this method can be arranged more flexibly than the other according to the ship's schedule, but requires having such tools as the portable pump or a hose and reducing valve on hand in advance.

Please choose one of the inspection methods and carefully read the relevant inspection procedure shown from the next page. Get a full picture of what is involved in the inspection and set everything ready beforehand. Once the inspection is done, please inform us of the result.

Inspection Procedure for Foam Dampers of High Expansion Foam Fire-fighting System for Vehicle Carrier Ships (Mass Inspection)

Introduction

This procedure is to inspect the operation of the foam dampers for the foam generators installed in car holds. Check items are the air hose and air cylinder to operate the foam damper, and limit switch to activate the fans.

General Outline

The general service air is introduced into the zone discharge line to apply pressure to the air/water tank for each foam generator in a given zone. The pressure transmitted through the air hose actuates the air cylinder to activate the foam damper to switch over an air flow path to the foam generator. This happens on the foam generators in the zone all at once.

The working pressure for the air cylinder is at most 0.25 MPa. To introduce the general service air into the zone discharge line, such equipment as a hose, fitting, and reducing valve would be needed for the connection as the case may be.

A manual valve or spectacle blind flange should be provided immediately in front of each foam generator to shut the foam solution.

<Preparation>

A) Download the inspection sheet in advance from the link below to list all the foam generators equipped with the foam damper.
https://kashiwa-tech.co.jp/maintenance/hx/CheckList-For-PCC-HX-Foam-Damper.xlsx

B) Drain residual water in the relevant piping completely to avoid spills in a protected zone.

C) Set the relevant valves (valves in the steering gear room and the manual valve or spectacle blind flange arranged immediately in front of each foam generator) as shown in Fig.1. Operate the test switch in the main control panel to set the only relevant automatic valve as indicated. Wrong setting could result in an outflow of the residual water in the piping to the protected zone.
This procedure specifically refers to A-ZONE, but the steps are applicable to any zone in the exactly same manner.

D) Check that all “OPEN” indicators on the main/sub control panel are turned off for the foam dampers.

E) Close all irrelevant valves just in case.

F) Use a hose or the like to connect the air test connector on the zone discharge line and the general service air line. Arrange a reducing valve and regulate the air supply pressure to the working pressure of the air cylinder, that is 0.25 MPa.

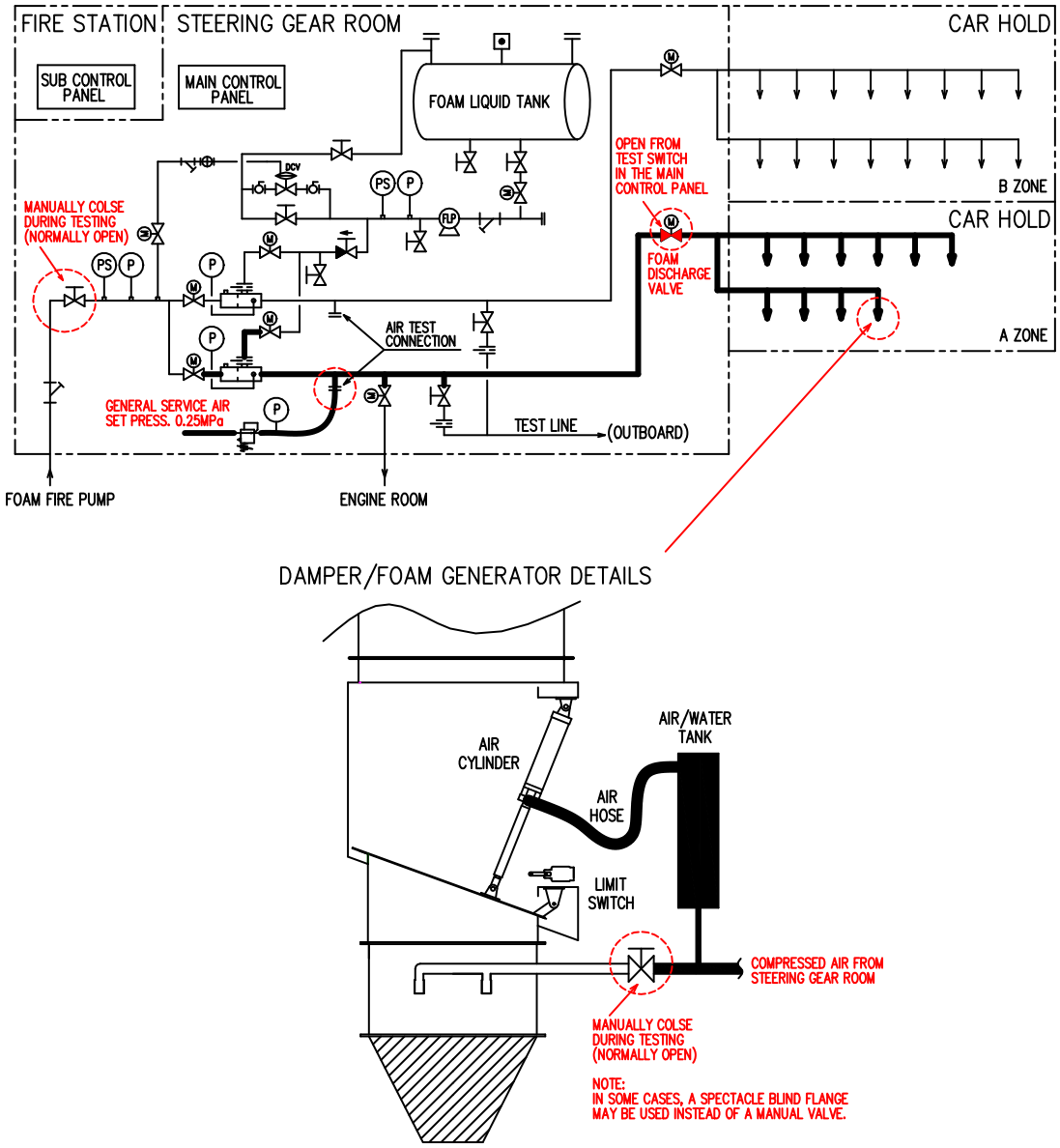


Fig.1

Remarks (for A-ZONE)

- Close the manual valve on the line from the foam fire pump (which is normally open) to avoid spills in the protected zone.
- Connect the air test connector on the zone discharge line to the general service air line with a hose (with a reducing valve and pressure gauge attached).
- Operate the test switch in the main control panel to open the foam discharge valve for A-ZONE (which is normally turned to “NORMAL” position).
- Close the manual valve or spectacle blind flange arranged immediately in front of each foam generator (which is normally open).

<Inspection Procedure>

1. Introduce a pressurized general service air (at 0.25 MPa) into the zone discharge line.
   ※ It takes time to fill the entire piping in the relevant zone.
2. When the pressure in the piping reaches 0.25 MPa, stop delivering the general service air and make sure that the pressure is maintained. If it is not, locate a leakage point and mend it. If it is, resume the delivery of the general service air.
3. Check locally that the damper switches over the air flow path to the foam generator.
   ※ Be aware that the damper could suddenly start moving.
   ※ Remove any dust or debris that could hinder smooth operation of the damper.
   ※ Presumable causes of function failure of the damper are: malfunction of the air cylinder, stuck clevis, corroded hinge, or breakage of the air hose.
4. Check that the corresponding “OPEN” indicator on the main/sub control panel lights up when the damper moves as intended and successfully presses the limit switch.
   At this time, check that the damper and the limit switch are operating smoothly.
   ※ If the damper or the limit switch does not operate smoothly, inspect their respective moving parts.
   ※ It is the limit switch that turns on the “OPEN” indicator. If it fails to turn on, identify the cause locally. It may be the malfunction of the switch itself, or a gap between the damper and the switch.
   ※ If the switch malfunctions, replace it with the new one.
   ※ If the lever of the switch does not reach the damper, adjust it.
   ※ If the air hose connected to the cylinder has a leakage, replace it with the new one.
5. After the inspection is done for all the dampers, stop delivering the general service air.
6. Open the manual valve or spectacle blind flange arranged immediately in front of each foam generator to depressurize and release the air.
7. Check that in response to the above action, the damper moves back to its original position and the corresponding “OPEN” indicator on the main/sub control panel turns off.
   ※ Some types of the air cylinders are provided with a three-way pilot valve to prevent malfunctions. Operate the valve following its instruction manual to bring the damper back to its original position.
   ※ Due to its shape, some dampers may require manual assistance to get back to their original position. Check locally to ensure that the damper completely moves back to its original position.
8. Check all “OPEN” indicators turn off.

<Restoration after the Inspection>

1. Turn the automatic valve operated with the test switch in the main control panel to “NORMAL” position.
2. Turn all the manual valves to “NORMAL” position.

3. Disconnect the line (hose) to deliver the general service air into the zone discharge line and restore the air test connector.
4. Make sure that everything is restored to “NORMAL” condition.
5. Ensure that all the accessories (e.g. air cylinder, air hose, limit switch, and cupper pipe) are correctly attached.

Inspection Procedure for Foam Dampers of High Expansion Foam Fire-fighting System for Vehicle Carrier Ships (Individual Inspection)

Introduction

This procedure is to inspect the operation of the foam dampers for the foam generators installed in car holds. Check items are the air hose and air cylinder to operate the foam damper, and limit switch to activate the fans.

General Outline

Pressure is applied by using a portable motor-driven air pump or introducing the general service air via the air hose which is disconnected from the air/water tank for a selected foam generator. The pressure applied through the air hose actuates the air cylinder to activate the foam damper individually to switch over an air flow path to the foam generator.

The working pressure for the air cylinder is at most 0.25 MPa. To directly supply air to the cylinder, a pressure regulating portable pump (powered by a battery) along with its fitting would be needed. To deliver air from the general service line to the cylinder, such equipment as a hose, fitting, and reducing valve would be needed. Please see that all necessary equipment and parts are ready on hand.

<Preparation>

A) Download the inspection sheet in advance from the link below to list all the foam generators equipped with the foam damper.
https://kashiwa-tech.co.jp/maintenance/hx/CheckList-For-PCC-HX-Foam-Damper.xlsx

B) Detach the air hose from the air/water tank and connect it to an air supply source as shown in Fig.1.

C) Check that all “OPEN” indicators on the main/sub control panel are turned off for the foam dampers.

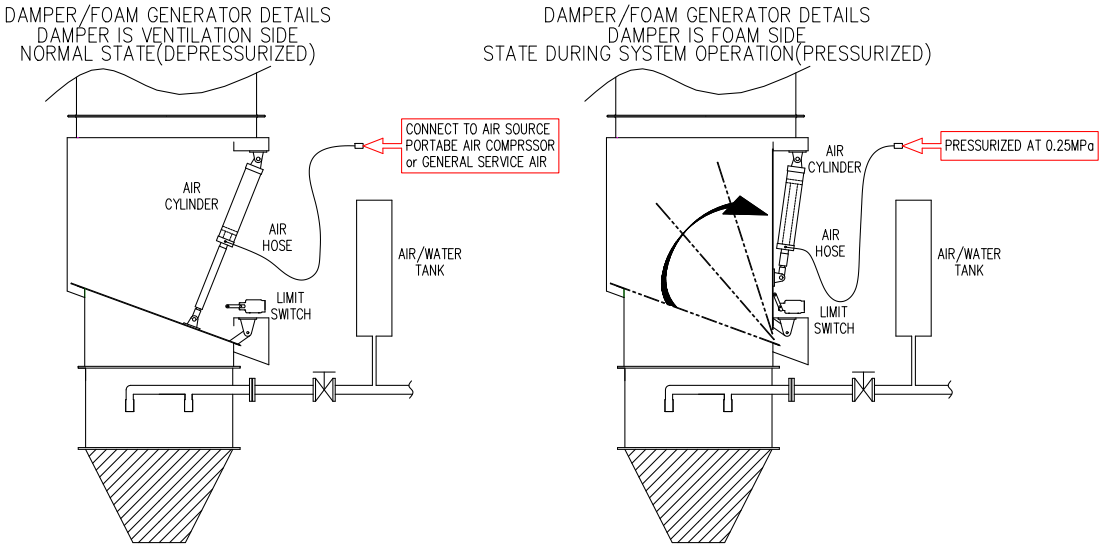


Fig. 1

<Inspection Procedure>

1. Apply pressure at 0.25 MPa from the air supply source.
2. When the pressure reaches 0.25 MPa, check that the damper gets activated and switches over the air flow path to the foam generator, and that no leakage from the air hose is found.
   ※ Be aware that the damper could suddenly start moving.
   ※ Remove any dust or debris that could hinder smooth operation of the damper.
   ※ Presumable causes of function failure of the damper are: malfunction of the air cylinder, stuck clevis, corroded hinge, or breakage of the air hose.
3. Check that the corresponding “OPEN” indicator on the main/sub control panel lights up when the damper moves as intended and successfully presses the limit switch.
   At this time, check that the damper and the limit switch are operating smoothly.
   ※ If the damper or the limit switch does not operate smoothly, inspect their respective moving parts.
   ※ It is the limit switch that turns on the “OPEN” indicator. If it fails to turn on, identify the cause locally. It may be the malfunction of the switch itself, or a gap between the damper and the switch.
   ※ If the switch malfunctions, replace it with the new one.
   ※ If the lever of the switch does not reach the damper, adjust it.
   ※ If the air hose connected to the cylinder has a leakage, replace it with the new one.
4. After the inspection is done, stop delivering the air.
5. Depressurize and release the air.
6. Check that as the pressure drops, the damper moves back to its original position and the corresponding “OPEN” indicator on the main/sub control panel turns off.
   ※ Some types of the air cylinders are provided with a three-way pilot valve to prevent malfunctions. Operate the valve following its instruction manual to bring the damper back to its original position.
   ※ Due to its shape, some dampers may require manual assistance to get back to their original position. Check locally to ensure that the damper completely moves back to its original position.
7. Follow the same sequence to test all other foam generators equipped with the foam damper.

<Restoration after the Inspection>

1. Put the air hose back to the air/water tank.
2. Make sure that everything is restored to “NORMAL” condition.

Portable Motor-driven Air Pump (for Reference)

We usually use a battery-powered air pump such as the one shown below to test the foam dampers. It is recommended to have more than 1 rechargeable battery for the inspection of a number of the foam dampers at once.

Manufacturer: Makita; Model: MP180D (battery charger: 100VAC (Japanese standard))
Maximum air pressure: 830 kPa
(The usable type depends on the specifications of the power supply and the geometry of the outlets available on your ship.)

This device is originally designed for inflating tires for bicycles or cars and equipped with a Schrader valve. To use it for the inspection purpose, an adapter such as the one shown below is needed.

To connect to a Schrader valve

To connect to the air hose (PT 1/8)

The pump can be connected to the air hose via this adapter to pressurize and inspect the foam damper.

[For your reference]
We are sharing the reference specifications and IMPA Code for each arranged item.

○ITEM：AIR HOSE
HOSE AIR RUBBER 15KG 6MM x 2B, IMPA Code：350101
○ITEM：HOSE NIPPLE
COUPLING AIR HOSE SCREW BRASS, 6MM, IMPA CODE：351061
○ITEM：HOSEBAND
HOSE BAND GALV STEEL, 8–14 MM, IMPA CODE：614051

Please note that specifications may vary depending on the test equipment used, so the IMPA Code is provided for reference only. We kindly request that you select the appropriate specifications based on the actual pumps and hoses to be used.

KASHIWA High Expansion Foam Fire Extinguishing System
Check List of Dampers and Foam Generators for Car hold deck

DATE :

Inspector :

SHIP NAME		SHIPBUILDER		S.No.	
IMO No.		OWNER		PLACE	

ZONE	Foam Generator No.	Damper Installation Deck No.	Damper Operation		Damper Limit Switch		Damper box Flexible Hose		Damper box Visual check		Foam Generator Visual check		Restore (Return to normal)	Remark
			GOOD	BAD	GOOD	BAD	GOOD	BAD	GOOD	BAD	GOOD	BAD		
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