

Installation and Maintenance Manual

Forbes Marshall Cast Strainer

FMSTR51/FMSTR52

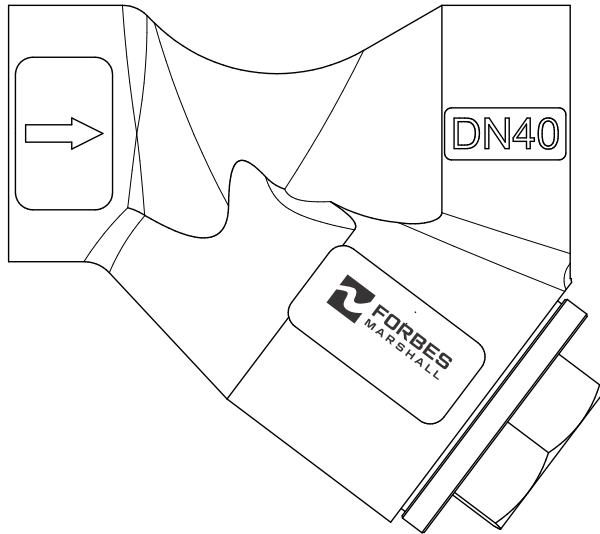


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PLEASE NOTE - Throughout this manual this cautionary symbol is used to describe a potential damage or injury that might occur if the safety considerations are overlooked. This symbol denotes **CAUTION**, **WARNING** or **DANGER**.



1. Preface:

This manual is intended for anyone using, commissioning, servicing, or disposing the below mentioned products safely and efficiently.

Forbes Marshall Cast Strainer [FMSTR51/FMSTR52]

Size: DN 15 (½"), DN 20(¾"), DN 25 (1"), DN 40 (1 ½"), DN 50 (2").

PLEASE NOTE:

Throughout this manual the following cautionary symbol is used to describe a potential damage or injury that might occur if the safety considerations are overlooked.

2. Important Safety Notes:



Read this section carefully before installing/operating/maintaining the product. The precautions listed in this manual are provided for personnel and equipment safety. Furthermore, Forbes Marshall accepts no responsibility for accidents or damage occurring as a result of failure to observe these precautions. Note that the product is designed to perform for non-contaminated fluids only. A contamination in the form of chemical, foreign particle etc. can lead to problem with product performance and life of the product.

If these products in compliance with the operating instructions are, properly installed, commissioned, maintained and installed by qualified personnel (refer Section 2.7) the safety operations of these products can be guaranteed. General instructions for proper use of tools and safety of equipments, pipeline and plant construction must also be complied with.

2.1 Intended use:

Check if the product is suitable for intended use/ application by referring to the installation and maintenance instructions, name plates and technical information sheets.

- i) The product is suitable for use as defined in the technical information sheet. In case the need arises to use the product on any other fluid please contact Forbes Marshall for assistance.
- ii) Check for the suitability in conformance to the limiting conditions specified in technical information sheet of the product.
- iii) The correct installation and direction of fluid flow has to be determined.
- iv) Forbes Marshall products are not intended to resist external stresses, hence necessary precautions to be taken to minimize the same.

2.2 Accessibility and Lighting:

Safe accessibility and working conditions are to be ensured prior to working on the product.

2.3 Hazardous environment and media:

The product has to be protected from hazardous environment and check to ensure that no hazardous liquids or gases pass through the product.

2.4 Depressurizing of systems and normalizing of temperature:

Ensure isolation and safety venting of any pressure to the atmospheric pressure. Even if the pressure gauge indicates zero, do not make an assumption that the system has been depressurized. To avoid danger of burns allow temperature to normalize after isolation.

2.5 Tools and consumables:

Ensure you have appropriate tools and / or consumables available before starting the work. Use of original Forbes Marshall replacement parts is recommended.

2.6 Protective clothing:

Consider for the requirement of any protective clothing for you/ or others in the vicinity for protection against hazards of temperature (high or low), chemicals, radiation, dangers to eyes and face, noise and falling objects.

2.7 Permits to work:

All work to be carried out under supervision of a competent person. Training should be imparted to operating personnel on correct usage of product as per Installation and Maintenance instruction. "Permit to work" to be complied with (wherever applicable), in case of absence of this system a responsible person should have complete information and knowledge on what work is going on and where required, arrange to have an assistant with his primary goal and responsibility being safety. "Warning Notices" should be posted wherever necessary

2.8 Handling:

There is a risk of injury if heavy products are handled manually. Analyze the risk and use appropriate handling method by taking into consideration the task, individual, the working environment and the load.

2.9 Freezing:

Provision should be made to protect systems which are not self-draining, against frost damage (in environment where they may be exposed to temperatures below freezing point) to be made.

2.10 Product Disposal:

It is necessary to dispose this product only in accordance with local regulations at the authorized, qualified collecting point specified for equipment's and its parts—Please refer the part details mentioned in the material table of this manual.

Please follow all waste disposal guidelines (Management & Handling) as published by local governing authorities in India & abroad

2.11 Returning products:

Customers and Stockist are reminded that, when returning products to Forbes Marshall they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk.

This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

3. Brief Product Information:

3.1 Description:

The Forbes Marshall Cast Strainer FMSTR51 (screwed end) / FMSTR52 (socket weld) is available in cast steel with stainless steel screen having 0.8 mm dia perforations as standard.

3.2 Size and Pipe Connections:

DN 15, 20, 25, 40 and 50

Screwed BSPT/ BSP/NPT and socket weld ends.

Available with IBR certificate.

3.3 Limiting Conditions:

Max working Pressure(bar g)

Size DN	FMSTR51(Screwed)	FMSTR52 (Socket Weld)
15	55.0	55.0
20	50.0	50.0
25	55.0	55.0
40	55.0	55.0
50	55.0	55.0

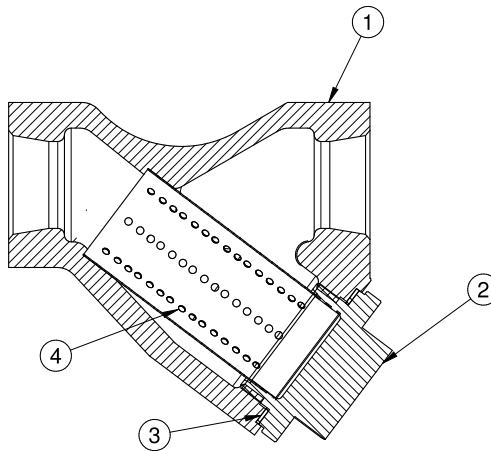
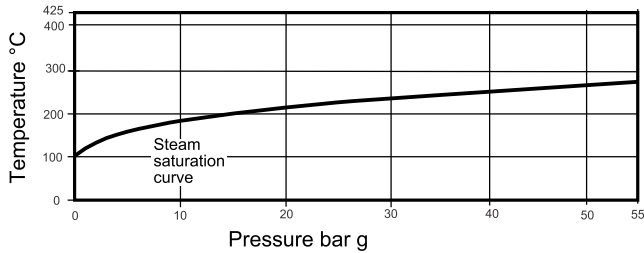


Figure 1: Forbes Marshall Cast Strainer

Materials:

No	Part	Material	Standard
1	Body	Cast steel	ASTM A216-WCB
2	Cap	Cast steel	ASTM A216-WCB
3	Gasket	Reinforced exfoliated graphite	
4	Screen	Stainless Steel	ASTM A240 SS304

3.4 Operating Range:



Dimensions: (approx.) in mm

Size DN	A	B	C	D	Weight
15	73	60	100	37	2 kg
20	88	65	110	40	2 kg
25	105	80	135	50	3 kg
40	162	125	195	74	7 kg
50	188	145	235	87	9 kg

Note : Blowdown or drain cock connections .The cap can be drilled to the following sizes to enable a blowdown or drain to be fitted.

3.5 Product Dimension and Drawing:

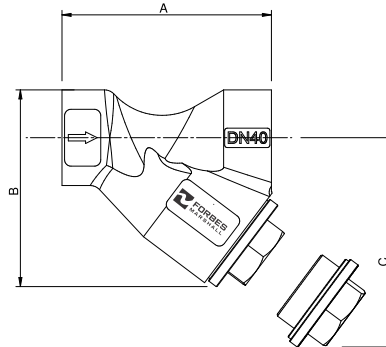


Figure 2: Dimensional drawing of FMSTR51 / FMSTR 52

Strainer size	Blowdown cock	Drain cock
15	3/8"	3/8"
20	1/2"	1/2"
25	1/2"	1/2"
40	3/4"	3/4"
50	3/4"	3/4"

4. Product Working Principle:

Forbes Marshall Cast Strainer is used to remove dirt, debris and other foreign particles from the fluid, it restrict the particle size which are larger than specified sieve size (mesh or perforation). Pressure drop across the strainer will increase as dirt and debris will block the opening of the sieve. As pressure drop increases above certain specified limit the strainer sieve need to be cleaned.

5. Installation Guidelines : [Refer Figure 3 and 4]



Note: Before implementing any installations observe the 'Important Safety notes' in section 2. Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended installation.

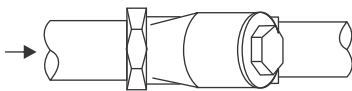
1. Check the direction marked on the strainer and the direction of fluid flow.
2. Remove protective covers from connections.
3. Strainer can be fitted on steam /gases and liquid systems in either horizontal pipework or vertical pipework when the flow and strainer pocket pointing downward. In a horizontal pipeline on steam / gas system the strainer pocket should be in the horizontal plane as this reduces the possibility of water hammer because of condense steam get accumulated in screen when strainer pocket pointed downward. On liquid systems the strainer pocket should point downwards.
4. Suitable isolation valves must be installed to allow for safe maintenance.

Note: Never install strainer in vertical pipework with flow from bottom to top it can lead to re-entrainment of filtered dirt or foreign particles back into the incoming flow.

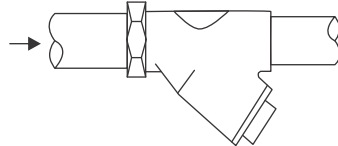
5. Strainer can be lagged (insulated) if required.



For socket weld / butt weld end connections coat the welded ends with primer and suitable high temperature paint immediately after welding before corrosion sets in.

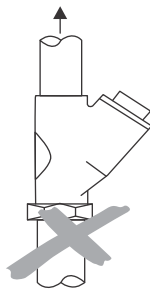


Strainer installed on steam or gas line

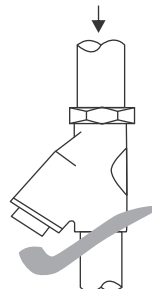


Strainer installed on liquid line

Figure 3 : Strainer installation on horizontal pipework



Flow upwards



Flow downwards

Figure 4 : Strainer installation on vertical pipework

6. Start-up and Commissioning:

6.1. Flushing of lines:

As part of pre-installation all fluid handling equipment particularly piping should be thoroughly cleaned of scale and the internal debris which accumulates during construction. This is accomplished by blowing or flushing with air, steam, water and other suitable medium.

Follow this step to carry out flushing of lines.

Note: For a detailed procedure on flushing of lines please visit Forbes Marshall website.

6.2. Commissioning:

After installation or maintenance ensure that the system is fully functioning by confirming fluid is passing through it.

7. Maintenance Guidelines:



Note: Before undertaking any maintenance of the product it must be isolated from both supply line and return line and ensure pressure is normalized to atmosphere. The product should then be allowed to cool. When re-assembling ensure that all joint faces are clean.

Note: The strainer cap gasket contains a thin stainless steel support ring which may cause physical injury if not handled and disposed of carefully.

7.1. Routine and preventive maintenance:

Please refer to the maintenance schedule mentioned in the table below to undertake routine maintenance of the strainer.

Sr. No.	PARAMETERS TO BE CHECKED	FREQUENCY FOR CHECKING VARIOUS PARAMETERS					
		Daily	Weekly	Monthly	Quarterly	Half Yearly	Annually
1.	Clean of the screen					Y	

7.2. Recommended tightening torques:

Size	Part	Torque Range
DN 15	Cap (2)	50-55Nm
DN 20		60-66 Nm
DN 25		100-110 Nm
DN 40		230-250 Nm
DN 50		330-360 Nm

Table 4: Recommended tightening torques for strainer [FMSTR51/FMSTR52].

7.3. Procedure to clean or replace strainer screen: [Refer figure 1]

1. Unscrew Strainer cap (2) and remove the screen (4)
2. Remove the muck and clean screen (4) thoroughly, fit screen carefully and fit cap (2) with new gasket (3).
3. Apply a thin coating of jointing paste.
4. Tighten cap (2) uniformly open up isolation valve. Check for gasket (3) leak if any then tighten the strainer cap (2) if required.

7.4. Strainer Cap opening procedure at site:

1. a. Allow the product to cool down completely.
2. b. If possible please take the product out from the line and do the maintenance activity on a work bench.
3. c. If its not possible to take the product out of the line (welded) then make sure that the product line is rigidly held. Many times the drip legs are not properly supported and hanging. If one tries to open the product in such conditions, there is a chance of spanner slip and damage.
4. d. Do not use a pipe wrench to open the cap. Pipe wrench damages the cap.
5. e. Do not use impact wrenches or air guns / nut runners.
6. f. Apply WD40 and keep it for soaking for some time. A light tap with a hammer on the cap top would help in opening the joint.
7. g. Use an open spanner or ring spanner and gradually apply force in the direction to open the threaded joint.
8. h. In case if the applied force is not enough to open the threads, use spanners with extended lengths.
9. i. The torque values specified in the manual are the tightening torques. The opening torque will be higher than the tightening torque and will depend on the service conditions like working temperature, time period since the joint opened the last time and the environment.

8. Troubleshooting:

If the expected performance is unachievable after installation of the Strainer, check the following points for appropriate corrective measures.

Failure Mode	Possible Cause	Remedy
No flow through strainer.	Strainer screen is clogged with rust or debris.	Flush inline drip leg or pipeline and clean the screen. If screen is rusted, replace with new screen.
Increased pressure drop across the strainer.	Screen is blocking up.	Clean or replace the screen.
Fluid leakage from strainer pocket.	Gasket deterioration or damage.	Replace with new gasket and tighten the cap to the recommended torque.

Note: Never attempt to modify the product. When replacing old part with new part, use the spare parts listed in section 9.

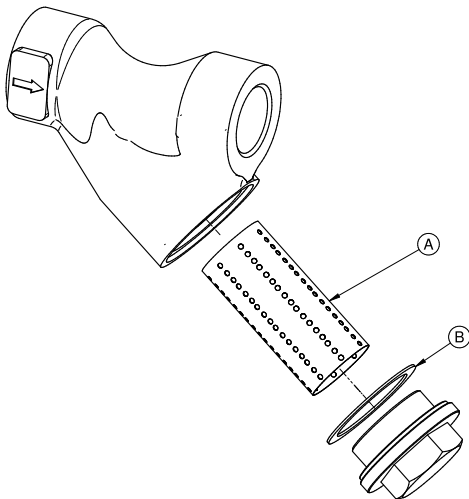
9. Available Spares:

Figure 5 : Exploded view of strainer [FMSTR51/FMSTR52]

Sr. No.	SPARE PART	SPARE CONSIST OF	PART No.	SPARE CODE
1	SCREEN & GASKET KIT 15NB	SCREEN & STRAINER CAP GASKET KIT [PACK OF 5 EACH]	-	SPARE-015FMSTR5152-SGKIT
	SCREEN & GASKET KIT 20NB		-	SPARE-020FMSTR5152-SGKIT
	SCREEN & GASKET KIT 25NB		-	SPARE-025FMSTR5152-SGKIT
	SCREEN & GASKET KIT 40NB		-	SPARE-040FMSTR5152-SGKIT
	SCREEN & GASKET KIT 50NB		-	SPARE-050FMSTR5152-SGKIT

Sr.No.	SPARE PART	SPARE CONSIST OF	PART No.	SPARE CODE
2	GASKET KIT 15NB	STRAINER CAP GASKET KIT [PACK OF 5]	-	SPARE-015FMSTR5152-GKIT
	GASKET KIT 20NB		-	SPARE-020FMSTR5152-GKIT
	GASKET KIT 25NB		-	SPARE-025FMSTR5152-GKIT
	GASKET KIT 40NB		-	SPARE-040FMSTR5152-GKIT
	GASKET KIT 50NB		-	SPARE-050FMSTR5152-GKIT

How to Order:

Example : 1 no. DN40 Forbes Marshall Cast Strainer FMSTR51/FMSTR52,screwed BSPT, IBR

How to Order Spares:

Always order spares by using the description given in the column headed Available Spares and stating the size and type of strainer and perforation or mesh required .

Example: 1No. strainer screen, stainless steel 304, 0.8mm perforation and gasket for DN40 Forbes Marshall Cast Strainer, FMSTR51 / FMSTR52.

10. Warranty Period:

As per ordering information and agreements in the contract.



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