

Method Statement

FM-200 Pipework Pressure & Puff/Flow Test

[Project Name]

Author

[Document Number]

[revision]

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1 Document Issue Log/Register

The following table will be updated upon the issue of the document and subsequent revisions to monitor any revisions and changes made before approval.

Revision	Date	Notes on changes
0	Click or tap to enter a date.	
1	Click or tap to enter a date.	
2	Click or tap to enter a date.	
3	Click or tap to enter a date.	
4	Click or tap to enter a date.	

2 Introduction

This project requires all functional testing procedures to be submitted to the client's representatives for review and approval before the works are allowed on site.

To ensure that the FM-200 pipework is installed and its integrity is in line with the buildings and designers' requirements, there will be a need to pressure & puff test it once the system has been installed.

The testing, described below, will check and validate the following:

- All the documentation is in place.
- The installation has been approved and signed off.
- Pre-requisites have been completed to allow testing to commence.
- Documenting of the details for the system and equipment under test.
- Verifying the integrity of the pipework.
- Verifying the continuity of the pipework.
- The system is set up according to the designers' requirements once the testing has been concluded.

3 Engineers Qualifications and Experience

Suitably trained personnel will undertake all testing works, including safety training, manufacturer training, and any local government requirements to comply with all laws and codes/regulations.

4 Programme of Works

The works relating to this procedure will be conducted in line with the commissioning programme / 2-week look ahead that will be provided, separately to this document, as noted in Section 5.

5 Documentation & Reference

To allow the testing to be conducted and meet the project requirements, the following documentation has been referred to:

Ref	Document	Project Document Number & Revision
1	Commissioning Plan/Specification	<i>[Add]</i>
2	General Project MEP Specification	<i>[Add]</i>
3	Particular Project MEP Specification	<i>[Add]</i>
4	Commissioning Programme	<i>[Add]</i>
5	Material Submission of Pipework and Ancillaries for the FM-200 System [to be marked up and attached in the appendix]	<i>[Add]</i>
6	FM-200 Schematic Drawings [to be marked up and attached in the appendix]	<i>[Add]</i>
7	FM-200 Layout Drawings [to be marked up and attached in the appendix]	<i>[Add]</i>
8	NFPA 2001 – Standard on Clean Agent Fire Extinguishing Systems [or relevant guideline in your country]	<i>[Add or change to the relevant guideline used]</i>

6 Project & Equipment Information

The below information will be added during the test.

Project Name	<i>[Add Name]</i>		
Testing Number:	<i>[Add Test Number]</i>		
System Number:	<i>[Add System ID]</i>		
Equipment Manufacturer:	<i>[Add Equipment ID]</i>		
Floor	<i>[Add Floor]</i>	Room	<i>[Add Room]</i>
Start Date:	<i>[Add]</i>	Finish Date:	<i>[Add]</i>
Start Time:	<i>[Add]</i>	Finish Time:	<i>[Add]</i>

7 Acceptance Criteria & Tolerances

The following details the testing tolerances to be utilized during the testing to prove the system is operating within its design requirements; these have been obtained from the project information, codes, guides, and standards.

Code Document	Code Section	Test Information	Tolerance Allowed
NFPA 2001	Chapter 10 [10.4.14.1]	Using 40 psi / 276 kPa / 2.7 bar for a period of 10 minutes	Drop not to exceed 80% of the initial test pressure

8 Permit to Work

The following permit-to-work systems should be in place to conduct the testing. The permit reference information should be completed at the testing once they have been obtained.

Ref	Detail of permit required	Responsibility [company]	Permit Reference
1	Access to general site	[Add]	[Add]
2	Access to location of equipment	[Add]	[Add]
3	Access to the equipment	[Add]	[Add]
4	System Isolation Permit	[Add]	[Add]

9 Inspection, Sign Off and Defect Management

Before any testing and commissioning works are conducted on the equipment and associated systems, the equipment and installation should be thoroughly inspected and signed off, according to the project process and requirements.

The below details the steps taken within this project, with responsibilities, to ensure the equipment and related systems are ready for pressure testing.

All documents should be provided and issued for review at testing, and a copy provided included in the final testing documentation.

Step	Document/Reference	Responsibility
Step 1	Material Submission to be approved and comments addressed. [Minimum Status B] <i>[Add reference/Status]</i>	Main/General Contractor Designer Commissioning Consultant
Step 2	Drawings to be approved and comments addressed. [Minimum Status B] <i>[Add reference/Status]</i>	Main/General Contractor Designer Commissioning Consultant
Step 3	Factory Testing, Functional Testing Method Statement, to be approved and comments addressed. [Minimum Status B] <i>[Add reference/Status]</i>	Main/General Contractor Commissioning Consultant Designer
Step 4	Factory Testing to be completed and comments addressed. <i>[Add reference/Status]</i>	Main/General Contractor Commissioning Consultant Designer
Step 5	Factory Testing Functional Testing Report to be approved and comments addressed. [Minimum Status B] <i>[Add reference/Status]</i>	Main/General Contractor Commissioning Consultant Designer
Step 6	Proceed To Deliver Certificate provided approved by Commissioning Consultant and Designer <i>[Add reference/Status]</i>	Main/General Contractor
Step 7	Delivery / Storage Inspection Check List provided, and all comments addressed that are critical to the testing activities As per Delivery Storage Section Checklist	Main/General Contractor Resident Engineer

Step	Document/Reference	Responsibility
Step 8	Installation Inspection Check List provided, and all comments addressed that are critical to the testing activities As per the Installation Section Checklist	Main/General Contractor Resident Engineer
Step 9	Future Maintenance Inspection Check List provided, and all comments addressed that are critical to the testing activities As per the Installation Section Checklist	Main/General Contractor Resident Engineer
Step 10	Pre-Functional Check List provided, and all comments addressed that are critical to the testing activities As per Pre-Functional Section Checklist	Main/General Contractor Commissioning Consultant
Step 11	Functional Testing Method Statement to be approved and comments addressed. [Minimum Status B] <i>[Add reference/Status]</i>	Main/General Contractor Commissioning Consultant Designer
Step 12	Self-Testing Records provided, and all comments addressed that are critical to the testing activities <i>[Add reference/Status]</i>	Main/General Contractor

10 Delivery Inspection

Once the FM-200 pipework and ancillaries arrive at the site, usually delivered by a transport company, the following should be checked with the driver before being accepted into storage.

Any noted damage should be reported to the manufacturer/supplier immediately in writing, supported with photographs.

Ref	Inspection/Task	Yes/No /[n/a]	Notes
1	Supplier's consolidated delivery ticket is available, showing all equipment and ancillaries for inspection and being used to check the delivery.		
2	A copy of the order is available for reference and is being used to review the delivery.		
3	Pipework is packaged with end caps to protect the internal surfaces.		
4	Pipework has the correct wall thickness.		
5	Pipework has the correct flanges.		
6	Pipework is dry internally.		
7	Pipework is not damaged.		
8	Pipework surfaces are clean and not scratched		
9	Paint has been applied to the pipework where required and is in good condition.		
10	All ancillaries are included in delivery as per the order and delivery note		
11	Replace any protection that has been removed		

11 Storage Inspection

11.1 Storage Area

If the FM-200 pipework is to be placed into storage on-site before installation, there should be an inspection completed checking the following.

Ref	Inspection/Task	Yes/No /[n/a]	Notes
1	The area is internal and shall not be affected by the weather.		
2	If the pipework & ancillaries are not to be stored internally but externally, there is sufficient protection to protect it from weather and ambient conditions.		
3	The surface where the pipework & ancillaries are to be placed is flat.		
4	The area is well covered and protected.		
5	The area is well ventilated and has no risk of high humidity.		
6	The area is clean & dust-free.		

11.2 Storage of the FM-200 Pipework & Ancillaries

Before the pipework is placed into storage, the following should be checked.

[note: due to the risks involved, the gas cylinders shall not be stored on-site, they shall be delivered and installed just before handover and documented separately].

Ref	Inspection/Task	Yes/No /[n/a]	Notes
1	Pipework & ancillaries will not be over stacked.		

Ref	Inspection/Task	Yes/No /[n/a]	Notes
2	Pipework & ancillaries shall not have materials stacked on them.		
3	All ancillaries shall be placed in a safe and secure location so items do not go missing or get damaged.		
4	Pipework/connection caps protecting the flanges are not removed.		
5	The pipework shall be raised from the floor to allow airflow and stop the risk of water ingress.		

12 Pre-Installation Inspection

Prior to the pipework & ancillaries being installed, the following should be checked.

Ref	Inspection/Task	Yes/No /[n/a]	Notes
1	The bracketry is ready and can bear the weight of the installation, and has been spaced correctly.		
2	The room/area is dry and watertight.		
3	The area being installed is not prone to flooding or ponding of water.		
4	The room/area the pipework will be installed into is clean and dust-free.		

Ref	Inspection/Task	Yes/No /[n/a]	Notes
	If there is dust/construction work, the pipework should be protected from concrete dust, cement.		
5	Check to ensure that all connection kits containing - gaskets, bolts are available to allow bolting up of the pipework.		
6	Pipework is clean and free of damage		

13 Maintenance/Access

Ref	Inspection/Task	Yes/No /[n/a]	Notes
1	There is enough space allowed around and above the pipework once installed to perform maintenance and remove components, where required [check the manufacturer's maintenance instructions for requirements]		

14 Pre-Commissioning Inspection

Once the pipework has been installed and before the functional testing and commissioning phase, the following shall be checked.

14.1 General

Ref	Inspection/Task	Yes/No /[n/a]	Notes
1	Pipework & ancillaries are installed according to the project		

Ref	Inspection/Task	Yes/No /[n/a]	Notes
	drawings & manufacturers' requirements [size, nozzle location].		
2	Discharge nozzles are installed and oriented per the manufacturer's requirements.		
3	Where nozzle deflectors have been installed, they are positioned according to the manufacturer's requirements.		
4	There is no risk of potential harm or injury from installing the nozzles and bracketry.		
5	There is no risk of loose objects being stored within the space on shelves, cabinets, or similar surfaces, near to the discharge nozzles from becoming projectiles.		
6	Piping is free to expand and contract without noise or damage to hangers, joints, or the building.		
7	Pipework does not put undue stress on ancillaries and equipment, connected and bracketed to support itself.		
8	Seismic restraints, where required, installed.		
9	All piping supports and hangers meet criteria set out in the specifications & manufacturers' requirements, including being securely fastened to prevent unwanted vertical or lateral movement during discharge.		

Ref	Inspection/Task	Yes/No /[n/a]	Notes
10	The pipework has been internally inspected to verify that there is no oil or dirt/debris within it that could cause an issue to the operation of the system discharge.		
11	Any changes in pipe sizes are made with the proper sized reducing fittings.		
12	All fittings meet specification requirements & manufacturers' requirements.		
13	All fittings and ancillaries are rated correctly and in line with the system's pressure & manufacturers' requirements.		
14	All equipment requiring maintenance is accessible (valves, junction boxes).		
15	Piping does not block access to equipment that is part of this system or another system.		
16	All valves are installed as per the drawing & manufacturers' requirements.		
17	Pipework is insulated as per the specification and vapor sealed where required.		
18	Piping is installed, ensuring that insulation shall not contact adjacent surfaces.		
19	Any pipe openings are temporarily sealed to maintain piping system cleanliness & integrity for testing.		

Ref	Inspection/Task	Yes/No /[n/a]	Notes
20	All components, including valves and controls, are labeled according to the project naming convention.		
21	Valves/check valves have been installed according to the manufacturer's requirements and are in the correct direction.		
22	All pressure gauges installed and display scale as per design & manufacturers' requirements.		

14.2 System Setup

Ref	Inspection/Task	Yes/No /[n/a]	Notes
1	The system setup has been checked to ensure it is in line with any strategies that have been developed.		

15 Equipment/Instruments & Information

To ensure the data collected during the testing is correct, the following equipment and instruments shall be used and presented to the commissioning manager for inspection before the testing.

All equipment and instruments, where applicable, shall have a current calibration certificate from an independent international laboratory, which shall be logged and detailed in the table below.

Equipment Type	Certificate expiry date	Model	Serial Number
Pressure Gauge			
Temporary Pressure Hoses			

Equipment Type	Certificate expiry date	Model	Serial Number
[rated for correct pressures]			
Caps for blanking discharge nozzles			
Nitrogen or Inert Gas Bottle			
Temperature & Humidity handheld sensor			
Ribbon for Puff Testing			
General Hand Tools			

A copy of all calibration documents shall be provided for inclusion within the final testing documentation.

16 Pneumatic Pressure Test

The following testing shall be completed for the FM-200 pipework system to ensure that its integrity is in line with the project requirements:

Note: the below is provided as an example; it's a standard testing method, but be aware that projects can be different, and this section should be checked and modified to ensure it aligns with your project.

Ref	Description	Information to collect	Yes/No /[n/a]	Notes
1	Ensure all pre-requisites and pre-functional testing checks have been completed.			
2	Remove all discharge nozzles and replace them with blanking caps.			
3	Connect the nitrogen bottle via the temporary hoses, valves, and pressure gauge to the valve assembly/connection point at the system's lowest point.			
4	Introduce pressure into the system slowly until the pressure gauge reads 40 psi / 276 kPa / 2.7 bar.			
5	Once at the required pressure, and with the nitrogen still attached and isolating valve closed, wait 2 minutes for the system to settle. If there is a drop-in pressure and no apparent leaks, increase pressure via the nitrogen bottle until test pressure is reached.			

Ref	Description	Information to collect	Yes/No /[n/a]	Notes
6	Isolate the nitrogen bottle via the temporary valve to ensure no additional pressure can be put into the system.			
7	Take air temperature readings in the spaces and document them on the pressure test certificate.			
8	Note the testing start time and date on the pressure testing certificate for the record, photographing the test gauges for evidence [if required].			
9	Walk the system checking for any leaks for the test period and checking the pressure gauge(s) for signs of any movement.			
10	The test should be aborted, and investigations made with remedial action taken if the test pressure moves outside of the required tolerance.			
11	If no issues are noted, then continue the test until the period of 10 minutes has been completed from the documented testing start time.			
12	Review the pressure gauges for the final time to see any pressure drop and ensure in line with the allowed tolerances.			

Ref	Description	Information to collect	Yes/No /[n/a]	Notes
13	Once the time has elapsed for the required test and is deemed accepted by the relevant parties in attendance, the testing will be complete.			
14	Photographic evidence should be taken with all information entered the pressure test certificate.			
15	Release the pressure from the system safely and disconnect the pressure gauge.			
16	Move to the puff/flow testing stage.			

Documentation relating to the testing should be provided and attached in the following appendices.

17 Puff/Flow Test

The reason for conducting a 'puff/flow' test is to ensure that there is a continuous flow through the pipework and to ensure all valves are installed correctly and in the correct direction:

Note: the below is provided as an example; it's a standard testing method, but be aware that projects can be different, and this section should be checked and modified to ensure it aligns with your project.

Ref	Description	Information to collect	Yes/No /[n/a]	Notes
1	Re-install all FM-200 discharge nozzles/heads			
2	At each discharge nozzle, tie a piece of ribbon so that it can 'flutter' when the air is passing through the nozzle, providing a visual indication.			
3	Ensure a bottle of nitrogen/temporary and hoses are connected at the cylinder connection to the system.			
4	Once ready, open the valve on the nitrogen bottle to allow it slowly through the pipework system.			
5	As the nitrogen passes through the system, the ribbon tied to the discharge heads should 'flutter,' proving the flow is continuous and that all system valves are in the correct direction.			

Ref	Description	Information to collect	Yes/No /[n/a]	Notes
6	Once the test is deemed accepted by the relevant parties in attendance, close off the valve stopping the nitrogen from flowing.			
7	Disconnect the temporary hoses and remove the ribbons from the discharge nozzles.			
8	Complete all documentation/certificates to prove the testing was successful and take photographic evidence [if required]			

Documentation relating to the testing should be provided and attached in the following appendices.

FM-200 TESTING CERTIFICATE

Test Number / ID			
Project Name/Number			
Test Type	Pneumatic Pressure & Puff Test		
Date Start		Date Finish	
Required Testing Pressure			
Start Time		Finish Time	
Test Pressure Start [bar/psi]		Test Pressure Finish [bar/psi]	
PASS			FAIL
Puff Test Completed Successfully: <input type="checkbox"/>			
Comments			
Signature			Date
Signature			Date

Appendix A – Material Submission

Add a copy of the document.

Appendix B – FM-200 Pipework Schematic

Add a copy of the document marked up with testing areas

Appendix C – FM-200 Pipework Layout

Add a copy of the document marked up with testing areas

Appendix D – Calibration Certificates

Add a copy of the document marked up with testing areas

Appendix E – Photographic Evidence

Add a copy of the document marked up with testing areas

-END-