EMS120

Emergency Shower Mixing Valve Assembly

GENERAL

The EMS120 emergency mixing assembly has been designed specifically to provide temperature controlled water to emergency fixtures as detailed in ANSI Z358.1-2014 and AS4775-2007 to achieve an optimum temperature control range of 20°C – 37.8°C. The EMS120 utilises specially made tempering valves Watermark approved to AS4032.2.

Tepid flushing fluid is considered necessary in all types of emergency equipment applications. Tepid is defined in the standard, as "A flushing fluid temperature conducive to promoting a minimum 15-minute irrigation period. A suitable range is 15.6 - 37.8°C." Generally, temperatures higher than 38°C may cause chemical interactions with the skin and result in further damage. At 15.6°C and below hypothermia becomes a concern. Consulting a safety/health advisor will be a helpful aid in the determination of the best temperature parameters. No two hazards are exactly the same and each should be evaluated on a case-by-case basis.

THERMOSTATIC

The EMS120 emergency mixing assembly is suitable for installation at or near a point of use for direct tepid water supply to an emergency fixture or grouping of fixtures. Groups of fixtures must meet the valve's flow capacity requirements if there is a potential for simultaneous operation.

For Emergency Showers; the EMS120 will provide up to 120 lpm at 70kPa pressure loss. For single or multiple Emergency Eye Wash Station installations, the EMS120 will control accurately at flow rates from 120 lpm down to 12 lpm (each tempering valve requires 6 lpm minimum flow rate for stable operation).

The cold water bypass design allows for cold water only to flow through the assembly in the event of heated water supply failure to the tempering valve. This feature has been integrated to ensure the functionality and integrity of the emergency shower is maintained.

SAFETY WARNINGS

The function of a EMS120 is to deliver water consistently at a pre-designated temperature. The Caleffi tempering valves are precision engineered to give continued superior and safe performance provided:

1. They are installed, commissioned, operated and maintained in accordance with the recommendations provided and accepted plumbing practices.
2. Periodic attention is given, as necessary, to maintain the product, the accessory fittings and the plumbing system in good functional order.
3. Showers must be maintained in accordance with AS4775.

In keeping with every other mechanical product, The EMS120 should not be considered as functionally infallible and, as such will never totally replace the vigilance and attention of maintenance, supervisory and safety staff, provided that they are installed, commissioned, operated and maintained, the risk of product failure and its associated consequences, if not eliminated, are reduced to the minimum achievable.

SYSTEM PARAMETERS

Prior to the installation of the EMS120, the system must be checked to ensure that the system operating specifications fall within the recommended operating range of the unit, i.e. verify supply temperatures, supply pressures, risk assessments, etc.

The supply system into which the EMS120 is to be installed must be thoroughly flushed and cleaned to remove any debris which may accumulate during the installation. Failure to remove any debris will affect the performance and the manufacturer's warranty on the product.

In areas that are subject to high levels of aggressive water, provision must be made to treat the water prior to it entering the unit.

OPERATING SPECIFICATIONS

Connections	32mm copper tails
Enclosure Dimensions	850H x 420W x 127D
Pre-set temperature:	≈ 25°C *(must be commissioned to desired temperature)*
Temperature control:	±3°C
Min cold inlet temperature:	5°C
Max cold inlet temperature:	20°C
Min hot inlet temperature:	55°C
Max hot inlet temperature:	85°C
Maximum unbalanced dynamic supply (hot/cold or cold/hot):	2 : 1 for stable temperature (*Recommended +/- 10%)*
Minimum temperature differential between hot water inlet and mixed water outlet to ensure shut off function:	10°C
Minimum temperature differential between mixed water outlet and cold water inlet to ensure stable operation:	5°C
Max flow rate @ 70kPa pressure loss	120 l/min *Higher flow rates are possible, but some water will be bypassed through the relief valve thereby giving a lower tepid flow temperature.*
Minimum flow rate for stable operation:	12 l/min
Cold water bypass flow (hot failure)	76 l/min cold water (minimum)
Max working pressure (static):	1400 kPa
Min working pressure (dynamic):	90kPa *

** Note that the assembly requires at least 70kPa pressure loss for maximum flow, and 20kpa extra for the bypass relief valve operation. Sufficient pressure is ALSO required to provide minimum of 210kPa after the assembly to the emergency fixtures to comply with AS4775.*

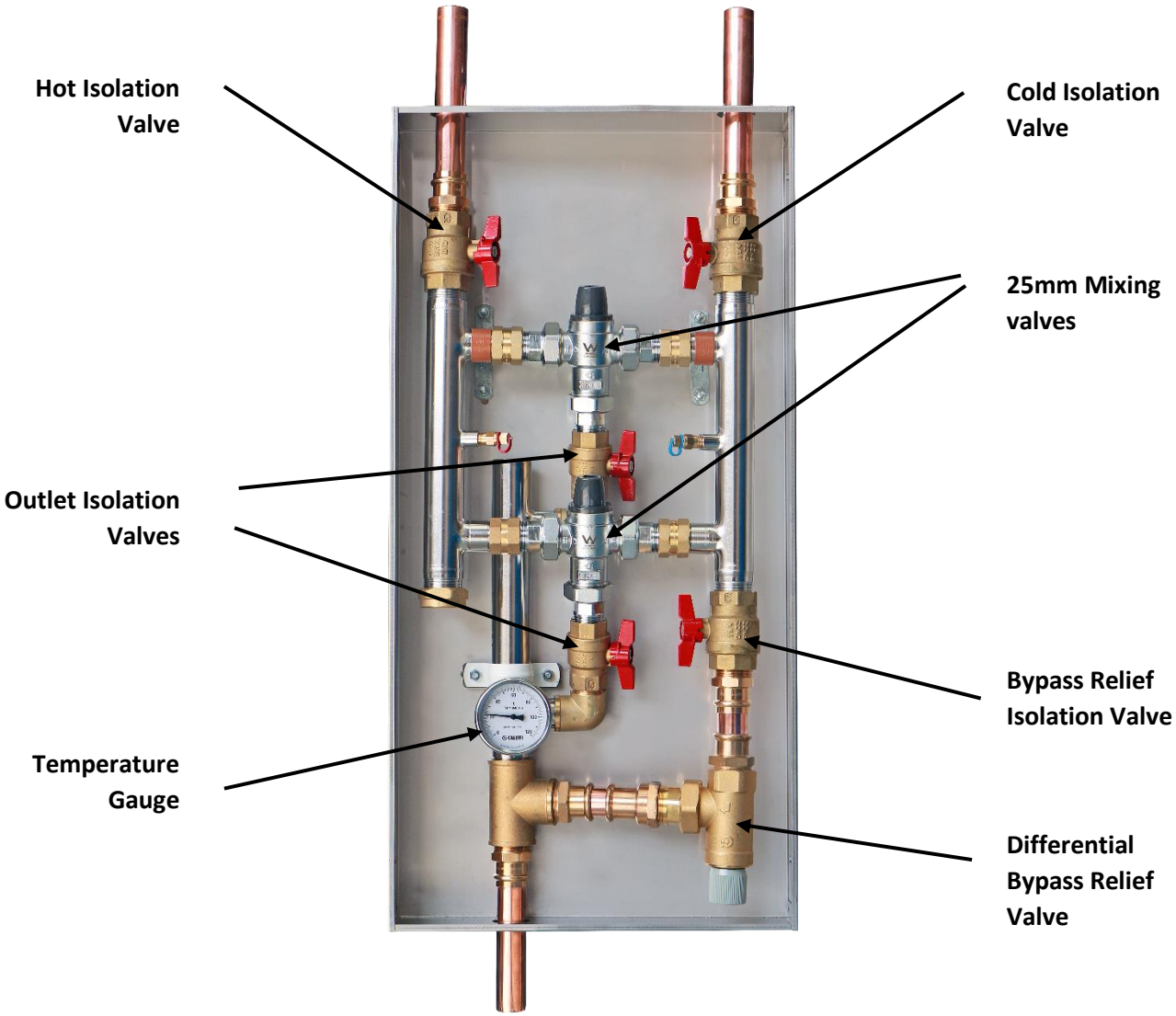
LOCATION

The EMS120 is suitable for installation indoors, or outdoors under cover.

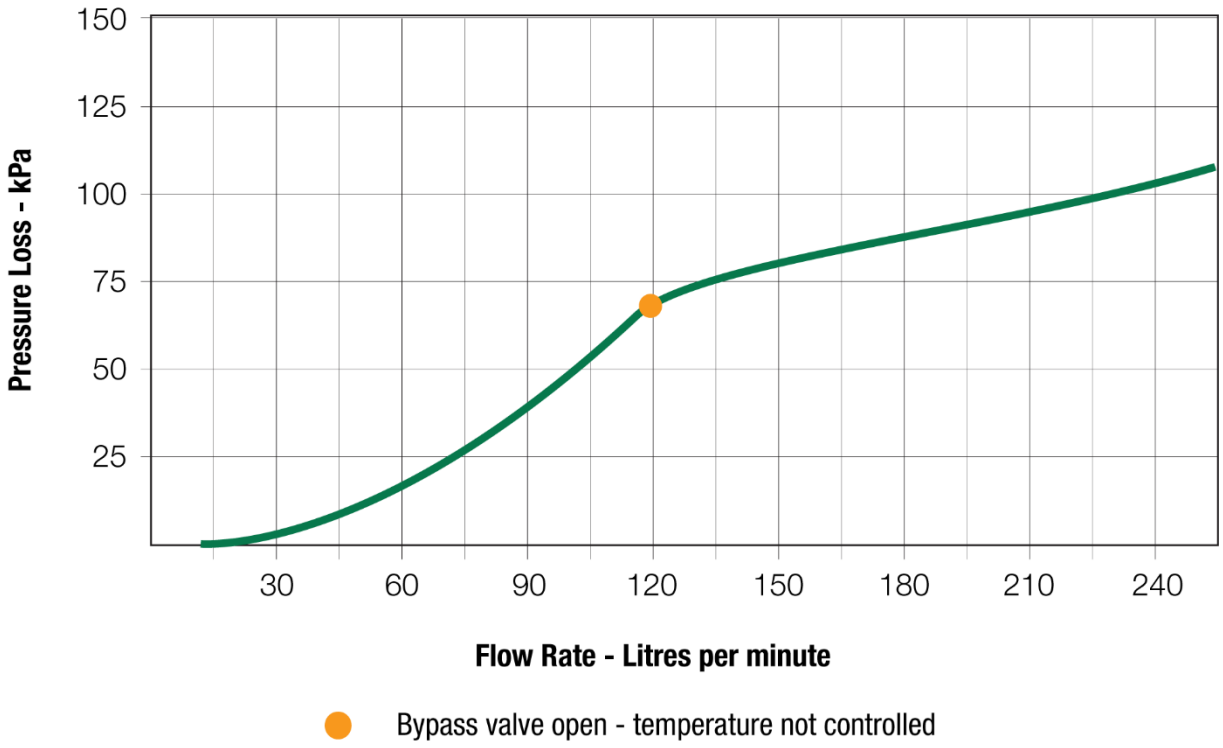
The unit should be installed at a location where it can easily be cleaned, adjusted or repaired. Clearance must be allowed for servicing of the tempering valves. The unit must be secured to a solid wall and be accessible without the use of a ladder / scaffold.

Where damage to property can occur in the event of the unit leaking, it must be installed over a safe tray. Installation and use of a safe tray must comply with AS/NZS 3500.4 and all local codes and regulatory authority requirements.

COMPONENTS



PRESSURE LOSS CHART



COMMISSIONING

Upon completion of the installation, the valve should be tested and commissioned in accordance with AS 4032.3, AS4775, as per the procedure outlined below or as specified by the local authority.

The following instructions should be read and understood prior to commissioning the EMS120 assembly. If, under any circumstances, there are aspects of the installation/system which do not comply with your requirements or the specifications as laid down, the valve must not be put into service until the installation/system does comply.

1. Ensure that the system is thoroughly clean and free from debris prior to commissioning the tempering valves.
2. We recommend that the commissioning of temperatures are carried out using a suitably calibrated and accurate digital thermometer. The valve is commissioned by measuring the mixed water temperature at the outlet.
3. In accordance with the requirements of AS4775, the mixing valve assembly shall deliver tepid water at the outlet of the emergency fixtures at a temperature no more than 37.8°C. The unit is capable of a temperature range from 20 – 50°C; it is therefore imperative that the temperature is set correctly during commissioning to avoid any risk of scalding, and taking into consideration the chemicals available on site.
4. The temperature at the outlet of each valve must be set taking into consideration any fluctuations which may occur within the system due to simultaneous demand.
5. Once the supply temperatures are stabilised and the normal operating conditions are established, the valve can be commissioned.

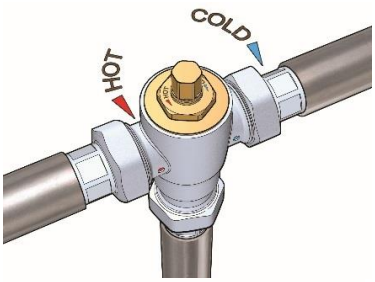
6. Close the outlet isolation valve on the one of the 25mm tempering valve and open the outlet isolation valve on the other tempering valve. Ensure that the bypass relief isolation valve is also closed.
7. We suggest that the following sequence is followed when commissioning the valve.
    a) Open the eye (eye/face) wash outlet. If the EMS120 is not supplying a combination shower, then the drench shower may be used for setting the temperature.
    b) Set the mixed water discharge temperature to the required temperature.
    c) Measure and record the temperature of the water discharging from the outlet and ensure the required blend temperature is achieved.
    d) Measure and record the temperature of hot and cold water supplies at the connections to the valve.
    e) Perform the thermal shut-off test. Isolate the cold water supply to the Caleffi tempering valve and monitor the mixed water temperature. The outlet flow should quickly cease flowing. If it does not stop, then review the fault finding table below.
    f) Restore the cold water supply to the valve and measure and record the outlet temperature after the mixed water temperature has stabilised. The final temperature found during this test should not exceed the permitted values +/-3°C.
    g) Once the desired temperature has been reached, the adjustment spindle can be locked in position using the locking nut supplied with the valve and replace the cap to prevent tampering by unauthorised persons.
8. Close the outlet isolation valve on the tempering valve that has been adjusted, then open the isolation valve to the other 25mm tempering valve and repeat step 7 (a – g) to commission the second 25mm tempering valve.
9. When each valve is completed, open all cold and hot tempering valve isolation valves, including the bypass relief isolation valve.
10. Open the emergency shower outlet and eye (eye/face) wash outlets for simultaneous flow.
11. Measure and record the temperature at the outlets.

    Note: If the final measured temperature with all valves operating at the outlet is higher than the required temperature, then it is necessary to repeat steps 6 to 8.

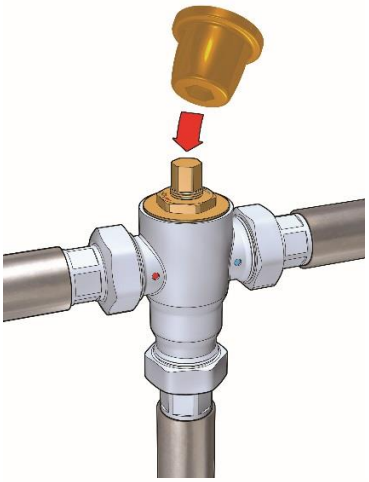
    Note: If the flow rate exceeds approx. 120lpm (70kPa pressure loss), then the bypass relief valve will open and allow some cold water to enter the tepid outlet, thereby supplying slightly lower temperature water from the assembly to the emergency shower.

12. The differential bypass relief function should also be tested. Ensure all isolation valves on the mixing valve assembly are open and then open the emergency shower fixture.
13. Simulate a hot water failure by closing the hot water isolation valves to both tempering valves. The water supply to the shower should now be cold.
    Note that the flow rate may be slightly reduced as the bypass operation produces 76 lpm with a pressure loss of 90kPa. The cold water bypass design allows for minimum flow in the unlikely event that the heated water source fails, thereby ensuring the functionality of the emergency shower is maintained as required by ANSI Z358.1-2014.

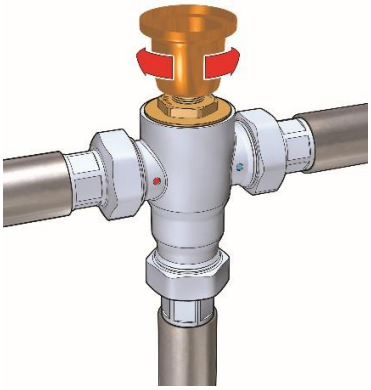
TEMPERATURE ADJUSTMENT



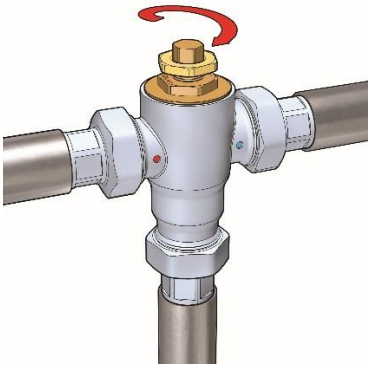
Remove the cap



Fit the temperature and adjustment cap



Temperature adjustment



Lock adjustment spindle with locking nut

MAINTENANCE

Tests should be carried out periodically to monitor the performance of the valve in accordance with AS 4032.3. Deterioration in performance can indicate the need for varying water supply conditions and/or maintenance or replacement of the valve. If, during these tests, the mixed water temperature has changed significantly from the previous test results, record the change before re-adjusting the mixed water temperature. If the final mixed water temperature is greater than the permitted values, we recommend that the details quoted in Installation and Commissioning sections are verified and that service work is required.

We recommend that the following checks are carried out at least every 12 months, or more frequently if required, to ensure that the optimum performance of the valve is maintained.

With reference to the exploded diagram:

1) On the Caleffi 5213 series valves, the inlet strainers (8) on both hot and cold water inlets can be removed for cleaning by unscrewing the inlet union nuts and carefully pulling apart the connecting pipework.
2) The built-in check valves (7) on the Caleffi 5213 series valves can be accessed in a similar way to 1) to ensure freedom of operation and correct seating.
3) Limescale can be removed by immersion in a suitable de-scaling fluid.
4) The valve body must not be disassembled.

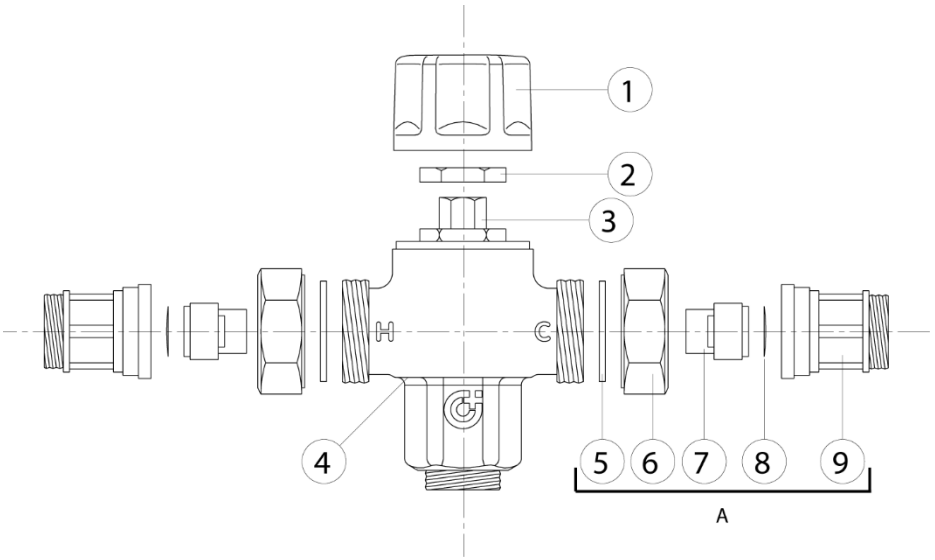
When this maintenance is complete, we recommend that the commissioning process is repeated.

Should the valve still not function correctly, it may be necessary to replace it. We recommend that, as a safety measure, the Caleffi 5213 series is replaced after 5 years service.

Contact Agent Service Department for details and advice.

EXPLODED DIAGRAM

1. **CAP**
2. **LOCKING NUT**
3. **TEMP. ADJ. SPINDLE**
4. **VALVE BODY**
5. **GASKET**
6. **UNION NUT**
7. **CHECK VALVE**
8. **INSERT STRAINER**
9. **TAIL PIECE BODY**



FAULT FINDING

Symptom	Cause	Corrective action
Hot water at the cold taps	a) Operation of the insert check valve is hindered; check valve is not sealing correctly. b) Check valves not fitted.	• Replace faulty check valves
Fluctuating mixed water temperature	a) Erratic supply temperatures at the inlets of the valve. b) Starvation of the water supplies at the inlets of the valve. c) Incorrect commissioning of the valve.	• Restore inlet conditions within the limits of the valve.
Erratic flow of water from the valve	a) Insufficient water supplies. b) Fluctuations in supply pressures/temperatures. c) Adverse effect created by other draw off points on the system.	• Stabilise inlet supply conditions.
No flow of water from the valve	a) In-line filters blocked. b) Insufficient supply pressures. c) Debris obstructing valve operation.	• Clean filters. • Restore inlet supplies. • Clean debris or scale from valve.
Valve does not fail safe when tested	a) Installation not in accordance with our recommendations. b) The minimum temperature differential not achieved. c) Internal mechanism hindered by debris.	• Install as oulined in the instructions. • Raise hot water temperature. • Clean debris or scale from valve.

AGENT / DISTRIBUTOR

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REPORTING TEST RESULTS

EMS120 Emergency Mixing Valve Assembly

Owner/occupier _____ **Authorized tester** _____

Address _____ **Licence number** _____

Date of test _____

Location of valve: _____

DETAILS OF TEST AND MAINTENANCE

Strainers	Cleaned ☐	Replaced ☐
Non-return valves	Cleaned ☐	Replaced ☐
O-rings and seals	Cleaned ☐	Replaced ☐
Element	Cleaned ☐	Replaced ☐
Other critical components	Cleaned ☐	Replaced ☐
Valve replaced	Cleaned ☐	Replaced ☐

TEMPERATURE TESTS

Temperature of hot water °C _____

Temperature of cold water °C _____

Temperature of mixed water at max flow °C _____

at min flow °C _____

Thermal shut-off tests

Hot water isolation test Passed ☐

Cold water bypass test Passed ☐

Element/critical component replacement due: _____

Next field test and maintenance due: _____

Authorized tester's signature _____ Date: _____