Thermostatic Mixing Valves

Fig. 77 & Fig. 78

Introduction

Thermostatic Mixing Valves (TMV) are self-acting and designed to blend hot and cold water, to ensure a constant, safe outlet temperature and prevent scalding.

- Design and manufactured to comply with BS EN1287 (Low Pressure) and BS EN1111 (High Pressure).
- Have been independently tested and certified as meeting the requirements of the D08 specification under the NSF TMV3 scheme.
- The Fig. 78 includes right angle isolation valves.
- Both the Fig. 77 & Fig. 78 thermostatic mixing valves are certified under the NSF TMV2 & TMV3 schemes and are WRAS approved products listed in the WRAS Approvals Directory.
- WRAS and NSF approval certificates can be accessed via the Hattersley website download portal or alternatively, please contact our Technical Helpline.

Fig. 77

Fig. 78

Technical Specification

Table 1

Factory Setting	41°C
Temperature Setting Range	30°C to 50°C
Cold Water Supply Temp	≤ 25°C (TMV2) / 25°C to 20°C (TMV3)
Hot Water Supply Temp	55°C to 65°C
Minimum Hot to Mix Temperature	12°C
Temperature Stability	±2°C
Maximum Working Pressure	10 Bar
Supply Pressure Imbalance Dynamic	2:1

General Installation

These instructions are issued as guidelines only and may not cover all installation conditions – if unsure please contact our Technical Helpline before installation.

- All installers have a duty of care and responsibility in ensuring compliance with regulations. The valve is not guaranteed to function correctly to the TMV2 and TMV3 specification unless it is installed and used in accordance with these instructions (see “Conditions of Use” section).
- The thermostatic mixing valve must be installed in accordance with the regulations of the local water company and the Water Supply (Water Fittings) Regulations 1999.
- The Fig. 77 & Fig. 78 are suitable for single and multiple outlet applications. Care must be taken when using one valve with multiple outlets as flow rates must be achieved under normal operating conditions. Please also ensure that the system has been designed within Legionella control guidelines.
- The Fig. 77 & Fig. 78 can be installed in any orientation.
- Flush hot & cold supply pipework before connection.
- For the Fig. 77, where isolation valves are not supplied, isolation valves in the water supply inlets must be fitted as close as practical to the TMV.
- PRVs to be fitted if required to achieve inlet pressure.
- For Fig. 77, wafer strainers are supplied as shown in Figure 3.
- For Fig. 78, strainers are supplied and located in the isolation valve body, as shown in Figure 4.

TMV2

The valves covered by these instructions have been specifically designed and manufactured as being in compliance with BS EN1287 and BS EN1111. Valves have been independently tested and approved as a TYPE 2 valve by the NSF TMV2 scheme for use in domestic situations.

TMV3

The valves covered by these instructions have been approved as TYPE 3 valves and being in compliance with under the NSF TMV3 scheme. They have been designed and manufactured for use in Healthcare and Commercial installations and complying with the Health Technical Memorandum HTM 04-01: Supplement Performance specification D08: thermostatic mixing.

Conditions of Use

Table 2 - Normal Conditions of Use for Type 2 and Type 3 Valves

Operating Pressure Range	Low Pressure TMV2 EN 1287	High Pressure TMV2 EN 1111	Low Pressure TMV3 DH Spec D 08	High Pressure TMV3 DH Spec D 08
Maximum Static Pressure	10 bar	10 bar	10 bar	10 bar
Flow Pressure - Hot & Cold	0.1 to 1 bar	0.5 to 5 bar	0.2 to 1 bar	1 to 5 bar
Hot Supply Temperature	55°C to 65ºC	55°C to 65ºC	55°C to 65ºC	55°C to 65ºC
Cold Supply Temperature	≤ 25°C	≤ 25°C	5°C to 20ºC	5°C to 20ºC
Temperature Differential (Hot Inlet-Outlet)	12°C	12°C	12°C	12°C

Note: Valves will not be approved for any conditions of use for which testing has not been undertaken. Therefore licensed valves operating outside these condition cannot be guaranteed by the Scheme to operate as Type 2 or 3 valves.

Limits of Use

Hattersley Fig. 77 & Fig. 78 valves have been approved for use on the following designated systems.

Table 3 - Valve Designation of Use for TMV2 & TMV3

High Pressure HP (1-5 Bar)	Low Pressure LP (0.2-1 Bar)	Application	Max. Mixed Temperature
HP-B	LP-B	Bidet	38ºC
HP-S	LP-S	Shower	41ºC
HP-W	LP-W	Wash Basin	41ºC
HP-T (TMV2)	-	Bath	44ºC
HP-T44 (TMV3)	-	Bath	44ºC

Note 1: The British Burns Association recommends 37 to 37.5°C as a comfortable bathing temperature for children. In premises covered by the Care Standards Act 2000, the maximum mixed water outlet temperature is 43°C.

Note 2: Set the mixed water outlet at these maximum initial temperature settings. During the cold water restoration stage the mixed water temperature can deviate by 2°C from these maximum initial settings.

Before Installation

- The hot and cold water inlets of the valve must be cleared, the valve must be correctly connected to the respective supplies. The valve body is marked with a 'C' for cold with a blue indicator and 'H' for hot with a red indicator.
- Check the main valve assembly bores are free of debris and the end sealing faces are clean.
- The use of sealing compounds is not recommended.

Pre-Commissioning Checks

1. The designation of the TMV matches the intended application in Table 3 (TMV2 or TMV3).
2. Supply pressures and temperatures are within the operating range of the valve.
3. Isolating valves and strainers are fitted.
4. Supply temperatures are within the range permitted for the valve and by guidance information on the prevention of legionella.
5. TMVs shall be located in such a way that they can be easily accessed for maintenance an commissioning purposes.

If all the conditions above are met, proceed to temperature setting.
The mixed water temperature at the terminal fitting should never exceed 46°C.

Commissioning

Since the installed supply conditions are likely to be different from those applied in the laboratory tests, it is appropriate, at commissioning, to carry out some simple checks and tests on each mixing valve to provide a performance reference point for future in-service tests.

1. Follow this method for adjusting the water temperature:
2. Remove the green plastic protective cap on top of the valve.
3. Back-out the nut, using a hexagon key:
   - To increase the temperature turn anti-clockwise
   - To decrease the temperature turn clockwise
   - To set the valve to a maximum mixed water temperature in accordance with the valve application (See Table 3).
4. When the valve has been installed following the correct conditions of use, it is advised that the valve is then subjected to exercise prior to the commissioning at the application temperature. Operate the valve from full cold to full hot at least three times.
5. With the valve at the full cold position bring the valve to the correct temperature. If the valve overshoots this, return the valve to the full cold and reset.
6. After adjustment replace the cap to lock the valve in position and prevent tampering.

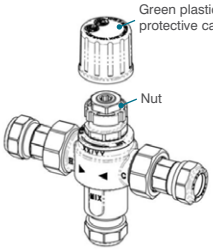

Figure 1
Fig. 77 pictured, cap removal

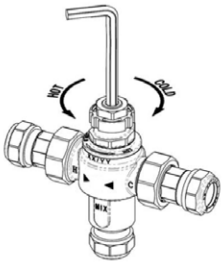

Figure 2
Fig. 77 pictured, temperature setting

Commissioning Test Sequence

a. Carry out the following commissioning test sequence:
   - i. Record the temperature of the hot and cold water supplies adjacent to the TMV. Record the pressures of the hot and cold water supplies at the inlets of the TMV. Note: if this measurement is not possible at the inlets to the TMV and is taken elsewhere, then the pressures at the TMV will be lower than the measured values.
   - ii. For all outlets, measure the temperature of the mixed water at the maximum available flow and record.
   - iii. Isolate the cold water supply to the mixing valve and observe the mixed water outlet.

b. For TMV2: If there is a residual flow during the commissioning or the annual verification (cold water supply isolation test), then this is acceptable providing the temperature of the water seeping from the valve is no more than 2°C above the designated maximum mixed water outlet temperature setting of the valve.
For TMV3: If there is a flow stream after 5 s then collect any water discharging into a suitably graduated measuring vessel for 60 seconds if the volume of water collected is greater than 120ml then further investigation is needed.

c. Restore the cold water supply, after 15 seconds record the mixed water temperature.

d. Verify that this temperature does not differ from the temperature taken in a) ii. above by 2°C, (this is a restoration test after a failure of the cold water supply and some deviation of the mixed water outlet temperature may be expected).

e. If the mixed water temperature differs by more than 2°C from the set temperature taken at a) ii. above, then recheck the supply conditions or re-commission.

f. The valve must then be adjusted and re-commissioned in accordance with the manufacturers' instructions.

Table 4 - Guide to Maximum Stabilised Temperatures Recorded During Site Tests

Application	Max. Mixed Water Temperature
Bidet	40ºC
Shower	43ºC
Washbasin	43ºC
Bath (44ºC Fill)	46ºC

In Service Testing

Purpose

The purpose of in-service tests is to regularly monitor and record the performance of the Thermostatic Mixing Valve. Deterioration in performance can indicate the need for service work on the valve and/or the water supplies.

Frequency of Testing

TMV2

It is a requirement that all TMV2 approved valves shall be verified against the original set temperature results once a year minimum.

TMV3 (Annex F of D 08)

In the absence of any other instruction or guidance on the means of determining the appropriate frequency of in-service testing, the following procedure may be used:

a. 6 to 8 weeks after commissioning carry out the tests detailed in "In-Service Tests".

b. 12 to 15 weeks after commissioning carry out the tests detailed in "In-Service Tests".

Depending on the results of the above tests, several possibilities exist:

c. If no significant changes (e.g. ≤ 1 K) in mixed water temperatures are recorded between commissioning and 6 to 8 week testing, or between commissioning and 12-15 week testing the next in-service test can be deferred to 24 to 28 weeks after commissioning.

d. If small changes (e.g. 1 to 2 K) in mixed water temperatures are recorded in only one of these periods, necessitating adjustment of the mixed water temperature, then the next in-service test can be deferred to 24 to 28 weeks after commissioning.

e. If small changes (e.g. 1 to 2 K) in mixed water temperatures are recorded in both of these periods, necessitating adjustment of the mixed water temperature, then the next in-service test should be carried out at 18 to 21 weeks after commissioning.

f. If significant changes (e.g. > 2 K) in mixed water temperatures are recorded in either of these periods, necessitating service work, then the next in-service test should be carried out at 18 to 21 weeks after commissioning.

In Service Testing (Continued)

The general principle to be observed after the first 2 or 3 in-service tests is that the intervals of future tests should be set to those which previous tests have shown can be achieved with no more than a small change in mixed water temperature.

Service Work Procedure

Using the same measuring equipment or equipment to the same specification as used in the commissioning of the valve, adjust the temperature of the mixed water in accordance with the requirement of the application. Follow the same test procedure as detailed in the 'Commissioning Test Sequence' section.

If the mixed water temperature has changed significantly from the previous test results (e.g.> 1 K), record the change and before re-adjusting the mixed water temperature check:

a. That any in-line or integral strainers are clean.

b. Any in-line or integral check valves or other anti-back siphonage devices are in good working order.

c. Any isolating valves are fully open.

With an acceptable mixed water temperature, complete the same series of tests as outlined in the 'Commissioning Test Sequence' section on page 4 and 5.

Note: In-service tests should be carried out with a frequency, which identifies a need for service work before an unsafe water temperature can result.

Maintenance

Most domestic water supplies contain calcium which will separate out when the water is heated in a system. The degree and speed of scaling may vary depending on factors such as water flow rates, system design, the hardness of the water and the temperature to which the water is heated.

Deposits of scale may over time form in the valve, particularly at the hot inlet. The formation of the scale may adversely affect the performance of the valve which will be detected during the in-service testing. If this occurs it will be necessary to remove the valve for de-scaling and service.

If required, the internal working parts can be removed and cleaned as follows:

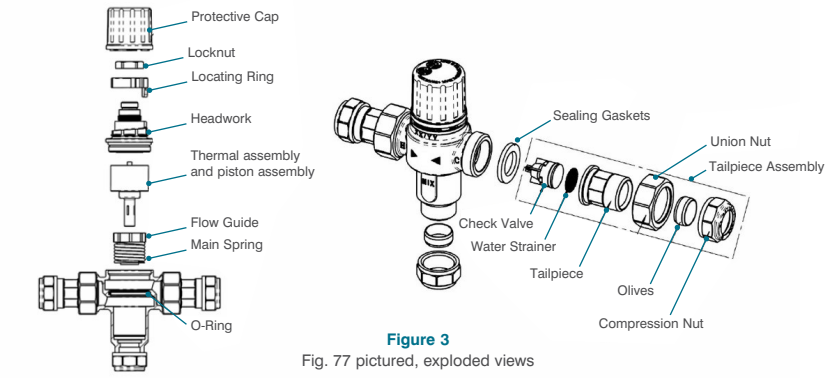

Figure 3
Fig. 77 pictured, exploded views

Maintenance (Continued)

1. Isolate hot and cold water supply.
2. Remove the valve to a clean working area.
3. Remove the protective cap.
4. Unscrew the headwork of the valve.
5. Carefully remove the temperature-sensitive and piston assembly, put to one side.
6. Remove the main spring and flow guide, carefully put to one side.
7. Inspect the components for contamination or damage.
8. Clean or replace as necessary.
9. Remove the O-ring.
10. Clean the valve body and Headwork using a propriety de-scaler (approved for use on potable water applications).
11. Thoroughly rinse the body and headwork in clean potable water.
12. Carefully fit new O-ring to body.
13. Carefully re-fit all components and perform the commissioning sequence.
14. If after cleaning the valve and replacing the O-ring seals the valve does not function correctly, it may be necessary to replace the thermal element.

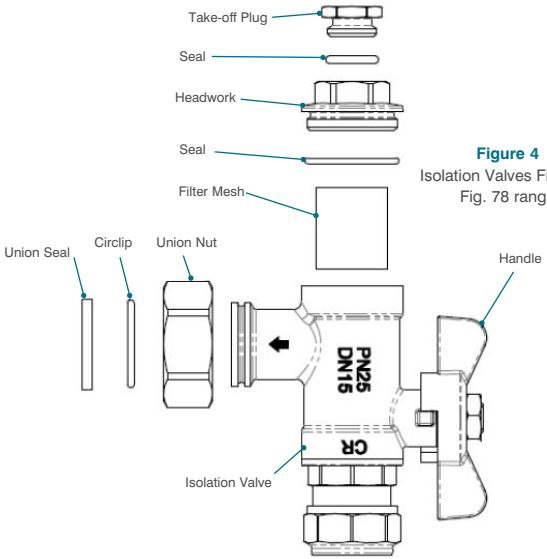

Figure 4
Isolation Valves Fitted to Fig. 78 range

Maintenance (Continued)

All Fig. 78 mixing valves are provided with isolation valves in lieu of the tail piece arrangement. This allows the connections of the hot and cold water supplies to be parallel to the mixed water outlet for ease of piping layouts.

The assemblies comprise an integral full bore ball valve and in-line strainer in an angled housing. When this arrangement is used, the requirements for isolation valves and strainers previously mentioned are regarded as fulfilled.

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• Approved to BS EN 331: 1998

• Designed and manufactured under quality management systems in accordance with BS EN ISO 9001:2008

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