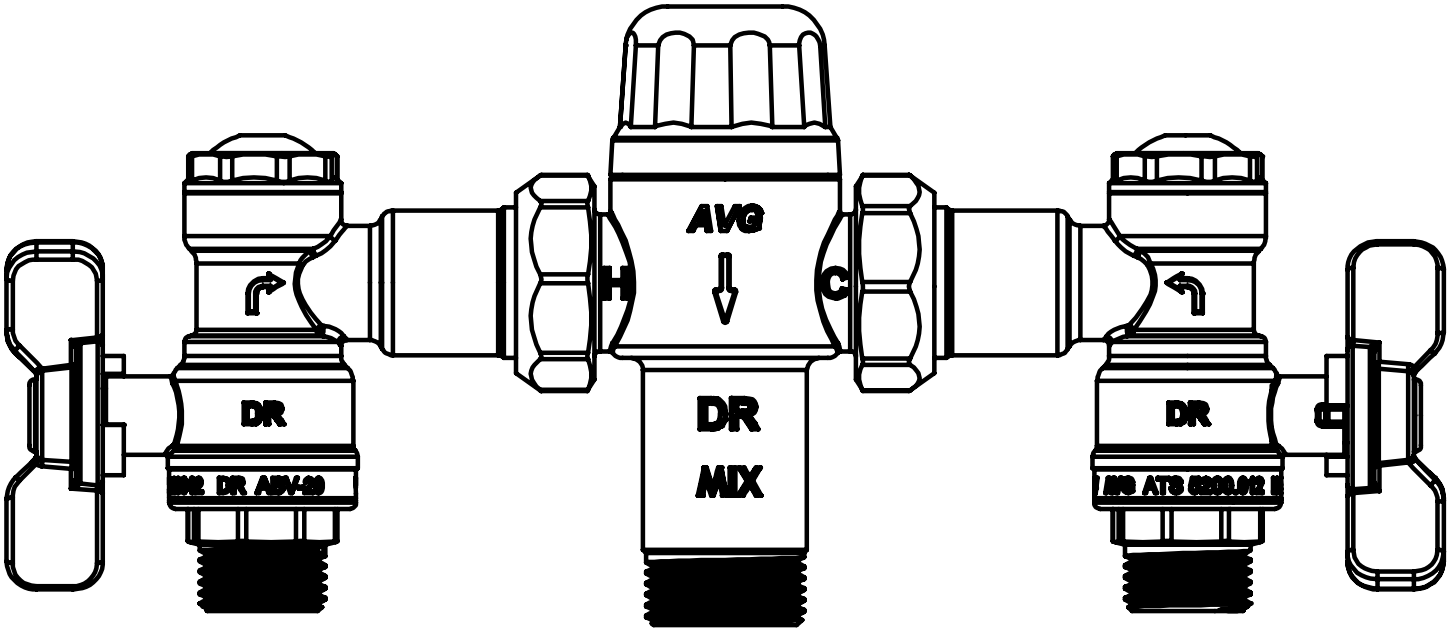
Australian Valve Group

A **WATTS** *Brand*

INSTALLATION, COMMISSIONING AND MAINTENANCE INSTRUCTIONS

INCLUDING DISINFECTION (THERMAL FLUSH) FUNCTION



15mm & 20mm THERMOSTATIC MIXING VALVE

FOR USE IN AUSTRALIA

WaterMark

AS 4032.1
ATS S5200.012
Lic No. 20137

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1. INTRODUCTION

The AVG Thermostatic Mixing Valve (TMV) is a high performance Thermostatic Mixing Valve suitable for a wide range of applications. The valve is designed to comply with Australian Standard AS4032.1 for Thermostatic Mixing Valves-Materials, Design and Performance Requirements and the NSW Health Department requirements. The TMV has the following features:

(a) Meets the requirements of AS4032.1 Thermostatic Mixing Valves,

(b) Provides high stability of mixed water temperature even under changing inlet conditions,

(c) Ensures rapid shut down of mixed outlet flow in the event of hot, or cold water supply isolation,

(d) Easily serviced on site,

(e) Suitable for installation into AS3500 compliant systems with hot water temperature as low as 60°C,

(f) The adjustment mechanism can be locked to prevent tampering,

(g) Disinfection (Thermal Flush) capability.

WARNING

Care needs to be taken when installing this valve, as the valve, pipe work and adjacent areas may be hot and could cause a burn injury.

The AVG Thermostatic mixing valve is not to be considered as an alternative to adequate supervision and duty of care during its use and operation.

2. WARRANTY

AVG warrant their valves against manufacturing defects for two (2) years subject to the following conditions:

1) Installed in accordance with the National Plumbing and Drainage Code AS3500 and all relevant Statutory and Local Codes in the State or Territory in which the valve is installed by a licensed plumber.

2) The valve must be installed in accordance with the AVG Installation instructions supplied with the valve.

3) The AVG warranty covers replacement of the valve only, at no charge. Costs to return the valve to AVG and replace the old valve are at the purchaser's expense.

4) The valve must be returned to AVG with a completed "AVG WARRANTY CLAIM FORM".

5) Where the valve forms part of a hot water system, the valve must be installed according to the hot water system manufacturers' specifications, in addition to all Statutory and Local State or Territory requirements.

6) The warranty is void if:

   - The valve has been damaged in any way
   - The valve has been tampered with
   - Incorrect installation
   - The failure of valve is due to faulty manufacture/installation of the hot water system of which the valve forms a part
   - The valve has failed due to excessive pressure or temperature outside the valve specification.

- The valve has failed due to non-compliance with the Plumbing Code AS3500.
- The valve has failed due to foreign matter or scale build up inside the valve.

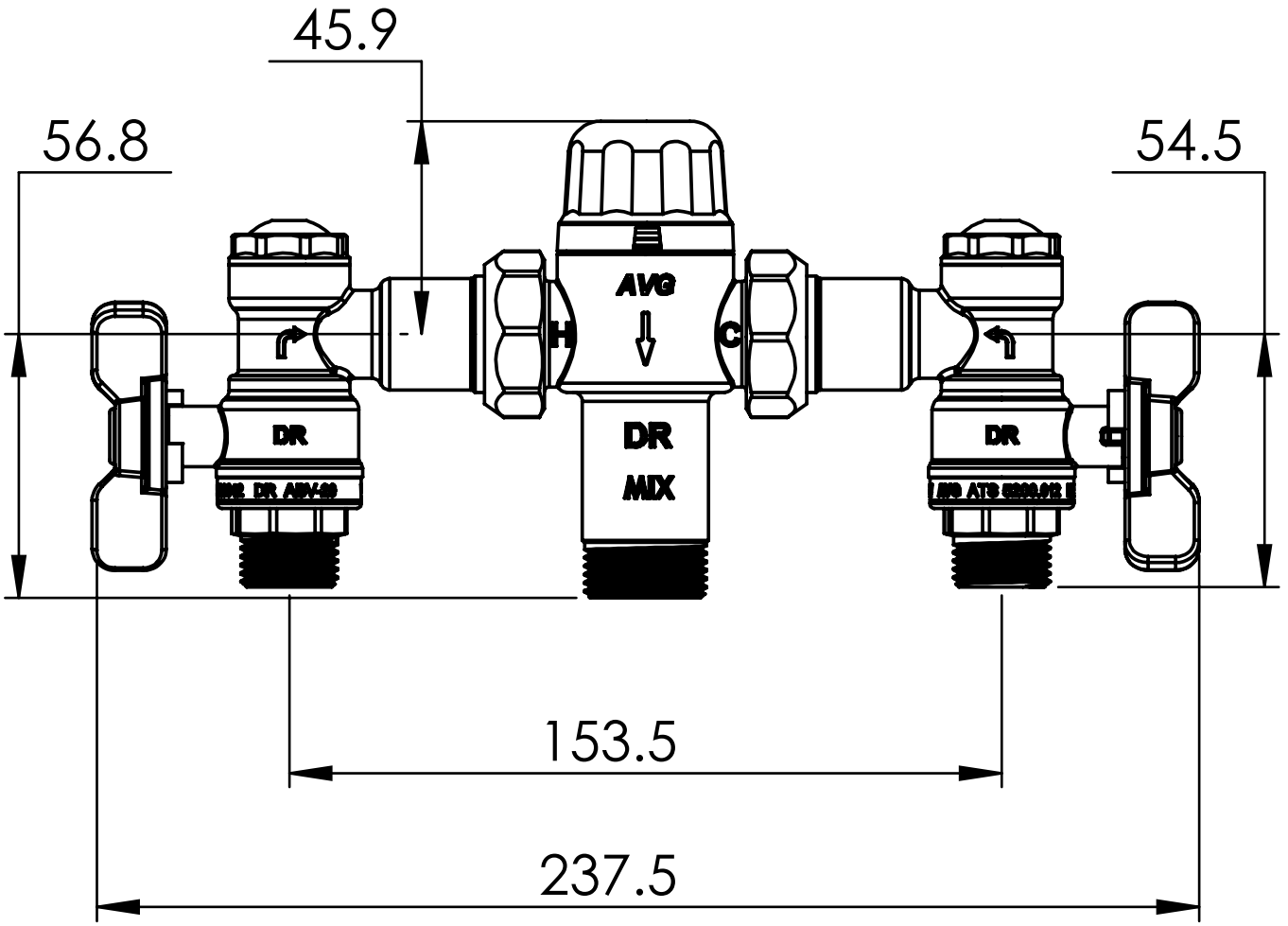
7) The AVG warranty does not cover any claims for damage to walls, carpets, furniture, foundations or any other consequential loss, directly or indirectly as a result of leakage from the valve, subject to any Statutory Provisions to the contrary.

AVG RESERVES THE RIGHT to change its specifications without prior notice and will not accept liability for any claim arising from such change.

3. PRODUCT RANGE & PHYSICAL DESCRIPTION

The AVG Thermostatic Mixing Valve is available complete with inlet service fittings. The valve is available with 15mm (½") or 20mm (¾") inlet connections x 20mm (¾") compression with optional 15mm (½") adaptor. The service fittings consist of isolating ball valves, strainers, pressure test points and non-return valves. The strainers can be serviced and cleaned without disturbing the installation (refer to Section 9). The inlet service fittings also incorporate union type fittings enabling the thermostatic mixing valve to be removed from its installation without disturbing its pipework. The schematics and dimensions of the valve are shown (Fig. 1)

Valve Dimensions (Fig. 1)



4. RECOMMENDED PRESSURES AND TEMPERATURES

MIXED OUTLET TEMPERATURE

Temperature Adjustment Range	35°C to 45°C

INLET TEMPERATURES

Cold Supply	Min. 5°C , Max. 25°C
Hot Supply	Min. 60°C, Max. 90°C
Hot to Mix Temperature Differential for stable operation	Min. 10°C
Cold to Mix Temperature Differential for stable operation	Min. 5°C

FLOW RATES

To ensure stable outlet conditions	Min. 4 litres/minute (As per Graph 1 overleaf)

DYNAMIC INLET PRESSURES

Hot and Cold Inlet Pressures	Min. 20kPa, Max. 500kPa

STATIC INLET PRESSURE

Hot and Cold Inlet Pressures	Max. 1000kPa

INLET PRESSURE RATIO

Maximum inlet pressure ratio for stable operation (Hot: Cold or Cold: Hot)	10:1 (either supply)

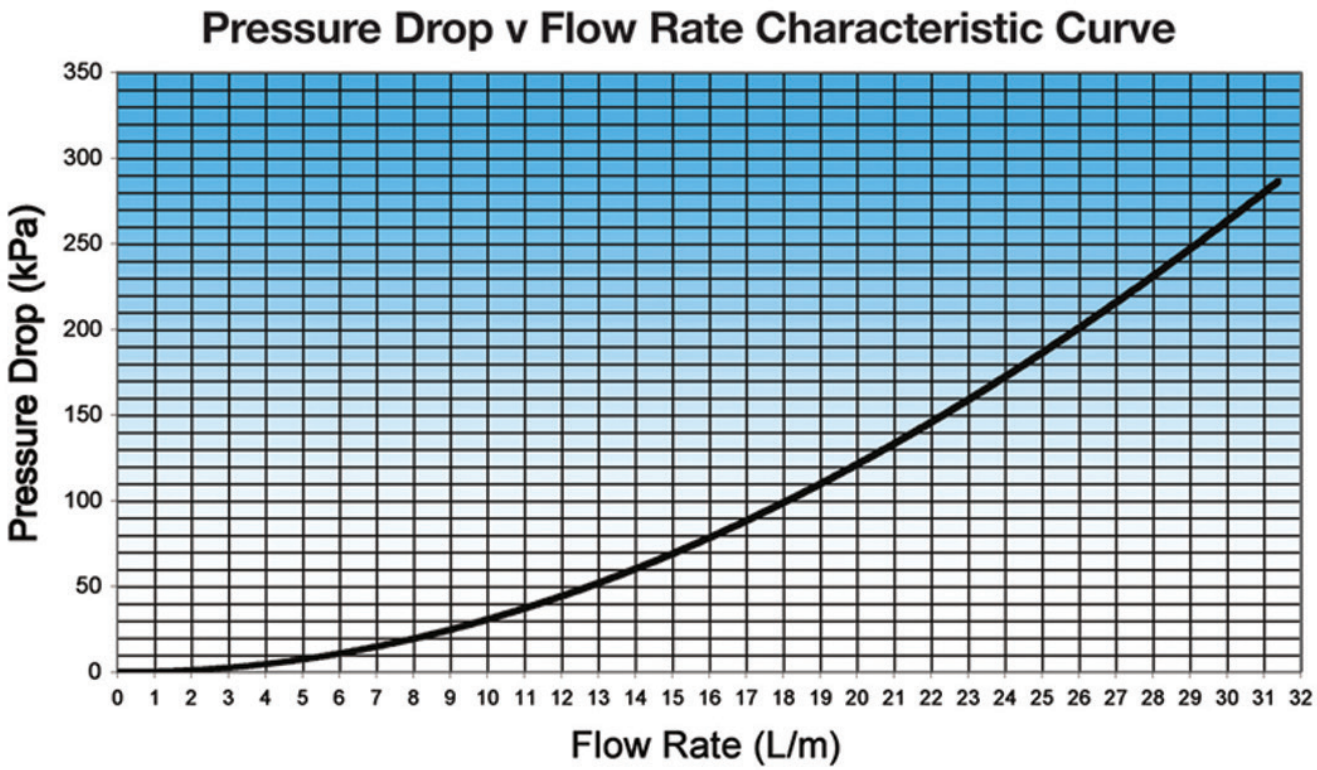
NOTE: For optimum operation it is recommended that the hot and cold water supply pressures be balanced to within +/- 10%.

NOTE: Notwithstanding the above, compliance with AS3500 must be maintained.

5. FLOW SIZING GRAPH

The AVG Thermostatic Mixing Valve is suitable for many applications. The Headloss Characteristic for Mixed Outlet Flowrate verses Balanced Inlet Pressure is shown below in Graph 1. It is important that the valve is sized correctly.

GRAPH 1



NOTE: To ensure optimum performance the minimum outlet flow of the mixing valve during operation should be at least 4 litres/minute.

It is important that the valve and pipe work is sized such that they comply with those listed in AS3500.1.2. and Appendix B to ensure the water velocity in the pipe work is within the allowed limit.

If the valve is to be installed and operated under unequal inlet pressures the lower inlet pressure determines the outlet flow rate. However, for optimum performance and stability it is recommended that the valve be installed with balanced dynamic inlet pressures (+/- 10%).

6. INSTALLATION

The AVG Thermostatic Mixing Valve should be installed as per the appropriate Standard, Code of Practice and legislation applicable to each state and any local requirements and details outlined in this section.

The AVG Thermostat Mixing Valve must be installed by a licensed plumber, or where applicable, a licensed plumber who has undertaken T.A.F.E. training in Thermostatic Mixing Valves.

NOTE: To effectively control microbial hazards during system design, installation, commissioning and maintenance, it is important to adhere to the requirements outlined in AS/NZS3666 and local legislation. See Section 10 for the disinfection procedure.

Inlet and outlet connections of the valve are clearly marked. The letters H and C cast into the valve body indicates the Hot and Cold inlet respectively. An arrow cast into the body of the valve identifies the valve outlet direction.

If the valve is not installed correctly then the warranty will be void. Please note that the user may be in danger if the valve malfunctions.

Check to ensure that the system operating conditions fall within the recommended operating range of the AVG Thermostatic Mixing Valve as detailed in Section 4. If the hot water supply temperature is greater than 90°C the valve may be damaged. A suitable temperature limiting valve must be fitted to the hot water supply, prior to the inlet fittings, if the temperature of the hot water will rise above 90°C.

It is also important that both of the inlet dynamic supply pressures are 500kPa or less. If either supply pressure exceeds 500kPa then a suitable pressure reducing valve must be fitted prior to the inlet control valve to reduce the pressure to an acceptable limit.

In order to achieve optimum performance from the valve it is recommended that the inlet pressures are balanced to within 10% of each other.

The water quality conditions should comply and not exceed the limits as listed in AS3500.4, Section 3.7.1.

It may be necessary to install a water softener or water treatment device.

NOTE: In some installations, flick mixers and solenoid valves are used. The water pressure may be seen to spike outside that recommended for the valve, during rapid shut off conditions. Even if the spike only lasts for a split second it is still considered to be outside the operating conditions and may cause the valve to operate incorrectly.

If this does occur, then measures must be taken to control the spike, such as inline pressure reducing valves directly before the valve inlets.

Thoroughly flush the pipe work with clean water to remove any swarf or debris before the valve is installed.

Care should be taken to prevent water damage occurring during this procedure.

It is required by AS3500.4.2 that “Each thermostatic mixing valve shall have an isolating stop tap/valve, line strainer and non-return valve fitted to the hot and cold water supply lines”. The inlet fittings supplied with each TMV will ensure this requirement is met.

If the AVG Thermostatic Mixing Valve is installed without the supplied inlet control valves then it will be necessary to install a separate isolating valve for ease of servicing, a non-return valve to prevent cross – connection and a strainer to both inlets to the valve.

Ensure that the test plugs in the top of the inlet fittings are water tight.

Install the valve so that it can be accessed easily for maintenance or servicing. The valve can be installed in a wall cavity, under a basin or on a wall, however it is essential that the mixing valve and inlet fittings are easily accessible for servicing.

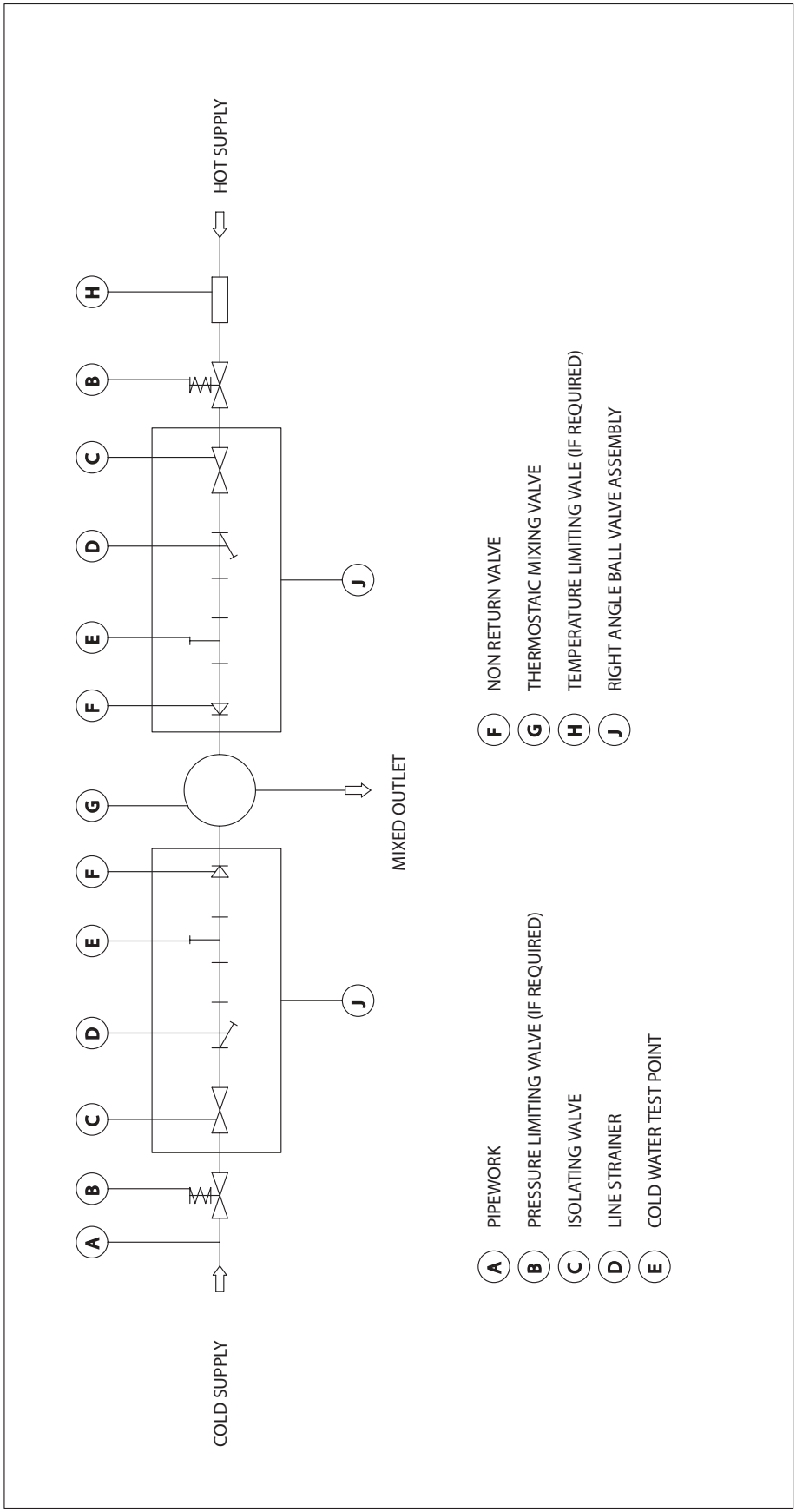
During installation or servicing, heat must not be applied near the mixing valve or inlet fittings, as this will damage the valve and inlet fitting internals.

Note: The AVG Thermostatic Mixing Valve is intended mainly for use in applications with set temperatures of 45°C or below.

When installed at higher set temperature, the performance may be less than specified in AS4032.1.

If the set temperature required is higher, then an AVG Tempering Valve approved to AS4032.2 would provide a greater margin for safety in reducing scalding accidents.

Schematic Installation Diagram (Fig. 2)



7. COMMISSIONING OF THE VALVE

Upon completion of the installation, the valve should be tested and commissioned as per the procedure outlined below or as specified by the local authority. The entire procedure should be read through thoroughly prior to the commissioning of the valve. A calibrated digital thermometer, having rapid response time with a maximum temperature hold, a small flat bladed screw driver, an 8” shifting spanner and the TMV protective top cap will be required to check and set the outlet mixed temperature of the valve.

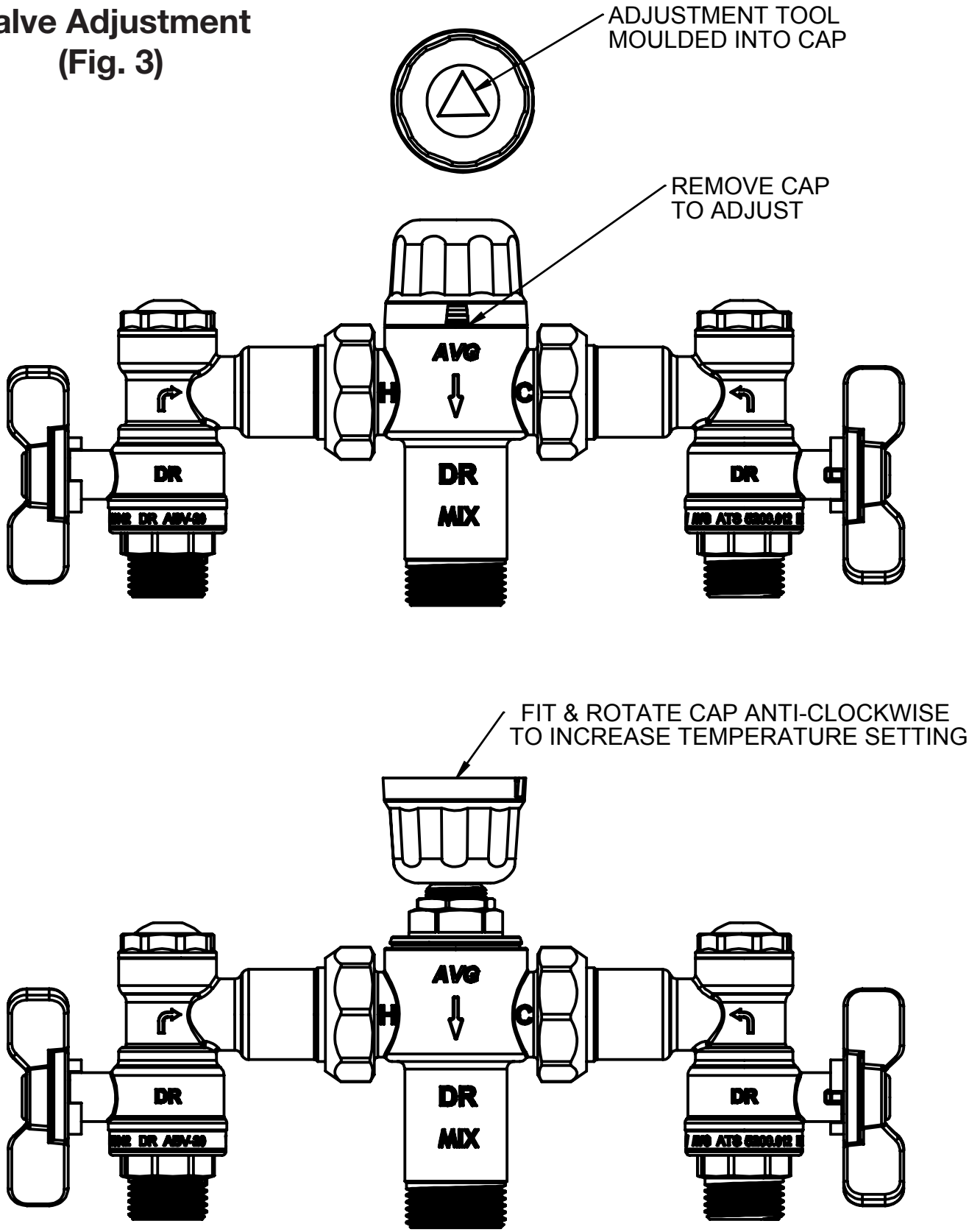
- Ensure all outlets that will be serviced by the valve have adequate warning signs posted to ensure that no outlet is used during commissioning.
- Open the cold supply line to the valve, then open the hot supply line, ensuring there are no leaks.
- Open the tapware outlet that is closest to the TMV.
- Allow the mixed outlet to flow for at least 60 seconds to allow the temperature to stabilize before taking a temperature reading. Use the digital thermometer and measure the temperature. The flow rate should be at least 4L/min. The flow rate can be checked with the aid of a known size container and a stopwatch.
- If the outlet temperature needs adjustment then the following steps are required:

TEMPERATURE ADJUSTMENT

1. Using a small flat bladed screw driver lever the protective top cap off the valve (Fig. 3).
2. Loosen the lock nut on the adjusting spindle.
3. Fit the cap over the adjusting spindle (Fig. 3).

4. Allow the mixed outlet temperature to stabilize for 60 seconds and once again take a temperature reading. Repeat the procedure until the desired temperature has been reached.
5. Tighten the lock nut and push the protective cap firmly on to the top of the valve until it ‘snaps’ back into place.
6. Check that the outlet temperature is stable over the full range of flow rates and that the flow rate is adequate for the application.
7. Close the outlet.
8. The TMV is now set and locked.

Valve Adjustment (Fig. 3)



8. SHUT DOWN TEST

Now that the mixing valve has been set and locked it is necessary to perform a shut-down check.

Allow the mixed water temperature to stabilize and note the outlet temperature. While holding a digital thermometer in the outlet flow, quickly isolate the cold water supply to the valve. The outlet flow should quickly cease flowing. As a rule-of-thumb the flow should be less than 0.1L/min following the isolation. Monitor the maximum outlet flow temperature, and record this on the Commissioning Report at the back of this instruction booklet.

The temperature should not exceed that allowed by the applicable standard or code of practice for each state. Restore the cold water supply to the valve. After the mixed water temperature has stabilized note the outlet temperature ensuring the outlet temperature has re-established.

Now repeat the above test, except this time quickly isolate the hot water supply to the valve. The outlet flow should quickly slow to a trickle. As a rule-of-thumb the trickle should typically be less than 0.4L/min@500kPa down to less than 0.1L/min@100kPa following the isolation. Restore the hot water supply to the valve and measure and record the outlet temperature after the mixed water temperature has stabilized ensuring the outlet temperature has re-established.

Ensure that all details of the Commissioning Report are completed and signed by the relevant signatories. A copy of this report should be kept with the installer and owner of the premises.

The valve is now commissioned and it can be used within the technical limits of operation.

9. MAINTENANCE AND SERVICING

The AVG Thermostatic Mixing Valve should be serviced and commissioned on an annual basis, unless the installed conditions require more attention.

ANNUAL MAINTENANCE PROCEDURE

Every 12 months the AVG Thermostatic Mixing Valve should be inspected and tested. The valve should be cleaned and inspected for leaks.

Isolate the hot and cold supplies to the mixing valve by closing the inlet ball valves. Remove the inlet fitting filter cover with a suitable spanner and then remove the mesh strainer, as shown in Fig. 4.

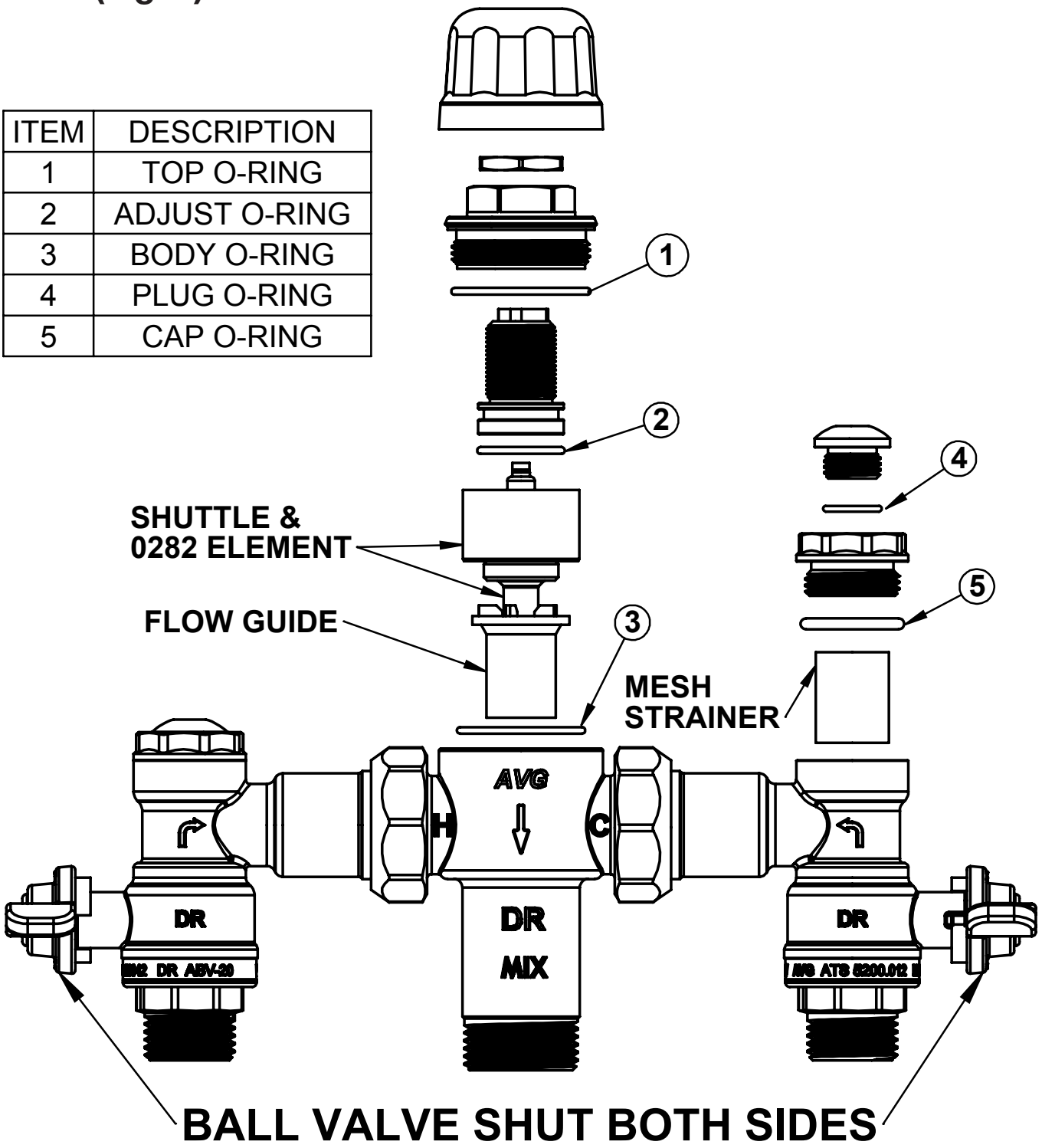
The strainers should be cleaned with a dilute water solution of suitable descaling solvent (such as CLR), checked for damage and then thoroughly rinsed with clean water. The strainers can then be re-fitted into the valve, and the top cover replaced and tightened to a maximum torque of 15Nm into the inlet valve bodies.

If the valve fails to shut down or fails to maintain its set temperature then refer to the fault findings solutions outlined in section 11. The valve piston ‘O’ ring and thermostatic element/shuttle assembly must be replaced every 5 years. or sooner when required.

Check that the valve and the top of the inlet fittings are tight and that there are no leaks. The valve must then be recommissioned as per Section 7, including temperature adjustment and shut down testing.

Servicing Diagram
(Fig. 4)

ITEM	DESCRIPTION
1	TOP O-RING
2	ADJUST O-RING
3	BODY O-RING
4	PLUG O-RING
5	CAP O-RING



10. DISINFECTION (THERMAL FLUSH) PROCEDURE

The AVG Thermostatic Mixing Valve (TMV) has a built-in function to enable the valve to pass hot water through the warm water system in a controlled manner. This feature is optional and should form part of the regular maintenance requirements for the site which allows maintenance plumbers to flush hot water through the TMV and the warm water plumbing. A risk assessment of each particular site should be carried out to determine the Thermal Flush frequency.

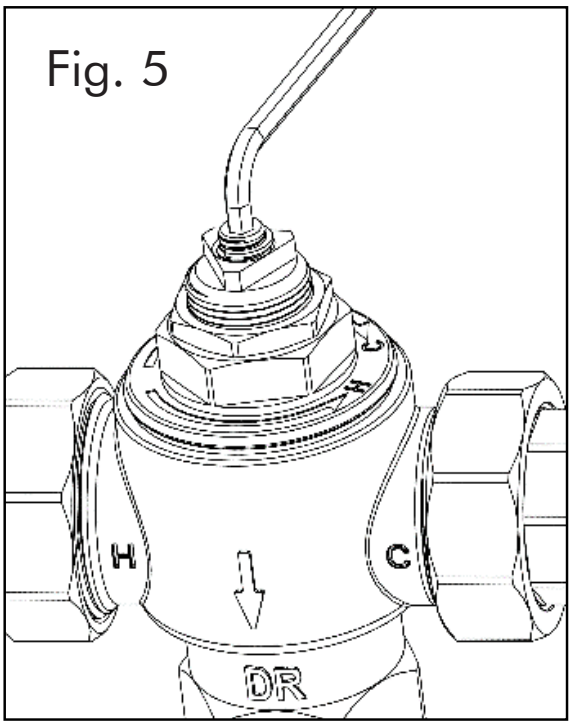


Fig. 5

Before commencing the Thermal Flush, the site should be controlled to prevent the risk of scalding from hot water emitted from the taps during this procedure. Appropriate signage and barricading is recommended.

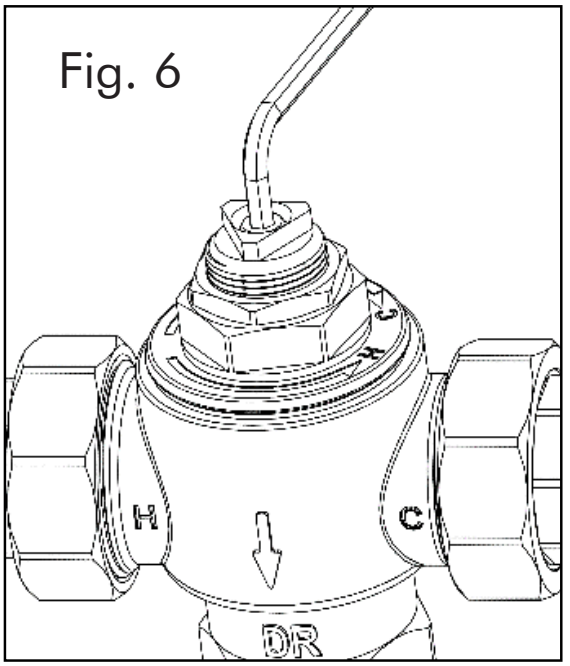


Fig. 6

Procedure:

1. Isolate both the hot and cold inlet ball valves to the TMV.
2. Remove the top cap from the TMV.
3. Ensure the lock nut for the adjusting spindle is tight.
4. Locate the temperature adjustment grub screw on top of the adjusting spindle.

5. Using a 3mm allen key, rotate the grub screw out (anti-clockwise) till it stops. See Fig.5.
6. Open the hot inlet ball valve.
7. Turn the tapware outlet on. **CAUTION:** Hot water will now flow through the TMV, the warm water plumbing and from the tapware outlet. Precautions must be taken to prevent scalding.
8. Once the required set time for the site's Thermal Flush procedure has passed, turn off the tapware outlet.
9. Turn on the cold water inlet ball valve at the TMV.
10. Using the 3mm allen key, rotate the temperature adjustment grub screw all the way in (clockwise) till it stops. See Fig.6.
11. Turn the tapware outlet on. **CAUTION:** Hot water will spurt from the outlet till the mixed water from the TMV begins to flow.
12. Check the outlet flow temperature, making sure it is within the required range.
13. Turn the tapware outlet off.
14. Replace the TMV top cap and click down into position.

11. FAULT FINDING

FAULT/SYMPTON	CAUSE	RECTIFICATION
1. The desired mixed water temperature cannot be obtained or valve is difficult to set.	Hot & cold supplies are fitted to the wrong connections. Valve contains debris. Strainers contain debris. Non-return devices are damaged.	Refit the valve with Hot/Cold supplies fitted to the correct connections. Clean valve ensuring debris is removed & components are not damaged. Clean strainers ensuring debris is removed. Check non-return device is not jammed. Clean if necessary.
2. The valve will not shut down.	The hot to mix temperature differential is not high enough. Sealing seat is damaged or fouled by debris.	Raise hot water temperature. Replace shuttle 'O' ring. Clean seat using suitable descaling solution. Replace element assembly.

FAULT/SYMPTON	CAUSE	RECTIFICATION
3. Mix temperature variation	Debris is fouling valve. Flow rate below 4L/ min. Strainers are fouled. Systems may be fluctuating outside valve parameters.	Clean the valve ensuring that all debris is removed and components are not damaged. Rectify any pressure deterioration. Clean strainers. Check system pressure, install pressure control valves to ensure inlet conditions are within those stated in 4.
4. Mix temperature changing over time	Inlet conditions (pressures or temperatures) are fluctuating. Strainers contain debris.	Install suitable pressure control valves to ensure Inlet conditions are within those stated in Sect 4. Clean strainers ensuring debris is removed.
5. Either full hot or cold flowing from outlet fixture	Valve is incorrectly set. Hot/Cold water has migrated to other inlet.	Adjust mix temperature between 35-45°C as required. Replace faulty non-return valves.

FAULT/SYMPTON	CAUSE	RECTIFICATION
6. No flow from the valve	Hot or cold water failure. Strainers are fouled.	Valve functioning correctly. Restore inlet supplies and check mix temperature. Clean strainers.
7. Flow rate reduced or fluctuating	Valve or inlet fittings fouled by debris. Dynamic inlet pressures are not within those recommended limits.	Check valve & inlet fittings for blockages. Ensure the dynamic inlet pressures are nominally balanced to within +/- 10%.
8. Mixed water temperature too hot or cold.	Valve has been tampered with. Valve incorrectly set. Inlet temperatures are not within specified limits.	Readjust valve to required set temperature. Readjust valve to required set temperature. Ensure inlet temperatures are within the specified Limits as listed in Sect 4.

FAULT/SYMPTON	CAUSE	RECTIFICATION
9. Warm water temperature adjuster difficult to move.	Adjuster at maximum mix temperature stop. Valve shuttle into over stroke.	Mixed water is at maximum temperature. No higher mix temperature adjustment is available. Wind adjuster out until set temperature required is achieved.
10. Hot water flows into the cold water system or vice versa.	Non return valves faulty.	Replace them.
11. Valve is noisy.	Water velocity above velocity requirements of AS3500.1.2.	Reduce water velocity.

12. COMMISSIONING REPORT

AUSTRALIAN VALVE GROUP (AVG) COMMISSIONING REPORT FOR THERMOSTATIC MIXING VALVES (use a separate sheet for each valve)

Name of Establishment: .....

Address of Establishment: .....

Phone Number: .....

Contact Person: .....Date: .....

Work Order No: .....

Make & Model of Hot Water Unit: .....

Temp of Hot Water: ..... °C Hot Water Pressure kPa: .....

Cold Water Supply via: .....

Pressure Reducing Valve Fitted: Yes / No

Temp of Cold Water:..... °C Cold Water Pressure kPa: ..... .

Make of Mixing Valve: .....

Model No: .....Size:.....

Valve Location/Building: .....

Valve Identification Number: .....

Total No. of Mixing Valves on Site/building:.....

Total No. of Outlets served by this valve: Baths ( ) Basins ( )

Showers ( ) Other outlets - Details: .....

.....

REPORT PAGE 1 OF 4

Valve installed to requirements of:

(a) The drawing & specification Yes / No

(b) The valve manufacture/supplier Yes / No

(c) The code of TMV's Yes / No

(d) The local water supply authority Yes / No

If NO, give details and action taken: .....

.....

Test results (complete table on following page)

Valve considered satisfactory for use: Yes / No

If NO, state reason and action taken: .....

.....

It is hereby certified that all the commissioning work has been carried out by the undersigned in accordance with local plumbing requirements for Thermostatic Mixing Valves.

Date initial service due: .....(Max.12 months use)

Valve commissioned by: .....

Signature of licensed plumber: .....

License/Cert No: .....

Business name of plumbing contractor: .....

Contractor's authority No: ..... Date: .....

NOTE: A duplicate copy of this report is to be retained at the site for any inspection by authorized persons.

The following information is to be provided by site manager/owner:

Valve size and installation recommended by (name): .....

.....

Valve supplied by (name): .....

Valve installed by (name): .....

Date of installation: .....Drawing No: .....

Certificate of Compliance/Inspection No:.....Dated: .....

Service Manual on site: Yes / No

Report received by (name): .....

Position: .....

Signature:.....Date: .....

For and on behalf of the client/site manager/owner.

TEST RESULTS:

Valve location/building: .....

Room or area designation: .....

Work Order No:. .....

Give details of brand and model designation. Commensurate with the design flow rate for the mixing valve.

NOTE: An accurate digital type thermometer is necessary for the temperature measurements. Prescribed temperature range for warm water .....°C to .....°C

Fail safe at both min. and max. flow rates (PASSED / FAILED)

Signature of licensed plumber: .....

License/Cert No: .....

Business name of plumbing contractor: .....

Contractor's authority No: .....Date: .....

AUSTRALIAN VALVE GROUP (AVG) SERVICING REPORT FOR THERMOSTATIC MIXING VALVES

Name of Establishment: .....

Address of Establishment: .....

Phone Number: .....

Contact Person: .....Date: .....

Work Order No: .....

Make & Model of Hot Water Unit: .....

Make of Mixing Valve: ..... Model No: .....Size: .....

Valve Location/building: .....

Valve Identification Number: .....

Total No. of Mixing Valves on Site/Building: .....

Total No. of Outlets served by this valve: Baths ( ) Basins ( )
Showers ( ) Other outlets - Details: .....

.....

Mixing Valve installed to requirements of:

(a) The drawing & specification	Yes / No
(b) The valve manufacture/supplier	Yes / No
(c) The code of TMV's	Yes / No
(d) The local water supply authority	Yes / No

If NO, give details and action taken: .....

.....

AUSTRALIAN VALVE GROUP (AVG) SERVICING REPORT FOR THERMOSTATIC MIXING VALVES

Any current complaints concerning installation or operation reported by establishment personnel or stated in previous report: YES / NO

If YES, give details: .....

.....

Particulars of service work carried out during this visit: .....

.....

List of items replaced (and part numbers) during this visit: .....

.....

Temp. of warm water at outlet: .....°C

Fail Safe Test: PASSED / FAILED

Valve considered satisfactory for further use: YES / NO

If NO, reason and action taken: .....

.....

Date next service due: .....(12 months maximum)

It is hereby certified that all service work has been carried out by the undersigned in accordance with local plumbing requirements for Thermostatic Mixing Valves.

Name of licensed plumber (print): .....

Signature: ..... Licence/Cert No: .....

Business name of plumbing contractor: .....

Contractors Authority No: ..... Date of Service: .....

AUSTRALIAN VALVE GROUP (AVG) SERVICING REPORT FOR THERMOSTATIC MIXING VALVES

NOTE: A duplicate copy of this report is to be retained at the site for any inspection. By authorized persons.

The following information is to be proved by site manager/owner:

Valve size and installation recommended by (name): .....

.....

Valve supplied by (name): .....

Valve installed by (name):.....

Date of installation: ..... Drawing No: .....

Certificate of Compliance/Inspection No:.....Date:.....

Service manual on site: YES / NO

Date of previous service: .....

Previous service carried out by:.....

Current report received by (name): .....

Position: .....

Signature:..... Date:.....

For and on behalf of the client/site manager/owner.

FOR SALES & TECHNICAL SERVICE

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