



**Kiwa UK Type 3 Certification:
Guidance for the Installation,
Commissioning & in-service testing
of Type 3 certified Thermostatic
Mixing Valves (TMV) for use in
Healthcare premises.**

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1. Introduction

It has been recognised that users of domestic hot water for ablutionary purposes in health and social care establishments are often at risk of injury by scalding. For some time, this risk has been attenuated by the use of Type 3 thermostatic mixing valves that comply with the Department of Health's Health Technical Memorandum 04-01: supplement. Performance specification D 08: thermostatic mixing valves (healthcare premises). Installing Type 3 thermostatic mixing valves ensures that end-users are adequately protected from the risk of scalding. The supply conditions and the valve's performance however must be periodically monitored, and the valve suitably maintained and tested to ensure that it continues to operate effectively. Changes to the temperature and pressure of the water supplies to the thermostatic valve may affect the valve's performance and must be considered when undertaking the in-service test.

Ignoring or failing to conduct adequate in-service inspection, testing and maintenance can adversely affect the valve's thermal performance. This document has been prepared to clarify the methods used to ensure that the supplies are adequate to install Type 3 valves, that the valve is commissioned correctly and that the on-site test is also undertaken correctly.

Prior to the installation of the thermostatic mixing valve a risk assessment shall be undertaken and recorded to verify the type of thermostatic valve to be installed i.e., Type 2 or Type 3

The water supply conditions must be suitable for the effective operation of the thermostatic mixing valve, see Table 1.

Table 1: Conditions for normal use

Operating pressure range	High pressure	Low pressure
Maximum static pressure - bar	10	10
Flow pressure, hot and cold - bar	1 to 5	0.2 to 1
Hot supply temperature - °C	55 to 65	55 to 65
Cold supply temperature - °C	5 to 20	5 to 20

Compliance with these supply conditions will also help to maintain the quality of the water supply when used in conjunction with Department of Health's Health Technical Memorandum 04-01: Safe water in Healthcare premises and the Health & Safety Executive Legionnaire's disease: The control of legionella bacteria in hot and cold-water systems (HSG274 Part 2)

The Thermostatic mixing valve shall be appropriate for the valve's intended use (designation) see Table 2.

Table 2: Valve Designations of use

Designation of use	High pressure	Low pressure
Bidet (B)	HP-B	LP-B
Shower (S)	HP-S	LP-S
Washbasin (W)	HP-W	LP-W
Tub (T) fill at 44°C	HP-T44	LP-T44
Tub (T) fill at 46°C	HP-T46	LP-T46
Diverter Tub/shower (D) Tub fill at 44°C or 46°C Shower at 41°C max	HP-D44 HP-D46	LP-D44 LP-D46

Any designation of use with suffix E, indicates an economy flowrate i.e., less than or equal to 8 l/min (excluding Tub fill).

2. Scope

This guide specifies best practice for; commissioning, in-service inspection and testing for Type 3 thermostatic mixing valves installed in health and social care establishments (e.g., hospitals, nursing homes, and residential care homes).

Type 3 thermostatic mixing valves installed in other applications to reduce the risk of scalding should also be inspected and tested in accordance with this document and the manufacturer's instructions.

This guide applies to thermostatic mixing valves installed for ablutionary purposes in health and social care establishments in which the hot and cold-water supplies comply with the limits specified in Table 1 and where the mixed water temperature is set to the value specified in Table 3 appropriate to the application.

Table 3: Mixed water temperature

Application and Designation	Initial set temperature of the mixed water (at point of discharge)
Bidet (B)	38°C max
Shower (S)	41°C max
Washbasin (W)	41°C max
Bath (44°C fill) (T44)	44°C max
Bath (46°C fill) (T46)	46°C max
Diverter Bath/Shower (D44)	Bath fill 44°C max, Shower 41°C max
Diverter Bath/Shower (D46)	Bath fill 46°C max, Shower 41°C max
Note: Set the mixed water outlet at these maximum initial temperature settings. During the cold-water restoration stage, the mixed water temp can deviate by 2°C from these maximum initial settings.	

Temperature override function:

The maximum temperature setting must be set when the temperature stop has been overridden as detailed in table 3. The temperature at the temperature stop prior to being overridden is a lower temperature.

3.0 Commissioning and in-service testing

3.1 Commissioning

3.1.1 Purpose

Commissioning ensures that the thermostatic mixing valve and the water supplies to it, are appropriate and that the valve has been adjusted to provide mixed water at an appropriate temperature for the intended application of use. It also provides records of the thermal performance of the thermostatic mixing valve.

3.1.2 Commissioning Procedure

3.1.2.1 Check that the Thermostatic valve is appropriate for the application or designation of use, see table 2.

Check that the water supplies are appropriate for the installation of the thermostatic mixing valve (see table 1 and flowchart Stage 1 confirmation of supply conditions).

Check that the mixed water temperature is appropriate for the application, if required adjust the mixed water temperature up to a maximum application temperature (as indicated in table 3) in accordance with the manufacturer's instructions.

Note: - After risk assessment a temperature that is lower than the maximum temperature allowable for the designated installation (vulnerable people) can also be set if deemed appropriate to do so.

Check that the supply pipework is free from debris or detritus.

3.1.2.2 Carry out the following commissioning test sequence (see flowchart stage 2):

- a) 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.
- b) For all outlets, measure the temperature of the mixed water at the maximum available flow and record.
- c) Isolate the cold-water supply to the mixing valve and observe the mixed water outlet.

3.1.2.3 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.

3.1.2.4 If there is no flow or if the volume of water collected is less than or equal to 120ml, then restore the cold-water supply, after 15 seconds record the mixed water temperature.

3.1.2.5 Verify that this temperature does not differ from the temperature taken in **b)** 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).

3.1.2.6 If the mixed water temperature differs by more than 2°C from the set temperature taken at **b)** above, then recheck the supply conditions or re-commission (see 3.1.2.7).

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

Note: Consider checking the following:

- the supply conditions for normal use are within the conditions specified in table 1;
- the in-line or integral strainers and check valves are clean;

- any isolating valves are fully open;
- the thermostatic mixing valve installation has been undertaken in accordance with the manufacturer's instructions;
- the temperature differential of the thermostatic mixing valve is appropriate for the supply conditions, in accordance with the manufacturer's instructions;
- the designation of use of the thermostatic mixing valve matches the intended application, table 2;

3.2 In-Service testing

3.2.1 Purpose

The purpose of in-service testing is to maintain assured performance and to provide records of the thermal performance of the thermostatic mixing valve, consistent with this standard and the risk assessment carried out by the water safety group.

3.2.2 In-service test Procedure

3.2.2.1 Carry out the following In-service test sequence (see flowchart stage 3):

- a) For all outlets measure and record the temperature of the mixed water at the maximum available flow. If required, the mixed water temperature may be readjusted up to a maximum temperature as indicated in table 3.

Note: - After risk assessment a temperature that is lower than the maximum temperature allowable for the designated installation (vulnerable people) can also be set if deemed appropriate to do so.

- b) Isolate the cold-water supply to the mixing valve and observe the mixed water outlet.

3.2.2.2 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 re-commissioning or service work is needed.

3.2.2.3 If there is no flow or if the volume of water collected is less than or equal to 120ml, then restore the cold-water supply, after 15 seconds record the mixed water temperature.

3.2.2.4 Verify that this temperature does not differ from the temperature taken in **a)** 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).

3.2.2.5 If the mixed water temperature differs by more than 2°C from the set temperature taken at **a)** above, then recheck the supply conditions or re-commission (see 3.2.2.6).

3.2.2.6 The valve must then be re-adjusted and re-commissioned in accordance with the manufacturer's instructions.

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. In the absence of any other instruction or guidance the procedure described below may be used

3.3 Frequency of in-service testing (informative)

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:

Changes to the mixed water outlet temperature may be attributed to a change in the supply conditions from those experienced at the time of the previous audit(s). The water supplies must be audited (see flowchart Stage 1) to ascertain where remedial action is required i.e., supplies or valve.

6 to 8 weeks after commissioning carry out the 1st post-commissioning test given in 3.2.

12 to 15 weeks after commissioning carry out the 2nd post-commissioning test given in 3.2.

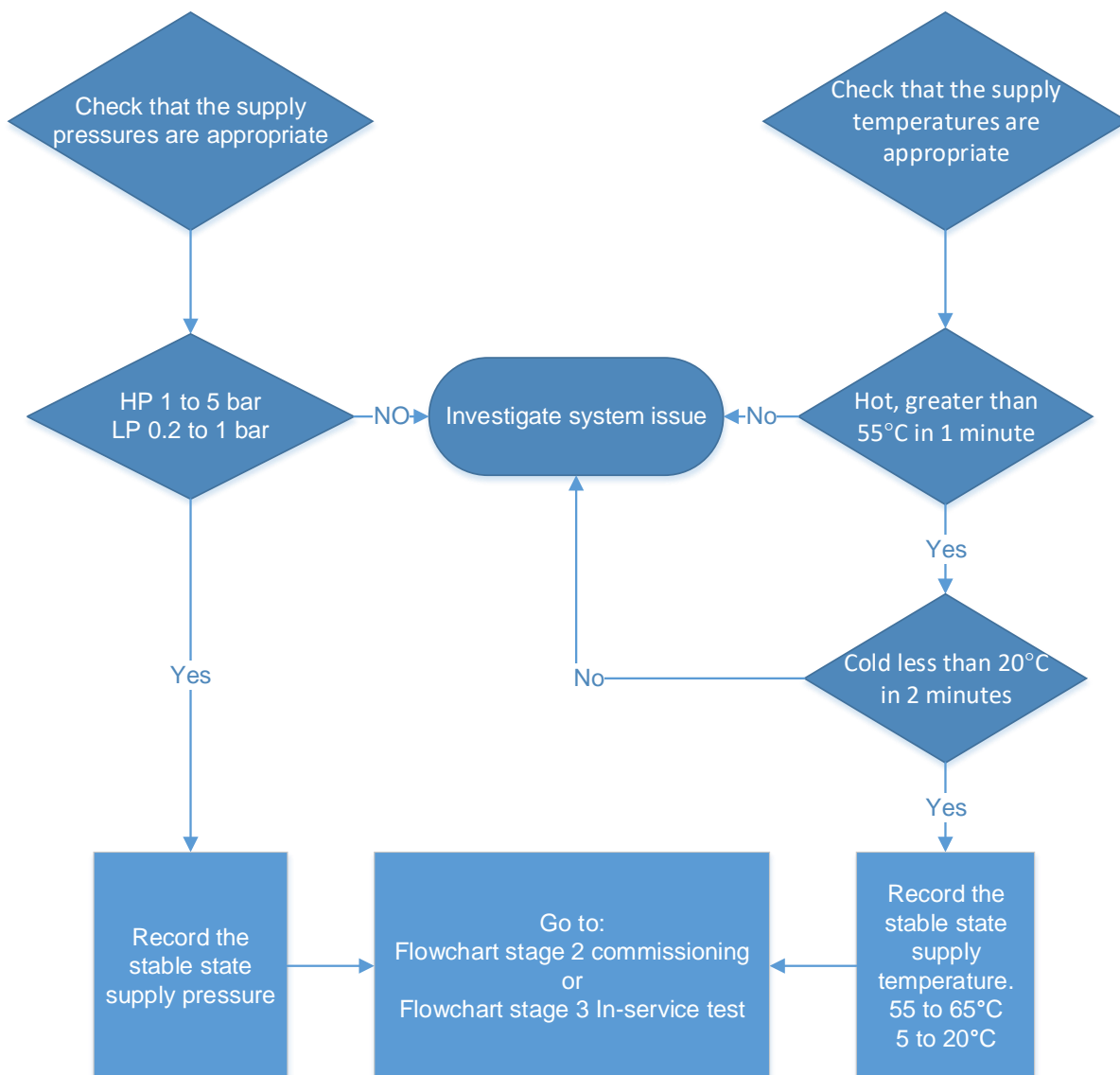
- If there is a difference between the 1st and 2nd post-commissioning tests of less than 2°C, then the next in-service test can be deferred to 24 to 28 weeks after commissioning.
- If there is a difference between the 1st and 2nd post-commissioning tests of greater than 2°C, then the next in-service test should be carried out at 18 to 21 weeks after commissioning.

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.

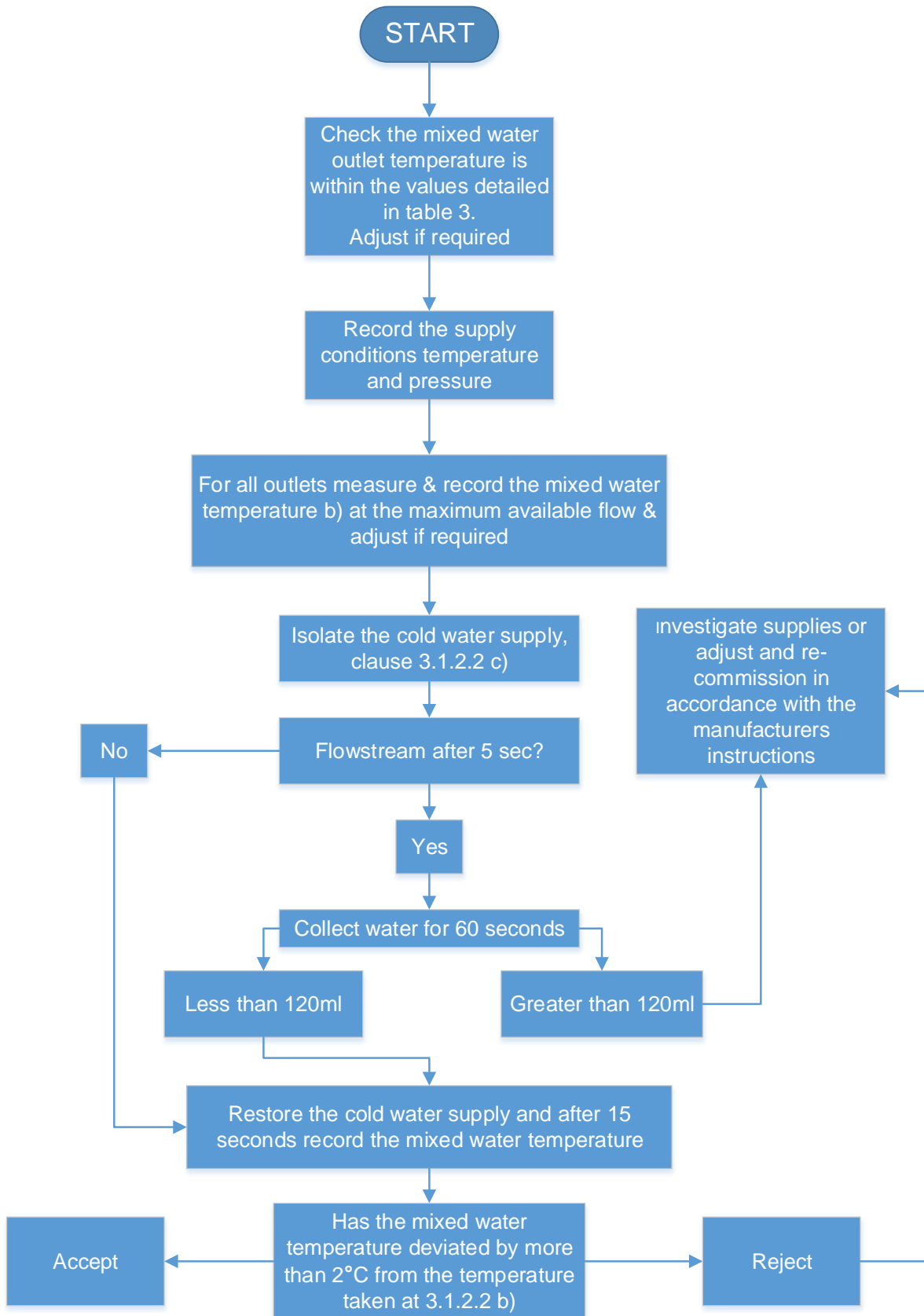
3.4 Maintenance

Thermostatic Mixing Valves are precision products and as such any maintenance needs to be undertaken in a clean environment and in accordance with the manufacturer's instructions.

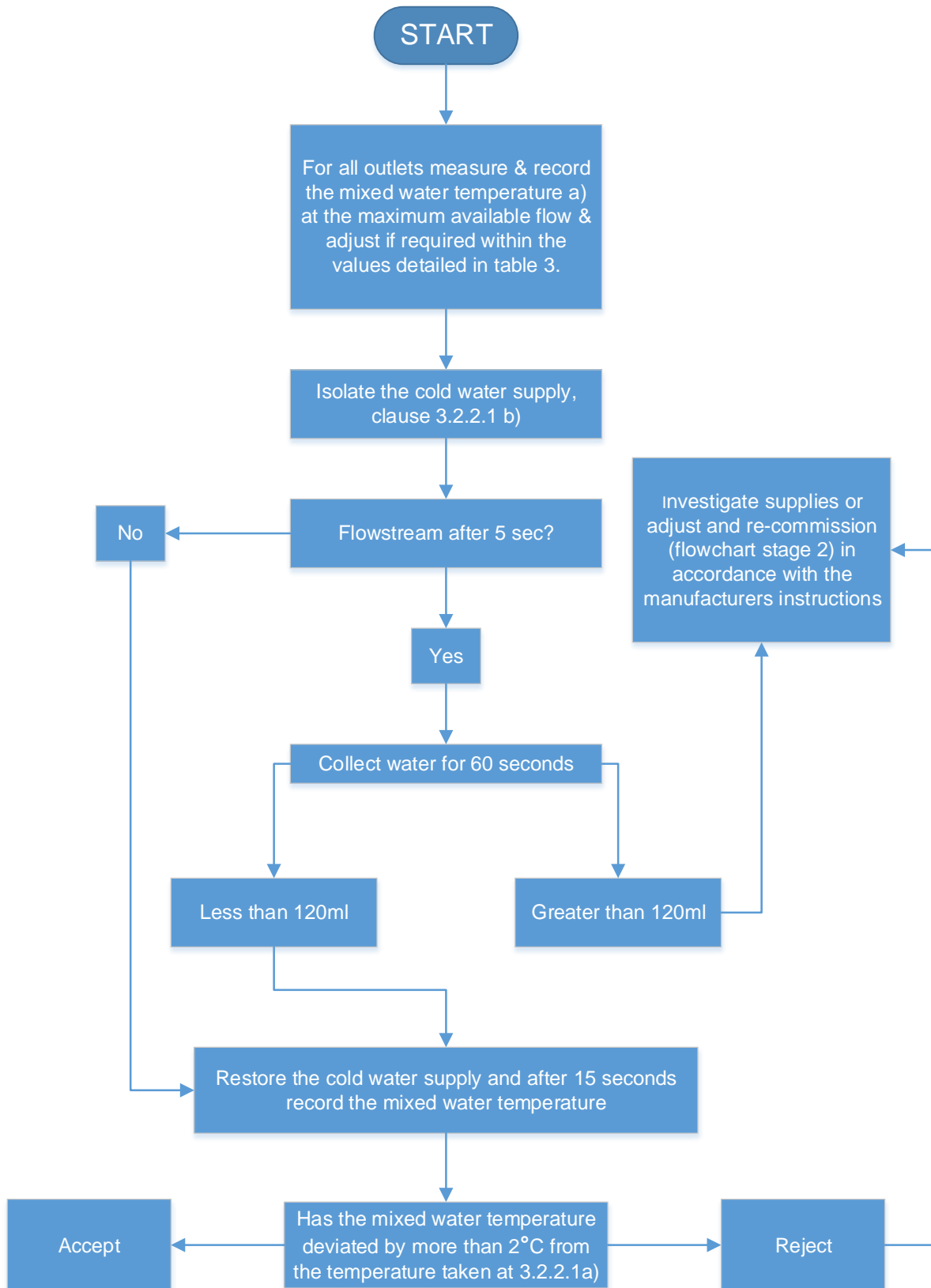
Flowchart Stage 1: HTM-04-01 confirmation of supply conditions:



Flowchart Stage 2: Commissioning procedure:



Flowchart Stage 3: In-Service test procedure:



TMV TEST RECORD SHEET FOR ON SITE TEST

Test Date:

Valve Reference:		Location: Installation Date: Test frequency: Engineers Name:
Mixed water outlet temperature:	°C	
Outlet Designation of use, i.e., HP/LP Tub/washbasin/shower/Bidet:		
Valve Min temperature differential:	°C	

Non-Compliance with HTM-04-01: Remedial actions required are as follows:

COMMISSIONING & IN-SERVICE TEST RESULTS (Clause 3.1 or 3.2)

Test Detail	Result	Observation/comment
Hot Supply Temp	°C	
Cold Supply Temp	°C	
Hot Supply Pressure	bar	
Cold Supply Pressure	bar	
Initial stable mixed water temp at Max Flow	°C	
Temperature differential	°C	
Isolate cold water supply: flow after 5s?	Yes/No	
Volume of water if flow after 5s*	ml	
Mixed Water Temperature after supply restored	°C	
Deviation from initial stable mixed water temp**	°C	

* If the volume of water collected is > 120ml then re-check the supply conditions or re-adjust the valve according to the manufacturer's instructions and then re-commission and re-test.

** if the deviation is greater than 2°C then service or re-check the supply conditions or re-adjust the valve in line with the manufacturer's instructions and then re-commission and re-test.

Next In-Service Test date (see clause 3.3)	
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