TEST CODE SHEET

---

1. TYPE OF TEST(S)

Contamination - mixing of primary and secondary circuits.

2. BYELAW REQUIREMENT FOR FITTINGS

Byelaw 15

No pipe forming part of a cistern fed vented primary circuit shall be connected to any pipe forming part of a secondary system.

Byelaw 36

(1) In every double feed indirect cylinder ..... the pressure in the primary heater..... shall not exceed the pressure of the stored water.....
(2) Paragraph (1) shall not apply to a cylinder inside which the primary heater ..... (a) has no joints; or (b) is constructed so that any joints will withstand any water pressure to which they are, or may be, subject.....

Byelaw 37

No single feed indirect cylinder shall be connected directly to any supply pipe.
Every such cylinder shall ..... (b) be so constructed and installed that no water in the primary circuit shall mix with water in the secondary circuit ..... when operating at a sustained temperature not exceeding 80°C.

3. BRITISH STANDARDS OR WATER SPECIFICATION, DEEMED TO SATISFY BYELAW REQUIREMENTS

(See Water Supply Byelaw Guide)

3.1 Fittings with 'kitemarks' which are deemed to satisfy the requirements of byelaws are listed in the directory.

4. TEST PROCEDURE

Note Unless otherwise stated the temperature of the test fluid shall be 20 ± 10°C.

4.1 Tests applicable to the following fittings-

COMBINATION HOT WATER STORAGE UNITS
- indirectly heated, double feed or single feed.

(A) DOUBLE FEED, INDIRECTLY HEATED COMBINATION HOT WATER STORAGE UNITS

TEST METHOD

Arrange the test apparatus as shown in Figure 1, with an additional primary water feed, venting and expansion arrangement for combination units without an integral feed and expansion cistern. (Note : The additional apparatus required is indicated in Figure 1 by dotted lines).

Use a circulator into which a thermostatically controlled 3KW electric immersion heater is screwed. Use sufficient 28mm copper tube and connections to connect the circulator to the combination unit to be tested which shall be positioned with its base not less than 900mm and not more that 1200mm above the floor level. Ensure that the total content of the circulator and the pipework does not exceed 5 litres.

Use two suitable thermometers, one (thermometer "T") positioned in the water in the feed cistern and the other (thermometer "S") at the hot water draw-off tap "G".

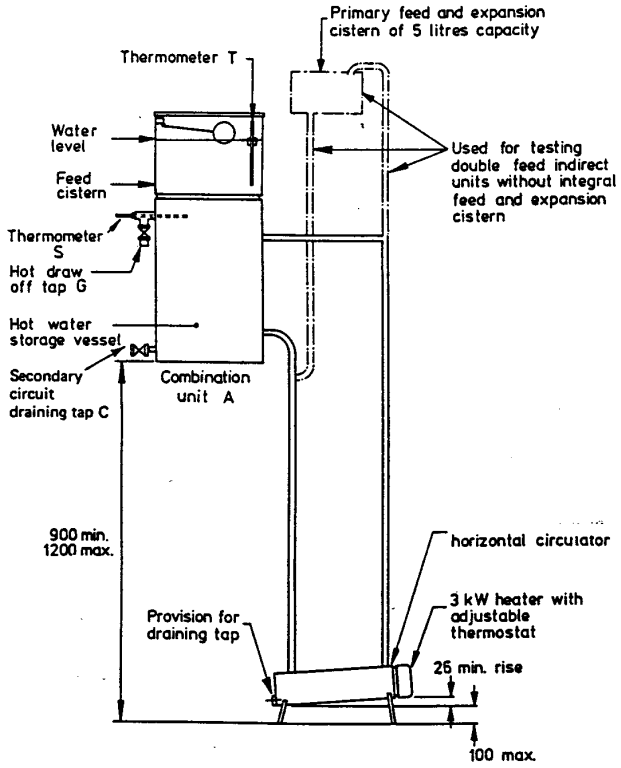
Fill the combination unit to be tested and the whole apparatus with water from the main cold water storage tank. Place the loose cover on the cistern. Where the combination unit to be tested does not have an integral primary feed and expansion cistern, fill the primary system to the bottom of the expansion cistern. Switch on the immersion heater and adjust the thermostat to give a water temperature not exceeding 80°C on thermometer "S". Switch off the immersion heater and drain the complete apparatus of water.

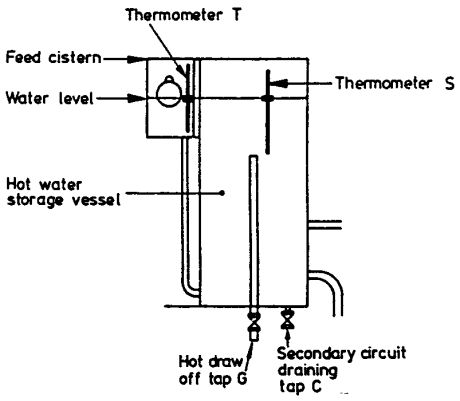
Dissolve approximately 0.5g of fluorescent dye in 0.3 litres of water and introduce it into the primary feed and expansion cistern. Refill the combination unit and apparatus to the correct water level as described above. Add 4 litres of water to the primary feed and expansion cistern and leave the whole apparatus for a minimum period of 12 hours in a room at a temperature of 20 ± 5°C.

Switch on the immersion heater and at the end of an 8 hour ± 15 mins period draw off 5% of the hot water storage capacity from the hot water draw-off tap "G", at a continuous rate of between 10 litres/min and 20 litres/min, and again record the temperature. Repeat this procedure until 70% of the capacity has been drawn off. Allow the combination unit to reheat and remain heating over a 20 hour period, after which disconnect the immersion heater thermostat to enable the primary water to boil. Allow the primary water to boil continuously for 30 ± 5 minutes and then switch off the immersion heater. After a further 24 hours draw off 70% of the hot water capacity. Examine the water drawn off for any trace of dye as an indication of the mixing of primary and secondary water.

5. ACCEPTANCE CRITERIA

At the conclusion of the test the water drawn off shall show no traces of the fluorescent dye colouring.





Alternative type of combination unit A

All dimensions are in millimetres.

NOTE. The dotted lines indicate additional apparatus required for testing double feed indirect combination units (see appendix B).

Figure 1. Layout of testing apparatus for direct and double feed indirect combination units

(B) SINGLE FEED, INDIRECTLY HEATED COMBINATION HOT WATER STORAGE UNITS

(Derived from BS 3198)

TEST METHOD

Arrange the apparatus as shown in Figure 2. Connect the single feed combination unit "A" to a cylinder "B" by means of 28mm size copper tube to facilitate good thermosyphonic circulation. Provide cylinder "B" with a thermostatically controlled 3KW immersion heater, a thermometer "R" to measure the primary water temperature and a valve arrangement "E" and "F" as shown, to enable fluorescein dye to be added. Place a thermometer "T" in the feed cistern.

Fill the entire system with cold water from the main cold water storage tank through the feed cistern, ensuring that taps "C" , "D" and valve "E" are closed. Switch on the heater for sufficient time to enable the thermostat in cylinder "B" to be adjusted so that the primary water temperature at the top of cylinder "B" as indicated by thermometer "R" does not exceed 80°C.

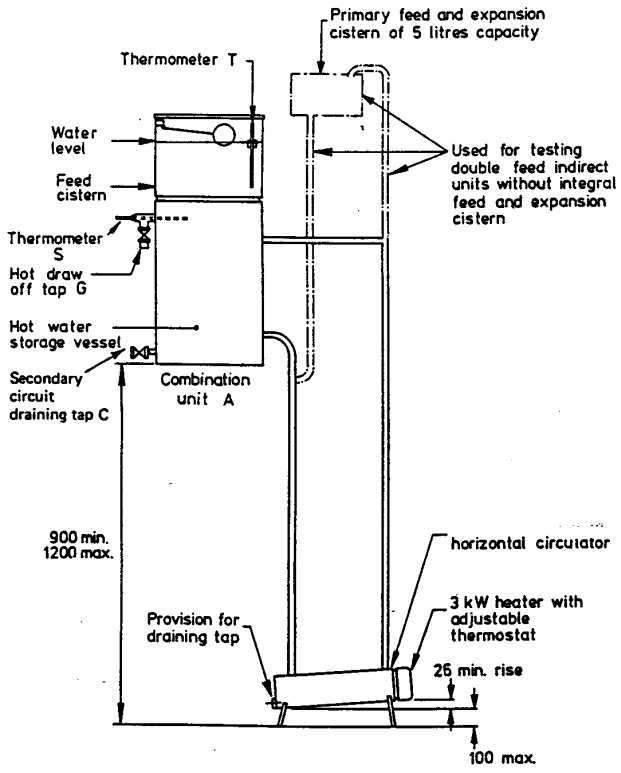
Switch off the heater, close the cold water supply to the float operated valve, and drain off the secondary and primary waters through taps "C" and "D" respectively.

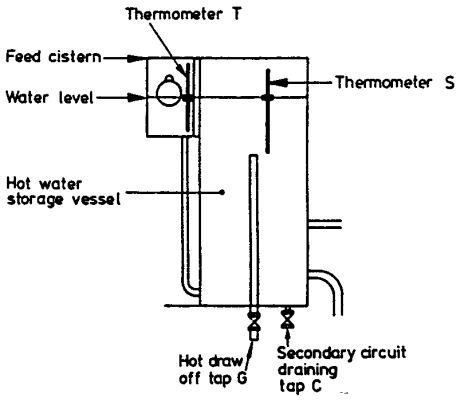
After closing taps "C", "D" and "E", refill the system through the float operated valve direct from the main cold water storage tank and ensure that the feed water does not exceed 16°C. Leave the apparatus when filled to the correct water level for a minimum period of 12 hours in a room at a temperature of 20 ± 5°C, and then switch on the heater and leave in operation for 8 hours ± 15 mins. Introduce approximately 1g of powdered fluorescein dye into cylinder "B" through the open valve "F" (with valve "E" remaining closed) and then by closing valve "F" and opening valve "E". Allow the system to cool over a period of not less than 72 hours. Switch on the heaters and leave in operation for a further 8 hours ± 15 mins.

Do not draw off or add water during this period of the test, but immediately afterwards draw off 5% of the hot water storage capacity from the hot water draw off tap "G", at a continuous rate of between 10 litres/min. and 20 litres/min. Repeat this procedure until 70% of the capacity has been drawn off. Examine the water drawn off for any trace of dye as an indication of the mixing of primary and secondary waters.

5. ACCEPTANCE CRITERIA

At the conclusion of the test the water drawn off shall show no traces of the flourescein dye colouring.





Alternative type of combination unit A

All dimensions are in millimetres.

NOTE. The dotted lines indicate additional apparatus required for testing double feed indirect combination units (see appendix B).

Figure 1. Layout of testing apparatus for direct and double feed indirect combination units