

Test Module 2

Space Heating, Low Temperature, Indirect
HEATING MODULE 2-DH55 Indirect

HM2-DH55C

Our Mission Statement: *"To improve the performance of residential HIUs across the UK."*

Revision History

Revision number	Comments	Author	Approver	Date
V1-Rev001	Final version of test module for publication alongside the third edition of the Technical Standard for UK HIU Test Regime	Technical Committee	Steering Group	01/09/2023
V1-Rev002	Amendments as detailed in BESA HIU Test Standard Update – Change Log 2026.	Technical Committee	Steering Group	20/03/2026

1. INTRODUCTION

This document forms part of the UK Test Standard for Heat Interface Units that has been developed to assess the role and performance of HIUs in UK heat networks.

BESA Technical Standard for UK HIU Test Regime (2023) sets out the overall Test Standard requirements. In order to avoid having to repeat successful tests, the tests have been bundled into 'modules'. This sub document covers MODULE 2 that comprises a series of tests, as set out below. Readers should refer to the main test document to understand how the tests and modules fit together within the overall Test Standard. The relevant version of the Test Standard that this sub-document applies to is detailed on the BESA HIU website www.thebesa.com/heating-interface-units.

2. SCOPE

This document covers the tests required for registration under

MODULE 2, covering HIUs supplying Space Heating at Low Temperature, Indirectly.

The module code is:

HM2-DH55C – HEATING MODULE 2-DH55 Indirect.

This module only applies to HIUs:

TYPE 1 HI /HWI

TYPE 5 HI

Pass/fail and best practice thresholds for these HIUs are shown below.

This module can be combined with DHW modules M8 or M10 for TYPE 1 HIUs.

3. TESTS TO BE CARRIED OUT

The following tests shall be carried out in this module.

M2.3.1 **Objective:** Perform static/steady state testing in order to investigate the performance characteristics of the HIU when meeting a specified space heating load.

Note: The static tests data shall be recorded for a minimum of 300 seconds once HIU and test rig operation has stabilised. The results shall then be presented in table form derived from the mean average over the test period, as well as a plot of the key metrics for the same time period.

- M2.3.2 The primary differential pressure shall be dictated by the tests to be undertaken. This shall be set to either at 50 kPa or 200 kPa dependent on the test. The test rig shall control primary differential pressure to the set point $\pm 4\%$.

Note that in all plotting of graphs when reporting, dP will be converted into MPa to ensure that dP has a similar magnitude to flow rate values (in l/s) and can therefore share the same axis, with temperature on a separate axis.

All tests shall include the following:

- M2.3.3 **Parameter recording** – there are several sensors across the test rig as well as instantaneous power values that shall be calculated from these sensor recordings. Only some of these will be required to be reported and plotted in graphs (see Reporting box at the end of the test module sections). However all sensors and calculated values shall be recorded for the duration of all tests and made available to the Technical Lead for analysis.
- M2.3.4 **Electrical consumption** – the maximum and average electrical consumption shall be measured throughout the test (in Watts $\pm 1\%$) along with the derived electrical losses. Electrical elements and other components not within the standard definition of a HIU shall be recorded in the HIU list of components and recorded as an extra line item of measured electrical consumption.

Tests 01d, 01e & 01f – Indirect heating HIU, space heating circuit capacity (Low Primary Temperature)

01d	DH/55C, Space Heating Indirect 0.5 kW, 45/35°C tertiary, 50 kPa
01e	DH/55C, Space Heating Indirect 1 kW, 45/35°C tertiary, 200 kPa
01f	DH/55C, Space Heating Indirect 4 kW, 45/35°C tertiary, 50 kPa

- M2.3.5 **Objective** – Perform static testing in order to investigate the performance characteristics of the HIU when **indirectly** meeting a space-heating load given a 45°C/35°C tertiary heating circuit and 55°C primary flow temperature. It should be noted that the 45°C/35°C tertiary heating temperatures have been selected as being representative of typical Underfloor Heating (UFH) or low temperature radiator operating temperatures.
- The static heating tests shall be carried out under different primary differential pressure conditions to simulate HIUs on differing points on a network. Tests 01d and 01f shall be carried out at a primary differential pressure of 50 kPa ± 2 kPa and test 01e shall be carried out at 200 kPa ± 8 kPa.
- M2.3.6 The return temperatures recorded from these tests are used as the inputs for calculating the Low Temperature Space Heating Volume Weighted Average Return Temperature figure for the HIU – see Appendix C in the main test document.
- M2.3.7 In these tests the space heating load shall be simulated by the heat exchanger on the test rig, with 45°C tertiary flow temperature and 35°C tertiary return temperatures. The HIU pump shall be deactivated, with flow rates adjusted within the test rig to deliver the required space heating load at the required temperature differential (10 K), as shown in Table 1.

M2 Table 1 – Design conditions for tests 01d, 01e and 01f

Test	Space heating load (kW)	Primary flow temperature (°C)	Space heating temperature profile (°C)	Space heating flow rate (l/s)
01d	0.5	55	45/35	0.012
01e	1	55	45/35	0.024
01f	4	55	45/35	0.096

M2.3.8 In all three tests the primary flow temperature t_{11} shall be $55^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$.

M2.3.9 The space heating flow temperature t_{22} shall be commissioned at 4 kW output.

The average space heating return temperature t_{21} shall not deviate more than $\pm 0.5^{\circ}\text{C}$ from the stipulated temperature during the test. The average space heating flow rate shall not deviate more than $\pm 5\%$ from the stipulated flow rate during the test. For the 0.5 kW and 1 kW tests, the HIU and test rig settings shall not be changed other than adjusting the flow rates on the test rig space heating circuit, such that the flow rate is within test tolerance and t_{21} is $35^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$

M2.3.10 For test 01f, the average space heating flow temperature shall not deviate more than $\pm 0.5^{\circ}\text{C}$ from the stipulated temperature during the test. For tests 01a and 01b, the average space heating flow temperature shall not deviate more than -0.5°C and $+2.0^{\circ}\text{C}$ from the stipulated temperature during the test.

The HIU will fail if the average space heating flow temperatures are outside the permitted tolerances for any of the three tests.

M2.3.11 The HIU will fail if space heating temperatures at t_{22} are not maintained at $45^{\circ}\text{C} \pm 5.0^{\circ}\text{C}$ (to one decimal place) for more than 1 second.

M2.3.12 The HIU outer case shall be in place for these tests.

No DHW shall be drawn off during these tests.

Pass/Fail Criteria

TEST 01 – Indirect heating HIU static testing of space heating circuit capacity

Fail if the VWART is above 37°C (to one decimal point).

Fail if the space heating flow temperature, $t_{22'}$ is not maintained at $45^{\circ}\text{C} \pm 5.0^{\circ}\text{C}$ (to one decimal place) for more than one second.

Fail if the average space heating flow temperature, $t_{22'}$ across the test is not $45^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$ (to one decimal place) (01f only).

Fail if the average space heating flow temperature, $t_{22'}$ across the test is not $45^{\circ}\text{C} - 0.5^{\circ}\text{C} / + 2.0^{\circ}\text{C}$ (to one decimal place) (01d and 01e).

Best Practice Criteria

TEST 01 – Indirect heating HIU static testing of space heating circuit capacity

Best practice if the VWART is less than or equal to 36°C (to one decimal point).

Best practice if the average space heating flow temperature, t_{22} , across all three tests is within 45°C $\pm 0.5^\circ\text{C}$.

These values do not constitute part of the formal test registration process. However, they do provide targets for manufacturers and purchasers seeking to achieve the highest possible performance in the sector.

4. TEST OUTPUTS

M2.4.1 A test report shall be prepared using the standardised BESA output template available to download from the BESA HIU website. The test will provide the following outputs:

Reporting

TEST 01 – Indirect heating HIU static testing of space heating circuit capacity

Report on the following values for each test:

A table including mean average values of t_{11} , t_{12} , q_1 , dP_1 , H_1 , t_{21} , t_{22} , q_2 , dP_2 , H_2 over the duration of each test.

Overall space heating VWART.

Plot graph of following key metrics for each test:

t_{11} , t_{12} , q_1 , t_{21} , t_{22} , q_2 over the duration of each test.

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