Technical Note			TN-022
Test: All tests			**Test no.:** All tests
Assumption: Primary system pressure			**Assumption no: 52**
Rev: 02	**Date:** 2021/11/15	**Author:** Wayne Early	**Checked:** Tom Naughton

1. Introduction

Current test regime, Section 2 Test facilities, paragraph 2.12 states, 'The primary system shall be pressurised to 3.0 bar+/-5% for all tests and the space heating system shall be pressurised to 1.5 bar +/-5% for all tests'.

The testing committee note that Swedish standard, F:103-7 uses 6 bar which is quite high in UK terms. This technical note will propose why 3 bar static pressure should be considered sufficient.

2. Consideration 1. Static Pressure Test, Test 0.

The existing static pressure test of the HIU Testing regime, Test 0 states, *'To test that there is a suitable margin of safety for the maximum pressure, the HIU will be pressure tested with cold water on the primary side at 1.43 times the design static pressure for 30 minutes'.*

This test satisfies the requirement to demonstrate that all components of the HIU have been pressure tested in accordance with the pressure equipment directive 97/23/EC. Pressurising the primary system to 3 bar cold fill pressure, ± 5% for tests 1a – 5b is only required in order to carry out these tests dynamically, this static pressure is not intended as a pressure test, it is intended to be representative of operating pressure.

3. Consideration 2. Reference System

The reference system referred to TN-A-010 Reference building by Josu Aurrekoetxea & Tom Naughton which has been accepted as an reference system will be used as a benchmark to compare the impact of the selection of different HIUs on the same CHN.

This building has 10 No. levels above basement which is 11 No. in total x 3m floor to floor which is equal to 33 x 0.098 or 3.24 bar 'static' pressure at the lowest level. Therefore the 'static' pressure of the rig for static tests 1a – 1f and dynamic tests 2a – 5b should best represent a real world scenario with respect to static pressure. Setting this at 3 bar is representative of the reference system.

4. Consideration 3. Static and dynamic tests

All HIU's require a pressure differential across the flow and return in order to operate satisfactorily. Static pressure does not create a significant pressure difference, this pressure differential is provided by

a pump generating velocity pressure. The static pressure of a system for the purposes of carrying out static tests 1a – 1f and dynamic tests 2a – 5b should only represent the system at rest with the pump providing the necessary velocity pressure to create the pressure differential for testing. Reducing the static fill pressure of the rig from six bar required under Swedish standard, F:103-7, to three bar would have no affects on the operating tests 1a – 5b.

5. Conclusions

Paragraph 2.12 of the current test regime requiring the primary system to be pressurized to 3.0 bar +/- 5% for all tests could be considered representative of a standard system at rest. The wording of Section 2 Test facilities, paragraph 2.12 could be revised to, 'The primary system shall be pressurised to 3.0 bar+/-5% cold fill pressure for all tests and the space heating system shall be pressurised to 1.5 bar +/- 5% cold fill pressure for all tests'. This would remove any ambiguity.

6. Recommendation

Retain static pressure requirement for test rig at 3 bar on the primary +/-5% for all tests.