Polypropylene Random (PPR) Piping Systems and Thermal Cycling Test in Operation

BUILDING SERVICES TECHNICAL DIVISION

reported by

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The speaker, Ir. A.H. Ung started with an overview of various thermoplastic piping materials which are currently in use in internal hot and cold plumbing works and highlighted their different characteristics and joining methods.

He said there are currently two reference Standards for the manufacture of PPR pipes and fittings: ISO 15874 parts 1-7 and MS 2286 parts 1-7. He focused mainly on ISO 15874 (the Standard) as MS 2286 is adopted from the former.

The Standard adopts the "S" Series and Design Pressure to determine the working pressure of the PPR piping system. This differs from conventional methods such as the widely used Nominal Pressure (PN) rating. Both pressure rating systems were compared and shown how they can be related to each other.

In addition, the Standard also classifies PPR pipes and fittings in 4 different Application Classes as follows:

Application Class	Typical Field Of Application
1	Hot Water Supply at 60°C
2	Hot Water Supply at 70°C
4	Underfloor Heating and Low Temperature Radiators
5	High Temperature Radiators

From the above, it is evident that not all PPR pipes and fittings are the same, even though the manufacturers adopt the same reference Standard, ISO 15874. The different application classes also yielded different test parameters for the respective application classes and these were highlighted in the presentation.

Apart from the many tests required for both the PPR pipes and fittings as separate components, the Standard also requires the pipe and fitting to be joined as a single test assembly for the Fitness For Purpose or Joint Test.

One of these, the Thermal Cycling Test, is tedious, time consuming and expensive. The joints have to be subjected to alternating temperature of 90°C for 15 minutes and 20°C for another 15 minutes at a constant design pressure. This constitutes one cycle and the test requires 5,000 cycles or 2,500 hours to complete.

The test must also be conducted for all diameters and design pressures. For example, if a manufacturer has 10 diameters (OD 20 to 160) and 3 design pressures (4, 6 & 8) of pipes, there are a total of 30 test assemblies to be tested!!

Since Sirim QAS does not have the facility to conduct this test, Azeeta Pipe System Sdn. Bhd. has designed and built the first and only Thermal Cycling Test Facility which has been approved by Sirim QAS. ■

Participants of the Technical Division to Azeeta Pipe System Sdn. Bhd.