

The Hey Group

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Reference Number CIM 438 Water Vapour Permeability r0

Determination of the water vapour transmission properties of RZ-Ecoseal

Introduction

The Centre for Infrastructure Management (CIM) at Sheffield Hallam University was requested by The Hey Group (from now on referred to as the client) to determine the water vapour transmission properties of RZ-Ecoseal and two other pipe insulation systems (from now on referred to as System 1 and System 2).

Experiment

The tests followed a methodology based on BS EN 12086:2013 (test conditions C). The test specimens, consisting of 185 mm diameter discs with thicknesses of 1.5mm (RZ-Ecoseal), 18mm (System 1) and 20mm (System 2) were provided by the client. Upon delivery to the laboratory, the discs were sealed onto the open mouth of circular test cups (Figure 1) in which the relative humidity was maintained constant at 93.7% by means of a saturated solution of potassium nitrate (KNO_3). The samples were then placed in a fan-assisted environmental chamber maintained at 23°C and 50% RH (Figure 2) and weighed every 24 hours until steady state vapour transmission was achieved. Water vapour transmission properties (Water Vapour Resistance Factor μ and Water Vapour Permeability δ) were calculated using the formulas recommended by BS EN 12086:2013. Two samples per insulation system were tested.

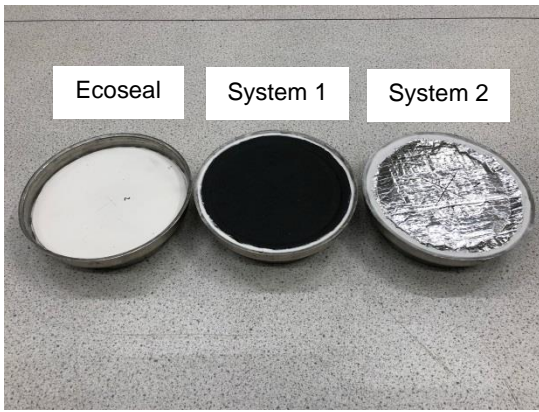


Figure 1 Test cups with specimens



Figure 2 Test cups with specimens in the environmental chamber

Results

The results of the tests are summarised in Table 1 and Figures 3 - 4.

Table 1 Water vapour transmission properties

Sample	Water Vapour Resistance Factor μ	Water vapour permeability δ $\text{kg}/(\text{m}\cdot\text{s}\cdot\text{Pa})$
Ecoseal	677.75	$2.86 \cdot 10^{-13}$
System 1	52.12	$3.71 \cdot 10^{-12}$
System 2	66.50	$2.91 \cdot 10^{-12}$

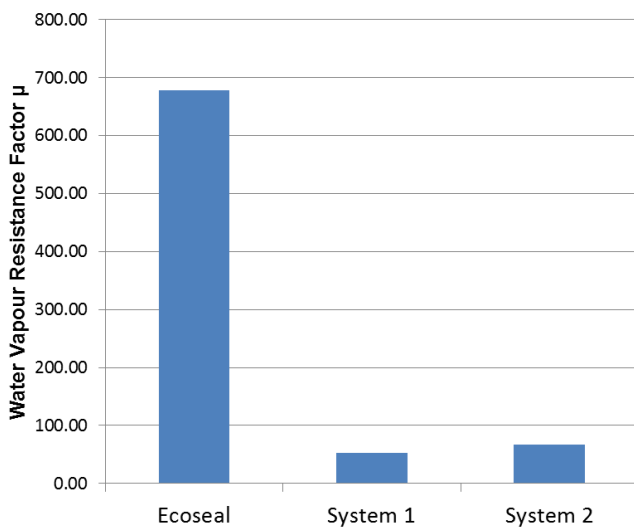


Figure 3 Water Vapour Resistance Factor μ

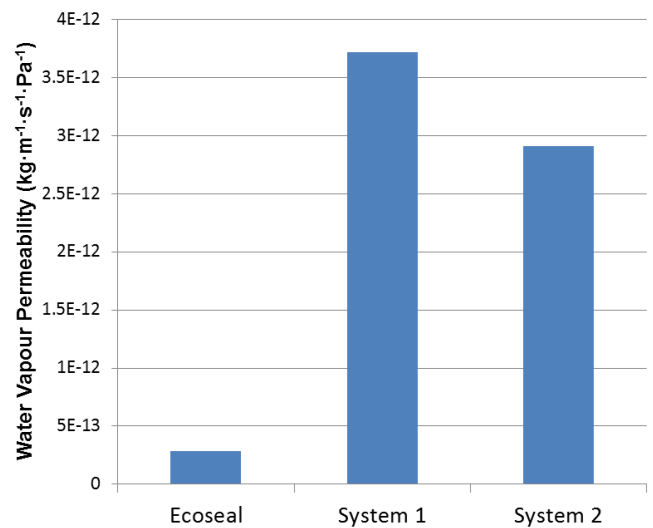




Figure 4 Water Vapour Permeability δ

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