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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

METHODS OF TESTING RIGID CELLULAR PLASTICS

AS 2498.5
DETERMINATION OF WATER VAPOUR TRANSMISSION RATE*

1 SCOPE. This standard sets out a method for determining the water vapour transmission rate through a rigid cellular plastics material

2 APPLICATION. This test is applicable under the following conditions:

(a) at 38°C and a relative humidity gradient of 0 to 88.5 percent; or

(b) at 23°C and a relative humidity gradient of 0 to 85 percent.

The results obtained for different rigid cellular plastics with these test methods are only comparable if the results are determined under the same conditions of temperature and relative humidity and the same thickness of the examined specimen. Attention is drawn to the fact that water vapour pressure across both sides of the test specimen is different when tested at 23°C from that at 38°C.

Where cellular plastics with open cells are to be tested, the test at 38°C and a relative humidity gradient of 0 to 88.5 percent, as well as the test at 23°C with a relative humidity gradient of 0 to 85 percent, causes a rapid saturation of the calcium chloride absorbing agent. Therefore, any results obtained above 3000 $\mu g/m^2.s$ may not be valid.

3 DEFINITION. For the purpose of this standard, the following definition applies:

Water vapour transmission rate (of a flat slab of material)—the mass of water transmitted through 1 m^2 of the material per second under specified conditions of temperature, humidity and thickness. It shall be expressed in micrograms per square metre per second ($\mu g/m^2.s$).

4 APPARATUS AND MATERIALS.

4.1 Beakers, 250 mL, low-form, of glass or metal suitably resistant to calcium chloride, about 65 mm internal diameter, the tops being slightly belled out to admit the sealant (4.8).

4.2 Measuring instruments, in accordance with AS 2498.2.

4.3 Circular metal template of 65 ± 0.1 mm diameter (see Fig. 1).

4.4 Small dish for melting the sealant (4.8).

4.5 Analytical balance capable of weighing beakers to an accuracy of ± 1 mg.

4.6 Either of the following:

(a) Constant-temperature, constant-humidity chamber capable of being maintained at the required test conditions.

(b) Desiccator in which the required humidity can be produced. This desiccator shall be able to hold at least five beakers with their test specimens and be placed in a constant temperature chamber; ISO/R 483* is a guide to the choice of the desiccator. The solution for use in the desiccator shall be one of the following:

(i) For testing at 38°C and a relative humidity gradient of 0 to 88.5 percent: potassium nitrate solution, saturated at 38°C, which contains a large excess of undissolved potassium nitrate.

(ii) For testing at 23°C and a relative humidity gradient of 0 to 85 percent: potassium chloride solution, saturated at 23°C, which contains a large excess of undissolved potassium chloride.

4.7 Desiccator containing anhydrous calcium chloride and large enough to hold five beakers.

4.8 Sealant, unaffected by the test conditions, consisting for example of a mixture of 90 percent microcrystalline wax and 10 percent of a plasticizer, e.g. low molecular mass polyisobutylene.

4.9 Anhydrous calcium chloride, particles about 5 mm in diameter, free of powder.

*This method is derived from and is technically identical with ISO 1663.

*ISO/R 483 Plastics—Methods for maintaining constant relative humidity in small enclosures by means of aqueous solutions.