Australian Standard®

Materials for solar collectors for swimming pool heating

Part 1: Rubber materials

This Australian Standard was prepared by Committee CS/28. It was approved on behalf of the Council of Standards Australia on 21 May 1990 and published on 17 September 1990.

The following interests are represented on Committee CS/28:

Australian and New Zealand Solar Energy Society
Australian Gas Association
CSIRO, Division of Building, Construction and Engineering
Department of Business and Consumer Affairs, N.S.W.
Department of Administrative Services, Australian Construction Services
Department of Industrial Relations and Employment, N.S.W.
Department of Mines and Energy, N.T.
Department of Primary Industries and Energy
Electricity Supply Association of Australia
Department of Energy, N.S.W.
Engineering and Water Supply Department, S.A.
Gas and Fuel Corporation of Victoria
Master Plumbers and Mechanical Services Association of Victoria
Melbourne and Metropolitan Board of Works
Metal Trades Industry Association of Australia
Solar Energy Industries Association of Australia
Trade Practices Commission
University of New South Wales
Victorian Solar Energy Council

Additional interests participating in preparation of Standard:

Plastics Institute of Australia
Rubber Manufacturers' Association of Australia

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PREFACE

This Standard was prepared by the Standards Australia Committee on Solar Water Heating, in response to proposals from the Victorian Solar Energy Council, and the Rubber Manufacturers' Association of Australia.

Heating of swimming pools to extend the swimming season is becoming popular in the cooler regions of Australia, and solar heating is being recognized as cost effective for this purpose. A Standard for solar heating of swimming pools has been prepared, and in addition to this it was felt that a Standard specifying the necessary properties of collectors was needed. The use of rubber collector strips is common both for household and public pool heating, and this Part of the Standard deals with rubber (EPDM) materials.

The requirements of this Standard are based on well established test methods for elastomeric materials. The tests have been selected for their relevance to collector performance and service life.

Although this Standard cannot quantify service life due to the difficulty in defining and controlling the many factors which affect solar collectors, the criteria used herein are based on the performance of materials that have been shown to have a satisfactory performance in pool heating applications.

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1 SCOPE. This Standard specifies the properties of ethylene propylene diene rubbers (EPDM) used in the manufacture of unglazed collectors intended for solar heating of swimming pools. The Standard is applicable to materials used for collectors which take the form of tubing, or absorber strips comprising water passages joined by a web.

The requirements of this Standard are based on the assumption that the solar pool heating systems in which these materials are used will be installed in accordance with AS 3634, and that the pool water will be maintained in accordance with AS 3633.

2 REFERENCED DOCUMENTS. The documents below are referred to in this Standard.

AS
1180 Methods of test for hose made from elastomeric materials
Method 5A: Hydrostatic pressure — Burst test
Method 5B: Hydrostatic pressure — Proof test

1683 Methods of test for rubber
Method 11: Tension testing of vulcanized rubber
Method 15: Indentation hardness of rubber and plastics by means of a durometer
Method 19: Rubber test mixes — Preparation, mixing and vulcanization — Equipment and procedures
Method 24: Rubber — Vulcanized — Determination of resistance to ozone cracking — Static strain test

2433 Plastics — Method for exposure to ultraviolet lamps

2620 Domestic garden hose
2620.1 Part 1: Reinforced hose

3633 Private swimming pools — Water quality

3634 Solar heating systems for swimming pools

ISO
188 Rubber, vulcanized — Accelerated ageing or heat resistance tests

4661/1 Rubber, vulcanized — Preparation of samples and test pieces
Part 1: Physical tests

3 GENERAL. The material is required to be evaluated under three conditions —

(a) as manufactured (qualification tests);
(b) after ageing in an oven; and
(c) after exposure to chemicals.

Conditions (b) and (c) are not cumulative, and are applied to separate test pieces.

4 FORMULATION. The formulation and conditions of cure employed in the manufacture of materials for solar absorbers shall be such that the materials will satisfactorily withstand the service conditions and meet the requirements of this Standard. As part of the formulation, the mix may include the addition of a suitable chemical for the purpose of inhibiting the growth of micro-organisms. Any such chemical shall, as present in the final cured material, be essentially insoluble in normal treated pool water, as described in AS 3633.

Any change in the formulation or conditions of manufacture will generally necessitate re-assessment of the material, particularly with regard to resistance to ozone, ultraviolet light, burst pressure, and common pool chemicals.

5 TEST PIECES. The test pieces required for the tests described in Clauses 7.1 to 7.3, and 7.6 and 7.7, shall be prepared from flat sheet, in accordance with AS 1683.19 and shall be satisfactorily cured.

The test piece required in Clauses 7.4 and 7.5 shall be a sample of the finished tube or absorber strip containing multiple water passages. The free length of tube or strip, after attachment of fittings shall be nominally 1 m.

Test pieces shall be prepared generally in accordance with ISO 4661/1.