AS 3634—1989

Australian Standard®

Solar heating systems for swimming pools

This Australian Standard was prepared by Committee CS/28, Solar Water Heaters. It was approved on behalf of the Council of Standards Australia on 14 June 1989 and published on 18 August 1989.

The following interests are represented on Committee CS/28:

Australian and New Zealand Solar Energy Society
Australian Gas Association
CSIRO, Division of Energy Technology
Department of Administrative Services, Australian Construction Services
Department of Business and Consumer Affairs, N.S.W.
Department of Minerals and Energy, N.S.W.
Department of Mines and Energy, N.T.
Department of Primary Industries and Energy
Electricity Supply Association of Australia
Engineering and Water Supply Department, S.A.
Gas and Fuel Corporation of Victoria
Master Plumbers and Mechanical Services Association of Victoria
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:

Swimming Pool and Spa Association of Australia

This Standard was issued in draft form for comment as DR 87144.

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First published as AS 3634—1989.

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7262 5804 0

PREFACE

This Standard was prepared by Standards Australia's Committee on Solar Water Heaters, in response to a request from the Victorian Solar Energy Council (VSEC). Studies commissioned by VSEC in 1984, including performance testing of swimming pool heaters, indicated that solar heating of swimming pools was very cost effective compared to gas or oil-fuelled heating. One outcome of these studies was the proposal by VSEC that standards should be established for pool heating covering the materials and performance of solar collectors used for pool heating, and the design, construction and installation of these systems.

The 1986 edition of AS 2535, *Solar collectors with liquid as the heat-transfer fluid — Methods of testing thermal performance*, incorporated revisions to make that Standard suitable for testing the performance of collectors of the types used for pool heating. A Standard for the materials used in unglazed collectors for pool heating is in course of preparation.

This Standard deals with design, construction and installation aspects collectively, and is based largely on the work of VSEC, and the assistance received from this source is gratefully acknowledged. Account has also been taken of BS 6785, *British Standard Code of Practice for solar heating systems for swimming pools*, and also the specifications for solar pool heating prepared by the Gas and Fuel Corporation of Victoria.

CONTENTS

STANDARDS AUSTRALIA

Australian Standard

Solar heating systems for swimming pools

1 SCOPE. This Standard sets out requirements for the design, installation and commissioning of solar heating systems for swimming pools, using direct circulation of pool water to the solar collectors. The Standard does not include electrical safety requirements, altered water treatment requirements, or performance requirements. Appendices are included dealing with system design, pool covers, calculation of heating load, and collector positioning.

The Standard is applicable to domestic and commercial or public pools, that are heated by solar energy either alone or in conjunction with other heating.

2 REFERENCED AND RELATED DOCUMENTS.

2.1 Referenced documents. The following documents are referred to in this Standard:

AS	
1159	Polyethylene pipes for pressure applications
1170	SAA Loading Code
1170.2	Part 2: Wind forces
1432	Copper tubes for water, gas and sanitation
1477	Unplasticized PVC (UPVC) pipes and fittings for pressure applications
2032	Code of practice for installation of UPVC pipe systems
2535	Solar collectors with liquid as the heat-transfer fluid — Method for testing thermal performance.
2610	Spa pools
2610.2	Part 2: Private spas
3633	Private swimming pools — Water quality
BS	
5391	Specification for acrylonitrile-butadienestyrene (ABS) pressure pipe Part 1: Pipe for industrial uses
5392	Specification for acrylonitrile-butadienestyrene (ABS) fittings for use with ABS pressure pipe Part 1: Fittings for use with pipe for industrial uses

Australian Solar Radiation Data Handbook, Canberra, Department of Primary Industries and Energy, 1987

2.2 Related documents. Attention is drawn to the following related documents:

Czarnecki J. T. *Swimming Pool Heating by Solar Energy.* CSIRO Division of Mechanical Engineering, Technical Report No. TR19, 1978.

Czarnecki J. T. *Selected Aspects of Solar Swimming Pool Heating.* CSIRO Division of Mechanical Engineering, Technical Report No. TR29, 1981.

Higgs J. *The Solar Heating of Public and Commercial Pools — A Design and Instruction Manual.* Victorian Solar Energy Council, October 1984.

Higgs J. *The Solar Heating of Public and Institutional Pools.* Victorian Solar Energy Council, March 1984.

Roy G.G. and Miller S.G. *Data Handbook for Solar Energy Designers.* University of W.A., 1980.

3 DEFINITIONS. For the purpose of this Standard, the definitions below apply.

3.1 Absorber — device within a collector for absorbing radiant energy and transferring the energy as heat into a fluid.

3.2 Collector — device containing an absorber. The types discussed in this Standard are as follows:

(a) *Flat plate collector* — non-concentrating collector in which the absorber is essentially planar.

(b) *Glazed collector* — collector in which the absorber is covered by a translucent or transparent glazing material.

(c) *Trickle collector* — flat plate collector in which the heat-transfer fluid is not contained within passageways in the absorber, but flows over the plate surface.

(d) *Panel collector* — collector in which the absorber (which is normally made of rigid plastics sheet) usually embodies numerous closely spaced fluid passages.

(e) *Piping collector* — collector system in which piping (such as black polyethylene agricultural piping) is arranged to act as an absorber on a roof or other base.

(f) *Strip collector* — collector system in which extruded strip embodying fluid passages is arranged to act as an absorber, on a roof or other base. The strip is typically around 50 mm to 150 mm in width and made of flexible elastomeric or plastic material.

(g) *Unglazed collector* — collector in which the absorber is directly exposed to the environment.

3.3 Collector area — the net area measured parallel to the plane of the collector available to admit solar radiation to the absorber. Figure 3.1 illustrates the width dimension used in calculating the collector area for different collector types.

3.4 Differential temperature controller — device that detects a small difference between two temperatures, and controls pumps and other electrical devices in accordance with this temperature difference.

3.5 Direct system — system in which pool water passes through the solar collectors.

3.6 Draindown — draining of the fluid from the collectors and associated pipework, normally for the purpose of preventing frost damage. Draindown may be