



BRANZ Appraised

Appraisal No.709 [2010]

BRANZ Appraisals

Technical Assessments of products
for building and construction

**BRANZ
APPRAISAL
No. 709 (2010)**

ARMAFLEX DUOSOLAR AND SOLAR PIPE INSULATION

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Product

1.1 Armaflex DuoSolar and Solar is pre-insulated pipe-work and pipe insulation for solar hot water heating systems.



Scope

- 2.1 Armaflex DuoSolar and Solar have been appraised as pipe insulation for solar water heaters complying with AS/NZS 3500.4.
- 2.2 Installation of DuoSolar pre-insulated pipe-work supplied by Armacell Australia Pty Ltd must be carried out only by a qualified and registered plumber.

Building Regulations

Building Code of Australia (BCA 2010)

3.1 In the opinion of BRANZ, Armaflex DuoSolar and Solar if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the BCA 2010:

BCA 2010 Volume 1 - Class 2 to Class 9 Buildings

Section J - Energy Efficiency: Performance Requirement JP1. Armaflex DuoSolar and Solar Pipe Insulation contribute to meeting this requirement. See Paragraphs 13.1 – 13.3.

BCA 2010 Deemed-to-Satisfy Provisions

Armaflex DuoSolar and Solar Insulation can be used to meet the provisions of Deemed-to-Satisfy Provisions J7.2 Hot water supply. See Paragraphs 13.1 – 13.3.

BCA 2010 Volume 2 – Class 1 and Class 10 Buildings – Housing Provisions

Part 2.6 Energy Efficiency: Performance Requirement P2.6.2 (a). Armaflex DuoSolar and Solar Pipe Insulation contribute to meeting this requirement. See Paragraphs 13.4 – 13.6.

3.2 This is an appraisal of an **Acceptable Solution** in terms of Building Code of Australia compliance.

New Zealand Building Code (NZBC)

3.3 In the opinion of BRANZ, Armaflex DuoSolar and Solar Pipe Insulation if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1(c) 5 years and B2.3.2. Armaflex DuoSolar and Solar Pipe Insulation meets these requirements. See Paragraph 8.1.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Armaflex DuoSolar and Solar Pipe Insulation meets this requirement and will not present a health hazard to people.

Clause G12 WATER SUPPLIES: Performance G12.3.2(c). Armaflex DuoSolar and Solar Pipe Insulation contribute to meeting these requirements. See Paragraphs 11.1.

Clause H1 ENERGY EFFICIENCY: Performance H1.3.4 (a) and (b). Armaflex DuoSolar and Solar Pipe Insulation contribute to meeting these requirements. See Paragraph 14.1.

3.4 This is an appraisal of an **Acceptable Solution** in terms of New Zealand Building Code compliance.

Technical Specification

Description

4.1 Armaflex DuoSolar and Solar pipe insulation comprises a black EPDM foam core, with an outer surface of polyethylene (PE) film.

4.2 Armaflex DuoSolar is a pair of insulated copper pipes. The insulation is 15 mm thick. DuoSolar is used to connect solar collectors with the hot-water storage tank. The copper pipe-work is supplied by SmartCo Pty Ltd, which is certified by WaterMark Licence No. WMKA21097 to AS 1432:2004. SmartCo Pty Ltd copper tube has been tested to AS/NZS 4020 and is suitable for drinking water.

4.3 Armaflex Solar is single insulation tubes, without copper, for insulating the flow and return lines of solar hot-water systems. The tubing is dusted to provide ease of fitting. The insulation is either 15 or 22 mm thick.

4.4 Armaflex DuoSolar and Solar Pipe Insulation are available in the sizes as set out in Tables 1 and 2.

Table 1: Armaflex DuoSolar (paired 15mm thick insulation pre-fitted to SmartCo Pty Ltd copper piping)

Pipe Size	Coil Length	Product Description
DN15 (1/2')	10 m	DuoSolar 15 x 12 10m coil
DN15 (1/2')	15 m	DuoSolar 15 x 12 15m coil
DN20 (3/4")	10 m	DuoSolar 15 x 20 10m coil
DN20 (3/4")	15 m	DuoSolar 15 x 20 15m coil

Table 2: Armaflex Solar Insulation (single coils of solar insulation supplied without copper)

Pipe Size	Insulation Thickness	Coil Length	Product Description
DN15 (1/2")	15 mm	25 m	Solar Tube 15 x 12 25m coil
DN20 (3/4")	15 mm	20 m	Solar Tube 15 x 20 20m coil
DN25 (1")	15 mm	15 m	Solar Tube 15 x 25 15m coil
DN15 (1/2')	22 mm	15 m	Solar Tube 22 x 12 15m coil
DN20 (3/4")	22 mm	10 m	Solar Tube 22 x 20 10m coil

Handling and Storage

5.1 Armaflex DuoSolar and Solar components must be handled and stored with care to prevent damage. They must be stored flat and kept clean and free from contaminants.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Armaflex DuoSolar and Solar. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

7.1 Solar water heater systems must be designed and installed in accordance with the requirements of AS/NZS 3500.4. In New Zealand designers and installers must note the modifications to AS/NZS 3500.4 in NZBC Acceptable Solution G12/AS2. Specific design installations may be designed in accordance with AS/NZS 3500.1 and AS/NZS 3500.4.

7.2 Provision for tube expansion and contraction should be allowed for in the design of the system to accommodate these forces on all fittings and fixtures.

7.3 Copper piping should not be placed in direct contact with metal roofs or cladding, due to the potential for corrosion of the roofing or cladding material.

7.4 Armaflex DuoSolar contains metallic piping and therefore equipotential bonding must be carried out in accordance with:

- AS/NZS 3500.1 Section 5.2 for Australia
- NZBC Acceptable Solution G12/AS1 Paragraph 9.0 for New Zealand.

Durability

Service Life

8.1 When the in-service pipe-work temperatures are limited as described by Table 3, Armaflex DuoSolar and Solar pipe insulation are expected to have a service life of at least six years. To ensure the durability of the insulation, the pipe-work temperature must not exceed 150°C at any time.

Table 3: Maximum Pipe-work Temperature Exposure Limits per Year

Pipework Temperature	Maximum Hours per Year
<80°C	No limit
80 - 99°C	50
100 - 119°C	37
120 - 139°C	28
140 - 150°C	21

Maximum hours per year is based on modelling of a typical domestic solar water heating system, with worst-case frequencies of extreme temperature.

The maximum hours reflects pipe temperatures at the collector outlet for Alice Springs (hottest climate and worst case) and an evacuated tube collector (highest temperature system).

Maintenance

9.1 Armaflex DuoSolar and Solar pipe insulation do not require any special maintenance. Any damage to the insulation sheathing should be taped to prevent ultra-violet exposure to the EPDM. Damaged insulation must be made good with new material.

Working Pressures and Temperatures

10.1 The maximum working pressure and temperature for the copper pipe-work, when it is used as a potable hot water supply component, must comply with the pipe manufacturer's recommendations.

Spread of Fire

11.1 In all applications, where DuoSolar pipe-work passes through a fire rated element of a structure or cavity barrier, the opening must be fire-stopped in a way that will permit thermal movement of the pipe.

External Moisture (New Zealand)

12.1 Where DuoSolar pipe-work passes through the building cladding, the weathertightness details of Acceptable Solution G12/AS2 Paragraph 5.2 must be followed.

Water Supplies

11.1 The SmartCo Pty Ltd copper pipework component of DuoSolar is certified by the WaterMark Licence No. WMKA21097 to AS 1432:2004 and the associated schedule, and is suitable for potable water supply use.

Thermal Resistance (R-Value)

12.1 Armaflex DuoSolar and Solar pipe insulation has the R-values as given in Table 4, when assessed in accordance with AS/NZS 4859.1 Paragraph 2.3.3.8.

Table 4: Insulation R-values for Australian Pipe Dimensions

Pipe Size	Pipe Diameter mm	Insulation Thickness mm	R-value m ² K/W
DN15	12.7	15	0.6
DN20	19.05	15	0.5
DN25	25.4	15	0.5
DN15	12.7	22	1.0
DN20	19.05	22	0.9

Energy Efficiency (Australia)

BCA 2010 Volume 1 - Class 2 to Class 9 Buildings

13.1 BCA 2010 Deemed-to-Satisfy Provision J7.2 requires that solar hot water supply systems, apart from climate zones 1, 2 and 3 be insulated in accordance with Section 8 of AS/NZS 3500.4.

SA J7.2 South Australian State Variation

13.2 The design and installation of hot water supplies in South Australia is regulated by Directions issued by the South Australian Water Corporation.

Vic J7.2 Victoria State Variation

13.3 BCA 2010 Performance Requirement J7.2 does not apply in the state of Victoria.

BCA 2010 Volume 2 - Class 1 and Class 10 Buildings – Housing Provisions

Acceptable Construction Manuals

13.4 BCA 2010 Paragraph 3.12.5.0 lists Section 8 of AS/NZS 3500.4 and Clause 3.38 of AS/NZS 3500.5 as Acceptable Construction Manuals for hot water supply systems. However, solar hot water supply systems in climate zones 1, 2 and 3 are not required to comply with these provisions.

State and Territory Variations

13.5 The design and installation of hot water supplies in South Australia is regulated by Directions issued by the South Australian Water Corporation.

13.6 BCA 2010 Paragraph 3.12.5.0 is deleted in Victoria.

Energy Efficiency (New Zealand)

14.1 NZBC Acceptable Solution G12/AS2 requires that hot water pipes associated with Solar Water Systems be insulated in accordance with NZBC Clause H1.3.4, except where connected to a heat dissipation device. NZBC Acceptable Solution H1/AS1 Paragraph 5.01 nominates NZS 4305 as a means of compliance to H1.3.4. Armaflex DuoSolar and Solar pipe insulation meets the minimum R-Value requirement of R 0.3 as required by NZS 4305 Paragraph 3.8.1.

Installation Information

Installation Skill Level Requirements

15.1 Installation of Armaflex DuoSolar Pipework must be carried out by a Registered Plumber. Installation of Armaflex Solar Pipe Insulation may be carried out by any competent tradesperson.

General

16.1 Installation of Armaflex DuoSolar pipework must be carried out in accordance with the relevant local standards and regulations.

16.2 Installation of Armaflex Solar is carried out by sliding the copper pipe through the centre of the insulation tube.

16.3 Care must be taken where the pipework penetrates the building cladding to ensure that the weathertightness of the building is maintained.

16.4 Solar water heating systems must be installed in accordance with the manufacturer's requirements and the relevant regulations and standards.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

17.1 Tests have been carried out on the product to assess the materials performance when exposed to ultraviolet and heat radiation. The test results have been reviewed by BRANZ experts and found to be satisfactory.

Other Investigations

- 18.1 An assessment was made of the durability of Armaflex DuoSolar and Solar Pipe Insulation by BRANZ technical experts.
- 18.2 The Technical Literature has been reviewed by BRANZ and found to be satisfactory.

Quality

- 19.1 SmartCo Pty Ltd have been granted WaterMark Certification by SAI Global, WaterMark Licence No. WMKA21097 to AS 1432:2004 and the associated schedule.
- 19.2 SmartCo Pty Ltd is responsible for the quality of the copper supplied.
- 19.3 Armacell GmbH Deutschland is certified to ISO 9001 and is responsible for the supply of the insulation component.
- 19.4 Quality of installation on site is the responsibility of the installer.

Sources of Information

- AS 1432: 2004 Copper tubes for plumbing, gasfitting and drainage applications.
- AS/NZS 3500.1: 2003 Plumbing and drainage – Water Services.
- AS/NZS 3500.4: 2003 Plumbing and drainage - Heated water services.
- AS/NZS 3500.5: 2000 Plumbing and drainage – Domestic installations.
- AS/NZS4859.1: 2002 Materials for the thermal insulation of buildings – General criteria and technical provisions.
- AS/NZS 4020: 2005 Testing of products for use in contact with drinking water.
- Building Code of Australia, Australian Building Codes Boards, 2010.
- Compliance Document for New Zealand Building Code Energy Efficiency Clause H1, Department of Building and Housing, Third Edition, May 2007.
- NZS 3501:1976 Specification for copper tubes for water, gas and sanitation.
- NZS 4305: 1996 Energy efficiency - Domestic type hot water systems.
- New Zealand Building Code Handbook Department of Building and Housing, Third Edition, May 2007.
- The Building Regulations 1992, up to, and including August 2008 Amendment.



BRANZ

In the opinion of BRANZ, Armaflex DuoSolar and Solar Pipe Insulation is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Armacell Australia Pty Ltd, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the technical literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. [Armacell Australia Pty Ltd](#):
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions.
 - d) Warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by [Armacell Australia Pty Ltd](#).
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to [Armacell Australia Pty Ltd](#) or any third party.

For BRANZ

P Burghout
Chief Executive

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