



**BRANZ Appraised**  
Appraisal No. 538 [2006]

**BRANZ Appraisals**

**Technical Assessments of products  
for building and construction**

**BRANZ  
APPRAISAL  
CERTIFICATE  
No. 538 (2006)**

**AQUATHERM® SHT  
PIPING SYSTEM**

**aquatherm NZ Ltd**  
P O Box 99 393  
Newmarket  
Auckland 1149

Tel: 09 570 7204  
Fax: 09 570 7206



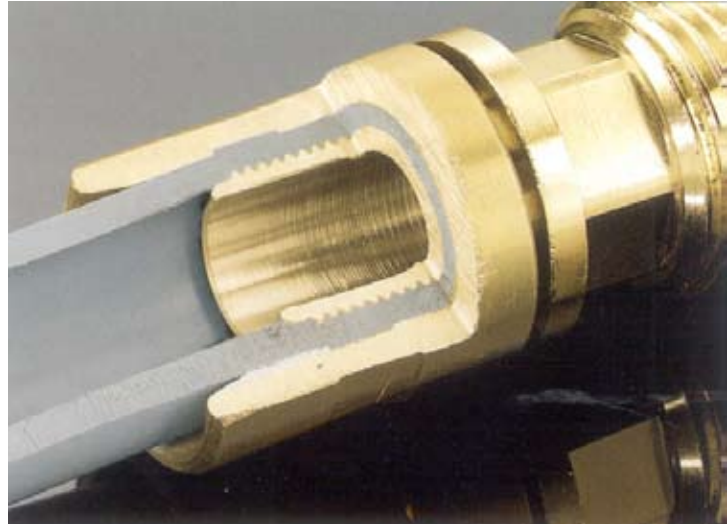
**BRANZ Limited**  
Private Bag 50 908  
Porirua City  
New Zealand  
Tel: +64 4 237 1170  
Fax: +64 4 237 1171  
[www.branz.co.nz](http://www.branz.co.nz)

**BRANZ Pty Ltd**  
P O Box 830  
Brookvale  
NSW 2100  
Australia  
Tel: +61 2 9938 6011  
Fax: +61 2 9938 6911  
[www.branz.com.au](http://www.branz.com.au)



## Product

1.1 The aquatherm® SHT Piping System consists of two types of pipe; a standard polybutylene pipe and an oxygen-barrier EVOH coated polybutylene pipe. Both pipes are available in 16 mm and 20 mm nominal diameter and use brass fittings with sliding sleeves. The standard pipes are for use in hot and cold water supply services. The oxygen-barrier pipes are for use in in-floor heating systems and hot water circulation heating systems.



**aquatherm® SHT**

## Scope

2.1 The aquatherm® SHT Piping System has been appraised for use as the piping components for water supply as per the scope of New Zealand Building Code (NZBC) Acceptable Solution G12/AS1 and Verification Method G12/VM1, and as pipe and fittings for proprietary heating systems subject to specific design.

## Building Regulations

### New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, the aquatherm® SHT Piping System, if used, designed, installed and maintained in accordance with the statements and conditions of this Certificate, will meet or contribute to meeting the following provisions of the NZBC:

**Clause B2 DURABILITY:** Performance B2.3.1(a) not less than 50 years, B2.3.1(b) 15 years, and B2.3.1(c) 5 years. The aquatherm® SHT Piping System meets these requirements. See Paragraphs 8.1 - 8.3.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. The aquatherm® SHT Piping System meets this requirement and will not present a health hazard to people.

**Clause G10 PIPED SERVICES:** Performance G10.3.1(a). The aquatherm® SHT Piping System oxygen-barrier pipe contributes to meeting this requirement when used in heating systems. See Paragraph 9.1.

**Clause G12 WATER SUPPLIES:** Performance G12.3.2(c) and G12.3.7 (a) and (b). The aquatherm® SHT Piping System contributes to meeting these requirements. See Paragraph 12.1.

3.2 This Certificate appraises an **Alternative Solution** in terms of New Zealand Building Code compliance.

## Technical Specification

### 4. Description

4.1 The standard aquatherm® SHT pipe is manufactured from polybutylene (PB) and is grey in colour. The oxygen-barrier aquatherm® SHT pipe is also manufactured from PB and has a clear coating as the oxygen barrier.

4.2 Both pipes come in sizes of 16 mm and 20 mm nominal external diameter, and are supplied in coils of 100 m lengths for the standard pipe and 250 m lengths for the oxygen-barrier pipe.

4.3 The pipes are continuously marked along their length with aquatherm® SHT, the pipe size, material type, certification information, date and time of manufacture and the distance from the end of the coil.

4.4 The fittings for use with the aquatherm® SHT polybutylene pipe are dezincification-resistant brass. The sliding sleeve fittings for standard pipe installations are identified by having two rings around the sleeve with “aquatherm” and the pipe diameter engraved in one. The sliding sleeve fittings for EVOH coated pipe installations are identified by having one ring around the sleeve with “aquatherm” and the pipe diameter engraved in it. All fitting bodies are marked with the diameter of the pipe it is to be used for, “a”, “DR”, AS3688, and Lic2551.

4.5 Other items used with the system but outside the scope of the Certificate are:

- Pre-insulated oxygen-barrier aquatherm® SHT pipe.
- Corrugated pipe for UV and mechanical protection of the aquatherm® SHT pipes.
- 90° Pipe bend brackets.
- Pipe clamps.
- Hot and cold pipe indicators.

#### Tools

4.6 The tools specified by aquatherm NZ Ltd for installation are outside the scope of this Certificate.

### Handling and Storage

5.1 aquatherm® SHT Piping System components must be handled and stored with care to prevent damage. The pipe must be stored where it will not be exposed to sunlight.

## Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the aquatherm® SHT Piping System. The Technical Literature must be read in conjunction with this Certificate. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Certificate must be followed.

## Design Information

### General

7.1 aquatherm® SHT Piping Systems must be designed and installed in accordance with the requirements of NZBC Acceptable Solution G12/AS1 or Verification Method G12/VM1. Specific design installations may be designed in accordance with AS/NZS 3500.1 and AS/NZS 3500.4.

7.2 aquatherm® SHT oxygen-barrier pipe is suitable for use in proprietary heating systems. These include embedded heating pipes in concrete slabs and circulation pipes for radiator type heating systems. These systems are to a specific design by the heating system proprietor and components other than the aquatherm® SHT pipe and fittings are outside the scope of this Certificate.

7.3 For information on the expected serviceable life of the aquatherm® SHT pipe at various temperatures and working pressures and also pipe friction factors, refer to the Technical Literature.

7.4 The aquatherm® SHT Piping System must not be used where it will be subject to direct sunlight.

7.5 The aquatherm® SHT polybutylene pipe must not be connected directly to auxiliary heaters such as solar collection panels or wet-backs without the installation of temperature protection devices in the system. Without protection, temperatures may exceed the operating limits. Pipes and fittings must not be installed within 1 metre of an inlet or outlet of a water heater.

7.6 Cold water supply pipes must not be embedded in heated concrete slabs. Where water supply pipes must pass through concrete slabs they must do so at right angles to the surface of the slab and be lagged with an impermeable flexible plastic material of not less than 6 mm thickness for the full depth of the slab penetration.

### Durability

8.1 The aquatherm® SHT Piping System, when used in easy and moderately difficult areas to access, will meet the NZBC Clause B2 Durability requirements for 5 years and 15 years.

8.2 The aquatherm® SHT pipe, when used in areas that are difficult to access, for example in or under concrete slabs, will meet the NZBC Clause B2 Durability requirement of not less than 50 years.

8.3 The above durability statements are based on the aquatherm® SHT Piping System being exposed to the maximum working pressures and temperatures described below and being intermittently heated during its life. Long use at higher temperatures will reduce the serviceable life of the system.

### Working Pressures and Temperatures

9.1 The maximum working pressure and temperature for the standard aquatherm® SHT Piping System, when used as a water supply system generally, is 1 MPa and 80°C. When used in difficult to access areas, such as under concrete floors, then the maximum working pressure and temperature for the system must be limited to 1 MPa and 70°C. The maximum working pressure and temperature for the oxygen-barrier aquatherm® SHT Piping System is 1 MPa and 70°C when used as a heating element in a concrete slab or as a hot water heating circulation system.

## Maintenance

10.1 The aquatherm® SHT Piping System hot and cold water supply components and heating system components do not require any special maintenance. Items such as valves and control equipment must be maintained to ensure the maximum working pressures and temperatures are not exceeded.

## Spread of Fire

11.1 In all applications where aquatherm® SHT polybutylene pipe 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.

11.2 When the pipe is used as a component in an underfloor heating system intended for use with fire-resistance rated suspended floor construction, a Fire Engineer must check that NZBC requirements are met.

## Water Supplies

12.1 The aquatherm® SHT Piping System has been tested to AS/NZS 4020 and is suitable for in-line and end-of-line potable water supply use in accordance with NZBC Acceptable Solution G12/AS1 Clause 2.1.2.

## Energy Efficiency

13.1 All domestic type hot water distribution pipes must be insulated in accordance with the requirements of NZS 4305 Sections 3.7 and 3.8.

## Installation Information

### Installation Skill Level Requirements

14.1 Installation of the aquatherm® SHT Piping System must be carried out by a Registered Plumber that has had instruction from aquatherm NZ Ltd on installation techniques.

#### General

14.2 Installation of the aquatherm® SHT Piping System must be in accordance with NZBC Clause G12/AS1, in particular Section 7.

14.3 aquatherm® SHT polybutylene pipes and the associated fittings must be designed and installed in accordance with the requirements of this Certificate and installation information in the Technical Literature.

14.4 When installing polybutylene pipe in framed walls, the holes must be accurately sized to allow pipework to expand and contract. In metal framework grommets must be used to protect the pipe from sharp edges.

14.5 The minimum bending radius for the aquatherm® SHT pipes is 5 times the pipe diameter, i.e. 80 mm for the 16 mm pipe and 100 mm for the 20 mm pipe. The aquatherm® SHT pipes may be bent without the aid of bending tools.

### Connecting Pipes and Fittings

14.6 Pipes are cut to the correct length using the aquatherm® SHT pipe cutter. A sliding sleeve of the correct type and diameter for the pipe being used is slid over the end of the pipe. The end of the pipe is then expanded using the expanding tool and the required fitting inserted in the end of the pipe. The sliding sleeve is then pulled back down over the end of the pipe and the fitting using the aquatherm® SHT mounting tool.

## Heating Component

14.7 It is not recommended to join pipes in locations where they will be concealed within concrete slabs or screeds. If a joint beneath the floor is unavoidable, such as with local damage repair, then aquatherm NZ Ltd must be contacted to determine the correct method to do this. This type of connection is outside the scope of this Certificate.

## Charging and Pressure Testing

15.1 Prior to enclosing the piping system, whether it is for piping in wall or floor cavities, or heating systems, a visual check of every fitting is required to ensure all sliding sleeves are securely in place.

15.2 All circuits within the system must be flushed with fresh, clean water so that they are free from trapped air and any foreign matter that may have entered the system.

15.3 When all air has been bled from the system, it must be pressure tested.

15.4 Piped services used for potable hot and cold water supply must not show any leakage when subjected to a pressure of 1500 kPa at 20°C for a period of not less than 30 minutes, in accordance with AS/NZS 3500.1.

15.5 Underfloor heating systems must be tested to the heating system manufacturer's requirements before the concrete is poured. Special precautions may be necessary if the pressure testing of the underfloor heating pipes is to take place in sub-zero temperatures.

### Commissioning Underfloor Heating Systems

15.6 Heat must not be applied to the underfloor heating system until the concrete has cured for at least 28 days, however BRANZ Bulletin No. 344 recommends 6 weeks, especially in winter. When cured, water at 20°C must be introduced into the system and maintained for 24 hours, increasing by 5°C every 24 hours thereafter, until the maximum operational flow temperature has been reached. The system must then be allowed to cool until the working temperature is acquired.

## Basis of Appraisal

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

### Tests

16.1 Tests have been carried out on the aquatherm® SHT Piping System by SKZ (Suddeutsches Kunststoff-Zentrum) Testing Laboratory in accordance with DVGW (German Gas and Water Professional Association) worksheet W534. The test results have been reviewed by BRANZ experts and found to be satisfactory.

16.2 Tests have been carried out on the DR brass fittings by Hayes Laboratories in accordance with AS 2345. The test results have been reviewed by BRANZ experts and found to be satisfactory.

16.3 Tests have been carried out on the aquatherm® SHT pipe and DR brass fittings by ams Laboratories Pty Ltd in accordance with AS/NZS 4020. The test results have been reviewed by BRANZ experts and found to be satisfactory.

### Other Investigations

17.1 An assessment was made of the durability of the aquatherm® SHT Piping System by BRANZ technical experts.

17.2 Site inspections were carried out by BRANZ to examine completed installations and installation methods.

17.3 The Technical Literature entitled 'aquatherm® SHT Sliding Sleeve Technology Technical Catalogue' has been reviewed by BRANZ and found to be satisfactory.

## Quality

18.1 The aquatherm® SHT pipe is manufactured by aquatherm GmbH, under an ISO 9001 Quality Management System (TUV CERT Certificate No. 01 100 5348).

18.2 The aquatherm® SHT pipe is certified by DVGW (registration number DW-8501AU2075).

18.3 The aquatherm® SHT brass fittings are manufactured in China by Ningbo Spark Tapware Ltd, under licence to aquatherm GmbH. Batch testing is carried out on all fasteners shipped to New Zealand.

18.4 aquatherm NZ Ltd is responsible for the quality of the product supplied.

18.5 Quality of installation on site is the responsibility of the installer.

## Sources of Information

- AS 2345:1992 Dezincification resistance of copper alloys.
- AS/NZS 3500.1: 2003 Plumbing and drainage - Water services.
- AS/NZS 3500.4: 2003 Plumbing and drainage - Heated water services.
- AS/NZS 4020:1999 Products for use in contact with drinking water.
- NZS 4305:1996 Energy efficiency - Domestic type hot water systems.
- DVGW W534 September 1995 - Connecting pipe elements and pipe connections.
- BRANZ Bulletin No. 344 (1996) Embedded floor heating.
- New Zealand Building Code Handbook and Approved Documents, Building Industry Authority, 1992.
- The Building Regulations 1992, up to, and including October 2004 Amendment.



**BRANZ**

**In the opinion of BRANZ, aquatherm® SHT Piping System is fit for purpose and will comply with the Building Code to the extent specified in this Certificate provided it is used, designed, installed and maintained as set out in this Certificate.**

**The Appraisal Certificate is issued only to the Certificate Holder, aquatherm NZ Ltd, and is valid until further notice, subject to the Conditions of Certification.**

### Conditions of Certification

1. This Certificate:
  - 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. The Certificate Holder:
  - 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.
3. The product and the manufacture are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ.
4. BRANZ makes no representation 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 the Certificate Holder.
5. Any reference in this Certificate to any other publication shall be read as a reference to the version of the publication specified in this Certificate.

For BRANZ

P Robertson  
Chief Executive

Date of issue: 28 November 2006