

7123AF AQUATHERM FUSIOTHERM® HOT & COLD WATER SYSTEM

Masterspec sections must be customised to suit the project being specified, by removing irrelevant information and adding project-specific information and selections.

1. GENERAL

This section relates to **aquatherm Fusiotherm®** and piped water supply systems from the network utility supply authority water main to designated points and appliances, the installation of hot water heating appliances, distributing piped hot water to other appliances, and the installation of tapware.

Modify or extend the above description to suit the project being specified.

1.1 RELATED WORK

Refer to SANITARYWARE, TAPWARE AND ACCESSORIES for tapware selections.

Include cross references to other sections where these contain related work.

Documents

1.2 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC G12/AS1	Water supplies
AS/NZS 2845.1	Water supply - Backflow prevention devices - Materials, design, and performance requirements
AS/NZS 3500.1	Plumbing and drainage - Water services
AS/NZS 3500.4	Plumbing and drainage - Heated water services
AS/NZS 3500.5	Plumbing and drainage - Domestic installations
NZS 4602	Low pressure copper thermal storage electric water heaters
NZS 4606	Storage water heaters
NZS 4607	Installation of thermal storage electric water heaters: valve vented Systems
NZS 4617	Tempering (3-port mixing) valves
NZS 5261	Gas Installations
NZS 7602	Polyethylene pipe (Type 5) for cold water services
AS 3688	Water supply - Copper and copper alloy body compression and capillary fittings and threaded-end connectors
NZS 7702	Specification for colours for identification, coding and special purposes
DIN 8077	Polypropylene (PP-R) Pipe dimensions
DIN 8078	Polypropylene (PP-R) pipes types 1, 2 & 3, General quality Requirements and testing.

Plumbers, Gasfitters and Drainlayers Act 2006

Documents listed above and cited in the clauses that follow are part of this specification. However this specification takes precedence in the event of it being at variance with the cited document.

Delete from the DOCUMENTS clause any document not cited. List any additional cited documents.

RELATED DOCUMENTS


Refer to the following related documents when preparing this section:

NZS 4305	Energy efficiency - Domestic type hot water systems
NZS 6214	Thermostats and thermal cut-outs for domestic thermal storage electric water heaters (alternating current only)
NZS 7610	Blue polyethylene pipes up to nominal size 63 for below ground use for potable water
NZS 7643	Code of practice for the installation of unplasticised PVC pipe systems
BRANZ BU 364	Preventing noise in plumbing installations

1.3 MANUFACTURER'S DOCUMENTS

Manufacturer's and supplier's documents relating to work in this section are:

Fusiotherm® Pipe systems technical manual - For the application in sanitary and heating

BRANZ Appraisal 539 - **fusiotherm®** Piping System 

BRANZ Appraisal 629 - **aquatherm®** - **lilac** Piping System

Copies of the above literature are available from **aquatherm**

Web: www.aquatherm.co.nz

Email: sales@aquatherm.co.nz
Telephone: 0-9-570 7204
Facsimile: 0-9-570 7206

It is important to ensure that all personnel on site have access to accurate, up to date technical information on the many products, materials and equipment used on a project. In most cases individual products are not used in isolation, but form part of a building process. Also a particular manufacturer's and/or supplier's requirements for handling, storage, preparation, installation, finishing and protection of their product can vary from what might be considered the norm. Access to technical information can help overcome this potential problem.

Warranties

1.4 WARRANTY

Warrant this work under normal environmental and use conditions against failure of materials and execution.

Warranty period: 2 years

Refer to the general section for the required form of WARRANTY AGREEMENT and details of when completed warranty must be submitted.

Check general section WARRANTIES for the date of commencement of warranties; which is normally practical completion of the contract. Refer to the chosen conditions of contract as it may also contain information on warranties and guarantees.

1.5 MATERIAL WARRANTY

Provide an **aquatherm GmbH** materials and installation warranty in the supplier's standard form including NZ\$5,000,000 cover for third party legal liability.

Warranty period: 10 years

From: Date of completion of system testing

Supplier and manufacturer warranties are those that are freely offered by the supplier or manufacturer. They are usually in their standard form and subject to their terms and conditions.

Requirements

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any specified **aquatherm Fusiotherm®** or associated products, components or accessories.

1.7 QUALIFICATIONS

Plumbers to be certified **aquatherm Fusiotherm®** installers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a plumber registered under the Plumbers, Gasfitters and Drainlayers Act 2006.

Refer to www.aquatherm.co.nz for a list of certified installers.

1.8 PIPEWORK LAYOUTS

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It is sometimes necessary to call for diagrammatic pipework layouts from the plumber prior to installation. This will depend on the degree of detail provided elsewhere and on whether to some degree at least the design of the system is a contract requirement.

1.9 INFORMATION FOR MAINTENANCE MANUAL

Supply maintenance manual information to the requirements set out in GENERAL section.

Check the general section OPERATION & MAINTENANCE and modify requirements if those set out are too onerous or too basic for the project in hand. If not using the general section that incorporates this requirement then add a special clause here.

Confirm when and where the information is to be supplied and in what numbers.

Performance

1.10 TESTING

Confirm the timing before carrying out any tests. Supply potable water and the apparatus needed. Ensure that any connected tapware is isolated before commencing testing. Test to **aquatherm Fusiotherm®** testing procedures as applicable. Provide completed test records in the **aquatherm** New Zealand Products Catalogue standard form.

2. PRODUCTS

Materials

- 2.1 POLYETHYLENE PIPE
To NZS 7602, type 5 (over 0.7 kPa) complete with fittings and accessories to the pipe manufacturer's requirements and all brand matched.
- 2.2 FUSIOTHERM POLYPROPYLENE PP-R 80 WATER PIPE
Fusiotherm[®] pipes to DIN 8077 and DIN 8078 complete with fusion welded fittings and accessories brand-matched.
- 2.3 AQUATHERM LILAC RECYCLED / RECLAIMED WATER PIPE
Aquatherm Lilac pipes to DIN 8077 and DIN 8078 complete with fusion welded fittings and accessories brand-matched. Manufactured to SDR 11 in Fusiolen PP-R. To NZS 7702 for identification and colour coding for non drinking water. To AS 3500.1.9 non - drinking water services.
Identification is clearly marked on the pipes for RECYCLED/RECLAIMED WATER.
- 2.4 WATER METER
To the requirements of the network utility operator and building operator.
- 2.5 VALVES
Pressure reducing or limiting valve, filter, non-return valve, cold water expansion valve, pressure relief valve, pressure relief valve and isolating valves to NZBC G12/AS1: Water supplies.
- 2.6 TEMPERING VALVE
Tempering valve to NZS 4617 to NZBC G12/AS1: Water supplies.
- 2.7 BACKFLOW PREVENTION DEVICES
Provide backflow prevention devices to AS/NZS 2845 where it is possible for water or contaminants to backflow into potable water supply. Refer to NZBC G12 AS/1 3.4 Backflow protection, and table 2, Selection of Backflow Prevention.
- 2.8 INSULATION
Pre-formed pipe sections complete with bends and fittings, with fixing tape to the manufacturer's requirements.
Materials available are fibreglass, polyurethane, rock fibre and flexible foam. Finishes - plain, calico and aluminium foil.
- Materials - hot water heating appliances**
Modify the following selections to suit requirements. Add instantaneous electric water heaters where appropriate.
- 2.9 ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE
A grade to NZS 4606, part 3 ceramic-coated steel thermal storage cylinder, insulated and complete with required fittings.
Change to plural where appropriate.
- 2.10 ELECTRIC HOT WATER CYLINDER, LOW PRESSURE
A grade to NZS 4602, copper thermal storage cylinder insulated and complete with pressure reducing valve and required fittings.
Change to plural where appropriate.
- 2.11 ELECTRIC HOT WATER CYLINDER, UNDER-SINK, LOW PRESSURE
A grade to NZS 4602, copper thermal storage cylinder insulated and complete with required fittings.
Change to plural where appropriate.
- 2.12 ELECTRIC BOILING CYLINDER, WALL MOUNTED
Wall-mounted boiling water heater in pre-finished cabinet, complete with tap draw off.
Change to plural where appropriate. Modify where the boiling cylinder is concealed.

- 2.13 GAS HOT WATER HEATER, STORAGE TYPE
Insulated cylinder with an integral gas burner and flue.
Change to plural where appropriate. Both externally and internally-mounted cylinders are available, for either natural gas or LPG.
- 2.14 GAS HOT WATER HEATER, CONTINUOUS FLOW TYPE
Continuous flow unit with an integral gas burner and flue.
*Change to plural where appropriate. Both externally and internally-mounted models are available, for either natural gas or LPG.
Remote digital controllers are available for these units. Refer to the manufacturer for details and list in SELECTIONS.*

Components

- 2.15 PIPE CLAMPS
Fusiotherm[®] proprietary pipe clamps and clips.
- 2.16 VALVES
Fusiotherm[®] proprietary valves and ball cocks as selected and required.

Accessories

- 2.17 FIRE RESISTANT SEALER
Gunnable inorganic or silicone elastomer sealant, packed to maintain the specified fire resistance rating of the floor or wall.
- 2.18 FIRE RESISTANT FOAM SEALER
Two-part silicone foam elastomer sealant, packed to maintain the specified fire resistance rating of the floor or wall.
Use fire resistant sealer for caulking the hole round the pipe. Use foam sealer for slots accommodating several pipes.
- 2.19 FIRE RESISTANT STRIP
Intumescent material mounted on a flexible fire retardant strip used in conjunction with the selected sealer.
Use this strip for plastic plumbing services.
- 2.20 FIRE RESISTANT COLLARS
Corrosion resistant steel collar or canister with intumescent packing to maintain the specified fire resistant rating of the floor or wall.
Use this for plastic plumbing systems in high rise construction.

3. EXECUTION

Conditions

- 3.1 HANDLE AND STORE
Handle and store pipes, fittings and accessories to avoid damage. Store on site, under cover, out of direct sunlight, on a clean level area, stacked to eliminate movement and away from work in progress to **Fusiotherm**[®] Pipe systems technical manual, section 4 Installation principles.
- 3.2 CORE HOLES AND SLEEVES
Review location and fit core holes and sleeves as needed throughout the structure in conjunction with the boxing, reinforcing and placing of concrete. Strip core holes and make good after installation of pipework.
- 3.3 FASTENING TECHNIQUE
Fix pipework using **Fusiotherm**[®] proprietary pipe brackets, spacing to **Fusiotherm**[®] Pipe systems technical manual, section 4 Installation principles. Ensure brackets are set out as fixed or sliding points **Fusiotherm**[®] Pipe systems technical manual, section 4 Installation principles.

- 3.4 CONCEAL
Conceal pipework within the fabric of the building unless detailed otherwise. Satin finish chrome plate exposed work, complete with matching ferrule at the surface penetration.
- 3.5 IN CONCRETE INSTALLATION
Install directly in concrete to **Fusiotherm**[®] pipe installation procedures.
- 3.6 IN GROUND INSTALLATION
Install to AS/NZS 3500.5, clause 2.13.3 Under concrete slabs.
- 3.7 THERMAL MOVEMENT
Accommodate movement in pipes resulting from temperature change by the layout of the pipe runs, by expansion joints and by sleeving through penetrations. Install pipework to **Fusiotherm**[®] Pipe systems technical manual, section 4 Installation principles.
- 3.8 PIPE SIZE
Flow rates to each outlet to be no less than those given in NZBC G12/AS1: Water supplies, table 3, Acceptable flow rates to sanitary fixtures, with pipe size as determined in table 4, Tempering valve and nominal pipe diameters and the **Fusiotherm**[®] Pipe systems technical manual.
Basic information can be obtained from the Fusiotherm[®] technical manual.

Application - jointing

- 3.9 JOINTING POLYETHYLENE PIPE
Seal ring compression joints and electrofusion to NZBC G12/AS1: Water supplies.
- 3.10 FUSIOTHERM POLYPROPYLENE PP-R 80 WATER SUPPLY
Size the piping layout to eliminate loss of pressure at any point by simultaneous draw-off. Run pipes complete with all fittings, support and fixing, fusion weld joints and install to manufacturers specifications, all to NZBC G12/AS1: Water supplies. Conceal pipework and pressure test before the wall linings are fixed.
- 3.11 AQUATHERM LILAC RECYCLED / RECLAIMED WATER PIPE
Size the piping layout to eliminate loss of pressure at any point by simultaneous draw-off. Run pipes complete with all fittings, support and fixing, fusion weld joints and install to manufacturers specifications for non-drinking water services, all to NZBC G12/AS1: Water supplies. Conceal pipework and pressure test before the wall linings are fixed.
Identification is clearly marked on the pipes for RECYCLED/RECLAIMED WATER.

Application - distribution systems

- 3.12 WATER SUPPLY CONNECTION
Arrange with the network utility operator for a connection to the water main and from there through a water meter and gate valve. Provide back flow prevention to NZBC G12/AS1: Water supplies.
Modify this clause to suit the project's water supply requirements regarding form, pipe material (metal or plastic), configuration and high hazard situations.
- 3.13 COLD WATER INSTALLATION
From connection point, size the runs and branches to deliver the acceptable flow rate to NZBC G12/AS1: Water supplies, table 3, Acceptable flow rates to sanitary fixtures at each outlet. Allow for the expected concurrent use of adjoining fixtures. Lay out pipes in straight runs with support spacing to NZBC G12/AS1: Water supplies, table 7, Water supply pipework support spacing firmly fixed and buffered to eliminate noise and hammer, with preformed tee-connection take-offs and branches, with bends to **Fusiotherm**[®] requirements, complete with necessary valves and fittings.
Refer to Fusiotherm Pipe systems technical manual.
- 3.14 MAIN ISOLATING VALVE
Install a **Fusiotherm**[®] isolating ball valve in an accessible position at the point of entry to the building.

- 3.15 IN LINE FILTER
Install an in line filter immediately adjacent to the isolating valve in an accessible position to allow for easy cleaning.

Application - hot water systems

- 3.16 HOT WATER CYLINDER INSTALLATION GENERALLY
Install hot water cylinders complete to the manufacturer's requirements and with seismic restraint as required to storage cylinders, to NZBC G12/AS1: Water supplies, 6.11, Water heater installation. Valve-vented systems to NZS 4607.
Modify this section to more closely describe the required installation, which might include mains or low pressure and/or cylinders installed in series.

- 3.17 INSTALL LOW PRESSURE UNDER-SINK HOT WATER CYLINDER
Install hot water cylinders complete to the manufacturer's requirements and to NZBC G12/AS1: Water supplies, 6.11 Water heater installation. Connect to sink tap.
Modify this or the following clause to suit an under-sink boiling unit.

- 3.18 INSTALL WALL-MOUNTED BOILING CYLINDER
Install to the cylinder manufacturer's stated requirements. Locate where shown.

- 3.19 GAS HOT WATER HEATER INSTALLATION, STORAGE TYPE
Install complete with the necessary fittings to the manufacturer's requirements and in accordance with NZBC G12/AS1: Water supplies, 6.11 Water heater installation and to NZS 5261. Install flue in accordance with the manufacturer's details and requirements.
Add further detail on the necessary flue installation and ventilation around the unit itself, depending on the chosen location.

- 3.20 GAS HOT WATER HEATER INSTALLATION, CONTINUOUS FLOW TYPE
Install complete with the necessary fittings to the manufacturer's requirements and in accordance with NZBC G12/AS1: Water supplies, 6.11, Water heater installation. Install flue in accordance with the manufacturer's details and requirements.
Add further detail on the necessary flue installation and ventilation around the unit itself, depending on the chosen location.

- 3.21 HOT WATER PIPEWORK
Use a take-off spigot to give separate branches to each fitting, lay out pipes with support spacing to NZBC G12/AS1: Water supplies, table 7 Water supply pipework support spacing. Fix firmly and buffer to eliminate noise and hammer, with preformed tee-connection take-offs and branches, with bends to **Fusiotherm**[®] requirements, complete with all necessary valves and fittings.

- 3.22 INSULATION
Lag all pipes with insulation to the manufacturer's requirements. Refer to SELECTIONS for type.
Refer to NZBC for areas where insulation is required.

- 3.23 INSTALL TEMPERING VALVE
Install 1 metre minimum from outlet of hot water cylinder and to manufacturer's instructions.

Application - fire resistant work

- 3.24 FIRE RESISTANT SEALER
Thoroughly clean the penetration of the floor or wall. Pack if necessary to support the sealant. Implant the sealant to the manufacturer's requirements to ensure full penetration and to obtain the required fire resistance rating. Tool the surface flush and smooth and allow to cure.

- 3.25 FIRE RESISTANT FOAM SEALER
Thoroughly clean the opening and box each side with fibreboard to contain the sealer. Mix sealer and inject into the opening to the volume and time limits in the sealer manufacturer's requirements to obtain the required fire resistance rating. Allow to cure, remove boxing and make good any voids with sealer.

- 3.26 **FIRE RESISTANT STRIP**
Wrap around the pipe and tape in place in the hole, caulking each side with fire resistant sealer. Tool the surface flush and smooth and allow to cure.
- 3.27 **FIRE RESISTANT COLLARS**
Insert circular type collars into the holes provided in the concrete. Supply canister type collars and locate and fix to boxing before the concrete is placed. Comply with the manufacturer's requirement for use of these elements complete with accessories, tapes and sealants.
- 3.28 **FIRE RESISTANT PANELS**
Secure steel frames or mullions within the openings to the panel manufacturer's details. Cut panels to suit the opening and the services and fit neatly and flush with required maximum clearances. Seal round panels and services with fire resistant foam sealer to maintain the fire resistance rating of the floor or wall.

Installation - tapware

- 3.29 **INSTALLING APPLIANCE ISOLATING VALVES - CONCEALED**
Install isolating valves for appliances in accessible positions. Locate in adjacent cupboards and position to allow for easy connection and operation.
This applies to dishwashers, washing machines and refrigerators with icemakers.
- 3.30 **INSTALLING TAPWARE**
Install to manufacturer's requirements.
Modify this clause to more closely reflect project requirements.
- 3.31 **INSTALLING BACKFLOW PREVENTION DEVICE**
Provide and install backflow prevention device as near as practicable to the potential source of contamination, and in an accessible position for maintenance and testing to AS/NZS 2845.3

Completion

- 3.32 **FLUSH OUT PIPEWORK**
Flush out pipework. Remove all filters, clean and reassemble.
- 3.33 **REPLACE**
Replace damaged or marked elements.
- 3.34 **LEAVE**
Leave work to the standard required by following procedures.
- 3.35 **REMOVE**
Remove debris, unused materials and elements from the site.

4. SELECTIONS

Substitutions are not permitted to the following, unless stated otherwise.
SELECTIONS is for providing details of the actual selections to be included in the contract works including model numbers, colours and other information necessary to ensure that the correct materials are supplied and installed.

Water main

- 4.1 **FUSIOTHERM POLYPROPYLENE PP-R 80 SD 11 FOR COMMERCIAL**
Size: 25mm outside diameter
Also available 20mm, 32mm, 40mm, 50mm, 63mm, 75mm, 90mm, 110mm, 125mm, 160mm, 200mm, 250mm
- 4.2 **FUSIOTHERM POLYPROPYLENE PP-R 80 SD 7.4 FOR HOUSING**
Size: 25mm outside diameter
Also available 16mm, 20mm, 32mm, 40mm, 50mm, 63mm, 75mm, 90mm, 110mm, 125mm, 160mm, 200mm, 250mm

Pipework

- 4.3 FUSIOTHERM POLYPROPYLENE PP-R 80 PIPE WORK
Branch off take: **Fusiotherm**[®] SDR 7.4
Branch main: **Fusiotherm**[®] SDR ~
Main: **Fusiotherm**[®] SDR ~
Branch main: 7.4 or 11
Main: 7.4 or 11
SDR 11 is recommended for cold water main over 32mm diameter.
- 4.4 HOT WATER RING MAIN FUSIOTHERM POLYPROPYLENE PP-R 80
Pipework: **Fusiotherm**[®] FASER composite pipe SDR 7.4
Insulation: ~
Pump: ~
Specify ring main systems in larger houses where a quality delivery system is required.
- 4.5 AQUATHERM LILAC RECYCLED / RECLAIMED WATER PIPE
Pipework: **Aquatherm Lilac** Fusiolen PP-R. SDR 11
Size: ~
Available in 20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 75mm, 90mm, 110mm, 125mm, 160mm, 200mm, 250mm.
Identification is clearly marked on the pipes for RECYCLED/RECLAIMED WATER.
- 4.6 INSULATION
Brand: ~
Material: ~
Wall thickness: ~
Finish: ~
Materials available are fibreglass, polyurethane, rock fibre. Finishes - plain, calico and aluminium foil.

Hot water systems

- 4.7 ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE
Brand: ~
Model size: ~
- 4.8 ELECTRIC HOT WATER CYLINDER, LOW PRESSURE
Brand: ~
Model size: ~
- 4.9 ELECTRIC HOT WATER CYLINDER, UNDER-SINK, LOW PRESSURE
Brand: ~
Model size: ~
- 4.10 ELECTRIC BOILING CYLINDER, WALL MOUNTED
Brand: ~
Model size: ~
- 4.11 GAS HOT WATER HEATER, STORAGE TYPE
Brand: ~
Model size: ~
- 4.12 GAS HOT WATER HEATER, CONTINUOUS FLOW TYPE
Brand: ~
Model size: ~
Remote controller: ~
Remote digital controllers are an optional extra and must be specifically specified. Types include a Compact controller, Shower proof control (for wet areas) and a Deluxe bath controller. Refer to the manufacturer for full details.

Valves and accessories

- 4.13 MAIN ISOLATING VALVE
Location: ~
Brand/type: **Fusiotherm®** ball valve
Suggested location is in a readily accessible position in a plant room or garage.
- 4.14 IN LINE FILTER
Location: ~
Brand/type: ~
Suggested location is adjacent to the main isolating valve and positioned for easy access for cleaning.
- 4.15 FLOOR/ZONE ISOLATING VALVES
Location: ~
Brand/type: **Fusiotherm®** ball valve
Suggested location is in an accessible position such as service or store rooms.
- 4.16 APPLIANCE ISOLATING VALVES - CONCEALED
Appliance: ~
Brand/type: **Fusiotherm®** ball valve or concealed valves to suit application
Suggested appliances include dishwashers, washing machines and refrigerators with icemakers.
- 4.17 APPLIANCE ISOLATING VALVES - EXPOSED
Appliance: Washing machine
Brand/type: Refer to tapware selections
Suggested appliances include dishwashers and washing machines.
- 4.18 TEMPERING VALVE
Location: ~
Brand/type: ~
- 4.19 BACKFLOW PREVENTION DEVICE
Location: ~
Brand/type: ~
- Fire resistant sealers**
- 4.20 FIRE RESISTANT SEALER
Location: ~
Manufacturer: ~
Type/number: ~
- 4.21 FIRE RESISTANT FOAM SEALER
Location: ~
Manufacturer: ~
Type/number: ~
- 4.22 FIRE RESISTANT STRIP
Location: ~
Manufacturer: ~
Type/number: ~
- 4.23 FIRE RESISTANT COLLARS
Location: ~
Manufacturer: ~
Type/number: ~
Pipe size: ~mm diameter