



PIPE INSULATION

A residential building design needs efficient distribution of hot and cold water to the kitchen, laundry and bathrooms.

By Trevor Pringle, ANZIA, BRANZ Principal Writer

A significant amount of energy is used in houses to heat water. Designers need to minimise the heat lost from both the heating device and the pipework or, in areas subject to frost, to prevent pipes freezing.

Energy efficiency and hot water piping

The performance requirements in section H1.3.4 of Building Code clause H1 *Energy efficiency* state: 'Systems for the heating, storage, or distribution of hot water to sanitary fixtures or sanitary appliances must, having regard to the energy source used—

- (a) limit the energy lost in the heating process; and
- (b) be constructed to limit heat losses from storage vessels, and from distribution systems connected to storage vessels.'

H1/AS1 5.0.1 calls up NZS 4305:1996 *Energy efficiency – Domestic type hot water systems* as a way of meeting the requirements of H1.3.4.

The specifier needs to demonstrate how they propose complying with the H1 requirements.

Acceptable Solutions

Section 7.2.1 of Acceptable Solution G12/AS1 requires that, where freezing is likely, hot and cold water supply systems protection includes:

- insulation of piping outside the building thermal envelope
- piping buried in the ground shall be insulated or installed at a level where it won't freeze
- insulation of storage water heater vent pipes. G12/AS2 *Solar water heaters* requires:
 - in 5.4.1, that 'Hot water pipes must be insulated to satisfy the requirements of Building Code clause H1.3.4, except where connected to a heat dissipation device'
 - in 5.4.2, 'Where closed cell elastomeric pipe insulation is used outside the building envelope, it must be painted or have another form of protection to prevent rapid deterioration due to exposure to UV radiation. Pipe insulation must be protected and must have a durability of not less than 5 years.'

A comment to section 5.4 of G12/AS2 says one way to meet 5.4.1 hot water pipe insulation requirements is complying with NZS 4305:1996.

Thermal insulation needed

NZS 4305:1996 and AS/NZS 3500.4:2003 *Plumbing and drainage – Heated water services*, section 8 require thermal insulation on:

- generally, the first 2 m of pipe from the storage vessel
- temperature and pressure relief valves

- the vent pipe to open-vented storage systems from the top of the storage water heater to a point 300 mm above the maximum standing water in the vent pipe.

Requirements specific to NZS 4305:1996 are thermally insulating:

- all water pipes external to the thermal envelope where there is a risk of freezing
- all hot water pipes embedded in concrete or buried underground (these pipes are required to be located within a duct)
- hot water distribution systems with hot water continuously circulating in a loop
- connecting pipes between a wetback and storage vessel
- from the water heater to the kitchen sink outlet.

Plan to minimise heat losses

BRANZ believes all hot water pipes inside and outside the thermal envelope should be insulated.

During planning, make distances from the water heater to the outlet(s) as short as possible.

Running insulated hot water pipes within the thermal envelope will further reduce the heat losses from the pipework.

Designers must specify where insulation is to be installed (and the type), otherwise the default provisions of NZS 4305 are likely to be applied. ◀