NZS 4602:1988
Amendment No. 1 appended

New Zealand Standard

Low Pressure Copper Thermal Storage Electric Water Heaters

Superseding NZS 4602:1976

NZS 4602:1988

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COMMITTEE REPRESENTATION

This Standard was prepared under the supervision of the Building and Civil Engineering Divisional Committee (30/-) for the Standards Council, established under the Standards Act 1965. The Electric Water Heaters (Open Vented) Committee (46/9) was responsible for the preparation of this Standard, and consisted of representatives of the following organizations:

Electrical Development Association
Electrical Manufacturer's Association
Ministry of Energy
Ministry of Works and Development
New Zealand Coppersmiths Manufacturers Guild
New Zealand Manufacturing Engineers' Federation

ACKNOWLEDGEMENT

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AMENDMENTS

Date of Issue	*Description*

CONTENTS PAGE

RELATED DOCUMENTS

Reference is made in this Standard to the following:

NEW ZEALAND STANDARDS

NZS 3501:1976	Copper tubes for water, gas, and sanitation
NZS 4603:1985	Code of practice for the installation of low pressure thermal storage electric water heaters with copper cylinders (open-vented systems)
NZS4606:0000	Mains pressure thermal storage electric water heaters (in preparation)
NZS4607:0000	Installation of thermal storage electric water heaters: valve vented systems (in preparation)
NZS 6300:1980	General requirements for household and similar electrical appliances

BRITISH STANDARDS

BS 21:1985	Pipe threads for tubes and fittings where pressure-tight joints are made on the threads
BS 476:----	Fire tests on building materials and structures
Part 4:1970	Non-combustibility test for materials
BS 1400:1985	Copper alloy ingots and copper alloy and high conductivity copper castings
BS 1845:1984	Specification for filler metals for brazing
BS 2779:1986	Pipe threads for tubes and fittings where pressure-tight joints are not made on the threads
BS 2870:1980	Rolled copper and copper alloys: sheet, strip and foil

NEW ZEALAND LEGISLATION

Electrical Wiring Regulations 1976

FOREWORD

This Standard constitutes a revision of NZS 4602:1976 *Low pressure thermal storage electric water heaters with copper cylinders* in which hard metric units have been introduced.

The requirements for thermal insulation have been up-graded to take advantage of the improved insulating materials now available and in recognition of the need for increased energy conservation. The standing heat loss requirements, which have remained unchanged since 1957, have been reduced by 50 % at the request of the Ministry of Energy.

The test for determining the standing heat loss has been modified to overcome problems of low repeatability.

NEW ZEALAND STANDARD

LOW PRESSURE COPPER THERMAL STORAGE ELECTRIC WATER HEATERS

1 SCOPE

1.1
This Standard applies to thermostatically controlled thermal storage electric water heaters designed to work at pressures not exceeding 12 mH_2O (120 kPa). The heaters are of vertical cylindrical form with copper vessels of 6.5 to 450 litres capacity, and are suitable for installation either open vented to NZS 4603 or valve vented to NZS 4607. Water heaters to this Standard are not intended for installation in other than a vertical position. Thermal storage water heaters for working pressures in excess of 12 mH_2O (120 kPa) are specified in NZS 4606.

2 DEFINITIONS

2.1
For the purposes of this Standard, the following definitions shall apply:

CISTERN WATER HEATER. A water heater which incorporates a cold water supply tank having a float-controlled valve or other equally effective form of water level control.

ELECTRICALLY HEATED. Heated by means of electric resistance elements.

FLOW PIPE CONNECTION. A connection on a water heater through which heated water flowing from some auxiliary means of heating enters the water heater.

INDIRECT WATER HEATER. A water heater in which the draw-off is indirectly heated by heat exchange from electrically heated stored water.

LOW PRESSURE WATER HEATER. A water heater designed to work under a pressure not exceeding 12 mH_2O (120 kPa) and not having a free water surface, i.e. not a zero pressure water heater.

PUSH-THROUGH WATER HEATER. A water heater with a stop-tap on the cold water inlet, so designed that the hot water is discharged through an open outlet.

RETURN PIPE CONNECTION. A connection on a water heater through which water flowing to some auxiliary means of heating leaves the water heater.

THERMAL STORAGE ELECTRIC WATER HEATER. An electric water heater in which heated water is stored or may remain in a vessel, and which is intended to be installed in a building. It includes the vessel, insulation, and outer casing, but does not include the hot water reticulation, a separate cold-water supply tank, or pressure reducing valve, cold water supply piping, thermostat, thermal cutout, or heating elements. WATER HEATER shall have the same connotation.

TYPE TEST. A test made on a type water heater representing the manufacturer's range in order to determine whether it complies with the requirements of this Standard.

TYPE WATER HEATER. A representative sample of electric water heaters identical in rating, capacity, construction and finish.

VERTICAL INSTALLATION. Installation so that an axis perpendicular to the diameter of a cylindrical water heater is vertical.

2.2
For the purposes of this Standard, the word "shall" refers to practices which are mandatory for compliance with this Standard. The word "should" refers to practices which are advised or recommended.

2.3
Pressure is shown in metres head of water (mH_2O) as the principal unit with the approximate equivalent value in kilopascals (kPa) as a secondary unit given in brackets.

3 CONSTRUCTION

3.1
The vessel shall be of cylindrical form with corrugated or straight sides and shall be made from half-hard copper complying with the requirements of BS 2870. Both ends shall be domed with a radius of curvature not greater than 0.75 times the diameter of the barrel, the top end domed externally. The radius of the flange connecting the domed ends to the barrel shall be not less than 25 mm for cylinders over 300 mm in diameter, and not less than 13 mm for cylinders 300 mm in diameter and under. The domed ends shall be jointed to the barrel not less than 20 mm below the centre of this radius. (See fig. 1.)

NOTE – It is recommended that cylinders with a capacity of 45 litres or more be constructed with a ratio of length to diameter between 1.5 to 1 and 4 to 1.

3.2
Vessels shall be jointed by:

(a) Overlapping; in which one edge is laid over the other and the edges brazed together
(b) Welting; in which each edge is doubled back on itself, the edges interlocked, and the whole hammered and grooved down to make a firm joint
(c) Other methods which achieve the same vessel life and performance as (a) or (b), subject to appropriate proof of equivalence being provided by the manufacturer.

3.3
Filler alloys for brazing shall conform to BS 1845, grades CP1, CP2 or CP4.

3.4
The thickness of copper used for the vessel shall be not less than that specified in table 1 appropriate to the type of water heater and the working pressure for which it is designed.

3.5
Provision shall be made for ready and convenient access to any component parts which may need servicing or replacement.

3.6
Indirect water heaters

3.6.1
All component parts of an indirect water heater that are subjected to mains pressure shall be capable of withstanding a test pressure of 2000 kPa.

3.6.2
Any pipe coil used for containing water at mains pressure shall be of copper and the quality and thickness of the tubing shall be not less than the requirements of table 1 of NZS 3501.

3.6.3
The stored-water container for indirect water heaters shall comply with the requirements of 3.1, 3.2, 3.3 and 3.4.

4
PUSH-THROUGH WATER HEATERS

4.1
A water flow restrictor, preferably capable of being adjusted *in situ*, shall be provided with every push-through water heater for fitting between the stopcock and the cylinder if the restrictor is not incorporated in the cylinder.

4.2
The thickness of copper for push-through water heaters shall be not less than that specified in table 1 for pressures up to 7.6 mH_2O.

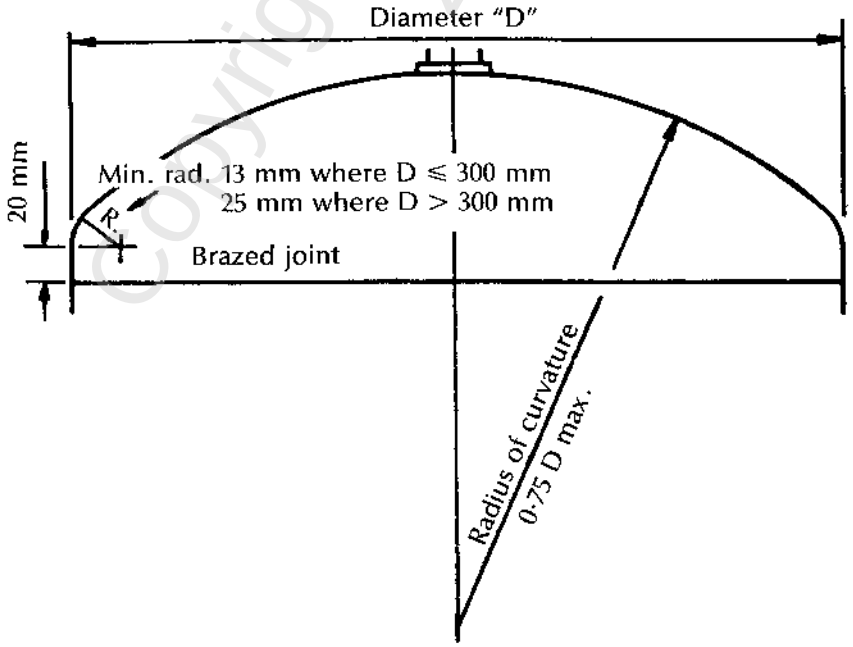


Fig. 1
DETAIL OF DOMED ENDS

Table 1
THICKNESS OF COPPER FOR THE VESSEL

Diameter of vessel	*Cistern water heaters*		*Working pressure*			
			Up to 7.6 mH_20		*7.6 to 12 mH_20*	
	Barrel	*Ends*	*Barrel*	*Ends*	*Barrel*	*Ends*
mm	mm	mm	mm	mm	mm	mm
Under 300	0.55	0.70	0.55	0.70	0.70	0.90
300 to under 480	0.55	0.70	0.70	0.90	0.90	1.20
480 to under 560	0.70	0.90	0.90	1.20	1.20	1.60
560 to 610 incl	0.90	0.90	1.20	1.60	1.60	1.60

5
CAPACITY

5.1
The capacity of a water heater shall be stated in litres and, when tested by filling with cold water, shall be within +5−0 % of the capacity marked on the casing in accordance with item (c) of 19.1.

6
PRESSURE TEST

6.1
Every vessel shall be tested by subjection to a sealed internal pressure equal to that specified in table 2 appropriate to the working pressure measured at the bottom of the vessel. The pressure shall be applied either hydraulically for a period of not less than 5 min or pneumatically for a period of not less than 2 min. The vessel shall be capable of holding the test pressure for the full test period and shall not show any leak.

Table 2
TEST PRESSURES

Working pressure	*Test pressure*
	kPa
Not exceeding 7.6 mH_20	140
Exceeding 7.6 mH_20	220
All working heads in cistern water heaters	55

7
PIPE CONNECTIONS

7.1
Water heaters shall be fitted with pipe connections of copper or copper-alloy complying with the requirements of section 12 for hot water outlet and cold water inlet, and of sizes not less than those specified in table 3. Pipe connections shall terminate not less than flush with, and not more than 25 mm beyond, the outer casing. Pipe connections to vessels with a diameter of 300 mm or more shall be made by means of threaded bushes brazed to the wall or ends, the holes being partly recessed to accommodate externally mounted flanges where used. All pipe connections shall be constructed in a manner that will allow unions to be screwed to the external fittings on the water heater.

Table 3
MINIMUM SIZES OF PIPE CONNECTIONS

Cylinder capacity	*indirect and push-through water heaters*	*Low pressure (including cistern) water heaters*
L		
Up to 70	½	Not specified
Over 70 to 185	½	¾
Over 185 to 275	¾	1
Over 275 to 450	¾	1¼

NOTE – Sizes given are nominal sizes of parallel pipe threads generally conforming to BS 21.

7.2
The cold water shall enter at any point below a line drawn 50 mm above the lower end of the vessel barrel.

7.3
On all cistern water heaters the size of the cold water inlet pipe connection shall be not less than the size of the hot water outlet pipe connection.

7.4
The hot water draw-off shall be from within 25 mm of the highest point of the vessel. The hot water outlet from the assembled water heater may be at any convenient point.

NOTE – This provision is intended to allow internal or external piping of hot water from the inside top of the water heater to any convenient point on the outside of the assembled water heater provided that any vent pipe is fitted to the highest point of the hot water pipework.

7.5
Any pressure relief valve connection shall be in the top 150 mm and within the top 20 % of the water capacity of the vessel.

8 FITTINGS FOR CONNECTION TO OTHER HEATERS

8.1
If the water heater is intended to be connected to auxiliary sources of heat such as a fuel furnace, wetback or solar panel the flow and return pipe connections shall be in such a position as to prevent back circulation of electrically heated hot water and:

(a) Be fitted as low as practicable in the vessel and
(b) Both be fitted not more than 385 mm above the inside bottom of the vessel and
(c) Be vertically separated by not more than 150 mm.

The flow pipe shall be extended to rise vertically inside the vessel without reduction in effective cross section. Such extension shall terminate not less than two-thirds of the clear internal height of the vessel above the bottom.

8.2
The lower end of the riser pipe may be brazed to the internal face of the entry boss. The nominal size of the circulator pipe connections shall not be less than that required to suit 25 mm pipework. (See 9.1.)

9 PIPE THREADS

9.1
All pipe connection threads used on water heaters shall comply with the requirements of section 2 of BS 21, except that male threads may be of parallel form.

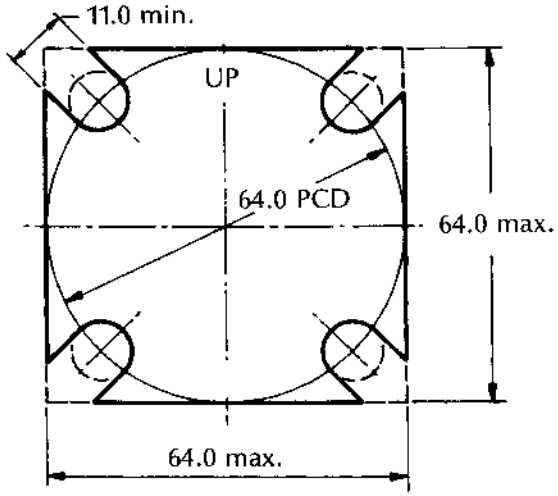
10 PROVISION FOR HEATING ELEMENTS, THERMOSTATS AND THERMAL CUTOUTS

10.1
Provision shall be made for a thermostat to be fitted to every water heater. Heaters of the boiling type may in addition be fitted with an audible alarm or other automatic device which will afford protection. Where the water heater is intended for use in valve-vented installations provision shall also be made for the mounting of a thermal cutout.

10.2
Fittings, shall be brazed to the side of the water heater to provide for the easy attachment and replacement of each heating element and thermostat. Where a contact thermostat is used secure means of fastening other than brazing are permitted. Where threaded bosses are used, a positive means shall be provided to locate the boss in the vessel prior to brazing. Such means include locally depressing the vessel shell or shouldering the boss.

10.3
Where provision is made for screwed heating elements and thermostats the thread shall be BS 2779 G1¼ for the heating element and BS 2779 G½ for the thermostat pocket. The length of thread on the element boss shall be 20 ±1.5 mm.

10.4
Where provision is made for bolt-on type heating elements an aperture of 41 ±1 mm diameter shall be provided having a sealing annulus not less than 2.5 mm wide. Means shall be provided for attachment of the heating unit to the vessel by its flange, the dimensions of which are given in fig. 2.



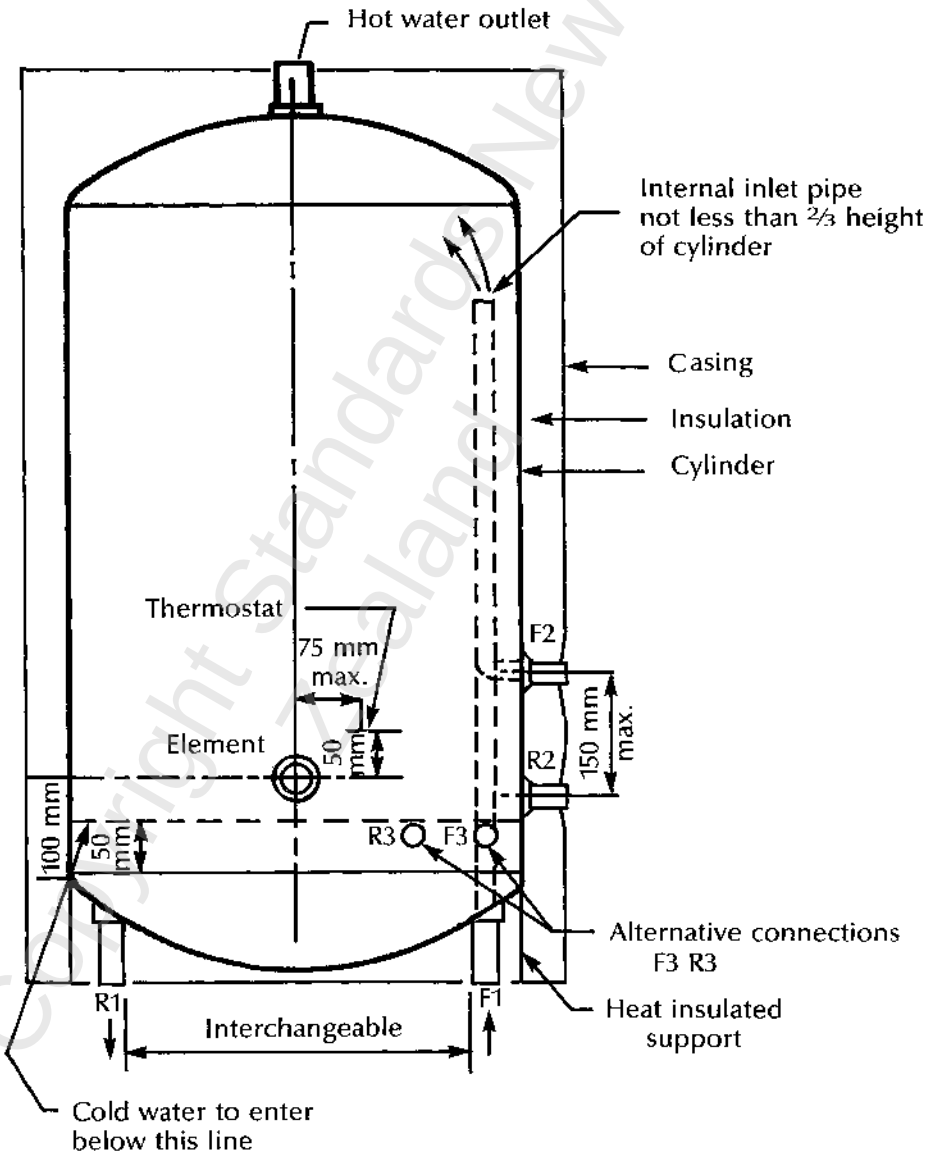
DIMENSIONS IN MILLIMETRES

Fig. 2
HEATING UNIT FLANGE – BOLT ON TYPE

10.5
For low pressure water heaters over 25 litres capacity:

(a) Where the element and thermostat are located within the storage vessel, the preferred position shall be in the barrel of the vessel, and as shown in fig. 3

(b) Where the element and thermostat are in a separate heating chamber, such heating chamber shall be incorporated within the thermal insulation and case of the complete water heater.



F indicates inlet connection and
R indicates outlet connection.
Note that F1 will be associated with R1, F2 with R2 and F3 with R3. Positions F1 and R1 are preferred. F1-R1 to be interchangeable by means of removable bushes.

Fig. 3
POSITION OF FITTINGS ON VESSEL

10.6
The requirements of 10.5 shall not preclude the installation of additional thermostatically controlled elements.

10.7
An electrical connection of not less than 5 kW capacity shall be brazed to the vessel adjacent to the element boss or fitting and the other end of the connection secured to the interior of the terminal chamber (see 14.4) by a means which will also provide a terminal complying with NZS 6300 for the connection of the electrical earth continuity conductor. The connection between vessel and case shall be not less than is required by the Electrical Wiring Regulations.

11 POSITION OF ELEMENTS AND THERMOSTATS FOR CONNECTION TO SOLAR HEATERS

11.1
On water heaters intended to be connected to auxiliary solar heaters the element and thermostat should be fitted 0.3 to 0.5 of the height of the water heater above the base.

NOTE – Electrical Supply Authorities may require a minimum volume of water above the heating element. A common requirement is 135 L.

12 COPPER ALLOYS

12.1
The copper alloy specified for pipe connections and element bosses shall comply with the requirements of one of the alloys contained in BS 1400 having a zinc content of not more than 30 %, a tin content of not more than 6 %, and a lead content of not more than 6 %. The proportion of arsenic shall not exceed 0.05 % in any alloy, but shall be not less than 0.02 % where the zinc content exceeds 20 %.

13 VESSEL SUPPORT

13.1
All vessels shall be provided with a durable corrosion-resistant support which shall be thermally insulated from the outer casing or from the vessel and shall not deteriorate or deform under the combined or separate influence of heat, moisture, and the weight of the vessel when in use.

14 CASING OR ENCLOSURE

14.1
Any thermal insulation used that is not non-combustible shall be enclosed in a non-combustible and vermin proof casing. Non-combustibility shall be determined in accordance with BS 476: Part 4. The casing shall be equivalent in strength to steel of 140 MPa yield stress of 0.4 mm thickness for the sides and of 0.55 mm thickness for flat ends. The casing shall be treated as necessary to resist corrosion. Pipe connections shall be such that any water drips are conveyed outside the casing. (See fig. 4.)

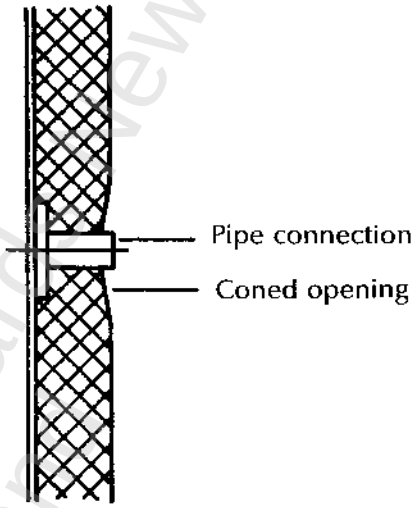


Fig. 4
EXAMPLE OF CONED OPENING TO CONVEY DRIPS OUTSIDE THE CASING

14.2
Thermal insulation that is non-combustible and vermin proof shall be protected from mechanical damage or deformation likely to arise in transport and installation or due to earthquake forces acting on the cylinder in service.

NOTE – For the purposes of design the earthquake load may be taken as a force equal to 50 % of the weight of the full water heater, acting horizontally on the water heater within 100 mm of the top or bottom and distributed over an area 50 mm high and 90° of the water heater periphery in width.

14.3
Where connections are brought through the casing there shall be a thermally insulated seal between the casing and the pipe or fitting.

14.4
A terminal chamber (or chambers) shall be provided to enclose the element and thermostat connections, completely isolating them from any combustible thermal insulation in the event of fire within the chamber. Chambers shall be provided with removable covers with provision

for sealing and shall have provision for cable entry at the side.

15
THERMAL INSULATION

15.1
The material used for thermal insulation shall be such that it will not deteriorate in use, nor cause corrosion of any part of the water heater with which it is in contact. It shall be so placed and secured as to maintain its form and position during transit, installation and service.

16
STANDING HEAT LOSS

16.1
Each type water heater shall be subjected to a type test in accordance with Appendix A and shall achieve a 24 h standing heat loss not greater than the appropriate value specified in table 4.

16.2
For water heaters of other sizes the maximum permitted 24 h heat loss shall be determined according to the following formulae and rounded to the nearest 0.1 kWh above:

Capacity (L)	*Heat loss (kWh)*
≤90	0.0084 L + 0.40
≥90	0.0048 L + 0.72

Table 4
STANDING HEAT LOSS

Cylinder capacity	*Maximum 24 h loss*
L	kWh
6.5	0.5
13	0.5
22	0.6
45	0.8
90	1.2
135	1.4
180	1.6
225	1.8
270	2.0
360	2.5
450	2.9

17
CATHODIC PROTECTION

17.1
Where requested, the manufacturer may install sacrificial anodes to provide cathodic protection where required by local water conditions.

18
COLD WATER SUPPLY TANK

18.1
For cistern water heaters, the capacity of the tank shall be not less than one-third the capacity of the water heater.

19
MARKING

19.1
The casing of every water heater shall be legibly marked, in letters of not less than 6 mm in height, with the following particulars grouped together in a prominent position:

(a) Name of manufacturer and town of manufacture
(b) Year of manufacture
(c) Capacity in litres
(d) Permissible maximum working pressure i.e. 7.6 mH_2O (75 kPa) or 12 mH_2O (120 kPa)
(e) The number of this New Zealand Standard, i.e. NZS 4602.

19.2
Where an internal pipe is used for the hot water draw off it shall be marked "hot water outlet only".

APPENDIX A

METHOD OF TEST FOR DETERMINING STANDING HEAT LOSS

A1

The following conditions shall apply during the test

(a) The water heater shall be filled with water

(b) Ambient temperature in the test room shall be maintained at any convenient nominal temperature between 21 °C and 32 °C. A fan or other means shall be employed to gently circulate the air to avoid stratification and dead pockets of air in the test area. The air from such fan should not play directly onto the water heater

(c) The ambient air temperature during the test shall not vary by more than ±3.0 °C measured using a temperature sensor with a thermal mass equivalent to 10 g – 20 g of water. The sensor shall be mounted 1.0 m – 1.5 m above the lowest part of water heater and 1.5 m ±100 mm from its surface. When a fan is used to circulate air, the temperature sensor should be on the suction side of the fan and within 1.5 m of the nearest part of the fan

(d) The nominal mean temperature of the water in the heater shall be maintained at 55.6 °C above nominal ambient air temperature. With an on-off type thermostat the water temperature shall not vary from the mean temperature by more than the following:

Heater capacity	*Temperature variation*
Up to 100 L	±4 °C
Above 100 L	±2.4 °C

For other types of control, such as a simmerstat, the water temperature shall not vary by more than ±1.4 °C from the mean temperatures.

Suggested heater element powers are:

Heater capacity	*Power*
Up to 100 L	60 W
Above 100 L	300 W

(e) The temperature of the water in the heater shall be measured by sensors located at a distance above the heating element equal to two-thirds of the distance between the top of the heating element and the inside of the top of the heater. The sensors shall be within 50 mm of the centroid of the plan cross section of the heater at the given height. The tolerance on height shall be ±10 mm. Not fewer than two sensors shall be used. A continuous record of temperature should be kept with a chart recorder and the mean water temperature calculated

(f) A kilowatt-hour meter shall be connected in the element supply

(g) All pipe fittings except the hot water outlet shall be plugged and insulated with 25 mm thick fibreglass blanket. The hot water outlet shall be left open until the heater reaches operating temperature prior to the start of power measurement and overflow has ceased. The outlet shall then be plugged with a cork or similar plug capable of being readily dislodged by water pressure, and insulated with 25 mm fibreglass blanket

(h) Heaters shall stand on a base of 20 mm nominal thickness particle board with at least 400 mm clearance above floor level. Air shall be able to circulate freely under the base. Holes 50 mm diameter shall be cut in the particle board in the way of fittings protruding from the bottom of the heater

(j) The overall error of the time temperature measuring and recording systems, kilowatt-hour meter and rounding shall not be greater than the following:

Heater capacity	*Maximum error*
Up to 200 L	±2 %
Above 200 L	±3 %

A2

The first reading of the kilowatt-hour meter shall be taken at a cut out of the thermostat not less than 24 h after the water first reaches its highest temperature. Readings shall then be taken at intervals of about 24 h, at the times when the thermostat cuts out. The standing loss for a period of about 24 h is thus found, and the loss for 24 h shall be calculated by proportion. No fewer than 4 such values shall be obtained, and the average of these be taken as the standing loss of the heater, provided that the difference between the mean water temperature and the mean air temperature is 55.6 °C. If the mean temperature difference is not 55.6 °C the correct standing loss figure shall be calculated by proportion.

A3

When testing the quick-recovery type of water heater it may be necessary to modify the method of measuring the temperature of the water above the element in the vessel. Such a modification shall be as follows:

(a) The water shall be heated as for the heat loss test and allowed to reach a steady temperature as determined by a sensor placed somewhere in the top third of the water above the level of the element. The value of the steady temperature so reached shall be between 66 °C and 88 °C

(b) Not less than 24 h after the water has

reached such a steady temperature, a temperature gradient test shall be taken of the water at points along a conveniently positioned vertical line in the vessel

(c) From these test figures a position on this line is then found at which the temperature is the average of the temperatures between the level of the element and the top of the vessel

(d) The heat loss test is then carried out with the 55.6 °C temperature difference maintained between this "average temperature point" and ambient temperature.

OTHER NEW ZEALAND STANDARDS FOR WATER HEATING SYSTEMS

NZS 4603:1985	Installation of low pressure thermal storage electric water heaters with copper cylinders (open-vented systems)
NZS 4604:1978	Dairy-type thermal storage electric water heaters with copper cylinders
NZS 4605:1978	Code of practice for the installation of dairy-type thermal storage electric water heaters
NZS 4606:0000	Mains pressure thermal storage electric water heaters (in preparation)
NZS 4607:0000	Installation of thermal storage electric water heaters: valve vented systems (in preparation)
NZS 4608:0000	Control valves for use in hot water systems (in preparation)
NZS 4613:1986	Domestic solar water heaters
NZS 4614:1986	Installation of domestic solar water heating systems
NZS 4617:0000	Tempering valves (Three-port mixing valves) (in preparation)
NZS 6205:1982 Part 2	Energy labelling of household appliances The energy labelling of thermal storage electric water heaters
NZS 6214:1988	Thermostats and thermal cutouts for domestic thermal storage electric water heaters (a.c. only)

LOW PRESSURE COPPER THERMAL STORAGE ELECTRIC WATER HEATERS

Pr Gratis

AMENDMENT No. 1

March 1990

EXPLANATORY NOTE - The Standard is amended to take account of recent experience with the use of adjustable thermostats to NZS 6214, and with heat loss testing of water heaters to the lower standing heat loss requirements.

DECLARATION

Amendment No. 1 was declared on 30 March 1990 by the Standards Council to be an amendment to NZS 4602:1988 pursuant to the provisions of section 10 of the Standards Act 1988.

(Amendment No. 1, March 1990)

RELATED DOCUMENTS

Delete the entries for NZS 4606, NZS 4607 and NZS 6300 and **substitute**:

NZS 4606:1989	Storage water heaters
NZS 4607:1989	Installation of thermal storage electric water heaters: Valve vented systems
NZS 6300:1989	Approval and test specification - general requiremens for household and similar electrical appliances

(Amendment No. 1, March 1990)

10 PROVISION FOR HEATING ELEMENTS, THERMOSTATS AND THERMAL CUTOUTS

10.3
In the last line **delete** "20 ±1.5 mm" and **substitute** "19 ±1.5 mm".

10.8
Add new clause as follows:

"Provision for the mounting of thermostats and thermal cutouts shall not be made on the cover of the electrical terminal chamber.

NOTE - Resettable thermal cutouts should be positioned to permit resetting as part of servicing but so as to preclude as far as practicable their misuse, e.g. as a secondary control mechanism in the event of thermostat failure".

(Amendment No.1, March 1990)

APPENDIX A METHOD OF TEST FOR DETERMINING STANDING HEAT LOSS

A2
Delete last 2 sentences and **substitute**:

"No fewer than 4 such values shall be obtained and the average of these determined. The heat content corresponding to any temperature drift shall be determined using the following formula and be added to (or deducted from) the observed total energy consumption:

Heat content (kWh) = 1.2×10^{-3} x Temperature drift (°C) x Heater capacity (L)

Where the difference between mean water and mean air temperature is not 55.6 °C the correct standing loss value shall be calculated by proportion".

(Amendment No.1, March 1990)

(C) 1990 STANDARDS COUNCIL
STANDARDS ASSOCIATION OF NEW ZEALAND
WELLINGTON TRADE CENTRE, 181-187 VICTORIA STREET
WELLINGTON 1

Are you a member of SANZ?
If not, please ask for our membership leaflet and application form for becoming a member.

All enquiries to:
The Director
Standards Association of New Zealand
Private Bag
WELLINGTON

THE NEW ZEALAND STANDARD CERTIFICATION MARK SCHEME

The 'S' Mark appearing on a product, container or label is an assurance that the goods are manufactured under a system of supervision, control, and testing (including periodical inspection at the manufacturer's works by SANZ Certification Officers) designed to ensure compliance of the commodity, process, or practice with the relevant New Zealand Standard. The New Zealand Standard Certification Mark, registered as a certification trade mark under the Trade Marks Act 1953, may be used only in terms of a licence issued by SANZ, and must be accompanied by the licence number and the NZS number.

Used correctly in conjunction with advertising the 'S' Mark can provide a strong assurance of product quality for a manufacturer when selling his goods and thus becomes a powerful marketing tool.

Manufacturers may obtain particulars of the conditions of licensing from the Director, Standards Association of New Zealand, Private Bag, Wellington.

Declared on 20 May 1988 by the Standards Council to be a Standard specification pursuant to the provisions of section 23 of the Standards Act 1965.

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