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NZECP 52:1996

NEW ZEALAND ELECTRICAL CODE OF PRACTICE

for

RETROFIT HEATERS FOR SPA-POOL INSTALLATIONS

Issued by the Office of
The Chief Electrical Engineer,
Energy and Resources Division, Ministry of Commerce
Wellington, New Zealand

THE ELECTRICITY ACT 1992

Approval of the New Zealand Electrical Code of Practice for Retrofit Heaters for Spa-Pool Installations

Pursuant to section 38 of the Electricity Act 1992, I, hereby approve the New Zealand Electrical Code of Practice for Retrofit Heaters for Spa-Pool Installations 1996 *(NZECP 52:1996)*.

The New Zealand Electrical Code of Practice for Retrofit Heaters for Spa-Pool Installations 1996 *(NZECP 52:1996)* was issued by the Acting Secretary of Commerce on the 15th day of May 1996.

Dated this 13th day of July 1997.

Max Bradford
Minister of Energy

COMMITTEE REPRESENTATION

This Code of Practice was prepared by the Ministry of Commerce, Chief Electrical Engineer's Office with reference to the following organisations:

Electrical Consultants
Electrical Contractor
Electrical Manufacturer

REVIEW

This Code of Practice will be revised as occasions arise. Suggestions for improvements of this Code are welcome. They should be sent to the Chief Electrical Engineer's Office, Ministry of Commerce, PO Box 1473, WELLINGTON.

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INTRODUCTION

This Code of Practice sets the type test requirements for spa-pool heaters that are intended for retrofitting in existing spa-pools for household and similar purposes and which do not comply with AS 3136/NZS 6232, to improve the safety of the spa-pool installation.

It is intended that the retrofit heaters will need only simple connection to the power supply and water circuits.

Safety of the spa-pool installation using a retrofitted heater complying with this Code of Practice relies on the heater being installed according to the manufacturers instructions that are supplied with the heater.

This document is published as a Code of Practice but it does not give details on design methodologies that can be used to meet the type test requirement.

New spa-pools that contain a heater complying with this Code of Practice are not exempt from complying with AS 3136/NZS 6232.

RETROFIT HEATERS FOR SPA-POOL INSTALLATIONS

SECTION 1

SCOPE, REFERENCE DOCUMENTS, INTERPRETATION, GLOSSARY AND NUMBERING

1.1 SCOPE

1.1.1 This Code sets out the safety test requirements of heaters for retrofit installation in the water heating circuit of existing spa-pools for household and similar purposes to improve the safety of the spa-pool installation.

1.1.2 The rated voltage for Class I and Class II heaters is 230 V for single-phase heaters and 400 V for three-phase heaters.

1.1.3 This Code does not apply to:

(a) Heaters with bare heating elements; or

(b) Electrode type heating elements; or

(c) Those heaters of existing spa-pool installations complying with NZES 9001 or AS 3136/NZS 6232.

1.2 REFERENCE DOCUMENTS

1.2.1 The following Standards and Specifications are referred to in this Code.

AS 1939	Degrees of protection provided by enclosures for electrical equipment *(IP Code)*.
AS/NZS 3350.1	Approval and test specification - Safety of household and similar appliances - Part 1 General requirements.
AS 3136/NZS 6232	Approval and test specification - Electrical equipment for spa-baths and spa and swimming pools.
NZES 9001	New Zealand electrical specification for electric heating and water circulation equipment for spa-pools and similar installations.

1.3 INTERPRETATION

For the purposes of this Code, the definitions given below shall apply.

1.3.1 Basic insulation - means the insulation applied to live parts to provide basic protection against electric shock.

1.3.2 Class I appliance - means an appliance in which protection against electric shock does not rely on basic insulation only, but which includes an additional safety precaution in that accessible conductive parts are connected to the protective earthing conductor in the fixed wiring of the installation so that accessible conductive parts cannot become live in the event of a failure of the basic insulation.

1.3.3 Class II appliance - means an appliance in which protection against electric shock does not rely on basic insulation only, but in which additional safety precautions such as double insulation or reinforced insulation is provided, there being no provision for protective earthing or reliance upon installation conditions.

1.3.4 Class III appliance - means an appliance in which protection against electric shock relies on supply at safety extra-low voltage and in which voltages higher than those of safety extra-low voltage are not generated.

1.3.5 Container - means that part of a spa-pool water circuit in which a heater of the immersion type is installed.

1.3.6 Degree of protection - means the extent of protection provided by an enclosure against access to live parts, or for harmful ingress of water and verified by standardised test methods in accordance with AS 1939.

1.3.7 Normal operation - means the heater is installed according to the manufacturer's instructions for installation and all pipe work is thermally insulated with material that has thermal resistance of a least 3.2 m^2 K/W. provided:

- Heaters of the immersion type are installed in the smallest container specified, the container being installed in a closed water circuit through which water is circulated at the lowest flow rate specified by the manufacturer for that heater;
- Heaters of the through flow type are installed in a closed water circuit through which water is circulated at the lowest flow rate specified by the manufacturer for that heater.

1.3.8 Operate independently in relation to contacts - means that the contacts that break the load current to the heater during the heating test are not the same contacts that break the load current to the heater during the abnormal operation tests.

1.3.9 Rated power input - means the power assigned to the heater by the manufacturer.

1.3.10 Thermal control - means a temperature sensing device that during normal operation controls the temperature of the water in the spa-pool.

1.4 GLOSSARY OF ABBREVIATIONS USED IN THIS CODE

AS	Australian Standard
AS/NZS	Australia/New Zealand Joint Standard
^{o}C	Degrees Celsius
K/W	Kelvin/Watts
m^2	Square Metres
mm	Millimetres
NZES	New Zealand Electrical Specification
V	Volts

1.5 NUMBERING SYSTEM OF THIS CODE

1.5.1 Sections are numbered from 1 to 3.

1.5.2 Subsections are numbered by one full stop between two numbers *(eg: 1.4)*.

1.5.3 Clauses are numbered by two full stops between three numbers *(eg: 2.1.1)*.

1.5.4 Subclauses are numbered by three full stops between four numbers *(eg: 2.1.6.1)*.

1.5.5 Paragraphs contain numbering punctuated by one or more full stops together with a parenthesised letter.

1.5.6 Unless otherwise specified, references in this Code to sections, subsections, clauses, subclauses, or paragraphs, are references to those of this Code.

SECTION 2

GENERAL

2.1 HEATER CONSTRUCTION

2.1.1 Immersion heaters shall be of Class I or Class III construction with respect to protection against electric shock.

2.1.2 Through flow heaters shall be of Class I, Class II or Class III construction with respect to protection against electric shock.

2.1.3 Heaters shall be designed so that basic insulation or reinforced insulation is not in contact with water under conditions of normal operation.

2.1.4 Metal parts of Class I heaters that are in contact with water under conditions of normal operation shall be provided with means of being permanently connected to the protective earthing terminal of the power supply installation.

2.1.5 Heaters shall have a minimum degree of protection IPX1 with respect to protection against harmful ingress of moisture.

2.1.6 Heaters submitted for type testing shall:

(a) Be completely assembled with all parts of the enclosure necessary to ensure protection against electric shock and harmful ingress of moisture; and

(b) Incorporate all of the thermal controls and protective fittings necessary for it to comply with this Code.

2.1.6.1 A heater that is submitted for type testing shall be assembled to the same level of assembly as it is when available for purchase.

2.2 PROTECTIVE FITTINGS

A protective fitting that operates during the abnormal operation tests, shall be of the non-self resetting type. The protective fitting shall operate independently of any thermal control.

2.3 HEATER COMPLIANCE

Compliance of the heater with subsections 2.1 and 2.2 shall be checked by inspection and by the tests specified in this Code and the tests of Clauses 8 and 16 of AS/NZS 3350.1.

2.4 INSTALLATION INSTRUCTIONS

Installation instructions shall include where relevant the following details:

- Details for connection to the water circuit and electricity supply;
- Type and dimensions of the container in which heaters of the immersion type can be installed;
- Where heaters of the immersion type should be positioned within the container;
- A statement that the installer must check that there is water in the water circuit before the heater is first switched on;
- The minimum water flow rate for which the heater is designed.

2.5 MARKING

The heater shall be provided with a rating plate that includes the following information:

- Rated voltage;
- Rated power input;
- Name, trademark, or identification mark of the manufacturer or responsible vendor;
- For Class II appliances, the symbol for Class II construction;
- Model or type reference of the heater.

2.6 POWER INPUT

The power input of the heater shall not be more than 5% higher or 10% lower than the rated power input when the heater is being supplied at rated voltage and is being operated under conditions of normal operation.

SECTION 3

HEATING TESTS

3.1 NORMAL OPERATION TEST

3.1.1 Heaters and their surroundings shall not attain excessive temperatures in normal use.

3.1.1.1 Compliance of the heater is checked as follows:

- The heater is operated under conditions of normal operation at 1.15 times rated power input until steady conditions are established.
- The test shall be terminated after 24 hours provided that a thermal control has operated.
- The temperature rise of component parts shall not exceed those specified in Table 3 of AS/NZS 3350.1.

3.2 ABNORMAL OPERATION TESTS

3.2.1 Heaters shall be constructed so that the risk of fire or mechanical damage impairing safety, is minimized in the event of loss of water or water flow in the water circuit.

3.2.1.1 Compliance of the heater is checked as follows.

Test 1.

The heater is set up for normal operation and is operated at a voltage giving 0.85 times rated power input. For this test the container or water circuit is empty, all thermal controls are short circuited or otherwise rendered inoperative.

The heater is considered to have passed this test if all of the following conditions are meet:

- There is no visual distortion or other damage to the heater enclosure or container;
- The external surface temperature of the heater enclosure or container has not exceeded 120 ^{o}C;
- A non self resetting protective fitting has operated to de-energise the heater.

The test is continued until steady conditions have been reached or until the heater has been de-energized by a non self resetting protective fitting.

Test 2.

Test 1 is repeated, on another sample of the heater if necessary, but with the heater supplied at 1.24 times rated power input.

Test 3.

Heaters are set up for normal operation and are operated at a voltage giving 1.15 times rated power input but with no water flow.

For heaters of the immersion type the container shall be filled with water to at least 100 mm above the highest point of the heating element or the highest level allowed by the construction.

For heaters of the through flow type, that part of the water circuit passing through the heater shall be filled to a level, the depth of which is half its full level.

All thermal controls shall be short circuited or otherwise rendered inoperative.

The water temperature shall not exceed 80 ^{o}C.

For the purposes of Test 3 a separate sample of the heater may be used, and the test is carried out for a time sufficient to ascertain whether the water will exceed the specified maximum temperature.