

**INFORMATION FOR WATER SUPPLIERS, PLUMBING  
INSTALLERS, LANDLORDS AND HOUSEHOLDERS**  
**ELECTRIC IMMERSION WATER HEATERS AND  
PLASTIC WATER STORAGE CISTERNS**



## **ADVICE REGARDING THE RISK OF SCALDING CAUSED BY FAILURE OF ELECTRIC IMMERSION WATER HEATERS**

### **INFORMATION FOR WATER SUPPLIERS, PLUMBING INSTALLERS, LANDLORDS AND HOUSEHOLDERS**

#### **INTRODUCTION**

Householders may have seen recent press reports of a risk of scalding arising from the collapse of plastic water storage cisterns containing very hot water due to electric immersion water heaters which fail to switch themselves off. The background to the incidents which have been reported is outlined below for information. Serious incidents of this type are very rare, but two fatalities in four years from the same cause make it prudent to carryout checks of older plumbing systems where this equipment may be installed.

The following advice is to re-assure householders and landlords regarding the likely risks and to advise them about relevant checks of their plumbing systems and what to do if they are planning to change their storage cisterns or immersion heaters.

#### **WHAT CAUSED THE FATAL SCALDING?**

The recently reported incident occurred in a house, where a faulty electric immersion heater which heated the domestic hot water failed to switch off when the normal hot water temperature was reached (electrical thermostat failure). This caused the water in the hot water storage cylinder to boil. To avoid over-pressurisation of the hot water cylinder, the plumbing system operated as designed by allowing the boiling water to discharge through a vent pipe into a plastic storage cistern (tank) in the roof space. This continued for some hours until the plastic tank was full of very hot water, and partly because it wasn't properly supported underneath, it distorted and split, spilling the very hot water onto the bedroom ceiling above a child's cot. The hot water cascaded onto the baby sleeping in the cot, who suffered severe scalding from which she subsequently died.

#### **CURRENT REQUIREMENTS**

Not all water heating systems use immersion heaters. If you are replacing an existing immersion heater or storage cistern or having a new installation, insist on the equipment and installation meeting the following requirements.

Electric immersion heaters made in accordance with British Standard BS EN 60335-2-73:2003<sup>1</sup> include an independent non self-resetting over-temperature cut-out safety device to prevent water in the hot water cylinder from overheating. This is in addition to the normal switching mechanism of the immersion heater.

**Since April 2004 it has been recommended that any repair, replacement or installation work on domestic immersion heaters should include the fitting of such a safety feature.**

Recently-built houses and flats may not have water storage cisterns at all, instead having all their water supplied directly from the water main. Where water storage cisterns are used they are often located in the roof space above the upper rooms and are typically used to store cold water for use directly, for example at bathroom taps, and to supply water to the vented hot water system.

Modern plastic cisterns should be able to contain boiling water without collapsing or splitting, provided they are adequately supported. Suitable plastic cisterns are those made since 1986 which are

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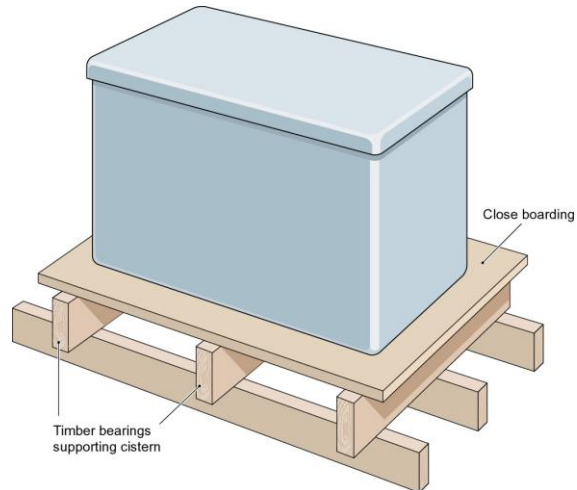
<sup>1</sup> British Standard BS EN 60335-2-73:2003 + A2:2009 'Specification for safety of household and similar electrical appliances. Particular requirements for fixed immersion heaters'

- (a) WRAS Approved Products (from 1999 onwards). Plastic cisterns which are currently WRAS Approved are listed in the Water Fittings and Materials Directory in Sections 0120, 0130, 0135 and 0170. Details are given in the individual entries indicating their suitability for storing water to be used for domestic purposes. The Directory is available free of charge on the WRAS website at <http://www.wras.co.uk/Directory>. or
- (b) approved by WRAS' predecessors before 1999 and have a Water Byelaws Advisory Service Listed Certificate Awarded or are Water Byelaws Scheme Approved Products (see below for markings), or
- (c) manufactured in accordance with the British Standard BS 4213: (1986 or later)<sup>2</sup>.

**SUPPORT FOR CISTERNS**

BS 4213:2004 stipulates that the minimum support for plastic storage cisterns, of capacity up to 500 litres should be at least 15mm thick marine plywood to provide a durable, rigid, flat and level platform beneath the whole base of the cistern.

If you are replacing an existing galvanised (metal) storage cistern by a plastic one, ensure the replacement complies with the standard or is WRAS Approved and is properly supported.



Example of close boarded support to a plastic cistern

**CHECKS ON YOUR EXISTING SYSTEM**

Particular attention should be given to systems over ten years old and those where householders or landlords may have other reason to suspect the adequacy of the initial installation or any subsequent work.

**CHECKS ON IMMERSION HEATERS**

- 1. Look for marking on the immersion heater to show if it is made in accordance with British Standard BS EN 60335-2-73:2003. If not, consider having it changed for one which does meet this standard. The cost of a replacement immersion heater should be less than £10, but the cost of having it installed by a qualified person will be additional.

**CHECKS ON CISTERNS**

- 2. Look for marking on the plastic cistern showing either
  - (a) the logo for WRAS Approved Products or the earlier approval marks



or

- (b) marking showing that the cistern was manufactured in accordance with BS 4213 (dating from 1986 or later).

Cisterns with these marks should be capable of withstanding boiling water if correctly supported.

<sup>2</sup> BS4213: 2004 'Cisterns for domestic use – Cold Water storage and combined feed and expansion (thermoplastic) cisterns up to 500 litres – Specification' is the current version of this standard.

3. It is not suitable to stand a plastic cistern directly on the joists of the ceiling because the weight will not be uniformly distributed. Check that the cistern is standing on a support which is of a suitable thickness and type of material, and which extends beneath the whole of the base of the cistern and does not allow any part of it to overhang the support. Check also that the support is not rotten or distorted due to leakage or condensation.
4. Check that the float valve and the overflow (warning) pipe are securely fastened through the cistern wall by the clamping nuts. Check the outside of the cistern to see that water isn't leaking from the entry holes in the cistern wall where the pipes pass through it.
5. Check that the water pipe leading to the float valve and also the overflow (warning) pipe, designed to take excess water safely away to waste, are properly supported so that their weight does not distort the cistern sides.
6. Ensure that the cistern lid is correctly in position.

## **SIGNS OF A PROBLEM WITH YOUR IMMERSION HEATER**

There are a number of warning signs if the immersion heater is overheating the hot water:

- (a) Excessively hot water coming out of the hot taps;
- (b) Excessive noise or 'bubbling' from the hot water cylinder
- (c) Hot water coming out of certain cold water taps. (Some storage cisterns also feed cold water taps, for example in the bathroom).
- (d) Steam or condensation in the roof space.
- (e) Unusual warmth between the insulating cover and cistern (tank) sides on the outside of the cold water storage cistern in the roof space (that is, more warmth than would be due to the surrounding air temperature).

If you suspect there is a problem with the immersion heater, arrange for a qualified person (plumber or electrician) to check it urgently. If you are a tenant, depending on the terms of your tenancy, arranging and paying for these checks may be the responsibility of your landlord. If so, ask the landlord to arrange the checks as a matter of urgency.

## **FURTHER INFORMATION**

**Requirements for water storage cisterns:** See the WRAS Water Regulations Guide section 7 pages 7.11 to 7.15. To order a copy of this publication contact WRAS on 01495 248454.

**Health and Safety Executive alert:** The Health and Safety Executive have issued a safety alert on this subject: 'Scalding risk from domestic hot water systems - safety alert' which is available on the HSE website:

<http://www.hse.gov.uk/services/localgovernment/hotwatersystems.htm>

<http://www.hse.gov.uk/press/2007/e07027.htm>

Advice should also be available from competent plumbers. Look for one who is a member of a professional institute such as the Chartered Institute of Plumbing and Heating Engineers or who is an approved contractor (see the WRAS website: <http://www.wras.co.uk/WIAPS/>)

Issued by the Water Regulations Advisory Scheme, which is funded by the UK Water Suppliers to publicise the Water Fittings Regulations and Scottish Water byelaws and operates a scheme to assess and approve water fittings and plumbing materials which comply with the requirements of the Regulations and Byelaws.

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