

Frequently Asked Questions

Hughes Zero Power Cooler® for Emergency Tank Showers

As this is the world's first zero power cooling system you may have some questions. Some of the most frequently asked are answered here, however if you would like to discuss anything in more detail please don't hesitate to contact Hughes on +44 (0)161 430 6618 or via sales@hughes-safety.com



Why would I choose the Zero Power Cooling System rather than one of the existing chillers?

Passive cooling of your emergency tank shower requires no electricity to work; if you have a remote location or area that does not have suitable power then our Zero Power Cooling System is ideal. A table comparing our Flameproof Chiller, Non-Flameproof Chiller and the Zero Power Cooling System can be viewed on our website.

How does it work?

During the cooler night-time ambient temperatures, the convection process of the passive cooling system draws heat out of the stored water in the tank and reduces the water temperature to safe working limits. During the daytime, the external exchanger is heated by solar radiation and the coolant no longer circulates. This causes the coolant in the system to stratify, hot water stays to the top and cooler water remains lower down preventing the water in the tank heating up.

In what locations has it been tested?

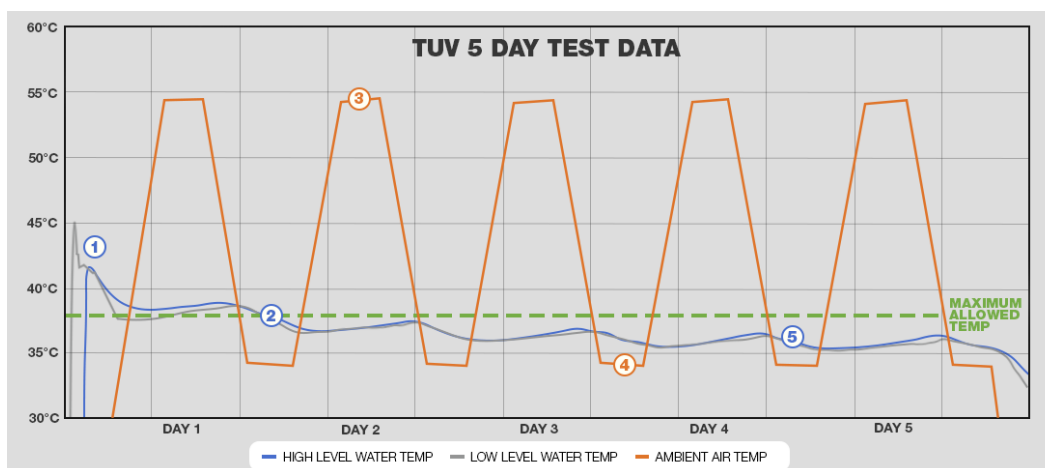
The cooling system has been tested in the UAE during the summer months where temperatures reached up to 55°C during the day and 35°C at night. There are also units currently in use in Saudi Arabia and Oman.

What temperature range will the system maintain?

Testing has proven that the unit will maintain a water temperature of 2°C higher than the average night-time temperature. For example, if your average night-time temperature is 32°C in the summer the water in the tank shower will be maintained at or below 34°C. (ANSI Z358.1-2014 stipulates water should be maintained between 16-38°C)

Do you have valid results available to view?

TUV, an independent laboratory based in Italy and the UK, have performed extensive tests on the Zero Power Cooling System, a summary of the results can be seen below. A copy of the full TUV test report can be found on our website.



1. Water temperature at start of test
2. Point at which water reaches a safe temperature
3. Daytime temperature level (55°C)
4. Night time temperature level (34°C)
5. Consistent water temperature (+/- 1.5°C)

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How long does it take to cool the water?

Please see commissioning time table below:

Inlet Water Temperature	Commissioning Time - Days						
	22°C	24°C	26°C	28°C	30°C	32°C	34°C
60°C	3	3	3	4	4	5	6
55°C	2	2	3	3	4	4	5
50°C	2	2	2	3	3	3	4
45°C	1	1	1	2	2	2	3
40°C	1	1	1	1	1	1	1
Night Air Temperature	22°C	24°C	26°C	28°C	30°C	32°C	34°C

What type of locations is this suitable for?

The system is designed for use outdoors and in both hazardous and non-hazardous areas.

Can it be retrofitted to an existing Hughes emergency tank shower? If so, which models?

Any of our 1500 litre emergency tank showers can be retrofitted to accept the cooling system.
(EXP-J-14K/1500; EXP-J-14KS/1500)

When retrofitting, is it easy for me to install or do you offer an installation service?

A retrofit kit and instructions are provided allowing your engineers to fit the Zero Power Cooling System to our emergency tank showers on site. Hughes can offer further support where needed - please contact our sales team for more information.

What are the maintenance requirements?

No maintenance is necessary, it is completely sealed and requires no spare parts.

Will it work for my site if the ambient night-time temperature does not drop below 38°C? Will the water available in the day still be tepid?

If your location has temperatures consistently above the 38°C average at night, please contact our sales team for the best solution for your requirements.

What are the effects of black bulb temperatures or solar radiation on the cooling system?

Where there is direct sunlight and solar radiation in the daytime, the cooling system is designed to benefit from this. There is a positive effect in the daytime in creating hot water at the top of the cooling system (on the external exchanger) as the hot water stratifies leaving the cooler water in the lower (internal) cooling exchanger.

The cooling cycle is not affected since it takes place during the evening/night-time when solar radiation is limited or zero. During the night phase, the temperature differential helps create the flow inside the cooling system to start the cooling process. An example of this can be seen on our website in the 'How it works' animation.

Can the cooling system be used where there are higher PPM chlorine levels?

Yes, in this instance, the internal stainless steel exchanger can be coated with a chlorinated rubber coating that is suitable for use with safety showers with no risk of contamination of the water in the tank.

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What happens when the shower is tested and potentially hotter water is introduced into the system?

Please see the example below. The impact has been calculated based on 150 litres of water (10% of the volume) which equates to 2 minutes of shower use - this is more than what would be used for normal weekly testing.

Using an extreme example where the water temperature is 36°C; in this condition, if 150 litres of the 1500 litre total is replaced with the same quantity of water at 50°C the result will be $36^{\circ}\text{C} + 50 \times 0.1 = 36.5^{\circ}\text{C}$ (remaining within the tepid water requirements). Please also note that this example is during the hottest months, the remainder of the year would allow for lower water temperatures in our tank showers. As such, there are no issues when the testing is performed once a week or if the shower is tested for a longer duration.

What is the lifespan of the cooling system?

The cooling system is constructed to specifications where a design life of 20-25 years is required. A 2 year warranty is offered on the system as standard.

What happens when the emergency tank shower is used for the full 15 minutes and needs refilling?

Upon any emergency activation of a safety shower, we recommend that the shower is inspected and recommissioned before it is used again. Once the cooler water in the system has been depleted it will need to be replaced with fresh potable water before it can be used again. During the peak summer months, water inlet temperatures can reach above 40°C. where this is the case please refer to the commissioning times matrix on the previous page.

If you require any further information or want to discuss your requirements in more detail please contact Hughes Safety Showers directly on +44 (0)161 430 6618 or via sales@hughes-safety.com

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