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Report On

Environmental Testing of a
Passively Cooled Emergency Tank Shower for
Hughes Safety Showers Ltd

COMMERCIAL-IN-CONFIDENCE

Document 75942408 Report 01 Issue 1 July 2018

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REPORT ON

Environmental Testing of a
Passively Cooled Emergency Tank Shower for
Hughes Safety Showers Ltd

Document 75942408 Report 01 Issue 1

July 2018

PREPARED FOR

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DATED 02 July 2018

UKAS TESTING 0141

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CONTENTS

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SECTION 1

REPORT SUMMARY

Environmental Testing of a
Passively Cooled Emergency Tank Shower for
Hughes Safety Showers Ltd

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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Environmental Testing of the Hughes Safety Showers Ltd Passively Cooled Emergency Tank Shower to the requirements of the customer test plan as listed below.

Objective	To perform climatic testing to check the water contained in the tank shower be maintained between +16°C to +38°C during test (+40°C starting point).
Manufacturer	Hughes Safety Showers Ltd
Description	Passively Cooled Emergency Tank Shower
Model Number(s)	EXP-J-14KS/1500 with ZPC Cooler Option
Serial Number(s)	ZPC0001
Number of Samples Tested	One
Test Specification/Issue/Date	Generally, in accordance with EN 60068-2-14:2009 Test Nb
Test Plan/Issue/Date	Customer test plan based on ANSI Z358, Clause B6 Delivered Flushing Fluid Temperature and previous temperature cycling test (July 2017)
Order Number Date	0000201237 05 April 2018
Start of Test	01 May 2018
Finish of Test	09 May 2018
Engineer Name(s)	Colin Hedley
Related Document(s)	Previous test data not from TÜV SÜD Product Service: Refer to Appendix B

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1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the test carried out is shown below.

Section	Test Plan	Clause	Test Description	Result
2.1	Customer test plan. Refer to Annex B	Clause B6 Delivered Flushing Fluid Temperature	Temperature Cycling Test	Completed satisfactorily

Satisfactory - No damage or detrimental effects were observed and performance assessments were reported as satisfactory.

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1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) was a Hughes Safety Showers Ltd passively cooled emergency tank shower as shown in Figure 1.3.1.

Figure 1.3.1 Passively cooled emergency tank shower as delivered located on wooden pallet without the stretch wrap cover

1.3.2 Test Configuration

Unpackaged product filled with 1500 litres water.
Customer supplied dimensions: 1580mm (W) x 1430mm (D) x 2600mm (H).
Refer to Annex A - Hughes Safety Showers Ltd - Packing List for details.

1.3.3 Modes of Operation

Non-operational.

1.3.4 Monitoring of Performance

N/A.

1.3.5 Performance Criteria

N/A.

1.4 DEVIATIONS FROM THE STANDARD

N/A.

1.5 MODIFICATION RECORD

No modifications were made to the EUT during testing.

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SECTION 2

TEST DETAILS

Environmental Testing of a
Passively Cooled Emergency Tank Shower for
Hughes Safety Showers Ltd

Product Service

2.1 TEMPERATURE CYCLING TEST

2.1.1 Test Plan / Specification Reference

Customer test plan based on excerpt from ANSI Z358, Clause B6 Delivered Flushing Fluid Temperature. Refer to Appendix B Results Data from Previous Test Completed for Hughes Safety Showers in July / August 2017 (not at TÜV SÜD Product Service)

Generally, in accordance with EN 60068-2-14:2009 Test Nb Change of Temperature

2.1.2 Equipment Under Test

Description	Model Number	Serial Number
Passively Cooled Emergency Tank Shower	EXP-J-14KS/1500 with ZPC Cooler Option	ZPC0001

2.1.3 Date of Test

01 May to 9 May 2018

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Method

1. Install the EUT into the test chamber.
2. Check the water temperature is even at +40°C.
3. Use the test results chart in Appendix B as the precedented (general) test setup for the temperature ramps and dwells.
   Note. This is being used as a baseline because it has been precedented and is reasonable, rather than a diurnal cycle taken from a test specification (which would give different results to those already obtained from a previous test).

Stabilise the chamber for 30 min at +25°C.

4. Adjust the chamber temperature from +25°C to +34°C in 1 hr 34 min.
5. Adjust the chamber temperature from +34°C to +55°C in 6 hrs.
6. Maintain +55°C for a period of 6 hours.
7. Adjust the chamber temperature from +55°C to +34°C in 6 hrs.
8. Maintain +34°C for a period of 6 hours.
9. Repeat steps 6 to 9 so that 5x cycles are completed in total.
10. After the final cycle is completed adjust the chamber temperature to +25°C in 1 hr 34 min.
11. Maintain +25°C indefinitely until EUT is removed from the chamber.

Notes.

- The customer has already located 3 off TÜV thermocouples into the EUT.
- Add two further thermocouples to check the water temperature and local ambient.
- Connect all thermocouples to a Pico data logger.
- Customer has installed their own independently logging thermocouples.
- TÜV can remove the top lid (retained by 4 off screws). This is the filling point.
- Pump 1500 litres of water into the tank at +40°C.
- The customer advised the fill level for 1500 litres. This is a depth measured to the surface of the water from the outside of the tank top between 80mm – 100mm.
- There is a side overfill outlet (which can be connected to a drain pipe, if required).
- The EUT can be moved with a fork lift truck when it is half full (750 l) or full (1500 l).

- This is a non-operational test.

Figure 2.1.1 Passively cooled emergency tank shower located in walk-in chamber

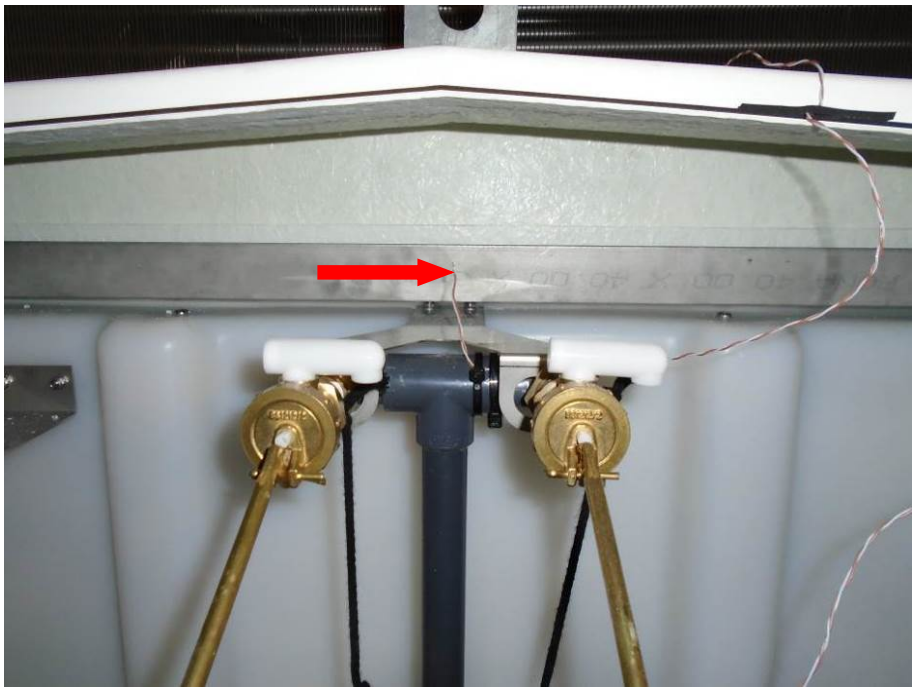

Figure 2.1.2 Top thermocouple (pre-installed by Hughes Safety Showers Ltd)

Figure 2.1.3 Middle thermocouple (pre-installed by Hughes Safety Showers Ltd)

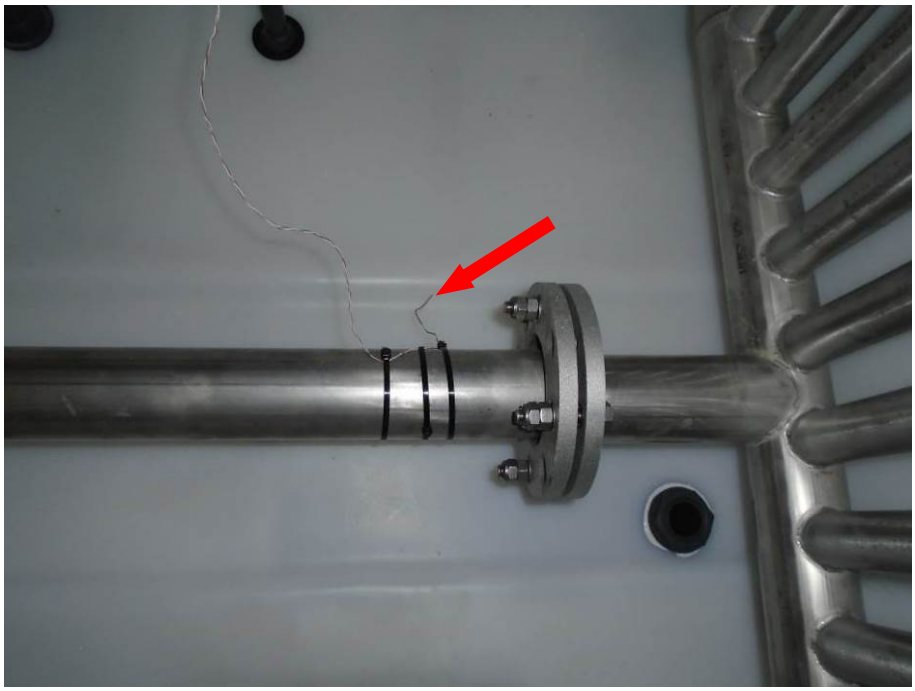

Figure 2.1.4 Bottom thermocouple (pre-installed by Hughes Safety Showers Ltd)

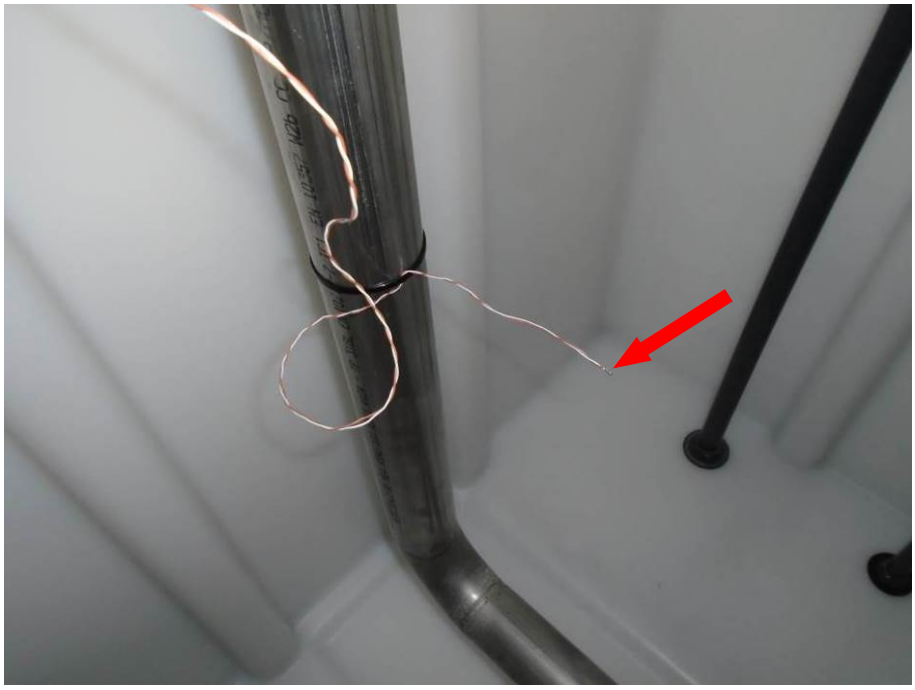

Figure 2.1.5 Additional middle thermocouple (installed by TÜV)

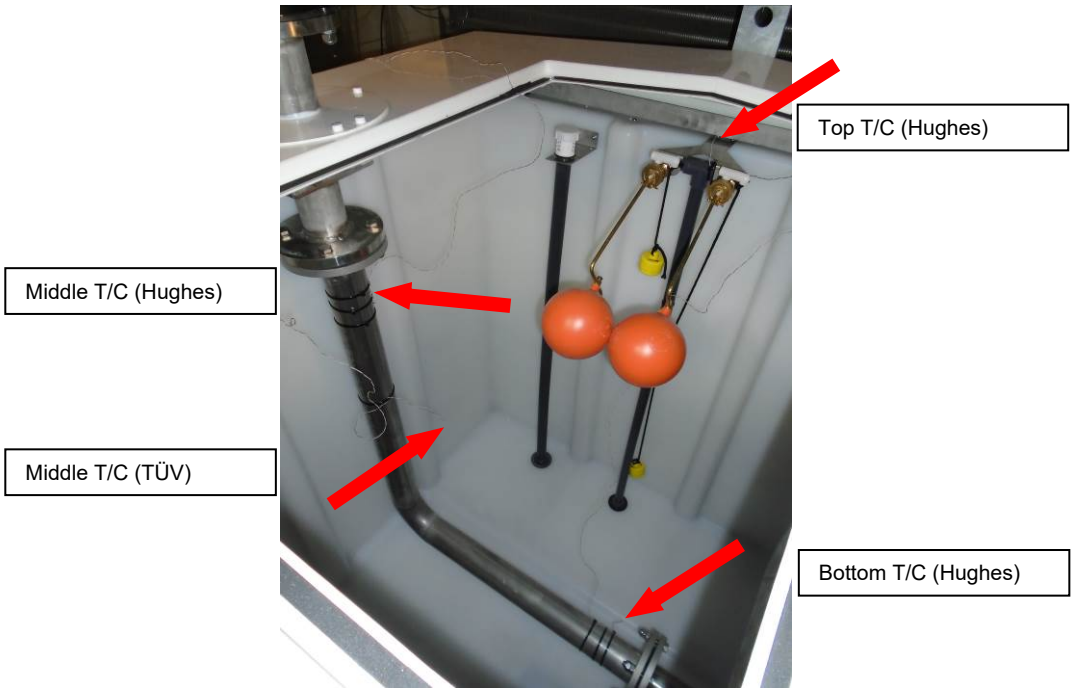

Figure 2.1.6 Additional middle thermocouple (installed by TÜV)

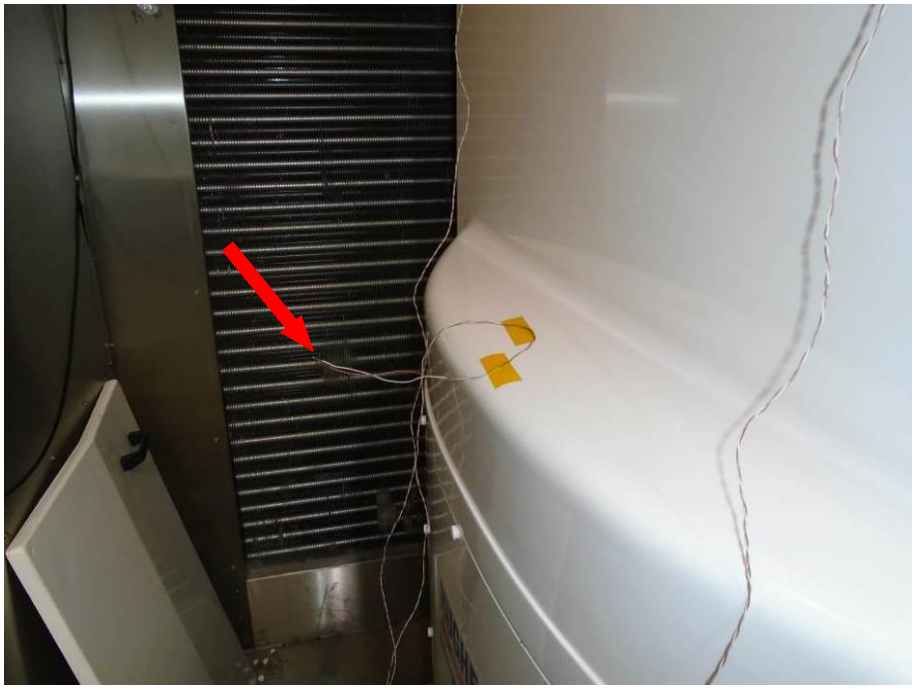

Figure 2.1.7 Local ambient thermocouple (installed by TÜV)

Figure 2.1.8 Shows the passively cooled emergency tank shower filled with water

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2.1.6 Test Results

The EUT showed no sign of damage or deterioration on completion of the testing. The wooden pallet had deformed during the test. The temperature variation of the chamber and the water in the tank during this test is shown in Figures 2.1.9 and 2.1.10. A final inspection will be performed upon return of the EUT to Hughes Safety Showers Ltd.

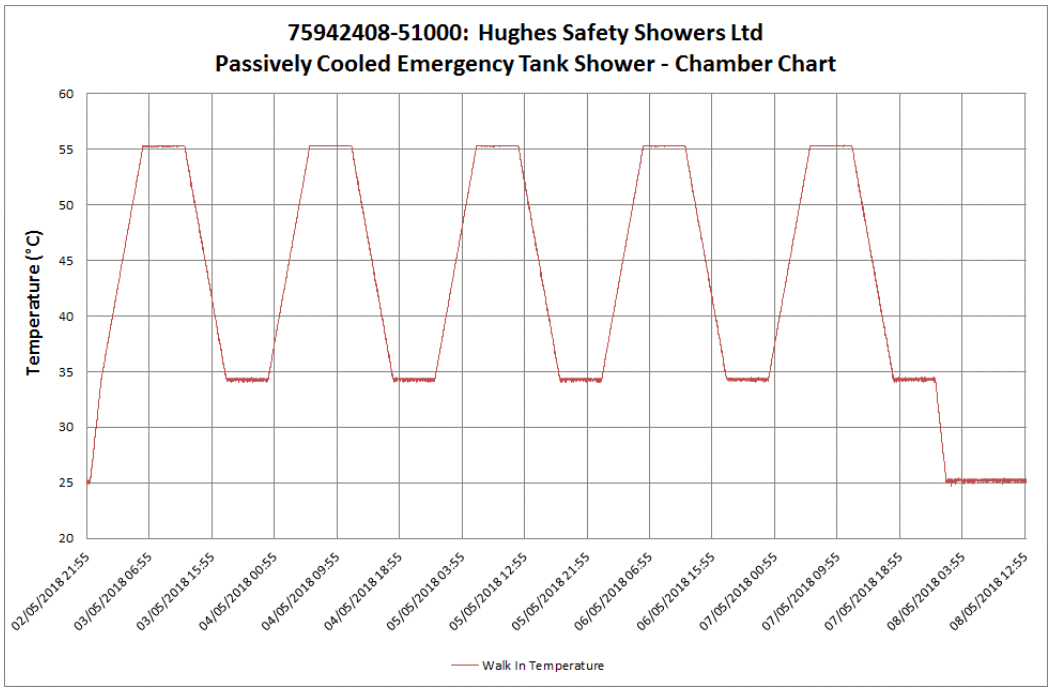

Figure 2.1.9 Chamber Temperature Profile

Product Service

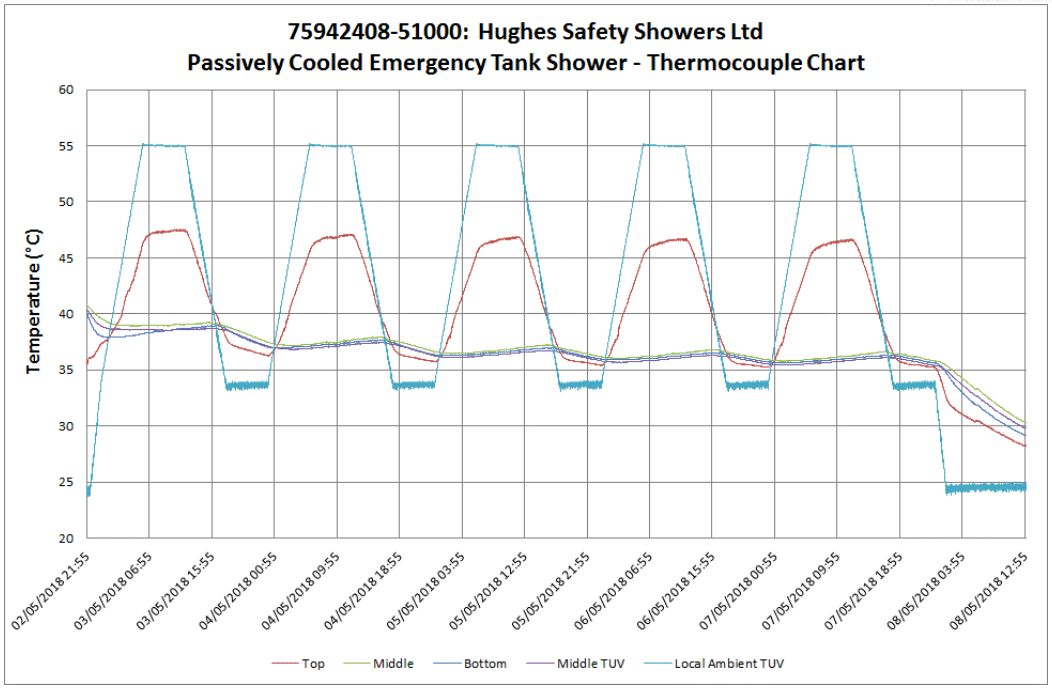

Figure 2.1.10 Thermocouple Temperature Profile

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SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

Instrument	Manufacturer	Type No.	TE No.	Cal Period (months)	Calibration Due
Section 2.1 – Temperature Cycling Test					
Climatic Chamber	Climatec	Walk-in	2847	12	19-Jun-2018
Data Logger	Pico Technology Ltd	TC-08	4428	12	08-Mar-2019
PFA Insulated T/C	TC Limited	Type T	4739	12	20-Jul-2018

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SECTION 4

INCIDENT REPORTS

4.1 INCIDENT REPORTS ISSUED

No incident reports were issued during the testing.

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).

ANNEX A

Hughes Safety Showers Ltd Packing List

Packing List

HUGHES
HUGHES-SAFETY.COM

HUGHES SAFETY SHOWERS LTD
Whitefield Road, Bredbury, Stockport,
Cheshire, SK6 2SS, England
Tel: +44(0)161 430 6618 Fax: +44(0)161 430 7928
Web Site: www.hughes-safety.com
E-mail: Sales@hughes-safety.com
Europe's Largest Manufacturer of Emergency Safety Showers, Eyebaths and Decontamination Showers
VAT Registration No: GB 918 5005 32

Deliver To (Consignee):
TUV SUD PRODUCT SERVICE LTD
OCTAGON HOUSE, CONCORDE WAY
SEGENSWORTH NORTH
FAREHAM
HAMPSHIRE
PO15 5RL
IAN VEAL 01489 558199

Our Ref	*Customer Order Ref*	*Ready for Desp*	*Shipping Terms*	*Transport/Carrier*
RS 00050	ALAN	23/04/2018	DAP PO15 5RL	ROAD - UK ROAD

Description of Goods

Item 1 EXP-J-14KS/1500

1 OFF # - (SPECIAL) MODEL EXP-J-14KS/1500. 1500 LITRE REMOTE TANK SHOWER. PRE-INSULATED AND ENCASED IN A WHITE GRP TANK SURROUND WHICH IS FITTED WITH A SIGN BOX (SPECIAL - 1500LTR TANK WITH PASSIVE COOLER FRAME SYSTEM, UN-HEATED WITH, SPECIAL GRP LID WITH CENTRAL GRP INSPECTION HATCH, TANK FRAME TO HAVE FIXING POINTS FOR THE PASSIVE MOUNTING FRAME COOLING UNIT.
STANDARD 1500 STAINLESS STEEL TANK TOP & FRAME WITH SEPARATE REMOVABLE BASE FRAME STAND APPROX 500MM HIGH (SO THAT TANK TOP CAN BE MADE INTO A 1500 TANK SHOWER WITH PASSIVE COOLER AT A LATER DATE AFTER TESTING)
PASSIVE COOLER MOUNTING FRAME SEE FABRICATION DRAWING NO: GELATO-001-FRAME). (FOR TESTING AT TUV)

Package	*Type*	*Size cm*			*Weight kg*	
		Length	*Width*	*Height*	*Gross Wt*	*Nett Wt*
1	Pallet & Shrink-Wrap	158	143	260	350	335

Customs Tariff Code: 73 24 9000

Short deliveries or damaged in transit must be notified within 24 hours of receipt of materials.

RS 00050

Hughes Safety Showers Ltd - Packing List

ANNEX B

Results Data from Previous Test Completed for Hughes Safety Showers in July / August 2017 (Not TÜV SÜD Product Service)

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Customer supplied test specification: ANSI Z358, Clause B6.

B6. Delivered Flushing Fluid Temperature

Continuous and timely irrigation of affected tissues for the recommended irrigation period are the principal factors in providing first aid. Providing flushing fluid at temperatures conducive to use for the recommended irrigation period is considered an integral part of providing suitable facilities. Medical recommendations suggest a flushing fluid at tepid temperatures be delivered to affected chemically-injured tissue. Temperatures in excess of 38°C (100°F) have proven to be harmful to the eyes and can enhance chemical interaction with the skin and eye tissue. Consideration should be given to the impact of isolated ambient temperature changes. Colder ambient temperature might require an enclosure for added protection. Warmer ambient temperature might require a re-evaluation of the water temperature.

While cold flushing fluid temperatures provide immediate cooling after chemical contact, prolonged exposure to cold fluids affect the ability to maintain adequate body temperature and can result in the premature cessation of first aid treatment. Recent information indicates that a temperature of 16°C (60°F) is suitable for the lower parameter for tepid flushing fluid without causing hypothermia to the equipment user.

Beng Yang of TUV SUD PSB Singapore found that: “We noticed that appendix B6 basically states that the water needs to be maintained between 16degC to 38degC. There is no mentioning of temperature tolerances, and also no mentioning of test procedures.”

Attached is the raw data of the testing that we carried out. There are images of the extracted graphs that shows the results. Just for info, we used Gemini data loggers for the tests.

		Temperature in °C		
		Average	Highest	Lowest
Sensor	Low Water	35.773	36.36	35.14
	High Water	35.82	36.36	35.31
	External Ambient	40.456	54.78	31.06
	Internal Ambient	36.762	41.35	33.06

Δ of internal and external ambient average **3.694**
Δ of high and low water temperature senor average **0.77**
Lowest water temperature recorded on **24/07** for both sensors
Highest water temperature recorded on **04/08** for both sensors
Highest ambient temperature recorded on **19/07** for both sensors
Lowest ambient temperature recorded on **7/7** for both sensors

Please note the following in relation to the data attached:

Time the sensors were programmed to UK time UAE was +3 hours ahead
Ambient sensors started logging 10 days before the water sensors due to a delay in getting them fitted
Internal Ambient Sensor is monitoring ambient temperature inside the tank under the lid
Low water sensor is approx. 30CM from the bottom of the tank
High water sensor is approx. 30CM from the top of the water level - distributed to ensure any difference in high or low water temps - the difference is +/- 0.077 of a degree on average which is negligible.

The tank was moved 20M and subsequently topped up with 6 litres of water on the 3rd of August after a small loss during movement.

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