Surface Temperature Tests on Four Electric Towel Rails

Carried out for

Prestige Radiators Ltd

Report 61548/1

Compiled by Philip Stonard

11 March 2019

This page is intentionally left blank

Surface Temperature Tests on Four Electric Towel Rails

Carried out for: Prestige Radiators Ltd
Unit 2, North Point Business Park
Off Selby Road
Eggborough
North Yorkshire
DN14 0JT

Contract: Report 61548/1

Issued by: BSRIA Limited
Old Bracknell Lane West
Bracknell
Berkshire
RG12 7AH
UK

Telephone: +44 (0)1344 465600

Fax: +44 (0)1344 465626

Email: bsria@bsria.co.uk
Website: www.bsria.co.uk

QUALITY ASSURANCE

Issue	Date	Compiled by:	Approved by:	Signature
Final	*11-Mar-2019*	*P.Stonard* *Senior Engineer*	*Tom Garrigan* *Business Manager*	

SUMMARY

This report details surface temperature tests conducted on four electric towel rails. The work was commissioned by Prestige Radiators Limited and was conducted during the period 14 January to 21 February 2019.

The items supplied consisted of four electric towel rails. They were 'ladder' style constructed from chrome plated steel and were designated as Prestige Towel Rails, sizes:

- P800500CS
- P1200500CS
- P1400500CS
- P1600500CS

Each contained a thermostatically controlled heating element designed to limit temperature to approximately 43°C. The element type was 43D.

The number of tubes and tube grouping vary with height.

From the tests conducted on the samples provided, each sample was capable of maintaining an average surface temperature below 43°C in accordance with the recommendations in the NHS Estates guidance document 'Safe hot water and surface temperatures'.

Details of the method and results are shown in the main body of this report.

CONTENTS

FIGURES

APPENDICES

1 INTRODUCTION

This report details surface temperature tests conducted on four electric towel rails. The work was commissioned by Prestige Radiators Ltd and was conducted during the period 14 January to 21 February 2019.

2 OBJECTIVES

The objective was to determine the surface temperature of the towel rails met the requirements of NHS Estates guidance document 'Safe hot water and surface temperatures' (temperatures below 43°C) after allowing to warm from cold and then maintain thermostatic control of the towel rail temperature for at least one hour.

3 ITEMS SUPPLIED FOR TEST

The items supplied consisted of four electric towel rails. They were 'ladder' style constructed from chrome plated steel and were designated as Prestige Towel rails, sizes:

- P800500CS
- P1200500CS
- P1400500CS
- P1600500CS

Each contained a thermostatically controlled heating element designed to limit temperature to approximately 43°C. The element type was 43D.

The number of tubes and tube grouping vary with height.

Product information can be seen in Appendix A. Photographs of the units are included in Appendix B.

4 INSTRUMENTATION

Instrument	Identifier	Calibration expiry date
Agilent logger+10 thermocouples	954	08/01/20
Power meter	1625	15/09/19

5 SCOPE AND METHODOLOGY

The scope was limited to surface temperature measurement of the towel rails and noting the peak power consumption.

The method involved installing the towel rails in a thermal chamber 4mx4mx3m, normally used for testing radiators without an integral heat source (BS EN442-2:2014). There are however no existing British or European standards for conducting the specific work detailed here. The chamber was conditioned to maintain a nominal 20°C in the centre of the room within a radiation shield, 0.75m above floor level. The conditioning was achieved by chilled water panels. There was no air movement around the room other than that created by the warm towel rail under test.

Ten thermocouples (eight on the smallest unit) were attached to the towel rail, in pairs on each side spaced from bottom to top to align with groups of horizontal tubes in the towel rail. Appendix B shows the typical arrangement. Thermocouples were calibrated against a reference resistance thermometer and the relevant corrections applied to the indicated values.

Note that the NHS Estates guidance document does not specify the number, type or position of surface temperature measurement devices.

A power meter was installed in the electrical supply and the towel rail turned on. Temperatures were automatically logged at intervals of 100 seconds. The towel rail was allowed to warm from cold and then maintain thermostatic control of the towel rail temperature at least one hour. Control was achieved by the towel rail internal thermostat monitoring the internal fluid temperature, and cycling on/off, coupled with the appropriately sized heating element being installed in each towel rail.

When the required time period had elapsed, the data from the last hour of each test was used to determine the average temperatures of each towel rail. A plot of the data was also conducted to show the temperature vs time graph from cold for each item.

Power consumption was noted when each unit was ‘on’ during its temperature control cycle.

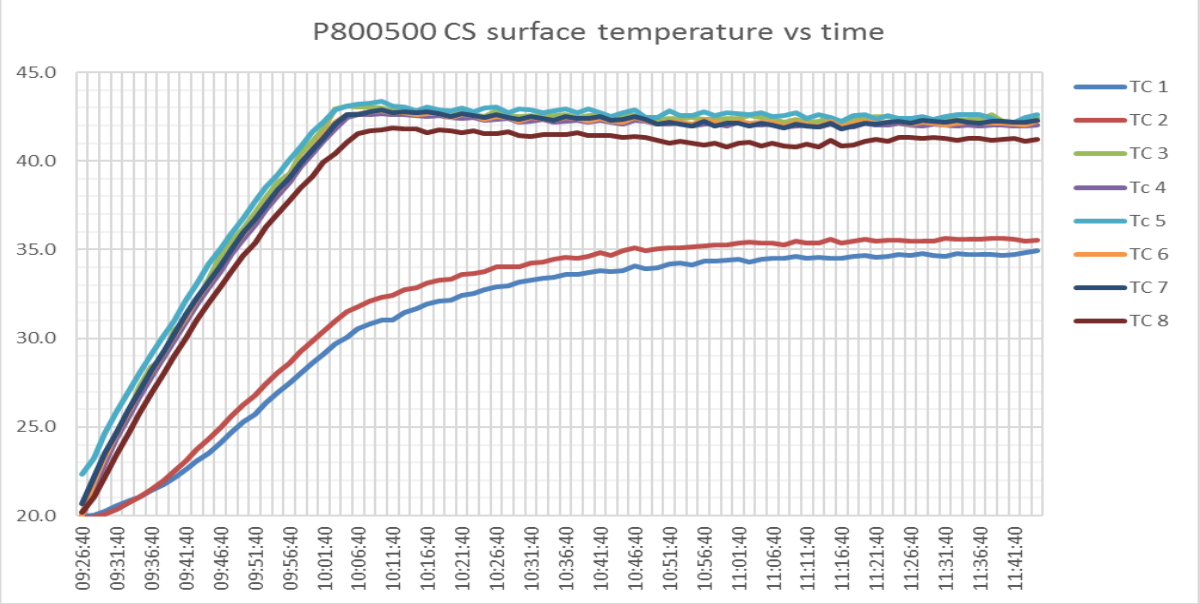
6 RESULTS

The results are shown in graphical form for each item. Averages are shown below for:

1. all thermocouples
2. excluding the thermocouples at the base (No1 & 2) which showed somewhat colder than others and hence reduced the overall average value.

Note that the total elapsed time (and thus graph scaling) varied for each test with at least 1 hour 'steady state' being recorded.

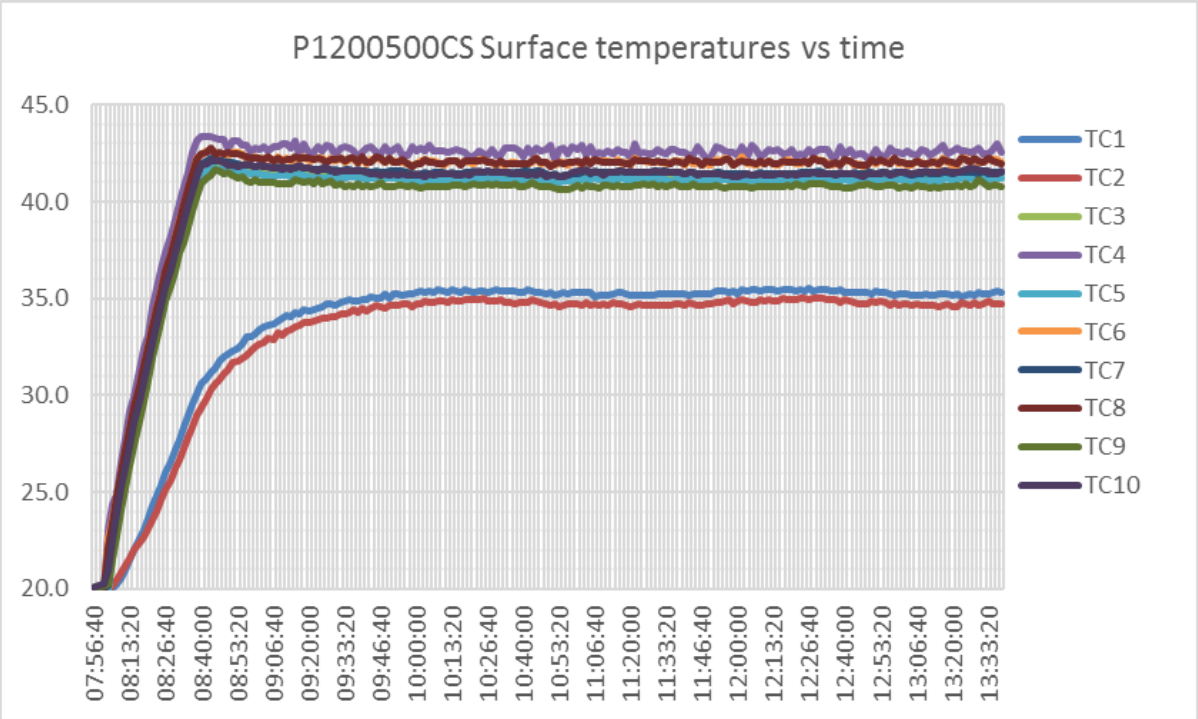
6.1 P800500CS



Average TC1-8 40.3°C
Average TC3-8 42.0°C

Maximum power consumption 220 Watts

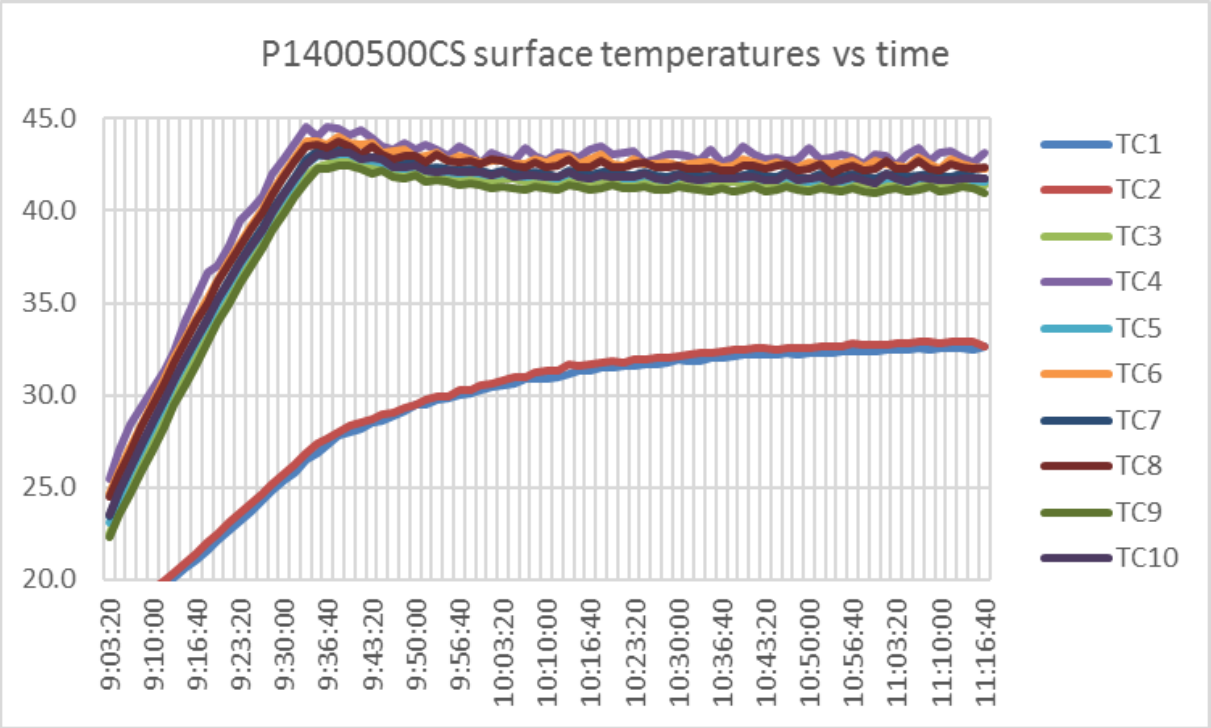
6.2 P1200500CS



Average TC 1-10	40.3°C
Average TC 3-10	41.6°C

Maximum power consumption 336 Watts

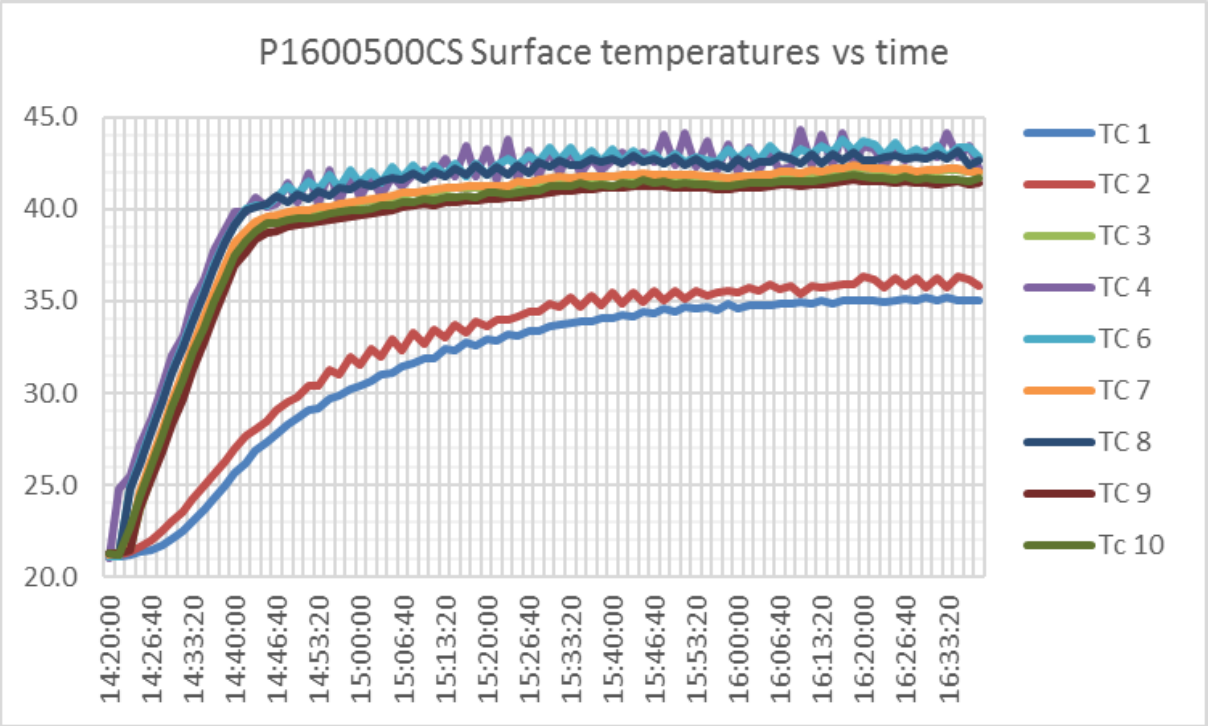
6.3 P1400500CS



Average TC 1-10	40.1°C
Average TC 3-10	42.0°C

Maximum power consumption 441 Watts

6.4 P1600500CS



Average TC 1-10	40.7°C
Average TC 3-10	42.2°C

Maximum power consumption 663 Watts

7 CONCLUSIONS

From the tests conducted on the samples provided, each sample was capable of maintaining an average surface temperature below 43°C in accordance with the recommendations in the NHS Estates guidance document 'Safe hot water and surface temperatures'.

APPENDIX A: PRODUCT INFORMATION

TEST RECORD SHEET TP21/2 : PRODUCT INFORMATION

BSRIA test reference number	61548A2PS
Client	Prestige radiators
Manufacturer	Prestige radiators
Product reference number	P800500CS
Product style	Towel rail (electric)
Material of construction	Steel, chrome plated
Date of receipt	11/01/19
Product or packaging markings	Type, manufacturer
Test start date	14/01/19
Weight (dry) (kg)	N/A (pre filled)
Water content (kg)	N/A

DIMENSIONAL MEASUREMENTS

Measurement Parameter	Measured value (mm)	Manufacturer's stated value (mm)	EN 442-2 dimensional tolerance (mm or %)	Pass / Fail
Overall height	800			
Overall depth	30.5			
Overall length	500		See comment	
Convector height	None			
Convector depth	None			

Number of columns per panel	17 Horizontal tubes (12, 5)
Distance installed from the wall (mm)	50
Distance between centres (mm)	N/A
Panel thickness (mm)	N/A Pipe dia 25.0
Convector overall length (mm)	None
Convector thickness (mm)	None
Spot weld horizontal pitch (mm)	None
Additional information	Power consumption 220 Watts

Comment: Not required for audit tests.

TEST ENGINEER	P.Stonard

TEST RECORD SHEET TP21/2 : PRODUCT INFORMATION

BSRIA test reference number	61548A4PS
Client	Prestige radiators ltd
Manufacturer	Prestige radiators ltd
Product reference number	P1200500CS
Product style	Towel rail (electric)
Material of construction	Steel, chrome plated
Date of receipt	19/02/19
Product or packaging markings	Type, manufacturer
Test start date	21/03/19
Weight (dry) (kg)	N/A (pre filled)
Water content (kg)	N/A

DIMENSIONAL MEASUREMENTS

Measurement Parameter	Measured value (mm)	Manufacturer's stated value (mm)	EN 442-2 dimensional tolerance (mm or %)	Pass / Fail
Overall height	1200			
Overall depth	30.3			
Overall length	500		See comment	
Convector height	None			
Convector depth	None			

Number of columns per panel	22 horizontal tubes (13,5,4)
Distance installed from the wall (mm)	50
Distance between centres (mm)	N/A
Panel thickness (mm)	N/A tube dia 25.0
Convector overall length (mm)	None
Convector thickness (mm)	None
Spot weld horizontal pitch (mm)	N/A tube pitch 15.0
Additional information	Power consumption 336 Watts

Comment: not required for audit tests

TEST ENGINEER	P.Stonard

TEST RECORD SHEET TP21/2 : PRODUCT INFORMATION

BSRIA test reference number	61548A3PS
Client	Prestige radiators ltd
Manufacturer	Prestige radiators ltd
Product reference number	P1400500CS
Product style	Towel rail (electric)
Material of construction	Steel, chrome plated
Date of receipt	24/01/19
Product or packaging markings	Type, manufacturer
Test start date	28/01/19
Weight (dry) (kg)	N/A (pre filled)
Water content (kg)	N/A

DIMENSIONAL MEASUREMENTS

Measurement Parameter	Measured value (mm)	Manufacturer's stated value (mm)	EN 442-2 dimensional tolerance (mm or %)	Pass / Fail
Overall height	1400			
Overall depth	31			
Overall length	500		See comment	
Convector height	None			
Convector depth	None			

Number of columns per panel	28 horizontal tubes (13,7,4,4)
Distance installed from the wall (mm)	50
Distance between centres (mm)	N/A
Panel thickness (mm)	N/A tube dia 25.1
Convector overall length (mm)	None
Convector thickness (mm)	None
Spot weld horizontal pitch (mm)	N/A tube pitch 15.9
Additional information	Power consumption 441 Watts

Comment: Not required for audit tests

TEST ENGINEER	P.Stonard

TEST RECORD SHEET TP21/2 : PRODUCT INFORMATION

BSRIA test reference number	61548A5PS
Client	Prestige radiators ltd
Manufacturer	Prestige radiators ltd
Product reference number	P1600500SC
Product style	Towel rail (electric)
Material of construction	Steel, chrome plated
Date of receipt	19/02/19
Product or packaging markings	Type, manufacturer
Test start date	21/02/19
Weight (dry) (kg)	N/A (pre filled)
Water content (kg)	N/A

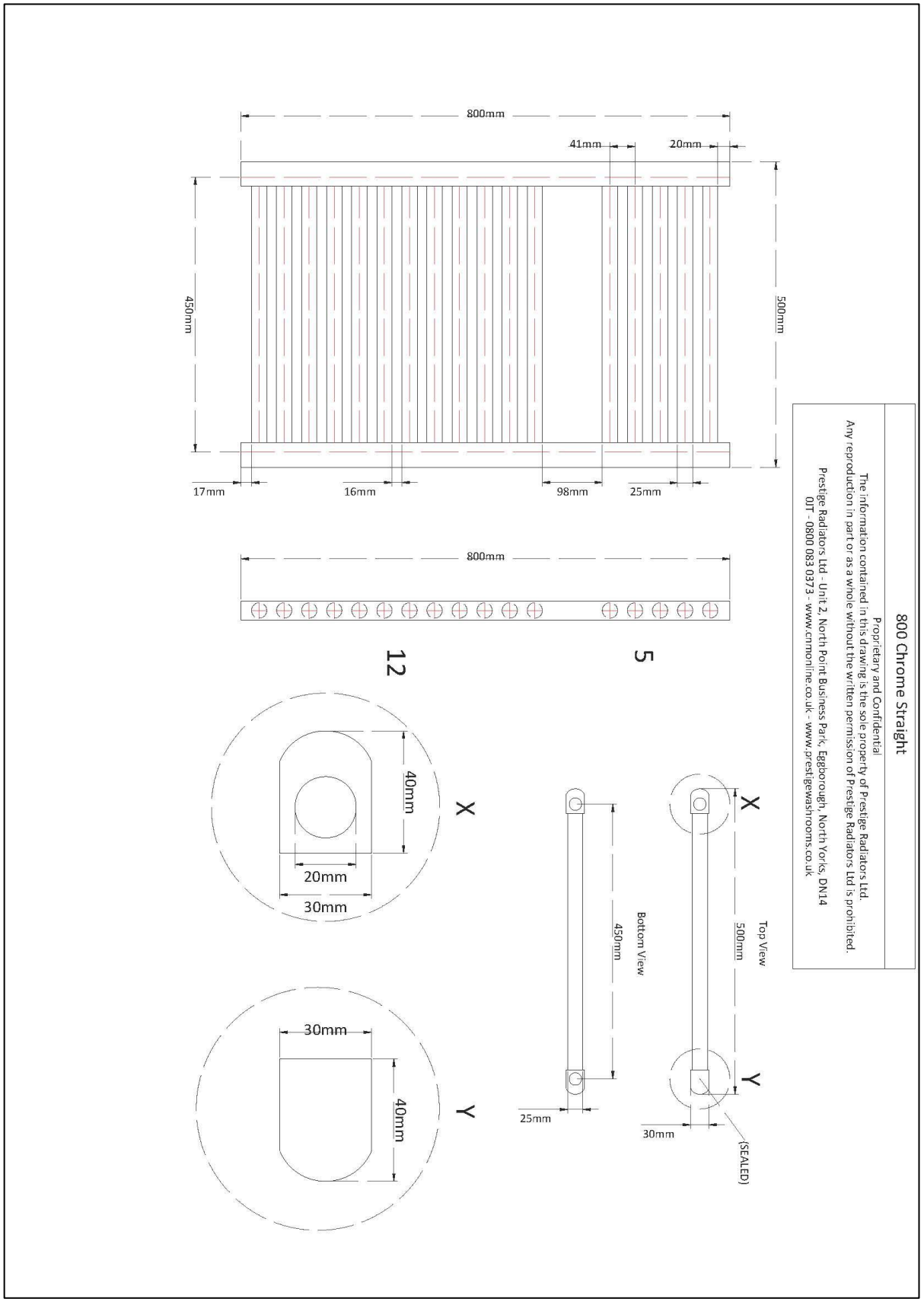
DIMENSIONAL MEASUREMENTS

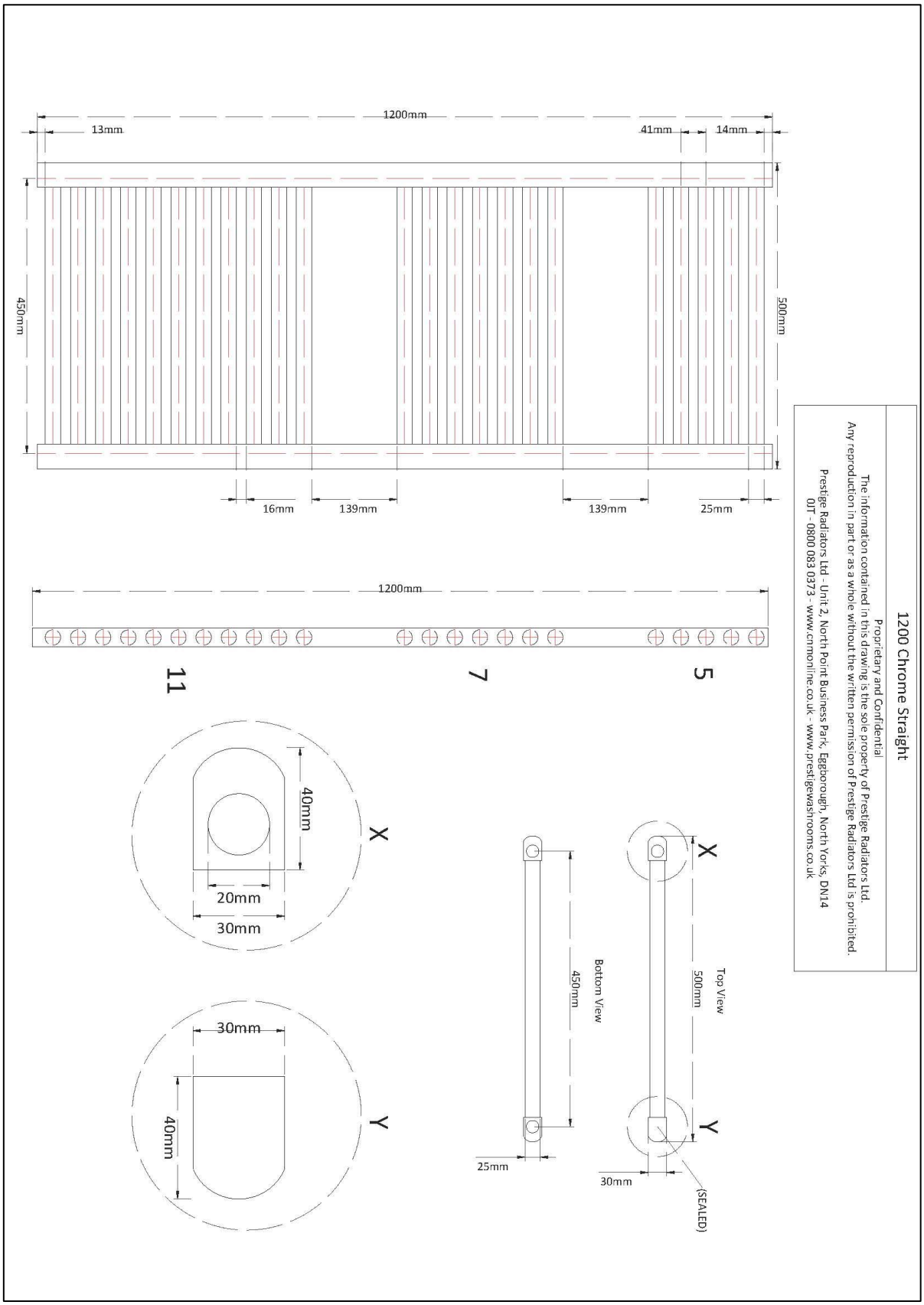
Measurement Parameter	Measured value (mm)	Manufacturer's stated value (mm)	EN 442-2 dimensional tolerance (mm or %)	Pass / Fail
Overall height	1600			
Overall depth	30			
Overall length	500		See comments	
Convector height	None			
Convector depth	None			

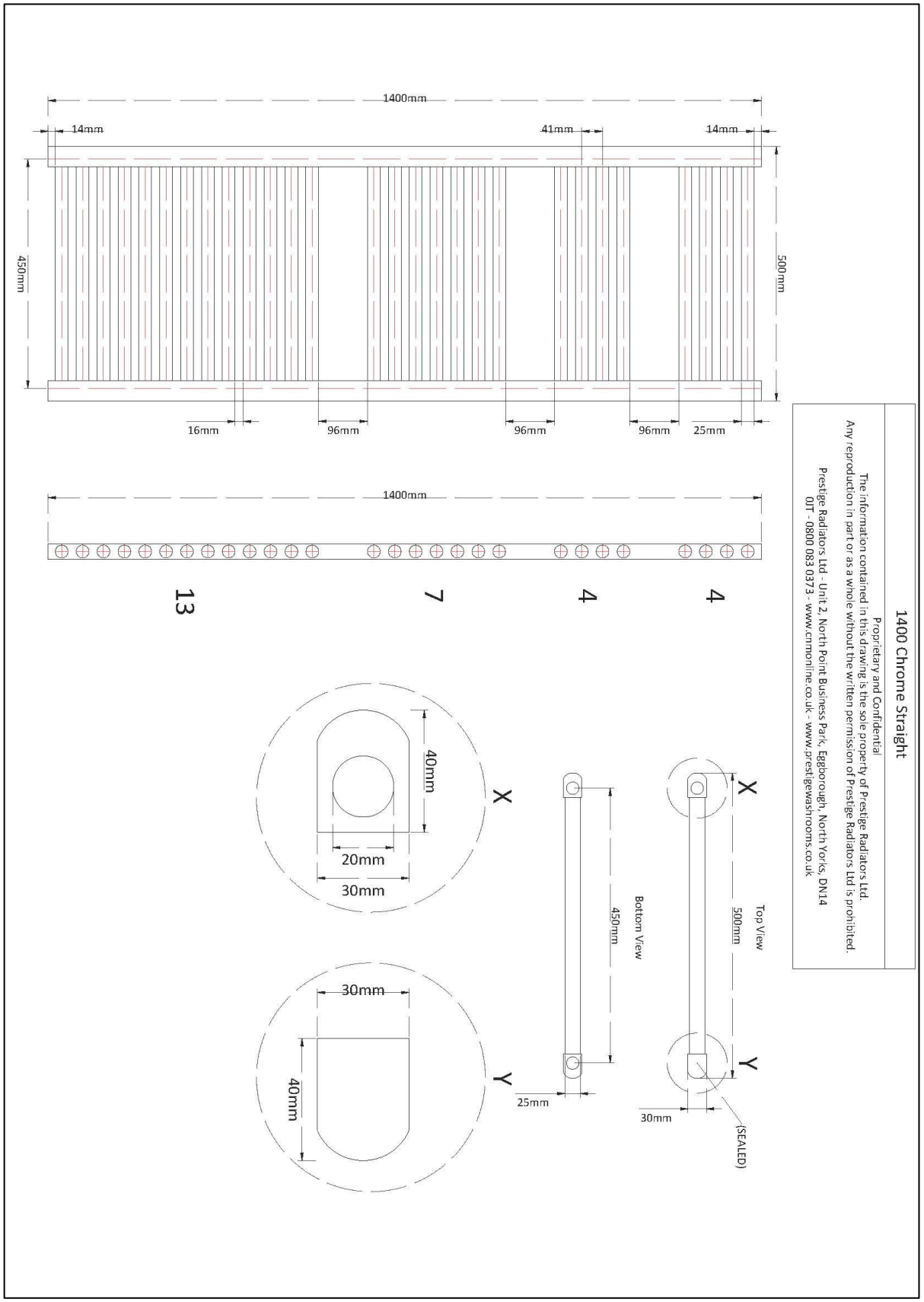
Number of columns per panel	32 horizontal tubes (13,7,6,6)
Distance installed from the wall (mm)	50
Distance between centres (mm)	N/A
Panel thickness (mm)	N/A tube dia 25.2
Convector overall length (mm)	None
Convector thickness (mm)	None
Spot weld horizontal pitch (mm)	N/A tube pitch 15.0
Additional information	Power consumption 663 Watts

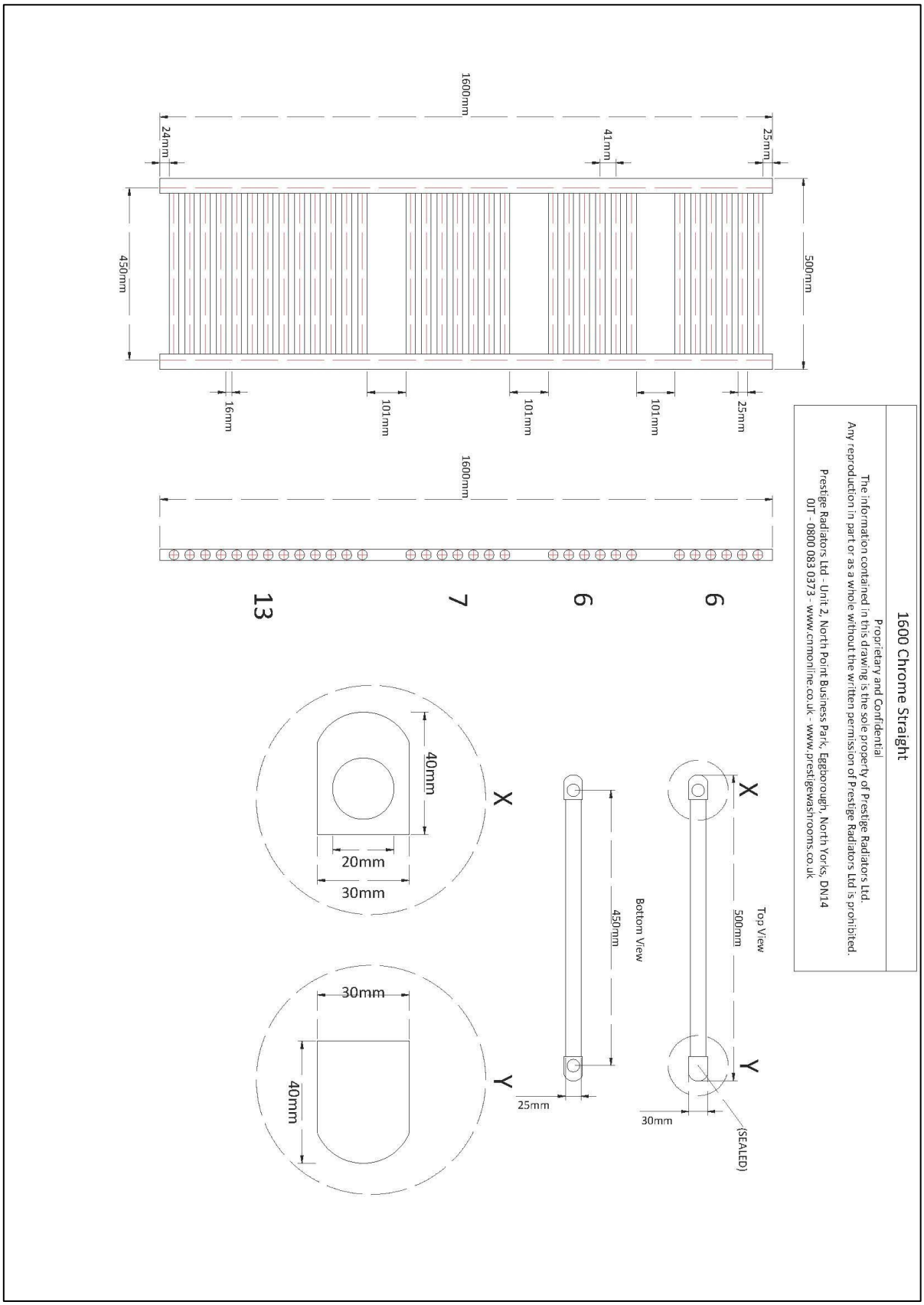
Comment: Not required for audit tests.

TEST ENGINEER	P.Stonard


800mm
41mm
20mm
450mm
500mm
17mm
16mm
98mm
25mm
800mm
12
5
40mm
X
20mm
30mm
30mm
40mm
Y
Bottom View
450mm
25mm
X
Top View
500mm
Y
30mm
(SEALED)
800 Chrome Straight
Proprietary and Confidential
The information contained in this drawing is the sole property of Prestige Radiators Ltd.
Any reproduction in part or as a whole without the written permission of Prestige Radiators Ltd is prohibited.
Prestige Radiators Ltd - Unit 2, North Point Business Park, Eggborough, North Yorks, DN14
0JT - 0800 083 0373 - www.cnmonline.co.uk - www.prestigewashrooms.co.uk


1200mm
13mm
41mm
14mm
450mm
500mm
16mm
139mm
139mm
25mm
1200mm
11
7
5
40mm
20mm
30mm
X
30mm
40mm
Y
Bottom View
450mm
25mm
X
Top View
500mm
Y
30mm
(SEALED)
1200 Chrome Straight
Proprietary and Confidential
The information contained in this drawing is the sole property of Prestige Radiators Ltd.
Any reproduction in part or as a whole without the written permission of Prestige Radiators Ltd is prohibited.
Prestige Radiators Ltd - Unit 2, North Point Business Park, Eggborough, North Yorks, DN14
0JT - 0800 083 0373 - www.cnmonline.co.uk - www.prestigewashrooms.co.uk


1400mm
14mm
41mm
14mm
450mm
500mm
16mm
96mm
96mm
96mm
25mm
1400mm
13
7
4
4
40mm
20mm
30mm
X
30mm
40mm
Y
Bottom View
450mm
25mm
X
Top View
500mm
Y
30mm
(SEALED)
1400 Chrome Straight
Proprietary and Confidential
The information contained in this drawing is the sole property of Prestige Radiators Ltd.
Any reproduction in part or as a whole without the written permission of Prestige Radiators Ltd is prohibited.
Prestige Radiators Ltd - Unit 2, North Point Business Park, Eggborough, North Yorks, DN14
0JT - 0800 083 0373 - www.cnmonline.co.uk - www.prestigewashrooms.co.uk


1600 Chrome Straight
Proprietary and Confidential
The information contained in this drawing is the sole property of Prestige Radiators Ltd.
Any reproduction in part or as a whole without the written permission of Prestige Radiators Ltd is prohibited.
Prestige Radiators Ltd - Unit 2, North Point Business Park, Eggborough, North Yorks, DN14
0IT - 0800 083 0373 - www.cnmonline.co.uk - www.prestigewashrooms.co.uk
1600mm
24mm
41mm
25mm
450mm
500mm
16mm
101mm
101mm
101mm
25mm
1600mm
13
7
6
6
40mm
20mm
30mm
X
30mm
40mm
Y
Bottom View
450mm
25mm
Top View
500mm
X
Y
30mm
(SEALED)

APPENDIX B: THERMOCOUPLE POSITIONS

Thermocouple positions

Figure 1 P800500CS

Figure 2 P1200500CS

Figure 3 P1400500CS

Figure 4 P1600500CS