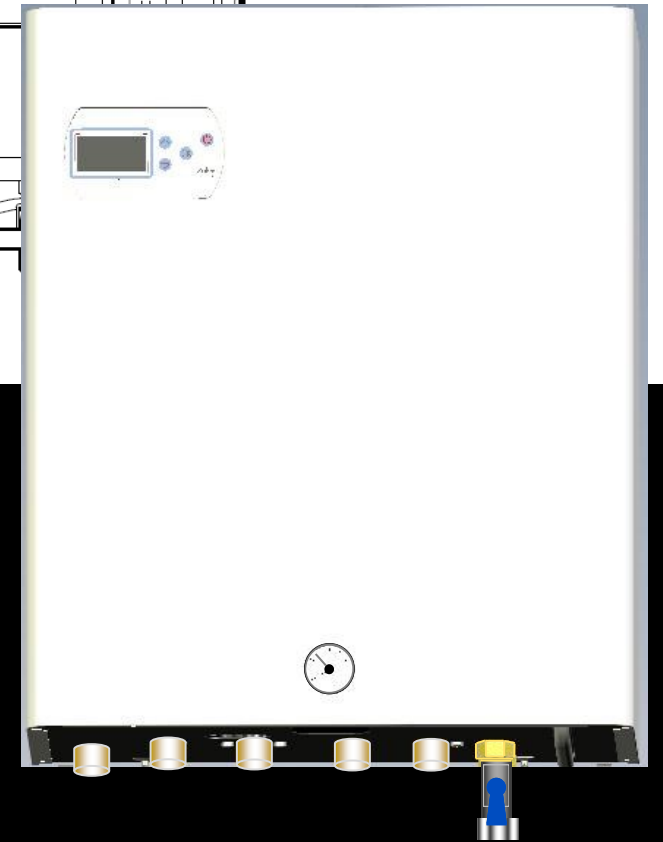
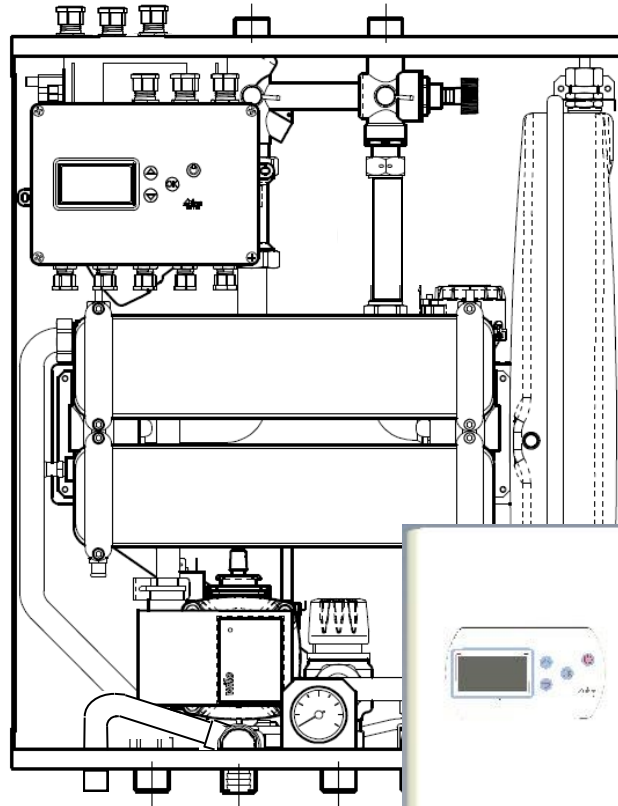


inta



Performance

HIPER HIU

UK patent applied for: 1420204.8

PROVEN PERFORMANCE.

The HIPER HIU has been independently tested and proved conforms to:

BS EN13203-01, which is the British Standard for; *'Gas fired domestic appliances producing hot water – Appliances not exceeding 70 kW heat input and 300 lt water storage capacity – Part 1, assessment of performance of hot water deliveries'*,

The HIU was tested, awarded 2 Stars, and measured on delivery of ;
DHW inlet temperature = 10°C;
DHW outlet temperature = 55°C;
DH inlet temperature = 70°C.

Abbreviations used;

DH	District Heating
DHW	Domestic Hot Water or HW
CH	Central Heating

Independently Tested



- Performance Curves
- Hot Water performance to BSEN13203-01 (also documents DH return temperatures)
- Pressure drops
- CH Performance

Models used for BS EN 13203-01 tests

HIPER Xi 45
HIPER Xi 60

**Hiper HIU tests meet the BS EN 13203-1
Stands with overall score of 28
points which is an HIU overall
rating of** ★★ –

Review of the 6 test results from page 5.

Patent Application

PATENT APPLICATION NUMBER 1420204.8

Classification ratings

(as recognised meeting BS N 132-03-01 hot water delivery performance



Maximum 40 or more score
Very good 28 to 39 score
Pass 14 to 27 score
No pass

Hiper Heat Interface Unit - Performance



DHW Performance to BS EN 13203.1 Standard

Test 1 - TIME

How long in SECONDS (T_m) for the DHW temperature to achieve TARGET (90% of the of temperature increase of 45°C required to meet the DHW set temperature of 55°C .)

Set temperature for DHWS is 55°C

Incoming cold mains temperature 10°C

DH Flow temperature set at 70°C

Test Flow rate (as required by the standard) 7 Ltrs/min.

Note - Test is run from **cold start! (NO pre-heat)**

Results; Rating
HIPER Xi45 average at 14 seconds ★★-

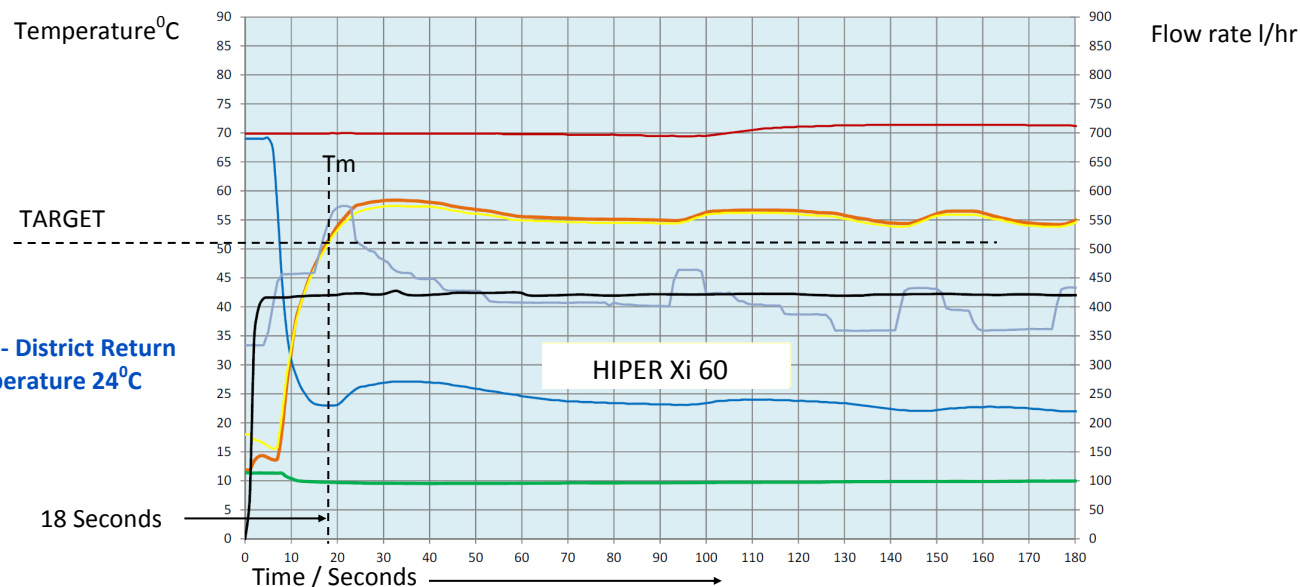
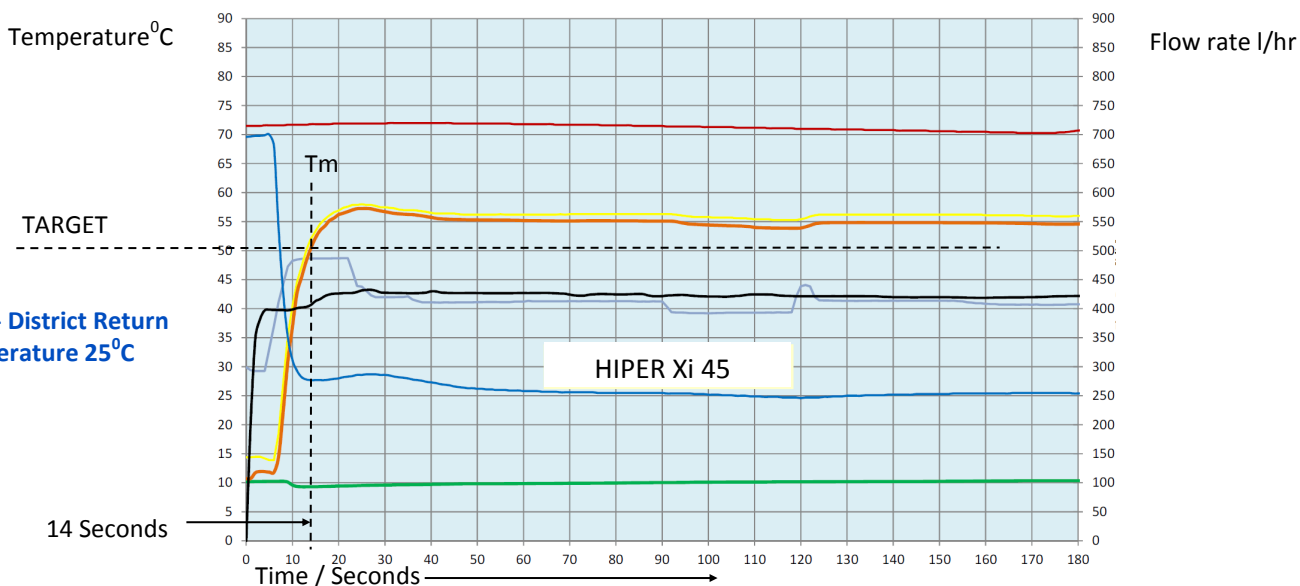
HIPER Xi60 average at 18 seconds ★★-

Legend - Temperature

- RED line District Heating (DH) FLOW
- YELLOW line Hot Water supply (DHW) before TMV
- ORANGE line Hot Water supply (DHW) after TMV
- BLUE line District Heating (DH) RETURN

Legend - Flow Rate

- BLACK line Hot Water supply (DHW) Flow rate
- LIGHT BLUE District Heating (DH) Flow rate



Hiper Heat Interface Unit - Performance



DHW Performance to BS EN 13203.1 Standard

Test 2 - STABILITY of DHW temperature (when the DHW demand is increased)

Run hot water as per BS standard rate for 2 minutes then increase the HW demand by 100 l/hr for 2 minutes after > 1 minute.

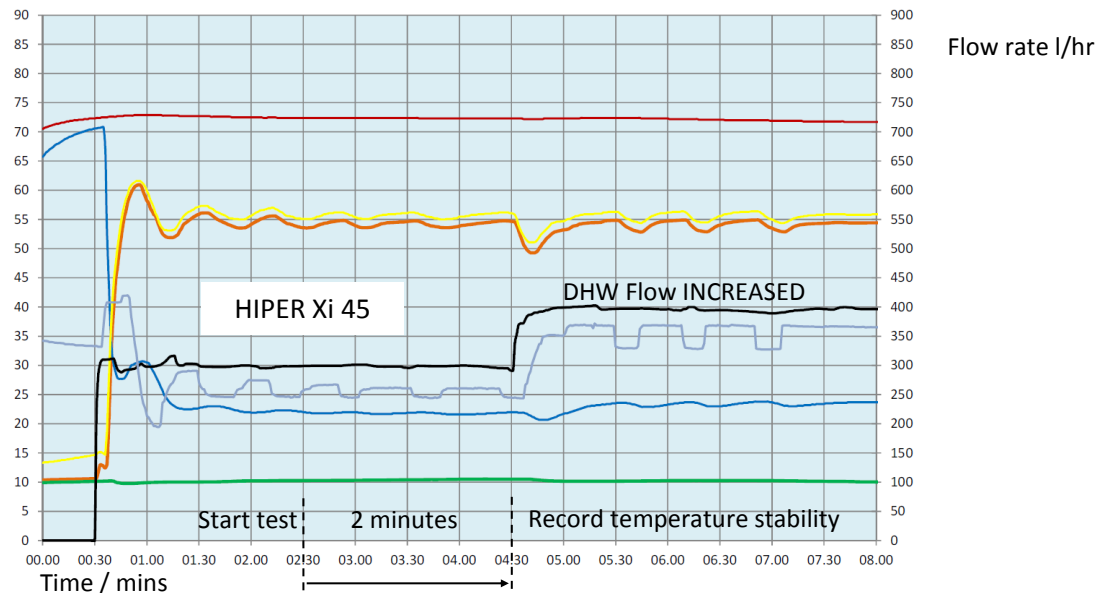
Set temperature for DHWS is 55°C
Incoming cold mains temperature 10°C
DH Flow temperature set at 70°C
Test Flow rate (as required by the standard) 7 Ltrs/min.
Note - Test is run from **cold start! (NO pre-heat)**

Results; Rating
HIPER Xi45 average 54.2°C ★★☆☆

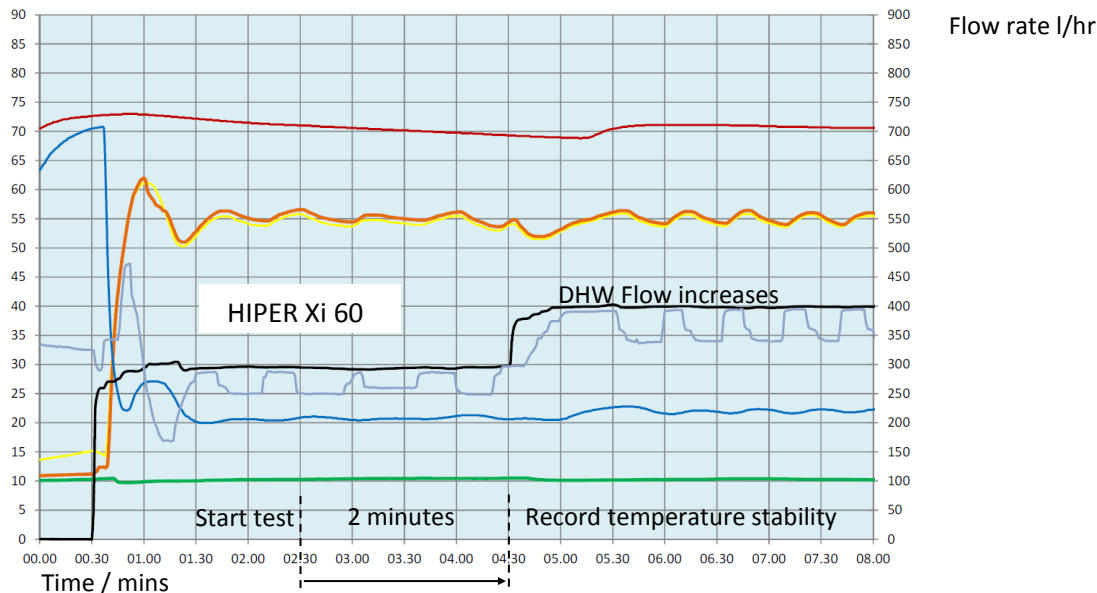
HIPER Xi60 average 55.1 ★★☆☆

Both units with less or = 2C - maximum stability category.

Temperature °C
Note - District Return Temperature 23.1°C



Temperature °C
Note - District Return Temperature 21.4°C



Legend - Temperature

- RED line District Heating (DH) FLOW
- YELLOW line Hot Water supply (DHW) before TMV
- ORANGE line Hot Water supply (DHW) after TMV
- BLUE line District Heating (DH) RETURN

Legend - Flow Rate

- BLACK line Hot Water supply (DHW) Flow rate
- LIGHT BLUE District Heating (DH) Flow rate

Hiper Heat Interface Unit - Performance



DHW Performance to BS EN 13203.1 Standard

Test 3 Part 1 -

STABILITY of DHW temperature

- at a **CONSTANT FLOW RATE!**

Test 1 at a DHW flow rate of 95% of the standard set rate of 7 l/min to deliver 1,820 kWh of hot water which determines the time duration of the Test.

Set temperature for DHWS is 55°C

Incoming cold mains temperature 10°C

Note - Test is run from **cold start! (NO pre-heat)**

Results;

HIPER Xi45 average temperature stability: 2.49° +/- (which is only 0.5° off of max score!)

Rating

☆☆-

HIPER Xi60 average temperature stability: 3.89° +/- recorded, meets the standard.

☆--

1,820 kWh delivered in 5.2 minutes.

Legend - Temperature

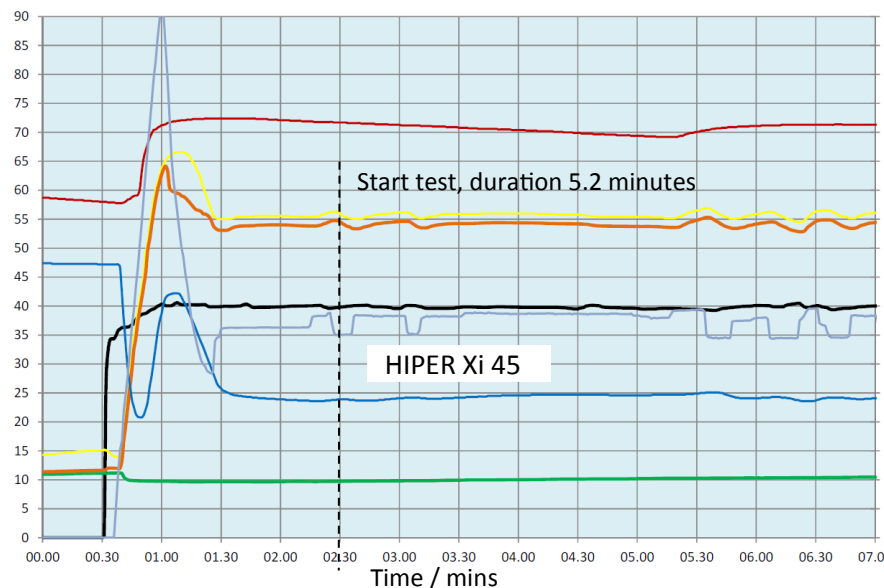
- RED line District Heating (DH) FLOW
- YELLOW line Hot Water supply (DHW) before TMV
- ORANGE line Hot Water supply (DHW) after TMV
- BLUE line District Heating (DH) RETURN

Legend - Flow Rate

- BLACK line Hot Water supply (DHW) Flow rate
- LIGHT BLUE District Heating (DH) Flow rate

Temperature°C

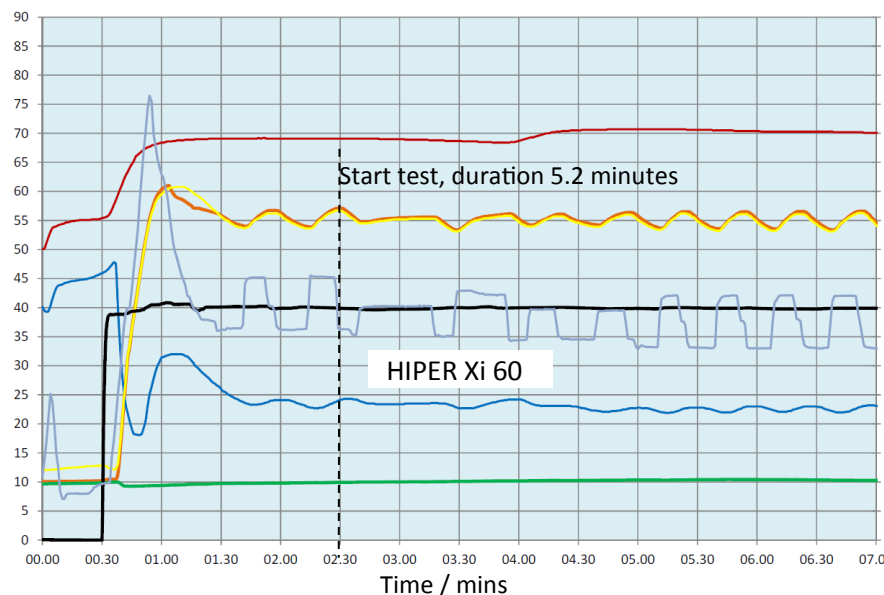
Note - District Return Temperature 25.5°C



Flow rate l/hr

Temperature°C

Note - District Return Temperature 21.4°C



Flow rate l/hr

Hiper Heat Interface Unit - Performance



DHW Performance to BS EN 13203.1 Standard

Test 3 Part 2 -

STABILITY of DHW temperature

- at a CONSTANT FLOW RATE!

Test 2 the DHW flow rate changed to 5 l/min and measured to deliver 1,820 kWh of hot water which determines the time duration of the Test.

Set temperature for DHWS is 55°C
Incoming cold mains temperature 10°C
District Flow is 70°C

Results;

HIPER Xi45 average temperature stability:
2.23° +/- (just 0.24° off of max score!)

Rating
☆☆-

HIPER Xi60 average temperature stability:
3.21° +/- recorded, meets the standard.

☆☆-

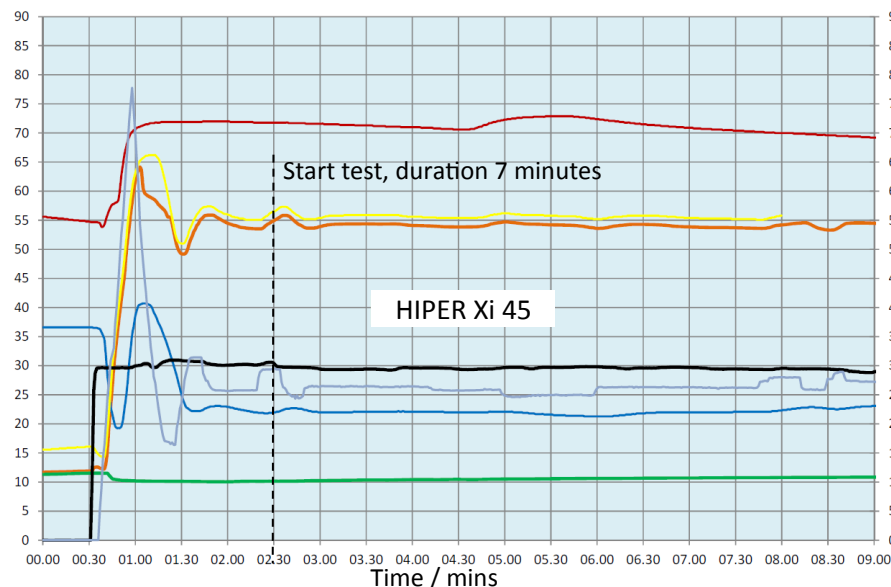
Legend - Temperature

- RED line District Heating (DH) FLOW
- YELLOW line Hot Water supply (DHW) before TMV
- ORANGE line Hot Water supply (DHW) after TMV
- BLUE line District Heating (DH) RETURN

Legend - Flow Rate

- BLACK line Hot Water supply (DHW) Flow rate
- LIGHT BLUE District Heating (DH) Flow rate

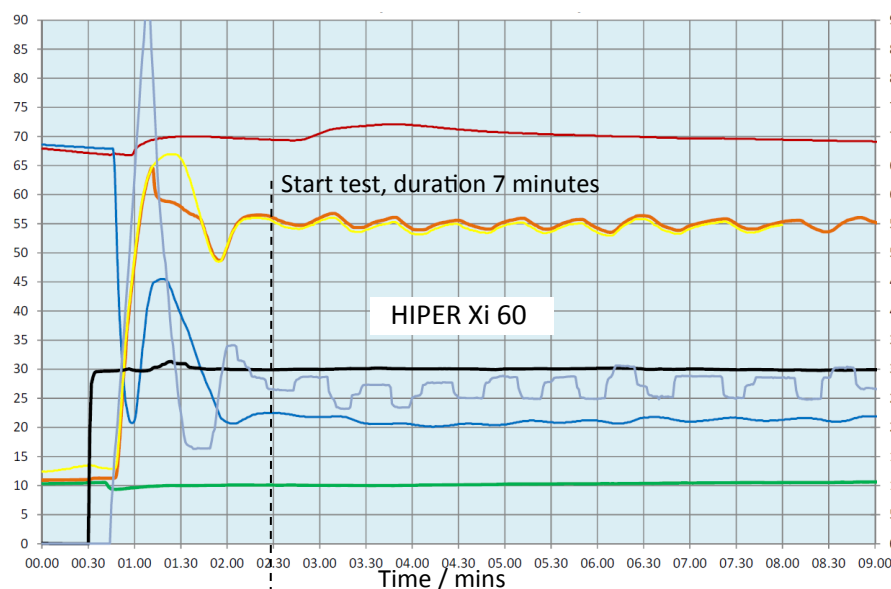
Temperature°C



Flow rate l/hr

Note - District Return Temperature 23.3°C

Temperature°C



Flow rate l/hr

Note - District Return Temperature 22.5°C

Hiper Heat Interface Unit - Performance



DHW Performance to BS EN 13203.1 Standard

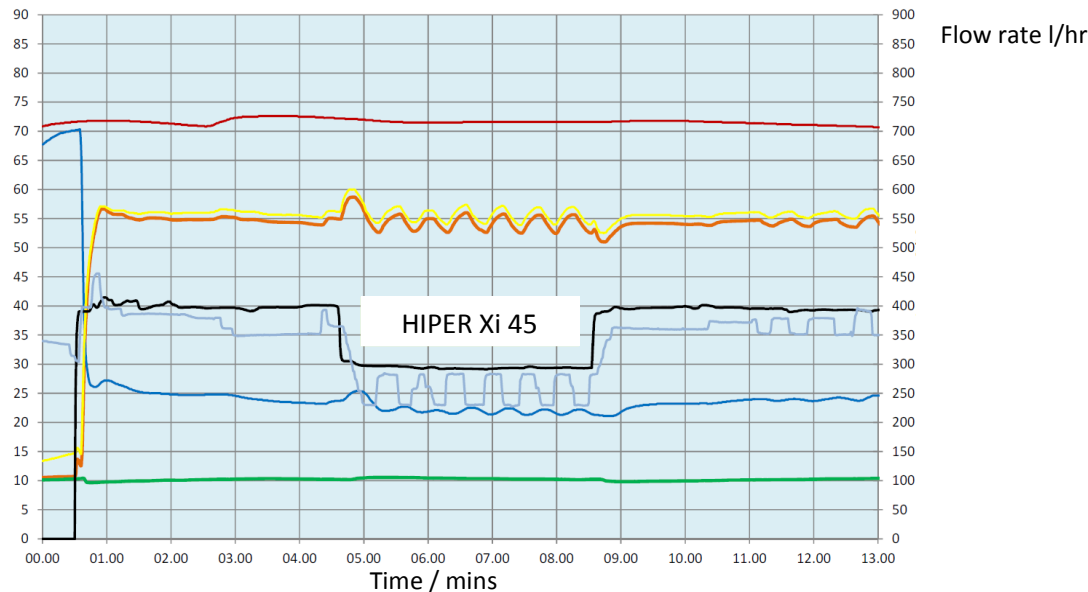
Test 4 - TIME for temperature stabilisation When there is a change in the flow.

The DHW flow is set at 399 l/h for a minimum 2 minutes. Then change to 294 l/h and measure the **TIME** it takes for the HIU to react and maintain a stable temperature of $\pm 5^{\circ}\text{C}$ of the set temperature 55°C . Then reset the DHW flow at 399 l/h, and again measure the time taken to re-stabilise within the ± 5 standard. Incoming cold mains temperature 10°C District Flow is 70°C

Results; Rating
HIPER Xi45 average temperature stability: ★★-
 Test results meet the standard.

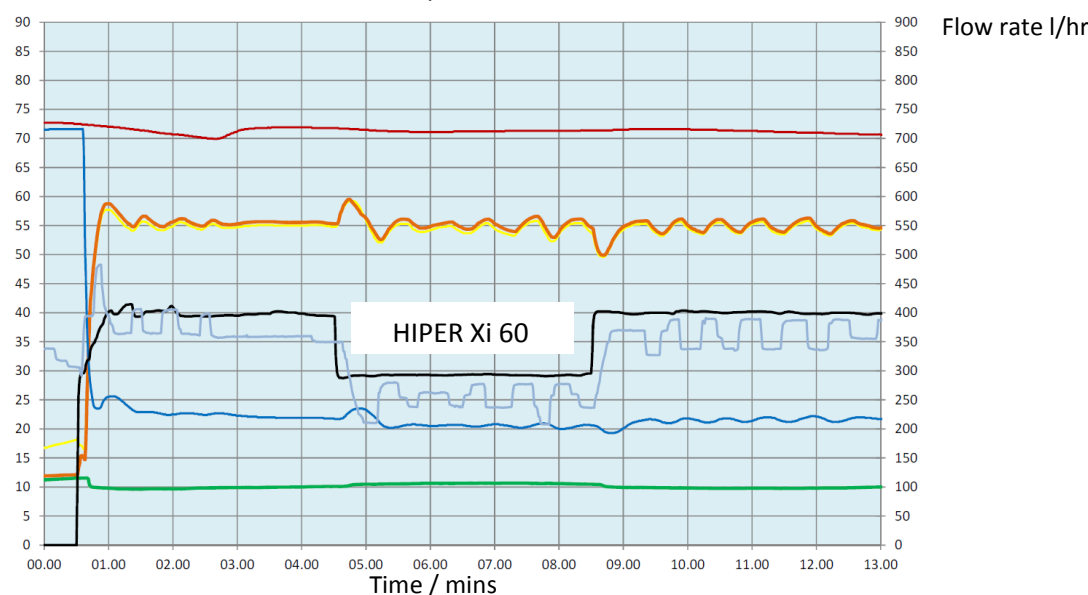
HIPER Xi60 average temperature stability: ★★-
 Test results meet the standard.

Temperature $^{\circ}\text{C}$



Note - District Return Temperature 23.5°C

Temperature $^{\circ}\text{C}$



Note - District Return Temperature 21.9°C

Legend - Temperature

- RED line District Heating (DH) FLOW
- YELLOW line Hot Water supply (DHW) before TMV
- ORANGE line Hot Water supply (DHW) after TMV
- BLUE line District Heating (DH) RETURN

Legend - Flow Rate

- BLACK line Hot Water supply (DHW) Flow rate
- LIGHT BLUE District Heating (DH) Flow rate

Hiper Heat Interface Unit - Performance

DHW Performance to BS EN 13203.1 Standard



Test 5 - Minimum DHW flow TEMPERATURE stability test.

Starting from COLD (10°C) a hot water demand is set at the low flow rate of 4 l/m. the HIU. Performance is measured over 7 minutes for stability within +/- 5°C. DHW set temperature is 55°C. Incoming cold mains temperature 10°C District Flow is 70°C

Results;
HIPER Xi45 - Performance factor rating

Rating
 ★★ -

Note - District Return Temperature 23.5°C

HIPER Xi60 - Performance factor rating

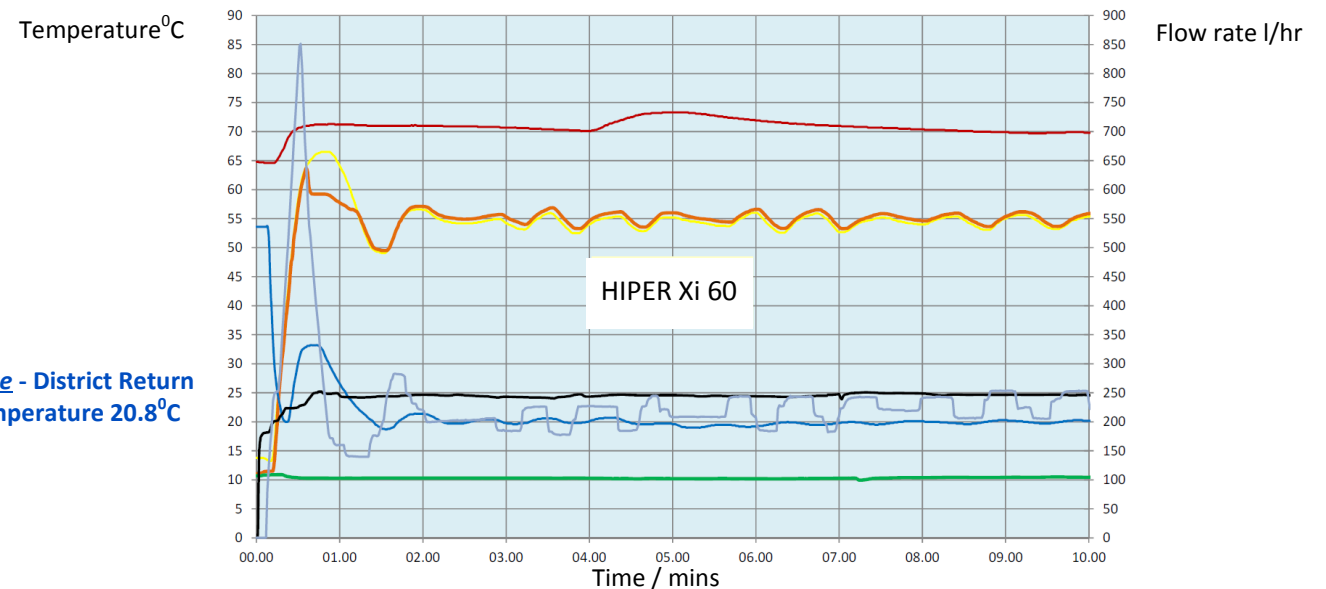
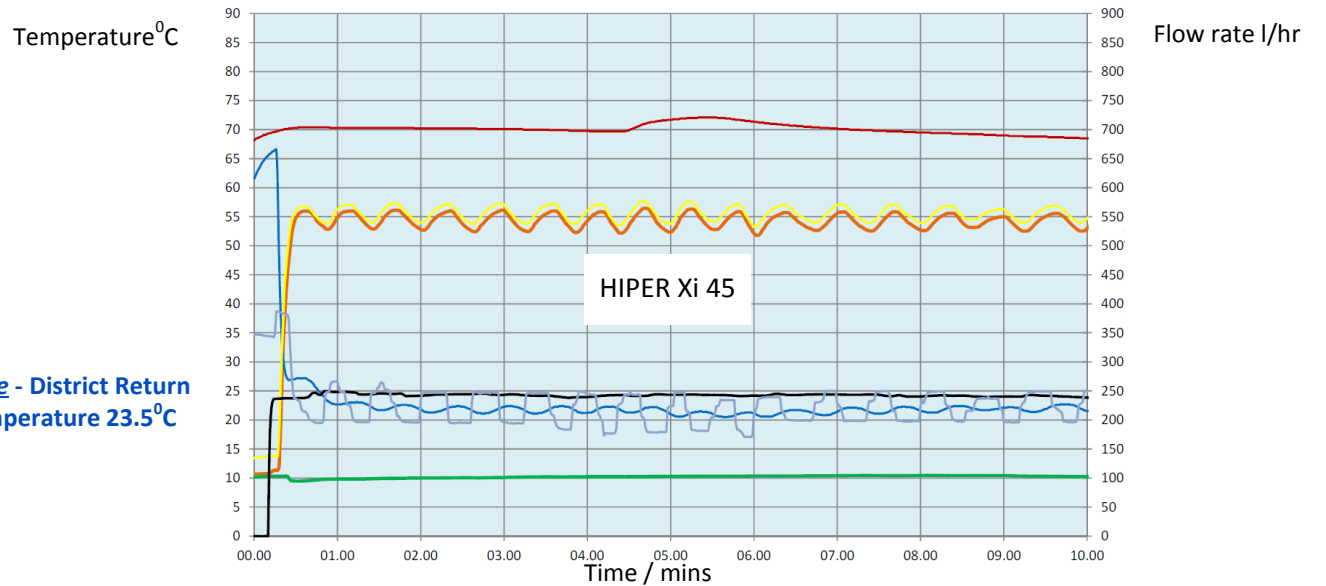
★★ -

Legend - Temperature

- RED line District Heating (DH) FLOW
- YELLOW line Hot Water supply (DHW) before TMV
- ORANGE line Hot Water supply (DHW) after TMV
- BLUE line District Heating (DH) RETURN

Legend - Flow Rate

- BLACK line Hot Water supply (DHW) Flow rate
- LIGHT BLUE District Heating (DH) Flow rate



Note - District Return Temperature 20.8°C

Hiper Heat Interface Unit - Performance



DHW Performance to BS EN 13203.1 Standard

Test 6 - Temperature shock test

A 10 second DHW demand at 7 l/min flow rate is repeated every 10 seconds.

The purpose of the test is to record the 'spike' in temperature as the HIU is forced to act to very rapid demands and shutdowns.

Set temperature for DHWS is 55°C

Incoming cold mains temperature 10°C

DH Flow temperature set at 70°C

Results;

In both units the effect of the Temperature Safety Valve can be seen to come into almost immediate effect, only a small amount over 'overheated water' is allowed out of the unit before the thermostatic valve compensates, then the supply stabilises within seconds as the PICV responds.

HIPER Xi45 - Performance factor rating

Rating

☆☆-

HIPER Xi60 - Performance factor rating

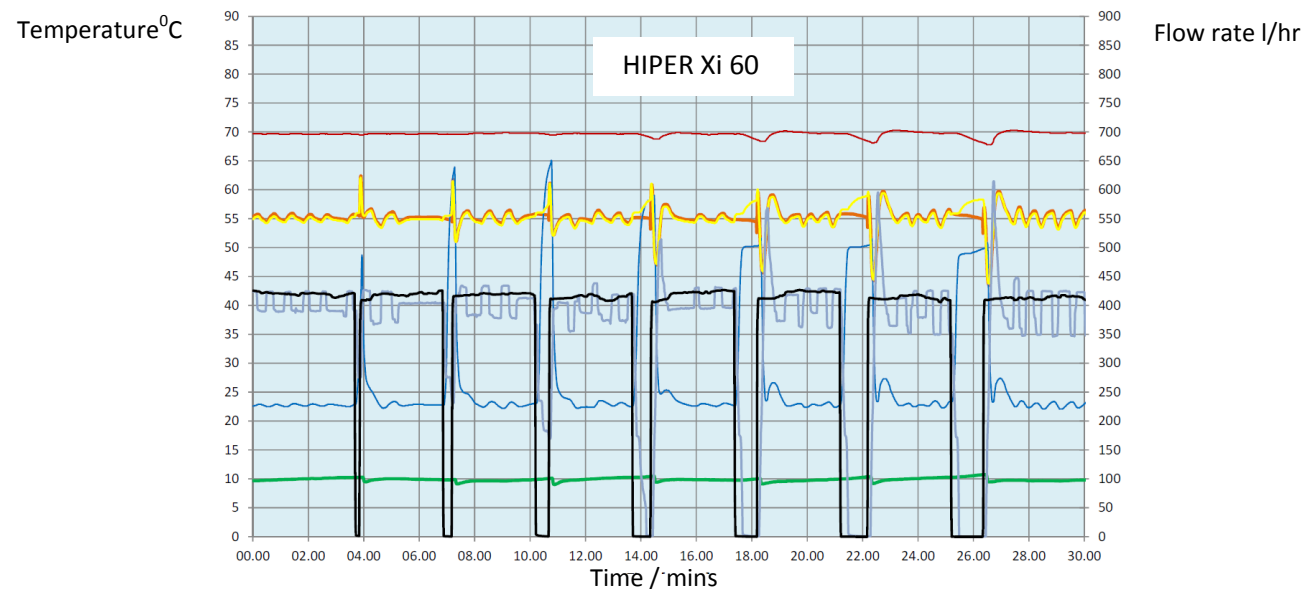
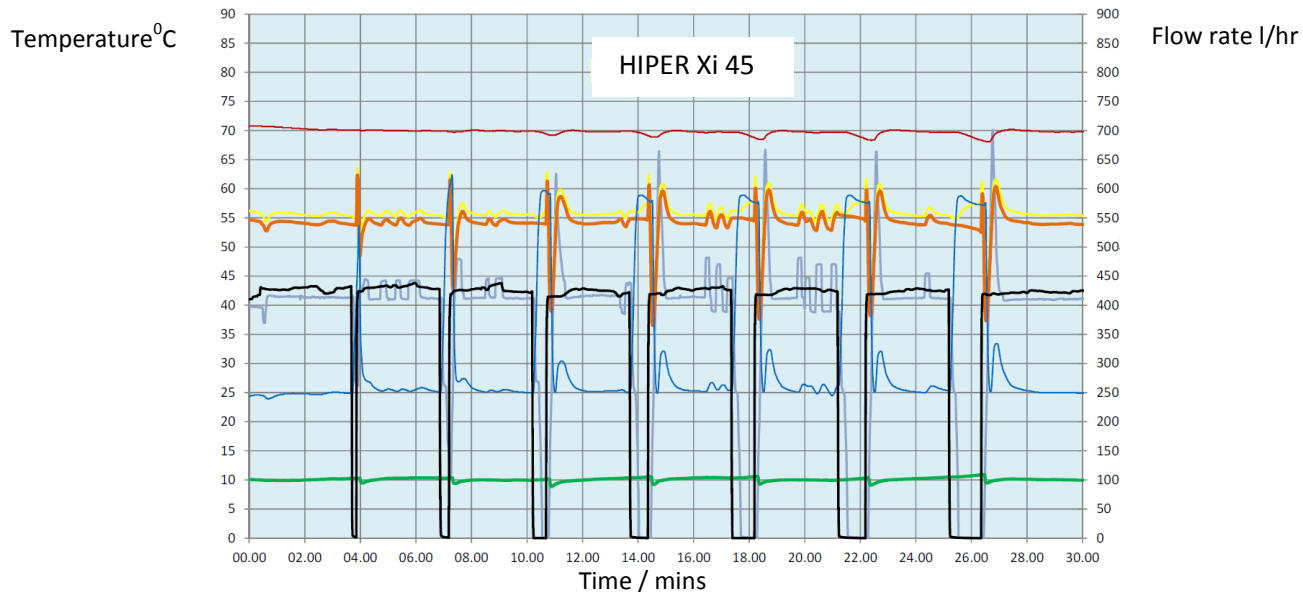
☆☆-

Legend - Temperature

- RED line District Heating (DH) FLOW
- YELLOW line Hot Water supply (DHW) before TMV
- ORANGE line Hot Water supply (DHW) after TMV
- BLUE line District Heating (DH) RETURN

Legend - Flow Rate

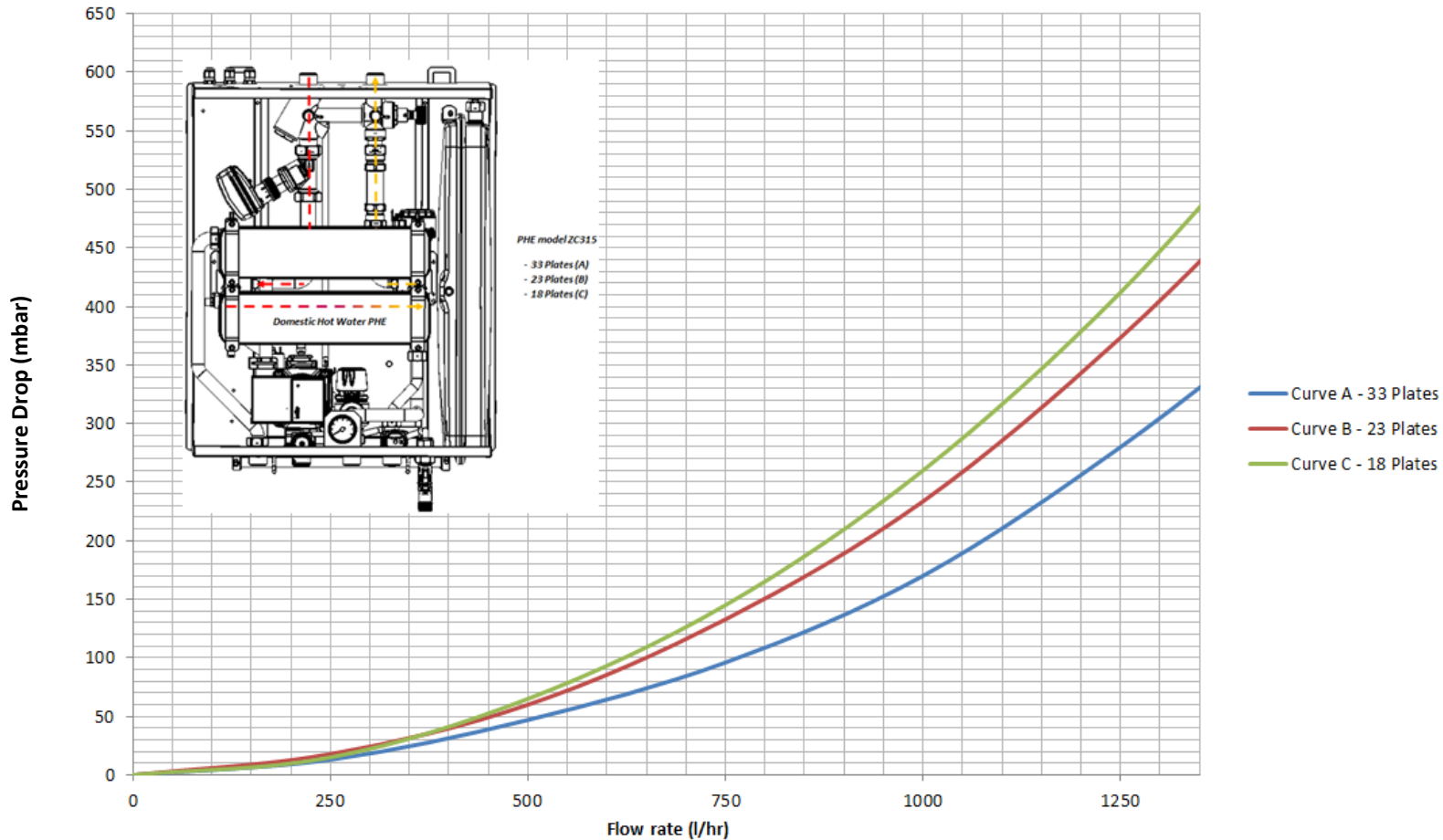
- BLACK line Hot Water supply (DHW) Flow rate
- LIGHT BLUE District Heating (DH) Flow rate



Hiper Heat Interface Unit - Performance

Pressure drop DH Primary Circuit

DH Pressure Drop (mbar)



Legend -

- BLUE line 18 Plate PHE for Central Heating - Hiper models Xi45, Xi60, Xi60L and Xi70
- RED line 33 Plate PHE (DHW side) - Hiper models Xi60 and Xi70
- GREEN line 23 Plate PHE (DHW side) - Hiper model Xi45

Performance Curves

Hiper Xi45

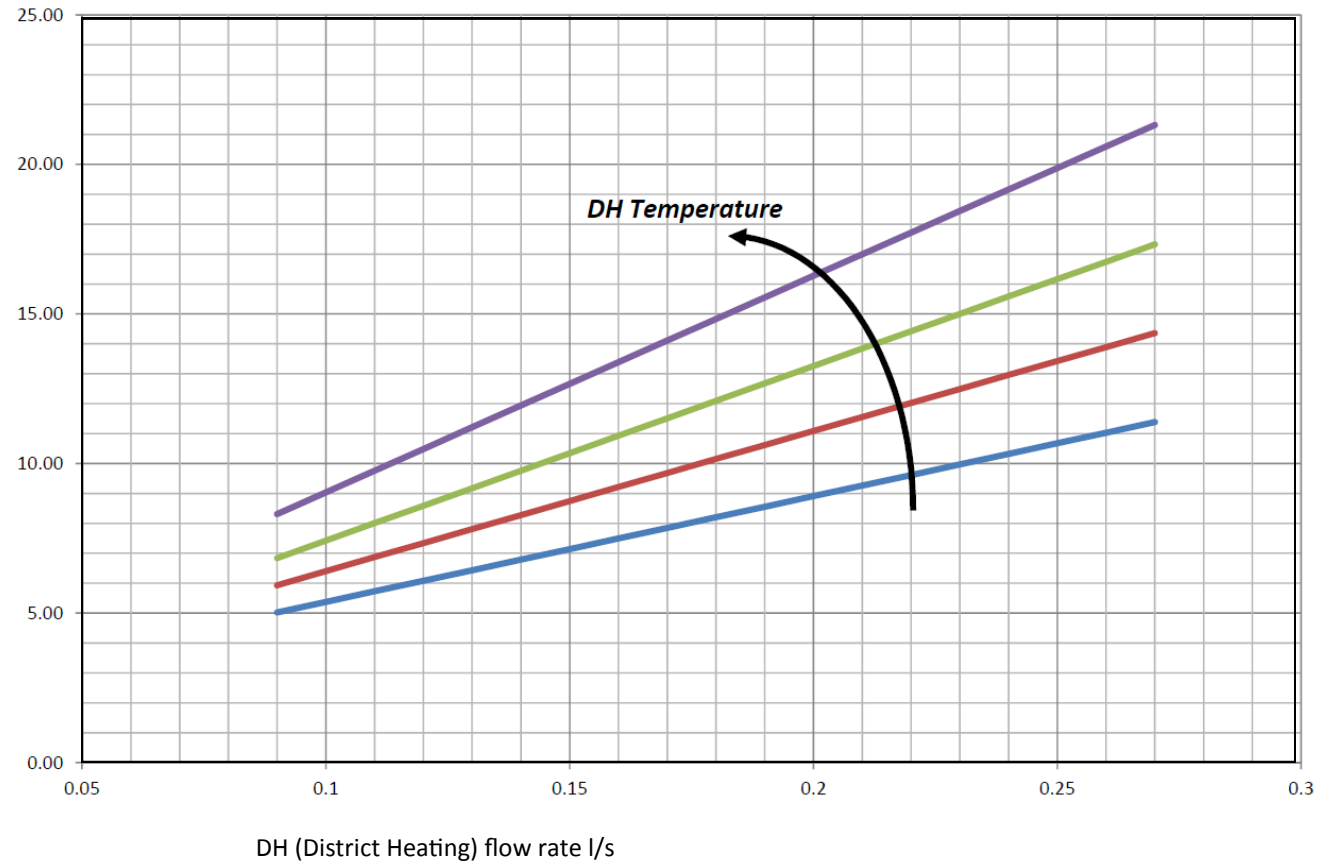
DHW production
Zilmet ZC315 plate heat exchanger
Number of plates - 23

DHW set temperature 55°C
Incoming cold mains temperature 10°C

Tests run over 4 x DH supply temperatures;

- 65°C DH Flow Temperature
- 70°C DH Flow Temperature
- 75°C DH Flow Temperature
- 85°C DH Flow Temperature

DHW
Flow rate
l/min



Performance Curves

Hiper Xi60

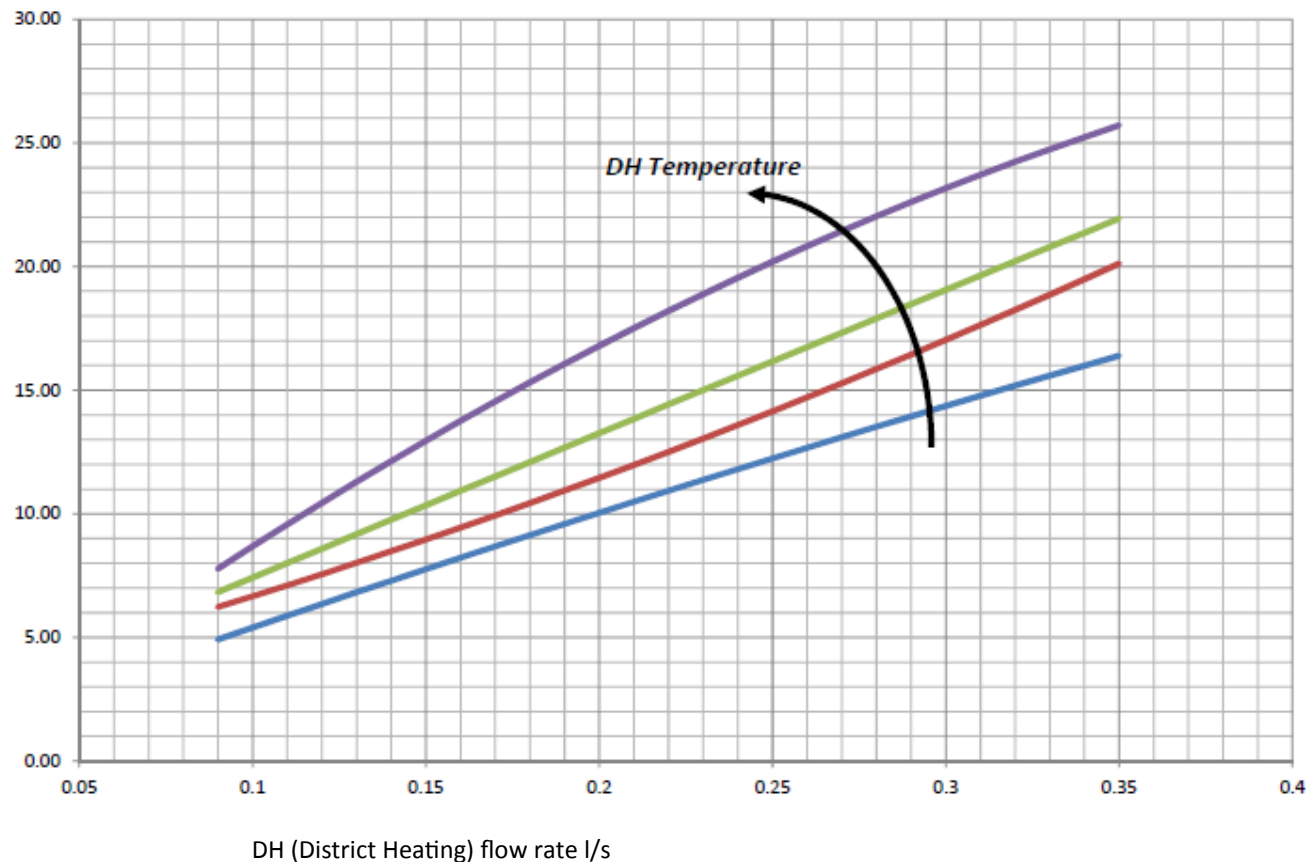
DHW production
Zilmet ZC315 plate heat exchanger
Number of plates - 33

DHW set temperature 55°C
Incoming cold mains temperature 10°C

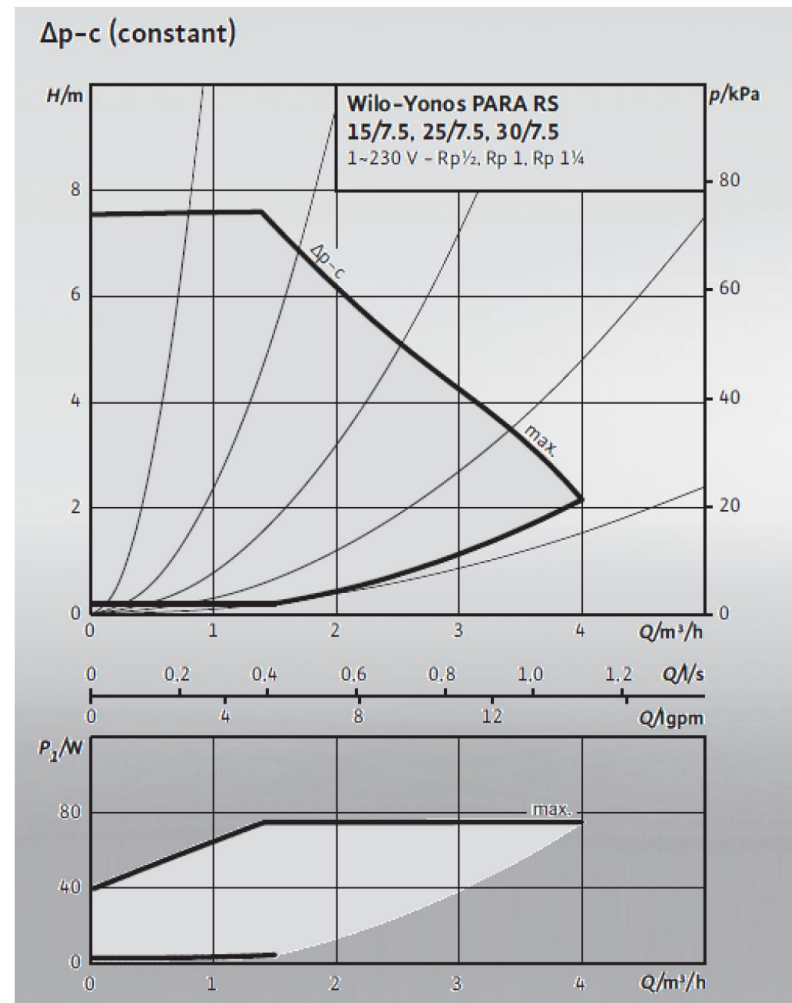
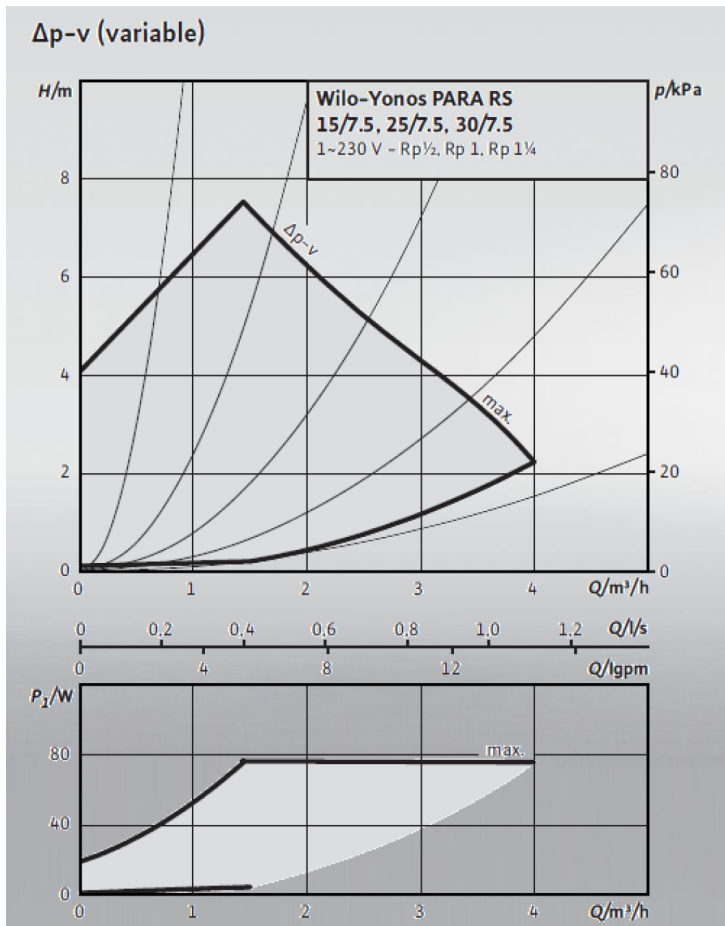
Tests run over 4 x DH supply temperatures;

- 65°C DH Flow Temperature
- 70°C DH Flow Temperature
- 75°C DH Flow Temperature
- 85°C DH Flow Temperature

DHW
Flow rate
l/min

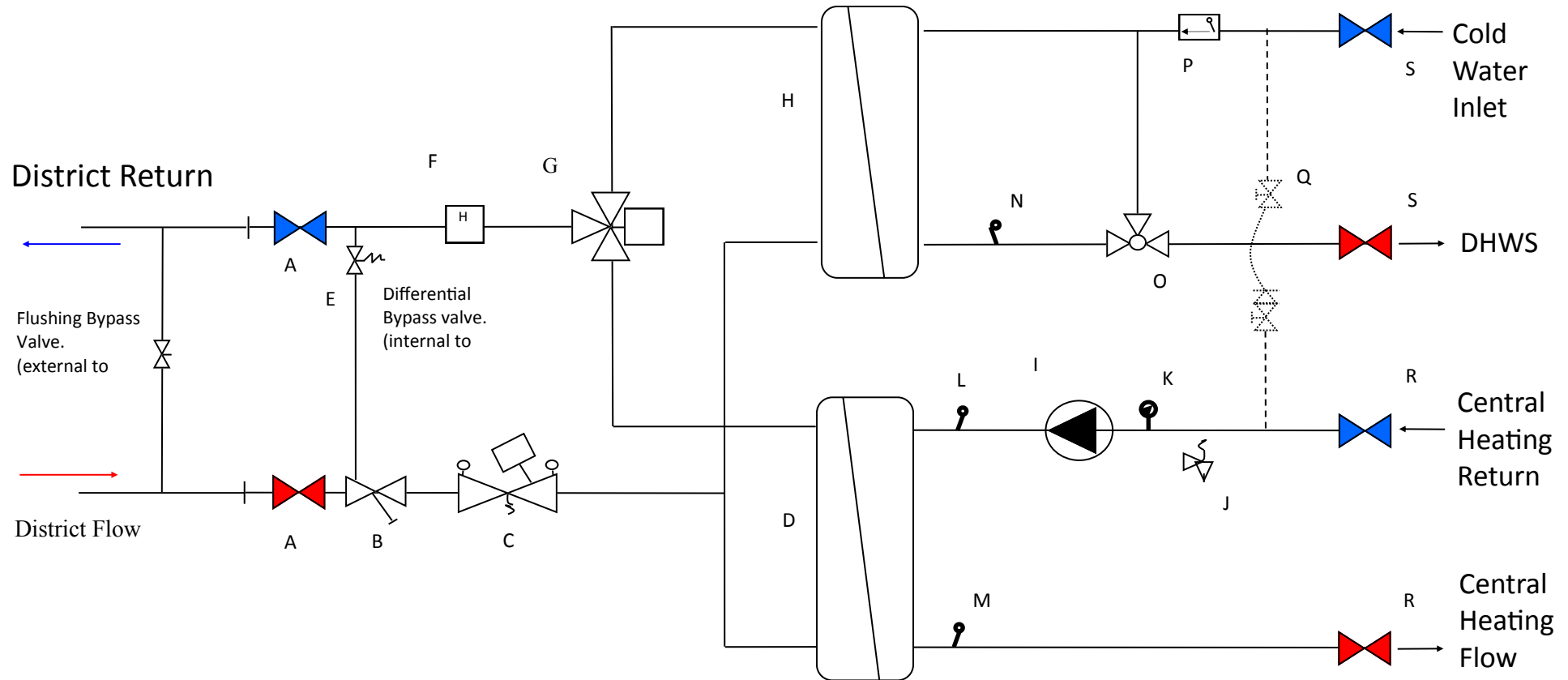


Wilco Yonos Para RS 7.5 RKA - Central Heating Pump, area of operation graphs - variable and constant speed settings

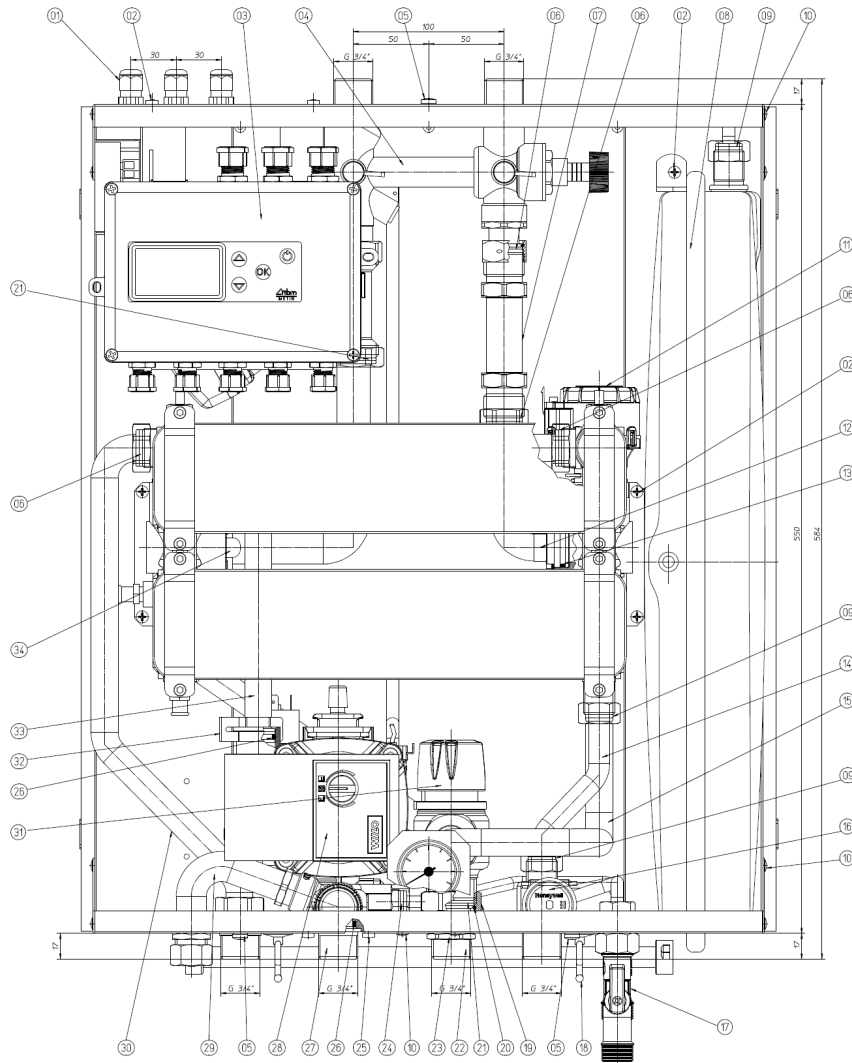


Hiper Heat Interface Unit - Performance

HIU internal scheme



A	District isolation ball valve	G	Diverter Valve	M	PT1000 CH FLOW Temp. Sensor	S	DHW & DCW IVs
B	Strainer 800 micron	H	DHW Heat Exchanger	N	NTC DHW Temperature Sensor	T	
C	PICV	I	WILO RKA PUMP (ERP)	O	Thermostatic Mixing Valve	U	
D	Plate Heat Exchanger HEATING	J	3 bar SRV	P	Flow Sensor	V	
E	Differential Bypass	K	Pressure Gauge	Q	Filling Loop	W	
F	Heat Meter	L	PT1000 CH RETURN Temp. Sensor	R	Central Heating IVs		



Identification numbered components description on request

Other Hiper publications available;

- Hiper General Information
- Hiper Installation Manual
- Hiper Installer Level Parameters
- Hiper User Guide
- Hiper PrePayment Guide
- Hiper Fill and Flush Valve

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