



Non-Technical Summary

Halewood Manufacturing Plant - Environmental Permit Variation

Jaguar Land Rover Limited

Prepared by:

SLR Consulting Limited

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SLR Project No.: 416.064966.00001

29 January 2024

Revision: 1

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1	29 January 2024	Roisin Ellis	Greg Altria	Greg Altria
	Click to enter a date.			
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Basis of Report

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1.0 INTRODUCTION

SLR Consulting Ltd (SLR) has been instructed by Jaguar Land Rover Limited (JLR) to prepare an environmental permit (EP) variation application for the proposed operation of three natural gas boilers at their Halewood Manufacturing Plant, Speke Boulevard, Speke, Liverpool, L24 9BJ hereafter referred to as 'the Site'.

This Non-Technical Summary (NTS) provides a summary of what is being applied for, the regulated facility and outlines the key technical standards and control measures that will be implemented at the Site as a result of the risk assessments.

In addition to this NTS, the EP application comprises the following documents:

- Section 2 - Application Forms (A, C2, C3 and F1);
- Section 3 - Drawings;
- Section 4 - Air Emissions Risk Assessment; and
- Section 5 - Site Condition Report.

1.1 Site Location

The Site is located off Speke Boulevard, between the city of Speke and the town of Halewood, Merseyside within the administrative area of Knowsley Metropolitan Borough Council. The A561 road network runs in a west to east direction, adjacent to the southern site boundary.

The closest statutory designated ecological sites are the Millwood & Alder Wood Local Nature Reserve (LNR) located approximately 404m east and Mersey Estuary Ramsar, Site of Special Scientific Interest (SSSI) and Special Protection Area (SPA) which is located approximately 1.68km to the south of the site.

2.0 APPLICATION OVERVIEW

There are 4 existing La Mont boilers located on the site. They are dual fuel boilers, primarily fuelled on natural gas but with gas oil as an emergency back-up. The La Mont boilers each have a rated thermal input capacity of 28 MWth. Aggregated, these have a thermal input capacity of 114MWth. As each boiler is >15MWth, and aggregated they have a capacity of >50MWth, they are regulated as Large Combustion Plant (LCP) subject to the LCP Directive (LCPD) under an environmental permit for a Section 1.1 installation activity (ref. EPR/BS5673IQ dated June 2007).

JLR proposes to install 3 no. natural gas fired Hoval UltraGas boilers each with a 1.518MW rated thermal input capacity at the Site. The Hoval boilers are proposed to be used to offset the need to use the La Mont boilers and will therefore result in a betterment with respect to emissions.

In discussions with the Site's Environment Agency (EA) officer, JLR has been advised that the Site's environmental permit should be varied to incorporate the Hoval boilers on the basis of aggregating with the existing boilers to be part of the Section 1.1 Part A(1) activity.

3.0 APPLICATION CONTENTS

3.1 Application Forms

Application forms have been completed and are enclosed in Section 2 of the application.



3.2 Air Emissions Risk Assessment (AERA)

An Air Emissions Risk Assessment (AERA) was undertaken by SLR (ref.416.064966.00001_AERA).

The AERA assesses potential impacts of emissions from the site using an advanced air dispersion model. The report presents the predicted impacts once the facility is operational in the context of existing baseline air quality conditions.

The conclusions of the AERA are as follows:

- The process contributions do not lead to any exceedances of the standards (long-term or short-term) for the protection of human health at any location outside of the Site; and
- The emissions from the Site are considered to cause 'no significant pollution' to the Hop Yard Wood and Mill Wood Ancient Woodland and the Millwood and Alder Wood LNR and 'no likely significant effects' to the Mersey Estuary Ramsar / SPA and the Liverpool Bay / Bae Lerpwl SPA.

3.3 Application Fee

Pre-application advice received on 25/10/23 (Appendix A) states 'as the additional boilers would increase the site capacity and therefore the environmental risk posed from the site it is likely this would be classified as a normal variation'.

The application fee for a normal variation application as per 1.10.1 of the EA's Environmental Permitting Charging Scheme 2022 is £9,552. The site will also require a habitats and conservation assessment at a cost of £779.

The total application fee will be £10,331.

4.0 TECHNICAL STANDARDS AND KEY CONTROL MEASURES

4.1 Technical Standards

Key technical standards laid out in the following documents govern the design and operation of the plant:

- Medium combustion plant: apply for an environmental permit (June 2023);
- Medium combustion plant: comply with emission limit values (March 2023); and
- Monitoring stack emissions: environmental permits (December 2019).

4.2 Key Control Measures

Key control measures that will be applied at the Site are as follows:

- The boilers will be equipped with low NOx burners;
- Emissions to air will be discharged through individual 8.5 meters above ground level stacks to aid atmospheric dispersal;
- A preventative maintenance schedule will be implemented; and
- Emissions to air will be monitored once every three years to ensure compliance with emission limits.



4.3 Compliance with NOx ELV

4.3.1 Achievable NOx Emission Concentrations

The Emission Limit Values which will apply to the boilers are outlined in Table 1:

Table 1 NOx Emission Limit Values

	New or Existing MCP	MWth	NOx ELV mg/m ³ (at 3% O ₂ content)
Boiler 1	New	1.518	100
Boiler 2	New	1.518	100
Boiler 3	New	1.518	100

Calculations based on NOx emissions of 31mg/kWh stated in the technical datasheet for the boilers (Appendix B) confirms the plant’s ability to comply with the NOx ELV. The calculations estimate emissions from the boilers to be 51.9mg/Nm³ (@3% O₂) at normal running load and 68.6 mg/Nm³ (@3% O₂) at heat up load.

4.4 Stack Emission Monitoring

Emissions monitoring ports will be fitted and access arrangements provided for the flue stack serving each boiler in accordance with the requirements of BS EN 15259.

Stack emissions monitoring will be undertaken in accordance with the standards and frequencies outlined in Table 2. The first round of stack emissions monitoring will be undertaken within 4 months of the date of permit issue or commissioning, whichever comes later.

Table 2 Emissions Monitoring Schedule

	Pollutant	Reference period	Monitoring frequency	Monitoring Standard or Method
Boiler 1	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	Periodic	Every 3 years from date of acceptance of first monitoring measurement	MCERTS BS EN 14792
Boiler 1	Carbon monoxide	Periodic	Every 3 years from date of acceptance of first monitoring measurement	MCERTS BS EN 15058
Boiler 2	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	Periodic	Every 3 years from date of acceptance of first monitoring measurement	MCERTS BS EN 14792
Boiler 2	Carbon monoxide	Periodic	Every 3 years from date of acceptance of first monitoring measurement	MCERTS BS EN 15058



	Pollutant	Reference period	Monitoring frequency	Monitoring Standard or Method
Boiler 3	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	Periodic	Every 3 years from date of acceptance of first monitoring measurement	MCERTS BS EN 14792
Boiler 3	Carbon monoxide	Periodic	Every 3 years from date of acceptance of first monitoring measurement	MCERTS BS EN 15058

5.0 CONCLUSIONS

The conclusion from the assessments undertaken for the environmental permit variation application is that the operation of 3 no. natural gas fired Hoval UltraGas boilers and the offsetting of emissions from the 4 existing La Mont boilers at the Halewood Manufacturing Plant is not predicted to significantly impact local receptors or the environment and will provide a high level of protection to the environment.

There are predicted to be no non-compliances with the air quality aspects of any environmental quality standards. Furthermore, it is considered that due to the technology and fuel used, the site can comply with the standard NOx ELV.

JLR are fully committed to ensuring the highest standards are met and will undertake its activities in a manner consistent with best industrial practices and in accordance with the company's management system.



Appendix A Pre-Application Advice



Greg Altria

From: SM-Defra-RESP-notifications (DEFRA) <RESP-notifications@defra.gov.uk>
Sent: 25 October 2023 10:41
To: Roisin Ellis
Cc: Mellor, Laura
Subject: Basic pre-application advice response - follow up question EPR/BS5673IQ/P002
CRM:0288038

You don't often get email from resp-notifications@defra.gov.uk. [Learn why this is important](#)



Pre-application reference: EPR/BS5673IQ/P002

Operator: JAGUAR LAND ROVER LIMITED

Facility: Halewood Combustion Plant EPR/BS5673IQ, Speke Boulevard, Halewood, L24 9BJ

Dear Roisin Ellis

Based on the information submitted I have provided a summary of the cost and variation type required for the proposed activities.

As the additional boilers would increase the site capacity and therefore the environmental risk posed from the site it is likely this would be classified as a **normal variation**. The guidance on charging can be found here [Environmental permits: when and how you are charged - GOV.UK \(www.gov.uk\)](#) .

See reference 1.10.1 in the changing scheme tables [The Environment Agency Charging Scheme 2022](#) which relates to activities which fall under section 1.1, as per the charging scheme the normal variation fee would be **£9,552**.

In addition there are habitats within screening distance so a habitats assessment would be required, as per form Part F1 this incurs an additional fee **£779**.

Total : £10,331

Disclaimer

The advice given is based on the information you have provided, and does not constitute a formal response or decision of the Environment Agency with regard to future permit applications. Any views or opinions expressed are without prejudice to the Environment Agency's formal consideration of any application. Please note that any application is subject to duly making and then full technical checks during determination, and additional information may be required based on your detailed submission and site specific requirements and the advice given is to address the specific pre-application request.

This advice covers installations only. Other permissions from the Environment Agency and/or other bodies may be required for associated or other activities.

Yours sincerely
Laura Mellor

Permitting Officer – Installations – National Permitting Service - Part of Operations – Regulation, Monitoring and Customer
Environment Agency | Aqua House, 20 Lionel Street, Birmingham, B3 1AQ.

Contact | Email: Laura.Mellor@environment-agency.gov.uk | Ext: 02084 748436 Mob: 07867370550



Operations
Regulation
Monitoring
Customer
National Permitting Service



Medium Combustion Plant

**Do you operate a medium combustion plant
or specified generator?**
**[Click here](#) to find out if you need to meet the
regulations**

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Appendix B Hoval Boiler Datasheet & Emission Calculations



■ **Description**

Hoval UltraGas® (1550)

Gas condensing boiler

- Boiler made of steel with condensing technology, combustion chamber made of stainless steel
- Maximum flue gas condensation by secondary heating surfaces made of hybrid stainless steel composite pipes; flue gas side: aluminium water side: stainless steel
- Thermal insulation with mineral wool mat
- Water pressure sensor:
 - Fulfils the function of a minimum and maximum pressure limiter
 - Replacement for the low water level protection
- Flue gas temperature sensor and flue gas temperature limiter built in
- Pre-mix burner
 - with fan and venturi
 - modulating operation
 - automatic ignition
 - ionisation guard
 - gas pressure monitor
- Gas boiler fully cased with steel plates, red powder-coated
- Heating connections incl. counter flanges, screws and seals backwards for:
 - flow
 - return - high temperature
 - return - low temperature
- *UltraGas® (1550)*: with integrated gas pipe compensator
- TopTronic® E controller installed
- Possibility of connecting an external gas solenoid valve with error output

TopTronic® E controller

Control panel

- Colour touchscreen 4.3 inch
- Heat generator blocking switch for interrupting operation
- Fault signalling lamp

TopTronic® E control module

- Simple, intuitive operating concept
- Display of the most important operating statuses
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with HovalConnect option)
- Adaptation of the heating strategy based on the weather forecast (with HovalConnect option)

TopTronic® E basic module heat generator (TTE-WEZ)

- Control functions integrated for
 - 1 heating circuit with mixer
 - 1 heating circuit without mixer
 - 1 hot water charging circuit
 - bivalent and cascade management
- Outdoor sensor
- Immersion sensor (calorifier sensor)



Model range

UltraGas® type	Heat output at 40/30 °C kW
(1550)	328-1550

- Contact sensor (flow temperature sensor)
- Rast-5 basic plug set

Options for TopTronic® E controller

- Can be expanded by max. 1 module expansion:
 - module expansion heating circuit or
 - module expansion heat accounting or
 - module expansion universal
- Can be networked with a total of up to 16 controller modules:
 - heating circuit/hot water module
 - solar module
 - buffer module
 - measuring module

Number of modules that can be additionally installed in the heat generator:

UltraGas® (1550)

- 4 controller modules/module expansions

Notice

Max. 1 module expansion can be connected to the basic module heat generator (TTE-WEZ)!

The supplementary plug set must be ordered in order to use expanded controller functions.

Further information about the TopTronic® E see "Controls"

Permissions boilers

UltraGas® (1550)
CE product ID No. applied for

Design on request

- With or without neutralisation
- Free-standing calorifier see "Calorifiers".

Delivery

- Boiler, casing and insulation separately packed and delivered

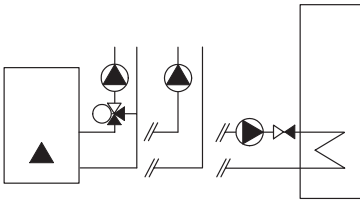
On-site

- Mounting of insulation, casing and control panel
- Mounting of boiler feet

■ Part No.

**Floor-standing gas condensing boiler
Hoval UltraGas®**

Part No.



Floor-standing gas condensing boiler with built-in Hoval TopTronic® E control

- Control functions integrated for
 - 1 heating circuit with mixer
 - 1 heating circuit without mixer
 - 1 hot water charging circuit
 - bivalent and cascade management
- Can be optionally expanded by max. 1 module expansion:
 - module expansion heating circuit or
 - module expansion heat accounting or
 - module expansion universal
- Can be optionally networked with a total of up to 16 controller modules (incl. solar module)

Boiler made of steel with TopTronic® E control, combustion chamber made of stainless steel. Secondary heating surfaces made of hybrid stainless steel composite pipes. Premix burner with fan. Modulating burner.

Delivery

Boiler, casing and thermal insulation separately packed

UltraGas® type	Heat output at 40/30 °C kW ¹⁾	Operating pressure bar
(1550)	328-1550	6

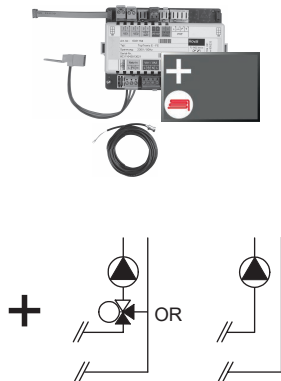
7017 831

¹⁾ kW = modulation range

■ Part No.

TopTronic® E module expansions
for TopTronic® E basic module heat generator

Part No.



TopTronic® E module expansion heating circuit TTE-FE HK

6034 576

Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions:

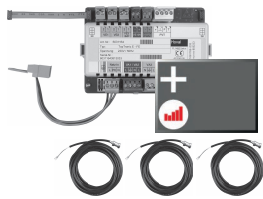
- 1 heating circuit without mixer or
- 1 heating circuit with mixer

incl. fitting accessories
1x contact sensor ALF/2P/4/T L = 4.0 m

Can be installed in:
Boiler control, wall housing, control panel

Notice

The supplementary plug set may have to be ordered to implement functions differing from the standard!



TopTronic® E module expansion heating circuit incl. energy balancing TTE-FE HK-EBZ

6037 062

Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions:

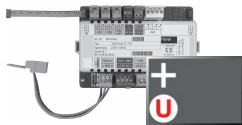
- 1 heating/cooling circuit w/o mixer or
- 1 heating/cooling circuit with mixer in each case incl. energy balancing

incl. fitting accessories
3x contact sensor ALF/2P/4/T L = 4.0 m

Can be installed in:
Boiler control, wall housing, control panel

Notice

Suitable flow rate sensors (pulse sensors) must be provided on site.



TopTronic® E module expansion Universal TTE-FE UNI

6034 575

Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions.

incl. fitting accessories

Can be installed in:
Boiler control, wall housing, control panel

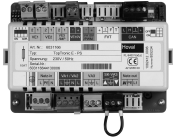
Further information

see "Controls" - "Hoval TopTronic® E module expansions" chapter

Notice

Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.

■ Part No.



Accessories for TopTronic® E

Part No.

Supplementary plug set

for basic module heat generator (TTE-WEZ) 6034 499
 for controller modules and module expansion 6034 503
 TTE-FE HK

TopTronic® E controller modules

TTE-HK/WW TopTronic® E heating circuit/hot water module 6034 571
 TTE-SOL TopTronic® E solar module 6037 058
 TTE-PS TopTronic® E buffer module 6037 057
 TTE-MWA TopTronic® E measuring module 6034 574

TopTronic® E room control modules

TTE-RBM TopTronic® E room control modules
 easy white 6037 071
 comfort white 6037 069
 comfort black 6037 070

Enhanced language package TopTronic® E

6039 253
 one SD card required per control module
 Consisting of the following languages:
 HU, CS, SL, RO, PL, TR, ES, HR, SR, JA, DA

HovalConnect

HovalConnect domestic starter LAN 6049 496
 HovalConnect domestic starter WLAN 6049 498
 HovalConnect commercial starter LAN 6049 495
 HovalConnect commercial starter WLAN 6049 497
 SMS remote control unit 6018 867
 System component SMS remote control unit 6022 797

TopTronic® E interface modules

GLT module 0-10 V 6034 578
 HovalConnect domestic starter Modbus 6049 501
 HovalConnect domestic starter KNX 6049 593
 HovalConnect commercial starter Modbus 6049 500
 HovalConnect commercial starter KNX 6049 502

TopTronic® E wall casing

WG-190 Wall casing small 6035 563
 WG-360 Wall casing medium 6035 564
 WG-360 BM Wall casing medium with control module cut-out 6035 565
 WG-510 Wall casing large 6035 566
 WG-510 BM Wall casing large with control module cut-out 6038 533

TopTronic® E sensors

AF/2P/K Outdoor sensor 2055 889
 TF/2P/5/6T Immersion sensor, L = 5.0 m 2055 888
 ALF/2P/4/T Contact sensor, L = 4.0 m 2056 775
 TF/1.1P/2.5S/6T Collector sensor, L = 2.5 m 2056 776

System housing

System housing 182 mm 6038 551
 System housing 254 mm 6038 552

Bivalent switch 2061 826

Commissioning and further information
 see "Controls"

■ Part No.

Accessories

Part No.

Flow temperature switch

for under floor heating (1 guard per heating circuit) 15-95 °C, differential gap 6 K, capillary tube max. 700 mm, setting (visible from the outside) inside the housing cover.



Clamp-on thermostat RAK-TW1000.S 242 902
Thermostat with strap, without cable and plug



Set clamp-on thermostat RAK-TW1000.S 6033 745
Thermostat with strap, with cable (4 m) and plug



Immersion thermostat RAK-TW1000.S SB 150 6010 082
Thermostat with pocket 1/2" - depth of immersion 150 mm, brass nickel-plated

Automatic quick release air vent 1/2"
with cut-off valve

2002 582



Assembly tube flow

Assembly tube for flow and return

for assembly on flow resp. high and low temperature return of the Hoval UltraGas® boiler. With screws and nuts for connection of

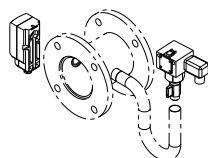
- an additional safety temperature limiter and a maximum pressure limiter on the flow and
- an expansion tank on the return

Dimension	Suitable for UltraGas®	Connection
DN 150	(1550)	flow
DN 150	(1550)	return



Assembly tube return

Further information see "Dimensions"



Safety armature set

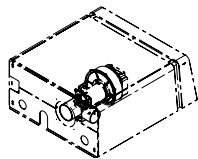
6025 358

Compatible with armature pipe for meeting safety requirements of EN 12828: > 300 kW or SWKI 93-1: 70-1000 kW related to single boiler

Consisting of:

- adjustable maximum pressure limiter incl. ball valve
- safety temperature limiter (RAK-ST.131)

■ Part No.

**Accessories****Part No.****Motorised air intake suction flap DN 180**

6015 197

for UltraGas® (400-1150)
For cascading boiler systems with a
common flue gas line.
Complete with cabling

**Gas filter 70631/6b Rp 2"**

2007 998

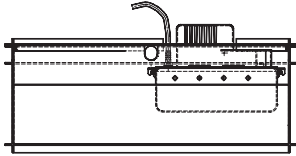
with measurement nozzle before and
behind the filter inset (diameter: 9 mm)
Pore width of the filter inset < 50 µm
Max. pressure difference 10 mbar
Max. inlet pressure 100 mbar

■ Part No.

Condensate drainage to UltraGas® (1550)

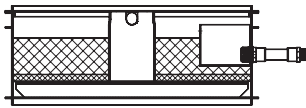
Part No.

Placed under the boiler



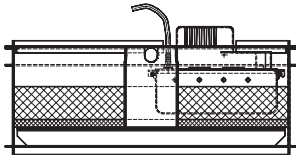
Condensate box KB 22
 for UltraGas® (125-1150), (250D-2300D),
 UltraOil® (65-300), (320D-600D)
 For condensate drainage into higher
 situated drain pipe with delivery pump.
 Max. delivery height 3.5 m, from
 1200 kW two delivery pumps necessary.
 Delivery rate 120 l/h
 incl. liquid level switch, silicone hose
 9/13 mm, 4 m long, electrical cable
 1.5 m with plug
 Use one box per boiler.

6033 767



Neutralisation box KB 23
 for UltraGas® (125-1150), (250D-2300D),
 UltraOil® (65-300), (320D-600D)
 Condensate drainage into lower situated
 drain pipe without condensate
 delivery pump
 with neutralisation
 12 kg neutralisation granulate
 Placed under the boiler
 Use one box per boiler.

6001 917



Neutralisation box KB 24
 for UltraGas® (125-1150), (250D-2300D),
 UltraOil® (65-300), (320D-600D)
 for transporting condensation water into
 a higher lying drainage duct,
 max. delivery height 3.5 m, from
 1200 kW two delivery pumps necessary.
 Delivery rate 120 l/h
 incl. liquid level switch, silicone hose
 9/13 mm, 4 m long, electrical cable
 1.5 m with plug
 12 kg granulate
 Use one box per boiler.

6033 764



Condensate pump
 for transporting condensation water
 into a higher drainage duct.
 Including connection line,
 completely wired,
 cable and plug for connection
 to the boiler controller
 max. transport height: 3.5 m
 Delivery rate up to 294 l/h
 combinable with neutralisation box
 can be mounted in boiler socket

6034 771



Neutralisation granulate
 for neutralisation box
 Refill set volume 3 kg
 Life time of one filling:
 approx. 2-4 years; depending on amount
 of condensate

2028 906

■ Technical data

Hoval UltraGas® (1550)

Type		(1550)
• Nominal heat output at 80/60 °C, natural gas	kW	298-1472
• Nominal heat output at 40/30 °C, natural gas	kW	328-1550
• Nominal heat output at 80/60 °C, propane ²⁾	kW	-
• Nominal heat output at 40/30 °C, propane ²⁾	kW	-
• Nominal load with natural gas ¹⁾	kW	303-1518
• Nominal load with propane ²⁾	kW	-
• Operating pressure heating min./max. (PMS)	bar	1/6
• Operating temperature max. (T _{max})	°C	90
• Boiler water content (V _(H₂O))	l	966
• Flow resistance boiler		see diagram
• Minimum circulation water quantity	l/h	-
• Boiler weight (without water content. incl. casing)	kg	2300
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV)	%	97.2/87.7
• Boiler efficiency at 30 % partial load (EN 15502) (NCV/GCV)	%	107.9/97.4
• NOx class (EN 15502)		6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx mg/kWh	31
• Content of CO ₂ in the flue gas minimum/maximum output	%	8.6/8.8
• Heat loss in standby mode	Watt	1600
• Dimensions		see table of dimensions
• Gas flow pressure minimum/maximum		
- Natural gas E/LL	mbar	17.4-80
- Liquid gas	mbar	-
• Gas connection value at 15 °C/1013 mbar:		
- Natural gas E (Wo = 15.0 kWh/m ³) NCV = 9.97 h/m ³	m ³ /h	30.4-152.3
- Natural gas LL (Wo = 12.4 kWh/m ³) NCV = 8.57 h/m ³	m ³ /h	35.4-177.1
- Propane (NCV = 25.9 kWh/m ³)	m ³ /h	-
• Operating voltage	V/Hz	1x230/50 3x400/50
• Electrical power consumption min./max.	Watt	271/4111
• Stand-by	Watt	9
• IP rating (integral protection)	IP	20
• Permitted ambient temperature during operation	°C	5-40
• Sound power level		
- Heating noise (EN 15036 part 1) (room air dependent)	dB(A)	86
- Exhaust noise radiated from the mouth (DIN 45635 part 47) (room air dependent/room air independent)	dB(A)	-
- Sound pressure level (depending on installation conditions) ³⁾		-
• Condensate quantity (natural gas) at 40/30 °C	l/h	138
• pH value of the condensate	approx.	4.2
• Construction type		B23P, C53, C63
• Flue gas system		
- Temperature class		T120
- Flue gas mass flow at nominal heat load (dry)	kg/h	2300
- Flue gas mass flow at lowest nominal heat load (dry)	kg/h	456
- Flue gas temperature at nominal output and operation 80/60 °C	°C	69
- Flue gas temperature at nominal output and operation 40/30 °C	°C	48
- Flue gas temp. at lowest nominal heat load and operation 40/30 °C	°C	32
- Maximum permitted temperature of the combustion air	°C	50
- Volume flow rate combustion air	Nm ³ /h	1885
- Maximum supply pressure for supply air and flue gas line	Pa	130
- Maximum draught/depression at flue gas outlet	Pa	-50
• Heat loss in stand-by mode	%	0.11

¹⁾ Data related to NCV. The boiler series is tested for EE/H-settings. With a factory setting of the Wobbe coefficient of 15.0 kWh/m³ operation at a Wobbe coefficient of 12.0 up to 15.7 kWh/m³ is possible without new settings.

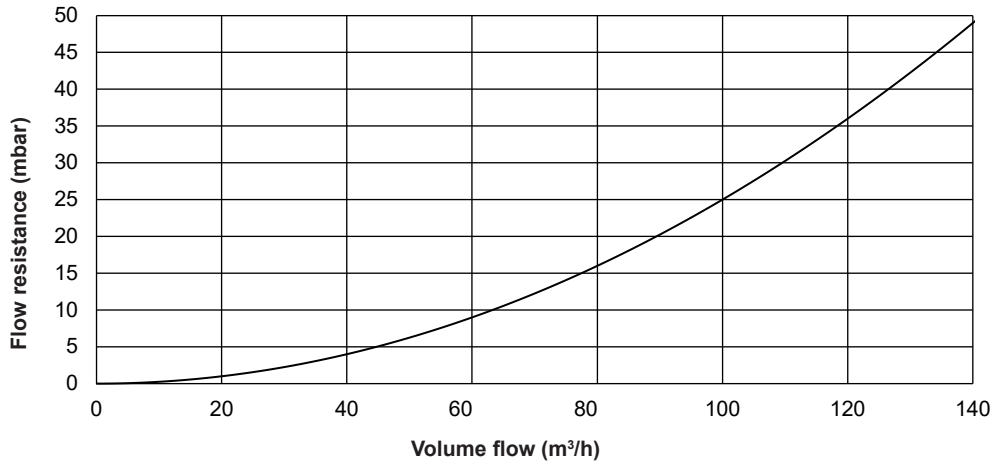
²⁾ Data related to NCV.

³⁾ See also notices at "Engineering".

■ Technical data

Flow resistance on the heating water side

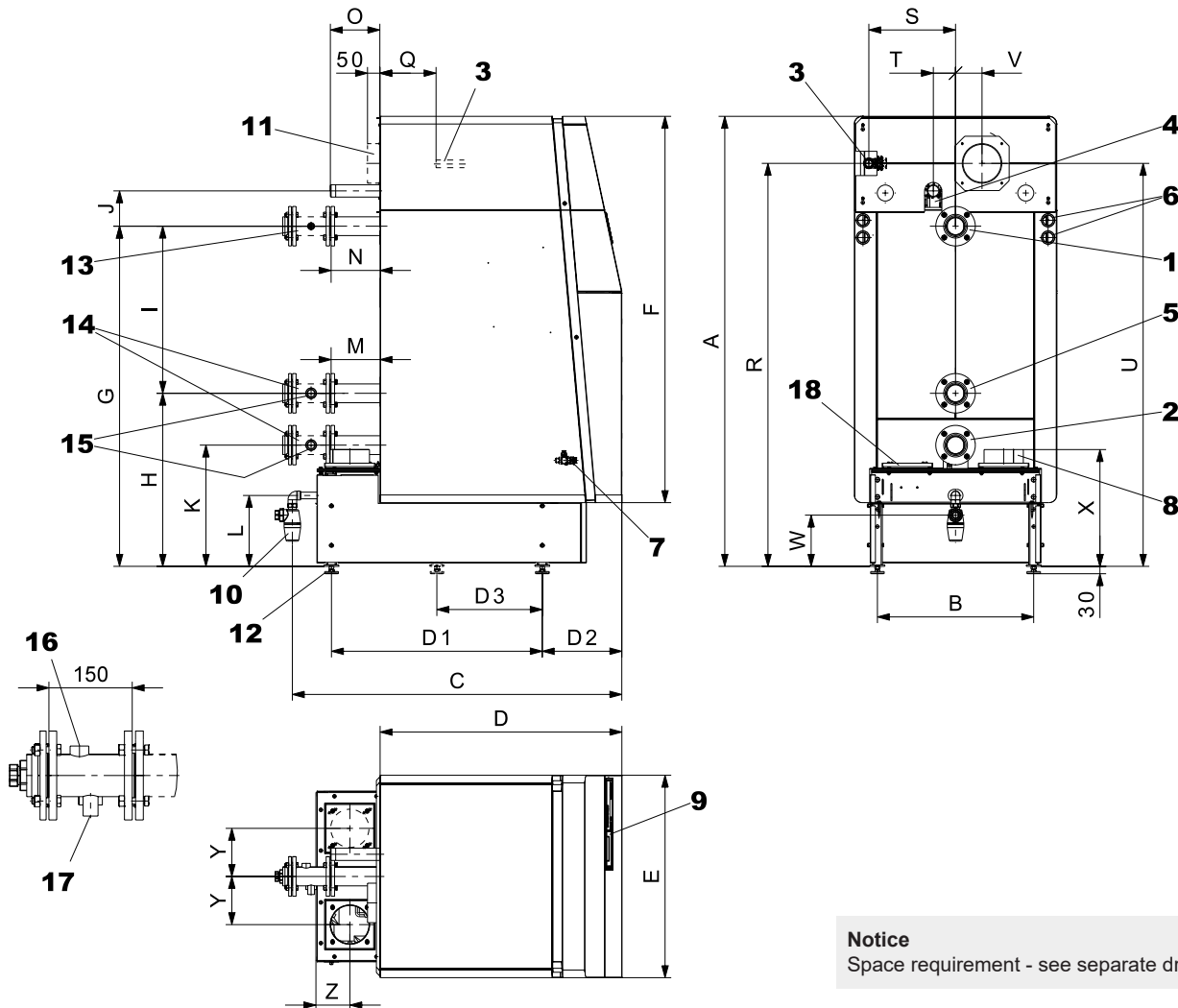
Hoval UltraGas® (1550)



■ Dimensions

UltraGas® (1550)

(Dimensions in mm)



Notice
Space requirement - see separate drawing

- 1 Flow heating
- 2 Low temperature return
- 3 Gas connection
- 4 Safety flow
- 5 High temperature return
- 6 Electrical connection left or right
- 7 Draining (behind the front casing)
- 8 Flue gas connector left or right
- 9 Control panel
- 10 Condensate drain with screw including syphon for plastic tube
- 11 Air inlet connector (option)
- 12 Boiler foot adjustable up to 80 mm
- 13 Safety valve connection flow (option)
- 14 Safety valve connection return (option)
- 15 Expansion Rp 1"
- 16 Pressure limiter Rp 3/4"
- 17 Safety temperature control Rp 1/2"
- 18 Cleaning opening left or right

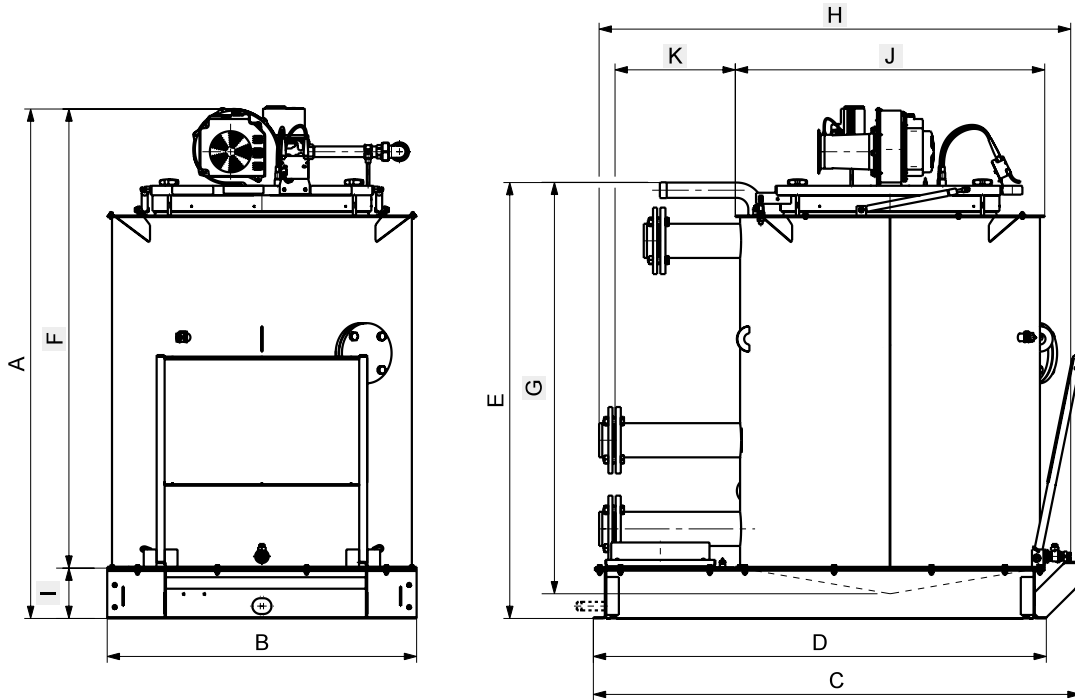
Type	A	B	C	D	D1	D2	D3	E	F	G	H	I	J	K	L	M	N	O	Q	R
(1550)	2547	1363	2152	1632	1790	242	895	1550	2260	1756	978	778	238	598	294	417	417	218	365	2210

Type	S	T	U	V	W	X	Y	Z			1,2,5	3	4	8	10	11
(1550)	625	100	2210	190	214	554	455	243	DN 150 / PN6 / 8 holes		Rp 2"	R 2"	Ø402/406	DN 40	Ø247/250	

■ Dimensions

Overall unit dimensions of the UltraGas®

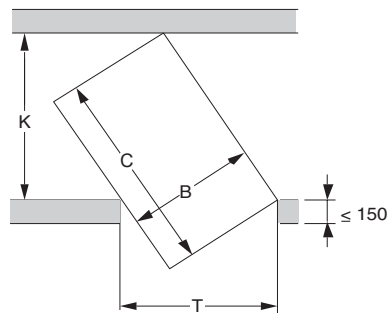
Boiler without casing and insulation



UltraGas® type	A	B	C	D	E	Measurements for installation as individual parts					
						F	G	H	I	J	K
(1550)	2244	1410	2032	1916	1780	-	-	-	-	-	-

Required min. width of door and corridor to bring in the boiler

The following informations are minimal dimensions



$$K = \frac{B}{T} \times C$$

$$T = \frac{B}{K} \times C$$

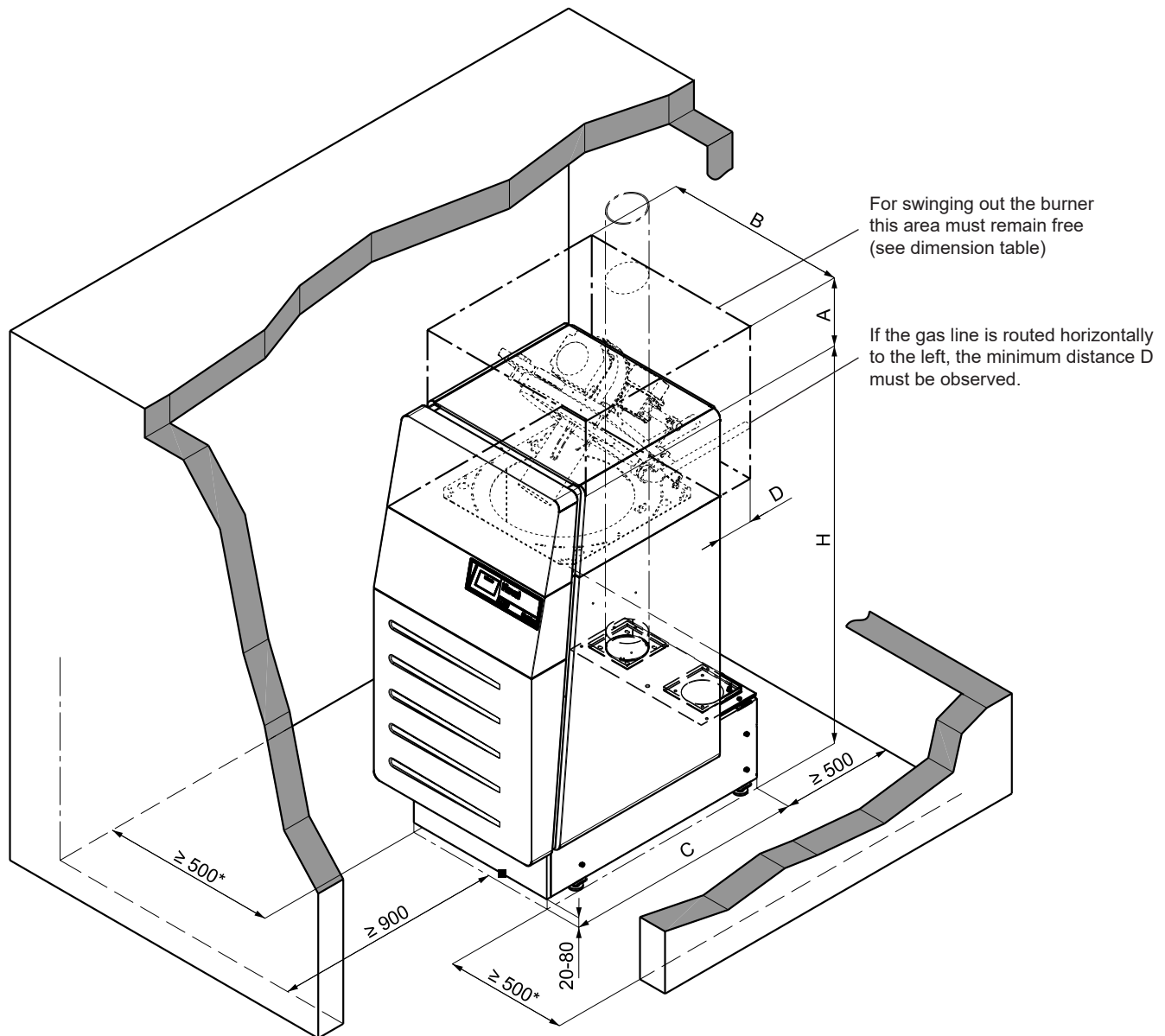
- B = Boiler width
- C = Max. length of boiler
- T = Door width
- K = Corridor width

Calculation example for the necessary corridor width, door width T = 1000

UltraGas® (1550) $K = \frac{1410}{1000} \times 2032 = \text{corridor width} \geq 2865$

■ Dimensions

Space requirement UltraGas® (1550)
(Dimensions in mm)



UltraGas® type	A	A minimal	B	C	D	H	H minimal
(1550)	-	450 ¹⁾	1550 ²⁾	2090	460	2560	2455 ³⁾

¹⁾ If room height is too small: reduction of dimension possible. See A minimal.

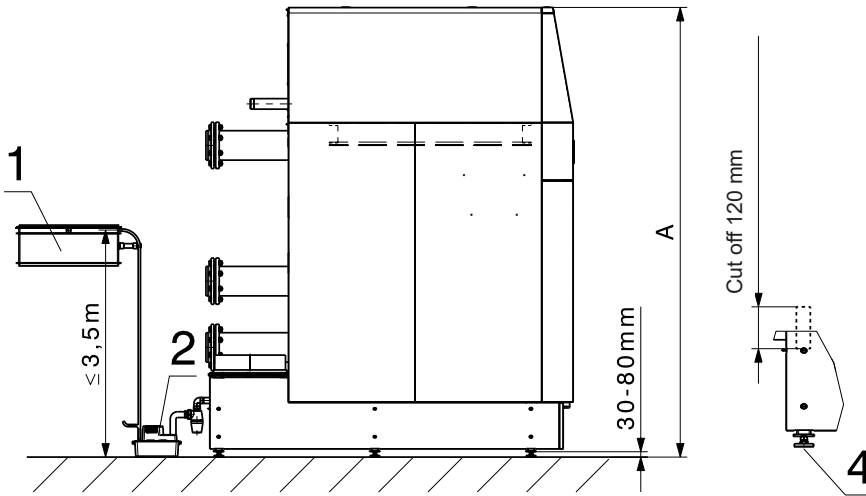
²⁾ **Attention!** With A minimal the burner can not be swung out completely anymore! This makes cleaning more difficult!

³⁾ Feet can be shortened, no base cladding possible. For details, see next page.

- The boiler can be placed with one side directly on the wall. For the casing to be installed, however, there must be a distance of at least 100 mm from the wall.
- The cleaning aperture must be easily accessible. As a result, a minimum distance of 500 mm must be maintained on the cleaning opening side.

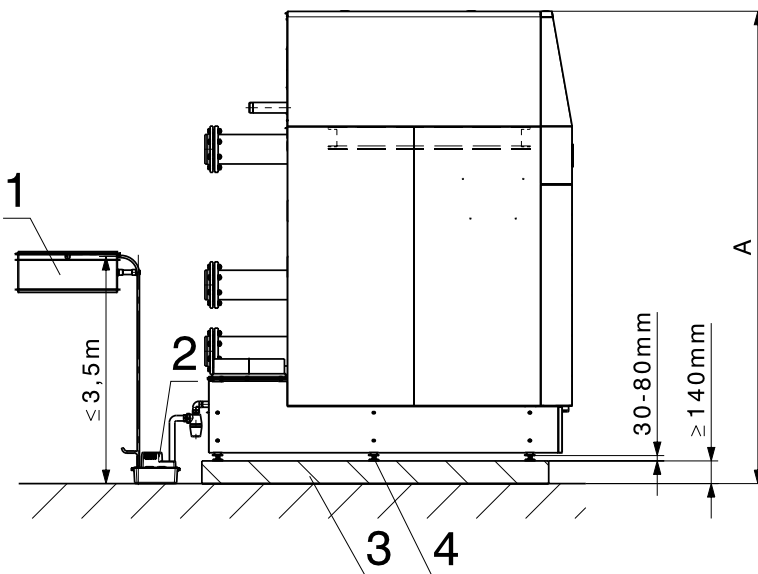
■ Dimensions

UltraGas® with shortened boiler feet
(Dimensions in mm)



UltraGas® type	A
(1550)	2457-2507

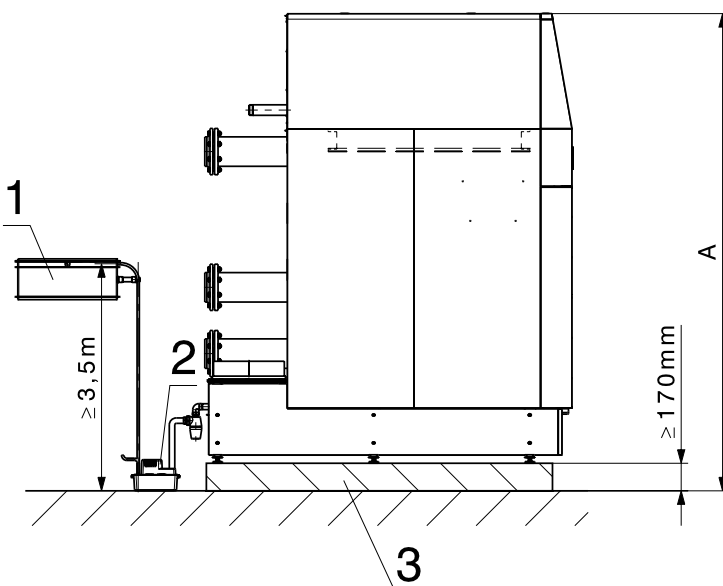
UltraGas® with masonry base and adjustable feet



UltraGas® type	A
(1550)	2455-2505

- 1 Neutralisation box
- 2 Condensate pump
- 3 Masonry base
- 4 Feet adjustable 30-80 mm

UltraGas® with masonry base without adjustable feet



UltraGas® type	A
(1550)	2465-2515

Base plates and adjustable feet will not be refunded!

■ Dimensions

Neutralisation unit for UltraGas® (1550)
(Dimensions in mm)

Neutralisation box type KB 23

Application

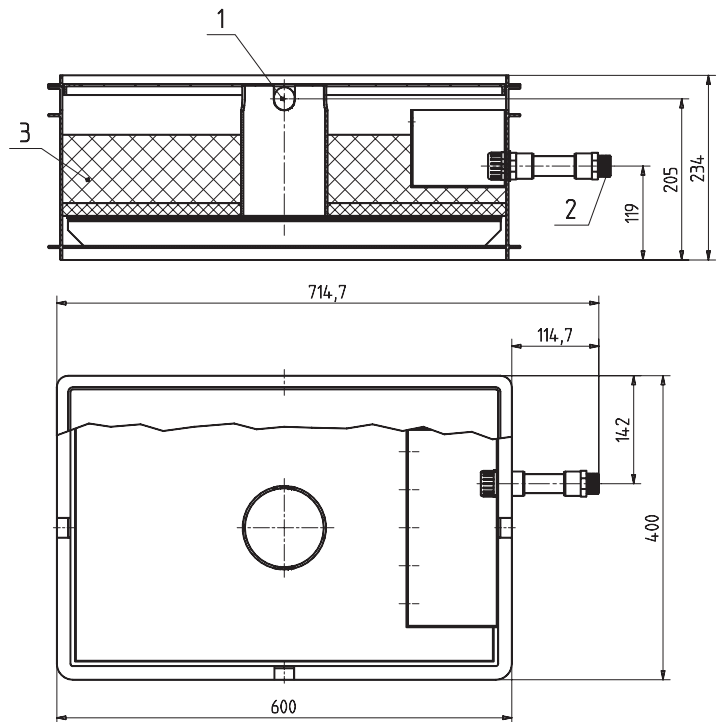
- Condensate drainage into lower situated drain pipe.
- With condensate neutralisation.
- Placed under or adjacent to the boiler

Execution

- Collector box with neutralisation unit
- 12 kg neutralisation granulate
- When installing under the boiler:
Fit boiler connection line (syphon) to neutralisation box.

On site

- In case of installation adjacent to the boiler, fit connection pipes between the boiler (syphon) and the neutralisation box.
- Drain pipe from the neutralisation box



- 1 Condensate inlet from the boiler
- 2 Outlet R 3/4"
- 3 Condensate box with 12 kg granulate

Neutralisation box with pump type KB 24

Application

- Condensate drainage into a higher situated drain pipe
- With condensate pump, delivery height 3.5 mm
- With condensate neutralisation, 12 kg granulate
- Placed under or adjacent to boiler

Execution

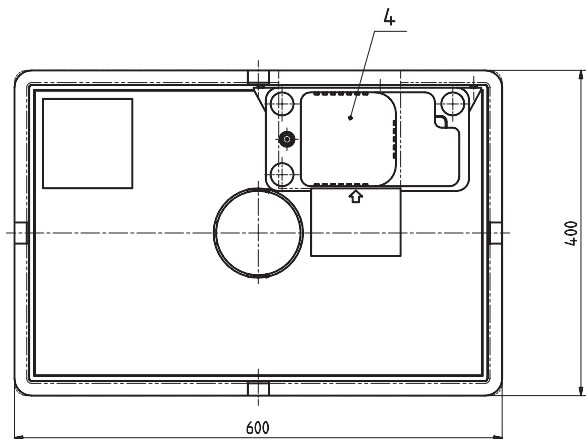
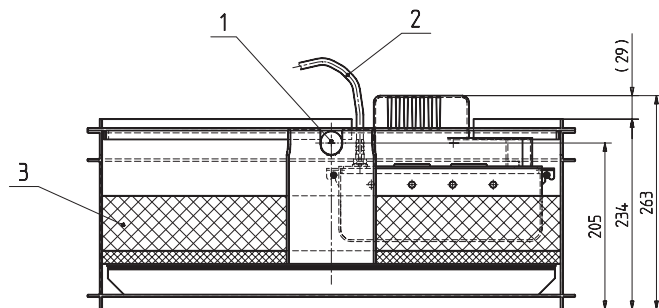
- Collector box with delivery pump and neutralisation unit
- 12 kg neutralisation granulate
- Pump delivery height max. 3.5 m (2 dm³/min)
- Silicone hose Ø 9/13 mm, length 4 m
- Electric cable length 1.5 m with plug for connection to the boiler control panel if the installation is located under the boiler
- Plastic connection pipe Ø 25, boiler (syphon) to neutralisation box if the installation is located under the boiler.

On site

- Drain pipe if the silicone hose is too short.

In the case of installation adjacent to boiler:

- Connection pipe between the boiler (syphon) and the neutralisation box
- Electrical connection between the delivery pump and the electrical control panel if the supplied cable is too short.



- 1 Condensate inlet from the boiler
- 2 Outlet from pump, silicon hose Ø 9/13 mm, length 4 m
- 3 Condensate box with 12 kg granulate (KB 24)
- 4 Condensate pump

Neutralisation box with pump type KB 22

Application

- Condensate drainage into a higher situated drain pipe
- With condensate pump, delivery height 3.5 mm
- Placed under or adjacent to boiler

Execution

Type characteristics as KB 24, but **without** neutralisation granulate

■ Engineering

Standards and guidelines

The following standards and guidelines must be complied with:

- Hoval technical information and installation instructions
- hydraulic and technical control regulations of Hoval
- local building law
- fire protection regulations
- DIN EN 12828 Safety-relevant requirements
- DIN EN 12831 Heaters Rules for the calculation of the heat requirements of buildings
- VDI 2035 Protection against damage by corrosion and boiler scale formation in heating and service water installations
- local fire brigade regulations

Water quality

Heating water:

- **The European Standard EN 14868 and the Directive VDI 2035 must be observed.**
- Hoval boilers and calorifiers are designed for heating plants without significant oxygen intake (plant type I according to EN 14868).
- Plants with
 - **continuous** oxygen intake (e.g. under-floor heating systems without diffusion proof plastic piping) or
 - **intermittent** oxygen intake (e.g. where frequent refilling is necessary) must be equipped with **separate circuits**.
- Treated heating water must be tested at least once yearly, according to the inhibitor manufacturer's instructions, more frequent testing may be necessary.
- A refilling is not necessary if the quality of the heating water in existing installations (e.g. exchange of boiler) conforms to VDI 2035. The Directive VDI 2035 applies equally to the replacement water.
- New and if applicable existing installations must be adequately cleaned and flushed before being recharged! The boiler may only be filled after the heating system has been flushed.
- Parts of the boiler/the calorifier which have contact with water are made of ferrous materials and stainless steel.

- On account of the danger of stress cracking corrosion in the parts made of stainless steel the chloride, nitrate and sulfate contents of the heating water must not exceed 50 mg/l in total.
- The pH value of the heating water should lie between 8.3 and 9.5 after 6 to 12 weeks of heating operation.

Filling and replacement water:

- For a plant using Hoval boilers untreated domestic water is generally best suited as filling and replacement water. However, the quality of the untreated domestic water must at least fulfil the standard set in VDI 2035 or be desalinated and/or be treated with inhibitors. The stipulations of EN 14868 must be observed.
- In order to maintain a high level of boiler efficiency and to avoid overheating of the heating surfaces the values given in the table should not be exceeded (dependent on boiler performance ratings - for multi-boiler plants rating of smallest boiler applies - and on the water content of the plant).
- The total amount of filling and replacement water which is used throughout the total service life of the boiler must not exceed three times the water capacity of the plant.
- If frost protection agent is being used, please contact the Hoval company to ask for the separate engineering sheet.

Frost protection agent

- see separate engineering sheet "Use of frost protection agent".

Heating room

- Gas boilers cannot be positioned in rooms in which halogen compounds can occur and into which combustion air can enter (e.g. laundrettes, hairdressers).
- Halogen compounds can be caused by cleaning and degreasing solutions, dissolvents, glue and bleaching lyes. Pay attention to the Procal leaflet, corrosion through halogen compounds.

Combustion air

For the version with common flue gas line with overpressure, the flue gas excess pressure set must be imperatively mounted! The supply of combustion air must be guaranteed. There must be no possibility to close the air supply opening. For direct combustion air to boiler (LAS system) mount the connection for direct combustion air inlet.

• *Room air-dependent operation:*

Minimum free cross-section of the opening into the open: 150 cm² or twice 75 cm² and additionally 2 cm² necessary for each kW of output over 50 kW for vent into the open.

Gas connection

Manual gas shut-off tap and gas filter

Immediately in front of the boiler a manual gas shut-off device (tap) must be installed according to relevant regulations. In the UltraGas® (1550) type, an external gas filter must be installed in the gas supply line. Make sure that the gas line from the external gas filter to the gas connection of the boiler is cleaned.

Commissioning

- Start-up is to be carried out only by a specialist of Hoval.
- Burner setting values according to the installation instructions.

Shut-off valve

- A shut-off valve must be installed upstream of every gas boiler.

Construction of a recommended gas connection



Legend:

- Gas ball valve
- Gas hose/compensator
- Gas filter
- Pressure gauge with test burner and push button cock

Table 1: Maximum filling quantity without/with demineralisation

	Total hardness of the filling water up to...							
	<0.1	0.5	1	1.5	2	2.5	3	>3.0
[mol/m ³] ¹⁾	<1	5	10	15	20	25	30	>30
f°H	<0.56	2.8	5.6	8.4	11.2	14.0	16.8	>16.8
d°H	<0.71	3.6	7.1	10.7	14.2	17.8	21.3	>21.3
~mg/l	<10	50.0	100.0	150.0	200.0	250.0	300.0	>300
Conductance ²⁾	<20	100.0	200.0	300.0	400.0	500.0	600.0	>600
Boiler size of the individual boiler	maximum filling quantity without demineralisation							
50 to 200 kW	NO DEMAND	50 l/kW	20 l/kW	20 l/kW				
200 to 600 kW		50 l/kW	50 l/kW	20 l/kW	ALWAYS DEMINERALISE			
over 600 kW								

¹⁾ Total of alkaline earths

²⁾ If the conductance in µS/cm exceeds the tabular value an analysis of the water is necessary.

■ Engineering

Type of gas

- The boiler is only to be operated with the type of gas stated on the rating plate.

Gas pressure natural gas

- Necessary flow pressure at the boiler inlet: UltraGas® (1150)
min. 17.4 mbar, max. 80 mbar

Closed heating system

The boiler is only approved for use in closed heating systems.

Minimum circulation water quantity

No minimum water circulation volume is required.

Calorifier connection

If a calorifier is connected, all heating groups must be provided with a mixer.

Boiler base

The boiler should be placed on a sufficiently high base (boiler base see accessories) to protect it against floor humidity and for the siphon for condensate drain.

Installation instructions

Please observe the installation instructions supplied with every boiler.

Space requirements

See "Dimensions" for information

Heating boiler in the attic

If the gas boiler is positioned on the top floor, the installation of a low water protection, which automatically turns the gas burner off in case of water shortage, is recommended.

Condensate drain

- A permit for discharge of the flue gas condensate into the sewage system must be obtained from the relevant authority or sewer operator.
- The condensate from the flue gas line can be discharged via the boiler. A condensate trap is no longer needed in the flue gas system.
- The condensate must be conducted openly (funnel) into the sewage system.
- Suitable materials for condensate drain:
 - stoneware pipes
 - pipes made from PVC
 - pipes made from polyethylene (PE)
 - pipes made from ABS or ASA

Expansion tank

- An adequately dimensioned expansion tank must be provided.
- The expansion tank has to be installed in principle at the boiler return, or at the safety flow.
- At the safety flow a safety valve and an automatic exhauster must be installed.

Noise damping

The following measures are possible for sound insulation:

- Make boiler room walls, ceiling and floor as solid as possible.
- If there are living areas above or below the boiler room, connect pipes flexibly using expansion joints.
- Connect circulating pumps to the piping network using expansion joints

Noise level

- The acoustic power level value is dependent on the local and spacial circumstances.
- The acoustic pressure level is dependent on the installation conditions and can for instance be 5 to 10 dB(A) lower than the acoustic power level at a distance of 1 m.
- DIN 4108 must be observed when installing in domestic living areas

Recommendation:

If the air inlet at the facade is near a noise sensitive place (window of bedroom, terrace etc.), we recommend to use a sound absorber at the direct combustion air inlet.

Allocation of gas filters for UltraGas®

UltraGas®	Gas throughput	Gas filter type	Dimension	Pressure drop gas filter (with clean filter) mbar
Type	m³/h			
(1550) ¹⁾	108.2	70631/6B	Rp 2"	3.1

¹⁾ On the UltraGas® (1550) installation of a gas filter in front of the gas burner is mandatory! It is essential to set the dimensions of the gas line!

Flue gas system

- Gas boilers must be connected to a flue gas system (chimney or flue gas lines).
- Flue gas lines must be gas tight and leak tight against condensate and over pressure.
- The flue gas lines must be secured against unwanted loosening of the plug connections.
- The flue gas system must be connected with an angle, so that the resulting condensate of the flue gas system can flow back to the boiler and can be neutralised there before discharging into the canalisation.
- Gas boilers with condensation heat utilisation are to be connected to a flue gas line min. Temperature class T120.
- A flue gas temperature limiter is built in in the boiler.

■ Engineering

Chimney dimensions

Table with bases for calculation:

- Calculation based on max. 1000 m above sea level.
- The first 2 m of the flue gas line must be configured with the same dimension as the flue gas connector, after which the size of the flue gas system can be selected according to the table below.
- Combustion air:
In the case of room air-independent operation (accessories optional) the air pipe should be of the same dimension as the flue gas line.
If the flue gas line diameter is greater than the combustion air connection an individual calculation must be effected.

Boiler		Flue gas line (smooth walled)	Number of elbows 90° (flue gas + supply air)				
UltraGas® type	Flue gas dim. mm internal	Designation DN	Total pipe length in m (flue gas + supply air)				
			1	2	3	4	5 ¹⁾
(1550)	402	400	50	50	50	50	

Notice: The data contained in the table “Dimensions flue gas systems” represent guide values.
An exact calculation for the flue gas duct must be made on-site.

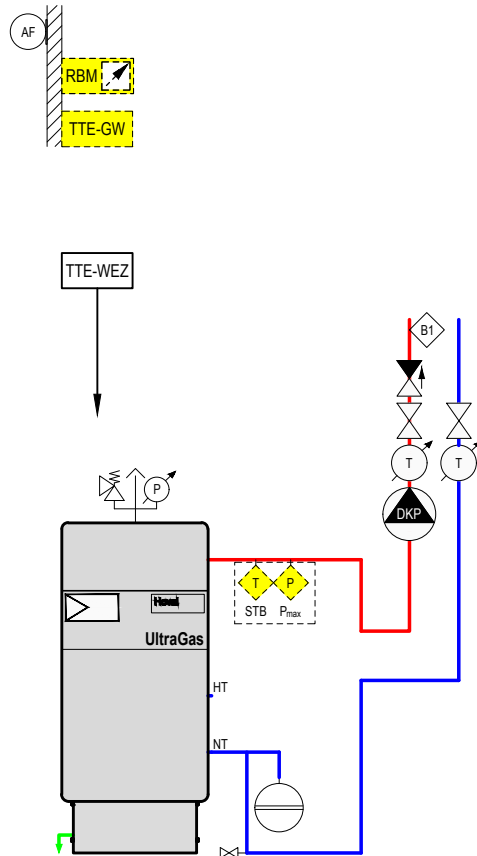
¹⁾ With 5 bends or more the feed pressure total at the combustion air/flue gas line is to be reduced by 30 % for the calculation.

With total pipe lengths exceeding 50 m, a separate calculation is necessary.

■ Examples

UltraGas® (125-1150)

Gas boiler with
- 1 direct circuit



Notice:

- The example schematics merely show the basic principle and do not contain all information required for installation. The installation must be done according to local conditions, dimensioning and regulations.
- With underfloor heating a flow temperature monitor must be built in.
- Shut-off devices to the safety valve (pressurised expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

- TTE-WEZ TopTronic® E basic module heat generator (installed)
- B1 Flow temperature guard (if required)
- AF Outdoor sensor
- DKP Pump for heating circuit without mixer

Option

- RBM TopTronic® E room control module
- TTE-GW TopTronic® E Gateway

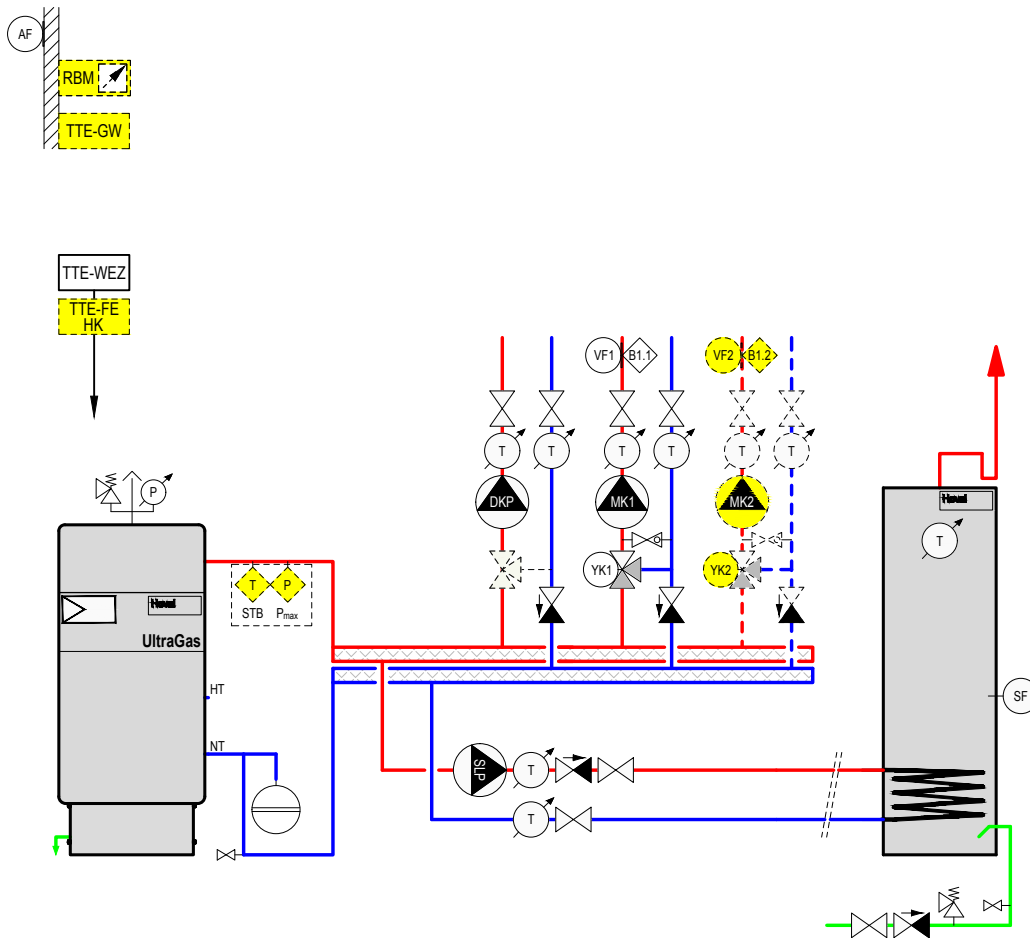
■ Examples

UltraGas® (125-1150)

Gas boiler with

- calorifier
- 1 direct circuit and 1-... mixer circuit(s)

Hydraulic schematic BDEE030



Notice:

- The example schematics merely show the basic principle and do not contain all information required for installation. The installation must be done according to local conditions, dimensioning and regulations.
- With underfloor heating a flow temperature monitor must be built in.
- Shut-off devices to the safety valve (pressurised expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

- | | |
|---------------|------------------------------------------------------|
| TTE-WEZ | TopTronic® E basic module heat generator (installed) |
| VF1 | Flow temperature sensor 1 |
| B1.1 | Flow temperature guard (if required) |
| MK1 | Pump mixer circuit 1 |
| YK1 | Actuator mixer 1 |
| AF | Outdoor sensor |
| SF | Calorifier sensor |
| DKP | Pump for heating circuit without mixer |
| SLP | Calorifier charging pump |
| <i>Option</i> | |
| RBM | TopTronic® E room control module |
| TTE-GW | TopTronic® E Gateway |
|
 | |
| TTE-FE HK | TopTronic® E module expansion heating circuit |
| VF2 | Flow temperature sensor 2 |
| B1.2 | Flow temperature guard (if required) |
| MK2 | Pump mixer circuit 2 |
| YK2 | Actuator mixer 2 |

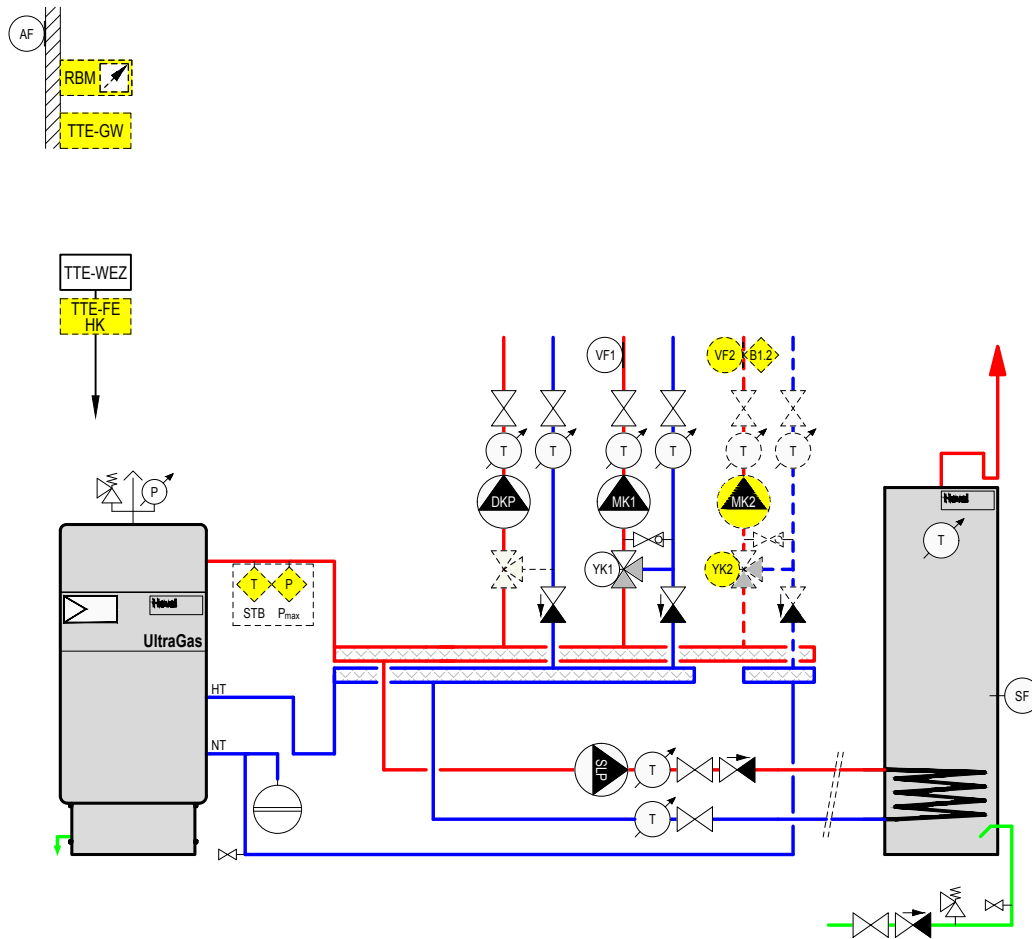
■ Examples

UltraGas® (125-1150)

Gas boiler with

- calorifier
- 1 direct circuit and 1-... mixer circuit(s)
(HT/LT separation)

Hydraulic schematic BDEE050



Notice:

- The example schematics merely show the basic principle and do not contain all information required for installation. The installation must be done according to local conditions, dimensioning and regulations.
- With underfloor heating a flow temperature monitor must be built in.
- Shut-off devices to the safety valve (pressurised expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

- TTE-WEZ TopTronic® E basic module heat generator (installed)
- VF1 Flow temperature sensor 1
- MK1 Pump mixer circuit 1
- YK1 Actuator mixer 1
- AF Outdoor sensor
- SF Calorifier sensor
- DKP Pump for heating circuit without mixer
- SLP Calorifier charging pump

Option

- RBM TopTronic® E room control module
- TTE-GW TopTronic® E Gateway

- TTE-FE HK TopTronic® E module expansion heating circuit
- VF2 Flow temperature sensor 2
- B1.2 Flow temperature guard (if required)
- MK2 Pump mixer circuit 2
- YK2 Actuator mixer 2

UNIT CONVERSION TOOL TO CALCULATE EMISSIONS

1. Select fuel type and properties

Natural Gas

Check the calorific value , moisture content and ash content in the Fuel Properties spreadsheet.

2. Select basis of boiler capacity estimate

3B: Heat output

Select on the basis of the available information
Only one of the Boiler capacity input boxes requires completion

3. Boiler capacity data input

3A: Fuel use

Fuel use 1 q/s

#N/A litre/s

3B: Heat output

Thermal efficiency 90% Net basis

90% Net basis

Heat output 1472 kW

1.47 MW

3C Volumetric flowrate of flue gas

Volumetric flowrate 0.0141 m3/s

at discharge conditions

0.0% moisture

11.0% oxygen, dry

273.0 K

3D: Heat input

Heat input 25.6 kW

Gross/net Net basis

Heat input 0.0256 MW, net

Fuel use 46.11 litre/s
Heat input 1635.56 kW, net 1816.70 kW, gross

Volumetric flowrate of flue gas 0.461 m3/s at 0% moisture
3% oxygen, dry
273 K

Flow: 0.461 m3/s 1659.6 m3/hr

Nitrogen oxides emissions:

31 mg/kWh

2777 kW normal running load

3670 kW heat up load

NOx emissions

51.9 mg/Nm3 normal running load

68.6 mg/Nm3 heat up load

Sense check (against the estimated g/hr):

86 g/hr 0.024 g/s

114 g/hr 0.032 g/s

51.82 mg/Nm3 matches the above

68.69 mg/Nm3 matches the above