

**When it comes to sustainability,
we think from the ground up.**



# GILLES BIOMASS BOILER

The most efficient way to heat on a low to zero carbon fuel

remeha
renewable technologies

**CONTENTS**


| | page |
|---|---|
| Introduction | 2 |
| Biomass and climate change | 3 |
| Fuel choices | 4 |
| Fuel storage | 5 |
| Fuel calculator | 6 |
| Transport systems | 7 |
| HPK-RA | 9 |
| HPKI-L 199 | 27 |
| HPKI-K 180-550kW | 29 |
| HPKI-R 999 | 34 |
| Important information | 36 |
| Notes | 38 |


# REMEHA COMMERCIAL - HIGH PERFORMANCE, HIGH EFFICIENCY BIOMASS BOILER TECHNOLOGY

Remeha Commercial has been manufacturing and supplying high performance low-carbon and energy-efficient heating products since 1935. Climate change is globally considered to be one of the most pressing and challenging issues of our time. As a company, Remeha is committed to creating a more sustainable future with new products that will support businesses and organisations in meeting our UK environmental and legislative targets and the nation in achieving decarbonisation.

Climate change is caused by the emission of harmful greenhouse gases which act like a blanket over the Earth's surface, trapping heat in the atmosphere and raising surface and atmospheric temperatures with devastating results to the planet. Carbon dioxide ($CO_2$) is one of the primary greenhouse gases.

Heating currently accounts for almost half of the UK's carbon emissions. Using biomass as a fuel to produce deliver low carbon heating and hot water from a renewable source could significantly reduce this. The Carbon Trust suggests that lifetime $CO_2$ emissions for woodchip biomass are in the range of 10-23 kg $CO_2$/MWh compared with 263-302 kg$CO_2$/MWh for natural gas. As technology advances, biomass boilers now offer greater ease of use and flexibility making them one of the most popular of all renewable technologies.

Remeha's range of high performance biomass boilers provide controllable, environmentally-friendly, low-carbon heating with efficiencies of up to 96% GCV and emission levels significantly below the new minimum levels of Building Regulations. Biomass boilers are often specified in conjunction with gas condensing boilers. The Remeha range of biomass boilers is fully-compatible with our market-leading, renewable-ready, high-efficiency gas condensing boilers, offering a quality solution to energy-efficient, low to zero carbon heating from a single supplier. With our technologically-advanced range of biomass boilers, our knowledgeable team and our experience of around 600 installations across the UK, when the heat is required on demand, Remeha Commercial can help.

# BIOMASS AND CLIMATE CHANGE

One of the most important environmental benefits of using sustainably produced wood for energy in place of fossil fuels is its positive impact in helping moderate long-term global climate change.

Fossil fuel combustion takes carbon that was locked away underground (as crude oil, gas, or coal) millions of years ago and transfers that carbon to the atmosphere as new $CO_2$. When wood is burned, on the other hand, it recycles carbon that was already in the natural carbon cycle, which is recaptured through sustainable forest growth. Consequently, the net long-term effect of burning wood fuel is considerably less, as long as the sources from which the wood came are sustainably managed.

**Biomass offers three key advantages over fossil fuel alternatives:**

**Carbon savings:** using solid biomass for heating typically gives reductions in carbon of around 80 to 90 per cent compared with fossil fuel alternatives.

**Fuel price savings:** biomass is up to 80% cheaper than heating oil.

**RHI funding:** Government support through the Renewable Heat Incentive means that biomass generates considerable annual payments for the amount of heat it generates and uses. This funding is dependent on boiler size and heat output

The Remeha range of fully-automated wood chip and wood pellet biomass boilers uses advanced combustion technology to achieve an outstanding combustion efficiency of up to 96%, resulting in lower fuel consumption and reduced ash of just 0.5-1%.

With emission levels significantly below the new minimum levels of Building Regulations, Remeha biomass boilers meet all environmental regulations and are eligible for RHI funding.







# FUEL CHOICES

This guide is to help the designer decide which wood fuel to choose and assumes that the choice to burn wood chips or pellets as a fuel has been made and that the different characteristics of the fuel need to be considered before making a final decision.

Wood pellets have a calorific value and a higher bulk density than Wood chip, this could make them more suitable for installations with a limited storage capacity or where frequent fuel deliveries are not viable (the calorific value of 5m³ of Wood pellet is equivalent to approximately 18m³ of Wood chip).

## Wood pellets Vs Wood chips

- Pellets flow freely whereas chips do not
- Pellets are a more dense form of fuel than chips therefore take less storage space per kW/hr
- Pellets are generally more expensive per kW/hr than chips
- A wood chip boiler can burn pellets whereas a pellet boiler can't burn wood chip

## Summary

At the time of writing chips are about 60% of the cost per kW/hr of Natural Gas and pellets are about the same as Natural Gas, therefore chips do have the possibility of giving a payback as well. Pellets are about 50% the cost of Gas Oil per kW/hr.

If fuel storage space, on site labour or a local supply of chips are unavailable, it is evident that pellets will give a significant carbon reduction over traditional heating fuels.

| | Wood pellet | Wood chip |
|---|---|---|
| Density kg/m³ approx | 650 | 200 |
| Heat output kW hr/m³ approx | 3000 | 800 |



# WOOD FUEL STORAGE

Consideration now needs to be given to the type of fuel store suitable for the different fuels as each has a different requirement. There is however one overriding consideration to bear in mind for both fuels: it is easier to move the heating system water than wood fuel, so try to keep the fuel store as close to the wood boiler as possible. The simpler the fuel route the better!

What capacity does the fuel store need to be?

Calculation of the fuel store capacity is dependent upon a number of factors:

- What output is the boiler in kW?
- How many hours per week will it be in operation?
- Which type of fuel is being used – pellet or chip?
- How often are fuel deliveries feasible?
- What is the capacity of the delivery vehicle?

**Wood chip example**

A 160kW boiler in a school working 6hrs per day at full output burning wood chip will burn the following amount of fuel per week.

160kW x 6hrs per day x 5 days per week = 4800 kW/hrs per week.

4800 divided by 800 (the amount of kW/hrs per m³ of chips) = 6m³ per week.

Most fuel delivery vehicles carry approximately 30m³ of fuel so in this instance if a 36/38m³ store could be created a delivery would be required approximately every 6 weeks without the store needing to be fully empty to receive a full load.

**Wood pellet example**

A 100kW boiler in a sports centre working approximately 12hrs per day at full output burning pellets will burn the following amount of fuel per week.

100kW x12hrs per day x 7 days per week = 8400kW/hrs per week.

8400 divided by 3000 (the amount of kW/hrs per m³ of pellets) = 2.8m³ per week.

That would require a full load approximately every 10 weeks or a half load every month or so.

**CALCULATIONS AT A GLANCE:**

**Wood chip**

Boiler output (kW) x hrs run per day x day run per week = kW/hrs produced per week.

kW/hrs per week divided by 800 (kW/hrs per m³ of chips) = m³ required per week.

**Wood pellet**

Boiler output (kW) x hrs run per day x day run per week = kW/hrs produced per week.

kW/hrs per week divided by 3000 (kW/hrs per m³ of Pellet) = m³ required per week.

## Wood chip storage

As mentioned previously, chips do not free flow so are not suitable for the sort of storage used for pellets. To move chips from the store to the transport system, a Sweep Auger needs to be used.

In operation the auger, which is driven by an electric motor, transfers its drive into a gearbox underneath the circular disc which then makes the arms rotate and drag the fuel to the auger. The fuel is then transported to the boiler via auger(s) like wood pellets.

Choose the largest diameter sweep collector that will fit between the fuel store walls to minimise fuel left around the edges.

Sweep collector operation undermines fuel causing it to fall inwards and then be fed into the feed auger. One motor drives the sweep collector and feed auger.

The wood chip store should be as square as possible to minimise the fuel left in the corners.

## Wood pellet storage

As previously mentioned, pellets will flow freely so they can be kept in a fuel store with a sloping floor to a central feed auger (ideal slope of 40 degrees or more). The fuel can then be moved using augers to the boiler or feed another auger to take the fuel further using extra augers. Alternatively, if no fuel storage room is available or you do not want to adapt one, other pellet storage options are available.

# BIOMASS FUEL CALCULATOR FOR 5 DAY WEEK

**Chip (800kW/hrs/m³ @ 200kgs)**

| Boiler Output kW | Full Load Operating Hours/Day | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 0.78 | 0.94 | 1.09 | 1.25 | 1.41 | 1.56 | 1.72 | 1.88 | 2.03 | 2.19 | 2.34 | 2.50 | 2.66 | 2.81 | 2.97 | 3.13 | 3.28 | 3.44 | 3.59 | 3.75 |
| 50 | 1.56 | 1.88 | 2.19 | 2.50 | 2.81 | 3.13 | 3.44 | 3.75 | 4.06 | 4.38 | 4.69 | 5.00 | 5.31 | 5.63 | 5.94 | 6.25 | 6.56 | 6.88 | 7.19 | 7.50 |
| 75 | 2.34 | 2.81 | 3.28 | 3.75 | 4.22 | 4.69 | 5.16 | 5.63 | 6.09 | 6.56 | 7.03 | 7.50 | 7.97 | 8.44 | 8.91 | 9.38 | 9.84 | 10.31 | 10.78 | 11.25 |
| 100 | 3.13 | 3.75 | 4.38 | 5.00 | 5.63 | 6.25 | 6.88 | 7.50 | 8.13 | 8.75 | 9.38 | 10.00 | 10.63 | 11.25 | 11.88 | 12.50 | 13.13 | 13.75 | 14.38 | 15.00 |
| 125 | 3.91 | 4.69 | 5.47 | 6.25 | 7.03 | 7.81 | 8.59 | 9.38 | 10.16 | 10.94 | 11.72 | 12.50 | 13.28 | 14.06 | 14.84 | 15.63 | 16.41 | 17.19 | 17.97 | 18.75 |
| 150 | 4.69 | 5.63 | 6.56 | 7.50 | 8.44 | 9.38 | 10.31 | 11.25 | 12.19 | 13.13 | 14.06 | 15.00 | 15.94 | 16.88 | 17.81 | 18.75 | 19.69 | 20.63 | 21.56 | 22.50 |
| 175 | 5.47 | 6.56 | 7.66 | 8.75 | 9.84 | 10.94 | 12.03 | 13.13 | 14.22 | 15.31 | 16.41 | 17.50 | 18.59 | 19.69 | 20.78 | 21.88 | 22.97 | 24.06 | 25.16 | 26.25 |
| 200 | 6.25 | 7.50 | 8.75 | 10.00 | 11.25 | 12.50 | 13.75 | 15.00 | 16.25 | 17.50 | 18.75 | 20.00 | 21.25 | 22.50 | 23.75 | 25.00 | 26.25 | 27.50 | 28.75 | 30.00 |
| 225 | 7.03 | 8.44 | 9.84 | 11.25 | 12.66 | 14.06 | 15.47 | 16.88 | 18.28 | 19.69 | 21.09 | 22.50 | 23.91 | 25.31 | 26.72 | 28.13 | 29.53 | 30.94 | 32.34 | 33.75 |
| 250 | 7.81 | 9.38 | 10.94 | 12.50 | 14.06 | 15.63 | 17.19 | 18.75 | 20.31 | 21.88 | 23.44 | 25.00 | 26.56 | 28.13 | 29.69 | 31.25 | 32.81 | 34.38 | 35.94 | 37.50 |
| 275 | 8.59 | 10.31 | 12.03 | 13.75 | 15.47 | 17.19 | 18.91 | 20.63 | 22.34 | 24.06 | 25.78 | 27.50 | 29.22 | 30.94 | 32.66 | 34.38 | 36.09 | 37.81 | 39.53 | 41.25 |
| 300 | 9.38 | 11.25 | 13.13 | 15.00 | 16.88 | 18.75 | 20.63 | 22.50 | 24.38 | 26.25 | 28.13 | 30.00 | 31.88 | 33.75 | 35.63 | 37.50 | 39.38 | 41.25 | 43.13 | 45.00 |
| 325 | 10.16 | 12.19 | 14.22 | 16.25 | 18.28 | 20.31 | 22.34 | 24.38 | 26.41 | 28.44 | 30.47 | 32.50 | 34.53 | 36.56 | 38.59 | 40.63 | 42.66 | 44.69 | 46.72 | 48.75 |
| 350 | 10.94 | 13.13 | 15.31 | 17.50 | 19.69 | 21.88 | 24.06 | 26.25 | 28.44 | 30.63 | 32.81 | 35.00 | 37.19 | 39.38 | 41.56 | 43.75 | 45.94 | 48.13 | 50.31 | 52.50 |
| 375 | 11.72 | 14.06 | 16.41 | 18.75 | 21.09 | 23.44 | 25.78 | 28.13 | 30.47 | 32.81 | 35.16 | 37.50 | 39.84 | 42.19 | 44.53 | 46.88 | 49.22 | 51.56 | 53.91 | 56.25 |
| 400 | 12.50 | 15.00 | 17.50 | 20.00 | 22.50 | 25.00 | 27.50 | 30.00 | 32.50 | 35.00 | 37.50 | 40.00 | 42.50 | 45.00 | 47.50 | 50.00 | 52.50 | 55.00 | 57.50 | 60.00 |
| 425 | 13.28 | 15.94 | 18.59 | 21.25 | 23.91 | 26.56 | 29.22 | 31.88 | 34.53 | 37.19 | 39.84 | 42.50 | 45.16 | 47.81 | 50.47 | 53.13 | 55.78 | 58.44 | 61.09 | 63.75 |
| 450 | 14.06 | 16.88 | 19.69 | 22.50 | 25.31 | 28.13 | 30.94 | 33.75 | 36.56 | 39.38 | 42.19 | 45.00 | 47.81 | 50.63 | 53.44 | 56.25 | 59.06 | 61.88 | 64.69 | 67.50 |
| 475 | 14.84 | 17.81 | 20.78 | 23.75 | 26.72 | 29.69 | 32.66 | 35.63 | 38.59 | 41.56 | 44.53 | 47.50 | 50.47 | 53.44 | 56.41 | 59.38 | 62.34 | 65.31 | 68.28 | 71.25 |
| 500 | 15.63 | 18.75 | 21.88 | 25.00 | 28.13 | 31.25 | 34.38 | 37.50 | 40.63 | 43.75 | 46.88 | 50.00 | 53.13 | 56.25 | 59.38 | 62.50 | 65.63 | 68.75 | 71.88 | 75.00 |

**Pellet (3000kW/hrs/m³ @ 650kgs)**

| Boiler Output kW | Full Load Operating Hours/Day | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 0.21 | 0.25 | 0.29 | 0.33 | 0.38 | 0.42 | 0.46 | 0.50 | 0.54 | 0.58 | 0.63 | 0.67 | 0.71 | 0.75 | 0.79 | 0.83 | 0.88 | 0.92 | 0.96 | 1.00 |
| 50 | 0.42 | 0.50 | 0.58 | 0.67 | 0.75 | 0.83 | 0.92 | 1.00 | 1.08 | 1.17 | 1.25 | 1.33 | 1.42 | 1.50 | 1.58 | 1.67 | 1.75 | 1.83 | 1.92 | 2.00 |
| 75 | 0.63 | 0.75 | 0.88 | 1.00 | 1.13 | 1.25 | 1.38 | 1.50 | 1.63 | 1.75 | 1.88 | 2.00 | 2.13 | 2.25 | 2.38 | 2.50 | 2.63 | 2.75 | 2.88 | 3.00 |
| 100 | 0.83 | 1.00 | 1.17 | 1.33 | 1.50 | 1.67 | 1.83 | 2.00 | 2.17 | 2.33 | 2.50 | 2.67 | 2.83 | 3.00 | 3.17 | 3.33 | 3.50 | 3.67 | 3.83 | 4.00 |
| 125 | 1.04 | 1.25 | 1.46 | 1.67 | 1.88 | 2.08 | 2.29 | 2.50 | 2.71 | 2.92 | 3.13 | 3.33 | 3.54 | 3.75 | 3.96 | 4.17 | 4.38 | 4.58 | 4.79 | 5.00 |
| 150 | 1.25 | 1.50 | 1.75 | 2.00 | 2.25 | 2.50 | 2.75 | 3.00 | 3.25 | 3.50 | 3.75 | 4.00 | 4.25 | 4.50 | 4.75 | 5.00 | 5.25 | 5.50 | 5.75 | 6.00 |
| 175 | 1.46 | 1.75 | 2.04 | 2.33 | 2.63 | 2.92 | 3.21 | 3.50 | 3.79 | 4.08 | 4.38 | 4.67 | 4.96 | 5.25 | 5.54 | 5.83 | 6.13 | 6.42 | 6.71 | 7.00 |
| 200 | 1.67 | 2.00 | 2.33 | 2.67 | 3.00 | 3.33 | 3.67 | 4.00 | 4.33 | 4.67 | 5.00 | 5.33 | 5.67 | 6.00 | 6.33 | 6.67 | 7.00 | 7.33 | 7.67 | 8.00 |
| 225 | 1.88 | 2.25 | 2.63 | 3.00 | 3.38 | 3.75 | 4.13 | 4.50 | 4.88 | 5.25 | 5.63 | 6.00 | 6.38 | 6.75 | 7.13 | 7.50 | 7.88 | 8.25 | 8.63 | 9.00 |
| 250 | 2.08 | 2.50 | 2.92 | 3.33 | 3.75 | 4.17 | 4.58 | 5.00 | 5.42 | 5.83 | 6.25 | 6.67 | 7.08 | 7.50 | 7.92 | 8.33 | 8.75 | 9.17 | 9.58 | 10.00 |
| 275 | 2.29 | 2.75 | 3.21 | 3.67 | 4.13 | 4.58 | 5.04 | 5.50 | 5.96 | 6.42 | 6.88 | 7.33 | 7.79 | 8.25 | 8.71 | 9.17 | 9.63 | 10.08 | 10.54 | 11.00 |
| 300 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 | 5.50 | 6.00 | 6.50 | 7.00 | 7.50 | 8.00 | 8.50 | 9.00 | 9.50 | 10.00 | 10.50 | 11.00 | 11.50 | 12.00 |
| 325 | 2.71 | 3.25 | 3.79 | 4.33 | 4.88 | 5.42 | 5.96 | 6.50 | 7.04 | 7.58 | 8.13 | 8.67 | 9.21 | 9.75 | 10.29 | 10.83 | 11.38 | 11.92 | 12.46 | 13.00 |
| 350 | 2.92 | 3.50 | 4.08 | 4.67 | 5.25 | 5.83 | 6.42 | 7.00 | 7.58 | 8.17 | 8.75 | 9.33 | 9.92 | 10.50 | 11.08 | 11.67 | 12.25 | 12.83 | 13.42 | 14.00 |
| 375 | 3.13 | 3.75 | 4.38 | 5.00 | 5.63 | 6.25 | 6.88 | 7.50 | 8.13 | 8.75 | 9.38 | 10.00 | 10.63 | 11.25 | 11.88 | 12.50 | 13.13 | 13.75 | 14.38 | 15.00 |
| 400 | 3.33 | 4.00 | 4.67 | 5.33 | 6.00 | 6.67 | 7.33 | 8.00 | 8.67 | 9.33 | 10.00 | 10.67 | 11.33 | 12.00 | 12.67 | 13.33 | 14.00 | 14.67 | 15.33 | 16.00 |
| 425 | 3.54 | 4.25 | 4.96 | 5.67 | 6.38 | 7.08 | 7.79 | 8.50 | 9.21 | 9.92 | 10.63 | 11.33 | 12.04 | 12.75 | 13.46 | 14.17 | 14.88 | 15.58 | 16.29 | 17.00 |
| 450 | 3.75 | 4.50 | 5.25 | 6.00 | 6.75 | 7.50 | 8.25 | 9.00 | 9.75 | 10.50 | 11.25 | 12.00 | 12.75 | 13.50 | 14.25 | 15.00 | 15.75 | 16.50 | 17.25 | 18.00 |
| 475 | 3.96 | 4.75 | 5.54 | 6.33 | 7.13 | 7.92 | 8.71 | 9.50 | 10.29 | 11.08 | 11.88 | 12.67 | 13.46 | 14.25 | 15.04 | 15.83 | 16.63 | 17.42 | 18.21 | 19.00 |
| 500 | 4.17 | 5.00 | 5.83 | 6.67 | 7.50 | 8.33 | 9.17 | 10.00 | 10.83 | 11.67 | 12.50 | 13.33 | 14.17 | 15.00 | 15.83 | 16.67 | 17.50 | 18.33 | 19.17 | 20.00 |

# BIOMASS FUEL CALCULATOR PER DAY

**Chip (800kW/hrs/m³ @ 200kgs)**

| Boiler Output kW | Full Load Operating Hours/Day | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 0.16 | 0.19 | 0.22 | 0.25 | 0.28 | 0.31 | 0.34 | 0.38 | 0.41 | 0.44 | 0.47 | 0.50 | 0.53 | 0.56 | 0.59 | 0.63 | 0.66 | 0.69 | 0.72 | 0.75 |
| 50 | 0.31 | 0.38 | 0.44 | 0.50 | 0.56 | 0.63 | 0.69 | 0.75 | 0.81 | 0.88 | 0.94 | 1.00 | 1.06 | 1.13 | 1.19 | 1.25 | 1.31 | 1.38 | 1.44 | 1.50 |
| 75 | 0.47 | 0.56 | 0.66 | 0.75 | 0.84 | 0.94 | 1.03 | 1.13 | 1.22 | 1.31 | 1.41 | 1.50 | 1.59 | 1.69 | 1.78 | 1.88 | 1.97 | 2.06 | 2.16 | 2.25 |
| 100 | 0.63 | 0.75 | 0.88 | 1.00 | 1.13 | 1.25 | 1.38 | 1.50 | 1.63 | 1.75 | 1.88 | 2.00 | 2.13 | 2.25 | 2.38 | 2.50 | 2.63 | 2.75 | 2.88 | 3.00 |
| 125 | 0.78 | 0.94 | 1.09 | 1.25 | 1.41 | 1.56 | 1.72 | 1.88 | 2.03 | 2.19 | 2.34 | 2.50 | 2.66 | 2.81 | 2.97 | 3.13 | 3.28 | 3.44 | 3.59 | 3.75 |
| 150 | 0.94 | 1.13 | 1.31 | 1.50 | 1.69 | 1.88 | 2.06 | 2.25 | 2.44 | 2.63 | 2.81 | 3.00 | 3.19 | 3.38 | 3.56 | 3.75 | 3.94 | 4.13 | 4.31 | 4.50 |
| 175 | 1.09 | 1.31 | 1.53 | 1.75 | 1.97 | 2.19 | 2.41 | 2.63 | 2.84 | 3.06 | 3.28 | 3.50 | 3.72 | 3.94 | 4.16 | 4.38 | 4.59 | 4.81 | 5.03 | 5.25 |
| 200 | 1.25 | 1.50 | 1.75 | 2.00 | 2.25 | 2.50 | 2.75 | 3.00 | 3.25 | 3.50 | 3.75 | 4.00 | 4.25 | 4.50 | 4.75 | 5.00 | 5.25 | 5.50 | 5.75 | 6.00 |
| 225 | 1.41 | 1.69 | 1.97 | 2.25 | 2.53 | 2.81 | 3.09 | 3.38 | 3.66 | 3.94 | 4.22 | 4.50 | 4.78 | 5.06 | 5.34 | 5.63 | 5.91 | 6.19 | 6.47 | 6.75 |
| 250 | 1.56 | 1.88 | 2.19 | 2.50 | 2.81 | 3.13 | 3.44 | 3.75 | 4.06 | 4.38 | 4.69 | 5.00 | 5.31 | 5.63 | 5.94 | 6.25 | 6.56 | 6.88 | 7.19 | 7.50 |
| 275 | 1.72 | 2.06 | 2.41 | 2.75 | 3.09 | 3.44 | 3.78 | 4.13 | 4.47 | 4.81 | 5.16 | 5.50 | 5.84 | 6.19 | 6.53 | 6.88 | 7.22 | 7.56 | 7.91 | 8.25 |
| 300 | 1.88 | 2.25 | 2.63 | 3.00 | 3.38 | 3.75 | 4.13 | 4.50 | 4.88 | 5.25 | 5.63 | 6.00 | 6.38 | 6.75 | 7.13 | 7.50 | 7.88 | 8.25 | 8.63 | 9.00 |
| 325 | 2.03 | 2.44 | 2.84 | 3.25 | 3.66 | 4.06 | 4.47 | 4.88 | 5.28 | 5.69 | 6.09 | 6.50 | 6.91 | 7.31 | 7.72 | 8.13 | 8.53 | 8.94 | 9.34 | 9.75 |
| 350 | 2.19 | 2.63 | 3.06 | 3.50 | 3.94 | 4.38 | 4.81 | 5.25 | 5.69 | 6.13 | 6.56 | 7.00 | 7.44 | 7.88 | 8.31 | 8.75 | 9.19 | 9.63 | 10.06 | 10.50 |
| 375 | 2.34 | 2.81 | 3.28 | 3.75 | 4.22 | 4.69 | 5.16 | 5.63 | 6.09 | 6.56 | 7.03 | 7.50 | 7.97 | 8.44 | 8.91 | 9.38 | 9.84 | 10.31 | 10.78 | 11.25 |
| 400 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 | 5.50 | 6.00 | 6.50 | 7.00 | 7.50 | 8.00 | 8.50 | 9.00 | 9.50 | 10.00 | 10.50 | 11.00 | 11.50 | 12.00 |
| 425 | 2.66 | 3.19 | 3.72 | 4.25 | 4.78 | 5.31 | 5.84 | 6.38 | 6.91 | 7.44 | 7.97 | 8.50 | 9.03 | 9.56 | 10.09 | 10.63 | 11.16 | 11.69 | 12.22 | 12.75 |
| 450 | 2.81 | 3.38 | 3.94 | 4.50 | 5.06 | 5.63 | 6.19 | 6.75 | 7.31 | 7.88 | 8.44 | 9.00 | 9.56 | 10.13 | 10.69 | 11.25 | 11.81 | 12.38 | 12.94 | 13.50 |
| 475 | 2.97 | 3.56 | 4.16 | 4.75 | 5.34 | 5.94 | 6.53 | 7.13 | 7.72 | 8.31 | 8.91 | 9.50 | 10.09 | 10.69 | 11.28 | 11.88 | 12.47 | 13.06 | 13.66 | 14.25 |
| 500 | 3.13 | 3.75 | 4.38 | 5.00 | 5.63 | 6.25 | 6.88 | 7.50 | 8.13 | 8.75 | 9.38 | 10.00 | 10.63 | 11.25 | 11.88 | 12.50 | 13.13 | 13.75 | 14.38 | 15.00 |

**Pellet (3000kW/hrs/m³ @ 650kgs)**

| Boiler Output kW | Full Load Operating Hours/Day | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.08 | 0.09 | 0.10 | 0.11 | 0.12 | 0.13 | 0.13 | 0.14 | 0.15 | 0.16 | 0.17 | 0.18 | 0.18 | 0.19 | 0.20 |
| 50 | 0.08 | 0.10 | 0.12 | 0.13 | 0.15 | 0.17 | 0.18 | 0.20 | 0.22 | 0.23 | 0.25 | 0.27 | 0.28 | 0.30 | 0.32 | 0.33 | 0.35 | 0.37 | 0.38 | 0.40 |
| 75 | 0.13 | 0.15 | 0.18 | 0.20 | 0.23 | 0.25 | 0.28 | 0.30 | 0.33 | 0.35 | 0.38 | 0.40 | 0.43 | 0.45 | 0.48 | 0.50 | 0.53 | 0.55 | 0.58 | 0.60 |
| 100 | 0.17 | 0.20 | 0.23 | 0.27 | 0.30 | 0.33 | 0.37 | 0.40 | 0.43 | 0.47 | 0.50 | 0.53 | 0.57 | 0.60 | 0.63 | 0.67 | 0.70 | 0.73 | 0.77 | 0.80 |
| 125 | 0.21 | 0.25 | 0.29 | 0.33 | 0.38 | 0.42 | 0.46 | 0.50 | 0.54 | 0.58 | 0.63 | 0.67 | 0.71 | 0.75 | 0.79 | 0.83 | 0.88 | 0.92 | 0.96 | 1.00 |
| 150 | 0.25 | 0.30 | 0.35 | 0.40 | 0.45 | 0.50 | 0.55 | 0.60 | 0.65 | 0.70 | 0.75 | 0.80 | 0.85 | 0.90 | 0.95 | 1.00 | 1.05 | 1.10 | 1.15 | 1.20 |
| 175 | 0.29 | 0.35 | 0.41 | 0.47 | 0.53 | 0.58 | 0.64 | 0.70 | 0.76 | 0.82 | 0.88 | 0.93 | 0.99 | 1.05 | 1.11 | 1.17 | 1.23 | 1.28 | 1.34 | 1.40 |
| 200 | 0.33 | 0.40 | 0.47 | 0.53 | 0.60 | 0.67 | 0.73 | 0.80 | 0.87 | 0.93 | 1.00 | 1.07 | 1.13 | 1.20 | 1.27 | 1.33 | 1.40 | 1.47 | 1.53 | 1.60 |
| 225 | 0.38 | 0.45 | 0.53 | 0.60 | 0.68 | 0.75 | 0.83 | 0.90 | 0.98 | 1.05 | 1.13 | 1.20 | 1.28 | 1.35 | 1.43 | 1.50 | 1.58 | 1.65 | 1.73 | 1.80 |
| 250 | 0.42 | 0.50 | 0.58 | 0.67 | 0.75 | 0.83 | 0.92 | 1.00 | 1.08 | 1.17 | 1.25 | 1.33 | 1.42 | 1.50 | 1.58 | 1.67 | 1.75 | 1.83 | 1.92 | 2.00 |
| 275 | 0.46 | 0.55 | 0.64 | 0.73 | 0.83 | 0.92 | 1.01 | 1.10 | 1.19 | 1.28 | 1.38 | 1.47 | 1.56 | 1.65 | 1.74 | 1.83 | 1.93 | 2.02 | 2.11 | 2.20 |
| 300 | 0.50 | 0.60 | 0.70 | 0.80 | 0.90 | 1.00 | 1.10 | 1.20 | 1.30 | 1.40 | 1.50 | 1.60 | 1.70 | 1.80 | 1.90 | 2.00 | 2.10 | 2.20 | 2.30 | 2.40 |
| 325 | 0.54 | 0.65 | 0.76 | 0.87 | 0.98 | 1.08 | 1.19 | 1.30 | 1.41 | 1.52 | 1.63 | 1.73 | 1.84 | 1.95 | 2.06 | 2.17 | 2.28 | 2.38 | 2.49 | 2.60 |
| 350 | 0.58 | 0.70 | 0.82 | 0.93 | 1.05 | 1.17 | 1.28 | 1.40 | 1.52 | 1.63 | 1.75 | 1.87 | 1.98 | 2.10 | 2.22 | 2.33 | 2.45 | 2.57 | 2.68 | 2.80 |
| 375 | 0.63 | 0.75 | 0.88 | 1.00 | 1.13 | 1.25 | 1.38 | 1.50 | 1.63 | 1.75 | 1.88 | 2.00 | 2.13 | 2.25 | 2.38 | 2.50 | 2.63 | 2.75 | 2.88 | 3.00 |
| 400 | 0.67 | 0.80 | 0.93 | 1.07 | 1.20 | 1.33 | 1.47 | 1.60 | 1.73 | 1.87 | 2.00 | 2.13 | 2.27 | 2.40 | 2.53 | 2.67 | 2.80 | 2.93 | 3.07 | 3.20 |
| 425 | 0.71 | 0.85 | 0.99 | 1.13 | 1.28 | 1.42 | 1.56 | 1.70 | 1.84 | 1.98 | 2.13 | 2.27 | 2.41 | 2.55 | 2.69 | 2.83 | 2.98 | 3.12 | 3.26 | 3.40 |
| 450 | 0.75 | 0.90 | 1.05 | 1.20 | 1.35 | 1.50 | 1.65 | 1.80 | 1.95 | 2.10 | 2.25 | 2.40 | 2.55 | 2.70 | 2.85 | 3.00 | 3.15 | 3.30 | 3.45 | 3.60 |
| 475 | 0.79 | 0.95 | 1.11 | 1.27 | 1.43 | 1.58 | 1.74 | 1.90 | 2.06 | 2.22 | 2.38 | 2.53 | 2.69 | 2.85 | 3.01 | 3.17 | 3.33 | 3.48 | 3.64 | 3.80 |
| 500 | 0.83 | 1.00 | 1.17 | 1.33 | 1.50 | 1.67 | 1.83 | 2.00 | 2.17 | 2.33 | 2.50 | 2.67 | 2.83 | 3.00 | 3.17 | 3.33 | 3.50 | 3.67 | 3.83 | 4.00 |





# TRANSPORT SYSTEMS

## Standard, rising and kinked pellet augers

Pellet auger with gear motor, multiple bearings and support feet for stability.

Auger channel for conveying the pellets with progressive pitch auger flights. After the system starts the augers convey the pellets from the storage room towards the boiler into the cell wheel on the pellet burner. The special layout of the auger ensures smooth and trouble-free fuel transport.



Standard auger

## Special features

Transport auger with progressive pitch (for gentle and easy transport of the pellets to the burner)

Gear box protection coupling prevents the auger and gear box from overload



Rising auger



Kinked auger

## Standard hinged sweep collector for woodchip

The main components are the spur gears used specifically by GILLES. They have a torque of 5000Nm and special seals that effectively and continuously prevent the penetration of dust and cuttings.
The robust design of the double-arm telescopic collector is also unmatched. This technology used by GILLES is the first to allow safe, fully automatic and convenient wood combustion. Two standard hinged arms make working in a small space radius possible. The ripping hook prevents blockages in that larger wood chips are automatically pushed down and cut in the cell wheel. Included is the pressure disc, the gear motor and the pre-tensioning device.

Max. delivery height for wood chip: 5m.

Includes safety device.

Over heat protection valve (OPV) for automatic extinguishing. By means of the controlled overrun of the stoker auger, the fuel supply chain is interrupted and eliminates back burning.

Incl. diameter adjustment.

- Massive auger shaft.

- 8 mm strong auger flights.

- Continuously welded progressive pitch auger flights.

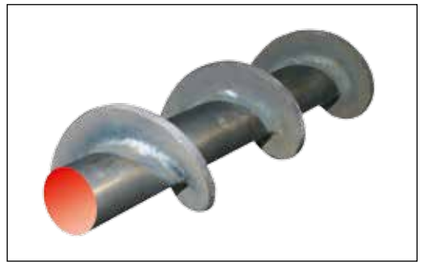
- Suitable for material size of G50 at maximum.



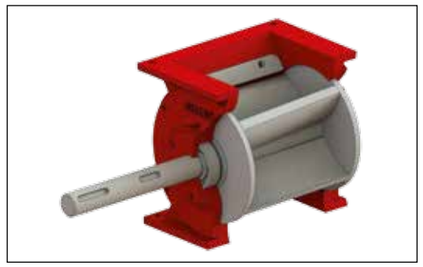
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Ripping hook



Continuously welded 8 mm auger flights



Cell wheel

## Special features

**Ripping hook** prevents blockages in that larger wood chips are automatically pushed down to then be cut in the cell wheel.

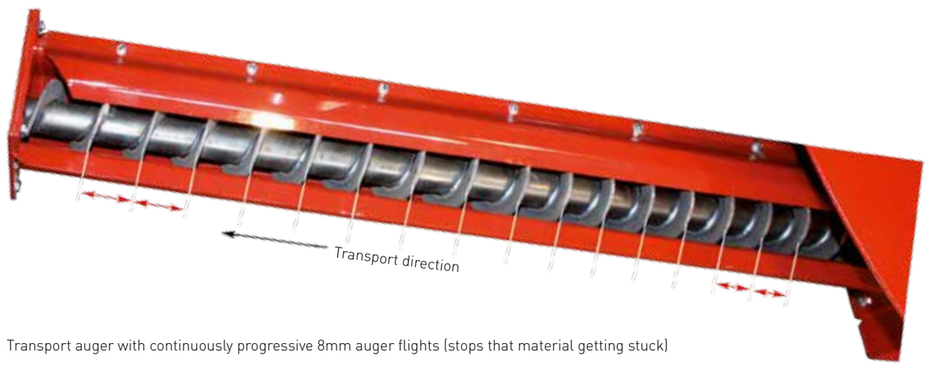
**Transport auger** with continuously welded 8mm auger flights and progressive pitch (prevents blockages)

### Cell wheel and combustion chamber

The cell wheel is a multi tested full-metal cell wheel reliably interrupts the boiler with the storage room and thus provides 100% protection against burnback. The blades attached to the running wheel are slightly curved which prevents noise generation and reduces compressive forces. From HPK-RA 75 these blades are running at an offset angle to the rotary axis to enhance the cutting action with a fixed cutting edge integrated in the stable noise-damping cast enclosure.

### Combustion chamber

High combustion temperatures guaranteed in all performance ranges and the best possible use of your fuel. Well designed air guidance is a precondition for highest quality of combustion. Years of experience, high tech development, resistant materials guarantee clean combustion and long service life.




Transport auger with continuously progressive 8mm auger flights (stops that material getting stuck)



## HPK-RA PELLET



## HPK-RA WOOD CHIP



## OVERVIEW

Gilles HPK-RA boilers are suitable for both pellet and woodchip, the high-performance boiler is produced as a tension-free welded construction to maximise the strength and durability of the boiler. Welded high-performance multiple-draught boiler in thick-walled boiler plate S235JR 6mm width. Horizontal heat exchanger tubes in seamless drawn thick-wall boiler pipe. 70mm thick external insulation.

Suitable for automatic combustion of wood chip and pellets and without any adjustments suitable for using pieces of wood in emergency operation, thanks to an additional combustion chamber opening and grate.

- Operational pressure max 3 bar
- Boilers have efficiency of >90%
- Modulation down to 30% of nominal output
- Automatic Ignition, Heat Exchanger cleaning and Ash removal
- 'Cell Wheel' burn back protection device
- Gilles touch heating control
- Bespoke fuel storage and transport system design

**Suitable fuel characteristics:**

Wood Chip
G50, W30 as per EN 14961-4 Property Class A1

Pellet
6mm ø as per EN 14961-2 Property Class A1

## BOILER CONTROLS

The Gilles Touch control panel incorporates state of the art programming and instrumentation. Alongside conventional sensors the boiler benefits from independently controlled primary and secondary combustion zones managed by the control system. This enables clean and complete burning of the fuel and achieves 95% efficiency, optimising emissions.

The Gilles Touch, via an internet connection, allows access and maintenance of the system from any computer, Smartphone or tablet device, this allows adjustment of the specific heatload without being in the vicinity of the boiler allowing you to change the requirements as and when needed. The advanced control system and high capacity heat exchangers in the boiler enables unrivalled modulation according to your specific demands.

**Benefits**

- Settings for different fuels
- Setting and alteration of all heating requirements via PC/Mac, Smartphone or tablet
- Modulation of the boiler
- Remote servicing of the boiler via internet
- Cascade control of up to 5 boilers
- Trend logging over 6 months (exportable to USB stick and can be shown in Excel)
- Automatic error notification via email
- Password protected

**Optional**

- Automatic error notification via SMS
- Status request and alterations possible via SMS (current boiler temperature, operating mode, boiler status, etc.)

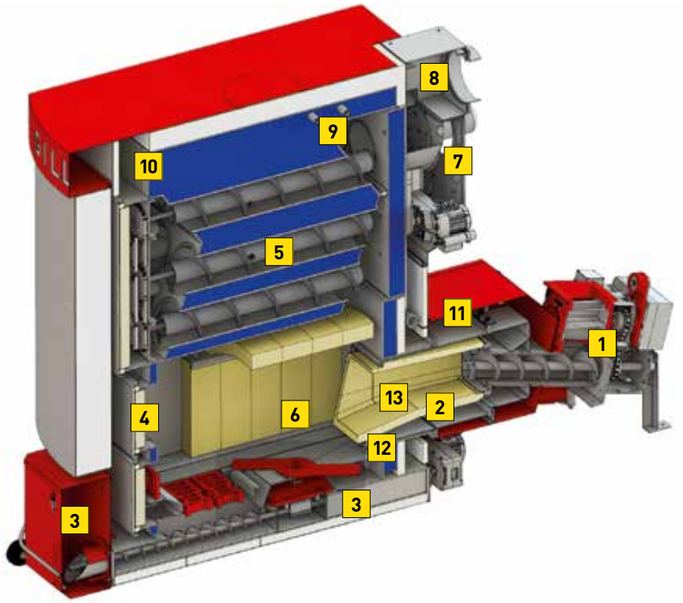
## HPK-RA PELLET




**Key Features**

1. Pellet burner in highly heat-resistant steel for HPK-RA 12.5 – 60 or ceramic for HPK-RA 75 – 160
2. Ash removal via ash agitator with special drive technology – ash compression resulting in long emptying intervals – rolling ash container
3. Combustion chamber door for log wood operation (no changeover required)
4. Horizontal pipe heat exchanger with automatic cleaning
5. Flue gas fan for optimal ignition process and permanent negative pressure in the boiler
6. Lambda probe for fuel detection and optimised, clean combustion process
7. Overheat protection
8. Welded multiple-draught boiler in 6 mm boiler plate
9. Shunt circuit with pump and mixing valve available
10. Primary air modulating variable
11. Secondary air modulating variable

## HPK-RA WOOD CHIP




**Key Features**

1. Cell wheel
2. Wood chip burner in high-quality heat-resistant ceramic
3. Ash removal via ash agitator with special drive technology – ash compression resulting in long emptying intervals
4. Combustion chamber door for log wood operation (no changeover required)
5. Horizontal pipe heat exchanger with automatic cleaning
6. Ceramic-lined afterburning chamber with individually offset heat-resistant fire bricks
7. Flue gas fan for optimal ignition process and permanent negative pressure in the boiler
8. Lambda probe for fuel detection and optimised, clean combustion process
9. Overheat protection
10. Welded multiple-draught boiler in 6 mm boiler plate
11. Shunt circuit with pump and mixing valve available
12. Primary air modulating variable
13. Secondary air modulating variable

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REMEHA GILLES BIOMASS BOILER HPK-RA OVERVIEW

# HPK-RA
# OUTPUT 49 - 153kW
# PELLET & WOOD CHIP



## HPK-RA 49

| | | Wood Pellet | | Wood Chip | |
|---|---|---|---|---|---|
| **Boiler Model** | | **HPK-RA 49** | | **HPK-RA 49** | |
| Product Code | | 401011 | | 401028 | |
| Full Load | kW | 49 | | 49 | |
| Part Load | kW | 15 | | 15 | |
| Boiler Dry Weight | kg | 724 | | 724 | |
| Dimensions L x W x H | mm | 1430 x 765 x 1445 | | 1430 x 765 x 1445 | |
| Hydraulic Pressure Drop | mbar 11K<br>mbar 20K | 36.5<br>11 | | 36.5<br>11 | |
| Water Flow Rate | l/s 10k<br>l/s 20k | 1.17<br>0.59 | | 1.17<br>0.59 | |
| Thermal Efficiency Full Load | % | 93.7 | | 91,7-93,1 | |
| Thermal Efficiency Part Load | % | 93.7 | | 92.8 | |
| Flow Temperature Max | °C | 95 | | 95 | |
| Return Temperature Min | °C | 55 | | 55 | |
| Maximum Working Pressure | bar | 3 | | 3 | |
| Fuel Type | | Pellets acc. to EN14961-2/OENORM M7135/DIN | | CEN/TS 14961 (P16, P45) | |
| Burner Type | | Forward fired | | Forward fired ceramic | |
| Consumption @ Full Load*1 | kg/hr | ~10 | | ~12 | |
| Burner Control On/Off | | Modulating | | Modulating | |
| Burner Noise Level | | n/a | | n/a | |
| Max Electric Power Input | kW | 3 | | 3 | |
| Max Current Consumption | A | 4.6 | | 4.6 | |
| Electrical Supply | | ~3/400V 50Hz 16A 5x2,5mm² | | ~3/400V 50Hz 16A 5x2,5mm² | |
| Flue Size | Ø mm | 180 | | 180 | |
| Height Central Line Flue Gas Outlet | mm | 1325 | | 1325 | |
| Flue Gas Volume Full Load | m³/hr | 86 | | 101 | |
| Flue Gas Volume Part Load | m³/hr | 32.3 | | 37.1 | |
| Flue Gas Temperature | High °C<br>Low °C | 126<br>94 | | 154<br>84 | |
| Type Tested and Seal of Approval by | | TÜV-Süd | | TÜV-Süd | |
| Test Procedure | | According to test report | | Range tested | |
| | | **13% Vol-% 02** | **10% Vol-% 02** | **13% Vol-% 02** | **10% Vol-% 02** |
| NOX Full Load*2*3*4 | mg/m³ | 82 | 113 | 94-105 | 129-145 |
| NOX Part Load*2*3*4 | mg/m³ | 77 | 106 | 101 | 138 |
| Organic "C" Full Load*2*4 | mg/m³ | 5 | 8 | 1 | 1-2 |
| Organic "C" Part Load*2*4 | mg/m³ | 2 | 3 | 5 | 7 |
| Dust Full Load*2*4 | mg/m³ | 15 | 20 | 11-29 | 15-40 |
| Dust Full Load*2*4 | mg/m³ | 19 | 26 | 19 | 26 |
| CO Full Load*2*4 | mg/m³ | 33 | 45 | 19-53 | 24-73 |
| CO Part Load*2*4 | mg/m³ | 22 | 31 | 163-224 | 224 |
| NOX Full Load*2*3 | mg/MJ | 54 | | 66-72 | |
| NOX Part Load*2*3 | mg/MJ | 50 | | 69-96 | |
| Organic "C" Full Load*2 | mg/MJ | 4 | | 1 | |
| Organic "C" Part Load*2 | mg/MJ | 1 | | 4 | |
| Dust Full Load*2 | mg/MJ | 10 | | 8-19 | |
| Dust Full Load*2 | mg/MJ | 12 | | 13 | |
| CO Full Load*2 | mg/MJ | 21 | | 12-36 | |
| CO Part Load*2 | mg/MJ | 15 | | 112 | |
| PM10 | | N/A | | N/A | |
| Delivery Dimensions | mm | | | | |
| Residual Fan Pressure Full Load | Pa | 9 | | 7 | |
| Residual Fan Pressure Part Load | Pa | 7 | | 8 | |
| Boiler Volume (Water) | Litre | 150 | | 150 | |
| Ash Container Volume | Litre | 43 | | 43 | |
| Flow Connection | | 1 1/2" | | 1 1/2" | |
| Return Connection | | 1 1/2" | | 1 1/2" | |
| Overheat Protection Valve Connection | | 1/2" | | 1/2" | |
| Burner Position | | Left or right | | Left/right or rear | |
| Ignition Method | | Electric/Automatic | | Electric/Automatic | |
| Feature | | Log wood operation possible | | Log wood operation possible | |
| Performance and Combustion Control | | Programmable logic controller | | Programmable logic controller | |
| Back Burn Protection by | | Full-metal cell wheel | | Full-metal cell wheel | |
| Ventilation Dependent Operation | | Yes | | Yes | |
| Type of Fans | | Radial fan | | Radial fan | |

*1 based on wood chips 20% moisture, 800kWh/kg, 200kg/m3
*2 referring to 0°C and 1013mbar, dry fume, 13% Vol-% $O_2$
*3 calculated as $NO_2$
*4 referring to 0°C and 1013mbar, dry fume, 10% Vol-% $O_2$

# HPK-RA 60

| | | Wood Pellet | | Wood Chip | |
|---|---|---|---|---|---|
| **Boiler Model** | | **HPK-RA 60** | | **HPK-RA 60** | |
| Product Code | | 401012 | | 401029 | |
| Full Load | kW | 60 | | 60 | |
| Part Load | kW | 18 | | 18 | |
| Boiler Dry Weight | kg | 1330 | | 1330 | |
| Dimensions L x W x H | mm | 1540 x 935 x 1785 | | 1540 x 935 x 1785 | |
| Hydraulic Pressure Drop | mbar 11K<br>mbar 20K | 6.1<br>1.8 | | 6.1<br>1.8 | |
| Water Flow Rate | l/s 10k<br>l/s 20k | 1.43<br>0.71 | | 1.43<br>0.71 | |
| Thermal Efficiency Full Load | % | 93.1 | | 91.7 | |
| Thermal Efficiency Part Load | % | 93.7 | | 92.8 | |
| Flow Temperature Max | °C | 95 | | 95 | |
| Return Temperature Min | °C | 55 | | 55 | |
| Maximum Working Pressure | bar | 3 | | 3 | |
| Fuel Type | | Pellets acc. to EN14961-2/OENORM M7135/DIN | | CEN/TS 14961 (P16, P45) | |
| Burner Type | | Forward fired | | Forward fired ceramic | |
| Consumption @ Full Load*1 | kg/hr | ~12 | | ~15 | |
| Burner Control On/Off | | Modulating | | Modulating | |
| Burner Noise Level | dB | n/a | | n/a | |
| Max Electric Power Input | kW | 3 | | 3 | |
| Max Current Consumption | A | 4.6 | | 4.6 | |
| Electrical Supply | | ~3/400V 50Hz 16A 5x2,5mm² | | ~3/400V 50Hz 16A 5x2,5mm² | |
| Flue Size | Ø mm | 200 | | 200 | |
| Height Central Line Flue Gas Outlet | mm | 1640 | | 1640 | |
| Flue Gas Volume Full Load | m³/hr | 108 | | 126 | |
| Flue Gas Volume Part Load | m³/hr | 39.9 | | 46 | |
| Flue Gas Temperature | High °C<br>Low °C | 144<br>94 | | 154<br>84 | |
| Type Tested and Seal of Approval by | | TÜV-Süd | | TÜV-Süd | |
| Test Procedure | | According to test report | | Range tested | |
| | | **13% Vol-% 02** | **10% Vol-% 02** | **13% Vol-% 02** | **10% Vol-% 02** |
| NOX Full Load*2*3*4 | mg/m³ | 101 | 138 | 94 | 129 |
| NOX Part Load*2*3*4 | mg/m³ | 77 | 106 | 101 | 138 |
| Organic "C" Full Load*2*4 | mg/m³ | 4 | 6 | 1 | 1 |
| Organic "C" Part Load*2*4 | mg/m³ | 2 | 3 | 5 | 7 |
| Dust Full Load*2*4 | mg/m³ | 16 | 23 | 11 | 15 |
| Dust Full Load*2*4 | mg/m³ | 19 | 26 | 19 | 26 |
| CO Full Load*2*4 | mg/m³ | 21 | 29 | 17 | 24 |
| CO Part Load*2*4 | mg/m³ | 22 | 32 | 163 | 224 |
| NOX Full Load*2*3 | mg/MJ | 77 | | 66 | |
| NOX Part Load*2*3 | mg/MJ | 50 | | 96 | |
| Organic "C" Full Load*2 | mg/MJ | 2 | | 1 | |
| Organic "C" Part Load*2 | mg/MJ | 1 | | 4 | |
| Dust Full Load*2 | mg/MJ | 19 | | 8 | |
| Dust Full Load*2 | mg/MJ | 12 | | 13 | |
| CO Full Load*2 | mg/MJ | 22 | | 12 | |
| CO Part Load*2 | mg/MJ | 15 | | 112 | |
| PM10 | | N/A | | N/A | |
| Delivery Dimensions | mm | | | | |
| Residual Fan Pressure Full Load | Pa | 11 | | 10 | |
| Residual Fan Pressure Part Load | Pa | 6 | | 9 | |
| Boiler Volume (Water) | Litre | 220 | | 220 | |
| Ash Container Volume | Litre | 43 | | 43 | |
| Flow Connection | | 1 1/2" | | 1 1/2" | |
| Return Connection | | 1 1/2" | | 1 1/2" | |
| Overheat Protection Valve Connection | | 1/2" | | 1/2" | |
| Burner Position | | Left or right | | Left/right or rear | |
| Ignition Method | | Electric/Automatic | | Electric/Automatic | |
| Feature | | Log wood operation possible | | Log wood operation possible | |
| Performance and Combustion Control | | Programmable logic controller | | Programmable logic controller | |
| Back Burn Protection by | | Full-metal cell wheel | | Full-metal cell wheel | |
| Ventilation Dependent Operation | | Yes | | Yes | |
| Type of Fans | | Radial fan | | Radial fan | |

*1 based on wood chips 20% moisture, 800kWh/kg, 200kg/m3
*2 referring to 0°C and 1013mbar, dry fume, 13% Vol-% $O_2$
*3 calculated as $NO_2$
*4 referring to 0°C and 1013mbar, dry fume, 10% Vol-% $O_2$



# HPK-RA 75

| | | Wood Pellet | | Wood Chip | |
|---|---|---|---|---|---|
| **Boiler Model** | | **HPK-RA 75** | | **HPK-RA 75** | |
| Product Code | | 401014 | | 401031 | |
| Full Load | kW | 75 | | 75 | |
| Part Load | kW | 23 | | 23 | |
| Boiler Dry Weight | kg | 1570 | | 1570 | |
| Dimensions L x W x H | mm | 1780 x 935 x 1785 | | 1780 x 935 x 1785 | |
| Hydraulic Pressure Drop | mbar 11K<br>mbar 20K | 9.4<br>2.9 | | 9.4<br>2.9 | |
| Water Flow Rate | l/s 10k<br>l/s 20k | 1.79<br>0.88 | | 1.79<br>0.88 | |
| Thermal Efficiency Full Load | % | 93.1-94.6 | | 91.7-93.5 | |
| Thermal Efficiency Part Load | % | 93.7-94.1 | | 92.8-92.9 | |
| Flow Temperature Max | °C | 95 | | 95 | |
| Return Temperature Min | °C | 55 | | 55 | |
| Maximum Working Pressure | bar | 3 | | 3 | |
| Fuel Type | | Pellets acc. to EN14961-2/OENORM M7135/DIN | | CEN/TS 14961 (P16, P45) | |
| Burner Type | | Forward fired | | Forward fired ceramic | |
| Consumption @ Full Load*1 | kg/hr | ~15 | | ~29 | |
| Burner Control On/Off | | Modulating | | Modulating | |
| Burner Noise Level | dB | n/a | | n/a | |
| Max Electric Power Input | kW | 3 | | 3 | |
| Max Current Consumption | A | 4.6 | | 4.6 | |
| Electrical Supply | | ~3/400V 50Hz 16A 5x2,5mm² | | ~3/400V 50Hz 16A 5x2,5mm² | |
| Flue Size | Ø mm | 200 | | 200 | |
| Height Central Line Flue Gas Outlet | mm | 1640 | | 1640 | |
| Flue Gas Volume Full Load | m³/hr | 134 | | 157 | |
| Flue Gas Volume Part Load | m³/hr | 49.9 | | 57.7 | |
| Flue Gas Temperature | High °C<br>Low °C | 109-144<br>81-94 | | 115-154<br>84 | |
| Type Tested and Seal of Approval by | | TÜV-Süd | | TÜV-Süd | |
| Test Procedure | | Range tested | | Range tested | |
| | | **13% Vol-% 02** | **10% Vol-% 02** | **13% Vol-% 02** | **10% Vol-% 02** |
| NOX Full Load*2*3*4 | mg/m³ | 101-134 | 138-184 | 94-106 | 129-146 |
| NOX Part Load*2*3*4 | mg/m³ | 77-117 | 106-161 | 101-104 | 138-143 |
| Organic "C" Full Load*2*4 | mg/m³ | <1-4 | <1-6 | <1-1 | 1-2 |
| Organic "C" Part Load*2*4 | mg/m³ | <1-2 | <2-3 | <2-5 | 2-7 |
| Dust Full Load*2*4 | mg/m³ | 16-28 | 23-59 | 11-35 | 15-49 |
| Dust Full Load*2*4 | mg/m³ | 19-23 | 26-32 | 19-26 | 26-35 |
| CO Full Load*2*4 | mg/m³ | 8-21 | 12-29 | 17-19 | 24-26 |
| CO Part Load*2*4 | mg/m³ | 18-22 | 25-32 | 74-163 | 102-224 |
| NOX Full Load*2*3 | mg/MJ | 77-89 | | 66-73 | |
| NOX Part Load*2*3 | mg/MJ | 50-78 | | 76-96 | |
| Organic "C" Full Load*2 | mg/MJ | <1-2 | | <1-1 | |
| Organic "C" Part Load*2 | mg/MJ | <1-1 | | <1-4 | |
| Dust Full Load*2 | mg/MJ | 19-28 | | 8-24 | |
| Dust Full Load*2 | mg/MJ | 12-15 | | 13-19 | |
| CO Full Load*2 | mg/MJ | 6-22 | | 12-13 | |
| CO Part Load*2 | mg/MJ | 12-15 | | 54-112 | |
| PM10 | | N/A | | N/A | |
| Delivery Dimensions | mm | | | | |
| Residual Fan Pressure Full Load | Pa | 8 | | 6 | |
| Residual Fan Pressure Part Load | Pa | 8 | | 6 | |
| Boiler Volume (Water) | Litre | 320 | | 320 | |
| Ash Container Volume | Litre | 43 | | 43 | |
| Flow Connection | | 1 1/2" | | 1 1/2" | |
| Return Connection | | 1 1/2" | | 1 1/2" | |
| Overheat Protection Valve Connection | | 1/2" | | 1/2" | |
| Burner Position | | Left/right or rear | | Left/right or rear | |
| Ignition Method | | Electric/Automatic | | Electric/Automatic | |
| Feature | | Log wood operation possible | | Log wood operation possible | |
| Performance and Combustion Control | | Programmable logic controller | | Programmable logic controller | |
| Back Burn Protection by | | Full-metal cell wheel | | Full-metal cell wheel | |
| Ventilation Dependent Operation | | Yes | | Yes | |
| Type of Fans | | Radial fan | | Radial fan | |

*1 based on wood chips 20% moisture, 800kWh/kg, 200kg/m3
*2 referring to 0°C and 1013mbar, dry fume, 13% Vol-% $O_2$
*3 calculated as $NO_2$
*4 referring to 0°C and 1013mbar, dry fume, 10% Vol-% $O_2$





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# HPK-RA 85

| | | Wood Pellet | | Wood Chip | |
|---|---|---|---|---|---|
| **Boiler Model** | | **HPK-RA 85** | | **HPK-RA 85** | |
| Product Code | | 401015 | | 401032 | |
| Full Load | kW | 85 | | 85 | |
| Part Load | kW | 26 | | 26 | |
| Boiler Dry Weight | kg | 1570 | | 1570 | |
| Dimensions L x W x H | mm | 1780 x 935 x 1785 | | 1780 x 935 x 1785 | |
| Hydraulic Pressure Drop | mbar 11K<br>mbar 20K | 12.2<br>3.7 | | 12.2<br>3.7 | |
| Water Flow Rate | l/s 10k<br>l/s 20k | 2.03<br>1.02 | | 2.03<br>1.02 | |
| Thermal Efficiency Full Load | % | 93.1-94.6 | | 91.7-93.5 | |
| Thermal Efficiency Part Load | % | 93.7-94.1 | | 92.8-92.9 | |
| Flow Temperature Max | °C | 95 | | 95 | |
| Return Temperature Min | °C | 55 | | 55 | |
| Maximum Working Pressure | bar | 3 | | 3 | |
| Fuel Type | | Pellets acc. to EN14961-2/OENORM M7135/G50 | | | |
| Burner Type | | Forward fired ceramic | | Forward fired ceramic | |
| Consumption @ Full Load*1 | kg/hr | ~17 | | ~21 | |
| Burner Control On/Off | | Modulating | | Modulating | |
| Burner Noise Level | dB | n/a | | n/a | |
| Max Electric Power Input | kW | 3 | | 3 | |
| Max Current Consumption | A | 4.6 | | 4.6 | |
| Electrical Supply | | ~3/400V 50Hz 16A 5x2,5mm² | | ~3/400V 50Hz 16A 5x2,5mm² | |
| Flue Size | Ø mm | 200 | | 200 | |
| Height Central Line Flue Gas Outlet | mm | 1640 | | 1640 | |
| Flue Gas Volume Full Load | m³/hr | 153 | | 181 | |
| Flue Gas Volume Part Load | m³/hr | 57.2 | | 65.8 | |
| Flue Gas Temperature | High °C<br>Low °C | 109-144<br>81-94 | | 115-154<br>84 | |
| Type Tested and Seal of Approval by | | TÜV-Süd | | TÜV-Süd | |
| Test Procedure | | Range tested | | Range tested | |
| | | **13% Vol-% 02** | **10% Vol-% 02** | **13% Vol-% 02** | **10% Vol-% 02** |
| NOX Full Load*2*3*4 | mg/m³ | 101-134 | 138-184 | 94-106 | 129-146 |
| Organic "C" Full Load*2*4 | mg/m³ | 77-117 | 106-161 | 101-104 | 138-143 |
| Organic "C" Part Load*2*4 | mg/m³ | <1-4 | <1-6 | <1-1 | 1-2 |
| Dust Full Load*2*4 | mg/m³ | <1-2 | <2-3 | <2-5 | 2-7 |
| Dust Full Load*2*4 | mg/m³ | 16-28 | 23-59 | 11-35 | 15-49 |
| CO Full Load*2*4 | mg/m³ | 19-23 | 26-32 | 19-26 | 26-35 |
| CO Part Load*2*4 | mg/m³ | 8-21 | 12-29 | 17-19 | 24-26 |
| NOX Full Load*2*3 | mg/MJ | 18-22 | 25-32 | 74-163 | 102-224 |
| NOX Part Load*2*3 | mg/MJ | 77-89 | | 66-73 | |
| Organic "C" Full Load*2 | mg/MJ | 50-78 | | 76-96 | |
| Organic "C" Part Load*2 | mg/MJ | <1-2 | | <1-1 | |
| Dust Full Load*2 | mg/MJ | <1-1 | | <1-4 | |
| Dust Full Load*2 | mg/MJ | 19-28 | | 8-24 | |
| CO Full Load*2 | mg/MJ | 12-15 | | 13-19 | |
| CO Part Load*2 | mg/MJ | 6-22 | | 12-13 | |
| PM10 | mg/MJ | 12-15 | | 54-112 | |
| Delivery Dimensions | | N/A | | N/A | |
| Residual Fan Pressure Full Load | mm | | | | |
| Residual Fan Pressure Part Load | Pa | 6 | | 3 | |
| Boiler Volume (Water) | Pa | 6 | | 3 | |
| Ash Container Volume | Litre | 320 | | 320 | |
| Flow Connection | Litre | 43 | | 43 | |
| Return Connection | | 1 1/2" | | 1 1/2" | |
| Overheat Protection Valve Connection | | 1 1/2" | | 1 1/2" | |
| Burner Position | | 1/2" | | 1/2" | |
| Ignition Method | | Left/right or rear | | Left/right or rear | |
| Feature | | Electric/Automatic | | Electric/Automatic | |
| Performance and Combustion Control | | Log wood operation possible | | Log wood operation possible | |
| Back Burn Protection by | | Programmable logic controller | | Programmable logic controller | |
| Ventilation Dependent Operation | | Full-metal cell wheel | | Full-metal cell wheel | |
| Type of Fans | | Yes | | Yes | |
| | | Radial fan | | Radial fan | |

*1 based on wood chips 20% moisture, 800kWh/kg, 200kg/m3
*2 referring to 0°C and 1013mbar, dry fume, 13% Vol-% $O_2$
*3 calculated as $NO_2$
*4 referring to 0°C and 1013mbar, dry fume, 10% Vol-% $O_2$

# HPK-RA 100

| | | Wood Pellet | | Wood Chip | |
|---|---|---|---|---|---|
| **Boiler Model** | | **HPK-RA 100** | | **HPK-RA 100** | |
| Product Code | | 401769 | | 401771 | |
| Full Load | kW | 100 | | 100 | |
| Part Load | kW | 30 | | 30 | |
| Boiler Dry Weight | kg | 1963 | | 1963 | |
| Dimensions L x W x H | mm | 2155 x 935 x 1785 | | 2155 x 935 x 1785 | |
| Hydraulic Pressure Drop | mbar 11K<br>mbar 20K | 13.1<br>4 | | 13.1<br>4 | |
| Water Flow Rate | l/s 10k<br>l/s 20k | 2.38<br>1.19 | | 2.38<br>1.19 | |
| Thermal Efficiency Full Load | % | 94.6 | | 93.5 | |
| Thermal Efficiency Part Load | % | 94.1 | | 92.9 | |
| Flow Temperature Max | °C | 95 | | 95 | |
| Return Temperature Min | °C | 55 | | 55 | |
| Maximum Working Pressure | bar | 3 | | 3 | |
| Fuel Type | | Pellets acc. to EN14961-2/OENORM M7135/ | | CEN/TS (P16, P45) | |
| Burner Type | | Forward fired ceramic | | Forward fired ceramic | |
| Consumption @ Full Load*1 | kg/hr | ~20 | | ~25 | |
| Burner Control On/Off | | Modulating | | Modulating | |
| Burner Noise Level | dB | n/a | | n/a | |
| Max Electric Power Input | kW | 3 | | 3 | |
| Max Current Consumption | A | 4.6 | | 4.6 | |
| Electrical Supply | | ~3/400V 50Hz 16A 5x2,5mm² | | ~3/400V 50Hz 16A 5x2,5mm² | |
| Flue Size | Ø mm | 250 | | 250 | |
| Height Central Line Flue Gas Outlet | mm | 1640 | | 1640 | |
| Flue Gas Volume Full Load | m³/hr | 174 | | 205 | |
| Flue Gas Volume Part Load | m³/hr | 65.4 | | 75.3 | |
| Flue Gas Temperature | High °C<br>Low °C | 109<br>81 | | 115<br>84 | |
| Type Tested and Seal of Approval by | | TÜV-Süd | | TÜV-Süd | |
| Test Procedure | | According to test report | | According to test report | |
| | | **13% Vol-% 02** | **10% Vol-% 02** | **13% Vol-% 02** | **10% Vol-% 02** |
| NOX Full Load*2*3*4 | mg/m³ | 134 | 184 | 106 | 146 |
| Organic "C" Full Load*2*4 | mg/m³ | 117 | 161 | 104 | 143 |
| Organic "C" Part Load*2*4 | mg/m³ | <1 | <1 | <1 | <2 |
| Dust Full Load*2*4 | mg/m³ | <1 | <2 | <2 | <2 |
| Dust Full Load*2*4 | mg/m³ | 43 | 59 | 35 | 49 |
| CO Full Load*2*4 | mg/m³ | 23 | 32 | 26 | 35 |
| CO Part Load*2*4 | mg/m³ | 8 | 12 | 19 | 26 |
| NOX Full Load*2*3 | mg/m³ | 18 | 25 | 74 | 102 |
| NOX Part Load*2*3 | mg/MJ | 89 | | 73 | |
| Organic "C" Full Load*2 | mg/MJ | 78 | | 76 | |
| Organic "C" Part Load*2 | mg/MJ | <1 | | <1 | |
| Dust Full Load*2 | mg/MJ | <1 | | <1 | |
| Dust Full Load*2 | mg/MJ | 28 | | 24 | |
| CO Full Load*2 | mg/MJ | 15 | | 19 | |
| CO Part Load*2 | mg/MJ | 6 | | 13 | |
| PM10 | mg/MJ | 12 | | 54 | |
| Delivery Dimensions | | N/A | | N/A | |
| Residual Fan Pressure Full Load | mm | | | | |
| Residual Fan Pressure Part Load | Pa | 12 | | 11 | |
| Boiler Volume (Water) | Pa | 10 | | 10 | |
| Ash Container Volume | Litre | 495 | | 495 | |
| Flow Connection | Litre | 80 | | 80 | |
| Return Connection | | 1 1/2" | | 1 1/2" | |
| Overheat Protection Valve Connection | | 1 1/2" | | 1 1/2" | |
| Burner Position | | 1/2" | | 1/2" | |
| Ignition Method | | Rear only | | Rear only | |
| Feature | | Electric/Automatic | | Electric/Automatic | |
| Performance and Combustion Control | | Log wood operation possible | | Log wood operation possible | |
| Back Burn Protection by | | Programmable logic controller | | Programmable logic controller | |
| Ventilation Dependent Operation | | Full-metal cell wheel | | Full-metal cell wheel | |
| Type of Fans | | Yes | | Yes | |
| | | Radial fan | | Radial fan | |

*1 based on wood chips 20% moisture, 800kWh/kg, 200kg/m3
*2 referring to 0°C and 1013mbar, dry fume, 13% Vol-% $O_2$
*3 calculated as $NO_2$
*4 referring to 0°C and 1013mbar, dry fume, 10% Vol-% $O_2$

# HPK-RA 120

| | | Wood Pellet | | Wood Chip | |
|---|---|---|---|---|---|
| **Boiler Model** | | **HPK-RA 120** | | **HPK-RA 120** | |
| Product Code | | 401770 | | 401772 | |
| Full Load | kW | 120 | | 120 | |
| Part Load | kW | 36 | | 36 | |
| Boiler Dry Weight | kg | 1963 | | 1963 | |
| Dimensions L x W x H | mm | 2155 x 935 x 1785 | | 2155 x 935 x 1785 | |
| Hydraulic Pressure Drop | mbar 11K<br>mbar 20K | 18.9<br>5.8 | | 18.9<br>5.8 | |
| Water Flow Rate | l/s 10k<br>l/s 20k | 2.86<br>1.43 | | 2.38<br>1.43 | |
| Thermal Efficiency Full Load | % | 93,2 - 94,6 | | 91,3-93,5 | |
| Thermal Efficiency Part Load | % | 94.1 | | 92.9 | |
| Flow Temperature Max | °C | 95 | | 95 | |
| Return Temperature Min | °C | 55 | | 55 | |
| Maximum Working Pressure | bar | 3 | | 3 | |
| Fuel Type | | Pellets acc. to EN14961-2/OENORM M7135/ | | G50 | |
| Burner Type | | Forward fired ceramic | | Forward fired ceramic | |
| Consumption @ Full Load*1 | kg/hr | ~24 | | ~30 | |
| Burner Control On/Off | | Modulating | | Modulating | |
| Burner Noise Level | dB | n/a | | n/a | |
| Max Electric Power Input | kW | 3 | | 3 | |
| Max Current Consumption | A | 4.6 | | 4.6 | |
| Electrical Supply | | ~3/400V 50Hz 16A 5x2,5mm² | | ~3/400V 50Hz 16A 5x2,5mm² | |
| Flue Size | Ø mm | 250 | | 250 | |
| Height Central Line Flue Gas Outlet | mm | 1640 | | 1640 | |
| Flue Gas Volume Full Load | m³/hr | 212 | | 248 | |
| Flue Gas Volume Part Load | m³/hr | 79.8 | | 91.8 | |
| Flue Gas Temperature | High °C<br>Low °C | 109-131<br>81 | | 115-143<br>84 | |
| Type Tested and Seal of Approval by | | TÜV-Süd | | TÜV-Süd | |
| Test Procedure | | Range tested | | Range tested | |
| | | **13% Vol-% 02** | **10% Vol-% 02** | **13% Vol-% 02** | **10% Vol-% 02** |
| NOX Full Load*2*3*4 | mg/m³ | 114-134 | 157-184 | 106-111 | 146-153 |
| Organic "C" Full Load*2*4 | mg/m³ | 117 | 161 | 104 | 143 |
| Organic "C" Part Load*2*4 | mg/m³ | <1 | <1-<2 | <1 | <2 |
| Dust Full Load*2*4 | mg/m³ | <1 | <2 | <2 | <2 |
| Dust Full Load*2*4 | mg/m³ | 28-36 | 50-59 | 31-35 | 43-49 |
| CO Full Load*2*4 | mg/m³ | 23 | 32 | 26 | 35 |
| CO Part Load*2*4 | mg/m³ | 8-25 | 12-35 | 19-62 | 26-85 |
| NOX Full Load*2*3 | mg/MJ | 18 | 25 | 74 | 102 |
| NOX Part Load*2*3 | mg/MJ | 74-89 | | 73-81 | |
| Organic "C" Full Load*2 | mg/MJ | 78 | | 76 | |
| Organic "C" Part Load*2 | mg/MJ | <1 | | <1-1 | |
| Dust Full Load*2 | mg/MJ | <1 | | <1 | |
| Dust Full Load*2 | mg/MJ | 23-28 | | 23-24 | |
| CO Full Load*2 | mg/MJ | 15 | | 19 | |
| CO Part Load*2 | mg/MJ | 6-16 | | 13-45 | |
| PM10 | mg/MJ | 12 | | 54 | |
| Delivery Dimensions | | N/A | | N/A | |
| Residual Fan Pressure Full Load | mm | | | | |
| Residual Fan Pressure Part Load | Pa | 10 | | 6 | |
| Boiler Volume (Water) | Pa | 10 | | 6 | |
| Ash Container Volume | Litre | 495 | | 495 | |
| Flow Connection | Litre | 80 | | 80 | |
| Return Connection | | 1 1/2" | | 1 1/2" | |
| Overheat Protection Valve Connection | | 1 1/2" | | 1 1/2" | |
| Burner Position | | 1/2" | | 1/2" | |
| Ignition Method | | Rear only | | Rear only | |
| Feature | | Electric/Automatic | | Electric/Automatic | |
| Performance and Combustion Control | | Log wood operation possible | | Log wood operation possible | |
| Back Burn Protection by | | Programmable logic controller | | Programmable logic controller | |
| Ventilation Dependent Operation | | Full-metal cell wheel | | Full-metal cell wheel | |
| Type of Fans | | Yes | | Yes | |
| | | Radial fan | | Radial fan | |

*1 based on wood chips 20% moisture, 800kWh/kg, 200kg/m3
*2 referring to 0°C and 1013mbar, dry fume, 13% Vol-% $O_2$
*3 calculated as $NO_2$
*4 referring to 0°C and 1013mbar, dry fume, 10% Vol-% $O_2$

# HPK-RA 145

| | | Wood Pellet | | Wood Chip | |
|---|---|---|---|---|---|
| **Boiler Model** | | **HPK-RA 145** | | **HPK-RA 145** | |
| Product Code | | 401019 | | 401036 | |
| Full Load | kW | 145 | | 145 | |
| Part Load | kW | 44 | | 44 | |
| Boiler Dry Weight | kg | 2463 | | 2463 | |
| Dimensions L x W x H | mm | 2620 x 935 x 1785 | | 2620 x 935 x 1785 | |
| Hydraulic Pressure Drop | mbar 11K<br>mbar 20K | 27.6<br>8.4 | | 27.6<br>8.4 | |
| Water Flow Rate | l/s 10k<br>l/s 20k | 3.45<br>1.73 | | 3.45<br>1.73 | |
| Thermal Efficiency Full Load | % | 93.2 | | 91.3 | |
| Thermal Efficiency Part Load | % | 94.1 | | 92.9 | |
| Flow Temperature Max | °C | 95 | | 95 | |
| Return Temperature Min | °C | 55 | | 55 | |
| Maximum Working Pressure | bar | 3 | | 3 | |
| Fuel Type | | Pellets acc. to EN14961-2/OENORM M7135/ | | G50 | |
| Burner Type | | Forward fired ceramic | | Forward fired ceramic | |
| Consumption @ Full Load*1 | kg/hr | ~30 | | ~37 | |
| Burner Control On/Off | | Modulating | | Modulating | |
| Burner Noise Level | dB | n/a | | n/a | |
| Max Electric Power Input | kW | 3 | | 3 | |
| Max Current Consumption | A | 4.6 | | 4.6 | |
| Electrical Supply | | ~3/400V 50Hz 16A 5x2,5mm² | | ~3/400V 50Hz 16A 5x2,5mm² | |
| Flue Size | Ø mm | 250 | | 250 | |
| Height Central Line Flue Gas Outlet | mm | 1640 | | 1640 | |
| Flue Gas Volume Full Load | m³/hr | 260 | | 307 | |
| Flue Gas Volume Part Load | m³/hr | 97.5 | | 113 | |
| Flue Gas Temperature | High °C<br>Low °C | 131<br>81 | | 143<br>84 | |
| Type Tested and Seal of Approval by | | TÜV-Süd | | TÜV-Süd | |
| Test Procedure | | Range tested | | Range tested | |
| | | **13% Vol-% 02** | **10% Vol-% 02** | **13% Vol-% 02** | **10% Vol-% 02** |
| NOX Full Load*2*3*4 | mg/m³ | 114 | 157 | 111 | 153 |
| Organic "C" Full Load*2*4 | mg/m³ | 117 | 161 | 104 | 143 |
| Organic "C" Part Load*2*4 | mg/m³ | <1 | <2 | <1 | (<2) |
| Dust Full Load*2*4 | mg/m³ | <1 | <2 | <2 | (<2) |
| Dust Full Load*2*4 | mg/m³ | 36 | 50 | 31 | 43 |
| CO Full Load*2*4 | mg/m³ | 23 | 32 | 26 | 35 |
| CO Part Load*2*4 | mg/m³ | 25 | 35 | 62 | 85 |
| NOX Full Load*2*3 | mg/MJ | 18 | 25 | 74 | 102 |
| NOX Part Load*2*3 | mg/MJ | 74 | | 81 | |
| Organic "C" Full Load*2 | mg/MJ | 78 | | 76 | |
| Organic "C" Part Load*2 | mg/MJ | <1 | | 1 | |
| Dust Full Load*2 | mg/MJ | <1 | | <1 | |
| Dust Full Load*2 | mg/MJ | 23 | | 23 | |
| CO Full Load*2 | mg/MJ | 15 | | 19 | |
| CO Part Load*2 | mg/MJ | 16 | | 45 | |
| PM10 | mg/MJ | 12 | | 54 | |
| Delivery Dimensions | | N/A | | N/A | |
| Residual Fan Pressure Full Load | mm | | | | |
| Residual Fan Pressure Part Load | Pa | 6 | | 7 | |
| Boiler Volume (Water) | Pa | 5 | | 7 | |
| Ash Container Volume | Litre | 620 | | 620 | |
| Flow Connection | Litre | 80 | | 80 | |
| Return Connection | | 2" | | 2" | |
| Overheat Protection Valve Connection | | 2" | | 2" | |
| Burner Position | | 1/2" | | 1/2" | |
| Ignition Method | | Rear only | | Rear only | |
| Feature | | Electric/Automatic | | Electric/Automatic | |
| Performance and Combustion Control | | Log wood operation possible | | Log wood operation possible | |
| Back Burn Protection by | | Programmable logic controller | | Programmable logic controller | |
| Ventilation Dependent Operation | | Full-metal cell wheel | | Full-metal cell wheel | |
| Type of Fans | | Yes | | Yes | |
| | | Radial fan | | Radial fan | |

*1 based on wood chips 20% moisture, 800kWh/kg, 200kg/m3
*2 referring to 0°C and 1013mbar, dry fume, 13% Vol-% $O_2$
*3 calculated as $NO_2$
*4 referring to 0°C and 1013mbar, dry fume, 10% Vol-% $O_2$



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REMEHA GILLES BIOMASS BOILER HPK-RA 145 TECHNICAL SPECIFICATION

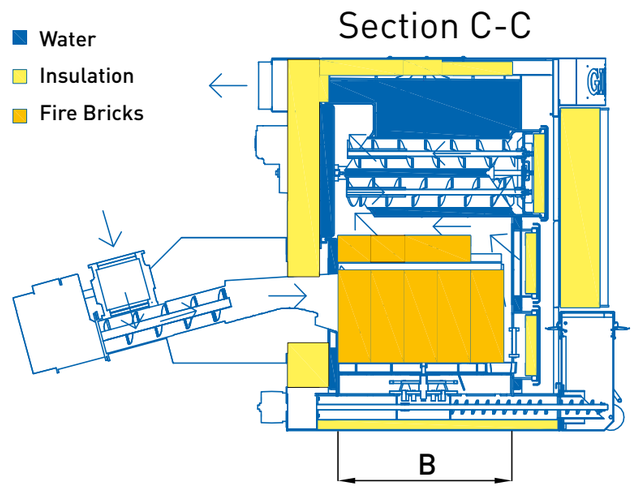
# HPK-RA 160

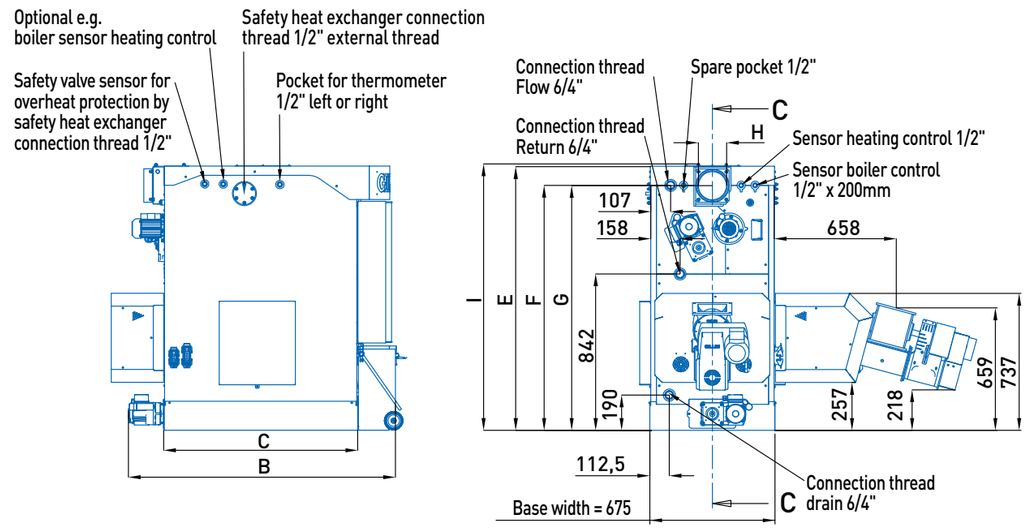
| | | Wood Pellet | | Wood Chip | |
|---|---|---|---|---|---|
| **Boiler Model** | | **HPK-RA 160** | | **HPK-RA 160** | |
| Product Code | | 4011534 | | 401602 | |
| Full Load | kW | 153 | | 150 | |
| Part Load | kW | 51 | | 51 | |
| Boiler Dry Weight | kg | 2463 | | 2463 | |
| Dimensions L x W x H | mm | 2620 x 935 x 1785 | | 2620 x 935 x 1785 | |
| Hydraulic Pressure Drop | mbar 11K<br>mbar 20K | 33.6<br>10.2 | | 33.6<br>10.2 | |
| Water Flow Rate | l/s 10k<br>l/s 20k | 3.58<br>1.79 | | 3.58<br>1.79 | |
| Thermal Efficiency Full Load | % | 93.2 | | 91.3 | |
| Thermal Efficiency Part Load | % | 94.1 | | 92.9 | |
| Flow Temperature Max | °C | 95 | | 95 | |
| Return Temperature Min | °C | 55 | | 55 | |
| Maximum Working Pressure | bar | 3 | | 3 | |
| Fuel Type | | Pellets acc. to EN14961-2/OENORM M7135/ | | G50 | |
| Burner Type | | Forward fired ceramic | | Forward fired ceramic | |
| Consumption @ Full Load*1 | kg/hr | ~31 | | ~39 | |
| Burner Control On/Off | | Modulating | | Modulating | |
| Burner Noise Level | dB | n/a | | n/a | |
| Max Electric Power Input | kW | 3 | | 3 | |
| Max Current Consumption | A | 4.6 | | 4.6 | |
| Electrical Supply | | ~3/400V 50Hz 16A 5x2,5mm² | | ~3/400V 50Hz 16A 5x2,5mm² | |
| Flue Size | Ø mm | 250 | | 250 | |
| Height Central Line Flue Gas Outlet | mm | 1640 | | 1640 | |
| Flue Gas Volume Full Load | m³/hr | 275 | | 318 | |
| Flue Gas Volume Part Load | m³/hr | 113 | | 127 | |
| Flue Gas Temperature | High °C<br>Low °C | 131<br>81 | | 143<br>84 | |
| Type Tested and Seal of Approval by | | TÜV-Süd | | TÜV-Süd | |
| Test Procedure | | Range tested | | Range tested | |
| | | **13% Vol-% 02** | **10% Vol-% 02** | **13% Vol-% 02** | **10% Vol-% 02** |
| NOX Full Load*2*3*4 | mg/m³ | 114 | 157 | 111 | 153 |
| NOX Part Load*2*3*4 | mg/m³ | 117 | 161 | 104 | 143 |
| Organic "C" Full Load*2*4 | mg/m³ | <1 | <2 | <1 | (<2) |
| Organic "C" Part Load*2*4 | mg/m³ | <1 | <2 | <2 | (<2) |
| Dust Full Load*2*4 | mg/m³ | 36 | 50 | 31 | 43 |
| Dust Full Load*2*4 | mg/m³ | 23 | 32 | 26 | 35 |
| CO Full Load*2*4 | mg/m³ | 25 | 35 | 62 | 85 |
| CO Part Load*2*4 | mg/m³ | 18 | 25 | 74 | 102 |
| NOX Full Load*2*3 | mg/MJ | 74 | | 81 | |
| NOX Part Load*2*3 | mg/MJ | 78 | | 76 | |
| Organic "C" Full Load*2 | mg/MJ | <1 | | 1 | |
| Organic "C" Part Load*2 | mg/MJ | <1 | | <1 | |
| Dust Full Load*2 | mg/MJ | 23 | | 23 | |
| Dust Full Load*2 | mg/MJ | 15 | | 19 | |
| CO Full Load*2 | mg/MJ | 16 | | 45 | |
| CO Part Load*2 | mg/MJ | 12 | | 54 | |
| PM10 | | N/A | | N/A | |
| Delivery Dimensions | mm | | | | |
| Residual Fan Pressure Full Load | Pa | 6 | | 6 | |
| Residual Fan Pressure Part Load | Pa | 5 | | 5 | |
| Boiler Volume (Water) | Litre | 620 | | 620 | |
| Ash Container Volume | Litre | 80 | | 80 | |
| Flow Connection | | 2" | | 2" | |
| Return Connection | | 2" | | 2" | |
| Overheat Protection Valve Connection | | 1/2" | | 1/2" | |
| Burner Position | | Rear only | | Rear only | |
| Ignition Method | | Electric/Automatic | | Electric/Automatic | |
| Feature | | Log wood operation possible | | Log wood operation possible | |
| Performance and Combustion Control | | Programmable logic controller | | Programmable logic controller | |
| Back Burn Protection by | | Full-metal cell wheel | | Full-metal cell wheel | |
| Ventilation Dependent Operation | | Yes | | Yes | |
| Type of Fans | | Radial fan | | Radial fan | |

*1 based on wood chips 20% moisture, 800kWh/kg, 200kg/m3
*2 referring to 0°C and 1013mbar, dry fume, 13% Vol-% $O_2$
*3 calculated as $NO_2$
*4 referring to 0°C and 1013mbar, dry fume, 10% Vol-% $O_2$



# WOODCHIP BOILER HPK-RA 49

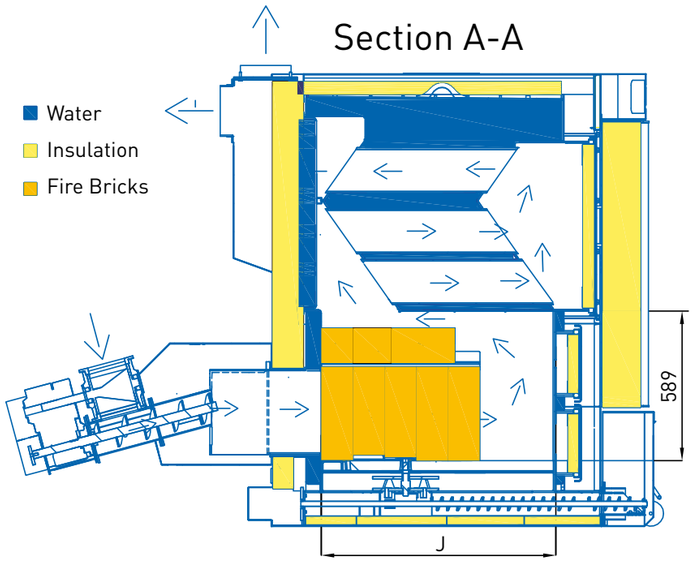


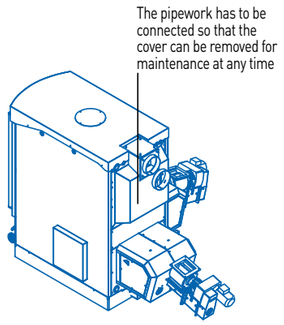



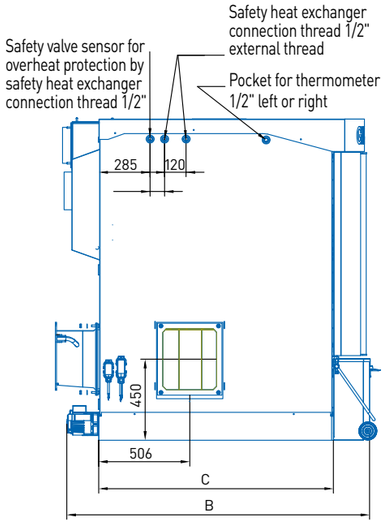

| Output kW | BS | Draughts | Volume l | Weight kg | Length in mm | | | | Height in mm | | Flue gas connection in mm | | | Combustion chamber |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | B | C | D | E | F | G | H | I | J |
| 49 | 8.1 | 6 | 150 | 724 | 1238 | 1445 | 1065 | 1000 | 1445 | 1355 | 1325 | 180 | 1480 | 685 |

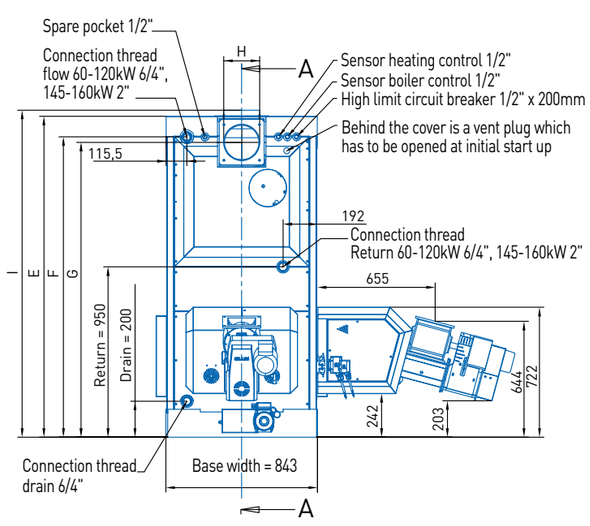
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## WOODCHIP BOILER HPK-RA 60-160



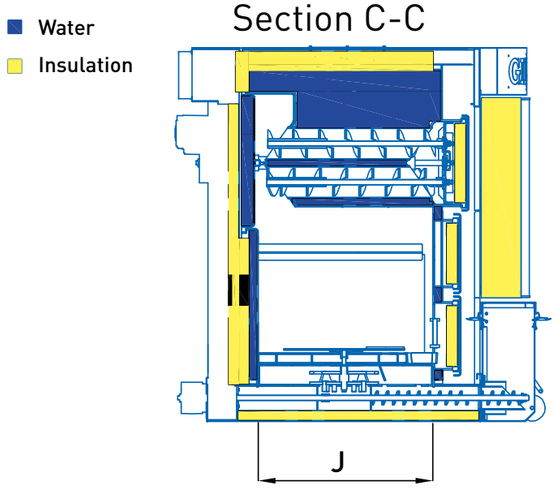



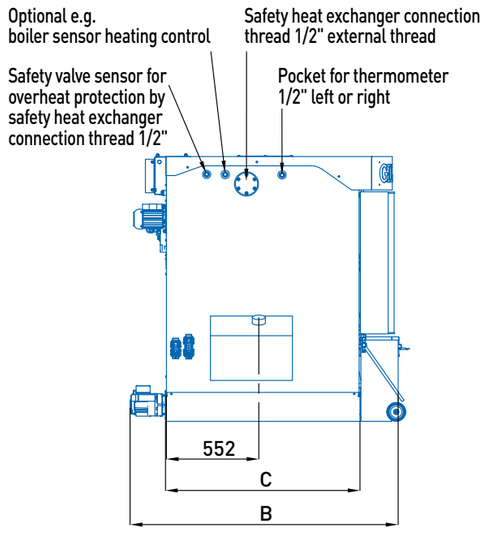

| Output kW | BS | Draughts | Volume l | Weight kg | Length in mm | | | | Height in mm | | Flue gas connection in mm | | | Combustion chamber |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | B | C | D | E | F | G | H | I | J |
| 60 | 2.1 | 9 | 220 | 1330 | 1238 | 1445 | 1065 | 1000 | 1785 | 1670 | 1640 | 200 | 1820 | 925 |
| 75 | 3.1 | 9 | 320 | 1570 | 1478 | 1685 | 1305 | 1200 | 1785 | 1670 | 1640 | 200 | 1820 | 925 |
| 85 | 3.1 | 9 | 320 | 1570 | 1478 | 1685 | 1305 | 1200 | 1785 | 1670 | 1640 | 200 | 1820 | 925 |
| 100 | 10.1 | 9 | 495 | 1963 | 1853 | 2060 | 1680 | 1400 | 1785 | 1670 | 1640 | 250 | 1820 | 1300 |
| 120 | 10.1 | 9 | 495 | 1963 | 1853 | 2060 | 1680 | 1400 | 1785 | 1670 | 1640 | 250 | 1820 | 1300 |
| 145 | 4.1 | 9 | 620 | 2463 | 2318 | 2525 | 2145 | 1840 | 1785 | 1670 | 1640 | 250 | 1820 | 1765 |
| 150 | 4.1 | 9 | 620 | 2463 | 2318 | 2525 | 2145 | 1840 | 1785 | 1670 | 1640 | 250 | 1820 | 1765 |

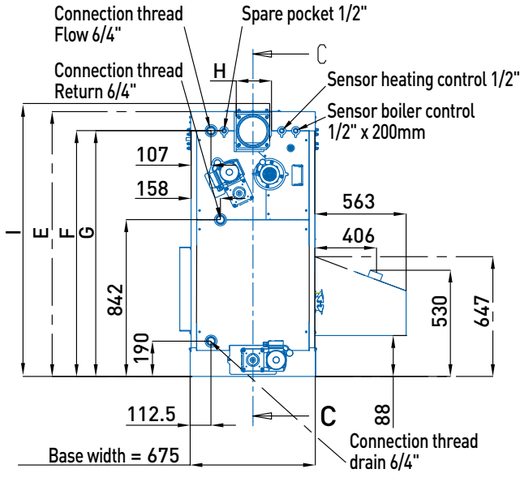




## PELLET BOILER HPK-RA 49



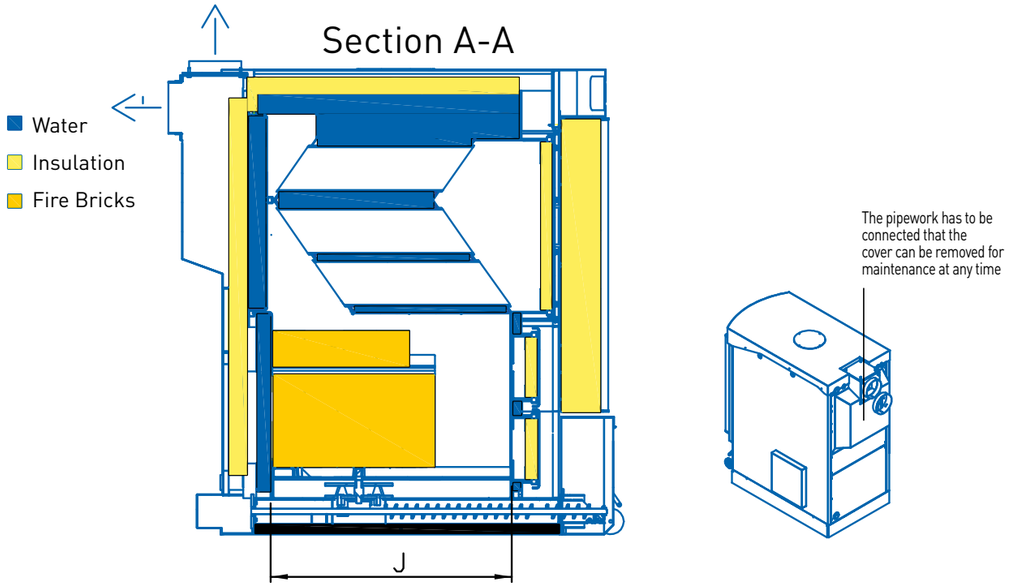



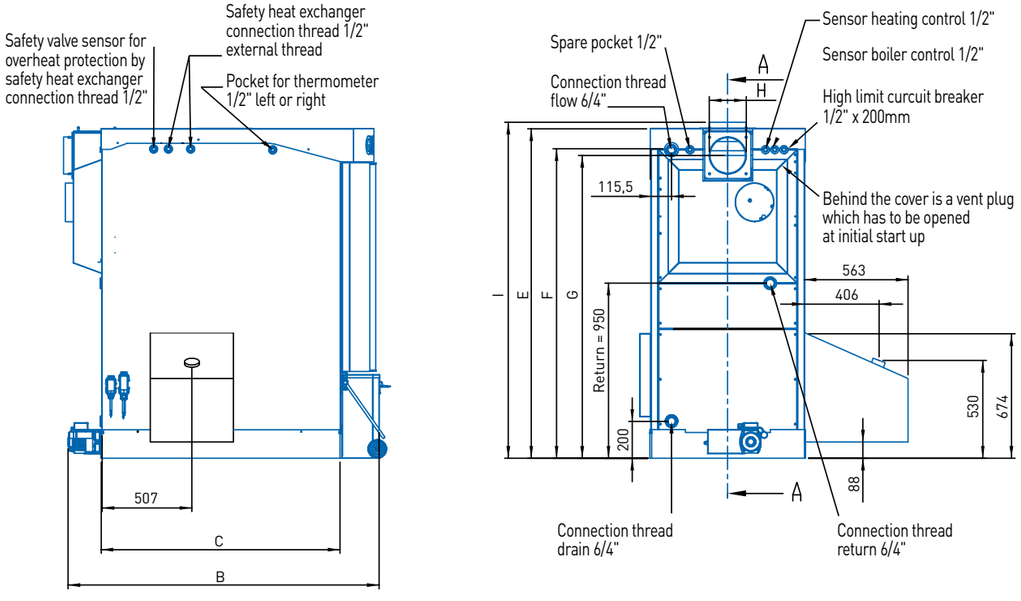

| Output kW | BS | Draughts | Volume l | Weight kg | Length in mm | | | | Height in mm | | Flue gas connection in mm | | | Combustion chamber |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | B | C | D | E | F | G | H | I | J |
| 49 | 8.1 | 6 | 150 | 724 | 1238 | 1445 | 1065 | 1000 | 1445 | 1355 | 1325 | 180 | 1480 | 685 |



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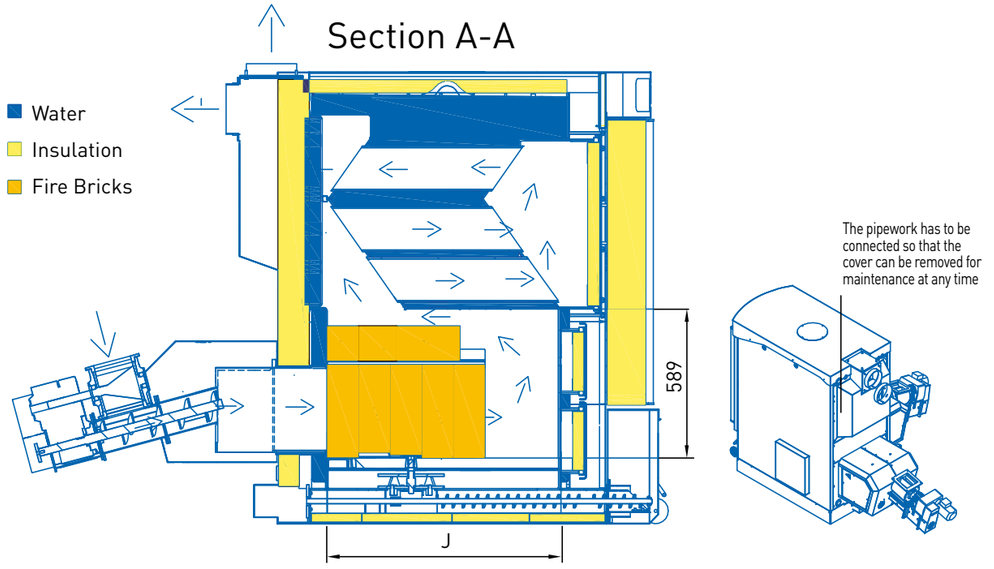
# PELLET BOILER HPK-RA 60

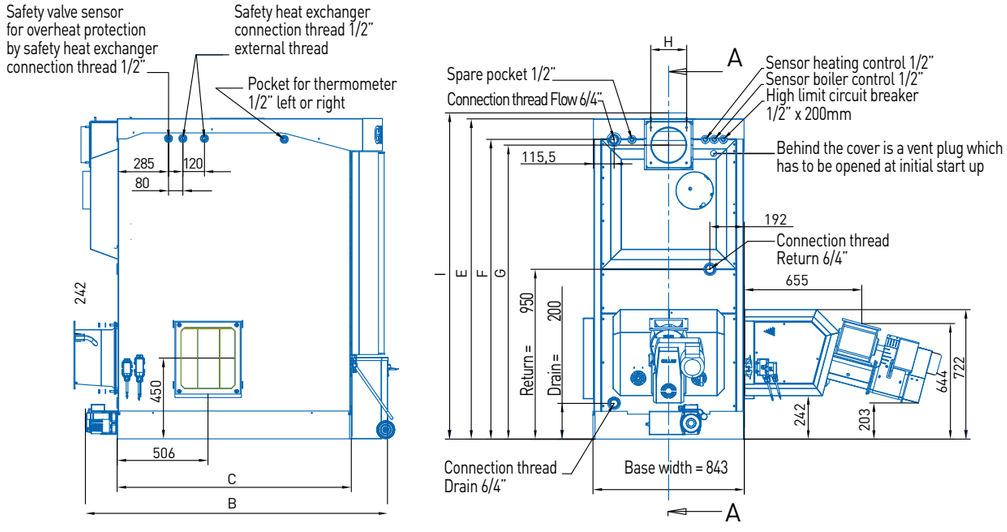



| Output kW | BS | Draughts | Volume l | Weight kg | Length in mm | | | | Height in mm | | Flue gas connection in mm | | | Combustion chamber |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | B | C | D | E | F | G | H | I | J |
| 60 | 2.1 | 9 | 220 | 1330 | 1238 | 1445 | 1065 | 1000 | 1785 | 1670 | 1640 | 200 | 1820 | 925 |

# PELLET BOILER HPK-RA 75-160



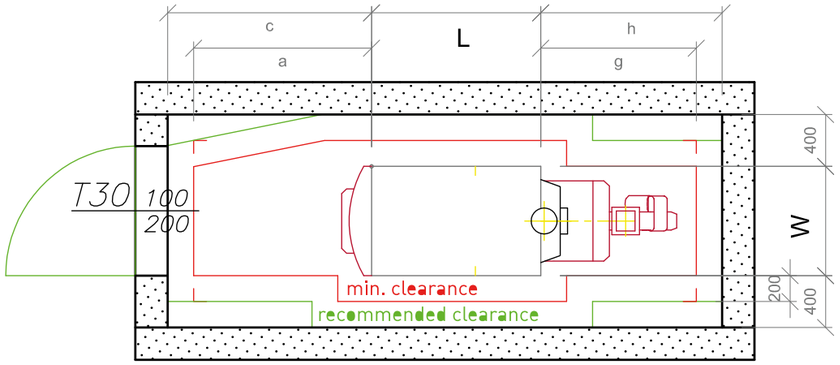



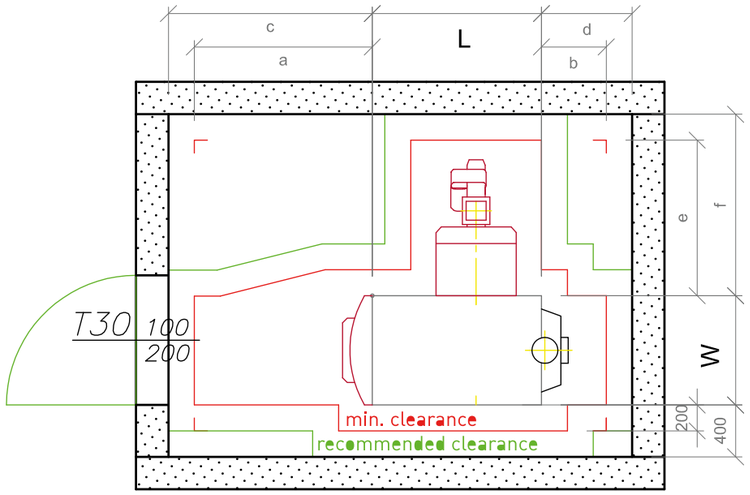

| Output kW | BS | Draughts | Volume l | Weight kg | Length in mm | | | | Height in mm | | Flue gas connection in mm | | | Combustion chamber |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | B | C | D | E | F | G | H | I | J |
| 75 | 3.1 | 9 | 320 | 1570 | 1478 | 1685 | 1305 | 1200 | 1785 | 1670 | 1640 | 200 | 1820 | 925 |
| 85 | 3.1 | 9 | 320 | 1570 | 1478 | 1685 | 1305 | 1200 | 1785 | 1670 | 1640 | 200 | 1820 | 925 |
| 100 | 10.1 | 9 | 495 | 1963 | 1853 | 2060 | 1680 | 1400 | 1785 | 1670 | 1640 | 250 | 1820 | 1300 |
| 120 | 10.1 | 9 | 495 | 1963 | 1853 | 2060 | 1680 | 1400 | 1785 | 1670 | 1640 | 250 | 1820 | 1300 |
| 145 | 4.1 | 9 | 620 | 2463 | 2318 | 2525 | 2145 | 1840 | 1785 | 1670 | 1640 | 250 | 1820 | 1765 |
| 153 | 4.1 | 9 | 620 | 2463 | 2318 | 2525 | 2145 | 1840 | 1785 | 1670 | 1640 | 250 | 1820 | 1765 |



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## MINIMUM CLEARANCE HPK-RA 49-160




| Type | HPK-RA | L | W | a | b | c | d | e | f | g | h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 8.2-WC | 49 | 1065 | 675 | 1170 | 500 | 1370 | 700 | 1200 | 1400 | 1200 | 1400 |
| 8.2-P | 49 | 1065 | 675 | 1170 | 500 | 1370 | 700 | 800 | 1000 | — | — |
| 9.2-P | 30/35/40 | 1065 | 675 | 1170 | 500 | 1370 | 700 | 1200 | 1400 | — | — |
| 2.3-P & WC | 60 | 1065 | 843 | 1170 | 500 | 1370 | 700 | 1200 | 1400 | 1200 | 1400 |
| 3.3-P & WC | 75/85 | 1305 | 843 | 1370 | 500 | 1570 | 700 | 1200 | 1400 | 1200 | 1400 |
| 10.2-P & WC | 98/100/120 | 1680 | 843 | 1570 | — | 1770 | — | — | — | 1200 | 1400 |
| 4.2-P & WC | 145/160 | 2145 | 843 | 2010 | — | 2210 | — | — | — | 1200 | 1400 |



## HPKI-L 199




The high performance boiler is produced as a stress free welded construction. The thermally insulated door at the front swings out completely permitting completely free access for cleaning all the boiler flues. The boiler is constructed in accordance with the natural combustion process of the wood fuel. The gasification combustion chamber is built on a direct pass principle. High combustion temperatures and a long furnace duration of the gases is the guarantee for a clean burning process.

Industrial biomass boiler HPKI-L 199 is made of boiler steel thickness of 5mm or more. The heat exchanger is of seamless, boiler tubes. Efficiency is over 90% with pellets. Flue gas temperature at the exit is from 170°C to 190°C at full load.

It can be fed either from a silo or directly from a fuel store by a fuel auger. The boiler is equipped with pneumatic heat exchanger cleaning, automatic ash discharge and automatic transport of pellets.

**Underfeed firing and ash discharge:**
The combustion of the fuel is completed in the retort. The burnt material will be pushed towards the ash discharge augers. The two ash augers transfer the ash into two separate ash bins to be emptied regularly.

**Heat exchanger cleaning:**
The solenoid activated valves on the heat exchanger door, which periodically release the air pressure clean the boiler tubes from the ashes and soot.

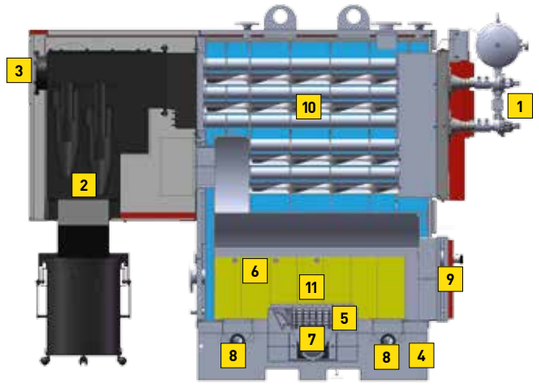
**Cyclone for separation of ash:**
The cyclone built on the boiler back ensures low dust emission into the atmosphere.

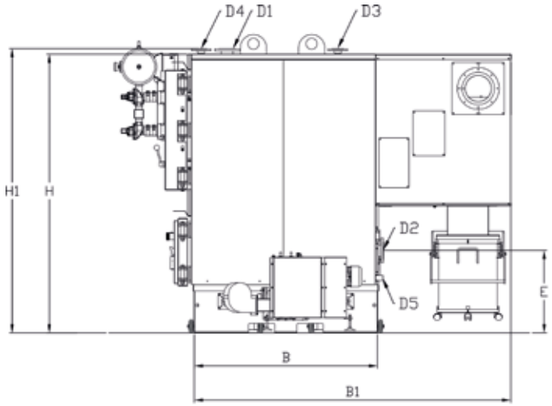
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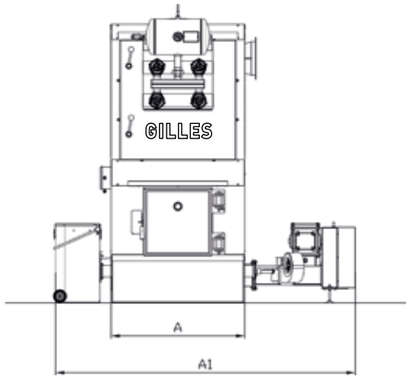
# HPKI-L 199

**Key Features**

1 Automatic heat exchanger cleaning
2 Automatic flue gas dust removal
3 Flue gas fan
4 Insulation
5 Primary air
6 Secondary air
7 Fuel stocking
8 Automatic ash removal in
9 Combustion chamber door
10 Heat exchanger
11 Combustion chamber




| Type | | HPKI-L 199 |
|---|---|---|
| Power | kW | 199 |
| Working Pressure | kPa | 300 |
| Test Pressure | kPa | 450 |
| Volume of water in boiler | Litre | 920 |
| Weight of boiler | Kg | 1800 |
| A | mm | 1005 |
| A1 | | 2660 |
| B | | 1400 |
| B1 | | 2120 |
| Flue pipe connection | | Ø 250 |
| E | | 625 |
| H | | 2125 |
| H1 | | 2275 |
| D1 Flow | | DN80 NP6 |
| D2 Return | | DN80 NP6 |
| D3 Safety Flanges | | DN40 NP16 |
| D4 Safety Flanges | | DN40 NP16 |
| D5 Drain | | 1" |



# HPKI-K
# OUTPUT 180-550kW
# PELLET & WOOD CHIP



The HPK-IK high-performance boiler is produced as a tension-free welded construction. The heat insulated door at the front swings out completely permitting so a free access for cleaning all the boiler flues. Constructed in accordance with the natural combustion process of the fuel wood. The gasification combustion chamber built on the direct-current principle is lined with a ceramic variable (replaceable) radiant ceiling. The high combustion temperatures and a long persisting time of the gases in the furnace guarantee clean combustion.

- Primary and secondary combustion air zone with air flow reading in the supply air ducts and linear air dosage by rotary valve and actuator
- Ceramic lining in High-temperature resisting special fire concrete
- Underfeed fuel stoking with combustion retort in heat resistant steel, incl grate rods in fire resistant cast alloy.
- Combustion grate incl. Grate rods in fire resistant cast alloy with pull-out ash removing box under it.
- Combustion chamber door in front.

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**incl. multi-cyclone flue dust interceptor**

Flue dust interceptor for removing the flue dust from flue gases. The interceptor is installed compact on the boiler.

- Housing with phased installed cast metal cyclones.
- Ash discharge cone with appropriated outflow form discharge system / separated position of ash container.

**incl. flue gas ventilator**

For creating and regulating the negative pressure in the boiler.

- Sturdy housing in steel
- Radial running wheel welded and balanced dynamically
- Motor with shaft and heat diversion panel designed to cope with high temperatures
- Insulation class F.

**Automatic cleaning of boiler tubes (optional)**

The cleaning of the interior of the boiler tube is carried out by means of an intensive compressed air shock. This cleans the tube at high speed and loosens any ash sticking on the walls. Special valves with a very high air throughput with a very short opening time are used to achieve the air prop. The tube stays clean as a result of the application of this cleaning principle, keeping the expenses and effort involved in additional cleaning work to a minimum. The flue gas temperature is low. The efficiency of the boiler is also improved.

- Special air jets with fast closing valves are built into the boiler doors
- Compressed air tank directly adjacent to valves with pressure sensor and safety valve
- Automatic valve control for optional setting up of the cleaning interval

Suitable fuel: Wood chip max. 40% moisture content acc. ONORM M7133 or EN 14961

Wood pellets acc. ONORM M 7135 as well as DIN Plus or wood pellets Class A1 acc. to EN 14961-2

**Cell wheel:**

100% protection against burn-back! The multi-tested full-metal cell wheel reliably interrupts the boiler with the storage room and thus provides 100% protection against burn back. The blades are attached to the running wheel at an offset angle to the rotary axis to enhance the cutting action. In addition, the blades are slightly curved, which prevents noise generation and reduces compressive forces. A fixed cutting edge is integrated in the stable and noise dampening cast enclosure to reduce the size of longer pieces of material.

**GILLES BOILER CONTROL for HPKI-K/R 180 – 550 kW for pellets and wood chip boilers**

- Continuous output regulation in the range from 30 to 100 %
- Combustion optimalisation;
- Lambda control;
- Underpressure regulation;
- Air quantity regulation;
- Control and regulation of the complete process, starting in silo by fuel discharge up to the heating boiler by means of PLC suitable for industry usage;
- Programming in compliance with the standard IEC 61131-3 of world-wide validity
- Duly elaborated control thanks to the home long year well developed know-how;

Different control circuits enable to keep the low emissions level even in case, when using fuel of various humidity contents, of various size or heat efficiency;

- The control may be set up via CAN-Bus or modem locally and externally at any time.



# INDUSTRIAL TRANSPORT SYSTEMS



## Walking floor (push rod) transport system 180 – 550kW

**The data in the following table should be observed when considering the push rods discharge system:**

Static calculation was made for wood chip of size G 50 and W 50, the maximum apparent density of 440 kg/m$^3$

| | Width/rod | Width/rod | Width/rod | Width/rod |
|---|---|---|---|---|
| **Length/rod** | 3.0m | 2.5m | 2.0m | 1.5m |
| **12m** | 2.3m * | 2.8m * | 3.5m * | 4.7m * |
| **10m** | 2.8m * | 3.4m * | 4.2m * | 5.6m * |
| **8m** | 3.5m * | 4.2m * | 5.3m * | 7.0m * |
| **6m** | 4.0m * | 5.6m * | 7.0m * | 9.0m * |

* max. delivery height

The permissible width of the push rods depends on the required length and intended delivery height

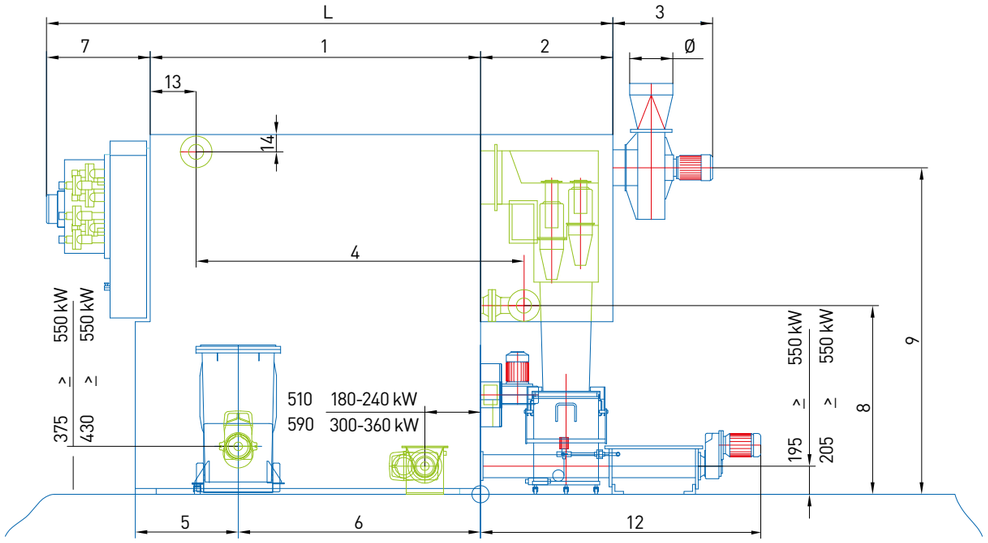
**Example:**
Intended bunker length is 10,0 m, intended delivery height is 4,0 m.

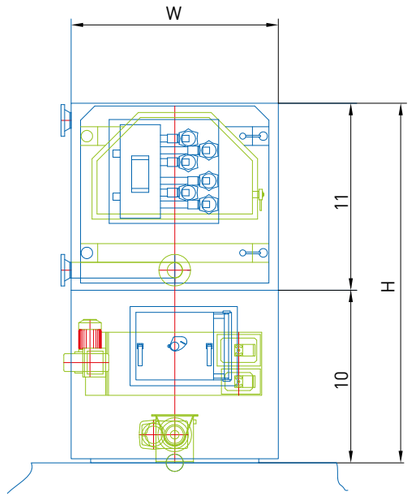
Pus rod may be used within 2,0 m at maximum.
In order to avoid the overbridging, the distance between push rods or wall should be 100 mm – 150 mm at maximum.

# FEEDER TANK

Feeder tank HPK-IK for 2 dosing augers (suitable for pellet and wood chip).

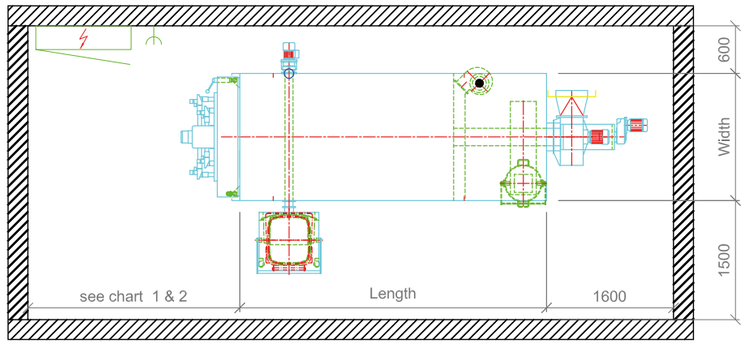
## HPKI-K 180-550



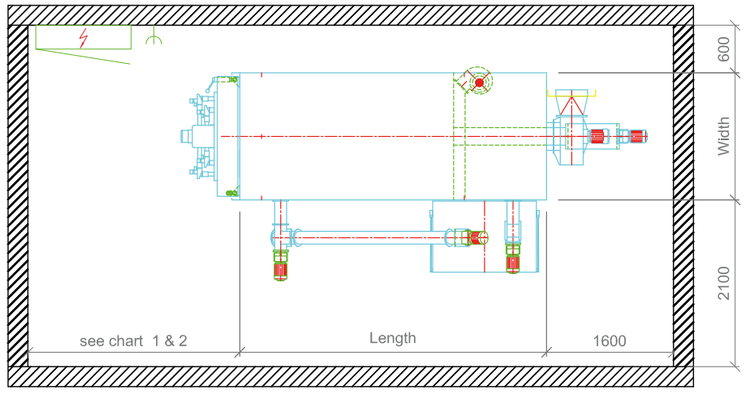




| Output kW | L | W | H | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Flow/ Return DN | Ø mm | Weight Furnace in Tons | Weight Heat Exchanger in Tons | Water in Litre | Kpa at t20°C | Flow Coefficient in $m^3/h$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 180 | 2990 | 1150 | 2200 | 1600 | 720 | 590 | 1450 | 530 | 1170 | 670 | 1150 | 1970 | 1050 | 1150 | 2000 | 250 | 150 | 65 | 180 | 2,34 | 1,32 | 830 | 2,6 | 48 |
| 195 | 3190 | 1150 | 2200 | 1600 | 920 | 590 | 1580 | 530 | 1170 | 670 | 1150 | 1970 | 1050 | 1150 | 2200 | 250 | 150 | 65 | 200 | 2,45 | 1,32 | 830 | 4,6 | 48 |
| 240 | 3190 | 1150 | 2200 | 1600 | 920 | 590 | 1580 | 530 | 1170 | 670 | 1150 | 1970 | 1050 | 1150 | 2200 | 250 | 150 | 65 | 200 | 2,45 | 1,32 | 830 | 4,6 | 48 |
| 300 | 3450 | 1250 | 2250 | 1800 | 920 | 590 | 1810 | 500 | 1400 | 730 | 1160 | 1990 | 1050 | 1200 | 2200 | 250 | 170 | 80 | 200 | 2,93 | 1,74 | 1100 | 3,2 | 72 |
| 360 | 3450 | 1250 | 2250 | 1800 | 920 | 670 | 1810 | 500 | 1400 | 730 | 1160 | 1990 | 1050 | 1200 | 2200 | 250 | 170 | 80 | 250 | 2,93 | 1,74 | 1100 | 4,6 | 72 |
| 450 | 3950 | 1440 | 2480 | 2300 | 920 | 670 | 2290 | 716 | 1684 | 730 | 1320 | 2270 | 1200 | 1280 | 2220 | 300 | 150 | 100 | 300 | 4,60 | 2,45 | 1550 | 3 | 110 |
| 550 | 3950 | 1440 | 2480 | 2300 | 920 | 670 | 2290 | 716 | 1684 | 730 | 1320 | 2270 | 1200 | 1280 | 2220 | 300 | 150 | 100 | 300 | 4,60 | 2,45 | 1550 | 4,6 | 110 |

## MINIMUM CLEARANCE HPKI-K 180-550




min. clearance, boiler with 240l ash bin




min. clearance, boiler with 800l ash bin

| Boiler specification | 1 Minimum clearance | 2 Recommended clearance | Length | Width |
|---|---|---|---|---|
| -180kW & 240kW | 1150mm | 1600mm | 2320/2520mm | 1150mm |
| -360kW & 360kW | 1250mm | 1800mm | 2720mm | 1250mm |
| -450kW & 550kW | 1450mm | 2300mm | 3220mm | 1450mm |



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REMEHA GILLES BIOMASS BOILER 180-550KW TECHNICAL SPECIFICATION

# HPKI-R 999



- Air cooled step grate boiler
- Handles fuel with a moisture content of 55%
- G100 Wood chips
- Efficiency >90%
- RHI Emission certificate

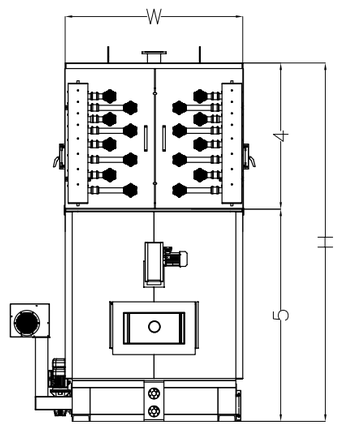
**High efficient combustion**

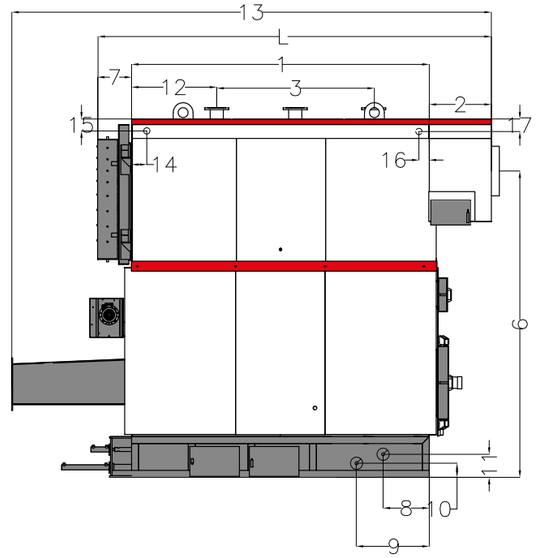
- Capable of full output burning
- Huge grate area, grates moved by dedicated hydraulic pump
- Pneumatic heat exchanger cleaning
- Touch screen control panel
- Fuel delivery by walking floor and cross conveyor
- Under grate ash discharge supplied as standard
- Cyclone supplied as standard, ceramic filter can be used in lieu





# HPKI-R 999




| Output in kW | L | W | H | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 999 | 3950 | 1790 | 3610 | 3000 | 630 | 1590 | 1470 | 2140 | 3090 | 320 | 465 | 735 | 142 | 232 | 860 | 4840 | 95 | 86 | 95 | 165 |

| Flow/Retun DN | Ø mm | Weight furnace in tons | Weight heat exchanger in tons | Water in Litre | Kpa at T20°C | Flow coefficient in m³/h |
|---|---|---|---|---|---|---|
| 125 / 125 | 500 | 14 | 6 | 3400 | 10 | 43 |

## WATER TREATMENT

It is generally considered good practise to treat the system water. The biomass boilers have a steel heat exchanger so a suitable inhibitor should be used for steel and all other metals in the heating system.

## BOILER ROOM VENTILATION REQUIREMENTS

Biomass boiler room ventilation can be determined by the following formula.

**Boiler Output kW x 3.222 + 80 cm² = Free Area cm²**

For example a 145kW boiler would need 547cm² of free area air inlet. A 100kW and a 45kW together in the same boiler house would have the same requirement.

Any conventionally flued appliances e.g pressure jet, water heater, atmospheric or conventionally flued Quinta etc will need their combustion/ventilation air in addition to the above in accordance with standard **BS6644** calculation.

## FLUEING REQUIREMENTS

It is important to understand the Biomass boilers operate on a natural draught flue principle, therefore, it is assumed that there is no, or very little residual fan pressure available for the flue calculation. In all instances a flue calculation must be carried out in accordance with EN13383, this will confirm safe removal of the flue gases in all but abnormal weather conditions.

The biomass boiler flue must be connected into a stainless steel twin wall flue system, with at least a 25mm insulation, the flue must also be suitable and approved for wood burning appliances, always contact a flue specialist for more guidance.

The cross sectional area of the boiler flue outlet must never be reduced in diameter, for longer flue runs or if additional bends are to be added, then this may include an increase in diameter.

If multiple biomass boilers are to be used, then each boiler must have its own flue and must not be shared with any other appliance.

The flue route must have a 1/3 - 2/3 rule applied, which means 1/3 is horizontal with 2/3 vertical, this should then bend 90° if at all possible. Offsets should be done with two 45° bends with the route taking an upward path, under no circumstances should the flue take a downward path.

If the flue route is difficult and natural draught will not occur, then an ID type fan could be fitted on the flue system, but specialist advice must be taken from the manufacturer.

There should be a negative flue draught reading between 12-18 Pa in all weather conditions, the draught stabiliser should be set accordingly.

The flue system must be fitted with an inspection tee piece, condensate trap and a draught stabiliser, these should be located as close as possible to the outlet of the boiler.



## FLUEING ENVIRONMENTAL ISSUES

All combustion causes pollution. When selecting your fuel you are also inevitably selecting the pollution that comes as a consequence of that decision. All Remeha-Gilles boilers when correctly installed are certified by AEA Technology as suitable for use in Smokeless Zones and meet with all the UK regulatory standards. All equipment certification is given based on the use of clean fuel. Clean fuel is essential otherwise you may be in breach of emissions regulations.

Other air pollutants of concern, but by no means exclusive to biomass combustion include

- PM10 Particles – Remeha-Gilles fully automated boilers are class leaders with low PM10 emissions
- PM10 levels will vary significantly with fuel quality. Pellets produce less PM10 than chips and may be a more suitable fuel choice for built up areas. PM10 emissions are of less concern in rural and suburban areas where existing PM10 levels are likely to be low. PM10 and 2.5 can be reduced to virtually zero with the use of ceramic filters on the flue outlet, available from Remeha.
- Sulfur Oxides (SOx) cause acid rain. Modern wood systems have 1/6 the $SO_2$ emissions of fuel oil.
- Nitrogen Oxides (NOx) produced by all combustion processes cause ozone, smog, acid rain and respiratory problems.
- Carbon Monoxide (CO) is produced by all fuel combustion processes. The level produced by wood combustion depends very much on how well the system is set up and maintained. CO emissions from wood burning are of relatively minor concern to air quality, except in some areas that already have high levels of CO in the air from traffic exhaust.
- Volatile Organic Compounds (VOCs) are a large family of air pollutants, some of which are produced by fuel consumption. Some are toxic, others are carcinogenic. VOCs elevate ozone and smog levels in the lower atmosphere, causing respiratory problems. Both wood and oil combustion produce VOCs – wood is higher in some compounds and oil is higher in others. VOC emissions can be minimized with good combustion practices.



REMEHA GILLES BIOMASS BOILER IMPORTANT INFORMATION

## NOTES

NOTES PAGE

## NOTES

Remeha Commercial
Innovation House
3 Oaklands Business Centre
Oaklands Park
Wokingham
RG41 2FD
T: 0118 978 3434

biomass@remeha.co.uk
**www.remeha.co.uk**

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