

# HEAT & POWER FROM WOOD KWK

60 KW HEAT / 20 KW POWER

**HARGASSNER**  
HEATING TECHNOLOGY FOR BIOMASS



[www.hargassner.com](http://www.hargassner.com)

**HEAT & POWER**  
FROM REGIONAL ENERGY





Markus, Elisabeth & Anton and Anton Hargassner

## Our vision is characterised by harmony between nature and satisfied customers.

We are proud of 35 years of experience and more than 100,000 satisfied clients. This, however, is not a reason for us to sit back. Quite the opposite is the case. Customer satisfaction combined with environmental friendliness are the primary goals of our philosophy and are the main attributes, which determine the company's future direction. Lowest emissions by highest efficiency, maximum comfort and long lifetime characterise the brand HARGASSNER. Yet, we continue to improve elements of our products to launch even better products in the future. We continually invest in research and quality management.

- Over 35 years of experience
- Worldwide exports
- More than 36,000 m<sup>2</sup> of production floor space
- More than 100,000 satisfied customers
- International awards



PROUD  
PARTNER OF  
**SKI  
AUSTRIA**



Dynamism, team spirit, closeness to nature, family and success are image elements that characterise Hargassner. And they are precisely the values people associate with the members of Austria's ski jumping team. Hargassner became an official partner of the ÖSV ski jumping team in September 2018.



## HEAT AND POWER FROM WOOD ENERGY FROM YOUR REGION

# The energy source of the future

In combination with other renewable energy like Solar and Wind - highly efficient cogeneration systems (CHPs) are important for a stable and environmentally-friendly energy supply. A small-scale, decentralised power unit is the perfect solution to reduce your long-term energy costs and to become independent of any electricity prices in the future. In the form of the KWK 60/20, Hargassner provides an economical and interesting solution for medium power range applications. Especially for commercial enterprises, public buildings and district heating applications, a Hargassner KWK is the perfect solution to provide environmentally-friendly energy.

Gasification CHP units feature a combined heat and power production technology - which can be operated with a high degree of electrical efficiency in district heating applications. The potential is tremendous.

60 - 70 % of the energy needs of Austria and Germany are covered by imported energy. Especially in winter months (low water level, low solar radiation) - the amount of renewable power is very low. Imported electricity - mainly from nuclear power plants - and electricity from coal and gas power plants thus form the major part of the energy mix. Therefore, power from Gasification-CHPs is inevitable to supply energy to everyone of us and prevent energy imports.



# HEAT & POWER FROM WOOD KWK

- 60 kW heat & 20 kW power
- Compact wood chip CHP
- Has already won the Energie Genie and AgrarFuchs awards



agrarfuchs



## Your benefits:

- Small and compact – tiny space requirement (just a 2.5 m<sup>2</sup> footprint)
- Modular & individual installation
- Water cooled unit --> High degree of efficiency
- Heat and sound insulated
- State of the art
- Series production
- TÜV-approved safety and very low emission values
- Compact plant design with very small space requirement
- Biomass-gasifier with filter unit and well-grounded control concept
- Proven and robust gas engine with very high degree of efficiency
- Sophisticated heat use --> over 95 % efficiency
- Single source supplier: Wood-gasifier, electrical engineering, conveyor technology, power generation, etc.
- Complete solution through integration with a Hargassner heating module

## Perfect for:



▪ Trades / Industry



▪ Tourism



▪ District heating networks



▪ Agriculture



The Hargassner KWK (combined heat and power) plant consists of a gasification unit (gasifier) and a generator unit (CHP). Based on the principle of wood gasification, this system is used to generate current and heat from natural wood chips. The electrical current generated here is fed into the public grid. The heat that arises is used for heating purposes, drying or similar applications.

### Advantages for existing district heating plants

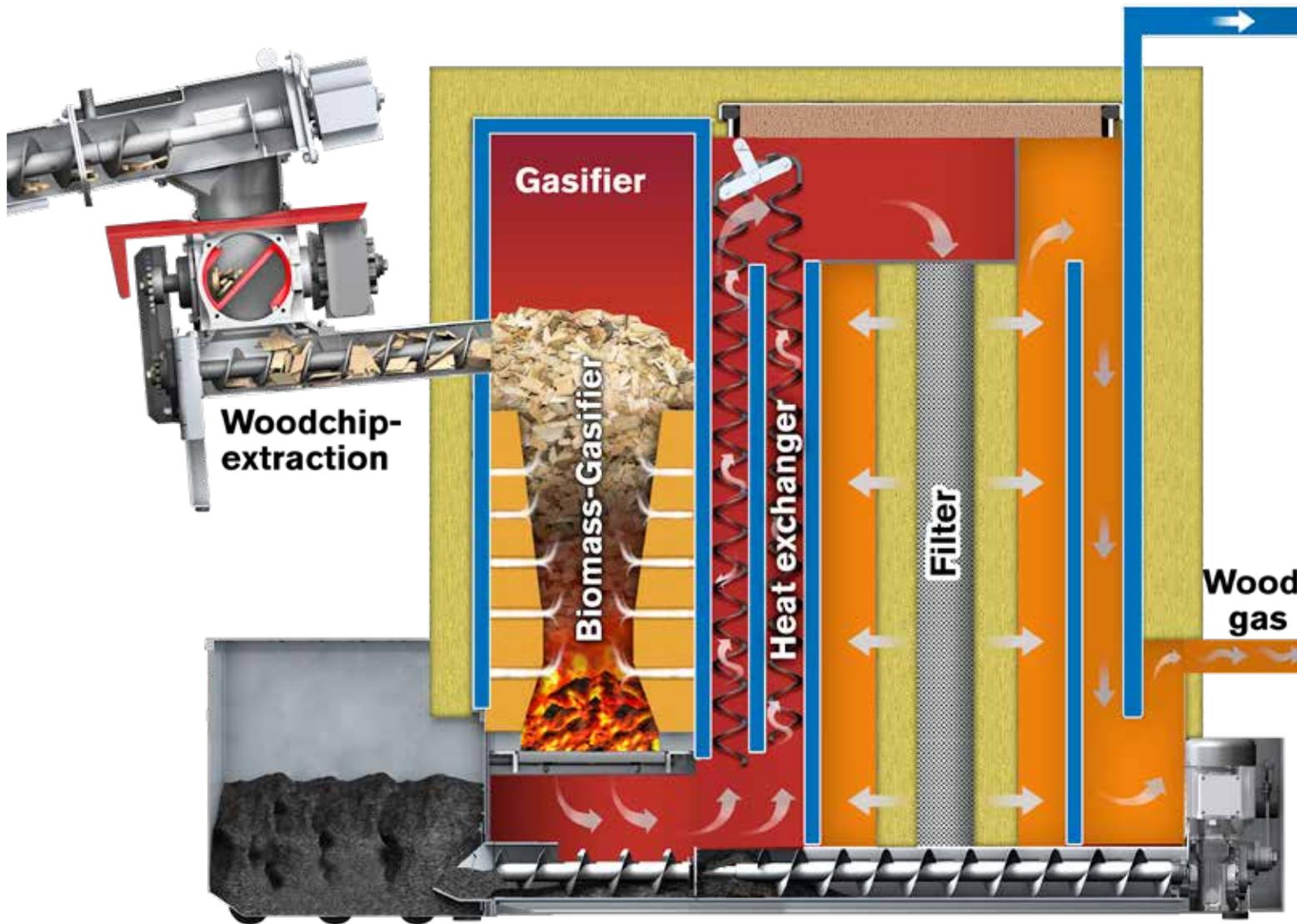
- The base load coverage in summer prevents inefficient part-load operation of the main boiler
- The power supply is another source of revenue for heat contractors
- Not much more fuel needed with simultaneous power cogeneration and additional efficiency increase

### Basic requirements for a gasifier plant

- Constant fuel supply in stable quality and calculable price.
- Assured power demand (Green power tariff, in-house power needs, ...)
- Assured year-round heat demand (district heating customers, process heat requirement)
- Technical feasibility (Space, pre-drying, grid-access, ...)
- Well-versed technical staff



# HEAT AND POWER FROM WOOD



## Gasifier

- Fuel supply by means of wood chip extraction
- Wood gasification in the biomass reactor
- Automatic fuel quality detection
- Effective heat transfer by turbulators
- Gas purification with special filter technology
- Automatic cleaning of the heat-exchanger
- Automatic de-ashing by means of ash extraction
- High degree of efficiency (> 95%)

## CHP power generation

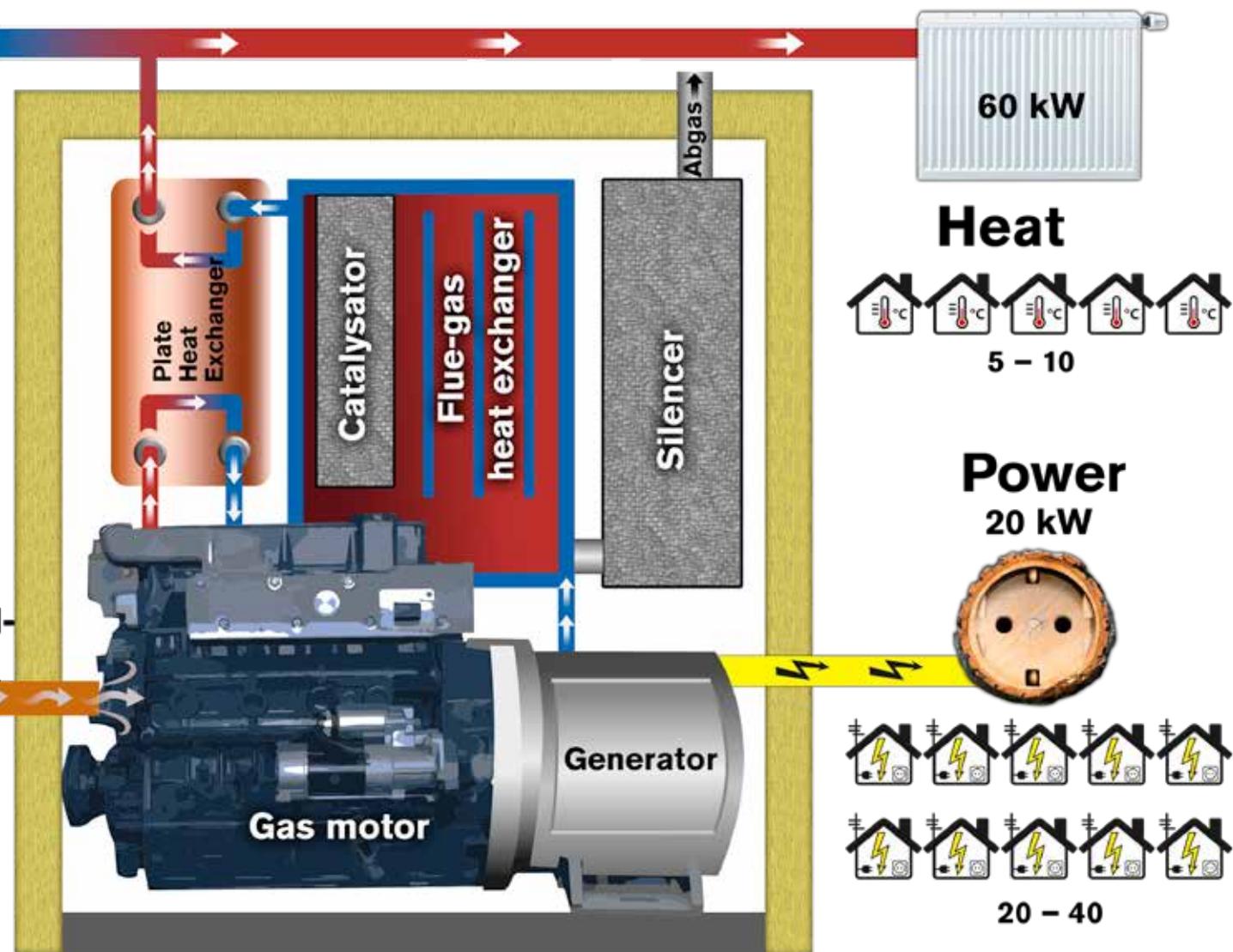
- Efficient industrial gas engine
- Water-cooled generator
- Flue-gas catalyst
- Flue-gas heat exchanger with heat recovery
- Optimal heat and sound insulation
- Easy to access for maintenance work

## Wood gasifier generator

The gas is generated, treated and cooled in a completely encapsulated unit. The wood chips are conveyed to the charging unit by a fuel extraction unit with a rotary feeder and then fed into the combustion chamber. The wood chips are only partially combusted here due to a defined air supply. The geometric structure of the gasifier insert ensures conversion into wood gas. The wood gas (a lean gas) is generated here; it flows through a heat exchanger with automatic treatment unit to the filter unit. The wood gas is then separated from the dust particles in a dry treatment

process. The filter unit is cleaned by an automatic device during operation. The purified wood gas flows through a second heat exchanger, where it is cooled to the target inlet temperature required for the engine. The vacuum in the gasifier unit housing prevents the wood gas escaping and offers a high degree of safety. The residual material from the gasification process and the filter unit is discharged by a screw conveyor.





### CHP power generation

The generator unit is designed as a completely encapsulated unit. It includes the gas engine and the generator which are connected to a torsionally flexible coupling. Before the wood gas enters the gas engine, the air required for combustion must be admixed. The required air mass is controlled by a closed loop A/F control. The gas mixture is used in the gas engine and the driven generator generates the electric current. The exhaust gas is passed through an exhaust gas heat exchanger where it is post-treated by a catalytic converter. In the exhaust gas heat exchanger, the exhaust gas is cooled down to condensation temperature, as a function of the temperature of the heating circuit return. The integrated sound-damping unit reduces the volume in the exhaust pipe in order to achieve the lowest possible sound level at the exhaust outlet.

### Grid and plant protection

The grid and plant protection module ensures complete and constant monitoring between the public grid and the cogeneration plant. It replaces the previously mandatory "permanently accessible voltage cutoff". The module is preset and tested; it meets all the standards and technical guidelines in effect in Europe.



# REFERENCES



## District heating networks

### District heating network in the community of Weng

A biomass district network was built in the community of Weng in 2012. The motivation at that time was to supply heat to newly constructed public housing projects. The community was also interested in supplying heat centrally to the civic offices, the multi-purpose hall and the fire service. Summer operation is also required for the hot water requirements of the public residential complex and some private houses. As the output range is very low here, however, a wood gasification plant with a connected cogeneration plant providing 60 kW heat and 20 kW electricity was installed in 2018.



This CHP plant is heated with the same fuel as the wood chip plant – with dried forest wood chips. It now serves as a boiler in the summer, and in the winter as a base load boiler for supplying heat. The electrical energy generated here is fed into the public grid as green electricity. As a result, the community centre is now supplied with biogenic, environmentally friendly heat, and part of the electricity supply is also ensured.

#### Basic data, district heating network:

- in operation since 2012

#### Consumers:

- 3 GEWOG residential blocks of 12 apartments each
- Bank
- Civic offices
- Fire service
- Multi-purpose hall
- Private households

#### Basic data, plants:

- Hargassner KWK 60 kW heat (basic load) and 20 kW electrical energy
- Hargassner Eco-HK 300 kW
- Storage tank 22,500 l



## District heating network

### Electrical energy:

- Full infeed ÖMAG

### Utilisation of generated heat:

- Residential properties (district heating network)

### Basic data, plant:

- Hargassner KWK 60 kW heat (basic load) and 20 kW electrical energy
- Hargassner Eco HK 150 kW (peak load coverage)
- Storage tank 60,000 l
- Solar wood chip drying



## Agricultural operations

### Agricultural operation in Lower Austria

A Hargassner CHP plant has been in operation at a farm in the district of Amstetten since the end of 2018. The farmer had been looking into the topic of wood gasification for a long time and began planning and submitting a concept for his operation as early as 2016 – initially with a competitor's CHP plant. The submission phase was successful at the time and he received a tariff promise for the green electricity feed-in tariff starting in 2018. However, in 2017 the farmer heard of Hargassner's new

innovative cogeneration system and switched to a Hargassner plant. "The whole solution is simple and the performance characteristics are also better suited to my farm," says the farmer, whose enthusiasm about the plant is obvious. In collaboration with the project supervisors from Hargassner, the planning and approval notices were changed to the new plant design.

The plant was delivered in early 2018 and installed in cooperation with a Hargassner installation contractor. This Hargassner CHP plant supplies two residential buildings, the pigsties and a grain and wood chip drying plant. The thermal energy from the plant is perfectly utilised throughout the year, while the electrical energy is fed into the public grid as green electricity.



#### Electrical energy:

- Full infeed ÖMAG

#### Utilisation of generated heat:

- Residential property
- Sties (pig fattening and rearing)
- Drying plant for wood chips, grains, maize, basic feed

#### Basic data, plant:

- Hargassner KWK 60 kW heat (basic load) and 20 kW electrical energy
- Hargassner Eco HK 100 kW (peak load coverage)
- Storage tank 43,000 l

### Agricultural operation in Upper Austria



#### Electrical energy:

- Covering internal requirements

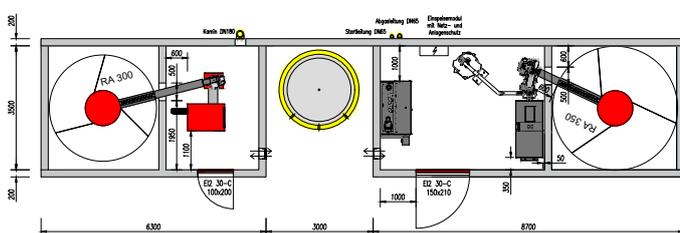
#### Utilisation of generated heat:

- Residential property
- Sheds (laying hens and rearing)
- Feed lime drying

#### Basic data, plant:

- Hargassner KWK 60 kW heat (basic load) and 20 kW electrical energy
- Photovoltaic system 120 kW
- Battery accumulator, storage tank 13,000 l

### Agricultural operation in Bavaria



#### Electrical energy:

- Covering internal requirements

#### Utilisation of generated heat:

- Residential property
- Sties (pig fattening and rearing)
- Wood chip drying system

#### Basic data, plant:

- Hargassner KWK 60 kW heat (basic load) and 20 kW electrical energy
- Storage tank 17,000 l



## Further references

CHP makes sense for companies (e.g., in the restaurants and catering/hotel sector or training centres) that have a continuous, simultaneous need for electricity and heat – especially if the demand for process heat and hot water results in a high basic heat load.

### District heating network in hotels in Altmühltal/Bavaria



#### Electrical energy:

- Covering internal requirements

#### Utilisation of generated heat:

- Country inn
- Hotel complex with 32 rooms
- Indoor swimming pool and wellness area

#### Basic data, plant:

- Hargassner KWK 60 kW heat (basic load) and 20 kW electrical energy
- Several storage tanks, total of 19,000 l

### District heating network for cultural and educational centre in Upper Bavaria



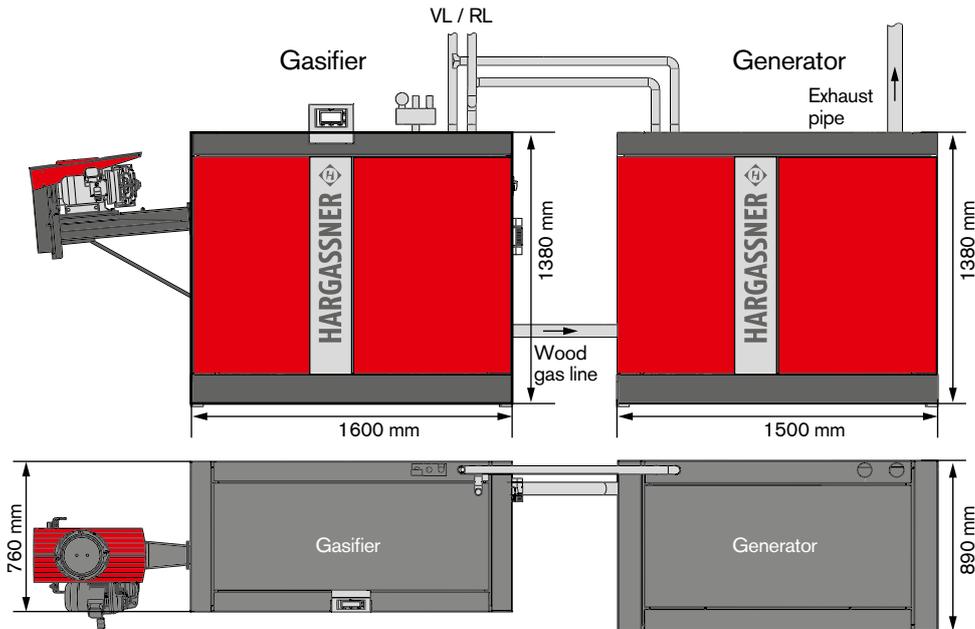
#### Electrical energy:

- The generated electrical energy covers approx. 21% of internal requirements

#### Basic data, plant/heat utilisation:

- The Hargassner KWK is used to cover the basic load
- A Hargassner Eco HK 300 is used to cover the average load
- The gas boiler covers peak loads
- 2 x 17,000 l storage tank

# TECHNICAL DATA



| Technical Data               | PERFORMANCE DATA, OVERALL |           |
|------------------------------|---------------------------|-----------|
|                              | Unit                      | Power     |
| Thermal power                | KW                        | 61        |
| Electrical power (gross/net) | KW                        | 20 / 19.4 |
| Overall output               | KW                        | 81        |
| Fuel power                   | KW                        | 85        |

| Technical Data        | PERFORMANCE DATA, OVERALL |            |
|-----------------------|---------------------------|------------|
|                       | Unit                      | Efficiency |
| Thermal efficiency    | %                         | 71.8       |
| Electrical efficiency | %                         | 23.5       |
| Total efficiency      | %                         | 95.3       |

## Fuel

- As per EN ISO 17225-4:2014: Wood chip class A1, P16S - P31S, M5-M15 (water content 5-15%)

## Electrical data:

- Electrical connection 400 V AC / 50 Hz, power factor  $\cos \varphi$  1.0
- Reactive current compensation: Capacitor, contactor with discharge resistor
- Protection class IP 55, fuse rating 50 A
- Control voltage 24 V DC, rated current 36.7 A, start-up current 1.5 x rated current (max. 1 000 ms)
- Operation mode grid-parallel (100% full infeed), grid and plant protection

## Monitoring:

- Carbon monoxide: CO warning system
- Overtemperature water circuit: Safety temperature limiter (STB) with manual reset

## Emission values:

- Carbon monoxide CO < 500 mg at 5% O<sub>2</sub>
- Nitrogen oxide NO<sub>x</sub> < 500 mg at 5% O<sub>2</sub>
- Sound generator unit at a distance of 1 m < 69 dBA
- Sound at exhaust gas outlet (with secondary silencer) at a distance of 1 m, 90° to the outlet < 65 dBA (< 55 dBA)

| Technical Data                                   | GASIFIER UNIT |                   |
|--|---------------|-------------------|
|  | Unit          |                   |
| Dimensions W x H x D                             | mm            | 1600 x 1380 x 760 |
| Weight   | kg            | 900               |
| Wood gas line connections                        | Inches        | DN 50 (2") IT     |
| Flow/return line connections                     | Inches        | DN 32 (1 1/4") IT |
| Fuel consumption                                 | kg/h          | approx. 19-20     |
| Wood chip energy content                         | kWh/kg        | 4.25              |
| Fuel water content                               | %             | 14.2              |
| Fuel power                                       | KW            | 85                |
| Max. flow temperature                            | °C            | 90                |
| Max. return temperature                          | °C            | 65                |
| Thermal output                                   | KW            | 16                |
| Residual material (in kg of deployed wood chips) | % (kg)        | approx. 1 - 3     |
| Max. operating pressure                          | bar           | max. 3            |

| Technical Data                    | GENERATOR UNIT |                   |
|-----------------------------------|----------------|-------------------|
|                                   | Unit           | Power             |
| Dimensions W x H x D              | mm             | 1500 x 1380 x 890 |
| Weight                            | kg             | 980               |
| Wood gas line connections         | Inches         | DN 50 (2") IT     |
| Exhaust gas line connection       | Inches         | DN 65 (2 1/2")    |
| Flow/return line connections      | Inches         | DN 40 (1 1/2") ET |
| Condensate drain line connections | Inches         | DN 20 (3/4") IT   |
| Starter line connections          | Inches         | DN 40 (1 1/2") ET |
| Effective electrical power        | KW             | 20                |
| Apparent electrical power         | kVA            | 25.4              |
| Thermal output                    | KW             | 45                |
| Max. flow temperature             | °C             | 85                |
| Min. return temperature           | °C             | 65                |
| Flue gas temperature              | °C             | 55 - 110          |
| Max. operating pressure           | bar            | 3                 |

## Generator

- Output 20 kW, voltage 400 V AC, frequency 50 Hz, rated current 36.7 A
- Operating mode S1, protection class IP 55, rotational speed 1510 rpm
- Cooling liquid cooled
- Efficiency 93.5%, power factor  $\cos \varphi$  0.8

## Engine:

- Type Kubota IG 3.6, cylinders inline 4, capacity 3.6 l
- Intake system normally aspirated engine
- Cooling liquid cooled

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