



ELECTRICITY & HEAT FROM WOOD

HKA 70 | LARGE-SCALE PROJECTS
SPANNER RE² GMBH





ELECTRICITY & HEAT

FROM WOOD

20,000,000 hours experience

- Spanner Re² is the leading manufacturer of wood-based combined heat and power plants with over 700 installed units and more than 20,000,000 operating hours of experience.

Proven worldwide

- Spanner Re²'s Biomass CHP are technically advanced and have proven themselves worldwide. We work closely with our customers of their exact requirements.

10 years of series production - "Made in Germany"

- Since 2008 Spanner Re² have been manufacturing their products in its Lower Bavarian factory in Neufahrn.

High fuel diversity

- The wood fuel used to power Spanner Re²'s CHPs doesn't have to be premium quality. Processed residual forest wood or roadside greenery can be refined as fuel to generate electricity and heat using Spanner Re²'s patented technology. The wide range of fuel sources makes operating the CHPs particularly flexible.

OUR CUSTOMERS REACH OVER 8,000 OPERATING HOURS A YEAR USING WOOD FUEL



ANNUAL OPERATING HOURS OF UP TO 99.18 % - AND WE CAN PROVE IT

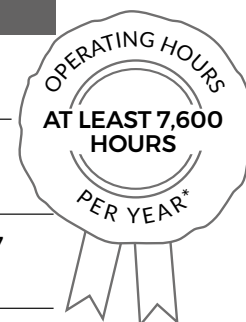
Convincing annual performance

- Many of our customers have annual operation hours of up to 99.18 % - which we can prove by means of annual efficiency statements.

Operation hours guarantee

- We guarantee a duration of at least 7,600 hours per year.

CUSTOMER NAME	MODEL	DATE OF COMMISSIONING	UPTIME/ YEAR	PERIOD
KOMMUNALSERVICE LANG Germany	HKA 45	11.12.11	98,48%	01.01.2012 - 31.12.2018
FA. WUNDER Germany	HKA 45	19.12.11	81,82%	02.02.2012 - 31.12.2016
SCHUHBAUER FERNWÄRME Germany	HKA 45	15.07.14	86,39%	01.01.2015-31.07.2017
FA. PENTEC Italy	HKA 45	01.12.15	96,72%	01.01.2016-31.12.2016
FA. WEISSTEINER Italy	2XHKA 45	07.08.13	89,32%	01.01.2014-31.12.2015 01.01.2018-31.12.2018
FA. LOG-HOLMES Italy	HKA 45	04.11.13	92,32%	01.01.2012-31.12.2016
	HKA 45	04.11.13	92,16%	01.01.2012-31.12.2016
FA. FRICKGUT Italy	HKA 45	01.09.11	81,04%	01.01.2012-31.12.2016
	HKA 45	01.09.11	79,77%	01.01.2012-31.12.2016
HOTEL TALJÖRGELE Italy	HKA 45	11.12.13	94,69%	01.01.2014-31.12.2016
	HKA 45	11.12.13	94,48%	01.01.2014-31.12.2016
	HKA 45	11.12.13	95,11%	01.01.2014-31.12.2016
FA. ENERGOLUX Latvia	HKA 45	28.04.17	87,90%	29.04.2017-29.08.2017
	HKA 45	28.04.17	99,18%	29.04.2017-29.08.2017
	HKA 45	28.04.17	90,87%	29.04.2017-29.08.2017
	HKA 45	28.04.17	86,99%	29.04.2017-29.08.2017
	HKA 45	28.04.17	83,74%	29.04.2017-29.08.2017
	HKA 45	28.04.17	96,16%	29.04.2017-29.08.2017
	HKA 45	28.04.17	89,86%	29.04.2017-29.08.2017
	HKA 45	28.04.17	89,50%	29.04.2017-29.08.2017
	HKA 45	28.04.17	98,86%	29.04.2017-29.08.2017
	HKA 45	28.04.17	83,97%	29.04.2017-29.08.2017
LG LIESMA LTD Latvia	HKA 45	24.09.15	80,63%	25.09.2015-31.12.2016
	HKA 45	24.09.15	81,24%	25.09.2015-31.12.2016
	HKA 45	24.09.15	80,02%	25.09.2015-31.12.2016
	HKA 45	24.09.15	81,03%	25.09.2015-31.12.2016
	HKA 45	24.09.15	80,02%	25.09.2015-31.12.2016
	HKA 45	24.09.15	81,54%	25.09.2015-31.12.2016
	HKA 45	24.09.15	79,93%	25.09.2015-31.12.2016



* See operating manual and biomass specification.

CASCADE



ADAPT PERFORMANCE AS REQUIRED. UPGRADE POSSIBLE AT ANY TIME

Flexible performance

- The modular design of our Biomass CHP makes it possible to combine several plants in a cascade. Depending on the heat demand, the systems are operated together or independently, which allows a particularly good partial load ability and maximum flexibility.

Performance upgrades possible

- The system can also be expanded with additional modules at a later date in case of increased energy demand.

Continuous operation guaranteed

- In contrast to a single large plant, a Biomass CHP cascade allows you to generate energy continuously even during maintenance work.

No external service technician required

- You can carry out 100 % maintenance yourself, even on series-produced engines. There is no need for expensive specialist

assistance. You will be trained to be wood gas experts at our "wood power academy", free of charge.

No intermediate medium / no condensate

- Our systems do not produce condensate that you have to dispose of for a fee. In addition, no intermediate medium such as thermal oil etc. is required, which reduces the plant process to the essentials and saves costs.

An investment that pays off

- The investment costs are extremely attractive compared to a large plant. With a good heat concept and good access to fuel, the Biomass CHP cascade pays for itself in just a few years.





TRANSFORM YOUR BUSINESS WITH BIOMASS CHP

SCOTLAND
Biomass CHP cascade
(3 x HKA 45) & Periphery

LATVIA
Biomass CHP cascade (10 x HKA 45)
with discharge & conveyor technology



LARGE-SCALE PROJECTS



Know-how in large-scale project planning

- We have already successfully implemented many major projects, such as a cascade with 21 plants with a Latvian local heating supplier (see p.4, above). We place great importance in our relationships with our customers and support them in the planning stages of a project and after the sale to ensure successful implementation.

Spanner Re² is a complete supplier

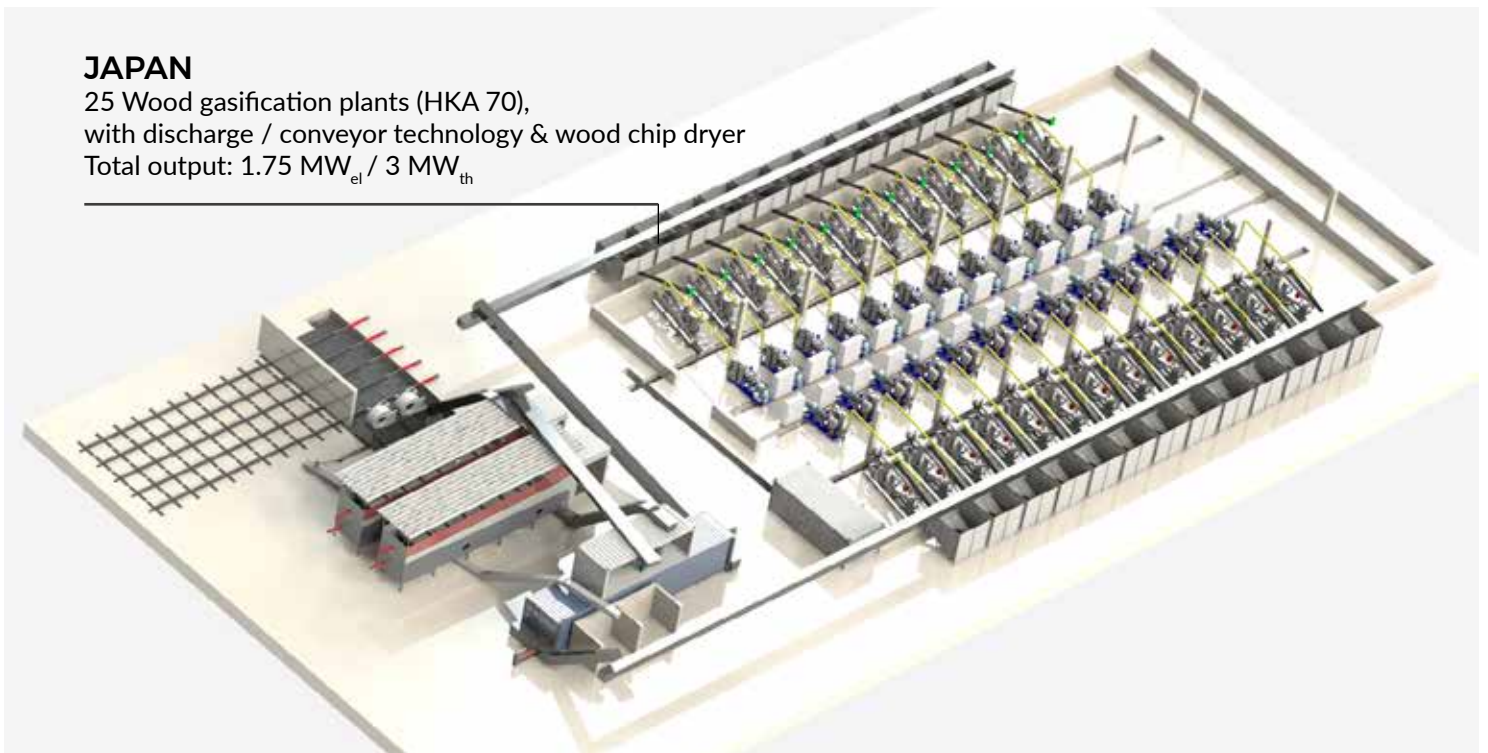
- With us you get everything from one source: from the plant to the dryer including periphery.

Time is money!

- With our web visualisation you can access your energy system at any time via mobile phone or PC. It is also possible to start the system with a click. This makes plant operation particularly flexible.

JAPAN

25 Wood gasification plants (HKA 70),
with discharge / conveyor technology & wood chip dryer
Total output: 1.75 MW_{el} / 3 MW_{th}



REFERENCES



Worldwide reference plants from Spanner Re²

- Visit one of our numerous Biomass CHP reference plants to see our reliable and proven technology in action.

Our reference list

- We will gladly send you our reference list so you can locate the plant you would like to visit nearby.

LATVIA

Biomass CHP cascade
(7 x HKA 45) with periphery

CANADA

EnergyBlock – Triple system (HKA 45),
with discharge / conveyor technology & wood chip dryer
Total output: 135 kW_{el} / 324 kW_{th}, off-grid



Find more references



TECHNICAL DATA

Model "HKA 70"

Motor	CHP 70 kW
Type	HMG 634S-132A
Layout	In-line-engine
Method	4-stroke Otto engine
Number of cylinders	(R) 6
Engine displacement	7,4 l
Normal speed	1500 1/min
WOOD GAS	
Composition	CO 17-20% , H ₂ 13-16%, CH ₄ 1-5%, CO ₂ 7-12% C _N H _N 0,1-0,5%, N ₂ rest
Tar content	< 100 mg/Nm ³
Heating value	5.6 MJ/Nm ³ = 1.55 kWh/Nm ³ (in standard condition)
Volumetric flow rate, approx..	132 Nm ³ /h
CHP OUTPUT CHARACTERISTICS ¹⁾	
Heating power of wood gas at 200 m above sea level	205.3 kW
Thermal power	105 kW
Electrical power	68 kW
Total power	173 kW
Thermal efficiency	51.2 %
Electrical efficiency	33.1 %
Total efficiency	84.3 %
GASIFIER OUTPUT CHARACTERISTICS ¹⁾	
Energy content of the wood chips with 9 % water content, corresponds 10 % humidity	4.5 kWh/kg
Rated thermal input at 200 m above the sea	236.5 kW
Heating power based on wood gas	205.3 kW
Cold gas efficiency	87 %
Thermanl power	18 kW
Total power	223.3 kW
Efficiency	94.4 %
OPERATION CONDITIONS	
Relative humidity	< 75 %, not condensing
Room temperature	10 - 40 °C
Room	closed, dry, observe legal rules and regulations, reccommendation: Fire resistance class F90
EMISSION VALUES	
Sound pressure level at a distance of 1 m CHP at distance of 1 m Exhaust gas outlet at a distance of 1 m	< 56 dba < 90 dBA < 55 dBA
Air exchange in the room	25 times/hour
Carbon monoxide (CO)	monitored by CO warning system
Ex protection	The system produces a potentially explosives gas
Exhaust gas ²⁾	CO < 650 mg/m ³ , NO _x < 500 mg/m ³ , Staub < 30 mg/m ³ Benzol < 1 mg/m ³

¹⁾ Reference conditions: 25°C air inlet temperaure, air pressure 100 kPa, relative humidity 30 %, wood gas with a heating value of 1.55 kWh/Nm³.
Fuel consumption tolerance +7%, thermal output tolerance +/-7%

²⁾ Exhaust gas value based on the measuring mode.

Output characteristics of the Spanner plant (Biomass CHP) based on the energy content of the wood chips with 9 % water content¹⁾

CHP + GASIFIER	
Energy content of the wood chips with 9 % water content, corresponds 10 % humidity	4.5 kWh/kg
Heating power of wood gas at 200 m above sea level	236.5 kW
Thermal power CHP	105 kW
Thermal output of wood gasifier	18 kW
Thermal power - total	123 kW
Electrical power	68 kW
Total power	191 kW
Thermal efficiency	52.0 %
Electrical efficiency	28.8 %
Total efficiency	80.8 %

¹⁾ In case of an installation altitude 200 m above the sea and an ambient temperature of 27°C, performance data in accordance with DIN ISO 3046-1, Power tolerance: ±5%, power reduction at T>40°C: 10 %/10K, power reduction per 100 m installation altitude: up to 0.8 kW/100 m.

Reference conditions: 25°C air inlet temperature, air pressure 100 kPa, relative humidity 30 %, wood gas with a heating value of 1.55 kWh/Nm³. Fuel consumption tolerance +7%, thermal output tolerance +/-7%

FUEL AND CONSUMPTION	
Consumption (depending on the chip material)	54.4 kg/h ²⁾
Material	Natural wood chips according to DIN ISO 17225-1
Size	P31S
Fine parts content	F10 ³⁾
Water content	M10 ⁴⁾
Ash content	A1.0

²⁾ Depending on the moisture content and quality of the gasification material that is used.

³⁾ The higher the fine parts content is, the more coal dust will be discharged via the ash.

⁴⁾ Water content in % = $\frac{\text{wet weight of wood} - \text{dry weight of wood}}{\text{wet weight of wood}} \times 100$

Wood moisture in % = $\frac{\text{wet weight of wood} - \text{dry weight of wood}}{\text{dry weight of wood}} \times 100$



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