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 particuarity 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 corresponds to over 8,688 hours per year - 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 COMISSIONING	OVERALL EFFICIENCY
KOMMUNALSERVICE LANG Germany	HKA 45	11.12.11	**98,17%**
WUNDER Germany	HKA 45	19.12.11	**82, 83%**
SCHUHBAUER FERNWÄRME Germany	HKA 45	15.07.14	**89,93%**
FA. PEN-TEC Italy	HKA 45	01.12.15	**96,56%**
FA. WEISSTEINER Italy	HKA 45 HKA 45	07.08.13 07.08.13	**88,78%** **90,87%**
FA. LOG-HOLMES Italy	HKA 45 HKA 45	04.11.13 04.11.13	**86,74%** **90,83%**
FA. FRICKGUT Italy	HKA 45 HKA 45	01.09.11 01.09.11	**83,93%** **82,85%**
HOTEL TALJÖRGELE Italy	HKA 45 HKA 45 HKA 45	11.12.13 11.12.13 11.12.13	**97,07%** **97,18%** **97,61%**
FA. ENERGOLUX Latvia	HKA 45 HKA 45 HKA 45 HKA 45 HKA 45 HKA 45 HKA 45 HKA 45 HKA 45 HKA 45	28.04.17 28.04.17 28.04.17 28.04.17 28.04.17 28.04.17 28.04.17 28.04.17 28.04.17 28.04.17	**87,90%** **99,18%** **90,87%** **86,99%** **83,74%** **96,16%** **89,86%** **89,50%** **98,86%** **83,97%**
LG LIESMA LTD Lettland	HKA 45 HKA 45 HKA 45 HKA 45 HKA 45 HKA 45 HKA 45	24.09.15 24.09.15 24.09.15 24.09.15 24.09.15 24.09.15 24.09.15	**80,63%** **81,24%** **80,02%** **81,03%** **80,02%** **81,54%** **79,93%**

* 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 particulary 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 change.

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

WOOD POWER
PATENTED
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.

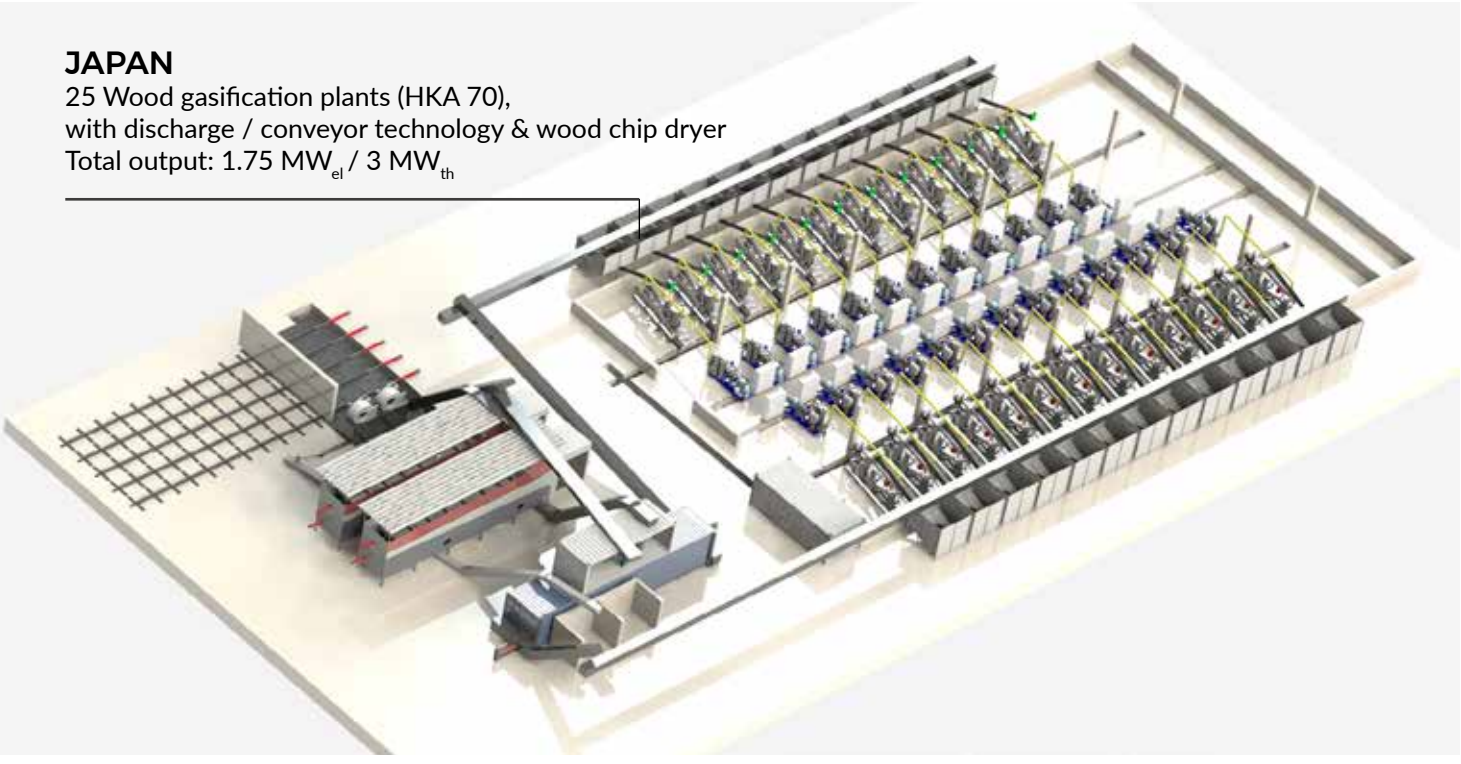
Spanner Re² is a complete supplier

- 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 particularity 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 MW_{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_NH_N 0,1–0,5%, N_2 rest
Tar content	< 100 mg/Nm³
Heating value	5.6 MJ/Nm³ = 1.55 kWh/Nm³ (in standard condition)
Volumetric flow rate, approx..	132 Nm³/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 restistance 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/m³, NO_x < 500 mg/m³, Staub < 30 mg/m³ Benzol < 1 mg/m³

[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 content[1)]

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 % = $\frac{\text{wet weight of wood - dry weight of wood}}{\text{wet weight of wood}} * 100$

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

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