



DP Specialist

Solution

MSW, RDF and Complex Fuels

DP CleanTech
Creating value from waste

DP EcoSpecialist and MaxSpecialist

DP Specialist boilers are specifically designed for complex or difficult fuels. The 'high pressure high temperature' technology is customised for the fuel type, and is manufactured with the most appropriate materials and supplementary systems to cater for even the most difficult fuels. Whether it is MSW, RDF or the lignin byproduct from 2G ethanol production, DP Specialist boilers are specifically designed to reach or even exceed the required performance levels from a chosen fuel, or from several fuel types.

As with all DP's boiler solutions, the starting point for optimizing the performance is a profound knowledge of the fuel characteristics. These properties will impact

the design of the fuel feeding system; the combustion grate, furnace height and other specific boiler parameters. DP's expertise in fuel analysis is a key aspect of our total solution approach.

DP Specialist boilers can cater for more than one type of feedstock, or for different modes of the same biomass. With every aspect of the DP Specialist boilers expressly designed to get the most out of a particular fuel situation and to meet customer output requirements, the inherent challenges and problems can be addressed at the outset, and then minimized in the design. This allows overall plant performance and efficiency to remain high, and reliably consistent.

DP Specialist Solution Advantages and Benefits



Optimizes combustion of complex fuel types through tailored engineering



Performance proven and guaranteed



Cost effectively addresses NOx emissions as an integral part of the design



Cost competitive



Is an extension of existing proven high performance product developed in Denmark



Extended life cycle



Can address a variety of complex fuel types through the design of specific components



Lower total cost of ownership

DP Specialist Boiler Solution for MSW / RDF

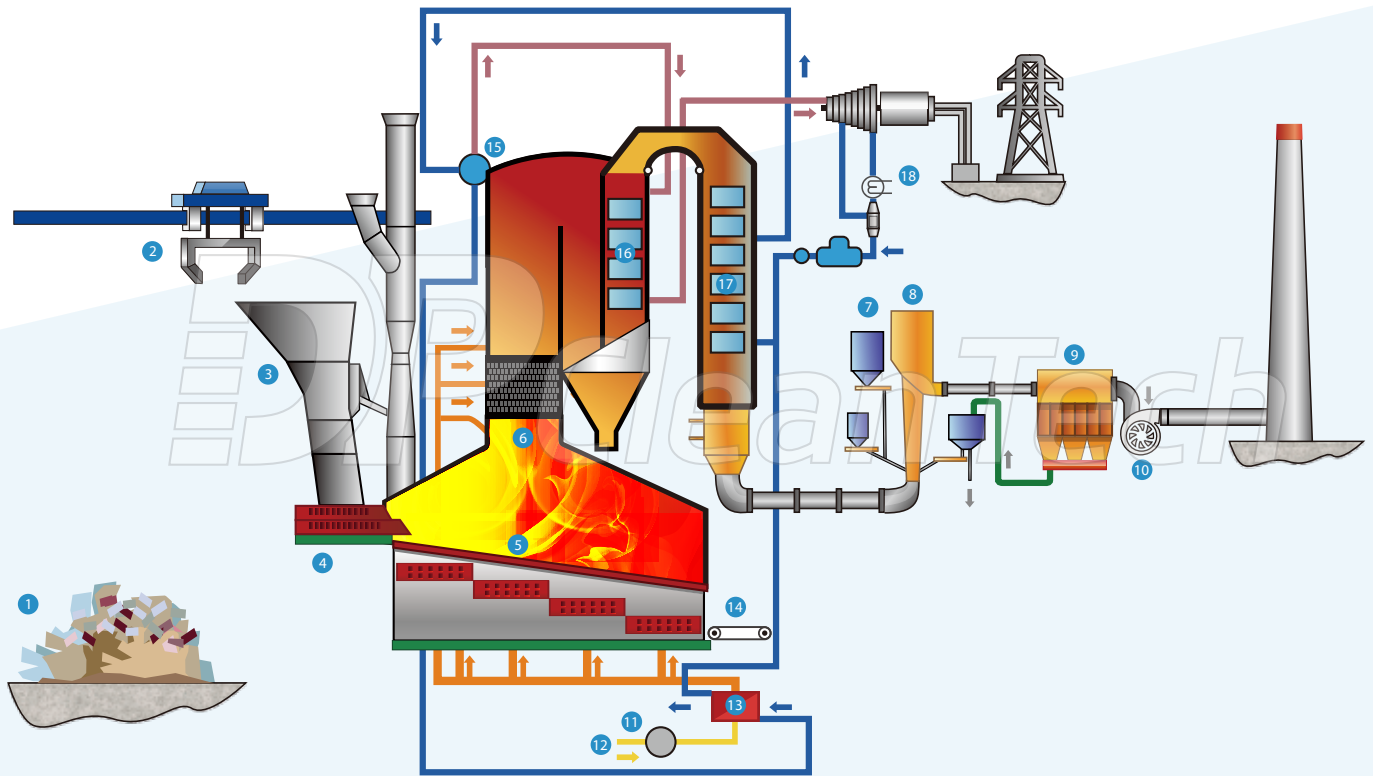


Image cannot be reproduced without permission of DP CleanTech

- | | | |
|----------------------|--------------------------|-----------------------------------|
| 1 Waste bunker | 7 Reagent storage | 13 Air preheater |
| 2 Crane | 8 Venturi reactor | 14 Slag conveyor |
| 3 Feeding hopper | 9 Bag filter | 15 Steam drum |
| 4 Pusher | 10 ID fan | 16 Superheater |
| 5 Step grate | 11 FD fan | 17 Economizer and flue gas cooler |
| 6 Combustion chamber | 12 Combustion air intake | 18 Condenser |

- Grate modifications to improve burnout of low quality fuel, and reduce the carbon content of residue, thereby increasing boiler efficiency
- Specially designed feeding system for efficient handling of complex fuel types
- Corrosion resistant materials reduce degradation and increases product life cycle
- Integrated flue gas cleaning technology for reduced NOx emissions

Designed Performance Parameters (30MW power plant solution)

Main Steam Flow	Main Steam Pressure	Main Steam Temperature	Feed Water Temperature	Fuel Consumption
62 t/h	60 bar	420°C	120°C	20.83 tph

Integrated NOx Reduction Technology with optional SNCR system

Boiler Size	Biomass Solution Type	Emission
130tph	Typical Biomass Solution	300mg/M3
	DP Solution	200mg/M3 (EU standard)
	DP Solution + SNCR	100mg/M3 (National China Standard)

Figures based on straw fuel standards

How is DP CleanTech different?

DP is a fuel expert

The importance of fuel in the economics of a power plant cannot be overestimated. DP designs the solution starting with a deep understanding of the fuel characteristics, to deliver solutions which are the most efficient possible with the available fuel.

DP provides integrated, fit for purpose solutions

DP power plant performance is guaranteed because DP considers all elements of the operation to ensure that the solution is designed to perform optimally, right from the beginning. DP can design the power plant and manage the whole process to ensure that the solutions are fully integrated and properly implemented across all aspects of the operation. DP products are designed to be fit for purpose, maintaining engineering integrity and performance whilst minimizing surplus design and manufacturing.

DP understands the economics of biomass power plants

Unlike many providers, DP has great experience in power plant economics, and is dedicated to designing cost competitive solutions that provide long term value and economic viability to achieve financial and business objectives.

DP invests in the future

DP conducts ongoing R&D to ensure that its solutions are proactively addressing the changing needs of our customers, and remain as the most efficient, performance guaranteed solutions in the market.

Research & Development

The DP Max and EcoSpecialist boilers are based on the proven design of the 130tph (1*30MW) biomass boiler solution. This advanced biomass direct combustion technology was developed in Europe and has been used successfully in more than 100 power plants worldwide. It has been modified specifically to maximize combustion of difficult and complex fuels.

DP has many years of operating experience and extensive operational data. This data, together with fuel data from DP's proprietary Biomasslab are major inputs to our ongoing research and development. Improving the performance of our products for an

ever increasing range of fuel types, is essential to meet the demands of our clients and the opportunities in the biomass industry.

DP's Global Engineering Services experts have tested and optimised the technology for reliability and performance, and all our products are designed for easy integration and installation. To ensure reliability and quality, specific modifications are developed and proved out before being incorporated in projects. DP also has the expertise - through our Flue Gas Cleaning division based in the UK - to provide solutions that address the increasingly stringent requirements for reducing NOx emissions.

About DP CleanTech

- ✓ DP CleanTech designs, engineers, manufactures and commissions biomass and waste-to-energy power plants, providing complete solutions for turning waste materials into clean energy.
- ✓ DP CleanTech has over 100 biomass power plant references around the world using high pressure, high temperature technology originally developed in Denmark.
- ✓ DP CleanTech is recognized as a world leader in the biomass clean energy field.

MATERIALS

The quality of materials and manufacturing are guaranteed to meet prevailing international standards. By utilizing proven corrosion resistant materials and technology, we significantly extend the product lifecycle thereby enhancing the cost effectiveness of all our boiler products.



Lignin



Cassava Residue



Municipal Solid Waste

MANUFACTURING

DP has its own manufacturing facility in Europe as well as a longstanding and trusted global supply chain. Designs are tailored according to customer needs and are built using modular components, allowing greater flexibility to manage costs.

