DP EcoMulti Solution

DP CleanTech
Creating value from waste

DP EcoMulti

The DP EcoMulti boiler is the latest development in DP CleanTech's portfolio, and has been specially designed to address 2 significant challenges faced by power plant operators in many regions: poor fuel quality and reducing NOx emissions.

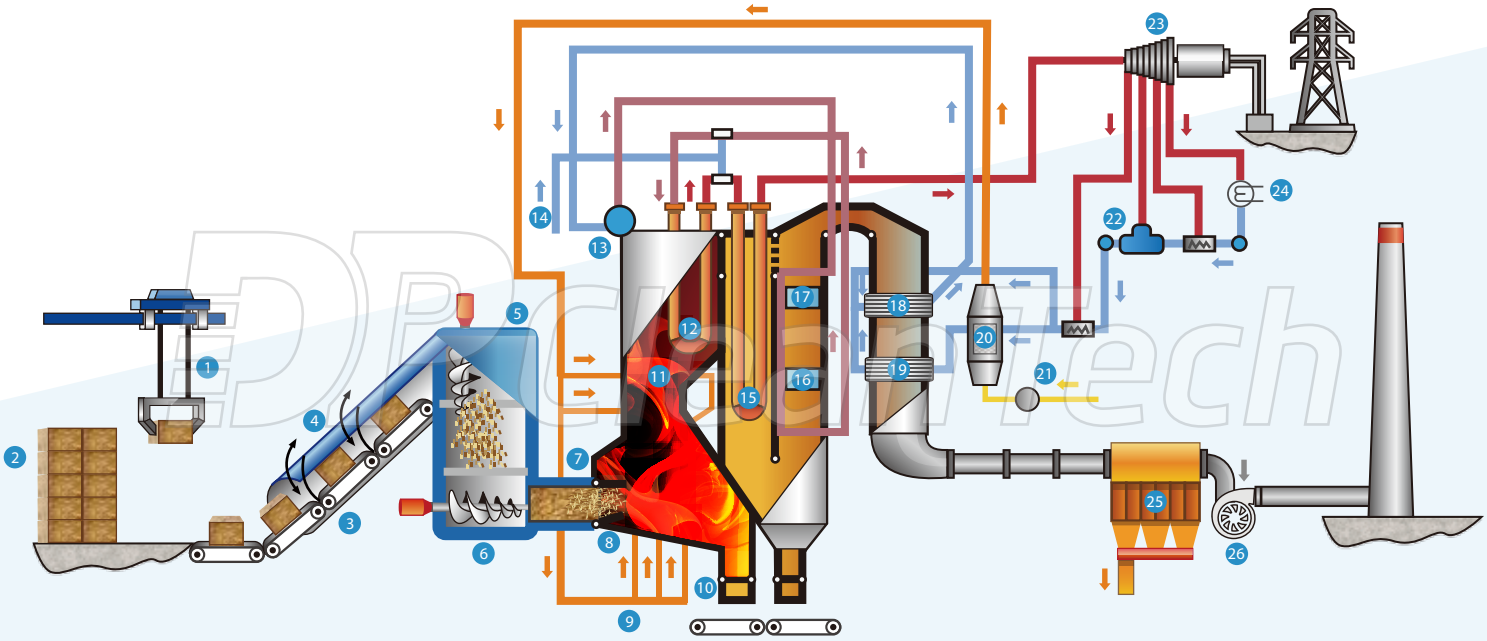
The EcoMulti is specifically designed and optimized for performance in difficult environments. We have developed, tested and verified the EcoMulti, and improvements have been made incrementally on existing projects to ensure that the final product is easily integrated and has superior performance.

The DP EcoMulti combines excellent performance engineered with top quality manufacturing standards to deliver benefits unmatched by more standard solutions.

DP EcoMulti Solution Advantages and Benefits

- **Optimizes combustion of poor quality / high corrosion fuels**
- **Performance proven and guaranteed**
- **Cost effectively addresses NOx emissions as an integral part of the design**
- **Cost competitive**
- DK — **Is an extension of existing proven high performance product developed in Denmark**
- **Extended life cycle**
- **Fuel type and quality flexibility**
- **Lower total cost of ownership**

DP EcoMulti Boiler Solution



1. Straw crane
2. Straw barns
3. Chain conveyors
4. Seal gates
5. Scarifier
6. Stoker
7. Water cooling duct
8. Vibrating grate
9. Preheated combustion air
10. Slag conveyor
11. Combustion chamber
12. Superheater 3
13. Steam drum
14. Water for atemperators
15. Superheater 4
16. Superheater 2
17. Superheater 1
18. Economizer
19. Flue gas cooler
20. Air preheater
21. FD fan
22. Deaerator
23. Turbine
24. Condenser
25. Bag filter
26. ID fan

- Grate stock bin redesigned to handle different sized scattered fuel
- Grate modifications to improve burnout of low quality fuel, and reduce the carbon content of residue, thereby increasing boiler efficiency
- Corrosion resistant materials reduce degradation and increases product life cycle
- Modifications in air temperature and optimization of air distribution system allows fuel handling with humidity levels of up to 56.7% and LHV of 5045 KJ/Kg.

Designed Performance Parameters (30MW power plant solution)

Main Steam Flow	Main Steam Pressure	Main Steam Temperature	Feed Water Temperature	Fuel Consumption	Boiler Efficiency	Annual Operation Hours	Plant Consumption	Plant Efficiency
130 t/h	92 bar	540°C	210°C	25 tph	>91%	>8000h	10%	>33%

Integrated NOx Reduction Technology

Boiler Size	Biomass Solution Type	Emission
130tph	Typical Biomass Solution	300mg/M3
	DP EcoMulti Solution	200mg/M3 (EU standard)
	DP EcoMulti 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 solutions

The performance of DP power plants is guaranteed because DP considers all elements of power plant 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 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.

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 process

The DP EcoMulti is 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 over 80 power plants worldwide.

Ongoing research and development is essential to further improve the performance of our products. Our operating experience and systematic data analyses highlight that the main factors inhibiting plant performance are the habitual use of different fuel varieties; and poor fuel quality. DP's Global Engineering Services experts have tested and optimised the technology for reliability and performance, and it has been designed for easy integration and installation. Specific modifications were developed and proved out in several projects (Wuqiao, Ning'an, Shangcai Shaoneng) before being incorporated into the DP EcoMulti solution. The enhancement and incorporation of NOx emissions capability is a key part of the design, in order to address the increasingly stringent regulations being introduced worldwide.

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 70 biomass power plant references around the world using high pressure, high temperature technology originally developed in Denmark.
- DP CleanTech built the first biomass power plant in China and is responsible for over 30% of the biomass power plants operating in China today.
- DP CleanTech is recognized as a world leader in the biomass clean energy field.

POOR FUEL QUALITY

High moisture or poor quality fuels accelerate corrosion, and reduce the life cycle of equipment. The DP EcoMulti boiler has been designed to optimize combustion and withstand the corrosive effects of such fuel, as well as handle multiple fuel types.

REDUCING NOx EMISSIONS

Increasingly stringent standards for NOx emissions are being introduced worldwide. The innovative, integrated EcoMulti design meets the most demanding standards for NOx emissions (100mg/M3) in the world, without the use of costly additional SCR's.

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www.dpcleantech.com

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