



# Start Up and Operating Experience at the Niklasdorf Waste to Energy Power Plant

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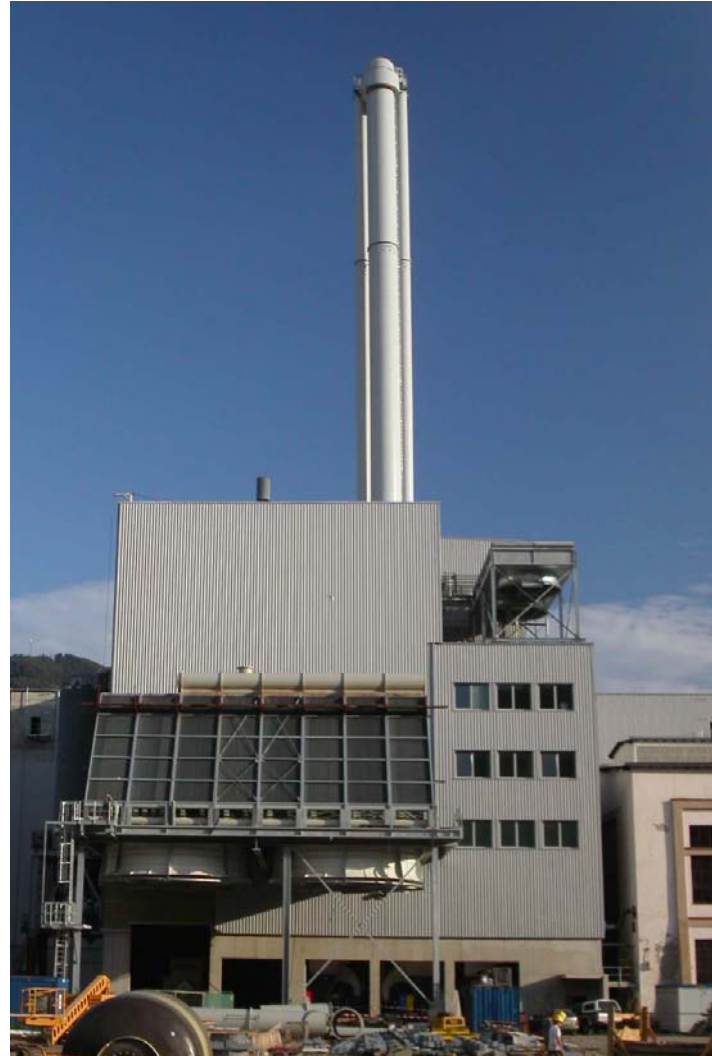
AUSTRIAN ENERGY & ENVIRONMENT AG

DI. Dr. Michael Resch

ENAGES



Niklasdorf Waste to Energy Plant  
In Styria / Austria





<b>Design values</b>	
<b>Maximum fuel heat rate</b>	<b>40,0 MW</b>
<b>Range of lower heating Value</b>	<b>8,0 ÷ 18,0 MJ/kg</b>
<b>Moisture</b>	<b>10 ÷ 40 % (w)</b>
<b>Ash content</b>	<b>10 - 35 % (w)</b>
<b>Fuel flow</b>	<b>8,0 - 16,0 t/h</b>
<b>Control range</b>	<b>60 ÷ 100 %</b>
<b>Bed temperature</b>	<b>630 ÷ 830 °C</b>
<b>Freeboard temperature</b>	<b>800 ÷ 900 °C</b>
<b>Boiler Efficiency ( depending on LHV)</b>	<b>87,8 ÷ 90,5 %</b>

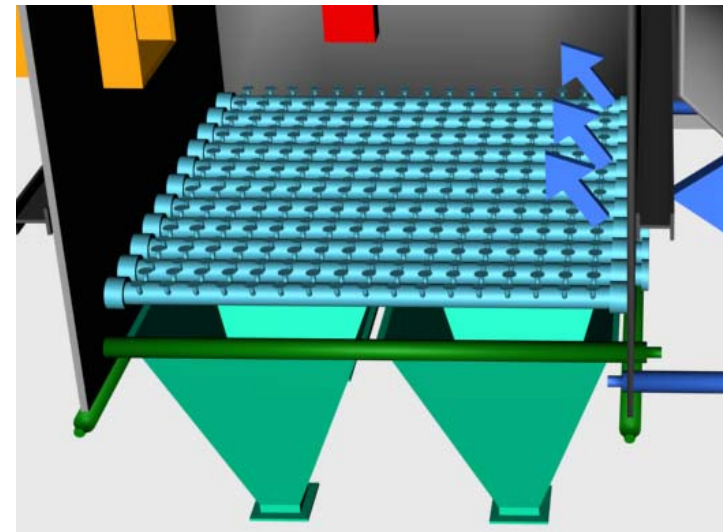
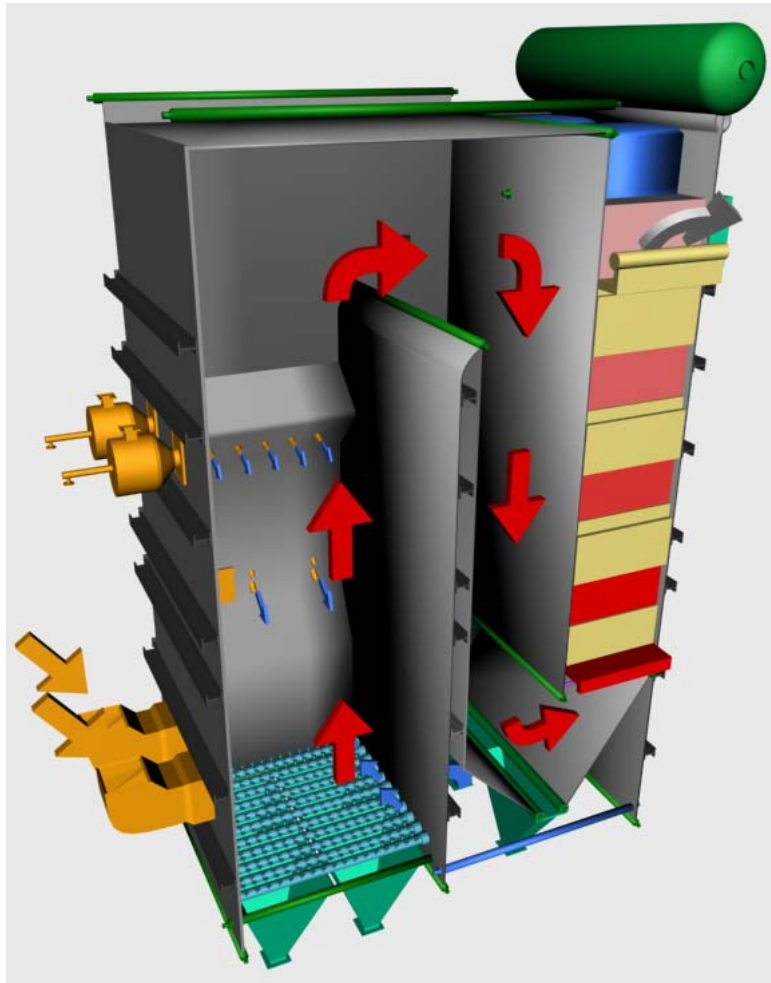
Design Data



<b>Carbon monoxide CO</b>	<b>50 mg/m<sup>3</sup>n<sup>(1)</sup></b>
<b>Unburned organic carbon C<sub>org</sub></b>	<b>8 mg/m<sup>3</sup>n<sup>(1)</sup></b>
<b>Dust</b>	<b>7 mg/m<sup>3</sup>n<sup>(1)</sup></b>
<b>Sulphur dioxide SO<sub>2</sub></b>	<b>20 mg/m<sup>3</sup>n<sup>(1)</sup></b>
<b>Nitrogen oxides NO<sub>x</sub> as NO<sub>2</sub></b>	<b>70 mg/m<sup>3</sup>n<sup>(1)</sup></b>
<b>Hydrochloric acid HCl</b>	<b>5 mg/m<sup>3</sup>n<sup>(1)</sup></b>
<b>Ammonia NH<sub>3</sub></b>	<b>5 mg/m<sup>3</sup>n<sup>(1)</sup></b>
<b>Mercury Hg</b>	<b>0,01 mg/m<sup>3</sup>n<sup>(2)</sup></b>
<b>Cd + Tl</b>	<b>0,01 mg/m<sup>3</sup>n<sup>(2)</sup></b>
<b>Dioxins and Furans PCDD/F</b>	<b>0,1 ng TE/m<sup>3</sup>n (ITEF) (2)</b>

Values are related to 11 % O<sub>2</sub> content in dry flue gas and are half hour average values (1) or average values over the sampling time (2).

### Emission Limits



ECOFLUID - Boiler



The process characteristics of the ECOFLUID AE&E bubbling bed are:

A substoichiometric primary air supply through the air distributor to control the bed temperature (approx. 30% of the total combustion air)

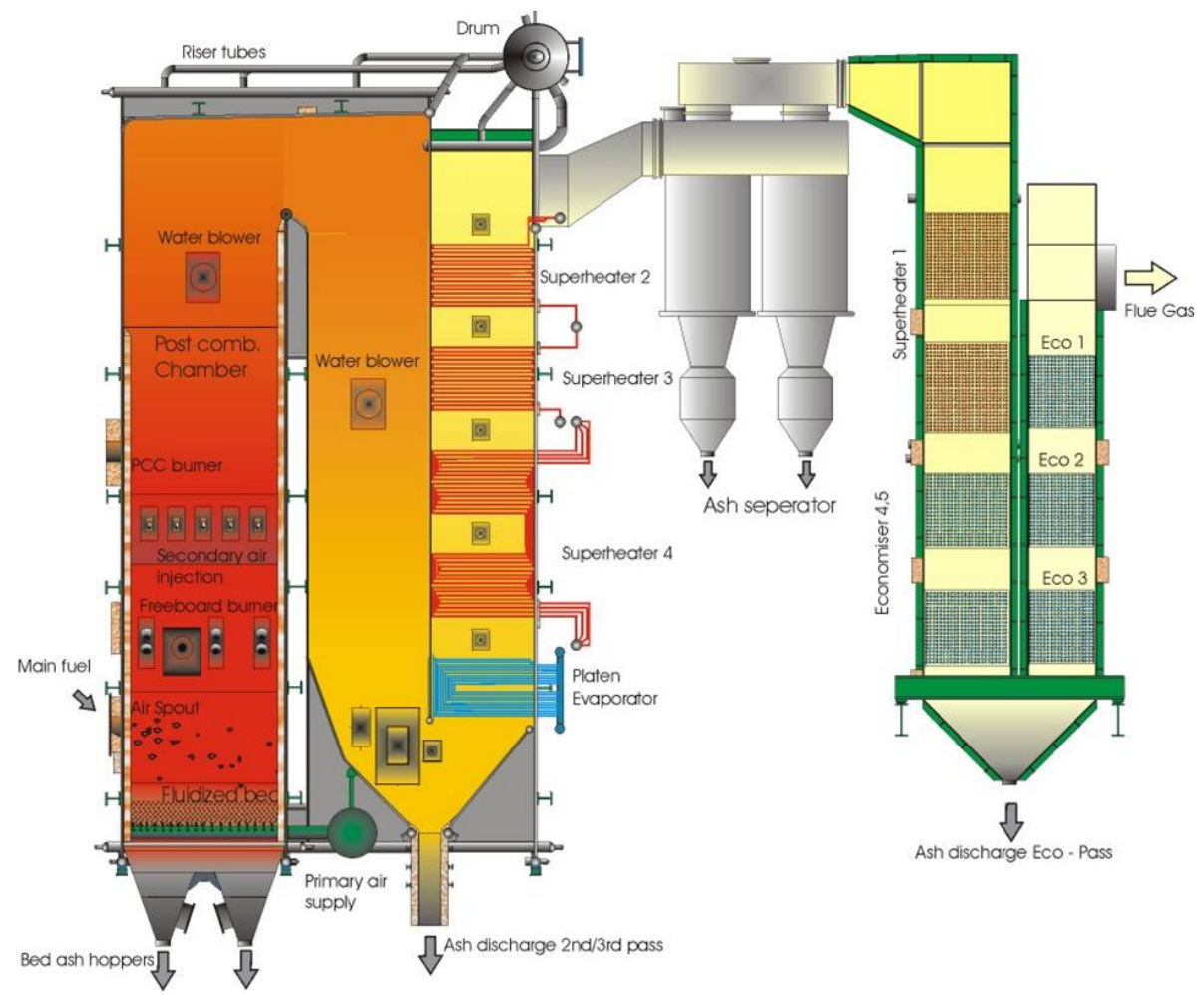
Recirculated flue gas mixed to the primary air to keep the fluidising gas flow sufficient

A proper designed secondary air system feeds the balance of the required combustion air above the fluidized bed resulting in an excellent burnout in the post-combustion chamber

An additional secondary air and flue-gas recirculation supply installed at the freeboard level for additional temperature control.



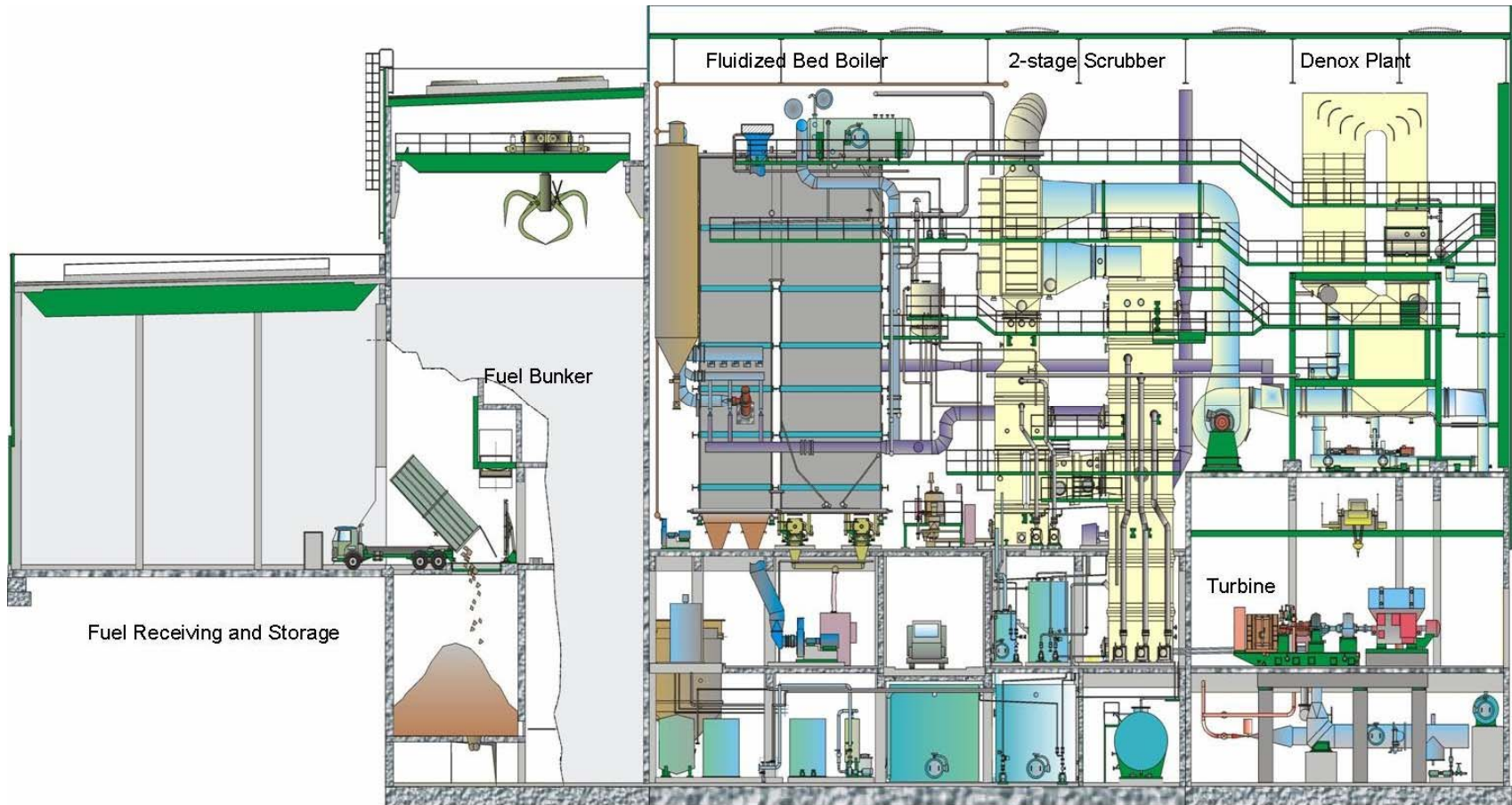
EcoFluid Boiler



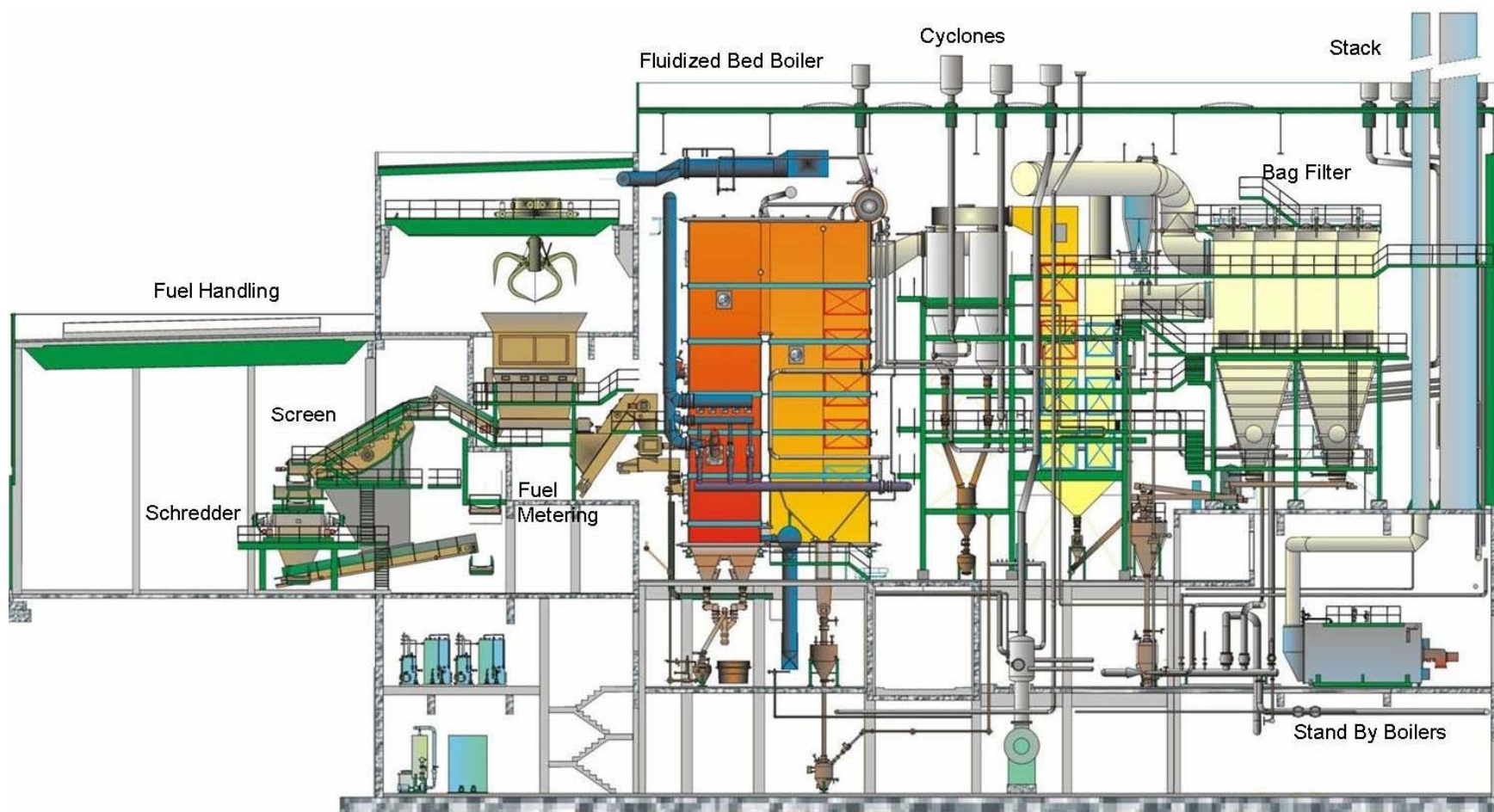


<b>Live steam flow</b>	<b>46,6 t/h</b>
<b>Live steam pressure</b>	<b>44 barg</b>
<b>Live steam temperature</b>	<b>400°C</b>
<b>Flue gas exit temperature</b>	<b>170+/-10°C</b>
<b>Feed water temperature</b>	<b>130°C</b>

### Boiler Design Data



Niklasdorf Waste to Energy Plant Section 1



Niklasdorf Waste to Energy Plant Section 2



Bed Drain Material



Bed Plugged with Wires and Coarse Material



Material Removed from the Bed Area



Slag Removed from Furnace



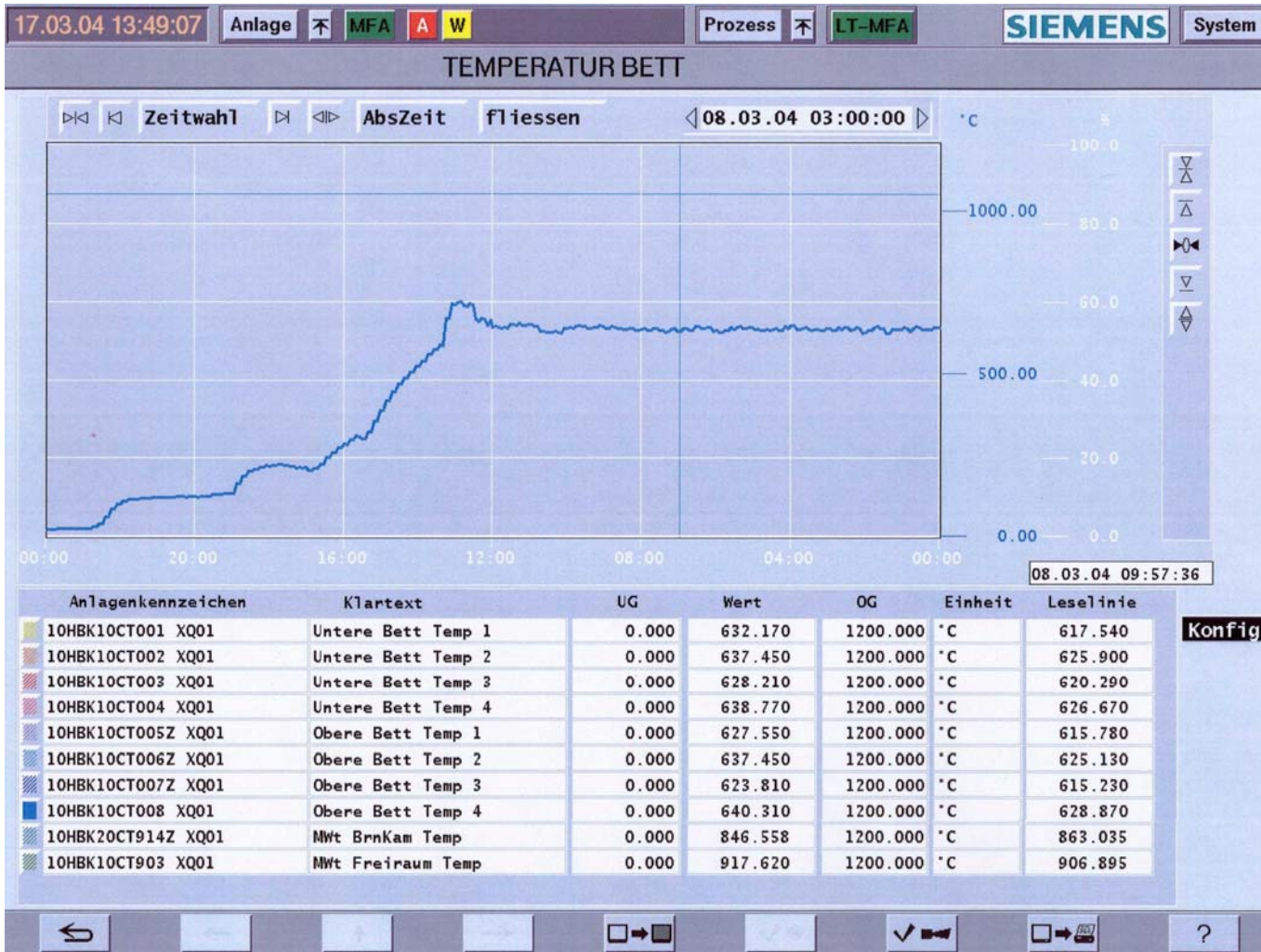


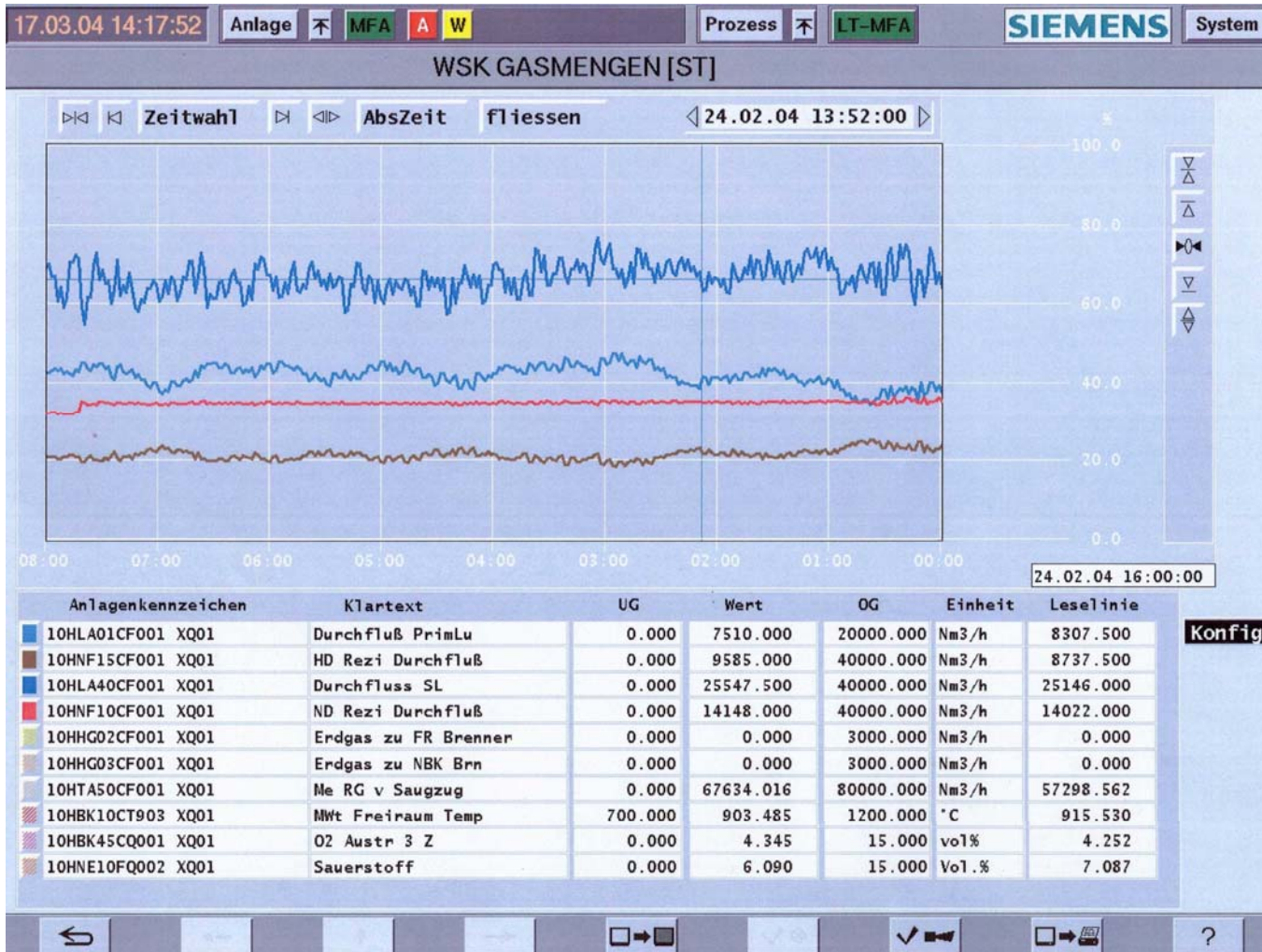


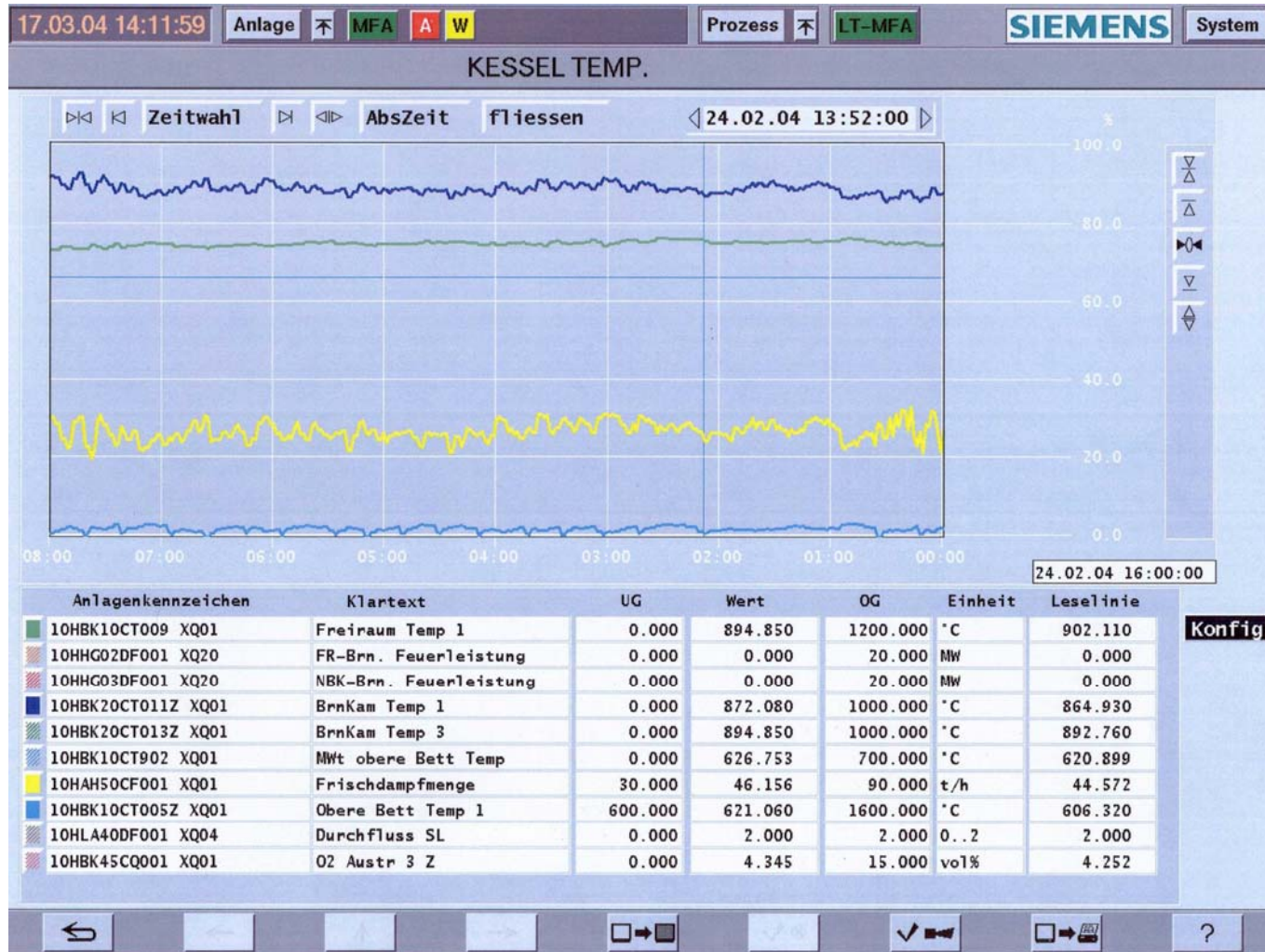
Typical raw gas emissions of the fluidized bed combustion are listed below.  
The values are related to 11 vol% Oxygen in dry flue gas.

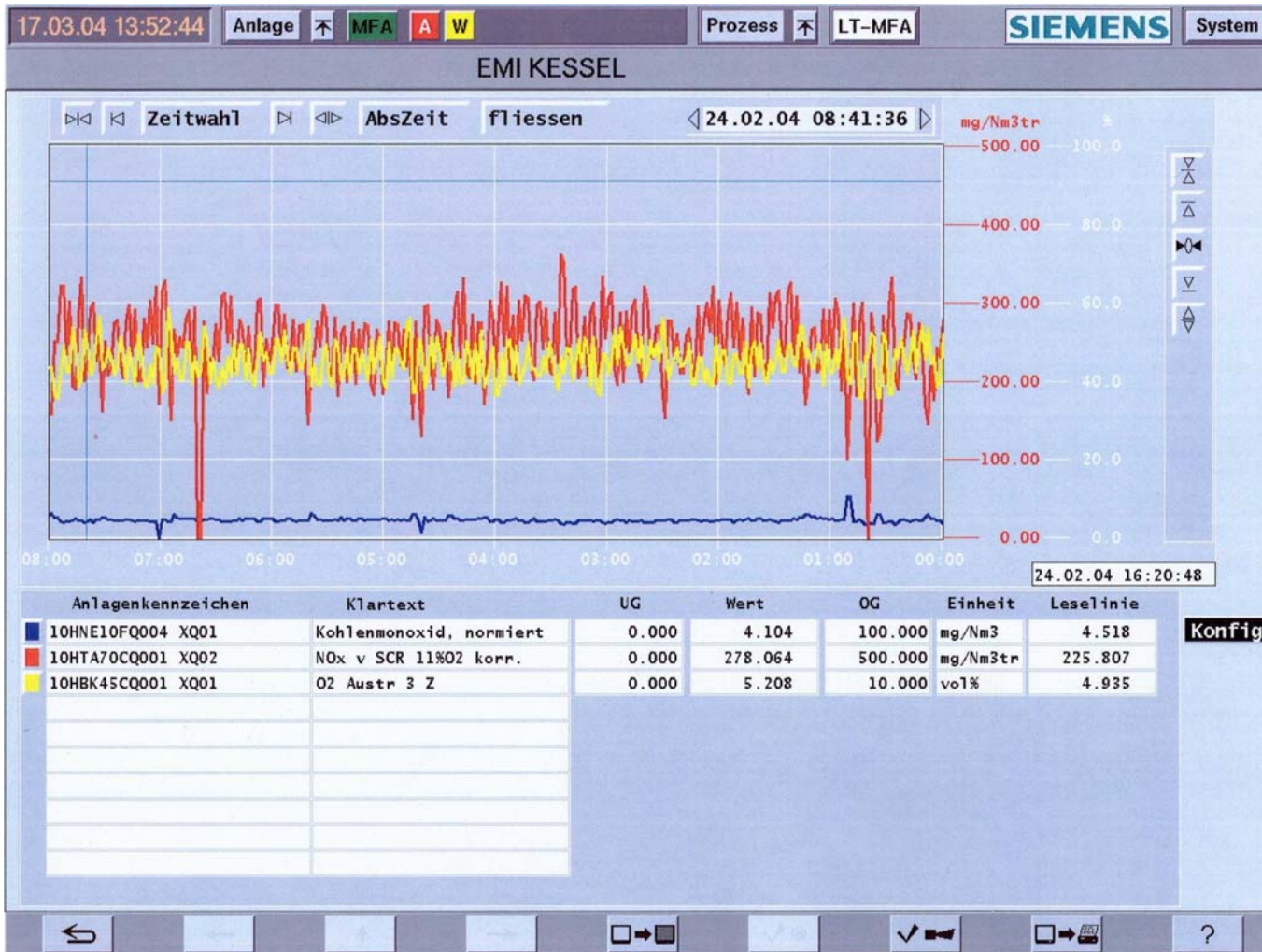
<b>Carbon monoxide CO</b>	<b>5 mg/m<sup>3</sup>n</b>
<b>Sulphur dioxide SO<sub>2</sub></b>	<b>&lt; 50 mg/m<sup>3</sup>n</b>
<b>Nitrogen oxides NO<sub>x</sub> as NO<sub>2</sub></b>	<b>200 - 300 mg/m<sup>3</sup>n</b>
<b>Hydrochloric acid HCl</b>	<b>700 – 1500 mg/m<sup>3</sup>n</b>

### Typical Emission Results of the Fluidized Bed Combustion







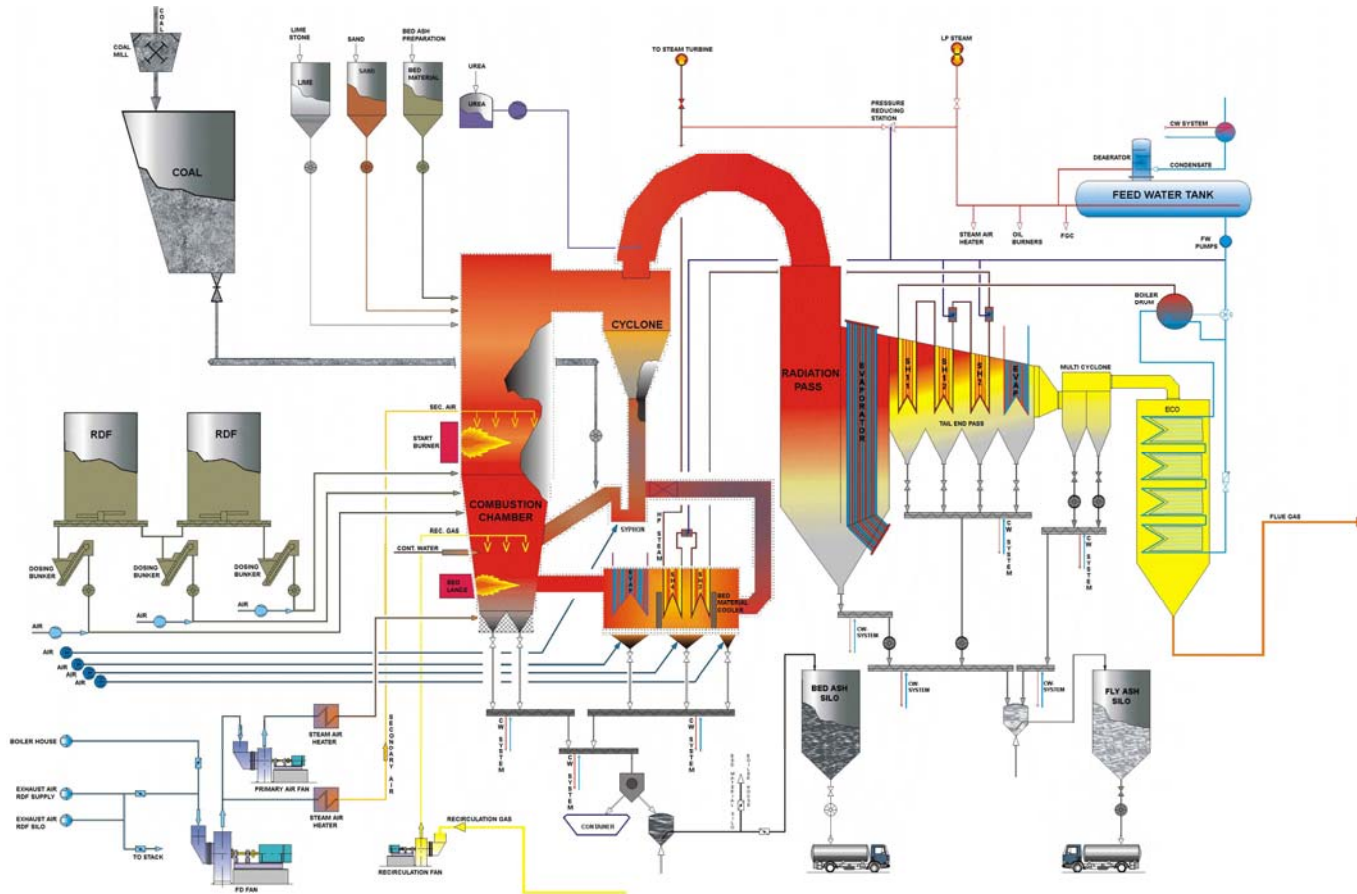




## 75 MWth CFB-Boiler for SW Neumünster, Germany

- HP steam flow 97 t/h
- HP steam temperature 470 °C
- HP steam pressure 66 bar
  
- Design thermal output 75 MW
- Max. load with gas/oil 75 MW
- Load range 40 - 110 %
  
- Fuel range (LHV) 10 - 30 MJ/kg





## 75 MWth CFB-Boiler for SW Neumünster, Germany



**Thank you for your attention –  
Sebastian Kaiser**

