ecoDry by Swiss Combi

for OSB and Wood Particle Dryers

is the patented closed steam loop drying technology with integrated combustion of VOC's

ecoDry is the alternative to WESP and RTO for OSB flake and wood particle dryers with same exhaust gas quality

ecoDry means no contact of combustion gas with the flakes or wood particles

ecoDry improves colour, surface and quality of the dried flakes, wood particles etc.

ecoDry reduces fire risk due to the steam drying with very low oxygen content

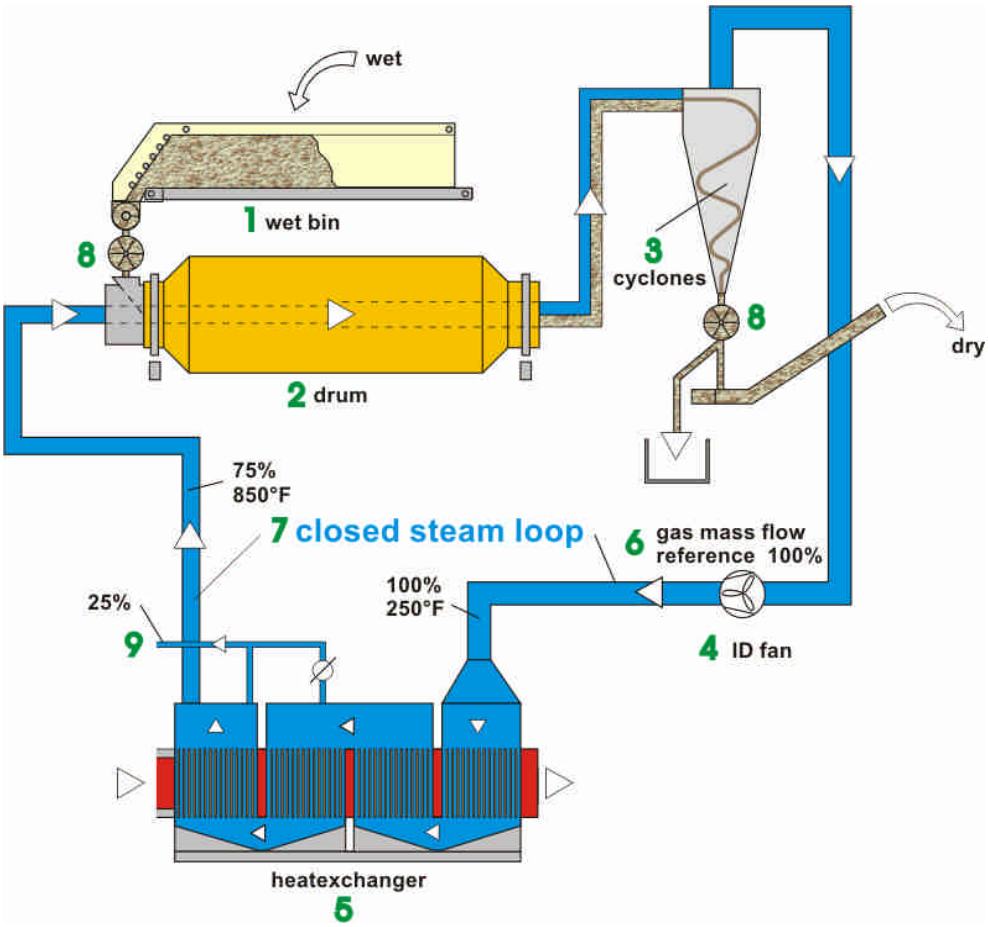
ecoDry reduces significantly deposit build-up in cyclones, ductings and fans

ecoDry reduces production cost by lower energy and electrical power consumption and longer operation time between cleaning

ecoDry was first time built 1989 for smell free drying of sewage sludge and is in operation for wood particle drying since 1996.

ecoDry is also proven technology in the starch, ethanol and biomass industries to produce non contaminated, high quality animal feed, and fulfils MACT emission standard for these industries.

The Closed Steam Loop



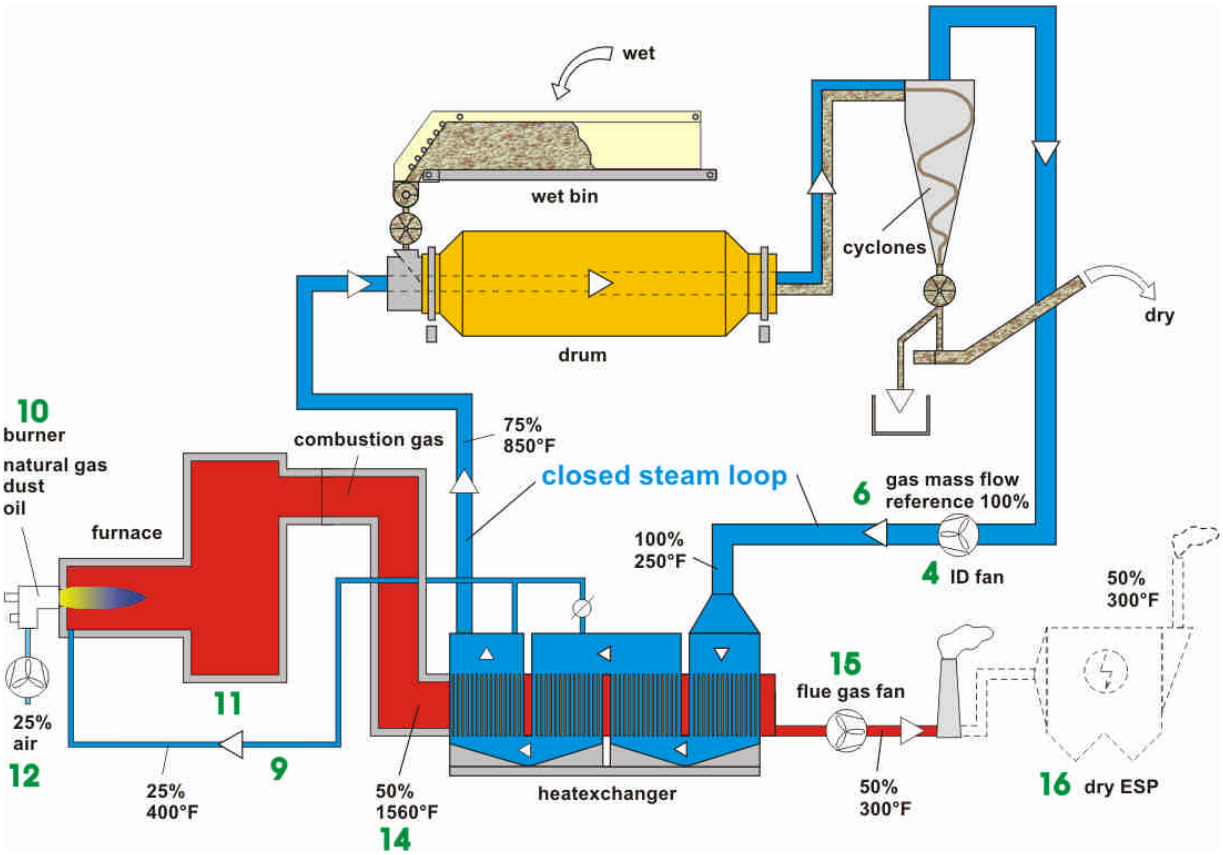
The wet strands or wood particles are fed in the known manner from the wet bin (1) into the drum (2). Dry, they are separated after the drum from the drying gas in a drop out chamber and/or cyclones, here shown only as one cyclone (3).

The drying gas is pulled by the ID fan (4) through the drum and cyclones and blown thereafter through the gas/gas heat exchanger (5) for re-heating (see reference 100% (6) as mass flow at the ID fan). About 75% is recycled to the drum inlet forming the "closed steam loop" (7).

The water evaporation and leakage air from drum seals and rotary valves (8) represent typically 25 %, which makes again 100 % mass flow passing through the ID fan.

The mass flow produced by the water evaporation, VOC's etc. driven out of the wood particles + the leakage air are bled off prewarmed at the heat exchanger to be guided to the furnace for thermal oxidation (9).

Energy Generation and Oxidation of VOC

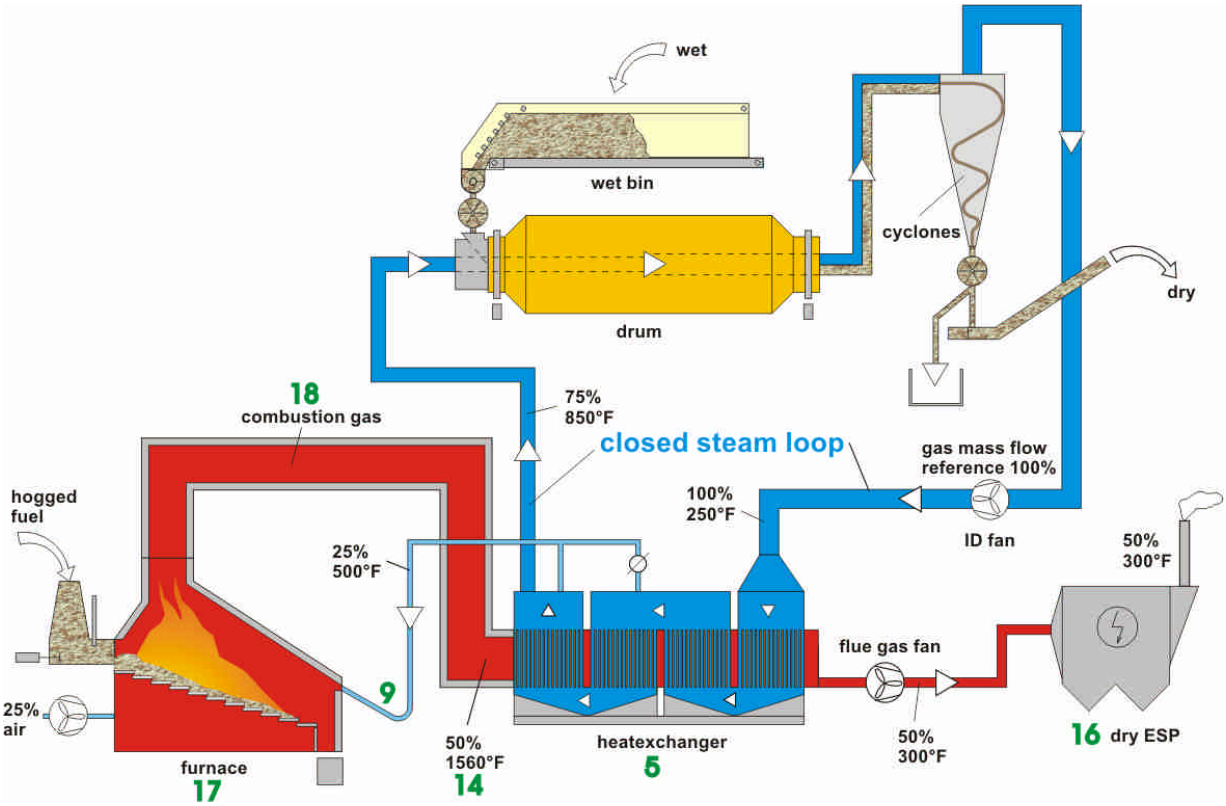


The diagram shows a typical arrangement of a natural gas, sanding dust or oil burner (10) with furnace (11). The figure shows that the bled off steam, which we call "inert gas"(9), is directed to the front end of the primary combustion chamber. This “inert gas” is there mixed with the flame for oxidation of the VOC's, carbon monoxide etc. To assure maximum destruction or oxidation, a temperature of about 1560 °F (1500 - 1600 °F) (14) is needed.

As shown, about the same mass flow of air (12) is needed through the burner as primary combustion air as the mass flow of "inert gas", which makes then the 50 % hot gas flow (14) entering the heat exchanger, where this gas is typically cooled down to about 300 °F at the flue gas fan (15). This makes about half the exhaust gas flow compared to the flow (6) through the ID fan (4).

When natural gas or oil is used as fuel, no further exhaust gas cleaning is needed. When burning sanding/screening dust, a dry ESP (16) is needed for fly ash separation.

Bark/Wet Fuel Heating



This figure shows a wet fuel heating furnace (17) including how the inert gas (9) can be introduced to an inclined grate furnace system without disturbing the combustion. Depending on type of furnace, part of the inert gas can be added through the normal secondary gas nozzles (not shown). The arrangement of the ducting between furnace and heat exchanger must be realized assuring good mixing of the flue gas for VOC destruction and burn out of sparks.

Due to the lower flame temperature of wet fuel, the inert gas (9) needs to be more pre-heated in the heat exchanger (5), (bleed off more from the hot end) to guarantee the needed temperature (13) of the furnace combustion gas (18).

It is obvious that this type of fuel produces fly ash needing a dry ESP (16) for flue gas cleaning.

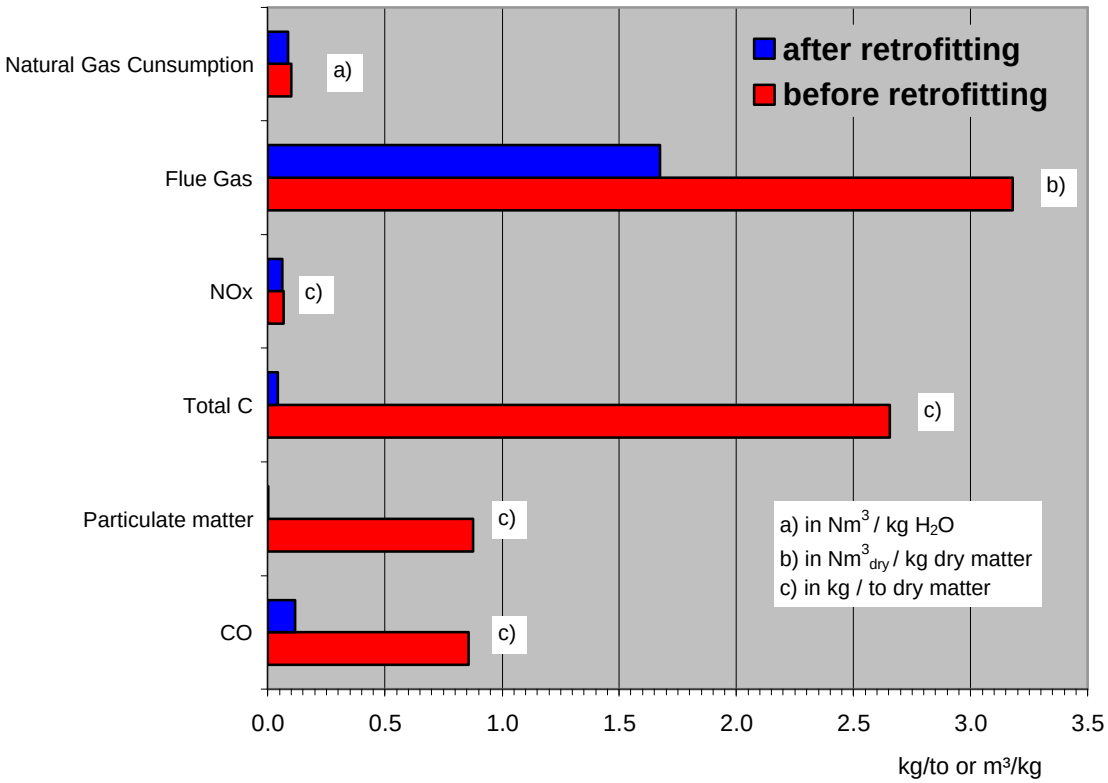
Emission reduction by *ecoDry*

In spring 1999 a Duplex dryer with nominal capacity of 16 to/h water evaporation was retrofitted to *ecoDry* in northern Germany to solve exhaust emission problems. The facility produces blocks for pallets of pine wood particles.

The German research institute WKI in Braunschweig published emission testing results before and after conversion. The results below are an extract of the paper published in German.

There is no screening or sanding dust available in that facility, and therefore the plant is heated by natural gas. Similar reductions are however possible when other fuels are used provided the furnace is operated with the necessary temperatures to destroy the VOC's.

The next page shows pictures of an OSB flake dryer converted to *ecoDry*.



Emissions before and after the conversion of the Duplex dryer in Uelzen

Single pass 5,4 x 24 NH after retrofit to *ecoDry.* In front the heat exchanger. Picture below shows hot flue gas ducting from furnace in the back through the no more used mixing chamber to the heat exchanger