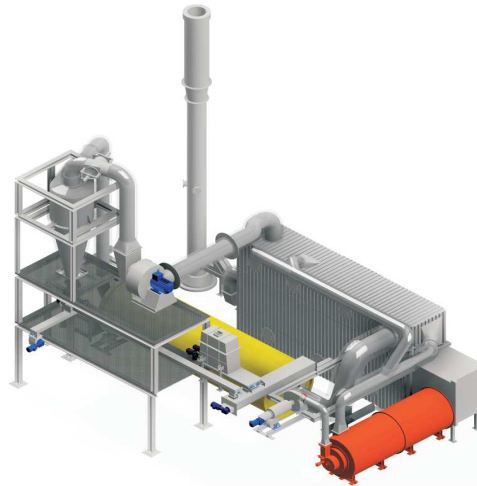
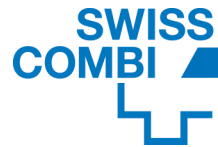


ecodry Superheated Steam Drying



Application field

- Stillage from ethanol/alcohol production (DDGS)
- By-products of the starch industry (fibres, concentrated liquids, protein)
- Wood chips, saw dust, shavings, OSB-flakes
- Sugar beet pulp, grass, alfalfa, shredded corn
- Pomace
- Mineral wool
- Aquafeed
- Fermentation residue
- Biomass with strong odour

Products to be dried



Technical specification

Space for dryer:	18m x 11m
Water evaporation:	1.5t/h up to >10t/h
Fuel:	Natural gas, oil, sander dust, hogged fuel
Thermal oxidation:	at 860°C
Superheated steam temp:	ca. 450°C
Thermal efficiency:	0.75 - 0.85kWh/kg water evaporation
Dew point bleed off for heat recovery:	96°C
Temperature flue gas:	160°C
Inlet moisture content:	up to 75% water content (dry product-backmixing)
Outlet moisture content:	2% water content achievable
Integrated cooling:	Heat recovery and emission reduction

References agricultural pomace / slurry



Drum size:	3.5m x 10.9m
Drying capacity:	4'000kg/h water evaporation
Energy demand:	0.85kWh/kg water evaporation
Biomass type:	agricultural pomace and sludge

References ethanol stillage drying



Drum size:	4m x 15.2m
Drying capacity:	9'000kg/h water evaporation
Energy demand:	0.79kWh/kg water evaporation
Biomass type:	Wet cake and syrup from ethanol production

References wheat/corn feed



Drum size:	3.2m x 12m
Drying capacity:	5'000kg/h water evaporation
Energy demand:	0.85kWh/kg water evaporation
Biomass type:	wheat fibres and solubles

ecodry Superheated Steam Drying



Application

ecoDry is a drum drying system with indirect heating. A superheated steam loop causes a water evaporation rate of 1.5t/h to more than 10t/h. A bleed-off of the steam loop is constantly led into the combustion chamber for thermal oxidation of the drying gases. Therefore VOC's, odour and organic dust is efficiently reduced. In contrast to other types of drying plants, there is no need for further measures concerning emission reduction. ecoDry systems have a high potential for energy recovery due to the high dew point of the bleed-off gas. The use of superheated steam leads to gentle drying.

Emission reduction compared to drum dryer

Flue gas:	48% lower
Nox:	14% lower
TOC:	99% lower
Particulate matter:	99% lower
CO:	86% lower

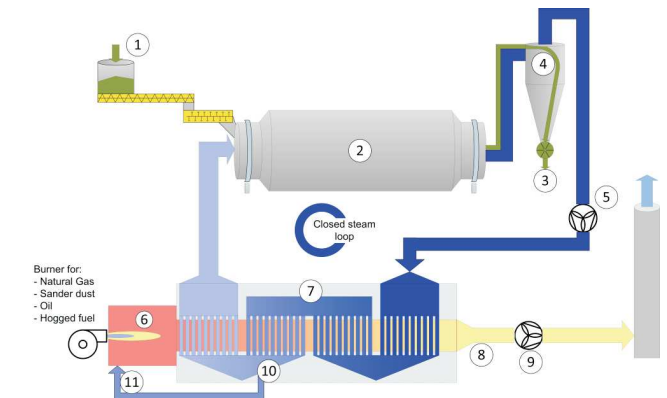
Heat recovery potential

With a dew point of the bleed-off gas of 96 °C, the ecoDry system offers a high potential for energy recovery. More than 60 % of its primary energy input can be recovered and used as energy in form of heat for various applications, as for example:

- evaporator heating
- hot water (85°C)
- district heating
- industrial processes
- etc.

Function

1. Wet product
2. Rotary drum
3. Dry product
4. Product separation cyclone
5. Main fan
6. Combustion chamber
7. Gas/gas heat exchanger
8. Flue gas
9. Exhaust fan
10. Steam bleed-off
11. Secondary gas



Advantages

- Environmental-friendly due to low emission values
- High quality dry product due to gentle superheated steam drying
- Low energy consumption due to small exhaust gas volume
- Extraordinary potential for heat recovery due to a high dew point in exhaust steam
- Low fire and explosion potential due to inert drying atmosphere
- Process integrated thermal oxidation of dryer emission



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