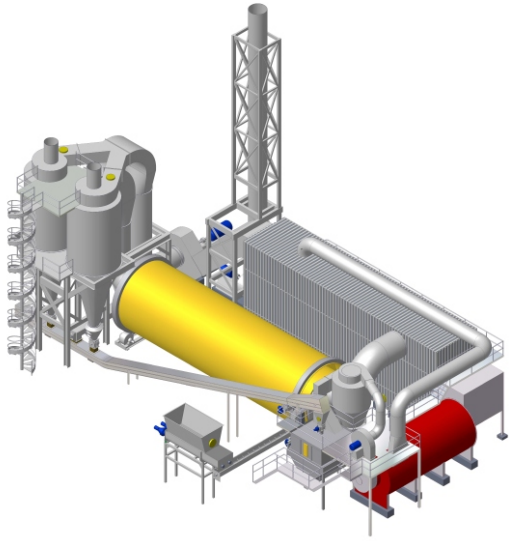
ecoDry Superheated Steam Drying

SWISS COMBI



Application field

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

Products to be dried


Stillage / DDGS


Starch products


Wood products


Pomace

Technical specification

Drum size:	3m - 6m
Length of drum:	12m - 18m
Water evaporation:	3 - 40t/h (per unit)
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, 120°C after economizer
Inlet moisture content:	up to 75% water content (dry product-backmixing)
Outlet moisture content:	<2% water content is possible
Integrated cooling:	Heat recovery and emission reduction

References wood particles for panel boards

Drum size:	5.8m x 17.7m
Drying capacity:	25'000kg/h water evaporation
Energy demand:	0.80kWh/kg water evaporation
Biomass type:	sawdust and wood flakes

References ethanol stillage drying

Drum size:	4.6m x 15.4m
Drying capacity:	18'500kg/h water evaporation
Energy demand:	0.78kWh/kg water evaporation
Biomass type:	Wet cake and syrup from ethanol production

References wheat/corn feed

Drum size:	4m x 15.2m
Drying capacity:	12'000kg/h water evaporation
Energy demand:	0.82kWh/kg water evaporation
Biomass type:	wheat fibres and solubles

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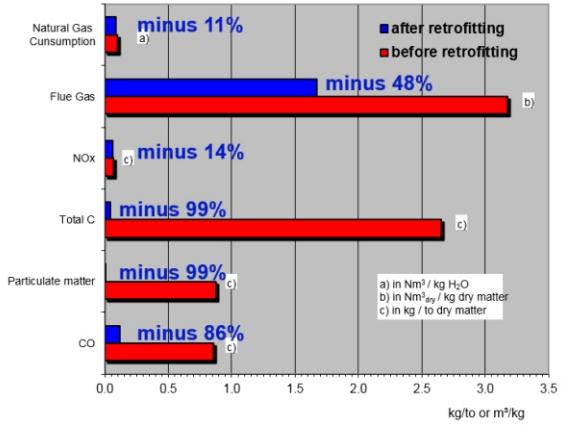
SWISS COMBI ecoDry

Application

ecoDry is a drum drying system with indirect heating. A superheated steam loop causes a water evaporation rate up to 40t/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.
The ecoDry system can be retrofitted to existing conventional drum dryers. SWISS COMBI also offer custom-made solutions such as integrated product cooling, for example in the ethanol and starch industry.

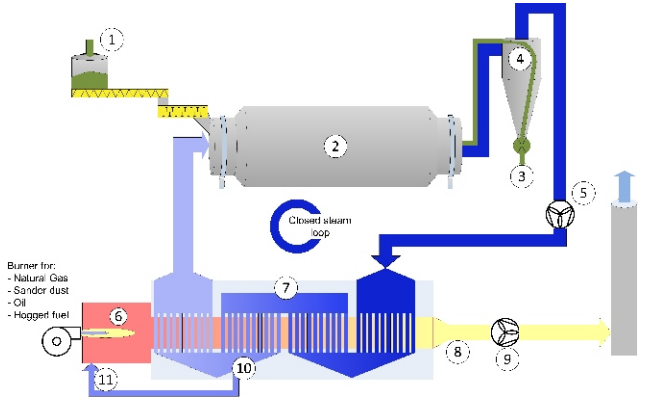
Emission reduction compared to drum dryer

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



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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