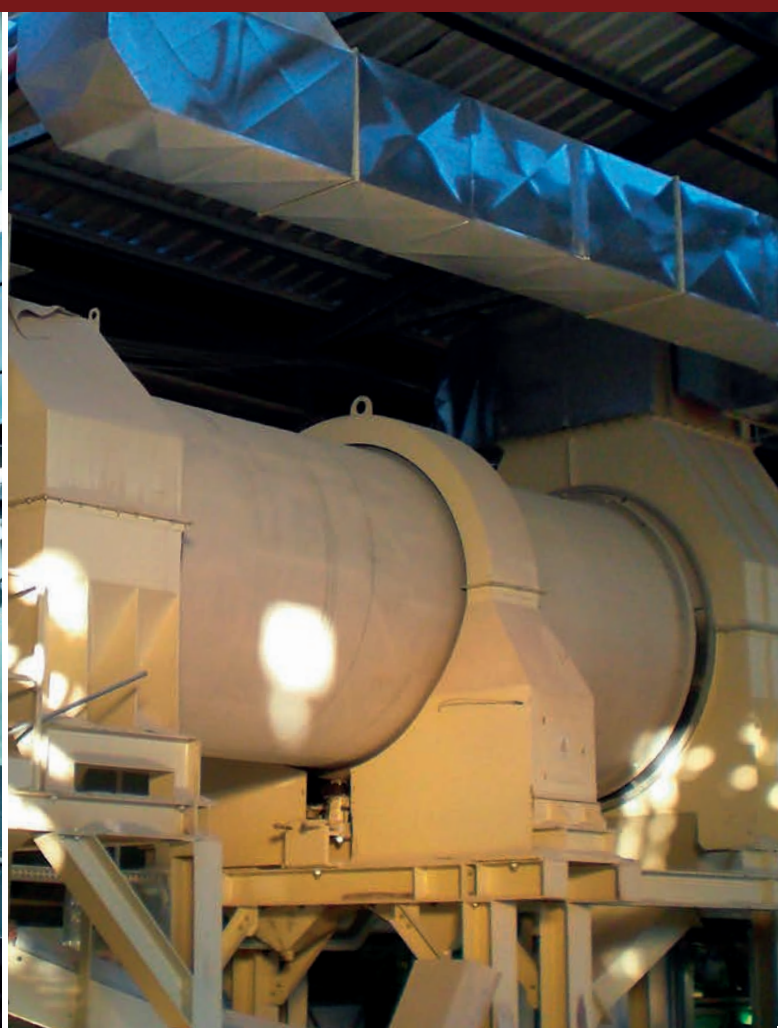


DRYERS

Hed13 / Single and Double Passage Dryer



HED-13 High efficiency dryer

The rotary drum dryers evolution



Drying sand with environmental air

To dry the same amount of sand, HED-13 uses from 20% to 30% less energy than a traditional dryer. The secret? The residual steam saturation capacity of environmental air.

Advantages

- Consumption till 1 kWh/l (energy per liter of evaporated water).
- Energy saving from 20% to 30%.
- Outgoing material temperature slightly higher than the environmental one.
- Automatic optimization of the sand flow.

“

“This year we avoided 171 t of CO2 entering in the atmosphere, equal to what is emitted from 114 city cars in the same period.”

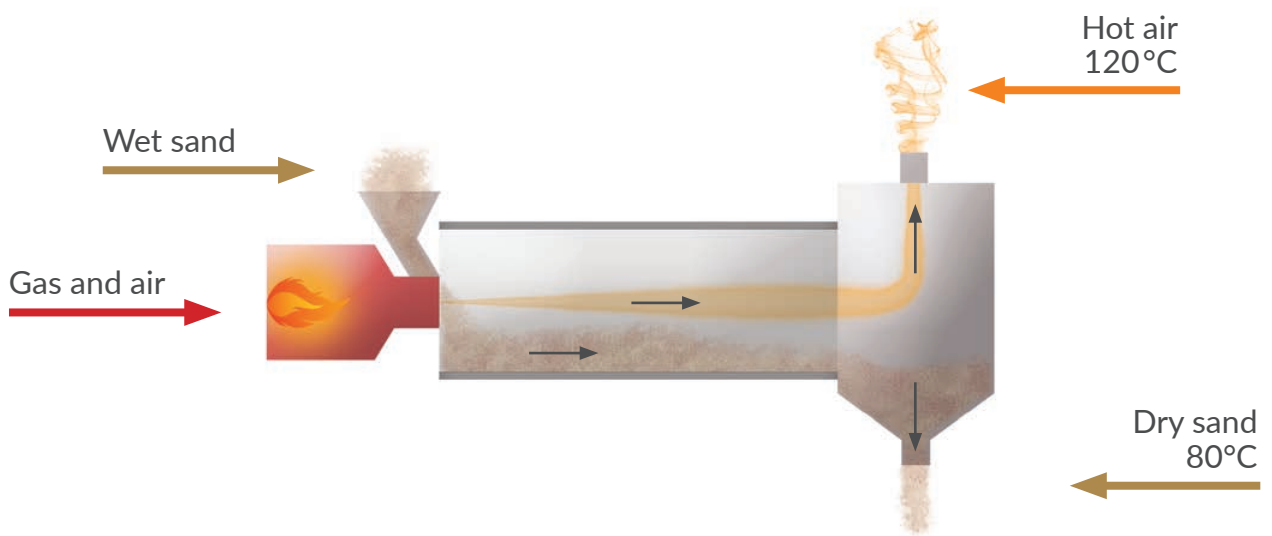
Alessio Lorenzi - Technical Director, Minerali Industriali

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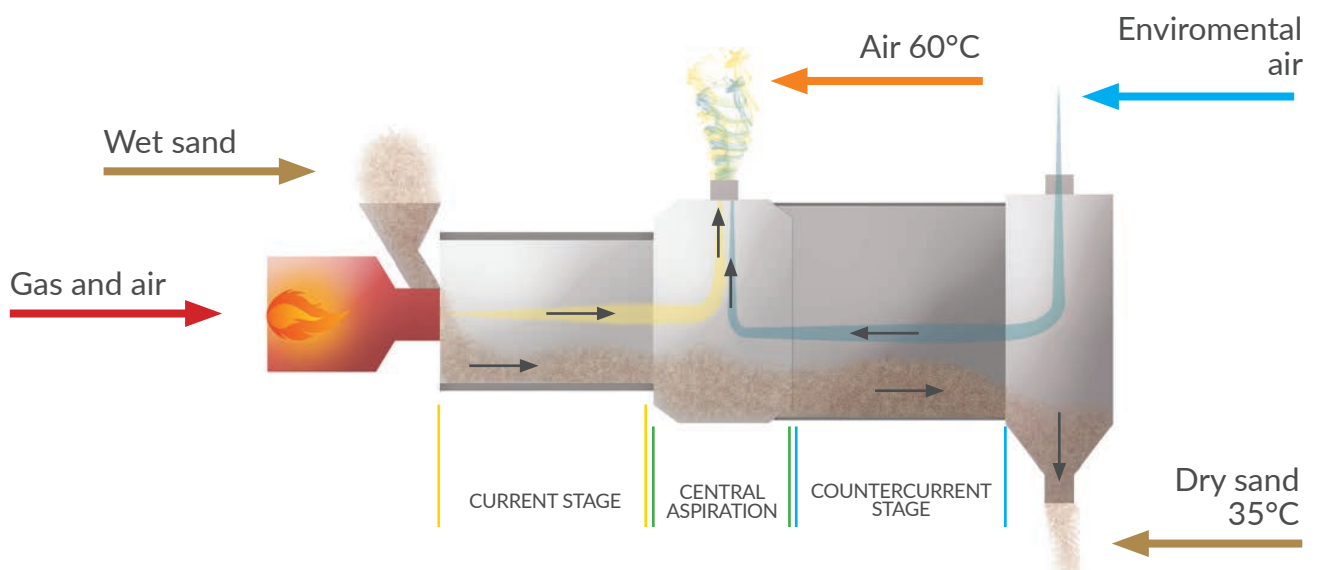
HED-13 CONFIGURATION

Traditional dryers (cocurrent or countercurrent) are characterized by the mono-directionality of the air flux. HED-13 aspiration originates from the center of the drum: the inlet material passes through a first stage, cocurrent with the hot air generated by the burner, then passes in a second stage countercurrent the environmental air, aspirated from the opposite side of the dryer. There is only a drum, with a single motorization.

CURRENT DRYER



HED-13



The air saturation capacity

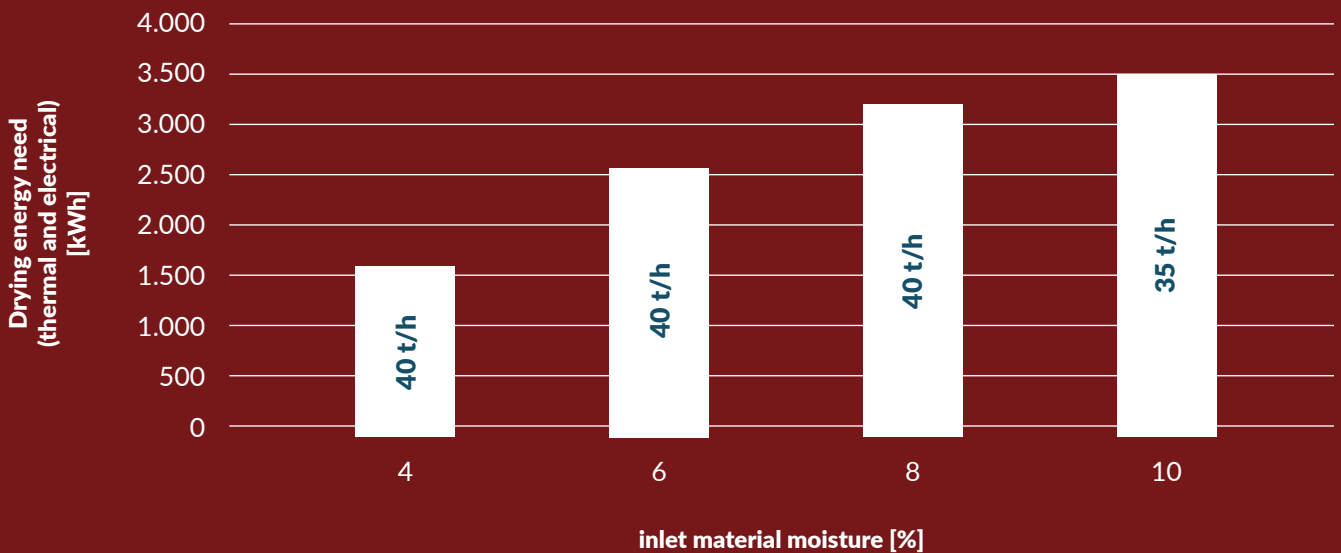
Passing the first cocurrent section, the sand is still slightly humid. The environmental countercurrent air flux, with its steam saturation capacity, guarantees the complete drying of the sand, without any other thermal energy contributions.

Lower temperatures

HED-13 configuration allows a relevant temperature decrease of both chimney air and outlet sand. Sand cooling is no longer needed for following treatments (for example magnetic separation, foundry uses, etc...).

Operational characteristics and maximum sand flow as a function of moisture (3.500 kW burner)

Consumption reduced till 1 kWh/l (energy per liter of evaporated water)



Internal blading

The internal blading design is the result of a long operational experience and allows to maximize the heat exchange between air and sand.

Insulation

To reach the described energy benefits, all the surfaces involved by the outlet air flow until the chimney are insulated.



Sand flow regulation

The feeding conveyor belt is controlled via VSD, according to a continuous regulation of the inlet sand flow.

Rotation control

Also the drum rotation is controlled via VSD: the speed is related to the flow, allowing the material residence time optimization into the dryer.

Aspiration power

Thanks to the automatic regulation air flow system (via VSD), aspiration power is always reduced to the minimum requested.

Stock dome

HED-13 dryer coupled with the draining storage domes of DOMSTOCK Series, permits both the storage and the wet material feed automation.



VSP engines control

- Length ■ 13 m
- Maximum diameter ■ 2,5 m
- Burner thermal power ■ from 1.500 to 3.500 kW
- Fuel ■ Natural gas – LPG – Cogeneration heat
- Electrical power ■ 70 kW installed – 40 kW employed
- Aspirated air flow ■ till 30.000 m³/h
- Maximum sand inlet flow ■ 40 t/h
- Inlet sand moisture ■ till 15%
- Specific consumption per liter of evaporated water ■ 1 kWh/l *

* may be less, depending from moisture, particle size, etc... .

CASE STUDY

Cocurrent dryer substitution with an HED-13 at Sasil S.r.l. (Italy)

Annual values	Old cocurrent dryer	HED-13	Difference (difference %)	Money saving* [€]
Sand flow [t]	50'000	50'000		
Average moisture [%]	6	6		
Evaporated water quantity [t]	3'000	3'000		
Natural gas consumption [Nm ³]	469'100	336'000	133'100 (-28%)	45'000
Electrical energy consumption [MWh]	129	63	-67 (-51%)	12'000
Electrical energy aspiration consumption [MWh]	92	38	-54 (-59%)	9'500
Total energy consumption [tep]	370	262	-107 (-29%)	
Energy consumption for liter of evaporated water [kWh/l]	1,43	1,02	-0,41 (-29%)	
CO ₂ emissions [t]	251	180	-71 (-26%)	

Emission trading (330 € / tep)
Energy saving + TEE

36'000 €/year
103'000 €/year

* costs based on italian rates

Dust reduction on the filter

HED-13 recovers the dust's coarse part, leaving in correspondence of the central aspiration. Considering the lower aspiration power, dust extraction is reduced, simplifying the dust treatment plant.

Emissions trading

According with the local law, the substitution of a traditional dryer with an HED-13 may permit the access to the emissions trading market.

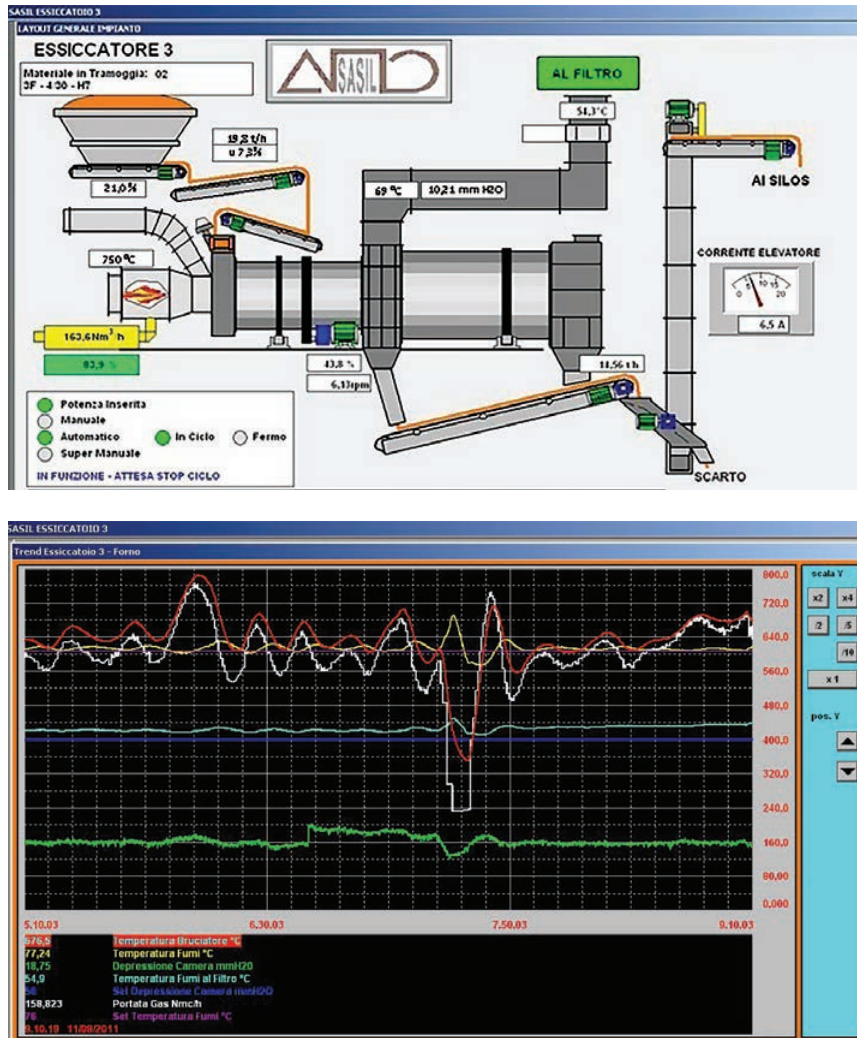
Environmental sustainability: CO₂ and cogeneration

HED-13 dryer reduces from 20% to 30 % the CO₂ emissions respect traditional solutions. Furthermore, HED-13 may accept an external heat source, for example from cogeneration.



Automation

HED-13 is furnished by own software that registers and regulates more than 20 parameters in real time, dust filter included. Monitored data are elaborated to minimize energy consumption and continuously maximize the dryer efficiency.



Dew point

Without a good control system HED-13 will not work in efficient way. The chimney dew point measure allows to maintain the air temperature as low as possible without obstruction problems in the dust filter.

“

“Dryer software adjusts automatically the gas consumptions in function of the moisture’s sand variation.”

Cosimo De Blasi - Dry Treatments Responsible, Sasil S.r.l.

”

SINGLE AND DOUBLE PASSAGE DRYER



Features of the dryers manufactured by Minerali industriali

Minerali Industriali manufactures a range of standard dryers, which can treat from 5.000 to 60.000 kg/h of traditional materials. All the dryers are designed explicitly based on each specific request. They operate in cocurrent, with the hot gases and the material following the same direction. This allows a better temperature control and a higher thermal efficiency. For fuel oil or naphtha, it can be installed a combustion/mixing chamber. The dryers manufactured by Minerali Industriali comply with the EC Machinery Directive.



Motorization

It's obtained by gear motors of high quality controlling directly the coaxial shaft to the cylinder. The rotation speed can be adjusted by means of frequency converters (inverters).

Burner

It's manufactured for industrial applications, modulating type with automatic adjustment of the flame depending on the temperature of exhaust smoke.



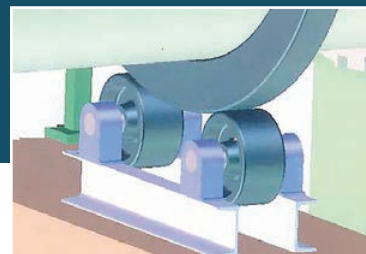
Valve for the discharge of material

It's double clapper type and motorized. It ensures the maintenance of the dryer when discharging.



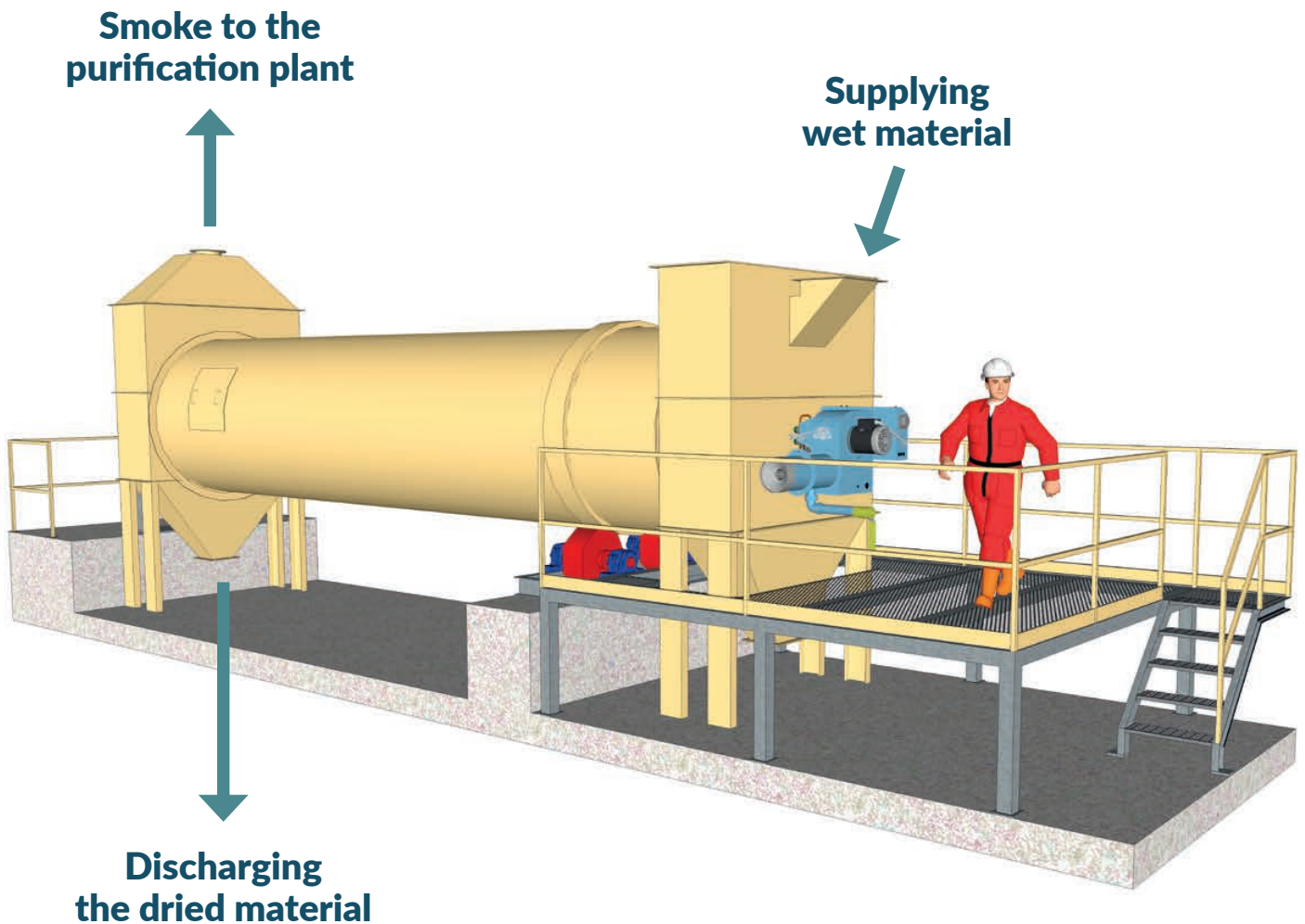
Rolling ring

It's made of forged steel, rests on two forged steel rollers and is mounted on aligning bearings with double row of rollers.



SD - SINGLE PASSAGE DRYER

It has a more simple structure and a lower thermal efficiency.

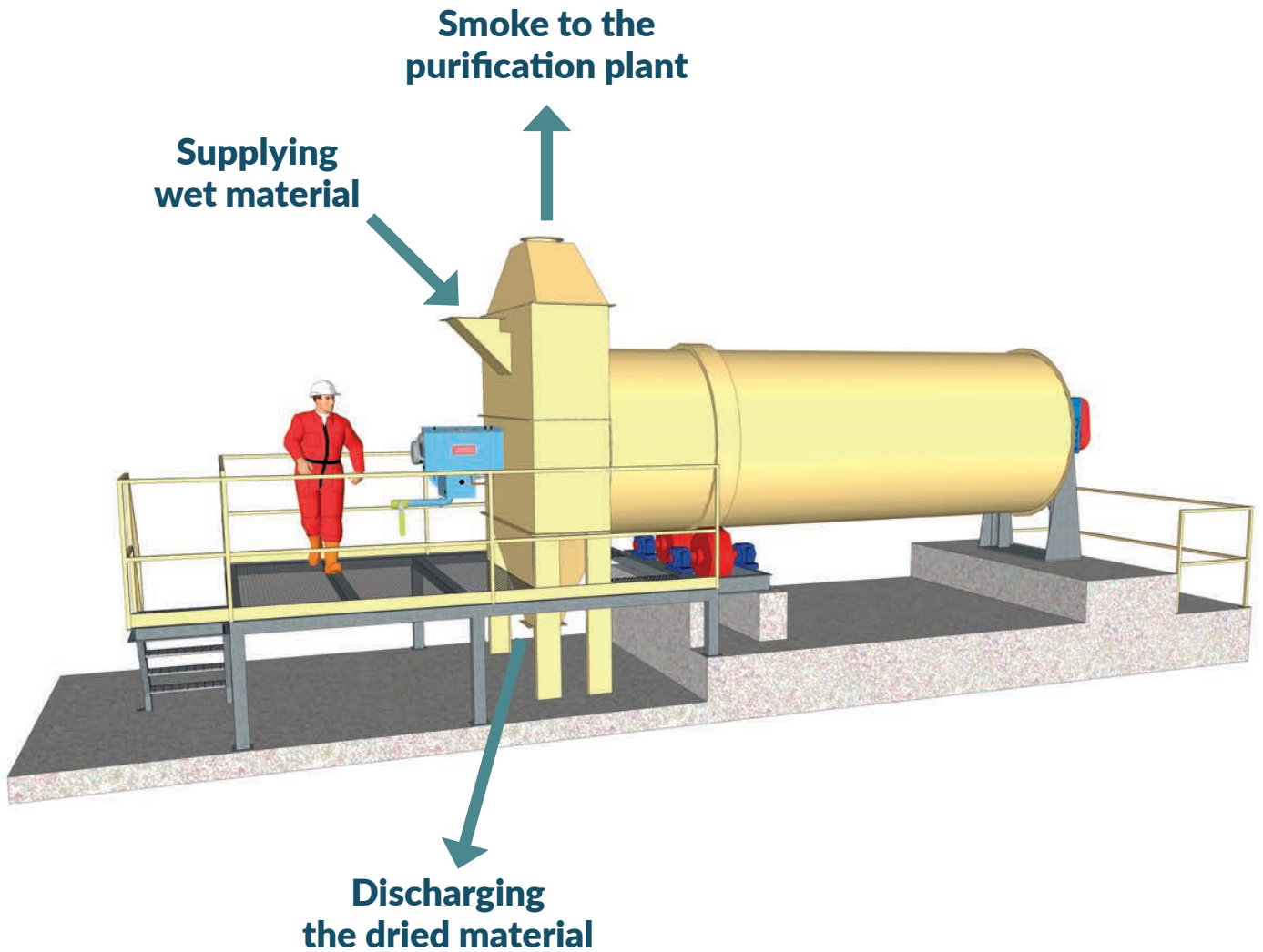


SD - OVERALL DIMENSIONS OF THE SINGLE PASSAGE DRYER

Single passage dryers	Model	SD 80	SD 100	SD 120	SD 150	SD 160	SD 180	SD 200
Drum diameter	mm	800	1.000	1.200	1.500	1.600	1.800	2.000
Drum length	mm	5.000	6.500	7.500	9.000	11.000	12.500	14.000

DD - DOUBLE PASSAGE DRYER

It's compact and has greater thermal efficiency. The supply unit and the discharge pipe are arranged on the same side, at one end of the cylinder. This enables to offer better engineering solutions and easily bypass the dryer during the periods that do not require its use.



DD - OVERALL DIMENSIONS OF THE SINGLE PASSAGE DRYER

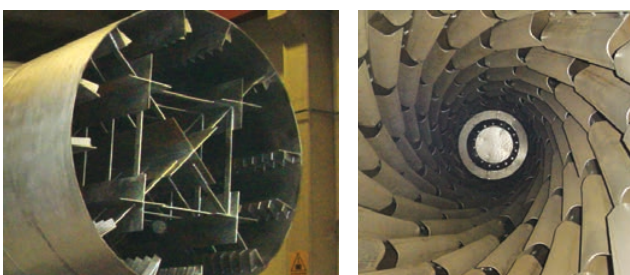
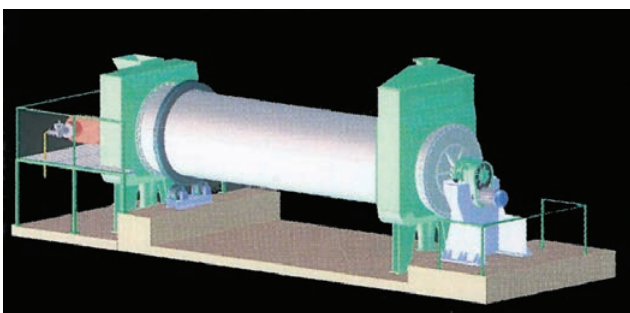
Double passage dryers	Model	DD 100	DD 130	DD 160	DD 180	DD 200	DD 220	DD 240
Diameter of the external drum	mm	1.000	1.300	1.600	1.800	2.000	2.200	2.400
Length of the external drum	mm	4.000	4.500	6.000	8.000	9.000	11.000	12.000

TECHNICAL FEATURES OF THE STANDARD SINGLE AND DOUBLE PASSAGE DRYER

Single insulated passage	Modello	SD 80	SD 100	SD 120	SD 150	SD 160	SD 180	SD 200
Double passage	Modello	DD 100	DD 130	DD 160	DD 180	DD 200	DD 220	DD 240
Flow of sand (U 7%)	kg/h	5.000	8.000	12.000	20.000	30.000	40.000	50.000
Flow of limestone (U 5%)	kg/h	6.000	10.000	14.000	24.000	36.000	48.000	60.000
Methane consumption	Nm ³ /h	35	50	80	160	300	400	500
Smoke flow at 120°	Em ³ /h	3.500	5.000	7.500	17.000	26.000	35.000	46.000
Dedusting filtering surface	m ²	50	80	100	250	350	450	600
Power of the dryer motor	kW	4	5,5	7,5	15	22	30	37
Power of the burner motor	kW	1	1	3	3	4	4	4
Power of the fan motor	kW	5,5	7,5	11	18,5	30	37	45
Total power installed	kW	10,5	14	21,5	36,5	56	71	86

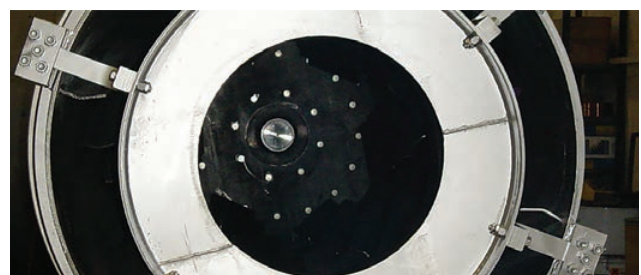
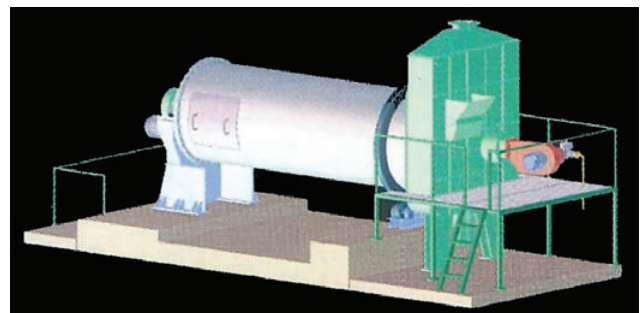
The data relates to material incoming at 15°C and outgoing at 95°C: however, they are indicative values and are recalculated for each specific application. The temperature of the outgoing material can be lowered, if required, up to 65°C with the drum increased and consequent reduction in consumption.

Single passage dryer



Internal blades available for the single passage dryer

Double passage dryer



Blades inside the double passage dryer

SOLUTION 360°

FROM MINE TO PRODUCTS



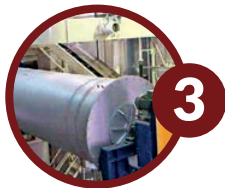
1

GEOLOGICAL SURVEY



2

LABORATORY TEST



3

INDUSTRIAL TEST



4

**LAYOUT DEFINITION
& ENGINEERING**



5

**DEDICATED TURN-KEY
SOLUTIONS**



6

CUSTOMER CARE

