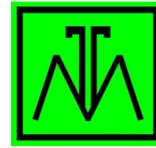


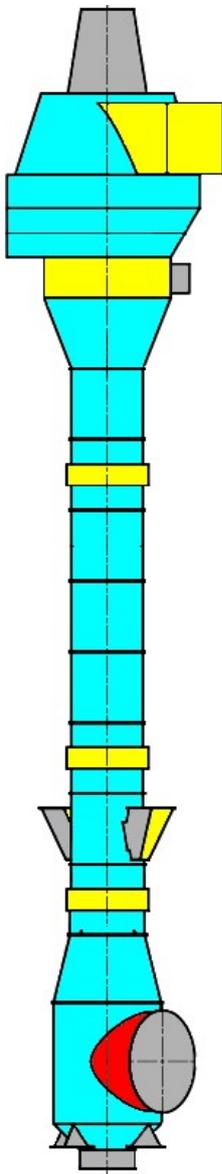
# Modern drying technologies of coal, concentrates and sludge at enrichment



Ing. Büro FTT

**100%** Guarantee of quality of coal

**10%** Increased coal issue

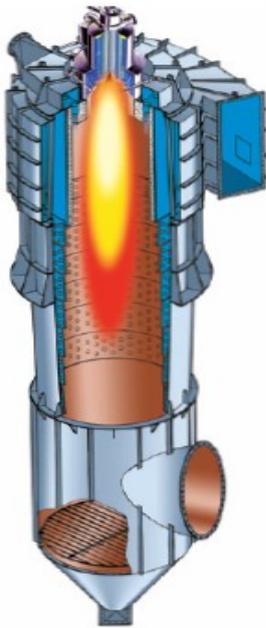


## Mechanical dewatering processes

Experience of modern coal preparation enterprises over the past 20 years show the following:

- The currently used technology in mechanical dewatering of sludge does not provide a 100% output of sellable coal with humidity indicators that satisfy consumers as well as conditions of carriage.
- Sludge's (class 0-0.2 mm) after dewatering when using the most modern equipment have humidity levels of 20-22%.
- **Mixing** of the entire volume of the sludge with coal concentrate increases the overall humidity of marketable products to 11-12%, making products substandard.
- In modern mine production equipment, the increase of depth of mine layers contributes to over-grinding of coal.
- Factories built without coal-drying technology today annually increase their losses because of coal waste.
- To ensure the quality indicator of a coal moisture content of under 9% in the summer and under 7% in the winter, enterprises have to send part of the coal sludge to waste.
- Eliminating fine grade coal in the enrichment process has led to a significant loss of raw coal as production waste, sometimes up to 8-10% of production value.

*Analysis of modern coal preparation processes shows that in order to reduce losses and improve the efficiency of the coal preparation plants, mechanical dewatering process should be complemented with thermal drying of coal sludge and fine classes.*



## Thermal Drying

In the years 2005 - 2015 the thermal drying technologies of coal have been radically reworked in Germany (Ing Büro FTT) and in Russia (CETCO).

Based on the analysis of dryers from coal preparation, the companies have developed technology to ensure a secure way of drying coal products, including coal concentrates and slurries with high humidity, including coal with high volatile.

New drying devices for coal have been developed with 3-10 times higher rates of intensity of the drying process. It will significantly reduce the capital costs of construction and maintenance for drying.

*The drying process in a gaseous medium with a reduction of the oxygen content to less than 9% prevents fire and explosions in the drying equipment.*

*The safest and most effective devices for drying fine coal and sludge are riser dryers connected to special low-inertia hot-gas-generators, which burn coal dust.*

*A modern coal drying plant supplies itself with fuel alone.*

## The vertical riser dryers

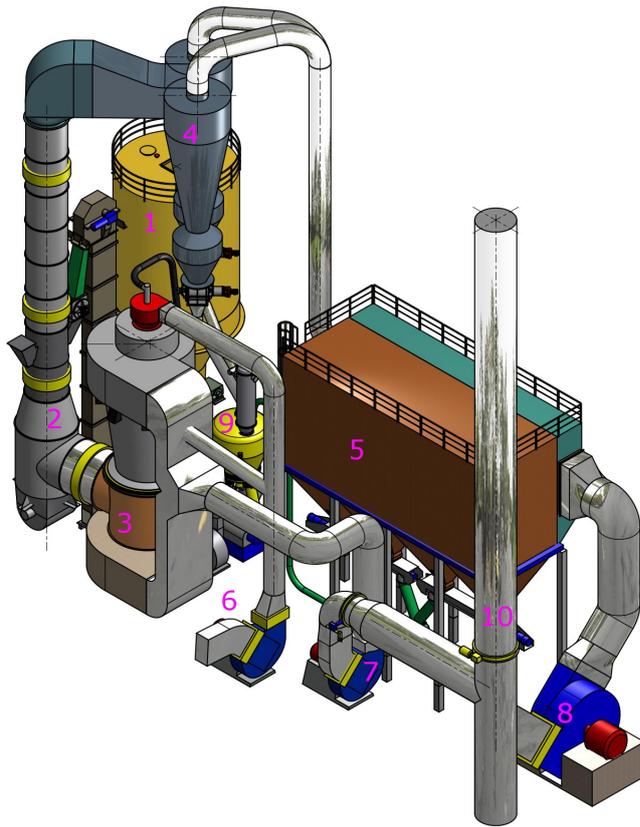
Indicators to ensure benefits for drying fire-hazardous products:

- Ability to work with high hot gas inlet temperatures of 900 - 1000 ° C,
- In the drying chamber, the safety for drying is maintained by a coal oxygen content of less than 9%,
- A residence time in the dryer for 2-3 seconds,
- The amount of material that is exposed to fire in the cavity of the device in case of violation of technological regime: 100-200 kg (much smaller compared to 20-30 tons of coal in rotary dryers),
- No moving parts to ensure sealed housing.



## Coal products applied to the drying

- |  |           |
|--|-----------|
| - Flotation concentrate (0 - 0.5 mm), moisture content | 20 - 25%  |
| - Fine concentrate (0 - 13 mm), moisture content       | 9 - 13%   |
| - Sludge (0 - 3 mm), moisture content                  | 20 - 25%. |



### Technological complex of vertical riser dryer SRT 2000

- 1 - raw material hopper,
- 2 - vertical dryer SRT,
- 3 - generator of hot gases,
- 4 - unloading cyclones
- 5 - bag filter,
- 6 - air fan for combustion,
- 7 - air blower for mixing,
- 8 - main induced draft fan,
- 9 - supply of pulverized coal to the burner,
- 10 - chimney

Dimensions L x B x H = 34m x 14m x 30m

### The design of dryers

**Protection from abrasion** - ceramics, stone casting, special wash. The service life of the abrasive protection is 10 years.

**Technical solutions** to work with slurry materials with a grain size of 0-2 mm.

**Low-inertia** hot-gas-generators, working with coal dust or backup liquid / gaseous fuel with a hot-gas-temperature of 900 - 1000 °C.

**Dry cleaning** of flue gases in the bag filters.

**Adjustable performance range** of 20-100%.

### Economical indicators

Consumption of coal fuel 15 kg / ton of dried coal.

Power consumption 2 kWh / ton of dried coal

The cost of drying is 0,5 -1 euros / ton of dried coal.

Specific industrial drying costs make up 1-3% of the trade cost of dried coal.

Return on investment in the construction of a new complete drying unit: less than 2 years.

In order to improve the economic performance of coal preparation plants:

- a modernization of the existing drying systems,
  - the installation of low-inertia hot-gas-generators,
  - the drying systems for a low oxygen content,
  - systems for drying coal slurry, dry gas cleaning devices,
  - systems for the processing and industrial use of coal slurry,
- is offered.



## The parameters of SRT dryers depending on performance

The performance of the dry coal, ton / h	30	50	100	150	200	250
The inlet moisture content of coal, %	14	14	14	14	14	14
Coal moisture after drying, %	5	5	5	5	5	5
The amount of vaporized moisture, ton / h	3,1	5,2	10,5	15,7	21	26
Power of hot gases generator, MW	4	6	12	18	25	30
Consumption of coal fuel, kg / h	440	730	1470	2200	2930	3660
Electricity consumption for drying, kW / h	60	100	200	300	400	500

### Optional special designs

- Vertical dryer for drying coal with a lump size of 20 mm or more;
- Riser dryers for drying liquid products, supplied through a nozzle - to spray, for example, coal slurries with a moisture content of 30-40%.



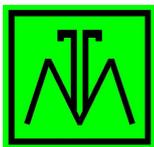
**The use of coal dust** in industrial plants instead of natural gas or fuel oil reduces fuel costs by 2-3 times. This is the optimal solution for all industrial plants within a radius of 2.000 km from the coal preparation plants and coal deposits.

ROI of construction costs of plants is at least a year due to the difference in fuel prices.

Designs and sells devices for local coal dust production used in drying of concentrates of metal ores, minerals, furnaces producing cement clinker, the production of fertilizers and other technologies;

Adapting technological equipment for coal dust.

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