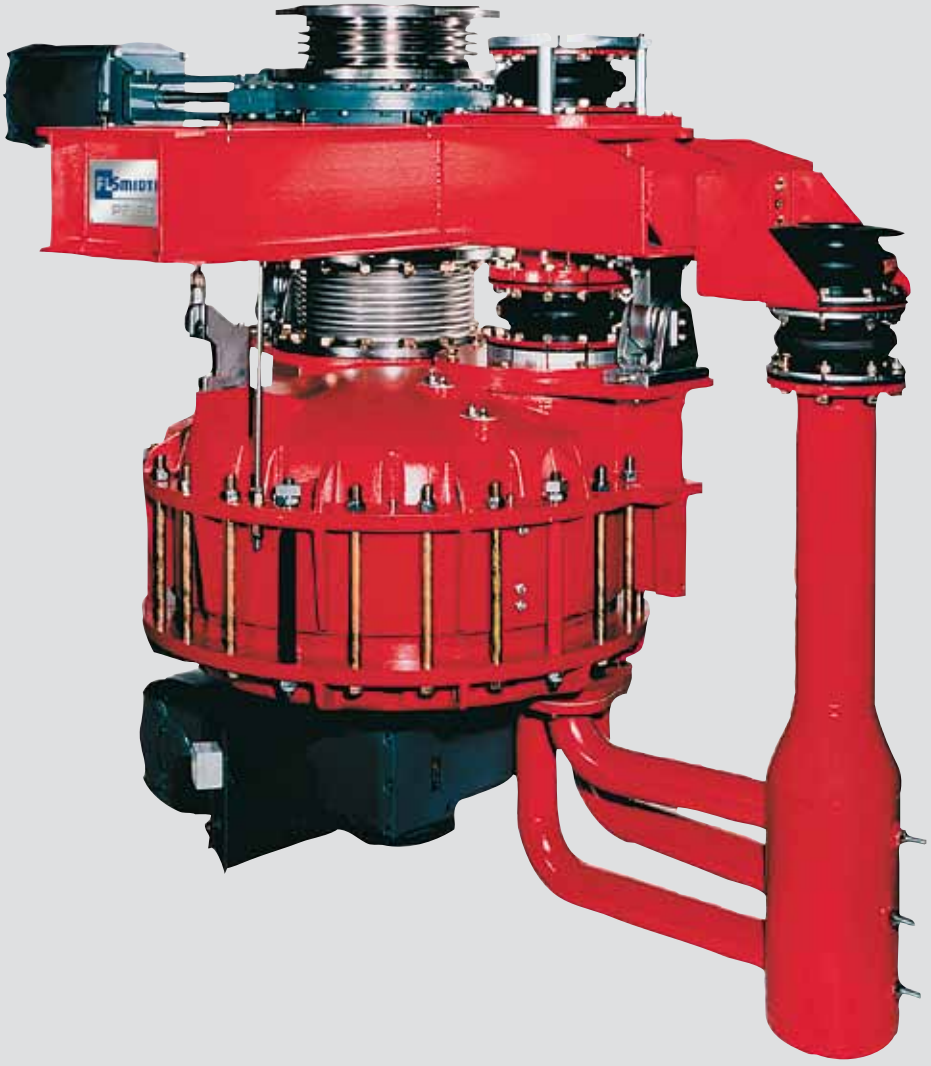
One Source

Product Brochure Pfister® DRW



Highly accurate and reliable gravimetric feeding of pulverised fuels

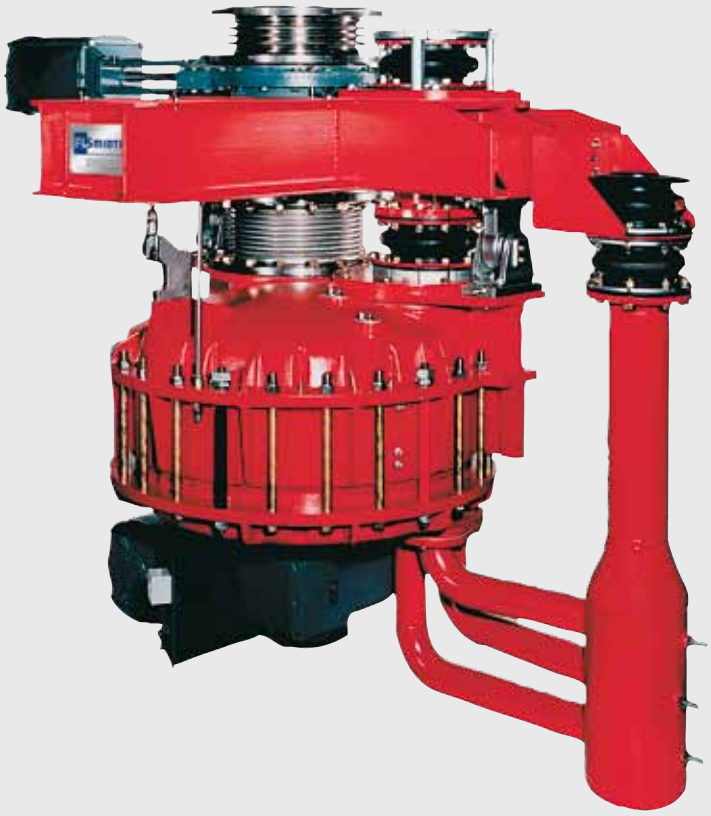
FLSmidth PFISTER

Rotor Weighfeeder Pfister® DRW

Highly accurate and reliable gravimetric feeding of pulverised fuels like lignite dust, petrol coke or coal dust directly to the burning process

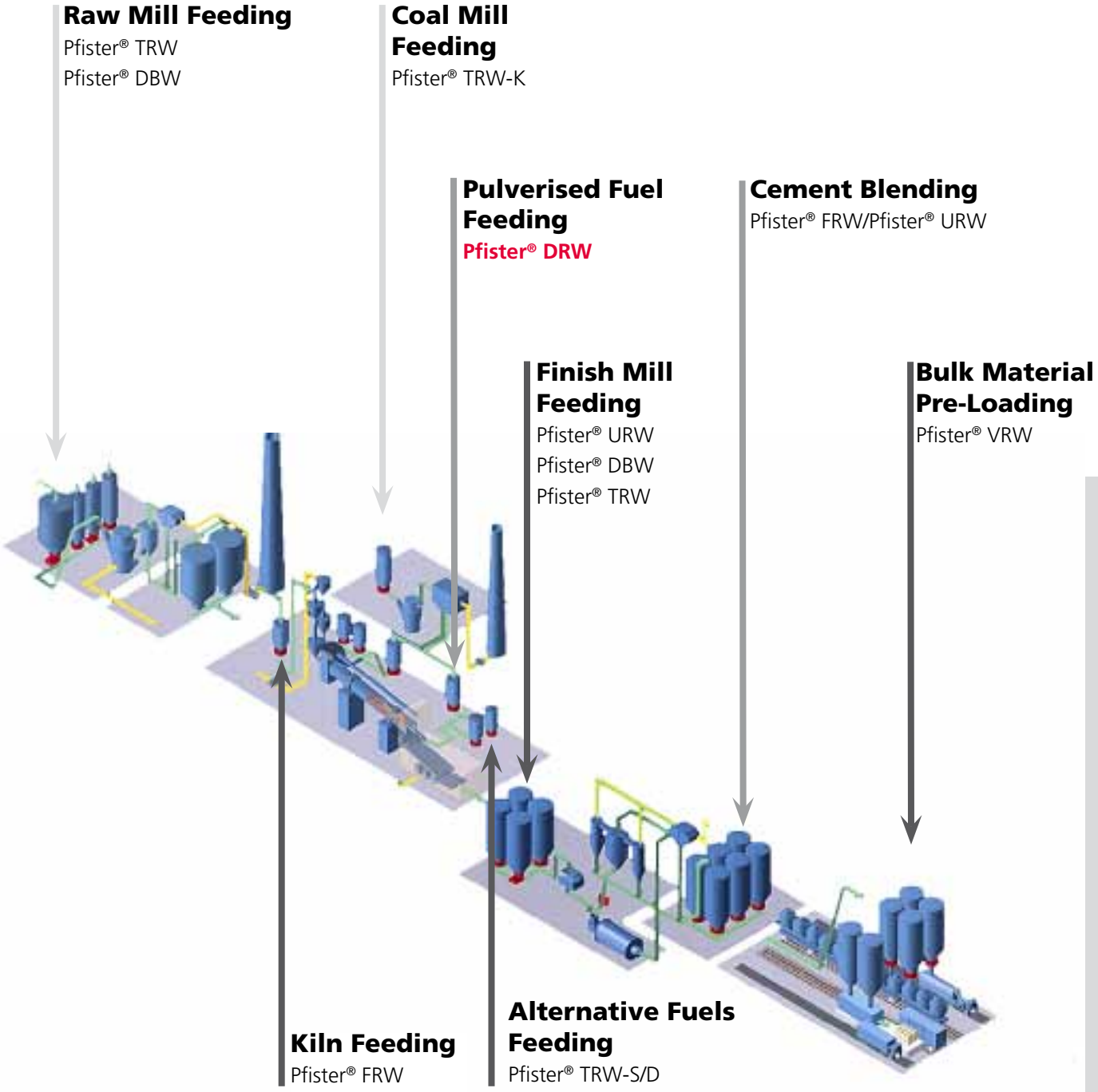
Indirect firing of pulverised fuels require highly precise dosing devices. Rotor weighfeeder Pfister® DRW is used to extract pulverised fuels such as hard-coal, lignite or petrol coke out of a storage silo and feed it with high accuracy and consistency to the burner to support an optimal flame.

Pneumatic transport of the coal to the burner is an essential part of the feeding system. The rotor weighfeeder is directly connected to a blower. Clean transport air is blown through the feeder and transports the fuel to the burner. FLSmidth® Pfister® supplies calculation of the transport pipe system and blower, matching the individual installation.
The amount of transport air depends mainly on the coal feed rate and length of the pipe. FLSmidth® Pfister® calculations provide optimal fuel transport to avoid material segregation in the pipes and thus pulsations or CO peaks.



Dosing and Feeding for Industrial Production

FLSmidth® Pfister® feeding and dosing devices exemplary in the cement production process:



Tradition & Progress

FLSmidth Pfister has more than 110 years of experience in manufacturing of industrial weighing equipment. It has been member stock quoted FLSmidth Group/Denmark since 1998.

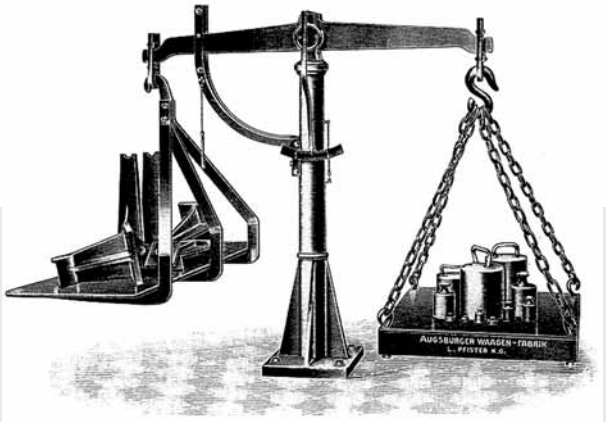
The patented rotor weighfeeder was invented by Pfister in 1984 to feed pulverised fuels for the cement burning process. This state-of-the-art dosing device has proved its properties in more than 2,000 installations worldwide.

FLSmidth Pfister additionally supplies know-how for equipment, related to the coal feeding process in order to ensure problem-free material handling and optimal pneumatic transport of the coal.

Fuels have a wide variety of material characteristics. Thus, FLSmidth Pfister helps to design individual installation solutions.

FLSmidth® Pfister® weighfeeders are

- engineered
- designed
- assembled
- tested
in Augsburg/Germany

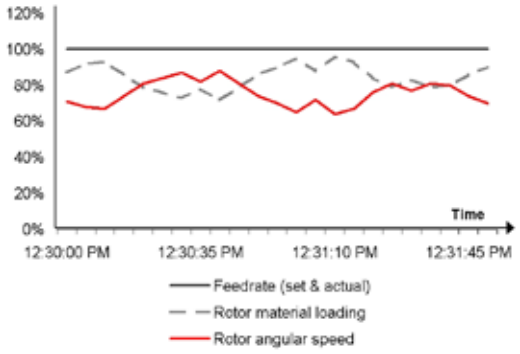


German Ludwig Pfister founded the company in 1894
Above: Historic scale

Functioning Principle of Pfister® Rotor Weighfeeders

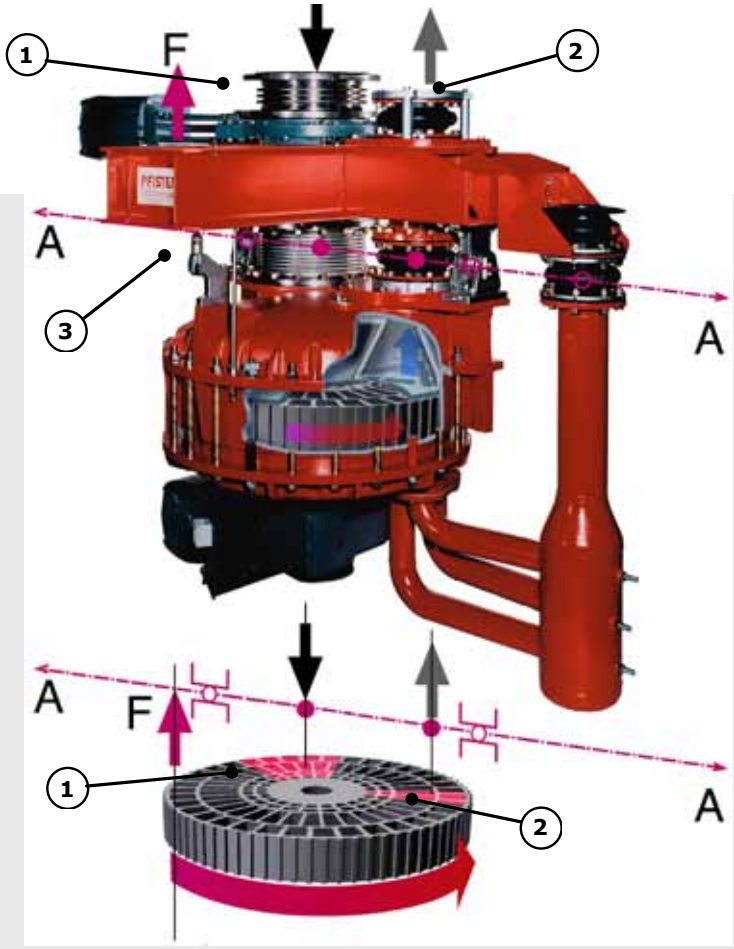
The picture below exemplary displays a rotor weighfeeder for dosing pulverised fuel. However, the weighing and dosing principle of all Pfister® rotor weighfeeders is identical: Material is extracted out of the material silo and is transported in the rotor chambers from the inlet (1) to the outlet (2). The rotor is mounted on bearings which form a weighing axis (A-A). This axis (A-A) is eccentric to the rotor shaft, and through the middle of inlet (1) and outlet (2). The third point is suspended at a load cell (3) which weighs the content in the rotor wheel gravimetically (F). This means the rotor weighfeeder measures actual kilograms and is therefore a real scale. The measured gravimetric force (F) provides information on the bulk material mass in the rotor weighfeeder before material discharge. The load of the rotor and the related rotor wheel position, is stored by the weighing electronics. The rotor wheel speed is controlled invers to the measured force (F). The feeder discharges the material at the outlet (2) with a highly accurate mass stream.

To achieve high accurate feeding, the angular speed of rotor is controlled invers to its loading.



Advanced Weighing Electronics ProsCon®

The electronic controller calculates the required speed of the motor for the time of the discharge. It uses the set feed rate and the measured bulk material mass to calculate the angular speed of the rotor (see chart). Less material in the rotor results in a higher angular speed, more material in a lower speed. With this pro-active principle, the so-called prospective control ProsCon®, Pfister® rotor weighfeeders achieve highly accurate compensation of variations in rotor loading and material density. This results in an extremely accurate short- and longterm feed rate.



1: inlet
2: outlet
3: load cell,
A-A: eccentric weighing axis
F: material measuring force

Customer Benefits
of FLSmidth® Pfister® Rotor Weighfeeders

Outstanding reliability & long service life
- Simple design with minimal number of functional parts
- Slowly moving rotor (4-8 rpm)
- Steel only in contact with material

High short- and long-term accuracy
- Pro-active control strategy ProsCon® (see below)
- Online calibration during operation if pre-bin is equipped with load cells
- Insensitive to pressure fluctuations in the process

Intuitive operator interface
- The rotor weighfeeder is an advanced mechatronic system
- However, it is easy to operate
- Flexible, reliable communication to the local plant control system

Easy maintenance
- All measuring parts and drives are accessible from the outside
- No cleaning necessary since no spillage possible
- Integration of material extraction, weighing, feeding and dosing in one system

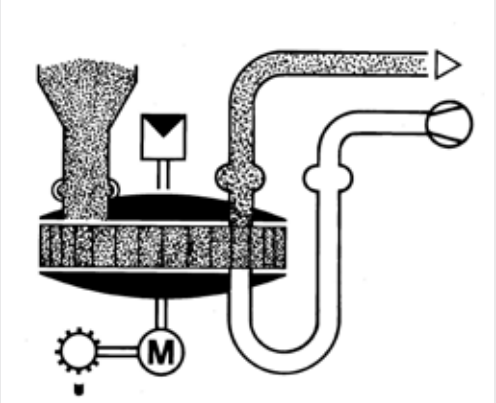
Instantaneously adjustable feed rate
- High accuracy in a range from 10% - 100% of max. feed rate
- Feed rate can be adjusted promptly without loss in accuracy
- Control strategy ProsCon® ensures virtually no reaction time in changes of the feed rate

Reactive Control Compared to Proactive Control Strategy

Other feeders are based on a reactive control (follow-up) rather then a pro-active control. Deviations in feed rate is measured and thus pre-feeding is adjusted. The measured deviation is already sent to the process. This also requires a sensitive pre-feeding device.

With the pro-active rotor weighfeeder, the material mass is measured before it leaves the rotor weighfeeder. That means that the speed of the rotor is adjusted before the material gets discharged into the system. The result is an extremely high accuracy.

Prospective control ProsCon®, pro-active control strategy

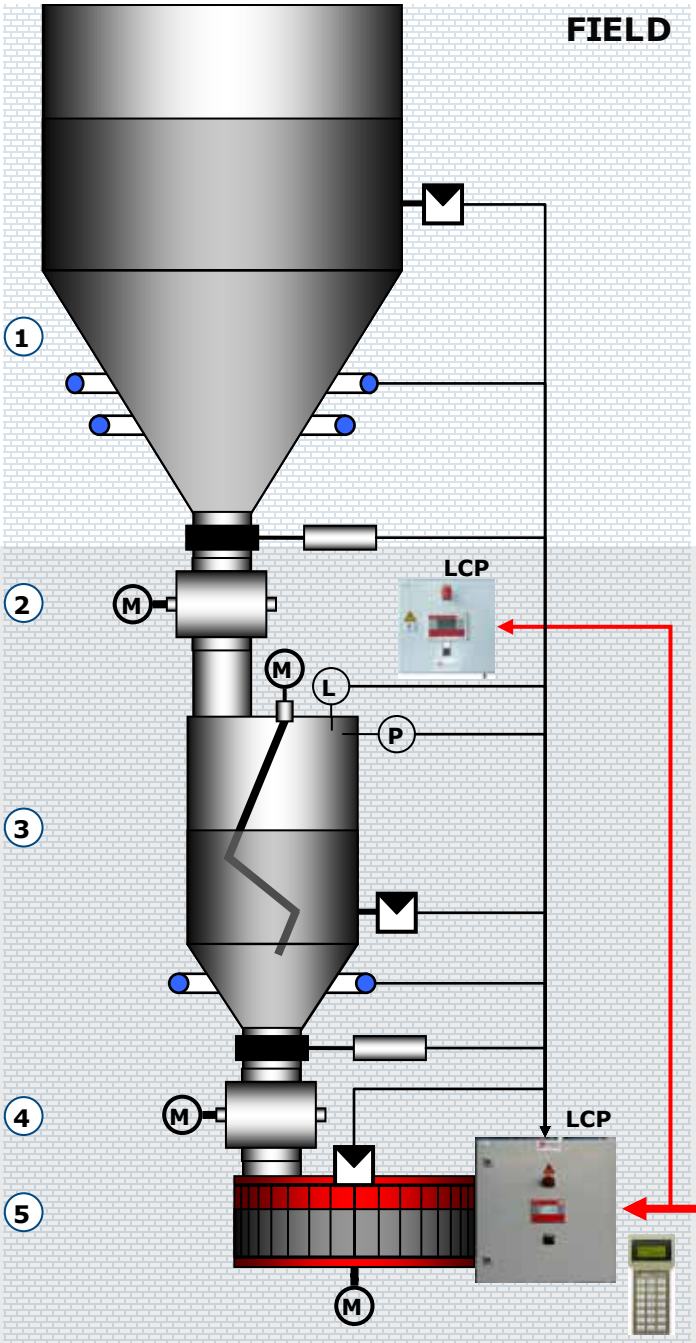


Structure of the dosing system:

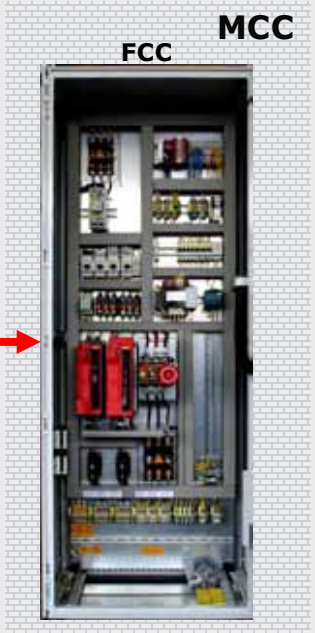
F-Control™ + dosing machine

F-Control™ dosing control system is used for continuously operating gravimetric feeders like rotor weighfeeders, belt weighfeeders, etc.

The main structural elements are a control cabinet FCC located in the plants motor control center (MCC) and local control panels (LCP) specifically designed for the environment surrounding the feeder (FIELD).
The control cabinet FCC contains all controllers for dosing and speed. This also includes the monitoring of these functions.
The local control panel(s) LCP consist of all necessary equipment to link the F-Control™ dosing control to the process and all devices to provide local access for maintenance and service operation.



System design: 1: material silo, 2: level feeder to bin, 3: calibration bin, 4: pre-feeder to feeder, 5: feeder
FCC: feeder control cabinet, LCP:local control panel(s)



Technical Facts
of Rotor Weighfeeder Pfister® DRW

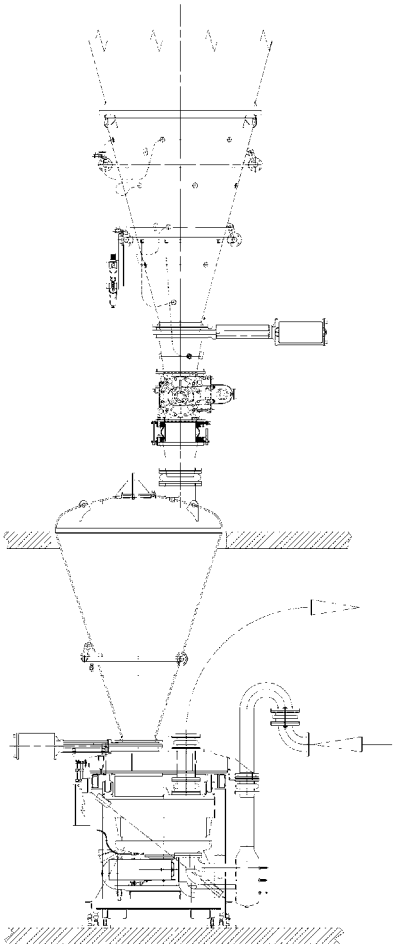
Application fields: Kiln and calciner firing process, hot gas generator (HGG)
Fuels: Petrolcoke, coaldust, lignite, oil shale
Dosing capacity: Up to 50 t/h with only one system possible

Design example:
- Stainless steel silo cone
- Silo cone aeration
- Shut-off gate
- Star feeder
- Flexible joints
- Calibration pre-hopper
- Rotor weighfeeder Pfister® DRW

Features:
- Stable fuel dosing
- Outstanding reliability
- High short- and longterm accuracy
- Compact, simple and modular design
- Explosion-proof
- In-line blending of a number of fuels into one common feeding line possible
- Integrated pneumatic fuel transport
- Large feeding range
- Online calibration during operation
- Up to 4 systems under one coal silo possible
- Slowly moving rotor
- Easy to maintain

Dosing control:
- Feeding Dosing Controller
- Prospective Control ProsCon®
- FlowBalance™ control
- User oriented interfaces
- Remote service access available

Certificates: ATEX (94/9/EC) in categories II1/2D and II1/3D, ISO 9001:2008

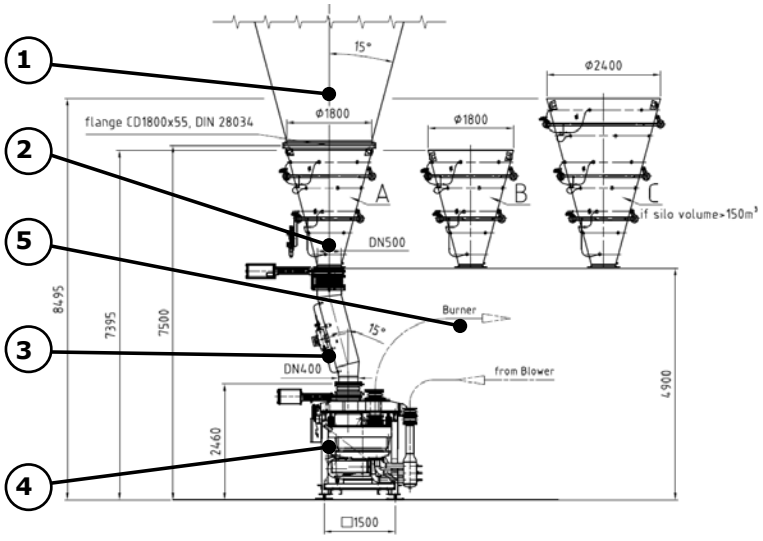


Solutions
with Rotor Weighfeeder Pfister® DRW

Dosing solutions with rotor weighfeeder Pfister® DRW can be designed for a large variety of applications. Based on the pre-conditions and requirmeents on-site, FLSmidth® Pfister® engineers help to determine the optimal installation.

Downpipe Solution

The coal is extracted out of a coal silo (1), supported by an aeration system (2). The rotor weighfeeder (4) reliably doses the coal and the transport air (5) discharges the machine and blows the coal directly to the burner. The high feed accuracy of the rotor weighfeeder ensures a steady air/coal mixture for the burner.
This installation is using a down-pipe (3) to connect the silo outlet with the rotor weighfeeder (4). Silo cones provided by FLSmidth® Pfister® can either be welded or flanged to the silo and are available in different sizes. These cones are in stainless steel, surface treated and have an inclination of 75° for optimal material flow and prevention of material bridging or tunnel flow.

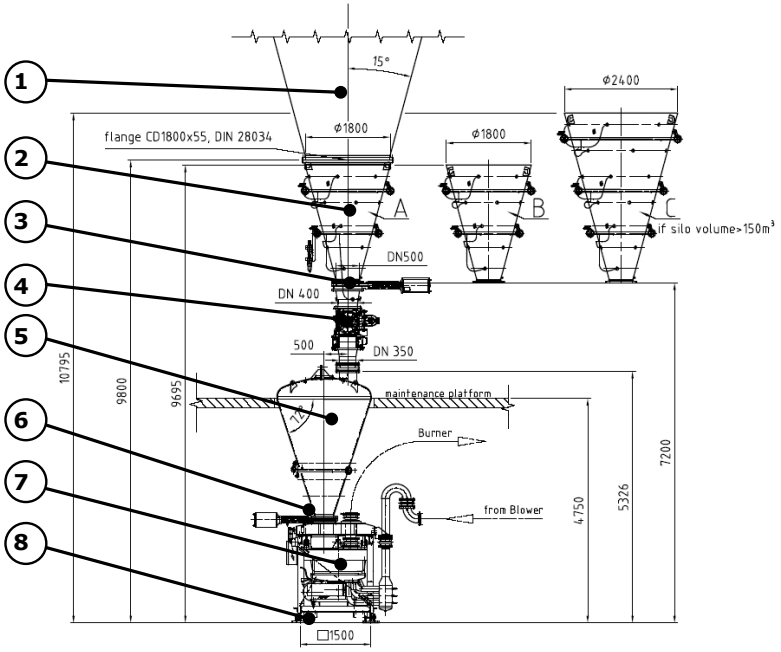


Downpipe solution:
1: silo, 2: silo cone aeration, 3: down-pipe,
4: rotor weighfeeder Pfister® DRW, 5: pneumatic transport system

Calibration Hopper Solution

To provide safety in material flow and to give the possibility for online-calibration, FLSmidth® Pfister® offers a solution using an intermediate buffer of coal in a calibration-hopper (5). The hopper cone is made in stainless steel and aerated. The starfeeder (4) regulates the filling of the calibration-hopper and provides an air sealing back to the silo. Optional a agitator arm is available to improve material flow.

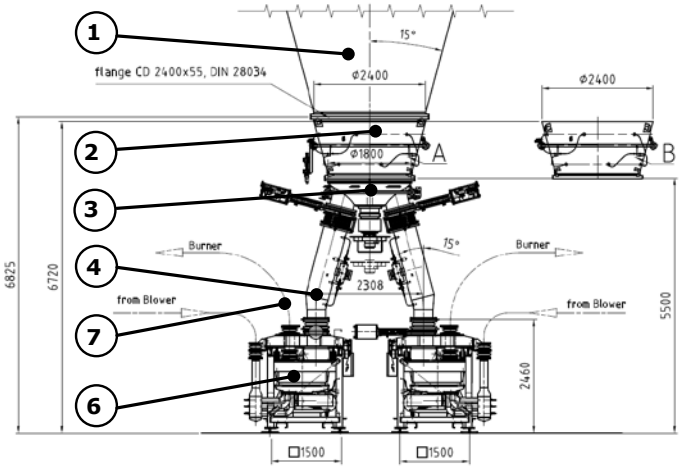
Benefits of the calibration hopper:
- Online calibration of the rotor weighfeeder
- Backpressure and leakage elimination
- Therefore reduction of wear in the system
- Safety in coal supply even with extremely fine and moist material
- Longer feed distances for pneumatic transport



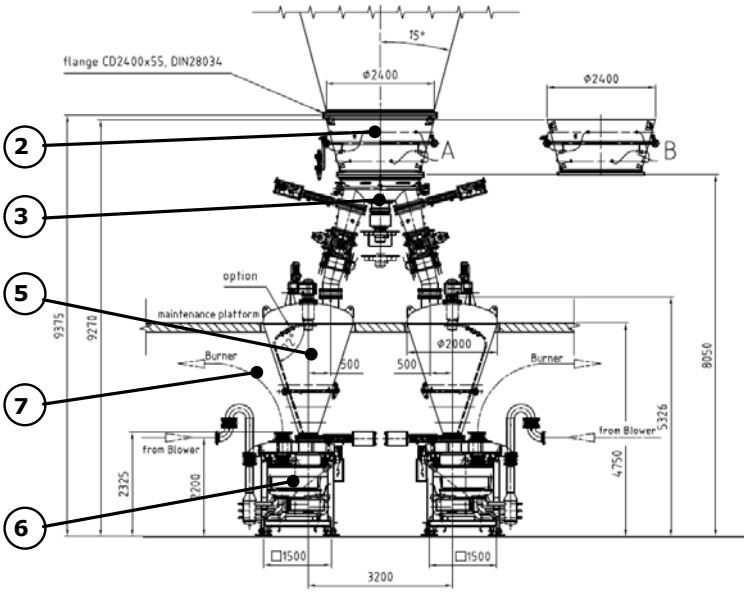
Calibration-hopper solution:
1: silo, 2: silo cone, 3/6: shut-off gates, 4: star feeder, 5: calibration hopper,
7: rotor weighfeeder Pfister® DRW, 8: weight measurement units

Several Systems Under One Coal Silo

For more economic operation of the cement burning process, Pfister® provides a material activator Pfister® SGA. This makes it possible to install up to four rotor weigh-feeders Pfister® DRW under one coal silo.



Material activator Pfister® SGA with down-pipes
1: silo, 2: silo cone, 3: material activator Pfister® SGA, 4: downpipe

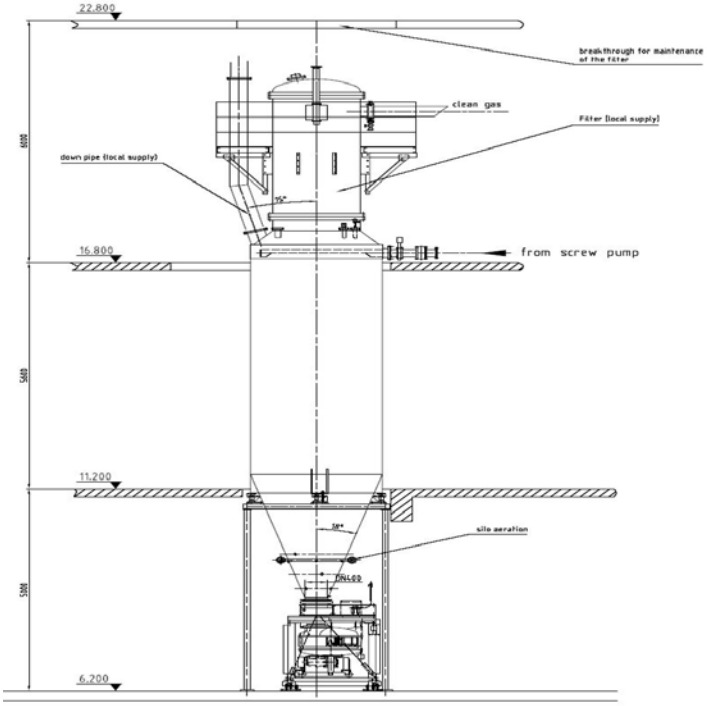


Material activator Pfister® SGA with calibration hoppers
5: calibration hopper, 6: rotor weighfeeder Pfister® DRW, 7: pneumatic transport

Block-System Solution

A special and economic version of a coal silo with an attached rotor weighfeeder is the so called block-system. It can also be used for online-calibration. The small size reduces coal extraction problems.

This solution is useful if the burners are far apart from the fine coal silo. It can easily be placed near the front- or back-end firing of the kilns.
It employs a intermediate silo with a volume of up to 30m³. The silo is directly connected to the rotor weigh-feeder and both together are placed on weight measure-ment units. The silo is also explosion proof of up to 10 bar, therefore no explosion flap necessary.



Block-System Solution. 1: filter, 2: intermediate coal silo, 3: rotor weighfeeder Pfister® DRW.

Applications with Pfister® DRW:
Coal dosing at a cement plant

In this Britsh cement plant coal dust and pet coke are dosed to the main and calciner burner with feedrates of 16 t/h (to the main burner) and 20 t/h (to the calciner burner).

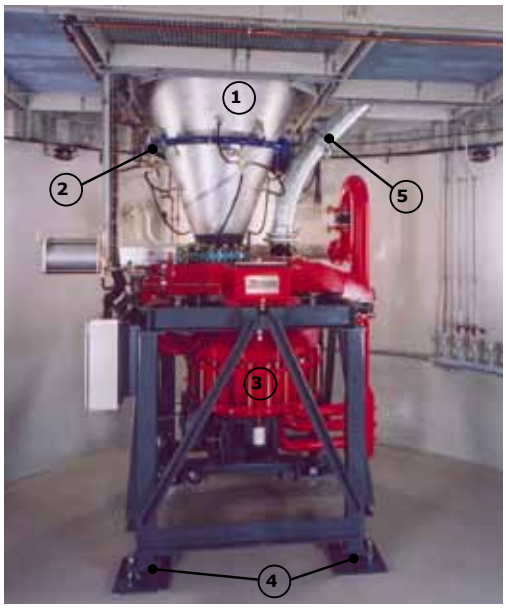
Pictures:
Upper: Aerated coal-silo cone (1) with material activator Pfister® SGA (2) and shut-off gates (3)

Middle: Star-feeders (4) feeding into calibration-hoppers (5)

Lower: Calibration-hoppers (5) Pfister® DRW (6)

Coal dosing at a cement plant in Germany

The upper picture displays the silo cone and outlet of this application:
Coal silo cone (1) with cone aeration (2), material activator Pfister® SGA (3) with additional second/ third/fourth outlet (4) and material activator Pfister® SGA aeration(5), pre-feeding devices shut-off gate (6) and star feeder (7)



Middle picture:
Rotor weighfeeder Pfister® DRW with calibration hopper, calibration-hopper (1) with aeration (2), rotor weighfeeder Pfister® DRW 4.10 (3) with calibration measurement units below(4), pneumatic transport pipe for coal transport to burner (5)

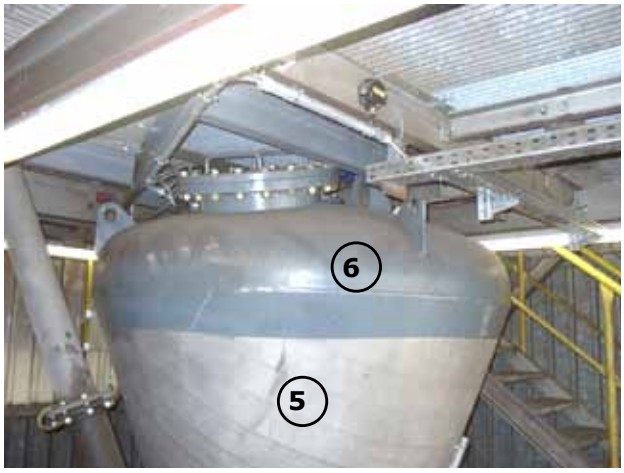
Coal dosing at a cement plant in Pakistan

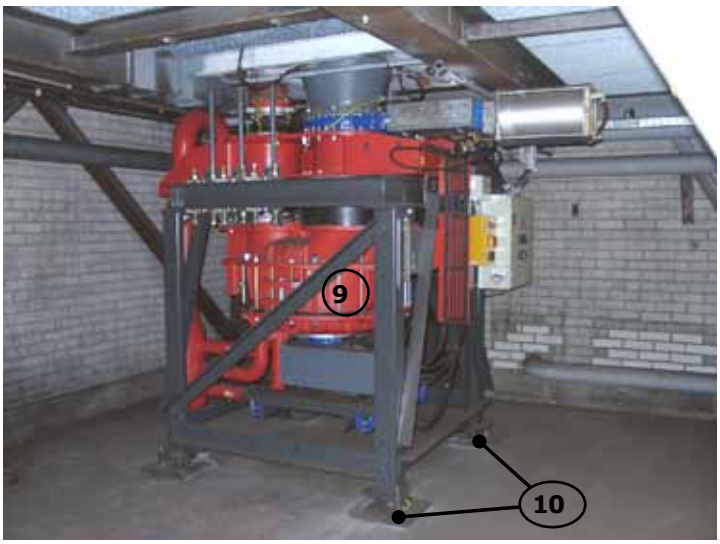
In this cement plant in Pakistan coal is dosed out of a double coal silo (left picture).

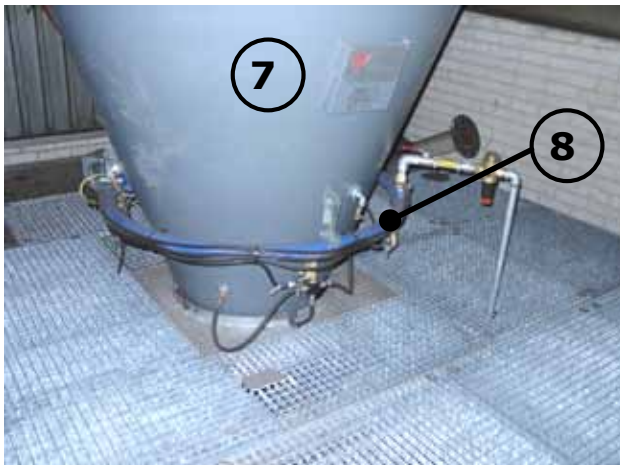
Picture, right:
Rotor weighfeeder Pfister® DRW (1) with down-pipe (2), fresh air pipes from blower (3) and transport air pipes to burner (4)

Coal dosing at a cement plant in Germany

The pictures of this application display:
- local silo extraction unit (1) and
- new shut-off gate (2)
- star-feeder (3) and
- motor for pre-hopper agitator arm (4)
- top of the pre-hopper top (5) with
- service opening (6) for easy maintenance
- pre-hopper cone (7) with
- aeration (8)
- rotor weighfeeder Pfister® DRW (9) with
- calibration measurement units (10)

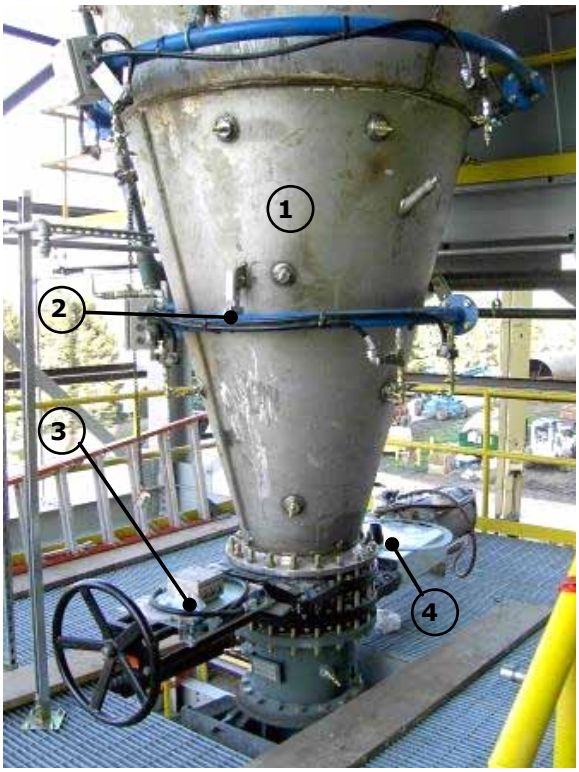


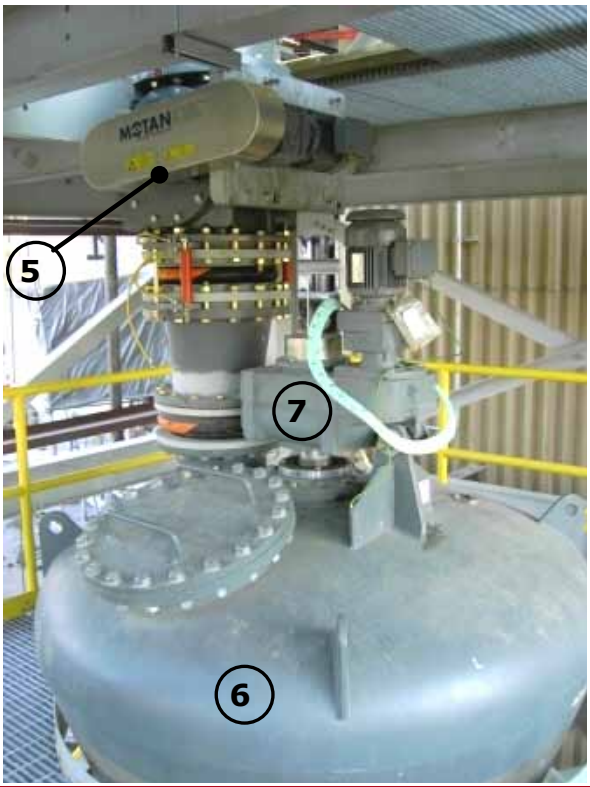




Coal dosing at a cement plant in the U.S.A.

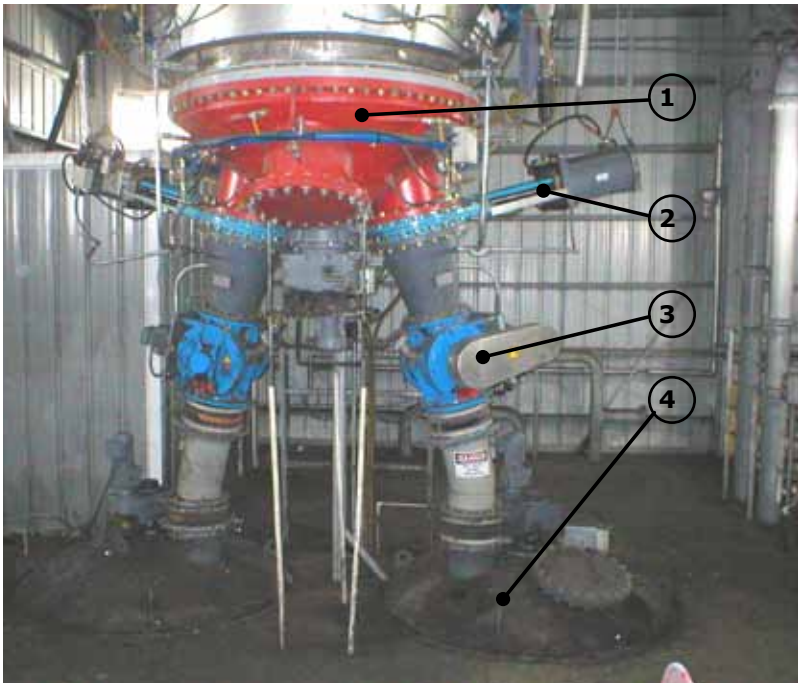
The pictures of this application display:
- silo cone (1) with
- aeration (2)
- manual (3) and pneumatic shut-off gate (4)
- Star feeder (5) feeding coal into the
- calibration-hopper (6) with
- agitator-arm motor and gear box (7)
- rotor weighfeeder Pfister® DRW (8) with
- calibration measurement units (9)





Coal dosing at a cement plant in the U.S.A.

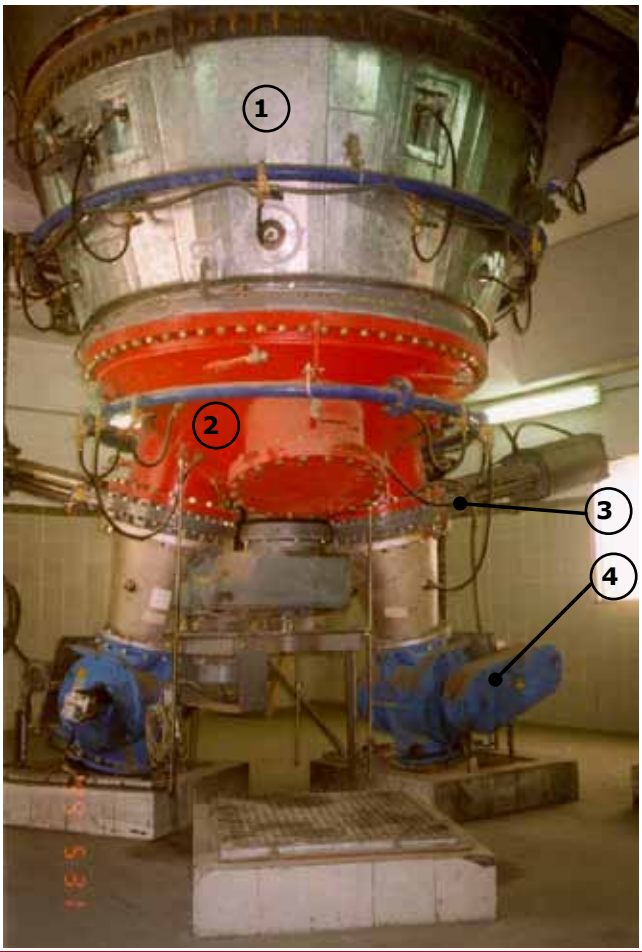
The pictures of this application display:
- material activator Pfister® SGA (1) with
- shut-off gates (2) and
- star-feeders (3) feeding material into
- calibration-hoppers (4) attached below
- rotor weighfeeder Pfister® DRW (5) with
- calibration-hoppers (6)

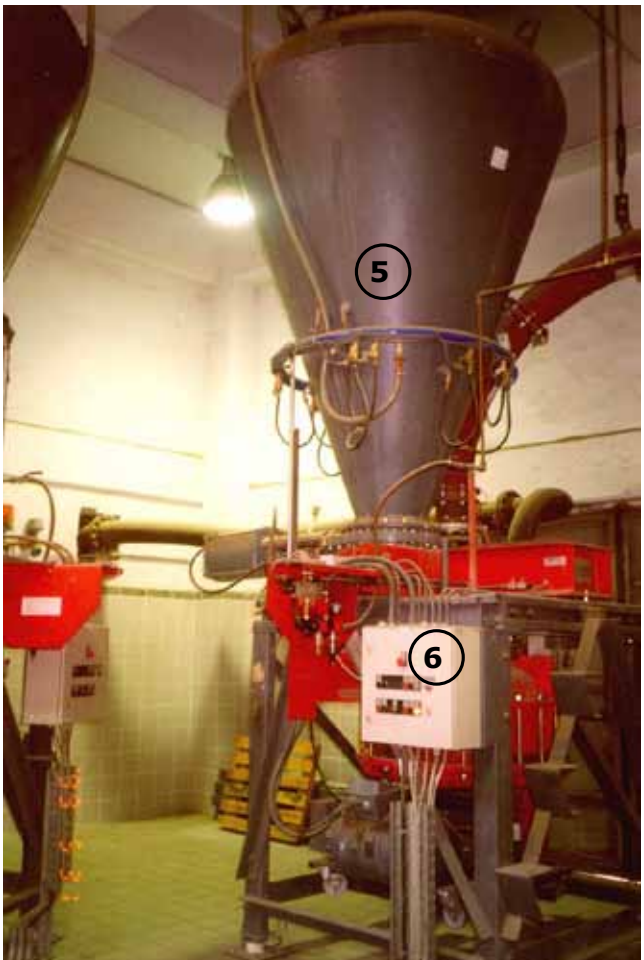


Coal dosing at a cement plant in the Lebanon

In this cement plant in the Lebanon the material activator Pfister® SGA was upgraded to a version with four outlets serving four rotor weighfeeders Pfister® DRW which are attached underneath and feeding three kilns (one with main burner and calciner burner).

The pictures diplay:
- aerated silo cone (1) and
- material activator Pfister® SGA with three outlets (2)
- shut-off gates (3) and
- star-feeders (4)
- calibration-hoppers (5) and
- rotor weighfeeder Pfister® DRW (6)



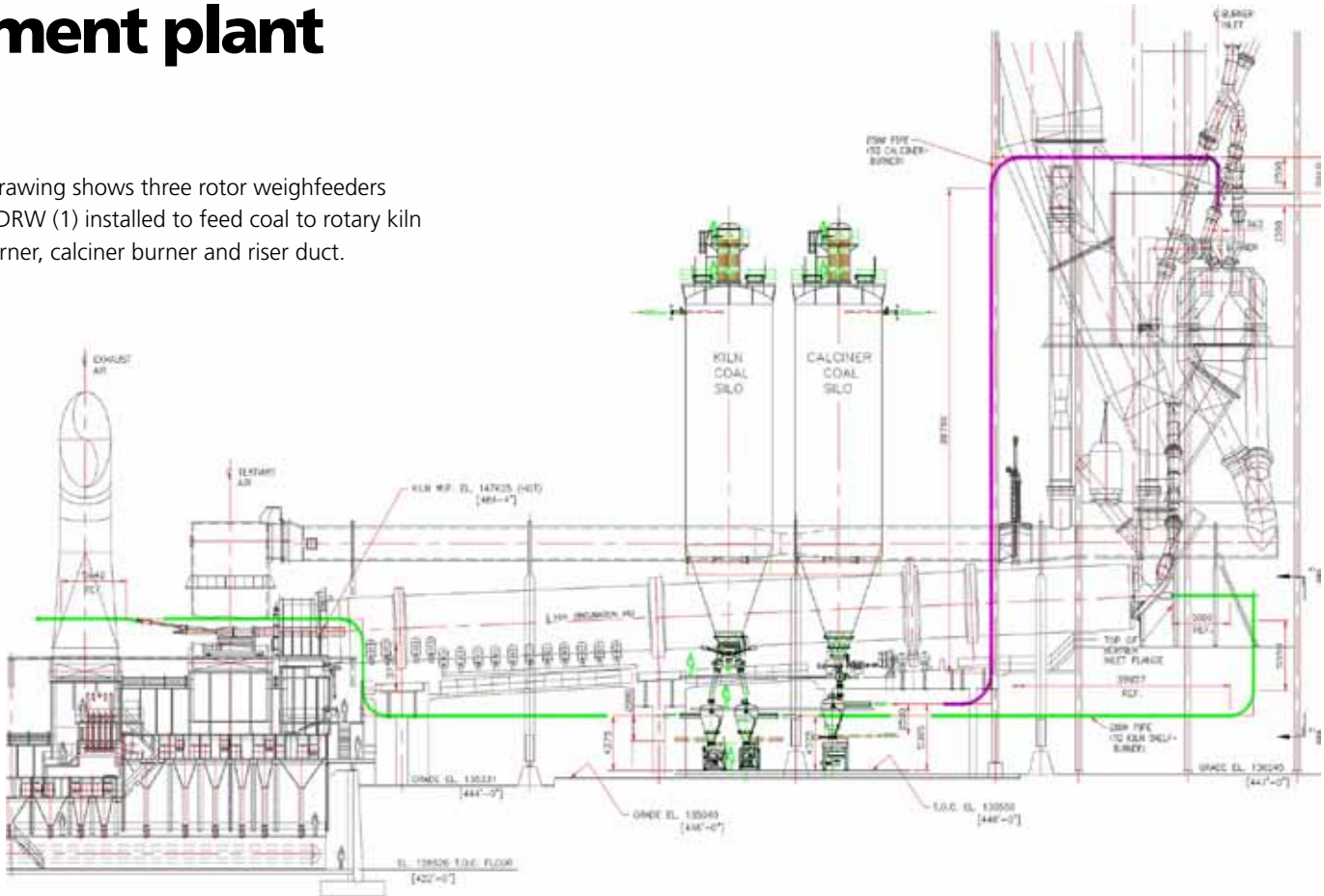


Dosing of pulverised fuel at a thermal power plant in Germany

The pictures display:
Four rotor weighfeeders Pfister® DRW (1) for dosing of pulverised fuel at a thermal power plant in Germany, pre-hopper with 20m³ (2) and material activator Pfister SGA® (3)

Multiple coal feeding in a cement plant

Below drawing shows three rotor weighfeeders Pfister® DRW (1) installed to feed coal to rotary kiln main burner, calciner burner and riser duct.



German Design & Assembly of FLSmidth® Pfister® Weighfeeders

All FLSmidth® Pfister® weighfeeders are engineered, designed and assembled at FLSmidth Pfister's headquarters in Ausgburg/Germany.

An experienced team of engineers and technicians tests all equipment at their own test fields.

In addition, Pfister® spares and parts are kept in stock for immediate disposal.

FLSmidth® Pfister® assembles all weighfeeders in Augsburg/Germany

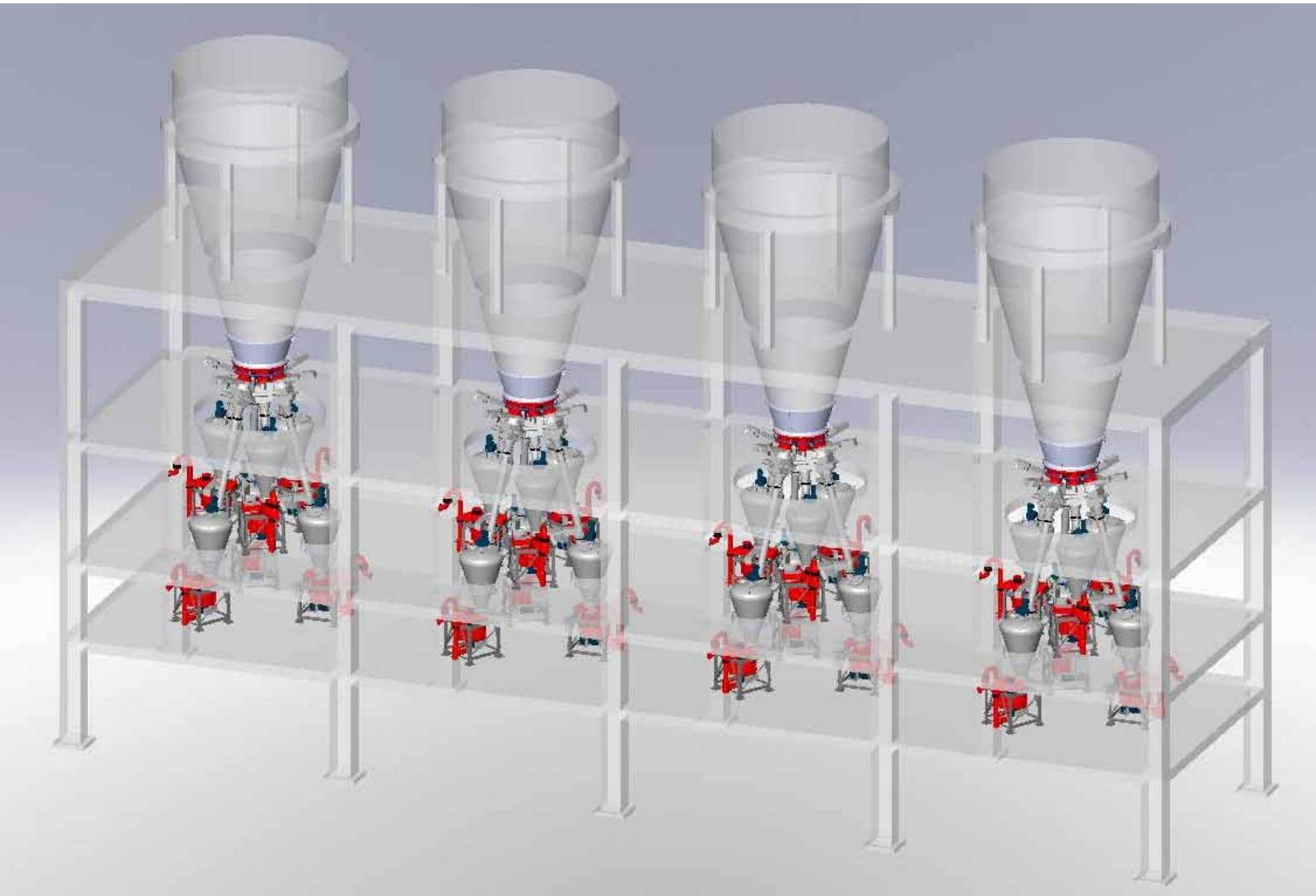
Engineering & Design

FLSmidth® Pfister® Engineering Services comprise:

- **Silo design**
- **Installation of equipment**
- **Calculation of pneumatic transport**

FLSmidth® Pfister® does not only supply the single dosing machines. FLSmidth Pfister's know-how includes the complete setup and surrounding of the installation like silo engineering, intermediate material transport and safety equipment.

That ensures that customers get all engineering from one experienced partner and one single source.



Pfister® Customer Service & After Sales Support

Thousands of FLSmidth® Pfister® systems are currently in operation worldwide and require global presence. Therefore FLSmidth Pfister operates sales and service offices in eight countries on four different continents.

Experienced service technicians stand by your side and provide first-class service. A 24-hour hotline and online trouble-shooting provide worldwide support. Also available are telesupport packages.

FLSmidth Pfister not only keeps a large number of spare parts in stock. Skilled spares specialists are looking forward to assist you in optimizing your own spare parts management.

FLSmidth Pfister´s services are rounded up by service contracts, which can be adapted individually to the customer´s needs.

Customer training on-site or at FLSmidth Pfister's training center ensures the best possible knowledge transfer.

Pfister® After Sales Support:

- **24-hour Hotline**
- **Telesupport**
- **Modern Maintenance Management**
- **Trainings and Seminars**
- **Service Contracts**

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