Product Brochure
Rotor Weighfeeder Pfister® DRW

Highly accurate and reliable gravimetric feeding of pulverised fuels

Watch here how Pfister® dosing solutions work.
**Rotor weighfeeder Pfister® DRW**

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

Pneumatic transport of the coal to the burner is an essential part of the feeding system. The rotor weighfeeder Pfister® DRW 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 system calculations provide optimal fuel transport to avoid material segregation in the pipes and thus pulsations or CO-peaks.
Dosierung und Beschickung in der Industrieproduktion

Beispiele von Pfister® Beschickungs- und Dosiersystemen im Zementproduktionsprozess:

**Rohmühlenbeschickung**
Pfister® TRW
Pfister® BWF
Pfister® AWF

**Kohlemühlenbeschickung**
Pfister® TRW-K

**Dosierung staubförmiger Brennstoffe**
Pfister® DRW

**Zementmühlenbeschickung**
Pfister® URW
Pfister® BWF
Pfister® AWF
Pfister® TRW

**Zement-Blending**
Pfister® FRW/Pfister® URW

**Ofenbeschickung**
Pfister® FRW

**Dosierung alternativer Brennstoffe**
Pfister® TRW-SD

**Zement-Vorladung**
Pfister® VRW
Functioning principle of Pfister® rotor weighfeeders

The picture below exemplary displays a rotor weighfeeder Pfister® DRW 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 body 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 gravimetrically (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 material load of the rotor and the related rotor wheel position, is stored by the weighing electronics. The rotor speed is controlled invers to the measured force (F). The rotor weighfeeder discharges the material at the outlet (2) with a highly accurate mass stream.

Prospective control ProsCon®:

Advanced weighing electronics

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 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 long-term feed rate.

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

To achieve high accurate feeding, the speed of rotor is controlled invers to its loading.
Customer benefits of Pfister® rotor weighfeeders

**Outstanding reliability & long service life**
- Simple design with minimal number of functional parts
- Slowly moving rotor
- Material transported in rotor chambers

**High short- and long-term accuracy**
- Prospective control ProsCon® (see below)
- Online calibration during operation if pre-hopper 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
- Integration of material extraction, weighing, feeding and dosing in one system

**Instantaneously adjustable feed rate**
- High accuracy in a range from 10% - 100% of maximum feed rate
- Feed rate can be adjusted promptly without loss in accuracy
- Prospective control 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 than a pro-active control. With a reactive control deviations in material loading are measured and thus pre-feeding is adjusted. The measured deviation is sent to the process. A sensitive pre-feeding device is required here.

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.
Structure of the dosing system: F-Control™ + dosing machine

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

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 rotor weighfeeder (FIELD).

The control cabinet FCC contains all controller parts for dosing and regulation of the rotor speed. This also includes the monitoring of these functions.

The local control panel(s) LCP contain the interface to link the F-Control™ dosing control to the process and all devices to provide local access for maintenance and service operation.
Technical facts of rotor weighfeeder Pfister® DRW

Application fields: Kiln and calciner firing process, hot gas generator (HGG)
Fuels: Pulverized 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
- Rotary valve or butterfly valve
- Flexible joints
- Calibration pre-hopper
- Rotor weighfeeder Pfister® DRW

Features:
- Stable fuel dosing
- Outstanding reliability
- High short- and long-term 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 possible
- Up to 4 systems under one coal silo possible
- Slowly moving rotor
- Easy to maintain

Dosing control:
- Feeder dosing controller Pfister® FDC
- Prospective control ProsCon®
- FlowBalance™ control
- User oriented interfaces
- Remote service access available

Certificates:
- ATEX in categories II1/2D and II1/3D, ISO 9001
Solutions with rotor weighfeeder Pfister® DRW

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

Downpipe Solution
The coal is extracted out of a coal silo (1), supported by an aeration system (2). The rotor weighfeeder Pfister® DRW (4) doses the coal with high precision 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 Pfister® DRW (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.

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 rotary valve (4) regulates the filling of the calibration hopper and provides a sealing back to the silo. Optional a stirrer arm is available to improve material flow.

Benefits of the calibration hopper:
- Online calibration of the rotor weighfeeder
- Backpressure and leakage sealing.
- Therefore reduction of wear in the system
- Safety in coal supply even with extremely fine and moist material
- Longer feed distances for pneumatic transport
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 weighfeeders Pfister® DRW under one coaldust silo.

Block System Solution

A special and economic version of a coaldust silo with an attached rotor weighfeeder is the so called block system. It can also be used for online calibration. The compact size offers optimal installation options.

This solution makes sense if the burners are located far from the fine coal silo. It can easily be placed near the burners of the kilns. The silos are typically delivered with a volume of up to 30 m³. The silo is directly connected to the rotor weighfeeder and both are placed on silo load cells. The silo is explosion proof up to 10 bar, therefore no explosion flap is necessary.
Applications with Pfister® DRW: Coal dosing at a cement plant

In this plant coaldust and pet coke is dosed to the main and calciner burners with feed rates of 16 t/h (to the main burner) and 20 t/h (to the calciner burner).

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

Middle: Rotary valves (4) for feeding into calibration hoppers (5)

Lower: Calibration hoppers with cone in stainless steel (5), rotor weighfeeder Pfister® DRW (6)
Dosing of pulverized lignite at a cement plant

The upper picture displays the silo cone:
Coaldust silo cone in stainless steel (1) with cone aeration (2), material activator Pfister® SGA (3) with additional second outlet (4) and aeration (5), silo shut-off gate (6) and rotary valve (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 transport of the pulverized lignite to burner (5)

The dosing capacity for pulverized lignite to the main burner is 8 t/h.

Coaldust dosing at a cement plant

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

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

The dosing capacity for coaldust is 10 t/h.
Dosing of coaldust and petcoke at a cement plant

The pictures of this application display:
- local silo extraction unit (1) and
- newly installed shut-off gate (2)
- rotary valve (3) and
- motor for stirrer arm (4)
- calibration hopper (5) with
- service opening (6) for easy maintenance
- hopper cone (7) in stainless steel with
- aeration (8)
- rotor weighfeeder Pfister® DRW (9) with
- calibration measurement units (10) for online calibration

The dosing capacity for coaldust and petcoke is up to 22 t/h.
Dosing of coaldust and petcoke at a cement plant

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

Dosing capacity for petcoke and coaldust up to 12 t/h.
Dosing of coaldust and petcoke at a cement plant

The pictures of this application display:
- material activator Pfister® SGA (1) with
- shut-off gates (2) and
- rotary valve (3) feeding material into
- calibration hoppers (4) attached below
- rotor weighfeeder Pfister® DRW (5) with
- calibration hoppers (6), cone in stainless steel

Flow rates of coaldust and petcoke up to 20 t/h to the calciner burner and up to 18 t/h to the main burner.
Dosing of coaldust at a cement plant

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 different kilns (3 x main burner, 1 x calciner burner).

The pictures display:
- aerated silo cone in stainless steel (1) and
- material activator Pfister® SGA
  with formerly three outlets (2)
- shut-off gates (3) and
- rotary valves (4)
- calibration hoppers (5) and
- rotor weighfeeder Pfister® DRW (6)

Dosing capacities for coaldust up to 12 t/h per rotor weighfeeders Pfister® DRW.
Dosing of pulverised fuel in a thermal power plant

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

The dosing capacity in this application is up to 10 t/h per rotor weighfeeder Pfister® DRW.

Multiple coaldust 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.
Dosing of coaldust at nickel plants

The left picture displays the silo cone with cone aeration.

The right hand picture displays rotor weighfeeder Pfister® DRW with calibration measurement units below and the pneumatic transport pipe for coaldust transport to the burner.

The dosing capacity for coaldust to the main burner is 8 t/h.

In this nickel plant coaldust is dosed by rotor weighfeeder Pfister® DRW with a dosing capacity of 10 t/h. The installation consists of a calibration hopper which can be seen above the rotor weighfeeder Pfister® DRW. This unit insures an absolutely save material flow to the rotor weighfeeder and is used for online calibration during operation.
German design & assembly of Pfister® rotor and belt weighfeeders

FLSmidth Pfister® weighfeeders are engineered, designed and assembled at FLSmidth Pfister’s headquarters in Augsburg/Germany and at their workshop in India.

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

In addition, Pfister® spares and parts are kept in stock for immediate disposal.
FLSmidth Pfister® engineering services comprise:

- Planning of the installations
- Silo engineering
- Calculation of pneumatic transport
- Further engineering services

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.
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 troubleshooting 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 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 training center ensures the best possible knowledge transfer.

**Pfister® after sales support**:
- 24-hour Hotline
- Telesupport
- Modern Maintenance Management
- Trainings and Seminars
- Service Contracts

FLSmidth Pfister’s headquarters are located in Augsburg / Germany.
FLSmidth Pfister has almost 120 years of experience in manufacturing of industrial weighing equipment. It is a member of the 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 2,800 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 fuels. FLSmidth Pfister also designs individual installation solutions.

**Tradition & progress**

**Pfister® weighfeeders are**
- engineered
- designed
- assembled
- tested

with the experience of almost 120 years.

The German Ludwig Pfister founded the company in 1894.

Above: Historic scale