# Product Brochure Pfister<sup>®</sup> URW



Highly accurate and reliable gravimetric feeding of pulverised material





# Rotor Weighfeeder Pfister<sup>®</sup> URW

Highly accurate and reliable gravimetric feeding of pulverised material with integrated pneumatic transport

Rotor weighfeeder Pfister<sup>®</sup> URW is especially designed for exact dosing of mill components such as fly ash, bypass or kiln dust and others into the raw or finish mill.

The integration of material extraction, weighing, dosing and material transfer into the pneumatic conveying line makes it a compact system that provides accuracy and constancy. Powered by the innovative prospective control ProsCon<sup>®</sup>, mass flow is controlled in advance. Thus, the outstanding constancy of metering with rotor weighfeeder Pfister<sup>®</sup> URW + prospective control ProsCon<sup>®</sup> dosing strategy makes it possible to achieve accurate material dosing.





# **Dosing and Feeding** for Industrial Production

FLSmidth<sup>®</sup> Pfister<sup>®</sup> 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<sup>®</sup> Pfister<sup>®</sup> weighfeeders are

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





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

# Functioning Principle of Pfister<sup>®</sup> Rotor Weighfeeders

The picture below exemplary displays rotor weighfeeder Pfister URW<sup>®</sup> for dosing pulverised fuel. However, the weighing and dosing principle of all Pfister<sup>®</sup> 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.



### Prospective Control ProsCon<sup>®</sup>: 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 so-called prospective control ProsCon<sup>®</sup>, Pfister<sup>®</sup> 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: blow-out pipe
- 4: towbar
- 5: rotor wheel chambers
- 6: variable speed drive
- A-A: eccentric weighing axis
- F: material measuring force





# **Customer Benefits** of FLSmidth<sup>®</sup> Pfister<sup>®</sup> 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

- Prospective control ProsCon<sup>®</sup> (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
- Prospective control ProsCon<sup>®</sup> 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<sup>®</sup>, pro-active control strategy



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

F-Control<sup>™</sup> 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<sup>™</sup> 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<sup>®</sup> URW

Application fields:	Kiln process, grinding process	
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Materials:	Mill components and additives such as fly ash, bypass and kiln dust, calcium hydrate, iron sulphate etc.	
Dosing capacity:	Up to 25 t/h	
Design example:	<ul> <li>Silo cone aeration</li> <li>Material activator</li> <li>Shut-off gate</li> <li>Connection unit</li> <li>Calibration pre-hopper</li> <li>Rotor weighfeeder Pfister<sup>®</sup> URW</li> <li>Blower</li> </ul>	
Features:	<ul> <li>Stable material dosing</li> <li>Outstanding reliability</li> <li>High short- and longterm accuracy</li> <li>Compact, simple and modular design</li> <li>Large feeding range</li> <li>Online calibration during operation</li> <li>Up to 4 systems under one silo possible</li> <li>Slowly moving rotor</li> <li>Easy to maintain</li> </ul>	
Dosing control:	<ul> <li>Feeding Dosing Controller</li> <li>Prospective control ProsCon<sup>®</sup></li> <li>FlowBalance<sup>™</sup> control</li> <li>User oriented interfaces</li> <li>Remote service access available</li> </ul>	
Certificates:	ISO 9001:2008	





# **Applications with Pfister<sup>®</sup> URW:** Fly ash and bypass dust dosing into the finish mill

In these plants fly ash and filter dust is dosed into the finish mill.

Pictures:
Left: Rotor weighfeeder Pfister<sup>®</sup> URW in a frame, feeding fly-ash
1: pre-bin cone, 2: cone aeration, 3: shut-off gate,
4: load cells for online calibration,
5: transport air pipe

Right: Dosing station for filter dust. 1: filter dust silo, 2: Rotor weighfeeder Pfister<sup>®</sup> URW with integrated pneumatic transport, 3: pneumatic transport pipe







### Fly ash feeding into the finish mill

In this plant two rotor weighfeeders Pfister<sup>®</sup> URW are employed for feeding fly ash. The numbers indicate:

- 1: silo cone
- 2: transport air pipe
- 3: transport air/material-mix pipe

# Dosing station for filter dust

In this installation rotor weighfeeder Pfister<sup>®</sup> URW is employed for dosing filter dust in a cement plant. The numbers indicate:

- 1: filter dust silo
- 2: rotor weighfeeder Pfister® URW with integrated
- pneumatic transport
- 3: pneumatic transport pipe







### Filter dust feeding and dosing

Filter dust is stored in a feed bin above rotor weighfeeder Pfister<sup>®</sup> URW and pneumatically transported to the finish mill.



### Feeding of dry chalk filler

Ground level (left picture): 1: pre-bin cone with aeration, 2: rotor weighfeeder Pfister<sup>®</sup> URW suspended at pre-bin, 3: transport air pipe

First floor (right picture). 1: dry chalk silo, 2: aerated bottom, 3: flow control gate for pre-bin filling, 4: pre-bin on load cells for online calibration



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### Kiln-bypass dosing at a cement plant in Germany

In this application in a cement plant chloride is extraced as well as by-pass dust dosed with rotor weighfeeder Pfister<sup>®</sup> URW to the cement mill and stored.

The pictures display material dosing and pneumatic feeding stations. The numbers indicate: 1: bypass silo, 2: material activator Pfister® SGA, 3: pre-bins, 4: rotor weighfeeder Pfister® URW, 5: load cells for online-calibration, 6: pneumatic transport pipes.

The drawing displays:

Material dosing and pneumatic feeding stations. 1: bypass silo, 2: material activator Pfister® SGA, 3: pre-bins, 4: rotor weighfeeder Pfister® URW, 5: load cells for online-calibration, 6: pneumatic transport pipes.









### Continuation: Kiln bypass solution

The flow chart below displays the chloride bypass: 1: kiln dust extraction, 2: kiln dust separation, 3: cooling screws, 4: transport system, 5: bypass silo, 6: three rotor weighfeeders Pfister<sup>®</sup> URWs with pre-hopper for dosing and transport to cement mills 1 to 5.



# German Design & Assembly of FLSmidth<sup>®</sup> Pfister<sup>®</sup> Weighfeeders

All FLSmidth<sup>®</sup> Pfister<sup>®</sup> 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<sup>®</sup> spares and parts are kept in stock for immediate disposal.







FLSmidth® Pfister® assembles all weighfeeders in Augsburg/Germany





# **Engineering & Design**

### FLSmidth<sup>®</sup> Pfister<sup>®</sup> 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<sup>®</sup> Customer Service & After Sales Support

Thousands of FLSmidth<sup>®</sup> Pfister<sup>®</sup> 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-shoo-ting 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





# One Source

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