Schenck Process Solutions for Increasing TSR

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Schenck Process Solutions for Increasing TSR: Alternative Fuel Feeding Systems

R .D. Kamat 2016-11-23,

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Overview & Technical Description

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Members of the Schenck Process Group

The Schenck Process Group comprises of the following companies:

schenck process · schenck AccuRate · fairfield · redler · stock · screenex

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A Global Partner: Thinking Globally, Acting Locally

Acting locally to support your needs the Schenck Process Group is working where you are.

Key Figures 2009:

- 2,100 employees worldwide
- Network of 27 Locations with multiple offices
- Over 130 territorial agencies
- Over 30 worldwide service bases offering customer-focused support
- 16 State-of-the-art assembly facilities worldwide
- Revenue >EUR 600 m

With an unrivalled global network of operating companies we are your competent global partner for weighing, feeding, screening and automation solutions throughout the process industries.

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Schenck Process Solutions for Increasing TSR

Schenck Process offers a wide range of solutions for increasing TSR:

This presentation focuses on Alternative Fuel Feeding Systems, however, we are pleased to address any interest that you may have in our other solutions for sustainable cement production.

Sustainable Cement Production via Alternative Fuels: Drivers for Change and Manufactures' Benefits

Drivers for the use of Alternative Fuels in Cement Production		Cement Manufactures' Benefits
Saving of energy costs through the substitution of high priced fossil fuels	**Schenck Process understands these drivers and by application of our process know-how and market leading technology we can…**	Assist in meeting emission reduction targets
Saving of natural minerals and fossil fuels		Facilitate the reduction of production costs by increasing energy efficiency
Recovering energy from waste		Enable retrofitting of alternative fuel feeding systems into existing plants
Contribution to the reduction of emissions		Offer co-operation with a global solution provider who understands your market and production needs

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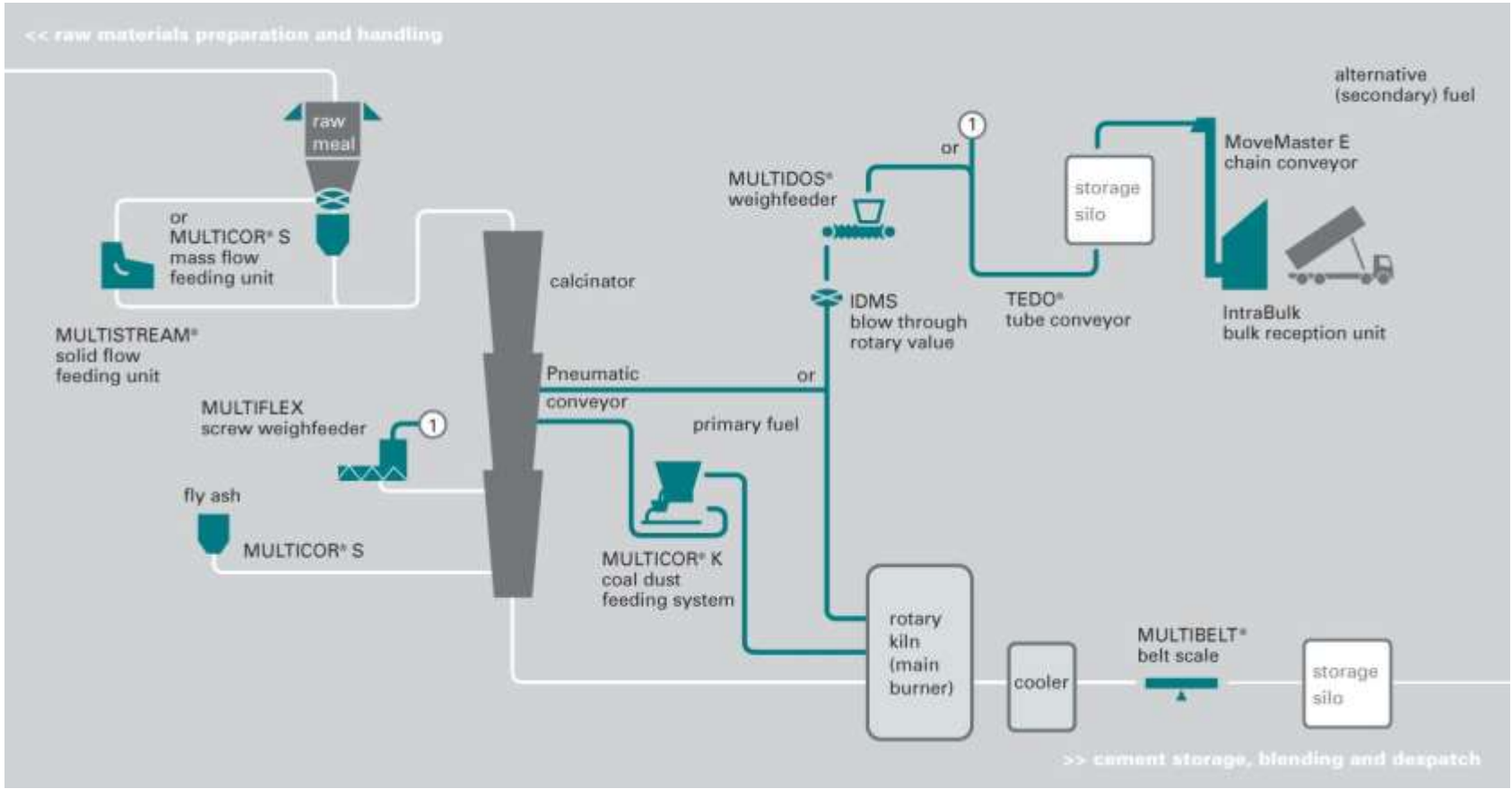
Cement Plant Schematic: Alternative Fuel Feeding Systems

Calciner and Kiln Feeding



Legend:

Process step covered by the Schenck Process Group

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Use of Alternative Fuels in Cement Production

Cement manufacturing is a very energy intensive process. The cost of energy represents a significant part of the total production costs. Therefore, the cement industry has made significant efforts to improve energy efficiency.

The use of alternative fuels brings a number of benefits to both the cement industry and society in general:

- Substitution of high priced fossil fuels such as coal, oil and gas – HIGHER TSR
- Saving of natural minerals and fossil fuels
- Recovery of energy from waste
- Reduction of emissions

Using alternative fuels does not have any negative impact on:

- Clinker quality
- Production capacity
- Kiln stability

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Use of Alternative Fuels in Cement Production: Multiple Fuel Types

Alternative Fuels are solid or liquid waste materials e.g.

- Shredded plastics
- Foil chips
- Conditioned sewage sludge
- Wood chips & saw meal
- Shredded tyres
- Palm kernel shells
- Rice husk
- Animal meal
- Mixtures of the above

Alternative Fuels have a high calorific value that can even exceed the heat value of hard coal (20 MJ/kg):

Foil chips:

grain size : 1-50 mm
heat value : 22 MJ/kg
bulk density: 0.08 t/m^3

BPG (solid fuel out of industrial waste):

grain size : 1-30 mm
heat value : 22 MJ/kg
bulk density: 0.2 t/m^3

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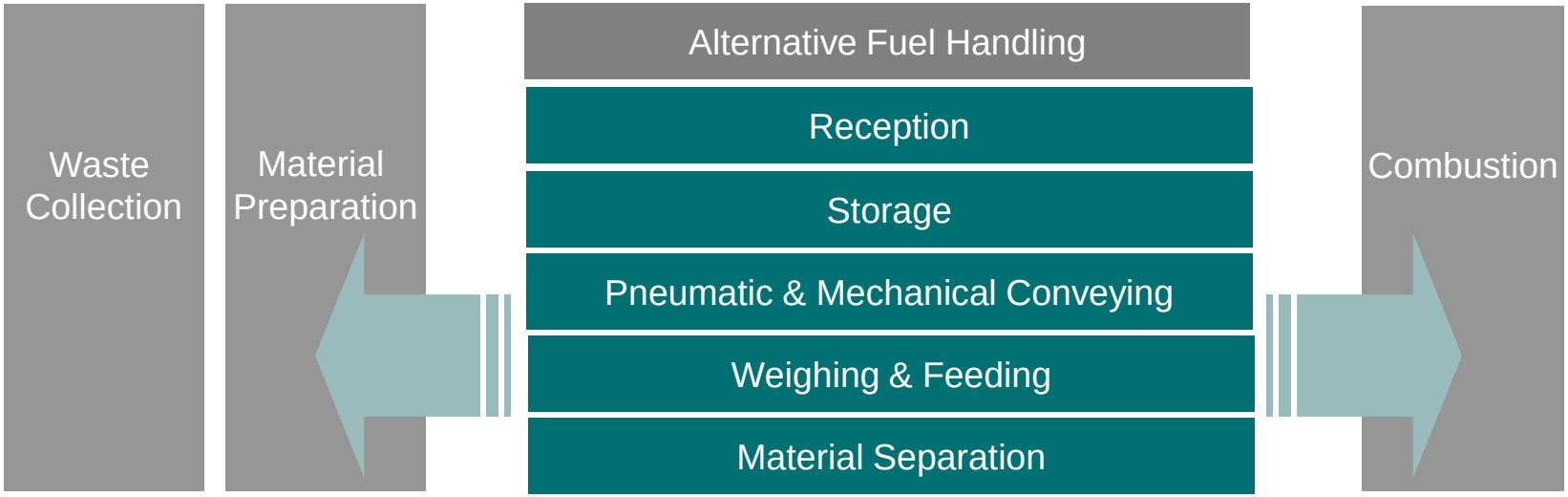
Use of Alternative Fuels in Cement Production: Process Steps



Through a combination of own equipment and strategic partnerships with different suppliers, Schenck Process are able to offer complete systems for feeding alternative fuels into cement or power plants

Depending on the customer's needs, we can find the optimum solution for the reception, storage, conveying, weighing & feeding and separation of a wide range of alternative fuels, while ensuring a perfect fit of the fuel handling system into the whole alternative fuel process – from material preparation to combustion

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Alternative Fuel Feeding Systems: Key Characteristics Embraced by Schenck Process

- Designed to handle a wide range of different alternative fuels with varying bulk density and flow characteristics
- Achievement of high accuracy and high feed constancy
- Avoidance of bottlenecks due to down times caused by blockages
- Use of robust equipment to ensure high reliability and production availability
- Handling of large volumes of low bulk density infeed material
- Ability to handle oversize material and foreign bodies
- Easy integration into existing installations
- Easy maintenance
- Short installation time (~ 4 month)
- Short return on investment (< 1 year)

Typical Design Data & Material Properties:	
Materials	Solid shredded wastes, bio mass, etc.
Feed rate	Up to 200m³/hr, max. 20 t/hr
Accuracy	±1 % within a range of 1:10
Grain size	Main burner: 0 – 35mm, max. 50mm, Calciner: 0 – 150 mm, max. 200mm
Bulk density	0.05 – 0.8 t/m³
Moisture	Max. 20 %
Material flow properties	Slightly sluggish, tending to bridging

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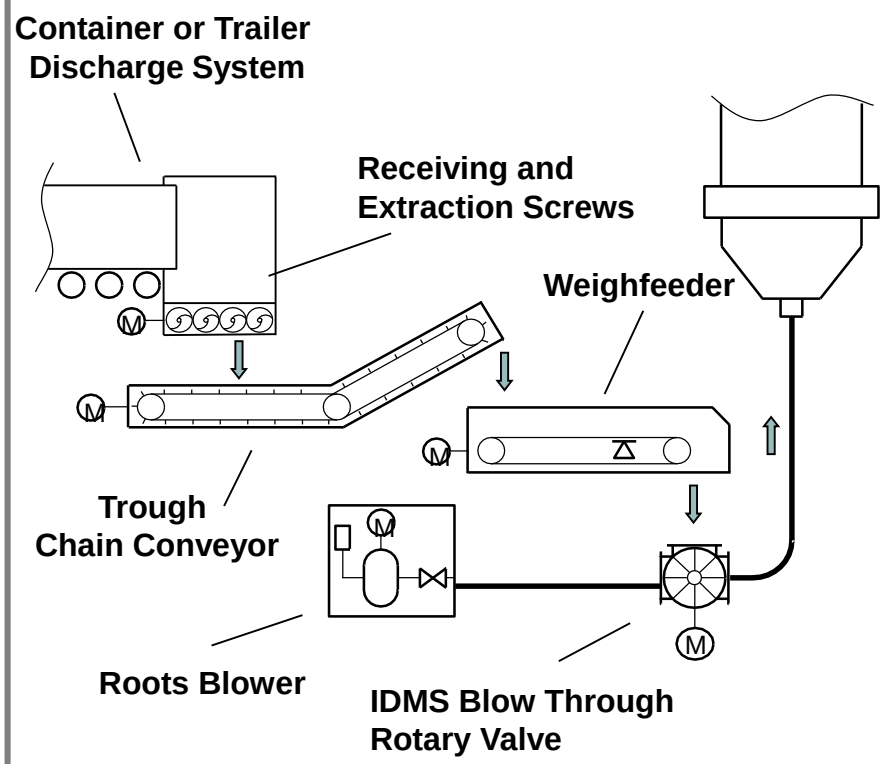
Alternative Fuel Feeding Systems

Application Overview, Schenck Process Solutions

Alternative Fuel Feeding: Typical Application Overview



Application	**Alternative Fuel Feeding System**
Duties	**Feeding of alternative fuels into cement and power plants**
Core SPG System Components	• **IntraBulk® bulk reception unit** • **MoveMaster® chain conveyors** • **MULTIDOS® / MULTIFLEX weighfeeders** • **IDMS blow through rotary valve** • **Controls and product & process knowledge**
Added Value	**In-house project management and packaged solution capabilities**
User Benefit	**Reduction of production costs through the substitution of high priced fossil fuels**
Systems Sold	**> 150 (comprising of various permutations of the abovementioned core SPG components)**

Schenck Process: Alternative Fuel Feeding Systems

Schenck Process - Alternative Fuel Feeding Systems

Reception


IntraBulk® Bulk Reception Unit


Dump & Docking Stations

Conveying


TEDO® Tube & U-Conveyors


Pneumatic Conveying

Storage


Storage Systems


Silo & Hopper Discharge


Bulk Material Valves

Weighing & Feeding


MULTIDOS® Weighfeeder (Belt)


MULTIFLEX Weighfeeder (Screw)


IDMS Blow Through Rotary Valve

Conveying


MoveMaster® Chain Conveyors

Material Separation


Screens & Separators

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Reception






IntraBulk® Bulk Reception Unit

- Above ground intake of alternative fuels
- No need for ground excavations and expensive civil engineering
- Fed from road vehicle or loader
- Fast vehicle turn around time
- Controlled discharge into process
- Modular heavy duty construction
- Quick installation and commissioning
- Depending on product characteristics discharge capacities can be in excess of 500 t/hr

Schenck Process: Alternative Fuel Feeding Systems

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Reception

Dump & Docking Stations

In addition to our IntraBulk® Bulk Reception Unit, we offer different solutions through strategic partnerships with knowledgeable suppliers for the reception of alternative fuels to suit various logistical requirements e.g.

- Dumping stations with roller discharge
- Dumping stations with moving floor box
- Trailers with moving floor discharge
- Tilting stations with screw bottom
- Screw bottom reception units

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Conveying

MoveMaster® Chain Conveyors

- Extensive and diverse product range
- Capacities from 1 - 2,000 t/hr
- High in-service availability through robust design

Pneumatic Conveying

- Pneumatic conveying to kiln, feeder or silo
- Feed rate: 2 - 20 t/hr
- Distances ≤ 200m, vertical height ≤ 70m
- Nominal diameter ND: 100 - 250mm

TEDO® Tube & U-Conveyors

- Easy to integrate in existing plants
- Able to handle long distances & problematic topographic areas
- Maximum Distance: 5,000m *(standard variants)*(i)
- Maximum Feedrate: 900m³/hr
- Minimum Bend Radius: 300 - 600 x d
- Tube Diameter: 180 - 550mm

Note:

(i) Designs for conveying distances > 5,000 m are available upon request – application dependent

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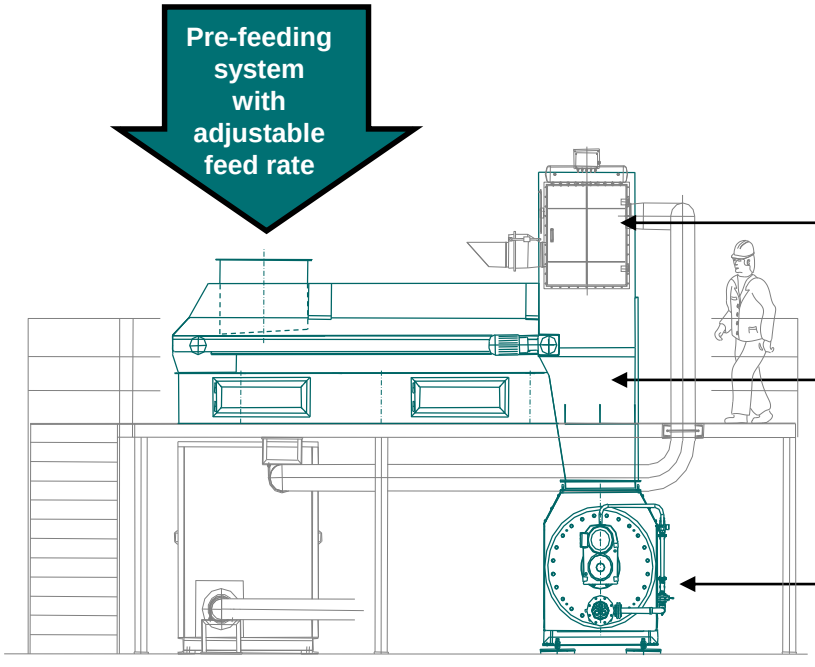
Weighing & Feeding



DISOCONT® Weighing Electronics

Filter unit

MULTIDOS® Weighfeeder

IDMS Blow Through Rotary Valve

- High accuracy for optimised fuel consumption
- Special feeder software for high feed constancy to ensure efficient kiln operation with minimised emissions

Schenck Process: Alternative Fuel Feeding Systems

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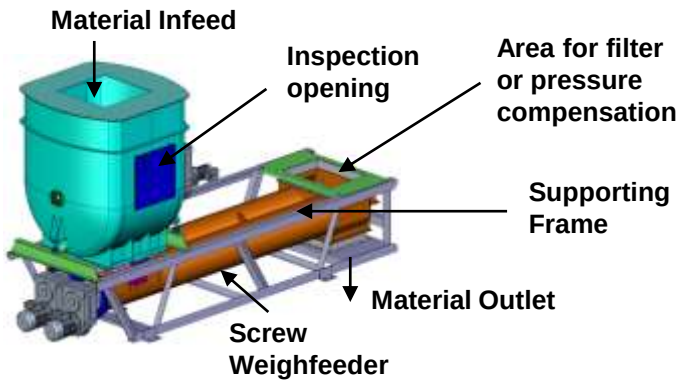
Weighing & Feeding

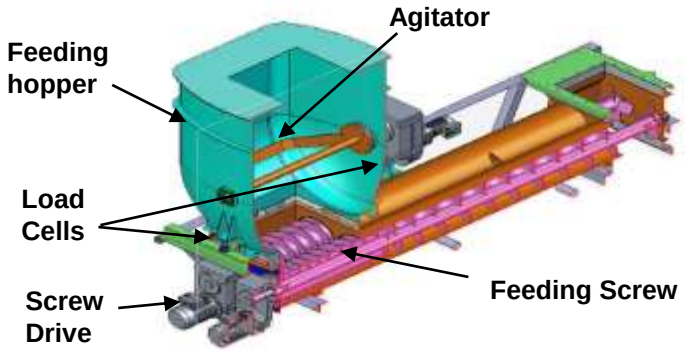
MULTIFLEX Screw Weighfeeder

- Flexible screw weighfeeder in dust-tight, enclosed design
- Suitable for all kinds of alternative fuels (explosive and non-explosive)
- Designed for materials with bulk density between 0.05 - 0.7 t/m^3 and particle size up to 100mm
- Designed for hoppers of up to 10m^3
- Feed rate of 1 to 20 t/hr
- High feed constancy, reliability & flexibility
- Easy maintenance

MULTIFLEX Screw Weighfeeder



Inside the MULTIFLEX



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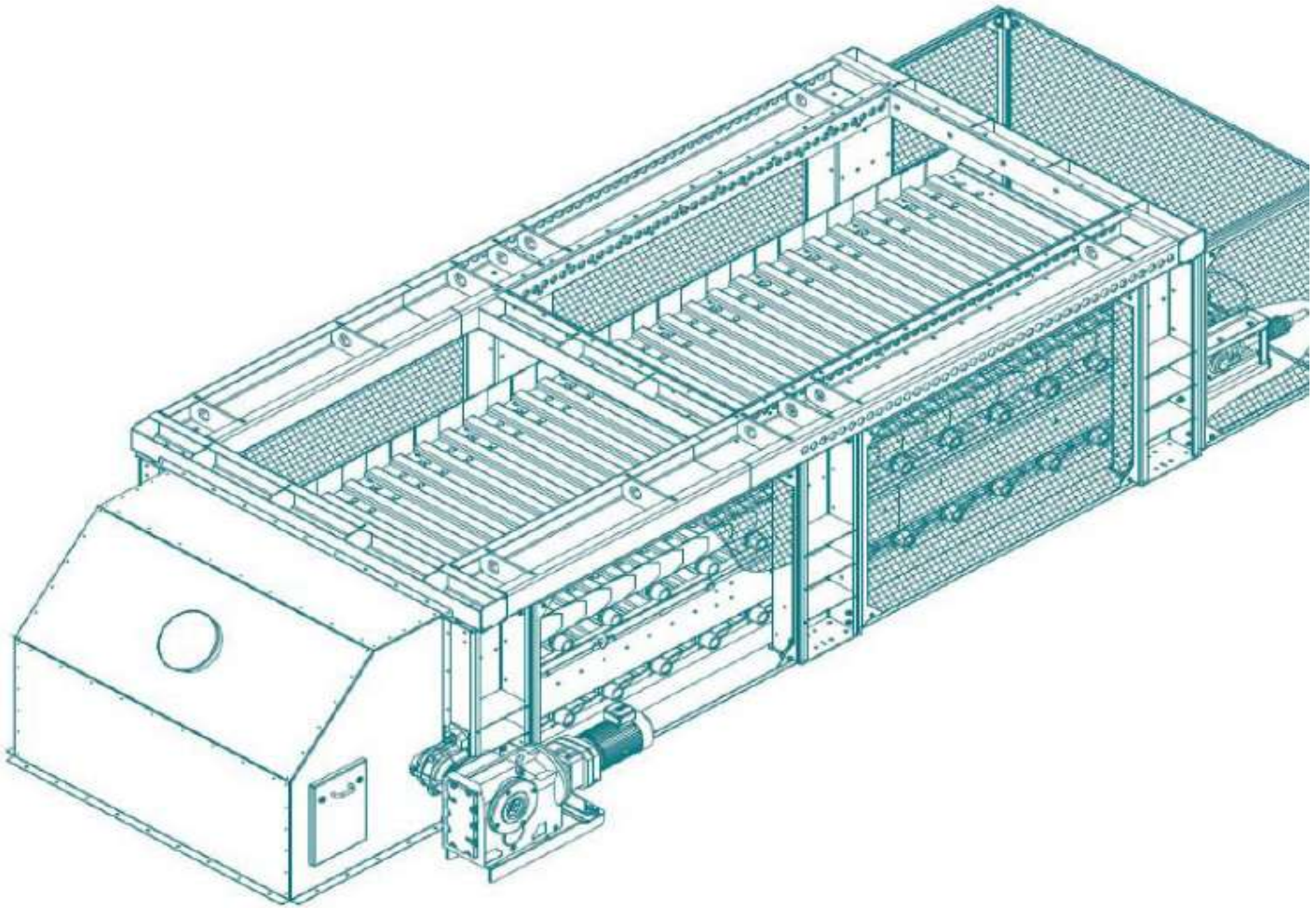
Schenck Process:
Alternative Fuel Feeding Systems

APRON WEIGH FEEDER



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Drive end : Discharge end

Schenck Process: Alternative Fuel Feeding Systems

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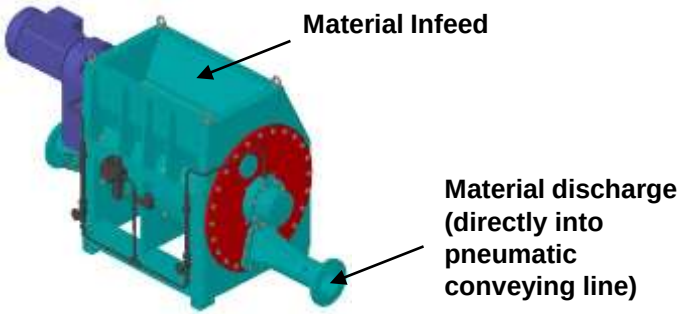
Weighing & Feeding

IDMS Blow Through Rotary Valve

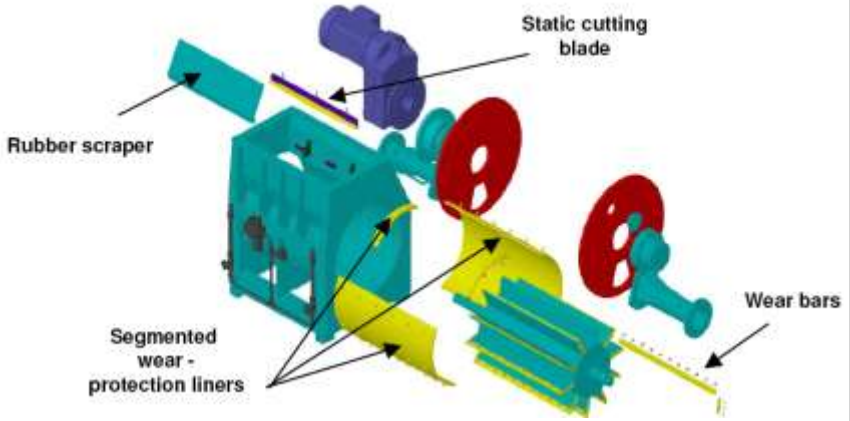
- In-line feeding to pressurised pneumatic conveying systems
- All wear parts exchangeable from the plant site
- Robust cutting blade for reliable handling of oversize material
- Blow through design for feeding cohesive fuels
- High degree of filling through large inlet section
- Feed rate up to 15 t/hr

<<Click here to play movie>>

IDMS Blow Through Rotary Valve



Inside the IDMS



Schenck Process: Alternative Fuel Feeding Systems

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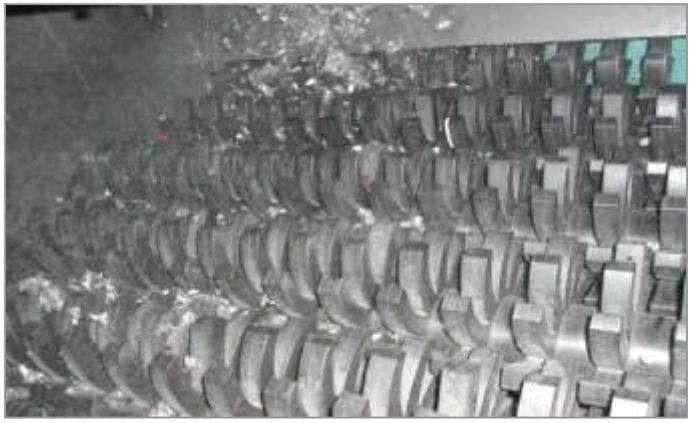
Material Separation



Star & Flower Screens

- Removing oversized material
- Protection of downstream equipment from disruptive materials (offerings via strategic partner)

Magnetic & NF-Metal Separators

- Removing ferrous and non-ferrous material
- Protection of downstream equipment from disruptive materials (offerings via strategic partner)

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Customer Examples

Examples of Realised Customer Projects, Case Study Duna Drava Cement





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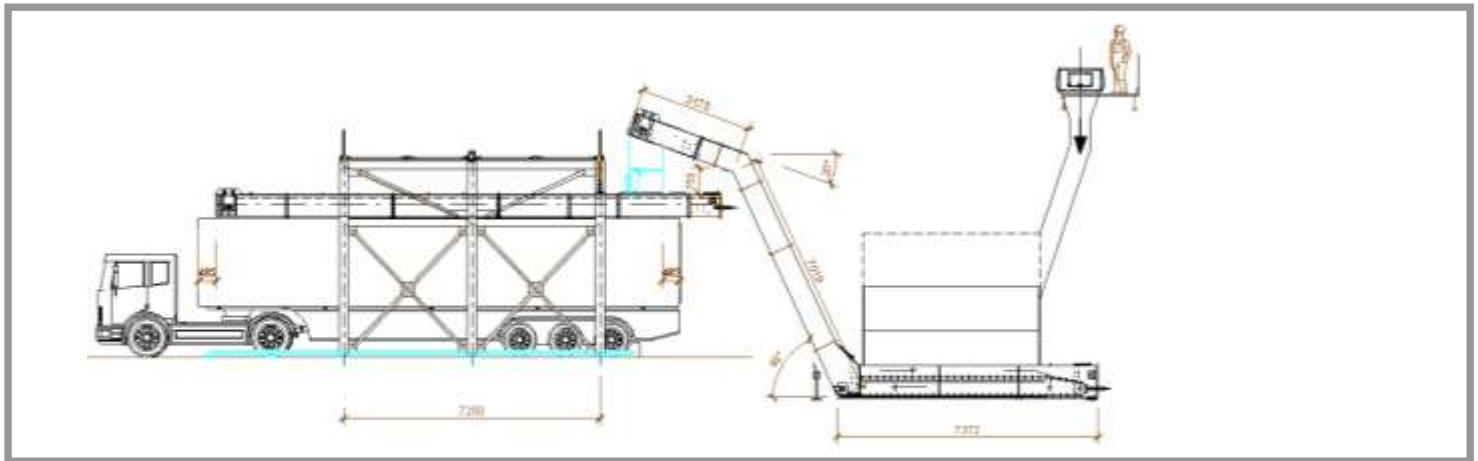
Alternative Fuel Feeding Systems: Customer Example – Trailer Loading System

Loading of alternative fuels into trailer to be transported to cement plant



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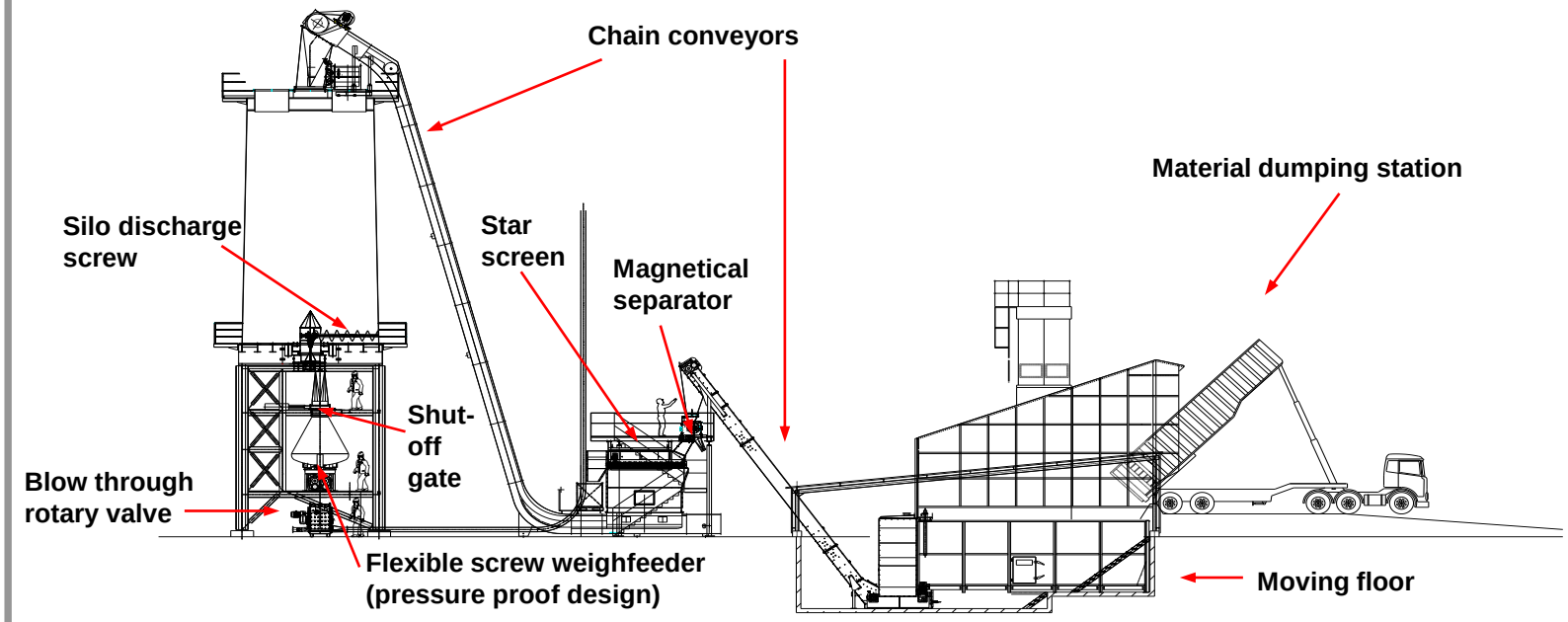
Alternative Fuel Feeding Systems: Customer Example – Feeding of Fluff & Sewage Sludge

Sewage sludge infeed (pressure proof design)

Fluff infeed



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Alternative Fuel Feeding Systems: Customer Example – Animal Meal Feeding

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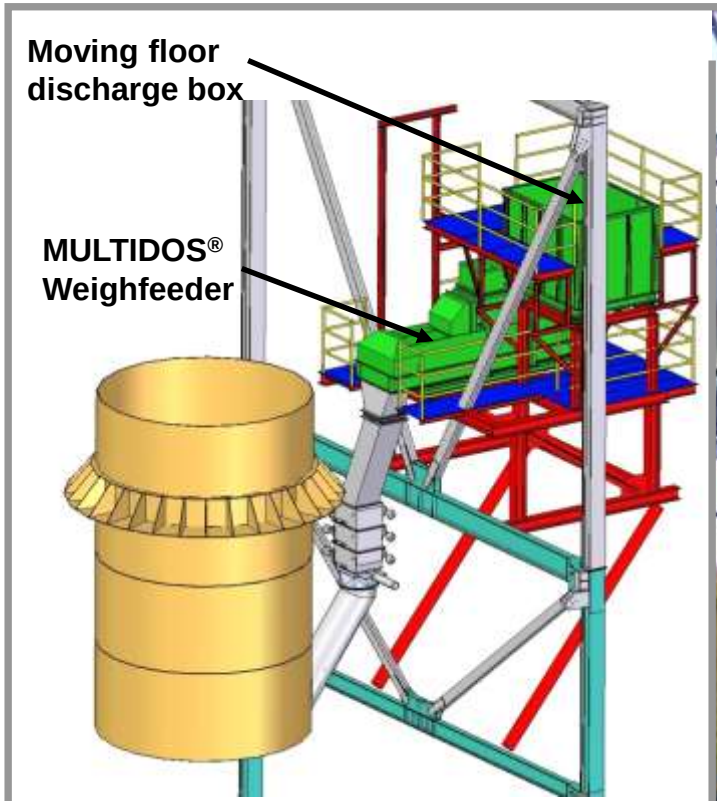
Alternative Fuel Feeding Systems: Customer Example – Tire Chips Feeding



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Alternative Fuel Feeding Systems: Case Study – Duna Drava Cement, Hungary

Application	**Alternative Fuel Feeding System**
Duties	**Feeding of alternative fuels into cement plant burner**
Alternative Fuels	**Shredded plastics, fluff, animal meal, saw meal**
Feed Rate	**Up to 6 t/hr**
Core SPG System Components	• **Bulk reception hopper with discharge equipment** • **Chain conveyor** • **MULTIDOS® weighfeeder** • **IDMS blow through rotary valve** • **Controls and product & process knowledge**
Year of Installation	**2005**

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Alternative Fuels Test Centre – Czech Republic

Overview & Technical Description





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Schenck Process Czech Republic: Alternative Fuels Test Centre

- Development, design and testing of new types of conveying, classification and feeding devices that handle alternative fuels, mainly for the cement and power industries
- Testing of physical properties of alternative fuels and their behaviour in alternative fuel feeding systems
- Also available, on-site testing at customers‘ facilities with Schenck Process‘ rentable, mobile test-rig

Schenck Process‘ Alternative Fuels Test Centre, Kladno (near Prague), Czech Republic

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Alternative Fuels Test Centre:
An Inside View

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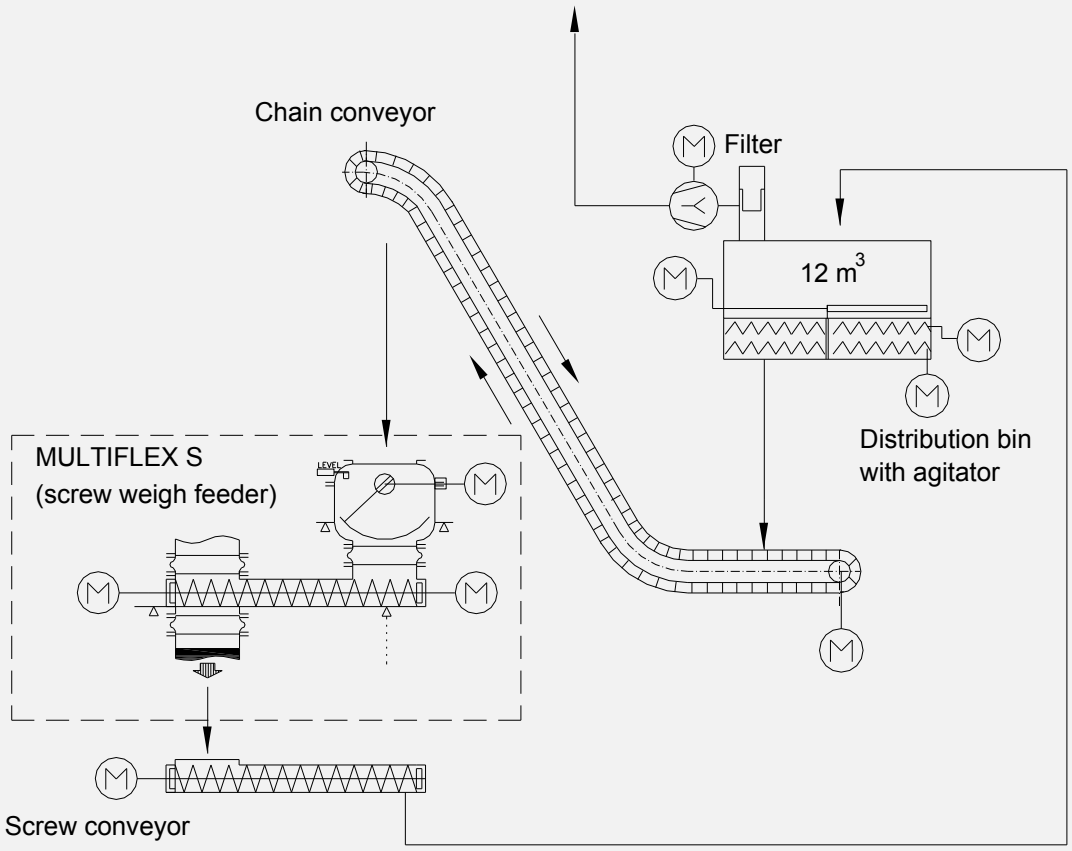
Alternative Fuels Test Centre: Test Field Area

Technical Description

SYSTEM 1: For closed-circuit feeding and mechanical or pneumatic conveying - up to 20 t/h (200 m^3/hr)	SYSTEM 2: For closed-circuit feeding and pneumatic conveying - up to 10 t/h (100 m^3/hr)
• Material bulk density 50 - 600 kg/m^3 • Material grain size up to 50 mm (optional 120 mm) • Material volume within the closed circuit: 3 - 10 m^3 • Testing of weighing, feeding and transporting systems • Testing of rotary valves, feeding shoes etc. • Measuring and testing parameters of pneumatic conveying systems • Air volume available for pneumatic conveying 400 - 2,200 m^3/h (optional 4,500 m^3/h), max. 1 bar back pressure	• Material bulk density 50 - 400 kg/m^3 • Material grain size up to 30 mm • Material volume within the closed circuit: 1 - 7 m^3 • Testing of weighing and feeding systems • Testing of rotary valves, feeding shoes, etc. • Measuring and testing parameters of pneumatic conveying systems • Air volume available for pneumatic conveying 400 - 2,300 m^3/h (optional 4,500 m^3/h), max. 1 bar back pressure

Technical Description:
System 1 - Mechanical conveying up to 20 t/h (200 m³/hr)

System 1



- Distribution bin: 12 m³ with two discharging screws and agitator
- MoveMaster® Chain conveyor with a capacity of 200 m³/h
- MULTIFLEX Screw weighfeeder for feeding 1 - 20 t/hr, (10 - 200 m³/hr)
- Screw conveyor capacity 200 m³/hr

Optional Configuration:

- MULTIDOS® Belt weighfeeder for feeding 1 - 20 t/hr, (10 - 200 m³/hr)

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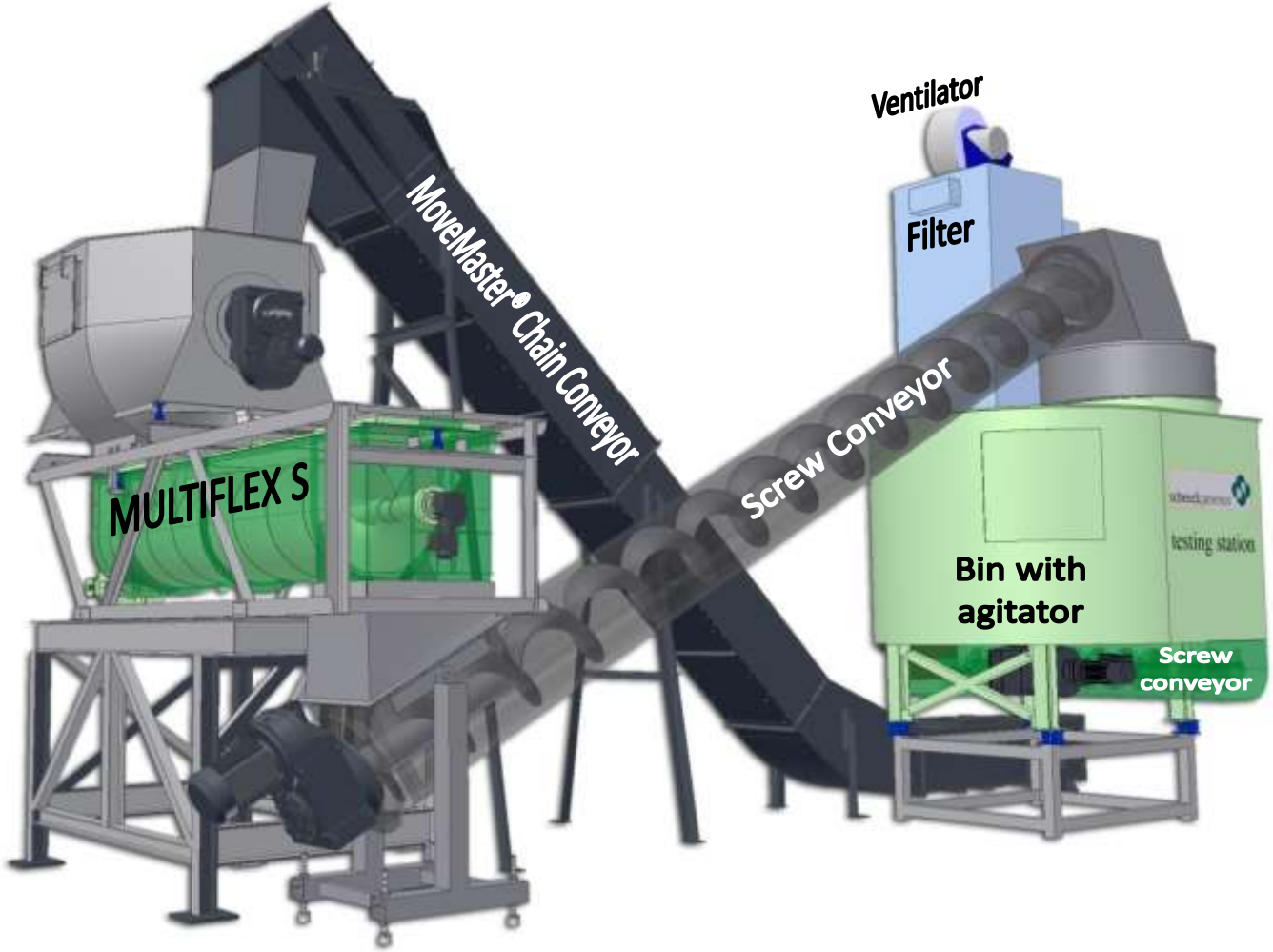
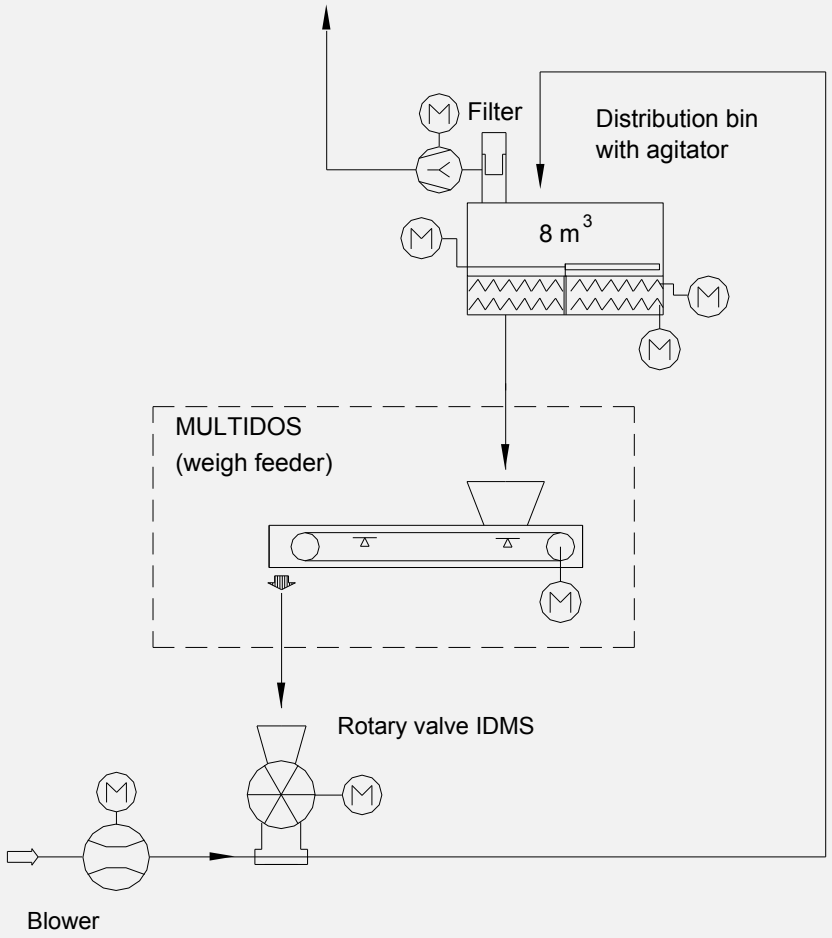
Technical Description:
System 1 - Mechanical conveying up to 20 t/hr (200 m³/hr)



Technical Description:
System 2 - Pneumatic conveying up to 10 t/hr (100 m³/hr)

System 2



- Distribution bin 8 m³ with two discharging screws and agitator
- MULTIDOS® Belt weighfeeder for feeding 1 – 10 t/hr, (10 – 100 m³/hr)
- Rotary valve IDMS 50/100
- Blower Aerzen GM 35S (2,300 m³/hr, 1 bar)

Optional Configuration:

- 2 x Blower Aerzen GM 35S (4,500 m³/hr, 1 bar)

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Technical Description:
System 2 - Pneumatic conveying up to 10 t/hr (100 m³/hr)

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Schenck Process Group:
Solutions in weighing, feeding, screening and automation