FEEDEX

HIGH DENSITY EXOTHERMIC FEEDER SLEEVES

+ Maximum yield
+ Smallest footprint
+ Minimum fettling costs
+ Suitable for high pressure moulding
+ Extensive product range
+ Customized solutions
Customer Requirements
Exothermic spot feeding technology

Industry trends
The need for high modulus spot feeders continues to increase as a result of:
+ The development of more complex cast parts, with more isolated sections having no direct feed path.
+ Increased mechanical requirements and more stringent as cast specifications.
+ Growing pressure to reduce casting production costs, by maximizing casting yield and minimising post casting operations such as fettling.

High pressure greensand moulding
The primary use of FEDEX sleeves is on modern high-pressure automatic greensand moulding lines which place extra demands on ram-up feeder sleeves.

These products must be able to withstand the highest moulding pressures, yet be simple and convenient to apply. FEDEX sleeves provide the highest compressive strength resistance and can be applied easily using a wide range of application technologies.

Product Requirements
Exothermic Characteristics
In order to deliver the high modulus required for spot feeding, the exothermic properties of the FEDEX material are key. Properties such as ignition time and burn rate have been optimised and adjusted for iron castings. A specific requirement of spot feeders is a high modulus to volume ratio. Feeders are required to provide long solidification times, but to contain at the same time only small amounts of feed metal. The development of the FEDEX recipe had to balance the exothermic characteristics to ensure the correct graphite micro-structure formation in ductile and vermicular iron alloys. The consistent performance of FEDEX is assured by comprehensive tests of incoming raw materials and finished product.

Ease of Application
The most critical requirement for FEDEX sleeves is the quick and easy application onto the pattern plate. A range of application technologies has been developed which allow the foundry to introduce FEDEX sleeves without negatively impacting moulding line productivity.
**FEEDEX Product Range**

**FEEDEX G, -V, -VS, -GK and VSK sleeves**

**Product Range Development**
The comprehensive range of FEEDEX products reflects the technical and commercial requirements of the foundry industry.

**G and V – Type FEEDEX sleeves**
In the early 1980s G and V-type sleeves were developed to allow a spot feeding on moulding lines where standard slurry formed sleeves failed due to insufficient strength and lack of application space.

**VS – Type FEEDEX sleeves**
The requirements of moulding lines with highest moulding pressures introduced in the 1990s led to a further development. VS type FEEDEX sleeves were introduced to in response to higher moulding pressures, and a need for smaller casting contact areas.

**GK and VSK – Type FEEDEX sleeves**
The latest generation of GK and VSK type sleeves provides the most simple application in conjunction with maximum benefits in terms of footprint area and cleaning cost reduction.

Working closely with our customers drives our product development and optimisation programs, ensuring product performance is tailored precisely to casting needs.
FEEDEX V and G sleeves

Application
The initial use of G and V FEEDEX sleeves was on low pressure jolt squeeze green sand moulding lines. Depending on the application these geometries can also be used in high pressure moulding lines and in the production of jobbing iron castings. The jobbing foundries discovered the benefits of improved casting yield and minimised cleaning work which were already understood by the automotive iron foundries.

FEEDEX V sleeves can be applied either with a fixed pin or on a spring pin without a breaker core.

PRODUCT RANGE
FEEDEX HD V8 (smallest)
+ Modulus – 0.75 cm
+ Cavity volume – 8 cm³
+ Base footprint – Ø 3 cm / 7 cm²

FEEDEX HD V2565 (largest)
+ Modulus – 5.2 cm
+ Cavity volume – 2565 cm³
+ Base footprint – Ø 15 cm / 176 cm²

Supplied with and without breaker cores
FEEDLEX VS sleeves

Application
FEEDLEX VS sleeves are used on low to high pressure green sand moulding lines. The field of application are castings which require the smallest feeder footprint and contact area.

Like FEEDLEX V sleeves they provide an optimized yield. In addition VS geometries provide a higher resistance to moulding pressures.

The optimised design facilitates ease of use as the sleeve is always self-centred when applied to the spring pin.

PRODUCT RANGE
FEEDLEX HD VS 10 (smallest)
+ Modulus – 0.85 cm³
+ Cavity volume – 15 cm³
+ Base footprint – Ø 3.8 cm / 11.3 cm²

FEEDLEX HD VS 770 (largest)
+ Modulus – 4.2 cm³
+ Cavity volume – 756 cm³
+ Base footprint – Ø 11 cm / 95 cm²

Supplied with highly exothermic locator cores and standard sand breaker cores.
FEEDEX K - VSK and GK sleeves

Application
FEEDEX VSK and GK sleeves are applied on high pressure green sand moulding lines, specifically those where FEEDEX VS sleeves reach their limits.

The cavity design is adopted from VS geometry, however in contrast to the VS design FEEDEX VSK sleeves do not require a spring pin, eliminating the need for maintenance of the locator pins.

The GK range with collapsible metal breaker cores was developed for use on castings with a higher metal volume demand.

PRODUCT RANGE
FEEDEX HD VSK 36/35 (smallest)
+ Modulus – 1.30 cm
+ Cavity volume – 30 cm³
+ Base foot print – 2.27 cm²

FEEDEX HD VSK 770/33 (largest)
+ Modulus – 4.1cm
+ Cavity volume – 720 cm³
+ Base foot print – 7.1 cm²

Supplied with collapsible metal breaker cores.
FEEDEX K - VSK and GK sleeves

Application example I
FEEDEX GK 6/12KW/33MH sleeves applied on a thin walled Ductile Iron engine housing casting where a higher feed volume to modulus ratio is required.

Application example II
FEEDEX VSK 159/33MH sleeves applied on a Ductile Iron housing casting where smallest contact areas between feeder and casting part are required.

Efficiency
The FEEDEX K design offers the foundryman the highest levels of performance in terms of resistance to moulding pressure and footprint on the casting.

A key consideration during the development of FEEDEX K was to ensure that the new breaker core concept did not influence the graphite micro-structure of the cast iron.

Extensive testing during development confirmed no deterioration of the nodular graphite, even adjacent to the metal core (see right).

Design
The design of the collapsible metal breaker core combines several benefits. The small flange in the contact area of the sleeve to the casting prevents damage to the pattern plates and also assures a pre-determined knock-off area, minimising fettling times and costs.
**FEEDEXX Product Range**

**Features / Benefits**

**Increased Strength**
The FEEDEXX product range provides 5 times higher compression strength in comparison to slurry formed products. This enables effective use in ram-up applications on moulding lines with highest moulding pressures.

<table>
<thead>
<tr>
<th></th>
<th>Modulus [cm]</th>
<th>Grassy Volume [cm³]</th>
<th>Compressive Strength [%]</th>
<th>Sleeve Weight [%]</th>
<th>Density [g/cm³]</th>
</tr>
</thead>
<tbody>
<tr>
<td>KALMIN KSP 7/10K</td>
<td>1.8</td>
<td>300</td>
<td>100</td>
<td>100</td>
<td>100</td>
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<tr>
<td>KALMINEX 2000 6/9K</td>
<td>1.7</td>
<td>180</td>
<td>132</td>
<td>136</td>
<td>132</td>
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<tr>
<td>KALMINEX XP 2000 6/9K</td>
<td>1.7</td>
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<td>306</td>
<td>136</td>
<td>132</td>
</tr>
<tr>
<td>KALMINEX SD 6/9K</td>
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<td>306</td>
<td>227</td>
<td>170</td>
</tr>
<tr>
<td>FEEDEXX HD V88</td>
<td>1.7</td>
<td>80</td>
<td>919</td>
<td>527</td>
<td>302</td>
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</table>

**Optimized yield**
By the application of FEEDEXX V – shape geometries the feeder weight is reduced by 90% in comparison to a sand riser with equivalent modulus.

|| Sand riser | Exothermic-insulating sleeve | High exothermic spot feeder |
|-------------|-----------------------------|----------------------------|
| Weight (KG) | 8.2                         | 2.1                        | 0.82                     |
| Weight (%)  | 100.0                       | 25.6                       | 10                       |

**Customisation**
To satisfy customer needs and requirements, the FEEDEXX product range has been continually extended and now includes more than 1,200 different articles. Both sleeve and breaker core designs can be tailored to suit individual applications, offering the foundrymen an optimised solution every time.

**Reduced footprint and contact area**
Through the process of continual development, contact area, footprint on the casting and cleaning times have been reduced.

<table>
<thead>
<tr>
<th>Sleeve design</th>
<th>Sand riser</th>
<th>Exothermic-insulating insert Sleeve P 6/9K</th>
<th>Highly exothermic spot feeder with silica and breaker core</th>
<th>Highly exothermic spot feeder with exothermic locator core</th>
<th>Highly exothermic spot feeder with collapsible metal breaker core</th>
</tr>
</thead>
<tbody>
<tr>
<td>Footprint area [%]</td>
<td>100.0</td>
<td>85.8</td>
<td>38.1</td>
<td>5.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Contact area [%]</td>
<td>100.0</td>
<td>7.6</td>
<td>3.6</td>
<td>5.0</td>
<td>2.8</td>
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