POINT-Riser®
PX-ME N

SCHÄFER
THE RISER COMPANY

Innovative feeder systems provide cost savings

The trend continues towards increasingly complex technical castings with challenging feeding requirements. Design engineers and foundries seeking to gain performance and cost advantages demand improvements to the traditional feeding systems that are available. The feeders of the PX-ME N product line from GTP Schäfer were specially designed to meet the current requirements of foundries to support the demand for complex castings at lower cost.

Internationally, foundries are facing evolving requirements in terms of process optimization, productivity increase, reduction of cycle material of the feeding and gating system, and the cost of machining and cleaning along with the increasing technical complexity of part geometries. To support foundry engineers in meeting these challenges, suppliers are asked to prioritize the development of innovative and process-optimized product solutions for their customers.

To respond to their customers' need for a standard product that offers a technical solution with both cost and efficiency benefits, GTP Schäfer developed their "POINT" riser portfolio. The portfolio has been developed to meet the demand for increasingly smaller feeder-to-casting contact areas on complex pattern contours and handle the high compaction pressures of the molding machines.

Image 1: burning POINT-Riser®

Individual options for every application

Image 2: Selected types from the POINT-Riser® portfolio

POINT-Risers® have a self-centering shape with a large internal diameter reduced by a smaller aperture in the accessory glued to the feeder, in order to generate a smaller feeder neck profile.

In addition to the traditional alternatives (exothermic reduction plates), the self-centering POINT-Risers® are also available with a metallic breaker core, or "ME metal sheet." It comprises a convex metal sheet firmly joined to the feeder body. Its major advantage is the high mechanical stress resistance of the metallic breaker core, especially on state-of-the-art high-pressure molding machines. The ME metal sheet is available with bore diameters ranging from 15 to 55 mm, depending on the modulus of the feeder as well as the individual application (e.g. material characteristics). In addition to standard round diameters, oval contact diameters (20 mm x 30 mm) are available for narrow and elevated positions, such as flanges, that only have a wall thickness of 20 to 30 mm but require the largest feeder neck possible.

This development is a key characteristic of the comprehensive feeding system solutions represented by POINT-Risers®. The feeder system is tailored to the needs of customers and processes with a variety of sizes and configurations.

The feeder can also be customized with regard to the choice of the feeder material. If, for example, the customer wishes to avoid fluorine contamination of the sand system from the feeders to meet the disposability criteria of returned sand, it is possible to choose fluorine-reduced or fluorine-free feeder material instead. For larger feeder modules, it is best to increase the insulating properties of the feeders. Cold-box-bound feeder materials are also available. Feeder size, contact geometry, and material type can be selected to support all customer and technical requirements.

Best choices for foundry engineers

The feeders of the PX-ME N series offer foundry engineers a wide range of possibilities with regard to the molding application technology to be applied, making it possible to tailor the application technique to the individual casting conditions.

For the self-centering inner contour of the POINT-Risers® both spring-loaded and fixed-location pins can be used to hold the feeder above the pattern contour prior to compaction. Image 1 shows the schematic example of a PX-ME N feeder before and after compaction, using either spring-loaded or fixed pins.

Application technology

During the compaction of the molding sand, the high mechanical pressure exerted by the molding machine squeezes the ME metal sheet with the feeder previously held upright towards the pattern plate, thereby forming a predefined breaker edge right on top of the casting surface.

The ME metal sheet is held on the pin above the pattern (image 2), and the metal sheet will be pushed down to the pattern plate during the mold compaction process. Variations in the pin height make it possible to streamline the process parameter “height of feeder neck” with regard to process safety and stability.

After compaction, the POINT-Riser® fits against the pattern contour with the edge of its metal sheet (image 3). Thus the locating surface of the feeder is only marginally larger than the selected riser neck diameter of the ME metal sheet.

Optimum sand compaction underneath the feeders is another advantage achieved by the fact that the PX-ME N feeder is held upright by the pin prior to compaction. The compaction level of the sand under the riser can also be controlled by the height of the pin and customized to suit the individual position.

The lower end of the pin can have an additional bevel edge, depending on the material, machining allowance, and location. It avoids damage to the casting surface caused by feeder rests breaking into the casting during knock-off.

Application technology

Application technology with fixed pin

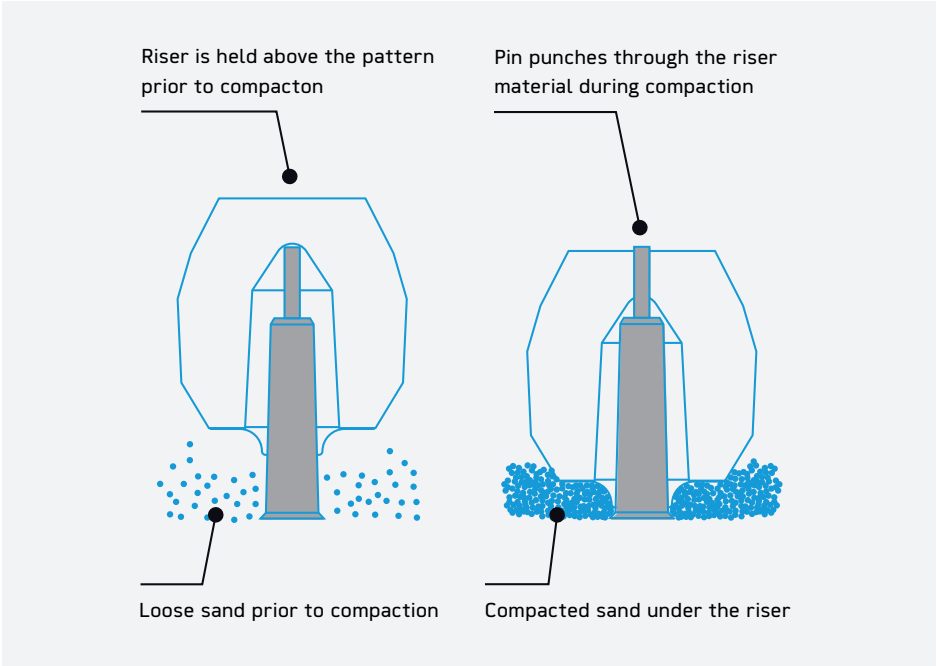

Image 3: Application technology with fixed pin

Application technology with spring-loaded pin

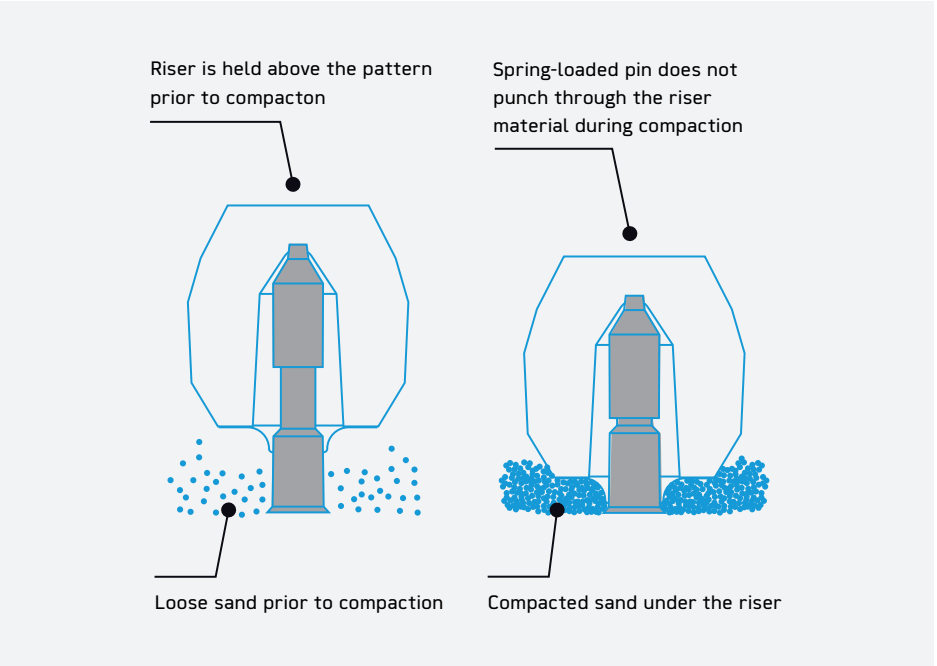

Image 4: Application technology with spring-loaded pin

Process-secure feeding

In addition, these sleeves significantly reduce the length of the feeder neck, which in turn lessens the risk of early "freezing" of the feeder neck.

The innovative POINT-Riser® technology with ME metal sheets makes it possible to apply feeders to small, irregular, or even bent surfaces without risk of damage to the breaker core. This feeder system significantly enlarges the field of application of feeders, especially on extremely small or protruding locating surfaces such as cams, knuckles, or flanges.

In narrow areas or positions, the foundry engineer usually has the option between oval breaker cores or a POINT-Riser® with an exothermic reduction plate. The application of oval breaker cores is restricted by the available support area on the pattern, or these support areas need to be enlarged, which creates additional cleaning work. While using POINT-Risers® with exothermic reduction plates, it is possible that parts of the riser necks remain after the knock-off process. Especially for these narrow contours, the "MEov N" metal sheet has been developed. Using the oval metal sheets can reduce the riser neck diameter by 10–15 mm compared to exothermic reduction plates or flat metal disks.

In the case of narrow surfaces, the foundryman previously had the option of using either an oval breaker core or a POINT-Riser® with an exothermic reduction plate. The application of oval breaker cores is limited by their contact surface on the pattern, or the contact area on the pattern must be enlarged.

The consequence of this is increased cleaning work at the post-processing stage. With POINT-Risers® with an exothermic reduction plate, parts of the riser necks can remain on the casting when the riser residues are "knocked off," resulting in comparatively high finishing costs. The "MEov N" metal disk with an oval riser neck cross-section was developed especially for narrow flanges and web-like contours, so that the above-mentioned enlargements of the contact area can be avoided. In comparison to exothermic reduction plates or flat metal breaker cores with oval holes, experience has shown that the oval neck is the best solution for this purpose and shortens the neck by about 10 to 15 mm.

Image 5: POINT-Riser® positioned on pattern plate

Reducing processing time by efficient removal

An accurate, predetermined breaking edge formed by the ME metal sheet (image 4) immediately above the casting surface facilitates the efficient and safe removal of the feeder rest in the cleaning shop. The minimized locating surface of the ME metal sheet creates a high-quality surface (image 4). The fettler is saved the tedious task of extensive grinding of the casting around the feeder neck. This reduces the throughput times of the castings as well as the fettling time. In addition, the risk of scrap caused during cleaning is reduced due to defined breaking edges and less complicated fettling operations.

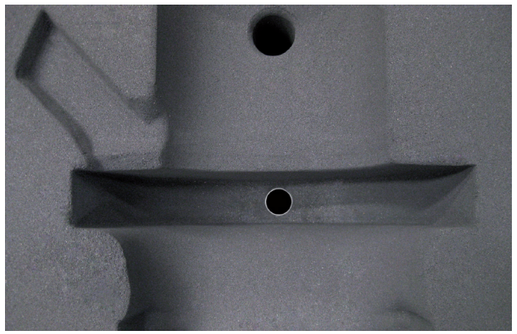

Image 6: POINT-Riser® in mold after compaction

Image 7: Knock-off area

COST ADVANTAGES FOR VOLUME PRODUCTION

Due to the unique capabilities of the POINT-Risers® the PX-ME N series provides foundries with a highly cost-effective alternative. The cost savings realized far exceed the cost of the risers being used. The saving potential of this functional riser technology can be summarized as follows:

1. Yield improvement due to higher efficiency of exothermic POINT-Risers®
2. Flexible allocation on extreme casting positions – directly on the spot
3. Higher efficiency of pattern space utilization – more castings per box
4. Reduction of scrap rate due to higher process stability
5. Reduction of cleaning costs, scrap, and time
6. Reduction of throughput time

Highlights

- Applicable on small spaces
- Higher output – more castings per box
- Scrap reduction
- Shorter processing times
- Fluorine-containing and fluorine-free feeder masses available
- Low emissions due to inorganic binder system

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