



New Harmony >> New Solutions™

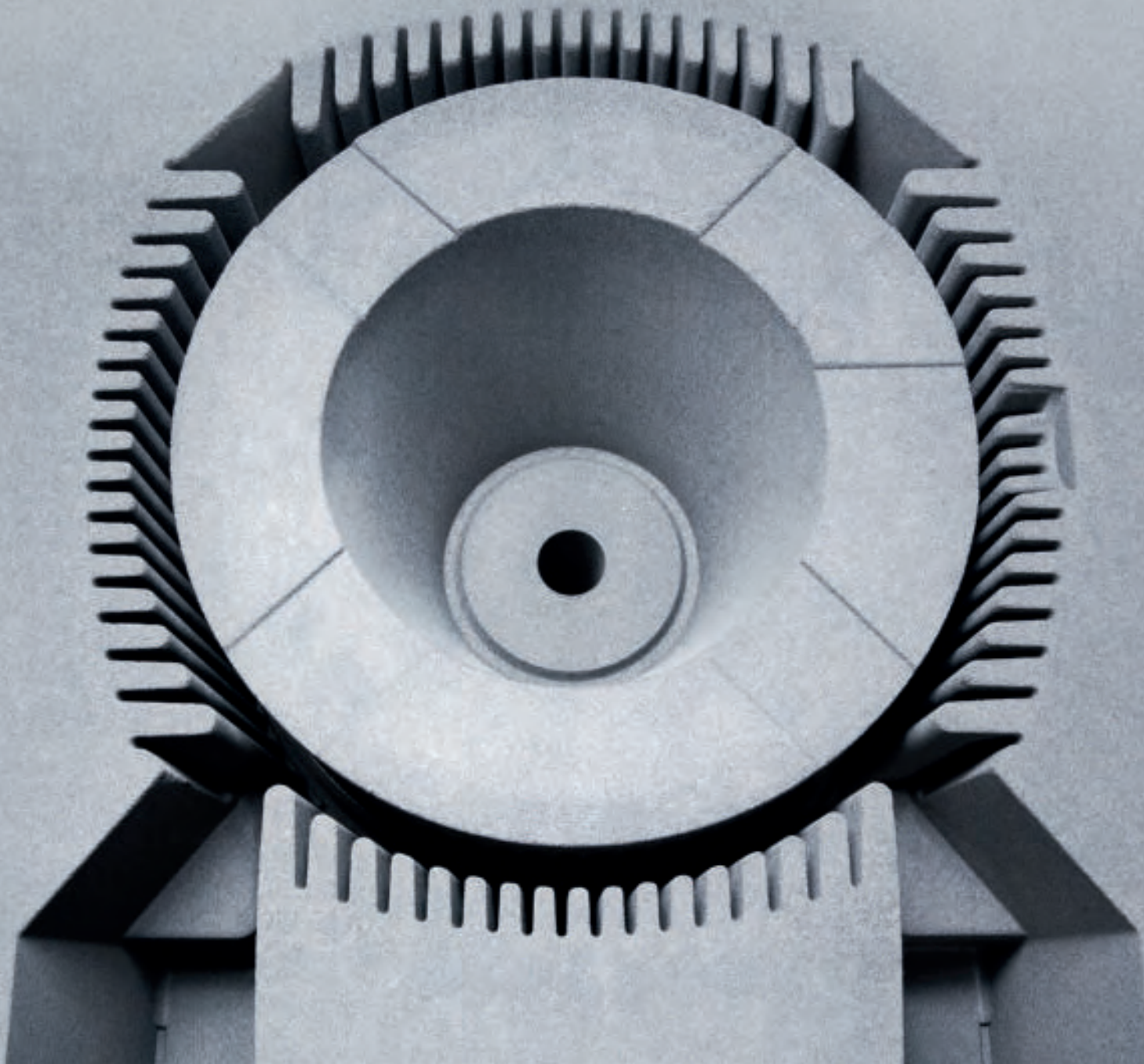
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sinto FOUNDRY INTEGRATION

MOULDING – POURING – RECLAMATION

Heinrich Wagner Sinto Technologies





PERFECTION IN EVERY SINGLE MOULD –

**Moulding plants, pouring machines
and plant technology made by HWS.**

Since we were established, we have been searching for new ways to achieve perfection. What began in 1937 in Bad Laasphe, Wittgensteiner Land has become a true success story by the present day. With more than 80 years of experience, more than 730 customised systems and an expertise network consisting of 340 employees nationally and more than 4,000 Sinto employees worldwide, we know that perfection forms in a sustainable way. Right from the

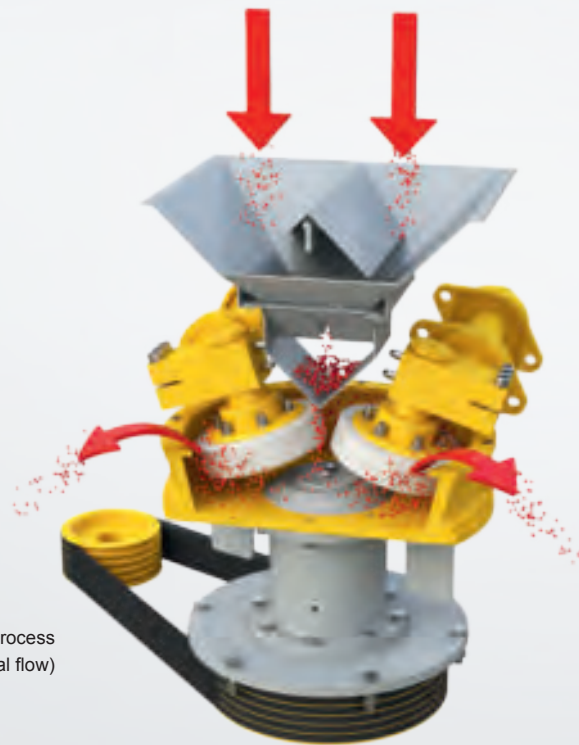
beginning, a pioneering spirit shaped our thoughts and our ambitions for well thought-out system solutions. In this way, as part of the Sinto Group in the 80's, we revolutionised the everyday life in foundries by means of the SEIATSU airflow squeeze moulding process. Even in the new millennium, we contribute to the stable future development of foundry technology as one of the leading companies thanks to sustainable concepts such as HWS sand reclamation.

 **MADE IN GERMANY**

RESOURCES AS FUTURE CAPITAL – HWS sand reclamation.

HWS is taking a stance against resource scarcity and the high costs resulting from it for the disposal of waste sand, landfill disposal and new sand procurement using technical knowledge and forward thinking.

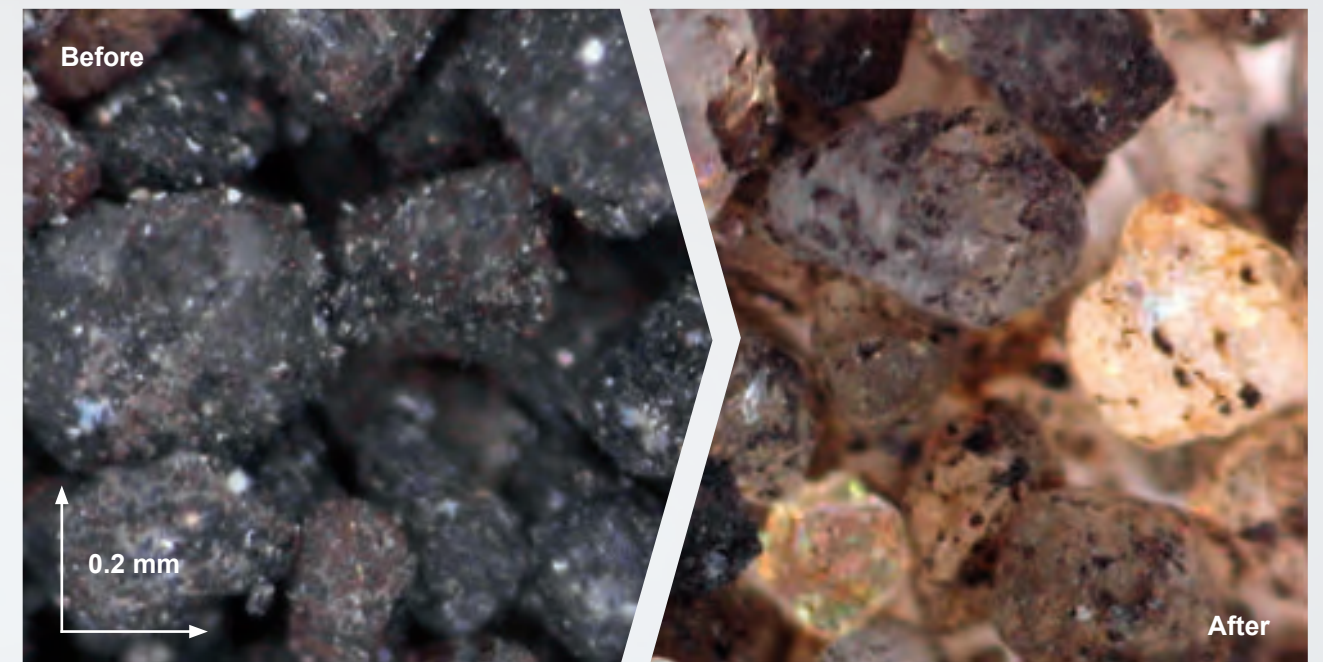
Thanks to the sophisticated HWS sand reclamation technology it is possible to bring back reclaimed green sand and core sand to the core sand process.



Sand reclamation process
(Material flow)

Existing binder residue is effectively removed from grain to grain based on the friction principle. Thanks to the variably adjustable contact pressures of the ceramic pressure rollers that are used, the HWS process for sand reclamation can be individually

adjusted to the respective characteristics of the starting sand. This is a fact that makes HWS sand reclamation one of the most material conserving and at the same time energy efficient processes within mechanical reclamation.



Before sand reclamation

Result of the sand reclamation

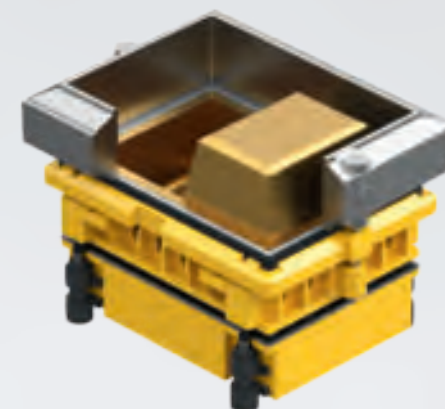
ADVANTAGES

- Energy-efficient, flexible process – unlike comparable thermal reclamation
- Integrated sifting for separating sand and dust and for reducing fines
- Preservation of natural resources by means of sand recycling
- No environmental requirements for the reclamation unit

PRECISION EVEN INTO THE FURTHEST CORNER – HWS SEIATSU.

Modern castings are based on complex geometries that require precise moulding. The HWS SEIATSU airflow squeeze moulding process enables efficient shaping accuracy and optimal strength of the green sand mould using its precise airflow control. Each individual grain of sand is precisely guided in the

direction of the pattern by the airflow through the moulding sand. As a result, the packing density increases layer by layer so that the highest degree of compaction in the deepest pattern regions is achieved. The secondary pressing that is subsequently carried out results in an above-average homogeneous mould.



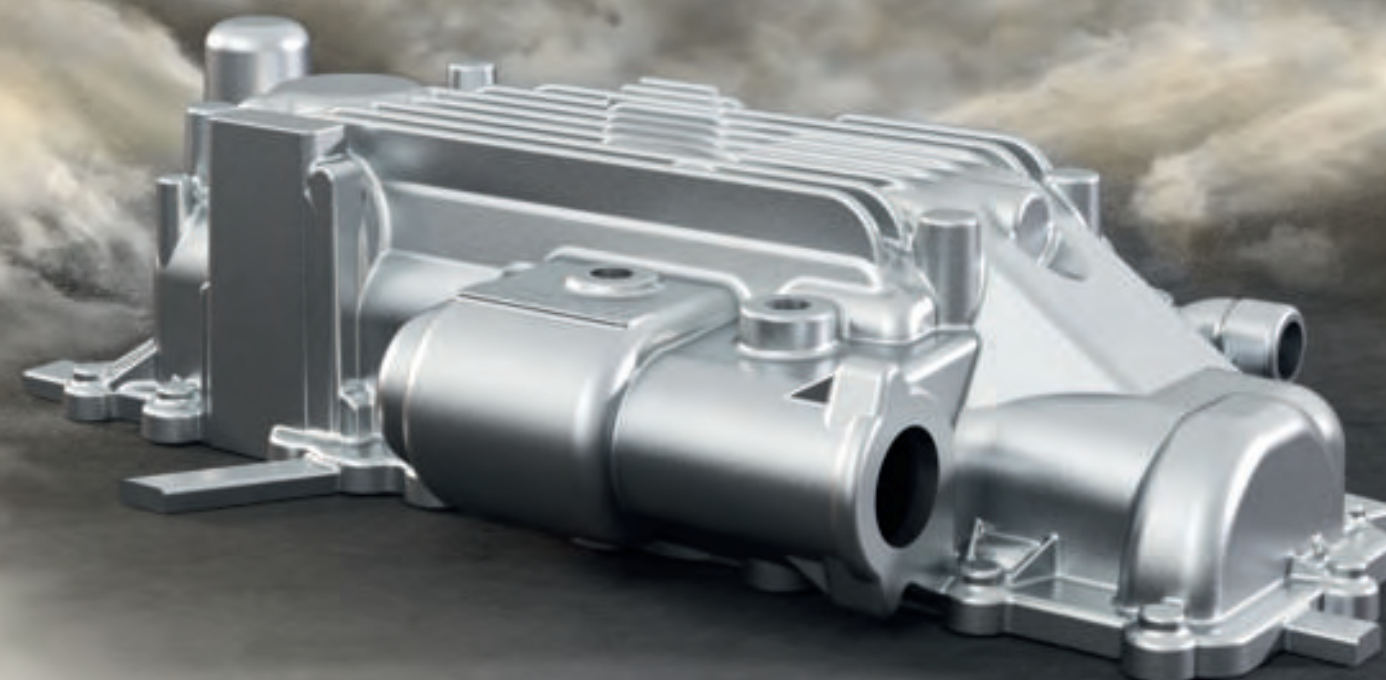
Maximum edge compaction with SEIATSU.plus

SEIATSU.plus provides the ideal extension to the HWS airflow squeeze moulding process for manufacturers of highly-complex castings. Specially developed for the requirements of complex, narrow contours with high sand compaction, SEIATSU.plus achieves an even higher mould strength at the edges using two-sided and also pattern-side compaction.

ADVANTAGES

- Suitable for high-precision castings
- Minimal mould draft angles
- High pattern utilisation
- High shaping accuracy
- Even mould hardness
- Reduction in core needs

SEIATSU airflow
pre-compaction process

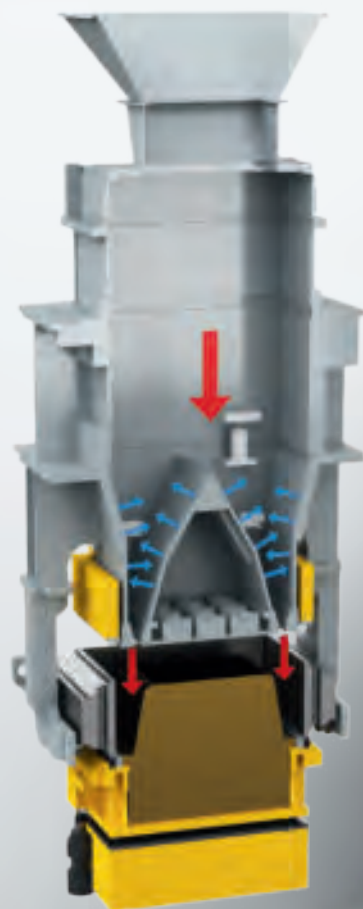


ENERGY AND RESOURCE PRESERVING MOULDING – HWS Aeration.

Mould systems with a fluidised sand filling process have a positive effect on the general energy and material usage balance. HWS Aeration is one of the most ground-breaking technologies in the area of

green sand moulding thanks to economical use of bentonite-bound moulding materials and a compact and structurally optimised movement process.

Aeration sand
filling process



Implemented within the compact machine format, the fluidised sand flows gently onto the pattern plate and creates an extremely high degree of compaction, supported by the pattern-dependent, pneumatically extended contour stamp. In this way, even complex

contours with deep pockets and a small diameter can be realised. A new filling of the hopper with sand and a pattern change (between drag and cope pattern) are implemented at the end of the lifting movement for optimised cycle times.

ADVANTAGES

- Compact and space-saving machine format
- Reduction in casting weights and pattern-related casting defects
- Very low emissions, energy-efficient and resource-saving process

ECONOMICAL, VERSATILE, COMPACT – flaskless moulding.

With a view to easy feasibility and a cost-efficient structure, HWS provides an economical solution for castings with a small number of cores. Thanks to a two-part, horizontal mould parting level, moulding

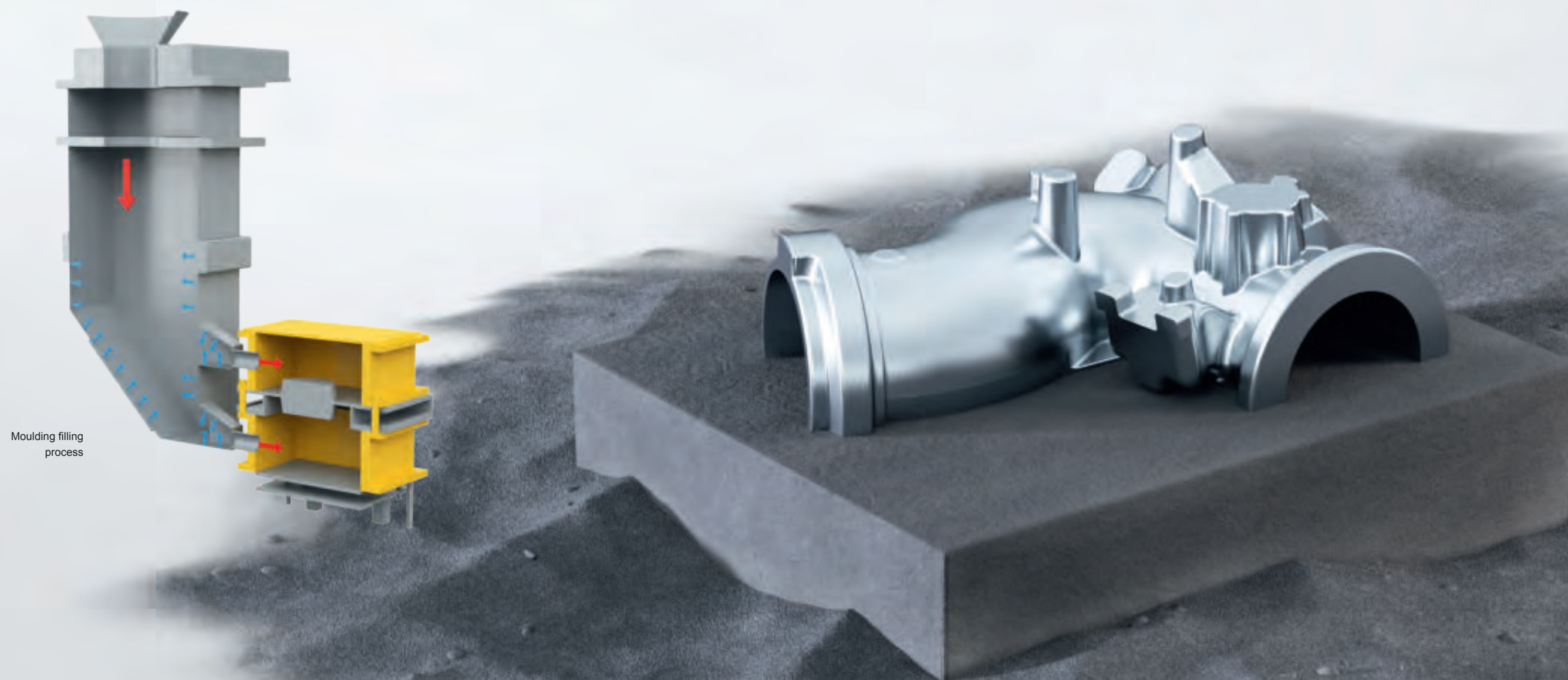
takes place directly within the moulding machine developed for this, without a surrounding supporting element. A fact that makes the flaskless moulding of particular interest for use with a view to efficiency.

Moulding with bentonite-bonded moulding sand only takes place exclusively within the closed mould cavity. Since these consist of an upper and lower mould frame and a match plate with the corresponding pattern contour, the filling and pre-compaction phase is implemented without creating

large quantities of dust or spill sand. Thanks to the possibility of variably adjusting the moulding cod heights, the final compaction process ensures (using two opposing pressure plates) an optimal sand ratio and even compaction.

ADVANTAGES

- Cost-effective process – without moulding box
- Energy saving due to the reduced amount of moved masses
- Compact individual plant layouts requiring minimum foundation works



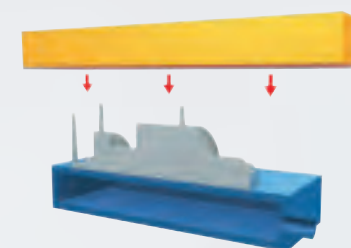
COMPACTION WITHOUT BINDERS – HWS V-Process.

The process developed by Sintokogio in 1972 for the physical binding of moulding sand works with negative pressure for the generation of the vacuum within the moulding box. Therefore, the process allows to use

quartz sand without additional binder. Ultimately, the goal of the vacuum moulding process within the HWS V-Process is homogeneous compaction across the entire mould volume.

The HWS vacuum moulding process provides the optimum conditions for individual and series production due to its high degree of flexibility. Suitable for all pourable metals and casting sizes from approx. 0.1 kg to approx. 12,000 kg, the process provides a multitude

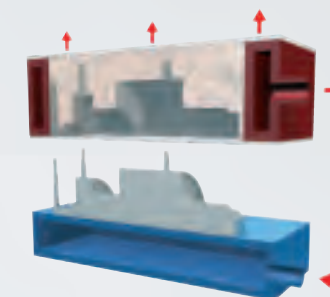
of application options – with moulding box sizes from 300 mm up to 4,000 mm. The vacuum moulding process also makes time and process-optimised separation of the casting and moulding sand possible.



Heat the pattern film and pull it onto the pattern with a vacuum



Place the moulding box onto the pattern



Separate the mould from the pattern

ADVANTAGES

- Binder-free moulding material and suitable for different moulding sands
- High dimensional accuracy, mould compaction and surface quality
- Versatile, robust process (even under difficult conditions)
- Low demands on the pattern
- Lowest emissions when casting

FULLY AUTOMATED, MONITORED POURING – HWS pouring units.

The ideal pouring equipment is of vital importance for high quality casting. Continuous monitoring and control of the entire pouring process is ensured thanks to fully automated HWS pouring units and machines.

The automated systems can be used for all new and existing flaskless systems as well as tight flask moulding plants with the green sand process and core packages.

Pouring process
control



The integrated and individually adjustable HWS control unit allows two-stage, continuous monitoring of the entire production process. Supported on one hand by a camera system and on the other by incorporated load cells, the HWS control determines the optimal ratio between pouring speed and the filling level inside the sprue cup while the process is

running. Furthermore, additives can be incorporated directly into the pouring stream using the optional, automatic inoculant supply. An interruption-free process can be implemented for high performance moulding plants, even during the pouring line pushing process.

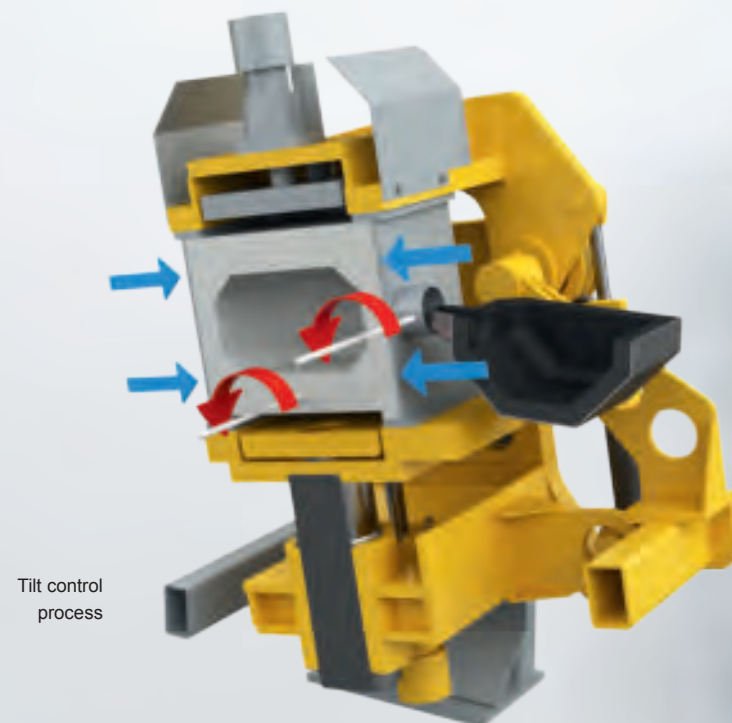
ADVANTAGES

- Reproducible, low-maintenance and precise pouring
- Prevention of iron overflow and iron spatter
- Alloys can be changed without problems
- Individually adjustable control unit for continuous monitoring of the entire process
- Temperature monitoring using a pyrometer

MORE FREEDOM DUE TO VARIABILITY IN TILTING – HWS gravity tilt casting.

Specially developed for the requirements with regard to high-quality aluminium castings, the HWS gravity tilt casting process impresses with its wide range of customisation options. Using a permanent metal mould, the process creates improved material characteristics thanks to its variably adjustable tilting angle and tilting speeds. The variable and independent tilting movement of the pouring machine and the pouring ladle provide laminar and low-turbulence

mould filling of the die. In addition, irregularities in the pouring process and quality defects can be minimised by the precise control of the filling speed. The variable design of the tilting movement not only ensures lower air inclusions during pouring but also offers the option of optimising the sprue and runners and thus a long-term reduction in cycle material and fewer oxide inclusions.



ADVANTAGES

- Better material characteristics through:
 - Flexible adjustability of the tilting angle and tilting speeds
 - Uniform, controlled mould filling
 - Reduction of oxide and gas absorption
- Reduction of circulation material
- Targeted die cooling

OPTIMUM SOLIDIFICATION FOR PERFECT ALUMINIUM CASTING – HWS low pressure casting.

The strength values and density of the structure play an elementary part in the production of complex light metal parts made from aluminium alloys. Optimum solidification for improving material characteristics is achieved using the HWS low pressure casting process. The high-precision HWS software enables the exact pressure feeding of the die against the direction of gravity and targeted die cooling. The

individually adjustable pouring parameters of the HWS low pressure casting process such as the pouring speed also ensure a controlled and reproducible pouring process. The formation of oxide skins, cold runs and air inclusions is reduced to a minimum. Furthermore, the downsizing of the gating system leads to a reduction of circulation material.



Mould filling
process

ADVANTAGES

- Better material characteristics through:
 - Uniform, controlled mould filling
 - Dense feeding
 - Reduction in oxide and gas absorption
- Reduction of circulation material
- Targeted die cooling



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