# voestalpine CHILL BLOCK & voestalpine FIN FILTER

## Robust solutions for a more stable and efficient casting process!

## voestalpine Chill Block

A stable casting process and high productivity are the prerequisites for an economically successful die caster. Ventilation plays an essential role in component quality, but also in trouble-free operation.
Standard steel vent blocks often have insufficient venting performance.

Vent blocks made of combinations of tungsten and copper alloys wear out quickly in the harsh everyday life of the foundry. The service life is comparatively short and damage leads to aluminium adhesion.

**voestalpine's venting system helps you achieve a more stable and efficient casting process.**

Insufficient venting is one of the main causes of porosity in die castings. This occurs when the air and gases cannot escape sufficiently from the cavity. In addition, inefficient venting can lead to higher "back pressures", which further reduces component quality. One of the most commonly used types of vents is the vent blocks or chill blocks. These can be used both for casting with and without vacuum support. Compared to vent grooves, they offer the advantage of a much higher venting performance and compared to piston systems, they are significantly less prone to failure and maintenance.

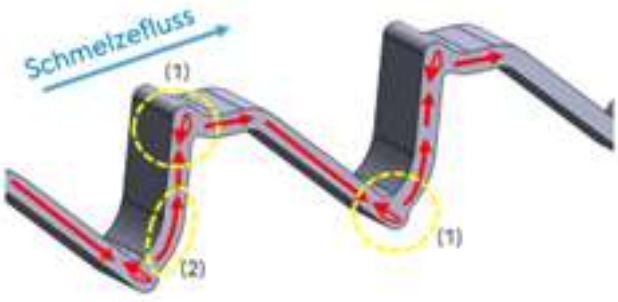
Vent blocks are available on the market in different designs. Starting with standard steel ingots, whose advantage lies in their robustness, to combinations of tungsten and copper alloys, which score with high thermal conductivity. voestalpine CHILL BLOCKS combine the best of both worlds. They are designed and manufactured in such a way that a reduction in maintenance costs, an increase in machine utilization as well as more reproducible venting conditions and thus a more consistent casting quality can be achieved, see table.

## Overview of the chill block variants

| | **Standard Steel Chill Block** | **Tungsten/Copper Chill Block** | **voestalpine CHILL BLOCK** |
|---|---|---|---|
| Gap dimension | **usually 0.7 – 1.0 mm** | **Usually 1.3 mm** | **usually 1.2 – 1.3 mm** |

| | **Standard Steel Chill Block** | **Tungsten/Copper Chill Block** | **voestalpine CHILL BLOCK** |
|---|---|---|---|
| Vent cross-section at 80 mm gap width | **68 mm² (with 0.85 mm gap)** | **104 mm²** | **104 mm²** |
| Width for venting with the same vent cross-section (104 mm)$^2$) and a length of 200 mm for venting | **123 mm width (0.85 mm gap)** | **80 mm width (1.3 mm gap)** | **80 mm width (1.3 mm gap)** |
| Explosive force with this dimensioning and an assumed pressure of 785 bar in the vent block | **1,931 kN or 197 tons** | **1,256 kN or 128 tons** | **1,256 kN or 128 tons** |
| Forces for the demoulding of the Al part of the chill block (results of experiments at an institute) | **530 N** | **530 N** | **350 N** |

The large gap size of the voestalpine CHILL BLOCKS is achieved by the patented shaft geometry with integrated barrages that additionally slow down the melt, *see Figure 1* below. In addition to the advantages already mentioned, the washboard is "poured clean", i.e. with significantly less spangles and dust formation. This results in an increased quality of the recycling material.



**< Figure 1**

*The patented shaft design with "barrages" that slows down the aluminum melt and thus enables a high gap.*

In addition to the high gap size for a steel vent block, the voestalpine CHILL BLOCKS offer another significant advantage. The patented voestalpine shaft design is asymmetrical, *see Figure 2*. In this way, the shrinkage forces occurring during solidification are used for improved demolding. The force required for ejection is reduced by approx. 35% and the aluminium detaches itself from the vent block after opening the mould, *see Figure 3*. This significantly reduces the risk of aluminum sticking to the vent block, manual removal and associated production interruptions. The result is a more stable casting quality and increased productivity.

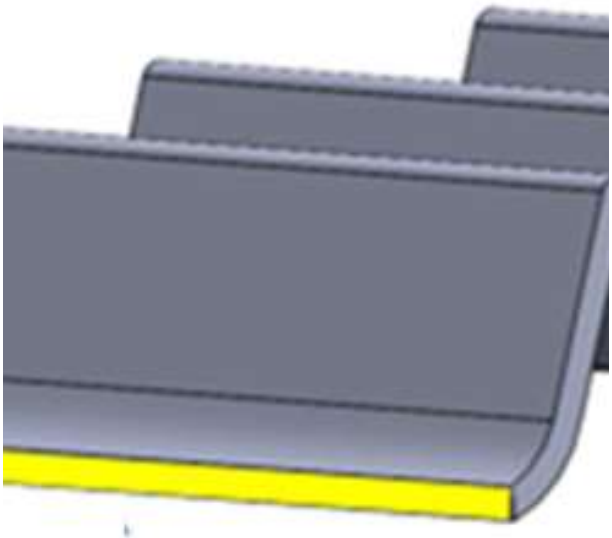


**Figure 2:** the patented asymmetrical voestalpine shaft design that uses the shrinkage forces that occur during solidification in such a way that the part detaches from the chill block and does not shrink.

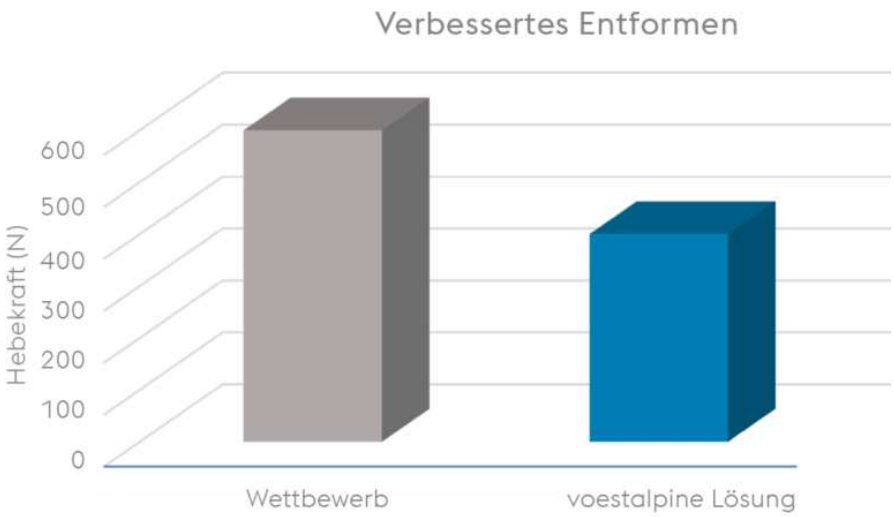



**Figure 3:** this requires a demoulding force that is approx. 35 % lower

### The advantages of voestalpine CHILL BLOCKS at a glance:

- **Robust and long service life: use of voestalpine premium steels**
- **High clearance: smaller installation space, reduced blast area and increased venting volume**
- **The necessary demoulding force is greatly reduced (by approx. 35%). This makes it easier to detach the aluminum part in the area of the vent, which leads to fewer disturbances**

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## voestalpine FIN Filter

Conventional filters for vacuum systems require a lot of maintenance and a large installation space. With our voestalpine FIN filter for casting with vacuum support, we offer another engineered product for stabilizing the casting process and increasing casting quality, *see Figure 4*.

The "heart" of the voestalpine FIN-FILTER is an additively manufactured mechanical filter. Because it is printed from Uddeholm AM Corrax powder – a corrosion-resistant mould steel –

it is extremely robust against both mechanical and corrosive loads.

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The filter is cleaned by simply blowing out the dirt particles using compressed air, *see Figure 5*. This can be done both manually and automatically via the vacuum unit.

The high corrosion resistance and the simple cleaning by means of an "air blast" make the removal and replacement of the filter unnecessary. The maintenance-free filter system can thus make a significant contribution to a trouble-free and more stable casting process. Another advantage is the very small installation space of the filter.

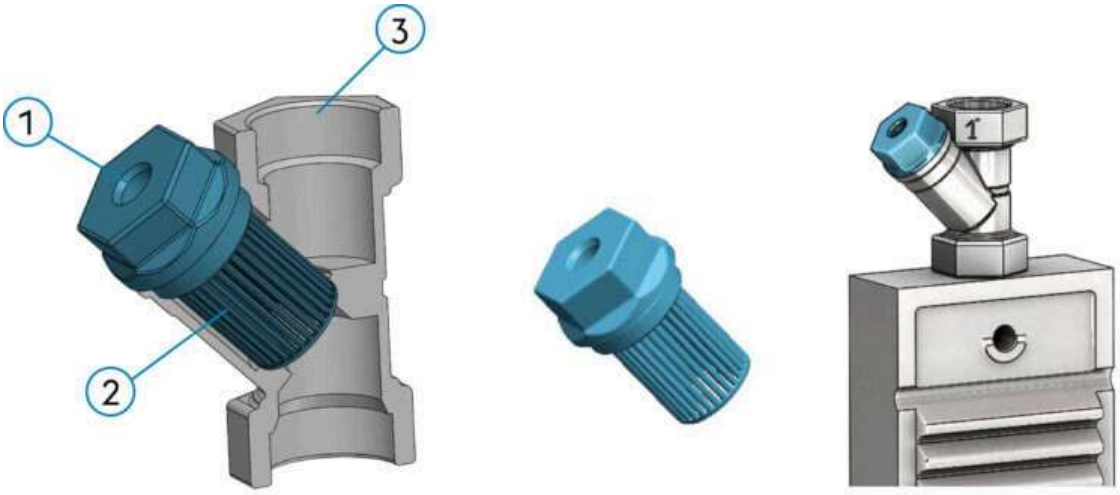


***Figure 4: Left:*** Fin Filter structure – 1st exhaust (measuring) M10x1 or G1/8" / 2nd filter insert with 346 mm² vent cross-section / 3rd vent system (Y-fitting) G3/4" or G1, ***middle:*** filter insert of the voestalpine FIN-FILTER, ***Right:*** voestalpine FIN FILTER and voestalpine CHILL-BLOCK

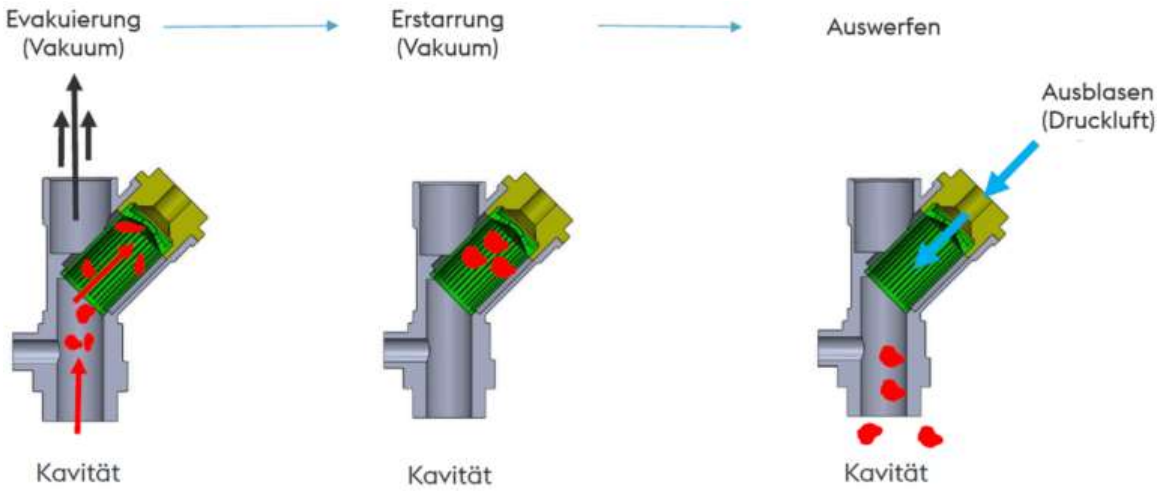


***Image 5:*** How voestalpine FIN FILTER works

## The voestalpine FIN-FILTER offers three major advantages compared to standard filter systems:

- **Maintenance-free system**
- **Very small installation space**
- **More reliable and correct vacuum readings**

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The die casting industry is undergoing a transformation. At the same time, the cost-effectiveness must be increased as the demands on the casting increase. The main levers for an economical casting process are the reduction of the reject rate and an increase in overall equipment effectiveness. Automation also usually needs to be further advanced. However, this requires processes that are as stable as possible. And the "harsh environment" of a foundry does not make these developments any easier.

Due to our many years of close cooperation with our customers worldwide, we know that a robust casting process is required. This "wealth of experience" combined with our high-quality hot-work steel and services leads to our voestalpine Engineered Products. Good ventilation is important for high component quality. In addition, we know the "everyday worries" of a caster, e.g. a clogged filter, the aluminum part in the vent block tears off the pouring channel and gets stuck, actually you would need a higher vent volume, etc. With the voestalpine CHILL BLOCK and the voestalpine FIN FILTER, we certainly won't solve all

these "everyday worries". But these products can make a significant contribution to higher casting quality and to the reduction of scrap, maintenance and machine downtime.

**voestalpine Engineered Products**

**Robust solutions for a more stable and efficient casting process!**

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