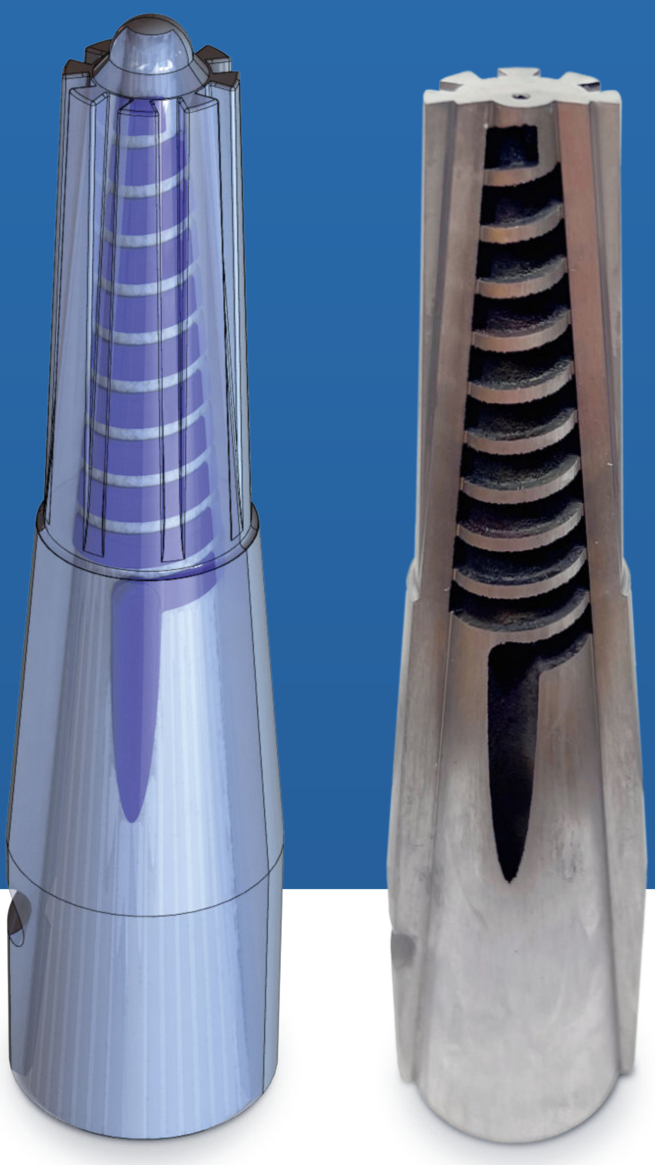
ZETTERER

NEAR-CONTOUR TEMPERING

ZETTERER LASER MELTING TECHNOLOGY



OUR SERVICE

- Consultation regarding near-contour cooling in customer-specific casting molds
- Optimization with the help of computer simulations
- Realization of projects with **Zetterer Laser Melting technology**

Steel 1.2343

NEAR-CONTOUR TEMPERING

ZETTERER LASER MELTING TECHNOLOGY

Following injection, the temperature of the mold must be lowered quickly and evenly so that the aluminum solidifies. If the part remains in the mold too long, it will be difficult to remove. This results in warpage and friction points.

Since the area of the tablet (filling hole for liquid aluminum) is where most of the material and the highest temperature is located, this usually determines the solidification period. **In terms of cooling, cooling close to the contour makes most sense.** Even in the case of hotspots (hot areas in the part), the cooling period can be shortened and the occurrence of cavities reduced.

While conventional cooling can only be introduced by drilling and is usually straight, **near-contour cooling with ZLM** (3D printing) allows **cooling to be introduced along the contour in 3D.** This means it can be adapted to the geometry of complicated routes (e.g. spirals).

Without cooling, the cooling period is very long. The same is true of conventional cooling (old cooling). Near-contour cooling takes place **close to the "hot" zone with a large surface area. This shortens the cooling period**.

The **Zetterer Laser Melting** generative manufacturing process is an additive process for the direct production of metallic components. **ZLM is a flatbed-powder process** often referred to as **metallic 3D printing**.

BENEFITS OF USING ZLM FOR DIE CASTING

A shorter cooling period:

- Reduces cycle times in die casting
- Minimizes the risk of shrinkage cavities and porosity in the cast part
- Enables minimum-quantity spraying due to effective cooling
- Eliminates hotspots in the mold

This means **better quality die cast parts** as well as a **shorter cycle time**.

THE EXISTING 3D PRINTER HAS

- 400W fiber laser
- Preheating of the building plate up to 400°C
- 250 x 250 x 250 mm installation space

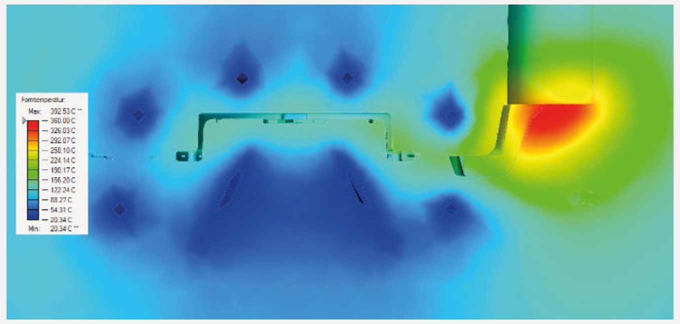
This makes it possible to produce **internal tempering channels** for near-contour cooling in 1.2343.

THE ADVANTAGE OF USING 1.2343 WITH ZLM

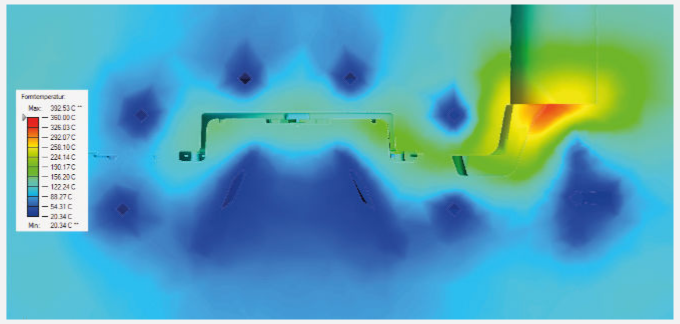
We use 1.2343 instead of 1.2709 because 1.2343 has **high thermal resistance and toughness, higher thermal conductivity** and **better resistance to hot cracking**. This makes it more suitable for die casting.

Parts made from 1.2343 using ZLM can be individually hardened to a hardness of between 42HRC and 52HRC and used in the mold in the same way as parts made from normal 1.2343. **So there are no limitations when compared with conventional manufacturing.**

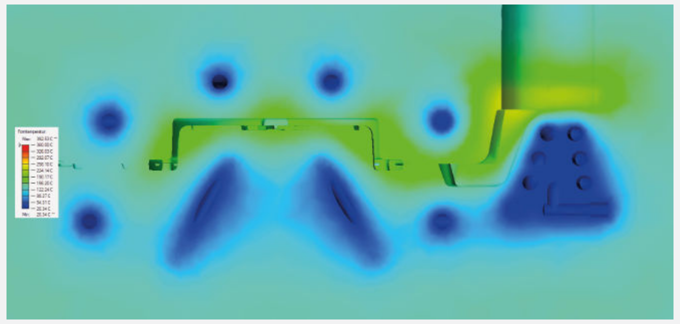
IMPROVES TEMPERATURE REGULATION THROUGH THE USE OF 3D-PRINTED COOLING



Without cooling



Conventional cooling



3D-printed cooling

1.2343

X37CrMoV5-1 C 0,38 Si 1,00 Cr 5,30 Mo 1,30 V 0,40

Thermal conductivity at °C	20	350	700
W/(M K) ANNEALED	29,8	30,0	33,4
W/(M K) QUENCHED & TEMPERED	26,8	27,3	30,3

1.2709

X3NiCoMoTi18-9-5) C < 0,02 Mo 5,00 Ni 18,00 Co 10,00 Ti 1,00

Thermal conductivity at °C	20	350	700
W/(M K)	14,2	18,5	22,5

The microstructure of the 3D-printed components corresponds with NADCA C through F.

ZETTERER PRÄZISION GMBH
Plant I: Venetianerstraße 6 • 91154 Roth / Unterheckenhofen
Plant II: Meckenloher Straße 9 • 91126 Rednitzhembach
Plant III: Strada Poienelor Nr. 5 • Parcul Industrial "Roman" Brașov • 500419 Brașov, Romania
Telephone: +49 (0)9171 83999-0
Telefax: +49 (0)9171 83999-99
mail@zetterer.com
zetterer.com