TRAKYA DÖKÜM
"your casting development partner''

MAGMA

CONTINUOUS IMPROVEMENT WITH CREATIVE SOLUTIONS FOR OPTIMIZING CASTING QUALITY

International MAGMA User Meeting 2024

October 9-11, 2024 Frankfurt

VOLKAN NESİPOĞLU

TRAKYA DÖKÜM SAN. VE TİC. A.Ş.

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Trakya Döküm Presentation

TRAKYA DÖKÜM

Trakya Döküm Corporate Academy
FIT FOR QUALITY

TRAKYA DÖKÜM

"your casting development partner''

MAGMA

MORE THAN 40 YEARS OF EXPERIENCE IN FOUNDRY PRACTICE

A world class IATF 16949 certified, state of the art foundry and machining plant

We offer comprehensive service from a single source

Offering "one stop shop" with in-house casting, machining, heat treatment, coating and sub-assembly operations

The shortest way from liquid metal to the final product

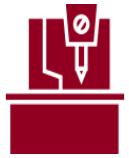
TRAKYA DÖKÜM
"your casting development partner''

MAGMA

AT A GLANCE

100.000
tons/year
Products
Capacity

7 Vertical
Moulding
Lines



400.000
h/year
Machining
Capacity

1200
Workforce

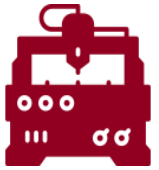
30+
Countries
Export to

+70 M USD
Investment in
Last 5 Years

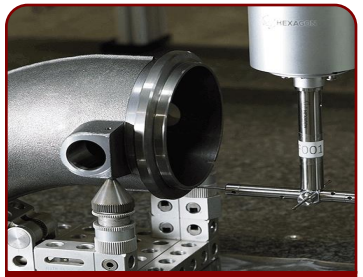
238.000 m²
Total Area
100.000 m²
Closed Area

%35
Machined
Parts Share

0,1 kg – 40 kg
Casting Weight
Range



%100
In-House
Pattern
Production



Design & Engineering

Casting

Machining

Heat Treatment

From concept through development, production, finishing & delivery, Trakya Döküm is a confident supplier partner for all your cast and machined part requirements.

Coating

Assembly

Automation

Packaging & Logistics

All operations of casting, machining, heat treatment, surface treatment and sub-assembly are carried out within the facility.

The flexible solution that meets all your requirements

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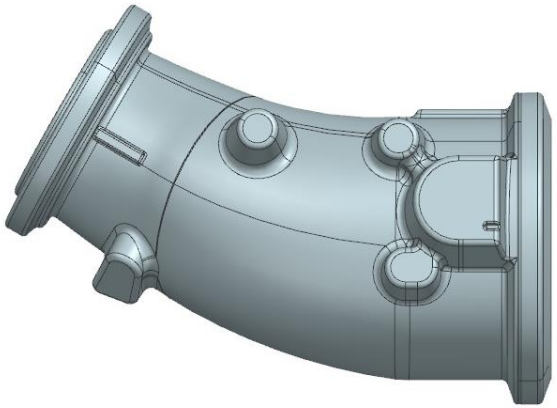
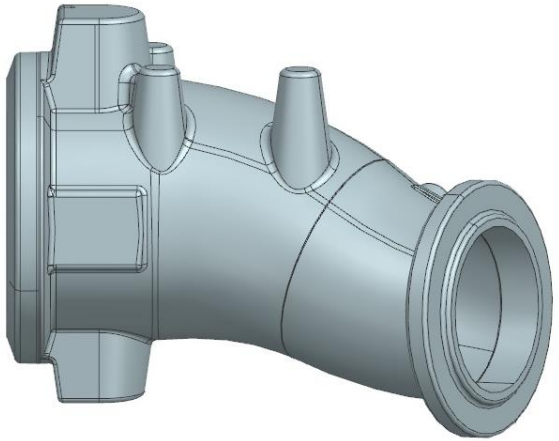
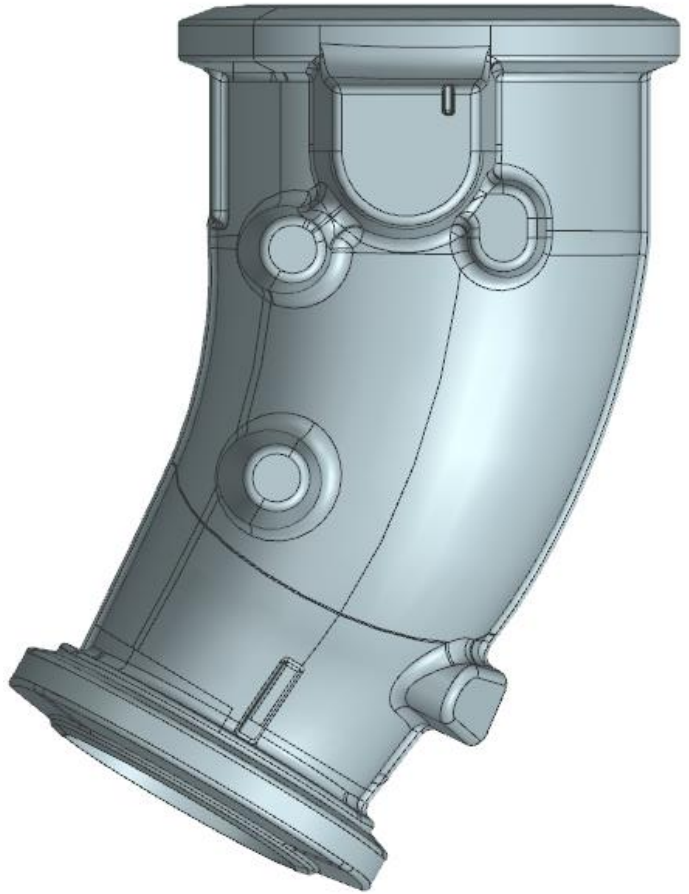
Part Description

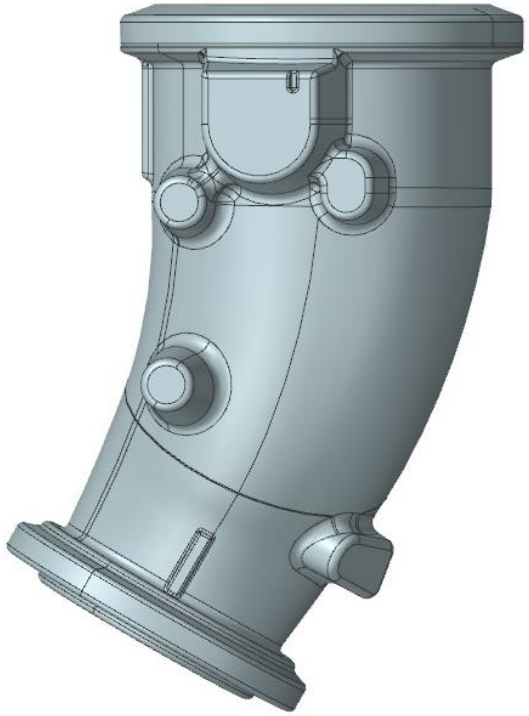
Part name: Exhaust Brake Throttle Body
Part weight: 8,0 kg
Material Grade: EN-GJS-450-10
Production Line: DISAMATIC Vertical Green Sand



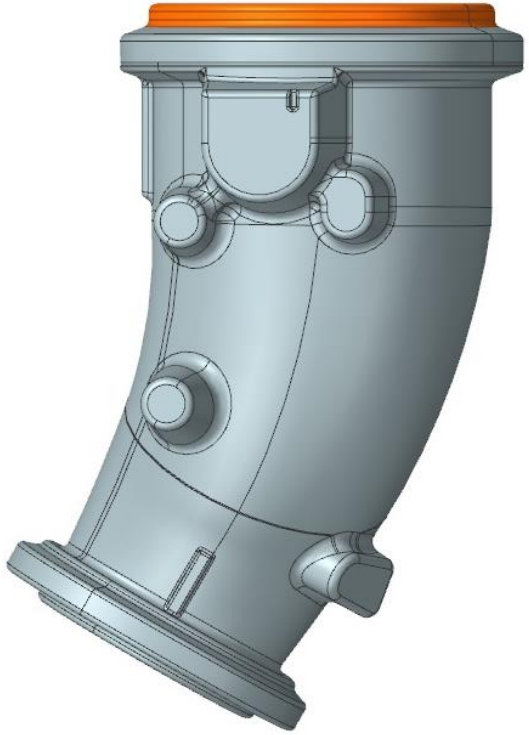




Customer Request



First design



New design (Costumer request)

The customer requested a chamfer modification on the flange, which risks porosity due to wall thickness variation along the feed path.

We communicated this risk via a MAGMA simulation and are exploring solutions to ensure porosity-free production.

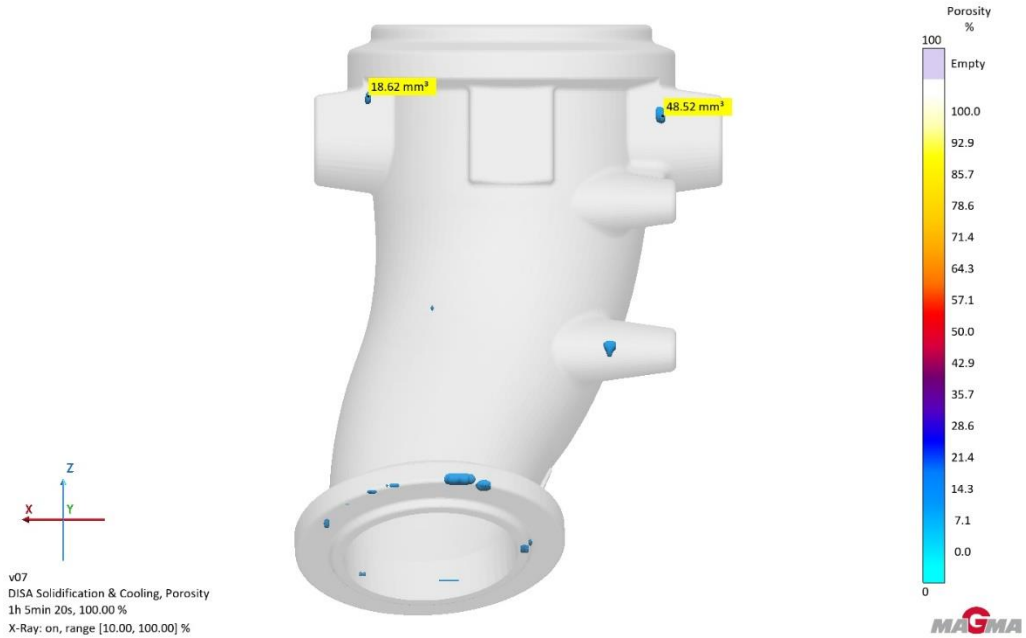
First Design - Solidification Results

In the original design, there was no porosity risk in the bosses. This was achieved through directional solidification via the feeder, ensuring proper flow and defect-free casting.

New Design - Solidification Results

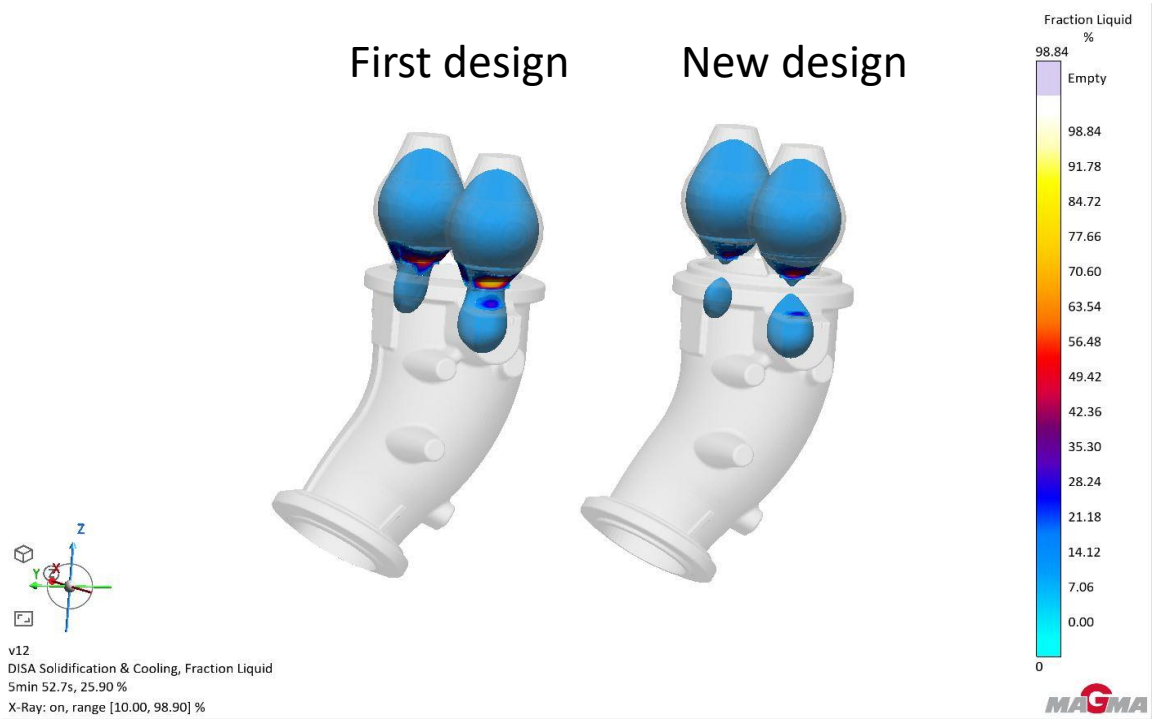
Testing with the new chamfer revealed that wall thickness changes disrupted solidification, causing the boss area to solidify independently and increasing porosity risk.

New Design - Solidification Results



The simulation indicated that if the connection between the part and the feeder is interrupted, porosity would develop, especially near the drilled hole, necessitating a redesign of the feeding system.

Comparison



A comparison of solidification results shows that the added chamfer with the current feeder system leads to porosity defects in the part.

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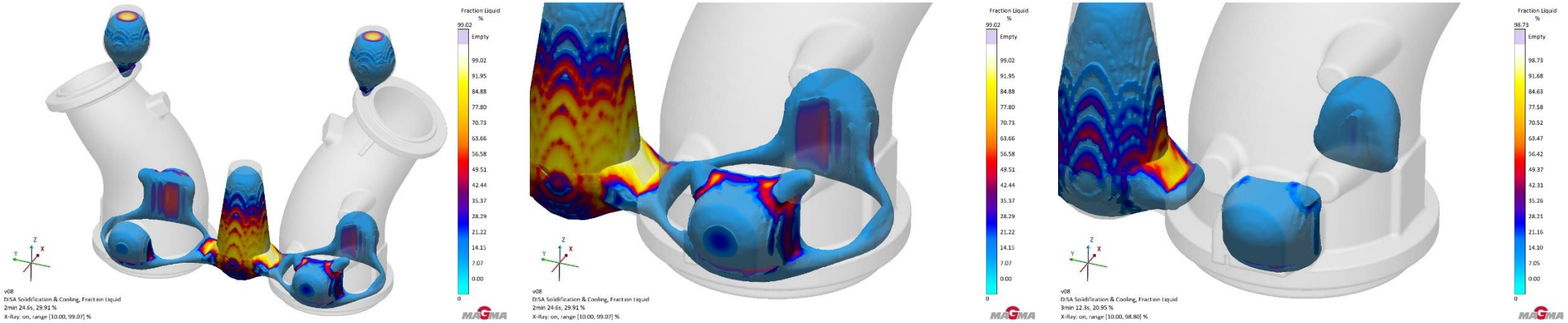
Improvement 1 - Layout Change

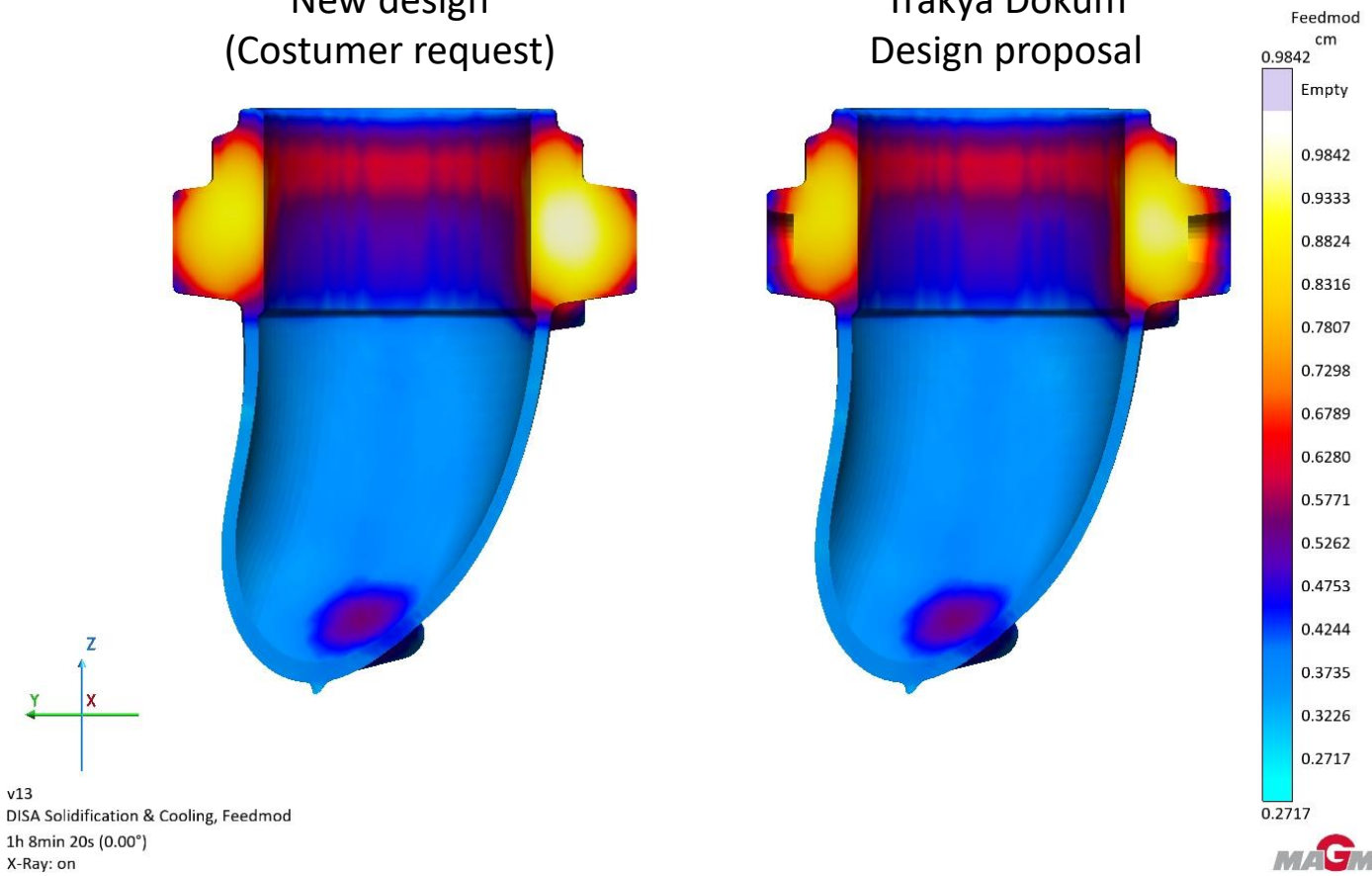


First, we aimed to minimize potential risks by utilizing ferro static pressure, which led us to rotate the part 180° around the y-axis. When we rotated the part, we also had to reposition the feeder. As a result of the simulation conducted with the new feeder, solidification was not directed toward the feeder.

Improvement 2 - Design Proposal

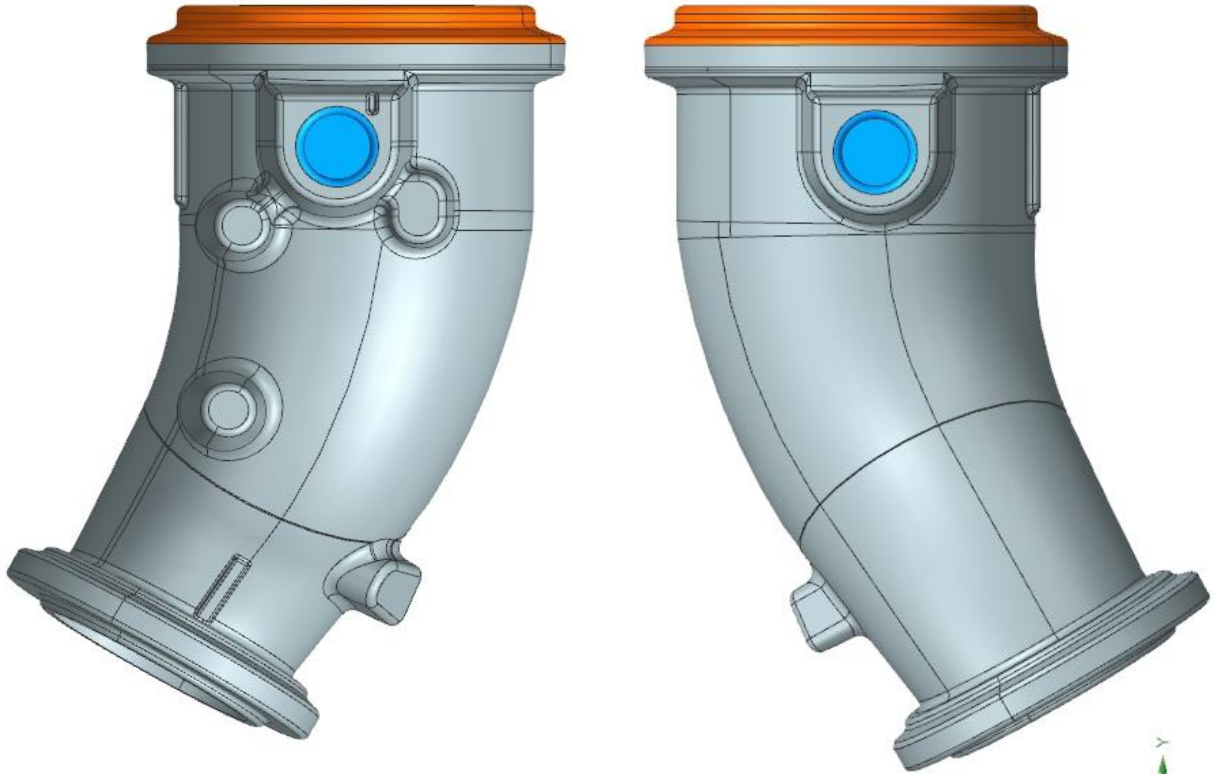
New design
(Costumer request)

Trakya Döküm
Design proposal

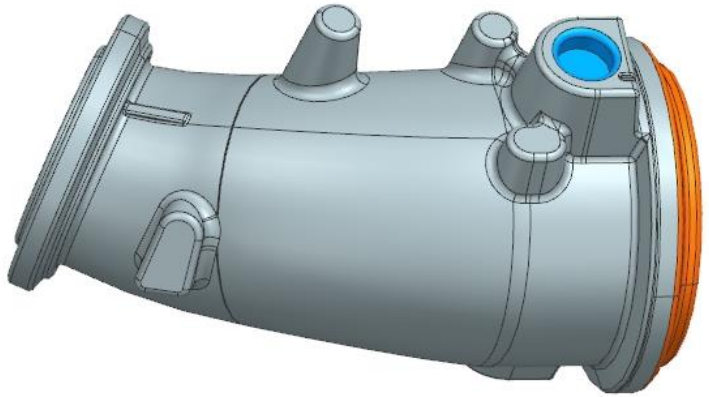


The boss area has the highest modulus; producing it with pre-holes can reduce modulus and shift the center. Our customer responded positively to this design change.

Improvement 2 - Design modification



We created partial holes in the boss area to remove excess material and shift the modulus away from the drilled hole, positively affecting solidification and reducing porosity risk.



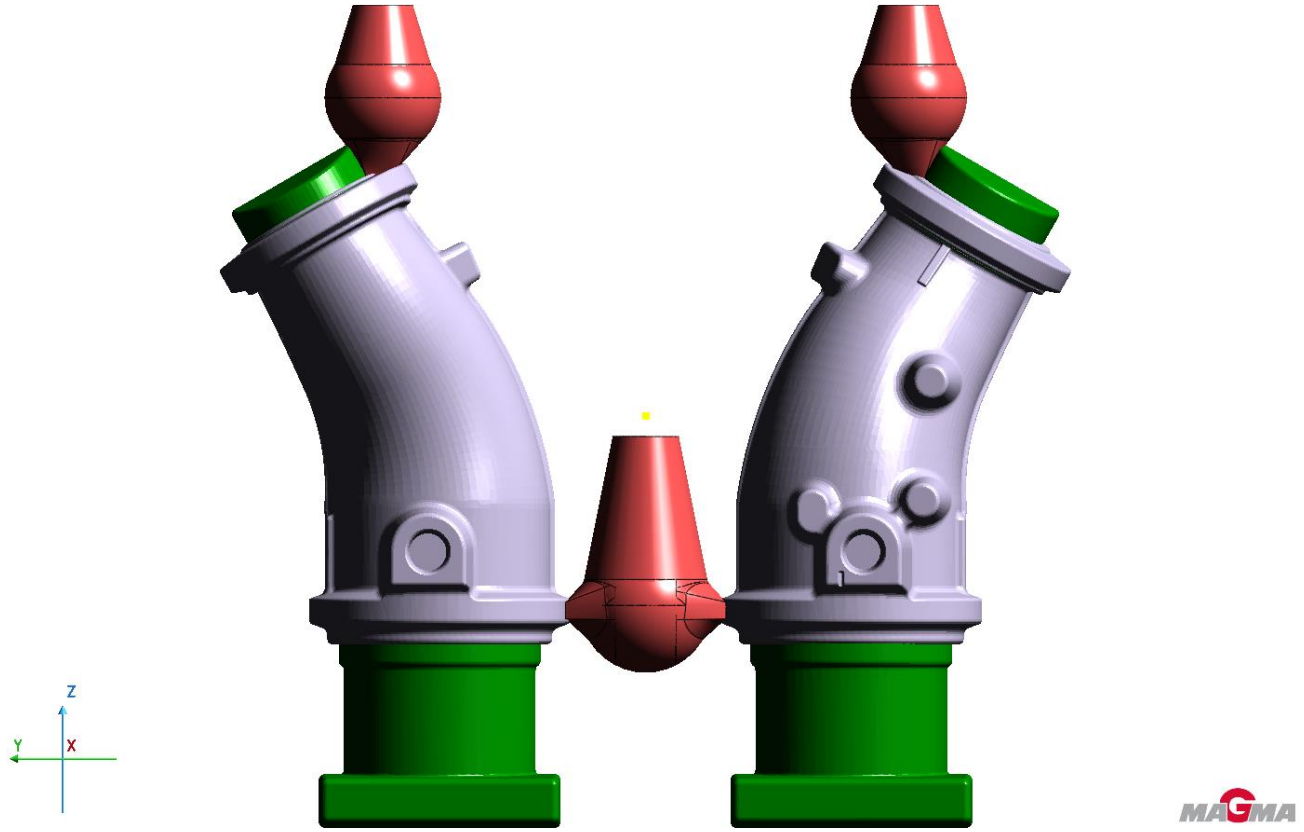
Improvement 2 - Hotspot & Porosity

Hotspot

Porosity

Although some residual porosity risk remains, improved directional solidification localized this risk away from critical areas, effectively reducing potential defects.

Final Layout



Here is the final part alongside the modified feeder system following the design changes.

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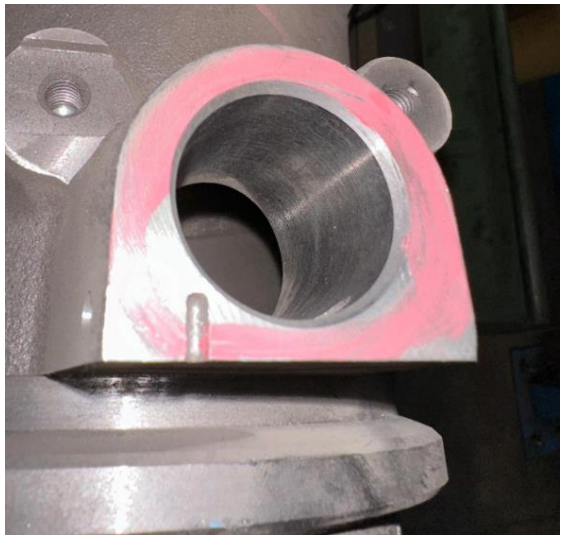
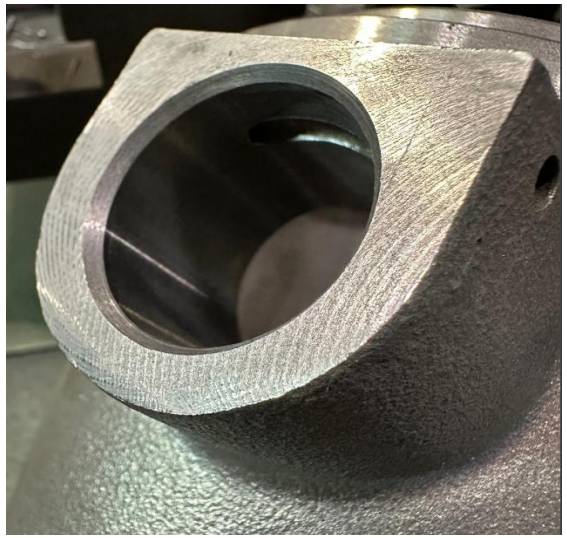
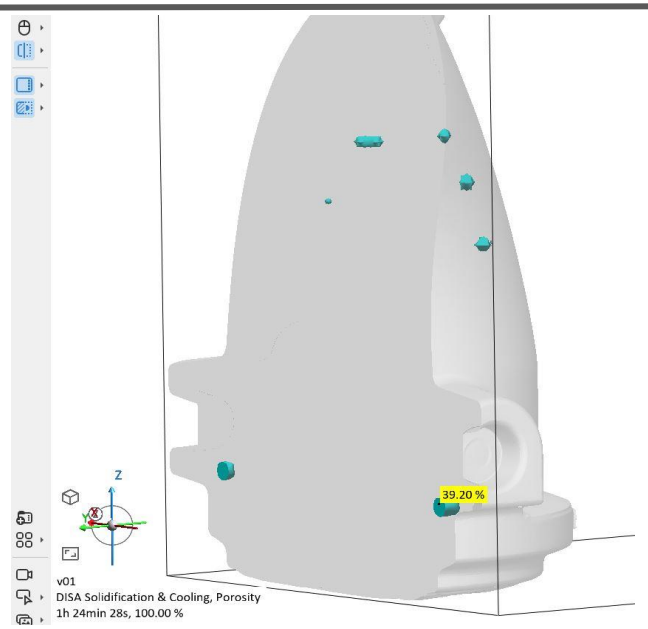
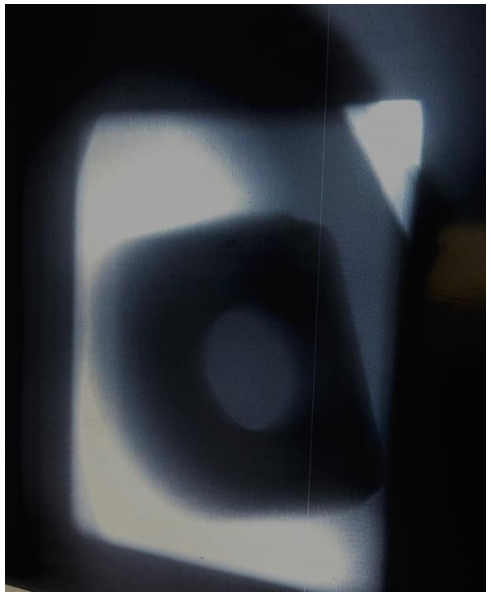
Validation - Trial Production









After implementing the changes, X-ray inspections of trial production parts showed no signs of porosity, confirming the effectiveness of our layout and design modifications we made.

The results aligned with our MAGMA simulations, confirming the accuracy of our predictions.

Conclusion

The production flow is now more efficient

Eliminated porosity defects

Significantly improved customer satisfaction

Thank you for your attention!
Any question?