# HTS Injectionsystem for GIGA and MEGA Casting





## HTS SIMULATION CAPABILITIES



#### SIMULATION OF PROCESS

- · Optimization of the injection system
- Print layout, casting geometry, thermal control, process parameters
- Shot profile, dosage and waiting times
- Optimization of the sprue system for balanced filling, reduced gas inclusions and failed runs
- efficient thermal control of the cavity and extended life of the mold
- robust process parameters, including shot curve, filling pressure and holding pressure for reduced porosity
- Optimized tool design and cooling conditions for minimized part distortion



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## HTS SIMULATION CAPABILITIES

## *≩*S SIMULIA ABAQUS

#### FINITE-ELEMENTS-ANALYZES

- Heat transfer analysis (stationary / transient)
- Structural analysis
- sequentially coupled thermal stress analysis
- CFD analysis of the temperature control system
- Fatigue analysis





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## HTS INJECTIONSYSTEM

At the HTS INJECTION SYSTEM all relevant parts of the injection system, including the ingate area, are matched to each other, to achieve the best performance for productivity, quality and cost efficiency.



## **HTS** INJECTIONSYSTEM



## **O iTherm**<sup>®</sup> BY **HTS**

iTherm® brand stands for ultimate productivity solutions, based on priciples of conformal cooling.

iTherm® components are made using different additive manufacturing technologies, among which also MFT and DED.

iTherm® components are used in die casting, injection moulding, hot stamping, aerospace and nuclear energy industries



## **O** iTherm<sup>®</sup> SHOT BLOCK



iTherm®

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conventional

#### CYCLE TIME IMPROVEMENT



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## **O iTherm**<sup>®</sup> COMPONENTS FOR GIGA CASTING

The aim of the iTherm® concept is to achieve the most effective cooling of the biscuit while at the same time ensuring a long lifetime.

#### Components:

- Shotblock: made out of hotwork toolsteel 1.2367 mod.
- Feedplate: made out of hotwork toolsteel 1.2367 mod.

#### Optimized areas:

- Cycle time: Reduction
- Cooling medium: lower consumption
- Lifespan: increased

This improves the overall CO2 footprint of the casting process.

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**O iTherm**<sup>®</sup> EXAMPLE OF CONCEPT





## **SLEEVE TYPE AND DESIGN IS KEY TO MINIMIZE NEGATIVE EFFECTS OF SLEEVE WARPAGE**



## **INNOSLEEVE IS A WIN-WIN SOLUTION FOR DIE CASTING**

# 🔘 innoSleeve



innoSleeve insert

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#### **GENERAL INFORMATION**

- patented solution for sleeve cost optimization developed by HTS
- made with special in-house developed alloy

#### **ADVANTAGES**

- **longer life time** (20% 40% compared to standard sleeve)
- lower frequency of shot sleeve replacements
- **shorter** production stoppages (quick & easy replacement)
- substantially lower overall costs
- op to 70% less CO<sub>2</sub> generated

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## **HOW INNOSLEEVE IS USED?**



. When using the innoSleeve insert, the OD of the sleeve remains the same (majority of conventional sleeves can be remachined for usage with innoSleeve insert)

- After the initial implementation when envelope and insert have are aquired, users only replace the inside insert, while the envelope remains
- innoSleeve insert can be quickly replaced with specially designed tool we supply



Sleeve version with Back + Front Insert and plunger-support at the end.

# Pistons





## **PISTONS**

Springbush / Vaccuumring Ensures best gliding and decreases wear replacement app. with every 3rd Ring



\*All the plungers in our product range are produced by OUR daughter companies, HTS IC d.o.o. and Alrotec s.a.

## FUNCTION OF RING PLUNGERS

During injection process, pressure increases and aluminum should spill into A between ring and plunger.

Meanwhile, the ring expands against the inside of the sleeve diameter and closes the clearance.

Therefore, any aluminum can't pass through.



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## ITHERM ® PLUNGER



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#### ADVANTAGES

- more freedom designing cooling channels
- even heat distribution on the working surface
- faster biscuit solidifaction
- no premature Al solidification
- shorter cycle time
- longest lifetime on the market

## ITHERM ® PLUNGER



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## ITHERM ® PLUNGER LIFETIME

With iTherm® Plunger, the conformal cooling of the steel allows the heat removal rate to exceed that of BeCu tips while extending its lifetime due to low transient stresses in the membrane.

Our customers have reported more than 120.000 shots lifetime of iTherm® Plunger (with 3x ring replacements).



iTherm® Plunger: new (left) and after 120.000 shots and 3 ring replacements (right)

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# Lubrication



## **HTS LUBRICATION SYSTEMS**



## **TYPICAL CHALLENGES HTS ROD SPRAY SOLVES**

### CHALLENGE

- LUBRICATION RESIDUES
  IN CAST PART
- LUBRICANT CONSUMPTION
- EXTENSIVE SLEEVE AND PLUNGER WEAR

## PROPOSED SOLUTION

#### HTS Rod Spray



- lubrication on complete sleeve length
- lower lubricant consumption
- longer sleeve and plunger lifetime

# HTS ROD SPRAY IS DESIGNED FOR OPTIMAL PERFORMANCE



### 6 CHANGEABLE NOOZLES



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### AIR-LUBRICANT CONNECTIONS



OPTION 1 connections inside of the sleeve



OPTION 2 connections in machined groove on bottom side of the sleeve

## HTS ROD SPRAY LUBRICATION SUMMARY

- Assures UNIFORM lubricant coating over the ENTIRE SLEEVE surface area.
- MINIMIZES LUBRICANT CONSUMPTION and consequently brings LESS IMPURITIES IN CASTED PART
- Reduces production down-time and improves process stability.
- All advantages are progressive with sleeve length and diameter.
- LONGER sleeve and plunger LIFETIME







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## **ONLINE-CONFIGURATOR**

Configure your existing injection system and receive a report with possible optimizations with the HTS system within a few seconds.

After registration and entering the email address, you will receive this detailed report, in which each individual item is compared and evaluated.

#### https://www.htsgroup.com/configurator

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# WE OFFER COMPLETE INJECTION SYSTEM SOLUTIONS



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# **NEXT STEPS?**