CASE STUDY

20% Cycle Time Reduction
By using Innovated Sprinkler Head Mold Insert

CHALLENGE

K-Rain aimed to boost productivity by cutting cycle times. Their first attempt using stainless steel with conventional cooling methods with cooling rods was found to be ineffective

SOLUTION

Partnering with Zero Tolerance LLC, they switched to Xact Metal's 3D printing technology and Uddeholm's Corrax® — a corrosion-resistant tool steel — delivering durable inserts and lasting performance.
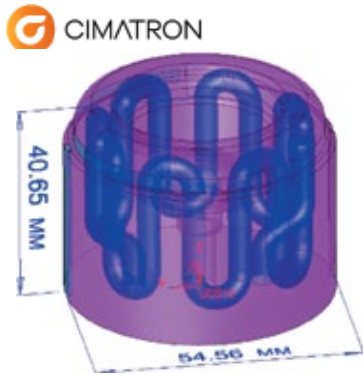
voestalpine Additive Manufacturing
www.voestalpine.com

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ONE STEP AHEAD.

CASE STUDY

SPRINKLER HEAD MOLD INSERT
WITH CONFORMAL COOLING - PROCESS

Simulation in Moldex3d software run by Reaction Plastics Solutions.
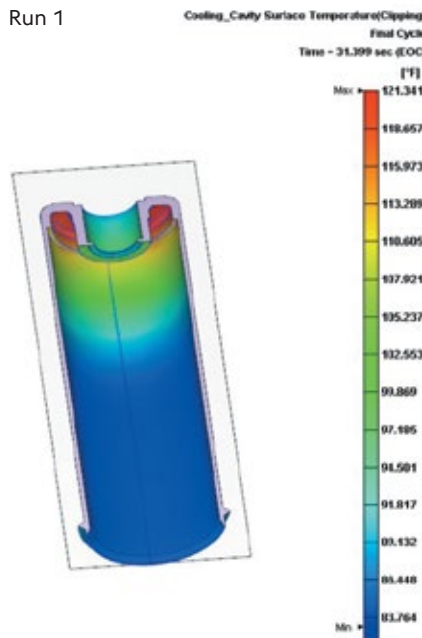Design done in Cimatron.
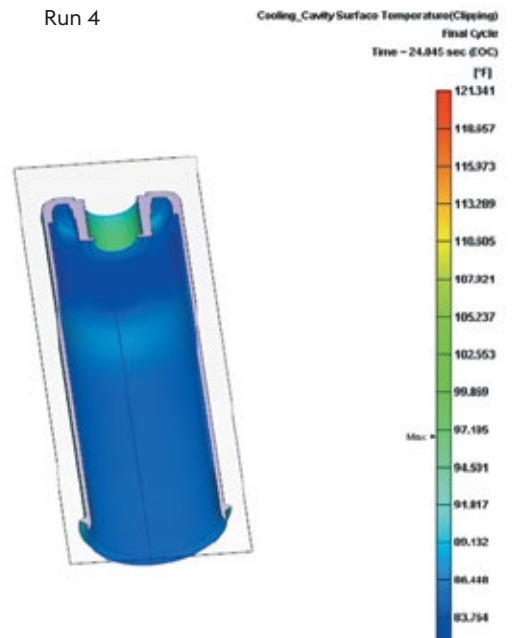
SOFTWARE SIMULATION

CAD MODEL DESIGN

Conformal cooling designed in Cimatron software saves a minimum 5 seconds in cycle time.

SIDE BY SIDE VIEW OF CAVITY SURFACE TEMPERATURE AT END OF CYCLE.

Run 1 — Cooling_Cavity Surface Temperature(Clipping) Final Cycle, Time = 31.399 sec (EOC) [°F]

Run 4 — Cooling_Cavity Surface Temperature(Clipping) Final Cycle, Time = 24.045 sec (EOC) [°F]

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35 HRS. PRINT TIME!

AS PRINTED
35 hrs. (quantity: 4)

Printed in Uddeholm Corrax Steel.

50 HRC AND A2 POLISH

FINISH MACHINING
(after heat treatment)

Zero Tolerance was able to heat treat the mold inserts up to 50 HRC, machine, EDM and then polish to an A2 surface finish.

SPRINKLER HEAD MOLD INSERT
WITH CONFORMAL COOLING
- FINAL INSERT

SPRINKLER HEAD MOLD INSERT
WITH CONFORMAL COOLING
- RESULTS

TOOLING ASSEMBLED

PRINTED INSERTS
USED IN INJECTION
MOLDING PRESS

FINISH/FINAL PART
Molded sprinkler head

RESULTS
REDUCED CYCLE TIME BY 20%

Reduced cycle time from 52 to 49sec. with a faster hydraulic unscrewing motor then from 49 to 41 sec. with new designed insert with conformal cooling circuit. This design change also almost completely eliminated sink on surface of the part.

SAVING
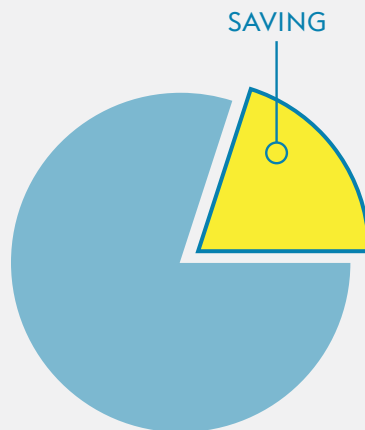
NEXT STEPS

K Rain plans to continue modifying multi production molds by printing with Xact Metal technology in Uddeholm Corrax Steel through Zero Tolerance CNC.

JOINT VENTURE

K-Rain, one of the world's largest manufacturers of irrigation products

Zero Tolerance LLC, a leading mold builder based in Michigan

Uddeholm's Corrax® additive powder

Xact Metal's affordable 3D printing technology