

## 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](http://www.voestalpine.com)

**voestalpine**  
ONE STEP AHEAD.

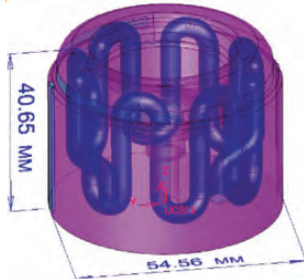
## CASE STUDY

### SPRINKLER HEAD MOLD INSERT WITH CONFORMAL COOLING - PROCESS

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

#### SOFTWARE SIMULATION

**CIMATRON**

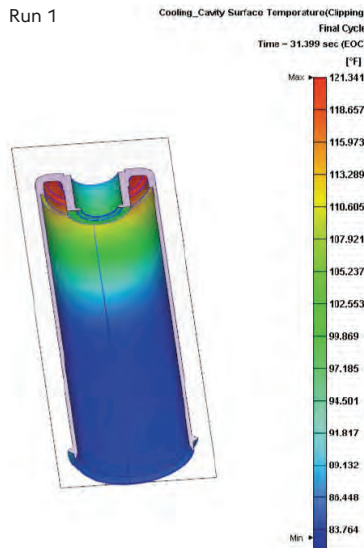


#### CAD MODEL DESIGN

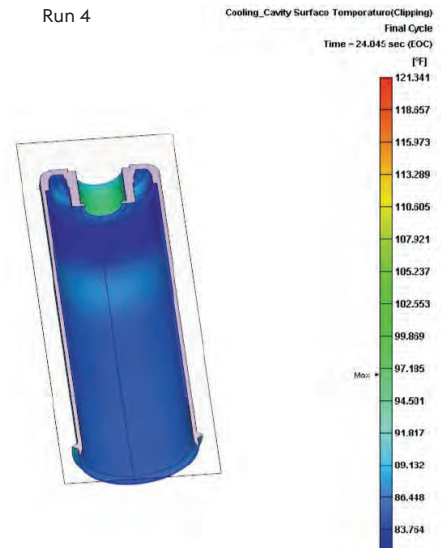
Conformal cooling designed in Cimatron software saves a minimum 5 seconds in cycle time.

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

Run 1



Run 4



#### 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.

## CASE STUDY

### SPRINKLER HEAD MOLD INSERT WITH CONFORMAL COOLING - FINAL INSERT



TOOLING ASSEMBLED

### SPRINKLER HEAD MOLD INSERT WITH CONFORMAL COOLING - RESULTS



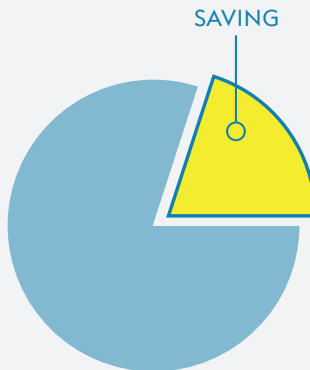
PRINTED INSERTS  
USED IN INJECTION  
MOLDING PRESS



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.



### ✓ 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



Uddeholm's Corrax® additive powder



Zero Tolerance LLC, a leading mold builder based in Michigan



Xact Metal's affordable 3D printing technology

