

# Ritemp™ Mold Cooling Technology

## Product Information

Ritemp™ mold cooling technology's primary objective is to overcome one of the key problems with the molding process; namely variations in the surface temperature of the mold. Ritemp™ provides highly uniform mold temperatures regardless of part geometry with hot spots completely eliminated.

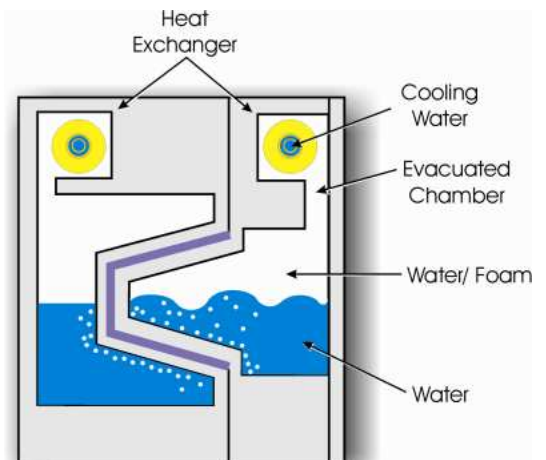
### How Ritemp™ works

Ritemp™, a patented technology developed and tested over 30 years, simplifies the design and manufacturing requirements of mold cooling by replacing gun drilled water lines with a "cooling chamber" or water pocket that completely envelops mold cooling surfaces. The water chamber ensures even heat distribution without the engineering compromise often limited by gun drilling. Using heat exchangers, water is condensed and recycled throughout the chamber. Air is removed prior to production eliminating any corrosion issues.

Water and or coolant flow is controlled by a Ritemp™ mold temperature control that senses and adjusts flow to regulate heat levels. The results range from lower operational and design/manufacturing costs to significant productivity gains.

### Top Ten Ritemp™ Benefits

1. Increased profitability for molder and mold maker
2. Faster Cycle times
3. Lower part reject rates
4. Mold corrosion eliminated
5. Reduced or eliminated part distortion
6. Reduced mold manufacturing costs
7. Reduced mold engineering costs
8. Condensation issues eliminated- mold does not "sweat"
9. Reduced energy costs
10. Reduction in maintenance costs with increased up time

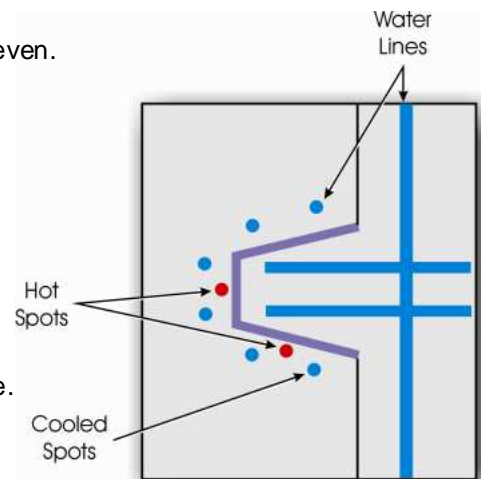


### The Ritemp™ Solution and Benefits

1. Cooling chamber surrounds part providing uniform cooling and heat control.
2. Air is evacuated from the cooling chambers before processing allowing water to boil at very low temperatures.
3. The resultant vapor rises to the top of the mould where it is condensed by specially designed heat exchangers.
4. The water will always boil where it is hottest and condense where it is coolest.
5. Heat is extracted from the mold by converting it to "Latent Heat of Vaporization."
6. This process ensures that the temperature throughout the mold is evened out automatically so that a high degree of uniformity is maintained.
7. The need for running multiple cooling circuits at different temperatures is eliminated.
8. Since oxygen is not allowed into the cooling process chambers, corrosion is not possible and eliminated.
9. Heat and cooling control using Ritemp™ Mold temperature Controller

## Pitfalls of Conventional Cooling Process

1. Cooling provided by gun drilled hole techniques are inherently uneven.
2. The efficiency of heat removal is rarely satisfactory.
3. The need for turbulent coolant flow creates the need for high coolant velocity.  
This need for velocity conflicts with the need for surface area with which to extract heat
4. Differential cooling rates cause distortion of the product and variations in surface finish.
5. Multiple cooling circuits are frequently needed to enable compensation for differences in heat input / output rates.
6. Corrosion in complex cooling circuits results in costly maintenance.
7. Cooling is often compromised due to the positions of ejector pins, screws and hot runner systems.



## The Ritemp™ Mold Temperature Controller

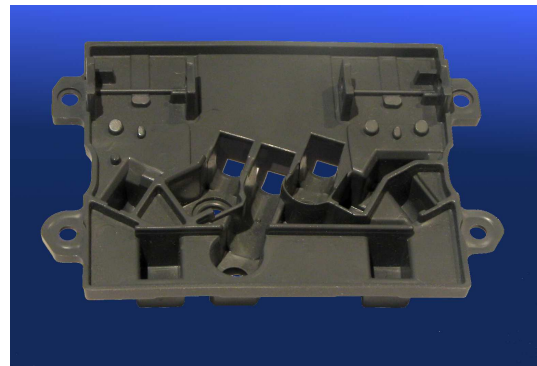
1. The controller turns the coolant supply on and off in response to the mold temperature.
2. Control is Closed Loop. A sensor, positioned in each chamber, accurately measures the temperature of the system.
3. When required it can also control a heating element for preheating the mold.
4. Two zones are standard and meet most applications. A six zone controller is also available.

## Electrical Part Sample Application

In this particular application, the challenges presented were multi faceted. The end user had a requirement for increased part production to meet market demand, sustainable part quality over several million shots annually and reduced costs. The existing 2 cavity production mold produced a 15 gram electrical box (pictured) with a 1.5 mm critical wall thickness dimension running Noryl material. The cycle time was 18 seconds.

Ritemp™ was used in the design and manufacture of a new

4 cavity production tool running the identical part.



## The Ritemp™ results

**The new 4 cavity tool runs 13 second cycle time( 28% reduction )** and has produced 7 million parts without fail to date ( Dec.2006). Further to this, RiTemp exceeded expectations in that the new tool **can actually run at a 10 second** cycle time but is currently limited by downstream handling equipment.

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