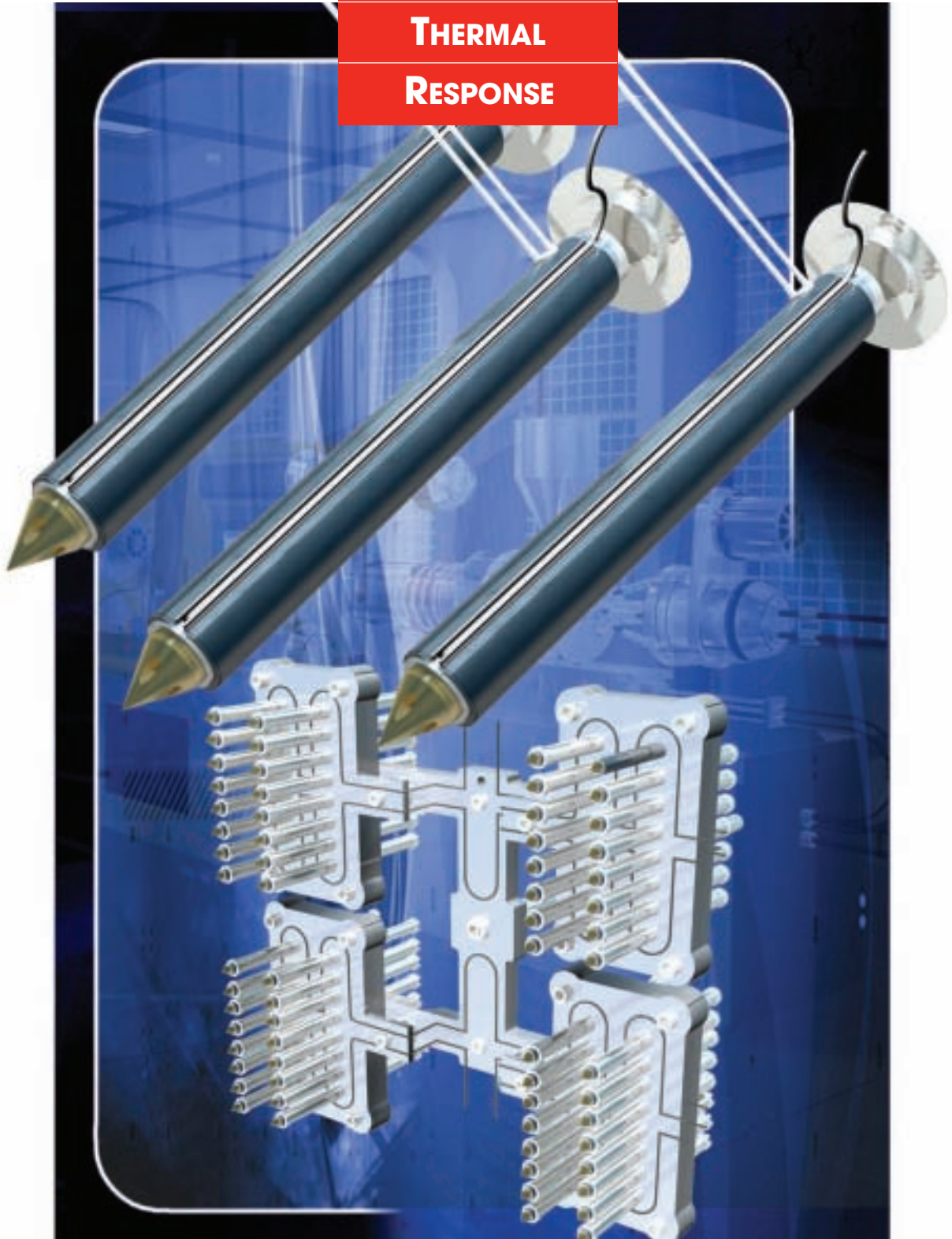


W A T L O W

# THERMASLEEVE™

NOZZLE HEATERS FOR  
HOT RUNNER SYSTEMS

**RAPID  
THERMAL  
RESPONSE**



# Watlow's THERMASLEEVE™ Nozzle Heaters Create a Precise Temperature Profile for Your Hot Runner System

Watlow's new THERMASLEEVE™ nozzle heater with patented manufacturing technology allows hot runner manufacturers to have a heater with rapid thermal

condensing water vapor and incidental water splash found in many hot runner environments.

## Patented Manufacturing Technology

Watlow's proprietary technology features a computer-controlled laser cutting technique that precisely generates the power distribution pattern. This process assures accurate and repeatable temperature distribution across the length of the heater. Temperature irregularities can be designed out of the system helping to ensure consistent part quality.



response, precise, repeatable temperature profiles all packaged in a low physical profile with a precise fit to the nozzle. The self-clamping heater is easy to install and remove and supports commercially available thermocouples.

## THERMASLEEVE Heater Construction

Watlow constructs its THERMASLEEVE nozzle heaters through a process of spraying resistor and dielectric materials on a metal substrate. This approach offers benefits over traditional heaters. THERMASLEEVE heaters can place heat precisely where it is needed, use less energy, help improve cycle times and yield and overcome traditional size restrictions. It also resists



Watlow's THERMASLEEVE nozzle heater has an extremely low physical profile with inside diameters ranging from 12.70 mm (0.50 in.) to over 34.90 mm (1.37 in.).

*Watlow's  
THERMASLEEVE  
Nozzle Heater...  
the Next Step  
in Heating  
Technologies ...*

## Rapid Thermal Response

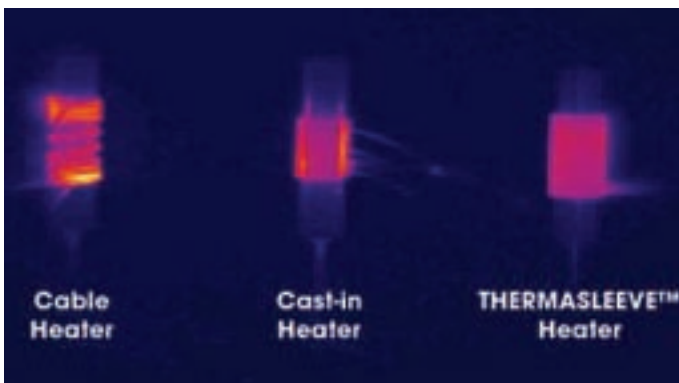
Watlow's THERMASLEEVE heaters are designed to have intimate contact with the entire surface of the nozzle, optimizing heat transfer. This intimate contact combined with lower heater mass contributes to rapid transfer of heat to and from the tip versus conventional heaters. The quick thermal response helps reduce cycle times and ensures high quality parts. Optimized heat transfer also equals lower heater temperature, which translates into less energy consumption of the entire system.

## Precise Temperature Profile

Whether your application requires an even or varied temperature distribution, Watlow's exclusive technology allows hot runner manufacturers to create precise temperature profiles beyond the limits of conventional heaters. Watlow uses this technology to create a signature profile specific to an application. A customized temperature profile leads to better flow through the nozzle, increases quality and shot-to-shot consistency.

## Low Physical Profile

The THERMASLEEVE hot runner nozzle heater is designed to have an extremely low profile. The heater comes in a small package with inside diameters ranging from 12.70 mm (0.50 in.) to over 34.90 mm (1.37 in.). Wall thickness ranges from as little as 2.00 mm (0.08 in.) up to 2.80 mm (0.11 in.). Even with a low profile, the THERMASLEEVE heater offers high wattages and better heat transfer compared to conventional heaters.



This thermal scan shows the inconsistency in heaters using traditional resistor wire products. Note the cable and cast-in heaters show the wire is hotter than the THERMASLEEVE technology, which is more uniform.

## Precision Fit

Watlow's THERMASLEEVE heater has intimate contact with the nozzle body due to its self-clamping feature. This ensures the heater is secured

in position during operation. No additional clamping device is needed. The heater maintains adequate clamping force throughout the temperature range with no modification needed to the nozzle body. This makes it easier to install and remove. The result is an optimized thermal coupling of the heater to the nozzle body.

## Repeatability

This evolutionary heater enables batch-to-batch consistency made possible by Watlow's revolutionary patented technology. The heater also has a repeatable thermal profile within each batch. THERMASLEEVE heaters allow accurate temperature and customizable wattage distribution across all of the nozzles on a hot runner system. This leads to increased productivity and quality of the final plastic product even with the most challenging resins.

## Optional External Thermocouple

The THERMASLEEVE heater can house an external thermocouple secured to the nozzle's body assuring reliability of the nozzle/sensor interface. The heater is designed with a slot to accommodate commercially available, off-the-shelf, thermocouple wire. An included retaining clip secures the thermocouple in position. This means a thermocouple groove does not need to be machined into the nozzle.

## Easy Installation and Removal

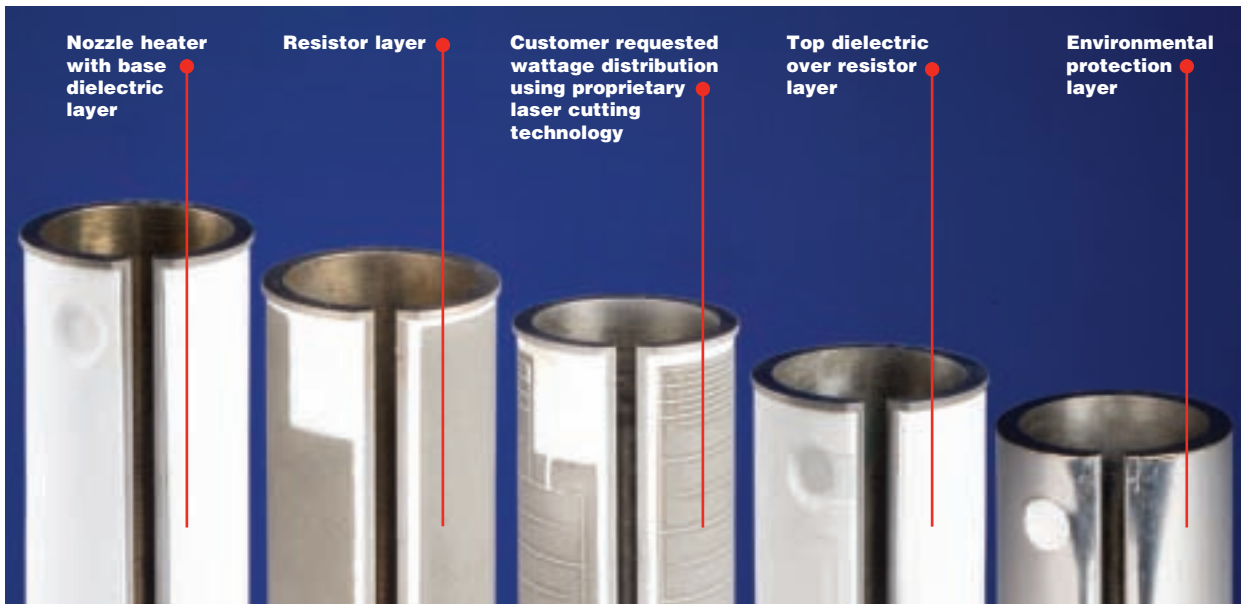
Watlow's new self-clamping THERMASLEEVE nozzle heater can be easily installed and removed from the nozzle with the installation and removal tool. The tool is designed specifically for ease of installation and removal helping to reduce the time required for mold maintenance. It also allows the heater to be reapplied to the nozzle after it is removed.



The self-clamping feature of the THERMASLEEVE heater allows it to be easily installed and removed from the nozzle with the installation and removal tool.



## THERMASLEEVE Heater Construction



### Nozzle Heater Comparison

	THERMASLEEVE	Cable/Coil	Cast-in
<b>Uniform temperature</b>	<ul style="list-style-type: none"> <li>Stable</li> <li>Repeatability</li> <li>Computer controlled distribution of heater power</li> </ul>	<ul style="list-style-type: none"> <li>Unstable</li> <li>Heaters can change geometry during cycling</li> </ul>	<ul style="list-style-type: none"> <li>High thermal conductivity</li> <li>Brass provides distribution of heat energy</li> </ul>
<b>Customizable wattage distribution</b>	<ul style="list-style-type: none"> <li>Customer selects from one to three unique zones of power and up to two zones of no-heat</li> </ul>	<ul style="list-style-type: none"> <li>Inexact wattage zones with undefined borders</li> </ul>	<ul style="list-style-type: none"> <li>Brass renders power distribution techniques ineffective</li> <li>Temperature differences along heater surfaces tend to diffuse</li> </ul>
<b>Precise temperature profile</b>	<ul style="list-style-type: none"> <li>Individual heating zones can be as short as 10 mm (0.39 in.) in length</li> <li>Custom temperature profiles are available</li> </ul>	<ul style="list-style-type: none"> <li>Zones have imprecise borders</li> <li>Gradual transition between zones</li> </ul>	<ul style="list-style-type: none"> <li>Zones have very imprecise borders</li> </ul>
<b>Variable power density</b>	<ul style="list-style-type: none"> <li>Each zone can be designed for &lt;math&gt;&lt; 1 \text{ W/cm}^2&lt;/math&gt; up to &lt;math&gt;15.5 \text{ W/cm}^2&lt;/math&gt; with intimate thermal contact</li> </ul>	<ul style="list-style-type: none"> <li>Less power is available</li> <li>Line contact to nozzle only &lt;math&gt;6 \text{ W/cm}^2&lt;/math&gt;</li> </ul>	<ul style="list-style-type: none"> <li>Less power is available</li> <li>Internal cable heater &lt;math&gt;12 \text{ W/cm}^2&lt;/math&gt;</li> <li>Ring shaped heater tends to lift-off from nozzle</li> </ul>
<b>Low physical profile</b>	<ul style="list-style-type: none"> <li>Wall thickness ranges from 2.00 – 2.80 mm (0.08 – 0.11 in.)</li> </ul>	<ul style="list-style-type: none"> <li>Profile depends on type and wattage: 1.60 - 4.00 mm (0.06 – 0.15 in.)</li> </ul>	<ul style="list-style-type: none"> <li>5.00 mm (0.19 in.) for cast-in and 3.00 mm (0.11 in.) for mini cast-in</li> </ul>
<b>Ease of installation and removal</b>	<p><b>Easy</b></p> <ul style="list-style-type: none"> <li>Installation/removal tool included designed to work within a 3.00 mm (0.11 in.) annulus</li> <li>Heater does not "bake" to nozzle</li> </ul>	<p><b>Hard</b></p> <ul style="list-style-type: none"> <li>Elements will be bent out of shape</li> <li>Heater easily damaged or destroyed on removal</li> </ul>	<p><b>Hard</b></p> <ul style="list-style-type: none"> <li>Elements are often destroyed on removal because of corrosion between the heater and nozzle</li> </ul>
<b>Accommodates a thermocouple</b>	<ul style="list-style-type: none"> <li>Heater has a slot designed to accommodate thermocouples</li> <li>Retaining clip secures thermocouple in place and allows easy removal</li> </ul>	<ul style="list-style-type: none"> <li>Thermocouple is typically internal to the heater and senses internal heater temperature rather than nozzle temperature</li> </ul>	<ul style="list-style-type: none"> <li>Thermocouple is typically internal to the heater and senses internal heater temperature rather than nozzle temperature</li> </ul>



Find out more about Watlow and how we can provide thermal solutions for your company:

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## About Watlow

Watlow Electric Manufacturing Company (Watlow) designs and manufactures industrial heaters, temperature sensors, controllers, system assemblies and software – all of the components of a thermal system. Designing and manufacturing the complete thermal system allows Watlow to recommend, develop and deliver the optimum thermal solution for our customers' equipment and process heat requirements.

Watlow manufactures thermal systems for a broad range of industries including but not limited to: semiconductor processing, aerospace, analytical instrumentation, medical equipment, packaging, foodservice equipment and plastics processing. Watlow customers receive the highest level of technical engineering combined with exceptional customer service.

Since 1922, Watlow has grown in product capability, market experience and global reach. We hold more than 140 patents and employ 2,000 employees working in 13 manufacturing facilities in the United States, Mexico, Europe and Asia. We also have sales offices in 17 countries around the world. Our company has grown at an exponential rate but our commitment remains the same – to provide our customers with superior products and services for their individual needs.

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