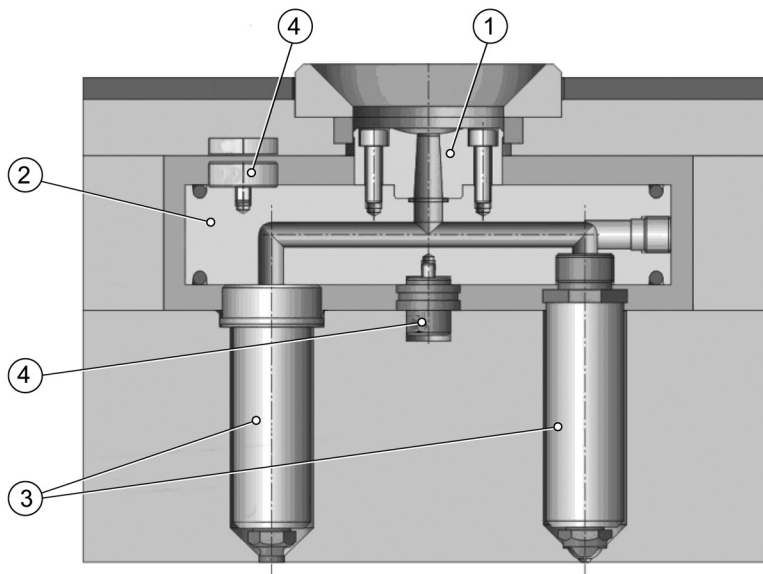




## Product Description

## 2 Product Description

Synventive Hot Runner Systems are temperature-controlled runner systems (230V) installed in injection molds for melt distribution and generally for plastics manufacturing optimization.



Doc003085.png

**Synventive Hot Runner Systems generally comprise an:**

- (1) Inlet bushing
- (2) Manifold
- (3) Nozzles
- (4) System support elements

### NOTICE

These essential parts can be optionally supplemented with meltflow control, connections, hot halves and temperature controllers, depending on type or application.



## Product Description

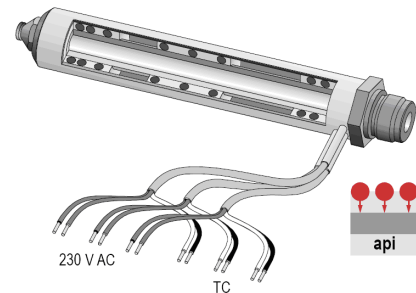
## 2.1 Nozzle Types

There are three types of Synventive hot runner nozzles which can be heated in two ways.

- Sprue bushings
- Support ring nozzles
- Threaded nozzles

### 2.1.1 API heating

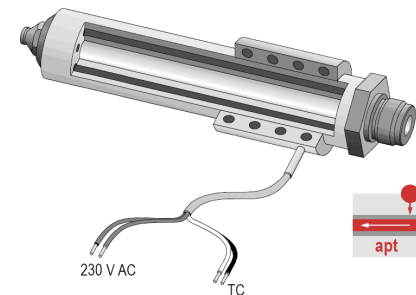
API nozzles are heated from outside through one or more heating zones with the corresponding power distribution. These zones are placed in multiple points along flow path so as to provide an optimum energy amount to the specific sections, thus ensuring a homogeneous temperature profile.



Doc003086.png

### 2.1.2 APT heating

APT nozzles are heated from outside using a single zone. Heat pipes are located parallel to the flow channel; through active energy transfer and distribution from the respective thermal source, these pipes ensure a homogeneous temperature profile along flow path. A heater is usually incorporated, depending on application specifics.

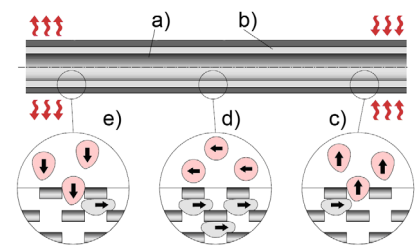


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#### 2.1.2.1 Heat pipe operation

The heat pipe comprises of a vacuum cut out (a) with a capillary structure (b) inside. Heat transfer inside this pipe is ensured by circulation provided by evaporation, vapor expansion, vapor condensation and condensate backflow due to capillary forces.

- Energy intake through evaporation
- Vapor expansion in the direction of lower pressure
- Heat transfer through condensation



Doc003088.png

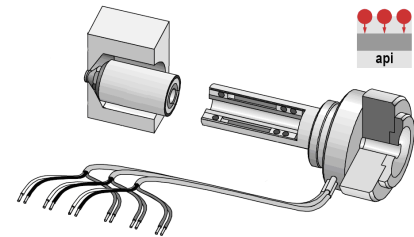


## Product Description

### 2.1.3 Sprue Bushing Nozzles

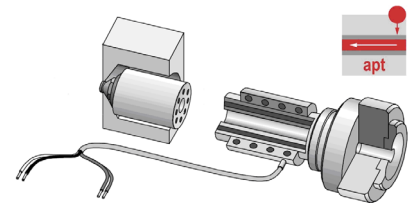
Single nozzles are hot runner nozzles with the inlet bushing directly mounted on the nozzle head. These nozzles are therefore also called heated inlet bushings or heated sprue bushings.

Sprue Bushing, API type



Doc003089.png

Sprue Bushing, APT type

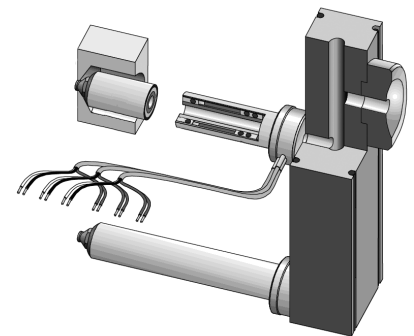


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### 2.1.4 Support Ring Nozzles

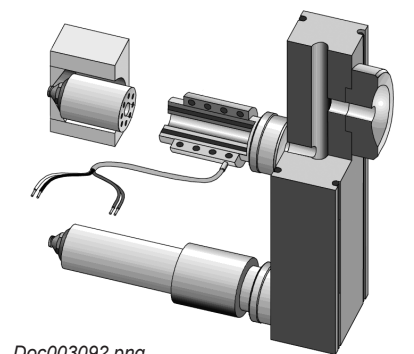
Support ring nozzles are hot runner nozzles mounted to manifolds by pressing the face of the nozzle head to the bottom surface of the manifold, the connection being such that during heating, the expanding manifold can “slide” on the nozzle heads.

Support ring nozzles, API type



Doc003091.png

Support ring fit nozzles, APT type



Doc003092.png

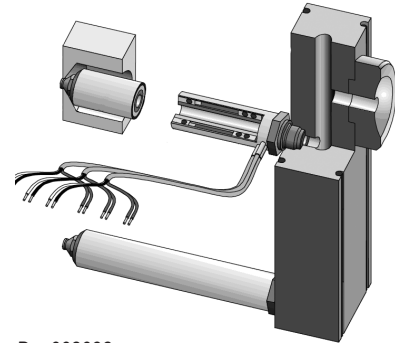


Product Description

### 2.1.5 Threaded Nozzles

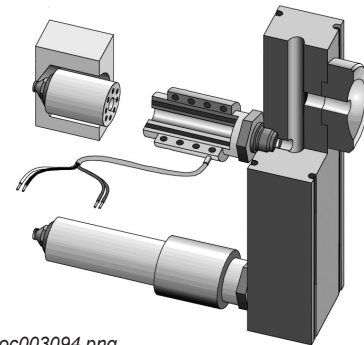
Threaded nozzles are hot runner nozzles screwed into the manifold.

Threaded nozzles , API type



Doc003093.png

Threaded nozzles , APT type – Doc003094.png



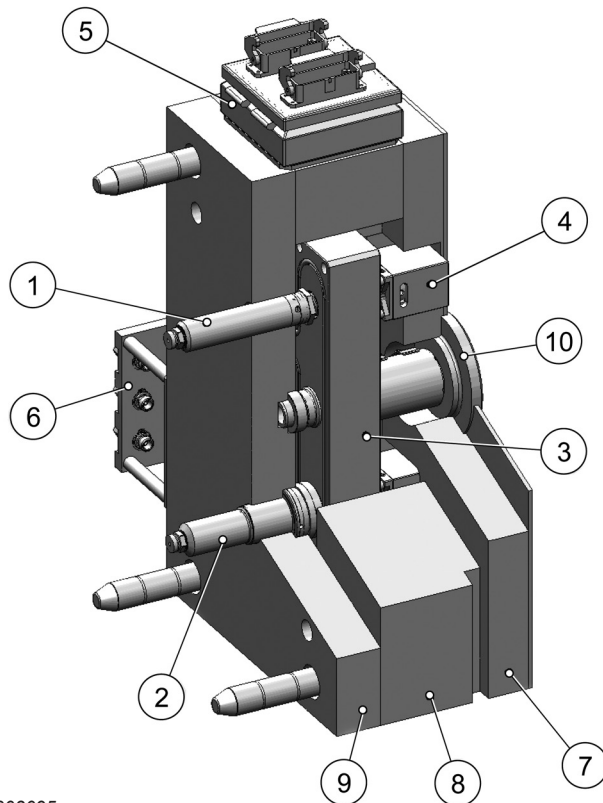
Doc003094.png



## Product Description

## 2.2 Hot Half

Synventive can also supply Hot Runner Systems as a complete hot half. Hot half is a preliminary stage for the fixed mold half and, as such, is supplied inclusive of the respective plates. The plates are fitted with cables and, if applicable, hose connections (hydraulics and pneumatics, if applicable), fully mounted and ready for assembly. Hot halves are designed and built to the customer's mold specifications.



Doc003095.png

### Components

- (1) Threaded nozzle
- (2) Support ring nozzle
- (3) Manifold
- (4) Valve gate actuator
- (5) Connection box (electricity)
- (6) Hose connections
- (7) Clamping plate
- (8) Spacer plate
- (9) Cavity plate
- (10) Inlet bushing

### 2.2.1 Hot Half Installation with Nozzles Hot Straight

This system has been designed with the nozzles to be straight in the hot condition. The nozzle locations have been offset to allow for the thermal expansion of the manifold. The nozzle tips will align with the gate locations in the mold after the manifold has reached operating temperature. To install the system onto the mold the manifold and inlet must be preheated.

#### **! WARNING**

##### Hot Surfaces Hazard

As the manifold is heated any plastic inside will expand. It is important to also heat the inlet to allow the plastic to expand out the inlet orifice and avoid any buildup of pressure in the manifold.

#### **NOTICE**

Refer to the Synventive Instruction Manual for complete instructions for Hot Runner installation and Servicing. These instructions are in addition only to the Synventive Instruction Manual.

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## Product Description

**Additional Installation Procedure:**

- 1) Pre heat the manifold to 220°C by using all manifold heating zones and the inlet zone. Refer to the Synventive Instruction manual for proper procedure.
- 2) Do not heat the nozzles.
- 3) Allow the manifold to soak for 15 minutes to be sure it is fully expanded.
- 4) Install the hot half onto the mold and secure with the required screws.

**Additional Procedure to remove the Hot Half from the mold:**

- 1) Remove the screws that secure the Hot Half to the mold.
- 2) Separate the hot half from the mold.
- 3) No preheating is needed to separate the Hot Half from the mold.