10.1 Nozzles (API)

Depending on nozzle type the nozzle body including heaters constitutes a single replaceable unit. An exception to this is the 03 and 04 nozzle types. The nozzle body and the heater of these two nozzle types can be replaced individually.

This section describes nozzle parts and uses a CBFT nozzle as an example.

### WARNING

#### Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

- Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.
- When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

#### Hazard of Pressurized Air

Pressurized air blow can result in hot plastic parts or foreign bodies entering the eyes, causing vision damage.

- Use personal protective equipment: Face protection, hearing protection and gloves.

### CAUTION

#### Hazard of Material Damage

Any impact against the nozzle tip may result in its damage.

- Never hammer or impact the nozzle tip from the front (i.e. from the side of the mold).
- Twisting could damage the nozzle tip.
  - When using the slide hammer, make sure the nozzle is pulled straight, without twisting.
  - When replacing the nozzles, the sealing rings must always be replaced.
10.1.1 Nozzle under the manifold and Accessories for single Nozzles, example of CBFT nozzle

In this section the nozzle parts are identified with the numbers indicated in the following figure.

**CAUTION**

Always tighten the screws to the torque specified in the respective table in section 13.2.3.

**Nozzles under the manifold**

1. Nozzle body incl. heating
2. Nozzle tip
3. Cone point insert
4. Sealing ring
5. Centering pin

**Accessories for single nozzles**

6. Insulation ring
   - (only on Support ring / Face fit nozzles)
7. Clamp band
8. Heater
9. Upper part (of the head)
   - (only individual single head for threaded / screw fit nozzles)
10. Lower part (of the head)
   - (only individual single head for threaded / screw fit nozzles)
11. Socket head cap screw
12. Counter sunk screw
10.1.2 Dismantling a single Nozzle and Nozzles under the manifold from injection mold

**NOTICE**

A slide hammer tool (Ta) must be used to remove the nozzle from the injection mold.

For this purpose the nozzle head (1) (9) is fitted with two threaded holes.

A single head has one threaded hole.

You can order a slide hammer tool from Synventive.

1) Attach the slide hammer tool (Ta) to the nozzle body (1)/head (9) using two socket head cap screws (Tb).

2) Using a thrusting movement of the hammer (Ta), hit it all the way to the stop position (Tc) several times until the nozzle is released.
3) Pull the nozzle out of the cut out, making sure it does not twist, as it could damage the nozzle tip.

10.1.2.1 Nozzle Tip removal

1) Attach the nozzle in smooth vice jaws or in vice jaws fitted with guards on the lateral flat surface (b) of the body (a).

**CAUTION**

Never attach the nozzle at the centering ring (c) or the nozzle body (a).

**WARNING**

Hot Surfaces Hazard

2) Heat the nozzle using the nozzle heater until the plastic melts.
3) Clean the nozzle (through nozzle head) using pressurized air to remove as much residual plastic as possible.

4) Unscrew the nozzle tip (2) from the nozzle body (1).

10.1.2.2 Removing the Nozzle Tip in event of Heater Failure

1) Heat the nozzle tip (2) using a heat gun to the maximum temperature of 450 °C (840 °F).

2) Clean the nozzle (through nozzle head) using pressurized air to remove as much residual plastic as possible.
3) Unscrew the nozzle tip (2) from the nozzle body (1).

10.1.2.3 Removing the Cone Point Insert

1) Affix the nozzle (2) in a vise.

- **NOTICE**
  - Using the wrench flats to secure it in the vise.
  - To make removal easier, the cone point insert is fitted with an extended shank.

- **WARNING**
  - Hot Surfaces Hazard

2) Heat the nozzle tip (2) using a heat gun to the maximum temperature of 450 °C (840 °F).

3) Secure the cone point insert (3) at the extended shank end with pliers and pull it out from the nozzle tip (2) using slight rotating movements.

- **NOTICE**
  - If unable to remove the cone point insert (3) from the nozzle tip (2), send the part to the nearest Synventive service center.
10.1.3 Dismantling single Nozzles from Injection Mold

1) Unscrew the 3 counter sunk screws (12) to remove the sealing ring (6) from the upper part (9) of the head.

2) Remove the heater band clamp (7) from heater (8).

3) Remove the heater (8) from upper part (9) of the head.
4) Unscrew the 3 socket head cap screws (11).

5) Release the upper part (9) from the lower part (10).

   **NOTICE**
   
   If it is difficult to split the two parts, use a brass pry bar or brass scraper.

6) Remove the sealing ring (4) from the nozzle (1).

7) Remove the lower part (10) from the nozzle body (1).
10.1.4 Assembling the single Nozzle

**WARNING**

**Hot Surfaces Hazard**

Contact between the skin and the hot nozzle could result in burns. Use personal protective equipment: Gloves resistant to high temperatures, apron, sleeves, to guard against burns.

---

10.1.4.1 Replacement of Nozzle Tip on Nozzles still in the Mold Base

On support ring / face fit nozzles (except for nozzles 03C and 03S) and threaded / screw fit nozzles, it is possible to replace the nozzle tip in the built-in condition.

The following conditions to be met:

- Support ring / Face fit nozzles shall be secured in the injection mold against rotation (e.g. with a pin) to prevent damage to nozzle heaters and leads.
- The injection mold to be fitted with a replaceable cavity plate.
- The replaceable cavity plate to be installed precisely on the pillars or matching elements (without any stress on the nozzle tip).

**CAUTION**

**Hazard of Material Damage**

Danger of tearing-off of the nozzle tip.

The nozzles must be in a cold state when the cavity plate is removed or re-installed.

1) For support ring face fit nozzles, wait until the nozzles in the injection mold cool down to room temperature.

**CAUTION**

For threaded / screw fit nozzles, manifold and nozzles must be cool down to room temperature.

2) Pull the cavity plate of from the guiding elements.
3) Heat the nozzles using nozzle heating until the plastic melts.

**CAUTION**

For threaded / screw fit nozzles, hold the nozzle firmly with an engineer's wrench using the hexagonal shape on the nozzle body.

4) Unscrew the nozzle tip (2) from the nozzle body (1).

5) Wait until the nozzles cool down.

6) Lubricate the thread (not the face) of the new nozzle tip with high-temperature assembly paste (anti-seize compound).

**NOTICE**

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

7) Install the new nozzle tip.

**CAUTION**

Use torque wrench with wrench insert and the torques indicated in the torque table (13.2.3).
10.1.4.2 Install the Nozzle Tip to the Nozzle Body

1) Thoroughly clean all nozzle parts, using:
   ● Wire brush on the outside
   ● Spiral wire brush on the inside

2) Verify there are no damaged spots or plastic residue on the mating surfaces (d).

3) Lubricate the thread (not the face) of the new nozzle tip with high-temperature assembly paste (anti-seize compound).

   **NOTICE**
   This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

4) Affix the nozzle tip (2) in a vise.

   **NOTICE**
   Using the wrench flats to secure it in the vise.

5) Heat the nozzle tip (2) using a heat gun to the maximum temperature of 450 °C (840 °F).
6) Insert the cone point insert (3) straight in the nozzle tip (2), making sure it does not twist.

7) Screw the nozzle tip (2) incl. the cone point insert (3) on the nozzle body (1).

**CAUTION**

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.2.3.

8) If a center ring pin (5) is used to secure against rotation, press it in the respective hole on the nozzle head.

9) Verify the system’s height adjustment once again (See section 4).

10) Insert a new sealing ring (4) between the nozzle (1) and the manifold.

**CAUTION**

The sealing ring (4) should be replaced anytime system maintenance is performed.
10.1.4.3 Assembling the Single Head

1) Insert the nozzle body (1) with the newly installed nozzle tip in the lower part (10).

   NOTICE
   Paying attention to the position of the center ring pin (5) between the nozzle body (1) and the lower part (10).

2) Make sure the nozzle body (1) bears flat on the lower part (10).

   NOTICE
   If needed, use a soft face hammer to fully seat the assembly.

3) Insert the sealing ring (4) in the respective recess on the nozzle head (1).

4) Put the upper part (9) on the lower part (10).

   NOTICE
   Paying attention to the nozzle’s cable outlet (a).
5) Screw the lower part (10) together with the upper part (9) using socket head cap screws (11).

6) Mount the heater (8) over the upper part (9).

**NOTICE**

Paying attention to the position of the heater’s cable outlet.
The heater cable outlet must go in the same direction as the nozzle’s cable outlet.

7) Place the heater band clamp (7) on the heater (8) and fix it firmly.

8) Screw with 3 counter sunk screw (12) the insulation ring (6) to the upper part (9).