Direct-Flo nozzles are the result of 5 decades of hot runner design and manufacturing experience. Plastic material is conveyed from the machine nozzle to the cavity by the most direct path thus minimizing stress and reducing pressure. Nozzle series are available with multiple lengths for a variety of applications accommodating small to very large shot weights. Each nozzle series has multiple gates configurations including hydraulic or pneumatic valve gate for highest gate quality. The DF Gold series has multiple flow channel sizes available from 3 to 25mm diameter.

DF Gold Features Include:

Twin Heater:
Incorporates two separate heating circuits in each nozzle heater. This provides for uninterrupted production if a single heater circuit failure occurs and allows for easy replacement during a planned maintenance period.

Improved Gating Configuration:
Several new tip designs have been added for increased application flexibility. All tips utilize proprietary coating that yields increased wear resistance.

Color Seal:
Please refer to INCOE’s standard color change purge process to remove all previous material. The color seal reduces the potential for any material to take residence in the insulation area.

Nozzle Assembly
- Maximum spherical radius depth is 2mm
- Head Insulator required (DFX-R)
- Head heater must be controlled on an individual zone
- Nozzle heater must be controlled on an individual zone
- Insulator between heater and center ring
- After disassembly, always replace O-ring on manifold applications
- Mold dimension must include expansion
- **Assembly with DFX Heads, replace only at INCOE plant.**
**Nozzle Heater**

Nozzle heaters are designed to direct the heat at critical positions along the length of the nozzle. This optimizes flow performance of the material and ensures long heater life while reducing heat transfer to the mold.

- Loosen set screw before disassembly, tighten after assembly.
- Use anti-seize compound. Heat up for disassembly, if necessary.
- Check continuity (OHM) before assembly.
- Protect wires against overheating.
- Extend TC only with Fe-CuNi type J or K if required.
- Consult INCOE before bending.
- Do not connect TC’s or heaters in parallel.

**Locating Rings**

Locating rings are used to position your nozzle. INCOE locating rings are available upon request, and are custom made per application.

<table>
<thead>
<tr>
<th>Series</th>
<th>O</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>DF 5</td>
<td>21</td>
<td>30</td>
</tr>
<tr>
<td>DF 8</td>
<td>29</td>
<td>32</td>
</tr>
<tr>
<td>DF 12</td>
<td>39</td>
<td>40</td>
</tr>
<tr>
<td>DF 18</td>
<td>46</td>
<td>45</td>
</tr>
<tr>
<td>DF 25</td>
<td>68</td>
<td>55</td>
</tr>
</tbody>
</table>

Reference dimensions O & N to design and position locating ring.
**Tip Puller**

**Removing a tip:**
Heat up nozzle tip or tip remover to approx. 150°C (302°F).

Screw on tip puller over the tip and pull tip straight out of nozzle body by using weight and screw. Do not twist, as this may cause damage.

Before assembly of new tip, make sure sealing area is clean.

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**Nozzle Torque Forces**

<table>
<thead>
<tr>
<th>Series</th>
<th>Nm / Lb-Ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>DF 3</td>
<td>30 / 22</td>
</tr>
<tr>
<td>DF 5</td>
<td>50 / 37</td>
</tr>
<tr>
<td>DF 8</td>
<td>110 / 81</td>
</tr>
<tr>
<td>DF 12</td>
<td>200 / 148</td>
</tr>
<tr>
<td>DF 18</td>
<td>250 / 184</td>
</tr>
<tr>
<td>DF 25</td>
<td>300 / 221</td>
</tr>
</tbody>
</table>

**Caps**

<table>
<thead>
<tr>
<th>Series</th>
<th>Nm / Lb-Ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>DF 3</td>
<td>5 / 4</td>
</tr>
<tr>
<td>DF 5</td>
<td>8 / 6</td>
</tr>
<tr>
<td>DF 8</td>
<td>35 / 26</td>
</tr>
<tr>
<td>DF 12</td>
<td>80 / 59</td>
</tr>
<tr>
<td>DF 18</td>
<td>120 / 89</td>
</tr>
<tr>
<td>DF 25</td>
<td>250 / 184</td>
</tr>
</tbody>
</table>

DFQ and DFX nozzles are application specific. DF heads are available with extra stock for angle or decompression applications.

- After cold torque force, the end caps must be retightened at a temperature of approx. 250°C (482°F).
- To unscrew end caps, heat up to approx. 250°C (482°F).
- Re-torque to proper torque setting.
- Always use high temperature anti-seize compound for threads.

Assembly with DFX Heads, replace only at INCOE plant.
Troubleshooting Single Nozzles

Gate Freezing:

- Melt temperature is too cold
- Gate land length is to print
- Tip insert damaged
- Gate diameter too small
- The face of the end cap is making contact with the mold
- Mold boring dimensions not to specification
- Foreign material in the gate area
- Drooling causing cold slug
- In topless applications; is the tip insert correctly oriented to the gate? Not too far back or too far forward (Tip set back)

End Cap Broken:

- The face of the end cap having a pre-load condition
- Over tightened
- Misalignment between the head and the end cap fit diameter

Freeze Off at the Head:

- Head heater or TC defective
- Head insulator ring is missing
- Mold locating ring inner diameter is too small (too much contact)
- Heaters on a separate zone of control
Troubleshooting Single Nozzles

Leakage at the End Cap

- Damaged fit diameter on end cap and/or mold bore
- Mold boring dimensions not to specification
- End cap is loose. Hot torque to INCOE specs.
- Possible cracked tip insert

Single Nozzle Head Cracking

- Radius too deep
- Mismatch between the barrel tip radius and the nozzle head radius

Nozzle Does Not Achieve Set Point

- Thermocouple issue
- Heater issue
- Water leak
- Nozzle leaking plastic

Gate Drooling or Stringing

- Machine nozzle, Orifice mismatch
- Nozzle set points too high for the material
- Too large of gate for the shot size
- Insufficient cooling in the gate area
- Improper decompression
- If the barrel is retracted from the nozzle and the drool stops, there is a machine issue

Material Sticking to the Face of the End Cap

- Insufficient cooling in mold
- Mold steel too hot
- Improper end cap contact (too little contact)
- Water cooled or topless style gate inserts are required
Troubleshooting Single Nozzles

Gate Vestige Too Long (ST/HT/CT):
- Normal length 50% of gate diameter for HT/ST (HTT/STT) style nozzles
- Normal length 100% of the gate diameter for CT/CTT style nozzles
- Tip has worn and now too short
- Gate land is too long
- Improper use of extra stock on a STXS/CTXS end caps
- Tip is improperly oriented to the gate area. Too far back (STT et al)
- Heater/cooling issues in the gate area
- Lack of decompression
- Check that mold temp is within material specs

Burn Marks on Molded Part:
- System temperature too high
- Residence time in system too long (interruptions)
- If shear sensitive plastic material (flame retardant) modification to gate SF-CT or CT
- No vent at burn
- Injection speed too high

Color Marks on Molded Part:
- Temperature sensitive material or poorly blended color
- Old color from former application in machine
- Old color in system. Follow INCOE recommended Color Change Procedure.

For questions or assistance, contact INCOE Service Department
Phone: 248-556-7790 / Email: tech.support@incoe.com