BETE Introduces the New Twist & Dry™, a Breakthrough in Spray Dryer Nozzle Maintenance
Choose The BETE Twist & Dry™

BETE Has Been Developing Specialized Industrial Nozzles for Over 50 Years

BETE’s success is built on its ability to engineer its nozzle designs to deliver the specific spray performance required for the most exacting applications. The BETE Twist & Dry™ is one of over 20,000 nozzle designs, engineered with the same precision and innovation as the nozzles we make for the space shuttle and nuclear power plants. Responsiveness to customer needs has led us to create designs that provide better performance, longer nozzle life, and greater ease of use. The BETE Twist & Dry™ is an engineered solution to an old maintenance problem that will save you valuable time and money.

We Make Nozzles Designed for Ease of Use as well as Superior Performance!

Replace the wear parts of your spray dry nozzles without turning the lances upside down.

The BETE Twist & Dry™ is the dryer operator’s nozzle. If you operate and maintain a spray dryer, you know just how difficult it can be to replace the nozzle wear parts. These unique features of the Twist & Dry™ design makes this chore much easier:

- Fewer parts
- Rugged Design: one piece swirl unit greatly reduces breakage of tungsten carbide pieces
- Easy Assembly: the Bete TD locking system* keeps the swirl chamber and orifice “locked” into position during assembly.
- Materials: Corrosion resistant 316 stainless steel body, tungsten carbide swirl unit and orifice disk, EPDM o-rings, other materials are available.
- Software support: Users of the Twist & Dry receive free-of-charge computer software that greatly simplifies selecting the correct swirl unit and orifice disk.
- Maximum Design Pressure: 7,500 psi, (517 bar)

* U.S. patent 5,934,569
Twist & Dry™

Nozzle For All Your Spray Drying Needs

Unique* “locking” mechanism keeps components securely in place during assembly and change out

Abrasion and corrosion resistant materials

Rugged Design

One piece swirl unit

Unobstructed fluid passages for clog-resistance and reliable operation

FDA Compliant materials for all food processing applications
Relationship of Twist & Dry™ Nozzle Design to Spray Characteristics and Performance
Twist & Dry®

Twist & Dry Component System

The Twist & Dry® series of nozzles was designed and developed for the spray drying industry, with the dryer operator specifically in mind. The patented locking system locks the swirl and orifice components into place prior to installation on the spray lance, eliminating many of the hassles associated with replacing wear parts and allowing for easier installs. Through continuous development and innovation, BETE offers solutions for high pressure, high temperature, and abrasive media applications.

DESIGN FEATURES
- Product consistency
- Premium tungsten carbide disc available for extended wear life
- Hand tighten - no special tools required for assembly
- Easy to maintain
- Clog-resistant design
- 218SS body for anti-galling

SPRAY SET-UPS
The spray angle and flow rate of a Twist and Dry assembly is determined by the swirl and orifice combination. The Twist & Dry series has almost 1,000 different combinations of swirl and orifice discs to provide flow rates and spray angles that best fit your needs. To locate the right swirl and orifice combination refer to the following TD/TD-K and TDL pages.

TD Series
The original TD series features BETE’s innovative and patented locking lug feature, single piece thick swirl component, clog-resistant design, and multiple carrier options to provide ease of installation, operation, and maintenance.
- BETE’s patented lug design
- Clog-resistant design

TDL Series
The TDL series offers a compact nozzle design that is ideal for small-scale applications and pilot testing.
- BETE’s patented lug design
- Small-scale applications
- Pilot testing

TD-K High Pressure Design
The TD-K series incorporates a PEEK back-up ring and optional Duplex carrier to allow for operation in high-pressure applications. Higher operating pressures can help increase yield, saving time and money. The TD series includes:
- TD-7K: rated for 7,000 psi
- TD-10K: rated for 10,000 psi

High Temperature (HT) Design
The HT set-up utilizes a special body design and carrier #7 to replace the traditional O-ring seals with metal gaskets, allowing for operation at high temperatures.
- HT rated for 7,000 psi at 800 °F
- No O-rings

Tungsten Carbide Options

<table>
<thead>
<tr>
<th>Tungsten Carbide Options</th>
<th>Suitable for most general spray drying applications</th>
<th>Superior wear resistance for extremely abrasive spray media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pro Grade</td>
<td></td>
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<tr>
<td>Premium Grade</td>
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</tbody>
</table>

www.BETE.com

SPECIAL PURPOSE
TO ORDER: specify pipe size, connection type, nozzle number, and material.

413-772-0846

Same day shipping for wear parts!
**Twist & Dry® Components & Options**

Talk to one of our engineers; we're here to help you find the right solution for your application!

413-772-0846

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To Order: Spray Set-up Number

<table>
<thead>
<tr>
<th>pipe size</th>
<th>carrier style</th>
<th>connection type</th>
</tr>
</thead>
<tbody>
<tr>
<td>¼ TD 2 - 025 - CI1 - 7K - 45 - CVB - B</td>
<td>carrier in Duplex 2205</td>
<td>HT if temperature is greater than 450 °F (232 °C) and less than or equal to 800 °F (427 °C); max pressure 7000 psi (485 bar)</td>
</tr>
</tbody>
</table>

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**Twist & Dry Material Selection Guide**

<table>
<thead>
<tr>
<th>Pressure</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>psi</td>
<td>bar</td>
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<tr>
<td>----------</td>
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<tr>
<td>10,000</td>
<td>690</td>
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<td>7,000</td>
<td>485</td>
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<tr>
<td>5,000</td>
<td>345</td>
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<td></td>
<td></td>
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<tr>
<td>3,500</td>
<td>240</td>
</tr>
<tr>
<td>800</td>
<td>55</td>
</tr>
</tbody>
</table>

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**Durable Beard-Deterring**

Carrier 1 (C11) (shown)
Carrier 11 (C111) - without lug

**Standard Carrier**

Carrier 2 (C12) (shown)
Carrier 5 (C15) - without lug

**Knife Edge Anti-Bearding**

Carrier 10 (C110) (shown)
Carrier 12 (C112) - without lug

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**Contact Information**

Call for the name of your nearest BETE representative.

CALL 413-772-0846

www.BETE.com
**Twist & Dry® Hollow Cone**

**DESIGN FEATURES**
- Patented locking mechanism for quick and easy change-out and maintenance
- High pressure applications:
  - TD-K with PEEK backup ring
  - HT body with Carrier #7
- High temperature applications:
  - TD/TD-K bodies with silicone O-ring
  - HT body with Carrier #7
- Female pipe thread or butt-weld connections
- Hand tighten, no special tools required
- Orifice size: 0.034” through 0.157”
- Interchangeable swirl and orifice discs for variable patterns and flow rates

**Spray Characteristics**
- Spray pattern: Hollow Cone
- Flow rates: 8.94 to 2,210 gph
- Spray angle: 50° through 85°, as listed

**Spray Angle Performance**
- Performance varies with pressure. Contact BETE for specific data on critical applications.

**Dimensions are approximate. Check with BETE for critical dimension applications.**

**Twist & Dry/TD-K Flow Rates**

| Female Pipe Size | Nozzle Number | Spray Angle | Swirl | Orifice Dia. (in.) | K Factor | 200 GPH PSI | 500 GPH PSI | 750 GPH PSI | 1000 GPH PSI | 1250 GPH PSI | 1500 GPH PSI | 1750 GPH PSI | 2000 GPH PSI | 2500 GPH PSI | 3000 GPH PSI | 4000 GPH PSI | 7000 GPH PSI | 10,000 GPH PSI |
|-----------------|---------------|-------------|-------|--------------------|----------|-------------|-------------|-------------|--------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|
| 3/4”            | TD1-45        | 75°         | 85°   | SW5 0.034          | 0.037    | 40.0        | 52.9        | 63.2        |              |              |              |              |              |              |              |              |              |
|                 | TD1-49        | 60°         | 70°   | SW4 0.034          | 0.040    | 43.3        | 55.9        | 66.2        |              |              |              |              |              |              |              |              |              |
|                 | TD2-32        | 70°         | 80°   | SW2 0.034          | 0.043    | 60.6        | 79.4        | 92.9        |              |              |              |              |              |              |              |              |              |
|                 | TD2-37        | 75°         | 85°   | SW1 0.040          | 0.049    | 50.0        | 66.2        | 79.1        |              |              |              |              |              |              |              |              |              |
|                 | TD4-43        | 60°         | 70°   | SW3 0.043          | 0.049    | 30.0        | 42.4        | 52.9        |              |              |              |              |              |              |              |              |              |
|                 | TD4-46        | 65°         | 75°   | SW2 0.043          | 0.049    | 28.0        | 39.5        | 49.5        |              |              |              |              |              |              |              |              |              |
|                 | TD6-46        | 70°         | 75°   | SW1 0.043          | 0.049    | 26.0        | 37.9        | 47.9        |              |              |              |              |              |              |              |              |              |
|                 | TD6-50        | 75°         | 80°   | SW3 0.040          | 0.049    | 24.0        | 34.3        | 44.3        |              |              |              |              |              |              |              |              |              |
|                 | TD6-53        | 80°         | 85°   | SW2 0.040          | 0.049    | 22.0        | 32.4        | 42.4        |              |              |              |              |              |              |              |              |              |
|                 | TD6-55        | 85°         | 90°   | SW1 0.037          | 0.057    | 20.0        | 30.1        | 40.1        |              |              |              |              |              |              |              |              |              |
|                 | TD6-58        | 90°         | 95°   | SW3 0.040          | 0.049    | 18.0        | 27.5        | 37.5        |              |              |              |              |              |              |              |              |              |

**Flow Rate (GPH) = K / PSI**

**Standard Materials:**
- Carrier: Stainless Steel, Duplex
- Body: Stainless Steel
- Swirl/Orifice: Tungsten Carbide

Spray angle performance varies with pressure. Contact BETE for specific data on critical applications.

*Applies to threaded TD body and standard carrier(s)
### Twist & Dry/TD-K Flow Rates

**Hollow Cone; 50° - 85° Spray Angles; 1/4", 3/8", 1/2", and 3/4" Pipe Sizes; NPT, BSP, or Weld Prep**

<table>
<thead>
<tr>
<th>Female Pipe Size</th>
<th>Nozzle Number</th>
<th>Spray Angle</th>
<th>Orifice Dia. (in.)</th>
<th>Swirl</th>
<th>K Factor</th>
<th>200 PSI</th>
<th>500 PSI</th>
<th>750 PSI</th>
<th>1000 PSI</th>
<th>1250 PSI</th>
<th>1500 PSI</th>
<th>1750 PSI</th>
<th>2000 PSI</th>
<th>2500 PSI</th>
<th>3000 PSI</th>
<th>4000 PSI</th>
<th>7000 PSI</th>
<th>10,000 PSI</th>
</tr>
</thead>
</table>
| **SW10 only available in Pro Grade Tungsten Carbide**

Flow Rate (GPH) = K \( \sqrt{\text{PSI}} \)

Standard Materials: Carrier: Stainless Steel, Duplex; Body: Stainless Steel; Swirl/Orifice: Tungsten Carbide

Spray angle performance varies with pressure. Contact BETE for specific data on critical applications.

www.BETE.com

CALL 413-772-0846
Twist & Dry® Low Flow Hollow Cone

DESIGN FEATURES
- Patented locking mechanism for quick and easy change-out and maintenance
- Lower flow rates than Twist & Dry series
- Female-threaded or butt weld pipe connections
- Orifice size: 0.018" through 0.058"
- Interchangeable swirl and orifice discs for variable patterns and flow rates

SPRAY CHARACTERISTICS
- Hollow Cone
- Flow rates: 2.86 to 123 gph
- Spray angle: 70° - 75°

Ideal for small-scale applications and pilot tests

Dimensions are approximate. Check with BETE for critical dimension applications.

TDL Flow Rates
Hollow Cone, 70° - 75° Spray Angles, 1/4" and 3/8" Pipe Sizes, NPT or BSP

<table>
<thead>
<tr>
<th>Female Pipe Size</th>
<th>Orifice</th>
<th>Swirl Dia. (in.)</th>
<th>K Factor</th>
<th>200 PSI</th>
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<th>750 PSI</th>
<th>1000 PSI</th>
<th>1250 PSI</th>
<th>1500 PSI</th>
<th>1750 PSI</th>
<th>2000 PSI</th>
<th>2500 PSI</th>
<th>3000 PSI</th>
<th>4000 PSI</th>
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<tr>
<td>TDL-14-8</td>
<td>SWL1</td>
<td>0.016</td>
<td>0.202</td>
<td>2.86</td>
<td>4.53</td>
<td>5.54</td>
<td>6.40</td>
<td>7.16</td>
<td>7.84</td>
<td>8.47</td>
<td>9.10</td>
<td>10.1</td>
<td>11.1</td>
<td>12.8</td>
<td>14.3</td>
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<tr>
<td>TDL-14-20</td>
<td>SWL4</td>
<td>0.020</td>
<td>0.215</td>
<td>3.04</td>
<td>4.81</td>
<td>5.89</td>
<td>6.80</td>
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<td>9.19</td>
<td>9.92</td>
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<td>11.9</td>
<td>13.0</td>
<td>15.0</td>
<td>16.8</td>
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<td>0.272</td>
<td>3.85</td>
<td>6.08</td>
<td>7.45</td>
<td>8.60</td>
<td>9.62</td>
<td>10.5</td>
<td>11.4</td>
<td>12.2</td>
<td>13.6</td>
<td>14.9</td>
<td>17.2</td>
<td>19.2</td>
</tr>
<tr>
<td>TDL-14-27</td>
<td>SWL4</td>
<td>0.027</td>
<td>0.316</td>
<td>4.47</td>
<td>7.07</td>
<td>8.66</td>
<td>10.0</td>
<td>11.2</td>
<td>12.2</td>
<td>13.2</td>
<td>14.1</td>
<td>15.8</td>
<td>17.3</td>
<td>20.0</td>
<td>22.4</td>
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<td>15.8</td>
<td>17.3</td>
<td>20.0</td>
<td>22.4</td>
</tr>
</tbody>
</table>

TDL Assembly

Flow Rate (GPH) = K \sqrt{PSI}

Standard Materials: Carrier: Stainless Steel; Body: Stainless Steel; Swirl/Orifice: Tungsten Carbide

Spray angle performance varies with pressure. Contact BETE for specific data on critical applications.

www.BETE.com
The Easiest Assembly of Any Spray Drying Nozzle Available Today

1. Place carrier o-ring into carrier.
2. Place orifice disc into carrier. The polished radius side of the disc should be facing you when properly positioned.
4. The swirl chamber is now ready to be “locked” into the carrier.
5. Use flathead screwdriver, with a slight push the swirl chamber can be twisted to ‘lock’ beneath the lugs. The swirl chamber and orifice disc are now securely held in place for continued assembly. Components remain properly positioned regardless of orientation due to unique BETE locking system.
6. Place o-ring on body in groove.
7. Although lubricating the large o-ring is not required, using the enclosed lubricant eases the last assembly step.
8. Hand tighten (25 in-lb. torque max.) the carrier to the body. (Even if the body is welded to a lance, the carrier goes on easily and the internal parts are held in their proper position.)

Tech Tip!
An easy way to line up the orifice disc inside the carrier is to place it on the point of a plastic rod or pencil and use the device to guide the disc into position. Then flip the carrier over and insert the swirl unit and twist.
Contact Your Local Representative: