Twist & Dry®

For All Your Spray Drying Needs

Now available with a new premium grade tungsten carbide, high temperature design, and new lug design.



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.

Recent Innovations in the TD/TD-K Series

- New, improved lug design
- High temperature body and carrier with metallic gaskets
- New premium grade of tungsten carbide

New Lug Design

New lug design improves manufacturability and the ability to offer carriers in a wide range of materials, including Duplex 2205 used in TD 10K models.



Cutaway view of carrier showing BETE's unique locking lug feature

High Temperature 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 in high temperature and pressure applications.

- HT rated for 7,000 psi (483 bar) at 800 °F (427 °C)
- No O-rings



New Premium Grade of Tungsten Carbide

Side-By-Side Material Comparison:

Standard Grade Tungsten Carbide:

Material Code 7H

- Hardness: 92.5 HRA
- 7H is the original grade of tungsten carbide used by BETE.
- Suitable for most spray drying applications.

New! Premium Grade Tungsten Carbide:

Material Code T11

- Hardness: 94.2 HRA
- T11 is the newest grade of tungsten carbide being offered by BETE.
- Harder material for increased wear resistance.
- Suitable for highly abrasive media.
- Similar corrosion resistance properties as standard grade

Field Tests

BETE's new grade of tungsten carbide was extensively field tested by customers spraying some of the most abrasive media in the industry, resulting in a high turnover of wear parts.

- BETE's new premium grade significantly outperformed competitors' "standard" grades of tungsten carbide leading to longer service life and less downtime.
- BETE's new premium grade performed the same or better than competitors' "high end" grades of tungsten carbide in long-term tests.

BETE®
BETE Fog Nozzle, Inc.

Same day shipping of wear parts!

50 Greenfield St.
Greenfield, MA 01301
T (413) 772-0846
F (413) 772-6729
www.bete.com

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 to 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



TDL Assembly

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 485 bar
- TD-10K: rated for 690 bar



Side View: TD-K body with PEEK backup ring

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 485 bar at 427 °C
- No O-rings



HT Assembly

TD/TD-K Drip Pro Check Valve

The TD Drip Pro check valve's patented design offers a high-flow solution to reduce drips which can lead to scorched particles and ruined product.

- Fits standard BETE carriers
- Replaces standard TD/TD-K bodies (except HT set-up)
- Drip-free operation
- Easy to assemble



Drip Pro Check Valve

Same day shipping for wear parts!



TD swirl disc



TD orifice disc

Tungsten Carbide Options	
Pro Grade	Suitable for most general spray drying applications
Premium Grade	Superior wear resistance for extremely abrasive spray media

SPECIAL PURPOSE

TO ORDER: specify pipe size, connection type, nozzle number, and material. **413-772-0846**

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

413-772-0846



Durable Beard-Deterring

Carrier 1 (CI1) (shown)
Carrier 11 (CI11) - without lug



Standard Carrier

Carrier 2 (CI2) (shown)
Carrier 5 (CI5) - without lug



Knife Edge Anti-Bearding

Carrier 10 (CI10) (shown)
Carrier 12 (CI12) - without lug

To Order: Spray Set-up Number

¼ TD 2 - 025 - CI1 - 7K – 45 – CVB – B

pipe size
add **xx-BW** if Butt Weld
(include pipe schedule where xx)

series

swirl number

orifice

carrier style
omit for standard carrier (model #2)
or if using HT set-up (HT body and carrier #7)

pressure
omit for TD/TDL or if using HT set-up (HT body and carrier #7)
7K see Material Selection Guide
includes PEEK backup ring
10K see Material Selection Guide
includes PEEK backup ring and Duplex 2205 carrier material

temperature
omit if temperature is less than or equal to 400 °F (204 °C)
45 if temperature is greater than 400 °F (204 °C)
and less than or equal to 450 °F (232 °C);
includes Silicone O-ring and PTFE CV seal if applicable
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)

check valve
omit if no check valve is needed
or using HT body
CVB for 30 psi (2 bar) cracking pressure
CVC for 75 psi (5 bar) cracking pressure

connection type
omit if NPT or Butt Weld
B if BSP

Twist & Dry Material Selection Guide

Pressure		Temperature			
psi	**bar**	**up to 302 °F (150 °C)**	**up to 400 °F (204 °C)**	**up to 450 °F (232 °C)**	**up to 800 °F (427 °C)**
10,000	**690**	**10K Set-up** Viton O-ring w/ PEEK Backup Ring Carrier in Duplex 2205	**10K Set-up** Viton O-ring w/ PEEK Backup Ring Carrier in Duplex 2205	**10K Set-up** Silicone O-ring w/ PEEK Backup Ring Carrier in Duplex 2205	
7,000	**485**	**7K Set-up** Viton O-ring w/ PEEK Backup Ring	**7K Set-up** Viton O-ring w/ PEEK Backup Ring	**7K Set-up** Silicone O-ring w/ PEEK Backup Ring	**HT Set-up** Metal Gaskets High Temperature Body Carrier #7
5,000	**345**	**TD/TDL Set-up** Viton O-ring			
3,500	**240**		**TD/TDL Set-up** Viton O-ring		
800	**55**			**TD/TDL Set-up** Silicone O-ring	

SPECIAL PURPOSE

CALL 413-772-0846
Call for the name of your nearest BETE representative.

TD/TD-K

Twist & Dry® Hollow Cone



TD Assembly

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-threaded or butt weld connections
- Hand tighten, no special tools required
- Orifice size: 0.864mm through 3.99mm
- Interchangeable swirl and orifice discs for variable patterns and flow rates
- Drip Pro check valve available upon request
- **Multiple grades of tungsten carbide to suit application needs**
- Same day shipping of wear parts
- Clog-resistant design
- Easy to maintain

SPRAY CHARACTERISTICS

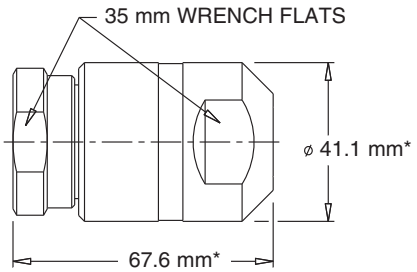
Spray pattern: Hollow Cone
Flow rates: 35.3 to 8,379 L/h
Spray angle: 50° through 85°, as listed



70° Hollow Cone



Cutaway view of carrier showing BETE's unique locking lug feature



Pipe Size	Weight* (g)
1/4"	539
3/8"	524
1/2"	510
3/4"	482

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

Twist & Dry/TD-K Flow Rates

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

Female Pipe Size	Nozzle Number	Spray Angle	Swirl	Orifice Dia (mm)	K Factor	LITERS PER HOUR @ BAR 15 bar	35 bar	50 bar	**70 bar**	90 bar	100 bar	120 bar	150 bar	175 bar	200 bar	Use TD-K for operation over 240 bar 300 bar	500 bar	690 bar
	TD2-34	**70°**	**SW2**	**0.864**	9.12	35.3	53.9	64.5	**76.3**	86.5	91.2	99.9	112	121	129	158	204	240
	TD1-37	**80°**	**SW1**	**0.94**														
	TD2-40	**75°**	**SW2**	**1.02**	11.4	44.1	67.4	80.6	**95.3**	108	114	125	140	151	161	197	255	299
1/4"	**TD1-49**	**85°**	**SW1**	**1.24**														
	TD4-34	**60°**	**SW4**	**0.864**	13.7	53.0	80.9	96.7	**114**	130	137	150	167	181	193	237	306	360
OR	**TD3-40**	**70°**	**SW3**	**1.02**														
	TD5-34	**50°**	**SW5**	**0.864**	16.0	61.8	94.4	113	**133**	151	160	175	195	211	226	277	358	420
3/8"	**TD4-40**	**65°**	**SW4**	**1.02**														
	TD4-43	**65°**	**SW4**	**1.09**	18.2	70.6	108	129	**153**	173	182	200	223	241	258	315	407	478
OR	**TD3-49**	**75°**	**SW3**	**1.24**														
	TD6-37	**50°**	**SW6**	**0.94**														
	TD5-40	**60°**	**SW5**	**1.02**	20.5	79.4	121	145	**172**	195	205	225	251	271	290	355	458	538
1/2"	**TD4-46**	**70°**	**SW4**	**1.17**														
	TD3-55	**75°**	**SW3**	**1.40**														
OR	**TD6-40**	**50°**	**SW6**	**1.02**														
	TD5-43	**60°**	**SW5**	**1.09**	22.8	88.3	135	161	**191**	216	228	250	279	301	322	395	510	599
3/4"	**TD4-52**	**70°**	**SW4**	**1.32**														
	TD5-49	**60°**	**SW5**	**1.24**														
	TD4-58	**70°**	**SW4**	**1.47**	25.1	97.1	148	177	**210**	238	251	275	307	332	355	435	561	659
	TD3-67	**80°**	**SW3**	**1.70**														

Flow Rate (L/h) = K $\sqrt{\text{bar}}$

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)

SPECIAL PURPOSE

TO ORDER:** specify pipe size, connection type, nozzle number, and material.* ***413-772-0846

Twist & Dry/TD-K Flow Rates

Hollow Cone; 50° to 80° Spray Angles; 1/4", 3/8", 1/2", and 3/4" Pipe Sizes; NPT, BSP, or Weld Prep

Female Pipe Size	Nozzle Number	Spray Angle	Swirl	Orifice Dia (mm)	K Factor	LITERS PER HOUR @ BAR										Use TD-K for operation over 240 bar		
						15 bar	35 bar	50 bar	**70 bar**	90 bar	100 bar	120 bar	150 bar	175 bar	200 bar	300 bar	500 bar	690 bar
	TD6-46	**55°**	**SW6**	**1.17**	27.4	106	162	193	**229**	259	273	300	335	362	387	475	613	720
	TD5-52	**65°**	**SW5**	**1.32**														
	TD4-61	**75°**	**SW4**	**1.55**														
	TD3-70	**80°**	**SW3**	**1.78**														
	TD6-52	**55°**	**SW6**	**1.32**	31.9	124	189	226	**267**	303	319	349	391	422	451	553	713	838
	TD5-58	**65°**	**SW5**	**1.47**														
	TD4-70	**75°**	**SW4**	**1.78**														
	TD7-49	**50°**	**SW7**	**1.24**	36.5	141	216	258	**305**	346	365	399	447	482	516	632	816	959
	TD6-55	**60°**	**SW6**	**1.4**														
	TD5-64	**70°**	**SW5**	**1.63**														
	TD4-76	**80°**	**SW4**	**1.93**														
	TD7-52	**50°**	**SW7**	**1.32**	41.0	159	243	290	**343**	389	410	449	502	543	580	710	917	1077
1/4"	**TD6-61**	**60°**	**SW6**	**1.55**														
	TD5-70	**70°**	**SW5**	**1.78**														
	TD7-58	**55°**	**SW7**	**1.47**	45.6	177	270	322	**381**	432	456	499	558	603	645	790	1020	1198
	TD6-64	**65°**	**SW6**	**1.63**														
	TD5-76	**75°**	**SW5**	**1.93**														
	TD4-91	**80°**	**SW4**	**2.31**														
	TD7-61	**55°**	**SW7**	**1.55**	50.1	194	297	355	**419**	476	501	549	614	663	709	868	1120	1316
OR	**TD6-70**	**65°**	**SW6**	**1.78**														
	TD5-82	**75°**	**SW5**	**2.08**														
	TD7-64	**55°**	**SW7**	**1.63**	54.7	212	324	387	**458**	519	547	599	670	724	773	947	1223	1437
	TD6-76	**65°**	**SW6**	**1.93**														
	TD5-88	**75°**	**SW5**	**2.24**														
3/8"	**TD8-67**	**50°**	**SW8**	**1.7**	68.4	265	404	483	**572**	649	684	749	837	904	967	1185	1529	1797
	TD7-76	**60°**	**SW7**	**1.93**														
	TD6-88	**70°**	**SW6**	**2.24**														
	TD5-109	**80°**	**SW5**	**2.77**														
	TD8-76	**50°**	**SW8**	**1.93**	82.0	318	485	580	**686**	778	820	899	1010	1090	1160	1420	1834	2154
	TD7-85	**65°**	**SW7**	**2.16**														
OR	**TD6-103**	**75°**	**SW6**	**2.62**														
	TD8-82	**55°**	**SW8**	**2.08**	95.7	371	566	677	**801**	908	957	1050	1170	1270	1350	1658	2140	2514
	TD7-97	**65°**	**SW7**	**2.46**														
	TD6-115	**75°**	**SW6**	**2.92**														
	TD9-82	**50°**	**SW9**	**2.08**	109	424	647	773	**915**	1040	1090	1200	1340	1450	1550	1888	2437	2863
	TD8-91	**60°**	**SW8**	**2.31**														
1/2"	**TD7-106**	**70°**	**SW7**	**2.69**														
	TD6-127	**80°**	**SW6**	**3.23**														
	TD9-88	**50°**	**SW9**	**2.24**	123	477	728	870	**1030**	1170	1230	1350	1510	1630	1740	2130	2750	3231
	TD8-100	**60°**	**SW8**	**2.54**														
	TD7-118	**70°**	**SW7**	**3.00**														
	TD6-142	**80°**	**SW6**	**3.61**														
OR	**TD9-94**	**55°**	**SW9**	**2.39**	137	530	809	967	**1140**	1300	1370	1500	1680	1810	1930	2373	3063	3599
	TD8-106	**65°**	**SW8**	**2.69**														
	TD7-127	**75°**	**SW7**	**3.23**														
	TD9-106	**55°**	**SW9**	**2.69**	160	618	944	1130	**1340**	1510	1600	1750	1950	2110	2260	2771	3578	4203
	TD8-121	**65°**	**SW8**	**3.07**														
	TD7-145	**75°**	**SW7**	**3.68**														
3/4"	**TD10-103**	**50°**	**SW10****	**2.62**	182	706	1080	1290	**1530**	1730	1820	2000	2230	2410	2580	3152	4070	4781
	TD9-115	**60°**	**SW9**	**2.92**														
	TD8-133	**70°**	**SW8**	**3.38**														
	TD10-118	**55°**	**SW10****	**3.00**	205	794	1210	1450	**1720**	1950	2050	2250	2510	2710	2900	3551	4584	5385
	TD9-127	**60°**	**SW9**	**3.23**														
	TD8-145	**70°**	**SW8**	**3.68**														
	TD9-136	**65°**	**SW9**	**3.45**	228	883	1350	1610	**1910**	2160	2280	2500	2790	3020	3220	3949	5098	5989
	TD8-157	**75°**	**SW8**	**3.99**														
	TD9-148	**65°**	**SW9**	**3.76**	251	971	1480	1770	**2100**	2380	2510	2750	3070	3320	3550	4347	5613	6593
	TD10-136	**60°**	**SW10****	**3.45**	274	1060	1620	1930	**2290**	2590	2740	3000	3350	3620	3870	4746	6127	7197
	TD9-154	**70°**	**SW9**	**3.91**														
	TD10-151	**60°**	**SW10****	**3.84**	296	1150	1750	2100	**2480**	2810	2960	3250	3630	3920	4190	5127	6619	7775
	TD10-157	**65°**	**SW10****	**3.99**	319	1240	1890	2260	**2670**	3030	3190	3500	3910	4220	4510	5525	7133	8379

Flow Rate (L/h) = K √ bar

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.

****SW10 only available in Pro Grade Tungsten Carbide**

CALL 413-772-0846
Call for the name of your nearest BETE representative.

TDL

Twist & Dry® Low Flow Hollow Cone



Female

DESIGN FEATURES

- Patented locking mechanism for quick and easy change-out and maintenance
- Lower flow rates than theTwist & Dry series
- Female-threaded or butt weld pipe connections
- Orifice size: 0.457mm through 1.47mm
- Interchangeable swirl and orifice discs for variable patterns and flow rates

SPRAY CHARACTERISTICS

- Hollow Cone

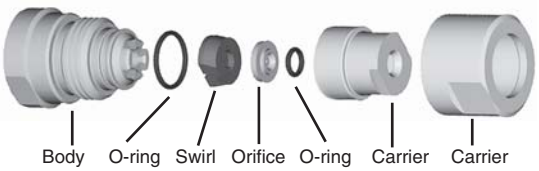
Flow rates: 11.3 to 416 L/h

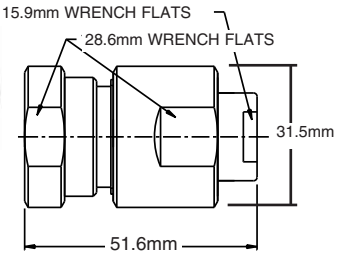
Spray angle: 70° - 75°

Ideal for small-scale applications and pilot tests



70° Hollow Cone





Pipe Size	Weight (g)
1/4"	119
3/8"	107

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

Female Pipe Size	Nozzle Number	Swirl	Orifice Dia. (mm)	K Factor	LITERS PER HOUR @ BAR										
					15 bar	35 bar	50 bar	**70 bar**	90 bar	100 bar	120 bar	150 bar	175 bar	200 bar	275 bar
1/4"	**TDL4-18**	**SWL4**	**0.457**	2.92	11.3	17.3	20.6	**24.4**	27.7	29.2	32.0	35.7	36.6	41.3	48.4
	TDL4-20	**SWL4**	**0.508**	3.10	12.0	18.3	21.9	**25.9**	29.4	31.0	34.0	38.0	41.0	43.8	51.4
	TDL4-22	**SWL4**	**0.559**	3.42	13.2	20.2	24.2	**28.6**	32.4	34.2	37.4	41.9	45.2	48.3	56.7
	TDL4-24	**SWL4**	**0.610**	3.92	15.2	23.2	27.7	**32.8**	37.2	39.2	42.9	48.0	51.9	55.4	65.0
	TDL4-27	**SWL4**	**0.686**	4.56	17.7	27.0	32.2	**38.1**	43.2	45.6	49.9	55.8	60.3	64.5	75.6
OR	**TDL1-22**	**SWL1**	**0.559**	5.01	19.4	29.7	35.5	**41.9**	47.6	50.1	54.9	61.4	66.3	70.9	83.1
	TDL1-24	**SWL1**	**0.610**	5.70	22.1	33.7	40.3	**47.7**	54.0	57.0	62.4	69.8	75.4	80.6	94.5
	TDL1-27	**SWL1**	**0.686**	6.61	25.6	39.1	46.7	**55.3**	62.7	66.1	72.4	80.9	87.4	93.5	110
	TDL1-30	**SWL1**	**0.762**	7.52	29.1	44.5	53.2	**62.9**	71.3	75.2	82.4	92.1	99.5	106	125
	TDL2-30	**SWL2**	**0.762**	9.12	35.3	53.9	64.5	**76.3**	86.5	91.2	100	112	121	129	151
	TDL2-33	**SWL2**	**0.838**	10.3	39.7	60.7	72.5	**85.5**	97.3	103	112	126	136	145	170
	TDL2-36	**SWL2**	**0.914**	11.4	44.1	67.4	80.6	**95.3**	108	114	125	140	151	161	189
	TDL2-38	**SWL2**	**0.965**	12.1	46.8	71.5	85.4	**101**	115	121	132	148	160	171	200
	TDL2-40	**SWL2**	**1.02**	13.2	51.2	78.2	93.5	**111**	125	132	145	162	175	187	219
	TDL2-42	**SWL2**	**1.07**	13.7	53.0	80.9	96.7	**114**	130	137	150	167	181	193	227
	TDL2-44	**SWL2**	**1.12**	14.1	54.7	83.6	100	**118**	134	141	155	173	187	200	234
	TDL2-46	**SWL2**	**1.17**	14.8	57.4	87.6	105	**124**	141	148	162	181	196	209	246
	TDL2-48	**SWL2**	**1.22**	16.0	61.8	94.4	113	**133**	151	160	175	195	211	226	265
	TDL2-50	**SWL2**	**1.27**	16.6	64.4	98.4	118	**139**	158	166	182	204	220	235	276
	TDL2-52	**SWL2**	**1.32**	18.0	69.7	107	127	**151**	171	180	197	220	238	255	298
	TDL2-54	**SWL2**	**1.37**	18.7	72.4	111	132	**156**	177	187	205	229	247	264	310
	TDL2-56	**SWL2**	**1.42**	19.1	74.1	113	135	**160**	182	191	210	234	253	271	317
3/8"	**TDL3-50**	**SWL3**	**1.27**	20.4	79.1	121	144	**171**	194	204	224	250	270	289	339
	TDL3-52	**SWL3**	**1.32**	21.8	84.4	129	154	**182**	207	218	239	267	288	308	361
	TDL3-54	**SWL3**	**1.37**	23.0	89.1	136	163	**193**	218	230	252	282	304	326	382
	TDL3-56	**SWL3**	**1.42**	24.4	94.4	144	172	**204**	231	244	267	299	323	345	404
	TDL3-58	**SWL3**	**1.47**	25.1	97.1	148	177	**210**	238	251	275	307	332	355	416

Flow Rate (L/h) = K $\sqrt{\text{bar}}$

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.

TO ORDER: *specify pipe size, connection type, nozzle number, and material.* **413-772-0846**