Twist & Dry®

Twist & Dry Component System

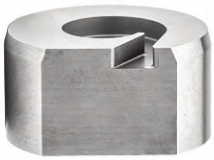
The Twist & Dry® series of nozzles was designed and developed for the spray drying industry, with the dryer operator specifically in mind. The patented locking system locks the swirl and orifice components into place prior to installation on the spray lance, eliminating many of the hassles associated 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

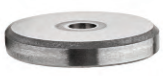
- Product consistency
- Premium tungsten carbide disc available for extended wear life
- Hand tighten - no special tools required for assembly
- Easy to maintain
- Clog-resistant design
- 218SS body for anti-galling

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 fit your needs. To locate the right swirl and orifice combination, refer to the following TD/TD-K and TDL pages.



TD swirl disc



TD orifice disc

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.

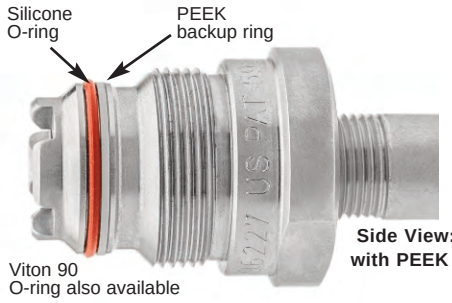
- BETE's patented lug design
- Small-scale applications
- Pilot testing

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 7,000 psi
- TD-10K: rated for 10,000 psi



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 7,000 psi at 800 °F
- 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

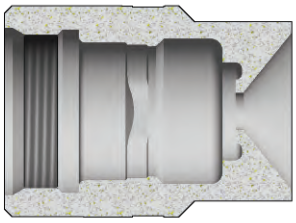
Tungsten Carbide Options	
Pro Grade	Suitable for most general spray drying applications
Premium Grade	Superior wear resistance for extremely abrasive spray media

Same day shipping for wear parts!

SPECIAL PURPOSE

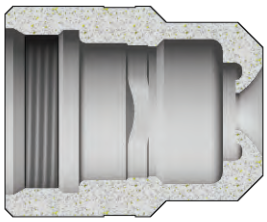
TO ORDER: specify pipe size, connection type, nozzle number, and material. **413-772-0846**

Talk to one of our engineers; we're here to help you find the right solution for your application.
413-772-0846



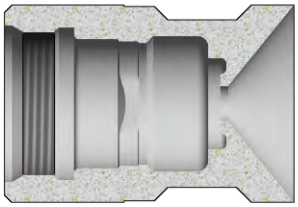
Durable Beard-Deterring

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 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
- 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

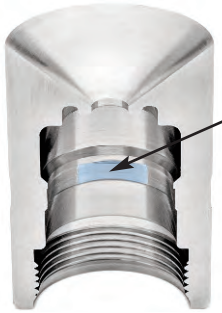
SPRAY CHARACTERISTICS

Spray pattern: Hollow Cone

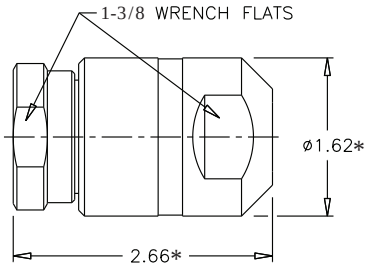
Flow rates: 8.94 to 2,210 gph

Spray angle: 50° through 85°, as listed

70° Hollow Cone



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



Pipe Size	Weight* (oz.)
1/4"	19
3/8"	18.5
1/2"	18
3/4"	17

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

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

Female Pipe Size	Nozzle Number	Spray Angle	Swirl	Orifice Dia. (in.)	K Factor	GALLONS PER HOUR @ PSI 200 PSI	500 PSI	750 PSI	**1000 PSI**	1250 PSI	1500 PSI	1750 PSI	2000 PSI	2500 PSI	3000 PSI	Use TD-K for operation over 3,500 psi 4000 PSI	7000 PSI	10,000 PSI
	TD2-34	**70°**	**SW2**	**0.034**	0.632	8.94	14.1	17.3	**20.0**	22.4	24.5	26.5	28.3	31.6	34.6	40.0	52.9	63.2
	TD1-37	**80°**	**SW1**	**0.037**														
	TD2-40	**75°**	**SW2**	**0.040**	0.791	11.2	17.7	21.7	**25.0**	28.0	30.6	33.1	35.4	39.5	43.3	50.0	66.2	79.1
	TD1-49	**85°**	**SW1**	**0.049**														
1/4"	**TD4-34**	**60°**	**SW4**	**0.034**	0.949	13.4	21.2	26.0	**30.0**	33.5	36.7	39.7	42.4	47.4	52.0	60.0	79.4	94.9
OR	**TD3-40**	**70°**	**SW3**	**0.040**														
3/8"	**TD5-34**	**50°**	**SW5**	**0.034**	1.11	15.7	24.7	30.3	**35.0**	39.1	42.9	46.3	49.5	55.3	60.6	70.0	92.9	111
	TD4-40	**65°**	**SW4**	**0.040**														
OR	**TD4-43**	**65°**	**SW4**	**0.043**	1.26	17.9	28.3	34.6	**40.0**	44.7	49.0	52.9	56.6	63.2	69.3	80.0	105	126
1/2"	**TD3-49**	**75°**	**SW3**	**0.049**														
	TD6-37	**50°**	**SW6**	**0.037**	1.42	20.1	31.8	39.0	**45.0**	50.3	55.1	59.5	63.6	71.2	77.9	90.0	119	142
	TD5-40	**60°**	**SW5**	**0.040**														
OR	**TD4-46**	**70°**	**SW4**	**0.046**														
3/4"	**TD3-55**	**75°**	**SW3**	**0.055**														
	TD6-40	**50°**	**SW6**	**0.040**	1.58	22.4	35.4	43.3	**50.0**	55.9	61.2	66.1	70.7	79.1	86.6	100	132	158
	TD5-43	**60°**	**SW5**	**0.043**														
	TD4-52	**70°**	**SW4**	**0.052**														
	TD5-49	**60°**	**SW5**	**0.049**	1.74	24.6	38.9	47.6	**55.0**	61.5	67.4	72.8	77.8	87.0	95.3	110	146	174
	TD4-58	**70°**	**SW4**	**0.058**														
	TD3-67	**80°**	**SW3**	**0.067**														

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

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.

SPECIAL PURPOSE

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

***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

Female Pipe Size	Nozzle Number	Spray Angle	Swirl	Orifice Dia. (in.)	K Factor	GALLONS PER HOUR @ PSI										Use TD-K for operation over 3,500 psi		
						200 PSI	500 PSI	750 PSI	**1000 PSI**	1250 PSI	1500 PSI	1750 PSI	2000 PSI	2500 PSI	3000 PSI	4000 PSI	7000 PSI	10,000 PSI
	TD6-46	55°	SW6	0.046	1.90	26.8	42.4	52.0	**60.0**	67.1	73.5	79.4	84.9	94.9	104	120	159	190
	TD5-52	65°	SW5	0.052														
	TD4-61	75°	SW4	0.061														
	TD3-70	80°	SW3	0.070														
	TD6-52	55°	SW6	0.052	2.21	31.3	49.5	60.6	**70.0**	78.3	85.7	92.6	99.0	111	121	140	185	221
	TD5-58	65°	SW5	0.058														
	TD4-70	75°	SW4	0.070														
	TD7-49	50°	SW7	0.049	2.53	35.8	56.6	69.3	**80.0**	89.4	98.0	106	113	126	139	160	212	253
	TD6-55	60°	SW6	0.055														
	TD5-64	70°	SW5	0.064														
	TD4-76	80°	SW4	0.076														
	TD7-52	50°	SW7	0.052	2.85	40.2	63.6	77.9	**90.0**	101	110	119	127	142	156	180	238	285
	TD6-61	60°	SW6	0.061														
	TD5-70	70°	SW5	0.070														
	TD7-58	55°	SW7	0.058	3.16	44.7	70.7	86.6	**100**	112	122	132	141	158	173	200	264	316
	TD6-64	65°	SW6	0.064														
	TD5-76	75°	SW5	0.076														
1/4"	TD4-91	80°	SW4	0.091														
	TD7-61	55°	SW7	0.061	3.48	49.2	77.8	95.3	**110**	123	135	146	156	174	191	220	291	348
OR	TD6-70	65°	SW6	0.070														
	TD5-82	75°	SW5	0.082														
	TD7-64	55°	SW7	0.064	3.79	53.7	84.9	104	**120**	134	147	159	170	190	208	240	317	379
3/8"	TD6-76	65°	SW6	0.076														
	TD5-88	75°	SW5	0.088														
	TD8-67	50°	SW8	0.067	4.74	67.1	106	130	**150**	168	184	198	212	237	260	300	397	474
OR	TD7-76	60°	SW7	0.076														
	TD6-88	70°	SW6	0.088														
	TD5-109	80°	SW5	0.109														
1/2"	TD8-76	50°	SW8	0.076	5.69	80.5	127	156	**180**	201	221	238	255	285	312	360	476	569
	TD7-85	65°	SW7	0.085														
OR	TD6-103	75°	SW6	0.103														
	TD8-82	55°	SW8	0.082	6.64	93.9	148	182	**210**	235	257	278	297	332	364	420	556	664
	TD7-97	65°	SW7	0.097														
3/4"	TD6-115	75°	SW6	0.115														
	TD9-82	50°	SW9	0.082	7.59	107	170	208	**240**	268	294	317	339	379	416	480	635	759
	TD8-91	60°	SW8	0.091														
	TD7-106	70°	SW7	0.106														
	TD6-127	80°	SW6	0.127														
	TD9-88	50°	SW9	0.088	8.54	121	191	234	**270**	302	331	357	382	427	468	540	715	854
	TD8-100	60°	SW8	0.100														
	TD7-118	70°	SW7	0.118														
	TD6-142	80°	SW6	0.142														
	TD9-94	55°	SW9	0.094	9.49	134	212	260	**300**	335	367	397	424	474	520	600	794	949
	TD8-106	65°	SW8	0.106														
	TD7-127	75°	SW7	0.127														
	TD9-106	55°	SW9	0.106	11.1	157	247	303	**350**	391	429	463	495	553	606	700	929	1110
	TD8-121	65°	SW8	0.121														
	TD7-145	75°	SW7	0.145														
	TD10-103	50°	SW10**	0.103	12.7	179	283	346	**400**	447	490	529	566	632	693	800	1063	1270
	TD9-115	60°	SW9	0.115														
	TD8-133	70°	SW8	0.133														
	TD10-118	55°	SW10**	0.118	14.2	201	318	390	**450**	503	551	595	636	712	779	900	1188	1420
	TD9-127	60°	SW9	0.127														
	TD8-145	70°	SW8	0.145														
	TD9-136	65°	SW9	0.136	15.8	224	354	433	**500**	559	612	661	707	791	866	1000	1322	1580
	TD8-157	75°	SW8	0.157														
	TD9-148	65°	SW9	0.148	17.4	246	389	476	**550**	615	674	728	778	870	953	1100	1456	1740
	TD10-136	60°	SW10**	0.136	19.0	268	424	520	**600**	671	735	794	849	949	1040	1200	1590	1900
	TD9-154	70°	SW9	0.154														
	TD10-151	60°	SW10**	0.151	20.6	291	460	563	**650**	727	796	860	919	1030	1130	1300	1724	2060
	TD10-157	65°	SW10**	0.157	22.1	313	495	606	**700**	783	857	926	990	1110	1210	1400	1849	2210

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

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.

****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

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

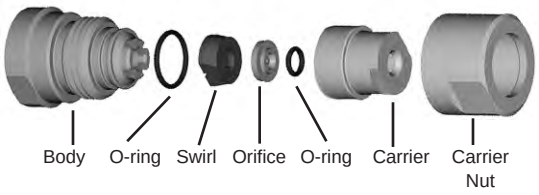
Flow rates: 2.86 to 123 gph

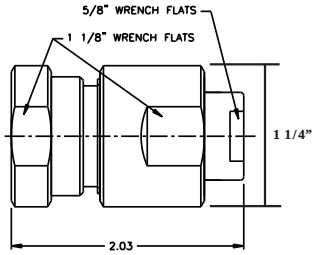
Spray angle: 70° - 75°

Ideal for small-scale applications and pilot tests

TDL Assembly

70° Hollow Cone





Pipe Size	Weight (oz)
1/4"	4.2
3/8"	3.8

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. (in.)	K Factor	GALLONS PER HOUR @ PSI											
					200 PSI	500 PSI	750 PSI	**1000 PSI**	1250 PSI	1500 PSI	1750 PSI	2000 PSI	2500 PSI	3000 PSI	4000 PSI	5000 PSI
	TDL4-18	**SWL4**	**0.018**	0.202	2.86	4.53	5.54	**6.40**	7.16	7.84	8.47	9.1	10.1	11.1	12.8	14.3
	TDL4-20	**SWL4**	**0.020**	0.215	3.04	4.81	5.89	**6.80**	7.60	8.33	9.00	9.62	10.8	11.8	13.6	15.2
	TDL4-22	**SWL4**	**0.022**	0.237	3.35	5.30	6.50	**7.50**	8.39	9.19	9.92	10.6	11.9	13.0	15.0	16.8
	TDL4-24	**SWL4**	**0.024**	0.272	3.85	6.08	7.45	**8.60**	9.62	10.5	11.4	12.2	13.6	14.9	17.2	19.2
1/4"	**TDL4-27**	**SWL4**	**0.027**	0.316	4.47	7.07	8.66	**10.0**	11.2	12.2	13.2	14.1	15.8	17.3	20.0	22.4
	TDL1-22	**SWL1**	**0.022**	0.348	4.92	7.78	9.53	**11.0**	12.3	13.5	14.6	15.6	17.4	19.1	22.0	24.6
	TDL1-24	**SWL1**	**0.024**	0.395	5.59	8.84	10.8	**12.5**	14.0	15.3	16.5	17.7	19.8	21.7	25.0	28.0
	TDL1-27	**SWL1**	**0.027**	0.459	6.48	10.3	12.6	**14.5**	16.2	17.8	19.2	20.5	22.9	25.1	29.0	32.4
	TDL1-30	**SWL1**	**0.030**	0.522	7.38	11.7	14.3	**16.5**	18.4	20.2	21.8	23.3	26.1	28.6	33.0	36.9
	TDL2-30	**SWL2**	**0.030**	0.632	8.94	14.1	17.3	**20.0**	22.4	24.5	26.5	28.3	31.6	34.6	40.0	44.7
OR	**TDL2-33**	**SWL2**	**0.033**	0.712	10.1	15.9	19.5	**22.5**	25.2	27.6	29.8	31.8	35.6	39.0	45.0	50.3
	TDL2-36	**SWL2**	**0.036**	0.791	11.2	17.7	21.7	**25.0**	28.0	30.6	33.1	35.4	39.5	43.3	50.0	55.9
	TDL2-38	**SWL2**	**0.038**	0.838	11.9	18.7	22.9	**26.5**	29.6	32.5	35.1	37.5	41.9	45.9	53.0	59.3
	TDL2-40	**SWL2**	**0.040**	0.917	13.0	20.5	25.1	**29.0**	32.4	35.5	38.4	41.0	45.9	50.2	58.0	64.8
	TDL2-42	**SWL2**	**0.042**	0.949	13.4	21.2	26.0	**30.0**	33.5	36.7	39.7	42.4	47.4	52.0	60.0	67.1
	TDL2-44	**SWL2**	**0.044**	0.980	13.9	21.9	26.8	**31.0**	34.7	38.0	41.0	43.8	49.0	53.7	62.0	69.3
	TDL2-46	**SWL2**	**0.046**	1.03	14.5	23.0	28.1	**32.5**	36.3	39.8	43.0	46.0	51.4	56.3	65.0	72.7
	TDL2-48	**SWL2**	**0.048**	1.11	15.7	24.7	30.3	**35.0**	39.1	42.9	46.3	49.5	55.3	60.6	70.0	78.3
3/8"	**TDL2-50**	**SWL2**	**0.050**	1.15	16.3	25.8	31.6	**36.5**	40.8	44.7	48.3	51.6	57.7	63.2	73.0	81.6
	TDL2-52	**SWL2**	**0.052**	1.25	17.7	27.9	34.2	**39.5**	44.2	48.4	52.3	55.9	62.5	68.4	79.0	88.3
	TDL2-54	**SWL2**	**0.054**	1.30	18.3	29.0	35.5	**41.0**	45.8	50.2	54.2	58.0	64.8	71.0	82.0	91.7
	TDL2-56	**SWL2**	**0.056**	1.33	18.8	29.7	36.4	**42.0**	47.0	51.4	55.6	59.4	66.4	72.7	84.0	93.9
	TDL3-50	**SWL3**	**0.050**	1.42	20.0	31.7	38.8	**44.8**	50.1	54.9	59.3	63.4	70.8	77.6	89.6	100
	TDL3-52	**SWL3**	**0.052**	1.51	21.4	33.8	41.4	**47.8**	53.4	58.5	63.2	67.6	75.6	82.8	95.6	107
	TDL3-54	**SWL3**	**0.054**	1.60	22.6	35.7	43.7	**50.5**	56.5	61.8	66.8	71.4	79.8	87.5	101	113
	TDL3-56	**SWL3**	**0.056**	1.69	23.9	37.8	46.3	**53.5**	59.8	65.5	70.8	75.7	84.6	92.7	107	120
	TDL3-58	**SWL3**	**0.058**	1.74	24.6	38.9	47.6	**55.0**	61.5	67.4	72.8	77.8	87.0	95.3	110	123

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.

SPECIAL PURPOSE

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