

Twist & Dry™

Twist & Dry™ Component System

WHIRL

The Twist & Dry™ component system was developed for the spray dryer industry. The TD-K was next developed as an innovative solution to expand spray dryer capacity up to 10,000 psi. The patented locking system locks components into place prior to installation. There are many interchangeable swirls and orifice disks available for varying the flow rates of the nozzles. Many materials are also available to allow for high temperature usage without leakage.

SPRAY SET-UPS

Twist & Dry nozzles have almost 1,000 different combinations of swirl and orifice discs to provide exactly the right flow rate and angle for your needs. The spray angle and flow rate are determined by the "swirl/orifice set-up"—a specific combination of one swirl disc and one orifice. To locate the right swirl and orifice combination refer to the following TD-K, Twist & Dry, and TDL pages.

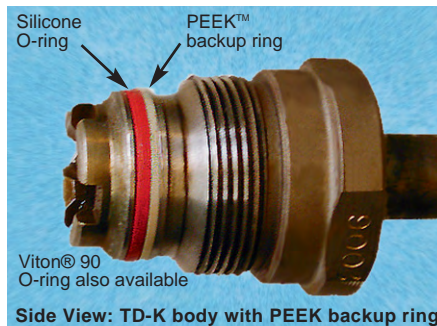
Spray angle is determined by the orifice geometry. Carriers and bodies differ in both material and design to accommodate both high temperature and pressure. The robust design allows for many material choices and combinations.



TDL Low Flow Twist & Dry™ Assembly

TD-K High Pressure Series

The TD-K is a high pressure nozzle in the Twist & Dry series. The series includes models TD-7K rated up to 7,000 psi and the TD-10K rated up to 10,000 psi.



Often higher pressures can increase yield and save money. Please visit www.bete.com/td-k.html.

Twist & Dry Series

The Twist & Dry is a BETE original design that answers the needs of the spray drying industry. The BETE design offers superior performance as well as an innovative patented locking mechanism. Replace the wear parts of your spray dry nozzles without turning the lances upside down.

The BETE Twist & Dry is designed with the operator in mind. If you operate and maintain a spray dryer, you know just how difficult it can be to replace the nozzle wear parts.

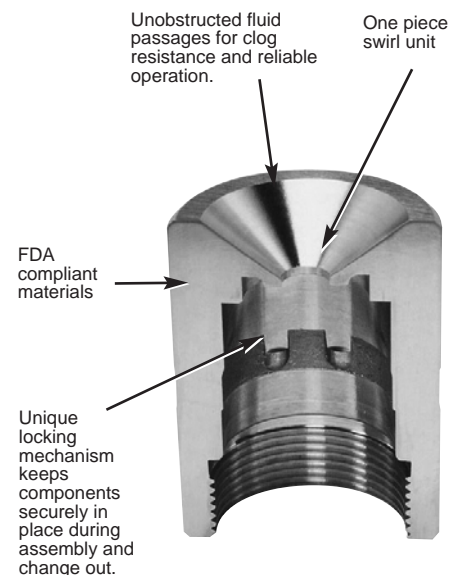


TD swirl disc



TD orifice disc

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 Twist & Dry locking system keeps the swirl chamber and orifice "locked" into position during assembly; Materials— corrosion-resistant 303 Stainless Steel carrier, Tungsten Carbide swirl unit and orifice disk, Viton® O-rings, other materials are available. BETE provides software support: users of the Twist & Dry receive free-of-charge computer software that greatly simplifies selecting the correct swirl unit and orifice disk.



Cutaway view of the Twist & Dry carrier

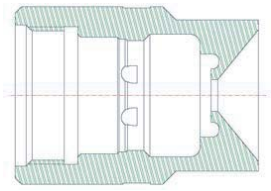
PEEK™ is a registered trademark of Victrex.

TO ORDER: specify pipe size, connection type, nozzle number, spray angle, and material.

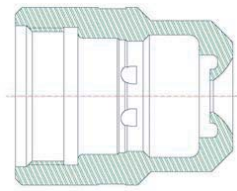
Twist & Dry™ Components & Options



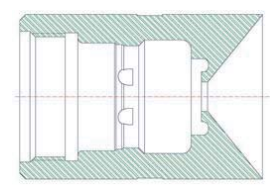
Pressure		Temperature		
bar	psi	up to 302°F (150°C)	up to 400°F (204°C)	up to 450°F (232°C)
689	10,000	TD 10K Viton 90 O-ring w/ PEEK Backup Ring Carrier in Duplex 2205 TD 10K only available in Carriers 5 and 11	TD 10K Viton 90 O-ring w/ PEEK Backup Ring Carrier in Duplex 2205 TD 10K only available in Carriers 5 and 11	TD 10K Silicone O-ring w/ PEEK Backup Ring Carrier in Duplex 2205 TD 10K only available in Carriers 5 and 11
483	7,000	TD 7K Viton 90 O-ring w/ PEEK Backup Ring	TD 7K Viton 90 O-ring w/ PEEK Backup Ring	TD 7K Silicone O-ring w/ PEEK Backup Ring
350	5,076	TD Viton 90 O-ring	TD Viton 90 O-ring	TD Silicone O-ring
241	3,500			
55	800			



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



Standard TD Carrier
Carrier 2 (C12) (shown)
Carrier 5 (C15) - without lugs



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

To Order: Spray Set-up Number

1/4 TD 2 - 025 - C11 - 7K - 45 - B @ 7H

pipe size

series

swirl number

orifice

carrier style
omit for TDL, or standard carrier, model #2

pressure
omit for TDL or if pressure is less than or equal to 3,500 psi (241 bar)

7K if pressure is greater than 3,500 psi and less than or equal to 7,000 psi; needs PEEK backup ring

10K if pressure is greater than 7,000 psi and less than or equal to 10,000 psi; needs PEEK backup ring + Duplex 2205 carrier material

material

thread
omit if NPT

temperature
omit if temperature is less than or equal to 400°F (204°C)

45 if temperature is greater than 400°F and less than or equal to 450°F (232°C); needs Silicone O-ring

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TD/TD-K



TD Assembly

Twist & Dry™ Hollow Cone

DESIGN FEATURES

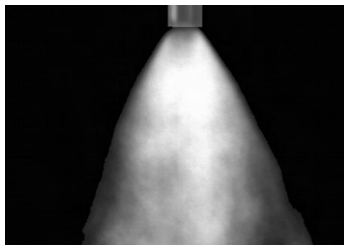
- Patented locking mechanism for quick and easy change-out and maintenance
- Choose TD-K to operate at high pressures for greater yield capacity
- PEEK backup ring with Viton® 90 O-rings or Silicone (for higher temperatures)
- Female-threaded or butt weld pipe connections
- Easy assembly, no special tools required

- Orifice size: 0.034" through 0.157"
- Interchangeable swirl and orifice discs for variable patterns and flow rates
- Please visit www.bete.com/td-k.html for more information on the TD-K nozzle

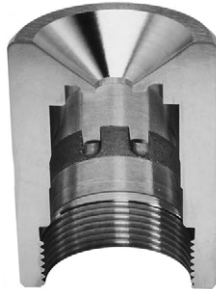
SPRAY CHARACTERISTICS

- Hollow Cone
- Flow rates:** 8.94 to 1,570 gph
Spray angle: 50°, 55°, 60°, 65°, 70°, 75°, 80°

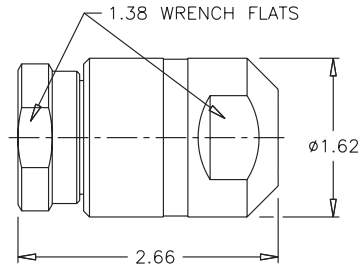
WHIRL



70° Hollow Cone



Cutaway view of carrier showing lugs and BETE's unique locking design



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 and Dimensions

Hollow Cone, 50° to 80° Spray Angles, 1/4", 3/8", 1/2" and 3/4" Pipe Size NPT, BSP or Welded

Female Pipe Size	Nozzle Number	Spray Angle	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	5000 PSI	
1/4" OR	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	44.7	
	TD1-37	80°	SW1 0.037														
3/8" OR	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	55.9	
	TD1-49	85°	SW1 0.049														
1/2" OR	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	67.1	
	TD3-40	70°	SW3 0.040														
3/4" OR	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	78.3	
	TD4-40	65°	SW4 0.040														
1/2" 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	89.4	
	TD3-49	75°	SW3 0.049														
3/4"	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	101	
	TD5-40	60°	SW5 0.040														
	TD4-46	70°	SW4 0.046														
	TD3-55	75°	SW3 0.055														
3/4"	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	112	
	TD5-43	60°	SW5 0.043														
	TD4-52	70°	SW4 0.052														
3/4"	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	123	
	TD4-58	70°	SW4 0.058														
	TD3-67	80°	SW3 0.067														

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

Standard Materials: Stainless Steel, Tungsten Carbide. Other materials available.

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.

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

Twist & Dry/TD-K Flow Rates and Dimensions

Hollow Cone, 50° to 80° Spray Angles, 1/4", 3/8", 1/2" and 3/4" Pipe Size NPT, BSP or Welded

Female Pipe Size	Nozzle Number	Spray Angle	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	5000 PSI
1/4" OR 3/8" OR 1/2" OR 3/4"	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	134
	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	157
	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	179
	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	201
	TD6-61	60°	SW6 0.061													
	TD5-70	70°	SW5 0.070	3.16	44.7	70.7	86.6	100	112	122	132	141	158	173	200	224
	TD7-58	55°	SW7 0.058													
	TD6-64	65°	SW6 0.064													
	TD5-76	75°	SW5 0.076													
	TD4-91	80°	SW4 0.091	3.48	49.2	77.8	95.3	110	123	135	146	156	174	191	220	246
	TD7-61	55°	SW7 0.061													
	TD6-70	65°	SW6 0.070													
TD5-82	75°	SW5 0.082	3.79	53.7	84.9	104	120	134	147	159	170	190	208	240	268	
TD7-64	55°	SW7 0.064														
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	335	
TD7-76	60°	SW7 0.076														
TD6-88	70°	SW6 0.088														
TD5-109	80°	SW5 0.109														
TD8-76	50°	SW8 0.076	5.69	80.5	127	156	180	201	221	238	255	285	312	360	402	
TD7-85	65°	SW7 0.085														
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	470	
TD7-97	65°	SW7 0.097														
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	537	
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	604	
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	671	
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	783	
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	894	
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	1010	
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	1120	
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	1230	
TD10-136	60°	SW10 0.136	19.0	268	424	520	600	671	735	794	849	949	1040	1200	1340	
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	1450	
TD10-157	65°	SW10 0.157	22.1	313	495	606	700	783	857	926	990	1110	1210	1400	1570	

Flow Rate (GPH) = K √PSI

Standard Materials: Stainless Steel, Tungsten Carbide. Other materials available.

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

