Full cone nozzles

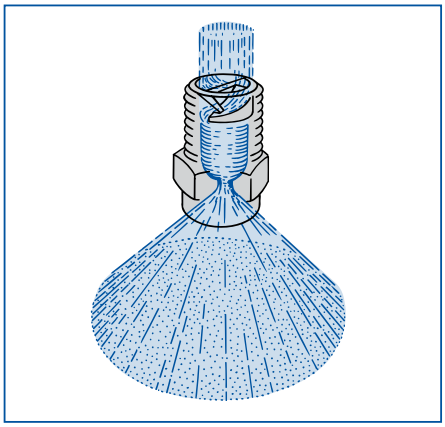
Absorption
Chemical process engineering
Chlorine precipitation
Cleaning
Cooling
Desuperheating
Dust control
Fire protection
Foam control
Gas treatment
Spraying onto mats in air washers
Spraying over packings
Surface spraying
Water treatment
and many others...

Full cone nozzles

Full cone nozzles spray completely within the interior of a circular area. They are especially appropriate for cleaning, coating, dust suppression, or any application where the target is static. There are two different styles of full cone nozzles: **Axial** and **Tangential**.

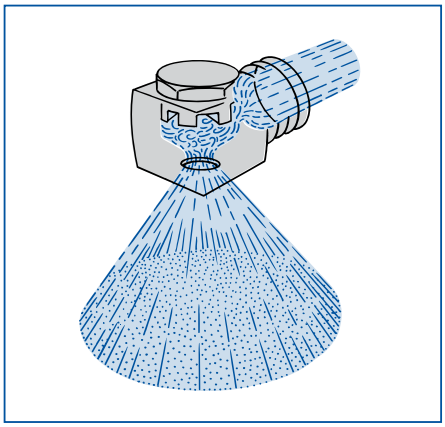
Axial full cone nozzles
Axial full cone nozzles spray on the same axis as the inlet fluid. Lechler axial full cone nozzles evenly distribute liquid spray over the whole circular impact area. This high precision of distribution is due to internal vanes which create swirl chambers inside the nozzle. These vanes break up the inlet flow so that the liquid exits the orifice in a circular mass of droplets. While an axial full cone nozzle's vane typically has a smaller free passage than the nozzle's orifice diameter, the Series 460's x-style swirl insert has larger free cross-sections, making it easier to spray particle-filled fluid. Axial full cone nozzles are available with several different spray angles and in a wide range of flow rates. Consequently, matching a specific axial full cone to your application can more easily be made. Therefore, axial full cones offer these advantages:

- Even liquid distribution
- Wide flow rate range
- Large number of available spray angles



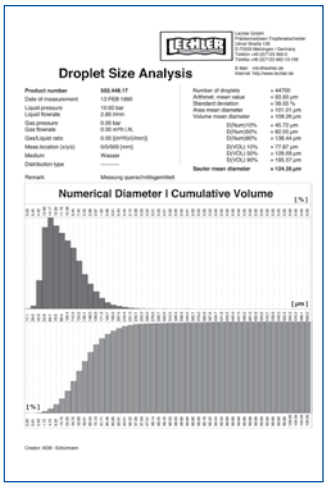
Tangential full cone nozzles
Tangential full cone nozzles spray at a 90° angle (or tangent) to the inlet fluid. Tangential full cone nozzles are particularly suited for spraying liquids with a high amount of particulate matter or for fire fighting applications. This is because unlike axial full cones, tangential full cone nozzles have no internal vanes, making them much less prone to clogging. The inlet fluid is tangentially supplied to a swirl chamber where it is put into rotation, much like in a tangential hollow cone nozzle. However, in this case the full cone spray is obtained when a sufficient amount of the fluid is disturbed by specially-arranged grooves, milled into the nozzle bottom, which cause a portion of the rotating liquid flow to diverge to the center of the swirl chamber. The result is a liquid spray which exits the nozzle orifice in an evenly distributed full cone pattern. Tangential full cone nozzles offer these advantages:

- Clog resistant, as they have no internal vanes
- Uniform liquid distribution
- Stable spray angles at various liquid pressures

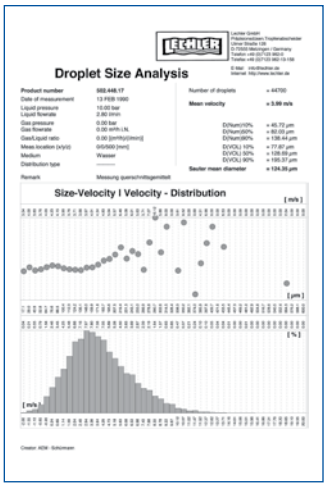


Cluster head nozzles
Lechler cluster head nozzles create a full cone spray of finely atomized droplets. This makes it particularly appropriate for applications in which a fine, fog-like, full cone atomized spray with a relatively large flow rate is necessary (e.g., gas exchange processes, steam cooling, or dust suppression). The cluster head nozzle achieves this pattern by overlapping seven separate hollow cones to form a full cone pattern with a larger droplet surface area compared to a similar standard full cone. It therefore creates the best of both worlds: it has the smaller droplet size and increased surface area of a hollow cone nozzle but with the overall coverage of a full cone. Such droplet sizes cannot be achieved by a single-orifice full cone spray nozzle with the same flow rate. The increased droplet surface area of the atomized liquid provides great efficiency in gas treatment and cooling applications. Cluster head nozzles offer these advantages:

- Large droplet surface area (i.e., fine or small droplet sizes)
- Full cone spray pattern
- Largest flow rates for the average droplet size produced



Cumulated volume distribution



Velocity distribution by number

1-800-777-2926

Full cone nozzles
Axial-flow
Series 460 / 461

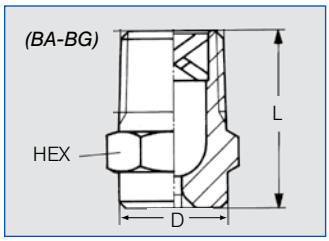
Uniform spray pattern. Offered in a wide range of spray angles and flow rates.

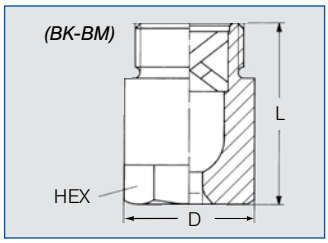
Applications:
- Washing and cleaning
- Dust suppression
- Mist eliminator washing
- Chemical reactors
- Surface spraying
- Chemical injection

Dimensions (in.)

Connection Code	Inlet (Male NPT)	L	D	Hex	Weight Brass (lb.)
BA	1/8	.71	.51	9/16	.03
BC	1/4	.87	.51	9/16	.04
BE	3/8	1.18	.63	11/16	.07
BG	1/2	1.65	.83	7/8	.15
BK	3/4	1.97	1.09	1-1/8	.38
BM	1	2.20	1.32	1-3/8	.79

Subject to technical modifications





Spray angle	Ordering no. Type	Mat. no. PVDF 5E	Mat. no. Polypro 53	Connection Male NPT 1/8"	1/4"	3/8"	1/2"	3/4"	1"	Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute) 10 psi	20 psi	liters per minute 2 bar	30 psi	40 psi	60 psi	80 psi	100 psi	150 psi	Spray Diam. D (in.) @ 30 psi H=8"	H=20"
60°	460. 644	○	-	-	BC	BE	-	-	-	.095	.075	.69	.91	4.0	1.1	1.2	1.4	1.6	1.7	2.0	9	22
	460. 964	○	-	-	-	-	-	BK	-	.229	.193	4.3	5.7	25	6.7	7.5	8.8	9.9	10.8	12.7	9	22
90°	460. 326	○	-	BA	-	-	-	-	-	.032	.022	.07	.09	0.4	.11	.12	.14	.16	.17	.20	15	34
	460. 406	○	-	BA	-	-	-	-	-	.047	.033	.17	.23	1.0	.27	.30	.35	.40	.43	.51	15	34
	460. 486	○	-	BA	-	-	-	-	-	.057	.047	.28	.36	1.6	.43	.48	.57	.63	.69	.82	15	34
	460. 526	○	-	BA	-	-	-	-	-	.065	.051	.35	.46	2.0	.54	.60	.71	.79	.87	1.0	15	34
	460. 606	○	-	BA	-	BE	-	-	-	.081	.057	.54	.72	3.2	.84	.95	1.1	1.2	1.4	1.6	15	34
	460. 646	○	-	-	BC	BE	-	-	-	.091	.071	.69	.91	4.0	1.1	1.2	1.4	1.6	1.7	2.0	15	38
	460. 726	○	-	-	-	BE	-	-	-	.116	.079	1.1	1.4	6.3	1.7	1.9	2.2	2.5	2.7	3.2	15	38
	460. 746	○	-	-	-	BE	-	-	-	.130	.075	1.2	1.6	7.1	1.9	2.1	2.5	2.8	3.1	3.6	15	38
	460. 766	○	-	-	-	BE	-	-	-	.130	.095	1.4	1.8	8.0	2.1	2.4	2.8	3.2	3.5	4.1	15	38
	460. 806	○	-	-	-	BE	-	-	-	.146	.106	1.7	2.3	10.0	2.7	3.0	3.5	4.0	4.3	5.1	15	38
	460. 846	○	-	-	-	BE	-	-	-	.160	.126	2.2	2.8	12.5	3.3	3.8	4.4	5.0	5.4	6.4	15	38
	460. 886	○	-	-	-	BE	BG	-	-	.185	.122	2.8	3.6	16.0	4.3	4.8	5.7	6.3	6.9	8.2	15	38
	460. 926	○	-	-	-	-	BG	-	-	.205	.150	3.5	4.6	20	5.4	6.0	7.1	7.9	8.7	10.2	15	38
	460. 966	○	-	-	-	-	BG	BK	-	.229	.150	4.3	5.7	25	6.7	7.5	8.8	9.9	10.8	12.7	15	38
	461. 006	○	-	-	-	-	BG	-	-	.252	.150	5.4	7.2	32	8.4	9.5	11.1	12.5	13.7	16.1	15	38
	461. 046	-	○	-	-	-	-	BK	-	.284	.209	6.9	9.1	40	10.7	12.0	14.1	15.9	17.3	20	15	38
	461. 086	○	-	-	-	-	-	BK	-	.323	.209	8.6	11.4	50	13.4	15.0	17.7	19.8	22	25	15	38
	461. 126	○	-	-	-	-	-	-	BM	.366	.256	10.9	14.3	63	16.9	18.9	22	25	27	32	15	38
	461. 146	○	-	-	-	-	-	-	BM	.390	.264	12.3	16.2	71	19.0	21	25	28	31	36	15	38
120°	460. 408	○	-	BA	-	-	-	-	-	.047	.033	.17	.23	1.0	.27	.30	.35	.40	.43	.51	27	48
	460. 488	○	-	BA	-	-	-	-	-	.059	.039	.28	.36	1.6	.43	.48	.57	.63	.69	.82	27	48
	460. 528	○	-	BA	-	-	-	-	-	.065	.047	.35	.46	2.0	.54	.60	.71	.79	.87	1.0	27	48
	460. 608	○	-	BA	-	-	-	-	-	.083	.055	.54	.72	3.2	.84	.95	1.1	1.2	1.4	1.6	27	48
	460. 648	○	-	-	BC	BE	-	-	-	.097	.063	.69	.91	4.0	1.1	1.2	1.4	1.6	1.7	2.0	27	52
	460. 728	○	-	-	-	BE	-	-	-	.122	.075	1.1	1.4	6.3	1.7	1.9	2.2	2.5	2.7	3.2	27	52
	460. 748	○	-	-	-	BE	-	-	-	.130	.075	1.2	1.6	7.1	1.9	2.1	2.5	2.8	3.1	3.6	27	52
	460. 768	○	-	-	-	BE	-	-	-	.138	.075	1.4	1.8	8.0	2.1	2.4	2.8	3.2	3.5	4.1	27	52
	460. 808	○	-	-	-	BE	-	-	-	.150	.095	1.7	2.3	10.0	2.7	3.0	3.5	4.0	4.3	5.1	27	52
	460. 848	○	-	-	-	BE	-	-	-	.165	.106	2.2	2.8	12.5	3.3	3.8	4.4	5.0	5.4	6.4	27	52
	460. 888	○	-	-	-	BE	BG	-	-	.181	.122	2.8	3.6	16.0	4.3	4.8	5.7	6.3	6.9	8.2	27	52
	460. 968	○	-	-	-	-	BG	-	-	.232	.162	4.3	5.7	25	6.7	7.5	8.8	9.9	10.8	12.7	27	52
	461. 048	-	○	-	-	-	-	BK	-	.299	.193	6.9	9.1	40	10.7	12.0	14.1	15.9	17.3	20	27	52

Example for ordering:	Type	+	Material no.	+	Conn.	=	Ordering no.
	460. 728	+	5E	+	BE	=	460. 728. 5E. BE

A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.

Conversion formula for the above series: $V_2 = V_1 * \left(\frac{P_2}{P_1}\right)^{0.4}$
(≤150 psi) (See page 12 for symbol definitions.)

Full cone nozzles
Axial-flow
Series 490 / 491

NEW Patent pending

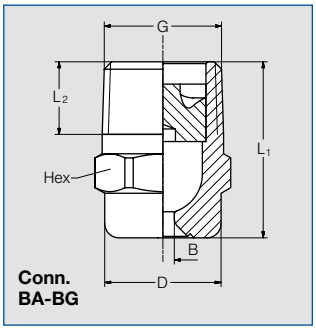
Excellent uniform full cone distribution and thorough atomization. Non-clogging nozzle design. Stable spray angle and particularly even liquid distribution.

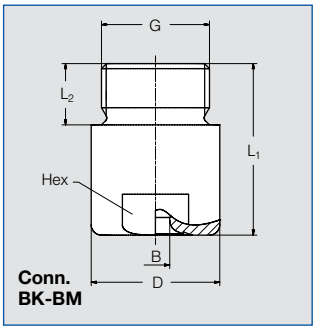
Applications:
Cleaning and washing processes, surface spraying, container cleaning, foam precipitation, degassing of liquids.

Series 490

Series 491

Series 490/491 represents a new generation within the axial-flow full cone nozzles product group. These nozzles were developed using state-of-the-art design and simulation methods (CFD).





Conn.	Dimensions (in.)] G	L_1	L_2	D	Hex	Weight Brass
BA	1/8 NPT	0.71	0.26	0.39	7/16	.03
BC	1/4 NPT	0.87	0.39	0.51	9/16	.04
BE	3/8 NPT	0.96	0.39	0.63	11/16	.07
BE	3/8 NPT	1.18	0.39	0.63	11/16	.11
BG	1/2 NPT	1.28	0.51	0.83	14/16	.13
BG	1/2 NPT	1.71	0.51	0.83	14/16	.19
BK	3/4 NPT	1.65	0.59	1.26	1-1/16	.42
BK	3/4 NPT	1.97	0.59	1.26	1-1/16	.44
BM	1 NPT	2.20	0.67	1.57	1-7/16	.77

Subject to technical modification.
In a critical installation situation, please ask for the exact dimensions.

Spray angle	Ordering no. Type	Mat. no. 316 L 1Y	Mat. no. Brass 30	Connection Male NPT 1/8"	1/4"	3/8"	1/2"	3/4"	1"	Orifice diam. (in.)	Free Passage (in.)	Flow Rate (Gallons Per Minute) 10 psi	20 psi	liters per minute 2 bar	30 psi	40 psi	60 psi	80 psi	100 psi	150 psi	Spray Diam. D (in.) @ 30 psi H=8"	H=20"
60°	**490. 404**	○	○	**BA**	-	-	-	-	-	.045	.045	.17	.23	1.00	.27	.30	.35	.40	.43	0.51	9	22
	490. 444	○	-	**BA**	-	-	-	-	-	.049	.049	.22	.29	1.25	.33	.38	.44	.49	.54	0.64	9	22
	490. 524	○	○	**BA**	-	-	-	-	-	.063	.063	.35	.46	2.00	.54	.60	.71	.79	.87	1.02	9	22
	490. 644	○	○	-	**BC**	**BE**	-	-	-	.091	.091	.69	.91	4.00	1.07	1.20	1.41	1.59	1.73	2.04	9	22
	490. 724	○	○	-	**BC**	**BE**	-	-	-	.112	.110	1.09	1.43	6.30	1.69	1.89	2.23	2.50	2.73	3.21	9	22
	490. 804	○	○	-	-	**BE**	-	-	-	.146	.146	1.72	2.28	10.00	2.68	3.00	3.53	3.97	4.34	5.10	9	22
	490. 844	○	○	-	-	-	**BG**	-	-	.159	.159	2.16	2.85	12.50	3.35	3.76	4.42	4.96	5.42	6.37	9	22
	490. 884	○	○	-	-	-	**BG**	-	-	.183	.183	2.76	3.64	16.00	4.28	4.81	5.65	6.34	6.94	8.16	9	22
	490. 964	○	○	-	-	-	-	**BK**	-	.228	.228	4.31	5.69	25.00	6.70	7.51	8.83	9.91	10.84	12.74	9	22
	491. 084	○	○	-	-	-	-	-	**BM**	.321	.321	8.63	11.38	50.00	13.39	15.02	17.67	19.82	21.67	25.49	9	22
90°	**490. 406**	○	○	**BA**	-	-	-	-	-	.047	.047	.17	.23	1.00	.27	.30	.35	.40	.43	.51	15	34
	490. 486	○	○	**BA**	-	-	-	-	-	.057	.057	.28	.36	1.60	.43	.48	.57	.63	.69	.82	15	34
	490. 526	○	○	**BA**	-	-	-	-	-	.067	.067	.35	.46	2.00	.54	.60	.71	.79	.87	1.02	15	34
	490. 606	○	○	**BA**	-	-	-	-	-	.081	.081	.54	.72	3.15	.84	.95	1.11	1.25	1.37	1.61	15	34
	490. 646	○	○	-	**BC**	-	-	-	-	.094	.094	.69	.91	4.00	1.07	1.20	1.41	1.59	1.73	2.04	15	38
	490. 726	○	○	-	**BC**	**BE**	-	-	-	.126	.110	1.09	1.43	6.30	1.69	1.89	2.23	2.50	2.73	3.21	15	38
	490. 806	○	○	-	-	**BE**	-	-	-	.154	.154	1.72	2.28	10.00	2.68	3.00	3.53	3.97	4.34	5.10	15	38
	490. 846	○	○	-	-	**BE**	-	-	-	.183	.157	2.16	2.85	12.50	3.35	3.76	4.42	4.96	5.42	6.37	15	38
	490. 886	○	○	-	-	-	**BG**	-	-	.215	.177	2.76	3.64	16.00	4.28	4.81	5.65	6.34	6.94	8.16	15	38
	490. 926	○	○	-	-	-	**BG**	-	-	.232	.177	3.45	4.56	20.00	5.36	6.01	7.07	7.93	8.67	10.20	15	38
	490. 966	○	○	-	-	-	BG	-	-	.258	.191	4.31	5.69	25.00	6.70	7.51	8.83	9.91	10.84	12.74	15	38
	491. 086	○	○	-	-	-	-	-	**BM**	.372	.285	8.63	11.38	50.00	13.39	15.02	17.67	19.82	21.67	25.49	15	38

Continued on next page.

Conversion formula for the above series: $V_2 = V_1 * \left(\frac{P_2}{P_1}\right)^{0.4}$ (≤150 psi) (See page 12 for symbol definitions.)

Full cone nozzles
Axial-flow
Series 490 / 491

Spray angle	Ordering no. Type	Mat. no. 316 L 1Y	Mat. no. Brass 30	Connection Male NPT 1/8"	1/4"	3/8"	1/2"	3/4"	1"	Orifice diam. (in.)	Free Passage (in.)	Flow Rate (Gallons Per Minute) 10 psi	20 psi	liters per minute 2 bar	30 psi	40 psi	60 psi	80 psi	100 psi	150 psi	Spray Diam. D (in.) @ 30 psi H=8"	H=20"
120°	**490. 368**	○	○	**BA**	-	-	-	-	-	.033	.026	.11	.14	.63	.17	.19	.22	.25	.27	.32	27	48
	490. 408	○	○	**BA**	-	-	-	-	-	.047	.047	.17	.23	1.00	.27	.30	.35	.40	.43	.51	27	48
	490. 488	○	○	**BA**	-	-	-	-	-	.057	.057	.28	.36	1.60	.43	.48	.57	.63	.69	.82	27	48
	490. 568	○	○	**BA**	-	-	-	-	-	.075	.075	.43	.57	2.50	.67	.75	.88	.99	1.08	1.27	27	48
	490. 648	○	○	-	**BC**	**BE**	-	-	-	.094	.094	.69	.91	4.00	1.07	1.20	1.41	1.59	1.73	2.04	27	52
	490. 728	○	○	-	**BC**	**BE**	-	-	-	.126	.110	1.09	1.43	6.30	1.69	1.89	2.23	2.50	2.73	3.21	27	52
	490. 748	○	-	-	-	**BE**	-	-	-	.126	.126	1.23	1.62	7.10	1.90	2.13	2.51	2.82	3.08	3.62	27	52
	490. 808	○	○	-	-	**BE**	-	-	-	.154	.154	1.72	2.28	10.00	2.68	3.00	3.53	3.97	4.34	5.10	27	52
	490. 848	○	○	-	-	BE	-	-	-	.185	.157	2.16	2.85	12.50	3.35	3.76	4.42	4.96	5.42	6.37	27	52
	490. 928	○	○	-	-	-	**BG**	-	-	.228	.187	3.45	4.56	20.00	5.36	6.01	7.07	7.93	8.67	10.20	27	52
	490. 968	○	○	-	-	-	BG	**BK**	-	.262	.191	4.31	5.69	25.00	6.70	7.51	8.83	9.91	10.84	12.74	27	52
	491. 048	○	○	-	-	-	-	**BK**	-	.362	.230	6.90	9.11	40.00	10.71	12.02	14.14	15.86	17.34	20.39	27	52
	491. 148	○	-	-	-	-	-	-	**BM**	.449	.301	12.25	16.17	71.00	19.01	21.33	25.09	28.15	30.78	36.20	27	52

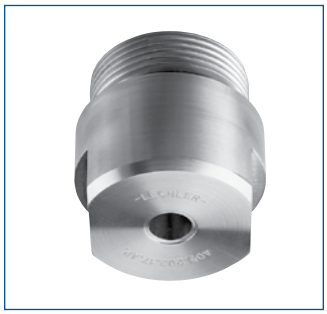
Example for ordering:	**Type**	**+**	**Material no.**	**+**	**Conn.**	**=**	**Ordering no.**
	490. 368	**+**	**1Y**	**+**	**BA**	**=**	**490. 368. 1Y. BA**

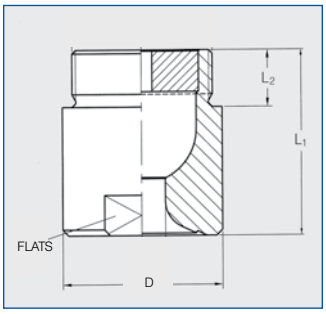
Conversion formula for the above series: $V_2 = V_1 * \left(\frac{P_2}{P_1}\right)^{0.4}$ (≤150 psi) (See page 12 for symbol definitions.)

Full cone nozzles
Axial-flow
Series 405

Uniform spray pattern. Large free passage cross-sections due to optimized x-style swirl insert.

Applications:
- Surface spraying
- Spraying over packings
- Cleaning and washing processes
- Chemical process engineering
- Cooling of gaseous fluids and solids
- Water treatment





Dimensions (in.)				
Inlet (Male NPT)	L1	L2	D	Flats
1-1/4	1.97	.75	1.93	1-5/8
1-1/2	2.36	.75	2.32	2
2	3.07	.94	2.68	2-3/8

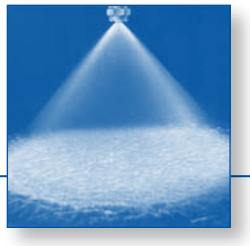
Spray angle	Ordering no. Type	Material no. 316L SS 1Y	Connection Male NPT 1 1/4"	1 1/2"	2"	Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute) 5 psi	10 psi	20 psi	liters per minute 2 bar	30 psi	40 psi	60 psi	Spray Diam. D (in.) @ 30 psi H=20"	H=40"
90°	**405. 206**	○	**BP**	-	-	.473	.197	13	17	23	100	27	30	35	31	57
	405. 286	○	-	**BR**	-	.599	.244	21	28	36	160	43	48	57	31	61
	405. 326	○	-	-	**BV**	.678	.303	26	35	46	200	54	60	71	33	63
	405. 366	○	-	-	**BV**	.768	.343	33	43	57	250	67	75	88	33	63
	405. 406	○	-	-	**BV**	.867	.374	41	54	72	315	85	95	111	33	63
120°	**405. 208**	○	**BP**	-	-	.500	.197	13	17	23	100	27	30	35	57	102
	405. 288	○	-	**BR**	-	.630	.260	21	28	36	160	43	48	57	59	106
	405. 328	○	-	-	**BV**	.701	.311	26	35	46	200	54	60	71	59	110
	405. 368	○	-	-	**BV**	.792	.347	33	43	57	250	67	75	88	59	110
	405. 408	○	-	-	**BV**	.883	.359	41	54	72	315	85	95	111	59	110

Example for ordering:	Type	+	Material no.	+	Conn.	=	Ordering no.
	405. 204	+	**1Y**	+	**BP**	=	**405. 204. 1Y. BP**

1-800-777-2926

Conversion formula for the above series: $V_2 = V_1 * \left(\frac{P_2}{P_1}\right)^{0.4}$ (≤150 psi) (See page 12 for symbol definitions.)

Full cone nozzles
Axial-flow
Series 419



Particularly insensitive to clogging thanks to very large free cross sections. Stable spray angle. Uniform spray pattern

Applications:
- Gas washing
- Spraying over packings
- Dust control
- Absorption
- Distillation

Figure 1

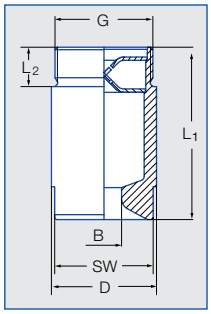


Figure 2

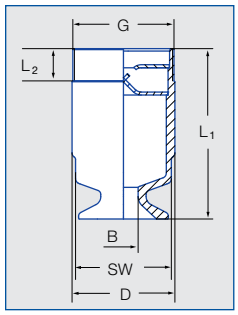
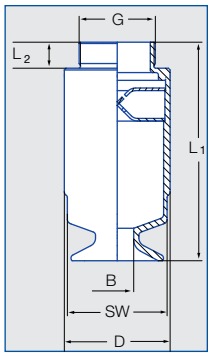
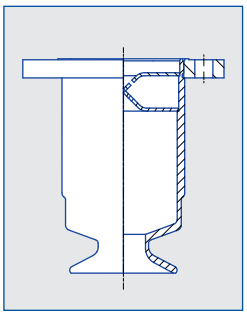


Figure 3





Other materials and flange versions are available on request

Spray Angle	Type	Code	Figure	Dimensions [in]					Weight (lbs)
				G NPT Male	L_1	L_2	D	Flats	
90° + 120°	419.3XX	**BR**	3	1 1/2	5.20	.87	2.52	2.36	3.31
		BV	1	2	4.49	.94	2.52	2.36	2.65
	419.4XX	**BV**	3	2	6.42	1.06	3.15	2.95	4.41
		BY	2	2 1/2	5.28	.94	3.15	2.95	3.75
	419.51X 419.54X	**BV**	3	2	7.83	1.06	4.02	3.74	8.16
		BY	3	2 1/2	7.95	1.18	4.02	3.74	8.38
		MA	3	3	8.07	1.26	4.02	3.74	11.46
		MC	2	3 1/2	6.65	1.06	4.02	3.74	7.05
	419.57X	**BY**	3	2 1/2	9.09	1.18	4.53	4.13	11.46
		MA	3	3	9.17	1.42	4.53	4.13	11.46
		ME	2	4	7.64	36	4.53	4.13	9.70
	419.6XX	**MA**	3	3	9.92	30	4.41	4.53	11.90
		MC	3	3 1/2	10.00	32	4.41	4.53	12.13

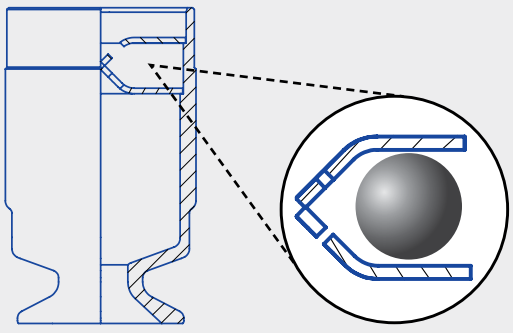
Conversion formula for the above series: $V_2 = V_1 * \left(\frac{P_2}{P_1}\right)^{0.4}$ (≤150 psi) (See page 12 for symbol definitions.)

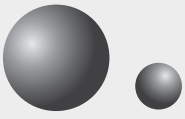
Full cone nozzles
Axial-flow
Series 419

Spray angle*	Type	Ordering no. Mat.-Nr. 1Y 316L SS	Mat.-Nr. 2P 904 L	Code 1 1/2 Male NPT	2 Male NPT	2 1/2 NPT male	3 NPT male	3 1/2 NPT male	4 NPT male	B Ø [in]	E Ø [in]	Flow Rate (Gallons Per Minute) 5 psi	10 psi	15 psi	30 psi	75 psi	Spray Diameter D [in] at p = 15 psi H = 20 in	D = 40 in
90°	**419.366**	○	○	**BR**	**BV**	-	-	-	-	.70	.69	33	43	51	67	97	39	79
	419.396	○	○	**BR**	**BV**	-	-	-	-	.81	.69	39	52	61	80	116	39	79
	419.446	○	○	-	**BV**	**BY**	-	-	-	.91	.81	52	69	81	107	155	39	79
	419.486	○	○	-	**BV**	**BY**	-	-	-	1.10	.81	65	86	101	134	193	39	79
	419.516	○	○	-	**BV**	**BY**	**MA**	**MC**	-	1.07	.95	78	104	122	161	232	39	79
	419.546	○	○	-	**BV**	**BY**	**MA**	**MC**	-	1.30	.95	93	124	144	190	274	39	79
	419.576	○	○	-	-	**BY**	**MA**	-	**ME**	1.34	1.07	111	147	172	228	328	39	79
	419.606	○	○	-	-	-	**MA**	**MC**	-	1.48	1.19	131	172	203	268	386	39	79
	419.626	○	○	-	-	-	**MA**	**MC**	-	1.69	1.19	163	216	254	335	483	39	79
120°	**419.368**	○	○	**BR**	**BV**	-	-	-	-	.81	.69	33	43	51	67	97	67	114
	419.398	○	○	**BR**	**BV**	-	-	-	-	.93	.69	39	52	61	80	116	67	114
	419.448	○	○	-	**BV**	**BY**	-	-	-	.96	.81	52	69	81	107	155	67	114
	419.488	○	○	-	**BV**	**BY**	-	-	-	1.16	.81	65	86	101	134	193	67	114
	419.518	○	○	-	**BV**	**BY**	**MA**	**MC**	-	1.07	.95	78	104	122	161	232	67	114
	419.548	○	○	-	**BV**	**BY**	**MA**	**MC**	-	1.34	.95	93	124	144	190	274	67	114
	419.578	○	○	-	-	**BY**	**MA**	-	**ME**	1.34	1.13	111	147	172	228	328	67	114
	419.608	○	○	-	-	-	**MA**	**MC**	-	1.50	1.27	131	172	203	268	386	67	114
	419.628	○	○	-	-	-	**MA**	**MC**	-	1.71	1.27	163	216	254	335	483	67	114

B = Orifice diameter-Ø · E = Free passage · * Spray angle at 15 psi

Example for ordering:	Type	+	Material-Nr.	+	Code	=	Ordering no.
	419.366	+	**1Y**		**BR**	=	**419.366.1Y.BR**



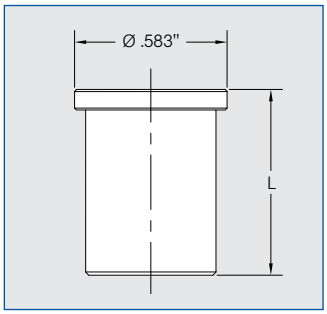


Comparison of the large FreeFlow cross-section with the cross-section of a similar full cone nozzle.

Full cone tips
Axial-flow
Series 468

Excellent uniform full cone distribution and thorough atomization. Spray angles are consistent over the full capacity range.

Applications:
- Washing and cleaning
- Mist eliminator washing
- Chemical reactors
- Surface spraying

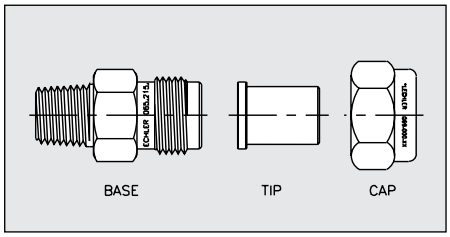


Dimensions (in.)		
Capacity	Length (L)	Wt. brass (lb.)
468.36X-468.60X	.71	.04
468.64X-468.84X	.97	.04

Spray angle	Ordering no. Type	Material no. 316 SS 17[1]	Brass 30	PVDF 5E	Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute) 10 psi	20 psi	liters per minute 2.0 bar	30 psi	40 psi	60 psi	80 psi	100 psi	150 psi	L (in.)	Spray Diam. D (in.) @ 30 psi H=8"	H=20"
60°	468. 604	-	○	-	.081	.055	.54	.72	3.2	.84	.95	1.1	1.2	1.4	1.6	.71	9	22
	468. 644	-	○	○	.095	.075	.69	.91	4.0	1.1	1.2	1.4	1.6	1.7	2.0	.97	9	22
	468. 684	-	○	-	.102	.079	.86	1.1	5.0	1.3	1.5	1.8	2.0	2.2	2.5	.97	9	22
	468. 724	○	○	-	.114	.079	1.1	1.4	6.3	1.7	1.9	2.2	2.5	2.7	3.2	.97	9	22
90°	468. 526	○	○	○	.065	.051	.35	.46	2.0	.54	.60	.71	.79	.87	1.0	.71	15	34
	468. 846	-	○	-	.160	.126	2.2	2.9	12.5	3.4	3.8	4.4	5.0	5.4	6.4	.97	15	34
120°	468. 368	-	○	-	.037	.028	.11	.14	.60	.17	.19	.22	.25	.27	.32	.71	27	61
	468. 408	○	○	-	.047	.033	.17	.23	1.0	.27	.30	.35	.40	.43	.51	.71	27	61
	468. 488	○	○	-	.059	.039	.28	.36	1.6	.43	.48	.57	.63	.69	.82	.71	27	61
	468. 528	○	○	-	.065	.047	.35	.46	2.0	.54	.60	.71	.79	.87	1.0	.71	27	61

Bases and Caps for Mounting

Inlet NPT Male	Outlet Male	Part No.	
1/4"	11/16 x 16	065. 215. XX. 10	**Standard Materials:**
3/8"	11/16 x 16	065. 211. XX. 10	17 316 SS
1/4"	3/8 BSPP	065. 215. XX. 11	30 Brass
3/8"	3/8 BSPP	065. 215. XX. 12	
Caps			
To fit 11/16x16		069. 000. XX. 00	Other materials available. See Accessories beginning on page 127.
To fit 3/8 BSPP		065. 200. XX. 00	



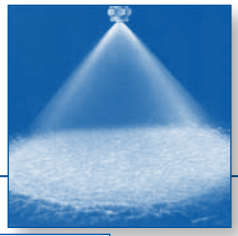
Example for ordering:	Type	+	Material no.	=	Ordering no.
	468. 526	+	17	=	468. 526. 17

1) We reserve the right to deliver material 316 SS or 316L SS, if we show the material code 17.

A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.

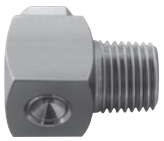
Conversion formula for the above series: $V_2 = V_1 * \left(\frac{P_2}{P_1}\right)^{0.4}$ **(≤150 psi)** (See page 12 for symbol definitions.)

Full cone nozzles
Tangential-flow
Series 422 / 423 Metal version

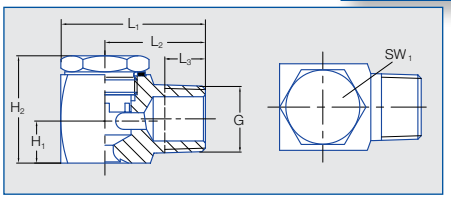


Tangential design has no internal swirl device for maximum clog resistance. Spray distribution and angle are stable over a wide range of pressures.

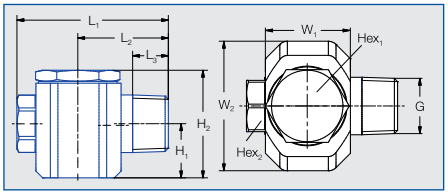
Applications:
- Cleaning and washing processes
- Mist eliminator washing
- Scrubber towers
- Chemical reactors
- Chemical injection



1/4, 3/8 versions



1/2 - 1 versions



Dimensions [in]

G (male NPT)	L_1	L_2	L_3	H_1	H_2	W_1	W_2	Hex_1	Hex_2	Weight (lb.)
1/4"	1.1	.79	.38	.31	.83	.61	.63	.43	-	.097
3/8"	1.42	.98	.4	.43	1.05	.91	.87	.75	-	.222
1/2"	2.2	1.32	.52	.79	1.57	1.26	1.89	1.06	0.75	.816
3/4"	2.58	1.52	.57	.93	2.24	1.5	2.48	1.42	1.06	1.83
1"	3.35	1.91	.66	1.07	2.6	2.17	3.07	1.61	1.42	3.49

Spray angle	Ordering no. Type	Mat. no. AISI 316L 1Y	Mat. no. Brass 30	Connection Male NPT 1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute) 10 psi	20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	Spray Diam. D (in.) @ 40 psi H=8"	H=20"
60°	422. 644	○	○	-	BE	-	-	-	-	-	-	.118	.118	.62	.88	4.0	1.2	1.5	1.8	2.0	9	20
90°	422. 406	○	○	BC	-	-	-	-	-	-	-	.059	.057	.16	.22	1.0	.31	.38	.44	.49	15	34
	422. 486	○	-	BC	-	-	-	-	-	-	-	.075	.071	.25	.35	1.6	.50	.61	.70	.78	15	34
	422. 566	○	○	BC	-	-	-	-	-	-	-	.091	.087	.39	.55	2.5	.78	.95	1.1	1.2	15	34
	422. 606	○	○	-	BE	-	-	-	-	-	-	.102	.099	.49	.69	3.2	.98	1.2	1.4	1.6	15	34
	422. 646	○	○	-	BE	-	-	-	-	-	-	.118	.114	.62	.88	4.0	1.2	1.5	1.8	2.0	15	38
	422. 766	○	-	-	BE	-	-	-	-	-	-	.164	.162	1.2	1.8	8.0	2.5	3.0	3.5	3.9	15	38
	422. 886	○	○	-	BE	-	-	-	-	-	-	.230	.230	2.5	3.5	16.0	5.0	6.1	7.0	7.9	15	38
	422. 966	○	-	-	-	BG	-	-	-	-	-	.315	.315	3.9	5.5	25	7.8	9.5	11.0	12.3	15	38
	423. 006	○	-	-	-	BG	-	-	-	-	-	.343	.343	4.8	6.8	31	9.6	11.8	13.6	15.2	15	38
	423. 046	○	-	-	-	-	BK	-	-	-	-	.426	.402	6.2	8.8	40	12	15	18	20	15	38
	423. 086	○	-	-	-	-	BK	-	-	-	-	.449	.433	7.8	11.0	50	15.5	19.0	22	25	15	38
	423. 126	○	-	-	-	-	BK	-	-	-	-	.500	.485	9.8	13.8	63	19.5	24	28	31	15	38
	423. 146	○	-	-	-	-	-	BM	-	-	-	.552	.532	11.0	15.6	71	22	27	31	35	15	38
	423. 206	○	-	-	-	-	-	BM	-	-	-	.670	.630	15.5	21.9	100	31	38	44	49	15	38
	423. 286	○	-	-	-	-	-	-	BP	-	-	.748	.748	25.0	35.0	160	50	61	71	79	15	38
	423. 366	○	-	-	-	-	-	-	-	BR	-	.875	-	38.0	54.0	246	76	93	107	120	15	38
	423. 406	○	-	-	-	-	-	-	-	-	BV	-	-	49.0	69.0	315	98	120	139	155	15	38
	423. 446	○	-	-	-	-	-	-	-	-	BV	-	-	62.0	88.0	400	124	152	175	196	27	38
120°	422. 568	○	○	BC	-	-	-	-	-	-	-	.091	.087	.39	.55	2.5	.78	.95	1.1	1.2	27	48
	422. 728	○	○	-	BE	-	-	-	-	-	-	.146	.142	.98	1.4	6.3	2.0	2.4	2.8	3.1	27	63
	422. 808	○	-	-	BE	-	-	-	-	-	-	.183	.181	1.6	2.2	10.0	3.1	3.8	4.4	4.9	27	63
	422. 848	○	○	-	BE	-	-	-	-	-	-	.205	.201	1.9	2.7	12.5	3.9	4.8	5.5	6.1	27	63
	422. 888	○	○	-	BE	-	-	-	-	-	-	.229	.225	2.5	3.5	16.0	5.0	6.1	7.0	7.9	27	63
	422. 928	○	-	-	-	BG	-	-	-	-	-	.288	.288	3.1	4.4	20	6.2	7.6	8.8	9.8	27	63
	422. 968	○	○	-	-	BG	-	-	-	-	-	.315	.315	3.9	5.5	25	7.8	9.5	11.0	12.3	27	63
	423. 008	○	-	-	-	BG	-	-	-	-	-	.343	.343	4.8	6.8	31	9.6	11.8	13.6	15.2	27	63
	423. 128	○	-	-	-	-	BK	-	-	-	-	.500	.485	9.8	13.8	63	19.5	24	28	31	27	63
	423. 208	○	-	-	-	-	-	BM	-	-	-	.670	.630	15.5	21.9	100	31	38	44	49	27	63

Example for ordering:	Type	+	Material no.	+	Conn.	=	Ordering no.
	422. 846	+	1Y	+	BE	=	422. 846. 1Y. BE

Different metallurgies may be available upon request.

A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.

1-800-777-2926

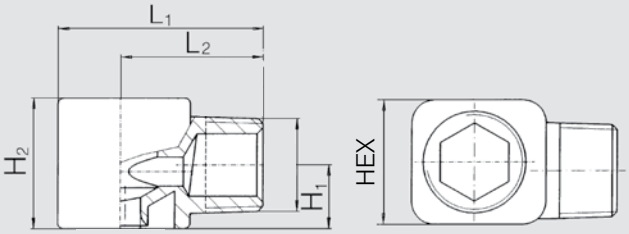
Conversion formula for the above series: $V_2 = V_1 * \sqrt{\frac{P_2}{P_1}}$

(See page 12 for symbol definitions.)

Full cone nozzles
Tangential-flow
Series 422 / 423 Plastic version

Vaneless tangential design combined with PVDF construction offers an excellent nozzle for critical environmental and chemical processing uses.

Applications:
- Mist eliminator washing
- Chemical reactors
- Scrubbers



Dimensions (in.)						
Inlet (Male NPT)	L1	L2	H1	H2	Hex	Wt. (lb.)
1/4	1.10	.79	.31	.63	5/8	.02
3/8	1.42	.98	.44	.91	7/8	.04
1/2	1.95	1.32	.76	1.50	1-5/16	.09
3/4	2.30	1.52	.96	1.97	1-5/8	.11

Spray angle	Ordering no. Type	Mat. no. PVDF 5E	Connection Male NPT 1/4"	Male NPT 3/8"	Male BSPT 1/2"	Male BSPT 3/4"	Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute) 10 psi	20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	Spray Diameter D (in.) @ 40 psi H=8"	H=20"
60°	422. 724	○	-	BE	-	-	.142	.142	.98	1.4	6.3	2.0	2.4	2.8	3.1	9	20
90°	422. 406	○	BC	-	-	-	.059	.057	.16	.22	1.0	.31	.38	.44	.49	15	34
	422. 486	○	BC	-	-	-	.075	.071	.25	.35	1.6	.50	.61	.70	.78	15	34
	422. 566	○	BC	-	-	-	.091	.087	.39	.55	2.5	.78	.95	1.1	1.2	15	34
	422. 606	○	-	BE	-	-	.102	.099	.49	.69	3.2	.98	1.2	1.4	1.6	15	34
	422. 646	○	-	BE	-	-	.118	.114	.62	.88	4.0	1.2	1.5	1.8	2.0	15	38
	422. 726	○	-	BE	-	-	.146	.142	.98	1.4	6.3	2.0	2.4	2.8	3.1	15	38
	422. 806	○	-	BE	-	-	.183	.181	1.6	2.2	10.0	3.1	3.8	4.4	4.9	15	38
	422. 846	○	-	BE	-	-	.205	.201	1.9	2.7	12.5	3.9	4.8	5.5	6.1	15	38
	422. 886	○	-	BE	-	-	.229	.225	2.5	3.5	16.0	5.0	6.1	7.0	7.9	15	38
	422. 926	○	-	-	CG	-	.288	.288	3.1	4.4	20	6.2	7.6	8.8	9.8	15	38
	422. 966	○	-	-	CG	-	.315	.315	3.9	5.5	25	7.8	9.5	11.0	12.3	15	38
	423. 006	○	-	-	CG	-	.343	.343	4.8	6.8	31	9.6	11.8	13.6	15.2	15	38
	423. 126	○	-	-	-	CK	.473	.473	9.8	13.8	63	19.5	24	28	31	15	38
120°	422. 408	○	BC	-	-	-	.059	.057	.16	.22	1.0	.31	.38	.44	.49	27	63
	422. 448	○	BC	-	-	-	.065	.063	.19	.26	1.2	.37	.46	.53	.59	27	63
	422. 488	○	BC	-	-	-	.075	.071	.25	.35	1.6	.50	.61	.70	.78	27	63
	422. 568	○	BC	-	-	-	.091	.087	.39	.55	2.5	.78	.95	1.1	1.2	27	63
	422. 728	○	-	BE	-	-	.146	.142	.98	1.4	6.3	2.0	2.4	2.8	3.1	27	63
	422. 888	○	-	BE	-	-	.229	.225	2.5	3.5	16.0	5.0	6.1	7.0	7.9	27	63
	423. 008	○	-	-	CG	-	.343	.343	4.8	6.8	31	9.6	11.8	13.6	15.2	27	63
	423. 128	○	-	-	-	CK	.500	.485	9.8	13.8	63	19.5	24	28	31	27	63

Example for ordering:	Type	+	Material no.	+	Conn.	=	Ordering no.
	422. 888	+	5E	+	BE	=	422. 888. 5E. BE

A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.

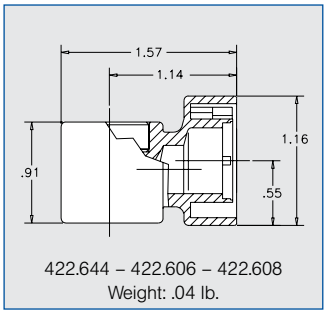
Conversion formula for the above series: $V_2 = V_1 * \sqrt{\frac{P_2}{P_1}}$

(See page 12 for symbol definitions.)

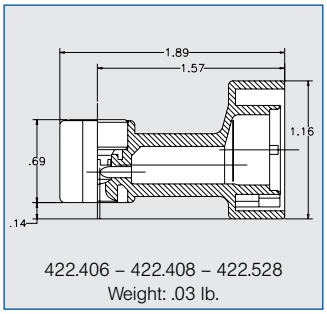
Full cone nozzles
Tangential-flow TWISTLOC quick release mount
Series 422

Bayonet PVDF nozzles mount by hand with a quick twist. Lechler's vaneless full cone design paired with a quick-disconnect offers an unbeatable combination where nozzles may need to be changed, cleaned, or inspected quickly.

Applications:
- Mist eliminator washing
- Critical cleaning operations
- Chemical reactors
- Scrubbers



422.644 – 422.606 – 422.608
Weight: .04 lb.

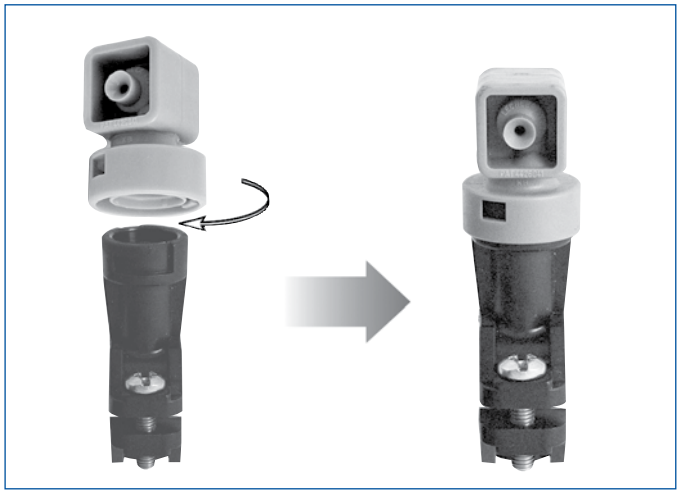


422.406 – 422.408 – 422.528
Weight: .03 lb.

Spray angle	Ordering no. Type	Mat. no. PVDF 5E	Mat. no. Polypro 53	Conn. Bayonet	Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute) 10 psi	20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	Spray Diameter D (in.) @ 40 psi H=8"	H=20"
60°	422. 644	-	○	KB	.114	.114	.62	.88	4.0	1.2	1.5	1.8	2.0	9	20
90°	422. 406	○	-	KB	.059	.057	.16	.22	1.0	.31	.38	.44	.49	15	34
	422. 606	○	-	KB	.102	.099	.49	.69	3.2	.98	1.2	1.4	1.6	15	34
120°	422. 408	○	-	KB	.059	.057	.16	.22	1.0	.31	.38	.44	.49	27	48
	422. 528	○	-	KB	.083	.079	.32	.44	2.0	.62	.76	.88	.98	27	48
	422. 608	○	-	KB	.102	.099	.49	.69	3.2	.98	1.2	1.4	1.6	27	63

Example for ordering:	Type	+	Material no.	+	Conn.	=	Ordering no.
	422. 608	+	5E	+	KB	=	422. 608. 5E. KB

Simple assembly – with just a twist



A listing of alternatives for various assembly possibilities is shown in the Accessories section beginning on page 127.

1-800-777-2926

Conversion formula for the above series: $V_2 = V_1 * \sqrt{\frac{P_2}{P_1}}$

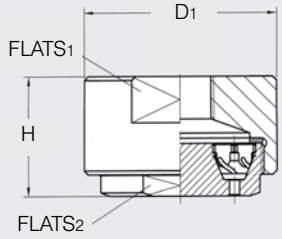
(See page 12 for symbol definitions.)

Full cone nozzles
Cluster head
Series 502 / 503

Each unit uses seven individual hollow cone orifices to generate small droplets. Sprays overlap into one wide angle full cone pattern.

Applications:
- Gas cooling
- Steam de-superheating
- Chemical reactors

∢ 70°

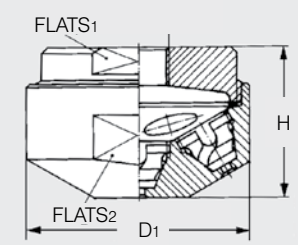


70° Version

Dimensions (in.)

	1/2"	3/4"
FLATS1	1.8	2.6
FLATS2	1.5	2.2
H	1.0	1.8
D	2.0	3.0
Weight (Brass)	.55 lb.	1.92 lb.

∢ 130°



130° Version

Dimensions (in.)

	1/2"	3/4"
FLATS1	1.1	2.0
FLATS2	1.4	2.2
H	1.1	2.1
D	1.6	2.4
Weight (Brass)	.33 lb.	.90 lb.

∢ Spray angle	Ordering no. Type	Material no. 316 SS 17	Material no. Brass 30	Connection Female NPT 1/2" 3/4"	Orifice diam. (in.)	Free passage (in.)	Flow Rate (Gallons Per Minute) 10 psi	20 psi	liters per minute 2 bar	30 psi	40 psi	60 psi	80 psi	100 psi	Spray Diam. D (in.) @ 30 psi H=40"	H=80"
70°	502. 445	-	○	BH -	.035	.020	.19	.27	1.3	.35	.39	.48	.55	.61	16	16
	502. 985	○	-	- BL	.129	.079	4.3	6.1	28	7.5	8.7	10.6	12.3	13.7	47	59
	503. 065	○	-	- BL	.193	.079	7.0	9.9	45	12.1	14.0	17.1	19.8	22	47	70
	503. 115	○	○	- BL	.236	.079	9.2	13.1	60	16.1	18.7	23	26	29	51	78
130°	502. 448	○	○	BH BL	.035	.020	.19	.27	1.3	.35	.39	.48	.55	.61	20	20
	502. 548	○	○	BH BL	.071	.020	.35	.49	2.2	.59	.70	.86	.99	1.1	27	27
	502. 588	○	○	- BL	.039	.039	1.6	2.3	2.8	.87	.87	1.1	1.2	1.4	32	35
	502. 748	○	○	- BL	.075	.079	1.2	1.6	7.1	1.9	2.2	2.7	3.1	3.5	43	47
	502. 798	○	-	- BL	.114	.079	1.5	2.1	9.5	2.6	3.0	3.6	4.2	4.7	47	51
	502. 838	○	○	- BL	.118	.079	1.8	2.6	11.8	3.2	3.7	4.5	5.2	5.8	55	63
	502. 908	○	○	- BL	.157	.079	2.8	3.9	18.0	4.8	5.6	6.8	7.9	8.8	59	70
	503. 028	○	○	- BL	.165	.079	5.5	7.7	36	9.7	11.0	13.5	15.6	17.4	63	70
	503. 118	○	○	- BL	.256	.079	9.2	13.1	60	16.1	18.7	23	26	29	79	118

Example for ordering:	Type	+	Material no.	+	Conn.	=	Ordering no.
	503. 028	+	17	+	BL	=	503. 028. 17. BL

Diagram of spray diameter

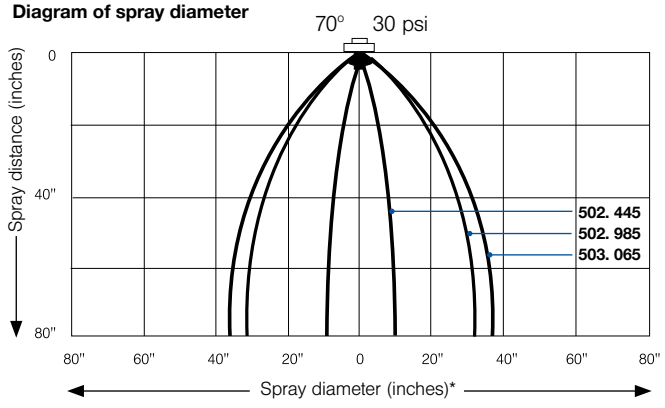
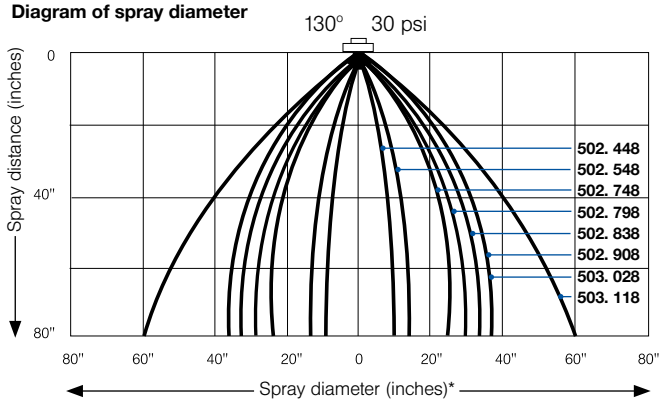


Diagram of spray diameter



* Spray diameter coordinates represent distance from zero (0) coordinate.For each curve, add both coordinate values to obtain spray diameter.

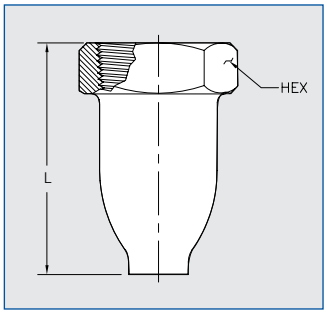
Conversion formula for the above series: $V_2 = V_1 * \sqrt{\frac{P_2}{P_1}}$

(See page 12 for symbol definitions.)

Full cone nozzles
Axial-flow CenterJet™
Series 459

Turbine-style vane for uniform atomization and distribution.

Applications:
- Surface spraying
- Quench cooling
- Fire suppression
- Chemical processing



Dimensions (in.) Inlet (Female NPT)	L	HEX	Wt. (lb.)
1-1/2	4.31	2-3/16	1.8
2	5.45	2-3/4	2.4
2-1/2	6.00	3-1/4	4.18
3	6.89	3-7/8	6.0

Ordering no. Type	Mat. no. 316 SS 17	Connection Female NPT 1 1/2"	2"	2 1/2"	3"	Orifice diam. (in.)	Flow Rate (Gallons Per Minute) 5 psi	10 psi	20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	Spray Angle in degrees @ 40 psi (*=15 psi)
STANDARD ANGLE															
459. 244	○	**BS**	-	-	-	.500	14	20	27	124	38	47	54	60	**62**
459. 284	○	**BS**	-	-	-	.625	18	25	36	165	50	62	71	79	**62**
459. 355	○	**BS**	-	-	-	.687	26	37	52	233	72	86	100	112	**70**
459. 356	○	**BS**	-	-	-	.687	26	37	52	233	72	86	100	112	**84**
459. 343	○	-	**BW**	-	-	.500	25	35	48	222	68	82	94	105	**43**
459. 365	○	-	**BW**	-	-	.656	28	39	53	242	72	86	98	110	***80**
459. 415	○	-	**BW**	-	-	.796	38	53	74	339	105	125	144	160	**66**
459. 455	○	-	**BW**	-	-	.906	48	68	95	434	132	160	183	205	**68**
459. 475	○	-	-	**BZ**	-	.910	54	75	104	475	143	172	200	221	**83**
459. 515	○	-	-	**BZ**	-	1.06	68	94	132	603	185	225	260	290	**67**
459. 584	○	-	-	-	**MB**	1.31	103	144	200	925	285	345	400	440	**57**
WIDE ANGLE															
459. 238	○	**BS**	-	-	-	.562	15	20	27	124	37	45	51	56	**120**
459. 266	○	**BS**	-	-	-	.500	14	19	26	117	35	42	48	53	**98**
459. 286	○	**BS**	-	-	-	.625	18	25	36	165	50	62	71	79	**94**
459. 288	○	**BS**	-	-	-	.625	19	26	36	162	49	58	66	73	**120**
459. 348	○	**BS**	-	-	-	.781	26	36	49	226	69	83	95	105	**120**
459. 378	○	-	**BW**	-	-	.781	33	45	61	273	82	98	110	122	**118**
459. 386	○	-	**BW**	-	-	.796	37	50	68	311	92	111	129	141	***99**
459. 408	○	-	**BW**	-	-	.937	40	55	74	332	100	118	135	147	**118**
459. 488	○	-	-	**BZ**	-	1.03	64	86	117	521	157	187	212	232	**119**
459. 496	○	-	-	**BZ**	-	0.98	63	87	119	543	165	200	233	259	***86**
459. 575	○	-	-	-	**MB**	1.31	110	150	205	938	275	330	380	421	***90**
459. 608	○	-	-	-	**MB**	1.43	146	200	274	1255	372	450	520	590	**120**

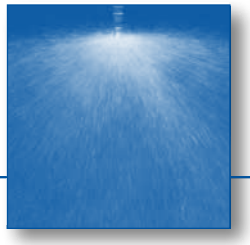
This product line is also available in larger capacities with inlets up to 6" in size. Please contact Lechler if you have an application requiring a larger size.

Example for ordering:	Type	+	Material no.	+	Conn.	=	Ordering no.
	459. 455	+	**17**	+	**BW**	=	**459. 455. 17. BW**

Conversion formula for the above series: $V_2 = V_1 * \sqrt{\frac{P_2}{P_1}}$
(See page 12 for symbol definitions.)

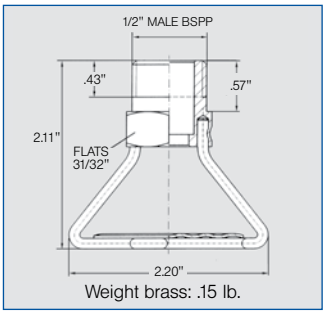
Deflector-plate nozzles

Series 524 / 525



Full cone spray has no swirl insert for greater clog resistance.

Applications:
- Fire fighting
- Broadcast spraying
- Wide area spraying
- Tank cleaning



Weight brass: .15 lb.

Spray angle	Ordering no. Type: Connection: 1/2" Male BSPP	Material no. 316 SS: 17	Material no. Brass: 30	Orifice diam. (in.)	Flow Rate (Gallons Per Minute) 10 psi	20 psi	liters per minute 2 bar	40 psi	60 psi	80 psi	100 psi	150 psi	Spray Diameter D (ft.) @ 45 psi H=40"	H=120"
180°	**524. 809**	○	○	.158	1.6	2.2	10	3.1	3.8	4.4	4.9	6.0	18	21
	525. 049	○	○	.315	6.2	8.8	40	12.4	15.2	17.6	19.6	24	33	43
	525. 109	-	○	.366	8.8	12.5	57	17.7	22	25	28	34	33	44
	525. 169	-	○	.429	12.6	17.8	81	25	31	36	40	49	35	44
	525. 229	-	○	.481	17.4	25	112	35	43	49	55	67	22	34
	525. 269	○	○	.485	22	31	140	43	53	61	69	84	17	33

Example for ordering:	**Type** **525. 049**	**+**	**Material no.** **30**	**=**	**Ordering no.** **525. 049. 30**

Conversion formula for the above series: $V_2 = V_1 * \sqrt{\frac{P_2}{P_1}}$

(See page 12 for symbol definitions.)