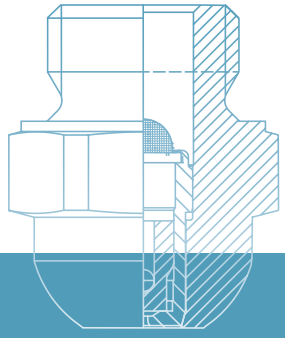
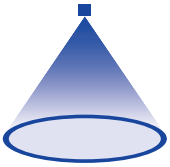
HOLLOW CONE NOZZLES



HOLLOW CONE NOZZLES
OVERVIEW OF TYPES

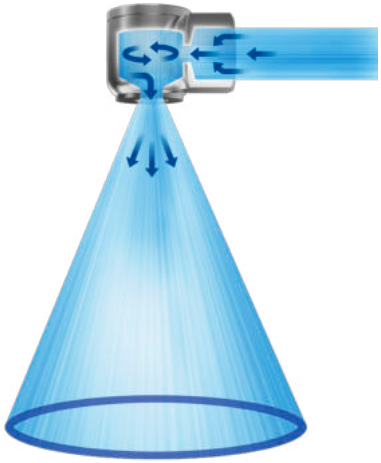


Hollow cone nozzles are used wherever fine droplets are required. A distinction is made between axial-flow hollow cone nozzles and tangential-flow hollow cone nozzles. Axial-flow hollow cone nozzles are mainly used for cooling, humidification and disinfecting, while tangential-flow hollow cone nozzles are traditionally used for humidification, dust control, sprinkling and foam control.

Axial-flow hollow cone nozzles

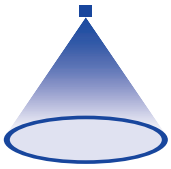
- High and controlled degree of atomization due to integrated swirl insert.
- Narrow droplet size spectrum.
- Uniform atomization.
- Large droplet surface area for mass transfer processes.

Tangential-flow hollow cone nozzles



- Liquid rotation without swirl insert.
- Clog-resistant maximum free passage.
- Large free cross sections.
- Operational reliability.
- Coarse droplets that are larger than axial-flow hollow cone nozzles.

HOLLOW CONE NOZZLES
OVERVIEW OF SERIES

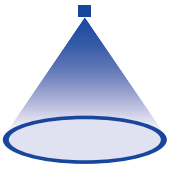


		Axial-flow hollow cone nozzles				
						
Series		**220**	**226**	**214/216/218**	**2TR**	
Information on page		151	152	153	154	
Flow rate at p = 30 psi	**Very low** < 0.13 gal/min	● (at p = 75 psi)	● (at p = 75 psi)	● (at p = 75 psi)	● (at p = 75 psi)	
	Low 0.13 gal/min–.53 gal/min			● (at p = 75 psi)	● (at p = 75 psi)	
	Medium .53 gal/min–2.64 gal/min			● (at p = 75 psi)		
	High 2.64 gal/min–13.21 gal/min			● (at p = 75 psi)		
	Very high > 13.21 gal/min					
Spray angle	**Small** 45°					
	Medium 55°–95°	●	●	●	●	
	Large 130°					
Nozzle material	**Stainless steel**	●	●	●		
	Brass			●		
	Plastic				●	
Nozzle connection		1/4 NPT	Assembly with retaining nut 3/8 NPT	1/8 NPT 1/4 NPT 3/8 NPT 1/2 NPT	Assembly with retaining nut 3/8 NPT	

Tangential-flow hollow cone nozzles

					
302	**302 with bayonet quick-release system**	**308**	**304/306/307**	**350**	**373 Ramp Bottom**
155/156	158	159	160	161	162
•	•				
•	•	•		•	
•		•	•	•	
•			•		
					•
	•				
•	•	•	•		•
•	•		•	•	
•			•		•
•		•	•		
•	•			•	
3/8 NPT 3/8 BSPP	Assembly with bayonet quick-release system	3/8 BSPP	1/2 BSPP 3/4 BSPP	3/8 BSPP	1 NPT 1 1/4 NPT 1 1/2 NPT 2 NPT

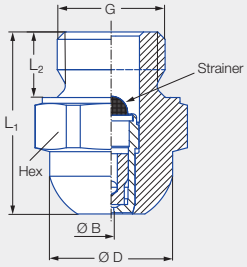
Axial-flow hollow cone nozzles
Series 220



Features:
- Extremely fine, fog-like atomization

Applications:
- Humidification
- Cooling
- Disinfection
- Chemical engineering
- Adiabatic cooling

Series 220



Connection	G	Dimensions [in]				Weight [lb]
		L_1	L_2	Ø D	Hex (mm)	
BC	1/4 NPT	0.87	0.31	0.59	17	0.06

Spray angle	Ordering number				Bore diameter B [in]	Narrowest free cross section Ø [in]	Strainer insert mesh size [in]	V̇ water [gal/min]								Spray diameter D [in] (at p = 75 bar)
	Type	Mat. no. 1Y Stainless steel 316L	Mat. no. 11 Stainless steel 430F	Connection 1/4 NPT				p [psi]								
								30	45	75	Liters per min. **5 bar**	100	145	290	725	1450	H = 10 [in]
60°	**220.004**	●	●	BC	0.004	0.004	0.002	–	–	0.003	**0.013**	0.004	0.005	0.007	0.011	0.015	5
	220.014	●	●	BC	0.006	0.006	0.002	–	0.004	0.005	**0.019**	0.006	0.007	0.010	0.016	0.022	6
	220.054	●	●	BC	0.008	0.006	0.002	0.005	0.006	0.007	**0.027**	0.008	0.010	0.014	0.023	0.032	6
80°	**220.085**	●	●	BC	0.010	0.010	0.004	0.007	0.008	0.011	**0.040**	0.012	0.015	0.021	0.033	0.047	7
	220.125	●	●	BC	0.014	0.014	0.004	0.011	0.013	0.017	**0.062**	0.019	0.023	0.033	0.052	0.073	9
	220.145	●	●	BC	0.016	0.016	0.004	0.014	0.017	0.022	**0.082**	0.025	0.031	0.043	0.068	0.097	10
	220.165	●	●	BC	0.018	0.018	0.008	0.018	0.021	0.028	**0.103**	0.032	0.038	0.054	0.086	0.122	10
	220.185	●	●	BC	0.022	0.014	0.008	0.022	0.027	0.035	**0.130**	0.040	0.049	0.069	0.109	0.154	11
	220.205	●	●	BC	0.024	0.014	0.008	0.028	0.034	0.044	**0.168**	0.053	0.063	0.089	0.140	0.198	11
	220.245	●	●	BC	0.028	0.020	0.008	0.044	0.054	0.070	**0.261**	0.081	0.097	0.138	0.218	0.308	11
	220.285	●	●	BC	0.035	0.022	0.004	0.066	0.081	0.105	**0.390**	0.121	0.146	0.206	0.326	0.461	12

Also available in BSPP

Mat. no.	Housing	Nozzle insert	Strainer
1Y	Stainless steel 316L	Stainless steel 316L	Stainless steel 316L
11	Stainless steel 430F	Stainless steel 430F	Stainless steel 316L

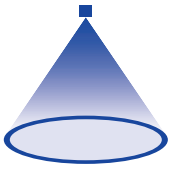
The supplied and integrated strainer insert prevents clogging of the nozzle, thereby ensuring a long service life.

Conversion formula for this series: $\dot{V}_2 = \dot{V}_1 \cdot \sqrt{\frac{p_2}{p_1}}$

Ordering example:	Type	+	Material no.	+	Code	=	Ordering no.
	220.004	+	1Y	+	BC	=	220.004.1Y.BC

Assembly accessories can be found in Chapter 12 “Accessories”.

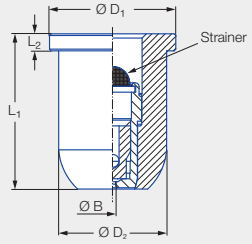
Axial-flow hollow cone nozzles
Series 226



Features:
- Extremely fine, fog-like atomization
- Assembly with retaining nut

Applications:
- Humidification
- Cooling
- Disinfection
- Chemical engineering
- Adiabatic cooling

Series 226



Connection	Dimensions [in]				Weight [lb]
	L_1	L_2	Ø D_1	Ø D_2	
Assembly with retaining nut 3/8 BSPP	0.71	0.08	0.58	0.50	0.04

Spray angle	Ordering number Type	Mat. no. 16 Stainless steel 303	Bore diameter B [in]	Narrowest free cross section Ø [in]	Strainer insert mesh size [in]	V̇ water [gal/min] p [psi] 30	45	75	Liters per min. 5 bar	100	145	290	725	1450	Spray diameter D [in] (at p = 75 psi) H = 10 [in]
60°	226.004	●	0.004	0.004	0.002	–	–	0.003	**0.013**	0.004	0.005	0.007	0.011	0.015	5
	226.014	●	0.006	0.006	0.002	–	0.004	0.005	**0.019**	0.006	0.007	0.010	0.016	0.022	6
	226.054	●	0.008	0.006	0.002	0.005	0.006	0.007	**0.027**	0.008	0.010	0.014	0.023	0.032	6
80°	226.085	●	0.010	0.010	0.004	0.007	0.008	0.011	**0.040**	0.012	0.015	0.021	0.033	0.047	7
	226.125	●	0.014	0.014	0.004	0.011	0.013	0.017	**0.062**	0.019	0.023	0.033	0.052	0.073	9
	226.145	●	0.016	0.016	0.004	0.014	0.017	0.022	**0.082**	0.025	0.031	0.043	0.068	0.097	10
	226.165	●	0.018	0.018	0.004	0.018	0.021	0.028	**0.103**	0.032	0.038	0.054	0.086	0.122	10
	226.185	●	0.022	0.014	0.008	0.022	0.027	0.035	**0.130**	0.040	0.049	0.069	0.109	0.154	11
	226.205	●	0.024	0.014	0.008	0.028	0.034	0.044	**0.168**	0.053	0.063	0.089	0.140	0.198	11
	226.245	●	0.028	0.020	0.008	0.044	0.054	0.070	**0.261**	0.081	0.097	0.138	0.218	0.308	11
	226.285	●	0.035	0.022	0.008	0.066	0.081	0.105	**0.390**	0.121	0.146	0.206	0.326	0.461	12

Mat. no.	Housing	Nozzle insert	Strainer
16	Stainless steel 303	Stainless steel 430F	Stainless steel 316L

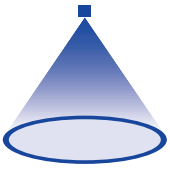
The supplied and integrated strainer insert prevents clogging of the nozzle, thereby ensuring a long service life.

Conversion formula for this series: $\dot{V}_2 = \dot{V}_1 \cdot \sqrt{\frac{p_2}{p_1}}$

Ordering example:	Type	+	Material no.	=	Ordering no.
	226.004	+	16	=	226.004.16

Assembly accessories can be found in Chapter 12 “Accessories”.

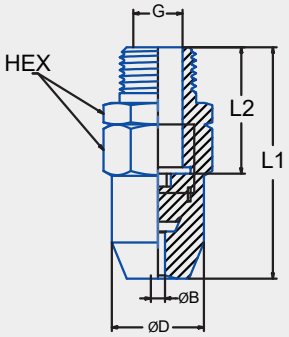
Axial-flow hollow cone nozzles
Series 214/216/218



Features:
- Fine, uniform atomization

Applications:
- Cooling
- Gas washing
- Dust control
- Sprinkling
- Adiabatic cooling

Series 214/216/218



Ordering no.	Dimensions [in]					Weight [lb]
	Thread size Male NPT	Hex (mm)	L_1	L_2	Ø D_1	
214.xxx.YY.BA	1/8	17	1.531	0.718	0.625	0.15
214.xxx.YY.BC	1/4	17	1.593	0.718	0.625	0.20
216.xxx.YY.BC	1/4	22	1.468	1.156	0.843	0.25
216.xxx.YY.BE	3/8	22	1.468	1.156	0.843	0.25
218.xxx.YY.BG	1/2	27	2.531	1.406	1.031	0.30

Spray angle	Ordering number							Bore diameter B [in]	Narrowest free cross section Ø [in]	V̇ water [gal/min]								Spray diameter D [in] (at p = 75 bar)
	Type	Mat. no.		Connection						p [psi]								
		17	30	Male NPT														
		Stainless steel 316Ti	Brass	1/8"	1/4"	3/8"	1/2"			10	15	30	45	75	Liters per min. 5 bar	145	290	H =10 [in]
60°	214.184	●	●	BA	BC			0.020	0.020	–	–	0.02	0.027	0.035	**0.13**	0.05	0.07	5
	216.324	●	●		BC	BE		0.039	0.039	–	0.08	0.11	0.13	0.17	**0.63**	0.24	0.33	7
	216.364	●	●		BC	BE		0.055	0.055	–	0.12	0.17	0.21	0.27	**1.00**	0.37	0.53	9
	216.404	●	●		BC	BE		0.079	0.079	–	0.19	0.27	0.33	0.42	**1.58**	0.59	0.83	9
80°	214.245	●	●	BA	BC			0.039	0.020	–	–	0.04	0.05	0.07	**0.25**	0.10	0.13	9
	214.305	●	●	BA	BC			0.071	0.020	–	0.06	0.09	0.11	0.14	**0.51**	0.19	0.27	13
90°	216.496	●	●		BC	BE		0.118	0.079	–	0.32	0.46	0.56	0.72	**2.69**	1.00	1.42	17
	216.566	●	●		BC	BE		0.157	0.079	–	0.47	0.67	0.82	1.06	**3.95**	1.48	2.09	17
	216.646	●	●		BC	BE		0.138	0.079	0.62	0.76	1.07	1.32	1.70	**6.32**	2.36	3.34	17
	216.686	●	●		BC	BE		0.157	0.079	0.78	0.95	1.34	1.65	2.13	**7.91**	2.95	4.18	18
	216.726	●	●		BC	BE		0.197	0.079	0.98	1.20	1.69	2.07	2.68	**9.96**	3.72	5.26	18
	216.776	●	●		BC	BE		0.234	0.079	1.31	1.61	2.28	2.79	3.60	**13.40**	5.01	7.08	19
	218.646	●	●				BG	0.197	0.079	0.62	0.76	1.07	1.32	1.70	**6.32**	2.36	3.34	20
	218.666	●	●				BG	0.217	0.079	0.70	0.86	1.21	1.48	1.91	**7.12**	2.66	3.76	20
	218.706	●	●				BG	0.256	0.079	0.87	1.06	1.50	1.84	2.38	**8.85**	3.31	4.68	20
	218.766	●	●				BG	0.197	0.079	1.24	1.52	2.15	2.63	3.40	**12.65**	4.73	6.68	20
	218.826	●	●				BG	0.256	0.079	1.74	2.13	3.01	3.69	4.76	**17.71**	6.62	9.36	20
	218.846	●	●				BG	0.300	0.079	1.94	2.37	3.36	4.11	5.31	**19.76**	7.38	10.44	20
	218.886	●	●				BG	0.354	0.094	2.48	3.04	4.30	5.26	6.80	**25.30**	9.45	13.37	20

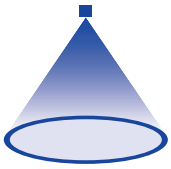
Also available in BSPP

Conversion formula for this series: $\dot{V}_2 = \dot{V}_1 \cdot \sqrt{\frac{p_2}{p_1}}$

Ordering example:	Type	+	Material no.	+	Code	=	Ordering no.
	214.184	+	17	+	BC	=	214.184.17.BC

Assembly accessories can be found in Chapter 12 "Accessories".

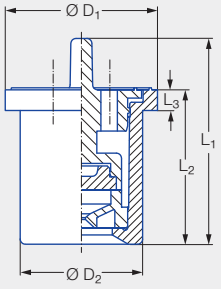
Axial-flow hollow cone nozzles
Series 2TR



Features:
- Fine, uniform atomization
- Assembly with retaining nut

Applications:
- Sprinkling
- Adiabatic cooling
- Cooling
- Humidification of air

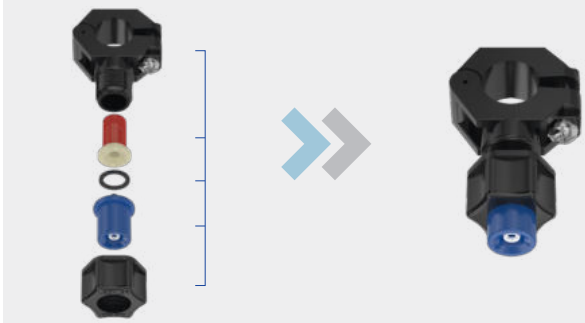
Series 2TR



Connection	Dimensions [in]					Weight [lb]
	L_1	L_2	L_3	Ø D_1	Ø D_2	
Assembly with retaining nut 3/8 BSPP	0.79	0.59	0.08	0.58	0.47	0.007

Spray angle	Ordering number Type	Mat. no. C8 Housing: POM Insert: Ceramic	Color	Bore diameter B [in]	Narrowest free cross section Ø [in]	V̇ water [gal/min] p [psi] 15	30	45	75	Liters per min. 5 bar	100	145	Spray diameter D [in] (at p = 75 bar) H = 10 [in]
80°	2TR.245	●	Purple	0.026	0.022	–	0.04	0.05	0.07	**0.25**	0.08	0.09	9
	2TR.275	●	Black	0.032	0.028	0.04	0.06	0.07	0.09	**0.35**	0.11	0.13	10
	2TR.305	●	Orange	0.035	0.032	0.06	0.09	0.11	0.14	**0.51**	0.16	0.19	13
	2TR.345	●	Green	0.043	0.035	0.09	0.13	0.16	0.20	**0.76**	0.24	0.28	17
	2TR.365	●	Yellow	0.055	0.037	0.12	0.18	0.21	0.28	**1.03**	0.32	0.38	19
	2TR.405	●	Blue	0.067	0.043	0.18	0.26	0.32	0.41	**1.53**	0.47	0.57	21
	2TR.445	●	Red	0.079	0.047	0.24	0.34	0.42	0.54	**2.02**	0.63	0.75	22
	2TR.485	●	Brown	0.087	0.051	0.30	0.42	0.52	0.67	**2.50**	0.78	0.93	22

Assembly example

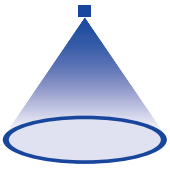


Conversion formula for this series: $\dot{V}_2 = \dot{V}_1 \cdot \sqrt{\frac{p_2}{p_1}}$

Ordering example:	Type	+	Material no.	=	Ordering no.
	2TR.245	+	C8	=	2TR.245.C8

Assembly accessories can be found in Chapter 12 “Accessories”.

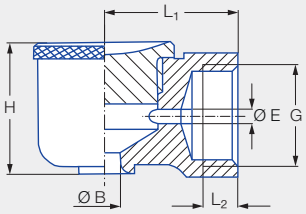
Tangential-flow hollow cone nozzles, stainless steel/brass version
Series 302

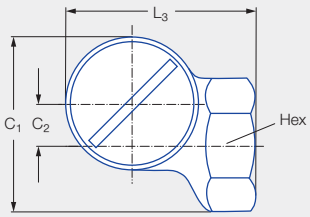


Features:
- Uniform atomization
- Clog-resistant nozzle without swirl insert

Applications:
- Humidification
- Dust control
- Sprinkling
- Foam control
- Adiabatic cooling

Series 302





G	Dimensions [in]							Weight [lb] (Brass)
	C_1	C_2	H	L_1	L_2	L_3	Hex (mm)	
3/8 BSPP	1.34	0.31	0.91	0.91	0.26	1.42	22	0.20

Spray angle	Ordering number				Bore diameter B [in]	Narrowest free cross section Ø [in]	V̇ water [gal/min]								Spray diameter D [mm] (at p = 30 psi)	
	Type	Mat. no. 1Y Stainless steel 316L	Mat. no. 30 Brass	C onn. Female BSPP 3/8"			p [psi]									
							10	15	30	Liters per min. **2 bar**	45	75	100	145	H = 10 [in]	H = 20 [in]
60°	**302.364**		●	**00**	0.06	0.06	0.10	0.12	0.17	**0.63**	0.21	0.27	0.31	0.37	11	17
	302.464	●	●	**00**	0.08	0.08	0.22	0.27	0.38	**1.40**	0.46	0.59	0.69	0.83	11	18
80°	**302.545**	●	●	**00**	0.19	0.09	0.35	0.43	0.60	**2.24**	0.74	0.95	1.10	1.32	14	26
90°	**302.606**	●	●	**00**	0.18	0.16	0.49	0.60	0.85	**3.15**	1.04	1.34	1.55	1.86	19	32
130°	**302.368**	●	●	**00**	0.12	0.04	0.10	0.12	0.17	**0.63**	0.21	0.27	0.31	0.37	26	43
	302.468	●	●	**00**	0.20	0.07	0.22	0.27	0.38	**1.40**	0.46	0.59	0.69	0.83	32	54
	302.548		●	**00**	0.20	0.10	0.35	0.43	0.60	**2.24**	0.74	0.95	1.10	1.32	38	65
	302.608	●	●	**00**	0.20	0.14	0.49	0.60	0.85	**3.15**	1.04	1.34	1.55	1.86	42	71
	302.668		●	**00**	0.30	0.14	0.70	0.85	1.21	**4.50**	1.48	1.91	2.21	2.66	44	77
	302.748	●	●	**00**	0.30	0.19	1.10	1.35	1.91	**7.10**	2.34	3.02	3.48	4.19	46	85

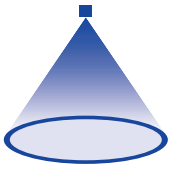
Available in NPT with adapter add-on.

Conversion formula for this series: $\dot{V}_2 = \dot{V}_1 \cdot \sqrt{\frac{p_2}{p_1}}$

Ordering example:	Type	+	Material no.	+	Code	=	Ordering no.
	302.364	+	30	+	00	=	302.364.30.00

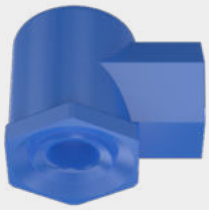
Assembly accessories can be found in Chapter 12 "Accessories".

Tangential-flow hollow cone nozzles, plastic version
Series 302

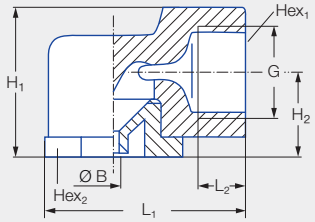


Features:
- Uniform atomization
- Clog resistant nozzle without swirl insert

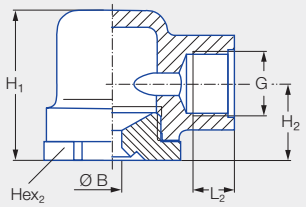
Applications:
- Humidification
- Dust control
- Sprinkling
- Foam control
- Adiabatic cooling



Series 302



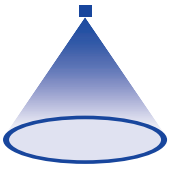
Type 302.32x–302.48x



Type 302.52x–302.96x

Type	G	Dimensions [in]						Weight [lb]	p_{max} [psi]
		H_1	H_2	L_1	L_2	Hex_1 (mm)	Hex_2 (mm)		
302.32x–302.48x	3/8 NPT/BSPP	1.08	0.65	1.71	0.39	22	22	0.03	75
302.52x–302.96x	3/8 NPT/BSPP	1.34	0.73	1.46	0.39	22	22	0.04	75

Spray angle	Ordering number						Bore diameter B [in]	Narrowest free cross section Ø [in]	V̇ water [gal/min]						Spray diameter D [in] (at p = 30 psi)	
	Type	Mat. no.			Connection				p [psi]							
		51	5E	53	Female											
		PA	PVDF	PP	3/8" NPT	3/8" BSPP			10	15	30	Liters per min. **2 bar**	45	75	H = 10 [in]	H = 20 [in]
60°	302.364	●		●	-	00	0.05	0.05	0.10	0.12	0.17	**0.63**	0.21	0.27	13	24
	302.464	●		●	-	00	0.08	0.08	0.22	0.27	0.38	**1.40**	0.46	0.59	13	24
90°	302.326	●	●		-	00	0.04	0.04	0.06	0.08	0.11	**0.40**	0.13	0.17	19	30
	302.366	●	●		-	00	0.05	0.05	0.10	0.12	0.17	**0.63**	0.21	0.27	19	31
	302.406	●	●	●	-	00	0.06	0.06	0.16	0.19	0.27	**1.00**	0.33	0.42	19	32
	302.486	●		●	-	00	0.08	0.08	0.25	0.30	0.43	**1.60**	0.53	0.68	20	33
	302.526	●		●	BF	00	0.20	0.08	0.31	0.38	0.54	**2.00**	0.66	0.85	20	34
	302.566	●		●	-	00	0.20	0.09	0.39	0.47	0.67	**2.50**	0.82	1.06	20	35
	302.606	●		●	BF	00	0.20	0.13	0.49	0.60	0.85	**3.15**	1.04	1.34	21	37
	302.686	●			BF	00	0.30	0.13	0.78	0.95	1.34	**5.00**	1.65	2.12	21	40
	302.766	●			BF	00	0.35	0.17	1.24	1.52	2.15	**8.00**	2.63	3.40	21	41
	302.846	●		●	BF	00	0.43	0.20	1.94	2.37	3.36	**12.50**	4.11	5.31	21	41
	302.886	●	●	●	BF	00	0.43	0.25	2.48	3.04	4.30	**16.00**	5.26	6.80	21	41
	302.966	●			BF	00	0.43	0.34	3.88	4.75	6.72	**25.00**	8.23	10.62	21	41



Spray angle	Ordering number						Bore diameter B [in]	Narrowest free cross section Ø [in]	V̇ water [gal/min]						Spray diameter D [in] (at p = 30 psi)	
	Type	Mat. no.			Connection				p [psi]							
		51	5E	53	Female											
		PA	PVDF	PP	3/8" NPT	3/8" BSPP			10	15	30	Liters per min. **2 bar**	45	75	H = 10 [in]	H = 20 [in]
130°	302.328		●			00	0.05	0.03	0.06	0.08	0.11	**0.40**	0.13	0.17	25	37
	302.368	●	●			00	0.07	0.04	0.10	0.12	0.17	**0.63**	0.21	0.27	26	40
	302.408	●	●			00	0.14	0.05	0.16	0.19	0.27	**1.00**	0.33	0.42	27	44
	302.488	●		●		00	0.20	0.06	0.25	0.30	0.43	**1.60**	0.53	0.68	28	49
	302.528	●			BF	00	0.20	0.08	0.31	0.38	0.54	**2.00**	0.66	0.85	30	52
	302.568	●				00	0.20	0.09	0.39	0.47	0.67	**2.50**	0.82	1.06	31	56
	302.608	●	*●	●	BF	00*	0.20	0.13	0.49	0.60	0.85	**3.15**	1.04	1.34	32	59
	302.648	●			BF	00	0.30	0.12	0.62	0.76	1.07	**4.00**	1.32	1.70	34	63
	302.688	●			BF	00	0.30	0.13	0.78	0.95	1.34	**5.00**	1.65	2.12	35	65
	302.728	●			BF	00	0.30	0.16	0.98	1.20	1.69	**6.30**	2.07	2.68	36	67
	302.768	●			BF	00	0.35	0.17	1.24	1.52	2.15	**8.00**	2.63	3.40	37	68
	302.848	●			BF	00	0.43	0.20	1.94	2.37	3.36	**12.50**	4.11	5.31	38	69
	302.888	●		●	BF	00	0.43	0.25	2.48	3.04	4.30	**16.00**	5.26	6.80	38	70
	302.968	*●	●		BF	00*	0.43	0.34	3.88	4.75	6.72	**25.00**	8.23	10.62	39	71

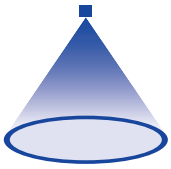
* Material only available in BSPP

Conversion formula for this series: $\dot{V}_2 = \dot{V}_1 \cdot \sqrt{\frac{p_2}{p_1}}$

Ordering example:	Type	+	Material no.	=	Ordering no.
	302.328	+	5E	=	302.328.5E

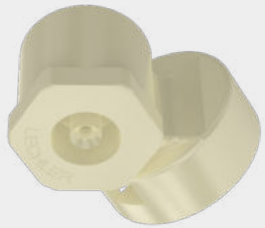
Assembly accessories can be found in Chapter 12 “Accessories”.

Tangential-flow hollow cone nozzles, plastic version with bayonet quick-release system
Series 302

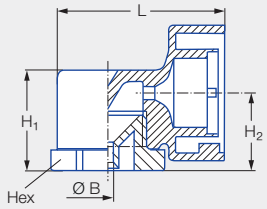


Features:
- Uniform atomization
- Clog-resistant nozzle without swirl insert
- Quick and secure assembly thanks to bayonet quick-release system
- Fixed alignment

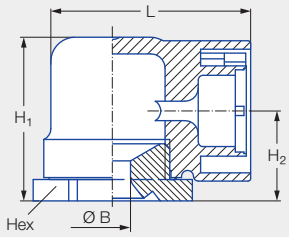
Applications:
- Humidification
- Dust control
- Sprinkling
- Foam control
- Adiabatic cooling



Series 302



Type 302.32x–302.54x



Type 302.6xx.51.KB

Type	Connection	Dimensions [in]				Weight [lb]	p_{max} [psi]
		H_1	H_2	L	Hex (mm)		
302.32x–302.54x	KB	0.86	0.66	1.42	22	0.03	75
302.6xx.51	KB	1.34	0.75	1.65	30	0.04	75

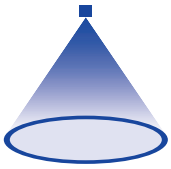
Spray angle	Ordering number					Bore diameter B [in]	Narrowest free cross section Ø [in]	V̇ water [gal/min]						Spray diameter D [in] (at p = 30 psi)	
	Type	Mat. no. 51 PA	Mat. no. 56 POM	Connection Bayonet quick-release system				p [psi]							
								10	15	30	Liters per min. 2 bar	45	75	H = 10 [in]	H = 20 [in]
45°	302.503	●		KB		0.081	0.081	0.28	0.34	0.48	**1.80**	0.59	0.76	8	17
60°	302.464		●	KB		0.077	0.077	0.22	0.27	0.38	**1.40**	0.46	0.59	11	21
80°	302.545		●	KB		0.091	0.091	0.35	0.43	0.60	**2.24**	0.74	0.95	18	32
90°	302.326	●	●	KB		0.041	0.041	0.06	0.08	0.11	**0.40**	0.13	0.17	16	28
	302.406	●	●	KB		0.061	0.061	0.16	0.19	0.27	**1.00**	0.33	0.42	16	29
	302.486	●		KB		0.083	0.083	0.25	0.30	0.43	**1.60**	0.53	0.68	18	31
	302.606	●		KB		0.197	0.126	0.49	0.60	0.85	**3.15**	1.04	1.34	21	39
	302.686		●	KB		0.300	0.133	0.78	0.95	1.34	**5.00**	1.65	2.12	21	40
130°	302.368		●	KB		0.051	0.051	0.10	0.12	0.17	**0.63**	0.21	0.27	26	43
	302.408	●	●	KB		0.079	0.079	0.16	0.19	0.27	**1.00**	0.33	0.42	27	47
	302.468	●		KB		0.094	0.094	0.22	0.27	0.38	**1.40**	0.46	0.59	27	49
	302.488	●		KB		0.108	0.108	0.25	0.30	0.43	**1.60**	0.53	0.68	28	51

Conversion formula for this series: $\dot{V}_2 = \dot{V}_1 \cdot \sqrt{\frac{p_2}{p_1}}$

Ordering example:	Type	+	Material no.	+	Code	=	Ordering no.
	302.503	+	51	+	KB	=	302.503.51.KB

Assembly accessories can be found in Chapter 12 “Accessories”.

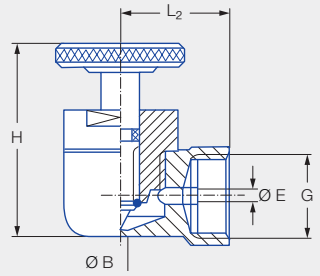
Tangential-flow hollow cone nozzles
Series 308

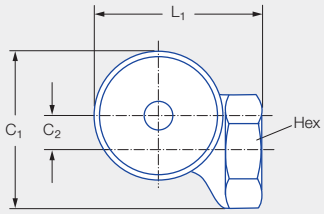


Features:
- Uniform atomization
- Clog-resistant nozzle without swirl insert
- Adjustable flow rate

Applications:
- Humidification in air washers
- Dust control
- Spraying onto filters
- Foam control
- Cooling

Series 308





G	Dimensions [in]						Weight [lb]
	C_1	C_2	H	L_1	L_2	Hex (mm)	
3/8 BSPP	1.34	0.31	1.57	1.42	0.91	22	0.33

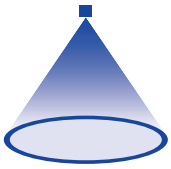
Spray angle	Ordering number		Bore diameter B [in]	Narrowest free cross section Ø [in]	$\dot{V}_{max}$ water [gal/min]							Spray diameter D [in] (at p = 30 psi)	
	Type	Mat. no. 30			p [psi]								
		Brass			5	10	15	30	Liters per min. **2 bar**	75	145	H = 10 [in]	H = 20 [in]
90°	**308.466**	●	0.08	0.08	0.15	0.22	0.27	0.38	**1.40**	0.59	0.83	17	33
	308.606	●	0.16	0.16	0.35	0.49	0.60	0.85	**3.15**	1.34	1.86	18	33

Conversion formula for this series: $\dot{V}_2 = \dot{V}_1 \cdot \sqrt{\frac{p_2}{p_1}}$

Ordering example:	Type	+	Material no.	=	Ordering no.
	308.466	+	30	=	308.466.30

Assembly accessories can be found in Chapter 12 “Accessories”.

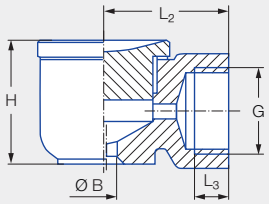
Tangential-flow hollow cone nozzles
Series 304/306/307

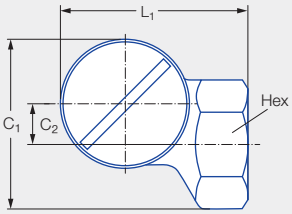


Features:
- Uniform atomization
- Clog-resistant nozzle without swirl insert

Applications:
- Storage tank cooling
- Foam control
- Dust control
- Surface treatment
- Absorption

Series 304/306/307





Series	G	Dimensions [in]							Weight [lb] (Brass)
		C_1	C_2	H	L_1	L_2	L_3	Hex (mm)	
304	1/2 BSPP	1.69	0.43	1.30	1.81	1.18	0.43	27	0.45
306/307	3/4 BSPP	2.13	0.51	1.69	2.36	1.57	0.51	36	0.90

Spray angle	Ordering number			Bore diameter B [in]	Narrowest free cross section Ø [in]	V̇ water [gal/min]								Spray diameter D [in] (at p = 30 psi)	
	Type	Mat. no. 1Y Stainless steel 316L	Mat. no. 30 Brass			p [psi]									
						5	10	30	Liters per min. **2 bar**	45	75	100	145	H = 10 [in]	H = 20 [in]
90°	**304.706**	●	●	0.201	0.201	0.61	0.87	1.50	**5.60**	1.84	2.38	2.75	3.31	20	39
	304.796	●	●	0.350	0.236	1.04	1.47	2.55	**9.50**	3.13	4.04	4.66	5.61	20	39
	306.906	●	●	0.354	0.354	1.97	2.79	4.84	**18.00**	5.92	7.65	8.83	10.63	22	41
	306.976	●	●	0.531	0.394	2.91	4.11	7.12	**26.50**	8.72	11.26	13.00	15.65	22	41
130°	**304.818**		●	0.472	0.197	1.16	1.64	2.85	**10.60**	3.49	4.50	5.20	6.26	47	83
	304.898	●	●	0.472	0.276	1.86	2.64	4.57	**17.00**	5.59	7.22	8.34	10.04	49	87
	306.978		●	0.748	0.287	2.91	4.11	7.12	**26.50**	8.72	11.26	13.00	15.65	51	93
	307.018	●	●	0.748	0.339	3.67	5.20	9.00	**33.50**	11.02	14.23	16.43	19.79	51	93

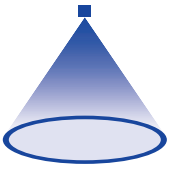
Available in NPT with adaptor add-on.

Conversion formula for this series: $\dot{V}_2 = \dot{V}_1 \cdot \sqrt{\frac{p_2}{p_1}}$

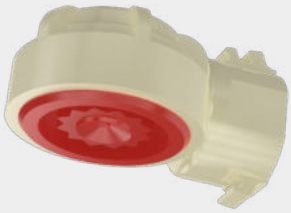
Ordering example:	Type	+	Material no.	=	Ordering no.
	304.706	+	1Y	=	304.706.1Y

Assembly accessories can be found in Chapter 12 "Accessories".

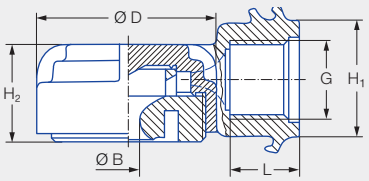
Tangential-flow hollow cone nozzles
Series 350



Features:
- High performance nozzle for humidification
- Very narrow droplet size spectrum
- Extremely uniform liquid distribution over the entire spray pattern
- Quick-release clamp unit available for pipe mounting



Series 350

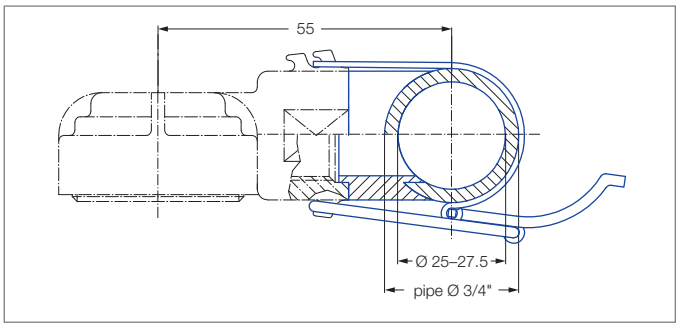


Applications:
- Foam control
- Dust control
- Surface treatment
- Absorption

G	Dimensions [in]				Weight [lb]	p_{max} [psi]
	H_1	H_2	L	Ø D		
3/8 BSPP	0.94	0.79	0.55	1.46	0.08	300

Spray angle	Ordering number		Bore diameter B [in]	Narrowest free cross section Ø [in]	V̇ water [gal/min]								Spray diameter D [in] (at p = 30 psi)	
	Type	Mat. no. 56			p [psi]									
		POM			10	15	30	Liters per min. 2 bar	45	75	100	145	H = 10 [in]	H = 20 [in]
130°	350.368	●	0.06	0.03	0.10	0.12	0.17	**0.63**	0.21	0.27	0.31	0.37	37	49
	350.608	●	0.20	0.06	0.49	0.60	0.85	**3.15**	1.04	1.34	1.55	1.86	39	77

Accessories:



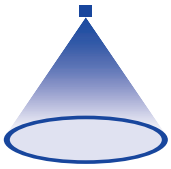
Recommended bore diameter 18 mm.
Quick-release clamp unit: Ordering no. 035.030.15.05.00.0.
Consisting of: Stainless steel clamp, polyurethane gasket.

Conversion formula for this series: $\dot{V}_2 = \dot{V}_1 \cdot \sqrt{\frac{p_2}{p_1}}$

Ordering example:	Type	+	Material no.	=	Ordering no.
	350.368	+	56	=	350.368.56

Assembly accessories can be found in Chapter 12 "Accessories".

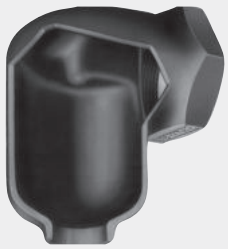
Eccentric hollow cone nozzles
Series 373 Ramp Bottom

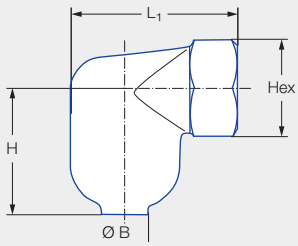


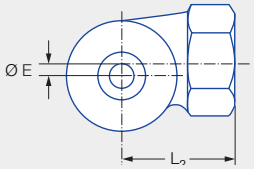
Features:
- Fine, uniform atomization even at low pressure
- Patented swirl chamber with built-in ramp extends service life

Applications:
- Gas cooling
- Water recooling
- Dust control

Series 373







Connection	G	Dimensions [in]					Weight [lb]
		H	L_1	L_2	E	Hex (mm)	
BN	1 NPT	2.05	2.64	1.77	0.25	41	0.6
BQ	1 1/4 NPT	2.56	3.03	2.01	0.31	48	1.2
BS	1 1/2 NPT	3.19	3.82	2.56	0.31	58	2.0
BW	2 NPT	3.69	4.25	4.50	0.50	71	2.7

Spray angle (at p = 40 psi)	Ordering number						Bore diameter B [in]	**V̇ water [gal/min]**							Spray diameter D [in] (at p = 30 psi)	
	Type	Mat. no.	Connection					**p [psi]**								
		17	Female									Liters per min.				
		Stainless steel 316	1 NPT	1 1/4 NPT	1 1/2 NPT	2 NPT		5	10	15	30	**2 bar**	75	145	H = 20 [in]	H = 40 [in]
70°	**373.115**	●	**BN**				0.45	6.91	9.77	11.97	16.93	**63**	26.76	37.21	26	47
80°	**373.175**	●	**BN**				0.51	8.77	12.41	15.2	21.49	**80**	33.98	47.25	31	57
75°	**373.235**	●		**BQ**			0.64	12.94	18.30	22.42	31.70	**118**	50.12	69.69	30	51
85°	**373.285**	●		**BQ**			0.81	17.55	24.82	30.39	42.98	**160**	67.96	94.50	31	53
85	**373.325**	●			**BS**		0.87	21.94	31.02	37.99	53.73	**200**	84.96	118.13	35	59
77°	**373.365**	●			**BS**		0.93	24.90	35.21	43.12	60.98	**227**	96.42	134.07	33	55
80°	**373.445**	●				**BW**	1.14	44.53	62.97	77.13	109.07	**406**	172.46	239.80	39	67
90°	**373.465**	●				**BW**	1.21	50.56	71.50	87.57	123.85	**461**	195.82	272.28	46	80

Other sizes and flow rates available upon request

Conversion formula for this series: $\dot{V}_2 = \dot{V}_1 \cdot \sqrt{\frac{p_2}{p_1}}$

Ordering example:	Type	+	Material no.	+	Code	=	Ordering no.
	373.115	+	17	+	BN	=	373.115.17.BN

Assembly accessories can be found in Chapter 12 "Accessories".