



Flat fan
nozzles

Flat fan nozzles

- Belt cleaning
- Coating
- Steam cleaning
- Degreasing
- High pressure cleaning
- Gravel washing
- Cooling
- Surface treatment
- Phosphating
- Rain curtains
- Foam control
- Foam spraying
- Lubrication

Filter cleaning
Spray cleaning
Washing processes
and many others...

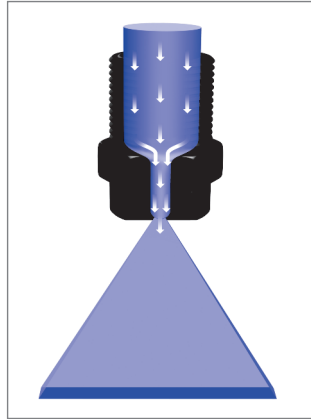


Lechler flat fan nozzles stand for uniform liquid distribution and jet pressures. Particularly powerful jets are generated with spray angles up to 60°. Nozzles with small flow rates are especially suited for humidifying and spraying in general. The flow geometry of the nozzle allows to produce accurate, compact jets, available with different liquid distribution patterns.

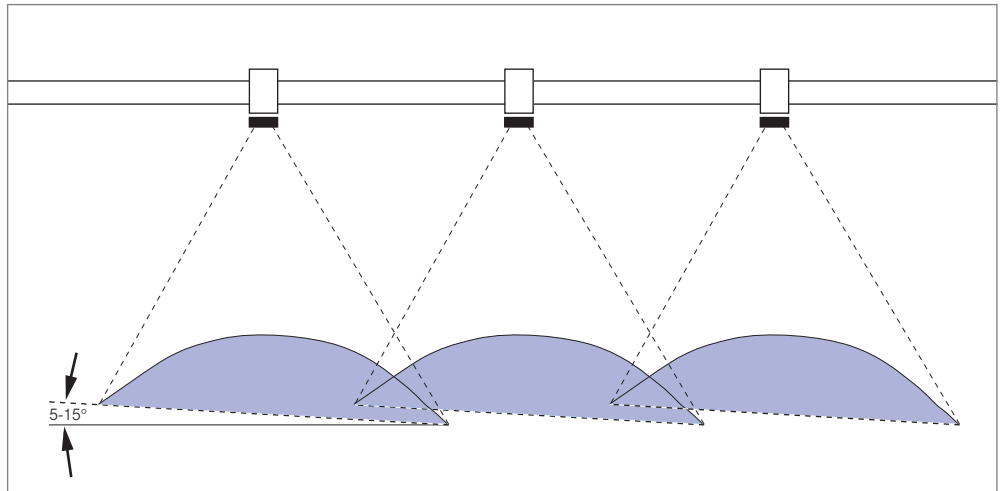
Basically, Lechler flat fan nozzles are designed for parabolic liquid distribution. Unaffected by transient pressures, they are suited for universal application. Their performance data are exactly defined. Operational values, such as flow rates, spray width, jet thickness and liquid distribution are readily available for a great variety of feed pressures. There are also special-design nozzles with rectangular or trapezoidal distribution of liquid.

Simple and cost-saving fixing attachments, as for instance dove-tail guides and eyelet clamps, considerably facilitate assembling and aligning of the nozzles.

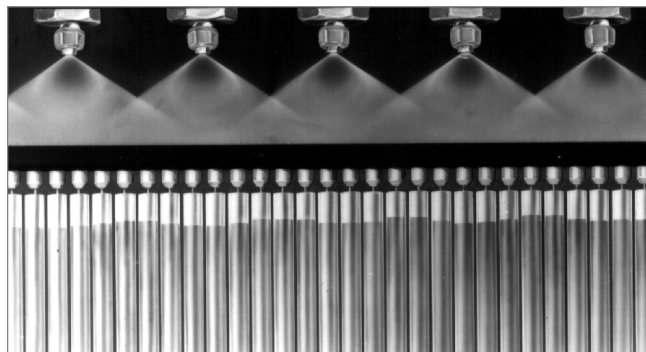
For all cleaning operations, in steelmaking and in many other fields of surface treatment, in short, wherever powerful, uniform water jets are required, Lechler flat fan nozzles constitute a decisive basis for achieving reliable process results.



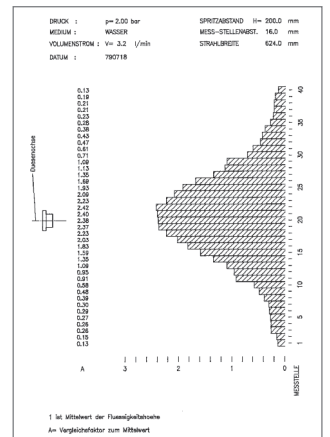
The **tongue-type nozzle** design represents a special kind of flat fan nozzle. With this nozzle type, the flat fan spray pattern is produced by a solid stream, impinging upon and deflecting from an outside deflector plate. As a result, a powerful, sharply delimited flat jet is shaped. The deflector plate has the form of a tongue, which determines the spray angle formation. Due to large free cross-sections, tongue-type nozzles are particularly clog-proof.



Arrangement of nozzles








Total liquid distribution



Liquid distribution single nozzle





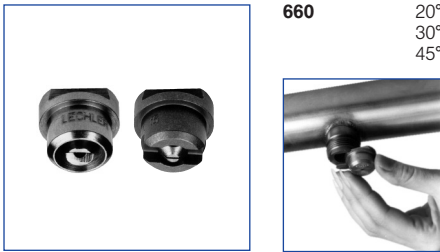


Flat fan nozzles

Low-pressure nozzles	Series		\dot{V} [l/min] at $p = 2$ bar	Connection	Application/ Design	Page
	632	20°	0.05 – 49.96	1/8 BSPP 1/4 BSPP 3/8 BSPP 1/2 BSPP	Spray cleaning, surface treatment, filter cleaning, belt cleaning, lubricating, coating. Standard design with conical, self-sealing thread.	4.8
	633	30° 45° 60° 75° 90° 120°				
	610	20° 30° 45° 60° 75° 90° 120°	0.05 – 4.00	1/8 BSPP	Cleaning installations, cooling headers, spray pipes. Compact design, suited for narrow installation conditions.	4.11
	612	20° 30° 45° 60° 75° 90° 120°	0.05 – 16.00	1/4 BSPP	Cleaning installations, cooling headers, spray pipes. Compact design, suited for narrow installation conditions.	4.13
	616	20° 30° 45° 60° 90° 120°	6.30 – 63.00	3/4 BSPP	Cleaning installations, rain curtains, gravel washing, spray pipes, foam spraying, roll cooling, cooling of rolled stock. Non-clogging features, more jet power.	4.15
	617					





Flat fan nozzles

Low-pressure nozzles	Series		\dot{V} [l/min] at p = 2 bar	Connection	Application/ Design	Page	
	652	20° 30° 45°	60° 75° 90° 120°	0.05 – 16.00	Assembly with 3/8" lock nut	Spray cleaning, surface treatment, filter cleaning, belt cleaning, lubricating, coating. Easy nozzle changing. Simple jet alignment.	4.17
 <p>Belt lubrication nozzles</p>	652. xxx. 8H. 03	75° 120°	0.05 – 0.22	Assembly with 3/8" lock nut	Belt lubrication, moistening, spraying of food products, moisturization of rollers, oiling, lubrication of metal sheets. Especially low flow rates. Parabolic liquid distribution.	4.19	
 <p>Nozzles for pressing into pipes</p>	612. xxx. 5E. 03	90° 120°	0.63 – 4.00	For pressing into pipes	Cleaning and rinsing opera- tions, dish washing machi- nes. For pressing into pipes.	4.20	
	656 657	20° 30° 45°	60° 90° 120°	6.30 – 40.00	Assembly with 3/4" lock nut	Cleaning installations, gravel washing, cooling headers, spray pipes, roll cooling, cooling of rolled stock. Easy nozzle changing, simple jet alignment.	4.21
	660	20° 30° 45°	60° 75° 90° 120°	0.05 – 10.00	Assembly with 3/8" lock nut and dove-tail guide	Cleaning installations, cool- ing headers, spray pipes. Automatic jet alignment, due to dove-tail guide.	4.23




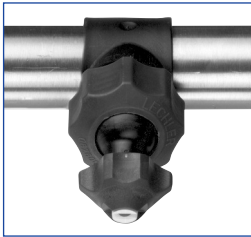
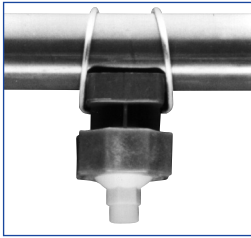

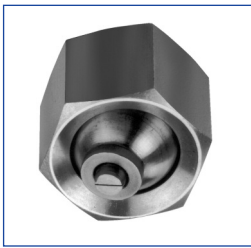


Flat fan nozzles

Low pressure Nozzles	Series		\dot{V} [l/min] at $p = 2$ bar	Connection	Application/ Design	Page
	664 665	20° 60° 30° 90° 45° 120°	6.30 – 63	Assembly with 3/4" lock nut and dove-tail guide	Cleaning installations, cooling headers, spray pipes, roll cooling cooling of rolled stock. Automatic jet alignment, due to dove-tail guide.	4.25
	646	20° 30° 45° 60° 90° 120°	0.32 – 3.15	Assembly with bayonet quick release system	Belt cleaning, surface treatment, cleaning, coating processes. Quick and easy assembly, adjusted spray direction.	4.28
	688 689	45°	8.00 – 31.50	3/8" BSPT 3/4" BSPP	Cleaning, washing and phosphating process. Particularly clog proof.	4.30
	686	90° 140°	0.50 – 28.00	1/8" BSPT 1/4" BSPT 3/8" BSPT 1/2" BSPT	Foam control in storage tanks and sewage treatment plants, for cleaning and washing process. Particularly clog proof.	4.31
	684	140°	0.50 – 10.00	Assembly with 3/8" lock nut	Foam control in storage tanks and sewage treatment plants, for cleaning and washing process. Particularly clog proof.	4.32
		 <p>Assembly with lock nut</p>				



Flat fan nozzles

High pressure nozzles	Series		\dot{V} [l/min] at p = 80 bar	Connection	Application/ Design	Page
	602 608 652	20° 30° 45° 60°	4.04 – 60.00	1/8" BSPT 1/4" BSPT NPT 1/8" NPT 1/4" Assembly with 3/8" lock nut	High pressure cleaning, steam cleaning.	4.33
Nozzle systems for surface technology	Series		\dot{V} [l/min] at p = 2 bar	Connection	Application/ Design	Page
	676/677 MEMO- SPRAY®	30° 60° 90° 120°	4.00 – 50.00	Assembly with clamp for the following pipe sizes: 1" 1 1/4" 1 1/2" 2"	Cleaning problems, phos- phating, degreasing, rinsing in surface treatment techni- ques. Ball joint, omnidirectional swivelling range of 20°. Simple quick assembling. Easy adjusting and cleaning.	4.34
	676 „Easy-Clip	60°	6.30 – 20.00	Assembly with clip for the following pipe sizes: 1" 1 1/4" 1 1/2" 2"	Cleaning problems, phos- phating, degreasing, rinsing in surface treatment techni- ques. Ball joint, omnidirectional swivelling range of 30°. Simple quick assembling. Easy adjusting and cleaning.	4.38
Swivelling nozzles	Series		\dot{V} [l/min] at p = 2 bar	Connection	Application/ Design	Page
	676	20° 30° 45° 60° 75° 90° 120°	0.05 – 10.00	3/8 BSPP Weld base Socket	Cleaning, cooling and lubri- cating process. Swivelling nozzle to meet exact jet alignment req- uirements. Omnidirectional swivelling range of 30°.	4.40



Flat fan nozzles

Descaling nozzles



Descaling nozzles
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the standard in descaling
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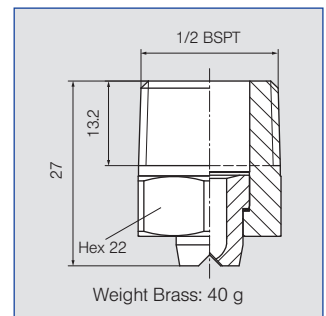
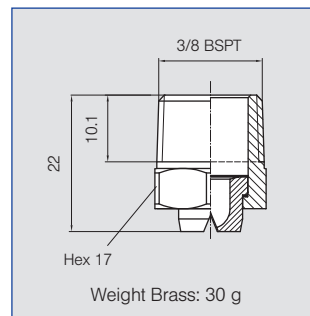
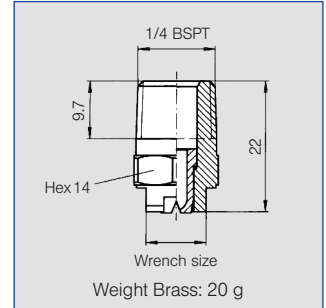
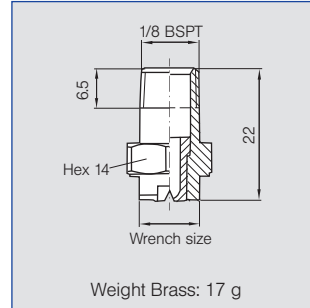
Flat fan nozzles

Series 632 / 633



Standard design with conical, self-sealing thread connection. Stable spray angle. Uniform, parabolical distribution of liquid. Spray pipes equipped with these nozzles show an extremely uniform total distribution of liquid.

Applications:
Spray cleaning, surface treatment, filter cleaning, belt cleaning, lubricating, coating.



Spray angle	Type	Ordering no.								A ∅ [mm]	E ∅ [mm]	V̇ [l/min]								Spray width B at p = 2 bar	
		Material-no.				Code						p [bar]								H =	
		16	17 ¹⁾	30	5E							0.5	1.0	2.0	3.0	5.0	7.0	10.0	250 mm	500 mm	
20°	632. 301	○	○	○	○	CA	CC	-	-	0.70	0.60	0.16*	0.23*	0.32	0.39	0.51	0.60	0.72	65	120	
	632. 361	○	○	○	○	CA	CC	-	-	1.00	0.80	0.31*	0.44*	0.63	0.77	1.00	1.18	1.40	70	130	
	632. 441	○	○	○	○	CA	CC	-	-	1.35	1.10	0.62*	0.88	1.25	1.53	1.98	2.34	2.80	75	145	
	632. 481	○	○	○	○	CA	CC	-	-	1.50	1.20	0.80*	1.13	1.60	1.96	2.53	2.99	3.58	75	150	
30°	632. 302	○	○	○	○	CA	CC	-	-	0.60	0.50	0.16*	0.23*	0.32	0.39	0.51	0.60	0.72	120	235	
	632. 362	○	○	○	○	CA	CC	-	-	1.00	0.70	0.31*	0.44*	0.63	0.77	1.00	1.18	1.40	120	235	
	632. 402	○	○	○	○	CA	CC	-	-	1.20	0.90	0.50*	0.71	1.00	1.23	1.58	1.87	2.24	120	235	
	632. 482	○	○	○	○	CA	CC	-	-	1.50	1.10	0.80*	1.13	1.60	1.96	2.53	2.99	3.58	120	235	
	632. 562	○	○	○	○	CA	CC	-	-	2.00	1.50	1.25	1.77	2.50	3.06	3.95	4.68	5.59	120	235	
	632. 642	○	○	○	-	-	CC	-	-	2.50	1.80	2.00	2.83	4.00	4.90	6.33	7.48	8.94	120	240	
	632. 722	○	○	○	-	-	CC	-	-	3.00	2.40	3.15	4.46	6.30	7.72	9.96	11.79	14.09	125	240	
	632. 762	○	○	○	-	-	CC	-	-	3.50	2.70	4.00	5.66	8.00	9.80	12.65	14.97	17.89	125	240	
	632. 802	○	○	○	-	-	CC	-	-	4.00	3.10	5.00	7.07	10.00	12.25	15.81	18.71	22.36	130	250	

¹⁾We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
*Differing spray pattern
Subject to technical modifications.

Continued on next page.

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.

Example Type + Material-no. + Code = Ordering no.
for ordering: 632. 301 + 16 + CA = 632. 301. 16 CC



Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$



Flat fan nozzles

Series 632 / 633



Spray angle	Ordering no.								A Ø [mm]	E Ø [mm]	V̇ [l/min]								Spray width B at p = 2 bar		
	Type	Material-no.				Code					p [bar]										
		16	17 ¹⁾	30	5E																
		AISI 303	AISI 316Ti/AISI 316L	Brass	PVDF	1/8 BSPT	1/4 BSPT	3/8 BSPT			1/2 BSPT	0.5	1.0	2.0	3.0	5.0	7.0	10.0	H= 250 mm	H= 500 mm	
45°	632.303	○	○	○	-	CA	CC	-	-	0.70	0.50	0.16*	0.23*	0.32	0.39	0.51	0.60	0.72	150	270	
	632.363	○	○	○	○	CA	CC	-	-	1.00	0.60	0.31*	0.44*	0.63	0.77	1.00	1.18	1.40	155	280	
	632.403	○	○	○	○	CA	CC	-	-	1.20	0.90	0.50*	0.71	1.00	1.23	1.58	1.87	2.24	175	320	
	632.483	○	○	○	○	CA	CC	-	-	1.50	1.10	0.80*	1.13	1.60	1.96	2.53	2.99	3.58	180	340	
	632.563	○	○	○	○	CA	CC	-	-	2.00	1.40	1.25	1.77	2.50	3.06	3.95	4.68	5.59	185	355	
	632.643	○	○	○	○	CA	CC	-	-	2.50	1.80	2.00	2.83	4.00	4.90	6.33	7.48	8.94	195	370	
	632.673	○	○	○	-	-	CC	CE	-	-	2.70	2.00	2.83	3.36	4.75	5.82	7.51	8.89	10.62	200	375
	632.723	○	○	○	-	-	CC	CE	-	-	3.00	2.40	3.15	4.46	6.30	7.72	9.96	11.79	14.09	200	375
	632.763	○	○	○	-	-	CC	CE	-	-	3.50	2.60	4.00	5.66	8.00	9.80	12.65	14.97	17.89	200	380
	632.803	○	○	○	-	-	CC	CE	CG	-	4.00	3.00	5.00	7.07	10.00	12.25	15.81	18.71	22.36	205	385
	632.843	○	○***	○	-	-	CC	-	CG	-	4.50	3.40	6.25	8.84	12.50	15.31	19.76	23.39	27.95	205	385
	632.883	○	○	○	-	-	-	-	CG	-	5.00	3.80	8.00	11.31	16.00	19.60	25.30	29.93	35.78	220	440
632.923	○	○	○	-	-	-	-	CG	-	5.50	4.20	10.00	14.14	20.00	24.50	31.62	37.42	44.72	220	440	
632.963	○	○	○	-	-	-	-	CG	-	6.00	4.40	12.50	17.68	25.00	30.62	39.53	46.77	55.90	220	440	
60°	632.304	○	○	○	○	CA	CC	-	-	0.70	0.40	0.16*	0.23*	0.32	0.39	0.51	0.60	0.72	215	425	
	632.334	○	○	○	○	CA	CC	-	-	0.90	0.50	0.22*	0.32*	0.45	0.55	0.71	0.84	1.01	220	440	
	632.364	○	○	○	○	CA	CC	-	-	1.00	0.60	0.31*	0.44*	0.63	0.77	1.00	1.18	1.40	230	460	
	632.404	○	○	○	○	CA	CC	-	-	1.20	0.80	0.50*	0.71	1.00	1.23	1.58	1.87	2.24	245	485	
	632.444	○	○	○	○	CA	CC	-	-	1.35	0.90	0.62*	0.88	1.25	1.53	1.98	2.34	2.80	255	495	
	632.484	○	○	○	○	CA	CC	-	-	1.50	1.00	0.80*	1.13	1.60	1.96	2.53	2.99	3.58	260	510	
	632.514	○	○	○	○	CA	CC	-	-	1.65	1.10	0.95*	1.34	1.90	2.33	3.00	3.56	4.25	270	520	
	632.564	○	○	○	○	CA	CC	-	-	2.00	1.30	1.25	1.77	2.50	3.06	3.95	4.68	5.59	280	535	
	632.604	○	○	○	○	CA	CC	-	-	2.20	1.50	1.58	2.23	3.15	3.86	4.98	5.89	7.04	290	550	
	632.644	○	○	○	○**	-	CC	CE	-	-	2.50	1.60	2.00	2.83	4.00	4.90	6.33	7.48	8.94	295	565
	632.674	○	○	○	○**	-	CC	CE	-	-	2.70	1.80	2.38	3.36	4.75	5.82	7.51	8.89	10.62	300	575
	632.724	○	○	○	○**	-	CC	CE	-	-	3.00	2.10	3.15	4.46	6.30	7.72	9.96	11.79	14.09	305	590
	632.764	○	○	○	-	-	CC	CE	-	-	3.50	2.30	4.00	5.66	8.00	9.80	12.65	14.97	17.89	310	595
	632.804	○	○***	○	○**	-	CC	-	CG	-	4.00	2.60	5.00	7.07	10.00	12.25	15.81	18.71	22.36	310	595
	632.844	○	○***	○	○**	-	CC	-	CG	-	4.50	3.00	6.25	8.84	12.50	15.31	19.76	23.39	27.95	310	590
	632.884	○	○***	○	○**	-	CC	-	CG	-	5.00	3.40	8.00	11.31	16.00	19.60	25.30	29.93	35.78	300	570
	632.924	○	○	○	-	-	-	-	CG	-	5.50	4.10	10.00	14.14	20.00	24.50	31.62	37.42	44.72	330	630
	632.964	○	○	○	-	-	-	-	CG	-	6.00	4.20	12.50	17.68	25.00	30.62	39.53	46.77	55.90	330	630
633.004	○	○	-	-	-	-	-	CG	-	7.00	4.80	15.75	22.27	31.50	38.57	49.80	58.92	70.43	330	630	
633.044	○	○	-	-	-	-	-	CG	-	8.00	5.50	20.00	28.28	40.00	48.99	63.25	74.83	89.44	340	640	
633.084	○	○	-	-	-	-	-	CG	-	9.00	6.80	25.00	35.36	50.00	61.24	79.06	93.54	111.80	340	640	
75°	632.145	○	-	○	-	CA	CC	-	-	0.20	0.12	-	0.04*	0.05	0.06	0.08	0.09	0.11	280	550	
	632.165	○	-	○	-	CA	CC	-	-	0.20	0.08	-	0.05*	0.07	0.08	0.10	0.12	0.15	290	560	
	632.185	○	-	○	-	CA	CC	-	-	0.20	0.15	-	0.06*	0.08	0.10	0.13	0.15	0.18	300	575	
	632.215	○	-	○	-	CA	CC	-	-	0.40	0.20	-	0.08*	0.11	0.14	0.18	0.21	0.25	300	580	
	632.245	○	-	○	-	CA	CC	-	-	0.50	0.30	-	0.12*	0.16	0.20	0.26	0.30	0.36	310	585	
	632.275	○	-	○	-	CA	CC	-	-	0.60	0.30	0.11*	0.16*	0.22	0.27	0.35	0.41	0.49	310	590	

¹⁾We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.

Continued on next page.

A = Equivalent bore diameter · E = narrowest free cross section

*Differing spray pattern

**Only available with code CC.

***Only available with code CG.

Subject to technical modifications.

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.

Example Type + Material-no. + Code = Ordering no.
for ordering: 632.303. + 16 + CA = 632.303.16.CA

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$





Flat fan nozzles

Series 632 / 633



Spray angle	Ordering no.								A Ø [mm]	E Ø [mm]	V̇ [l/min]								Spray width B at p = 2 bar		
	Type	Material-no.				Code					p [bar]										
		16	17 ¹⁾	30	5E	1/8 BSPT	1/4 BSPT	3/8 BSPT			1/2 BSPT	0.5	1.0	2.0	3.0	5.0	7.0	10.0			H=
		AISI 303	AISI 316Ti/AISI 316L	Brass	PVDF														H=	H=	
250 mm	500 mm																				
90°	632.216	○	-	○	-	CA	CC	-	-	0.40	0.20	-	0.08*	0.11	0.14	0.18	0.21	0.25	370	700	
	632.276	○	-	○	-	CA	CC	-	-	0.60	0.30	0.11*	0.16*	0.22	0.27	0.35	0.41	0.49	375	720	
	632.306	○	○	○	○	CA	CC	-	-	0.70	0.40	0.16*	0.23*	0.32	0.39	0.51	0.60	0.72	380	740	
	632.336	○	○	○	○	CA	CC	-	-	0.90	0.50	0.22*	0.32*	0.45	0.55	0.71	0.84	1.01	415	800	
	632.366	○	○	○	○	CA	CC	-	-	1.00	0.50	0.31*	0.44*	0.63	0.77	1.00	1.18	1.41	420	810	
	632.406	○	○	○	○	CA	CC	-	-	1.20	0.70	0.50*	0.71	1.00	1.23	1.58	1.87	2.24	430	820	
	632.446	○	○	○	○	CA	CC	-	-	1.35	0.80	0.62*	0.88	1.25	1.53	1.98	2.34	2.80	435	830	
	632.486	○	○	○	○	CA	CC	-	-	1.50	0.80	0.80*	1.13	1.60	1.96	2.53	2.99	3.58	440	835	
	632.516	○	○	○	○	CA	CC	-	-	1.65	0.90	0.95*	1.34	1.90	2.33	3.00	3.56	4.25	440	840	
	632.566	○	○	○	○	CA	CC	-	-	2.00	1.10	1.25	1.77	2.50	3.06	3.95	4.68	5.59	445	850	
	632.606	○	○	○	○	CA	CC	-	-	2.20	1.20	1.58	2.23	3.15	3.86	4.98	5.89	7.04	450	860	
	632.646	○	○	○	○**	-	CC	CE	-	2.50	1.30	2.00	2.83	4.00	4.90	6.33	7.48	8.94	455	865	
	632.676	○	○	○	○**	-	CC	CE	-	2.70	1.40	2.38	3.36	4.75	5.82	7.51	8.89	10.62	465	875	
	632.726	○	○	○	○**	-	CC	CE	-	3.00	1.70	3.15	4.46	6.30	7.72	9.96	11.79	14.09	470	885	
	632.766	○	○	○	○**	-	CC	CE	-	3.50	1.90	4.00	5.66	8.00	9.80	12.65	14.97	17.89	475	890	
	632.806	○	○***	○	○**	-	CC	-	CG	4.00	2.40	5.00	7.07	10.00	12.25	15.81	18.71	22.36	480	900	
632.846	○	○***	○	○**	-	CC	-	CG	4.50	2.40	6.25	8.84	12.50	15.31	19.76	23.39	27.95	480	900		
632.886	○	○***	○	○**	-	CC	-	CG	5.00	3.10	8.00	11.31	16.00	19.60	25.30	29.93	35.78	480	910		
632.926	○	○	○	-	-	-	-	CG	5.50	3.60	10.00	14.14	20.00	24.50	31.62	37.42	44.72	525	1020		
632.966	○	○	○	-	-	-	-	CG	6.00	3.90	12.50	17.68	25.00	30.62	39.53	46.77	55.90	525	1020		
120°	632.187	○	-	○	-	CA	CC	-	-	0.35	0.20	-	0.06*	0.08	0.10	0.13	0.15	0.18	630	1200	
	632.217	○	-	○	-	CA	CC	-	-	0.40	0.20	-	0.08*	0.11	0.14	0.18	0.21	0.25	640	1210	
	632.247	○	-	○	-	CA	CC	-	-	0.50	0.20	-	0.12*	0.16	0.20	0.26	0.30	0.36	650	1230	
	632.277	○	-	○	-	CA	CC	-	-	0.60	0.30	-	0.16*	0.22	0.27	0.35	0.41	0.49	660	1250	
	632.307	○	○	○	○	CA	CC	-	-	0.70	0.30	0.16*	0.23*	0.32	0.39	0.51	0.60	0.72	660	1250	
	632.337	○	○	○	○	CA	CC	-	-	0.90	0.40	0.22*	0.32*	0.45	0.55	0.71	0.84	1.01	670	1270	
	632.367	○	○	○	○	CA	CC	-	-	1.00	0.50	0.31*	0.44*	0.63	0.77	1.00	1.18	1.41	670	1270	
	632.407	○	○	○	○	CA	CC	-	-	1.20	0.60	0.50*	0.71	1.00	1.23	1.58	1.87	2.24	670	1270	
	632.447	○	○	○	○	CA	CC	-	-	1.35	0.60	0.62*	0.88	1.25	1.53	1.98	2.34	2.80	675	1270	
	632.487	○	○	○	○	CA	CC	-	-	1.50	0.60	0.80*	1.13	1.60	1.96	2.53	2.99	3.58	680	1275	
	632.517	○	○	○	○	CA	CC	-	-	1.65	0.90	0.95*	1.34	1.90	2.33	3.00	3.56	4.25	685	1280	
	632.567	○	○	○	○	CA	CC	-	-	2.00	0.90	1.25	1.77	2.50	3.06	3.95	4.68	5.59	690	1285	
	632.607	○	○	○	○	CA	CC	-	-	2.20	1.10	1.58	2.23	3.15	3.86	4.98	5.89	7.04	700	1300	
	632.647	○	○	○	-	-	CC	CE	-	2.50	1.30	2.00	2.83	4.00	4.90	6.33	7.48	8.94	700	1300	
	632.677	○	○	○	○**	-	CC	CE	-	2.70	1.40	2.38	3.36	4.75	5.82	7.51	8.89	10.62	720	1330	
	632.727	○	○	○	○**	-	CC	CE	-	3.00	1.60	3.15	4.46	6.30	7.72	9.96	11.79	14.09	740	1360	
632.767	○	○	○	○**	-	CC	CE	-	3.50	1.70	4.00	5.66	8.00	9.80	12.65	14.97	17.89	760	1400		
632.807	○	○***	○	-	-	CC	-	CG	4.00	2.00	5.00	7.07	10.00	12.25	15.81	18.71	22.36	790	1450		
632.847	○***	○***	○***	○**	-	CC	-	CG	4.50	2.30	6.25	8.84	12.50	15.31	19.76	23.39	27.95	790	1450		
632.887	○	○	○	-	-	-	-	CG	5.00	2.60	8.00	11.31	16.00	19.60	25.30	29.93	35.78	800	1460		
632.927	○	○	○	-	-	-	-	CG	5.00	2.90	10.00	14.14	20.00	24.50	31.62	37.42	44.72	800	1460		

1) We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
 A = Equivalent bore diameter · E = narrowest free cross section
 * Differing spray pattern
 ** Only available with code CC.
 *** Only available with code CG.
 Subject to technical modifications.

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.

Example for ordering: Type + Material-no. + Code = Ordering no.
 632.216. + 16 + CA = 632.216.16.CA



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



Flat fan nozzles

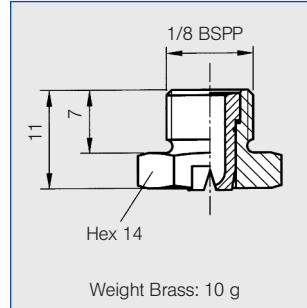
Series 610



Compact design, suitable for narrow installation conditions. Stable spray angle. Uniform, parabolic distribution of liquid.

Applications:

Cleaning installations, cooling headers, spray pipes.



Spray angle	Ordering no.		A Ø [mm]	E Ø [mm]	ṽ [l/min]								Spray width B at p = 2 bar		
	Type	Mat.-no.			p [bar]								H =		
		16			30	0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	250 mm	500 mm	
20°	610.301	○	○	0.70	0.60	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	65	125	
	610.361	○	○	1.00	0.80	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	65	125	
	610.441	○	○	1.35	1.10	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	65	125	
	610.481	○	○	1.50	1.20	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	65	125	
30°	610.302	○	○	0.70	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	115	230	
	610.362	○	○	1.00	0.70	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	115	230	
	610.402	○	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	115	230	
	610.482	○	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	115	230	
	610.562	○	○	2.00	1.50	1.25	1.77	2.50	0.78	3.06	3.95	5.59	115	230	
45°	610.303	○	○	0.70	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	185	340	
	610.363	○	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	185	340	
	610.403	○	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	185	340	
	610.483	○	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	185	340	
	610.563	○	○	2.00	1.40	1.25	1.77	2.50	0.78	3.06	3.95	5.59	185	340	
	610.643	○	○	2.50	1.80	2.00	2.83	4.00	1.24	4.90	6.33	8.94	185	340	
60°	610.304	○	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	275	525	
	610.334	○	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	275	525	
	610.364	○	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	275	525	
	610.404	○	○	1.20	0.80	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	275	525	
	610.444	○	○	1.35	0.90	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	280	530	
	610.484	○	○	1.50	1.00	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	280	530	
	610.514	○	○	1.65	1.10	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	280	530	
	610.564	○	○	2.00	1.30	1.25	1.77	2.50	0.78	3.06	3.95	5.59	280	530	
610.604	○	○	2.20	1.50	1.58	2.23	3.15	0.98	3.86	4.98	7.04	280	530		
75°	610.145	○	○	0.20	0.12	-	0.04*	0.05	0.02	0.06	0.08	0.11	285	550	
	610.165	○	○	0.20	0.08	-	0.05*	0.07	0.02	0.08	0.10	0.15	285	555	
	610.185	○	○	0.20	0.15	-	0.06*	0.08	0.11	0.10	0.13	0.18	290	560	
	610.215	○	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	290	560	
	610.245	○	○	0.50	0.30	-	0.12*	0.16	0.05	0.20	0.26	0.36	290	560	
	610.275	○	○	0.60	0.30	0.11*	0.16*	0.22	0.07	0.27	0.35	0.49	290	560	

A = Equivalent bore diameter · E = narrowest free cross section

* Differing spray pattern

Subject to technical modifications.

Continued on next page.

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.

For complete assembly accessories, please refer to »Accessories«.

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	610.301	+	16	=	610.301.16

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$





Flat fan nozzles

Series 610



Spray angle	Ordering no.		A ∅ [mm]	E ∅ [mm]	V̇ [l/min]								Spray width B at p = 2 bar	
	Type	Mat.-no.			p [bar]								H =	
		16	30	[US gal/min] at 40 psi								250 mm	500 mm	
	AISI 303	Brass	0.5	1.0	2.0	3.0	5.0	10.0						
90°	610. 216	○	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	380	670
	610. 276	○	○	0.60	0.30	0.11*	0.16*	0.22	0.07	0.27	0.35	0.49	450	795
	610. 306	○	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	450	795
	610. 336	○	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	450	795
	610. 366	○	○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	450	795
	610. 406	○	○	1.20	0.70	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	450	800
	610. 446	○	○	1.35	0.80	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	450	800
	610. 486	○	○	1.50	0.80	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	450	800
	610. 516	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	450	800
	610. 566	○	○	2.00	1.10	1.25	1.77	2.50	0.78	3.06	3.95	5.59	450	805
610. 606	○	○	2.20	1.20	1.58	2.23	3.15	0.98	3.86	4.98	7.04	450	805	
120°	610. 187	○	○	0.35	0.20	-	0.06*	0.08	0.02	0.10	0.13	0.18	640	1220
	610. 217	○	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	650	1230
	610. 247	○	○	0.50	0.20	-	0.12*	0.16	0.05	0.20	0.26	0.36	655	1245
	610. 277	○	○	0.60	0.30	-	0.16*	0.22	0.07	0.27	0.35	0.49	655	1250
	610. 307	○	○	0.70	0.30	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	660	1260
	610. 337	○	○	0.90	0.40	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	660	1260
	610. 367	○	○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	660	1265
	610. 407	○	○	1.20	0.60	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	660	1270
	610. 447	○	○	1.35	0.60	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	665	1270
	610. 487	○	○	1.50	0.60	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	665	1270
	610. 517	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	670	1275
	610. 567	○	○	2.00	0.90	1.25	1.77	2.50	0.78	3.06	3.95	5.59	670	1280
	610. 607	○	○	2.20	1.10	1.58	2.23	3.15	0.98	3.86	4.98	7.04	675	1285

A = Equivalent bore diameter · E = narrowest free cross section
 * Differing spray pattern
 Subject to technical modifications.

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
 For complete assembly accessories, please refer to »Accessories«.

Example	Type	+	Material-no.	=	Ordering no.
for ordering:	610. 216	+	16	=	610. 216. 16



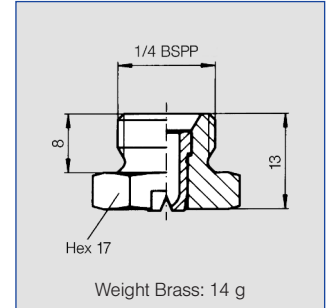
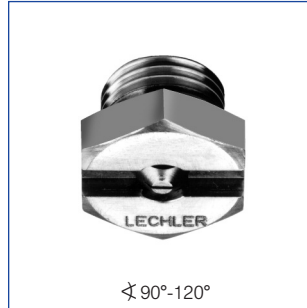
Flat fan nozzles

Series 612



Compact design, suitable for narrow installation conditions. Stable spray angle. Uniform, parabolic distribution of liquid.

Applications:
Cleaning installations. cooling headers spray pipes.



Spray angle	Ordering no.				A Ø [mm]	E Ø [mm]	V̇ [l/min]						Spray width B at p = 2 bar		
	Type	Material-no.					p [bar]								
		16	17 ¹⁾	30											
		AISI 303	AISI 316Ti/AISI 316L	Brass			0.5	1.0	2.0	[US gal/min] at 40 psi	3.0	5.0	10.0	H= 250 mm	H= 500 mm
20°	612.301	○	○	○	0.70	0.60	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	75	150
	612.361	○	○	○	1.00	0.80	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	80	150
	612.441	○	○	○	1.30	1.10	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	80	155
	612.481	○	○	○	1.50	1.20	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	80	155
30°	612.302	○	○	○	0.60	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	85	140
	612.362	○	○	○	1.00	0.70	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	95	160
	612.402	○	○	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	105	190
	612.482	○	○	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	120	225
	612.562	○	○	○	2.00	1.50	1.25	1.77	2.50	0.78	3.06	3.95	5.59	135	240
	612.642	○	○	○	2.50	1.80	2.00	2.83	4.00	1.24	4.90	6.33	8.94	145	285
	612.722	○	○	○	3.00	2.40	3.15	4.46	6.30	1.95	7.72	9.96	14.09	150	290
	612.762	○	○	○	3.50	2.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	150	290
612.802	○	○	○	4.00	3.10	5.00	7.07	10.00	3.10	12.25	15.81	22.36	150	290	
45°	612.303	○	○	○	0.70	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	160	315
	612.363	○	○	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	170	340
	612.403	○	○	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	175	345
	612.483	○	○	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	195	375
	612.563	○	○	○	2.00	1.40	1.25	1.77	2.50	0.78	3.06	3.95	5.59	190	365
	612.643	○	○	○	2.50	1.80	2.00	2.83	4.00	1.24	4.90	6.33	8.94	190	365
	612.723	○	○	○	3.00	2.40	3.15	4.46	6.30	1.95	7.72	9.96	14.09	195	370
	612.763	○	○	○	3.50	2.60	4.00	5.66	8.00	2.48	9.80	12.65	17.89	195	370
612.803	○	○	○	4.00	3.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	195	370	
60°	612.304	○	○	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	245	490
	612.334	○	○	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	250	495
	612.364	○	○	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	255	500
	612.404	○	○	○	1.20	0.80	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	260	510
	612.444	○	○	○	1.35	0.90	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	260	510
	612.484	○	○	○	1.50	1.00	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	270	525
	612.514	○	○	○	1.65	1.10	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	260	510
	612.564	○	○	○	2.00	1.30	1.25	1.77	2.50	0.78	3.06	3.95	5.59	260	505
	612.604	○	○	○	2.20	1.50	1.58	2.23	3.15	0.98	3.86	4.98	7.04	265	505
	612.644	○	○	○	2.50	1.60	2.00	2.83	4.00	1.24	4.90	6.33	8.94	265	505
	612.674	○	○	○	2.70	1.80	2.38	3.36	4.75	1.47	5.82	7.51	10.62	265	505
	612.724	○	○	○	3.00	2.10	3.15	4.46	6.30	1.95	7.72	9.96	14.09	265	505
	612.764	○	○	○	3.50	2.30	4.00	5.66	8.00	2.48	9.80	12.65	17.89	260	500
	612.804	○	○	○	4.00	2.60	5.00	7.07	10.00	3.10	12.25	15.81	22.36	255	490
612.884	○	-	○	5.00	3.40	8.00	11.31	16.00	4.96	19.60	25.30	35.78	255	490	

¹⁾ We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
*Differing spray pattern Subject to technical modifications.

Continued on next page.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$





Flat fan nozzles

Series 612



Spray angle	Ordering no.			A Ø [mm]	E Ø [mm]	V̇ [l/min]							Spray width B at p = 2 bar		
	Type	Material-no.				p [bar]									
		16	17 ¹⁾			30	0.5	1.0	2.0	[US gal/min] at 40 psi	3.0	5.0			10.0
	AISI 303	AISI 316Ti/AISI 316L	Brass												
75°	612. 145	○	-	○	0.20	0.12	-	0.04*	0.05	0.02	0.06	0.08	0.11	300	580
	612. 165	○	-	○	0.20	0.08	-	0.05*	0.07	0.02	0.08	0.10	0.15	310	590
	612. 185	○	-	○	0.20	0.15	-	0.06*	0.08	0.02	0.10	0.13	0.18	320	600
	612. 215	○	-	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	325	610
	612. 245	○	-	○	0.50	0.30	-	0.12*	0.16	0.05	0.20	0.26	0.36	330	615
	612. 275	○	-	○	0.60	0.30	0.11*	0.16*	0.22	0.07	0.27	0.35	0.49	340	630
90°	612. 216	○	-	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	420	820
	612. 276	○	-	○	0.60	0.30	0.11*	0.16*	0.22	0.07	0.27	0.35	0.49	420	820
	612. 306	○	○	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	425	840
	612. 336	○	○	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	425	840
	612. 366	○	○	○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	425	835
	612. 406	○	○	○	1.20	0.70	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	425	835
	612. 446	○	○	○	1.35	0.80	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	425	835
	612. 486	○	○	○	1.50	0.80	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	425	830
	612. 516	○	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	425	830
	612. 566	○	○	○	2.00	1.10	1.25	1.77	2.50	0.78	3.06	3.95	5.59	425	825
	612. 606	○	○	○	2.20	1.20	1.58	2.23	3.15	0.98	3.86	4.98	7.04	425	820
	612. 646	○	○	○	2.50	1.30	2.00	2.83	4.00	1.24	4.90	6.33	8.94	425	820
	612. 676	○	○	○	2.70	1.40	2.38	3.36	4.75	1.47	5.82	7.51	10.62	425	815
	612. 726	○	○	○	3.00	1.70	3.15	4.46	6.30	1.95	7.71	9.96	14.09	425	810
	612. 766	○	○	○	3.50	1.90	4.00	5.66	8.00	2.48	9.80	12.65	17.89	425	810
	612. 806	○	-	○	4.00	2.40	5.00	7.07	10.00	3.10	12.25	15.81	22.36	425	805
120°	612. 187	○	-	○	0.35	0.20	-	0.06*	0.08	0.02	0.10	0.13	0.18	610	1140
	612. 217	○	-	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	615	1150
	612. 247	○	-	○	0.50	0.20	-	0.12*	0.16	0.05	0.20	0.26	0.36	620	1160
	612. 277	○	-	○	0.60	0.30	-	0.16*	0.22	0.07	0.27	0.35	0.49	620	1170
	612. 307	○	-	○	0.70	0.30	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	625	1175
	612. 337	○	○	○	0.90	0.40	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	630	1180
	612. 367	○	○	○	1.00	0.40	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	635	1190
	612. 407	○	○	○	1.20	0.60	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	640	1195
	612. 447	○	○	○	1.35	0.60	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	645	1200
	612. 487	○	○	○	1.50	0.60	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	650	1200
	612. 517	○	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	650	1205
	612. 567	○	○	○	2.00	0.90	1.25	1.77	2.50	0.78	3.06	3.95	5.59	655	1210
	612. 607	○	○	○	2.20	1.10	1.58	2.23	3.15	0.98	3.86	4.98	7.04	660	1215
	612. 647	○	○	○	2.50	1.30	2.00	2.83	4.00	1.24	4.90	6.33	8.94	660	1220
	612. 677	○	○	○	2.70	1.40	2.38	3.36	4.75	1.47	5.82	7.51	10.62	665	1230
	612. 727	○	○	○	3.00	1.60	3.15	4.46	6.30	1.95	7.71	9.96	14.09	675	1245
	612. 767	○	○	○	3.50	1.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	680	1260
	612. 807	○	-	○	4.00	2.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	690	1280

1) We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
 A = Equivalent bore diameter · E = narrowest free cross section
 *Differing spray pattern
 Subject to technical modifications.

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
 For complete assembly accessories, please refer to »Accessories«.

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	612. 145	+	16	=	612. 145. 16



Flat fan nozzles

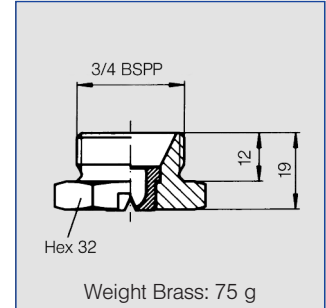
Series 616 / 617



Uniform, parabolic distribution of liquid. Increased non-clogging features, more jet power, less fog.

Applications:

Cleaning installations, rain curtains, gravel washing, spray pipes, foam spraying, roll cooling, cooling of rolled stock.



Spray angle	Ordering no.				A Ø [mm]	E Ø [mm]	ṽ [l/min]							Spray width B at p = 2 bar	
	Type	Material-no.					p [bar]							 H = 250 mm H = 500 mm	
		16	17 ¹⁾	30			0.5	1.0	2.0	3.0	5.0	10.0	US gal./min] at 40 psi		
		AISI 303	AISI 316Ti/AISI 316L	Brass											
20°	616. 721	○	○	○	3.00	2.50	3.15	4.45	6.30	1.95	7.72	9.96	14.09	80	140
	616. 801	○	○	○	4.00	3.20	5.00	7.07	10.00	3.10	12.25	15.81	22.36	80	145
	616. 881	○	○	○	5.00	4.00	8.00	11.31	16.00	4.96	19.60	25.30	35.78	80	145
	616. 921	○	○	○	5.50	4.40	10.00	14.14	20.00	6.20	24.49	31.62	44.72	80	145
	616. 961	○	○	○	6.00	5.10	12.50	17.68	25.00	7.75	30.62	39.53	55.90	80	145
30°	616. 722	○	○	○	3.00	2.40	3.15	4.45	6.30	1.95	7.72	9.96	14.09	120	230
	616. 762	○	○	○	3.50	2.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	120	230
	616. 802	○	○	○	4.00	3.10	5.00	7.07	10.00	3.10	12.25	15.81	22.36	120	235
	616. 882	○	○	○	5.00	4.00	8.00	11.31	16.00	4.96	19.60	25.30	35.78	120	235
	616. 922	○	○	○	5.50	4.40	10.00	14.14	20.00	6.20	24.49	31.62	44.72	120	235
	616. 962	○	-	○	6.00	5.00	12.50	17.68	25.00	7.75	30.62	39.53	55.90	125	240
45°	616. 723	○	○	○	3.00	2.40	3.15	4.45	6.30	1.95	7.72	9.96	14.09	175	330
	616. 763	○	○	○	3.50	2.60	4.00	5.66	8.00	2.48	9.80	12.65	17.89	175	330
	616. 803	○	○	○	4.00	3.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	175	335
	616. 843	○	○	○	4.50	3.40	6.25	8.84	12.50	3.88	15.31	19.76	27.95	180	335
	616. 883	○	○	○	5.00	3.80	8.00	11.31	16.00	4.96	19.60	25.30	35.78	185	350
	616. 923	○	○	○	5.50	4.20	10.00	14.14	20.00	6.20	24.49	31.62	44.72	190	360
	616. 963	○	○	○	6.00	4.40	12.50	17.68	25.00	7.75	30.62	39.53	55.90	200	375
60°	616. 724	○	○	○	3.00	2.10	3.15	4.45	6.30	1.95	7.72	9.96	14.09	295	575
	616. 764	○	○	○	3.50	2.30	4.00	5.66	8.00	2.48	9.80	12.65	17.89	300	580
	616. 804	○	○	○	4.00	2.60	5.00	7.07	10.00	3.10	12.25	15.81	22.36	300	580
	616. 844	○	○	○	4.50	3.00	6.25	8.84	12.50	3.88	15.31	19.76	27.95	300	580
	616. 884	○	○	○	5.00	3.40	8.00	11.31	16.00	4.96	19.60	25.30	35.78	300	580
	616. 924	○	○	○	5.50	4.10	10.00	14.14	20.00	6.20	24.49	31.62	44.72	300	580
	616. 964	○	○	○	6.00	4.20	12.50	17.68	25.00	7.75	30.62	39.53	55.90	300	580
	617. 044	○	-	○	8.00	5.50	20.00	28.28	40.00	12.41	48.99	63.25	89.44	300	580
	617. 124	-	-	○	10.00	7.40	31.50	44.55	63.00	19.54	77.16	99.61	140.87	300	580
90°	616. 726	○	○	○	3.00	1.70	3.15	4.45	6.30	1.95	7.72	9.96	14.09	540	1000
	616. 766	○	○	○	3.50	1.90	4.00	5.66	8.00	2.48	9.80	12.65	17.89	550	1010
	616. 806	○	○	○	4.00	2.40	5.00	7.07	10.00	3.10	12.25	15.81	22.36	550	1010
	616. 846	○	○	○	4.50	2.40	6.25	8.84	12.50	3.88	15.31	19.76	27.95	550	1020
	616. 886	○	○	○	5.00	3.10	8.00	11.31	16.00	4.96	19.60	25.30	35.78	550	1020
	616. 926	○	○	○	5.50	3.60	10.00	14.14	20.00	6.20	24.49	31.62	44.72	555	1025
	616. 966	○	○	○	6.00	3.90	12.50	17.68	25.00	7.75	30.62	39.53	55.90	560	1030

¹⁾ We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
 A = Equivalent bore diameter · E = narrowest free cross section
 Subject to technical modifications.

Continued on next page.

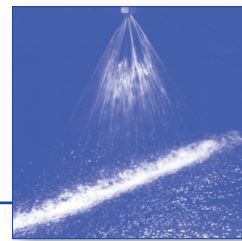
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$





Flat fan nozzles

Series 616 / 617



Spray angle	Ordering no.			A Ø [mm]	E Ø [mm]	\dot{V} [l/min]							Spray width B at p = 2 bar		
	Type	Material-no.				p [bar]									
		16	17 ¹⁾												30
		AISI 303	AISI 316Ti/AISI 316L			Brass	0.5	1.0	2.0	[US gal/ min] at 40 psi	3.0	5.0	10.0	H = 250 mm	H = 500 mm
120°	616. 727	○	○	○	3.00	1.60	3.15	4.45	6.30	1.95	7.72	9.96	14.09	975	1755
	616. 767	○	○	○	3.50	1.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	970	1750
	616. 807	○	○	○	4.00	2.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	965	1740
	616. 887	○	○	○	5.00	2.60	8.00	11.31	16.00	4.96	19.60	25.30	35.78	955	1730
	616. 927	○	○	○	5.50	2.90	10.00	14.14	20.00	6.20	24.49	31.62	44.72	950	1720
	616. 967	-	-	○	6.00	3.20	12.50	17.68	25.00	7.75	30.62	39.53	55.90	950	1720
	617. 047	-	-	○	8.00	4.40	20.00	28.28	40.00	12.41	48.99	63.25	89.44	950	1720

¹⁾ We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
Subject to technical modifications.

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.

Example	Type	+	Material-no.	=	Ordering no.
for ordering:	616. 727	+	16	=	616. 727. 16



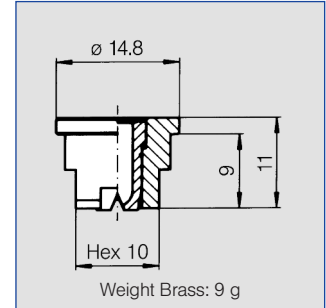
Flat fan nozzles for retaining nut Series 652



**Assembly with retaining nut.
Easy nozzle changing, simple
jet alignment. Uniform, para-
bolic distribution of liquid.
Spray pipes equipped with
these nozzles show an
extremely uniform total liquid
distribution.**

Applications:

Spray cleaning, surface
treatment, filter cleaning, belt
cleaning, lubricating, coating.



Spray angle	Ordering no.					A ∅ [mm]	E ∅ [mm]	V̇ [l/min]										Spray width B at p = 2 bar	
	Type	Material-no.						p [bar]											
		16	17 ¹⁾	30	5E														
		AISI 303	AISI 316Ti/ AISI 316L	Brass	PVDF			0.5	1.0	2.0	[US gal/ min] at 40 psi	3.0	5.0	10.0	H = 250 mm	H = 500 mm			
20°	652.301	○	○	○	○	0.70	0.60	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	65	125			
	652.361	○	○	○	○	1.00	0.80	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	65	125			
	652.441	○	○	○	○	1.35	1.10	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	65	125			
	652.481	○	○	○	○	1.50	1.20	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	65	125			
30°	652.302	○	○	○	○	0.60	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	115	230			
	652.362	○	○	○	○	1.00	0.70	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	115	230			
	652.402	○	○	○	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	115	230			
	652.482	○	○	○	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	115	230			
	652.562	○	○	○	○	2.00	1.50	1.25	1.77	2.50	0.78	3.06	3.95	5.59	115	230			
	652.642	○	○	○	-	2.50	1.80	2.00	2.83	4.00	1.24	4.90	6.33	8.94	120	230			
	652.722	○	○	○	-	3.00	2.40	3.15	4.46	6.30	1.95	7.72	9.96	14.09	120	235			
	652.762	○	○	○	-	3.50	2.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	120	235			
652.802	○	○	○	-	4.00	3.10	5.00	7.07	10.00	3.10	12.25	15.81	22.36	120	240				
45°	652.303	○	○	○	-	0.70	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	180	340			
	652.363	○	○	○	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	185	340			
	652.403	○	○	○	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	185	340			
	652.483	○	○	○	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	185	340			
	652.563	○	○	○	○	2.00	1.40	1.25	1.77	2.50	0.78	3.06	3.95	5.59	185	340			
	652.643	○	○	○	○	2.50	1.80	2.00	2.83	4.00	1.24	4.90	6.33	8.94	185	345			
	652.723	○	○	○	-	3.00	2.40	3.15	4.46	6.30	1.95	7.72	9.96	14.09	190	355			
	652.763	○	○	○	-	3.50	2.60	4.00	5.66	8.00	2.48	9.80	12.65	17.89	190	355			
652.803	○	○	○	-	4.00	3.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	195	360				
60°	652.304	○	○	○	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	275	525			
	652.334	○	○	○	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	275	525			
	652.364	○	○	○	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	275	525			
	652.404	○	○	○	○	1.20	0.80	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	275	525			
	652.444	○	○	○	○	1.35	0.90	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	280	530			
	652.484	○	○	○	○	1.50	1.00	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	280	530			
	652.514	○	○	○	○	1.65	1.10	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	280	530			
	652.564	○	○	○	○	2.00	1.30	1.25	1.77	2.50	0.78	3.06	3.95	5.59	280	525			
	652.604	○	○	○	○	2.20	1.50	1.58	2.23	3.15	0.98	3.86	4.98	7.04	280	520			
	652.644	○	○	○	○	2.50	1.60	2.00	2.83	4.00	1.24	4.90	6.33	8.94	275	520			
	652.674	○	○	○	○	2.70	1.80	2.38	3.36	4.75	1.47	5.82	7.51	10.62	275	520			
	652.724	○	○	○	○	3.00	2.10	3.15	4.46	6.30	1.95	7.72	9.96	14.09	275	520			
	652.764	○	○	○	-	3.50	2.30	4.00	5.66	8.00	2.48	9.80	12.65	17.89	270	515			
	652.804	○	○	○	○	4.00	2.60	5.00	7.07	10.00	3.10	12.25	15.81	22.36	270	510			
	652.844	○	-	-	○	4.50	3.00	6.25	8.84	12.50	3.88	15.31	19.76	27.95	270	510			
	652.884	○	-	○	-	5.00	3.40	8.00	11.31	16.00	4.96	19.60	25.30	35.78	270	505			

¹⁾ We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section · *Differing spray pattern.

Continued on next page.

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





Flat fan nozzles for retaining nut Series 652



Spray angle	Ordering no.					A ∅ [mm]	E ∅ [mm]	\dot{V} [l/min]										Spray width B at p = 2 bar	
	Type	Material-no.						p [bar]											
		16	17 ¹⁾	30	5E			[US gal/min] at 40 psi											
		AISI 303	AISI 316Ti/AISI 316L	Brass	PVDF			0.5	1.0	2.0	3.0	5.0	10.0	H = 250 mm	H = 500 mm				
75°	652. 145	○	-	○	-	0.20	0.12	-	0.04*	0.05	0.02	0.06	0.08	0.11	285	550			
	652. 165	○	-	○	-	0.20	0.08	-	0.05*	0.07	0.02	0.08	0.10	0.15	285	555			
	652. 185	○	-	○	-	0.20	0.15	-	0.06*	0.08	0.02	0.10	0.13	0.18	290	560			
	652. 215	○	-	○	-	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	290	560			
	652. 245	○	-	○	-	0.50	0.30	-	0.12*	0.16	0.05	0.20	0.26	0.36	290	560			
	652. 275	○	-	○	-	0.60	0.30	0.11*	0.16*	0.22	0.07	0.27	0.35	0.49	290	560			
90°	652. 216	○	-	○	-	0.40	0.20	0.06*	0.08*	0.11	0.03	0.14	0.18	0.25	380	760			
	652. 246	○	-	○	-	0.50	0.30	0.08*	0.12*	0.16	0.05	0.20	0.26	0.36	380	760			
	652. 276	○	-	○	-	0.60	0.30	0.11*	0.16*	0.22	0.07	0.27	0.35	0.49	450	795			
	652. 306	○	○	○	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	450	795			
	652. 336	○	○	○	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	450	795			
	652. 366	○	○	○	○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	450	795			
	652. 406	○	○	○	○	1.20	0.70	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	450	800			
	652. 446	○	○	○	○	1.35	0.80	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	450	800			
	652. 486	○	○	○	○	1.50	0.80	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	450	800			
	652. 516	○	○	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	450	800			
	652. 566	○	○	○	○	2.00	1.10	1.25	1.77	2.50	0.78	3.06	3.95	5.59	450	805			
	652. 606	○	○	○	○	2.20	1.20	1.58	2.23	3.15	0.98	3.86	4.98	7.04	450	805			
	652. 646	○	○	○	○	2.50	1.30	2.00	2.83	4.00	1.24	4.90	6.33	8.94	450	805			
	652. 676	○	○	○	○	2.70	1.40	2.38	3.36	4.75	1.47	5.82	7.51	10.62	450	810			
	652. 726	○	○	○	○	3.00	1.70	3.15	4.46	6.30	1.95	7.72	9.96	14.09	450	810			
	652. 766	○	○	○	-	3.50	1.90	4.00	5.66	8.00	2.48	9.80	12.65	17.89	450	815			
	652. 806	○	○	○	○	4.00	2.40	5.00	7.07	10.00	3.10	12.25	15.81	22.36	450	820			
	652. 846	-	-	○	○	4.50	2.40	6.25	8.84	12.50	3.88	15.31	19.76	27.95	450	820			
652. 886	○	-	○	○	5.00	3.10	8.00	11.31	16.00	4.96	19.60	25.30	35.78	450	835				
120°	652. 187	○	-	○	-	0.35	0.20	-	0.06*	0.08	0.02	0.10	0.13	0.18	640	1220			
	652. 217	○	-	○	-	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	650	1230			
	652. 247	○	-	○	-	0.50	0.20	-	0.12*	0.16	0.05	0.20	0.26	0.36	655	1245			
	652. 277	○	-	○	-	0.60	0.30	-	0.16*	0.22	0.07	0.27	0.35	0.49	655	1250			
	652. 307	○	-	○	○	0.70	0.30	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	660	1260			
	652. 337	○	○	○	○	0.90	0.40	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	660	1260			
	652. 367	○	○	○	○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	660	1265			
	652. 407	○	○	○	○	1.20	0.60	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	660	1270			
	652. 447	○	○	○	○	1.35	0.60	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	665	1270			
	652. 487	○	○	○	○	1.50	0.60	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	665	1270			
	652. 517	○	○	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	670	1275			
	652. 567	○	○	○	○	2.00	0.90	1.25	1.77	2.50	0.78	3.06	3.95	5.59	670	1280			
	652. 607	○	○	○	○	2.20	1.10	1.58	2.23	3.15	0.98	3.86	4.98	7.04	675	1285			
	652. 647	○	○	○	-	2.50	1.30	2.00	2.83	4.00	1.24	4.90	6.33	8.94	680	1295			
	652. 677	○	○	○	-	2.70	1.40	2.38	3.36	4.75	1.47	5.82	7.51	10.62	685	1300			
	652. 727	○	○	○	○	3.00	1.60	3.15	4.46	6.30	1.95	7.72	9.96	14.09	695	1315			
	652. 767	○	○	○	-	3.50	1.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	705	1330			
	652. 807	○	-	○	-	4.00	2.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	705	1330			
	652. 847	-	-	-	○	4.50	2.30	6.25	8.84	12.50	3.88	15.31	19.76	27.95	800	1460			
	652. 887	-	-	-	○	5.00	2.60	8.00	11.31	16.00	4.96	19.60	25.30	35.78	800	1460			

¹⁾ We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section

*Differing spray pattern. Subject to technical modifications.

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
For complete assembly accessories, please refer to »Accessories«.

Example for ordering: Type 652. 145 + Material-no. 16 = Ordering no. 652. 145. 16





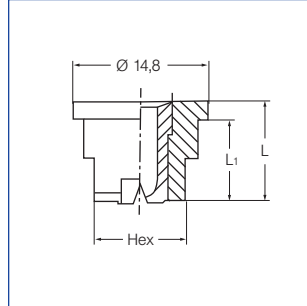
Flat fan nozzles for belt lubrication

Series 652. xxx. 8H. 03



Especially low flow rates. Parabolic liquid distribution

Applications:
Belt lubrication, moistening,
spraying of food products,
moisturization of rollers,
oiling, lubrication of metal
sheets.



Operating pressure range:

1 to 5 bar

Recommended operating pressure:

3 bar

Viscosity:

The nozzles can be operated with viscous media, e. g. transmission fluid (max. approx. 200 mPas). However the spray angle decreases.

Return valve with gauze filter:

- Prevents dripping and saves medium
- Size of filter mesh: 0,08 mm (200 mesh)
- **095.016.53.11.00**
Opening pressure: approx. 0,5 bar
Closing pressure: approx. 0,3 bar
- **095.016.53.14.63**
Opening pressure: approx. 2,8 bar
Closing pressure: approx. 1,6 bar

Spray angle	Ordering no.		Colour	E Ø [mm]	V̇ [l/min]			
	Type	Mat.-no.			p [bar]			
					16 AISI 303	8H.03* POM/AISI 303	1.0	2.0
75°	652. 145	○ ○	green	0.30	0.04**	0.05	0.06	0.08
	652. 165	○ ○	black	0.34	0.05**	0.07	0.08	0.10
	652. 185	○ ○	red	0.20	0.06**	0.08	0.10	0.13
	652. 215	○ ○	blue	0.20	0.08**	0.11	0.14	0.18
	652. 245	○ ○	orange	0.30	0.12**	0.16	0.20	0.26
120°	652.275	○ ○	brown	0.30	0.16**	0.22	0.27	0.35
	652. 187	○ ○	grey	0.20	0.06**	0.08	0.10	0.13
	652. 247	○ ○	black	0.20	0.12**	0.16	0.20	0.26
	652. 277	○ ○	black	0.30	0.16**	0.22	0.27	0.35

E = narrowest free cross section

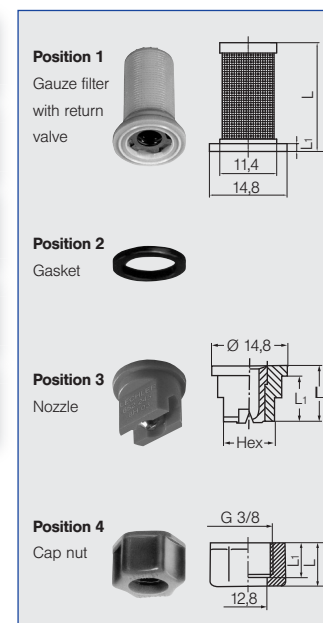
* Housing POM, nozzle insert AISI 303

** Differing spray pattern. Subject to technical modifications.

Pos.	Name	Ordering no.	Material	Dimensions [mm]			** [mm]
				L	L1	SW	
1	Gauze filter with return valve	095. 016. 53. 11. 00	PP	21	1.5	-	0.08
		095. 016. 53. 14. 63	PP	21	1.5	-	0.08
2	Gasket	065. 240. 55	PTFE	-	-	-	-
		065. 240. 72	EWP 210	-	-	-	-
3	Nozzle	Ordering no. see flow tables	AISI 303	11	9	10	-
			POM/AISI 303*	12	10	8	-
4	Cap nut	065. 200. 16	AISI 303	13	10	22	-
		065. 200. 56	POM	14.5	11.5	22	-

* Housing POM, Nozzle insert AISI 303

** Size of mesh



Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$





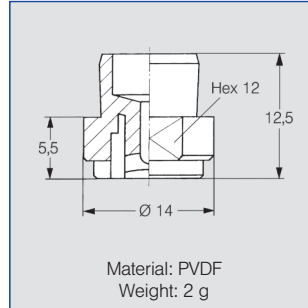
Flat fan nozzles for pressing into pipes

Series 612. XXX. 5E. 03



**For pressing into pipes.
Stable spray pattern.
Uniform, parabolic distribution of liquid.**

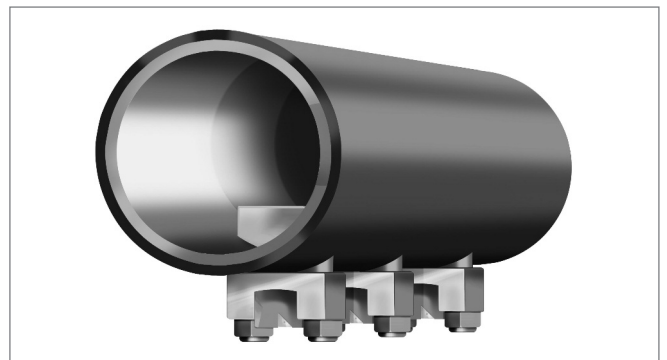
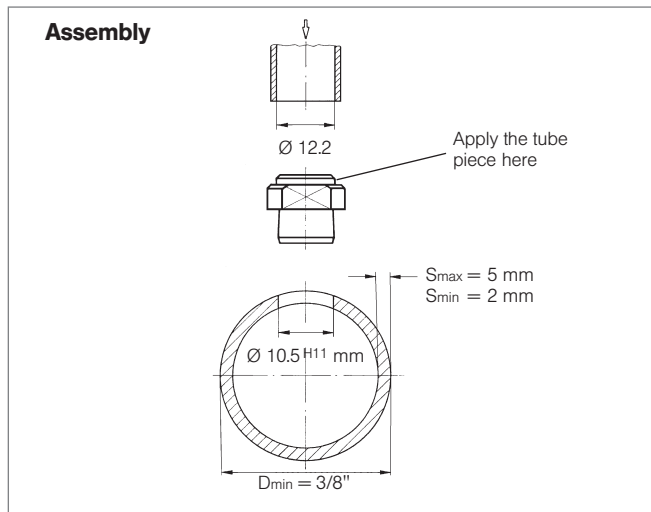
Applications:
Cleaning and rinsing, dish washing.



Spray angle	Ordering no.		A Ø [mm]	E Ø [mm]	V̇ [l/min]						Spray width B at p = 2 bar	
	Type	Mat.-no.			p [bar] Pmax = 2 bar						H =	
					5E.03	0.3	0.5	0.7	1.0	1.5	2.0	250 mm
90°	612. 366	○	1.0	0.5	0.24	0.31	0.37	0.44	0.55	0.63	505	980
	612. 486	○	1.5	0.6	0.62	0.80	0.95	1.13	1.39	1.60	525	1020
120°	612. 487	○	1.5	0.6	0.62	0.80	0.95	1.13	1.39	1.60	800	1460
	612. 647	○	2.5	1.2	1.55	2.00	2.37	2.83	3.46	4.00	800	1460

A = Equivalent bore diameter · E = narrowest free cross section

Further nozzle sizes on request.



Assembly:
Drill pipe (Ø 10 mm), ream to Ø 10,5^{H11} mm, adjust, put tube (Ø 12,2 mm) on nozzle and drive in with a rubber mallet.
Flow velocity in the pipe max. 2–3 m/s.

Example for ordering:	Type	+	Mat.-no.	=	Ordering no.
	612. 366	+	5E. 03	=	612. 366. 5E. 03



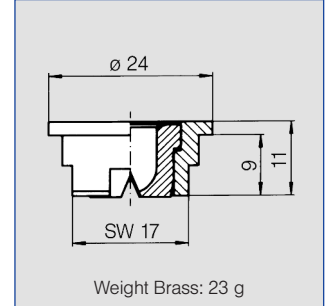
Flat fan nozzles for retaining nut Series 656 / 657



**Assembly with retaining nut.
Easy nozzle changing, simple
jet alignment. Uniform, para-
bolic distribution of liquid.
Increased non-clogging
features, more jet power, less
fog.**

Applications:

Cleaning installations, gravel
washing, cooling headers,
spray pipes, roll cooling, cool-
ing of rolled stock.



Spray angle	Ordering no.				A ∅ [mm]	E ∅ [mm]	ṽ [l/min]						Spray width B at p = 2 bar		
	Type	Material-no.					p [bar]								
		16	17 ¹⁾	30			0.5	1.0	2.0	[US gal/ min] at 40 psi	3.0	5.0			10.0
		AISI 303	AISI 316Ti/AISI 316L	Brass											
20°	656. 721	○	○	○	3.00	2.50	3.15	4.45	6.30	1.95	7.72	9.96	14.09	110	205
	656. 801	○	○	○	4.00	3.20	5.00	7.07	10.00	3.10	12.25	15.81	22.36	110	205
	656. 881	○	○	○	5.00	4.00	8.00	11.31	16.00	4.96	19.60	25.30	35.78	110	205
	656. 921	○	○	○	5.50	4.40	10.00	14.14	20.00	6.20	24.49	31.62	44.72	110	205
	656.961	○	○	○	6.00	5.30	12.50	17.68	25.00	7.75	30.62	39.53	55.90	110	205
30°	656. 722	○	○	○	3.00	2.40	3.15	4.45	6.30	1.95	7.72	9.96	14.09	150	280
	656. 762	○	○	○	3.50	2.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	150	280
	656. 802	○	○	○	4.00	3.10	5.00	7.07	10.00	3.10	12.25	15.81	22.36	150	280
	656. 882	○	○	○	5.00	4.00	8.00	11.31	16.00	4.96	19.60	25.30	35.78	150	280
	656. 922	○	○	○	5.50	4.40	10.00	14.14	20.00	6.20	24.49	31.62	44.72	150	280
	656. 962	○	○	○	6.00	5.00	12.50	17.68	25.00	7.75	30.62	39.53	55.90	150	280
45°	656. 723	○	○	○	3.00	2.40	3.15	4.45	6.30	1.95	7.72	9.96	14.09	280	520
	656. 763	○	○	○	3.50	2.60	4.00	5.66	8.00	2.48	9.80	12.65	17.89	280	520
	656. 803	○	○	○	4.00	3.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	280	520
	656. 843	○	○	○	4.50	3.40	6.25	8.84	12.50	3.88	15.31	19.76	27.95	280	520
	656. 883	○	○	○	5.00	3.80	8.00	11.31	16.00	4.96	19.60	25.30	35.78	280	520
	656. 923	○	○	○	5.50	4.20	10.00	14.14	20.00	6.20	24.49	31.62	44.72	280	520
	656. 963	○	○	○	6.00	4.40	12.50	17.68	25.00	7.75	30.62	39.53	55.90	280	520
60°	656. 724	○	○	○	3.00	2.10	3.15	4.45	6.30	1.95	7.72	9.96	14.09	320	595
	656. 764	○	○	○	3.50	2.30	4.00	5.66	8.00	2.48	9.80	12.65	17.89	320	595
	656. 804	○	○	○	4.00	2.60	5.00	7.07	10.00	3.10	12.25	15.81	22.36	320	595
	656. 844	○	○	○	4.50	3.00	6.25	8.84	12.50	3.88	15.31	19.76	27.95	320	595
	656. 884	○	○	○	5.00	3.40	8.00	11.31	16.00	4.96	19.60	25.30	35.78	320	595
	656. 924	○	○	○	5.50	4.10	10.00	14.14	20.00	6.20	24.49	31.62	44.72	320	595
	656. 964	○	○	○	6.00	4.20	12.50	17.68	25.00	7.75	30.62	39.53	55.90	320	595
	657. 044	-	○	○	8.00	5.50	20.00	28.28	40.00	12.41	48.99	63.25	89.44	320	595
90°	656. 726	○	○	○	3.00	1.70	3.15	4.45	6.30	1.95	7.72	9.96	14.09	420	800
	656. 766	○	○	○	3.50	1.90	4.00	5.66	8.00	2.48	9.80	12.65	17.89	420	800
	656. 806	○	○	○	4.00	2.40	5.00	7.07	10.00	3.10	12.25	15.81	22.36	420	800
	656. 846	○	○	○	4.50	2.40	6.25	8.84	12.50	3.88	15.31	19.76	27.95	420	800
	656. 886	○	○	○	5.00	3.10	8.00	11.31	16.00	4.96	19.60	25.30	35.78	420	800
	656. 926	○	○	○	5.50	3.60	10.00	14.14	20.00	6.20	24.49	31.62	44.72	420	800
	656. 966	○	○	○	6.00	3.90	12.50	17.68	25.00	7.75	30.62	39.53	55.90	420	800
	657. 046	-	-	○	8.00	4.90	20.00	28.28	40.00	12.41	48.99	63.25	89.44	420	800

¹⁾ We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
Subject to technical modifications.

Continued on next page.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$





Flat fan nozzles for retaining nut Series 656 / 657

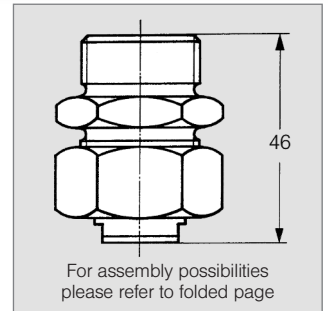


Spray angle	Ordering no.			A ∅ [mm]	E ∅ [mm]	V̇ [l/min]							Spray width B at p = 2 bar		
	Type	Material-no.				p [bar]							 H = 250 mm H = 500 mm		
		16	17 ¹⁾			30	0.5	1.0	2.0	[US gal./ min] at 40 psi	3.0	5.0			10.0
		AISI 303	AISI 316Ti/AISI 316L	Brass											
120°	656. 727	○	○	○	3.00	1.60	3.15	4.45	6.30	1.95	7.72	9.96	14.09	1240	2150
	656. 767	○	○	○	3.50	1.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	1240	2150
	656. 807	○	○	○	4.00	2.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	1240	2150
	656. 887	○	○	○	5.00	2.60	8.00	11.31	16.00	4.96	19.60	25.30	35.78	1240	2150
	656. 927	○	○	○	5.50	2.90	10.00	14.14	20.00	6.20	24.49	31.62	44.72	1240	2150

¹⁾ We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
 A = Equivalent bore diameter · E = narrowest free cross section
 Subject to technical modifications.

Example	Type	+	Material-no.	=	Ordering no.
for ordering:	656. 727	+	16	=	656. 727. 16

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.
 For complete assembly accessories, please refer to »Accessories«.





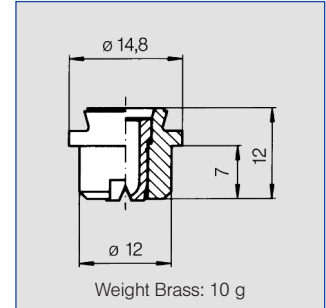
Flat fan nozzles with dove-tail guide Series 660



Assembly with retaining nut. Automatic jet alignment due to dove-tail guide. Stable spray angle. Uniform, parabolic distribution of liquid. Spray pipes with these nozzles show an extremely uniform total liquid distribution.

Applications:

Cleaning installations. cooling headers. spray pipes.



Spray angle	Ordering no.				A Ø [mm]	E Ø [mm]	ṽ [l/min]							Spray width B at p = 2 bar	
	Type	Material-no.					p [bar]								
		16	17 ¹⁾	30											
		AISI 303	AISI 316Ti/AISI 316L	Brass			0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	H = 250 mm	H = 500 mm
20°	660.301	○	○	○	0.70	0.60	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	60	110
	660.361	○	○	○	1.00	0.80	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	65	125
	660.441	○	○	○	1.35	1.10	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	65	125
	660.481	○	○	○	1.50	1.20	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	70	130
30°	660.302	○	○	○	0.60	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	110	205
	660.362	○	○	○	1.00	0.70	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	110	205
	660.402	○	○	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	110	205
	660.482	○	○	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.57	110	210
	660.562	○	○	○	2.00	1.50	1.25	1.76	2.50	0.78	3.06	3.95	5.59	110	210
45°	660.303	○	○	○	0.70	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	180	340
	660.363	○	○	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	185	340
	660.403	○	○	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	185	340
	660.483	○	○	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	185	340
	660.563	○	○	○	2.00	1.40	1.25	1.76	2.50	0.78	3.06	3.95	5.59	190	345
	660.643	○	○	○	2.50	1.80	2.00	2.83	4.00	1.24	4.90	6.33	8.94	190	350
60°	660.304	○	○	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	275	525
	660.334	○	○	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	275	525
	660.364	○	○	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	275	525
	660.404	○	○	○	1.20	0.80	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	275	525
	660.444	○	○	○	1.35	0.90	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	275	525
	660.484	○	○	○	1.50	1.00	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	275	525
	660.514	○	○	○	1.65	1.10	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	275	525
	660.564	○	○	○	2.00	1.30	1.25	1.77	2.50	0.78	3.06	3.95	5.59	275	525
	660.604	○	○	○	2.20	1.50	1.58	2.23	3.15	0.98	3.86	4.98	7.04	275	525
	660.644	○	○	○	2.50	1.60	2.00	2.83	4.00	1.24	4.90	6.33	8.94	275	525
	660.724	○	○	○	3.00	2.10	3.15	4.46	6.30	1.95	7.72	9.96	14.09	275	520
660.804	○	-	○	4.00	2.60	5.00	7.07	10.00	3.10	12.25	15.81	22.36	270	520	
75°	660.145	○	-	○	0.20	0.12	-	0.04*	0.05	0.02	0.06	0.08	0.11	320	600
	660.165	○	-	○	0.20	0.08	-	0.05*	0.07	0.02	0.08	0.10	0.15	330	620
	660.185	○	-	○	0.20	0.15	-	0.06*	0.08	0.02	0.10	0.13	0.18	335	625
	660.215	○	-	○	0.50	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	340	630
	660.245	○	-	○	0.50	0.30	-	0.12*	0.16	0.05	0.20	0.26	0.36	345	640
	660.275	○	-	○	0.60	0.30	-	0.11*	0.16*	0.22	0.07	0.27	0.35	345	645

¹⁾ We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.

A = Equivalent bore diameter · E = narrowest free cross section

* Differing spray pattern

Continued on next page.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$





Flat fan nozzles with dove-tail guide Series 660

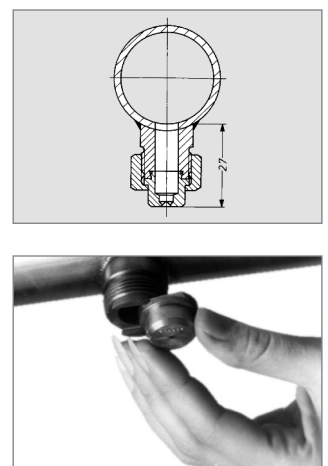
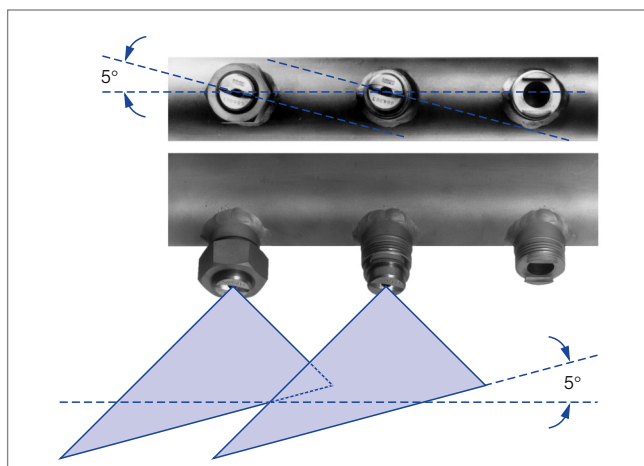
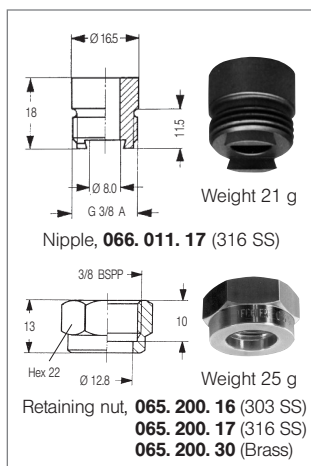


Spray angle	Ordering no.				A ∅ [mm]	E ∅ [mm]	V̇ [l/min]						Spray width B at p = 2 bar		
	Type	Material-no.					p [bar]						 H = 250 mm H = 500 mm		
		16	17 ¹⁾	30			[US gal/min] at 40 psi								
		AISI 303	AISI 316Ti/ AISI 316L	Brass			0.5	1.0	2.0	3.0	5.0	10.0	250 mm	500 mm	
90°	660. 216	○	-	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	500	900
	660. 276	○	-	○	0.60	0.30	0.11*	0.16*	0.22	0.07	0.27	0.35	0.49	500	900
	660. 306	○	-	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	515	930
	660. 336	○	○	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	515	930
	660. 366	○	○	○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	515	930
	660. 406	○	○	○	1.20	0.70	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	515	930
	660. 446	○	○	○	1.35	0.80	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	510	925
	660. 486	○	○	○	1.50	0.80	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	510	925
	660. 516	○	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	510	925
	660. 566	○	○	○	2.00	1.10	1.25	1.77	2.50	0.78	3.06	3.95	5.59	505	920
	660. 606	○	○	○	2.20	1.20	1.58	2.23	3.15	0.98	3.86	4.98	7.04	505	915
	660. 646	○	○	○	2.50	1.30	2.00	2.83	4.00	1.24	4.90	6.33	8.94	500	910
	660. 676	○	○	○	2.70	1.40	2.38	3.36	4.75	1.47	5.82	7.51	10.62	495	905
660. 726	○	○	○	3.00	1.70	3.15	4.46	6.30	1.95	7.72	9.96	14.09	490	900	
660. 806	-	○	○	4.00	2.40	5.00	7.07	10.00	3.10	12.25	15.81	22.36	470	875	
120°	660. 187	○	-	○	0.35	0.20	-	0.06*	0.08	0.02	0.10	0.13	0.18	650	1220
	660. 217	○	-	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	655	1230
	660. 247	○	-	○	0.50	0.20	-	0.12*	0.16	0.05	0.20	0.26	0.36	655	1240
	660. 277	○	-	○	0.60	0.30	-	0.16*	0.22	0.07	0.27	0.35	0.49	660	1250
	660. 307	○	-	○	0.70	0.30	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	660	1260
	660. 337	○	○	○	0.90	0.40	0.22*	0.32*	0.45	0.14	0.55	0.71	1.00	660	1260
	660. 367	○	○	○	1.00	0.40	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	660	1265
	660. 407	○	○	○	1.20	0.60	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	665	1270
	660. 447	○	○	○	1.35	0.60	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	670	1270
	660. 487	○	○	○	1.50	0.60	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	675	1270
	660. 517	○	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	675	1275
	660. 567	○	○	○	2.00	0.90	1.25	1.77	2.50	0.78	3.06	3.95	5.59	685	1280
	660. 607	○	○	○	2.20	1.10	1.58	2.23	3.15	0.98	3.86	4.98	7.04	695	1285
	660. 647	○	○	○	2.50	1.30	2.00	2.83	4.00	1.24	4.90	6.33	8.94	705	1295
	660. 727	○	○	○	3.00	1.60	3.15	4.46	6.30	1.95	7.72	9.96	14.09	735	1315
	660. 807	○	-	○	4.00	2.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	780	1345

¹⁾ We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
 A = Equivalent bore diameter · E = narrowest free cross section
 * Differing spray pattern

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	660. 216.	+	16	=	660. 216. 16

Accessories





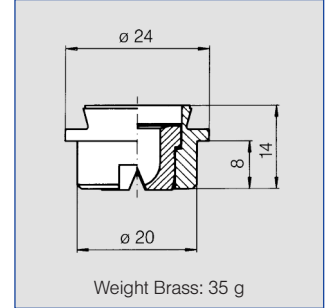
Flat fan nozzles with dove-tail guide Series 664 / 665



Assembly with retaining nut. Automatic jet alignment due to dove-tail guide. Stable spray angle. Uniform, parabolic distribution of liquid. Spray pipes with these nozzles show an extremely uniform total liquid distribution.

Applications:

Cleaning installations, cooling headers, spray pipes, roll cooling, cooling of rolled stock.



Spray angle	Ordering no.				A Ø [mm]	E Ø [mm]	v̇ [l/min]						Spray width B at p = 2 bar		
	Type	Material-no.					p [bar]						H =		
		16	17 ¹⁾	30			0.5	1.0	2.0	3.0	5.0	10.0	250 mm	500 mm	
		AISI 303	AISI 316Ti/ AISI 316L	Brass			[US gal./min] at 40 psi								
20°	664. 721	○	○	○	3.00	2.50	3.15	4.45	6.30	1.95	7.72	9.96	14.09	110	205
	664. 801	○	○	○	4.00	3.20	5.00	7.07	10.00	3.10	12.25	15.81	22.36	110	205
	664. 881	○	○	○	5.00	4.00	8.00	11.31	16.00	4.96	19.60	25.30	35.78	110	205
	664. 921	○	○	○	5.50	4.40	10.00	14.14	20.00	6.20	24.49	31.62	44.72	110	205
	664. 961	○	○	○	6.00	5.10	12.50	17.68	25.00	7.75	30.62	39.53	55.90	100	205
30°	664. 722	○	○	○	3.00	2.40	3.15	4.45	6.30	1.95	7.72	9.96	14.09	150	280
	664. 762	○	○	○	3.50	2.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	150	280
	664. 802	○	○	○	4.00	3.10	5.00	7.07	10.00	3.10	12.25	15.81	22.36	150	280
	664. 882	○	○	○	5.00	4.00	8.00	11.31	16.00	4.96	19.60	25.30	35.78	150	280
	664. 922	○	○	○	5.50	4.40	10.00	14.14	20.00	6.20	24.49	31.62	44.72	150	280
	664. 962	○	○	○	6.00	5.00	12.50	17.68	25.00	7.75	30.62	39.53	55.90	150	280
	665. 042	○	-	○	8.00	6.40	20.00	28.28	40.00	12.41	48.99	63.25	89.44	150	280
	665. 122	-	-	○	10.00	8.20	31.50	44.55	63.00	19.54	77.16	99.61	140.87	150	280
45°	664. 723	○	○	○	3.00	2.40	3.15	4.45	6.30	1.95	7.72	9.96	14.09	260	490
	664. 763	○	○	○	3.50	2.60	4.00	5.66	8.00	2.48	9.80	12.65	17.89	260	490
	664. 803	○	○	○	4.00	3.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	265	495
	664. 843	○	○	○	4.50	3.40	6.25	8.84	12.50	3.88	15.31	19.76	27.95	265	495
	664. 883	○	○	○	5.00	3.80	8.00	11.31	16.00	4.96	19.60	25.30	35.78	265	500
	664. 923	○	○	○	5.50	4.20	10.00	14.14	20.00	6.20	24.49	31.62	44.72	270	505
	664. 963	○	○	○	6.00	4.40	12.50	17.68	25.00	7.75	30.62	39.53	55.90	270	510
	665. 043	-	-	○	8.00	5.90	20.00	28.28	40.00	12.41	48.99	63.25	89.44	275	520
	60°	664. 724	○	○	○	3.00	2.10	3.15	4.45	6.30	1.95	7.72	9.96	14.09	300
664. 764		○	○	○	3.50	2.30	4.00	5.66	8.00	2.48	9.80	12.65	17.89	300	565
664. 804		○	○	○	4.00	2.60	5.00	7.07	10.00	3.10	12.25	15.81	22.36	300	565
664. 844		○	○	○	4.50	3.00	6.25	8.84	12.50	3.88	15.31	19.76	27.95	300	570
664. 884		○	○	○	5.00	3.40	8.00	11.31	16.00	4.96	19.60	25.30	35.78	305	570
664. 924		○	○	○	5.50	4.10	10.00	14.14	20.00	6.20	24.49	31.62	44.72	305	575
664. 964		○	○	○	6.00	4.20	12.50	17.68	25.00	7.75	30.62	39.53	55.90	310	580
665. 044		○	○	○	8.00	5.50	20.00	28.28	40.00	12.41	48.99	63.25	89.44	315	585
665. 084		-	○	○	9.00	6.20	25.00	35.36	50.00	15.51	61.24	79.06	111.80	320	590
665. 124		-	-	○	10.00	7.40	31.50	44.55	63.00	19.54	77.16	99.61	140.87	325	600

¹⁾ We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
Subject to technical modifications.

Continued on next page.

Example	Type	+	Material-no.	=	Ordering no.
for Ordering:	664. 721	+	16	=	664. 721. 16

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





Flat fan nozzles with dove-tail guide Series 664 / 665



Spray angle	Ordering no.			A Ø [mm]	E Ø [mm]	\dot{V} [l/min]							Spray width B at p = 2 bar		
	Type	Material-no.				p [bar]									
		16	17 ¹⁾			30									
		AISI 303	AISI 316Ti/AISI 316L			Brass	0.5	1.0	2.0	[US gal./ min] at 40 psi	3.0	5.0	10.0	H = 250 mm	H = 500 mm
90°	664. 726	○	○	○	3.00	1.70	3.15	4.45	6.30	1.95	7.72	9.96	14.09	420	800
	664. 766	○	○	○	3.50	1.90	4.00	5.66	8.00	2.48	9.80	12.65	17.89	420	800
	664. 806	○	○	○	4.00	2.40	5.00	7.07	10.00	3.10	12.25	15.81	22.36	420	800
	664. 846	○	○	○	4.50	2.40	6.25	8.84	12.50	3.88	15.31	19.76	27.95	420	800
	664. 886	○	○	○	5.00	3.10	8.00	11.31	16.00	4.96	19.60	25.30	35.78	420	800
	664. 926	○	○	○	5.50	3.60	10.00	14.14	20.00	6.20	24.49	31.62	44.72	420	800
	664. 966	○	○	○	6.00	3.90	12.50	17.68	25.00	7.75	30.62	39.53	55.90	420	800
	665. 046	-	-	○	8.00	4.90	20.00	28.28	40.00	12.41	48.99	63.25	89.44	420	800
	665. 126	-	-	○	10.00	6.40	31.50	44.55	63.00	19.54	77.16	99.61	140.87	420	800
120°	664. 727	○	○	○	3.00	1.60	3.15	4.45	6.30	1.95	7.72	9.96	14.09	1240	2150
	664. 767	○	○	○	3.50	1.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	1240	2150
	664. 807	○	○	○	4.00	2.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	1240	2150
	664. 887	○	○	○	5.00	2.60	8.00	11.31	16.00	4.96	19.60	25.30	35.78	1240	2150
	664. 927	○	○	○	5.50	2.90	10.00	14.14	20.00	6.20	24.49	31.62	44.72	1240	2150
	664. 967	-	-	○	6.00	3.20	12.50	17.68	25.00	7.75	30.62	39.53	55.90	1240	2150
	665. 047	-	-	○	8.00	4.40	20.00	28.28	40.00	12.41	48.99	63.25	89.44	1240	2150

¹⁾ We reserve the right to deliver AISI 316Ti or AISI 316L under the material no. 17.
A = Equivalent bore diameter · E = narrowest free cross section
Subject to technical modifications.

Example	Type	+	Material-no.	=	Ordering no.
for ordering:	664. 726	+	16	=	664. 726. 16



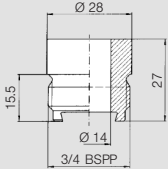
Accessories see next page.



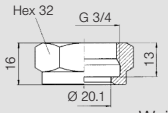
Flat fan nozzles with dove-tail guide Series 664 / 665



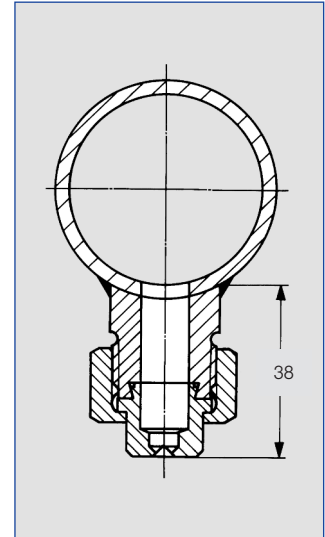
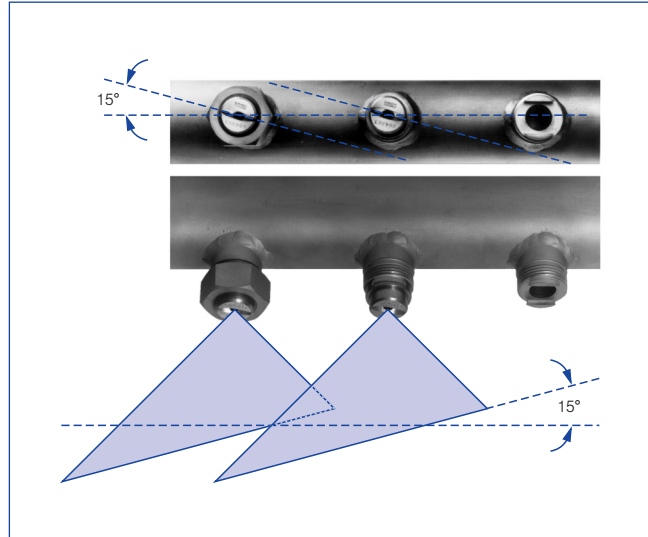
Accessories



Weight: 65 g
Nipple, **066.410.17** (AISI 316Ti)



Weight Brass: 60 g
Retaining nut, **065.600.16** (AISI 303)
065.600.17 (AISI 316Ti)
065.600.30 (Brass)



Pretreatment in a pickling line

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$



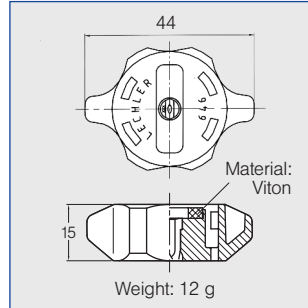


Flat fan nozzles with bayonet quick release cap Series 646



Quick and easy assembly with bayonet quick release cap. Adjusted spray direction. Uniform liquid distribution.

Applications:
Belt cleaning, surface treatment, cleaning, coating processes.



Spray angle	Ordering no.		A Ø [mm]	E Ø [mm]	ṽ [l/min]							Spray width B at p = 2 bar	
	Type	Mat.-no. 5E			p [bar]							H =	
					0.5	1.0	2.0	[US gal/min] at 40 psi	3.0	5.0	10.0	250 mm	500 mm
20°	646. 301	○	0.70	0.60	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	75	150
	646. 361	○	1.00	0.80	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	80	150
	646. 441	○	1.35	1.10	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	80	155
	646. 481	○	1.50	1.20	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	80	155
30°	646. 302	○	0.70	0.50	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	85	140
	646. 362	○	1.00	0.70	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	95	160
	646. 402	○	1.20	0.90	0.50*	0.71	1.00	0.39	1.23	1.58	2.24	105	190
	646. 482	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	120	225
	646. 562	○	2.00	1.50	1.25	1.77	2.50	0.78	3.06	3.95	5.59	135	240
45°	646. 363	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	185	340
	646. 403	○	1.20	0.90	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	185	340
	646. 483	○	1.50	1.10	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	185	340
	464. 563	○	2.00	1.40	1.20	1.77	2.50	0.78	3.06	3.95	5.59	185	340
	464. 643	○	2.50	1.80	2.00	2.83	4.00	1.24	4.90	6.33	8.94	185	345
60°	646. 304	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	245	490
	646. 334	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	250	495
	646. 364	○	1.00	0.60	0.31*	0.44*	0.63	0.20	0.77	1.00	1.40	255	500
	646. 404	○	1.20	0.80	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	260	510
	646. 444	○	1.35	0.90	0.62	0.88	1.25	0.39	1.53	1.98	2.80	260	510
	646. 484	○	1.50	1.00	0.80	1.13	1.60	0.50	1.96	2.53	3.58	270	525
	646. 514	○	1.65	1.10	0.95	1.34	1.90	0.59	2.33	3.00	4.25	260	510
	646. 564	○	2.00	1.30	1.25	1.77	2.50	0.78	3.06	3.95	5.59	260	505
646. 604	○	2.20	1.50	1.58	2.23	3.15	0.98	3.86	4.98	7.04	265	505	
90°	646. 306	○	0.70	0.40	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	425	840
	646. 336	○	0.90	0.50	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	425	840
	646. 366	○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	425	840
	646. 406	○	1.20	0.70	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	425	835
	646. 446	○	1.35	0.80	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	425	835
	646. 486	○	1.50	0.80	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	425	830
	646. 516	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	425	830
	646. 566	○	2.00	1.10	1.25	1.77	2.50	0.78	3.06	3.95	5.59	425	825
	646. 606	○	2.20	1.20	1.58	2.23	3.15	0.98	3.86	4.98	7.04	425	820

A = Equivalent bore diameter · E = narrowest free cross section

* Differing spray pattern

Subject to technical modifications.

Continued on next page.

Example for ordering: Type 646. 301 + Material-no. 5E = Ordering no. 646. 301. 5E

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.





Flat fan nozzles with bayonet quick release cap Series 646



Spray angle	Ordering no.		A Ø [mm]	E Ø [mm]	\dot{V} [l/min]							Spray width B at p = 2 bar	
	Type	Mat.-no. 5E			p [bar]							 H = 250 mm H = 500 mm	
					[US gal/min] at 40 psi		0.5	1.0	2.0	3.0	5.0		
120°	646. 307	○	0.70	0.30	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	625	1175
	646. 337	○	0.90	0.40	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	630	1180
	646. 367	○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	635	1190
	646. 407	○	1.20	0.60	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	640	1195
	646. 447	○	1.35	0.60	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	645	1200
	646. 487	○	1.50	0.60	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	650	1200
	646. 517	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	650	1205
	646. 567	○	2.00	0.90	1.25	1.77	2.50	0.78	3.06	3.95	5.59	655	1210
646. 607	○	2.20	1.10	1.58	2.23	3.15	0.98	3.86	4.98	7.04	660	1215	

A = Equivalent bore diameter · E = narrowest free cross section
* Differing spray pattern
Subject to technical modifications.

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	646. 307	+	5E	=	646. 307. 5E



Assembly accessories see page 9.3

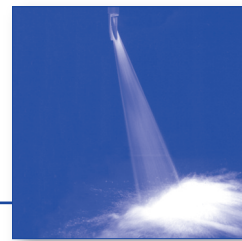
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$





Tongue-type nozzles

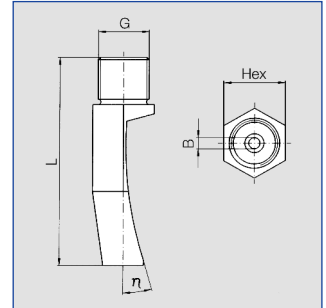
Series 688 / 689



Hard, sharp flat fan, narrowly delimited jet pattern. Not prone to clogging.

Applications:

Cleaning, washing, degreasing and phosphating, preparation techniques.

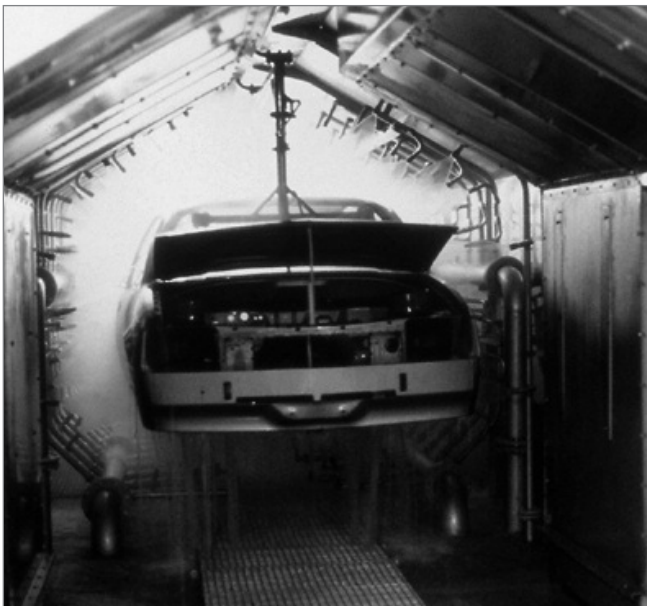


Spray angle	η	Ordering no.						B \varnothing [mm]	\dot{V} [l/min]				Dimensions		Weight	Spray width B at p=2 bar	
		Type	Mat.-no.		Code G		p [bar]				L [mm]	SW [mm]	H				
			16	5E			0.5		1.0	2.0			5.0	H = 250 mm		H = 500 mm	
			AISI 303	PVDF	3/8 BSPT	3/4 BSPP											
45°	35°	688.763	○	-	CE	-	3.0	4.00	5.66	8.00	12.65	43	19	114 g	220	440	
	30°	688.843	○	-	CE	-	3.8	6.25	8.84	12.50	19.76	50	19	133 g	220	440	
	29°	688.923	○	-	CE	-	4.8	10.00	14.14	20.00	31.62	59	22	247 g	220	440	
	35°	689.003	○	○	-	90	6.0	15.75	22.27	31.50	49.81	80/80	32/24	306/33	250	490	

B = Bore diameter

Example for ordering:	Type	+ Material-no.	+ Code	= Ordering no.
	688.763	+ 16	+ CE	= 688.763.16.CE

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities. For complete assembly accessories, please refer to »Accessories«.

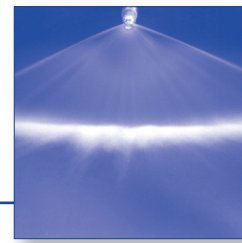


Phosphating line



Tongue-type nozzles

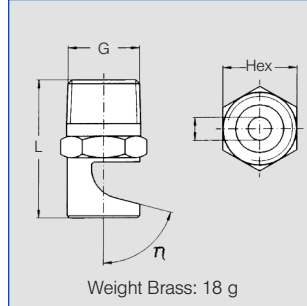
Series 686




Wide flat fan with a sharply delimited jet pattern. Particularly clog-proof.

Applications:

Foam control in storage tanks and sewage treatment plants, cleaning and washing process, requiring powerful and concentrated water jets.



Spray angle	η	Ordering no.						B ∅ [mm]	ṽ [l/min]			Dimensions								Spray width B at p=2 bar  H = 250 mm	
		Type	Material-no.			Code G			p [bar]			L [mm]				Hex [mm]					
			16	30	5E	1/8 BSPT	1/4 BSPT		1/2 BSPT	1.0	2.0	5.0	R 1/8	R 1/4	R 3/8	R 1/2	R 1/8	R 1/4	R 3/8		R 1/2
90°	53°	686.366	-	○	-	CA	-	-	0.80	0.45	0.63	1.00	22	-	-	-	11	-	-	-	520
	75°	686.406	○	○	-	CA	-	-	1.00	0.71	1.00	1.58	23	-	-	-	11	-	-	-	525
	40°	686.686	○	○	-	CC	-	-	2.40	3.54	5.00	7.91	-	29	-	-	-	14	-	-	530
	40°	686.726	-	○	-	CA	-	-	2.70	4.45	6.30	9.96	26	-	-	-	11	-	-	-	530
	40°	686.806	○	○	-	CC	-	-	3.40	7.07	10.00	15.81	-	34	-	-	-	14	-	-	530
	40°	686.886	○	-	-	CC	-	-	4.20	11.31	16.00	25.30	-	36	-	-	-	17	-	-	530
140°	75°	686.368	○	○	-	CA	-	-	0.80	0.45	0.63	1.00	23	-	-	-	11	-	-	-	1360
		686.408	○	○	-	CA	-	-	1.00	0.71	1.00	1.58	23	-	-	-	11	-	-	-	1370
		686.448	○	○	-	CC	-	-	1.20	0.88	1.25	1.98	-	28	-	-	-	14	-	-	1370
		686.488	○	○	-	CA	CC	-	1.30	1.13	1.60	2.53	23	28	-	-	11	14	-	-	1370
		686.528	○	○	-	CA	CC	-	1.50	1.41	2.00	3.16	23	28	-	-	11	14	-	-	1370
		686.568	○	○	○*	CA	CC	-	1.70	1.77	2.50	3.59	23	-	-	-	11	-	-	-	1370
		686.608	○	○	-	CA	CC	-	1.90	2.23	3.15	4.98	23	28	-	-	11	14	-	-	1370
		686.648	○	○	-	CC	-	-	2.20	2.83	4.00	6.32	-	28	-	-	-	14	-	-	1370
		686.688	○	○	-	CA	CC	-	2.40	3.54	5.00	7.91	23	28	-	-	11	14	-	-	1370
		686.728	○	○	-	CA	CC	-	2.70	4.45	6.30	9.96	23	-	-	-	11	-	-	-	1370
		686.768	○	○	-	CC	-	-	3.00	5.66	8.00	12.65	-	28	-	-	-	14	-	-	1370
		686.808	○	○	-	CA	CC	-	3.40	7.07	10.00	15.81	23	28	-	-	11	14	-	-	1370
		686.828	○	○	-	CC	-	-	3.60	7.92	11.20	17.71	-	28	-	-	-	14	-	-	1370
		686.848	○	○	-	CC	-	-	3.80	8.80	12.50	19.76	-	28	-	-	-	14	-	-	1370
		686.868	○	○	-	CC	-	-	4.00	9.90	14.00	22.14	-	28	-	-	-	14	-	-	1370
		686.888	○	○	-	CC	-	-	4.20	11.31	16.00	25.30	-	28	-	-	-	14	-	-	1370
		686.908	○	○	-	CC	-	-	4.50	12.73	18.00	28.46	-	28	-	-	-	14	-	-	1370
		686.928	○	-	-	-	-	-	4.70	14.14	20.00	31.62	-	-	-	-	-	-	17	-	-
686.968	-	○	-	-	CG	-	5.30	17.68	25.00	39.53	-	-	32	40	-	-	17	22	-	1370	
686.988	○	-	-	-	CG	-	5.60	19.80	28.00	44.27	-	-	32	40	-	-	17	22	-	1370	

B = Bore diameter

Can also be used for air or saturated steam (see page 6.8)

* Only available with code CA.

The folded page at the end of the catalogue will give you a survey on the various assembly possibilities.

For complete assembly accessories, please refer to »Accessories«.

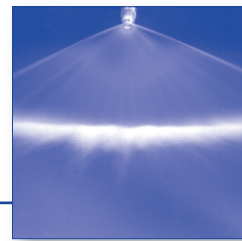
Example for ordering: Type + Material-no. + Code = Ordering no.
686.366 + 30 + CA = 686.366.30.CA

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$





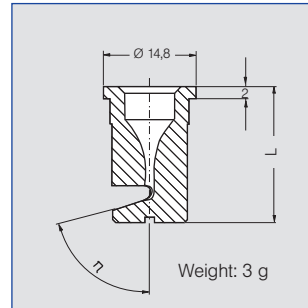
Tongue-type nozzles for retaining nut Series 684




**Assembly with retaining nut.
Wide flat fan with a sharply
delimited spray pattern.
Particularly clog-proof. Easy
nozzle changing, simple jet
alignment.**

Applications:

Foam control in storage tanks
and sewage treatment plants.
Cleaning and washing process,
requiring powerful and concen-
trated water jets.



Spray angle	η	Ordering no.		Colour**	B \emptyset [mm]	\dot{V} [l/min]			L [mm]	Spray width B at p = 2 bar  H = 250 mm	
		Type	Mat- no.			p [bar]					
			56			5E	1.0	2.0			5.0
140°	75°	684. 348	○	-	green	0.7	0.35*	0.50	0.79	20	1360
	75°	684. 368	○	○	yellow	0.8	0.45*	0.63	1.00	20	1360
	75°	684. 408	○	-	blue	1.0	0.71	1.00	1.58	20	1370
	75°	684. 448	○	-	red	1.2	0.88	1.25	1.98	20	1370
	75°	684. 488	○	○	brown	1.3	1.13	1.60	2.53	20	1370
	75°	684. 528	○	-	grey	1.5	1.41	2.00	3.16	20	1370
	75°	684. 568	○	○	white	1.7	1.77	2.50	3.95	19	1370
	75°	684. 608	○	-	light blue	1.9	2.23	3.15	4.98	19	1370
	75°	684. 688	○	-	green	2.4	3.54	5.00	7.91	17	1370
	75°	684. 728	○	○	black	2.7	4.45	6.30	9.96	17	1370
	75°	684. 808	○	-	purple	3.4	7.07	10.00	15.81	16	1370

B = Bore diameter

* Differing spray pattern.

** Material PVDF generally blue

Example	Type	+	Material-no.	=	Ordering no.
for ordering:	684. 348	+	56	=	684. 348. 56

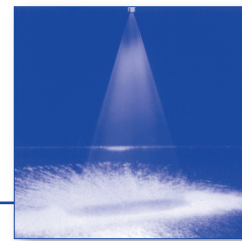
**The folded page at the end of the catalogue will give you
a survey on the various assembly possibilities.
For complete assembly accessories, please refer to
»Accessories«.**





High pressure flat fan nozzles

Series 602 / 608 / 652



Sharp uniform flat fan with an extremely narrow jet depth.

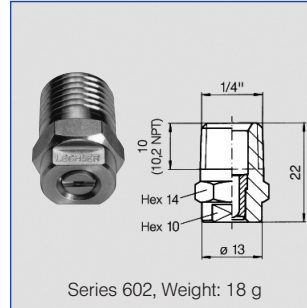
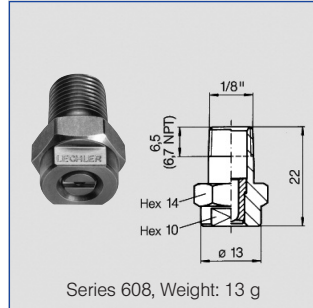
Applications:

High pressure cleaners, steam jet cleaners

Materials:

Nozzle body: stainless steel
AISI 303

Insert: hardened stainless steel
1.4034 S



US gal/min. bei 40 psi	Nozzle-Code			Flow rate code				A Ø [mm]	V̇ [l/min]						
	Connection			Spray angle					p [bar]						
	1/8"	1/4"	nut	20°	30°	45°	60°		40	60	80	100	120	150	200
02	608	602	652	361	362	363	364	1.00	2.86	3.50	4.04	4.52	4.95	5.53	6.39
025	608	602	652	381	382	383	384	1.10	3.54	4.33	5.00	5.59	6.12	6.85	7.91
03	608	602	652	401	402	403	404	1.18	4.31	5.28	6.10	6.82	7.47	8.35	9.64
034	608	602	652	411	412	413	414	1.30	4.95	6.06	7.00	7.83	8.57	9.59	11.07
04	608	602	652	451	452	453	454	1.35	5.80	7.10	8.20	9.17	10.04	11.23	12.97
045	608	602	652	471	472	473	474	1.40	6.51	7.97	9.20	10.29	11.27	12.60	14.55
05	608	602	652	481	482	483	484	1.55	7.29	8.92	10.30	11.52	12.62	14.11	16.29
055	608	602	652	501	502	503	504	1.60	7.96	9.74	11.25	12.58	13.78	15.41	17.79
06	608	602	652	521	522	523	524	1.72	8.70	10.66	12.31	13.76	15.07	16.85	19.46
065	608	602	652	531	532	533	534	1.75	9.38	11.49	13.26	14.83	16.25	18.16	20.97
07	608	602	652	541	542	543	544	1.80	10.06	12.32	14.22	15.90	17.42	19.47	22.49
075	608	602	652	551	552	553	554	1.90	10.75	13.16	15.20	16.99	18.62	20.81	24.04
08	608	602	652	571	572	573	574	2.05	11.48	14.06	16.23	18.15	19.88	22.23	25.67
09	608	602	652	591	592	593	594	2.10	13.01	15.93	18.40	20.57	22.53	25.19	29.09
10	608	602	652	601	602	603	604	2.30	14.43	17.76	20.40	22.81	24.99	27.94	32.26
125	-	602	652	641	642	643	644	2.50	17.82	21.82	25.20	28.17	30.86	34.51	39.85
15	-	602	652	671	672	673	674	2.70	21.35	26.15	30.20	33.76	36.98	41.35	47.74
175	-	602	652	701	702	703	704	3.00	25.03	30.66	35.40	39.58	43.36	48.47	55.97
20	-	602	652	-	-	723	724	3.05	28.85	35.33	40.80	45.62	49.97	55.87	64.52
30	-	602	652	-	-	793	-	3.90	42.43	51.96	60.00	67.08	73.48	82.16	94.88

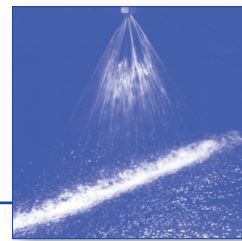
A = Equivalent bore diameter

Connection Code	Connection	p _{max} [bar]
A3.00	BSPT	ca. 350
A3.07	NPT	ca. 350
A3.29	Lock nut	ca. 200

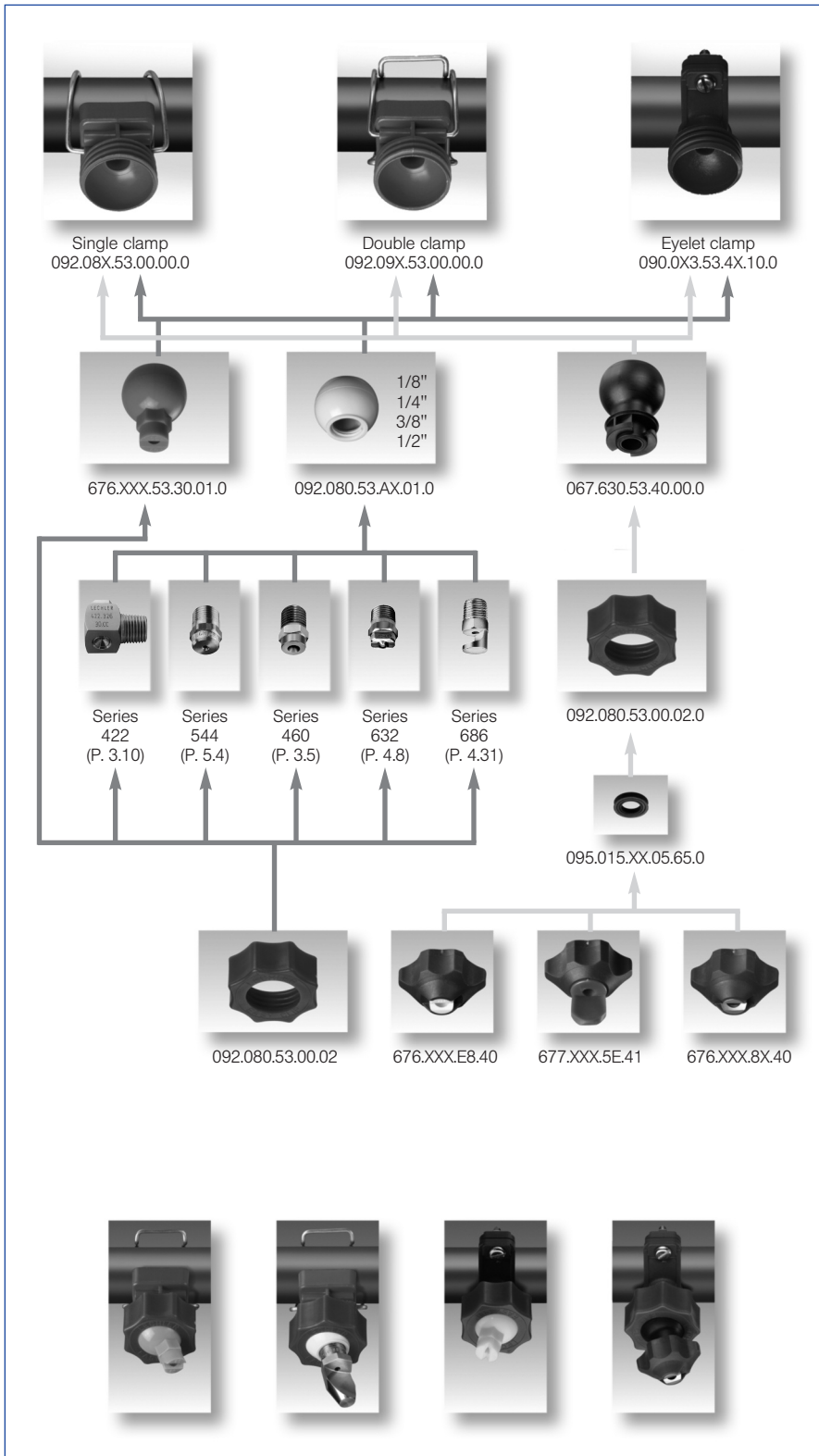
Example for ordering:	Nozzle-Code	+	Flow rate code	+	Connection-Code	=	Ordering no.
	602		361		A3.07		602.361.A3.07
							(Flat fan 20°; 4.52 l/min. at 100 bar; 1/4" NPT)

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$





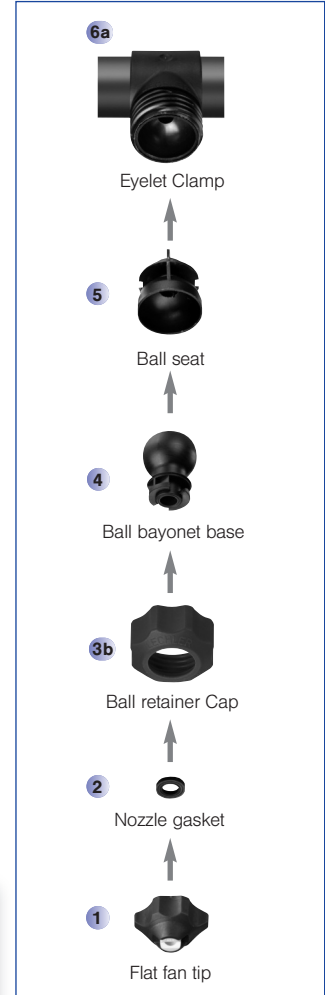
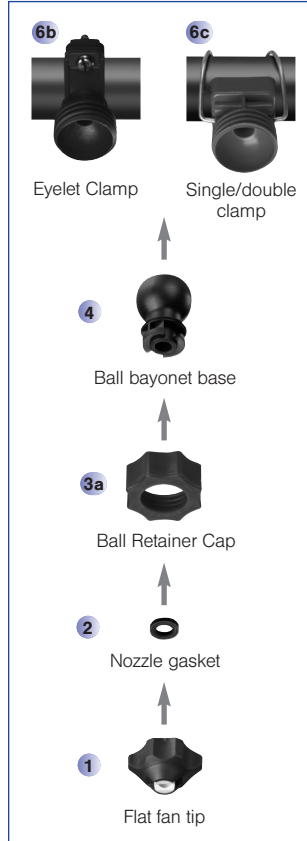
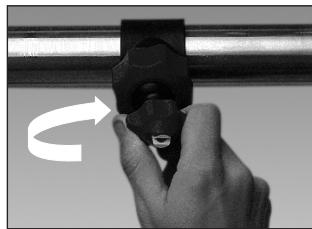
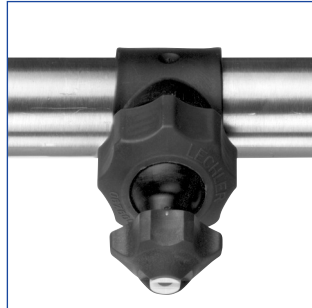
MEM SPRAY® / Easy-Clip combination



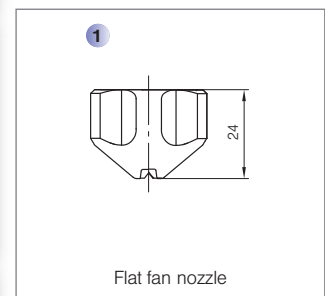


Maintaining of the adjusted spray direction by the »memory effect«. Very easy handling without the need for special tools. Especially pressure resistant pipe connector.

Application:
Degreasing, phosphating in surface treatment, cleaning.



Type	Ordering no.	Material				E Ø [mm]	Flow rate [l/min] bei p [bar]					Weight [g]				
		8F Housing: PP Insert: 303 SS	8R Housing: PP Insert: 316 L	E8 Housing: PP Insert: ceramic	53 Polypropylene (PP)		1.0	1.5	2.0	2.5	5.0	PP/ AISI 316TI	PP/ AISI 316L	PP/Ceramic	PP	
1 Flat fan nozzle	30°	676. 642. xx. 40	○	○	-	-	1.6	2.83	3.46	4.00	4.47	6.33	15	15	-	-
	30°	676. 722. xx. 40	○	○	-	-	2.1	4.46	5.46	6.30	7.04	9.96	15	15	-	-
	30°	676. 762. xx. 40	○	○	-	-	2.3	5.66	6.93	8.00	8.94	12.65	15	15	-	-
	30°	676. 802. xx. 40	○	○	-	-	2.6	7.07	8.66	10.00	11.18	15.81	15	15	-	-
	30°	676. 842. xx. 40	○	○	-	-	3.0	8.84	10.82	12.50	13.97	19.76	15	15	-	-
	30°	676. 882. xx. 40	○	○	-	-	3.4	11.31	13.86	16.00	17.89	25.30	15	15	10	8
	30°	676. 922. xx. 40	○	○	-	-	4.1	14.14	17.32	20.00	22.36	31.62	15	15	10	8
1 Flat fan nozzle	30°	676. 962. xx. 40	○	○	-	-	4.2	17.68	21.65	25.00	27.95	39.53	15	15	10	8
	30°	677. 002. xx. 40	○	-	-	-	4.7	22.27	27.28	31.50	35.22	49.81	15	-	-	-
	60°	676. 644. xx. 40	○	○	-	-	1.6	2.83	3.46	4.00	4.47	6.33	15	15	-	-
	60°	676. 724. xx. 40	○	○	-	-	2.1	4.46	5.46	6.30	7.04	9.96	15	15	-	-
	60°	676. 764. xx. 40	○	○	-	-	2.3	5.66	6.93	8.00	8.94	12.65	15	15	-	-
	60°	676. 804. xx. 40	○	○	-	-	2.6	7.07	8.66	10.00	11.18	15.81	15	15	-	-
	60°	676. 844. xx. 40	○	○	-	-	3.0	8.84	10.82	12.50	13.97	19.76	15	15	-	-
	60°	676. 884. xx. 40	○	○	○	○	3.4	11.31	13.86	16.00	17.89	25.30	15	15	10	8
	60°	676. 924. xx. 40	○	○	○	○	4.1	14.14	17.32	20.00	22.36	31.62	15	15	10	8
	60°	676. 964. xx. 40	○	○	○	○	4.2	17.68	21.65	25.00	27.95	39.53	15	15	10	8
60°	677. 004. xx. 40	○	○	○	○	4.7	22.27	27.28	31.50	35.22	49.81	15	15	10	8	
1 Flat fan nozzle	60°	677. 044. xx. 40	○	○	-	-	5.5	28.28	34.64	40.00	44.72	63.25	15	15	-	-
	60°	677. 084. xx. 40	○	○	-	-	6.2	35.36	43.30	50.00	55.90	79.06	15	15	-	-



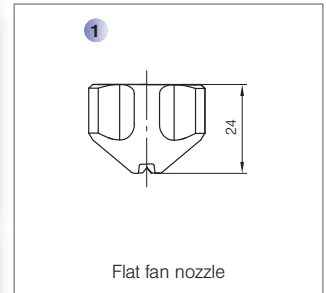
Continued on next page.

Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$





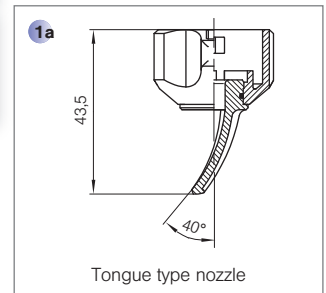
Type	α	Ordering no.	Material				E Ø [mm]	Flow rate [l/min] at p [bar]					Weight [g]				
			8F Housing: PP Insert: AISI 303	8R Housing: PP Insert: AISI 316L	E8 Housing: PP Insert: ceramic	53 Polypropylene (PP)		1.0	1.5	2.0	2.5	5.0	PP/ AISI 316Ti	PP/ AISI 316L	PP/Ceramic	PP	
1 Flat fan nozzle	90°	676. 646. xx. 40	○	○	-	-	1.6	2.83	3.46	4.00	4.47	6.33	15	15	-	-	-
	90°	676. 726. xx. 40	○	○	-	-	2.1	4.46	5.46	6.30	7.04	9.96	15	15	-	-	-
	90°	676. 766. xx. 40	○	○	-	-	2.3	5.66	6.93	8.00	8.94	12.65	15	15	-	-	-
	90°	676. 806. xx. 40	○	○	-	-	2.6	7.07	8.66	10.00	11.18	15.81	15	15	-	-	-
	90°	676. 846. xx. 40	○	○	-	-	3.0	8.84	10.82	12.50	13.97	19.76	15	15	-	-	-
	90°	676. 886. xx. 40	○	○	-	-	3.4	11.31	13.86	16.00	17.89	25.30	15	15	-	-	-
	90°	676. 926. xx. 40	○	○	-	-	4.1	14.14	17.32	20.00	22.36	31.62	15	15	-	-	-
1 Flat fan nozzle	90°	676. 966. xx. 40	○	○	-	-	4.2	17.68	21.65	25.00	27.95	39.53	15	15	-	-	-
	120°	676. 647. xx. 40	○	○	-	-	1.6	2.83	3.46	4.00	4.47	6.33	15	15	-	-	-
	120°	676. 727. xx. 40	○	○	-	-	2.1	4.46	5.46	6.30	7.04	9.96	15	15	-	-	-
	120°	676. 767. xx. 40	○	○	-	-	2.3	5.66	6.93	8.00	8.94	12.65	15	15	-	-	-
	120°	676. 807. xx. 40	○	○	-	-	2.6	7.07	8.66	10.00	11.18	15.81	15	15	-	-	-
	120°	676. 847. xx. 40	○	○	-	-	3.0	8.84	10.82	12.50	13.97	19.76	15	15	-	-	-
	120°	676. 887. xx. 40	○	○	-	-	3.4	11.31	13.86	16.00	17.89	25.30	15	15	-	-	-
120°	676. 927. xx. 40	○	○	-	-	4.1	14.14	17.32	20.00	22.36	31.62	15	15	-	-	-	



	α	η	Ordering no.	Material		E Ø [mm]	Flow rate [l/min] at p [bar]					Weight [g]	
				8R Housing: PP Insert: AISI 316L	5E PVDF		1.0	1.5	2.0	2.5	5.0	PP/ AISI 316L	PVDF
1a Tongue type nozzle	45°	35°	676. 803. XX. 41	○	-	3.4	7.07	8.66	10.00	11.18	15.81	25	-
	60°	35°	676. 874. XX. 41	○	-	4.2	10.61	12.99	15.00	16.77	23.72	25	-
	60°	35°	676. 924. XX. 41	○	-	4.7	14.14	17.32	20.00	22.36	31.62	25	-
	70°	40°	677. 005. XX. 41	○	○	6.0	22.27	27.28	31.50	35.22	49.81	25	11

E = narrowest free cross section

Example Type + Material-no. = Ordering no.
for Ordering: 676. 646. xx. 40 + 8R = 676. 646. 8R. 40

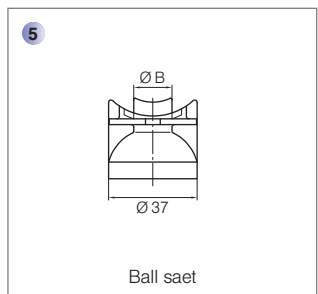
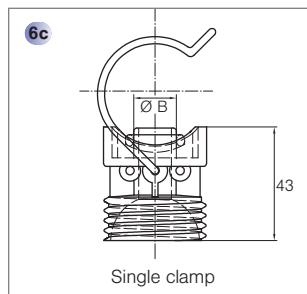
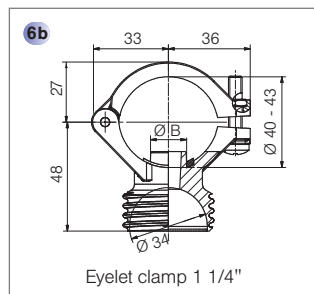
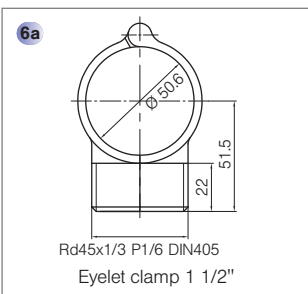
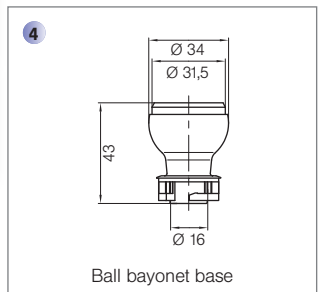
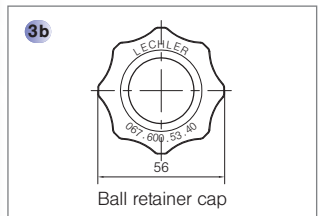
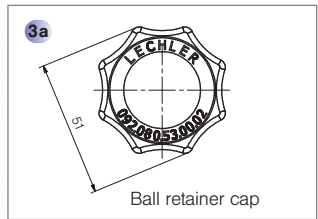
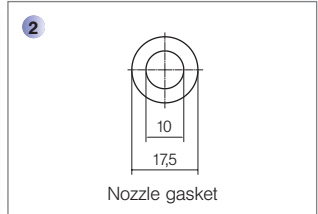




Type	Ordering no.	Material				Bore-Ø B	For pipe-Ø	Weight [g]	
		53 Polypropylene (PP)	6M PP reinforced	6C EPDM	7A Viton			PP	EPDM/Viton
2 Nozzle gasket	095.015.xx.05.65.0	-	-	○	○			-	1
3a Ball retainer cap	092.080.xx.00.02	○	-	-	-			18	-
3b Ball retainer cap	067.600.xx.40	○	-	-	-			18	-
4 Ball bayonet base	067.630.xx.40	○	-	-	-			12	-
5 Ball seat for Ball retainer cap no. 067.631.xx.40.00.0	067.631.xx.40.22.0	-	○	-	-	13.8 mm	1 1/4" (40.0-43.0 mm)	9	-
	067.631.xx.40.02.0	-	○	-	-	16.0 mm	1 1/4" (40.0-43.0 mm)	11	-
	067.631.xx.40.12.0	-	○	-	-	19.8 mm	1 1/4" (40.0-43.0 mm)	13	-
Ball seat for Ball retainer cap no. 067.631.xx.50.00.0	067.631.xx.50.22.0	-	○	-	-	13.8 mm	1 1/2" (46.0-49.0 mm)	9	-
	067.631.xx.50.02.0	-	○	-	-	16.0 mm	1 1/2" (46.0-49.0 mm)	11	-
	067.631.xx.50.12.0	-	○	-	-	19.8 mm	1 1/2" (46.0-49.0 mm)	13	-
6a Eyelet clamp	067.631.xx.40.00.0	○	-	-	-	-	1 1/4" (40.0-43.0 mm)	31	-
	067.631.xx.50.00.0	○	-	-	-	-	1 1/2" (46.0-49.0 mm)	33	-
6b Eyelet clamp	090.023.xx.44.10.0	○	-	-	-	13.8 mm	1" (32.0-34.5 mm)	48	-
	090.023.xx.43.10.0	○	-	-	-	16.0 mm	1" (32.0-34.5 mm)	48	-
	090.033.xx.44.10.0	○	-	-	-	13.8 mm	1 1/4" (40.0-43.0 mm)	50	-
	090.033.xx.43.10.0	○	-	-	-	16.0 mm	1 1/4" (40.0-43.0 mm)	50	-
	090.033.xx.40.10.0	○	-	-	-	20.0 mm	1 1/4" (40.0-43.0 mm)	50	-
	090.043.xx.44.10.0	○	-	-	-	13.8 mm	1 1/2" (46.0-49.0 mm)	52	-
6c Single clamp	092.080.xx.00	○	-	-	-	16.0 mm	1" (32.0-34.5 mm)	36	-
	092.081.xx.00	○	-	-	-	16.0 mm	1 1/4" (40.0-43.0 mm)	38	-
	092.082.xx.00	○	-	-	-	16.0 mm	1 1/2" (46.0-49.0 mm)	40	-
	092.083.xx.00	○	-	-	-	16.0 mm	2" (58.0-62.0 mm)	42	-

* other bore-Ø on request
E = narrowest free cross section

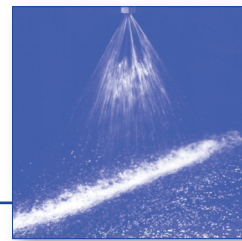
Example Type + Material-no. = Ordering no.
for ordering: 095.015.xx.05.065.0 + 53 = 095.015.53.05.065.0





Nozzle systems for surface technology

Easy-Clip nozzle system



Quick and easy assembly with clamp. No tools required. Allround swivelling by 30°. Easy adjustment and cleaning.

Applications:
Degreasing, phosphating in surface treatment.

Materials:
Clamp: Stainless steel AISI 301
Sealing: EPDM
Cylinder pin, Screw, Screw unit: 1.4401.
Body, ball retainer cap: PP, reinforced
Nozzle, ball joint: PP



Sets

existing of

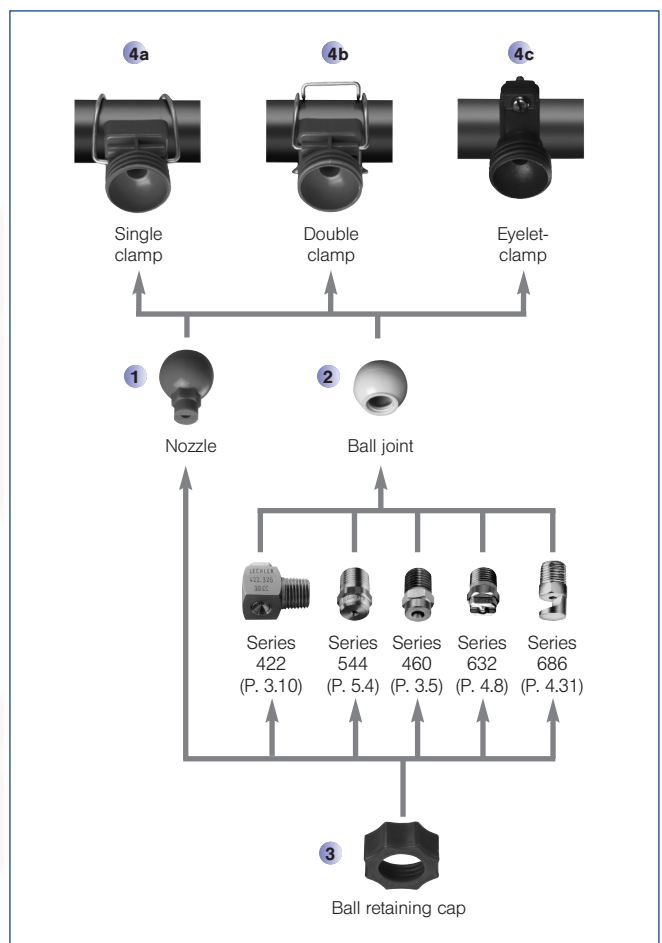
- Nozzle
- Single clamp for 1 1/4" pipe
- Ball retainer cap

Ordering no.	Nozzle Colour	∠	Ṃ [l/min]				
			p [bar]				
			0.5	1.0	1.5	2.0	2.5
676. 724. 53. 31	grey	60°	3.15	4.45	5.45	6.30	7.04
676. 764. 53. 31	brown		4.00	5.66	6.93	8.00	8.94
676. 804. 53. 31	lilac		5.00	7.07	8.66	10.00	11.18
676. 844. 53. 31	yellow		6.25	8.84	10.83	12.50	13.98
676. 884. 53. 31	red		8.00	11.31	13.85	16.00	17.89
676. 904. 53. 31	blue		9.10	12.87	15.76	18.20	20.35
676. 924. 53. 31	green		10.00	14.14	17.32	20.00	22.36

existing of

- Ball joint
- Single clamp for 1 1/4" pipe
- Ball retainer cap

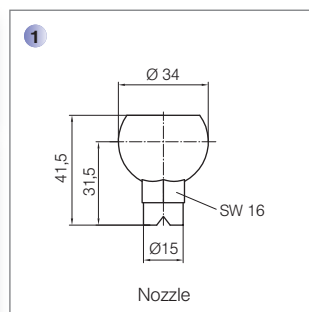
Ordering no.	Ball Colour	Nozzle connection	For nozzle series
092. 081. 53. AB	beige	G 1/8"	460, 632, 686, 610, 544
092. 081. 53. AD	beige	G 1/4"	422, 460, 544, 612, 632, 686
092. 081. 53. AF	beige	G 3/8"	422, 460, 632, 686, 688
092. 081. 53. AH	beige	G 1/2"	422, 460, 632, 686



Components

1 Nozzle

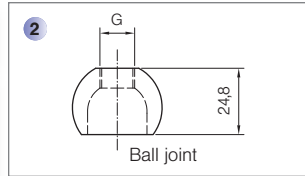
Ordering no.	Colour	∠	Ṃ [l/min]				
			p [bar]				
			0.5	1.0	1.5	2.0	2.5
676. 724. 53. 30. 01	grey	60°	3.15	4.45	5.45	6.30	7.04
676. 764. 53. 30. 01	brown		4.00	5.66	6.93	8.00	8.94
676. 804. 53. 30. 01	lilac		5.00	7.07	8.66	10.00	11.18
676. 844. 53. 30. 01	yellow		6.25	8.84	10.83	12.50	13.98
676. 884. 53. 30. 01	red		8.00	11.31	13.85	16.00	17.89
676. 904. 53. 30. 01	blue		9.10	12.87	15.67	18.20	20.35
676. 924. 53. 30. 01	green		10.00	14.14	17.32	20.00	22.36
092. 080. 53. 00. 01	grey		Blind nozzle				





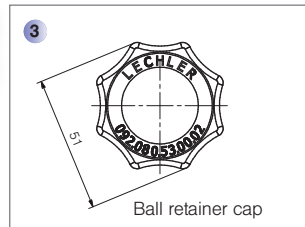
2 Ball joint

Ordering no.	Colour	Nozzle connection	For nozzle series
092. 080. 53. AB. 01	beige	G 1/8"	460, 544, 610, 632, 686
092. 080. 53. AD. 01	beige	G 1/4"	422, 460, 544, 612, 632, 686
092. 080. 53. AF. 01	beige	G 3/8"	422, 460, 632, 686, 688
092. 080. 53. AH. 01	beige	G 1/2"	422, 460, 632, 686



3 Ball retainer cap

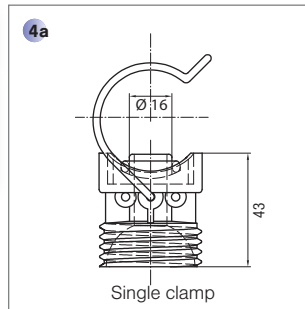
Ordering no.
092. 080. 53. 00. 02



4a Single clamp

Ordering no.	Bore-Ø	For pipe-Ø
092. 080. 53. 00	16 mm	1" (32.0-34.5 mm)
092. 081. 53. 00	16 mm	1 1/4" (40.0-43.0 mm)
092. 082. 53. 00	16 mm	1 1/2" (46.0-49.0 mm)
092. 083. 53. 00	16 mm	2" (58.0-62.0 mm)

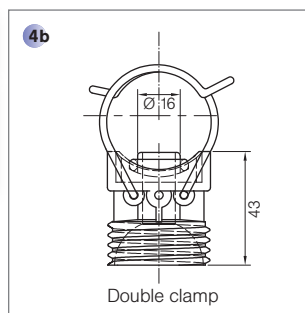
Other bore-Ø (13.8 / 20.0 mm) on request.



4b Double clamp

Ordering no.	Bore-Ø	For Pipe-Ø
092. 090. 53. 00	16 mm	1" (32.0-34.5 mm)
092. 091. 53. 00	16 mm	1 1/4" (40.0-43.0 mm)
092. 092. 53. 00	16 mm	1 1/2" (46.0-49.0 mm)
092. 093. 53. 00	16 mm	2" (58.0-62.0 mm)

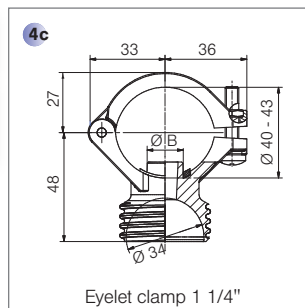
Other bore-Ø (13.8 / 20.0 mm) on request.



4c Eyelet clamp

Ordering no.	Bore-Ø	For pipe-Ø
090. 023. 53. 43. 10. 0	16 mm	1" (32.0-34.5 mm)
090. 033. 53. 43. 10. 0	16 mm	1 1/4" (40.0-43.0 mm)
090. 043. 53. 43. 10. 0	16 mm	1 1/2" (46.0-49.0 mm)

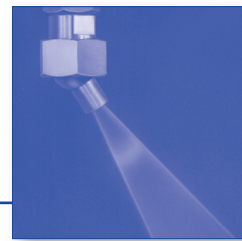
Other bore-Ø (13.8 / 20.0 mm) on request.





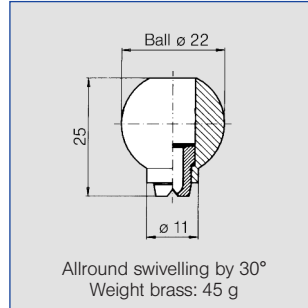
Flat fan nozzles with ball joint

Series 676



Swivelling nozzle for precise adjusting of jet direction. No gaskets necessary. Long, unproblematic service life.

Applications:
Cleaning, cooling, lubricating.



Spray angle	Ordering no.		A Ø [mm]	E Ø [mm]	\dot{V} [l/min]						Spray width B at p = 2 bar		
	Type	Mat.-no.			p [bar] (p _{max} = 30 bar)								
			16	30	0.5	1.0	2.0	3.0	5.0	10.0	H = 250 mm	H = 500 mm	
20°	676. 301	○	○	0.70	0.60	0.16*	0.23*	0.32	0.39	0.51	0.72	65	120
	676. 361	○	○	1.00	0.80	0.31*	0.44*	0.63	0.77	1.00	1.40	70	130
	676. 441	○	○	1.35	1.10	0.62*	0.88	1.25	1.53	1.98	2.80	75	145
	676. 481	○	○	1.50	1.20	0.80*	1.13	1.60	1.96	2.53	3.58	75	150
30°	676. 302	○	○	0.70	0.50	0.16*	0.23*	0.32	0.39	0.51	0.72	120	235
	676. 362	○	○	1.00	0.70	0.31*	0.44*	0.63	0.77	1.00	1.40	120	235
	676. 402	○	○	1.20	0.90	0.50*	0.71	1.00	1.23	1.58	2.24	120	235
	676. 482	○	○	1.50	1.10	0.80*	1.13	1.60	1.96	2.53	3.58	120	235
	676. 562	○	○	2.00	1.50	1.25	1.77	2.50	3.06	3.95	5.59	120	235
	676. 642	○	○	2.50	1.80	2.00	2.83	4.00	4.90	6.33	8.94	120	240
	676. 722	○	○	3.00	2.40	3.15	4.46	6.30	7.72	9.96	14.09	125	240
	676. 762	○	○	3.50	2.70	4.00	5.66	8.00	9.80	12.65	17.89	125	245
676. 802	○	○	4.00	3.10	5.00	7.07	10.00	12.25	15.81	22.36	130	250	
45°	676. 303	○	○	0.70	0.50	0.16*	0.23*	0.32	0.39	0.51	0.72	150	270
	676. 363	○	○	1.00	0.60	0.31*	0.44*	0.63	0.77	1.00	1.40	155	280
	676. 403	○	○	1.20	0.90	0.50*	0.71	1.00	1.23	1.58	2.24	175	320
	676. 483	○	○	1.50	1.10	0.80	1.13	1.60	1.96	2.53	3.58	180	340
	676. 563	○	○	2.00	1.40	1.25	1.77	2.50	3.06	3.95	5.59	185	355
	676. 643	○	○	2.50	1.80	2.00	2.83	4.00	4.90	6.33	8.94	195	370
	676. 723	○	○	3.00	2.40	3.15	4.46	6.30	7.72	9.96	14.09	200	375
	676. 763	○	○	3.50	2.60	4.00	5.66	8.00	9.80	12.65	17.89	200	380
676. 803	○	○	4.00	3.00	5.00	7.07	10.00	12.25	15.81	22.36	205	385	
60°	676. 304	○	○	0.70	0.40	0.16*	0.23*	0.32	0.39	0.51	0.72	215	425
	676. 334	○	○	0.90	0.50	0.22*	0.32*	0.45	0.55	0.71	1.01	220	440
	676. 364	○	○	1.00	0.60	0.31*	0.44*	0.63	0.77	1.00	1.40	230	460
	676. 404	○	○	1.20	0.80	0.50*	0.71	1.00	1.23	1.58	2.24	245	485
	676. 444	○	○	1.35	0.90	0.62*	0.88	1.25	1.53	1.98	2.80	255	495
	676. 484	○	○	1.50	1.00	0.80*	1.13	1.60	1.96	2.53	3.58	260	510
	676. 514	○	○	1.65	1.10	0.95*	1.34	1.90	2.33	3.00	4.25	270	520
	676. 564	○	○	2.00	1.30	1.25	1.77	2.50	3.06	3.95	5.59	280	535
	676. 604	○	○	2.20	1.50	1.58	2.23	3.15	3.86	4.98	7.04	290	550
	676. 644	○	○	2.50	1.60	2.00	2.83	4.00	4.90	6.33	8.94	295	565
	676. 674	○	○	2.70	1.80	2.38	3.36	4.75	5.82	7.51	10.62	300	575
	676. 724	○	○	3.00	2.10	3.15	4.46	6.30	7.72	9.96	14.09	305	590
	676. 764	○	○	3.50	2.30	4.00	5.66	8.00	9.80	12.65	17.89	310	595

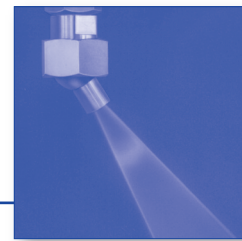
A = Equivalent bore diameter · E = narrowest free cross section
* Differing spray pattern

Continued on next page.



Flat fan nozzles with ball joint

Series 676



Spray angle	Ordering no.		A Ø [mm]	E Ø [mm]	\dot{V} [l/min]						Spray width B at p = 2 bar		
	Type	Mat.-no.			p [bar] (p _{max} = 30 bar)								
		16			30	0.5	1.0	2.0	3.0	5.0			10.0
		AISI 303	Brass										
75°	676. 145	○	○	0.20	0.12	-	0.04*	0.05	0.06	0.08	0.11	280	550
	676. 165	○	○	0.20	0.08	-	0.05*	0.07	0.08	0.10	0.15	290	560
	676. 185	○	○	0.20	0.15	-	0.06*	0.08	0.10	0.13	0.18	300	575
	676. 215	○	○	0.40	0.20	-	0.08*	0.11	0.14	0.18	0.25	300	580
	676. 245	○	○	0.50	0.30	-	0.12*	0.16	0.20	0.26	0.30	310	585
	676. 275	○	○	0.60	0.30	0.11*	0.16*	0.22	0.27	0.35	0.49	310	590
90°	676. 216	○	○	0.40	0.20	-	0.08*	0.11	0.14	0.18	0.25	370	700
	676. 276	○	○	0.60	0.30	0.11*	0.16*	0.22	0.27	0.35	0.49	375	720
	676. 306	○	○	0.70	0.40	0.16*	0.23*	0.32	0.39	0.51	0.72	380	740
	676. 336	○	○	0.90	0.50	0.22*	0.32*	0.45	0.55	0.71	1.01	415	800
	676. 366	○	○	1.00	0.50	0.31*	0.44*	0.63	0.77	1.00	1.40	420	810
	676. 406	○	○	1.20	0.70	0.50*	0.71	1.00	1.23	1.58	2.24	430	820
	676. 446	○	○	1.35	0.80	0.62*	0.88	1.25	1.53	1.98	2.80	435	830
	676. 486	○	○	1.50	0.80	0.80*	1.13	1.60	1.96	2.53	3.58	440	835
	676. 516	○	○	1.65	0.90	0.95*	1.34	1.90	2.33	3.00	4.25	440	840
	676. 566	○	○	2.00	1.10	1.25	1.77	2.50	3.06	3.95	5.59	445	850
	676. 606	○	○	2.20	1.20	1.58	2.23	3.15	3.86	4.98	7.04	450	860
	676. 646	○	○	2.50	1.30	2.00	2.83	4.00	4.90	6.33	8.94	455	865
	676. 676	○	○	2.70	1.40	2.38	3.36	4.75	5.82	7.51	10.62	465	875
	676. 726	○	○	3.00	1.70	3.15	4.46	6.30	7.72	9.96	14.09	470	885
120°	676. 187	○	○	0.35	0.20	-	0.06*	0.08	0.10	0.13	0.18	630	1200
	676. 217	○	○	0.40	0.20	-	0.08*	0.11	0.14	0.18	0.25	640	1210
	676. 247	○	○	0.50	0.20	-	0.12*	0.16	0.20	0.26	0.36	650	1230
	676. 277	○	○	0.60	0.30	-	0.16*	0.22	0.27	0.35	0.49	660	1250
	676. 307	○	○	0.70	0.30	0.16*	0.23*	0.32	0.39	0.51	0.72	660	1250
	676. 337	○	○	0.90	0.40	0.22*	0.32*	0.45	0.55	0.71	1.01	670	1270
	676. 367	○	○	1.00	0.50	0.31*	0.44*	0.63	0.77	1.00	1.40	670	1270
	676. 407	○	○	1.20	0.60	0.50*	0.71	1.00	1.23	1.58	2.24	670	1270
	676. 447	○	○	1.35	0.60	0.62*	0.88	1.25	1.53	1.98	2.80	675	1270
	676. 487	○	○	1.50	0.60	0.80*	1.13	1.60	1.96	2.53	3.58	680	1275
	676. 517	○	○	1.65	0.90	0.95*	1.34	1.90	2.33	3.00	4.25	685	1280
	676. 567	○	○	2.00	0.90	1.25	1.77	2.50	3.06	3.95	5.59	690	1285
	676. 607	○	○	2.20	1.10	1.58	2.23	3.15	3.86	4.98	7.04	700	1300
	676. 647	○	○	2.50	1.30	2.00	2.83	4.00	4.90	6.33	8.94	700	1300
	676. 677	○	○	2.70	1.40	2.38	3.36	4.75	5.82	7.51	10.62	720	1330
	676. 727	○	○	3.00	1.60	3.15	4.46	6.30	7.72	9.96	14.09	740	1360
	676. 767	○	○	3.50	1.70	4.00	5.66	8.00	9.80	12.65	17.89	760	1400

A = Equivalent bore diameter · E = narrowest free cross section

* Differing spray pattern

Accessories see next page.

Example	Type	+	Material-no.	=	Ordering no.
for ordering:	676. 145	+	16	=	676. 145. 16

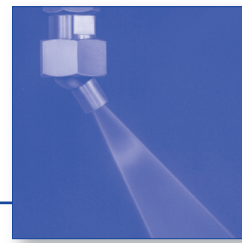
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 \cdot \sqrt{\frac{p_2}{p_1}}$





Flat fan nozzles with ball joint

Series 676



Accessories

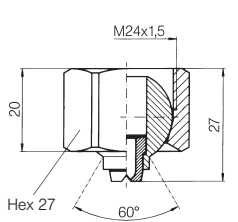
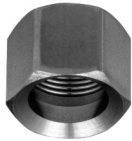
Retaining nut

092. 020. 16. 00. 02

Material: AISI 303

092. 020. 30. 00. 02

Material: Brass



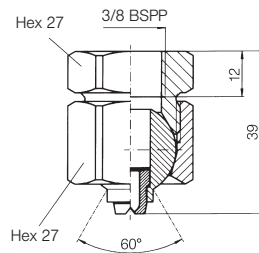
Socket

092. 020. 16. AF. 03

Material: AISI 303

092. 020. 30. AF. 03

Material: Brass



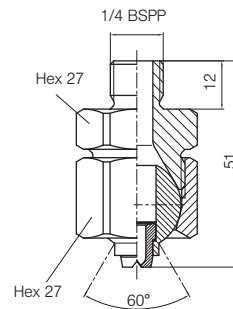
Retaining nipple

092. 024. 16. AC. 03

Material: AISI 303

092. 024. 30. AC. 03

Material: Brass



Welding nipple

092. 020. 17. 00. 04

Material: AISI 316Ti

