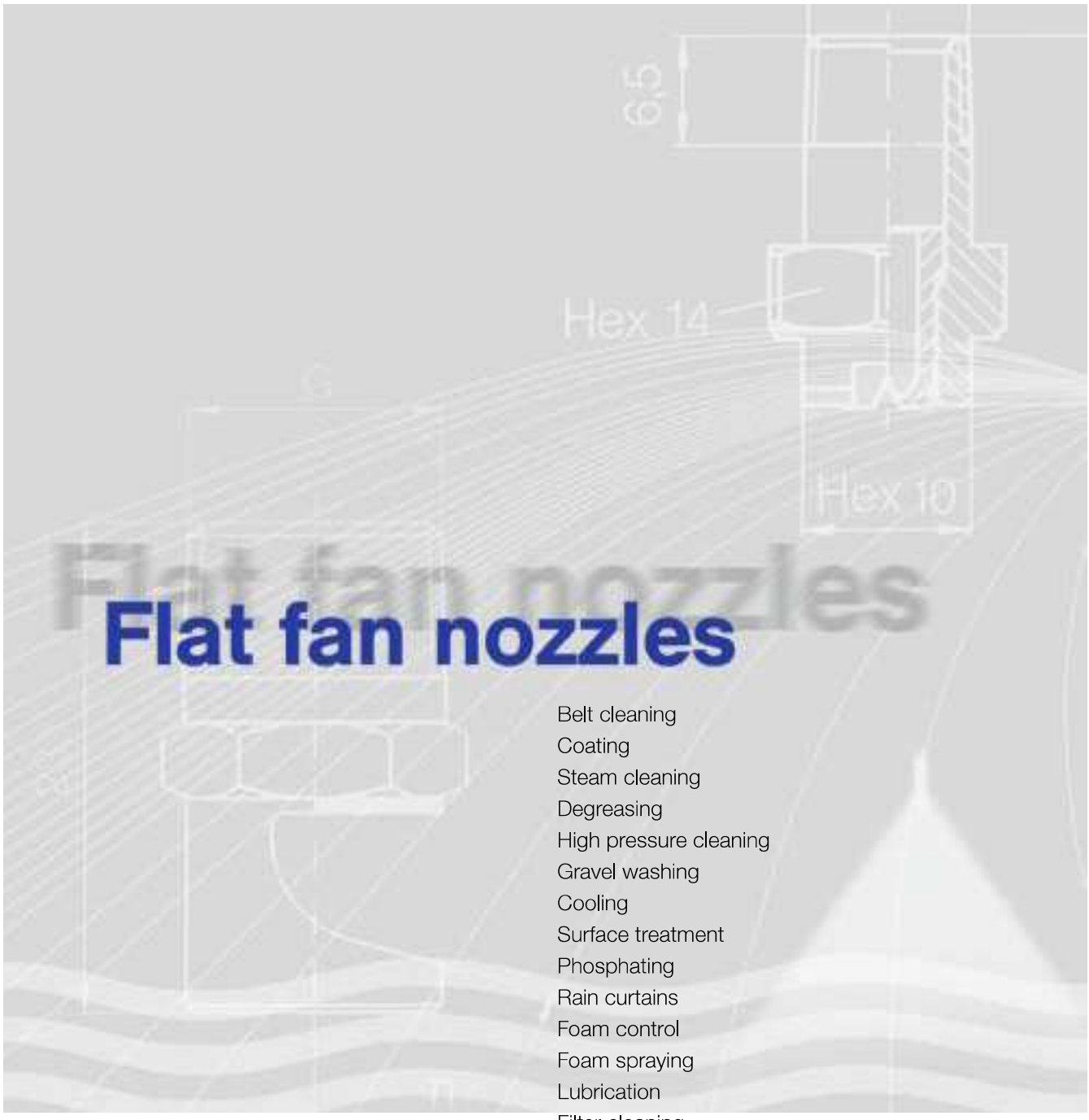
ENGINEERING
YOUR SPRAY SOLUTION

LECHLER



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...

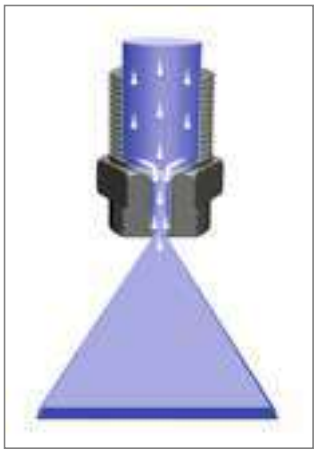
Flat fan nozzles

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.

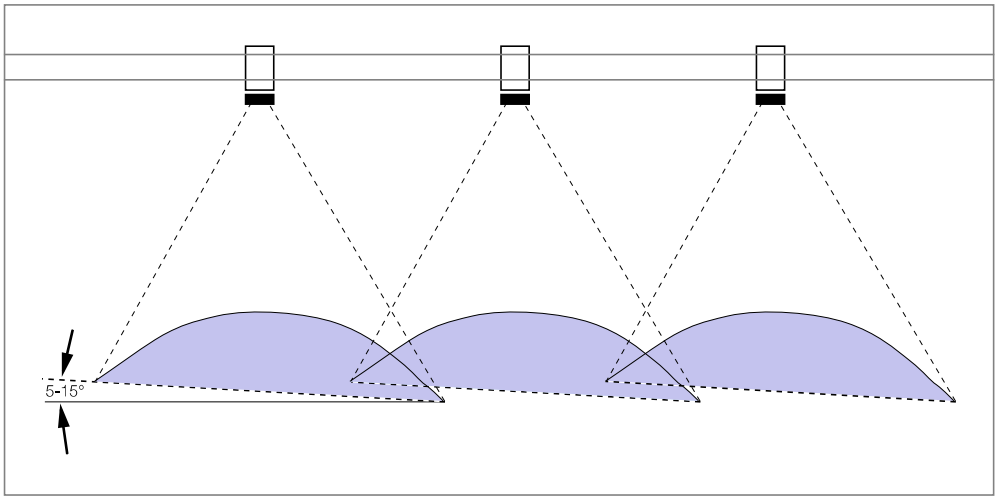
Basically, Lechler flat fan nozzles are designed for parabolic liquid distribution. Unaffected by transient pressures, they are suited for universal application. Their performance data are exactly defined. Operational values, such as flow rates, spray width, jet thickness and liquid distribution are 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.

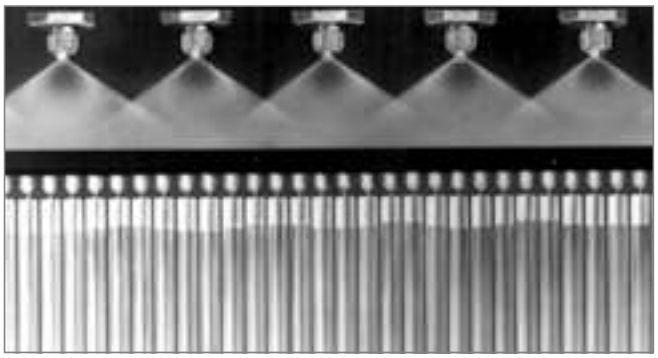
For all cleaning operations, in steelmaking and in many other fields of surface treatment, in short, wherever powerful, uniform water jets are required, Lechler flat fan nozzles constitute a decisive basis for achieving reliable process results.



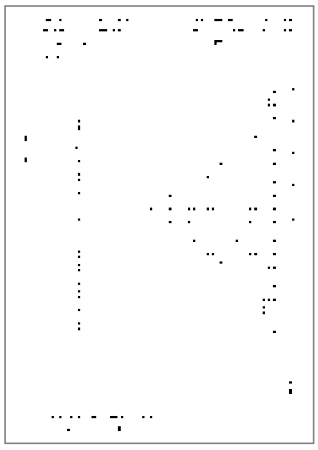
The **tongue-type nozzle** design represents a special kind of flat fan nozzle. With this nozzle type, the flat fan spray pattern is produced by a solid stream, impinging upon and deflecting from an outside deflector plate. As a result, a powerful, sharply delimited flat jet is shaped. The deflector 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

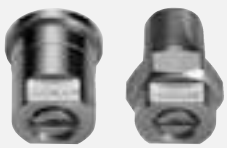
Flat fan nozzles

Low-pressure nozzles	Series		V̇ [l/min] at p = 2 bar	Connection	Application/ Design	Page
	**632** **633**	20° 30° 45° 60° 75° 90° 120°	0.05 – 50.00	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
	**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.**	4.10
	**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.**	4.12
	**616** **617**	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.**	4.14
 	**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.**	4.16

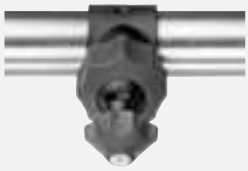
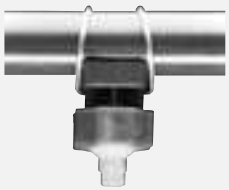
Flat fan nozzles

Low-pressure nozzles	Series		V̇ [l/min] at p = 2 bar	Connection	Application/ Design	Page
 Belt lubrication nozzles	**652**	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.**	4.18
 Nozzles for pressing into pipes	**612. xxx. 5E. 03**	90° 120°	0.63 – 4.00	For pressing into pipes	Cleaning and rinsing operations, dish washing machines. **For pressing into pipes.**	4.19
	**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 alignement.**	4.20
 	**660**	20° 30° 45° 60° 75° 90° 120°	0.05 – 10.00	Assembly with 3/8 lock nut and dove-tail guide	Cleaning installations, cooling headers, spray pipes. **Automatic jet alignment, due to dove-tail guide.**	4.22
 	**664** **665**	20° 30° 45° 60° 90° 120°	6.30 – 63.00	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.**	4.24

Flat fan nozzles

Low-pressure nozzles	Series		$\dot{V}$ [l/min] at p = 2 bar	Connection	Application/ Design	Page
	**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.**	4.26
	**688** **689**	45°	8.00 – 31.50	3/8 BSPT 3/4 BSPP	Cleaning, washing and phosphating process. **Particularly clog proof.**	4.28
	**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.**	4.29
	**684** **Assembly with lock nut** 	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.**	4.30
High pressure nozzles	Series		$\dot{V}$ [l/min] at p = 80 bar	Connection	Application/ Design	Page
	**602** **608** **652**	20° 30° 45° 60°	4.08 - 61.16	1/8 BSPT 1/4 BSPT 1/8 NPT 1/4 NPT Assembly with 3/8 lock nut	High pressure cleaning, steam cleaning.	4.31
	**6FH**	20° 30° 45° 60°	4.08 - 61.16	1/8 BSPT 1/4 BSPT 1/8 NPT 1/4 NPT Retaining nut	High pressure cleaning	4.32

Flat fan nozzles

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, phosphating, degreasing, rinsing in surface treatment techniques. **Ball joint, omnidirectional swivelling range of 20°.** **Simple quick assembling.** **Easy adjusting and cleaning.**	4.33
	**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, phosphating, degreasing, rinsing in surface treatment techniques. **Ball joint, omnidirectional swivelling range of 30°.** **Simple quick assembling.** **Easy adjusting and cleaning.**	4.37

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	Welding nipple Retaining nipple Socket	Cleaning, cooling and lubricating process. **Swivelling nozzle to meet exact jet alignment requirements. Omnidirectional swivelling range of 30°.**	4.39

Descaling nozzles

Descaling nozzles SCALEMASTER® – the standard in descaling technology.

Upon request:
Please ask for our brochures »SCALEMASTER®«.

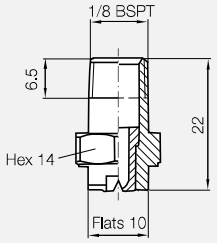
Flat fan nozzles
Series 632/633

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

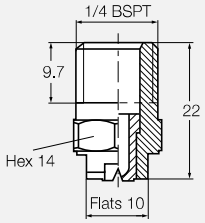
Applications:
Spray cleaning, surface treatment, filter cleaning, belt cleaning, lubricating, coating.

303 SS/ 316Ti SS/Brass (∢ 20°-75°)

303 SS/ 316Ti SS/Brass (∢ 90°-120°)



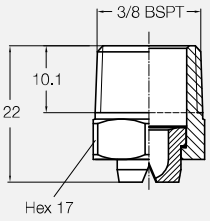
Weight Brass: 17 g



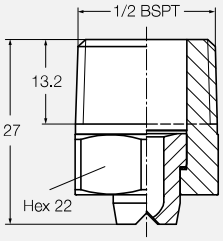
Weight Brass: 20 g

PVDF

3/8 or 1/2 version



Weight Brass: 30 g



Weight Brass: 40 g

Spray angle	Type	Ordering no. Mat. no. 16[1] 303 SS/ 304 SS	17[2] 316Ti SS/ 316L SS	30 Brass	5E PVDF	Code 1/8 BSPT	1/4 BSPT	3/8 BSPT	1/2 BSPT	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	3.0	5.0	7.0	10.0	Spray width B at p=2 bar H = 200 mm	H = 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 303 SS or 304 SS under the material no. 16.
2) We reserve the right to deliver 316Ti SS or 316L SS 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 for ordering:	Type	+	Material-no.	+	Code	=	Ordering no.
	632.301	+	**16**	+	**CA**	=	**632.301.16.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	Mat. no.				Code						p [bar]							H = 200 mm	H = 500 mm
		16[1] 303 SS/ 304 SS	17[2] 316Ti SS/ 316L SS	30 Brass	5E 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		
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	0.14	–	0.05*	0.07	0.08	0.10	0.12	0.15	290	560
	632.185	○	-	○	-	CA	CC	-	-	0.20	0.16	–	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 303 SS or 304 SS under the material no. 16.
2) We reserve the right to deliver 316Ti SS or 316L SS 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.

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.	+	Code	=	Ordering no.
	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. Type	Mat. no. 16[1] 303 SS/304 SS	Mat. no. 17[2] 316Ti SS/316L SS	Mat. no. 30 Brass	Mat. no. 5E PVDF	Code 1/8 BSPT	Code 1/4 BSPT	Code 3/8 BSPT	Code 1/2 BSPT	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	3.0	5.0	7.0	10.0	Spray width B at p=2 bar H = 200 mm	H = 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	1,020
	632.966	○	○	○	-	-	-	-	**CG**	6.00	3.90	12.50	17.68	25.00	30.62	39.53	46.77	55.90	525	1,020
120°	**632.187**	○	-	○	-	**CA**	**CC**	-	-	0.35	0.20	-	0.06*	0.08	0.10	0.13	0.15	0.18	630	1,200
	632.217	○	-	○	-	**CA**	**CC**	-	-	0.40	0.20	-	0.08*	0.11	0.14	0.18	0.21	0.25	640	1,210
	632.247	○	-	○	-	**CA**	**CC**	-	-	0.50	0.20	-	0.12*	0.16	0.20	0.26	0.30	0.36	650	1,230
	632.277	○	-	○	-	**CA**	**CC**	-	-	0.60	0.30	-	0.16*	0.22	0.27	0.35	0.41	0.49	660	1,250
	632.307	○	○	○	○	**CA**	**CC**	-	-	0.70	0.30	0.16*	0.23*	0.32	0.39	0.51	0.60	0.72	660	1,250
	632.337	○	○	○	○	**CA**	**CC**	-	-	0.90	0.40	0.22*	0.32*	0.45	0.55	0.71	0.84	1.01	670	1,270
	632.367	○	○	○	○	**CA**	**CC**	-	-	1.00	0.50	0.31*	0.44*	0.63	0.77	1.00	1.18	1.41	670	1,270
	632.407	○	○	○	○	**CA**	**CC**	-	-	1.20	0.60	0.50*	0.71	1.00	1.23	1.58	1.87	2.24	670	1,270
	632.447	○	○	○	○	**CA**	**CC**	-	-	1.35	0.60	0.62*	0.88	1.25	1.53	1.98	2.34	2.80	675	1,270
	632.487	○	○	○	○	**CA**	**CC**	-	-	1.50	0.60	0.80*	1.13	1.60	1.96	2.53	2.99	3.58	680	1,275
	632.517	○	○	○	○	**CA**	**CC**	-	-	1.65	0.90	0.95*	1.34	1.90	2.33	3.00	3.56	4.25	685	1,280
	632.567	○	○	○	○	**CA**	**CC**	-	-	2.00	0.90	1.25	1.77	2.50	3.06	3.95	4.68	5.59	690	1,285
	632.607	○	○	○	○	**CA**	**CC**	-	-	2.20	1.10	1.58	2.23	3.15	3.86	4.98	5.89	7.04	700	1,300
	632.647	○	○	○	-	-	**CC**	**CE**	-	2.50	1.30	2.00	2.83	4.00	4.90	6.33	7.48	8.94	700	1,300
	632.677	○	○	○	○**	-	**CC**	**CE**	-	2.70	1.40	2.38	3.36	4.75	5.82	7.51	8.89	10.62	720	1,330
	632.727	○	○	○	○**	-	**CC**	**CE**	-	3.00	1.60	3.15	4.46	6.30	7.72	9.96	11.79	14.09	740	1,360
	632.767	○	○	○	○**	-	**CC**	**CE**	-	3.50	1.70	4.00	5.66	8.00	9.80	12.65	14.97	17.89	760	1,400
	632.807	○	○***	○	-	-	**CC**	-	**CG**	4.00	2.00	5.00	7.07	10.00	12.25	15.81	18.71	22.36	790	1,450
	632.847	○***	○***	○***	○**	-	**CC**	-	**CG**	4.50	2.30	6.25	8.84	12.50	15.31	19.76	23.39	27.95	790	1,450
	632.887	○	○	○	-	-	-	-	**CG**	5.00	2.60	8.00	11.31	16.00	19.60	25.30	29.93	35.78	800	1,460
	632.927	○	○	○	-	-	-	-	**CG**	5.50	2.90	10.00	14.14	20.00	24.50	31.62	37.42	44.72	800	1,460

1) We reserve the right to deliver 303 SS or 304 SS under the material no. 16.
2) We reserve the right to deliver 316Ti SS or 316L SS 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".

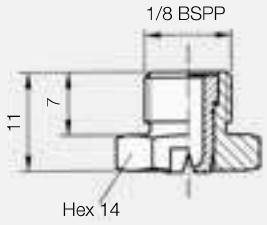
Example for ordering:	Type	+	Material-no.	+	Code	=	Ordering no.
	632.216.	+	**16**	+	**CA**	=	**632.216.16.CA**

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

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.



Weight Brass: 10 g

Spray angle	Ordering no. Type	Mat. no. 16 303 SS	Mat. no. 30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray width B at p=2 bar H = 250 mm	H = 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	0.14	-	0.05*	0.07	0.02	0.08	0.10	0.15	285	555
	610.185	○	○	0.20	0.16	-	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.

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

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".

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. Type	Mat. no. 16 303 SS	Mat. no. 30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray width B at p=2 bar H = 250 mm	H = 500 mm
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	1,220
	610.217	○	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	650	1,230
	610.247	○	○	0.50	0.20	-	0.12*	0.16	0.05	0.20	0.26	0.36	655	1,245
	610.277	○	○	0.60	0.30	-	0.16*	0.22	0.07	0.27	0.35	0.49	655	1,250
	610.307	○	○	0.70	0.30	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	660	1,260
	610.337	○	○	0.90	0.40	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	660	1,260
	610.367	○	○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	660	1,265
	610.407	○	○	1.20	0.60	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	660	1,270
	610.447	○	○	1.35	0.60	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	665	1,270
	610.487	○	○	1.50	0.60	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	665	1,270
	610.517	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	670	1,275
	610.567	○	○	2.00	0.90	1.25	1.77	2.50	0.78	3.06	3.95	5.59	670	1,280
	610.607	○	○	2.20	1.10	1.58	2.23	3.15	0.98	3.86	4.98	7.04	675	1,285

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

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	610.216	+	**16**	=	**610.216.16**

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".

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

Flat fan nozzles
Series 612

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

Applications:
Cleaning installations. cooling headers spray pipes.

∢ 20°-75°

∢ 90°-120°

Weight Brass: 14 g

Spray angle	Ordering no. Type	Mat. no. 16 303 SS	17 [1] 316Ti SS/ 316L SS	30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./ min] at 40 psi	3.0	5.0	10.0	Spray width B at p=2 bar 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 316Ti SS or 316L SS 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. Type	Mat. no. 16 303 SS	17 [1] 316Ti SS/ 316L SS	30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./ min] at 40 psi	3.0	5.0	10.0	Spray width B at p=2 bar H = 250 mm	H = 500 mm
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	0.14	-	0.05*	0.07	0.02	0.08	0.10	0.15	310	590
	612.185	○	-	○	0.20	0.16	-	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	1,140
	612.217	○	-	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	615	1,150
	612.247	○	-	○	0.50	0.20	-	0.12*	0.16	0.05	0.20	0.26	0.36	620	1,160
	612.277	○	-	○	0.60	0.30	-	0.16*	0.22	0.07	0.27	0.35	0.49	620	1,170
	612.307	○	-	○	0.70	0.30	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	625	1,175
	612.337	○	○	○	0.90	0.40	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	630	1,180
	612.367	○	○	○	1.00	0.40	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	635	1,190
	612.407	○	○	○	1.20	0.60	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	640	1,195
	612.447	○	○	○	1.35	0.60	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	645	1,200
	612.487	○	○	○	1.50	0.60	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	650	1,200
	612.517	○	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	650	1,205
	612.567	○	○	○	2.00	0.90	1.25	1.77	2.50	0.78	3.06	3.95	5.59	655	1,210
	612.607	○	○	○	2.20	1.10	1.58	2.23	3.15	0.98	3.86	4.98	7.04	660	1,215
	612.647	○	○	○	2.50	1.30	2.00	2.83	4.00	1.24	4.90	6.33	8.94	660	1,220
	612.677	○	○	○	2.70	1.40	2.38	3.36	4.75	1.47	5.82	7.51	10.62	665	1,230
	612.727	○	○	○	3.00	1.60	3.15	4.46	6.30	1.95	7.71	9.96	14.09	675	1,245
	612.767	○	○	○	3.50	1.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	680	1,260
	612.807	○	-	○	4.00	2.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	690	1,280

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

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	612.145	+	16	=	612.145.16

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".

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

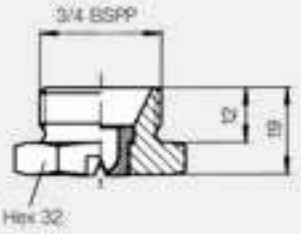
Flat fan nozzles
Series 616/617

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.

∢ 20°-60°

∢ 90°-120°



Weight Brass: 75 g

Spray angle	Ordering no. Type	Mat. no. 16 303 SS	17 [1] 316Ti SS/ 316L SS	30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./ min] at 40 psi	3.0	5.0	10.0	Spray width B at p=2 bar H = 250 mm	H = 500 mm
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	1,000
	616.766	○	○	○	3.50	1.90	4.00	5.66	8.00	2.48	9.80	12.65	17.89	550	1,010
	616.806	○	○	○	4.00	2.40	5.00	7.07	10.00	3.10	12.25	15.81	22.36	550	1,010
	616.846	○	○	○	4.50	2.40	6.25	8.84	12.50	3.88	15.31	19.76	27.95	550	1,020
	616.886	○	○	○	5.00	3.10	8.00	11.31	16.00	4.96	19.60	25.30	35.78	550	1,020
	616.926	○	○	○	5.50	3.60	10.00	14.14	20.00	6.20	24.49	31.62	44.72	555	1,025
	616.966	○	○	○	6.00	3.90	12.50	17.68	25.00	7.75	30.62	39.53	55.90	560	1,030

[1] We reserve the right to deliver 316Ti SS or 316L SS 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]	V̇ [l/min]							Spray width B at p=2 bar	
	Type	Mat. no. 16 (303 SS)	Mat. no. 17[1] (316Ti SS/ 316L SS)	Mat. no. 30 (Brass)			p [bar] 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	1,755
	616.767	○	○	○	3.50	1.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	970	1,750
	616.807	○	○	○	4.00	2.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	965	1,740
	616.887	○	○	○	5.00	2.60	8.00	11.31	16.00	4.96	19.60	25.30	35.78	955	1,730
	616.927	○	○	○	5.50	2.90	10.00	14.14	20.00	6.20	24.49	31.62	44.72	950	1,720
	616.967	-	-	○	6.00	3.20	12.50	17.68	25.00	7.75	30.62	39.53	55.90	950	1,720
	617.047	-	-	○	8.00	4.40	20.00	28.28	40.00	12.41	48.99	63.25	89.44	950	1,720

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

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	616.727	+	**16**	=	**616.727.16**

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".

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 652

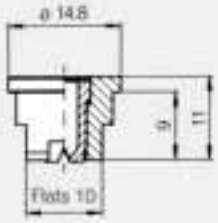
Assembly with retaining nut. Easy nozzle changing, simple jet alignment. Uniform, parabolic distribution of liquid. Spray pipes equiped with these nozzles show an extremely uniform total liquid distribution.

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

303 SS/ 316Ti SS/ Brass (⚹20°-75°)

303 SS/ 316Ti SS/ Brass (⚹90°-120°)

PVDF



Weight Brass: 9 g

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

[1] We reserve the right to deliver 316Ti SS or 316L SS 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 for retaining nut
Series 652

Spray angle	Ordering no. Type	Mat. no. 16 303 SS	17[1] 316Ti SS/ 316L SS	30 Brass	5E PVDF	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	3.0	5.0	10.0	Spray width B at p=2 bar H = 250 mm	H = 500 mm
75°	**652.145**	○	-	○	-	0.20	0.12	-	0.04*	0.05	0.06	0.08	0.11	285	550
	652.165	○	-	○	-	0.20	0.14	-	0.05*	0.07	0.08	0.10	0.15	285	555
	652.185	○	-	○	-	0.20	0.16	-	0.06*	0.08	0.10	0.13	0.18	290	560
	652.215	○	-	○	-	0.40	0.20	-	0.08*	0.11	0.14	0.18	0.25	290	560
	652.245	○	-	○	-	0.50	0.30	-	0.12*	0.16	0.20	0.26	0.36	290	560
	652.275	○	-	○	-	0.60	0.30	0.11*	0.16*	0.22	0.27	0.35	0.49	290	560
90°	**652.216**	○	-	○	-	0.40	0.20	0.06*	0.08*	0.11	0.14	0.18	0.25	380	760
	652.246	○	-	○	-	0.50	0.30	0.08*	0.12*	0.16	0.20	0.26	0.36	380	760
	652.276	○	-	○	-	0.60	0.30	0.11*	0.16*	0.22	0.27	0.35	0.49	450	795
	652.306	○	○	○	○	0.70	0.40	0.16*	0.23*	0.32	0.39	0.51	0.72	450	795
	652.336	○	○	○	○	0.90	0.50	0.22*	0.32*	0.45	0.55	0.71	1.01	450	795
	652.366	○	○	○	○	1.00	0.50	0.31*	0.44*	0.63	0.77	1.00	1.41	450	795
	652.406	○	○	○	○	1.20	0.70	0.50*	0.71	1.00	1.23	1.58	2.24	450	800
	652.446	○	○	○	○	1.35	0.80	0.62*	0.88	1.25	1.53	1.98	2.80	450	800
	652.486	○	○	○	○	1.50	0.80	0.80*	1.13	1.60	1.96	2.53	3.58	450	800
	652.516	○	○	○	○	1.65	0.90	0.95*	1.34	1.90	2.33	3.00	4.25	450	800
	652.566	○	○	○	○	2.00	1.10	1.25	1.77	2.50	3.06	3.95	5.59	450	805
	652.606	○	○	○	○	2.20	1.20	1.58	2.23	3.15	3.86	4.98	7.04	450	805
	652.646	○	○	○	○	2.50	1.30	2.00	2.83	4.00	4.90	6.33	8.94	450	805
	652.676	○	○	○	○	2.70	1.40	2.38	3.36	4.75	5.82	7.51	10.62	450	810
	652.726	○	○	○	○	3.00	1.70	3.15	4.46	6.30	7.72	9.96	14.09	450	810
	652.766	○	○	○	-	3.50	1.90	4.00	5.66	8.00	9.80	12.65	17.89	450	815
	652.806	○	○	○	○	4.00	2.40	5.00	7.07	10.00	12.25	15.81	22.36	450	820
	652.846	-	-	○	○	4.50	2.40	6.25	8.84	12.50	15.31	19.76	27.95	450	820
	652.886	○	-	○	○	5.00	3.10	8.00	11.31	16.00	19.60	25.30	35.78	450	835
120°	**652.187**	○	-	○	-	0.35	0.20	-	0.06*	0.08	0.10	0.13	0.18	640	1,220
	652.217	○	-	○	-	0.40	0.20	-	0.08*	0.11	0.14	0.18	0.25	650	1,230
	652.247	○	-	○	-	0.50	0.20	-	0.12*	0.16	0.20	0.26	0.36	655	1,245
	652.277	○	-	○	-	0.60	0.30	-	0.16*	0.22	0.27	0.35	0.49	655	1,250
	652.307	○	-	○	○	0.70	0.30	0.16*	0.23*	0.32	0.39	0.51	0.72	660	1,260
	652.337	○	○	○	○	0.90	0.40	0.22*	0.32*	0.45	0.55	0.71	1.01	660	1,260
	652.367	○	○	○	○	1.00	0.50	0.31*	0.44*	0.63	0.77	1.00	1.41	660	1,265
	652.407	○	○	○	○	1.20	0.60	0.50*	0.71	1.00	1.23	1.58	2.24	660	1,270
	652.447	○	○	○	○	1.35	0.60	0.62*	0.88	1.25	1.53	1.98	2.80	665	1,270
	652.487	○	○	○	○	1.50	0.60	0.80*	1.13	1.60	1.96	2.53	3.58	665	1,270
	652.517	○	○	○	○	1.65	0.90	0.95*	1.34	1.90	2.33	3.00	4.25	670	1,275
	652.567	○	○	○	○	2.00	0.90	1.25	1.77	2.50	3.06	3.95	5.59	670	1,280
	652.607	○	○	○	○	2.20	1.10	1.58	2.23	3.15	3.86	4.98	7.04	675	1,285
	652.647	○	○	○	-	2.50	1.30	2.00	2.83	4.00	4.90	6.33	8.94	680	1,295
	652.677	○	○	○	-	2.70	1.40	2.38	3.36	4.75	5.82	7.51	10.62	685	1,300
	652.727	○	○	○	○	3.00	1.60	3.15	4.46	6.30	7.72	9.96	14.09	695	1,315
	652.767	○	○	○	-	3.50	1.70	4.00	5.66	8.00	9.80	12.65	17.89	705	1,330
	652.807	○	-	○	-	4.00	2.00	5.00	7.07	10.00	12.25	15.81	22.36	705	1,330
	652.847	-	-	-	○	4.50	2.30	6.25	8.84	12.50	15.31	19.76	27.95	800	1,460
	652.887	-	-	-	○	5.00	2.60	8.00	11.31	16.00	19.60	25.30	35.78	800	1,460

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

Example of ordering:	Type	+	Material no.	= Ordering no.
	652.145	+	16	= 652.145.16

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".

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

Flat fan nozzles for belt lubrication
Series 652

Especially low flow rates.
Parabolic liquid distribution.

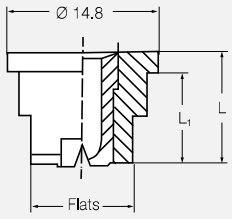
Applications:
Belt lubrication, moistening, spraying of food products, moisturization of rollers, oiling, lubrication of metal sheets.

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 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



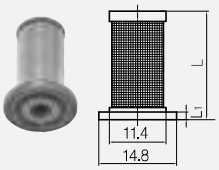
Spray angle	Ordering no. Type	Mat. no. 16 303 SS	8H.03* POM/303 SS	56.03 POM	Colour	E Ø [mm]	V̇ [l/min] p [bar] 1.0	2.0	3.0	5.0
75°	**652.145**	○	○	○	green	0.12	0.04**	0.05	0.06	0.08
	652.165	○	○	-	black	0.14	0.05**	0.07	0.08	0.10
	652.185	○	○	○	red	0.16	0.06**	0.08	0.10	0.13
	652.215	○	○	-	blue	0.20	0.08**	0.11	0.14	0.18
	652.245	○	○	-	orange	0.30	0.12**	0.16	0.20	0.26
	652.275	○	○	-	brown	0.30	0.16**	0.22	0.27	0.35
120°	**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 303 SS
** Differing spray pattern.
Subject to technical modifications.

Pos.	Name	Ordering no.	Material	Colour	Dimensions [mm] L	L_1	Flats	** [mm]
1	**Filter with return valve**	095.016.53.11.00 095.016.53.14.63	PP PP	blue green	21 21	1.5 1.5	- -	0.08 0.08
2	**Gasket**	065.240.55 065.240.72	PTFE EWP 210	- -	- -	- -	- -	- -
3	**Nozzle**	Ordering no. see flow tables	303 SS POM/303 SS*	- -	11 12	9 10	10 8	- -
4	**Cap nut**	065.200.16 065.200.56	303 SS POM	- black	13 14.5	10 11.5	22 22	- -

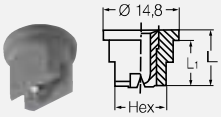
* Housing POM, Nozzle insert 303 SS
** Size of mesh

Position 1
Filter with return valve

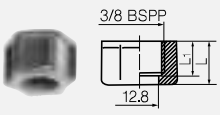


Position 2
Gasket

Position 3
Nozzle



Position 4
Cap nut

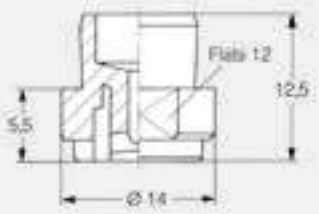


Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

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.



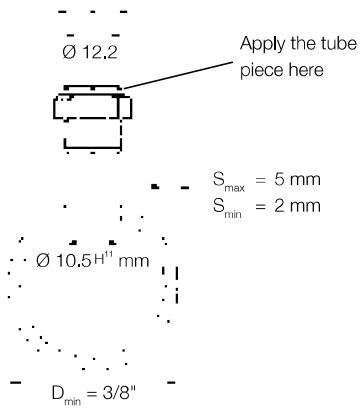
Material: PVDF
Weight: 2 g

Spray angle	Ordering no. Type	Mat. no. 5E.03 PVDF	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.3	0.5	0.7	1.0	1.5	2.0	Spray width B at p=2 bar H = 250 mm	H = 500 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	1,020
120°	**612.487**	○	1.5	0.6	0.62	0.80	0.95	1.13	1.39	1.60	800	1,460
	612.647	○	2.5	1.2	1.55	2.00	2.37	2.83	3.46	4.00	800	1,460

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

Further nozzle sizes on request.

Assembly



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 612.366	+	Mat.-no. 5E.03	= Ordering no. = 612.366.5E.03

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

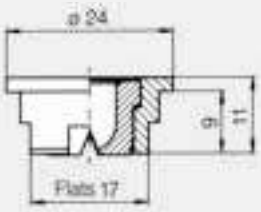
Flat fan nozzles for retaining nut
Series 656/657

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

Applications:
Cleaning installations, gravel washing, cooling headers, spray pipes, roll cooling, cooling of rolled stock.

20°-60°

90°-120°



Weight Brass: 23 g

Spray angle	Ordering no. Type	Mat. no. 16 303 SS	17[1] 316Ti SS/ 316L SS	30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./ min] at 40 psi	3.0	5.0	10.0	Spray width B at p=2 bar H = 250 mm	H = 500 mm
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 316Ti SS or 316L SS 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: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

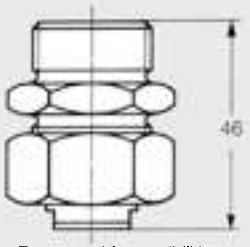
Flat fan nozzles for retaining nut
Series 656/657

Spray angle	Ordering no. Type	Mat. no. 16 303 SS	Mat. no. 17[1] 316Ti SS/ 316L SS	Mat. no. 30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./ min] at 40 psi	3.0	5.0	10.0	Spray width B at p=2 bar H = 250 mm	H = 500 mm
120°	**656.727**	○	○	○	3.00	1.60	3.15	4.45	6.30	1.95	7.72	9.96	14.09	675	1,350
	656.767	○	○	○	3.50	1.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	800	1,600
	656.807	○	○	○	4.00	2.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	740	1,485
	656.887	○	○	○	5.00	2.60	8.00	11.31	16.00	4.96	19.60	25.30	35.78	775	1,540
	656.927	○	○	○	5.50	2.90	10.00	14.14	20.00	6.20	24.49	31.62	44.72	815	1,630

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

Example for ordering:	Type 656.727	+	Material-no. 16	= Ordering no. 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".



For assembly possibilities please refer to folded page

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

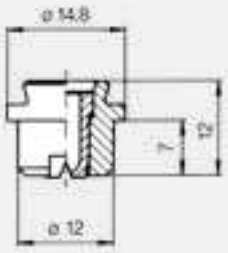
Flat fan nozzles with dove-tail guide
Series 660

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.

∢ 20°-75°

∢ 90°-120°



Weight Brass: 10 g

Spray angle	Ordering no. Type	Mat. no. 16 303 SS	Mat. no. 17 [1] 316Ti SS/ 316L SS	Mat. no. 30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./ min] at 40 psi	3.0	5.0	10.0	Spray width B at p=2 bar 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	0.14	-	0.05*	0.07	0.02	0.08	0.10	0.15	330	620
	660.185	○	-	○	0.20	0.16	-	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	0.49	345	645

[1] We reserve the right to deliver 316Ti SS or 316L SS 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: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

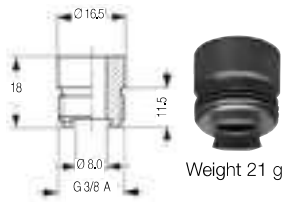
Flat fan nozzles with dove-tail guide
Series 660

Spray angle	Ordering no. Type	Mat. no. 16 303 SS	Mat. no. 17[1] 316Ti SS/ 316L SS	Mat. no. 30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./ min] at 40 psi	3.0	5.0	10.0	Spray width B at p=2 bar H = 250 mm	H = 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	1,220
	660.217	○	-	○	0.40	0.20	-	0.08*	0.11	0.03	0.14	0.18	0.25	655	1,230
	660.247	○	-	○	0.50	0.20	-	0.12*	0.16	0.05	0.20	0.26	0.36	655	1,240
	660.277	○	-	○	0.60	0.30	-	0.16*	0.22	0.07	0.27	0.35	0.49	660	1,250
	660.307	○	-	○	0.70	0.30	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	660	1,260
	660.337	○	○	○	0.90	0.40	0.22*	0.32*	0.45	0.14	0.55	0.71	1.00	660	1,260
	660.367	○	○	○	1.00	0.40	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	660	1,265
	660.407	○	○	○	1.20	0.60	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	665	1,270
	660.447	○	○	○	1.35	0.60	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	670	1,270
	660.487	○	○	○	1.50	0.60	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	675	1,270
	660.517	○	○	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	675	1,275
	660.567	○	○	○	2.00	0.90	1.25	1.77	2.50	0.78	3.06	3.95	5.59	685	1,280
	660.607	○	○	○	2.20	1.10	1.58	2.23	3.15	0.98	3.86	4.98	7.04	695	1,285
	660.647	○	○	○	2.50	1.30	2.00	2.83	4.00	1.24	4.90	6.33	8.94	705	1,295
	660.727	○	○	○	3.00	1.60	3.15	4.46	6.30	1.95	7.72	9.96	14.09	735	1,315
	660.807	○	-	○	4.00	2.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	780	1,345

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

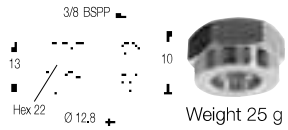
Example for ordering:	Type	+	Material-no.	=	Ordering no.
	660.216.	+	**16**	=	**660.216.16**

Accessories



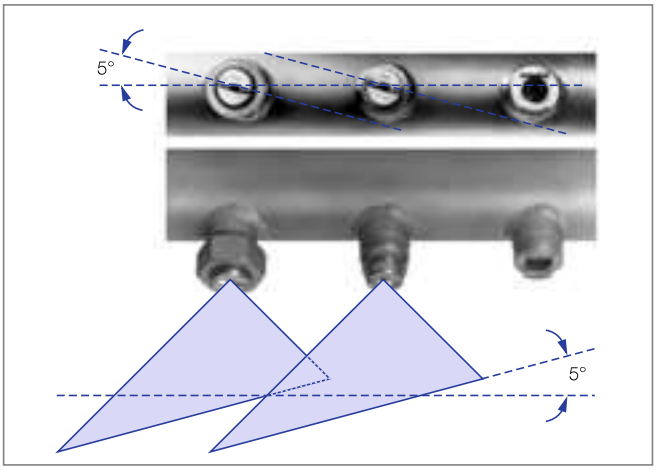
Weight 21 g

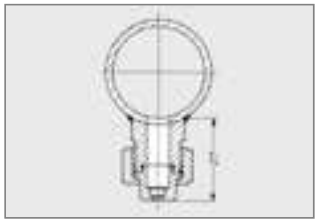
Nipple, **066.011.17** (316 SS)



Weight 25 g

Retaining nut, **065.200.16** (303 SS)
065.200.17 (316 SS)
065.200.30 (Brass)





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

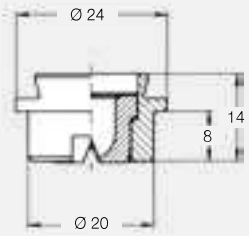
Flat fan nozzles with dove-tail guide
Series 664/665

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.

∢ 20°-60°

∢ 90°-120°



Weight Brass: 35 g

Spray angle	Type	Ordering no. Mat. no. 16 303 SS	17[1] 316Ti SS/ 316L SS	30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./ min] at 40 psi	3.0	5.0	10.0	Spray width B at p=2 bar H = 250 mm	H = 500 mm
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	560
	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 316Ti SS or 316L SS 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 with dove-tail guide
Series 664/665

Spray angle	Ordering no. Type	Mat. no. 16 303 SS	17[1] 316Ti SS/ 316L SS	30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./ min] at 40 psi	3.0	5.0	10.0	Spray width B at p=2 bar 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	1,240	2,150
	664.767	○	○	○	3.50	1.70	4.00	5.66	8.00	2.48	9.80	12.65	17.89	1,240	2,150
	664.807	○	○	○	4.00	2.00	5.00	7.07	10.00	3.10	12.25	15.81	22.36	1,240	2,150
	664.887	○	○	○	5.00	2.60	8.00	11.31	16.00	4.96	19.60	25.30	35.78	1,240	2,150
	664.927	○	○	○	5.50	2.90	10.00	14.14	20.00	6.20	24.49	31.62	44.72	1,240	2,150
	664.967	-	-	○	6.00	3.20	12.50	17.68	25.00	7.75	30.62	39.53	55.90	1,240	2,150
	665.047	-	-	○	8.00	4.40	20.00	28.28	40.00	12.41	48.99	63.25	89.44	1,240	2,150

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

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	664.726	+	16	=	664.726.16

Pretreatment in a pickling line

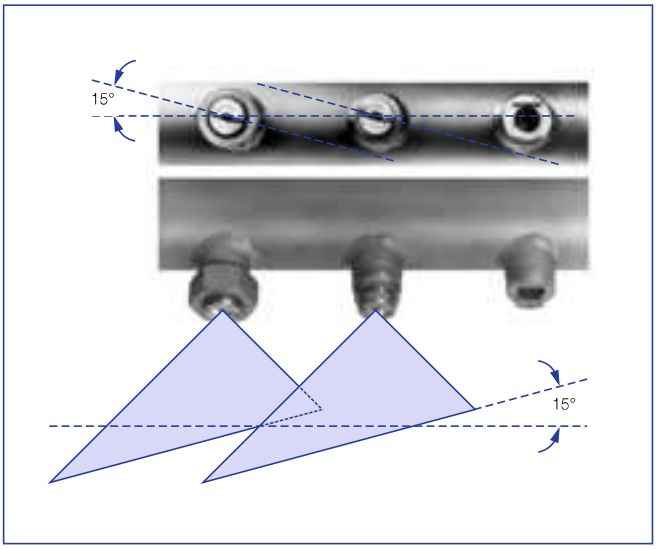
Accessories

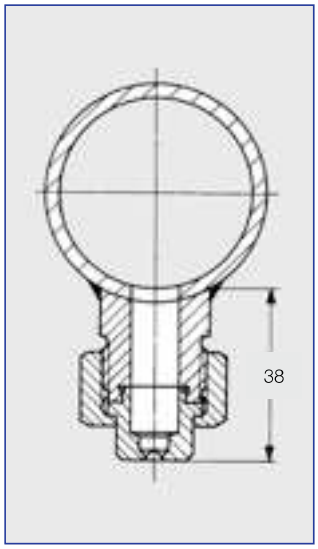
Weight: 65 g

Nipple, **066.410.17** (316Ti SS)

Weight Brass: 60 g

Retaining nut, **065.600.16** (303 SS)
065.600.17 (316Ti SS)
065.600.30 (Brass)



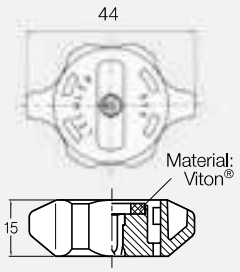


Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

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.



Weight: 12 g

Spray angle	Ordering no. Type	Mat. no. 5E PVDF	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray width B at p=2 bar H = 250 mm	H = 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
	646.563	○	2.00	1.40	1.20	1.77	2.50	0.78	3.06	3.95	5.59	185	340
	646.643	○	2.50	1.80	200	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".

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

Spray angle	Ordering no. Type	Mat. no. 5E PVDF	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	[US gal./min] at 40 psi	3.0	5.0	10.0	Spray width B at p=2 bar H = 250 mm	H = 500 mm
120°	**646.307**	○	0.70	0.30	0.16*	0.23*	0.32	0.10	0.39	0.51	0.72	625	1,175
	646.337	○	0.90	0.40	0.22*	0.32*	0.45	0.14	0.55	0.71	1.01	630	1,180
	646.367	○	1.00	0.50	0.31*	0.44*	0.63	0.20	0.77	1.00	1.41	635	1,190
	646.407	○	1.20	0.60	0.50*	0.71	1.00	0.31	1.23	1.58	2.24	640	1,195
	646.447	○	1.35	0.60	0.62*	0.88	1.25	0.39	1.53	1.98	2.80	645	1,200
	646.487	○	1.50	0.60	0.80*	1.13	1.60	0.50	1.96	2.53	3.58	650	1,200
	646.517	○	1.65	0.90	0.95*	1.34	1.90	0.59	2.33	3.00	4.25	650	1,205
	646.567	○	2.00	0.90	1.25	1.77	2.50	0.78	3.06	3.95	5.59	655	1,210
	646.607	○	2.20	1.10	1.58	2.23	3.15	0.98	3.86	4.98	7.04	660	1,215

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 646.307	+	Material-no. 5E	=	Ordering no. 646.307.5E

Assembly accessories see page 9.4

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.

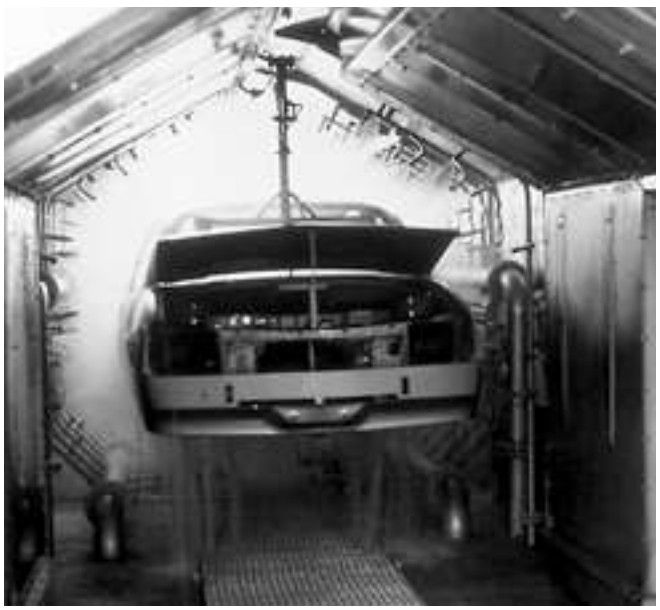
Series 688/689

Spray angle	η	Ordering no. Type	Mat. no. 16 303 SS	Mat. no. 5E PVDF	Code G 3/8 BSPT	Code G 3/4 BSPP	B Ø [mm]	V̇ [l/min] p [bar] 0.5	1.0	2.0	5.0	Dimensions L [mm]	Hex [mm]	Weight	Spray width B at p=2 bar H = 250 mm	H = 500 mm
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".



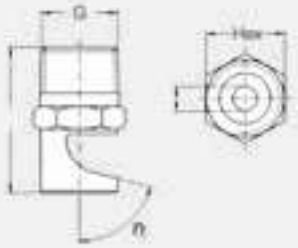
Phosphating line

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

Tongue-type nozzles
Series 686

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

Applications:
Foam control in storage tanks, crate washers, cleaning and washing processes requiring powerful and concentrated water jets.



Weight Brass: 18 g

Spray angle	η	Type	Ordering no. Mat. no. 16 303 SS	30 Brass	5E PVDF	Code G 1/8 BSPT	1/4 BSPT	3/8 BSPT	1/2 BSPT	B Ø [mm]	V̇ [l/min] p [bar] 1.0	2.0	5.0	Dimensions L [mm] R 1/8	R 1/4	R 3/8	R 1/2	Hex [mm] R 1/8	R 1/4	R 3/8	R 1/2	Spray width B at p=2 bar H = 250 mm
90°	75°	**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
	40°	**686.926**	○	-	-	-	-	**CE**	-	4.70	14.14	20.00	31.62	-	-	39	-	-	-	17	-	530
140°	75°	**686.368**	○	○	-	**CA**	-	-	-	0.80	0.45	0.63	1.00	23	-	-	-	11	-	-	-	1,360
		686.408	○	○	-	**CA**	-	-	-	1.00	0.71	1.00	1.58	23	-	-	-	11	-	-	-	1,370
		686.448	○	○	-	-	**CC**	-	-	1.20	0.88	1.25	1.98	-	28	-	-	-	14	-	-	1,370
		686.488	○	○	-	**CA**	**CC**		-	1.30	1.13	1.60	2.53	23	28	-	-	11	14	-	-	1,370
		686.528	○	○	-	**CA**	**CC**	-	-	1.50	1.41	2.00	3.16	23	28	-	-	11	14	-	-	1,370
		686.568	○	○	○*	**CA**	**CC**	-	-	1.70	1.77	2.50	3.59	23	-	-	-	11	-	-	-	1,370
		686.608	○	○	-	**CA**	**CC**	-	-	1.90	2.23	3.15	4.98	23	28	-	-	11	14	-	-	1,370
		686.648	○	○	-	-	**CC**	-	-	2.20	2.83	4.00	6.32	-	28	-	-	-	14	-	-	1,370
		686.688	○	○	-	**CA**	**CC**	-	-	2.40	3.54	5.00	7.91	23	28	-	-	11	14	-	-	1,370
		686.728	○	○	-	**CA**	**CC**	-	-	2.70	4.45	6.30	9.96	23	-	-	-	11	-	-	-	1,370
		686.768	○	○	-	-	**CC**	-	-	3.00	5.66	8.00	12.65	-	28	-	-	-	14	-	-	1,370
		686.808	○	○	-	**CA**	**CC**	-	-	3.40	7.07	10.00	15.81	23	28	-	-	11	14	-	-	1,370
		686.828	○	○	-	-	**CC**	-	-	3.60	7.92	11.20	17.71	-	28	-	-	-	14	-	-	1,370
		686.848	○	○	-	-	**CC**	-	-	3.80	8.80	12.50	19.76	-	28	-	-	-	14	-	-	1,370
		686.868	○	○	-	-	**CC**	-	-	4.00	9.90	14.00	22.14	-	28	-	-	-	14	-	-	1,370
		686.888	○	○	-	-	**CC**	-	-	4.20	11.31	16.00	25.30	-	28	-	-	-	14	-	-	1,370
		686.908	○	○	-	-	**CC**	-	-	4.50	12.73	18.00	28.46		28	-	-	-	14	-	-	1,370
		686.928	○	-	-	-	-	**CE**	-	4.70	14.14	20.00	31.62	-	-	32	-	-	-	17	-	1,370
		686.968	-	○	-	-	-	-	**CG**	5.30	17.68	25.00	39.53	-	-	32	40	-	-	17	22	1,370
		686.988	○	-	-	-	-	**CE**	**CG**	5.60	19.80	28.00	44.27	-	-	32	40	-	-	17	22	1,370

B = bore diameter
Can also be used for air or saturated steam (see page 6.8).
*Only available with code CA

Example of ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	686.366	+	**30**	+	**CA**	=	**686.366.30.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".

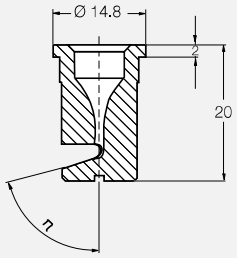
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

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 concentrated water jets.

Series 684



Weight: 3 g

Spray angle	η	Ordering no. Type	Mat. no. 56 POM	Mat. no. 5E PVDF	Colour**	B Ø [mm]	V̇ [l/min] p [bar] 1.0	2.0	5.0	L [mm]	Spray width B at p=2 bar H = 250 mm
140°	75°	**684.348**	○	-	green	0.7	0.35*	0.50	0.79	20	1,360
	75°	**684.368**	○	○	yellow	0.8	0.45*	0.63	1.00	20	1,360
	75°	**684.408**	○	-	blue	1.0	0.71	1.00	1.58	20	1,370
	75°	**684.448**	○	-	red	1.2	0.88	1.25	1.98	20	1,370
	75°	**684.488**	○	○	brown	1.3	1.13	1.60	2.53	20	1,370
	75°	**684.528**	○	-	grey	1.5	1.41	2.00	3.16	20	1,370
	75°	**684.568**	○	○	white	1.7	1.77	2.50	3.95	19	1,370
	75°	**684.608**	○	-	light blue	1.9	2.23	3.15	4.98	19	1,370
	75°	**684.688**	○	-	green	2.4	3.54	5.00	7.91	17	1,370
	75°	**684.728**	○	○	black	2.7	4.45	6.30	9.96	17	1,370
	75°	**684.808**	○	-	beige	3.4	7.07	10.00	15.81	16	1,370

B = bore diameter
* Differing spray pattern.
** Material PVDF generally blue

Example for ordering:	Type 684.348	+	Material-no. 56	=	Ordering no. 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«.

For assembly possibilities please refer to folded page.

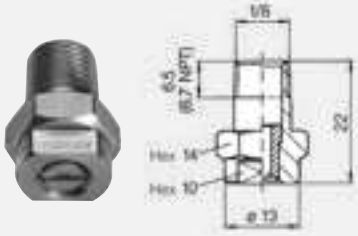
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

High pressure flat fan nozzles
Series 602/608/652

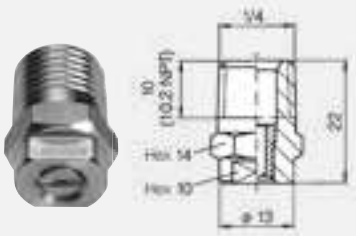
Sharp uniform flat fan with an extremely narrow jet depth.

Applications:
High pressure cleaners, steam jet cleaners.

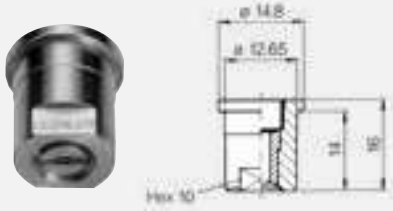
Materials:
Nozzle body:
303 SS
Insert:
hardened stainless steel
420F SS



Series 608, Weight: 13 g



Series 602, Weight: 18 g



Series 652, Weight: 13 g

US gal/ min. at 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	2.88	3.53	4.08	4.56	5.00	5.58	6.45
021	608	602	652	371	372	373	374	1.02	3.03	3.71	4.28	4.79	5.25	5.87	6.77
025	608	602	652	381	382	383	384	1.10	3.60	4.42	5.10	5.70	6.24	6.98	8.06
028	608	602	652	391	392	393	394	1.16	4.04	4.94	5.71	6.38	6.99	7.81	9.02
03	608	602	652	401	402	403	404	1.18	4.32	5.29	6.11	6.83	7.48	8.37	9.66
034	608	602	652	411	412	413	414	1.30	4.90	6.00	6.93	7.75	8.49	9.49	10.96
038	608	602	652	441	442	443	-	1.33	5.48	6.72	7.75	8.67	9.50	10.62	12.26
04	608	602	652	451	452	453	454	1.35	5.77	7.06	8.16	9.12	9.99	11.17	12.90
043	608	602	652	461	462	-	-	1.38	6.20	7.59	8.77	9.80	10.74	12.00	13.86
045	608	602	652	471	472	473	474	1.40	6.49	7.95	9.18	10.26	11.24	12.57	14.51
05	608	602	652	481	482	483	484	1.55	7.21	8.83	10.20	11.40	12.49	13.96	16.12
055	608	602	652	501	502	503	504	1.60	7.93	9.71	11.22	12.54	13.74	15.36	17.73
06	608	602	652	521	522	523	524	1.72	8.65	10.60	12.24	13.68	14.99	16.75	19.35
065	608	602	652	531	532	533	534	1.75	9.37	11.48	13.26	14.82	16.23	18.15	20.96
07	608	602	652	541	542	543	544	1.80	10.09	12.36	14.28	15.96	17.48	19.55	22.57
075	608	602	652	551	552	553	554	1.90	10.81	13.25	15.29	17.10	18.73	20.94	24.18
08	608	602	652	571	572	573	574	2.05	11.54	14.13	16.31	18.24	19.98	22.34	25.80
087	608	602	652	581	582	583	584	2.06	12.54	15.36	17.74	19.83	21.72	24.29	28.04
09	608	602	652	591	592	593	594	2.10	12.98	15.89	18.35	20.52	22.48	25.13	29.02
10	608	602	652	601	602	603	604	2.30	14.41	17.65	20.38	22.79	24.97	27.91	32.23
11	-	602	652	621	622	623	624	2.40	15.86	19.42	22.42	25.07	27.46	30.70	35.45
125	-	602	652	641	642	643	644	2.50	18.02	22.07	25.48	28.49	31.21	34.89	40.29
131	-	602	652	651	652	653	654	2.55	18.89	23.13	26.71	29.86	32.71	36.57	42.23
139	-	602	652	661	662	663	664	2.65	20.04	24.54	28.34	31.68	34.70	38.80	44.80
15	-	602	652	671	672	673	674	2.70	21.62	26.48	30.58	34.19	37.45	41.87	48.35
175	-	602	652	701	702	703	704	3.00	25.23	30.90	35.68	39.89	43.70	48.86	56.41
20	-	602	652	-	-	723	724	3.05	28.83	35.31	40.78	45.59	49.94	55.84	64.47
25	-	602	652	-	-	763	764	3.50	36.04	44.14	50.97	56.99	62.43	69.80	80.60
30	-	602	652	-	-	793	-	3.90	43.25	52.97	61.16	68.38	74.91	83.75	96.70

A = equivalent bore diameter

Connection Code	Connection	p_{max}* [bar]
A3.00	BSPT	ca. 700
A3.07	NPT	ca. 700
A3.29	Lock nut	ca. 300

* Only valid for operation at constant pressure

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

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

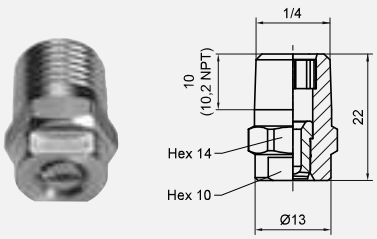
High pressure flat fan nozzles
Series 6FH

With spray stabilizer.
Sharp uniform flat fan with an extremely narrow jet depth.

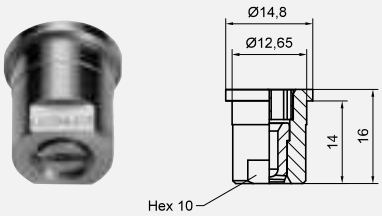
Applications:
High pressure cleaning.

Materials:
Nozzle body:
303 SS
Insert:
hardened stainless steel
420F SS
Spray Stabilizer:
301 SS

Version with male thread 1/8, Weight: 13 g



Version with male thread 1/4, Weight: 18 g



Version for retaining nut, Weight: 13 g

US gal/min. at 40 psi	Nozzle code	Flow rate code: Spray angle 20°	30°	45°	60°	Material no. A3	A Ø [mm]	V̇ [l/min] p [bar] 40	60	80	100	120	150	200
02	6FH	361	362	363	364	○	1.00	2.88	3.53	4.08	4.56	5.00	5.58	6.45
021	6FH	371	372	373	374	○	1.02	3.03	3.71	4.28	4.79	5.25	5.87	6.77
025	6FH	381	382	383	384	○	1.10	3.60	4.42	5.10	5.70	6.24	6.98	8.06
028	6FH	391	392	393	394	○	1.16	4.04	4.94	5.71	6.38	6.99	7.81	9.02
03	6FH	401	402	403	404	○	1.18	4.32	5.29	6.11	6.83	7.48	8.37	9.66
034	6FH	411	412	413	414	○	1.30	4.90	6.00	6.93	7.75	8.49	9.49	10.96
038	6FH	441	442	443	-	○	1.33	5.48	6.72	7.75	8.67	9.50	10.62	12.26
04	6FH	451	452	453	454	○	1.35	5.77	7.06	8.16	9.12	9.99	11.17	12.90
043	6FH	461	462	-	-	○	1.38	6.20	7.59	8.77	9.80	10.74	12.00	13.86
045	6FH	471	472	473	474	○	1.40	6.49	7.95	9.18	10.26	11.24	12.57	14.51
05	6FH	481	482	483	484	○	1.55	7.21	8.83	10.20	11.40	12.49	13.96	16.12
055	6FH	501	502	503	504	○	1.60	7.93	9.71	11.22	12.54	13.74	15.36	17.73
06	6FH	521	522	523	524	○	1.72	8.65	10.60	12.24	13.68	14.99	16.75	19.35
065	6FH	531	532	533	534	○	1.75	9.37	11.48	13.26	14.82	16.23	18.15	20.96
07	6FH	541	542	543	544	○	1.80	10.09	12.36	14.28	15.96	17.48	19.55	22.57
075	6FH	551	552	553	554	○	1.90	10.81	13.25	15.29	17.10	18.73	20.94	24.18
08	6FH	571	572	573	574	○	2.05	11.54	14.13	16.31	18.24	19.98	22.34	25.80
087	6FH	581	582	583	584	○	2.06	12.54	15.36	17.74	19.83	21.72	24.29	28.04
09	6FH	591	592	593	594	○	2.10	12.98	15.89	18.35	20.52	22.48	25.13	29.02
10	6FH	601	602	603	604	○	2.30	14.41	17.65	20.38	22.79	24.97	27.91	32.23
11	6FH	621*	622*	623*	624*	○	2.40	15.86	19.42	22.42	25.07	27.46	30.70	35.45
125	6FH	641*	642*	643*	644*	○	2.50	18.02	22.07	25.48	28.49	31.21	34.89	40.29
131	6FH	651*	652*	653*	654*	○	2.55	18.89	23.13	26.71	29.86	32.71	36.57	42.23
139	6FH	661*	662*	663*	664*	○	2.65	20.04	24.54	28.34	31.68	34.70	38.80	44.80
15	6FH	671*	672*	673*	674*	○	2.70	21.62	26.48	30.58	34.19	37.45	41.87	48.35
175	6FH	701*	702*	703*	704*	○	3.00	25.23	30.90	35.68	39.89	43.70	48.86	56.41
20	6FH	-	-	723*	724*	○	3.05	28.83	35.31	40.78	45.59	49.94	55.84	64.47
25	6FH	-	-	763*	764*	○	3.50	36.04	44.14	50.97	56.99	62.43	69.80	80.60
30	6FH	-	-	793*	-	○	3.90	43.25	52.97	61.16	68.38	74.91	83.7 5	96.70

A = equivalent bore diameter * Only available with connection code CC, BC or 29.

Connection code	Connection	p_{max}* [bar]
CA	1/8 BSPT	approx. 700
BA	1/8 NPT	approx. 700
CC	1/4 BSPT	approx. 700
BC	1/4 NPT	approx. 700
29	Retaining nut	approx. 300

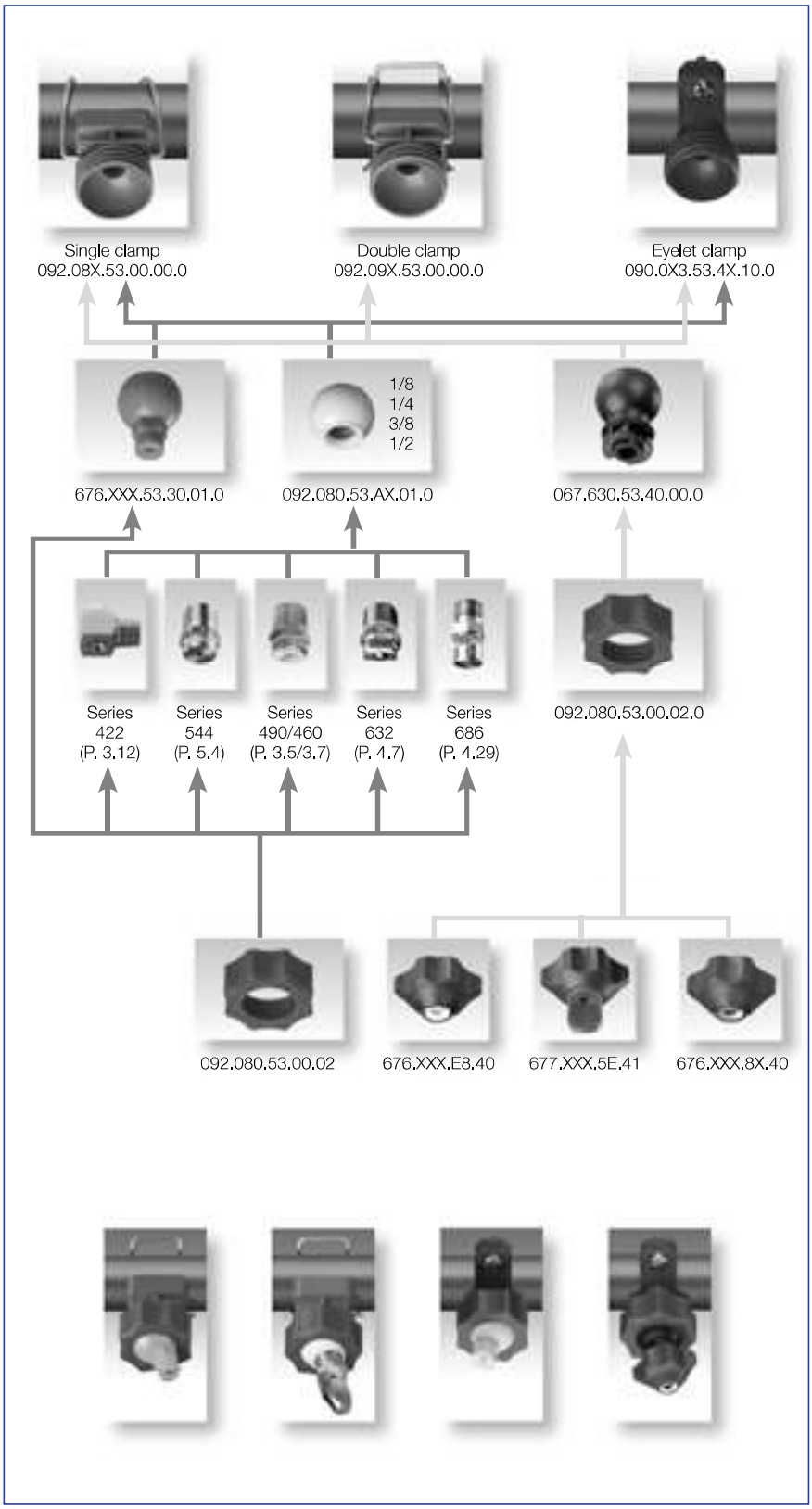
* Only valid for operation at constant pressure

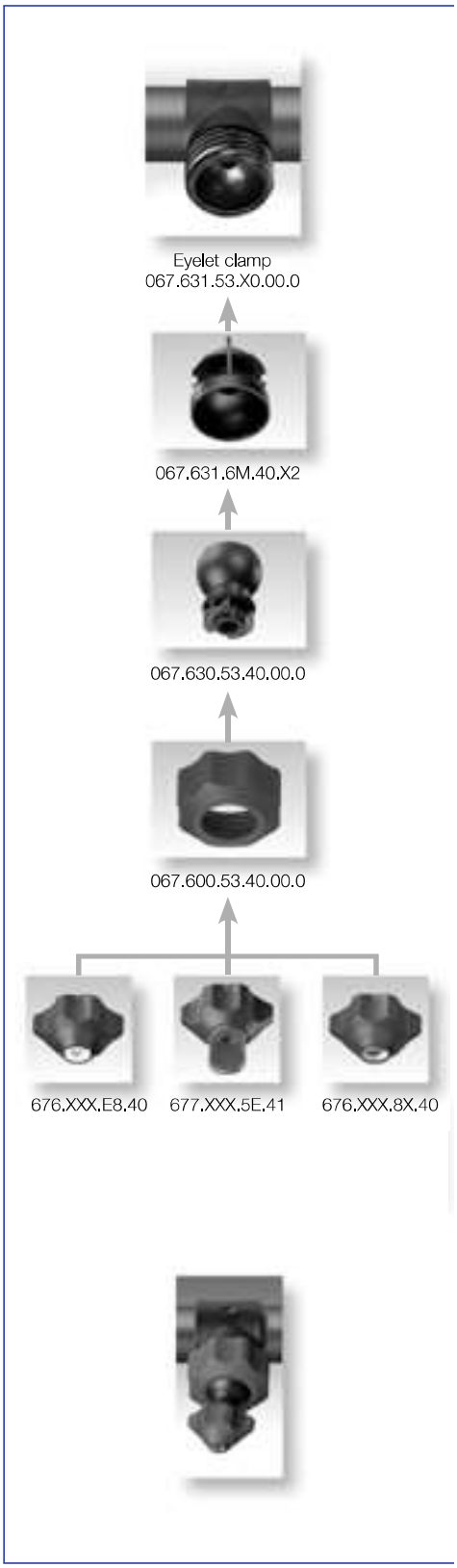
Example for ordering:

Nozzle code	+	Flow rate code	+	Material no.	+	Connection code	=	Ordering no.
6FH	+	361	+	A3	+	CA	=	6FH.361.A3.CA (Flat fan 20°; 4.56 l/min. at 100 bar; 1/8 BSPT)

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

MEMOSPRAY®/Easy-Clip combination

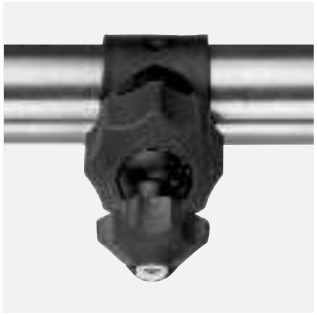


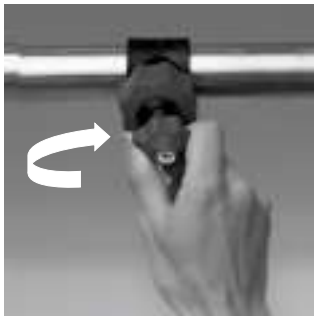


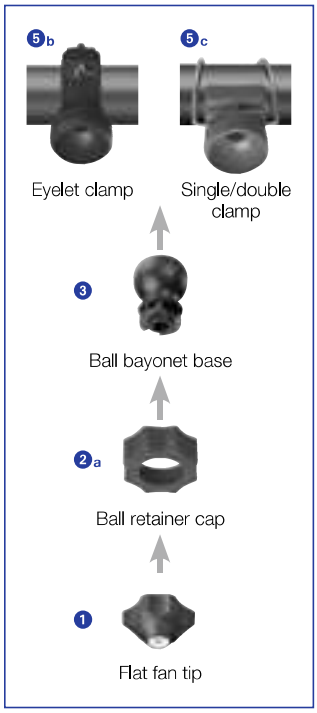
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

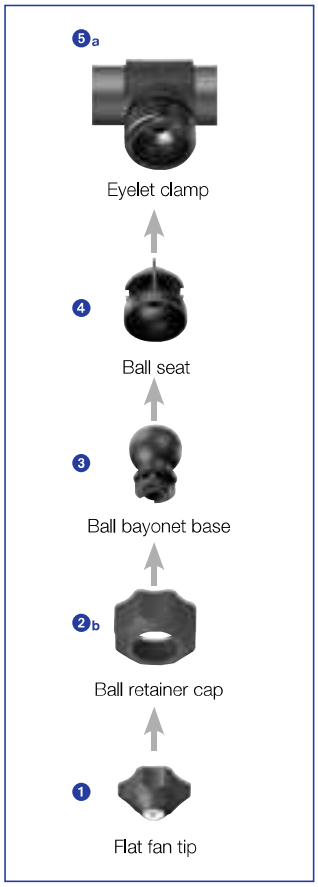
Maintaining of the adjusted spray direction by the »memory effect«. Very easy handling without the need for special tools. Especially pressure resistant pipe connector.

Application:
Degreasing, phosphating in surface treatment, cleaning.









	Type		Ordering no.	Material no. 8F Housing: PP Insert: 303 SS	8R Housing: PP Insert: 316L SS	E8 Housing: PP Insert: ceramic	53 Polypropylene (PP)	E Ø [mm]	Flow rate [l/min] at p [bar] 1.0	1.5	2.0	2.5	5.0	Weight [g] PP/3016Ti SS	PP/316L SS	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
		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	–	–	–
1	**Flat fan nozzle**	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
		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	–	–

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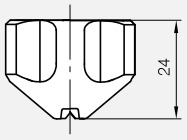
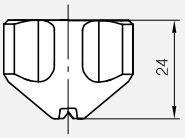


Flat fan nozzle incl. gasket 095.015.7A.05.65 (Material: Viton®)

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

Type		Ordering no.	Material no. 8F Housing: PP Insert: 303 SS	8R Housing: PP Insert: 316L SS	E8 Housing: PP Insert: ceramic	53 Polypropylene (PP)	E Ø [mm]	Flow rate [l/min] at p [bar] 1.0	1.5	2.0	2.5	5.0	Weight [g] PP/316Ti SS	PP/316L SS	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	–	–
	90°	**676.966.xx.40**	○	○	-	-	4.2	17.68	21.65	25.00	27.95	39.53	15	15	–	–
1 **Flat fan nozzle**	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	–	–
Blind nozzle	-	**067.630.8F.40.01**	○	-	-	-	–	–	–	–	–	–	15	–	–	–

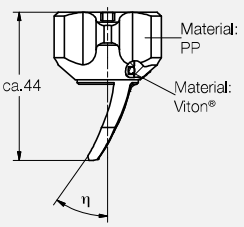
1



Flat fan nozzle incl. gasket 095.015.7A.05.65 (Material: Viton®)

Type		η	Ordering no.	Material no. 8R Housing: PP Insert: 316L SS	5E PVDF	E Ø [mm]	Flow rate [l/min] at p [bar] 1.0	1.5	2.0	2.5	5.0	Weight [g] PP/316L SS	PVDF
1a **Tongue-type nozzle**	90°	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	–
	90°	35°	**676.924.xx.41**	○	-	4.7	14.14	17.32	20.00	22.36	31.62	25	–
	90°	40°	**677.005.xx.41**	○	○	6.0	22.27	27.28	31.50	35.22	49.81	25	11

1a



Tongue-type nozzle incl. gasket 095.015.7A.05.65 (Material: Viton®)

E = narrowest free cross section

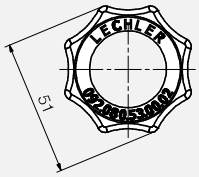
Example of ordering:	Type	+	Material no.	=	Ordering no.
	676.646.xx.40	+	8R	=	676.646.8R.40

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

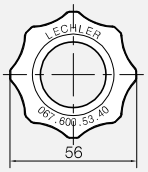
	Type	Ordering no.	Material no. 53 Polypropylene (PP)	Material no. 6M PP reinforced	Spigot-Ø B_R	Recommended bore-Ø	For pipe-Ø	Weight [g] PP
2a	**Ball retainer cap**	**092.080.xx.00.02**	○	-				18
2b	**Ball retainer cap**	**067.600.xx.40**	○	-				18
3	**Ball bayonet base**	**067.630.xx.40**	○	-				12
4	**Ball seat for Ball**	**067.631.xx.40.22**	-	○	13.8 mm	14.0-14.3 mm	1 1/4" (40.0-43.0 mm)	9
	eyelet clamp no.	**067.631.xx.40.02**	-	○	16.0 mm	16.5-17.0 mm	1 1/4" (40.0-43.0 mm)	11
	067.631.xx.40.00.0	**067.631.xx.40.12**	-	○	19.8 mm	20.3-20.8 mm	1 1/4" (40.0-43.0 mm)	13
	Ball seat for Ball	**067.631.xx.50.22**	-	○	13.8 mm	14.0-14.3 mm	1 1/2" (46.0-49.0 mm)	9
	eyelet clamp no.	**067.631.xx.50.02**	-	○	16.0 mm	16.5-17.0 mm	1 1/2" (46.0-49.0 mm)	11
	067.631.xx.50.00.0	**067.631.xx.50.12**	-	○	19.8 mm	20.3-20.8 mm	1 1/2" (46.0-49.0 mm)	13
5a	**Eyelet clamp**	**067.631.xx.40.00**	○	-	–	–	1 1/4" (40.0-43.0 mm)	31
		067.631.xx.50.00	○	-	–	–	1 1/2" (46.0-49.0 mm)	33
5b	**Eyelet clamp**	**090.023.xx.44.10**	○	-	13.8 mm	14.0-14.3 mm	1" (32.0-34.5 mm)	48
		090.023.xx.43.10	○	-	16.0 mm	16.5-17.0 mm	1" (32.0-34.5 mm)	48
		090.033.xx.44.10	○	-	13.8 mm	14.0-14.3 mm	1 1/4" (40.0-43.0 mm)	50
		090.033.xx.43.10	○	-	16.0 mm	16.5-17.0 mm	1 1/4" (40.0-43.0 mm)	50
		090.033.xx.40.10	○	-	20.0 mm	20.5-21.0 mm	1 1/4" (40.0-43.0 mm)	50
		090.043.xx.44.10	○	-	13.8 mm	14.0-14.3 mm	1 1/2" (46.0-49.0 mm)	52
		090.043.xx.43.10	○	-	16.0 mm	16.5-17.0 mm	1 1/2" (46.0-49.0 mm)	52
		090.043.xx.40.10	○	-	20.0 mm	20.5-21.0 mm	1 1/2" (46.0-49.0 mm	52
5c	**Single clamp***	**092.080.xx.00**	○	-	16.3 mm	16.5-17.0 mm	1" (32.0-34.5 mm)	36
		092.081.xx.00	○	-	16.3 mm	16.5-17.0 mm	1 1/4" (40.0-43.0 mm)	38
		092.082.xx.00	○	-	16.3 mm	16.5-17.0 mm	1 1/2" (46.0-49.0 mm)	40
		092.083.xx.00	○	-	16.3 mm	16.5-17.0 mm	2" (58.0-62.0 mm)	42

*other bore diameter on request
E = narrowest free cross section

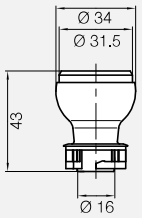
Example for ordering:	Type	+	Material no.	=	Ordering no.
	092.080.xx.00.02	+	**53**	=	**092.080.53.00.02**

2a


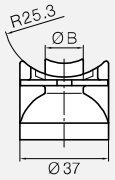
Ball retainer cap

2b


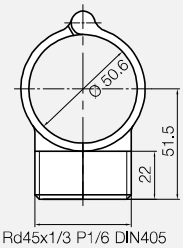
Ball retainer cap

3


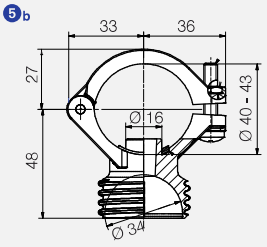
Ball bayonet base

4


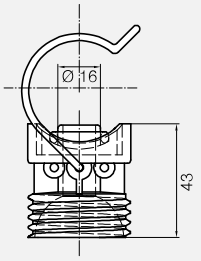
Ball seat

5a


Rd45x1/3 P1/6 DIN405
Eyelet clamp 1 1/2"

5b


Eyelet clamp 1 1/4"

5c


Single clamp

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

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 301 SS
Sealing: EPDM
Cylinder pin, screw and screw unit: 316 SS.
Body, ball retainer cap: PP, reinforced.
Nozzle, ball joint: PP

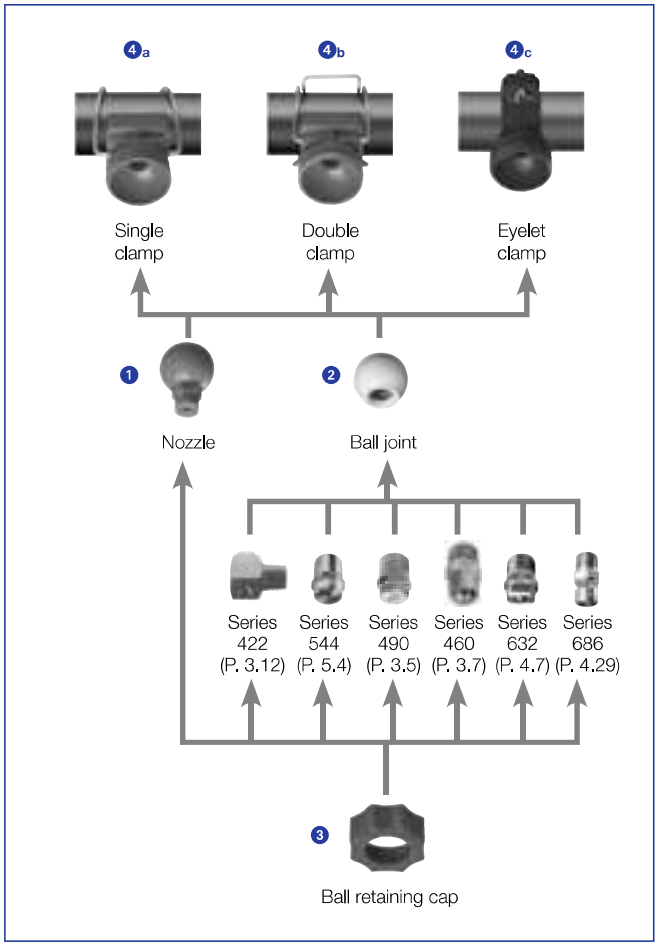
Sets

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

Ordering no.	Nozzle colour		V̇ [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	60°	4.00	5.66	6.93	8.00	8.94
676.804.53.31	lilac	60°	5.00	7.07	8.66	10.00	11.18
676.844.53.31	yellow	60°	6.25	8.84	10.83	12.50	13.98
676.884.53.31	red	60°	8.00	11.31	13.85	16.00	17.89
676.904.53.31	blue	60°	9.10	12.87	15.76	18.20	20.35
676.924.53.31	green	60°	10.00	14.14	17.32	20.00	22.36

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

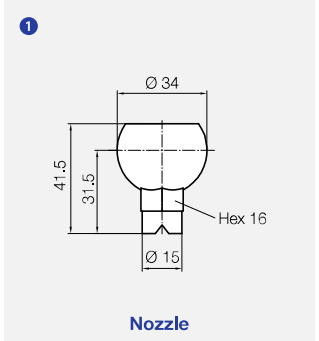
Ordering no.	Ball colour	Nozzle connection	For nozzle series
092.081.53.AB	beige	1/8 BSPP	460, 490, 632, 686, 610, 544
092.081.53.AD	beige	1/4 BSPP	422, 460, 490, 544, 612, 632, 686
092.081.53.AF	beige	3/8 BSPP	422, 460, 490, 632, 686, 688
092.081.53.AH	beige	1/2 BSPP	422, 460, 490, 632, 686



Components

1 Nozzle

Ordering no.	Nozzle colour		V̇ [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	60°	4.00	5.66	6.93	8.00	8.94
676.804.53.30.01	lilac	60°	5.00	7.07	8.66	10.00	11.18
676.844.53.30.01	yellow	60°	6.25	8.84	10.83	12.50	13.98
676.884.53.30.01	red	60°	8.00	11.31	13.85	16.00	17.89
676.904.53.30.01	blue	60°	9.10	12.87	15.67	18.20	20.35
676.924.53.30.01	green	60°	10.00	14.14	17.32	20.00	22.36
092.080.53.00.01	grey	Blind nozzle					



Nozzle

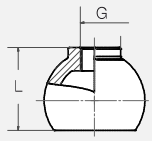
Conversion formula for the above series: $\dot{V}_2 = \dot{V}_1 * \sqrt{\frac{p_2}{p_1}}$

Easy-Clip nozzle system

❷ Ball joint

Ordering no.	Colour	Nozzle connection	L [mm]	For nozzle series
092.080.53.AB.01	beige	1/8 BSPP	28.4	460, 490, 544, 632, 686
092.080.53.AD.01	beige	1/4 BSPP	32.4	422, 460, 490, 544, 612, 632, 686
092.080.53.AF. 01	beige	3/8 BSPP	31.4	422, 460, 490, 632, 686, 688
092.080.53.AH.01	beige	1/2 BSPP	33.0	422, 460, 490, 632, 686

❷

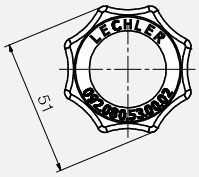


Ball joint

❸ Ball retainer cap

Ordering no.
092.080.53.00.02

❸



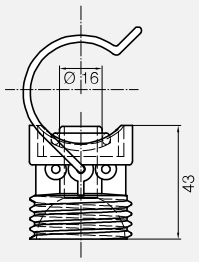
Ball retainer cap

❹a Single clamp

Ordering no.	Spigot-Ø BR	Recommended bore-Ø	For Pipe-Ø
092.080.53.00	16.3 mm	16.5-17.0 mm	1" (32.0-34.5 mm)
092.081.53.00	16.3 mm	16.5-17.0 mm	1 1/4" (40.0-43.0 mm)
092.082.53.00	16.3 mm	16.5-17.0 mm	1 1/2" (46.0-49.0 mm)
092.083.53.00	16.3 mm	16.5-17.0 mm	2" (58.0-62.0 mm)

Other spigot-Ø (13.8/19.0 mm) on request.

❹a



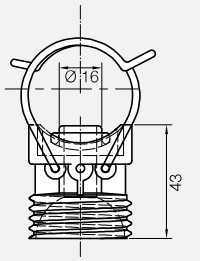
Single clamp

❹b Double clamp

Ordering no.	Spigot-Ø BR	Recommended bore-Ø	For Pipe-Ø
092.090.53.00	16.3 mm	16.5-17.0 mm	1" (32.0-34.5 mm)
092.091.53.00	16.3 mm	16.5-17.0 mm	1 1/4" (40.0-43.0 mm)
092.092.53.00	16.3 mm	16.5-17.0 mm	1 1/2" (46.0-49.0 mm)
092.093.53.00	16.3 mm	16.5-17.0 mm	2" (58.0-62.0 mm)

Other spigot-Ø (13.8/19.0 mm) on request.

❹b



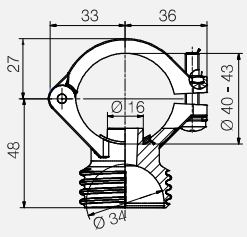
Double clamp

❹c Eyelet clamp

Ordering no.	Spigot-Ø BR	Recommended bore-Ø	For Pipe-Ø
090.023.53.43.10	16 mm	16.5-17.0 mm	1" (32.0-34.5 mm)
090.033.53.43.10	16 mm	16.5-17.0 mm	1 1/4" (40.0-43.0 mm)
090.043.53.43.10	16 mm	16.5-17.0 mm	1 1/2" (46.0-49.0 mm)

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

❹c



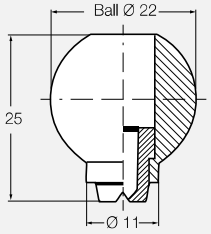
Eyelet clamp 1 1/4"

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

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.



Allround swivelling by 30°
Weight brass: 45 g

Spray angle	Ordering no. Type	Mat. no. 16 303 SS	Mat. no. 30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] (p_{max} = 30 bar) 0.5	1.0	2.0	3.0	5.0	10.0	Spray width B at p=2 bar 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.

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

Flat fan nozzles with ball joint
Series 676

Spray angle	Ordering no. Type	Mat. no. 16 303 SS	Mat. no. 30 Brass	A Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar] (p$_{max}$ = 30 bar) 0.5	1.0	2.0	3.0	5.0	10.0	Spray width B at p=2 bar H = 250 mm	H = 500 mm
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	1,200
	676.217	○	○	0.40	0.20	-	0.08*	0.11	0.14	0.18	0.25	640	1,210
	676.247	○	○	0.50	0.20	-	0.12*	0.16	0.20	0.26	0.36	650	1,230
	676.277	○	○	0.60	0.30	-	0.16*	0.22	0.27	0.35	0.49	660	1,250
	676.307	○	○	0.70	0.30	0.16*	0.23*	0.32	0.39	0.51	0.72	660	1,250
	676.337	○	○	0.90	0.40	0.22*	0.32*	0.45	0.55	0.71	1.01	670	1,270
	676.367	○	○	1.00	0.50	0.31*	0.44*	0.63	0.77	1.00	1.40	670	1,270
	676.407	○	○	1.20	0.60	0.50*	0.71	1.00	1.23	1.58	2.24	670	1,270
	676.447	○	○	1.35	0.60	0.62*	0.88	1.25	1.53	1.98	2.80	675	1,270
	676.487	○	○	1.50	0.60	0.80*	1.13	1.60	1.96	2.53	3.58	680	1,275
	676.517	○	○	1.65	0.90	0.95*	1.34	1.90	2.33	3.00	4.25	685	1,280
	676.567	○	○	2.00	0.90	1.25	1.77	2.50	3.06	3.95	5.59	690	1,285
	676.607	○	○	2.20	1.10	1.58	2.23	3.15	3.86	4.98	7.04	700	1,300
	676.647	○	○	2.50	1.30	2.00	2.83	4.00	4.90	6.33	8.94	700	1,300
	676.677	○	○	2.70	1.40	2.38	3.36	4.75	5.82	7.51	10.62	720	1,330
	676.727	○	○	3.00	1.60	3.15	4.46	6.30	7.72	9.96	14.09	740	1,360
	676.767	○	○	3.50	1.70	4.00	5.66	8.00	9.80	12.65	17.89	760	1,400

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

Accessories see next page.

Example for ordering:	Type	+	Material-no.	=	Ordering no.
	676.145	+	**16**	=	**676.145.16**

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

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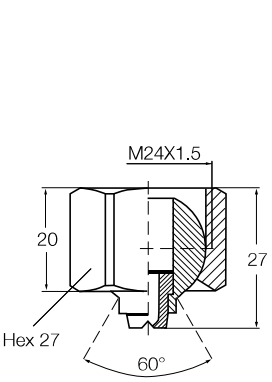
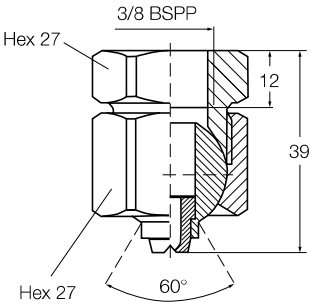
Accessories

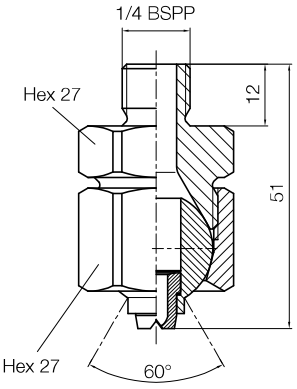
Retaining nut
092.020.16.00.02
Material: 303 SS
092.020.30.00.02
Material: Brass



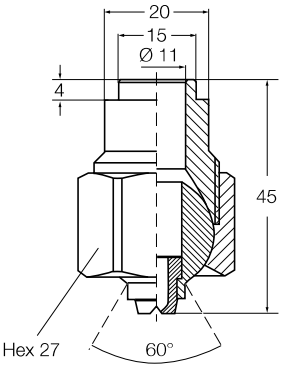
Socket
092.020.16.AF.03
Material: 303 SS
092.020.30.AF.03
Material: Brass



Retaining nipple
092.024.16.AC.03
Material: 303 SS
092.024.30.AC.03
Material: Brass



Welding nipple
092.020.17.00.04
Material: 316Ti SS



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