

Schlick Series 100-200 and Series 586 Hollow-Cone Nozzles

Applications:

- Air conditioning
- Combustion
- De-icing
- Direct lubrication
- Fabric moisturising
- Gas conditioning
- Gas cooling
- Granulating equipment
- Grease atomising
- Humidifying
- Mixing
- Process engineering
- Pulp moisturising
- Spray drying
- Steam condensation
- Superheated steam cooling
- Tobacco moisturising
- Water recooling
- Water treatment



Schlick hollow-cone nozzles

- Hollow-cone nozzles atomise liquids under pressure into finest droplets having a large specific surface.
- The liquid is fed to the nozzle under pressure and enters the swirl chamber through tangential slits.
- In the swirl chamber the energy in the pressurised liquid is converted into rotational energy.
- A centrifugal film of rotating liquid forms a hollow cone. After overcoming surface tension, the cone disperses into a myriad of fine droplets.
- The nozzles are available with 0.1 mm to 60 mm diameter orifices.
- Nozzles from 0.1 to 0.5 mm diameter are fitted with a strainer to protect against clogging.
- Spray angles of 15°, 30°, 45°, 60°, 90° and 120° are possible.
- Nozzles with 0.1 to 0.3 diameter orifices are only available with standard spray angles.
- Standard spray angles are approx.
60° for 0.1 to 0.5 mm diameter orifices
70° for 0.5 to 1.6 mm diameter orifices
78° for 1.61 to 2.5 mm diameter orifices
80 to 85° from 21 mm upwards
- The nozzle is given a smaller or larger orifice than those quoted in the table for smaller or larger spray angles. The respective flow rates correspond to the standard orifice. The overall height of the nozzle may change.
- $\Delta p = 3$ bar has been chosen as the test and rated pressure (generally available from the water mains).
- The quality of the atomised spray and the droplet spectrum are related to the diameter of the orifice, pressure, spray angle, density, viscosity, and surface tension.
- Minimum atomising pressure
0.1 – 0.5 mm diameter: $\Delta p = 3 - 6$ bar
0.5 – 1.6 mm diameter: $\Delta p = 0.5$ bar
< 1.6 mm diameter: $\Delta p = 0.1 - 0.5$ bar
- **For droplet size the following applies:**
For the same orifice,
higher pressure → smaller droplets
lower pressure → larger droplets

For the same pressure,
larger orifice → larger droplets
smaller orifice → smaller droplets
 $d_T \sim \text{diameter}$

For same pressure and same orifice,
larger spray angle → smaller droplets
smaller spray angle → larger droplets
 $d_T \sim \frac{1}{\text{spray angle}}$
- Liquids with a higher viscosity and surface tension have to be tested, as atomisation could be coarser.

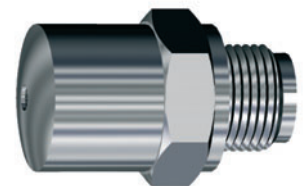
Other hollow-cone nozzles:

Models 118, 202, 432:	for abrasive liquids and for spray drying
Models 121, 123:	for low flow rates and fine atomising
Models 400, 401:	for liquids with a tendency to clog

Nozzle designs

Model 100 – Hollow-cone nozzle

Fig. 05001



Model 200 – Hollow-cone nozzle

Fig. 05002



Assemblies

Model 100 Form 7-1 – Hollow-cone nozzle

Pneumatically controlled by control air. A needle closes the outlet abruptly when the control air is shut off. Especially suitable for etching, marking, cyclic spraying and above all for liquids under pressure where drips are to be avoided.

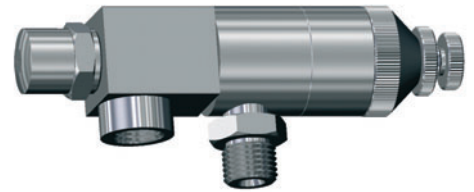


Fig. 05003

Model 100 Form 8 – Hollow-cone spray nozzle

With solenoid valve.

Standard design: 220 V, 50 Hz, 100 % ED.

Ambient temperature:

max. 55 °C, enclosure protection IP 65.

Cycling frequency: limited only by the changeover time.

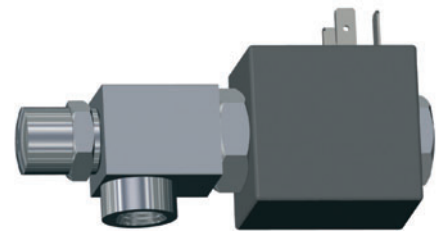


Fig. 05004

Model 103 – Hollow-cone nozzle

Short form



Fig. 05005

Model 104 – Hollow-cone nozzle

For right-angled installation



Fig. 05006

Model 586 – Hollow-cone nozzle

For cooling superheated steam

Moving centrifugal core (non-return valve function)

Dimensions and flow rates on request

Standard orifices in mm:

Size 1, G 1/4: 1.1 - 1.6 - 2.3 - 2.8 - 3.2 - 3.9 - 4.2 - 4.5 - 4.8

Size 2, G 3/8: 5.0 - 5.5 - 6.0

Size 3, G 1/2: 7.0 - 8.0

Size 4, G 3/4: 10.0 - 11.0

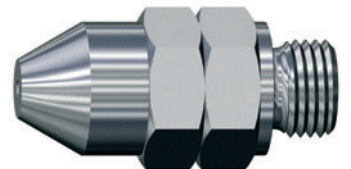


Fig. 05007

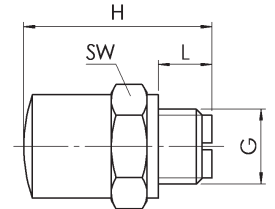
Materials

- | | | | |
|----------------------------------|--------------------|------------|--------------------------------|
| - Brass | - Tantalum | - PVC | - PVDF |
| - Acid resistant stainless steel | - HASTELLOY | - PTFE | |
| - Heat resistant stainless steel | - INCONEL | - PP | Custom products from other |
| - Titanium | - Platinum-Iridium | - RCH 1000 | materials available on request |

Dimensions

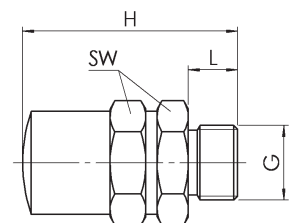
Model 100 standard design (length is longer for spray angles < 60°)

Size		1	2	3	4	5	6	7	8	9	10
Connector	G ISO 228	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	3
Thread length	L	8	9	11	14	16	19	20	21	24	30
Total height	H	26	32	40	50	63	80	90	100	110	160
Spanner size	SW	17	20	24	27	36	46	55	65	80	120
Weight of brass	ca. kg	0.03	0.05	0.08	0.12	0.28	0.70	0.88	1.40	2.40	6.00



Model 200 with hexagonal fitting

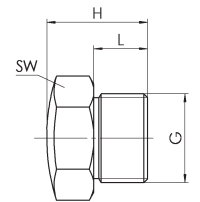
Size		1	2	3	4	5	6
Connector	G ISO 228	1/8	1/4	3/8	1/2	3/4	1
Thread length	L	8	9	11	14	16	19
Total height	H	31	38	47	58	70	95
Spanner size	SW	17	20	24	27	36	46
Weight of brass	ca. kg	0.04	0.08	0.12	0.22	0.31	0.90



Model 103 short design

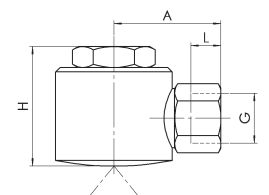
Orifices and flow rates are table sorted to size and not to connection thread

Size		1	2	3	4	5	6	7
Connector	G ISO 228	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Thread length	L	11	14	16	19	20	21	24
Total height	H	18	21	28	36	46	60	68
Spanner size	SW	20	24	32	36	46	55	65

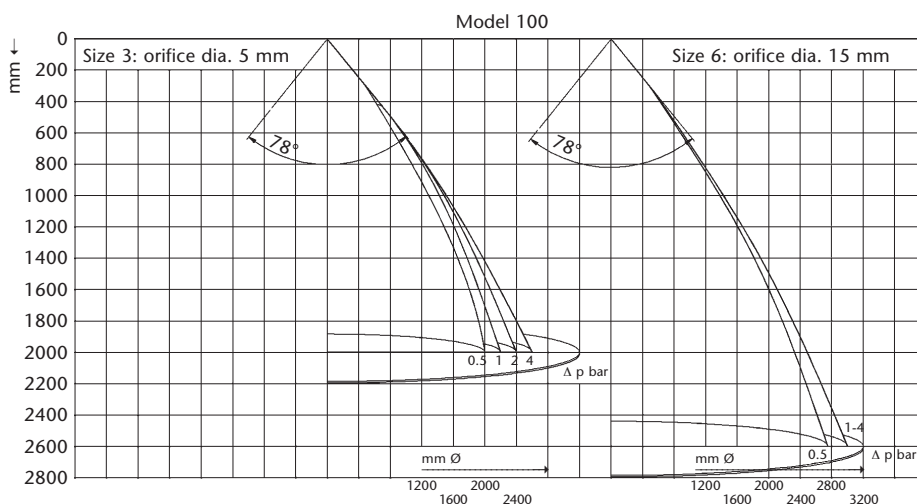


Model 104 with right-angled connection

Size		1	2	3	4	5	6	7
Connector	G ISO 228	1/8	1/4	3/8	1/2	3/4	1	1 1/4
Thread length	L	8	9	11	14	16	19	20
Total height	H	30	30	40	50	60	75	85
Length	A	30	30	40	50	60	70	80



Cone diameter



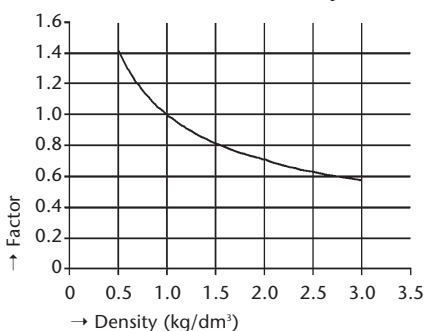
Performance specification

Performance data of hollow-cone nozzles

Model 100/200 size	Nozzle orifice Ø in mm	Flow rate in l/min at									Nozzle spray angle in °
		0.25 bar	0.5 bar	1 bar	2 bar	3 bar	4 bar	6 bar	8 bar	10 bar	
1. G ¹ / ₈	0.3					0.035	0.040	0.050	0.057	0.064	60
	0.4					0.062	0.072	0.088	0.100	0.113	60
	0.5				0.080	0.097	0.111	0.138	0.159	0.178	63
	0.8				0.204	0.250	0.288	0.354	0.408	0.457	68
	1.1			0.270	0.380	0.470	0.540	0.660	0.770	0.860	70
	1.6		0.41	0.58	0.81	1.00	1.16	1.43	1.64	1.83	72
	2.3	0.60	0.84	1.19	1.68	2.06	2.38	2.92	3.37	3.76	75
	2.8	0.88	1.24	1.76	2.48	3.05	3.52	4.32	4.98	5.57	78
2. G ¹ / ₄	3.2	1.15	1.63	2.30	3.26	4.00	4.62	5.65	6.52	7.30	78
	3.6	1.45	2.06	2.92	4.12	5.05	5.83	7.15	8.25	9.20	78
	3.9	1.70	2.41	3.40	4.80	5.90	6.82	8.35	9.63	10.75	78
	4.2	1.98	2.82	3.98	5.63	6.90	7.95	9.75	11.30	12.60	78
	4.5	2.28	3.23	4.55	6.45	7.90	9.10	11.20	12.90	14.40	78
	4.8	2.60	3.68	5.20	7.35	9.00	10.40	12.75	14.70	16.50	78
3. G ³ / ₈	5.0	2.80	4.00	5.60	7.95	9.75	11.13	13.80	15.90	17.80	78
	5.5	3.40	4.82	6.80	9.65	11.80	13.60	16.70	19.25	21.50	78
	6.0	4.05	5.70	8.10	11.40	14.00	16.20	19.80	22.80	25.60	78
4. G ¹ / ₂	7.0	5.50	7.80	11.00	15.60	19.10	22.00	27.00	31.20	34.80	78
	8.0	7.20	10.20	14.40	20.40	25.00	28.80	35.40	40.80	45.70	78
5. G ³ / ₄	10.0	11.30	15.90	22.50	31.80	39.00	45.00	55.20	63.70	71.20	78
	11.0	13.60	19.20	27.20	38.40	47.00	54.50	66.50	77.00	86.00	78
6. G1	13.0	19.00	27.00	38.00	54.00	66.00	76.00	93.00	108.00	120.00	78
	15.0	25.00	36.00	51.00	72.00	88.00	102.00	124.00	144.00	161.00	78
7. G1 ¹ / ₄	18.0	36.00	51.00	73.00	103.00	126.00	145.00	178.00	206.00	230.00	79
	21.0	50.00	70.00	99.00	140.00	172.00	197.00	244.00	281.00	314.00	80
8. G1 ¹ / ₂	23.0	60.00	84.00	119.00	168.00	206.00	238.00	292.00	337.00	376.00	81
	25.0	70.00	100.00	140.00	198.00	243.00	280.00	344.00	397.00	445.00	82
9. G2	30.0	102.00	143.00	203.00	287.00	352.00	406.00	497.00	575.00	642.00	83
	36.0	145.00	206.00	292.00	412.00	505.00	583.00	650.00	715.00	825.00	84
10. G3	50.0	280.00	400.00	560.00	795.00	975.00	1113.00	1380.00	1590.00	1780.00	85
	60.0	405.00	570.00	810.00	1140.00	1400.00	1620.00	1980.00	2280.00	2560.00	85

- Flow referred to water at 16 °C – see conversion table for liquids of other densities.
- Orifice diameters are given in 1/10 mm on the individual nozzles.
- For technical reasons, nozzles with a spray angle that deviates from the standard are provided with a smaller or larger outlet orifice. The individual flow rates, however, correspond to the standard orifice.

Conversion factor for density

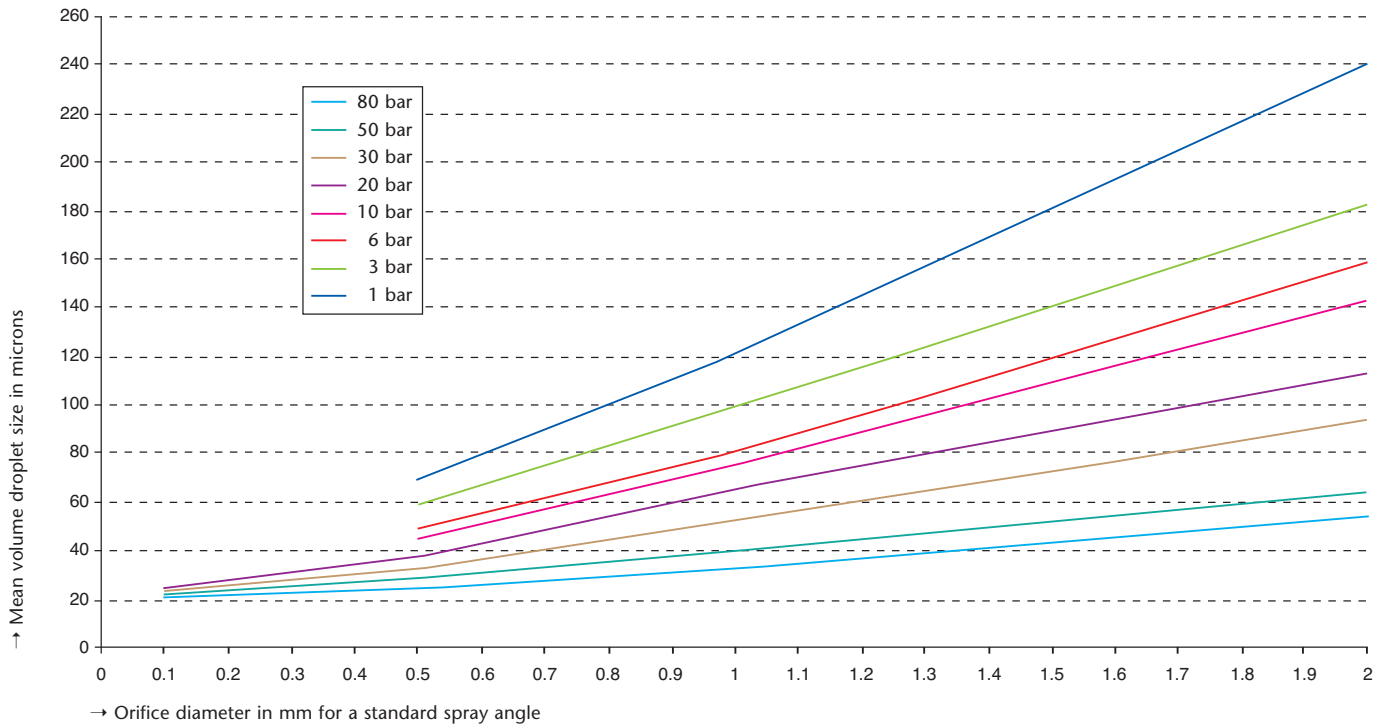


- Flow rates differ for liquids of densities deviating from that of water.
- Use the conversion factors on the left to determine flow rates.
- To convert the flow rate, simply multiply the value referring to water from the table above by the respective conversion factor.
- The influence of viscosity cannot be calculated. The flow rate must be determined experimentally for values differing largely from water.

Droplet Size

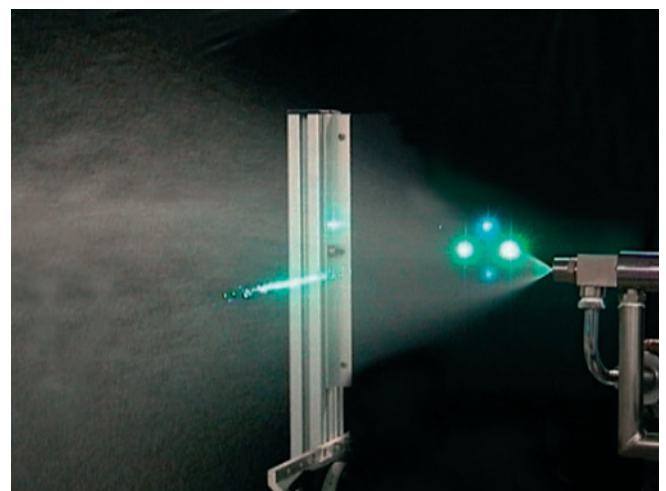
Hollow-cone spray nozzles

Mean volume droplet size in microns



Laser measurement of a Model 100 spray angle

0.7 mm orifice with standard spray pattern at a liquid differential pressure of 8 bar



Custom versions

Model 200 S28 – Hollow-cone nozzle

With strainer attachment



Fig. 05008

Model 200 S8 – Hollow-cone nozzle

With extended thread fitting for installation in walls



Fig. 05009

Model 103 S14 – Hollow-cone nozzle

For insertion pipes, with slots to screw in the nozzle



Fig. 05010

Custom designs/specialities

Model 100 Form 5 S31 – Hollow-cone nozzle

With heating system and flanged mounting

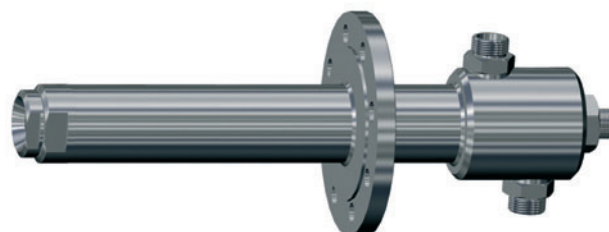


Fig. 05011

Model 100 Form 7-1 – Hollow-cone nozzle

With pneumatic OPEN/CLOSE control and diary fitting



Fig. 05012

Service spectrum

Pilot test laboratory

Before any new spray nozzles are used we subject them to comprehensive trials in our own test laboratory – if need be to your operational parameters. During these tests, we precisely determine droplet size, velocities and flow densities with our modern DUAL PDA laser-measuring equipment.



Test nozzles

Schlick spray nozzles are world renowned for highest precision. We can offer you the best and most lasting solution to your requirements. And, if you want, we can supply you with test nozzles in advance – just contact us.

Engineering

Take advantage of our comprehensive expertise – from design to installation – the conception of new products or

the optimisation of existing plant. We would be glad to help you improve the success of your operation.

Repair service

As well as competent advice and its inception, you can profit from an efficient after-sales service that guarantees long-term supply of all products. We carry out both repair and conversion of Schlick spray nozzles, and in emergency, we can supply spare parts quickly and reliably.

Onsite service

If required we will investigate and develop an optimal solution to suit individual requirements onsite. We will advise you and give you support during installation and initial start-up of the plant. A further plus is the help available from our worldwide technical field service network.

Custom products

As one of the leading spray nozzle manufacturers in Europe, we can offer both high quality standard solutions and are in the position of developing customised products for individual tasks as fast as possible, even for small production runs.



Documentation to the customer's requirements

Reliability and quality are the basis for successful cooperation with our international customers. This applies both to our products and to our service. If you wish, we will supply you with all necessary documentation such as technical handbooks for the nozzles (drawings, flow diagrams, installation and operating instructions) together with factory and material specifications.



All specifications are subject to change (flow rates/dimensions).

The performance/flow rate specifications quoted are descriptive or product identities and can vary by up to ± 5 percent on delivery.



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