



The image features a technical drawing of a pneumatic nozzle. The drawing includes a side view of the nozzle with dimensions: a total length of 62 mm, a distance of 46 mm from the nozzle tip to a specific feature, and a diameter of $\text{M}8 \times 0,75$. A distance of ca. 90 mm is also indicated. Below the side view is a top view of the nozzle's nozzle body, showing a diameter of $\text{Ø} 42 \text{ mm}$ and a length of 39,6 mm. The top view also shows a G 1/4 connection. A list of applications is provided next to the nozzle body drawing.

Pneumatic nozzles

- Atomization of viscous liquids
- Cooling
- Gas cooling
- Humidification of air
- Humidification of goods
- Lubrication
- Web dampening
- and many others...



Pneumatic atomizing nozzles are available in various designs to comply with specific spray and flow requirements:

- self-aspiration (siphon principle)
- supply of liquid from a vessel located at a higher level (gravity principle)
- supply of liquid under pressure (pressure principle)
- mixing of fluids inside or outside the nozzle
- full cone or flat fan spray pattern

For many applications, adjustability of liquid flow and, thereby, of the droplet size, is possible with the aid of manually operated accessory components.

A pneumatically controlled piston (series 136) or magnetic valve (series 166) allows to perform automatic or intermittent operations. A number of special customized designs complete the nozzle range.

Criteria for selecting pneumatic atomizing nozzles

1. Spray pattern

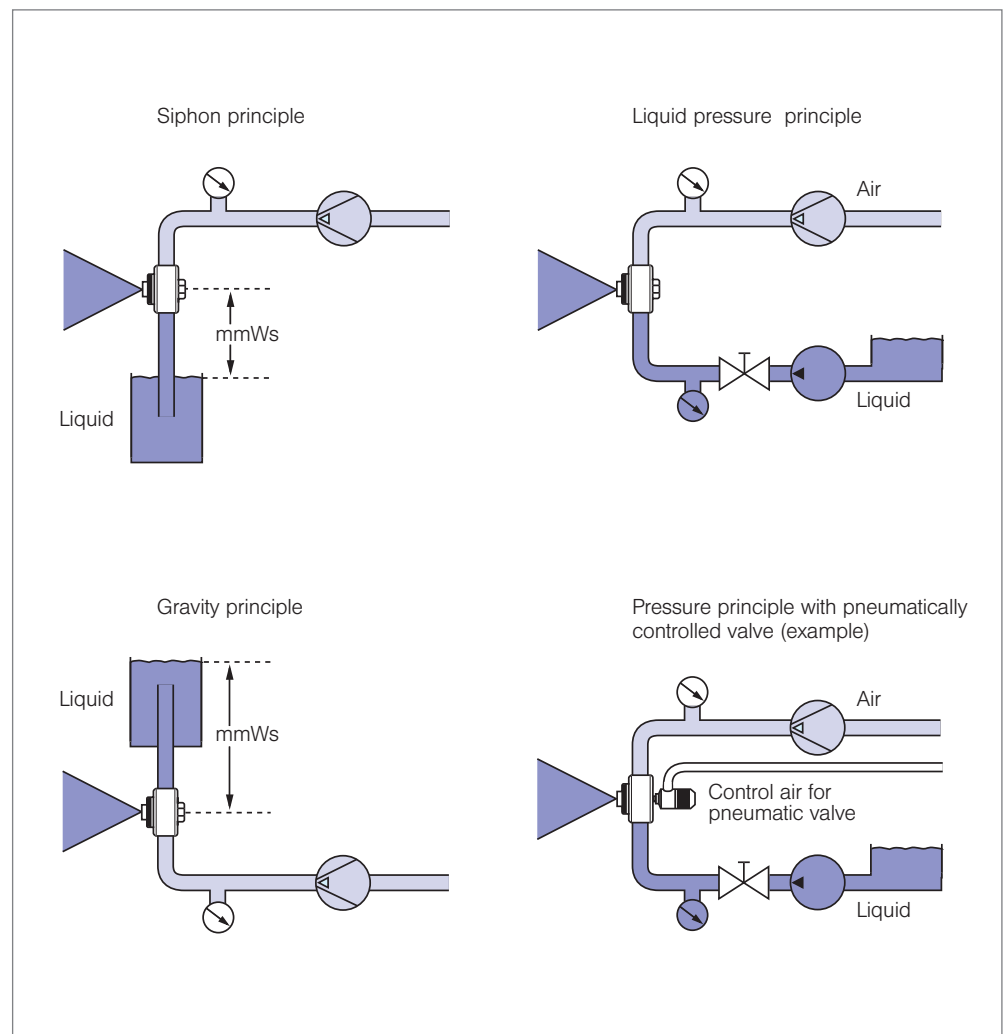
Pneumatic flat fan atomizing nozzles should be chosen for humidifying and cooling of goods, for web dampening and for a number of painting tasks; in short, wherever a broad linear impact is required. **Pneumatic full cone atomizing nozzles**, however, should be used, when a compact, circular impact or a major reach is required, e.g. for direct air humidifying, for gas cooling or for chemical process applications.

2. Mode of liquid supply

Whenever liquid can be supplied under pressure, it is recommended to use nozzles functioning by the **liquid pressure principle**. Use of pneumatic atomizing nozzles operating to the **siphon or the gravity principle** is recommended when liquid is to be sprayed in small quantities, e.g. for spraying of disinfectants.

















3. Mixing of fluids

The supply of air or gas provides an additional breaking up of the liquid flow into finest drop particles. This supply and mixing can either take place inside or outside the nozzle. **Inside mixing** should be preferred, when water, low viscosity liquids or liquids without solid matter are to be atomized. **Outside mixing** is particularly suited for atomizing viscous liquids which are prone to impurities and therefore tend to cause clogging of the nozzle. Low liquid pressures are used with this type of nozzle due to its design.

















Pneumatic atomizing nozzles

Spray pattern	Mode of liquid supply	Mixing of fluids	Series		\dot{V} Water [l/h]	Application	Page
Full cone	Pressure principle	Inside	136.1 166.1	20°	1,50 – 172,70	Humidification of air, cooling.	1.5
							
Full cone	Pressure principle	Inside	136.2 166.2	60°	1,80 – 80,70	Humidification of air, cooling.	1.7
							
Full cone	Siphon or gravity principle	Out-side	136.3 166.3	20°	0,40 – 43,70	Chemical industry, cooling, spraying of viscous liquids.	1.9
							
Flat fan	Pressure principle	Inside	136.4 166.4	45° 60° 80°	0,30 – 96,20	Web dampening, humidification of goods, cooling.	1.10
							
Flat fan	Siphon or gravity principle	Inside	136.5 166.5	60°	0,50 – 6,50	Web dampening, humidification of goods, cooling.	1.12
							



Pneumatic atomizing nozzles

Spray pattern	Mode of liquid supply	Mixing of fluids	Series		\dot{V} Water [l/h]	Application	Page
Flat fan	Pressure principle	Outside	136.6 166.6	45° 60°	2,00 – 94,10	Web dampening, humidification of goods, atomization of viscous fluids.	1.13
							
Full cone	Siphon or gravity principle	Inside	140	20° – 30°	4,50 – 12,00	Lubrication, cooling, humidification of air.	1.16
							
Full cone	Pressure principle	Inside	170	15°	8,50 – 290,00 [l/min]	Gas cooling, flue gas desulphurisation, exhaust gas conditioning, dust control.	On request. Please ask for our leaflet „Twinfluid Nozzle Lances“.
							
Full cone	Pressure principle	Outside	150	20° – 30°	0,15 – 63,00 [l/min]	Chemical process engineering, cooling, atomizing of viscous liquids.	On request. Please ask for our leaflet „Twinfluid Nozzle Lances“.
							

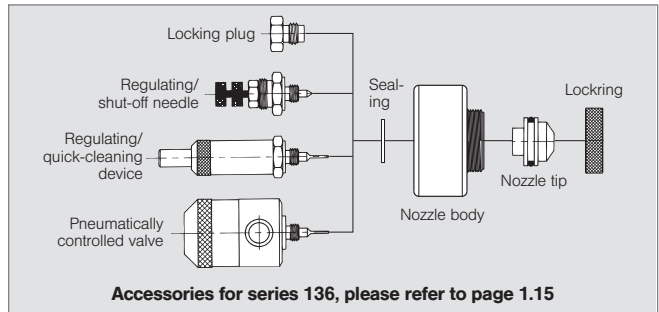
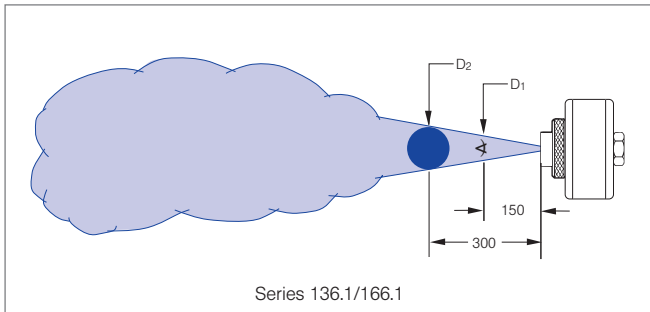
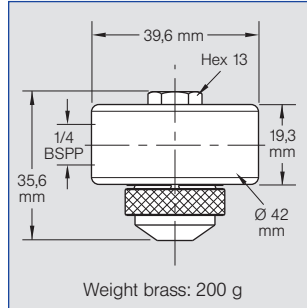


Pneumatic atomizing nozzles, Full cone, pressure principle, internal mixing Series 136.1/166.1



Fine full cone atomization and fogging with air or gas. Liquid pressure principle. Internal mixing of fluids.

Applications:
Humidification of air, cooling.



Spray angle	Ordering no.		E Ø [mm]	Liquid pressure p [bar]												Spray dimensions			
	Type	Mat.-no.		0,7			1,5			3,0			4,0			p Air [bar]	p Water [bar]	D ₁	D ₂
				p Air [bar]	V̇ Water [l/h]	V̇ _n Air [m ³ /h]	p Air [bar]	V̇ Water [l/h]	V̇ _n Air [m ³ /h]	p Air [bar]	V̇ Water [l/h]	V̇ _n Air [m ³ /h]	p Air [bar]	V̇ Water [l/h]	V̇ _n Air [m ³ /h]				
20°	136. 105. xx. 15 166. 105. xx. 15	1.4305/303 SS Brass plated	0,50	0,80	3,60	0,60	1,50	5,10	0,80	2,80	7,00	1,20	4,30	6,10	1,90	0,80	0,70	40	50
				1,00	2,50	0,70	1,70	4,30	1,00	2,90	6,60	1,30	4,40	5,80	2,00	1,70	1,50	40	50
				1,10	2,00	0,80	1,80	3,80	1,00	3,00	6,30	1,30	4,60	5,00	2,10	2,50	2,00	40	60
				1,20	1,50	0,90	1,90	3,30	1,10	3,30	5,20	1,60	4,70	4,70	2,20	3,00	3,00	40	60
				-	-	-	-	-	-	3,40	4,90	1,60	4,80	4,40	2,30	4,30	4,00	40	60
				-	-	-	-	-	-	3,60	4,10	1,80	5,00	3,80	2,40	-	-	-	-
	136. 104. xx. 15 166. 104. xx. 15	0,50	0,70	5,30	1,20	1,40	7,30	1,80	2,90	9,20	3,00	4,30	9,50	4,20	0,80	0,70	40	50	
			0,80	5,00	1,30	1,50	7,00	2,00	3,00	8,90	3,10	4,60	8,90	4,50	1,40	1,50	40	50	
			1,00	4,40	1,50	1,70	6,40	2,10	3,20	8,50	3,30	4,80	8,60	4,70	2,30	2,00	40	60	
			-	-	-	1,80	6,10	2,20	3,30	8,30	3,40	5,20	7,60	5,10	2,90	3,00	40	70	
			-	-	-	1,90	5,80	2,30	3,40	8,10	3,50	5,50	7,10	5,40	4,30	4,00	40	80	
			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	136. 104. xx. 14 166. 104. xx. 14	0,70	0,80	8,20	1,20	1,50	11,70	1,80	2,50	18,00	2,40	3,30	20,40	3,00	1,50	0,70	40	80	
			1,10	5,50	1,60	1,80	9,60	2,10	2,80	16,20	2,80	3,60	18,90	3,30	2,30	1,50	40	80	
			1,40	4,20	1,90	2,10	7,50	2,50	3,00	15,00	3,00	3,90	17,30	3,70	2,90	2,00	40	80	
			1,50	3,90	2,00	2,30	6,60	2,70	3,30	13,10	3,30	4,10	16,20	3,90	3,30	3,00	40	80	
			1,70	3,30	2,20	2,60	5,60	2,90	3,60	11,50	3,70	4,40	14,70	4,30	4,10	4,00	40	80	
			1,80	3,00	2,30	2,80	4,90	3,10	3,90	9,80	4,00	4,70	13,20	4,60	-	-	-	-	
			1,90	2,70	2,40	2,90	4,50	3,20	4,10	9,00	4,20	4,80	12,80	4,70	-	-	-	-	
			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

E = narrowest free cross section (water)

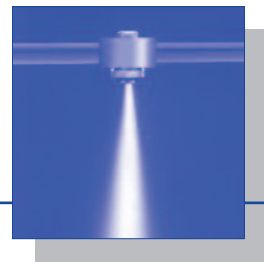
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Example for ordering: Type 136. 105. xx. 15 + Material no. (xx) 35 = Ordering no. 136. 105. 35. 15





Pneumatic atomizing nozzles, Full cone, pressure principle, internal mixing Series 136.1 / 166.1



Spray angle	Ordering no.		E ∅ [mm]	Liquid pressure p [bar]												Spray dimensions					
	Type	Mat. no.		0,7			1,5			3,0			4,0			p Air [bar]	p Water [bar]	D ₁	D ₂		
				p Air [bar]	v̇ Water [l/h]	v̇ _n Air [m ³ /h]	p Air [bar]	v̇ Water [l/h]	v̇ _n Air [m ³ /h]	p Air [bar]	v̇ Water [l/h]	v̇ _n Air [m ³ /h]	p Air [bar]	v̇ Water [l/h]	v̇ _n Air [m ³ /h]						
	16	35																			
20°	136. 103. xx. 13 166. 103. xx. 13	○	○	1,00	1,10	13,30	2,60	1,90	20,70	3,60	3,30	29,50	5,40	-	-	-	1,70	0,70	40	60	
					1,40	10,30	3,10	2,20	17,60	4,20	3,80	25,70	6,20	4,50	32,00	7,10	2,80	1,50	40	80	
					1,50	9,40	3,30	2,50	14,70	4,80	4,50	19,70	7,50	5,20	26,90	8,20	3,80	2,00	40	80	
					1,70	8,50	3,70	2,80	12,50	5,20	5,20	15,70	8,60	5,50	24,90	8,80	5,20	3,00	40	80	
					1,80	7,70	3,90	3,00	11,10	5,60	5,50	14,10	9,10	-	-	-	5,90	4,00	40	80	
					1,90	7,30	4,00	3,30	9,50	6,00	5,90	12,20	9,80	-	-	-	-	-	-	-	-
					2,10	6,10	4,30	3,40	8,70	6,20	-	-	-	-	-	-	-	-	-	-	-
					1,00	34,90	3,60	1,40	91,90	3,10	2,50	143,60	4,00	3,20	172,70	4,50	0,70	0,70	60	130	
	1,10	29,80	4,00	1,50	82,70	3,50	2,80	123,20	5,10	3,50	154,10	5,60	1,50	1,50	80	130					
	1,20	25,40	4,50	1,70	65,40	4,40	3,00	108,40	5,90	3,70	141,50	6,40	3,00	3,00	80	100					
	1,30	22,30	4,80	1,80	57,90	4,80	3,20	94,70	6,80	4,00	123,40	7,60	4,00	4,00	50	90					
	-	-	-	1,90	50,70	5,30	3,30	88,10	7,20	4,50	93,30	9,70	-	-	-	-					
	-	-	-	2,00	45,20	5,70	3,50	75,50	8,10	4,80	77,80	10,90	-	-	-	-					
	-	-	-	-	-	-	3,80	61,50	9,40	5,20	64,70	12,70	-	-	-	-					

E = narrowest free cross section (water)

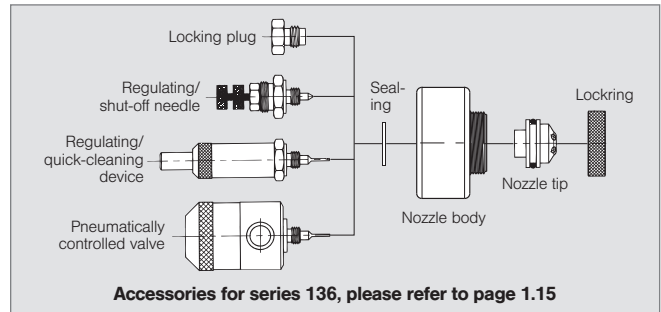
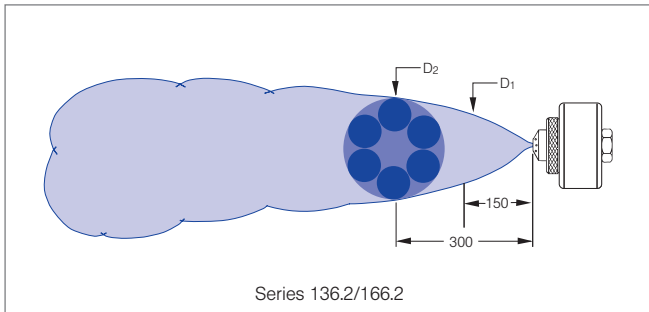
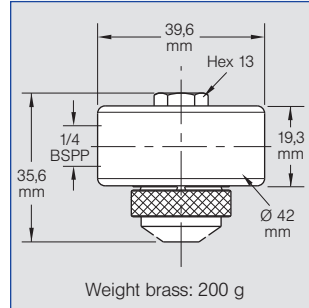
Example **Type** + **Material no. (xx)** = **Ordering no.**
for ordering: **136. 103. xx. 13** + **16** = **136. 103. 16. 13**



Pneumatic atomizing nozzles, Full cone, pressure principle, internal mixing Series 136.2 / 166.2



Fine full cone atomization and fogging with air or gas. Especially wide spray angle of 60°. Pressure principle. Internal mixing of fluids.
Applications:
Humidification of air, cooling.



Spray angle	Ordering no.		E Ø [mm]	Liquid pressure p [bar]												Spray dimensions				
	Type	Mat. no.		0,7			1,5			3,0			4,0			p Air [bar]	p Water [bar]	D1 [mm]	D2 [mm]	
				p Air [bar]	V̇ Water [l/h]	V̇n Air [m³/h]	p Air [bar]	V̇ Water [l/h]	V̇n Air [m³/h]	p Air [bar]	V̇ Water [l/h]	V̇n Air [m³/h]	p Air [bar]	V̇ Water [l/h]	V̇n Air [m³/h]					
60°	136. 206. xx. 15 166. 206. xx. 15	1.4305/303 SS Brass plated	0,50	-	-	-	1,40	6,10	1,50	2,90	7,40	2,60	4,10	7,50	3,50	1,50	1,50	200	300	
				-	-	-	1,50	5,60	1,60	3,20	6,40	2,90	4,50	6,20	3,90	2,30	2,00	200	330	
				-	-	-	1,70	4,70	1,80	3,30	5,90	3,00	4,80	5,10	4,20	3,20	3,00	200	330	
				-	-	-	1,80	4,20	1,90	3,40	5,60	3,10	5,20	3,50	4,70	4,10	4,00	200	330	
	136. 208. xx. 12 166. 208. xx. 12	1.4305/303 SS Brass plated	1,00	0,70	22,40	2,10	1,40	35,10	2,90	2,80	47,10	4,70	4,30	29,50	8,30	0,80	0,70	190	360	
				0,80	17,20	2,50	1,50	28,70	3,20	2,90	40,40	4,80	4,50	23,10	9,30	1,50	1,50	200	380	
				0,90	12,10	3,00	1,70	20,30	4,10	3,00	37,20	5,30	4,80	15,20	10,50	2,30	2,00	200	380	
				1,00	7,80	3,50	1,80	16,30	4,60	3,20	30,20	6,20	5,20	5,50	13,00	3,20	3,00	200	360	
				1,10	4,40	4,10	1,90	11,70	5,10	3,30	24,20	6,90	-	-	-	4,10	4,00	200	360	
				1,20	1,80	4,60	-	-	-	3,40	21,90	7,20	-	-	-	-	-	-	-	-
				-	-	-	-	-	-	3,60	14,70	8,30	-	-	-	-	-	-	-	-
				-	-	-	-	-	-	3,70	11,70	8,80	-	-	-	-	-	-	-	-
				-	-	-	-	-	-	3,80	7,30	9,60	-	-	-	-	-	-	-	-

E = narrowest free cross section (water)

Continued on next page.

Example: Type + Material no. (xx) = Ordering no.
for ordering 136. 206. xx. 15 + 16 = 136. 206. 16. 15



Pneumatic atomizing nozzles, Full cone, pressure principle, internal mixing Series 136.2 / 166.2



Spray angle	Ordering no.		E Ø [mm]	Liquid pressure p [bar]												Spray dimensions				
	Type	Mat. no.		0,7			1,5			3,0			4,0			p Air [bar]	p Water [bar]	D ₁ [mm]	D ₂ [mm]	
				p Air [bar]	V̇ Water [l/h]	V̇ _n Air [m ³ /h]	p Air [bar]	V̇ Water [l/h]	V̇ _n Air [m ³ /h]	p Air [bar]	V̇ Water [l/h]	V̇ _n Air [m ³ /h]	p Air [bar]	V̇ Water [l/h]	V̇ _n Air [m ³ /h]					
	16	35																		
60°	136. 211. xx. 11 166. 211. xx. 11	1.4305/303 SS Brass plated	1,40	1,70	25,40	5,20	2,60	46,90	6,80	4,10	78,00	9,00	-	-	-	0,80	0,70	230	430	
				1,80	22,60	5,50	2,90	38,20	7,60	4,50	67,20	10,30	-	-	-	1,50	1,50	230	460	
				1,90	20,70	5,70	3,00	36,20	7,80	4,80	59,20	11,10	-	-	-	2,30	2,00	220	430	
				2,10	17,20	6,20	3,20	31,70	8,30	5,20	50,20	12,10	-	-	-	3,20	3,00	200	430	
				2,20	15,30	6,40	3,30	29,30	8,60	5,50	44,70	13,00	-	-	-	-	-	-	-	-
				2,30	13,30	6,70	3,40	27,30	8,90	-	-	-	-	-	-	-	-	-	-	-
				2,50	10,60	7,10	3,60	23,20	9,30	-	-	-	-	-	-	-	-	-	-	-
				1,20	36,30	4,80	2,10	52,90	6,90	4,10	69,80	11,60	5,20	80,70	14,20	0,80	0,70	230	380	
	1,50	32,40	5,60	2,30	50,70	7,40	4,50	66,30	12,70	5,30	80,00	14,50	1,50	1,50	220	380				
	1,80	28,90	6,40	2,60	47,40	8,20	4,80	63,40	13,40	5,40	79,00	14,70	2,30	2,00	200	380				
	1,90	27,90	6,70	2,90	43,90	9,00	5,20	59,50	14,50	-	-	-	3,20	3,00	200	360				
	2,10	26,20	7,20	3,20	40,70	9,70	-	-	-	-	-	-	4,10	4,00	190	360				
	2,20	25,30	7,40	3,40	38,30	10,20	-	-	-	-	-	-	-	-	-	-	-			
	2,30	24,30	7,60	4,10	30,10	11,90	-	-	-	-	-	-	-	-	-	-	-			

E = narrowest free cross section (water)

Example **Type** + **Material no. (xx)** = **Ordering no.**
for ordering: **136. 211. xx. 11** + **16** = **136. 211. 16. 11**

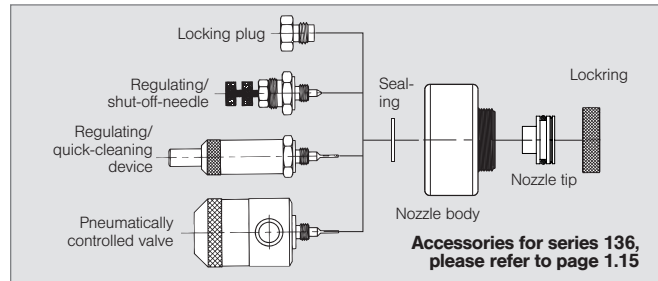
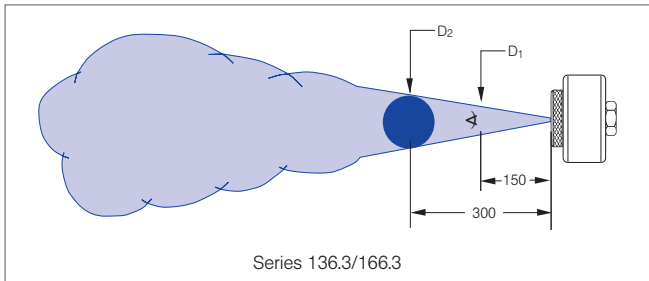
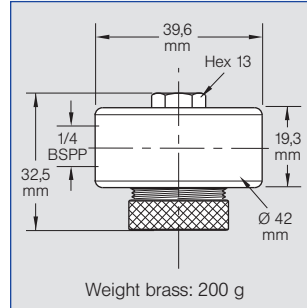


Pneumatic atomizing nozzles, Full cone, siphon principle, external mixing Series 136.3 / 166.3



Particularly fine full cone atomization with air or gas. Siphon principle. External mixing of fluids.

Applications:
Chemical industry, cooling,
atomization of viscous liquids.



Spray angle	Ordering no.		E Ø [mm]	Air		V̇ Water [l/h]								Spray dimensions			
	Type	Mat. no.		p [bar]	V̇ _n [m³/h]	Water column [mm WS]			Aspiration height [mm WS]					p _{Air} [bar]	D ₁ [mm]	D ₂ [mm]	
						16	35	450	300	150	100	200	300				600
20°	136. 330. xx. 16 166. 330. xx. 16	1.4305/303 SS Brass plated	0,40	1,40	1,30	1,90	1,70	1,50	1,10	1,00	0,90	-	-	1,40	60	120	
				2,80	2,10	2,10	2,00	1,80	1,40	1,40	1,30	0,90	-	2,80	60	110	
	136. 330. xx. 14 166. 330. xx. 14	0,70	4,10	2,80	2,20	2,20	2,00	1,80	1,70	1,70	1,40	1,10	4,10	60	110		
			5,50	3,60	2,40	2,30	2,20	2,10	2,00	1,90	1,70	1,40	5,50	60	110		
			1,40	1,30	5,60	5,20	4,70	3,50	3,00	2,50	-	-	1,40	50	100		
	136. 329. xx. 14 166. 329. xx. 14	0,70	2,80	2,10	6,50	6,00	5,50	4,50	4,00	3,50	2,00	0,70	2,80	50	110		
			4,10	2,90	7,20	6,70	6,30	5,10	4,60	4,20	3,00	1,90	4,10	50	110		
			5,50	3,80	7,10	6,70	6,30	5,70	5,40	5,10	4,30	3,00	5,50	50	110		
	136. 328. xx. 13 166. 328. xx. 13	1,00	1,40	1,90	5,30	4,90	4,40	3,60	3,20	2,60	1,20	0,50	1,40	70	130		
			2,80	3,10	5,30	4,90	4,50	3,80	3,40	1,80	0,90	0,40	2,80	60	120		
			4,10	4,20	4,60	4,30	3,90	1,00	0,90	0,80	0,50	-	4,10	60	130		
	136. 327. xx. 12 166. 327. xx. 12	1,50	5,50	5,40	3,40	0,90	0,60	-	-	-	-	-	-	5,50	110	110	
			1,40	2,00	8,90	8,00	7,20	5,50	4,10	3,10	1,30	-	1,40	50	110		
			2,80	3,20	9,70	9,00	8,20	6,50	5,60	4,70	2,70	1,70	2,80	50	100		
	136. 326. xx. 11 166. 326. xx. 11	2,50	4,10	4,30	9,80	9,00	8,40	6,70	5,90	4,90	2,80	1,70	4,10	60	110		
			5,50	5,50	9,90	9,10	8,50	7,10	6,20	5,10	2,80	1,80	5,50	50	100		
			1,40	3,60	19,30	17,40	15,30	11,80	10,30	8,30	0,40	-	1,40	50	90		
					2,80	5,90	16,80	14,80	12,30	8,70	3,60	1,10	-	-	2,80	50	100
					4,10	7,80	12,90	10,50	7,80	2,00	1,50	-	-	-	4,10	50	100
					5,50	10,00	6,60	3,60	-	-	-	-	-	-	5,50	50	90
					1,40	6,20	43,70	38,00	31,70	21,20	18,30	16,00	-	-	1,40	50	110
					2,80	9,90	24,20	19,50	15,60	4,50	-	-	-	-	2,80	50	110

E = narrowest free cross section (water)

Operational information:

Liquid flow of pneumatic atomizing nozzles with external mixing can be turned down to 0 with air pressure remaining constant.

Example for ordering:	Type	+ Material no. (xx)	= Ordering no.
	136. 330. xx. 16	+ 16	= 136. 330. 16. 16



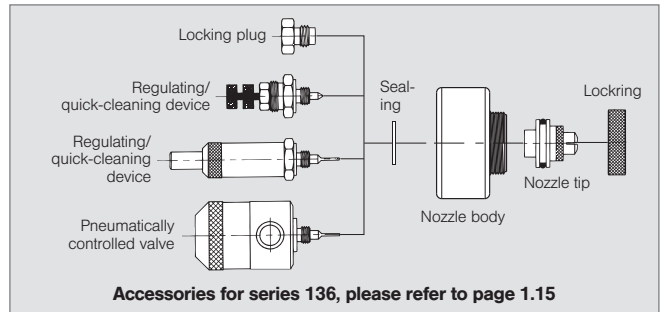
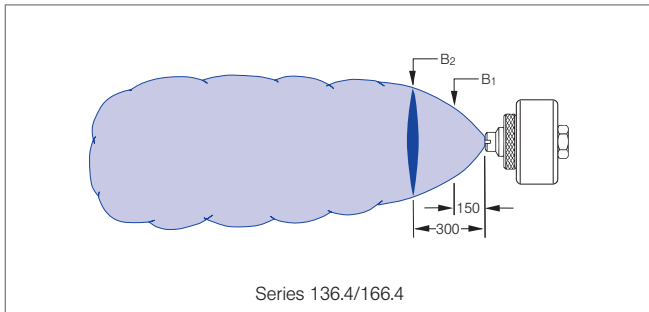
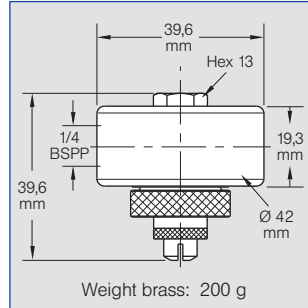


Pneumatic atomizing nozzles, Flat fan, pressure principle, internal mixing Series 136.4 / 166.4



Particularly fine flat fan atomization with air or gas. Siphon principle. Internal mixing of fluids.

Applications:
Web dampening, cooling,
humidification of goods.



Spray angle	Ordering no.		E Ø [mm]	Liquid pressure p [bar]												Spray dimensions							
	Type	Mat. no.		0,7				1,5				3,0				4,0				p Air [bar]	p Water [bar]	B ₁ [mm]	B ₂ [mm]
				p Air [bar]	ṽ Water [l/h]	ṽ _n Air [m ³ /h]	p Air [bar]	ṽ Water [l/h]	ṽ _n Air [m ³ /h]	p Air [bar]	ṽ Water [l/h]	ṽ _n Air [m ³ /h]	p Air [bar]	ṽ Water [l/h]	ṽ _n Air [m ³ /h]								
	16	35																					
45°	136. 417. xx. 14 166. 417. xx. 14	○ ○	0,70	1,00	7,40	1,30	1,50	12,50	1,60	3,00	16,40	2,60	4,50	16,40	3,80	1,40	0,70	60	110				
				1,10	6,70	1,40	1,80	10,70	1,90	3,30	14,90	2,90	4,80	15,20	4,10	2,30	1,50	100	150				
				1,20	6,10	1,50	2,10	9,10	2,20	3,70	13,10	3,30	5,20	13,60	4,50	3,20	2,00	100	170				
				1,40	4,80	1,70	2,30	8,00	2,40	4,10	11,40	3,70	5,50	12,50	4,90	3,70	3,00	150	230				
				1,90	2,50	2,30	2,90	5,20	3,00	5,90	4,90	5,50	-	-	-	-	-	-	-	-			
				2,20	1,60	2,50	3,30	3,50	3,40	-	-	-	-	-	-	-	-	-	-	-	-		
	136. 416. xx. 14 166. 416. xx. 14	○ ○	0,60	1,20	4,20	1,40	2,10	6,90	2,00	3,80	10,10	3,20	5,20	10,60	4,30	1,50	0,70	90	140				
				1,40	2,80	1,60	2,30	5,60	2,20	4,10	8,60	3,50	5,50	9,20	4,60	2,60	1,50	130	180				
				1,50	2,20	1,80	2,50	4,40	2,50	4,50	6,60	4,00	5,90	7,60	5,00	3,20	2,00	180	230				
				1,70	1,30	2,00	2,60	3,80	2,60	4,80	5,10	4,30	6,20	6,10	5,20	4,10	3,00	240	400				
				1,80	1,00	2,10	2,80	2,80	2,80	5,20	3,30	4,70	-	-	-	-	5,50	4,00	300	480			
				1,90	0,30	2,20	2,90	2,40	2,90	-	-	-	-	-	-	-	-	-	-	-	-		
	136. 415. xx. 13 166. 415. xx. 13	○ ○	1,00	1,00	15,90	1,20	2,10	20,40	2,10	3,80	26,90	3,30	5,20	29,00	4,30	1,10	0,70	80	130				
				1,10	14,90	1,30	2,30	18,60	2,30	4,10	24,60	3,60	5,50	27,00	4,60	2,10	1,50	80	130				
				1,20	14,00	1,40	2,50	16,60	2,40	4,50	21,60	3,90	5,90	24,20	4,90	2,80	2,00	90	130				
				1,40	11,80	1,60	2,60	15,60	2,50	4,80	19,30	4,20	-	-	-	3,60	3,00	130	190				
				-	-	-	2,80	13,70	2,70	5,20	16,50	4,50	-	-	-	-	4,80	4,00	140	220			
				-	-	-	2,90	12,70	2,80	-	-	-	-	-	-	-	-	-	-	-	-		

E = narrowest free cross section (water)

Continued on next page.

Example **Type** + **Material no. (xx)** = **Ordering no.**
for ordering: **136. 416. xx. 14 + 16** = **136. 416. 16. 14**





Pneumatic atomizing nozzles, Flat fan, pressure principle, internal mixing Series 136.4 / 166.4



Spray angle	Ordering no.		E ∅ [mm]	Liquid pressure p [bar]												Spray dimensions									
	Type	Mat. no.		0,7			1,5			3,0			4,0			p [bar]	p [bar]	B ₁ [mm]	B ₂ [mm]						
				p [bar]	V̇ [l/h]	V̇ _{Air} [m ³ /h]	p [bar]	V̇ [l/h]	V̇ _{Air} [m ³ /h]	p [bar]	V̇ [l/h]	V̇ _{Air} [m ³ /h]	p [bar]	V̇ [l/h]	V̇ _{Air} [m ³ /h]										
	16	35																							
		1,4305/303 SS	Brass plated																						
45°	136. 413. xx. 12 166. 413. xx. 12	○	○	1,10	0,80	29,90	1,80	1,50	45,10	2,60	3,40	51,10	5,20	4,70	54,40	7,00	1,10	0,70	220	330					
					1,00	24,20	2,20	1,70	39,40	3,00	3,70	45,20	5,80	4,80	52,70	7,20	2,20	1,50	220	360					
					1,10	21,70	2,50	1,80	36,80	3,20	4,00	40,00	6,40	5,20	46,20	8,00	3,20	2,00	220	360					
					1,20	19,70	2,70	1,90	34,20	3,40	4,10	38,70	6,50	5,50	42,00	8,60	3,90	3,00	280	430					
					1,40	16,70	3,10	2,10	30,20	3,80	4,30	35,40	7,00	-	-	-	5,90	4,00	280	430					
					1,50	15,10	3,30	2,20	28,70	4,00	4,40	34,30	7,10	-	-	-	-	-	-	-	-				
					1,70	12,40	3,70	2,30	26,80	4,30	4,60	31,50	7,50	-	-	-	-	-	-	-	-				
					1,80	11,20	3,90	2,50	23,90	4,60	4,70	30,50	7,70	-	-	-	-	-	-	-	-				
					1,90	10,10	4,00	2,60	22,60	4,80	4,80	29,40	7,90	-	-	-	-	-	-	-	-				
					2,10	8,30	4,40	2,80	20,40	5,20	5,00	27,30	8,30	-	-	-	-	-	-	-	-				
					-	-	-	-	-	-	-	-	5,20	25,40	8,60	-	-	-	-	-	-	-			
					60°	136. 446. xx. 15 166. 446. xx. 15	○	○	0,50	0,80	4,60	1,10	1,50	6,60	1,70	2,90	8,90	2,70	4,50	8,90	4,00	1,10	0,70	180	300
										1,00	3,90	1,40	1,80	5,80	2,00	3,20	8,30	3,00	5,20	7,50	4,70	2,10	1,50	230	360
1,10	3,50	1,50	2,10	4,80						2,20	3,40	7,80	3,20	5,90	5,90	5,30	2,80	2,00	250	410					
1,20	3,00	1,60	2,30	4,20						2,40	4,10	6,10	3,80	6,20	5,30	5,60	3,40	3,00	300	510					
1,40	2,20	1,80	2,60	3,20						2,70	4,50	5,20	4,20	-	-	-	5,90	4,00	360	560					
1,50	1,90	1,90	2,80	2,50						2,90	4,80	4,40	4,50	-	-	-	-	-	-	-	-				
136. 418. xx. 14 166. 418. xx. 14	○	○	0,60	0,80		7,90	1,00	1,40	12,40	1,30	2,90	15,80	2,30	4,50	14,80	3,60	1,10	0,70	180	300					
				1,00		6,30	1,20	1,70	10,30	1,60	3,20	14,20	2,60	4,80	13,50	3,90	2,10	1,50	200	330					
				1,10		5,60	1,30	1,90	8,90	1,80	3,40	13,20	2,80	5,20	11,80	4,40	2,90	2,00	230	360					
				1,20		4,70	1,40	2,10	7,70	2,10	4,10	9,60	3,60	5,50	10,50	4,70	3,40	3,00	280	430					
				1,40		3,50	1,70	2,20	7,10	2,20	4,50	8,00	4,00	5,90	9,20	5,10	5,50	4,00	330	530					
				-		-	-	2,30	6,60	2,30	4,80	6,70	4,30	6,20	8,20	5,40	-	-	-	-	-				
-	-	-	2,50	5,50		2,50	-	-	-	-	-	-	-	-	-	-	-	-							
136. 442. xx. 11 166. 442. xx. 11	○	○	1,40	1,00		15,90	4,20	1,80	33,90	5,40	2,90	94,60	5,30	4,00	96,20	7,40	1,00	0,70	180	300					
				1,10		10,40	4,90	1,90	26,70	6,10	3,00	84,00	5,90	4,10	86,60	8,00	1,80	1,50	230	380					
				1,20		5,90	5,50	2,00	21,40	6,70	3,20	65,80	7,00	4,50	58,40	10,50	2,60	2,00	220	360					
				1,30		2,00	6,10	2,10	17,00	7,30	3,30	57,80	7,70	4,80	42,10	12,40	3,30	3,00	280	430					
				-		-	-	-	-	-	3,40	50,80	8,30	5,20	25,80	14,90	4,80	4,00	280	430					
				-	-	-	-	-	-	3,60	38,20	9,70	5,50	16,50	16,70	-	-	-	-	-					
-	-	-	-	-	-	3,70	32,70	10,30	-	-	-	-	-	-	-	-	-								
80°	136. 414. xx. 13 166. 414. xx. 13	○	○	0,80	1,10	9,80	2,10	1,90	15,80	3,00	3,20	25,10	4,20	4,50	25,90	5,70	1,40	0,70	240	430					
					1,20	8,40	2,30	2,10	13,50	3,30	3,40	23,00	4,50	4,80	23,30	6,10	2,20	1,50	360	610					
					1,40	5,80	2,70	2,20	12,50	3,50	3,60	21,20	4,80	5,20	20,00	6,80	2,90	2,00	360	640					
					1,50	4,10	2,80	2,30	11,30	3,60	3,70	20,10	5,00	5,50	17,60	7,30	3,70	3,00	410	710					
					1,70	1,10	3,20	2,50	9,10	4,00	3,90	18,10	5,30	5,90	14,50	7,90	5,20	4,00	430	740					
					-	-	-	-	-	-	4,00	17,30	5,50	-	-	-	-	-	-	-	-				
					-	-	-	-	-	-	4,10	16,40	5,60	-	-	-	-	-	-	-	-				

E = narrowest free cross section (water)

Example **Type** + **Material no. (xx)** = **Ordering no.**
for ordering: 136. 413. xx. 12 + 16 = 136. 413. 16. 12

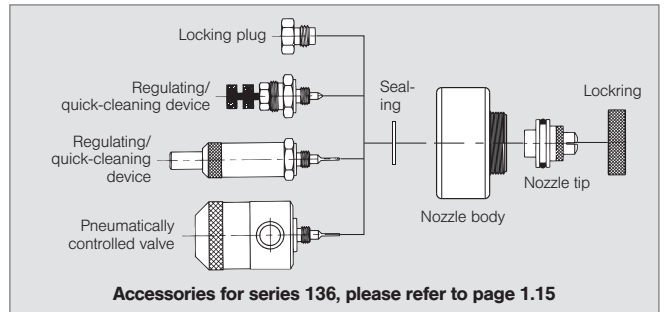
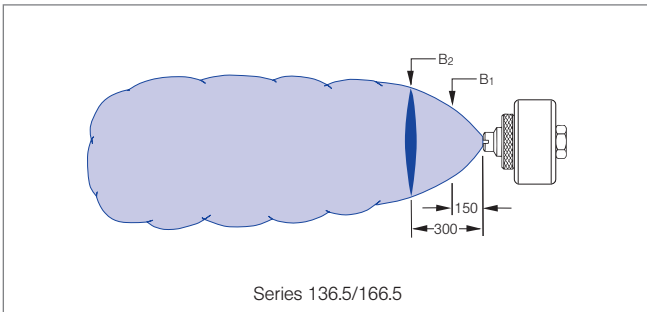
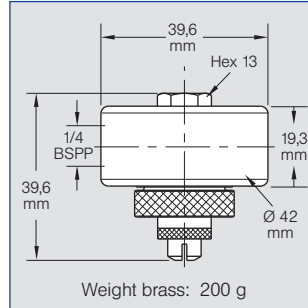


Pneumatic atomizing nozzles, Flat fan, siphon principle, internal mixing Series 136.5 / 166.5



Particularly fine flat fan atomization with air or gas. Siphon principle. Internal mixing of fluids.

Applications:
Web dampening, cooling,
humidification of goods.



Spray angle	Ordering no..		E Ø [mm]	Air		V̇ Water [l/h]										Spray dimensions		
	Type	Mat. no.		p [bar]	V̇ _n [m ³ /h]	Water column [mm WS]			Aspiration height [mm WS]					p _{Air} [bar]	B ₁ [mm]	B ₂ [mm]		
						16	35	450	300	150	100	200	300				600	900
60°	136. 523. xx. 14 166. 523. xx. 14	○	○	0,70	0,70	1,60	3,90	3,50	3,20	2,70	2,50	2,30	1,50	1,10	0,70	250	500	
					1,50	2,50	3,60	3,30	3,00	2,70	2,70	2,60	2,30	1,90	1,50	190	390	
	136. 522. xx. 14 166. 522. xx. 14	○	○	0,70	2,00	3,00	3,00	2,70	2,50	2,30	2,30	2,10	1,80	2,00	180	350		
					1,50	2,80	2,30	2,10	1,90	1,70	1,60	1,50	1,10	0,80	0,70	330	670	
	136. 521. xx. 13 166. 521. xx. 13	○	○	0,90	2,00	3,40	1,70	1,50	1,30	1,10	1,00	0,90	0,50	-	1,50	360	730	
					1,50	2,20	5,50	4,80	4,40	4,00	3,60	3,30	2,50	1,60	1,50	240	480	
	136. 519. xx. 13 166. 519. xx. 13	○	○	1,00	2,00	2,70	4,80	4,20	3,90	3,60	3,40	3,10	2,40	1,70	2,00	210	420	
					3,00	3,60	3,70	3,40	3,20	2,60	2,40	2,20	1,70	1,20	3,00	220	430	
					3,50	4,10	3,00	2,70	2,50	2,00	1,90	1,70	1,30	0,60	3,50	210	430	
					1,50	1,90	6,50	5,90	5,20	4,20	3,70	3,30	2,40	1,50	1,50	160	320	
					2,00	2,30	6,10	5,60	4,90	3,90	3,60	3,60	3,10	2,40	2,00	160	320	
					3,00	3,20	4,40	4,00	3,60	3,90	3,70	3,70	3,00	2,40	3,00	180	350	
3,50					3,60	3,60	3,80	3,80	3,40	3,30	3,30	2,60	2,10	3,50	180	350		
				4,00	4,00	3,70	3,50	3,30	2,90	2,80	2,80	2,20	1,80	4,00	180	350		

E = narrowest free cross section (water)

Example for ordering: Type 136. 523. xx. 14 + Material no. (xx) 16 = Ordering no. 136. 523. 16. 14

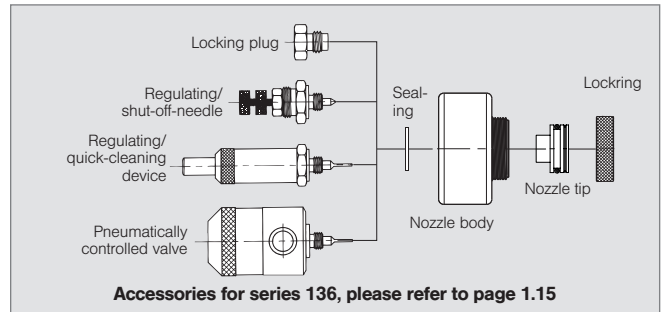
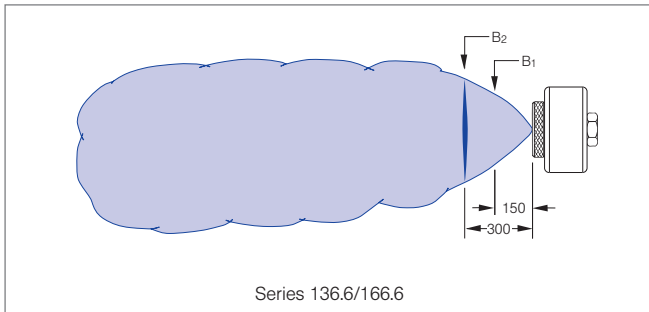
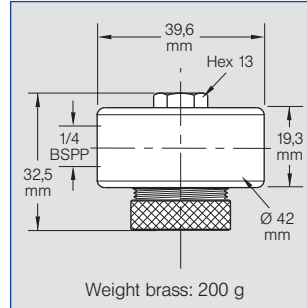


Pneumatic atomizing nozzles, Flat fan, pressure principle, external mixing Series 136.6 / 166.6



**Fine flat fan atomization
with the aid of air or gas.
Liquid pressure principle.
External mixing of fluids.**

Applications:
Web dampening, cooling,
humidification of goods, ato-
mization of viscous liquids.



Spray angle	Ordering no.		E Ø [mm]	Liquid pressure p [bar]												Spray dimensions			
	Type	Mat. no.		0,07			0,15			0,30			0,35			p Air [bar]	p Water [bar]	B1 [mm]	B2 [mm]
				p Air [bar]	ṽ Water [l/h]	ṽn Air [m³/h]	p Air [bar]	ṽ Water [l/h]	ṽn Air [m³/h]	p Air [bar]	ṽ Water [l/h]	ṽn Air [m³/h]	p Air [bar]	ṽ Water [l/h]	ṽn Air [m³/h]				
45°	136. 640. xx. 16 166. 640. xx. 16	1.4305/303 SS Brass plated	0,40	1,40	2,00	3,20	1,40	2,60	3,20	1,40	3,20	3,20	1,40	3,70	3,20	1,40	0,07	80	150
				2,10	2,10	4,10	2,10	2,60	4,10	2,10	3,50	4,10	2,10	3,70	4,10	2,10	0,15	80	150
				2,80	2,10	5,10	2,80	2,60	5,10	2,80	3,60	5,10	2,80	3,70	5,00	2,80	0,20	80	150
				3,40	2,10	5,90	3,40	2,70	5,90	3,40	3,40	5,90	3,40	3,80	5,90	3,40	0,30	80	150
	4,10	2,10	6,90	4,10	2,50	6,90	4,10	3,40	6,90	4,10	3,70	6,90	4,10	0,35	80	150			
	136. 640. xx. 15 166. 640. xx. 15	0,50	1,40	3,00	3,20	1,40	3,80	3,20	1,40	5,00	3,20	1,40	5,50	3,20	1,40	0,07	130	180	
			2,10	3,20	4,10	2,10	3,90	4,10	2,10	5,20	4,20	2,10	5,50	4,20	2,10	0,15	150	200	
			2,80	3,10	5,10	2,80	4,00	5,10	2,80	5,20	5,10	2,80	5,50	5,10	2,80	0,20	150	200	
			3,40	3,10	5,90	3,40	4,00	5,90	3,40	5,20	5,90	3,40	5,50	5,90	3,40	0,30	150	230	
	4,10	3,00	6,90	4,10	3,90	6,90	4,10	5,10	6,90	4,10	5,50	6,90	4,10	0,35	150	230			
	136. 640. xx. 14 166. 640. xx. 14	0,70	1,40	6,10	3,20	1,40	8,00	3,20	1,40	10,80	3,20	1,40	11,40	3,20	1,40	0,07	150	230	
			2,10	6,30	4,20	2,10	8,20	4,20	2,10	10,80	4,20	2,10	11,60	4,20	2,10	0,15	150	230	
2,80			6,30	5,10	2,80	8,30	5,10	2,80	10,90	5,10	2,80	11,60	5,10	2,80	0,20	150	250		
3,40			6,30	6,00	3,40	8,30	6,00	3,40	10,90	6,00	3,40	11,60	6,00	3,40	0,30	150	250		
4,10	6,20	7,00	4,10	8,20	7,00	4,10	10,80	6,90	4,10	11,50	6,90	4,10	0,35	150	250				
60°	136. 639. xx. 16 166. 639. xx. 16	0,40	-	-	-	1,40	2,50	4,00	1,40	3,30	4,00	1,40	3,50	4,00	1,40	0,07	100	130	
			-	-	-	2,10	2,50	5,20	2,10	3,40	5,10	2,10	3,60	5,10	1,80	0,15	90	110	
			-	-	-	2,80	2,60	6,30	2,80	3,30	6,30	2,80	3,50	6,30	2,80	0,20	90	130	
			-	-	-	3,40	2,50	7,30	3,40	3,30	7,30	3,40	3,50	7,30	3,40	0,30	100	150	
	-	-	-	4,10	2,50	8,50	4,10	3,30	8,50	4,10	3,50	8,50	4,80	0,35	130	140			
	136. 639. xx. 15 166. 639. xx. 15	0,50	1,40	2,90	4,00	1,40	3,80	4,00	1,40	5,10	4,00	1,40	5,30	4,00	1,40	0,07	90	130	
			2,10	3,00	5,20	2,10	3,80	5,20	2,10	5,10	5,20	2,10	5,40	5,20	2,10	0,15	90	140	
			2,80	3,00	6,40	2,80	3,80	6,40	2,80	5,10	6,40	2,80	5,30	6,40	2,80	0,20	90	140	
			3,40	2,90	7,40	3,40	3,80	7,50	3,40	5,10	7,40	3,40	5,40	7,40	3,40	0,30	100	150	
	4,10	2,80	8,60	4,10	3,70	8,60	4,10	5,00	8,60	4,10	5,40	8,60	4,10	0,35	100	150			

E = narrowest free cross section (water)

Continued on next page.

Example for ordering: Type 13,6. 640. xx. 16 + Material no. (xx) = 16 = Ordering no. = 136. 640. 16. 16





Pneumatic atomizing nozzles, Flat fan, pressure principle, external mixing Series 136.6 / 166.6



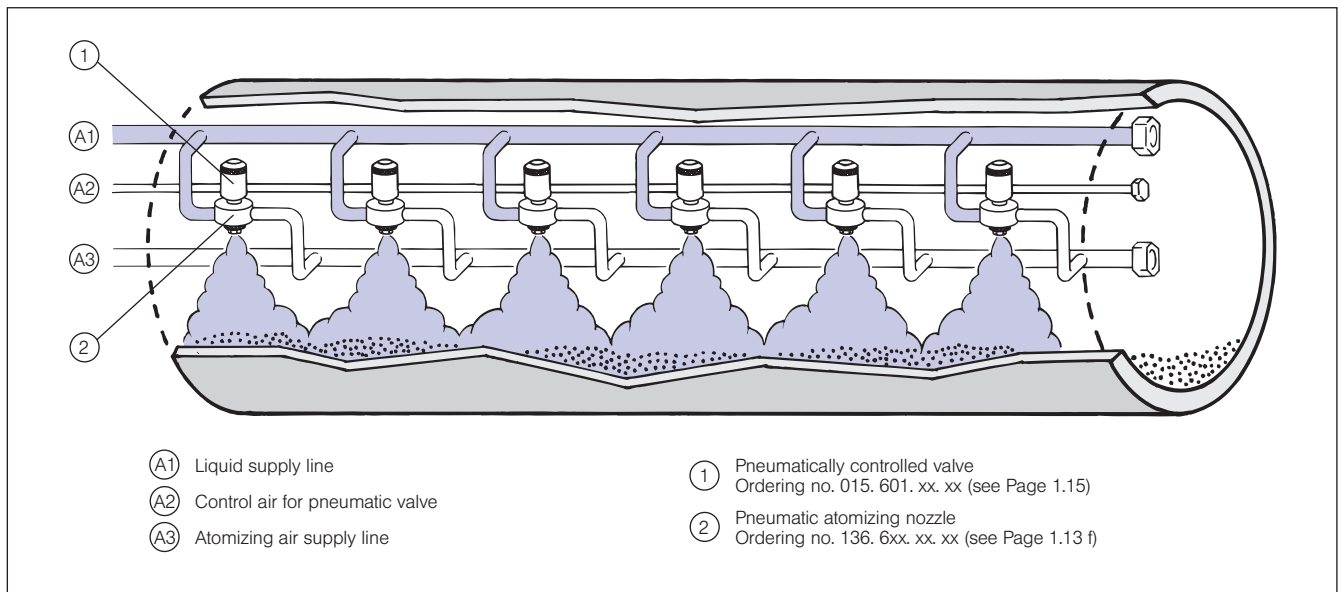
Spray angle	Ordering no.		E ∅ [mm]	Liquid pressure p [bar]												Spray dimensions				
	Type	Mat. no.		0,07			0,15			0,30			0,35			p Air [bar]	p Water [bar]	B ₁ [mm]	B ₂ [mm]	
				p Air [bar]	v̇ Water [l/h]	v̇ _n Air [m ³ /h]	p Air [bar]	v̇ Water [l/h]	v̇ _n Air [m ³ /h]	p Air [bar]	v̇ Water [l/h]	v̇ _n Air [m ³ /h]	p Air [bar]	v̇ Water [l/h]	v̇ _n Air [m ³ /h]					
	16	35																		
		1.4305/303 SS	Brass plated																	
60°	136. 639. xx. 14 166. 639. xx. 14	○	○	0,70	1,40	5,90	4,00	1,40	7,90	4,00	1,40	10,60	4,00	1,40	11,40	4,00	1,40	0,07	90	130
					2,10	6,10	5,30	2,10	8,10	5,20	2,10	10,70	5,20	2,10	11,40	5,30	2,10	0,15	130	170
					2,80	6,00	6,40	2,80	8,00	6,50	2,80	10,80	6,40	2,80	11,40	6,40	2,80	0,20	140	180
					3,40	6,00	7,50	3,40	8,00	7,50	3,40	10,70	7,50	3,40	11,40	7,50	3,40	0,30	140	170
	4,10	5,70	8,70	4,10	7,80	8,70	4,10	10,60	8,70	4,10	11,30	8,70	4,10	0,35	140	190				
	136. 637. xx. 13 166. 637. xx. 13	○	○	1,00	1,40	11,00	9,10	1,40	14,20	9,20	1,40	18,90	9,10	1,40	19,90	9,20	1,40	0,07	140	180
					2,10	11,20	11,90	2,10	14,70	11,90	2,10	22,70	11,90	2,10	20,10	11,80	2,10	0,15	170	220
					2,80	11,10	14,70	2,80	14,50	14,60	2,80	19,10	14,60	2,80	20,30	14,60	2,80	0,20	180	240
					3,40	10,60	17,00	3,40	14,30	17,00	3,40	22,60	16,90	3,40	20,20	16,90	3,40	0,30	180	240
	4,10	10,20	19,60	4,10	13,70	19,70	4,10	18,60	19,70	4,10	19,90	19,70	4,10	0,35	180	240				
	136. 634. xx. 12 166. 634. xx. 12	○	○	1,50	1,40	26,90	9,60	1,40	33,80	9,70	1,40	43,50	9,70	1,40	46,40	9,60	1,40	0,07	190	330
					2,10	26,50	12,60	2,10	34,00	12,50	2,10	43,70	12,50	2,10	46,50	12,60	2,10	0,15	200	330
					2,80	25,00	15,50	2,80	32,80	15,40	2,80	43,00	15,40	2,80	46,10	15,50	2,80	0,20	200	330
					3,40	23,60	17,90	3,40	31,80	17,90	3,40	42,70	17,90	3,40	45,30	17,90	3,40	0,30	190	300
	4,10	21,50	20,80	4,10	30,70	20,80	4,10	41,60	20,90	4,10	44,60	20,80	4,10	0,35	200	300				
	136. 632. xx. 11 166. 632. xx. 11	○	○	2,50	1,40	42,90	13,90	1,40	56,70	13,90	1,40	84,90	13,90	1,40	94,10	13,90	1,40	0,07	150	280
					2,10	47,60	18,20	2,10	59,70	18,10	2,10	81,80	18,10	2,10	89,70	18,10	2,10	0,15	180	290
					2,80	51,70	22,20	2,80	64,40	22,30	2,80	80,30	22,20	2,80	87,00	22,30	2,80	0,20	180	300
					3,40	52,50	25,90	3,40	67,00	25,80	3,40	82,10	25,90	3,40	87,00	25,80	3,40	0,30	150	280
	4,10	51,30	30,00	4,10	66,70	30,00	4,10	83,10	30,10	4,10	87,50	30,00	4,10	0,35	150	280				

E = narrowest free cross section (water)

Operational information:

Liquid flow of pneumatic atomizing nozzles with external mixing can be turned down to 0 with air pressure remaining constant.

Bestellbeispiel: Type + Material-Nr. (xx) = Bestellnummer
136. 639. xx. 14 + 16 = 136. 639. 16. 14

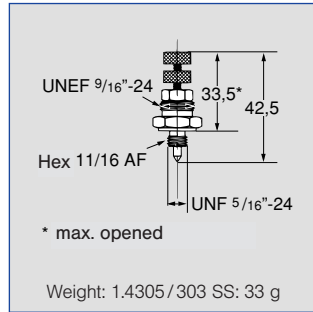
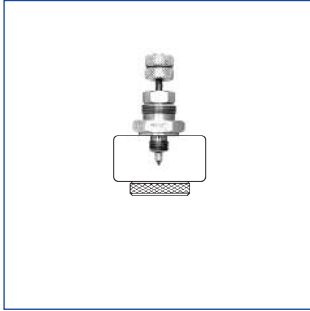


Cereal dampening in a mixing drum



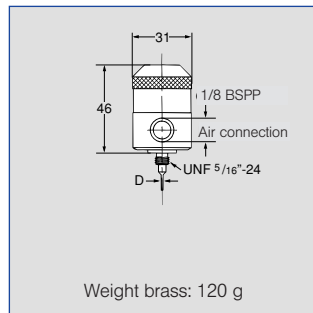
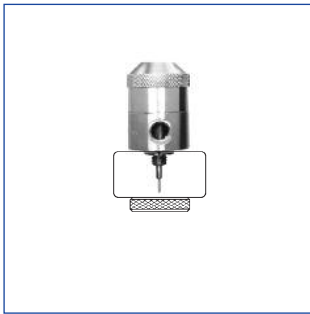
Accessories for pneumatic atomizing nozzles of the series 136.1 - 136.6

Regulating device and shutting-off needle:



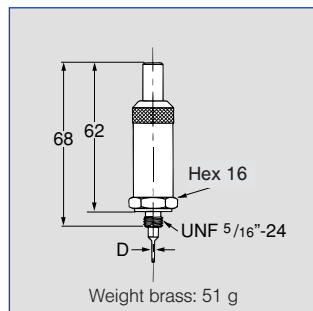
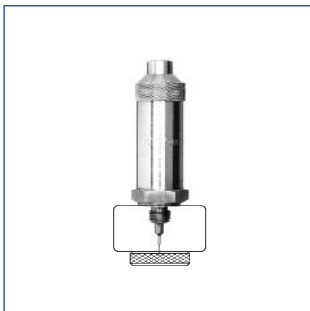
Ordering no.		For all nozzles of the series 136
Type	Mat. no.	
	16 1.4305/303 SS	
015. 600	<input type="radio"/>	

Pneumatically controlled valve. Opening pressure 2,1 bar, max. 180 cycles/min.



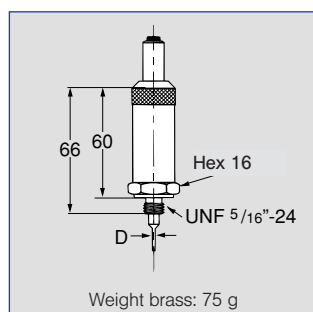
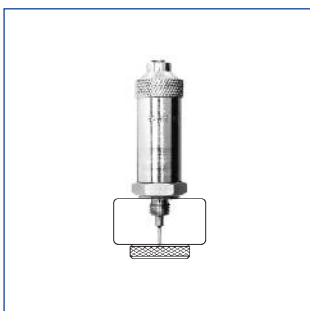
Ordering no.		For nozzles	Needle diameter D [mm]
Type	Mat. no.		
	16 35 1.4305/ 303 SS Brass plated		
015. 601. xx. 01	<input type="radio"/> <input type="radio"/>	136. xxx. xx. 11	2,4
015. 601. xx. 02	<input type="radio"/> <input type="radio"/>	136. xxx. xx. 12	1,4
015. 601. xx. 03	<input type="radio"/> <input type="radio"/>	136. xxx. xx. 13	1,0
015. 601. xx. 04	<input type="radio"/> <input type="radio"/>	136. xxx. xx. 14	0,7
015. 601. xx. 05	<input type="radio"/> <input type="radio"/>	136. xxx. xx. 15	0,5
015. 601. xx. 06	<input type="radio"/> <input type="radio"/>	136. xxx. xx. 16	0,3

Quick-cleaning device



Ordering no.		For nozzles	Needle diameter D [mm]
Type	Mat. no.		
	16 35 1.4305/ 303 SS Brass plated		
015. 602. xx. 01	<input type="radio"/> <input type="radio"/>	136.xxx.xx.11	2,4
015. 602. xx. 02	<input type="radio"/> <input type="radio"/>	136.xxx.xx.12	1,4
015. 602. xx. 03	<input type="radio"/> <input type="radio"/>	136.xxx.xx.13	1,0
015. 602. xx. 04	<input type="radio"/> <input type="radio"/>	136.xxx.xx.14	0,7
015. 602. xx. 05	<input type="radio"/> <input type="radio"/>	136.xxx.xx.15	0,5
015. 602. xx. 06	<input type="radio"/> <input type="radio"/>	136.xxx.xx.16	0,3

Regulating device with quick-cleaning needle



Ordering no.		For nozzles	Needle diameter D [mm]
Type	Mat. no.		
	16 35 1.4305/ 303 SS Brass plated		
015. 603. xx. 01	<input type="radio"/> <input type="radio"/>	136. xxx. xx. 11	2,4
015. 603. xx. 02	<input type="radio"/> <input type="radio"/>	136. xxx. xx. 12	1,4
015. 603. xx. 03	<input type="radio"/> <input type="radio"/>	136. xxx. xx. 13	1,0
015. 603. xx. 04	<input type="radio"/> <input type="radio"/>	136. xxx. xx. 14	0,7
015. 603. xx. 05	<input type="radio"/> <input type="radio"/>	136. xxx. xx. 15	0,5
015. 603. xx. 06	<input type="radio"/> <input type="radio"/>	136. xxx. xx. 16	0,3

Example for ordering: Type 015. 602. xx. 01 + Material no. (xx) + 16 = Ordering no. 015. 602. 16. 01

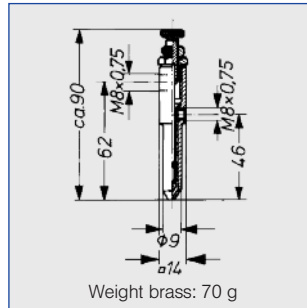


Pneumatic atomizing nozzles, Full cone, siphon principle, internal mixing Series 140



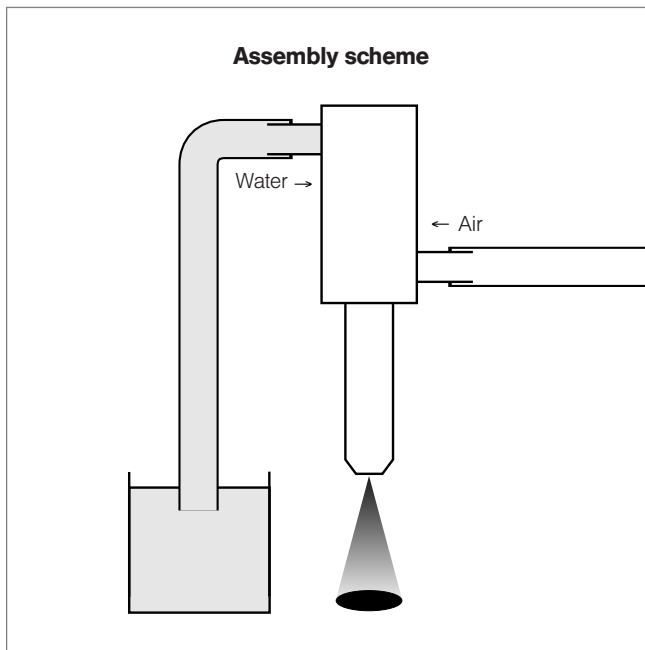
Particularly fine full cone atomization. Siphon principle. Internal mixing of fluids. Integrated regulating device.

Applications:
Lubrication, cooling, humidification of air.



Spray angle	Ordering no.	E Ø [mm]		H _s Aspiration height [mm WS]	$\dot{V}_W = \text{Liquid}$ $\dot{V}_A = \text{Air}$							
		Water	Air		p [bar] Air pressure							
					0,5		1,0		2,0		3,0	
					W [l/h]	L [m³/h]	W [l/h]	L [m³/h]	W [l/h]	L [m³/h]	W [l/h]	L [m³/h]
20°-30°	140. 252. 30. 01	0,50	0,75	500 200	- 4,50	- 2,50	4,50 7,00	4,00 4,00	8,00 10,00	6,00 6,00	10,50 12,00	8,00 8,00

E = narrowest free cross section (water)



Accessories:

Gasket
014. 040. 72
7,8 x 12 x 1 (EWP 210)

Nipple
014. 010. 30. 04
(Material brass)
Weight: 17 g