

NOZZLES AND NOZZLE SYSTEMS FOR DUST SUPPRESSION



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ABOUT BETE



BETE SUPPLIES HIGH-PERFORMANCE NOZZLES AND COMPLETE SYSTEMS FOR DUST SUPPRESSION. WORLDWIDE.

NOZZLES AND SPECIAL SYSTEMS FOR EVERY CHALLENGE. EFFICIENT. PATENTED. CERTIFIED.

WE JOIN FORCES WITH OUR CUSTOMERS TO FIND THE MOST EFFECTIVE SOLUTION FOR THEIR DUST PROBLEM. NOZZLE TECHNOLOGY SPECIALISTS.

RELY ON OUR DROPLET SIZE AND EVAPORATION EXPERTISE. SPRAY LAB AND SIMULATION.

USE OF THE LATEST DESIGN AND PRODUCTION TECHNOLOGIES. OPTIMAL TECHNICAL PROCESSING.

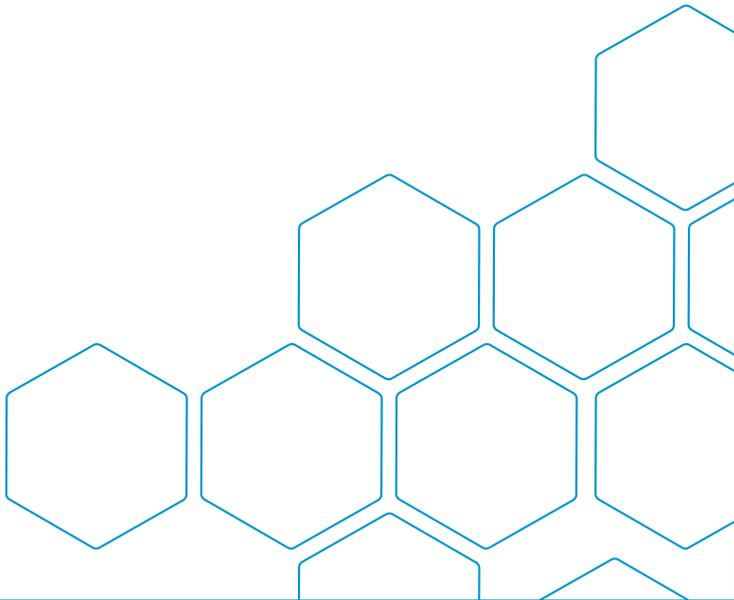
THE RIGHT NOZZLE IN THE RIGHT PLACE AT THE RIGHT TIME. EXPERTISE. SPECIALIST ENGINEERING.

EXCEEDING OUR CUSTOMERS' EXPECTATIONS IS WHAT FUELS OUR GROWTH. 100% CUSTOMER-ORIENTED.

PARTNER OF MINING AND OTHER INDUSTRIES. LOCALLY ROOTED. GLOBALLY NETWORKED.

A BENCHMARK FOR DESIGN AND PERFORMANCE. FOR THE DEEP SEA. SPACE. AND EVERYWHERE IN BETWEEN.

DUST SUPPRESSION



Emission protection is a topic that has gained considerable importance in recent years. Strict environmental regulations and increasing environment- and health-related risk awareness have led to a change in thinking for the industry in all sectors.

BETE, therefore, specifically endeavours to capture dust at the point of origin using customer- and application-specific nozzle systems – all while ensuring the best possible occupational safety and environmental protection. Thanks to our decades of experience in dust suppression both above and below ground, we can draw on a broad portfolio of nozzles and nozzle systems.

BETE supports their customers with a comprehensive range of solutions – from individual nozzles and spray lances to integrated complete systems for dust control.

Our unrivalled nozzle expertise, together with in-depth industry knowledge, gives you the confidence to maintain safe and reliable system operations and allows us to meet stringent limit specifications – even in challenging conditions.



**Emission control
is becoming
increasingly important.
Industries around the
world rely on
our unique
spray solutions.**



DUST SUPPRESSIONS

EFFECTIVELY BINDING DUST WITH THE RIGHT DROPLET SIZE

The main theory in dust control is that water droplets coming into contact with dust particles are agglomerated and the dust bound by the water mist becomes heavier and sinks to the ground.

The size of the water droplets is crucial in this process. If the droplets are too small, they cannot combine with the dust particles and suppress them. Conversely, water droplets that are significantly larger than the dust particles form an air cushion around them. This prevents the dust from coming into direct contact with the water droplet and swirling around it.

WHAT BETE PERFORMANCE IS ALL ABOUT

WE SPECIALISE IN ACHIEVING THE MOST EFFECTIVE SPRAYING PROCESSES

The most effective dust binding is achieved when the droplets are similar in size to the relevant dust. The correct distribution of the droplets, which can be optimised by selecting the appropriate nozzle, is what counts – and we at BETE have perfected this process.

For effective dust suppression, we offer customised systems in addition to standard solutions. From analysis to installation and maintenance, we will find the optimal solution for your system.

BETE nozzles atomise water into a fine spray so that the atomised water combines with the dust particles in the air.

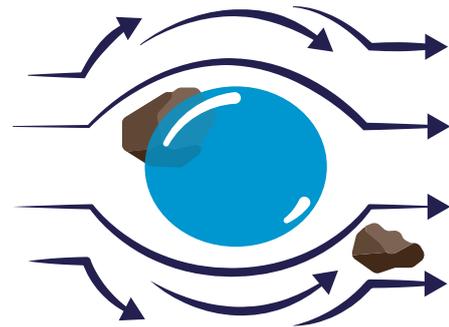
APPLICATIONS

- Belt systems
- Belt transfers
- Crushers
- Demolition equipment
- Cleaning vehicles
- Environmental protection

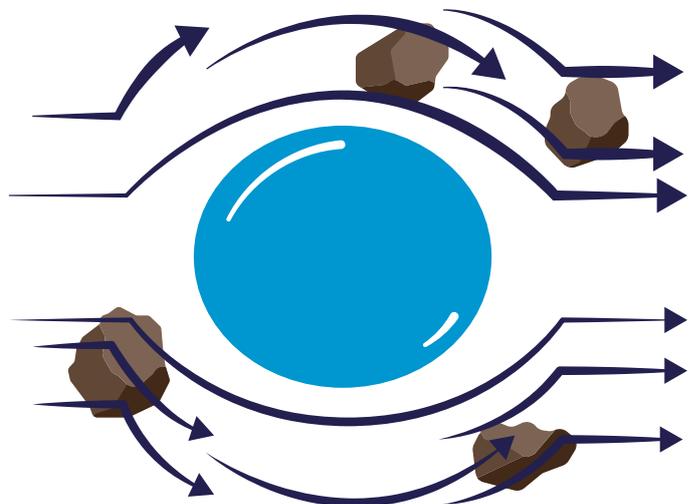
THESE ARE THE BENEFITS OF OUR DUST SUPPRESSION SYSTEMS

- Efficient and cost-effective solution for dust suppression
- Can be operated as stand-alone units or integrated into central plant control systems
- Your machines and systems stay cleaner and are subjected to less wear
- Avoid raw material loss
- Energy- and water-saving effects
- Avoid hazardous airborne contaminants
- Employee health and safety is guaranteed
- No additional personnel costs

EFFECTIVE DUST BINDING



INEFFECTIVE DUST BINDING





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Our goal is to identify the most efficient dust control strategy for our customers.



PARTNER OF MINING



BETE – A PARTNER FOR THE MINING INDUSTRY. WORLDWIDE.

BETE is a trusted nozzle supplier to major mining companies around the world.

THE HIGHEST REQUIREMENTS. THE TOUGHEST CONDITIONS. MAXIMUM OPERATIONAL RELIABILITY.

BETE nozzles are designed to be reliable in demanding environments, including construction sites with extreme temperatures and heavy dust loads.

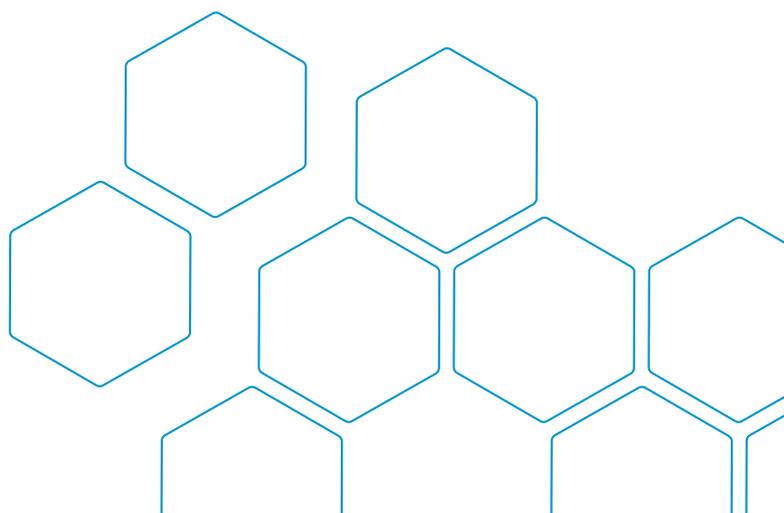
To achieve optimal spraying processes with maximum operational safety, we combine expertise at many levels. The design and manufacturing of robust components is very important to us. Nozzles and complete nozzle systems are manufactured and supplied by us – and specifically designed for your processes. We are well aware that the quality of our nozzle technology ensures the quality of your machines and systems. BETE's great strength lies in developing customer- and application-specific solutions. We join forces with our customers to find the most efficient solution for their dust problem.

WE SPRAY EVERYTHING. MINING SUCCESS STORIES.

A range of specially developed and proven nozzles for dust suppression systems – in many designs and materials – is available for the mining industry. Whatever your challenge, we will find a solution. This is, after all, what we have been doing every day since 1950. It is about products and solutions that not only create a perfect result, but shape an entire industry.

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We protect
our customers'
systems from
dust and
its impact.



WE OPTIMISE THE MINING INDUSTRY

MINE/TUNNEL APPLICATIONS

- Roadheaders
- Continuous miners
- Extracting plants
- Drilling machines
- Loaders
- Tunnel cross-sectional nozzle systems

OPEN PIT APPLICATIONS

- Bucket wheel excavators
- Stackers
- Belt systems
- Belt transfers
- Crushers

UNMATCHED DUST CONTROL EXPERTISE

BETE nozzles have been a benchmark for quality, performance and design for over 70 years. Major mining companies around the world rely on our unique expertise. For us, this includes comprehensive customer service, competent consulting engineers, highly complex dust suppression system design, market-driven prices and the fastest possible order processing.

Nozzles and nozzle systems for the mining industry.
Our nozzles are ready to meet your challenges.

PZ

AIR-ATOMIZING NOZZLE

SPECIALLY DESIGNED FOR DUST SUPPRESSION APPLICATIONS

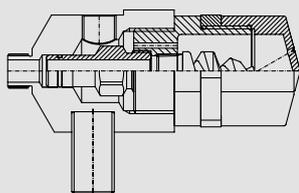


DESIGN FEATURES

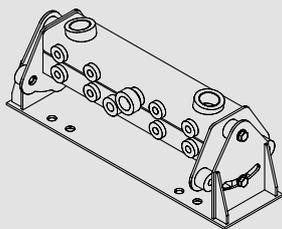
- 7-piece design
- Male connection
- Oval Spray pattern (full cone)
- Special patterns & spray angles on request (flat fan / round full cone / etc. – available)
- Standard materials: 316 / 316L SS

SPRAY CHARACTERISTICS

- Full cone (oval)
- Fine atomization
- Long distance spraying



Single nozzle adapter
(for one PZ nozzle)



Two-nozzle manifold



STANDARD AIR CAP (2.6 MM BORINGS)

Air Pressure bar	Water Pressure bar	Air Flow Nm ³ /h	Water Flow lpm
1.8	1.6	47.75	1.02
1.8	1.8	34.00	3.10
2.0	1.8	50.42	1.23
2.0	2.0	37.50	3.15
2.3	2.0	61.25	0.56
2.3	2.3	41.50	3.31
2.8	2.6	62.00	1.72
2.8	2.9	43.50	4.19

SPECIAL AIR CAP (2.0 MM BORINGS)

Low flow version			
Air Pressure bar	Water Pressure bar	Air Flow Nm ³ /h	Water Flow lpm
1.8	1.6		
1.8	1.8	18.50	2.11
2.0	1.8		
2.0	2.0	23.30	2.28
2.3	2.0		
2.3	2.3	27.00	2.30

ADVANTAGES OF THE BETE PZ-NOZZLE

DUST SUPPRESSION

The BETE PZ-nozzle has been specially developed for highest efficiency in dust suppression. The modular design allows this nozzle to operate in a vast variety of applications.

WEAR AND TEAR

The BETE PZ-nozzle is designed to avoid high costs because of wear and tear. All parts are replaceable on their own.

ADJUSTABLE (WATER + AIR CONSUMPTION)

Nozzle operation is easily fine tuned for any application by adjusting the inlet pressures.

ADJUSTABLE (DIRECTION)

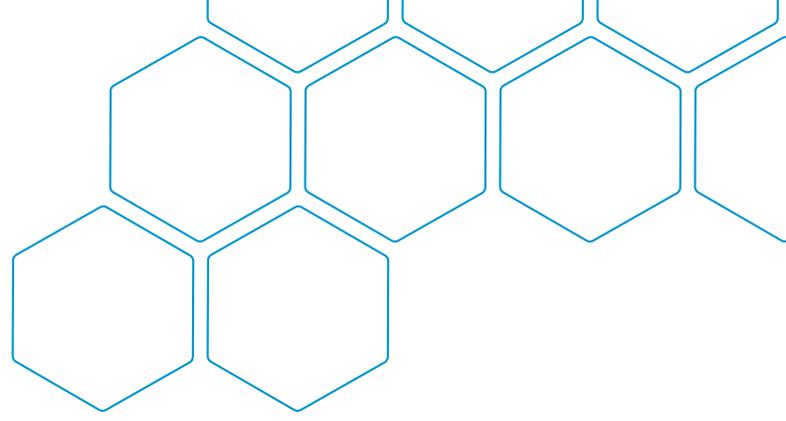
Flexible designs allow the nozzles to be installed in optimal locations close to the dust generation points, increasing dust suppression efficiency and minimizing water and air consumption.

EASY TO MAINTAIN

All parts can be disassembled quickly without special tools allowing for quick turn arounds and preventing long down times.

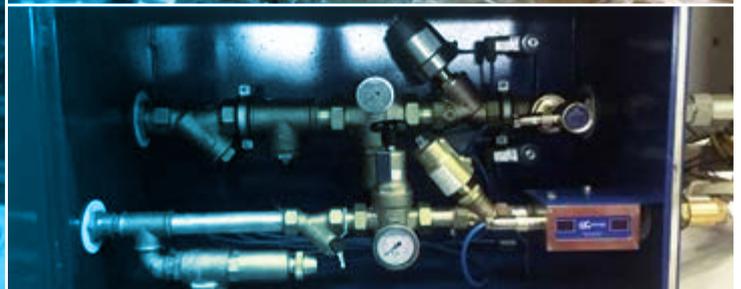
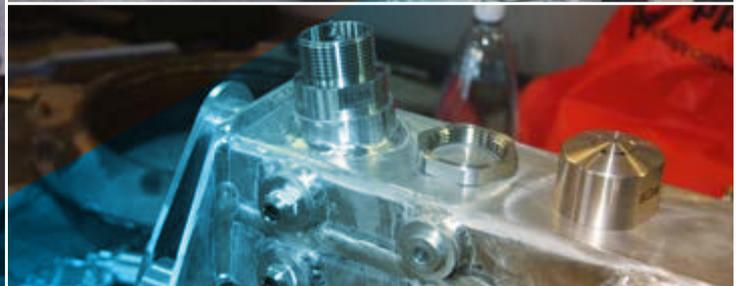
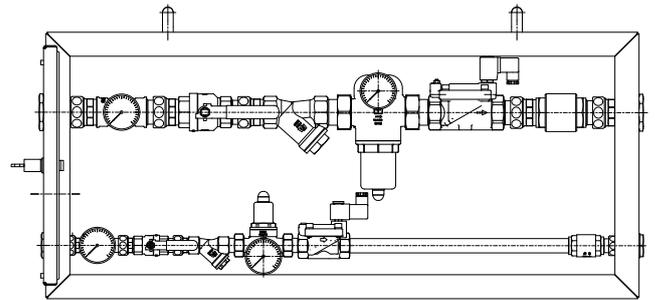
INSTALLATION

Can be used in single-nozzle adapters or in specially designed manifolds for multiple nozzles.



PZ MANIFOLDS/CONTROL UNITS

For using our PZ-air-atomizing nozzles in dust suppression and explosion protection applications, we offer both standard components and custom manifold and control solutions. This gives you the choice of having us manufacture a special solution for you or determining that our catalogue components are sufficient for your application. Our manifolds can be manufactured in many different designs – as shown in the example images.



HA

FOG NOZZLE

**FINEST FOG AT
LOW PRESSURES**

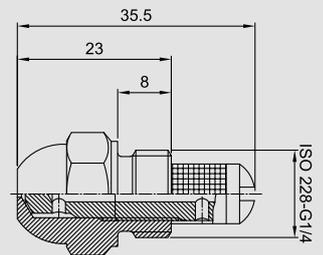
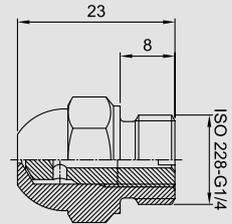


DESIGN FEATURES

- Standard 3-piece construction
- Male connection
- Special spray angles on request
- Strainer available in 110 or 180 mesh

SPRAY CHARACTERISTICS

- Hollow cone
- Finest fog



HA 15°, 30°, 45°, 60°, 90°, 120° (FROM 0,30 MM ORIFICE-Ø)
G 1/4" ISO 228, 1/4" BSP or NPT, 9/16" UNEF

Pipe size	Nozzle Number	D Ø (mm)	< Standard	V l/h @					
				1 bar	3 bar	5 bar	7 bar	10 bar	20 bar
1/4" or 9/16" UNEF	HA-0.10	0.10	63°				0.90	1.08	1.50
	HA-0.15	0.15	63°				1.35	1.62	2.28
	HA-0.20	0.20	63°			1.61	1.91	2.28	3.30
	HA-0.25	0.25	63°			1.98	2.71	3.24	4.56
	HA-0.30	0.30	63°			2.35	3.21	3.84	5.40
	HA-0.35	0.35	63°		2.86	3.69	4.37	5.22	7.38
	HA-0.40	0.40	63°		3.75	4.84	5.72	6.84	9.66
	HA-0.45	0.45	65°		4.74	6.12	7.23	8.64	12.18
	HA-0.50	0.50	70°		5.85	7.55	8.94	10.68	15.12
	HA-0.55	0.55	70°		7.08	9.14	10.79	12.90	18.24
	HA-0.60	0.60	70°		8.46	10.92	12.90	15.42	21.84
	HA-0.70	0.70	70°		11.46	14.79	17.47	20.88	29.58
	HA-0.80	0.80	70°		15.00	19.36	22.89	27.36	38.70
	HA-0.90	0.90	70°		18.96	24.48	28.97	34.62	48.90
	HA-1.00	1.00	70°	13.56	23.46	30.29	35.79	42.78	60.54
	HA-1.10	1.10	70°	16.38	28.38	36.64	43.32	51.78	73.26
	HA-1.20	1.20	70°	19.50	33.78	43.61	51.55	61.62	87.18
	HA-1.30	1.30	70°	22.86	39.60	51.12	60.49	72.30	102.24
	HA-1.40	1.40	75°	26.52	45.96	59.33	70.18	83.88	118.62
	HA-1.50	1.50	75°	30.42	52.74	68.09	80.52	96.24	136.14
	HA-1.60	1.60	78°	34.62	60.00	77.46	91.61	109.5	154.86
	HA-1.70	1.70	78°	39.12	67.74	87.45	103.46	123.66	174.90
	HA-1.80	1.80	78°	43.86	75.96	98.06	116.06	138.72	196.08
	HA-1.90	1.90	78°	48.84	84.60	109.2	129.21	154.44	218.40
	HA-2.00	2.00	78°	54.12	93.78	121.00	143.22	171.18	242.10
	HA-2.10	2.10	78°	59.70	103.30	133.40	157.88	188.70	266.88
	HA-2.20	2.20	78°	65.46	113.40	146.40	173.19	207.00	292.74
	HA-2.30	2.30	78°	71.58	124.00	160.00	189.40	226.38	320.16

Standard-materials: 316L SS (1.4404), 303 SS (1.4305), brass, PVC, Polypropylene, PTFE

<-) = Spray angle

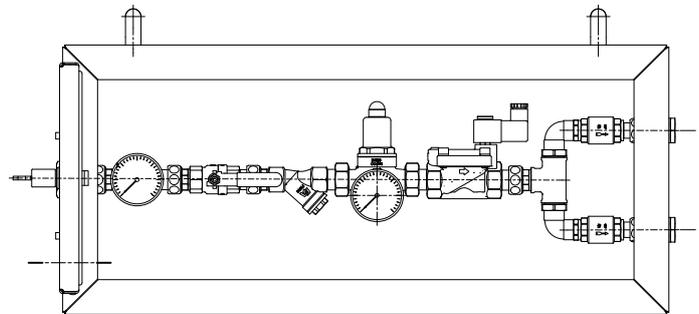
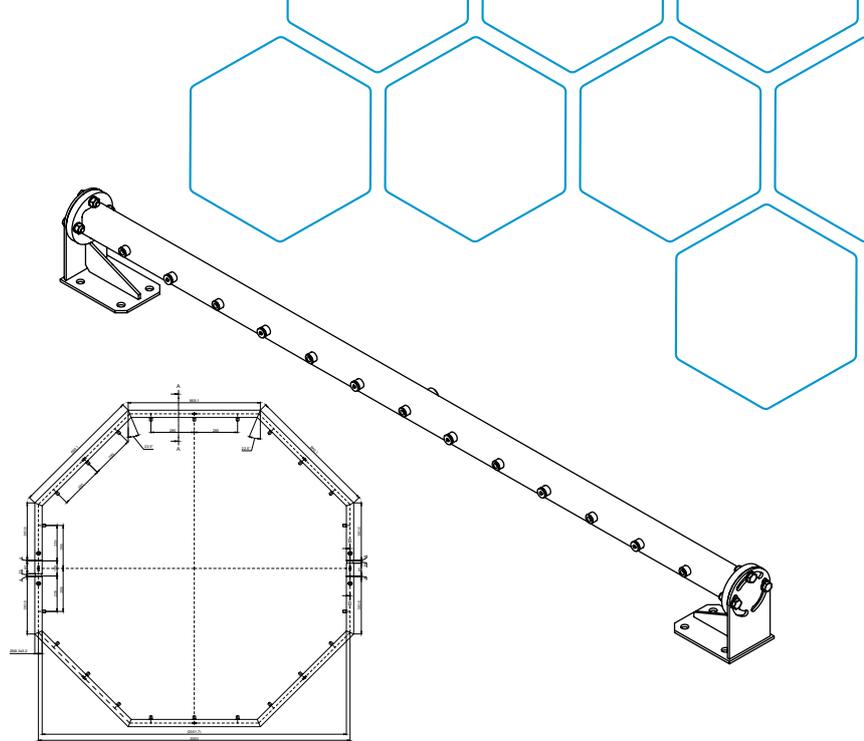
Example for a nozzle description: G1 / 4HA0,20-6320 | HA-0,20 = Size of the nozzle, 63 = Spray angle 63°, 20 = Material (1.4404)

HA MANIFOLDS/CONTROL UNITS

To use our HA-fog nozzles for dust suppression, we offer customized manifolds. This ensures that a sufficient number of nozzles can be placed as close to the dust source as possible.

Our manifolds can be manufactured in many different designs.

We also offer the possibility to regulate the water pressure with control units and if necessary to split the total flow to several manifolds.



DB

HIGH PRESSURE EDUCTOR NOZZLE

**SPECIALLY DESIGNED FOR DUST
SUPPRESSION APPLICATIONS**



DESIGN FEATURES

- 3-piece design
- Male connection
- Full Cone / Fog
- Standard materials: 1.4404 / 1.4401
- Adjustable with SJ-connection

SPRAY CHARACTERISTICS

- Full cone
- Finest fog
- Small spray angle (30°–45°)
- Long distance spraying
- Pressure range: 10–200 bar



FLOW RATES OF THE STANDARD VERSION (OTHER FLOW RATES ON REQUEST)

Nozzle Number	Liters per Minute						
	10 bar	20 bar	30 bar	50 bar	100 bar	150 bar	200 bar
DB-0.21	1.39	1.87	2.23	2.78	3.74	4.45	5.04
DB-0.30	1.98	2.67	3.18	3.96	5.33	6.35	7.18
DB-0.42	2.78	3.74	4.45	5.55	7.47	8.90	10.07
DB-0.57	3.75	5.05	6.01	7.48	10.09	12.00	13.60

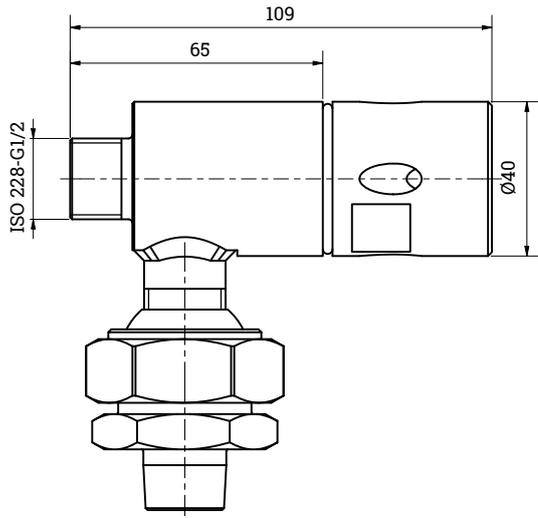
ADVANTAGES OF THE DB-NOZZLE

WEAR AND TEAR

The BETE-nozzle system is designed to avoid high costs because of wear and tear. All parts are replaceable on their own.

ADJUSTABLE (DIRECTION)

The nozzles can be installed close to where the dust appears. This helps in lowering the water and gives the possibility to catch most of the dust.

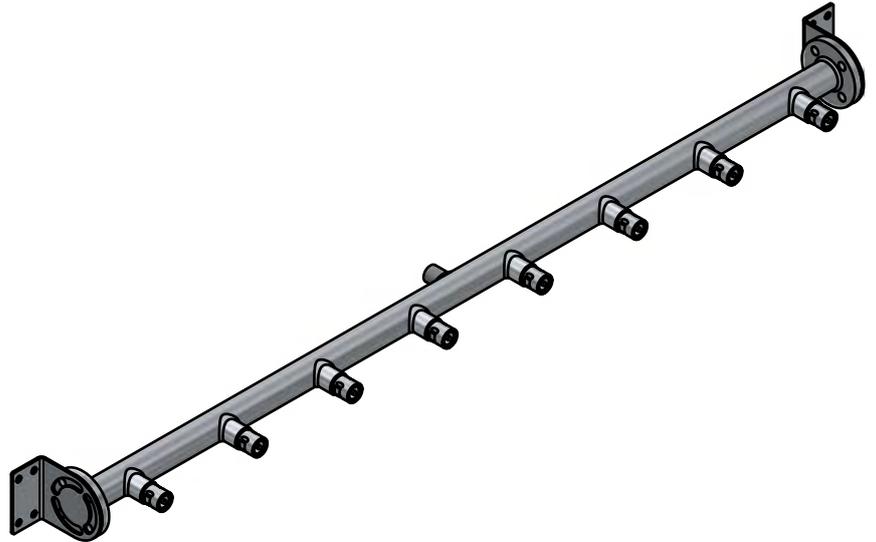


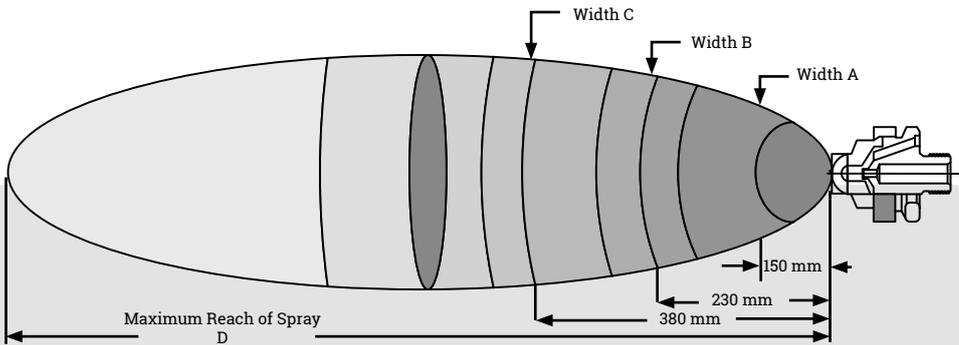
EASY TO MAINTAIN

All parts can be disassembled quickly. This prevents the system from long down times.

INSTALLATION

Can be used in single-nozzle adapter or in specially designed frames for more than one nozzle.





DESIGN FEATURES

- External mix: allows spraying of viscous materials
- Variable atomization

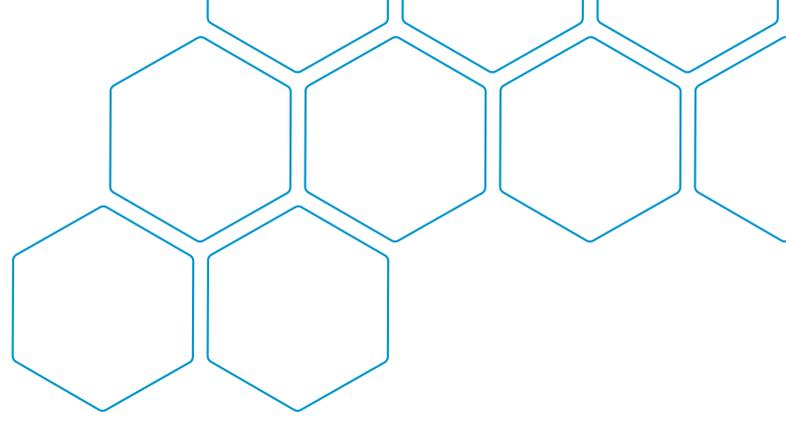
SPRAY CHARACTERISTICS

- Moderate spray angle (60°– 90°)
- Precise metering of the liquid flow rate

XAEF SET-UP FLOW RATES AND DIMENSIONS
PRESSURE-FED, EXTERNAL MIX, FLAT FAN SPRAY PATTERN, 1/8" AND 1/4" PIPE SIZES, BSP OR NPT

Pipe Size	Nozzle Number	Fluid and Air Cap Numbers	0.2 Bar Liquid			0.3 Bar Liquid			0.7 Bar Liquid			1.5 Bar Liquid			3.0 Bar Liquid			Spray Dimensions						
			Air (bar)	l/h	Nm ³ /h	Air (bar)	l/h	Nm ³ /h	Air (bar)	l/h	Nm ³ /h	Air (bar)	l/h	Nm ³ /h	Air (bar)	l/h	Nm ³ /h	air	liquid	A (mm)	B (mm)	C (mm)	D (mm)	
1/8" or 1/4"	EF 050	Fluid Cap FC7 & Air Cap AC1001	0.4	1.32	0.4	1.32	0.4	1.50	0.6	1.68	0.7	2.04	1.1	2.70	1.8	3.72	0.6	1.5	280	330	430	28		
			0.4	1.50	0.4	1.50	0.6	1.68	0.7	2.04	1.1	2.70	1.1	2.70	1.8	3.72	0.6	1.5	280	330	400	1.8		
			0.5	1.62	0.6	1.68	0.7	2.04	0.9	2.40	1.4	3.24	2.5	4.74	1.1	1.5	280	350	460	1.8				
			0.6	1.68	0.7	2.04	0.9	2.40	1.4	3.24	2.5	4.74	1.1	1.5	280	350	460	1.8						
			3	1.68	0.7	2.04	0.9	2.40	1.4	3.24	2.5	4.74	1.1	1.5	280	350	460	1.8						
			3	1.68	0.7	2.04	0.9	2.40	1.4	3.24	2.5	4.74	1.1	1.5	280	350	460	1.8						
	EF 100	Fluid Cap FC7 & Air Cap AC1003	0.2	1.51	0.4	1.58	0.7	1.87	1.4	2.72	2.8	4.38	0.2	0.2	90	150	230	0.9						
			0.4	1.58	0.7	1.87	1.1	2.38	1.8	3.23	3.5	5.10	1.1	0.2	90	150	230	1.2						
			0.7	1.87	1.1	2.38	1.4	2.72	2.1	3.57	4.2	6.12	1.4	0.4	100	150	230	1.2						
			1.1	2.38	1.4	2.72	1.8	3.23	2.8	4.42	4.9	7.14	1.4	1.4	120	180	250	1.5						
			1.4	2.72	1.8	3.23	2.1	3.56	3.5	5.10	5.3	7.65	1.8	0.7	120	150	240	1.5						
			1.8	3.23	2.1	3.56	2.8	4.42	4.2	6.12	5.6	8.34	2.8	1.4	130	180	280	1.8						
	EF 150	Fluid Cap FC4 & Air Cap AC1001	2.1	3.56	2.8	4.42	3.5	5.10	5.6	8.34	6.3	9.54	4.9	2.8	150	180	240	2.4						
			0.4	1.32	0.4	1.32	0.6	1.68	0.7	2.04	1.1	2.70	0.7	0.3	280	330	400	1.5						
			0.6	1.68	0.7	2.04	0.7	2.04	1.4	3.24	1.4	3.24	1.1	0.7	300	380	480	2.1						
			0.7	2.04	1.1	2.70	1.4	3.24	2.1	4.26	2.1	4.26	0.7	1.5	380	460	580	1.8						
			1.1	2.70	1.4	3.24	2.1	4.26	2.5	5.10	2.5	6.12	1.4	1.5	350	430	560	2.4						
			5	2.70	1.4	3.24	2.1	4.26	2.5	5.10	2.5	6.12	1.4	1.5	350	430	560	2.4						
	EF 200	Fluid Cap FC4 & Air Cap AC1003	0.4	1.58	0.7	1.87	1.1	2.38	1.8	3.23	3.2	4.92	0.4	0.2	80	140	220	1.0						
			0.7	1.87	1.1	2.38	1.4	2.72	2.1	3.56	3.5	5.10	1.4	0.2	90	150	220	1.7						
			1.1	2.38	1.4	2.72	1.8	3.23	2.8	4.42	4.2	6.12	1.8	0.4	100	170	230	1.8						
			1.4	2.72	1.8	3.23	2.1	3.56	3.5	5.10	4.9	7.14	1.8	1.4	130	190	290	2.1						
			1.8	3.23	2.1	3.56	2.8	4.42	4.2	6.12	5.3	7.62	2.1	0.7	130	180	250	1.8						
			2.1	3.56	2.8	4.42	3.5	5.10	4.9	7.14	6.3	9.54	3.5	1.4	130	220	300	2.4						
EF 250	Fluid Cap FC3 & Air Cap AC1001	2.8	4.42	3.5	5.10	4.2	6.12	6.3	9.54	6.7	9.84	5.3	2.8	150	190	250	3.0							
		0.4	1.50	0.4	1.50	0.4	1.50	0.7	2.04	1.4	3.24	0.6	0.3	350	480	610	1.8							
		0.5	1.65	0.6	1.68	0.6	1.68	0.9	2.40	1.8	3.72	0.6	0.7	350	480	630	1.5							
		0.6	1.68	0.7	1.86	0.7	2.04	1.1	2.70	2.1	4.26	0.7	1.5	380	480	630	1.8							
		0.7	2.04	0.7	2.04	0.9	2.40	1.4	3.24	2.5	4.74	1.1	1.5	410	510	660	2.1							
		9	2.04	0.7	2.04	0.9	2.40	1.4	3.24	2.5	4.74	1.1	1.5	410	510	660	2.1							
EF 300	Fluid Cap FC3 & Air Cap AC1003	3.5	5.10	4.2	6.12	4.9	7.14	6.3	9.54	7.0	10.56	5.3	2.8	170	200	300	4.0							
		0.7	1.87	1.1	2.38	1.4	2.72	2.5	4.08	3.5	5.10	0.7	0.2	130	170	250	1.2							
		1.1	2.38	1.4	2.72	1.8	3.23	2.8	4.42	4.2	6.12	1.8	0.2	130	170	250	1.8							
		1.4	2.72	1.8	3.23	2.1	3.56	3.5	5.10	4.9	7.14	2.1	0.4	130	180	240	1.8							
		1.8	3.23	2.1	3.56	2.8	4.42	4.2	6.12	5.3	7.62	2.5	1.4	140	200	320	1.8							
		2.1	3.56	2.8	4.42	3.5	5.10	4.9	7.14	5.6	8.34	2.8	0.7	140	190	300	2.3							

Standard Materials: Nickel-plated Brass, 303 Stainless Steel, and 316 Stainless Steel



XAEF SET-UP FLOW RATES AND DIMENSIONS

PRESSURE-FED, EXTERNAL MIX, FLAT FAN SPRAY PATTERN, 1/8" AND 1/4" PIPE SIZES, BSP OR NPT

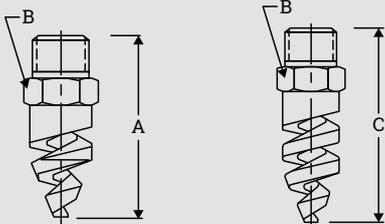
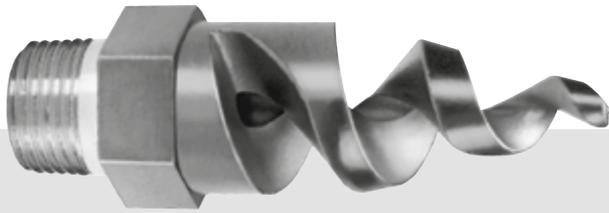
Pipe Size	Nozzle Number	Fluid and Air Cap Numbers	0.2 Bar Liquid			0.3 Bar Liquid			0.7 Bar Liquid			1.5 Bar Liquid			3.0 Bar Liquid			Spray Dimensions				
			Air (bar)	l/h	Nm ³ /h	Air (bar)	l/h	Nm ³ /h	Air (bar)	l/h	Nm ³ /h	Air (bar)	l/h	Nm ³ /h	Air (bar)	l/h	Nm ³ /h	air	liquid	A (mm)	B (mm)	C (mm)
1/8" or 1/4"	EF 350	Fluid Cap FC6 & Air Cap AC1002	0.6	5.46	0.7	6.12	1.4	9.36	2.1	12.6	2.8	37	15.6	4.2	52	17.1	2.1	0.7	330	380	480	3.8
			0.7	6.12	1.1	7.80	2.1	12.6	2.8	15.6	4.2	37	15.6	4.2	52	21.6	2.1	1.5	350	460	560	4.3
			1.1	7.80	1.8	11.0	2.5	14.1	3.5	18.6	5.3	25.8	4.2	1.5	380	480	660	4.6				
			1.4	9.36	2.1	12.6	2.8	15.6	4.2	21.6	5.6	27.3	3.9	2.0	410	510	690	4.6				
	EF 400	Fluid Cap FC6 & Air Cap AC1004	0.7	5.10	1.0	6.12	1.4	6.96	2.5	10.7	3.2	37	16.0	4.2	52	12.7	0.7	0.2	130	190	250	1.7
			1.0	6.12	1.4	6.96	1.8	8.34	2.8	11.7	3.5	37	16.0	4.2	52	13.9	1.8	0.2	130	190	250	2.7
			1.4	6.96	1.8	8.34	2.1	9.36	3.5	13.6	3.9	37	16.0	4.2	52	15.3	2.1	0.4	150	190	280	3.0
			1.8	8.34	2.1	9.36	2.5	10.7	4.2	16.0	4.2	37	16.0	4.2	52	16.5	2.5	0.7	150	220	280	3.5
			2.1	9.36	2.8	11.7	2.8	11.7	4.9	18.7	4.9	37	16.0	4.2	52	18.8	2.5	1.4	170	230	360	3.7
			2.8	11.7	3.5	13.6	3.5	13.6	5.6	21.6	5.6	37	16.0	4.2	52	21.6	4.2	1.4	170	230	370	4.3
			3.5	13.6	4.2	16.0	4.2	16.0	6.3	24.7	6.3	37	16.0	4.2	52	24.7	4.9	2.8	170	220	320	4.9
			EF 450	Fluid Cap FC2 & Air Cap AC1002	0.6	5.46	0.7	6.12	1.1	7.80	2.5	14.1	3.5	48	19.8	6.0	68	18.6	1.8	0.7	350	480
	1.1	7.80			1.4	9.36	1.8	11.0	3.2	17.1	4.6	48	19.8	6.0	68	22.8	2.5	1.5	380	460	640	3.8
	1.4	9.36			1.8	11.0	2.5	14.1	3.9	19.8	6.0	48	19.8	6.0	68	28.5	4.2	1.5	300	430	580	4.9
	1.8	11.0			2.1	12.6	2.8	15.6	4.2	21.6	6.7	48	19.8	6.0	68	31.5	4.2	2.0	330	430	610	5.2
	EF 500	Fluid Cap FC2 & Air Cap AC1004	0.7	5.10	1.4	6.96	1.8	8.34	2.8	11.7	3.5	68	24.3	7.0	100	13.9	0.7	0.4	150	190	270	2.1
			1.0	6.12	1.8	8.34	2.1	9.36	3.2	12.7	4.2	68	24.3	7.0	100	16.5	1.8	0.7	150	190	270	3.0
			1.4	6.96	2.1	9.36	2.5	10.7	3.5	13.6	4.9	68	24.3	7.0	100	18.8	2.5	1.4	150	220	330	3.4
			1.8	8.34	2.5	10.7	2.8	11.7	4.2	16.0	5.3	68	24.3	7.0	100	20.4	2.8	1.4	150	220	360	3.8
			2.1	9.36	2.8	11.7	3.5	13.6	4.9	18.7	5.6	68	24.3	7.0	100	21.6	2.8	1.4	170	250	370	4.0
			2.8	11.7	3.5	13.6	4.2	16.0	5.6	21.6	6.3	68	24.3	7.0	100	24.7	4.2	2.1	170	250	370	4.9
			3.5	13.6	4.2	16.0	4.9	18.7	6.3	24.7	6.6	68	24.3	7.0	100	25.7	5.3	2.8	180	230	360	5.8
	EF 550	Fluid Cap FC1 & Air Cap AC1002	0.7	6.12	1.1	7.80	1.8	11.0	3.2	17.1	5.3	100	27.3	7.0	141	25.8	2.8	0.7	400	560	760	3.0
			1.1	7.80	1.4	9.36	2.1	12.6	3.5	18.6	6.0	100	27.3	7.0	141	28.5	3.2	1.5	480	580	790	4.3
			1.4	9.36	2.1	12.6	2.8	15.6	4.9	24.3	6.7	100	27.3	7.0	141	31.5	5.6	1.5	380	510	660	5.8
			1.8	11.0	2.5	14.1	3.2	17.1	5.9	27.3	7.0	100	27.3	7.0	141	33.0	3.9	2.0	480	640	840	4.3
	EF 600	Fluid Cap FC1 & Air Cap AC1004	1.0	6.12	1.8	8.34	2.5	10.7	3.2	12.7	3.9	141	18.8	3.2	153	21.6	2.8	0.7	150	200	250	2.7
			1.4	6.96	2.1	9.36	2.8	11.7	3.5	13.6	4.2	141	18.8	3.2	153	16.5	2.1	0.2	150	220	290	3.0
			1.8	8.34	2.5	10.7	3.2	12.7	3.9	14.8	4.6	141	18.8	3.2	153	17.8	2.8	0.4	180	240	360	3.5
			2.1	9.36	2.8	11.7	3.5	13.6	4.2	16.0	4.9	141	18.8	3.2	153	18.8	3.2	1.4	200	280	390	3.7
			2.5	10.7	3.2	12.7	4.2	16.0	4.9	18.7	5.6	141	18.8	3.2	153	21.6	3.5	0.7	190	270	380	4.0
			2.8	11.7	3.5	13.6	4.9	18.7	5.6	21.6	6.3	141	18.8	3.2	153	24.7	4.2	1.4	200	280	390	4.3
			3.5	13.6	4.2	16.0	5.6	21.6	6.3	24.7	7.0	141	18.8	3.2	153	27.2	5.6	2.8	180	240	380	5.9
	EF 650	Fluid Cap FC8 & Air Cap AC1005	1.8	14.1	1.8	2.5	2.5	18.0	3.9	24.6		175	38.4		280	1.8	0.2	150	200	290	3.0	
			2.1	15.6	2.1	2.8	2.8	19.8	4.2	26.7		175	38.4		280	2.8	0.2	150	200	300	3.4	
			2.5	18.0	2.5	3.2	3.2	21.3	4.6	28.8		175	38.4		280	2.8	0.3	150	200	300	4.0	
			2.8	19.8	2.8	3.5	3.5	22.8	4.9	31.2		175	38.4		280	3.5	0.7	170	220	320	4.3	
			3.2	21.3	3.2	3.9	3.9	24.6	5.3	33.9		175	38.4		280	3.9	1.5	170	220	340	4.6	
			3.5	22.8	3.5	4.2	4.2	26.7	5.6	36.0		175	38.4		280	4.2	1.0	170	230	330	4.7	
			4.2	26.7	4.2	4.9	4.9	31.2	6.3	41.1		175	38.4		280	4.9	1.5	170	230	340	5.5	
	EF 700	Fluid Cap FC9 & Air Cap AC1005	2.1	15.6	2.8	19.8	3.9	24.6	4.9	31.2		175	38.4		280	2.1	0.2	170	240	340	3.5	
			2.5	18.0	3.2	21.3	4.2	26.7	5.3	33.9		175	38.4		280	3.2	0.2	180	240	360	4.3	
			2.8	19.8	3.5	22.8	4.6	28.8	5.6	36.0		175	38.4		280	3.9	0.3	180	250	360	4.9	
			3.2	21.3	3.9	24.6	4.9	31.2	6.0	41.1		175	38.4		280	4.9	0.7	180	250	360	5.5	
			3.5	22.8	4.2	26.7	5.3	33.9	6.3	41.1		175	38.4		280	4.9	1.5	200	250	380	5.5	
			4.2	26.7	4.9	31.2	5.6	36.0	6.3	41.1		175	38.4		280	5.3	1.0	180	250	380	5.8	
			4.9	31.2	5.6	36.0	6.3	41.1	6.3	41.1		175	38.4		280	5.6	1.5	200	250	380	6.1	
	EF 750	Fluid Cap FC5 & Air Cap AC1005	2.8	19.8	3.5	22.8	4.6	28.8	5.6	36.0		192	36.0		280	2.8	0.2	190	250	360	4.6	
3.2			21.3	3.9	24.6	4.9	31.2	6.0	38.4		192	36.0		280	3.9	0.2	200	250	370	4.9		
3.5			22.8	4.2	26.7	5.3	33.9	6.3	41.1		192	36.0		280	4.6	0.3	200	250	370	5.2		
3.9			24.6	4.6	28.8	5.6	36.0	6.3	41.1		192	36.0		280	5.3	0.7	220	270	380	5.5		
4.2			26.7	4.9	31.2	6.0	38.4	6.3	41.1		192	36.0		280	5.6	1.0	220	270	410	5.5		
4.6			28.8	5.3	33.9	6.3	41.1	6.3	41.1		192	36.0		280	5.6	1.5	220	270	410	5.8		
4.9	31.2	5.6	36.0	6.3	41.1	6.3	41.1		192	36.0		280	6.0	1.5	220	270	410	6.1				

Standard Materials: Nickel-plated Brass, 303 Stainless Steel, and 316 Stainless Steel

TF

FULL CONE NOZZLE

WIDE RANGE OF FLOWS AND ANGLES



DESIGN FEATURES

- The original spiral nozzle invented by BETE
- High energy efficiency
- One-piece / no internal parts
- Clog resistant performance
- High discharge velocity
- Male connection standard; female connection available by special order

SPRAY CHARACTERISTICS

- Wide range of flow rates and spray angles
- Fine atomization
- Spray angles: 60° to 170°
- Flow rates: 2,26 to 10700 l/min (Higher flow rates available)

TF FULL CONE FLOW RATES AND DIMENSIONS

FULL CONE, 60° (NN), 90° (FCN OR FFCN), 120° (FC OR FFC), 150° AND 170° SPRAY ANGLES, 1/8" TO 4" PIP E SIZES, BSP OR NPT

Male Pipe Size	Nozzle Number	Available Spray Angles					K Factor	LITERS PER MINUTE @										Approx. (mm)		Dim. (mm) for Metal Only*			Wt. (g)	
		60°	90°	120°	150°	170°		PTFE not recommended at pressures above blue line					Metal ONLY at pressures above green line					Orif. Dia	Free Pass Dia.	A**	B	C	Metal	Plas
		0.5 bar	0.7 bar	1 bar	2 bar	3 bar		5 bar	10 bar	20 bar	10 bar	20 bar	10 bar	20 bar	10 bar	20 bar	10 bar	20 bar	10 bar	20 bar	10 bar	20 bar		
1/8"	TF6	60°	90°	120°	150°	170°	3.19	2.26	2.67	3.19	4.5	5.5	7.1	10.1	14.3	2.38	2.38	42.9	14.3	42.9	28	6		
	TF8	60°	90°	120°	150°	170°	5.93	4.19	4.96	5.93	8.4	10.3	13.2	18.7	26.5	3.18	3.18	42.9	14.3	55.6				
1/4"	TF6	60°	90°	120°	150°	170°	3.19	2.26	2.67	3.19	4.5	5.5	7.1	10.1	14.3	2.38	2.38	47.6	14.3	47.6				
	TF8	60°	90°	120°	150°	170°	5.93	4.19	4.96	5.93	8.4	10.3	13.2	18.7	26.5	3.18	3.18	47.6	14.3	60.3	35	6		
3/8"	TF10	60°	90°	120°	150°	170°	9.12	6.45	7.63	9.12	12.9	15.8	20.4	28.8	40.8	3.97	3.18	47.6	14.3	60.3				
	TF6	60°	90°	120°			3.19	2.26	2.67	3.19	4.5	5.5	7.1	10.1	14.3	2.38	2.38							
	TF8	60°	90°	120°			5.93	4.19	4.96	5.93	8.4	10.3	13.2	18.7	26.5	3.18	3.18							
	TF10	60°	90°	120°			9.12	6.45	7.63	9.12	12.9	15.8	20.4	28.8	40.8	3.97	3.18							
	TF12	60°	90°	120°	150°	170°	13.7	9.67	11.4	13.7	19.3	23.7	30.6	43.2	61.1	4.76	3.18	47.6	14.3	60.3	46	7		
	TF14	60°	90°	120°	150°	170°	18.5	13.1	15.4	18.5	26.1	32.0	41.3	58.4	82.6	5.56	3.18							
1/2"	TF16	60°	90°	120°	150°	170°	24.2	17.1	20.2	24.2	34.2	41.8	54.0	76.4	108	6.35	3.18							
	TF20	60°	90°	120°	150°	170°	37.6	26.6	31.5	37.6	53.2	65.1	84.1	119	168	7.94	3.18							
	TF24	60°	90°	120°	150°	170°	54.9	38.8	46.0	54.9	77.7	95.1	123	174	246	9.53	4.76	63.5	22.2	77.7	85	14		
	TF28	60°	90°	120°	150°	170°	75.2	53.2	62.9	75.2	106	130	168	238	336	11.1	4.76							
3/4"	TF32	60°	90°	120°	150°	170°	95.7	67.7	80.1	95.7	135	166	214	303	428	12.7	4.76	69.9	28.6	88.9	156	25		
	TF40	60°	90°	120°	150°	170°	153	108	128	153	216	264	341	483	683	15.9	6.35							
1"	TF48	60°	90°	120°	150°	170°	217	153	181	216	306	375	484	685	968	19.1	6.35	92.1	34.9	111	241	71		
	TF56	60°	90°	120°	150°	170°	294	208	246	294	416	509	657	930	1320	22.2	7.94	111	50.8	137				
1 1/2"	TF64	60°	90°	120°	150°	170°	385	272	322	385	545	667	861	1220	1720	25.4	7.94	111	50.8	137	624	120		
	TF72	60°	90°	120°	150°	170°	438	309	366	438	619	758	978	1380	1960	28.6	7.94	111	50.8	143				
2"	TF88	60°	90°	120°	150°	170°	638	451	534	638	902	1110	1430	2020	2850	34.9	11.1	143	63.5	175	1300	227		
	TF96 ¹	60°	90°	120°	150°	170°	806	570	674	806	1140	1400	1800	2550	3600	38.1	11.1	176	63.5	178	1530	255		
3"	TF112 ¹	60°	90°	120°	150°	170°	1170	825	976	1170	1650	2020	2610	3690	5220	44.5	14.3	219	88.9	235	3230	567		
	TF128 ¹	60°	90°	120°	150°	170°	1550	1090	1290	1550	2190	2680	3460	4891	6920	50.8	14.3							
4"	TF160 ¹	60°	90°	120°			2390	1690	2000	2390	3380	4140	5350	7570	10700	63.5	15.9	257	114		4790	765		

Flow Rate (l/min) $K\sqrt{\text{bar}}$

* Dimensions are for bar stock, cast sizes may vary

** 60° nozzles slightly longer, call us for details

¹ Three turn nozzles

Standard Materials: Brass, 316 Stainless Steel, PVC, Polypropylene and PTFE (PP not available for TF6 thru TF10)
Spray angle performance varies with pressure. Contact BETE for specific data on critical applications.

PERFORMANCE SPRAY ENGINEERING

AVAILABLE FOR YOU. WITH NOZZLE EXPERTISE AND EXCELLENT SERVICE

We offer standard solutions and customised complete solutions that exceed our customers' expectations in every respect. From holding initial discussions through to the design, manufacturing and ongoing service: our deep understanding of the industry and processes allows us to make your project a success.

FIRST-CLASS CUSTOMER SERVICE

Right from the start of the project, we draw on our expertise to support our customers. We develop in a fast, resource-focused manner and deliver high-quality nozzle technology that helps to sustainably eliminate your dust problem.

EXPERT ENGINEERING ADVICE

Our engineers develop nozzles, spray lances and designs for almost every industry. Among them are patented innovations that enable us to do things with nozzles that others cannot. Industries around the world rely on our specialised spray solutions. Our team will help you select the right nozzle technology to find the best spraying solution for your application.

SIMULATIONS FOR OPTIMAL NOZZLE USE

Diagnosing spraying problems, optimising the performance of spraying applications and finding new ways to spray is our mission. BETE's spray lab has state-of-the-art tools for measuring spray properties. When spray lab testing is impractical or too costly, virtual simulations are the key. Using computational fluid dynamics (CFD) models and simulations, we calculate the fluid mechanics and individually check the effects on the overall yield in all conceivable environments and requirements. This allows us to predict droplet trajectories, evaporation, flow patterns and circulations and evaluate how applied stresses affect our product materials and designs. We can therefore ensure that our nozzles' spray patterns perfectly match the requirements of your processes.

FLEXIBLE MATERIALS AND PRECISION MANUFACTURING

We use various manufacturing processes to produce standard or customised nozzles and tailor-made spray solutions for specific application requirements. We have experience with standard materials ranging from brass and stainless steel to advanced alloys, ceramics and polymers.

INSTALLATION AND COMMISSIONING

With BETE, you can rely on a well-coordinated team. We work closely with you to achieve a common goal: quickly putting your system into operation with components for an effective dust suppression system and ensuring a safe, resource-saving operational process.

FASTEST POSSIBLE ORDER PROCESSING

Our expert knowledge gained from working in dozens of industries and improving thousands of applications leads to a perfect spray result. The driving force behind this lies in our highly skilled employees. We respond to our customers' needs and ensure that performance, quality and delivery expectations are met. You can rely on us!

A HISTORY OF EFFICIENT SPRAYING TECHNIQUES ARE OUR PAST AND OUR FUTURE. SINCE 1950.

Making spray applications as efficient and sustainable as possible is a science in itself – a science to which we devote all our expertise and innovative spirit. From the invention of the first spiral nozzle to perfecting our complete nozzle range.

If there is one thing that truly makes BETE stand out, it is the ability to respond quickly and effectively to spray challenges of all kinds – be they simple or complicated – anywhere in the world.



DUST FIGHTERS YOUR TEAM

We put our passion for our professions and varying skills into your projects. Our expert engineering and ability to manufacture all relevant components will make your processes even more efficient. We understand, analyse and optimise the entire process. Thanks to this expert knowledge, BETE has been one of the most innovative technology leaders in the industry for over 70 years.

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