



GEA Cleaning Technology
Business Line Cleaning Technology

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Legal notice

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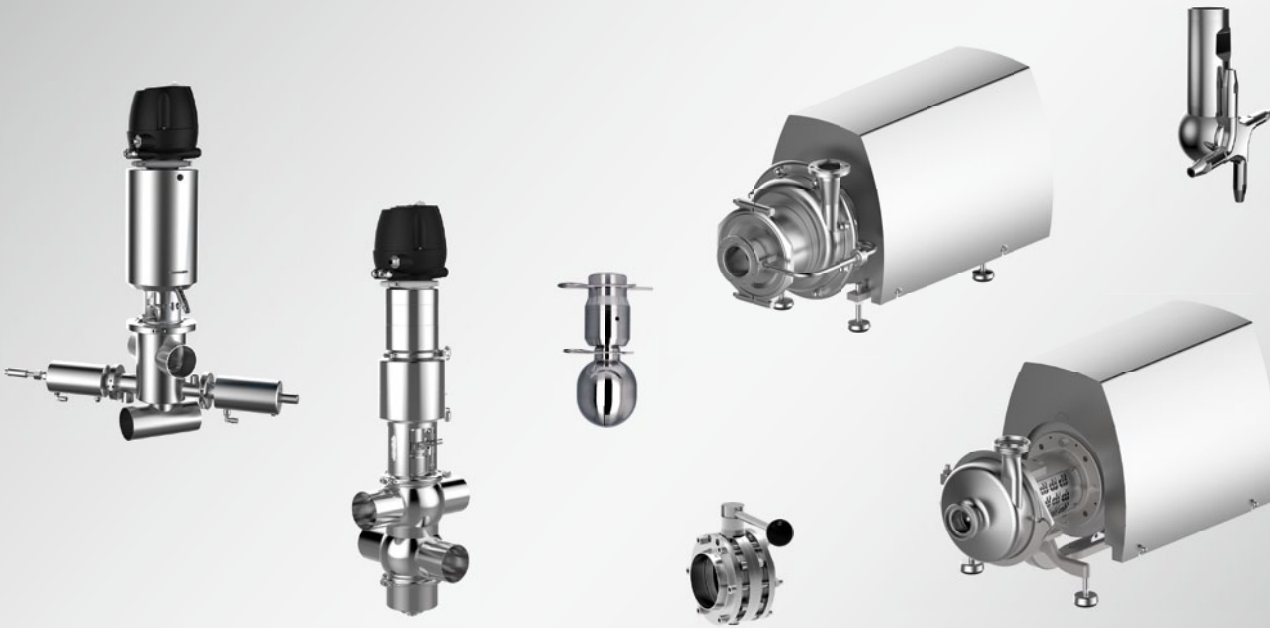
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Regardless of the application – for our customers product quality and profitability are what matters. This is what GEA Flow Components is known for. Our engineers are specialists in everything that flows.

GEA Group Aktiengesellschaft

GEA is one of the largest suppliers of process technology for the food industry and for a wide range of other industries. As an international technology group, the company focuses on world-leading process solutions and components for sophisticated production processes.

GEA Flow Components

GEA offers well-engineered process components and services to ensure smooth production processes in the treatment of liquid products. We develop and produce a comprehensive product range that includes valve technology for all hygienic classes (Hygienic, UltraClean, Aseptic), hygienic pumps and cleaning technology.

GEA Flow Components products and services are available around the world through the international GEA network.



Around one quarter of the milk processed is handled by GEA equipment



Roughly every second liter of beer is brewed using GEA equipment and solutions



Approx. one in three instant coffee lines has been built by GEA

Business Unit GEA Flow Components

State-of-the-art hygienic design

GEA Flow Components meet the highest hygienic standards where required, such as EHEDG and 3-A standards.

Hygienic valves and components from GEA form the core component of matrix-piped process plants.

When it comes to sterile applications, GEA offers both UltraClean and Aseptic valves and systems. The hermetic sealing of the product area provides a maximum level of process line isolation and thus contributes to process and product safety.

The hygienic pump range from GEA includes centrifugal pumps (single-stage, multi-stage and self-priming), as well as rotary lobe pumps.

GEA cleaning devices – whether index, orbital, rotary or static – achieve optimum cleaning results in multiple industries. GEA product recovery systems help to recover valuable products and reduce both waste disposal costs as well as water and detergent consumption.

Applications

- Beverage
 - Beer, juice, smoothie products ...
- Dairy
 - Milk, yoghurt, cheese ...
- Food
 - Sauces & cremes, ketchup, mayonnaise ...
- Pharma/Biotech
 - Pharmaceuticals, biotechnology products, cosmetics & health care ...
- Chemicals
 - Fine chemicals, bulk chemicals, cleaning chemicals ...
- Dairy farming
 - Raw milk processing ...



Hygienic Valve Technology

A complete range of economically designed Hygienic valves for complex tasks as well as basic functions, helping producers to achieve high product quality and efficiency.



Aseptic Valve Technology

UltraClean and Aseptic valves are suitable for production processes which require a higher safety protection against contamination from the environment and thus warrant microbial stability of the product over the whole process.



Hygienic Pump Technology

A great variety of Hygienic pumps with sensibly rated high efficiency motors and carefully designed flow paths, driving economic efficiency and sustainable operation.



Cleaning Technology

Index, orbital, rotating and static cleaners in a complete range, developed with special emphasis on saving valuable resources in the cleaning process.



GEA cleaning technology – the solution for every cleaning process

Our cleaning equipment has been developed for sustainable practice, with special emphasis on saving valuable resources in the cleaning process.

Whether using orbital, rotary or static, our cleaners achieve the best cleaning results in multiple industry sectors.

Incorporating our systems into your production can help you to reduce production downtime, waste disposal costs, and water and detergent consumption.

We offer economical, flexible and service-oriented solutions:

Economical

- Reduction in consumption of energy, water, and cleaning agents
- Time and labor required for cleaning is minimized

Flexible

- Diverse range of orbital, rotating, and static cleaners
- Customized cleaning solutions for many different kinds of applications and tank sizes
- Various different spray patterns
- Different cleaning times possible

Service-oriented

- Tailored Engineering Support
- Digital tools (e.g. 3D models)
- Easy-to-maintain
- Onsite cleaning tests

Examples of applications and industries:

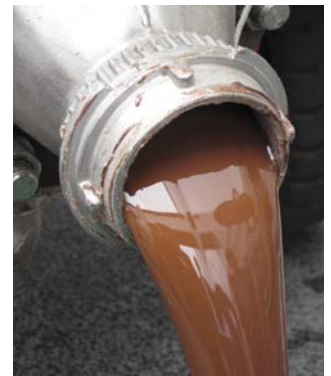
Applications:

- Process vessels
- Storage tanks
- Lauter tuns
- Milk tanks
- Spray dryers
- Fermenters
- Silos
- Mixers
- Batch blenders
- Shipping containers
- Tanker trucks
- IBCs
- Container wash tunnels
- etc.



Industries:

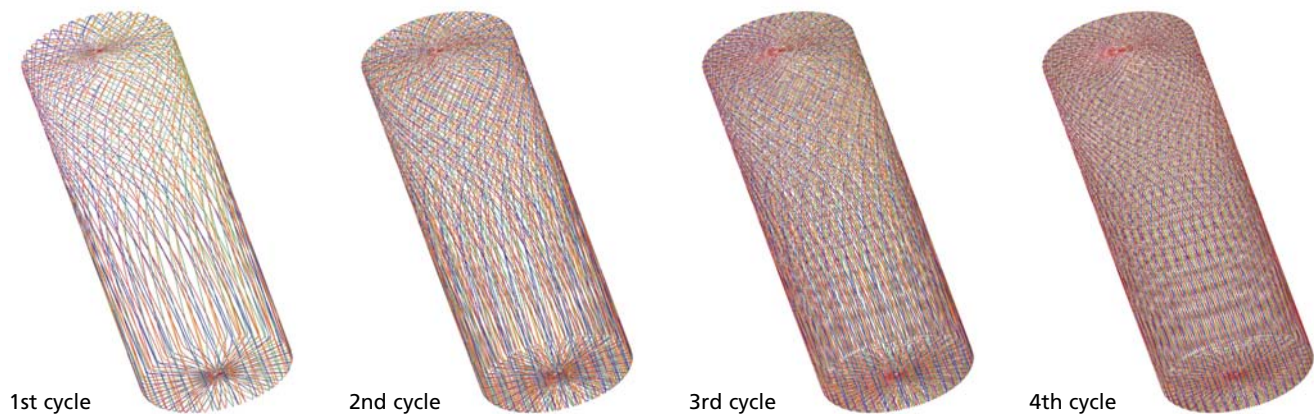
- Brewing and beverage industries
- Dairy and food industries
- Cosmetics industry
- Pharmaceuticals industry
- Fine chemicals industry
- Biotechnology industry
- Chemicals industry
- Paint industry
- etc.



Orbital cleaners

Orbital cleaners work on the basis of two rotating axes, one horizontal and one vertical, as shown in the illustration.

- Hygienic design
- Ball bearing free (exception TMC)
- Slim, compact design
- Intensive cleaning with targeted jets
- Long life
- Easy-to-maintain
- Driven by the cleaning medium (exception TMC)
- Low number of components (orbital cleaners Typhoon, Tempest, Tornado all use the same spare parts)
- Reproducible cleaning by monitoring of the rotation with sensor SMW 100



Rotating jet cleaner

The proven cleaning method of the jet cleaner achieves optimum cleaning results with powerful, slowly rotating fan-spray jets.

- Operates with minimal drive pressure
- Driven using fluid transmission
- Functionally robust
- Easy to maintain
- Integrated cleaning lance
- Various possible spray patterns using different nozzle arrangements on the spray head
- Long life due to wear-resistant components
- For reproducible cleaning, the rotation monitoring option is recommended



Rotating cleaners

The optimum cleaning effect of the rotating cleaners is produced by targeted flat jets or fast moving high impact droplets

- Hygienic design
- Ball bearing free
- Low number of components



Spray balls

Spray balls as static cleaners are designed for flush cleaning with a high flow rate, thus providing powerful flushing at low pressure.

- Low capital outlay
- No wearing parts
- Various possible spray patterns, materials, and surfaces
- High flow rates



Retractors In-Line Sprayer


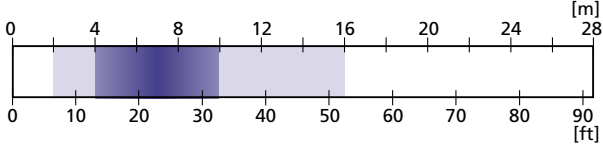
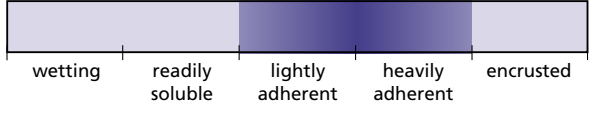

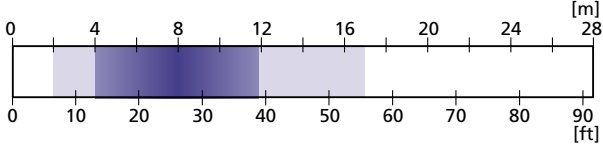
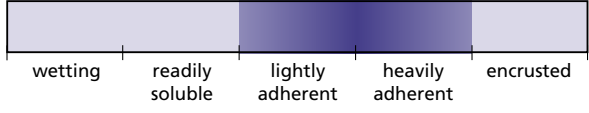

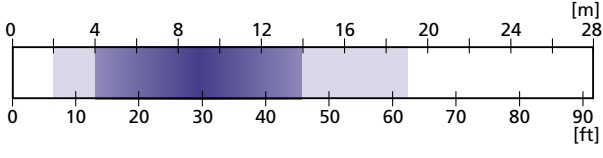
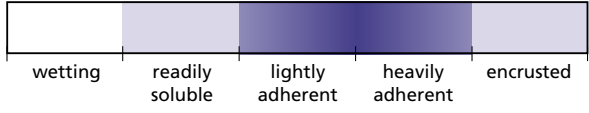

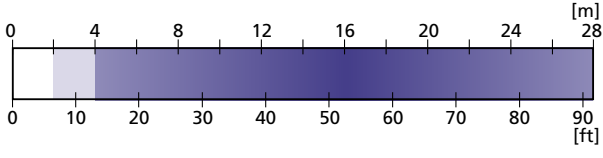
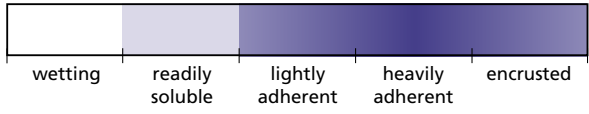

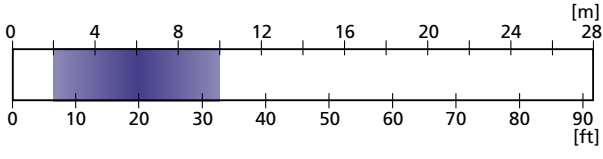
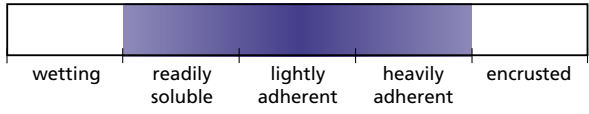

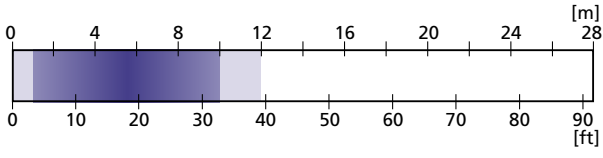
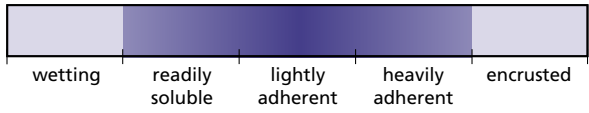
The In-Line Sprayer has an extendable spray head that only extends into the product space during cleaning – which is especially useful for cleaning tanks with moving fixtures (such as agitators, scrapers, etc.) and for large pipes. After cleaning, the spray head retracts into its inoperative position.

- Savings on cleaning agents due to targeted cleaning
- Demonstrable process reliability and functional reliability
- Range of seal materials


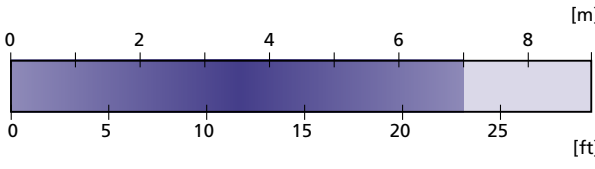
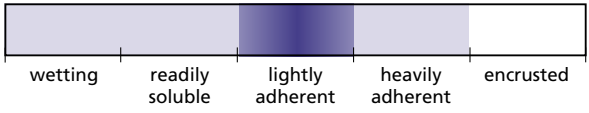

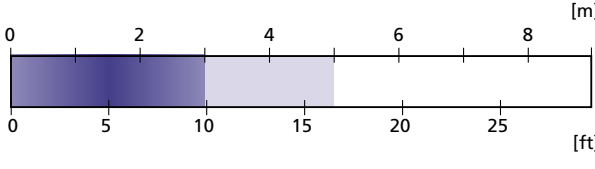


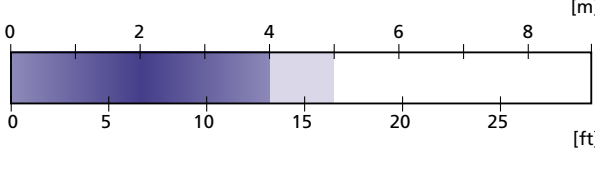
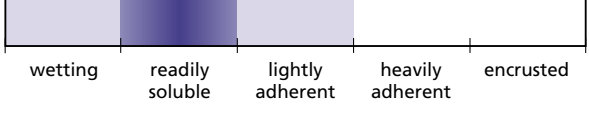

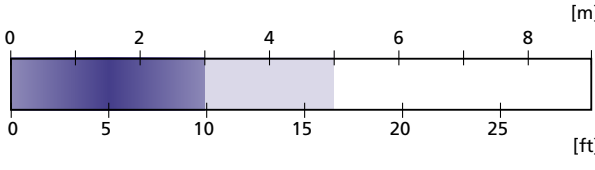
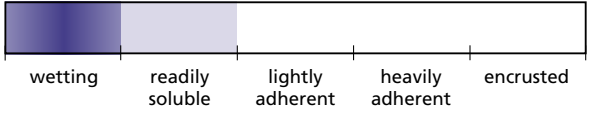

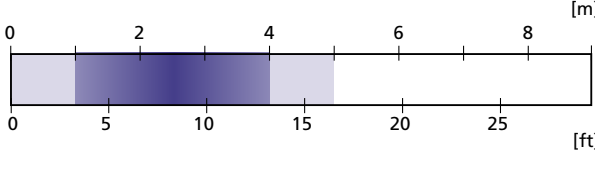


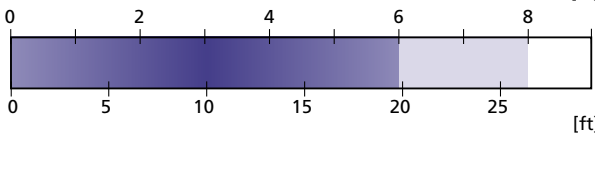
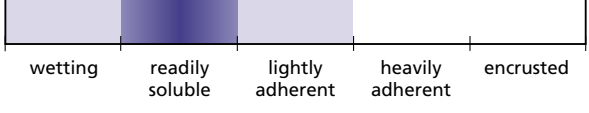








In-Line Sprayer

Cleaning components

	Recommended cleaning diameter	Level of soiling
 <p>Twister</p>		
 <p>Typhoon</p>		
 <p>Tempest</p>		
 <p>Tornado / 4</p>		
 <p>Jet cleaners</p>		
 <p>TMC 45/85</p>		

Recommended working pressure	Flow rate	
<p>0 4 8 12 16 20 24 35 [bar] [psi]</p>	<p>0 5 10 15 20 25 30 35 40 [m³/h] [l/min] [USGPM]</p>	<p>Twister</p>
<p>0 4 8 12 16 20 24 35 [bar] [psi]</p>	<p>0 5 10 15 20 25 30 35 40 [m³/h] [l/min] [USGPM]</p>	<p>Typhoon</p>
<p>0 4 8 12 16 20 24 35 [bar] [psi]</p>	<p>0 5 10 15 20 25 30 35 40 [m³/h] [l/min] [USGPM]</p>	<p>Tempest</p>
<p>0 4 8 12 16 20 24 35 [bar] [psi]</p>	<p>up to 47.4 m³/h, 790 l/min, 209 USGPM</p> <p>0 5 10 15 20 25 30 35 40 [m³/h] [l/min] [USGPM]</p>	<p>Tornado / 4</p>
<p>0 4 8 12 16 20 24 35 [bar] [psi]</p>	<p>0 5 10 15 20 25 30 35 40 [m³/h] [l/min] [USGPM]</p>	<p>Jet cleaners</p>
<p>0 4 8 12 16 20 24 35 [bar] [psi]</p>	<p>0 5 10 15 20 25 30 35 40 [m³/h] [l/min] [USGPM]</p>	<p>TMC 45/85</p>

	Recommended cleaning diameter	Wet of soiling
 Turbo SSB		
 Sanitor		
 Turbodisc/ Chemidisc		
 Torus/ Chemitorus		
 Clipdisc		
 Spray ball		

Recommended working pressure	Flow rate	
<p>0 2 4 6 8 10 12 14 16 18 20 [bar] 0 50 100 150 200 250 [psi]</p>	<p>up to 24.5 m³/h</p> <p>0 2 4 6 8 10 12 14 16 [m³/h] 0 50 100 150 200 250 [l/min] 0 10 20 30 40 50 60 [USGPM]</p>	 <p>Turbo SSB</p>
<p>0 2 4 6 8 10 12 14 16 18 20 [bar] 0 50 100 150 200 250 [psi]</p>	<p>0 2 4 6 8 10 12 14 16 [m³/h] 0 50 100 150 200 250 [l/min] 0 10 20 30 40 50 60 [USGPM]</p>	 <p>Sanitor</p>
<p>0 2 4 6 8 10 12 14 16 18 20 [bar] 0 50 100 150 200 250 [psi]</p>	<p>0 2 4 6 8 10 12 14 16 [m³/h] 0 50 100 150 200 250 [l/min] 0 10 20 30 40 50 60 [USGPM]</p>	 <p>Turbodisc/ Chemidisc</p>
<p>0 2 4 6 8 10 12 14 16 18 20 [bar] 0 50 100 150 200 250 [psi]</p>	<p>0 2 4 6 8 10 12 14 16 [m³/h] 0 50 100 150 200 250 [l/min] 0 10 20 30 40 50 60 [USGPM]</p>	 <p>Torus/ Chemitorus</p>
<p>0 2 4 6 8 10 12 14 16 18 20 [bar] 0 50 100 150 200 250 [psi]</p>	<p>0 2 4 6 8 10 12 14 16 [m³/h] 0 50 100 150 200 250 [l/min] 0 10 20 30 40 50 60 [USGPM]</p>	 <p>Clipdisc</p>
<p>0 2 4 6 8 10 12 14 16 18 20 [bar] 0 50 100 150 200 250 [psi]</p>	<p>up to 67 m³/h</p> <p>0 2 4 6 8 10 12 14 16 [m³/h] 0 50 100 150 200 250 [l/min] 0 10 20 30 40 50 60 [USGPM]</p>	 <p>Spray ball</p>

Resistance of sealing materials depending on type and temperature of the medium conveyed.

General resistance comparison of product wetted seals

Resistance: A = good resistance
 B = reduced service live
 C = not resistant

Sealing material		EPDM	FKM	FFKM	VMQ	PTFE	C-PTFE
general operating temperature		-40...+135°C *	-10...+200°C *	-10...+230°C *	-50...+200°C *	-40...+260°C *	-40...+260°C *
Medium	Temp.						
Caustics up to 3%	to 80°C	A	B	A	B	A	A
Caustics up to 5%	to 40°C	A	B	A	B	A	A
Caustics up to 5%	to 80°C	A	C	A	B	A	A
Caustics more than 5%		B	C	A	B	A	A
Anorganic acids up to 3% **	to 80°C	A	A	A	B	A	A
Anorganic acids up to 5% **	to 80°C	B	A	A	B	A	A
Anorganic acids up to 5% **	to 100°C	C	A	A	B	A	A
Water	to 80°C	A	A	A	A	A	A
Steam	to 135°C	A	B	B	B	A	A
Steam, approx. 30 min	to 150°C	A	B	B	B	A	A
Fuels/hydrocarbons		C	A	A	C	A	A
Product with a fat content of max. 35%		A	A	A	B	A	A
Product with a fat content more than 35%		C	A	A	B	A	A
Oils		C	A	A	B	A	A

Other applications on request

* = Depending on installation circumstances

** = Anorganic acids such as nitric or sulfid acid

This overview of sealing material is based on manufacturer's information not considering the operating conditions.

The contact time can negatively affect the service life of the seals.

The sealing materials comply with the regulations of FDA 21 CFR 177.2600 or FDA 21 CFR 177.1550.

Diagrams and Cycle Times

*All Diagrams and cycle times are based on a cleaning medium of:
 density 1 kg/dm³, viscosity 1 mm²/s, temperature 20 °C, tolerance ±10%*



- Powerful compact jetting cleaner
- Low flow rate
- Fits through 100 mm / 4 inch diameter hole
- High spray dwell time
- Similar to Typhoon, Tempest, Tornado for maintenance purposes

Approx. cycle times

Pressure	Nozzles Ø 3 mm	Nozzles Ø 4 mm
4 bar	2 min	3 min 30 s
6 bar	1 min 45 s	2 min 45 s
8 bar	1 min 30 s	2 min 15 s
10 bar	1 min 15 s	2 min

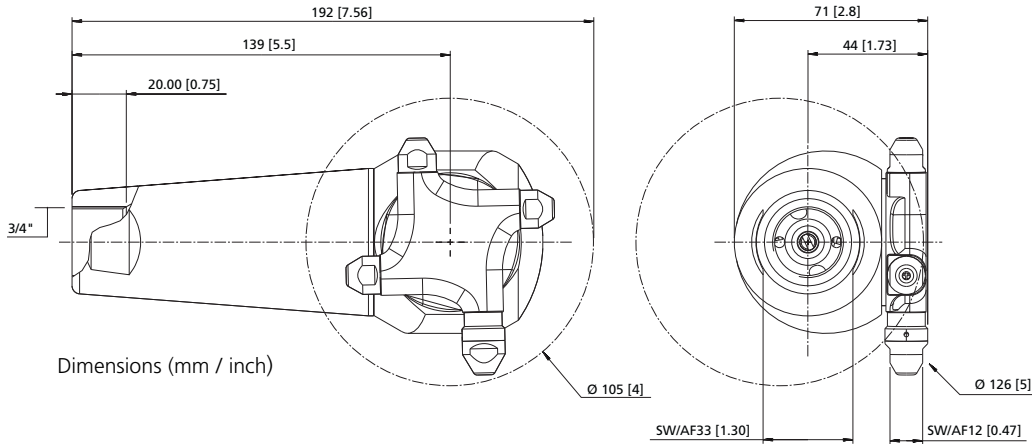
Recommended

working pressure:	4 - 10 bar (58 - 145 psi)
Cleaning diameter:	max. 16 m (52 ft)
Flow rate:	2.7 - 5.8 m ³ /h (45 - 97 l/min / 11.9 - 25.6 USgpm)
Spray angle:	360°
Operating temperature:	max. 95 °C (203 °F)
Ambient temperature:	max. 140 °C (284 °F), 30 min
Insertion opening:	min. Ø 100 mm (3.94 inch)
Materials:	stainless steel 316L (1.4404), C-PTFE or PTFE, C-PEEK
Weight:	approx. 2.0 kg (4.4 lbs)
Preferred mounting position:	any

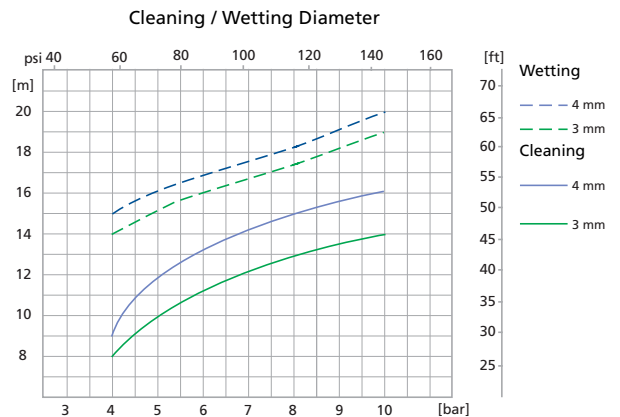
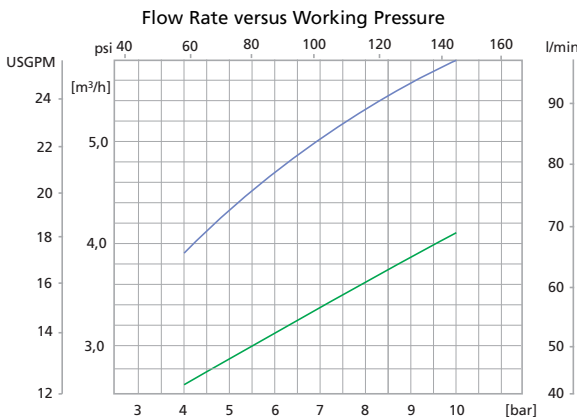
Version 1

	Part number
3/4" BSP / 3 mm nozzles / C-PTFE	4660-4990-111
3/4" BSP / 4 mm nozzles / C-PTFE	4660-4990-121
3/4" BSP / 3 mm nozzles / PTFE	4660-4990-110
3/4" BSP / 4 mm nozzles / PTFE	4660-4990-120
3/4" NPT / 3 mm nozzles / C-PTFE	4660-4990-112
3/4" NPT / 4 mm nozzles / C-PTFE	4660-4990-122
3/4" NPT / 3 mm nozzles / PTFE	4660-4990-113
3/4" NPT / 4 mm nozzles / PTFE	4660-4990-123

¹ optional with Pin Fix connection



Dimensions (mm / inch)



Orbital cleaner - Typhoon



- Self-cleaning
- High spray dwell time
- Identical to Tempest & Tornado for maintenance purposes

Approx. cycle times

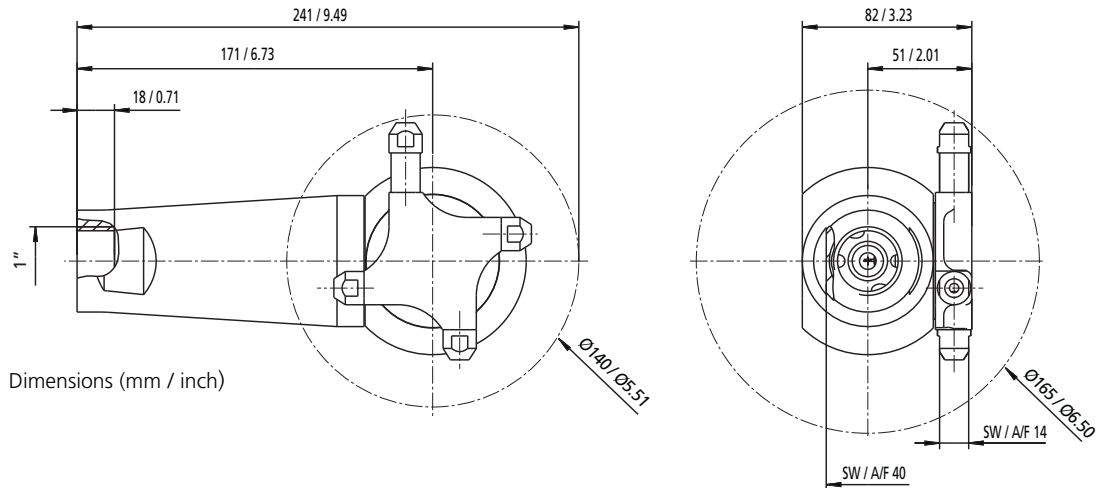
Pressure	Nozzles Ø 4.5 mm	Nozzles Ø 6 mm
4 bar	4 min 45 s	5 min 45 s
6 bar	4 min	4 min 30 s
8 bar	3 min 30 s	4 min
10 bar	3 min	3 min 30 s

Recommended

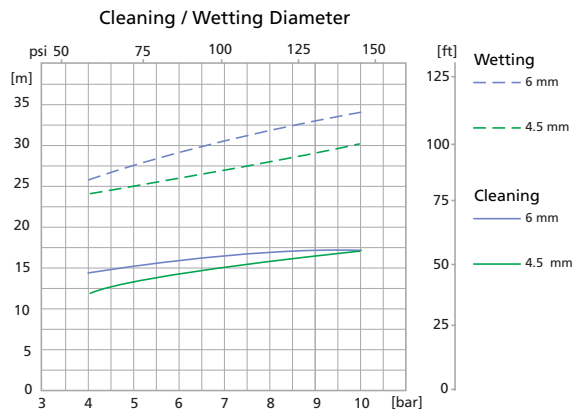
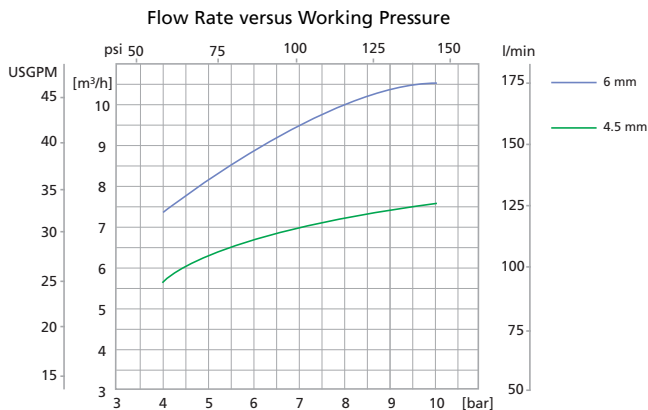
working pressure:	4 - 10 bar (58 - 145 psi)
Cleaning diameter:	max. 17 m (55.8 ft)
Flow rate:	5.6 - 10.5 m ³ /h (93 - 175 l/min / 24.7 - 46.2 USgpm)
Spray angle:	360°
Operating temperature:	max. 95 °C (203 °F)
Ambient temperature:	max. 140 °C (284 °F), 30 min
Insertion opening:	min. Ø 130 mm (5.12 inch)
Materials:	stainless steel 316L (1.4404), C-PTFE or PTFE, C-PEEK
Weight:	approx. 2.8 kg (6.2 lbs)
Preferred mounting position:	any

Version ¹	Part number
1" BSP / 4.5 mm nozzles / C-PTFE	4660-4969-117
1" BSP / 6 mm nozzles / C-PTFE	4660-4969-118
1" BSP / 4.5 mm nozzles / PTFE 1"	4660-4969-119
BSP / 6 mm nozzles / PTFE	4660-4969-120
1" NPT / 4.5 mm nozzles / C-PTFE	4660-4969-121
1" NPT / 6 mm nozzles / C-PTFE	4660-4969-122
1" NPT / 4.5 mm nozzles / PTFE 1"	4660-4969-123
NPT / 6 mm nozzles / PTFE	4660-4969-124

¹ optional with Pin Fix connection



Dimensions (mm / inch)



Orbital cleaner - Tempest



- Self-cleaning
- High spray dwell time
- Identical to Tornado & Typhoon for maintenance purposes

Approx. cycle times

Pressure	Nozzles Ø 7 mm	Nozzles Ø 8 mm
4 bar	9 min 45 s	8 min
6 bar	7 min 45 s	6 min 30 s
8 bar	6 min 45 s	5 min 30 s
10 bar	5 min 45 s	5 min

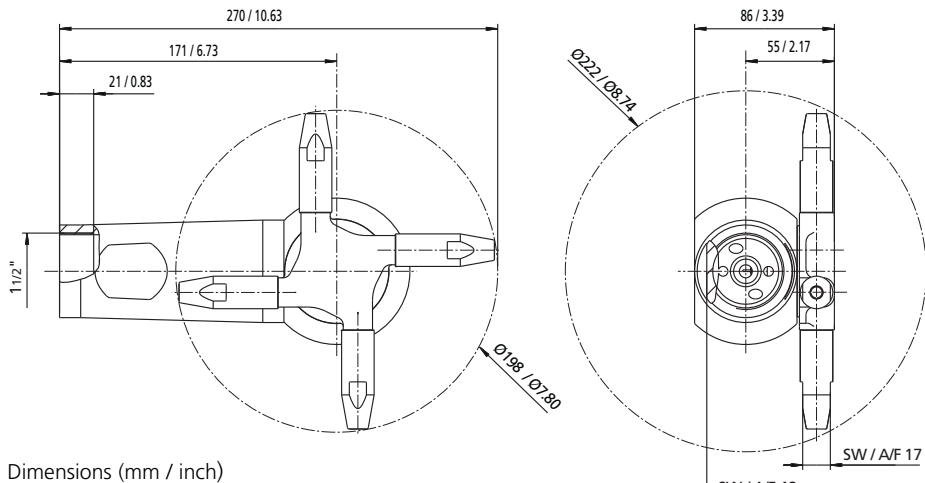
Recommended

working pressure:	4 - 10 bar (58 - 145 psi)
Cleaning diameter:	max. 19 m (62 ft)
Flow rate:	12 - 23.4 m ³ /h (200 - 390 l/min / 53 - 103 USgpm)
Spray angle:	360°
Operating temperature:	max. 95 °C (203 °F)
Ambient temperature:	max. 140 °C (284 °F), 30 min
Insertion opening:	min. Ø 210 mm (8.27 inch)
Materials:	stainless steel 316L (1.4404), C-PTFE or PTFE, C-PEEK
Weight:	approx. 3.9 kg (8.6 lbs)
Preferred mounting position:	any

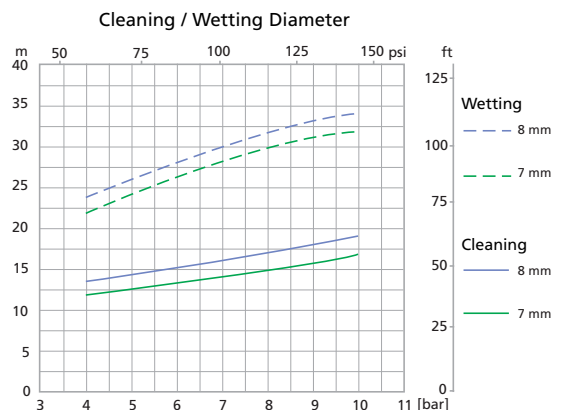
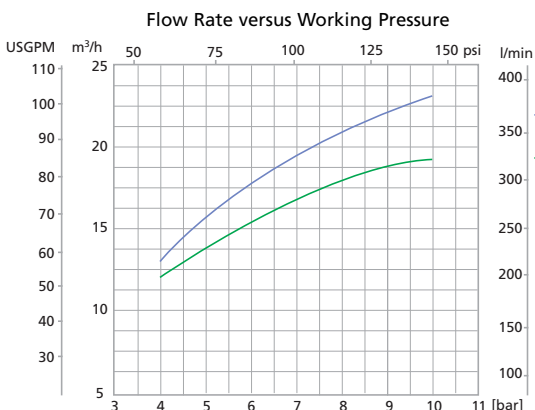
Version 1

Version 1	Part number
1 1/2" BSP / 7 mm nozzles / C-PTFE	4660-4968-117
1 1/2" BSP / 8 mm nozzles / C-PTFE	4660-4968-118
1 1/2" BSP / 7 mm nozzles / PTFE	4660-4968-119
1 1/2" BSP / 8 mm nozzles / PTFE	4660-4968-120
1 1/2" NPT / 7 mm nozzles / C-PTFE	4660-4968-121
1 1/2" NPT / 8 mm nozzles / C-PTFE	4660-4968-122
1 1/2" NPT / 7 mm nozzles / PTFE	4660-4968-123
1 1/2" NPT / 8 mm nozzles / PTFE	4660-4968-124

¹ optional with Pin Fix connection



Dimensions (mm / inch)



Orbital cleaner - Tornado



- Self-cleaning
- High spray dwell time
- Identical to Tempest & Typhoon for maintenance purpose

Recommended working pressure:	4 - 10 bar (58 - 145 psi)
Cleaning diameter:	max. 27 m (88.6 ft)
Flow rate:	14.6 - 22.7 m ³ /h (243 - 378 l/min / 64.3 - 99.9 USgpm)
Spray angle:	360°
Operating temperature:	max. 95 °C (203 °F)
Ambient temperature:	max. 140 °C (284 °F), 30 min
Insertion opening:	min. Ø 220 mm (8.66 inch)
Materials:	stainless steel 316L (1.4404), C-PTFE or PTFE
Weight:	approx. 3.1 kg (6.8 lbs)
Preferred mounting position:	any

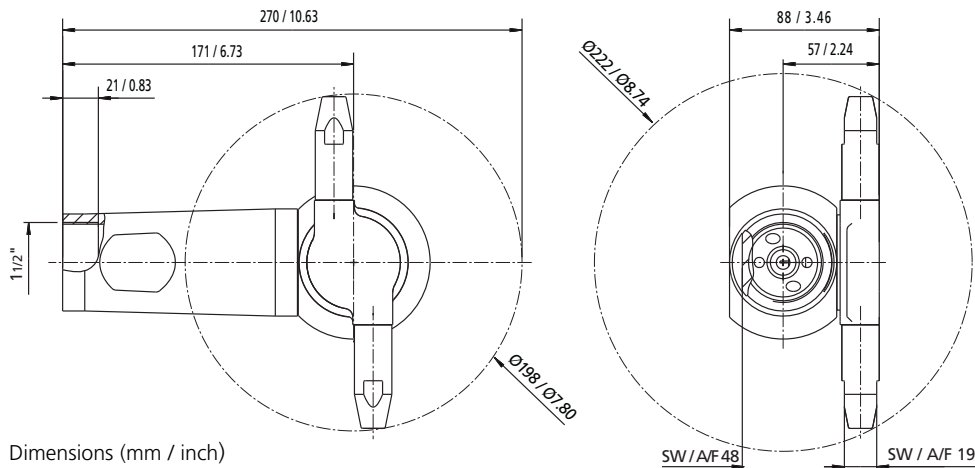
Approx. cycle times

Pressure	Nozzles Ø 11 mm
4 bar	11 min 45 s
6 bar	7 min 30 s
8 bar	6 min 15 s
10 bar	5 min 30 s

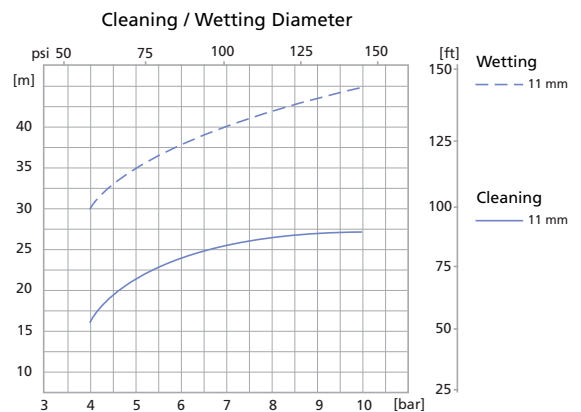
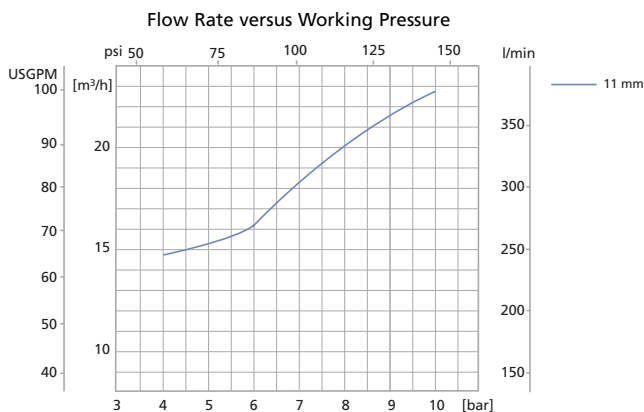
Version ¹

Version ¹	Part number
1 1/2" BSP / 11 mm nozzles / C-PTFE	4660-4970-113
1 1/2" BSP / 11 mm nozzles / PTFE	4660-4970-114
1 1/2" NPT / 11 mm nozzles / C-PTFE	4660-4970-115
1 1/2" NPT / 11 mm nozzles / PTFE	4660-4970-116

¹ optional with Pin Fix connection



Dimensions (mm / inch)



Orbital cleaner - Tornado 4



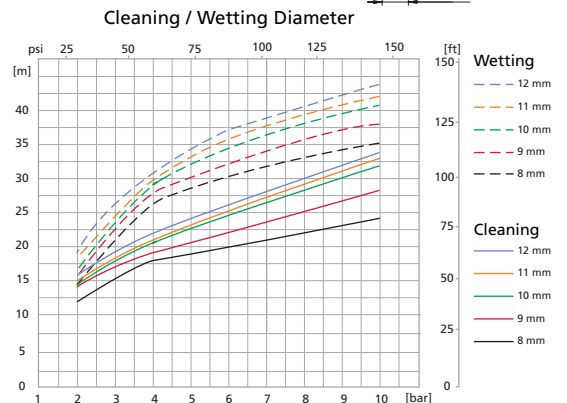
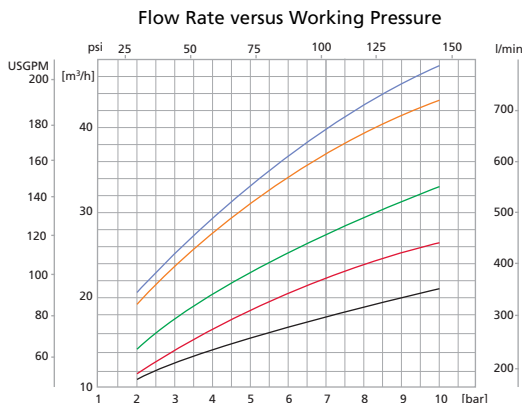
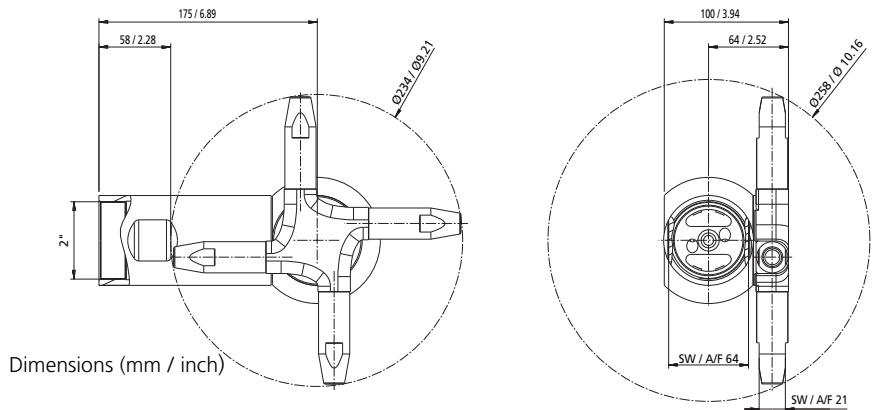
- Large powerful jetting cleaner
- High flow rates
- Self-cleaning
- High spray dwell time
- Similar to Typhoon, Tempest, Tornado for maintenance purposes

Recommended working pressure:	4 - 10 bar (58 - 145 psi)
Cleaning diameter:	max. 33 m (108 ft)
Flow rate:	14.2 - 47.4 m ³ /h (236 - 790 l/min / 62.3 - 208.7 USgpm)
Spray angle:	360°
Operating temperature:	max. 95 °C (203 °F)
Ambient temperature:	max. 140 °C (284 °F), 30 min
Insertion opening:	min. Ø 250 mm (9.84 in)
Materials:	stainless steel 316L (1.4404), C-PTFE or PTFE
Weight:	approx. 4.6 kg (10.1 lbs)
Preferred mounting position:	any

Pressure	Nozzles Ø				
	8 mm	9 mm	10 mm	11 mm	12 mm
4 bar	9 min 45 s	6 min 20 s	7 min 15 s	8 min 45 s	8 min 15 s
6 bar	7 min 30 s	5 min 15 s	5 min 15 s	7 min 15 s	6 min 30 s
8 bar	6 min 30 s	4 min 45 s	4 min 30 s	6 min 30 s	6 min 15 s
10 bar	5 min 45 s	4 min 30 s	4 min 15 s	5 min 30 s	5 min 30 s

Version ¹	Part number	Version ¹	Part number
2" BSP / 8 mm nozzles / C-PTFE	4660-4980-115	2" NPT / 8 mm nozzles / C-PTFE	4660-4980-119
2" BSP / 9 mm nozzles / C-PTFE	4660-4980-114	2" NPT / 9 mm nozzles / C-PTFE	4660-4980-120
2" BSP / 10 mm nozzles / C-PTFE	4660-4980-113	2" NPT / 10 mm nozzles / C-PTFE	4660-4980-121
2" BSP / 11 mm nozzles / C-PTFE	4660-4980-132	2" NPT / 11 mm nozzles / C-PTFE	4660-4980-134
2" BSP / 12 mm nozzles / C-PTFE	4660-4980-138	2" NPT / 12 mm nozzles / C-PTFE	4660-4980-140
2" BSP / 8 mm nozzles / PTFE	4660-4980-116	2" NPT / 8 mm nozzles / PTFE	4660-4980-122
2" BSP / 9 mm nozzles / PTFE	4660-4980-117	2" NPT / 9 mm nozzles / PTFE	4660-4980-123
2" BSP / 10 mm nozzles / PTFE	4660-4980-118	2" NPT / 10 mm nozzles / PTFE	4660-4980-124
2" BSP / 11 mm nozzles / PTFE	4660-4980-133	2" NPT / 11 mm nozzles / PTFE	4660-4980-135
2" BSP / 12 mm nozzles / PTFE	4660-4980-139	2" NPT / 12 mm nozzles / PTFE	4660-4980-141

¹ optional with Pin Fix connection

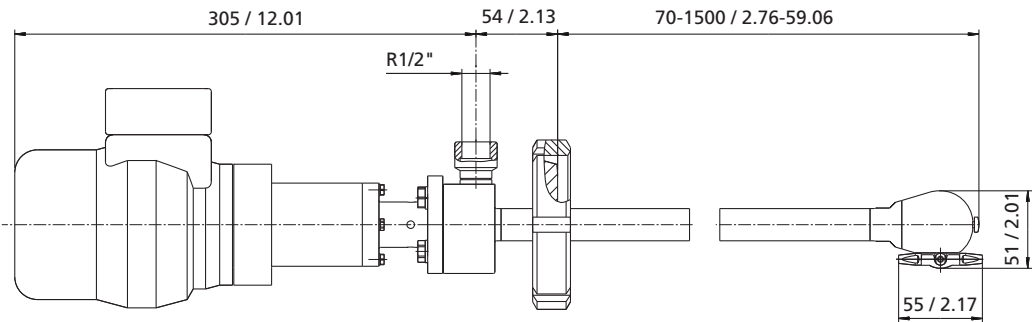




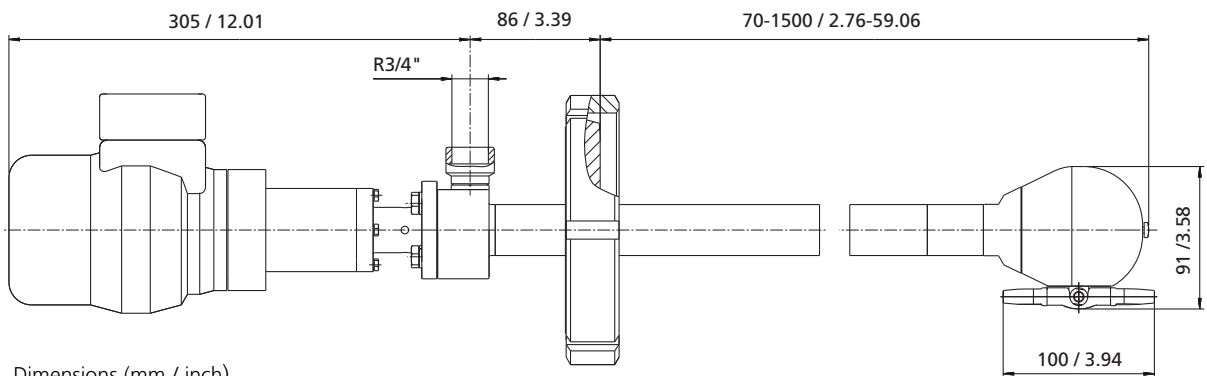
Working pressure:	1 - 25 bar (14.5 - 362.6 psi)
Cleaning diameter:	max. 12 m (39.4 ft)
Flow rate:	0.5 - 8.25 m ³ /h (8.3 - 137.5 l/min / 2.2 - 36.3 USgpm)
Spray angle:	360°
Operating temperature:	max. 90 °C (194 °F)
Ambient temperature/SIP:	max. 130 °C (266 °F), 30 min
Insertion opening:	min. Ø 50 / 96 mm (1.96 / 3.78 inch)
Materials:	stainless steel 316L (1.4404), PTFE
Pipe connection:	3/4" BSP / female thread
Weight:	approx. 11 kg / 15 kg (24.25 / 33.06 lbs)
Preferred mounting position:	any

- Variable volume flows and working pressures
- Different speed with frequent inverter
- Working pressure up to 25 bar (362.6 psi)

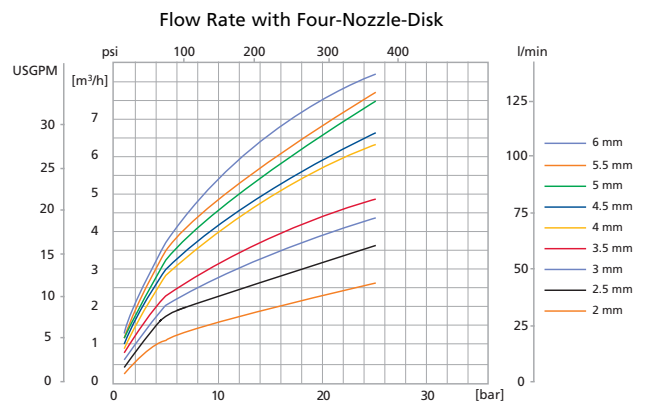
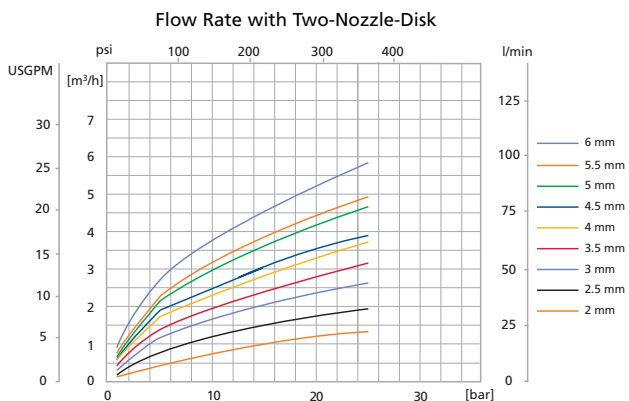
TMC 45



TMC 85



Dimensions (mm / inch)



Order key - Orbital cleaners - TMC 45 / TMC 85

Code	RT_TMC	45	1	5	4	2	K	230	-	-	-	0	0	0	K
Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Example	Item	Designation	Code options for selection												
RT_TMC	1	Type	RT_TMC = Orbital cleaner TMC												
45	2	Size	45 = TMC 45 85 = TMC 85												
1	3	Basic price	1 Ø 21.3 mm (TMC 45) Ø 33.7 mm (TMC 85) Inserted length 500 mm 2 Ø 21.3 mm (TMC 45) Ø 33.7 mm (TMC 85) Inserted length 750 mm 3 Ø 21.3 mm (TMC 45) Ø 33.7 mm (TMC 85) Inserted length 1000 mm												
S	4	Surcharge for special inserted length	5 Reduction/extension of support tube in range 200 - 1500 mm ¹												
4	5	Nozzle disk	2 With 2 nozzles Ø 2.0 - 3.5 mm (TMC 45) / Ø 4.0 - 6.0 mm (TMC 85) 4 With 4 nozzles Ø 2.0; 2.5; 3.0; 3.5 mm 40 With 4 nozzles Ø 4.0; 4.5; 5.0; 5.5; 6.0 mm												
2	6	Nozzle diameter TMC 45 Nozzle diameter TMC 85	2 = 2 mm; 2,5 = 2.5 mm; 3 = 3 mm; 3,5 = 3.5 mm; 4 = 4 mm; 4,5 = 4.5 mm; 5 = 5 mm; 5,5 = 5.5 mm; 6 = 6 mm												
K	7	Usage	K Not in EX zones E In EX zones (valid for zones 1, 2, 21, 22)												
230	8	Motor	400 Drive motor 400V / 50Hz; IP55;1400 rpm; 90W 230 Drive motor 230V / 50Hz 24 Drive motor 24V including stainless steel protection hood P Compressed air motor with stainless steel protection hood												
-	9	Motor options	- None F Frequency inverter integrated in the motor's terminal box												
-	10	Protection hood	- None SH With stainless steel protection hood												
-	11	Handle	- None H With stainless steel handle												
0	12	Tank connection ²	0 None 65 Tank connection DIN 11851 KM DN 65 80 Tank connection DIN 11851 KM DN 80 100 Tank connection DIN 11851 KM DN 100 125 Tank connection DIN 11851 KM DN 125 150 Tank connection DIN 11851 KM DN 150 SCH Swivel and sliding flange												
0	13	Cleaning medium connection	0 Welded end 21x2.5 mm 1 Sleeve R1/2" female thread 2 Sleeve R3/4" female thread 3 Sleeve R1" female thread 4 Nipple R1/2" male thread 5 Nipple R3/4" male thread 6 Nipple R1" male thread												
0	14	Surface	0 Ra < 0.8 µm ground (without weld seams) 1 Electropolished Ra < 0.4 µm (without weld seams etc.)												
K	15	Certificates	K No certificate W (41) With factory certificate 2.2 DIN EN10204 Z (42) With material test certificate 3.1 DIN EN10204 A (41/42) Material test certificate 3.1 DIN EN10204												

¹ Insertion length

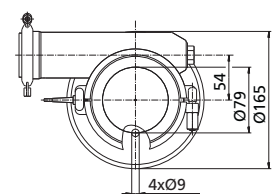
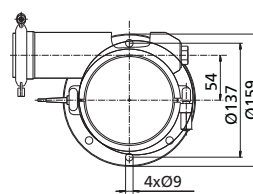
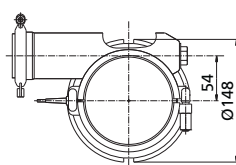
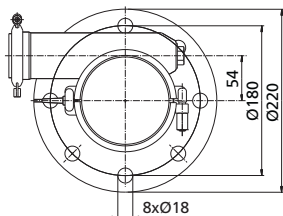
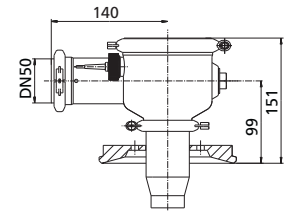
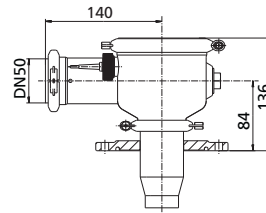
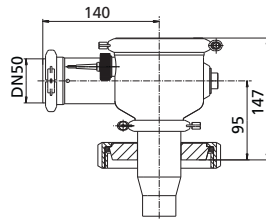
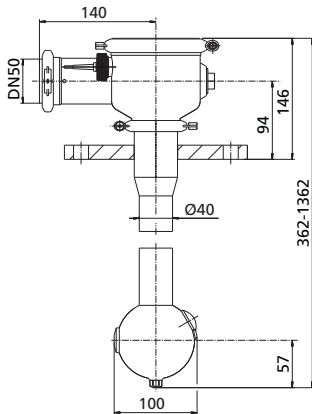
² Special connections available on request

Rotating cleaner - Rotating Jet Cleaner Type 2E



Working pressure:	2.3 - 4.3 bar (33.4 - 62.4 psi)
Cleaning diameter:	max. 10 m (32.8 ft)
Flow rate:	7 - 29 m ³ /h / 116 - 483 l/min / 30.8 - 127.7 USgpm
Operating temperature:	max. 80 °C, 30 min / optional 90 °C
Ambient temperature/SIP:	max. 130 °C, 30 min with PTFE version only
Insertion opening:	min. Ø 100 mm
Materials:	stainless steel 1.4571 (316Ti) / PP up to 80 °C / EPDM stainless steel 1.4571 (316Ti) / PTFE up to 90 °C / EPDM
Pressure supply port / tank connection:	variable
Weight:	approx. 11 kg (24.25 lbs)
Preferred mounting position:	vertical down

- Robust, low-maintenance
- Variable spray pattern
- Low pressure required
- Slow controlled rotation
- Optional built-in sensor to monitor functioning
- Can be used in the tank safety system

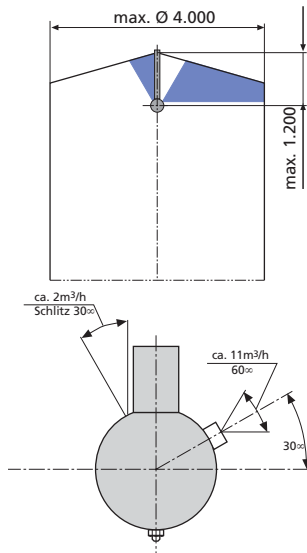


Form G - flange, DN 100 PN 16 to DIN 2501

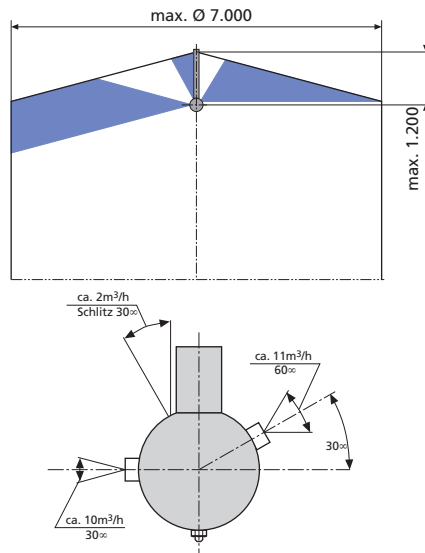
Form E - screwed union, conical fitting / round slotted nut DN 100 to DIN 11851

Form D - GEA Tuchenhausen VARIVENT® grooved flange, DN 100 PN 10 with O-ring design

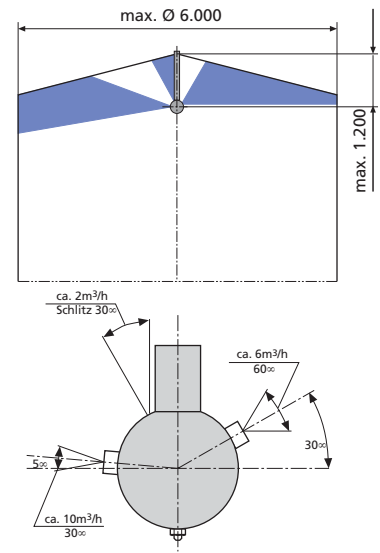
Form A - weld-in flange, split version, fitted from the inside



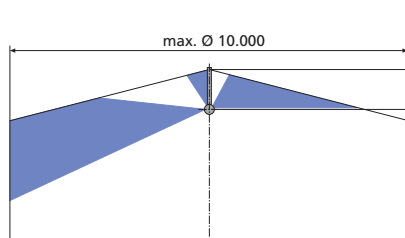
Spray pattern A



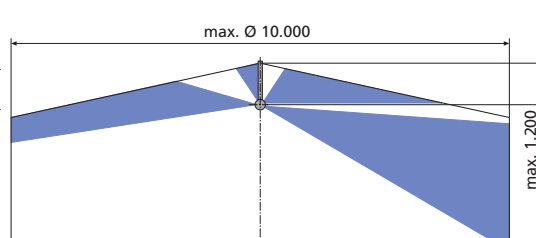
Spray pattern B



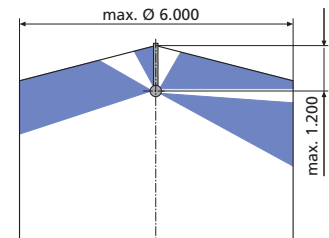
Spray pattern B1



Spray pattern C1



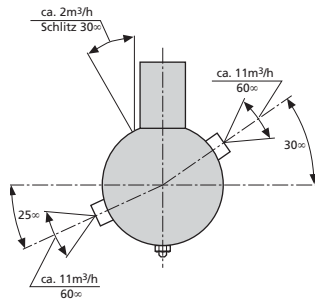
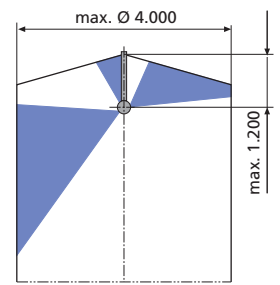
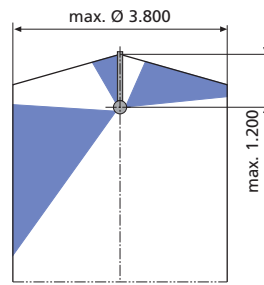
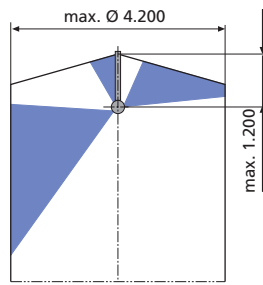
Spray pattern C2



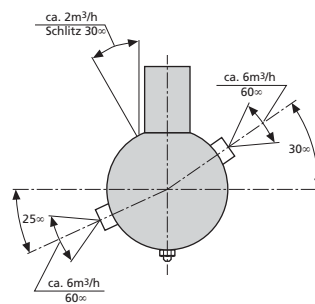
Spray pattern C4

Dimensions (mm)

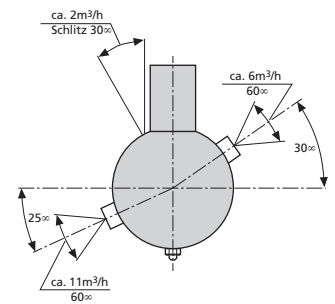
Type	Number of nozzles	Volume flow [m ³ /h]	Pressure [bar]	[rpm]	Spray circle [Ø m]
A	1	13 – 14	2.7	8 – 12	4
B	2	23 – 24	3.7	4 – 6	7
B1	2	18 – 19	3.0	3 – 4	6
C1	2	23 – 24	3.7	4 – 6	10
C2	3	28 – 29	4.3	5 – 8	10
C4	3	24 – 25	3.9	5 – 7	6



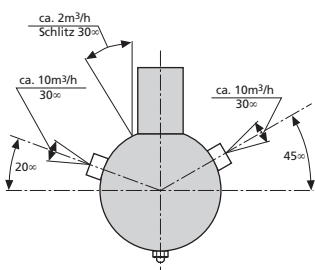
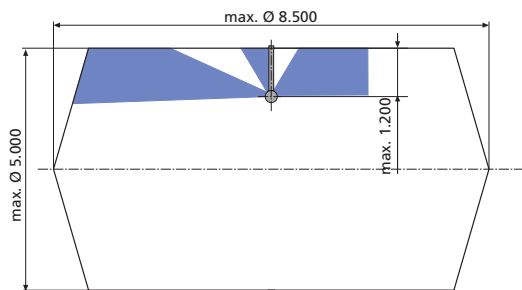
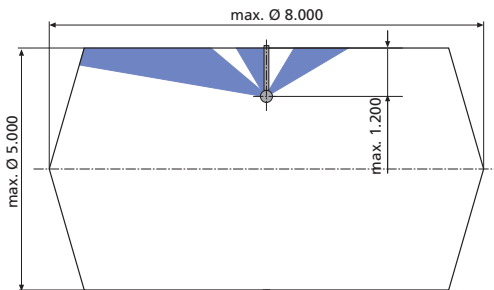
Spray pattern D1



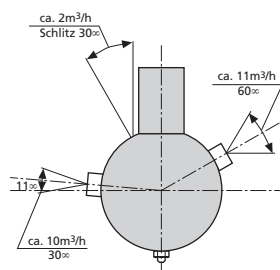
Spray pattern D2



Spray pattern D3



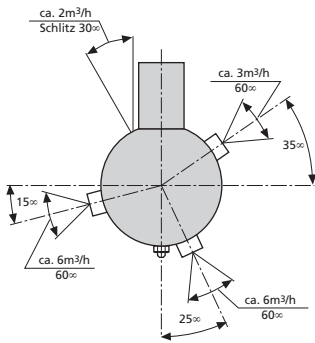
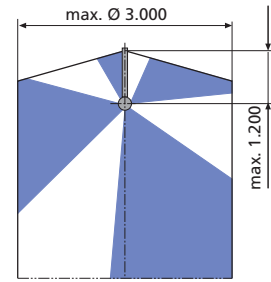
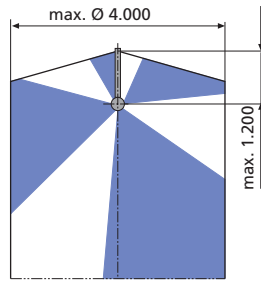
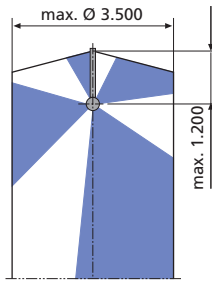
Spray pattern E



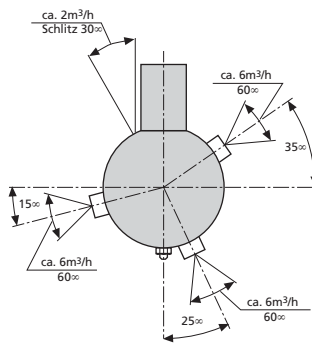
Spray pattern E1

Dimensions (mm)

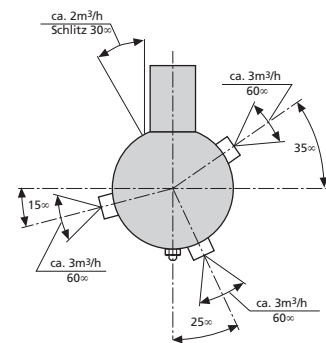
Type	Number of nozzles	Volume flow [m³/h]	Pressure [bar]	[rpm]	Spray circle [Ø m]
D1	2	24 – 25	3.8	4 – 6	4.2
D2	2	14 – 15	2.8	3 – 4	3.8
D3	2	19 – 20	3.4	4 – 5	4
E	2	22 – 23	3.6	4 – 6	8
E1	2	23 – 24	3.7	4 – 6	8.5



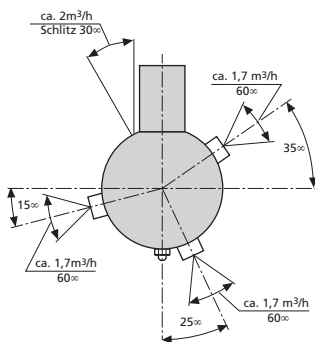
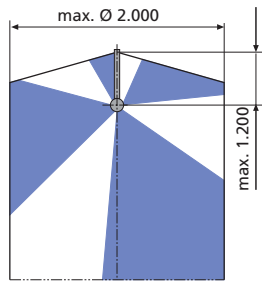
Spray pattern F2



Spray pattern F3



Spray pattern F5



Spray pattern F6

Dimensions (mm)

Type	Number of nozzles	Volume flow [m³/h]	Pressure [bar]	[rpm]	Spray circle [Ø m]
F2	3	17 - 18	2.8	3 - 5	3.5
F3	3	20 - 21	3.2	3 - 5	4
F5	3	11 - 12	2.6	6 - 0	3
F6	3	7 - 8	2.3	4 - 6	2

Order key - Rotating Jet cleaners

Code	RTZR	2E	2	600	00	3	10	C2	0	M	K
Item	1	2	3	4	5	6	7	8	9	10	11

Example	Item	Designation	Code options for selection
RTZR	1	Type	RTZR = rotating jet cleaner
2E	2	Version	2E = type 2E
2	3	Material	2 1.4571 (316TI) / PP Version 2E
			3 1.4571 (316TI) / ETFE Version 2E
600	4	Insertion length	200 = 200 mm 400 = 400 mm 600 = 600 mm
			800 = 800 mm 1000 = 1000 mm 1200 = 1200 mm
00	5	Tank connection for ZR 2E	00 No tank connection
			03 Form G, flange, DN 100 PN 16 DIN 2501
			04 Form E, conical fitting / slotted nut, DN 100 DIN 11851
			08 Form A, weld-in flange, split version
			09 Form D, VARIVENT® grooved flange, 4" OD PN 10
			10 Form D, VARIVENT® grooved flange, DN 100 PN 10
			13 Form D, VARIVENT® grooved flange, DN 125 PN 10
			14 Form D, VARIVENT® grooved flange, DN 162 PN 10
3	6	Pressure supply port	1 Clamping ring connection DN 50
			2 Screw fitting DN 50 DIN 11851
			3 VARIVENT® grooved flange DN 50 PN 16
			4 Screwed pipe union DN 50 DIN 11851
			5 VARIVENT® flange connection DN 50 PN 16 complete
10	7	Feedback	1 Connection for proximity switch, blanked
			10 Proximity switch 8.2 V DC (Namur)
			11 Proximity switch 10-30 V DC (3-wire)
			21 Proximity switch 20-250 V AC (2-wire)
			33 PTFE sleeve for proximity switch only
C2	8	Nozzle arrangement 2E	A B B1 C1 D1 D2 D3 E1 E
			C2 C4 F2 F3 F5 F6
0	9	Counter flange for tank connection	0 No counter flange
			1 Flange seal, form F
			3 Counter flange, form F, complete
			4 VARIVENT® flat flange DN 100 / 4" OD
			4 VARIVENT® flat flange DN 125
			4 VARIVENT® flat flange DN 162
M	10	Surface	M Matt
			P Electropolished
K	11	Certificates	K No certificate
			W (41) With factory certificate 2.2 DIN EN10204

Rotating cleaners - Turbo SSB 40



Pin Fix



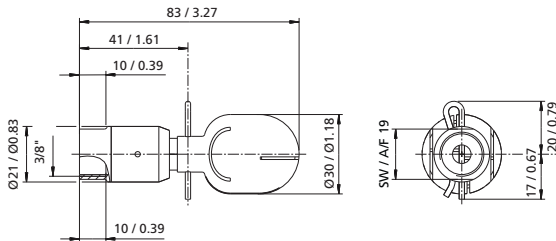
BSP/NPT

Turbo SSB 40	
Working pressure:	2 - 5 bar (29 - 72.5 psi)
Cleaning diameter:	max. 3 m (9.8 ft)
Flow rate:	2.1 - 3.7 m ³ /h (38.3 - 61.7 l/min / 10.1 - 16.3 USgpm)
Spray angle:	360°
Operating temperature:	max. 90 °C (194 °F)
Ambient temperature/SIP:	max. 140 °C (284 °F), 30 min
Insertion opening:	BSP/NPT min. Ø 38 mm (1.5 inch) min. / Pin Fix Ø 57 mm (2.24 inch)
Materials:	stainless steel 316L (1.4404) with C-PTFE or PTFE
Preferred mounting position:	vertical down

- Slow constant rotation
- Powerful fan jets

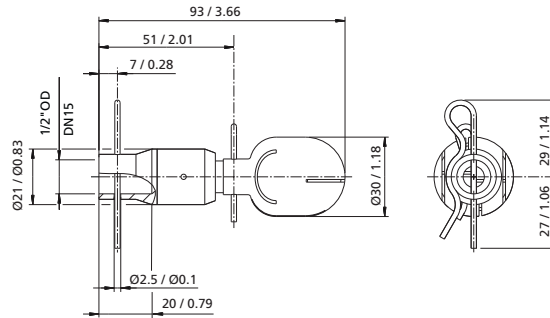
Version	Part number
3/8" BSP female / C-PTFE	4660-2556-113
3/8" BSP female / PTFE	4660-2555-112
3/8" NPT female / C-PTFE	4660-2558-213
3/8" NPT female / PTFE	4660-2558-212

Version	Part number
Pin Fix for 1/2" OD pipe (12.7 x 1.6 mm) / C-PTFE	4660-2557-413
Pin Fix for 1/2" OD pipe (12.7 x 1.6 mm) / PTFE	4660-2561-412
Pin Fix for DN 15 pipe (19 x 1.5 mm) / C-PTFE	4660-2557-419
Pin Fix for DN 15 pipe (19 x 1.5 mm) / PTFE	4660-2561-419

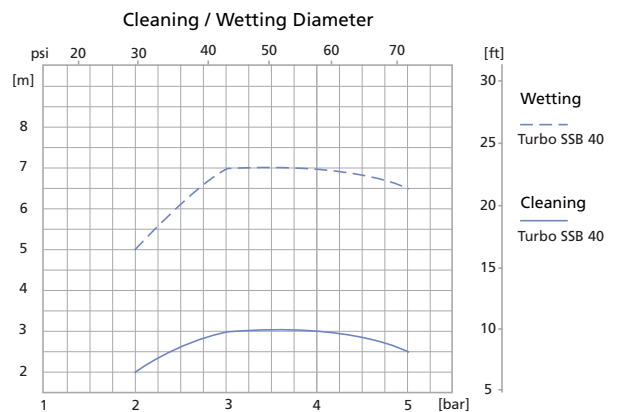
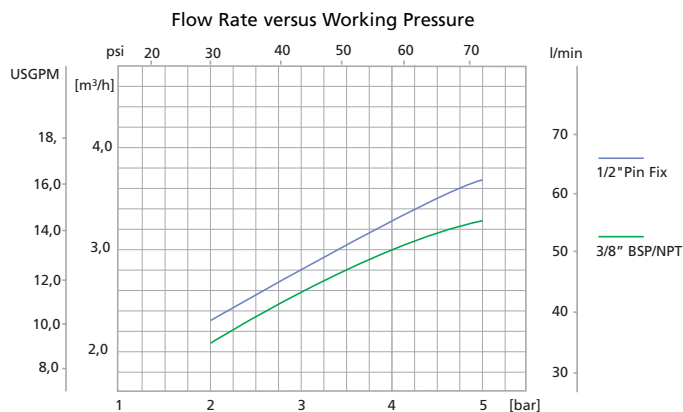


Female thread

Dimensions (mm / inch)



Pin Fix



Rotating cleaners - Turbo SSB 75 / Turbo SSB 75 CS



Turbo SSB 75 Pin Fix



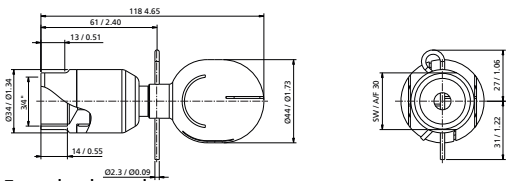
Turbo SSB 75 CS
BSP/NPT

- Slow constant rotation
- Powerful fan jets
- Combined shaft version (CS) without pinned ball

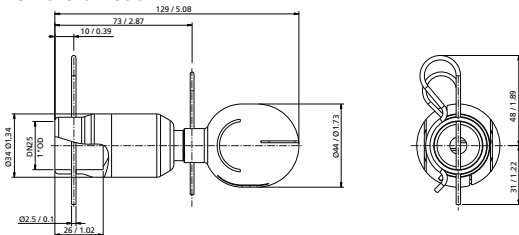
	Turbo SSB 75
Working pressure:	2 - 10 bar (29 - 145 psi)
Cleaning diameter:	max. 4.7 m (15.4 ft)
Flow rate:	3.6 - 9.2 m ³ /h (60 - 153.3 l/min / 15.85 - 40.5 USgpm)
Spray angle:	360°
Operating temperature:	max. 90 °C (194 °F)
Ambient temperature/SIP:	max. 140 °C (284 °F), 30 min
Insertion opening:	Turbo SSB 75 BSP/NPT min. 60 mm (2.36 inch) / Pin Fix min. Ø 90 mm (3.54 inch) Turbo SSB 75 CS BSP/NPT min. 45 mm (1.77 inch) / PinFix min. Ø 90 mm (3.54 inch)
Materials:	stainless steel 316L (1.4404) with C-PTFE or PTFE
Preferred mounting position:	vertical down

Version	Part number
3/4" BSP female / C-PTFE	4660-2337-113
3/4" BSP female / PTFE	4660-2336-112
3/4" NPT female / C-PTFE	4660-2341-213
3/4" NPT female / PTFE	4660-2346-212
Pin Fix for 1" OD (25.4 x 1.6 mm) pipe / C-PTFE	4660-2342-413
Pin Fix for 1" OD (25.4 x 1.6 mm) pipe / PTFE	4660-2347-412
Pin Fix for DN 25 (29 x 1.5 mm) pipe / C-PTFE	4660-2558-413
Pin Fix for DN 25 (29 x 1.5 mm) pipe / PTFE	4660-2558-414

Version	Part number
3/4" BSP female / C-PTFE CS	4660-2558-421
3/4" BSP female / PTFE CS	4660-2558-418
3/4" NPT female / C-PTFE CS	4660-2558-422
3/4" NPT female / PTFE CS	4660-2558-424
Pin Fix for 1" OD (25.4 x 1.6 mm) pipe / C-PTFE CS	4660-2558-423
Pin Fix for 1" OD (25.4 x 1.6 mm) pipe / PTFE CS	4660-2558-425
Pin Fix for DN 25 (29 x 1.5 mm) pipe / C-PTFE CS	4660-2558-420
Pin Fix for DN 25 (29 x 1.5 mm) pipe / PTFE CS	4660-2558-419

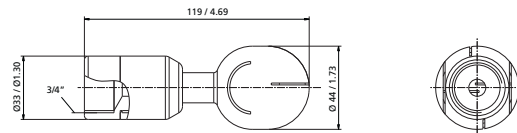


Female thread

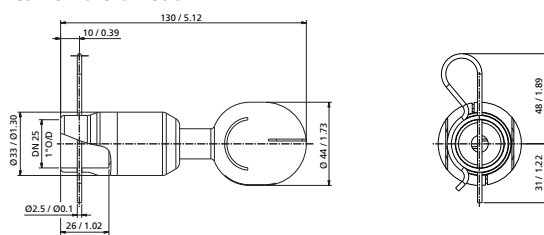


Pin Fix

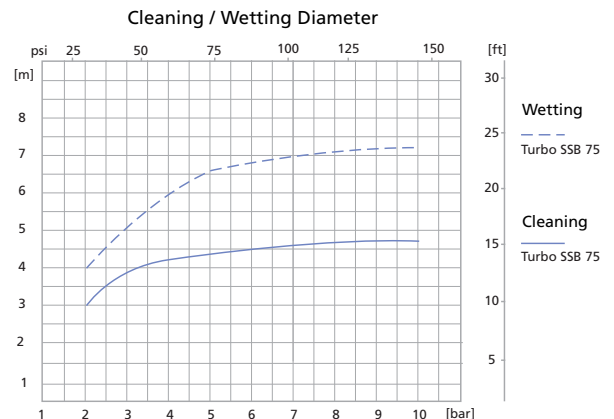
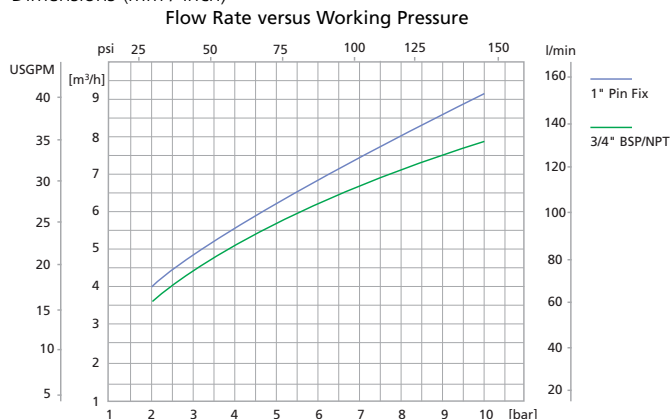
Dimensions (mm / inch)



CS Female thread



CS Pin Fix



Rotating cleaners - Turbo SSB 125



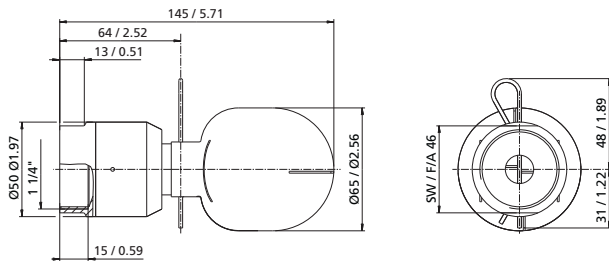
Pin Fix

BSP/NPT

Turbo SSB 125	
Working pressure:	2 - 6 bar (29 - 87 psi)
Cleaning diameter:	max. 10 m (32.8 ft)
Flow rate:	12 - 24.5 m ³ /h (200 - 408.3 l/min / 52.8 - 107.9 USgpm)
Spray angle:	360°
Operating temperature:	max. 90 °C (194 °F)
Ambient temperature/SIP:	max. 140 °C (284 °F), 30 min
Insertion opening:	BSP/NPT min. 90 mm (3.54 inch) / PinFix min. Ø 110 mm (4.33 inch)
Materials:	stainless steel 316L (1.4404) with C-PTFE or PTFE
Preferred mounting position:	vertical down

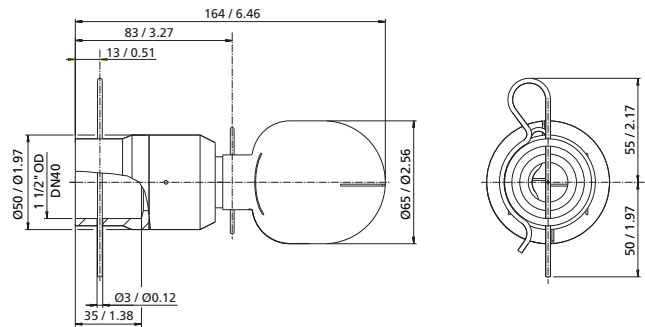
- Slow constant rotation
- Powerful fan jets

Version	Part number	Version	Part number
1 1/4" BSP female / C-PTFE	4660-2451-113	Pin Fix for 1 1/2" OD (38.1 x 1.6 mm) pipe / C-PTFE	4660-2452-413
1 1/4" BSP female / PTFE	4660-2448-112	Pin Fix for 1 1/2" OD (38.1 x 1.6 mm) pipe / PTFE	4660-2454-412
1 1/4" NPT female / C-PTFE	4660-2558-417	Pin Fix for DN 40 (41 x 1.5 mm) pipe / C-PTFE	4660-2558-415
1 1/4" NPT female / PTFE	4660-2453-212	Pin Fix for DN 40 (41 x 1.5 mm) pipe / PTFE	4660-2558-416

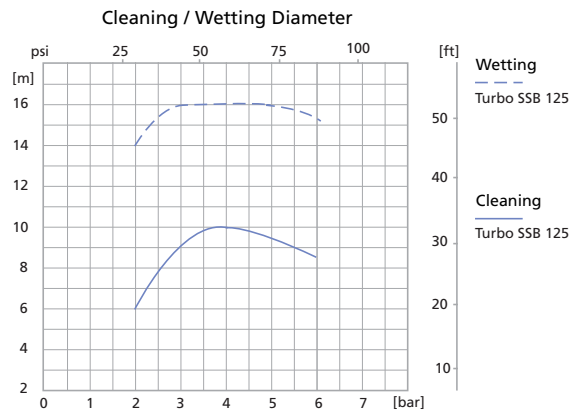
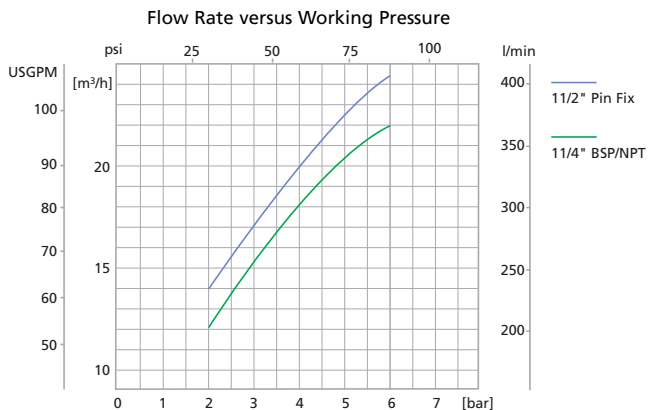


Female thread

Dimensions (mm / inch)



Pin Fix



Rotating cleaners - Sanitor



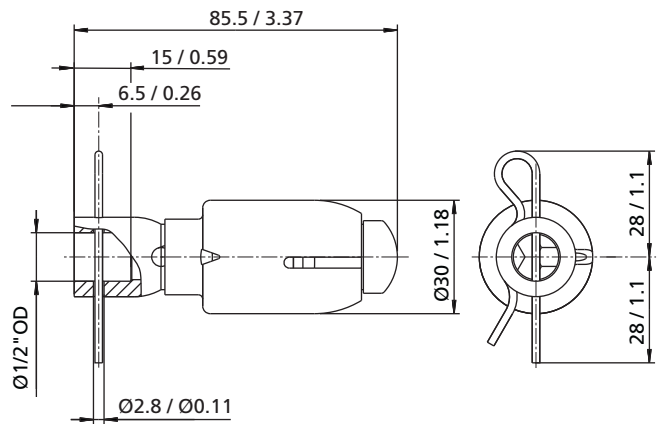
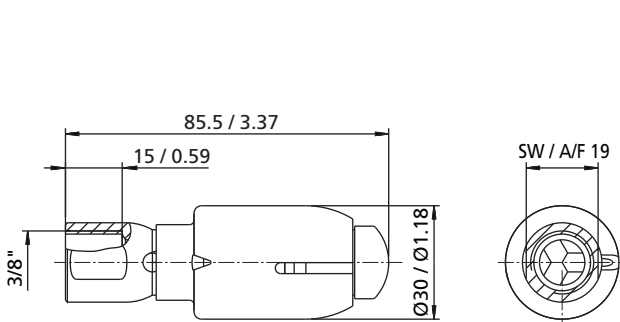
Pin Fix

BSP/NPT

Working pressure:	2 - 20 bar (29 - 290 psi)
Cleaning diameter:	max. 4.8 m (15.1 ft)
Flow rate:	1.5 - 4.8 m ³ /h (25 - 80 l/min / 6.6 - 21.13 USgpm)
Spray angle:	360°
Operating temperature:	max. 95 °C (203 °F)
Ambient temperature/SIP:	max. 140 °C (284 °F), 30 min
Insertion opening:	BSP/NPT min. Ø 32 mm (1.26 inch) / PinFix min. Ø 60 mm (2.36 inch)
Materials:	stainless steel 316L (1.4404)
Preferred mounting position:	vertical down

- Slow constant rotation
- Low volume flow
- Working pressure up to 20 bar
- No elastomers

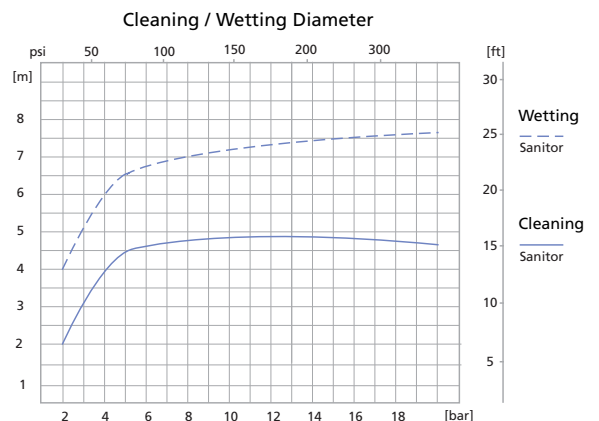
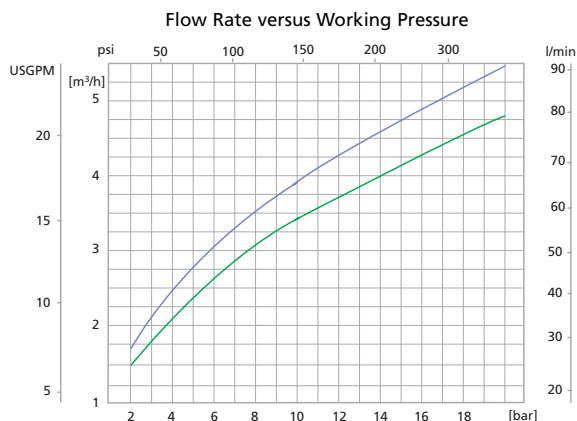
Version	Part number
3/8" BSP	4660-3002-010
3/8" NPT	4660-3003-010
Pin Fix for 1/2" OD (12.7x1.6mm) pipe	4660-3001-010



Female thread

Pin Fix

Dimensions (mm / inch)

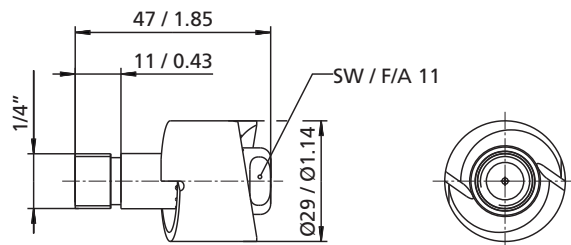




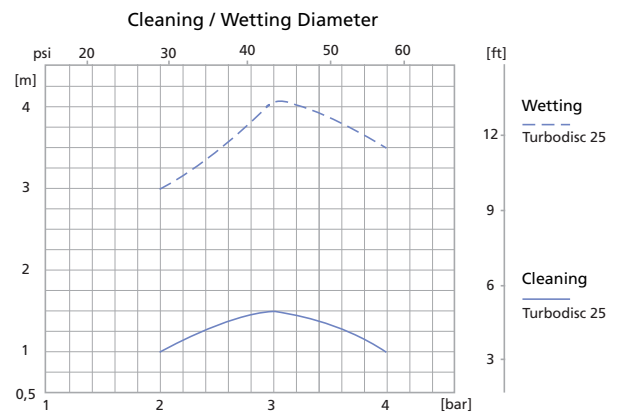
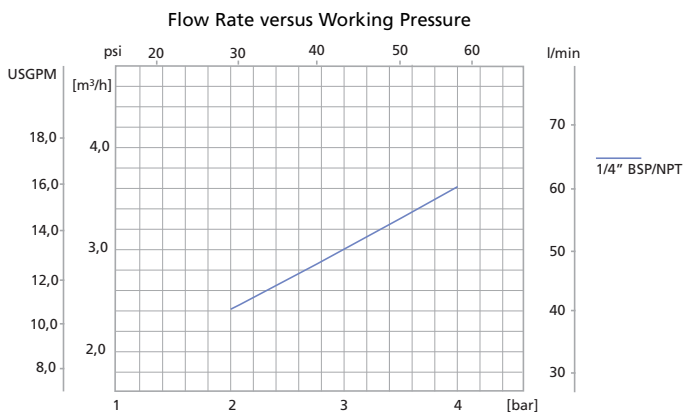
Turbodisc 25	
Working pressure:	2-4 bar (29 - 58 psi)
Cleaning diameter:	max. 1.5 m (4.9 ft)
Flow rate:	2.4 - 3.6 m ³ /h (40 - 60 l/min / 10.57 - 15.85 USgpm)
Spray angle:	360°
Operating temperature:	max. 95 °C (203 °F)
Ambient temperature/SIP:	max. 140 °C (284 °F), 30 min
Insertion opening:	min. Ø 31 mm (1.22 inch)
Materials:	stainless steel 316L (1.4404) with C-PTFE or PTFE
Preferred mounting position:	any

- Effective wash - due to high rotation speed
- Low flow rates

Version	Part number
1/4" BSP male / C-PTFE	4660-1678-113
1/4" BSP male / PTFE	4660-1603-002
1/4" NPT male / C-PTFE	4660-1677-203
1/4" NPT male / PTFE	4660-1604-202



Dimensions (mm / inch)



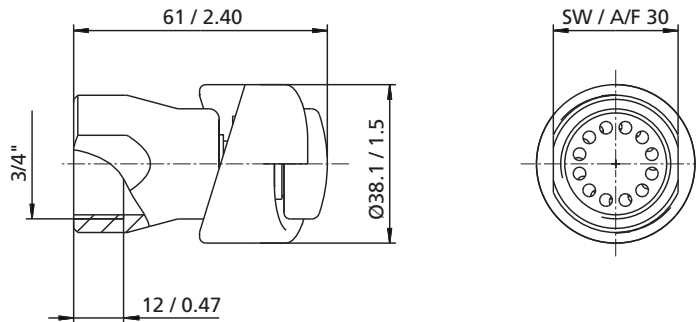


Turbodisc 75	
Working pressure:	2-4 bar (29 - 58 psi)
Cleaning diameter:	max. 2.4 m (7.9 ft)
Flow rate:	4.5 - 6.3 m ³ /h (75 - 105 l/min / 19.8 - 27.7 USgpm)
Spray angle:	360°
Operating temperature:	max. 95 °C (203 °F)
Ambient temperature/SIP:	max. 140 °C (284 °F), 30 min
Insertion opening:	min. Ø 41 mm (1.61 inch)
Materials:	stainless steel 316L (1.4404) with C-PTFE or PTFE
Preferred mounting position:	any

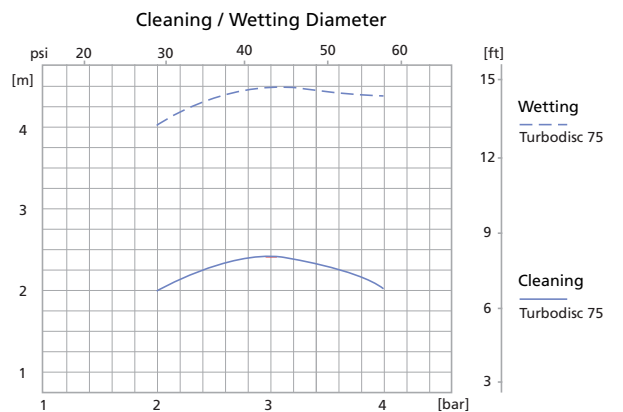
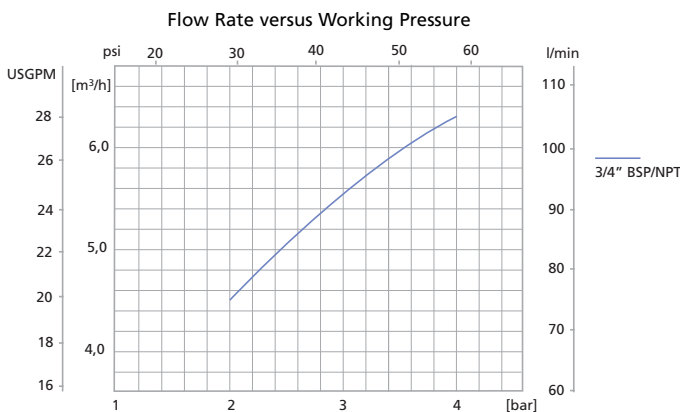
- Effective wash - due to high rotation speed
- Low flow rates

Version ¹	Part number
3/4" BSP female / C-PTFE	4660-1615-003
3/4" BSP female / PTFE	4660-1624-002
3/4" NPT female / C-PTFE	4660-1677-210
3/4" NPT female / PTFE	4660-1677-211

¹ optional with Pin Fix connection



Dimensions (mm / inch)



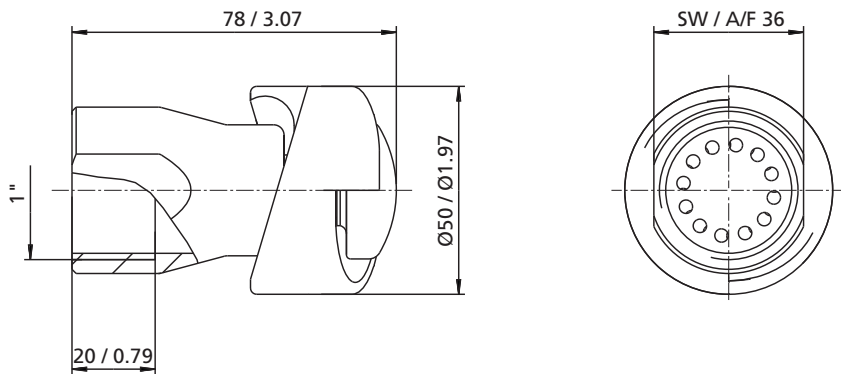


Turbodisc 100	
Working pressure:	2-4 bar (29 - 58 psi)
Cleaning diameter:	max. 4.5 m (14.8 ft)
Flow rate:	7.2 - 9.5 m³/h (120 - 158.3 l/min / 31.7 - 41.8 USgpm)
Spray angle:	360°
Operating temperature:	max. 95 °C (203 °F)
Ambient temperature/SIP:	max. 140 °C (284 °F), 30 min
Insertion opening:	min. Ø 55 mm (2.17 inch)
Materials:	stainless steel 316L (1.4404) with C-PTFE or PTFE
Preferred mounting position:	any

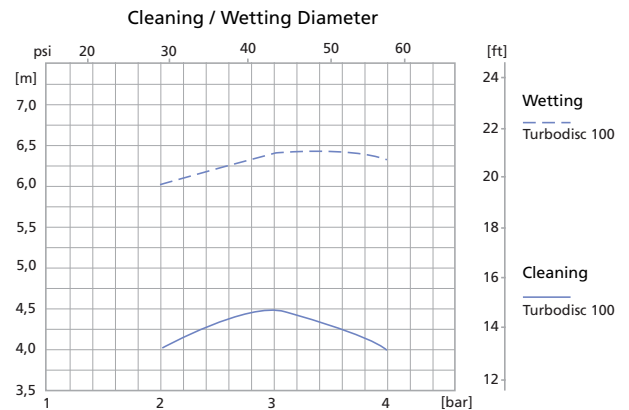
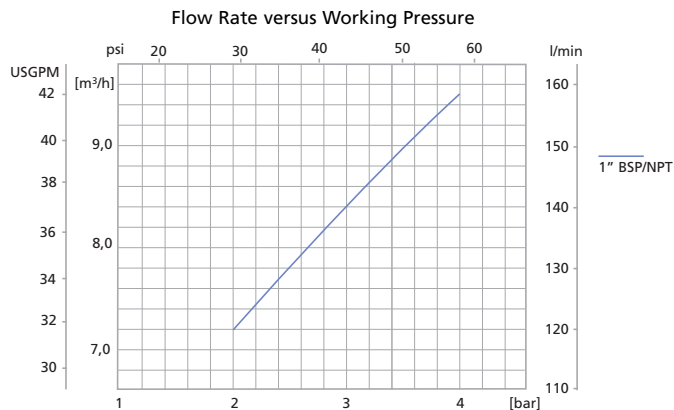
- Effective wash - due to high rotation speed
- Low flow rates

Version ¹	Part number
1" BSP female / C-PTFE	4660-1611-113
1" BSP female / PTFE	4660-1624-112
1" NPT female / C-PTFE	4660-1677-204
1" NPT female / PTFE	4660-1624-212

¹ optional with Pin Fix connection



Dimensions (mm / inch)



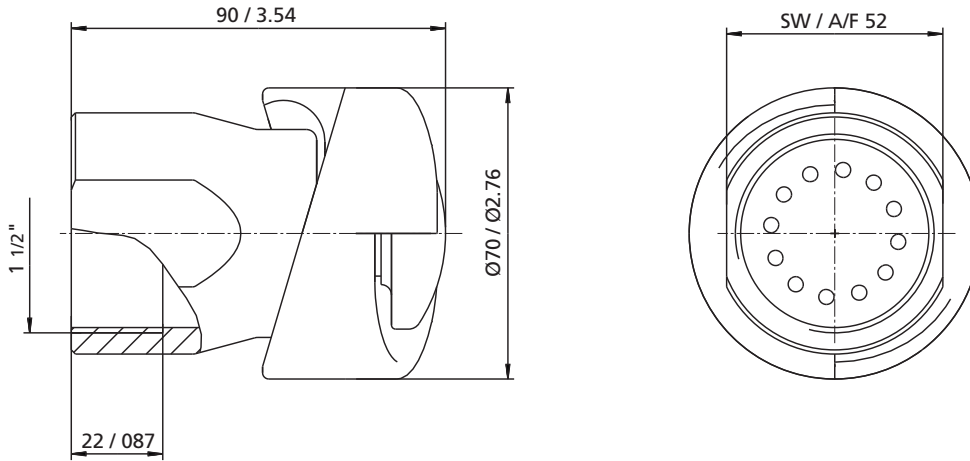


Turbodisc 150	
Working pressure:	2-4 bar (29 - 58 psi)
Cleaning diameter:	max. 5 m (16.4 ft)
Flow rate:	10.8 - 14.7 m ³ /h (180 - 245 l/min / 47.6 - 64.72 USgpm)
Spray angle:	360°
Operating temperature:	max. 95 °C (203 °F)
Ambient temperature/SIP:	max. 140 °C (284 °F), 30 min
Insertion opening:	min. Ø 75 mm (2.95 inch)
Materials:	stainless steel 316L (1.4404) with C-PTFE or PTFE
Preferred mounting position:	any

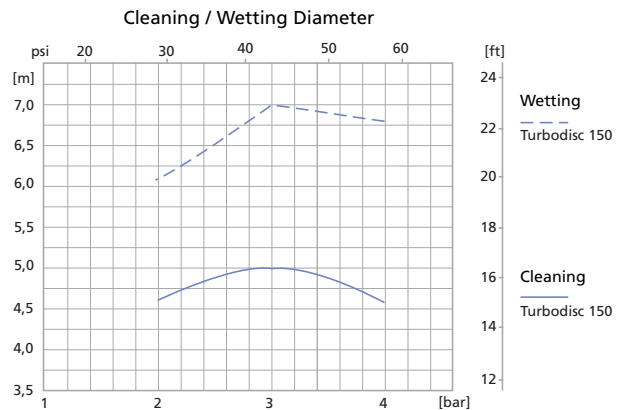
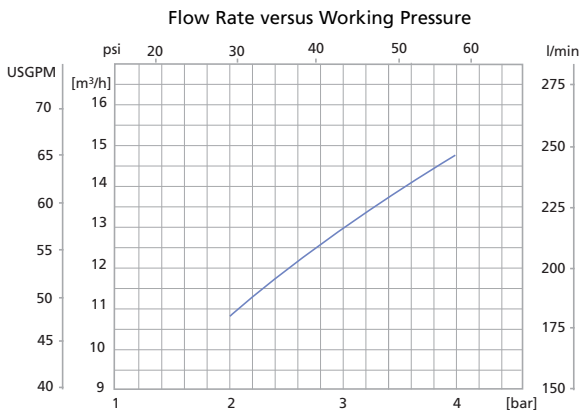
- Effective wash - due to high rotation speed
- Low flow rates

Version ¹	Part number
1 1/2" BSP female / C-PTFE	4660-1662-113
1 1/2" BSP female / PTFE	4660-1654-112
1 1/2" NPT female / C-PTFE	4660-1677-205
1 1/2" NPT female / PTFE	4660-1677-206

¹ optional with Pin Fix connection



Dimensions (mm / inch)



Rotating cleaners - Chemidisc 25



C-PTFE

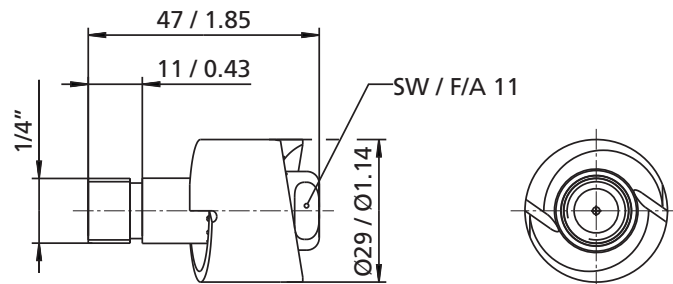


PTFE

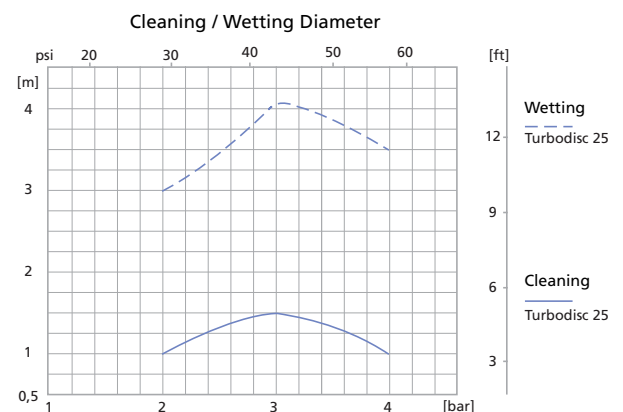
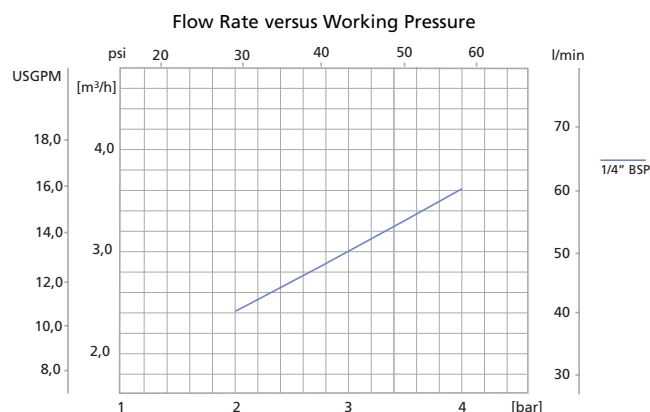
Chemidisc 25	
Working pressure:	2-4 bar (29 - 58 psi)
Cleaning diameter:	max. 1.5 m (4.9 ft)
Flow rate:	2.4 - 3.6 m ³ /h (40 - 60 l/min / 10.57 - 15.85 USgpm)
Spray angle:	360°
Operating temperature:	max. 95 °C (203 °F)
Ambient temperature/SIP:	max. 140 °C (284 °F), 30 min
Insertion opening:	min. Ø 31 mm (1.22 inch)
Materials:	C-PTFE or PTFE
Preferred mounting position:	any

- Chemical resistant - ideal for corrosive environments
- Lightweight construction - safer in glass lined vessels
- Effective wash - due to high rotation speed

Version	Part number
1/4" BSP male / C-PTFE	4660-1118-133
1/4" BSP male / PTFE	4660-1123-122



Dimensions (mm / inch)





PTFE

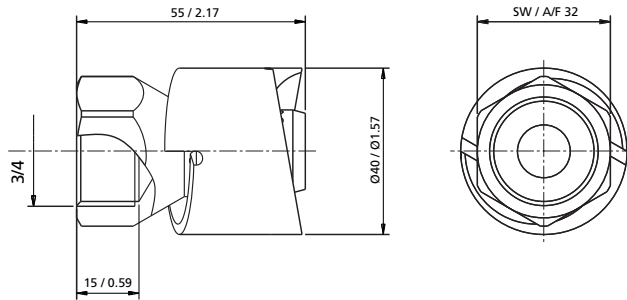


C-PTFE

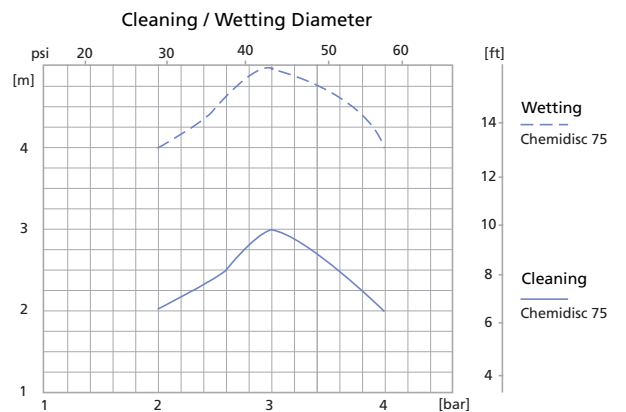
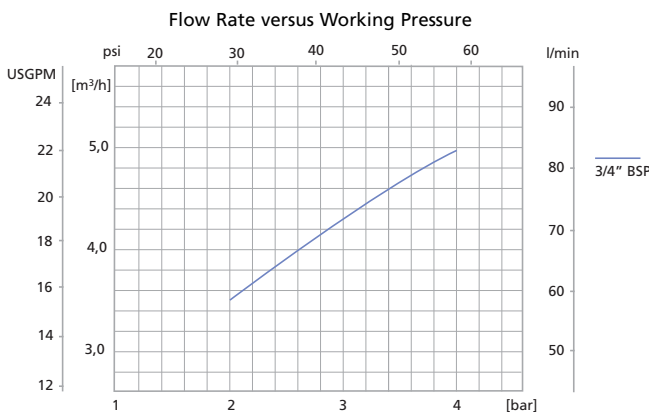
Chemidisc 75	
Working pressure:	2-4 bar (29 - 58 psi)
Cleaning diameter:	3 m (9.8 ft)
Flow rate:	3.5 - 5 m ³ /h (59 - 83 l/min / 15.6 - 21.9 USgpm)
Spray angle:	360°
Operating temperature:	max. 95 °C (203 °F)
Ambient temperature/SIP:	max. 140 °C (284 °F), 30 min
Insertion opening:	min. Ø 41 mm (1.61 inch)
Materials:	C-PTFE or PTFE
Preferred mounting position:	any

- Chemical resistant - ideal for corrosive environments
- Lightweight construction - safer in glass lined vessels
- Effective wash - due to high rotation speed

Version	Part number
3/4" BSP female / C-PTFE	4660-1131-133
3/4" BSP female / PTFE	4660-1134-122



Dimensions (mm / inch)





PTFE

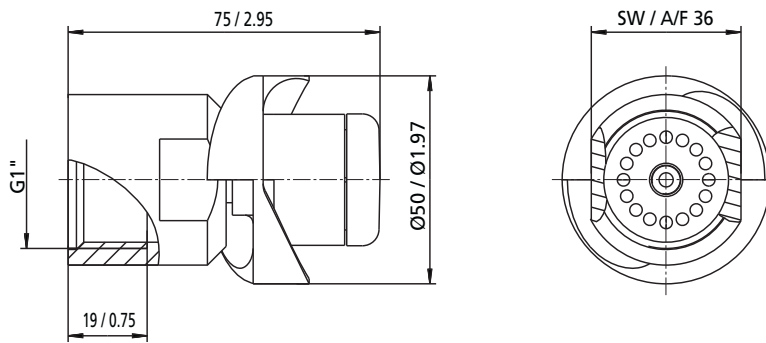


C-PTFE

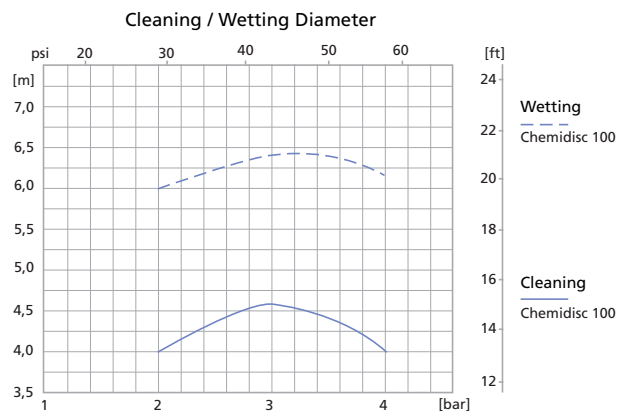
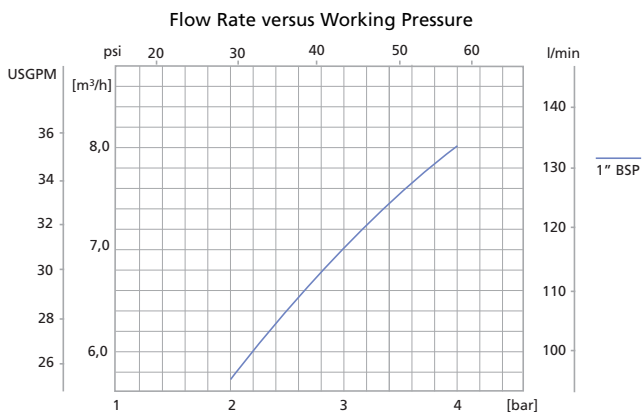
Chemidisc 100	
Working pressure:	2-4 bar (29 - 58 psi)
Cleaning diameter:	4.6 m (15.1 ft)
Flow rate:	5.7 - 8 m ³ /h (95 - 134 l/min / 25.1 - 35.6 USgpm)
Spray angle:	360°
Operating temperature:	max. 95 °C (203 °F)
Ambient temperature/SIP:	max. 140 °C (284 °F), 30 min
Insertion opening:	min. Ø 55 (2.17 inch)
Materials:	C-PTFE or PTFE
Preferred mounting position:	any

- Chemical resistant - ideal for corrosive environments
- Lightweight construction - safer in glass lined vessels
- Effective wash - due to high rotation speed

Version	Part number
1" BSP female / C-PTFE	4660-1137-103
1" BSP female / PTFE	4660-1103-122



Dimensions (mm / inch)





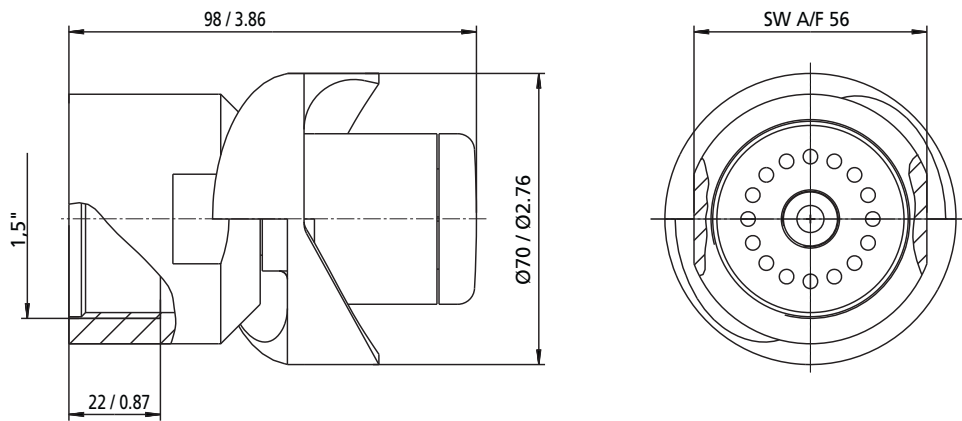
PTFE

C-PTFE

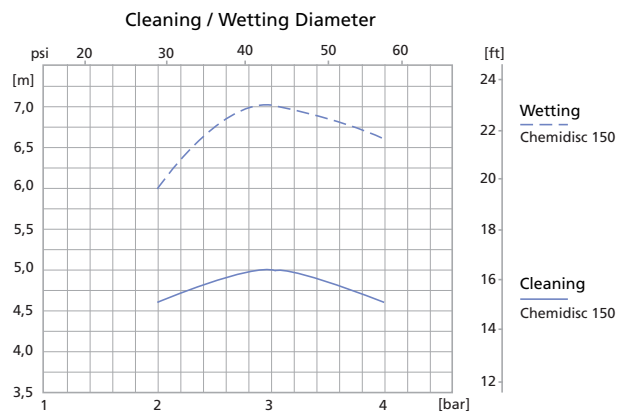
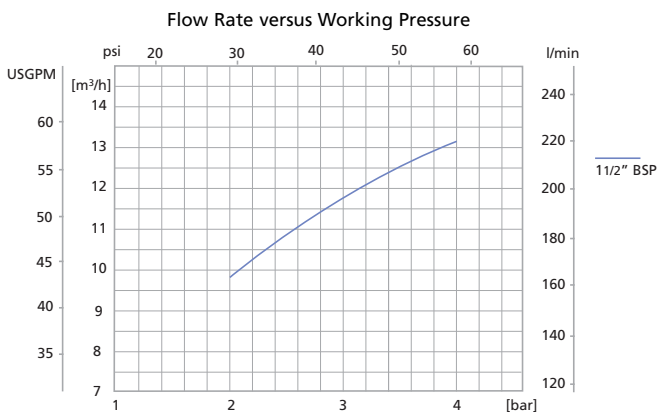
- Chemical resistant - ideal for corrosive environments
- Lightweight construction - safer in glass lined vessels
- Effective wash - due to high rotation speed

Chemidisc150	
Working pressure:	2-4 bar (29 - 58 psi)
Cleaning diameter:	5 m (16.4 ft)
Flow rate:	9.8 - 13.2 m ³ /h (163 - 220 l/min / 43.1 - 58.1 USgpm)
Spray angle:	360°
Operating temperature:	max. 95 °C (203 °F)
Ambient temperature/SIP:	max. 140 °C (284 °F), 30 min
Insertion opening:	min. Ø 75 mm (2.95 inch)
Materials:	C-PTFE or PTFE
Preferred mounting position:	any

Version	Part number
1 1/2" BSP female / C-PTFE	4660-1112-133
1 1/2" BSP female / PTFE	4660-1114-122



Dimensions (mm / inch)



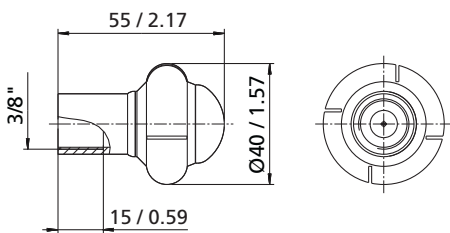
Rotating cleaners - Torus 50



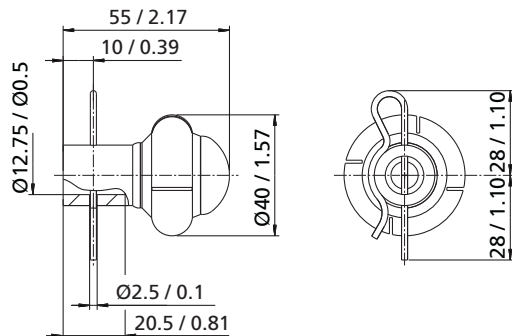
Torus 50	
Working pressure:	1 - 4 bar (14.5 - 58 psi)
Cleaning diameter:	max. 2.2 m (7.2 ft)
Flow rate:	0.9 - 2 m ³ /h (15 - 33.3 l/min / 4 - 8.8 USgpm)
Spray angle:	360° (optional 180°)
Operating temperature:	max. 65 °C (149 °F)
Ambient temperature:	max. 75 °C (167 °F), 30 min
Insertion opening:	BSP/NPT min. Ø 42 mm (1.65 inch) / Pin Fix 58 mm (2.38 inch)
Materials:	stainless steel 316L (1.4404) with PTFE or C-PTFE
Preferred mounting position:	any

- Ultrahygienic
- Low consumption of cleaning medium
- Effective wash - due to high rotation speed
- Low working pressure

Version	Part number
3/8" BSP female / C-PTFE	4660-1708-113
3/8" BSP female / PTFE	4660-1723-112
3/8" NPT female / C-PTFE	4660-1726-213
3/8" NPT female / PTFE	4660-1726-212
Pin Fix for 1/2" OD pipe (12.7x1.6 mm) C-PTFE	4660-1713-413
Pin Fix for 1/2" OD pipe (12.7x1.6 mm) PTFE	4660-1724-412

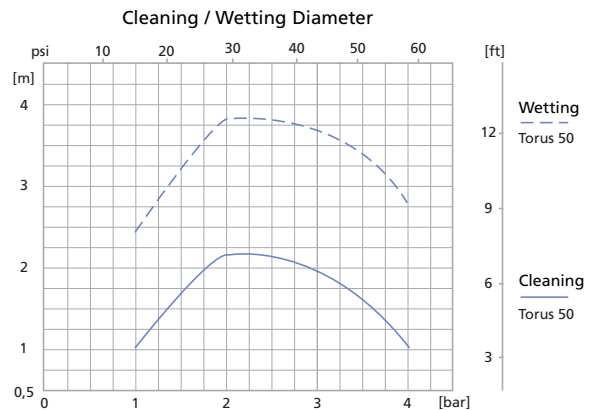
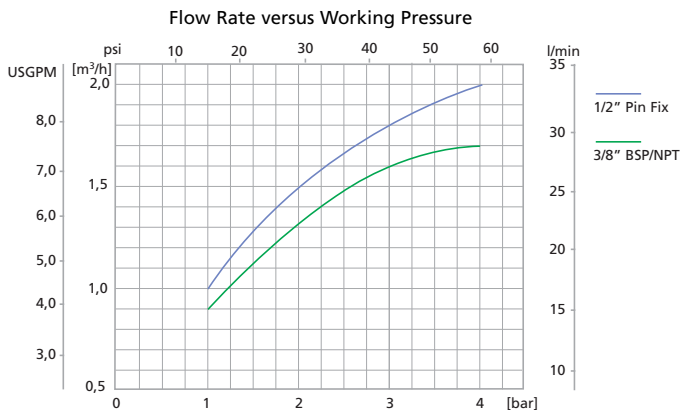


BSP female thread



Pin Fix

Dimensions (mm / inch)



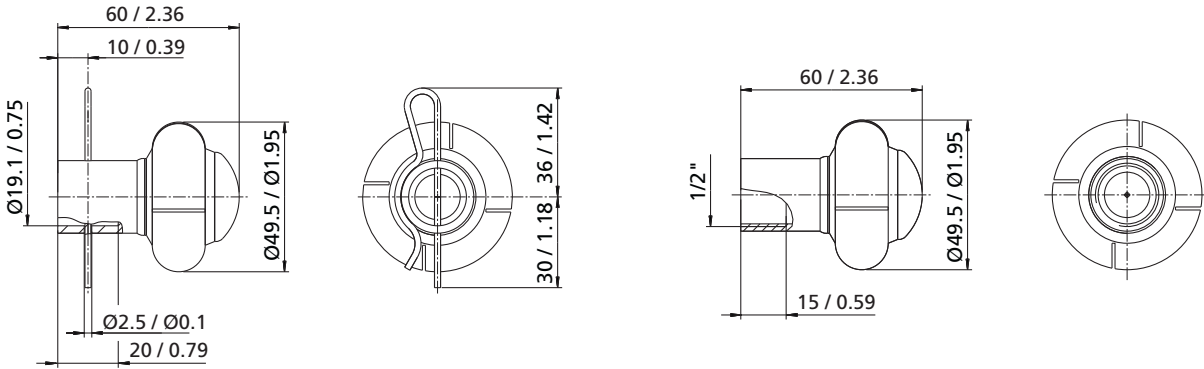


- Ultrahygienic
- Low consumption of cleaning medium
- Effective wash - due to high rotation speed
- Low working pressure

Torus 75	
Working pressure:	1 - 4 bar (14.5 - 58 psi)
Cleaning diameter:	max. 3.3 m (10.8 ft)
Flow rate:	1.8 - 4.6 m ³ /h (30 - 76.7 l/min / 7.9 - 20.3 USgpm)
Spray angle:	360° (optional 180°)
Operating temperature:	max. 65 °C (149 °F)
Ambient temperature:	max. 75 °C (167 °F), 30 min
Insertion opening:	BSP/NPT min. Ø 52 mm (2.05 inch) / Pin Fix 68 mm (2.38 inch)
Materials:	stainless steel 316L (1.4404) with PTFE or C-PTFE
Preferred mounting position:	any

Version	Part number
1/2" BSP female / C-PTFE	4660-1741-113
1/2" BSP female / PTFE	4660-1754-112
1/2" NPT female / C-PTFE	4660-1708-116
1/2" NPT female / PTFE	4660-1755-212
Pin Fix for 3/4" OD pipe (19.05x1.6) C-PTFE	4660-1744-413
Pin Fix for 3/4" OD pipe (19.05x1.6) PTFE	4660-1757-412

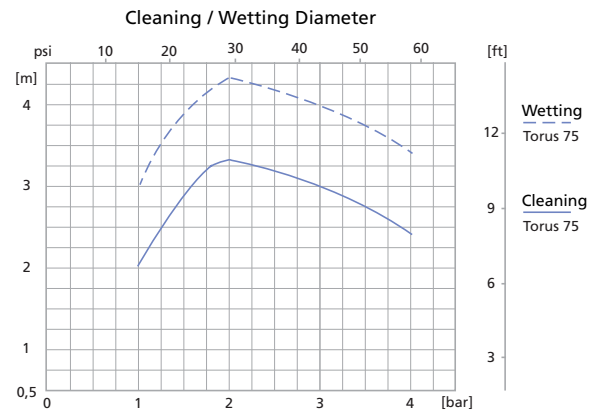
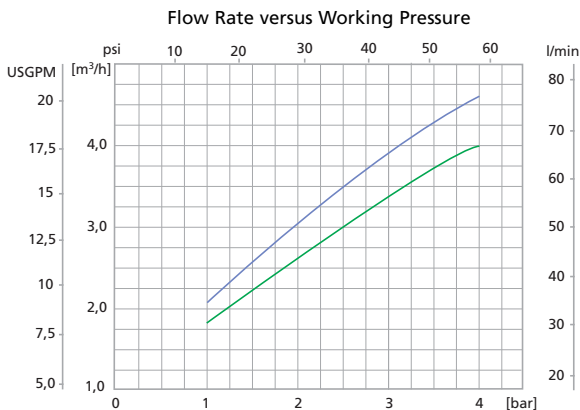
Dimensions (mm / inch)



Pin Fix

BSP female thread

Dimensions (mm / inch)



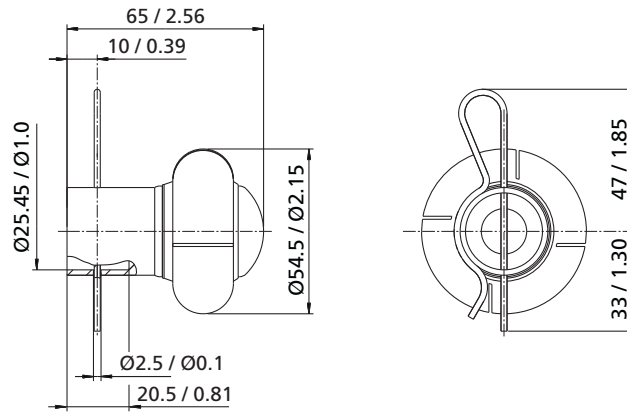
Rotating cleaners - Torus 100



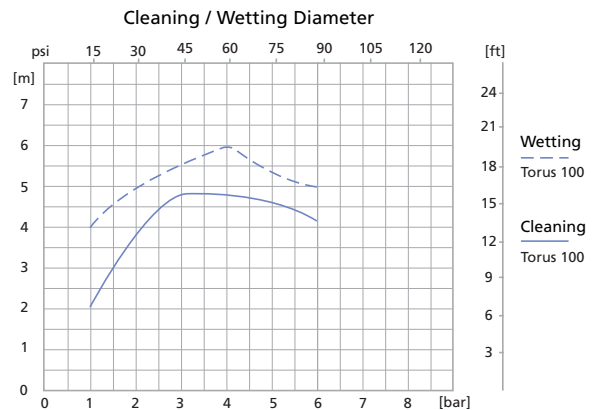
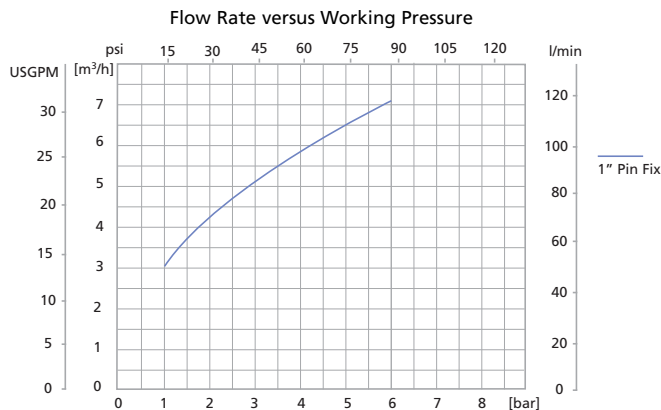
Torus 100	
Working pressure:	1 - 4 bar (14.5 - 58 psi)
Cleaning diameter:	max. 4.8 m (15.7 ft)
Flow rate:	3 - 7.1 m ³ /h (50 - 118.3 l/min / 13.2 - 31.3 USgpm)
Spray angle:	360° (optional 180°)
Operating temperature:	max. 65 °C (149 °F)
Ambient temperature:	max. 75 °C (167 °F), 30 min
Insertion opening:	min. Ø 85 mm (3.35 inch)
Materials:	stainless steel 316L (1.4404) with PTFE or C-PTFE
Preferred mounting position:	any

- Ultrahygienic
- Low consumption of cleaning medium
- Effective wash - due to high rotation speed
- Low working pressure

Version	Part number
Pin Fix for 1" OD pipe (25.4x1.6) / C-PTFE	4660-1701-413
Pin Fix for 1" OD pipe (25.4x1.6) / PTFE	4660-1704-412



Dimensions (mm / inch)





PTFE

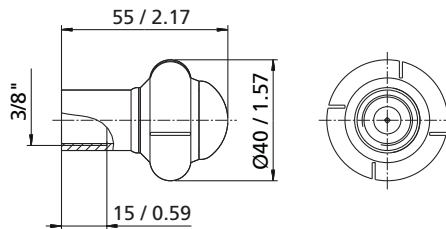


C-PTFE

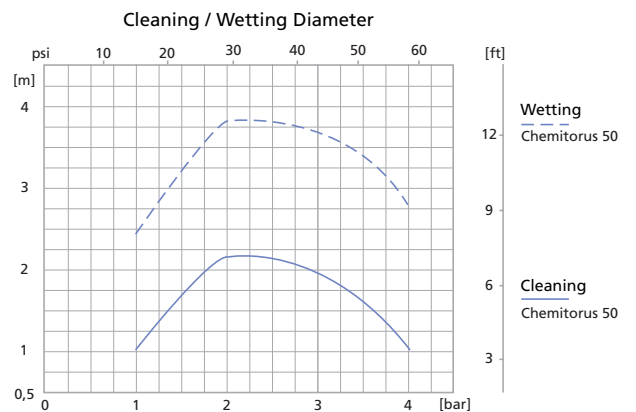
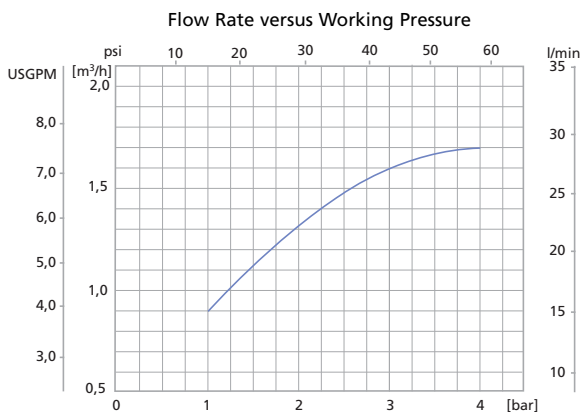
Chemitorus 50	
Working pressure:	1 - 4 bar (14.5 - 58 psi)
Cleaning diameter:	max. 2.2 m (7.2 ft)
Flow rate:	0.9 - 1.7 m ³ /h (15 - 28.3 l/min / 4 - 7.5 USgpm)
Spray angle:	360° (optional 180°)
Operating temperature:	max. 65 °C (149 °F)
Ambient temperature:	max. 75 °C (167 °F), 30 min
Insertion opening:	min. Ø 42 mm (1.65 inch)
Materials:	PTFE or C-PTFE
Preferred mounting position:	any

- Chemical resistant - ideal for corrosive environments
- Lightweight construction - safer in glass lined vessels
- High rotation speed
- Low working pressure

Version	Part number
3/8" BSP female / C-PTFE	4660-1732-033
3/8" BSP female / PTFE	4660-1735-122



Dimensions (mm / inch)



Rotating cleaners - Chemitorus 75



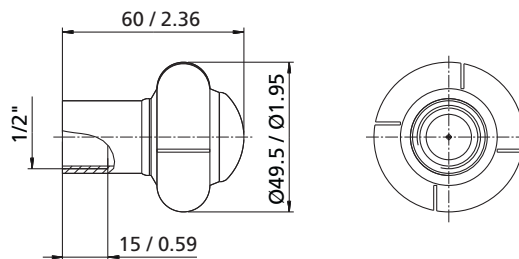
PTFE

C-PTFE

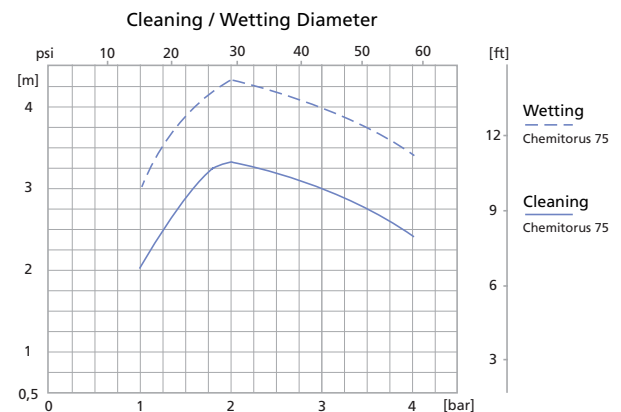
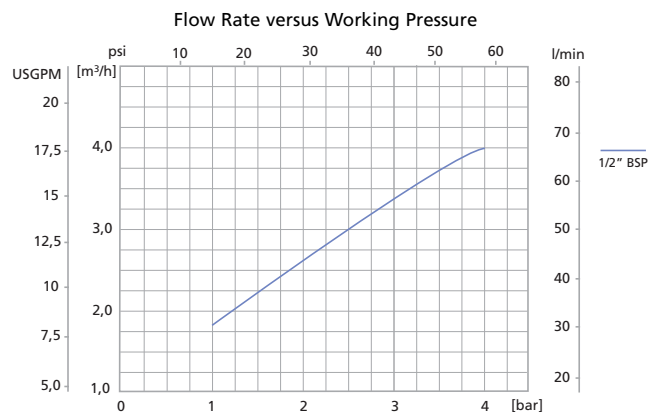
Chemitorus 75	
Working pressure:	1 - 4 bar (14.5 - 58 psi)
Cleaning diameter:	max. 3.3 m (10.8 ft)
Flow rate:	1.8 - 4 m ³ /h (30 - 66.7 l/min / 7.9 - 17.6 USgpm)
Spray angle:	360° (optional 180°)
Operating temperature:	max. 65 °C (149 °F)
Ambient temperature:	max. 75 °C (167 °F), 30 min
Insertion opening:	min. Ø 52 mm (2.05 inch)
Materials:	PTFE or C-PTFE
Preferred mounting position:	any

- Chemical resistant - ideal for corrosive environments
- Lightweight construction - safer in glass lined vessels
- High rotation speed
- Low working pressure

Version	Part number
1/2" BSP female / C-PTFE	4660-1762-033
1/2" BSP female / PTFE	4660-1765-022



Dimensions (mm / inch)



Rotating cleaners - Clipdisc 100

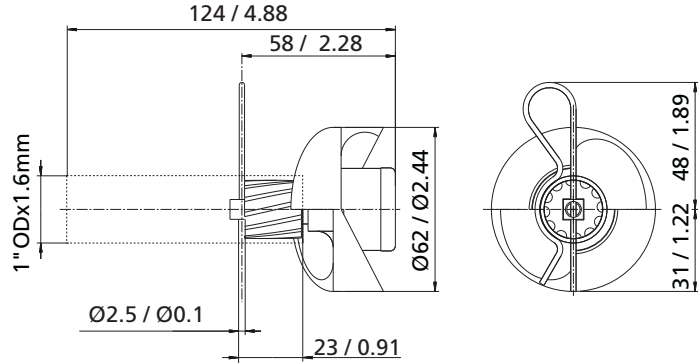


Photo shows cleaner with optional fixing tube

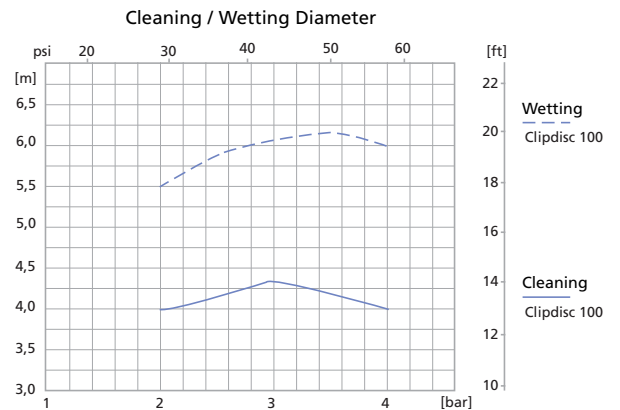
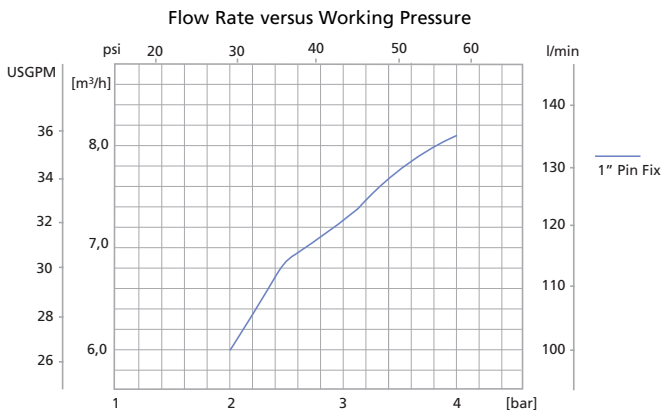
- High rotation speed
- Ultrahygienic
- Good rinsing performance

Clipdisc 100	
Working pressure:	2 - 4 bar (29 - 58 psi)
Cleaning diameter:	max. 4.3 m (14.1 ft)
Flow rate:	6 - 8.1 m ³ /h (100 -135 l/min / 26.4 - 35.7 USgpm)
Spray angle:	360°
Operating temperature:	max. 95 °C (203 °F)
Ambient temperature:	max. 140 °C (284 °F), 30 min
Insertion opening:	min. Ø 80 mm (3.15 inch)
Materials:	stainless steel 316L (1.4404) with PVDF
Preferred mounting position:	any

Version	Part number
Pin Fix for 1" OD pipe (25.4x1.6 mm)	4660-1301-507



Dimensions (mm / inch)



Rotating cleaners - Clipdisc 150

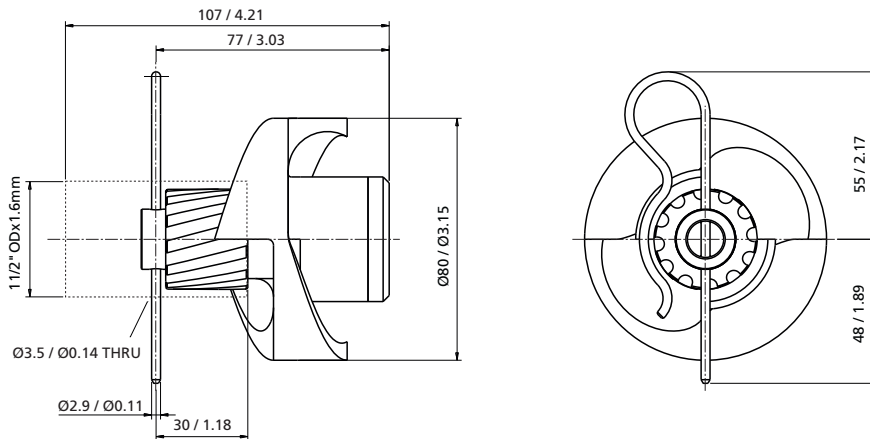


Photo shows cleaner with optional fixing tube

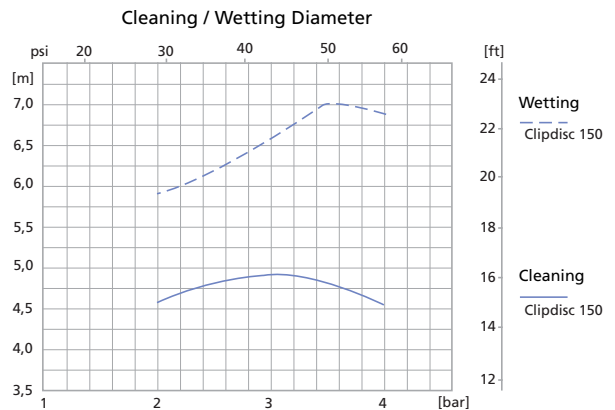
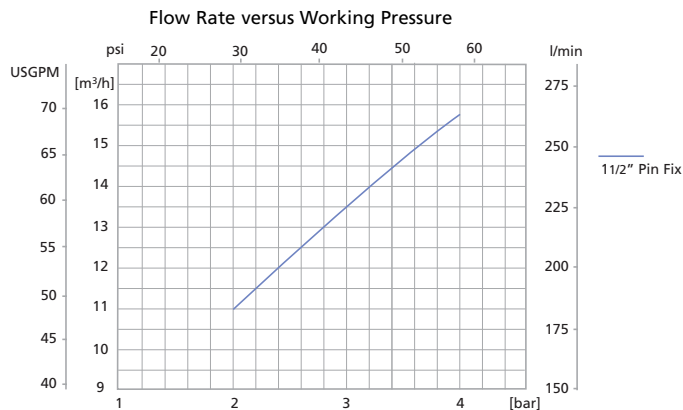
- High rotation speed
- Ultrahygienic
- Good rinsing performance

Clipdisc 150	
Working pressure:	2 - 4 bar (29 - 58 psi)
Cleaning diameter:	max. 4.9 m (16 ft)
Flow rate:	11 - 15.8 m ³ /h (183 - 263 l/min / 48.3 - 69.5 USgpm)
Spray angle:	360°
Operating temperature:	max. 95 °C (203 °F)
Ambient temperature:	max. 140 °C (284 °F), 30 min
Insertion opening:	min. Ø 110 mm (4.33 inch)
Materials:	stainless steel 316L (1.4404) with PVDF
Preferred mounting position:	any

Version	Part number
Pin Fix for 1 1/2" OD pipe (38.1x1.6 mm)	4660-1303-517



Dimensions (mm / inch)



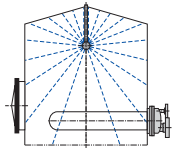
Static cleaners - spray balls



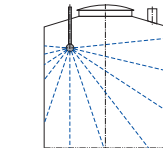
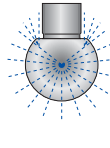
- Low pressures required
- Various possible materials and surfaces
- Variable spray patterns
- Good rinsing performance

Working pressure:	1 - 2.5 bar (14.5 - 36.3 psi)
Cleaning diameter:	up to 8 m (26.2 ft)
Flow rate:	0.9 - 66.7 m ³ /h (15 - 1,112 l/min / 4 - 294 USgpm)
Spray angle:	188° - 360°
Operating Temperature:	max. 95 °C (203 °F)
Materials:	stainless steel 316L (1.4404), 316L (1.4435), 1.4539, alloy 59 (2.4605)
Pipe connection:	clip fastening / thread
Surfaces:	matt, ground, electropolished
Preferred mounting position:	any

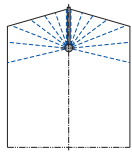
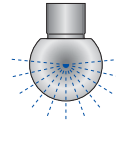
Spray patterns



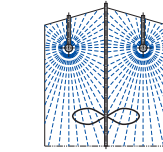
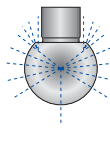
Spray pattern A for vertical tanks



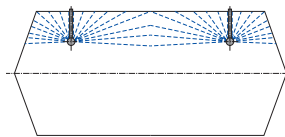
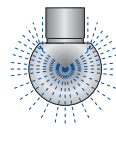
Spray pattern B for vertical tanks with open connectors at the top



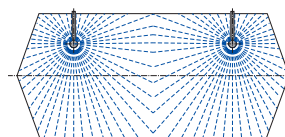
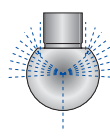
Spray pattern G for vertical tanks



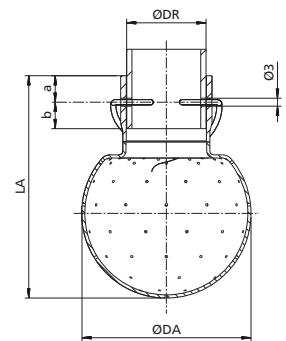
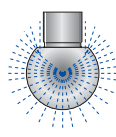
Spray pattern LA for vertical tanks



Spray pattern L for horizontal tanks



Spray pattern LA for horizontal tanks



Spray balls, dimensions, bore dimension

Material	Type 05					Type 1					Type 2		
	316L 1.4404		316 L 1.4435	1.4539	Alloy 59 2.4605	316 L 1.4404		316L 1.4435	Alloy 59 2.4605	316 L 1.4404			
Ø DR	12 [mm]	13 [mm]	1/2"OD [mm]	13.5 [mm]	13 [mm]	1/2"OD [mm]	29 [mm]	1"OD [mm]	29 [mm]	33.7 [mm]	33.7 [mm]	53 [mm]	2"OD [mm]
Ø DA	28	28	28	28	28	28	64	64	64	64	64	93	93
LA	46.6	46.6	46.6	46.6	46.6	46.6	84	84	84	84	84	113.5	113.5
b+a	18	18	16	18	18	18	20	20	20	16.5	16.5	30	30
a	10	10	8	10	10	10	10	10	10	6	6	10	10
b	8	8	8	8	8	8	10	10	10	10.5	10.5	20	20
Bore from lower edge of pipe													
b-0.2	7.8	7.8	7.8	7.8	7.8	7.8	9.8	9.8	9.8	10.3	10.3	19.8	19.8

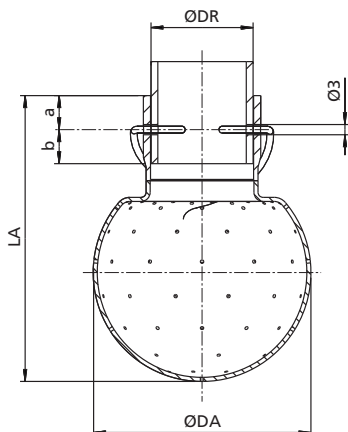
Static cleaners - spray balls

Clip fastening as per DIN 11850

Surface: matt, material : 316L (1.4404)

Type	Spray angle	Volume flow rate [m ³ /h] 1 bar	Cleaning diameter [m]	Dimensions		Connection: clip for pipe da [mm]	Part no.
				DA [mm]	LA [mm]		
A 05	360°	5.1	1.0 - 2.0	28	46.6	12	253-109.63
A 05-1.0	360°	2.8	0.8 - 1.5	28	46.6	12	253-109.73
A 05	360°	5.1	1.0 - 2.0	28	46.6	13	253-111.40
A 05-1.0	360°	2.8	0.8 - 1.5	28	46.6	13	253-111.41
A 1-1.0	360°	3.0	1.5 - 2.5	64	84.0	29	254-000044
A 1-1.5	360°	7.0	1.8 - 3.0	64	84.0	29	254-000046
A 1	360°	9.8	2.0 - 3.0	64	84.0	29	254-000030
A 1-1	360°	12.8	2.5 - 3.5	64	84.0	29	254-000031
A 1-2	360°	15.3	3.0 - 4.0	64	84.0	29	254-000032
A 2	360°	21.9	3.5 - 5.0	93	113.5	53	254-000042
A 2-1	360°	28.4	4.0 - 6.0	93	113.5	53	254-000040
A 2-2	360°	35.6	5.0 - 7.0	93	113.5	53	254-000041
A 2-3	360°	40.9	6.0 - 8.0	93	113.5	53	254-000049
B 05	192°	3.0	1.0 - 2.0	28	46.6	12	253-109.74
B 05	192°	3.0	1.0 - 2.0	28	46.6	13	253-111.42
B 1	192°	9.5	2.0 - 3.0	64	84.0	29	254-000033
B 2	194°	22.4	3.5 - 5.0	93	113.5	53	254-000050
B 2-3	194°	42.2	6.0 - 8.0	93	113.5	53	254-000053
G 05	232°	4.7	1.0 - 2.0	28	46.6	12	253-109.78
G 05	232°	4.7	1.0 - 2.0	28	46.6	13	253-111.46
G 1	206°	9.2	2.0 - 3.0	64	84.0	29	254-000036
G 1-1	206°	11.2	2.5 - 3.5	64	84.0	29	254-000037
G 1-2	206°	14.5	3.0 - 4.0	64	84.0	29	254-000038
G 2	246°	20.1	3.5 - 5.0	93	113.5	53	254-000054
G 2-1	246°	26.8	4.0 - 6.0	93	113.5	53	254-000055
G 2-2	246°	34.7	5.0 - 7.0	93	113.5	53	254-000056
G 2-3	246°	41.0	6.0 - 8.0	93	113.5	53	254-000057
L 1	188°	8.6	2.5 - 3.0	64	84.0	29	254-000045
LA 1-1.0	360°	5.5	1.5 - 2.5	64	84.0	29	254-000048
LA 1-1.5	360°	11.0	2.5 - 3.0	64	84.0	29	254-000047

Recommended operating pressure 1.0 to 2.5 bar g at inlet of spray ball



Pipes

DIN 11850 series 2 (DIN 11866 series A for external pipe dimensions)			DIN 11866 series B DIN EN ISO 1127			DIN 11866 series C ASME-BPE 2005		
DN	DR [mm]	s [mm]	DN/OD	DR [mm]	s [mm]	DN	DR [mm]	s [mm]
10	13	1.5	13.5	13.5	1.6	1/2"	12.7	1.65
15	19	1.5	17.2	17.2	1.6	3/4"	19.05	1.65
20	23	1.5	21.3	21.3	1.6			
			26.9	26.9	1.6			
25	29	1.5	33.7	33.7	2.0	1"	25.4	1.65
40	41	1.5	42.4	42.4	2.0	1 1/2"	38.1	1.65
50	53	1.5	48.3	48.3	2.0	2"	50.8	1.65

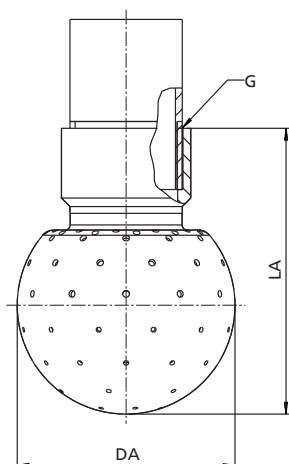
Static cleaners - spray balls

Threaded connection as per DIN ISO 228-1

Surface: matt, material: 316L (1.4404)

Type	Spray angle	Volume flow rate [m³/h] 1 bar	Cleaning diameter [m]	Dimensions		Connection: threaded sleeve	Part no.
				DA [mm]	LA [mm]		
A 05	360°	4.7	1.0 - 2.0	28	25	G 1/4"	253-106.01
A 05-1.0	360°	2.4	0.8 - 1.5	28	25	G 1/4"	253-106.26
A 1-1.0	360°	2.5	1.5 - 2.5	64	84	G 1"	253-106.34
A 1-1.5	360°	6.5	1.8 - 3.0	64	84	G 1"	253-106.35
A 1	360°	9.4	2.0 - 3.0	64	84	G 1"	253-106.10
A 1-1	360°	12.3	2.5 - 3.5	64	84	G 1"	253-106.11
A 1-2	360°	14.8	3.0 - 4.0	64	84	G 1"	253-106.12
A 2	360°	20.9	3.5 - 5.0	93	113.5	G 2"	253-106.36
A 2-1	360°	27.4	4.0 - 6.0	93	113.5	G 2"	253-106.37
A 2-2	360°	34.6	5.0 - 7.0	93	113.5	G 2"	253-106.38
A 2-3	360°	39.9	6.0 - 8.0	93	113.5	G 2"	253-106.33
B 05	192°	2.5	1.0 - 2.0	28	25	G 1/4"	253-106.02
B 1	192°	9.0	2.0 - 3.0	64	84	G 1"	253-106.13
B 2	194°	21.4	3.5 - 5.0	93	113.5	G 2"	253-106.39
B 2-3	194°	41.2	6.0 - 8.0	93	113.5	G 2"	253-106.42
G 05	232°	4.2	1.0 - 2.0	28	25	G 1/4"	253-106.22
G 1	206°	8.7	2.0 - 3.0	64	84	G 1"	253-106.19
G 1-1	206°	10.7	2.5 - 3.5	64	84	G 1"	253-106.20
G 1-2	206°	14.0	3.0 - 4.0	64	84	G 1"	253-106.21
G 2	246°	19.1	3.5 - 5.0	93	113.5	G 2"	253-106.47
G 2-1	246°	25.8	4.0 - 6.0	93	113.5	G 2"	253-106.48
G 2-2	246°	33.7	5.0 - 7.0	93	113.5	G 2"	253-106.49
G 2-3	246°	40.0	6.0 - 8.0	93	113.5	G 2"	253-106.50
L 1	188°	8.1	2.5 - 3.0	64	84	G 1"	253-106.73
LA 1-1.5	360°	10.5	2.5 - 3.0	64	84	G 1"	253-106.77

Recommended operating pressure 1.0 to 2.5 bar g at inlet of spray ball



Pipes

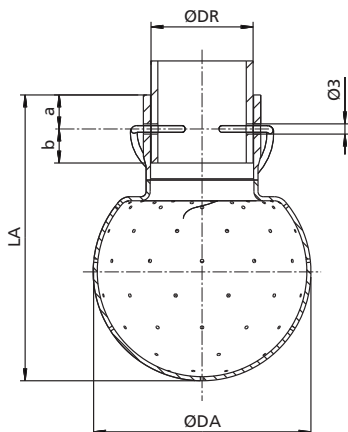
DIN 11850 series 2 (DIN 11866 series A for external pipe dimensions)			DIN 11866 series B DIN EN ISO 1127			DIN 11866 series C ASME-BPE 2005		
DN	DR [mm]	s [mm]	DN/OD	DR [mm]	s [mm]	DN	DR [mm]	s [mm]
10	13	1.5	13.5	13.5	1.6	1/2"	12.7	1.65
15	19	1.5	17.2	17.2	1.6	3/4"	19.05	1.65
20	23	1.5	21.3	21.3	1.6			
			26.9	26.9	1.6			
25	29	1.5	33.7	33.7	2.0	1"	25.4	1.65
40	41	1.5	42.4	42.4	2.0	1 1/2"	38.1	1.65
50	53	1.5	48.3	48.3	2.0	2"	50.8	1.65

Clip fastening with inch OD

Surface: ground, outside Ra <= 0.8 µm, material: 316L (1.4404)

Type	Spray angle	Volume flow rate [m³/h] 1 bar	Cleaning diameter [m]	Dimensions		Connection: clip for pipe inch OD [mm]	Part no.
				DA [mm]	LA [mm]		
A 05	360°	5.1	1.0 - 2.0	28	46.6	1/2" (12.7)	253-109.42
A 05-1.0	360°	2.8	0.8 - 1.5	28	46.6	1/2" (12.7)	253-111.43
A 1-1.0	360°	3.0	1.5 - 2.5	64	84.0	1" (25.4)	253-111.48
A 1-1.5	360°	7.0	1.8 - 3.0	64	84.0	1" (25.4)	253-111.49
A 1	360°	9.8	2.0 - 3.0	64	84.0	1" (25.4)	253-109.43
A 1-1	360°	12.8	2.5 - 3.5	64	84.0	1" (25.4)	253-109.44
A 1-2	360°	15.3	3.0 - 4.0	64	84.0	1" (25.4)	253-109.47
A 2	360°	21.9	3.5 - 5.0	93	113.5	2" (50.8)	253-109.49
A 2-1	360°	28.4	4.0 - 6.0	93	113.5	2" (50.8)	253-109.52
A 2-2	360°	35.6	5.0 - 7.0	93	113.5	2" (50.8)	253-109.54
A 2-3	360°	40.9	6.0 - 8.0	93	113.5	2" (50.8)	253-109.59
B 05	192°	3.0	1.0 - 2.0	28	46.6	1/2" (12.7)	253-111.44
B 1	192°	9.5	2.0 - 3.0	64	84.0	1" (25.4)	253-109.50
B 2	194°	22.4	3.5 - 5.0	93	113.5	2" (50.8)	253-111.51
B 2-3	194°	42.2	6.0 - 8.0	93	113.5	2" (50.8)	253-111.54
G 05	232°	4.7	1.0 - 2.0	28	46.6	1/2" (12.7)	253-111.45
G 1	206°	9.2	2.0 - 3.0	64	84.0	1" (25.4)	253-109.06
G 1-1	206°	11.2	2.5 - 3.5	64	84.0	1" (25.4)	253-109.45
G 1-2	206°	14.5	3.0 - 4.0	64	84.0	1" (25.4)	253-109.48
G 2	246°	20.1	3.5 - 5.0	93	113.5	2" (50.8)	253-109.07
G 2-1	246°	26.8	4.0 - 6.0	93	113.5	2" (50.8)	253-109.53
G 2-2	246°	34.7	5.0 - 7.0	93	113.5	2" (50.8)	253-109.55
G 2-3	246°	41.0	6.0 - 8.0	93	113.5	2" (50.8)	253-111.55
L 1	188°	8.6	2.5 - 3.0	64	84.0	1" (25.4)	253-111.37
LA 1-1.0	360°	5.5	1.5 - 2.5	64	84.0	1" (25.4)	253-111.65
LA 1-1.5	360°	11.0	2.5 - 3.0	64	84.0	1" (25.4)	253-111.62

Recommended operating pressure 1.0 to 2.5 bar g at inlet of spray ball



Pipes

DIN 11850 series 2 (DIN 11866 series A for external pipe dimensions)			DIN 11866 series B DIN EN ISO 1127			DIN 11866 series C ASME-BPE 2005		
DN	DR [mm]	s [mm]	DN/OD	DR [mm]	s [mm]	DN	DR [mm]	s [mm]
10	13	1.5	13.5	13.5	1.6	1/2"	12.7	1.65
15	19	1.5	17.2	17.2	1.6	3/4"	19.05	1.65
20	23	1.5	21.3	21.3	1.6			
			26.9	26.9	1.6			
25	29	1.5	33.7	33.7	2.0	1"	25.4	1.65
40	41	1.5	42.4	42.4	2.0	1 1/2"	38.1	1.65
50	53	1.5	48.3	48.3	2.0	2"	50.8	1.65

Static cleaners - spray balls - special material

Clip fastening as per DIN 11850

Surface: electropolished*, outside Ra <= 0.5 µm, material: 1.4435, Fe<1%

Type	Spray angle	Volume flow rate [m³/h] 1 bar	Cleaning diameter [m]	Dimensions		Connection: clip for pipe [mm]	Part no.
				DA [mm]	LA [mm]		
A 1-1.0	360°	3.0	1.5 - 2.5	64	84	29	253-111.83
A 1-1.5	360°	7.0	1.8 - 3.0	64	84	29	253-111.84
A 1	360°	9.8	2.0 - 3.0	64	84	29	253-111.82
LA 1-1.0	360°	5.5	1.5 - 2.5	64	84	29	253-111.80
LA 1-1.5	360°	11.0	2.5 - 3.0	64	84	29	253-111.81

Clip fastening as per ISO

Surface: electropolished*, outside Ra <= 0.5 µm, material: 1.4435, Fe<1%

Type	Spray angle	Volume flow rate [m³/h] 1 bar	Cleaning diameter [m]	Dimensions		Connection: clip for pipe ISO [mm]	Part no.
				DA [mm]	LA [mm]		
A 05	360°	5.1	1.0 - 2.0	28	46.6	13.5	253-111.78
A 05-1.0	360°	2.8	0.8 - 1.5	28	46.6	13.5	253-111.79
A 1-1.0	360°	3.0	1.5 - 2.5	64	84.0	33.7	253-111.88
A 1-1.5	360°	7.0	1.8 - 3.0	64	84.0	33.7	253-111.87
LA 1-1.0	360°	5.5	1.5 - 2.5	64	84.0	33.7	253-111.85
LA 1-1.5	360°	11.0	2.5 - 3.0	64	84.0	33.7	253-111.86

Clip fastening, OD and ISO

Surface: electropolished*, outside Ra <= 0.5 µm, material: 2.4605/2.4602

Type	Spray angle	Volume flow rate [m³/h] 1 bar	Cleaning diameter [m]	Dimensions		Connection: clip OD/ISO	Part no.
				DA [mm]	LA [mm]		
A 05	360°	5.1	1.0 - 2.0	28	48	1/2" (12.7)	253-111.76
A 05-1.0	360°	2.8	0.8 - 1.5	28	48	1/2" (12.7)	253-111.77
A 1-1.0	360°	3.0	1.5 - 2.5	64	85	33.7	253-111.68
A 1-1.5	360°	7.0	1.8 - 3.0	64	85	33.7	253-111.69

Threaded connection as per DIN ISO 228-1

Surface: electropolished*, outside Ra <= 0.5 µm, material: 2.4605/2.4602

Type	Spray angle	Volume flow rate [m³/h] 1 bar	Cleaning diameter [m]	Dimensions		Connection: sleeve G	Part no.
				DA [mm]	LA [mm]		
A 05	360°	4.7	1.0 - 2.0	28	48	G 1/4"	253-106.78
A 05-1.0	360°	2.4	0.8 - 1.5	28	48	G 1/4"	253-106.79

* Attention: the flow rate for electropolished spray balls made from 316L (1.4435) and spray balls made from alloy 59 (2.4605) (Hastelloy® C22/2.4602) may turn out to be 15-20% than the volume flows given in the table.

Threaded connection as per DIN ISO

Surface: matt, material: 1.4539

Type	Spray angle	Volume flow rate [m³/h] 1 bar	Cleaning diameter [m]	Dimensions		Connection: sleeve G	Part no.
				DA [mm]	LA [mm]		
A 05	360°	4.7	1.0 - 2.0	28	25	G 1/4"	253-106.68

Recommended operating pressure 1.0 to 2.5 bar g at inlet of spray ball

Static cleaners - spray balls - volume flow rates

Spray balls with clip fastening

Recommended operating pressure at the inlet of the spray ball

Type	Spray angle	Cleaning diameter [m]	Recommended pressure					
			Tanks without fixtures		Tanks with fixtures such as agitators			
			1 bar g [m³/h]	1.5 bar g [m³/h]	1.8 bar g [m³/h]	2.0 bar g [m³/h]	2.2 bar g [m³/h]	2.5 bar g [m³/h]
A 05	360°	1.0 - 2.0	5.1	6.2	6.8	7.2	7.6	8.1
A 05-1.0	360°	0.8 - 1.5	2.8	3.4	3.8	4.0	4.2	4.4
A 1-1.0	360°	1.5 - 2.5	3.0	3.7	4.0	4.2	4.4	4.7
A 1-1.5	360°	1.8 - 3.0	7.0	8.6	9.4	9.9	10.4	11.1
A 1	360°	2.0 - 3.0	9.8	12.0	13.1	13.9	14.5	15.5
A 1-1	360°	2.5 - 3.5	12.8	15.7	17.2	18.1	19.0	20.2
A 1-2	360°	3.0 - 4.0	15.3	18.7	20.5	21.6	22.6	24.1
A 2	360°	3.5 - 5.0	21.9	26.8	29.4	31.0	32.5	34.6
A 2-1	360°	4.0 - 6.0	28.4	34.8	38.2	40.2	42.2	45.0
A 2-2	360°	5.0 - 7.0	35.6	43.6	47.8	50.3	52.8	56.3
A 2-3	360°	6.0 - 8.0	40.9	50.1	54.9	57.8	60.7	64.7
B 05	192°	1.0 - 2.0	3.0	3.7	4.0	4.2	4.4	4.7
B 1	192°	2.0 - 3.0	9.5	11.6	12.7	13.4	14.1	15.0
B 2	194°	3.5 - 5.0	22.4	27.4	30.1	31.7	33.2	35.4
B 2-3	194°	6.0 - 8.0	42.2	51.7	56.6	59.7	62.6	66.7
G 05	232°	1.0 - 2.0	4.7	5.8	6.3	6.6	7.0	7.4
G 1	206°	2.0 - 3.0	9.2	11.3	12.3	13.0	13.6	14.5
G 1-1	206°	2.5 - 3.5	11.2	13.7	15.0	15.8	16.6	17.7
G 1-2	206°	3.0 - 4.0	14.5	17.8	19.5	20.5	21.5	22.9
G 2	246°	3.5 - 5.0	20.1	24.6	27.0	28.4	29.8	31.8
G 2-1	246°	4.0 - 6.0	26.8	32.8	36.0	37.9	39.8	42.4
G 2-2	246°	5.0 - 7.0	34.7	42.5	46.6	49.1	51.5	54.9
G 2-3	246°	6.0 - 8.0	41.0	50.2	55.0	58.0	60.8	64.8
L 1	188°	2.5 - 3.0	8.6	10.5	11.5	12.2	12.8	13.6
LA 1-1.0	360°	1.5 - 2.5	5.5	6.7	7.4	7.8	8.2	8.7
LA 1-1.5	360°	2.5 - 3.0	11.0	13.5	14.8	15.6	16.3	17.4

Attention: the flow rate for electropolished spray balls made from 316L (1.4435) and spray balls made from alloy 59 (2.4605) (Hastelloy® C22/2.4602) may turn out to be 15-20% than the volume flows given in the table.

Conversion formula for other volume flow rates: $Q_2 = Q_1 \times \sqrt{p_2 / p_1}$ [m³/h]

General guidance 30-50 l/min per meter tank circumference



Static cleaners - spray balls - volume flow rates

Spray balls with threaded connection

Recommended operating pressure at the inlet of the spray ball

Type	Spray angle	Cleaning diameter [m]	Recommended pressure					
			Tanks without fixtures		Tanks with fixtures such as agitators			
			1 bar g [m³/h]	1.5 bar g [m³/h]	1.8 bar g [m³/h]	2.0 bar g [m³/h]	2.2 bar g [m³/h]	2.5 bar g [m³/h]
A 05	360°	1.0- 2.0	4.7	5.8	6.3	6.6	7.0	7.4
A 05-1.0	360°	0.8- 1.5	2.4	2.9	3.2	3.4	3.6	3.8
A 1-1.0	360°	1.5- 2.5	2.5	3.1	3.4	3.5	3.7	4.0
A 1-1.5	360°	1.8- 3.0	6.5	8.0	8.7	9.2	9.6	10.3
A 1	360°	2.0- 3.0	9.4	11.5	12.6	13.3	13.9	14.9
A 1-1	360°	2.5- 3.5	12.3	15.1	16.5	17.4	18.2	19.4
A 1-2	360°	3.0- 4.0	14.8	18.1	19.9	20.9	22.0	23.4
A 2	360°	3.5- 5.0	20.9	25.6	28.0	29.6	31.0	33.0
A 2-1	360°	4.0- 6.0	27.3	33.4	36.6	38.6	40.5	43.2
A 2-2	360°	5.0-7.0	34.6	42.4	46.4	48.9	51.3	54.7
A 2-3	360°	6.0- 8.0	39.9	48.9	53.5	56.4	59.2	63.1
B 05	192°	1.0- 2.0	2.5	3.1	3.4	3.5	3.7	4.0
B 1	192°	2.0- 3.0	9.0	11.0	12.1	12.7	13.3	14.2
B 2	194°	3.5- 5.0	21.4	26.2	28.7	30.3	31.7	33.8
B 2-3	194°	6.0- 8.0	41.2	50.5	55.3	58.3	61.1	65.1
G 05	232°	1.0- 2.0	4.2	5.1	5.6	5.9	6.2	6.6
G 1	206°	2.0- 3.0	8.7	10.7	11.7	12.3	12.9	13.8
G 1-1	206°	2.5- 3.5	10.7	13.1	14.4	15.1	15.9	16.9
G 1-2	206°	3.0- 4.0	14.0	17.1	18.8	19.8	20.8	22.1
G 2	246°	3.5- 5.0	19.1	23.4	25.6	27.0	28.3	30.2
G 2-1	246°	4.0- 6.0	25.8	31.6	34.6	36.5	38.3	40.8
G 2-2	246°	5.0-7.0	33.7	41.3	45.2	47.7	50.0	53.3
G 2-3	246°	6.0- 8.0	40.0	49.0	53.7	56.6	59.3	63.2
L 1	188°	2.5- 3.0	8.1	9.9	10.9	11.5	12.0	12.8
LA 1-1.5	360°	2.5- 3.0	10.5	12.9	14.1	14.8	15.6	16.6

Attention: the flow rate for electropolished spray balls made from 316L (1.4435) and spray balls made from alloy 59 (2.4605) (Hastelloy® C22/2.4602) may turn out to be 15-20% than the volume flows given in the table.

Conversion formula for other volume flow rates: $Q_2 = Q_1 \times \sqrt{p_2 / p_1}$ [m³/h]

General guidance 30-50 l/min per meter tank circumference



Retractor - In-Line Sprayer, type IS 25



Working pressure:	1.8 - 2.5 bar (26.1 - 36.3 psi)	
Flow rate:	2.9 - 5.4 m ³ /h (48.3 - 90.4 l/min. / 12.8 - 23.8 USpgm)	
Cleaning diameter:	max. 1.6 m (5.2 ft)	
Spray angle:	192° - 360°	
Materials:	product wetted	316L (1.4435) with EPDM / FKM or FFKM
	not product wetted	316 (1.4301) with NBR
Weight:	approx. 6 kg (13.23 lbs)	
Preferred mounting position:	any	

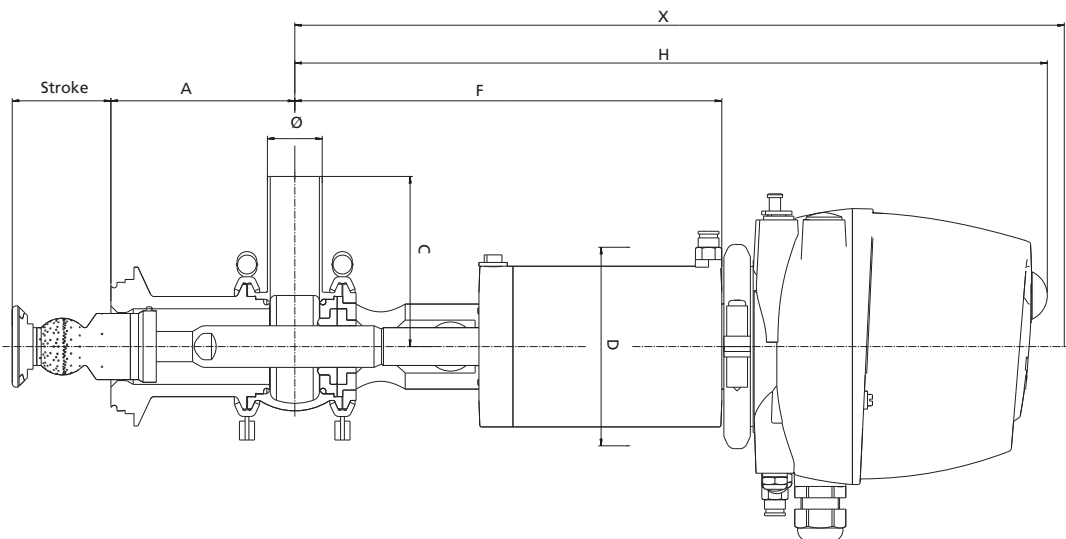


In-Line Sprayer in open position



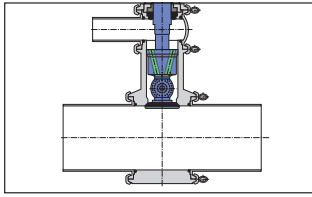
In-Line Sprayer in closed position

- Spray head is not in the process during production
- Low pressures required
- Huge savings on cleaning agents due to targeted cleaning
- Demonstrable process reliability and functional reliability
- Range of seal materials
- Feedback sensor (optional)

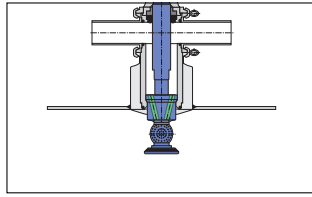


		Nominal size	Ø	A	C	D	F	H	X	Stroke
Metric	Outside diameter as per DIN 11850, series II, DIN 11866, series A	DN 25	29.0x1.5	98	90	85	226	366	450	56
ISO	Outside diameter as per DIN EN ISO 1127	ISO 33.7	33.7x2	99.5	114.3	85	227.5	366	450	56

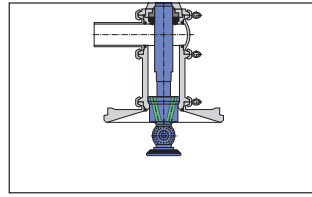
Retractor - In-Line Sprayer, type IS 25



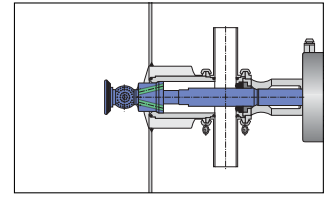
Housing connection for VARINLINE® housing DN 80 to DN 150, 4" OD and 6" IPS



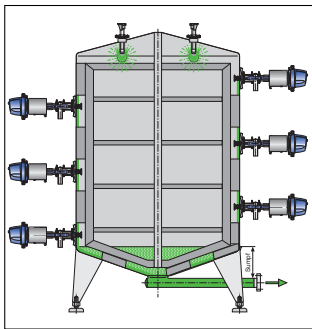
Housing connection IS-Roh for welding in, for pipe from DN 200 to DN 400



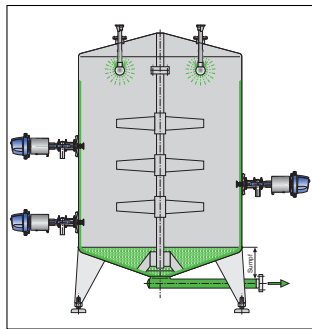
Tank weld-in flange T50/40 for welding into tank floors or tank shells



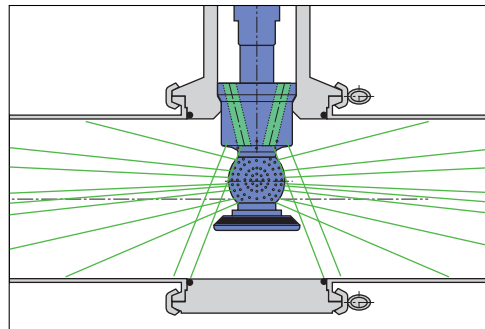
Housing connection IS-T for welding into a tank shell



Installation in tanks with scraper

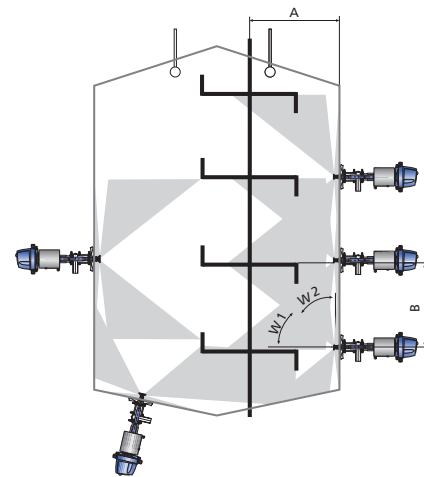


Installation in tanks with agitator

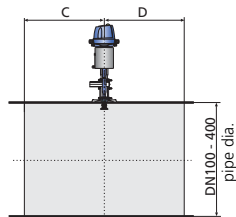


Installation with VARINLINE® housing in a pipeline

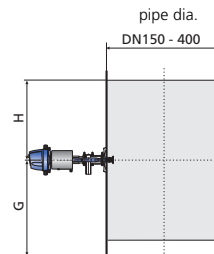
Areas of application and cleaning angles



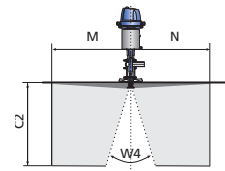
Agitator tank



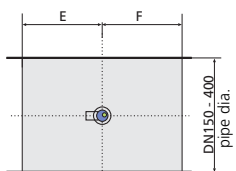
Horizontal pipe, installation from the top



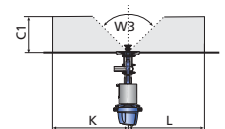
Vertical pipe



Tank, installation from the top



Horizontal pipe, installation from the side, 90°



Tank, installation from the bottom

Data in [mm and °]	A	B	W1	W2	C	D	E	F	G	H	K	L	C1	W3	M	N	C2	W4
Spray hole B 0.6 mm	1,000	1,200	48°	34°	800	800	700	700	2,000	300	900	900	800	98°	900	900	2,000	90°
Spray hole B 0.8 mm	1,500	1,500	48°	34°	800	800	700	700	2,500	700	900	900	800	98°	900	900	2,000	90°

Two types of spray heads are available:
Spray head B 06 (all holes 0.6 mm)
Spray head B 08 (all holes 0.8 mm)

Flow rates (optimum operating pressure 1.8 to 2.5 bar)					
Pressure [bar]	1.5	1.8	2.0	2.2	2.5
Flow rate B 0.6 [m³/h]	2.9	3.2	3.4	3.5	3.8
Flow rate B 0.8 [m³/h]	4.2	4.6	4.8	5.1	5.4

Retractor - In-Line Sprayer, type IS 25

Code	IS 25	D	T	01	0	0	1	K	00	2	0
Item	1	2	3	4	5	6	7	8	9	10	11
Example	Item	Designation	Code options for selection								
IS 25	1	Type	IS 25 In_Line Sprayer DN 25								
D	2	Nominal size standard	D DN 25 DIN (29x1.5 mm) S DIN EN ISO (33.7x2.0 mm)								
T	3	Housing	L with 1 socket 1.4435 T with 2 sockets 1.4435								
01	4	Spray ball	01 Spray head B 0.6 05 Spray head B 0.8								
0	5	Pressure supply port per connector neck ¹	0 Welded end NFK Hygienic grooved flange, DIN 11864-2, DIN 11853-2 ASN Aseptic flange connection, DIN 11864-2 ASK Hygienic flange connection, DIN 11864-2, DIN 11853-2 AVK Hygienic screwed union, DIN 11864-1, DIN 11853-2 AVN Aseptic screwed union, DIN 11864-1 TN VARIVENT® grooved flange with O-ring and connecting components TK VARIVENT® flange connection, grooved flange on housing								
0	6	Process connection ²	1 Tank weld-in flange T 50/40 1.4404 3 Tank weld-in flange T 50/40 1.4435 5 Housing connection for VARINLINE® housing ³ (DN80-150/4"-6" OD/IPS) 8 Adaptable housing connection IS-Roh for pipes 2 Housing connection IS-T 1.4435 / 316L								
1	7	Seal materials, in contact with product	1 EPDM 2 FKM 4 FFKM								
K	8	Usage	K Not in ATEX zones E In ATEX zones (valid for zones 1, 2, 21, 22)								
00	9	Feedback ⁴	- No feedback M With proximity switch holder M2 With proximity switch holder and 2 proximity switches M1 With proximity switch holder and 1 proximity switch T Feedback module T.VIS® M1 with 2 feedback components and 1 pilot valve 24V								
2	10	Surface quality of housing	2 Inside Ra 0.8 µm, outside matt 3 Inside Ra 0.8 µm, outside polished 4 Inside Ra 0.4 µm, outside matt 8 Inside Ra 0.4 µm, outside polished								
0	11	Certificates	K No certificate W (41) With factory certificate 2.2 DIN EN10204 Z (42) With material test certificate 3.1 DIN EN10204								

¹ Only with EPDM seal

² Optional: weld-in device, part number 254-000271

³ VARINLINE® housing must be ordered separately

⁴ Other feedback components can be selected under T.VIS® feedback systems



- Aseptic measuring point
- Elastomer-free seal
- FDA/EHEDG compliant



Tempest with monitoring sensor SMW 100

To verify the operation of orbital cleaning devices

Weld-in sleeve system:	GEA
Material:	housing 1.4305
Parts in contact with media:	PEEK
Supply voltage:	18...32 VDC
Non-load power requirement:	< 20 mA
Active output signal:	max. 50 mA (PNP)
Time delay:	< 0.3 s
Response time:	< 75 ms
Ambient temperature:	-10 – + 70 °C
Process temperature:	0...+100 °C
CIP / SIP cleaning:	0...150 °C (max. 30 min.)
IP protection:	IP 65 / 67
Operating pressure:	max. 10 bar (145 psi)

Usage in water and water-based cleaning fluids

Kinematic viscosity	1.004 x 10 m ² /s
Conductivity	0.05 S/m

Type	Part number
Sensor SMW 100 (to monitor the functioning of orbital cleaners)	
With weld-in sleeve	222-000015
Without weld-in sleeve	222-000013



To verify operation of orbital wash heads

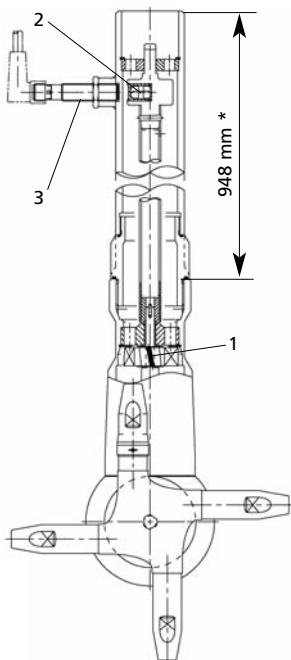
Material:	316L (1.4404), C-PTFE, EPDM (other elastomers on request)
Parts in contact with media:	316L (1.4404), C-PTFE, EPDM
Ambient temperature:	magnetic proximity sensor 0 - 100 °C Cleaner max. 140 °C, 30 min
Compatible cleaning devices:	Always supplied as a complete unit with Typhoon, Tempest, Tornado or Tornado 4 (Cleaner has to be specified separately)
Feedback:	magnetic proximity sensor 10-30 V DC
Connection:	Inlet: 1 1/2" or 2" male connection BSP or NPT Outlet: according to Tankwasher Standard Veri-Clean housing supplied without vessel connection (customized vessel connections on request)
Surface:	machine finish inside (generally Ra 0.8 µm to 1.6 µm), Ra 0.8 µm outside mechanically polished up to Ra 0.4 µm outside on request
Preferred mounting position:	vertical

- No extra tank connections
- Includes CIP down pipe
- Variable insertion length

Version

1/2" BSP/948mm	4660-8818-110
1 1/2" NPT/948mm	4660-8818-111
2" BSP/948mm	4660-8818-112
2" NPT/948mm	4660-8818-113

Dimensions (mm)



Operation

- wash head turbine (1) rotates magnet (2) inside vericlean
- external sensor (3) detects magnetic field
- stream of signal pulses generated during normal operation

* other lengths available on request

Designation	Part number
Service kits for orbital cleaners	
Twister TSG C-PTFE	4660-4050-888
Twister TSG PTFE	4660-4051-888
Typhoon / Tempest / Tornado TSK TSG C-PTFE	4660-4013-888
Typhoon / Tempest / Tornado TSK TSG PTFE (For cleaners with stainless steel planet gears only)	4660-4014-888
Typhoon / Tempest / Tornado TSKA TPB TSG C-PTFE	4660-4015-888
Typhoon / Tempest / Tornado TSKA TPB TSG PTFE (For cleaners with stainless steel or PEEK planet gears)	4660-4017-888
Typhoon / Tempest / Tornado TSKB TPB/TSG C-PTFE	4660-4016-888
Typhoon / Tempest / Tornado TSKB TPB/TSG PTFE (To upgrade from PEEK to stainless steel planet gears)	4660-4018-888
Tornado 4 C-PTFE	4660-4980-888
Tornado 4 PTFE	4660-4981-888
TMC 45 cleaner head	254-000537
TMC 85 cleaner head	254-000538
TMC 45 coupling	254-000539
TMC 85 coupling	254-000539

Special tool kit





For Twister	4660-4031-888
For Typhoon, Tempest, Tornado	4660-4011-888
For Tornado 4	4660-4041-888
For TMC 45	254-000566
For TMC 85	254-000568


Protection cage for Thyphoon, Tempest and Tornado




For Typhoon, Material: 316L (1.4404), Welding connection for pipe: 25,4 mm	254-000630
For Tempest/Tornado, Material: 316L (1.4404), Welding connection for pipe: 41 mm	254-000524
For Tempest/Tornado, Material: 316L (1.4404), Double-sided connection: 1 1/2" BSP male thread	254-000580


	Designation	Part number
Hygienic weld-on nipples for cleaners		
	DN 10 / G 3/8" BSP	705-138
	DN 15 / G 1/2" BSP	705-139
	DN 20 / G 3/4" BSP	705-137
	DN 25 / G 1" BSP	705-136
	DN 40 / G 1 1/4" BSP	705-145
	DN 40 / G 1 1/2" BSP	705-135
	3/8" OD / G 3/8" BSP	705-151
	3/4" OD / G 1/2" BSP	705-148
	1" OD / G 3/4" BSP	705-149
	1" OD / G 1" BSP	705-146
	1 1/2" OD / G 1 1/4" BSP	705-147
	2" OD / G 1 1/2" BSP	705-150

Dirt arrester		
	Connection G-G DIN 11851, gauze filter 0.5 mm, material 316L (1.4404)	
	DN 25 / G-G DIN 11851	254-000545
	DN 50 / G-G DIN 11851	254-000546
	DN 80 / G-G DIN 11851	254-000547

Fixing tube - pre- drilled for welding tube existing CIP-pipe		
	Stainless steel fixing tube for Clipdisc 100	4660-8140-010
	Stainless steel fixing tube for Clipdisc 150	4660-0661-000

Mobile trestle for cleaners		
	Connection 1"	254-000502
	Connection 1 1/2"	254-000504

Set of certificates for cleaners		
	Factory certificate 2.2 DIN EN 10204, FDA conformity, Material test certificate 3.1 DIN EN 10204 other certificates on request	

Tank Safety System VARITOP		
	The tank safety system is used for tank cleaning, for the protection of the tank against inadmissible overpressure and vacuum and for the control of the gas and liquid flow.	
	Further information on request	

Cleaning lance

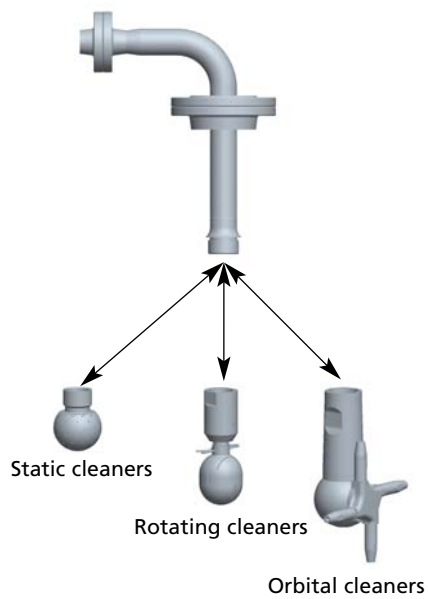
Code	RTL	07	08	00	00	E	01	00	00	E	M	Z
Item	1	2	3	4	5	6	7	8	9	10	11	12

Example	Item	Designation	Code options for selection
RTL	1	RTL	Cleaning lance
07	2	Prepared with	01 3/8" BSP male thread 02 1/4" BSP female thread 03 1/2" BSP male thread 04 3/4" BSP male thread 05 1" BSP male thread 06 1 1/4" BSP male thread 07 1 1/2" BSP male thread 08 2" BSP male thread 09 Pin Fix for 1/2" OD pipe (12.7x1.6) 10 Pin Fix for 3/4" OD pipe (19.05x1.6) 11 Pin Fix for 1" OD pipe (25.4x1.6) 12 Pin Fix for 1 1/2" OD pipe (38.1x1.6) 13 Pin Fix for pipe (12mm) 14 Pin Fix for pipe (13mm) 15 Pin Fix for pipe (29mm) 16 Pin Fix for pipe (53mm)
08	3	Insertion length (any can be chosen)	01 100 mm 04 400 mm 07 700 mm 10 1000 mm 02 200 mm 05 500 mm 08 800 mm 15 1500 mm 03 300 mm 06 600 mm 09 900 mm 33 Customized
00	4	Tank connection	00 No tank connection (welded in) 01 Blind flange PN 16 DN 40, DIN 1092-1 02 Blind flange PN 16 DN 50, DIN 1092-1 03 Blind flange PN 16 DN 65, DIN 1092-1 04 Blind flange PN 16 DN 80, DIN 1092-1 05 Blind flange PN 16 DN 100, DIN 1092-1 06 Blind flange PN 16 DN 125, DIN 1092-1 07 Blind flange PN 16 DN 150, DIN 1092-1 08 Blind flange PN 16 DN 200, DIN 1092-1 09 VARIVENT® grooved flange, DN 40 10 VARIVENT® grooved flange, DN 50 11 VARIVENT® grooved flange, DN 65 12 VARIVENT® grooved flange, DN 80 13 VARIVENT® grooved flange, DN 100 14 VARIVENT® grooved flange, DN 125 15 VARIVENT® grooved flange, DN 150 16 VARIVENT® grooved flange, 1 1/2" OD 17 VARIVENT® grooved flange, 2" OD 18 VARIVENT® grooved flange, 2 1/2" OD 19 VARIVENT® grooved flange, 3" OD 20 VARIVENT® grooved flange, 4" OD 21 VARIVENT® grooved flange, 6" OD 22 Hygienic grooved flange DN 40, DIN 11853-2, (formerly DIN 11864-2, short) 23 Hygienic grooved flange DN 50, DIN 11853-2, (formerly DIN 11864-2, short) 24 Hygienic grooved flange DN 65, DIN 11853-2, (formerly DIN 11864-2, short)

Code	RTL	07	08	00	00	E	01	00	00	E	M	Z
Item	1	2	3	4	5	6	7	8	9	10	11	12

Example	Item	Designation	Code options for selection
00	4	Tank connection	25 Hygienic grooved flange DN 80, DIN 11853-2, (formerly DIN 11864-2, short) 26 Hygienic grooved flange DN 100, DIN 11853-2, (formerly DIN 11864-2, short) 27 Hygienic grooved flange DN 125, DIN 11853-2, (formerly DIN 11864-2, short) 28 Hygienic grooved flange DN 150, DIN 11853-2, (formerly DIN 11864-2, short) 29 Hygiene grooved flange 1 1/2" OD DIN 11853-2, (formerly DIN 11864-2, short) 30 Hygiene grooved flange 2" OD DIN 11853-2, (formerly DIN 11864-2, short) 31 Hygiene grooved flange 2 1/2" OD DIN 11853-2, (formerly DIN 11864-2, short) 32 Hygiene grooved flange 3" OD DIN 11853-2, (formerly DIN 11864-2, short) 33 Hygiene grooved flange 4" OD DIN 11853-2, (formerly DIN 11864-2, short) 34 Hygiene grooved flange 6" OD DIN 11853-2, (formerly DIN 11864-2, short) 35 Tri-Clamp, 1 1/2" OD, DIN 32676 36 Tri-Clamp, 2" OD, DIN 32676 37 Tri-Clamp, 2 1/2" OD, DIN 32676 38 Tri-Clamp, 3" OD, DIN 32676 39 Tri-Clamp, 4" OD, DIN 32676 40 Tri-Clamp, 6" OD, DIN 32676 41 Conical fitting / round slotted nut DN 65, DIN 11851 42 Conical fitting / round slotted nut DN 80, DIN 11851 43 Conical fitting / round slotted nut DN 100, DIN 11851 44 Conical fitting / round slotted nut DN 125, DIN 11851 45 Conical fitting / round slotted nut DN 150, DIN 11851
00	5	Counter flange/ flange seal, tank connection	00 No counter flange 01 With counter flange
E	6	Tank connection seal	E EPDM F FKM S SEL (for blind flange only) N NBR (for blind flange only)
01	7	Monitoring sensor	00 No monitoring sensor 01 With monitoring sensor (for orbital cleaners only) 02 Prepared for monitoring sensor (for orbital cleaners only)
00	8	Pressure supply port	00 Welded end 01 VARIVENT® grooved flange DN 25 02 VARIVENT® grooved flange DN 50 03 VARIVENT® grooved flange 1" OD 04 VARIVENT® grooved flange 2" OD 05 Hygienic grooved flange DN 25, DIN 11853-2 06 Hygienic grooved flange DN 50, DIN 11853-2 07 Hygienic grooved flange 1" OD, DIN 11853-2 08 Hygienic grooved flange 2" OD, DIN 11853-2 09 Screw fitting DN 25, DIN 11851 10 Screw fitting DN 50, DIN 11851 11 Tri-Clamp 1" OD, DIN 32676 12 Tri-Clamp 2" OD, DIN 32676 13 Welding neck flange DN 25, DIN 1092-1 14 Welding neck flange DN 50, DIN 1092-1 15 Clamping ring flange DN 50

Code	RTL	07	08	00	00	E	01	00	00	E	M	Z	
Item	1	2	3	4	5	6	7	8	9	10	11	12	
Example	Item	Designation	Code options for selection										
00	9	Counter flange flange seal, pressure supply port	00	No counter flange									
			01	With counter flange									
E	10	Pressure supply port seal	E	EPDM									
			F	FKM									
			S	SEL (for welding neck flange only)									
			N	NBR (for welding neck flange only)									
M	11	Surface	M	Matt									
			E	Electropolished									
Z	12	Certificates	-	None									
			W	2.2 factory certificate									



Abbreviations and Terms

A/F	Indicates the size of spanners width across flats
approx.	approximately
bar	Unit of measurement of pressure [bar]
	All pressure ratings [bar / psi] are referring to excess pressure [bar g / psi g] if no other data is mentioned.
barg	Unit of measurement excess pressure [bar g]
BS	British Standard
BSP	British Standard Pipe Thread
BSPT	British Standard Pipe Tapered Thread
°C	Unit of measurement of temperature [degree Celsius]
CIP	Cleaning In Place
C-PEEK	Carbon filled Polyether ether ketone
C-PTFE	Carbon filled Polytetrafluoroethylene
CS	Turbo SSB Version CS (combined shaft)
DIN	German standard issued by DIN (Deutsches Institut für Normung e.V, German Institute for Standardization)
DN	DIN nominal width
EN	European Standard
EPDM	Material designation Short designation according to DIN/ISO 1629: Ethylene Propylene Diene Rubber
GEA	GEA AG group of companies GEA stands for Global Engineering Alliance
°F	Unit of measurement of temperature [degree Fahrenheit]
FDA	U.S. Food and Drug Administration
FKM	Material designation, short designation according to DIN/ISO 1629: Fluorine rubber (Viton®)
FFKM	Material designation, short designation according to DIN/ISO 1629 Perfluoroelastomer rubber
h	Unit of measurement of time [hour]
HNBR	Material designation Short designation according to DIN/ISO 1629: Hydrogenated acrylonitrile butadiene rubber
Inch IPS	US pipe dimension Iron Pipe Size
Inch OD	Pipe dimension acc. to British standard (BS), Outside Diameter
IP	Protection class according to IEC 60529
IPS	see inch IPS
ISO	International standard issued by the International Organization for Standardization
kg	Unit of measurement of weight [kilogram]
l	Unit of measurement of volume [litre]
M	metric
max.	maximum
min.	minimum
min	Unit of measurement of time [minute]
m	Unit of measurement of length [metre]
mm	Unit of measurement of length [millimetre]
µm	Unit of measurement of length [micrometre]
NBR	Material designation, short designation according to DIN/ ISO 1629 Acryl nitrile butadine rubber (Nitrile rubber)
NPT	National Pipe Thread
PEEK	Polyether ether ketone
PP	Polypropylene
psi	Unit of measurement of pressure, pound-force per square inch, 1 psi = 6894,75 Pa (All pressure ratings [bar / psi] are referring to excess pressure [bar g / psi g] if no other data is mentioned.)
PTFE	Polytetrafluoroethylene
PVDF	Polyvinylidene flouride
Ra	Average roughness
s	Unit of measurement of time [second]
T.VIS®	Tuchenhagen Valve Information System
V AC	Volt alternating current
V DC	Volt direct current
VMQ	Slicon rubber
W	Unit of measurement of power [Watt]

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Cleaner inquiries Checklist



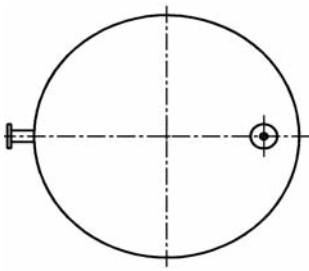
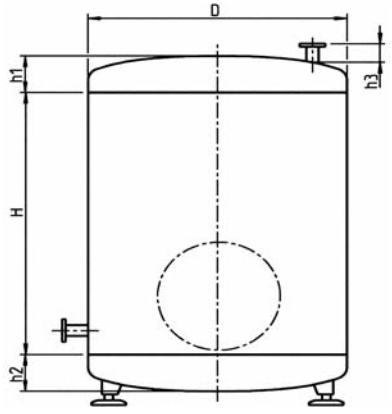
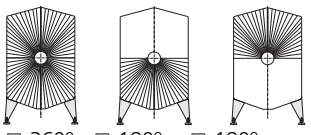
1 Company / Customer no.: _____
 Contact person: _____
 Tel.: _____ Fax: _____ E-Mail: _____

2 Project / Tag no.: _____

3 Current status

What is the current method of cleaning?	
Cleaning medium:	Estimated cleaning time:
Max. ambient temperature:	Max. medium temperature:
Competition:	

4 Characteristics of tank/item to be cleaned*

Cleaning inlets / ports	H (height)	cm
Tank <input type="checkbox"/> vertical <input type="checkbox"/> horizontal	L (length)	cm
h1 (cap) cm h2 (base) cm	D (diameter)	cm
h3 (connector fitting) cm	Side view	
<p>Top view</p> <p>Draw in any connector fittings</p> 	<p>Draw in any internal fixtures and the filling level</p> 	
<p>If a detailed drawing or sketch of the tank is available, please supply it with this inquiry.</p>		
<p>A B C</p>  <p><input type="checkbox"/> 360° <input type="checkbox"/> 180° <input type="checkbox"/> 180°</p>	<p>Fixtures: <input type="checkbox"/> Agitators/mixers <input type="checkbox"/> Scrapers <input type="checkbox"/> Heating coil</p> <p><input type="checkbox"/> Baffles <input type="checkbox"/> Measuring instruments <input type="checkbox"/> Other:</p> <p>Number of cleaners: _____ Usage: <input type="checkbox"/> Fixed <input type="checkbox"/> Mobile</p> <p>Placing of cleaners: <input type="checkbox"/> From top <input type="checkbox"/> From below (manhole)</p>	

5 General information (if known)

Type of fouling*:	<input type="checkbox"/> Water-soluble <input type="checkbox"/> Greasy <input type="checkbox"/> Encrusted
	<input type="checkbox"/> Solvent-soluble <input type="checkbox"/> Other:
Available supply pressure:	bar Volume flow rate: m ³ /h Material
Is there a filter for cleaning fluid:	<input type="checkbox"/> No <input type="checkbox"/> Yes microns
Desired mounting position:	<input type="checkbox"/> Vertical <input type="checkbox"/> Horizontal <input type="checkbox"/> Other
Certificates:	<input type="checkbox"/> FDA <input type="checkbox"/> ATEX <input type="checkbox"/> Material 3.1
Monitoring sensor:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Desired functioning (if known):	<input type="checkbox"/> Orbital (3D) <input type="checkbox"/> Rotating <input type="checkbox"/> Static

6 Comments/Other

* Mandatory fields, please complete



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GEA is a global technology company with multi-billion euro sales operations in more than 50 countries. Founded in 1881 the company is one of the largest providers of innovative equipment and process technology. GEA is listed in the STOXX® Europe 600 Index. In addition, the company is included in selected MSCI Global Sustainability Indexes.

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