



VESSEL CLEANING

	PAGE
Application Overview	55
Selection and Optimization Tips	56
CIP / WIP Solutions	58
Fixed Spray Balls	60
Fluid-Driven Rotary Nozzles	62
Regulated Fluid-Driven Rotary Nozzles	70





EFFECTIVE CLEANING FOR VIRTUALLY ANY APPLICATION

Unlike tablets or capsules intended for oral consumption, drugs manufactured through bio-processing methods are usually administered parenterally (intravenously) or by routes other than the digestive tract. The stakes are, therefore, much higher, and the risk of contamination must be reduced or eliminated at all costs – sterility and cleanability become the highest priorities. All markets in the bio-processing industry strive for some level of bioburden control (control over a biological product's level of contamination with microorganisms), the stringency of which is dependent on the type of product being processed.



SELECTION AND OPTIMIZATION TIPS

Address these factors first to identify the best tank cleaning solution for your application.

1. HYGIENIC EQUIPMENT CLEANING

- Regular and thorough cleaning of hygienic equipment is essential to maintaining bioburden control and preventing cross contamination.
- Spray device selection is critical to passing a wetting test of the internal surfaces of the hygienic equipment.
- Spray device selection is dependent on a review of the device's design and operation parameters as well as the intended process.
- Proper equipment design and spray device selection will ensure a robust cleanability potential.

2. VESSEL REVIEW

- Vessel size (volume).
- Nozzle size, total number of nozzles, location(s) on vessel.
- Internal vessel geometry and appurtenances (agitator, baffles, spargers, dip tubes, instrument wells, sample ports, etc.).
- Shadowing concerns.

3. CLEAN UTILITIES AND PROCESS REVIEW

- Clean utility capacity (gpm/lpm) at pressure (psi/bar) available.
- Chemistry employed (aqueous vs. solvent-based materials).
- Temperature (hot water or steam).
- Air blows.

4. CLEANING METHODOLOGY*

Clean in Place (CIP): Cleaning equipment left in place during product manufacture.

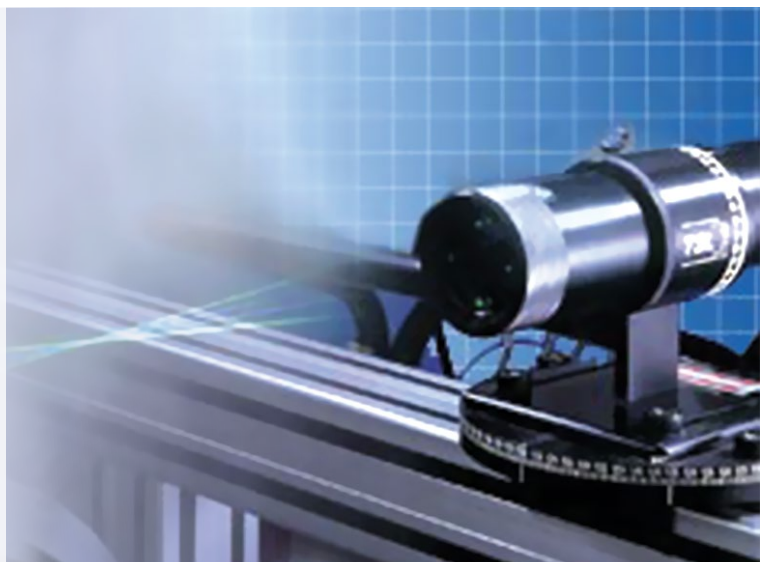
Steam in Place (SIP): Cleaning equipment left in place during the steam process and/or used to deliver the steam.

Wash in Place (WIP): Cleaning equipment removed during product manufacture. Typically not used for applications requiring a high level of bioburden control or sterile applications. Rotary spray devices and spray balls can be considered for these applications.

*Note: Applications requiring a high level of bioburden control or sterile CIP applications require equipment designed and fabricated to the ASME® BPE standard. Typically a unique keyed wand with a precision drilled spray ball is required for a successful riboflavin wetting test.

SPRAY TIP: USE SPRAY ANALYSIS TO SELECT THE RIGHT CLEANING SOLUTION

Unsure which spray device is right for you? Our Spray Analysis and Research Services team is able to provide state-of-the-art analysis of your equipment, including sophisticated CFD (Computational Fluid Dynamics) and PDI (Phase Doppler Interferometry) technology to simulate the efficacy of different spray patterns and device configurations inside a 3D model of your vessel to determine which solution is right for your application.



SELECTION AND OPTIMIZATION TIPS (CONTINUED)

Address these factors first to identify the best tank cleaning solution for your application.

5. FLOW RATE

- The ASME® BPE standard targets a flow rate of 2.5 to 3 gpm (9.4 to 11.4 lpm) per foot (0.3 m) of inner vessel circumference using a 180° up spray ball. This flow results in a turbulent sheeting action down the vessel walls.
- Consider using a lower flow rate when static or dynamic spray devices are used that have a 360° spray pattern.
- A lower flow rate of 1.9 to 2.3 gpm (7.2 to 8.7 lpm) per foot (0.3 m) of inner vessel circumference can be targeted when specifying a single-axis rotary spray device.

6. SPRAY DEVICE REVIEW

- Review external and internal surfaces for best hygienic design. Design should consider drainability and cleanability of all surfaces.
- Determine the device's materials of construction, including all subcomponents. Review for compatibility with clean utility and process solutions.
- Orifice selection and resultant spray pattern (jet, fan, etc.) ensures complete wetting of all targeted surfaces.
- Ease of device disassembly for cleaning, maintenance and inspection.
- Device connection style (e.g., clipped, butt weld) meets intended cleaning methodology.
- Cleaning equipment data package meets the owner's/end user's requirements for material test reports, surface finish certificates, welder certificates, no ADI certificates, elastomeric USP Class VI certificates, etc.

7. SPRAY IMPACT

- Rinsing targeted surfaces (numerous small orifices, low pressure).
- Cleaning targeted surfaces (fewer, larger orifices, higher pressure).
- Note: Increasing flow rate is more effective than increasing pressure. Doubling the flow rate increases impact by as much as 100%, while doubling pressure provides only 40% greater impact.



A typical vessel used for bioprocessing.

CUSTOM-FABRICATED WANDS, MANIFOLDS, AND MORE

PRODUCT OVERVIEW

Nozzles are just one part of a total cleaning solution. In addition to our entire line of customizable spray devices, we are able to design and fabricate custom wands, manifolds, and other solutions for nearly any application or process requirement. Our custom solutions can optimize spray performance, improve product quality and simplify system installation while minimizing physical changes to existing operations.

METALLIC / WELDED SOLUTIONS

- Custom CIP Lances/Wands, dip tubes, tube manifolds, spray rings and more designed and fabricated to your exact requirements
- Materials of construction: 316L stainless steel, Hastelloy®, AL6XN®, and other exotics
- Welders and weld/fabrication procedures BPVC Sect. IX compliant as required by the ASME® BPE

NON-METALLIC SOLUTIONS

- Non-metallic materials available upon request, including: Polypropylene, PVDF, PTFE and more
- Plastics and elastomers available with FDA or USP Class VI certificates
- GMP manufacturing procedures and fabrication



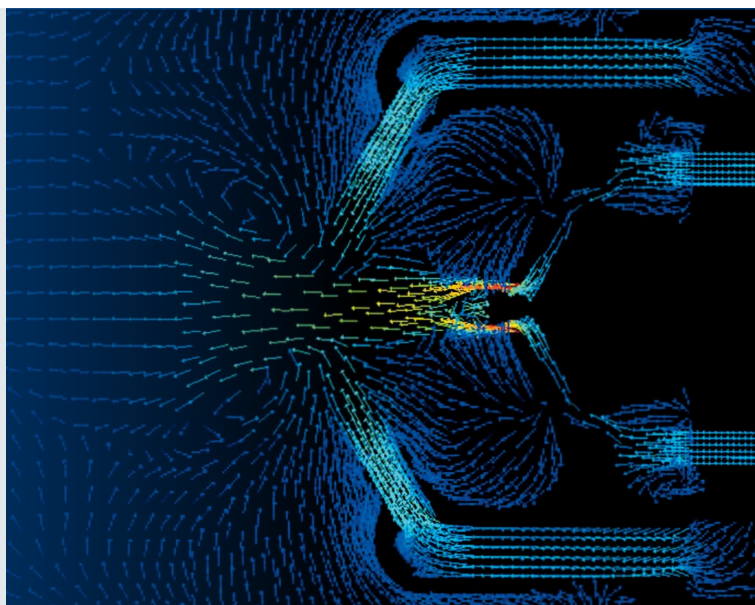
Polypropylene and
PTFE Lances

316L Spray Ball Lance

SPRAY TIP: STATE-OF-THE-ART SPRAY TESTING ENSURES SUPERIOR RESULTS

As part of our manufacturing process, our custom-welded solutions undergo rigorous testing and analysis to ensure superior results for our customers. Our sophisticated, in-house wet laboratory facilities enable us to collect and analyze complex data.

We will first work with you to develop a set of testing criteria which are relevant to your process parameters and application requirements. Once the data is collected, we are then able to generate a range of spray characterization data to allow us to determine the right solution for you. We are also able to perform wettability testing, certify calibrated flow testing, provide nozzle throw data and more per your process/acceptance requirements or requests.



BIOPHARMACEUTICAL PRECISION-DRILLED SPRAY BALLS

PRODUCT OVERVIEW

In addition to standard vessel cleaning products, we are able to provide completely customizable, precision-drilled, directionally-controlled spray ball solutions for your biopharmaceutical tank cleaning application.

DESIGN STAGE

First, a 3D solid model of your vessel, generated by our own experienced engineering group, is used to develop the directionally controlled orifice pattern to your exact specifications. The orifice pattern is then manufactured using CNC technology, ensuring that the orifice pattern is precise and repeatable.

FABRICATION STAGE

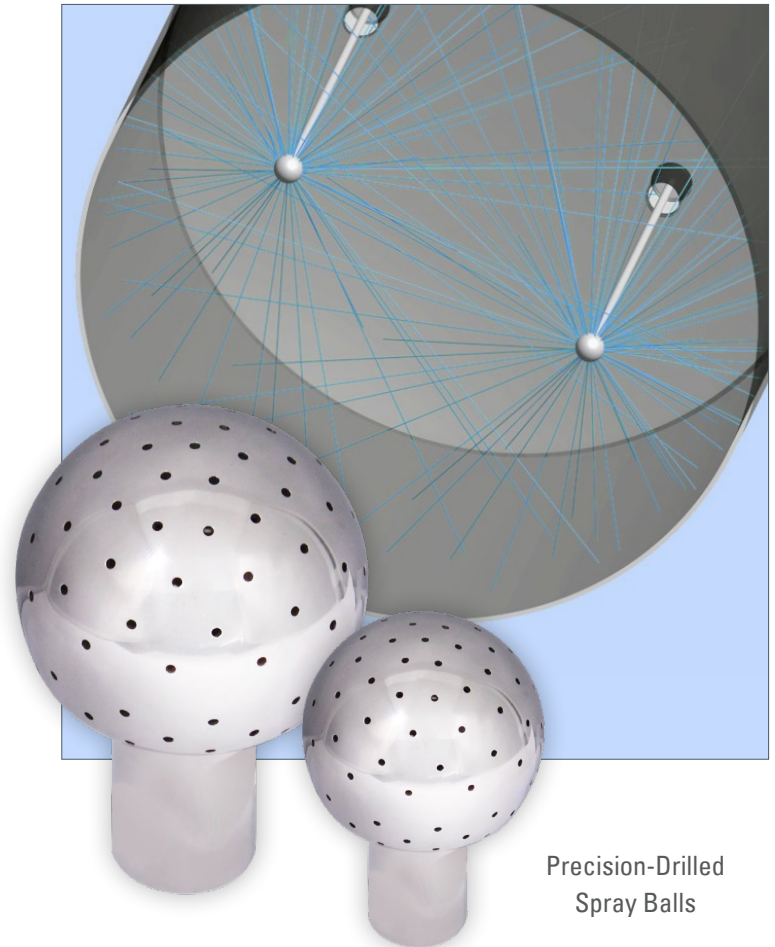
Next, our welding and manufacturing group fabricates the spray ball using procedures and welders in compliance with BPVC Sect. IX as required by ASME® BPE.

- Customer-specified surface finishes applied in-house and checked using profilometer (surface finish certification available)
- Experienced in fabricating and welding a broad range of exotic materials, including Hastelloy®, AL6XN®, and other high-nickel materials and coatings
- Any level of customer-defined positive material identification, destructive and non-destructive testing available

TURNOVER STAGE

Finally, we prepare either a standard or customer-defined turnover/data package to meet your process requirements, including (but not limited to):

- Welder/weld certification
- Material certification and material test reports (MTRs)
- Surface finish/electropolish certification
- GMP compliance



Precision-Drilled
Spray Balls



TANKJET® 63225-3A FIXED SPRAY BALLS

PRODUCT OVERVIEW

TankJet 63225-3A fixed spray balls are vessel cleaning nozzles ideal for sanitary rinsing and removal of light residues.

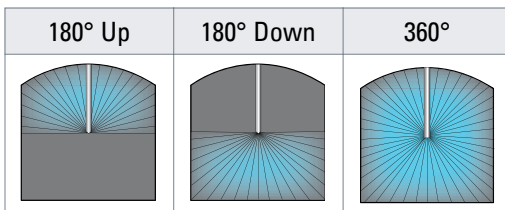
FEATURES AND BENEFITS

- Suitable for CIP – no moving parts
- Can be installed in any position
- Low-cost way to rinse easy-to-remove residues
- 316L stainless steel construction permits the use of a wide array of chemicals
- Polished 32Ra interior and exterior surface finish
- Custom drilling upon request
- Suitable for cleaning tanks up to 13' (4 m) in diameter



TankJet 63225-3A
Fixed Spray Balls

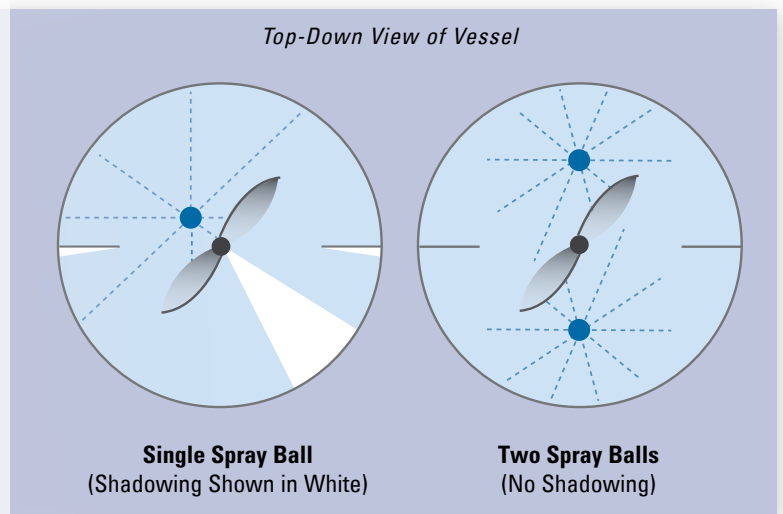
SPRAY COVERAGE



A = 180° Up, B = 180° Down, E = 360°

SPRAY TIP: ELIMINATE SHADOWING WITH MULTIPLE SPRAY NOZZLES

Obstructions in the vessel such as agitators or baffles can cause "shadowing" – areas where the spray cannot reach – greatly reducing the cleaning efficacy of a single spray ball. In these cases, two or more nozzles may be required to effectively clean the entire vessel.



DIMENSIONS – TANKJET® 63225-3A FIXED SPRAY BALLS

	Nozzle Type/Size	Inlet Tube Size A	Ball dia. B in. (mm)	C in. (mm)	D in. (mm)	E in. (mm)	Pin dia. F in. (mm)
	63225E-.75-1.5-40-3A	0.75"	1-1/2 (38.1)	2-17/32 (64.3)	3/8 (9.5)	1/4 (6.4)	9/64 (3.6)
	63225E-A-2-40-3A	1"	2 (50.8)	3-5/16 (84.1)	3/8 (9.5)	3/8 (9.5)	9/64 (3.6)
	63225A-1.5-2.5-40-3A	1.5"	2-1/2 (63.5)	4-1/4 (108)	1/4 (6.4)	3/4 (19.1)	13/64 (5.2)

PERFORMANCE DATA

Nozzle Type/Size	Capacity gpm (l/min)			Max. Tank Dia. ft. (m)
	15 psi (1.0 bar)	25 psi (1.7 bar)	40 psi (3.0 bar)	
63225E-.75-1.5-40-3A	31 (115)	40 (151)	51 (192)	10 (3.0)
63225E-A-2-40-3A	31 (115)	40 (151)	51 (192)	13 (4.0)
63225A-1.5-2.5-40-3A	31 (115)	40 (151)	51 (192)	13 (4.0)

ORDERING INFORMATION – TANKJET® 63225-3A FIXED SPRAY BALLS

To order, specify nozzle and coverage type, inlet tube size, ball diameter, and capacity.

Example

Nozzle Type	Coverage Type	Inlet Tube Size	Ball Dia.	Capacity Size	3A (Optional)
-------------	---------------	-----------------	-----------	---------------	---------------

63225 E – 0.75 1.5 – 40 – 3A

TANKJET® 30473 FLUID-DRIVEN ROTARY NOZZLES

PRODUCT OVERVIEW

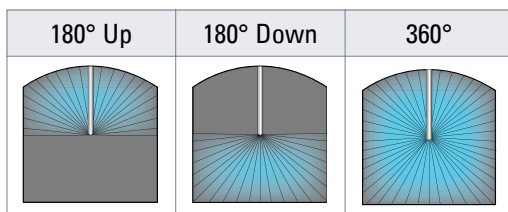
30473 Mini-Spinner Nozzles are cost-effective, fluid-driven rotary nozzles designed to effectively clean and rinse small vessels for pharmaceutical and biopharmaceutical applications.

FEATURES AND BENEFITS

- Effective cleaning and rinsing of tanks up to 3' (0.91 m) in diameter
- For low flow/pressure applications
- Self-lubricated with cleaning fluid and self-draining
- Rotating spray head can be easily removed for inspection and maintenance
- USP Class VI components are manufactured using material stock produced with USP Class VI resins; available with USP Class VI Viton O-ring
- Data package includes material test reports for 316L stainless materials

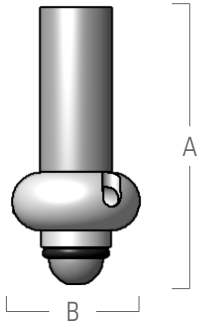


SPRAY COVERAGE



A = 180° Up, B = 180° Down, E = 360°

DIMENSIONS – TANKJET® 30473 FLUID-DRIVEN ROTARY NOZZLES

	Nozzle No.	A	B Dia.	Weight
	30473-1/4-TEF	1.75 in (44.4 mm)	.87 in (22 mm)	0.5 oz
	30473-3/8-316STF	1.90 in (48.3 mm)	.87 in (22 mm)	1.7 oz
	30473-BW	1.90 in (48.3 mm)	.87 in (22 mm)	1.0 oz

PERFORMANCE DATA

Capacity gpm					Capacity l/min				
10 psi	20 psi	30 psi	40 psi	50 psi	0.7 bar	1.5 bar	2.0 bar	3.0 bar	3.4 bar
2.1	2.9	3.5	4.0	4.5	7.8	11.3	13.0	15.0	17.0

ORDERING INFORMATION – TANKJET® 30473 FLUID-DRIVEN ROTARY NOZZLES

To order, specify nozzle type, spray pattern, inlet connection, and material code (see configuration options).

Example

Inlet Type*	Nozzle Type	Spray Coverage	Conn. Type	Material Code
—	30473	B	BW	SSTEF6

*Add B for BSPT connections, leave blank for NPT connections

CONFIGURATION OPTIONS

Non-Metallic	TEF (TEFLON) <i>or</i> TEFUSP (USP Class VI TEFLON)
Metallic/ Non-Metallic	316STF (316SS / TEFLON) <i>or</i> SSTEF6 (316L / USP Class VI Teflon)

Material Code
TEF= TEFLON®
TEFUSP= USP Class VI TEFLON®
316SS= 316 stainless steel
316L= 316L stainless steel

TANKJET® 28500 FLUID-DRIVEN ROTARY NOZZLES

PRODUCT OVERVIEW

TankJet 28500 fluid-driven tank cleaning nozzles are constructed of durable, non-metallic materials and are ideal for use in CIP systems as well as other sanitary vessel cleaning applications.

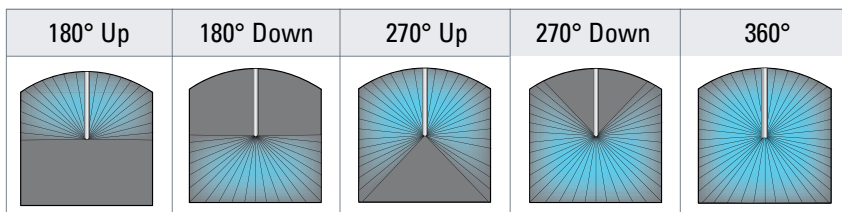
FEATURES AND BENEFITS

- Ideal for cleaning tanks, vessels and containers up to 18' (5.5 m) in diameter
- Threadless and tapered design promotes self-draining to prevent nozzle build-up
- Conforms to 3A sanitary standard 78-01 for spray cleaning devices to remain in place
- 28500R has a rotating spray head that can be removed from the body for inspection and maintenance
- Materials of construction meet FDA 21CFR177.1550 and 3-A Standard 20



TankJet 28500
Fluid-Driven Rotary Nozzles

SPRAY COVERAGE



A = 180° Up, B = 180° Down, C = 270° Up, D = 270° Down, E = 360°

DIMENSIONS — TANKJET® 28500 FLUID-DRIVEN ROTARY NOZZLES

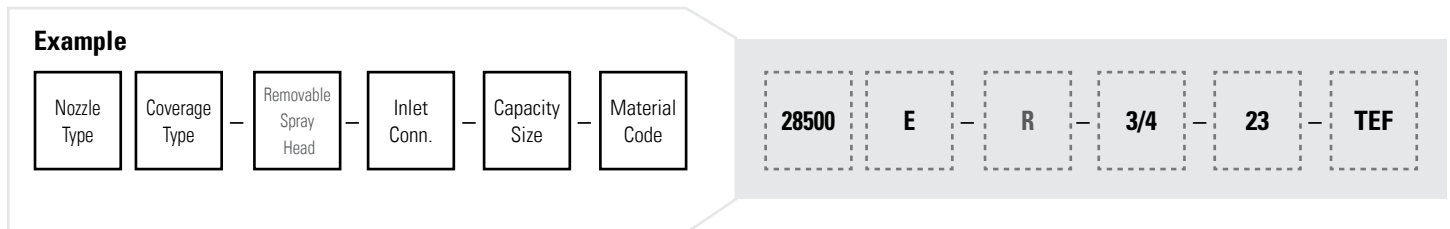
	Nozzle Inlet ID	Inlet Dia.	X Dia.	Y	Z
	3/4"-8	.76"	1.94 (49.3)	2.50 (63.5)	0.375 (9.5)
	3/4"	.76"	2.25 (57.2)	2.625 (66.6)	0.375 (9.5)
	DN20	22.2 mm	2.25 (57.2)	2.625 (66.6)	0.375 (9.5)
	1"	1.02"	2.75 (69.8)	2.875 (73.0)	0.5 (12.7)
	DN25	28.2 mm	2.75 (69.8)	2.875 (73.0)	0.5 (12.7)
	1-1/2"	1.52"	3.625 (92.0)	3.625 (92.0)	0.75 (19.0)
	DN40	40.2 mm	3.625 (92.0)	3.625 (92.0)	0.75 (19.0)

PERFORMANCE DATA

Nozzle No.	Orifice Dia. in. (mm)	Capacity gpm (l/min)				
		10 psi (0.7 bar)	20 psi (1.5 bar)	30 psi (2 bar)	40 psi (3 bar)	50 psi (3.5 bar)
28500 (A - E)-3/4-8-TEF	0.093 (2.4)	4.0 (15.1)	5.7 (21.6)	6.9 (26.1)	8.0 (30.3)	8.9 (33.7)
28500 (A - E)-3/4-18-TEF	0.089 (2.3)	9.0 (34.0)	12.7 (50.0)	15.6 (58.0)	18.0 (71.0)	20.1 (77)
28500 (A - E)-DN20-18-TEF	0.089 (2.3)	9.0 (34.0)	12.7 (50.0)	15.6 (58.0)	18.0 (71.0)	20.1 (77)
28500 (A - E)-3/4-23-TEF	0.110 (2.8)	11.5 (44.0)	16.3 (60.0)	19.9 (74.0)	23.0 (91.0)	26.0 (99.0)
28500 (A - E)-DN20-23-TEF	0.110 (2.8)	11.5 (44.0)	16.3 (60.0)	19.9 (74.0)	23.0 (91.0)	26.0 (99.0)
28500 (A - E)-3/4-32-TEF	0.154 (3.9)	16.0 (61.0)	22.6 (89.0)	27.7 (103.0)	32.0 (126.0)	35.8 (136.0)
28500 (A - E)-DN20-32-TEF	0.154 (3.9)	16.0 (61.0)	22.6 (89.0)	27.7 (103.0)	32.0 (126.0)	35.8 (136.0)
28500 (A - E)-3/4-46-TEF	0.257 (6.5)	23.0 (88.0)	32.5 (128.0)	39.8 (148.0)	46.0 (181.0)	51.4 (196.0)
28500 (A - E)-DN20-46-TEF	0.257 (6.5)	23.0 (88.0)	32.5 (128.0)	39.8 (148.0)	46.0 (181.0)	51.4 (196.0)
28500 (A - E)-1-33-TEF	0.152 (3.9)	16.5 (63.0)	23.0 (92.0)	29.0 (106.0)	33.0 (131.0)	37.0 (141.0)
28500 (A - E)-DN25-33-TEF	0.152 (3.9)	16.5 (63.0)	23.0 (92.0)	29.0 (106.0)	33.0 (131.0)	37.0 (141.0)
28500 (A - E)-1-50-TEF	0.209 (5.3)	25.0 (95.0)	35.4 (140.0)	43.3 (161.0)	50.0 (197.0)	55.9 (213.0)
28500 (A - E)-DN25-50-TEF	0.209 (5.3)	25.0 (95.0)	35.4 (140.0)	43.3 (161.0)	50.0 (197.0)	55.9 (213.0)
28500 (A - E)-1-70-TEF	0.266 (6.8)	35.0 (133.0)	49.5 (195.0)	60.6 (226.0)	70.0 (276.0)	78.3 (298.0)
28500 (A - E)-DN25-70-TEF	0.266 (6.8)	35.0 (133.0)	49.5 (195.0)	60.6 (226.0)	70.0 (276.0)	78.3 (298.0)
28500 (A - E)-1-1/2-53-TEF	0.201 (5.1)	27.0 (101.0)	37.0 (148.0)	46.0 (171.0)	53.0 (209.0)	59.0 (226.0)
28500 (A - E)-DN40-53-TEF	0.201 (5.1)	27.0 (101.0)	37.0 (148.0)	46.0 (171.0)	53.0 (209.0)	59.0 (226.0)
28500 (A - E)-1-1/2-70-TEF	0.266 (6.8)	35.0 (132.0)	49.0 (185.0)	61.0 (231.0)	70.0 (265.0)	78.0 (295.0)
28500 (A - E)-DN40-70-TEF	0.266 (6.8)	35.0 (132.0)	49.0 (185.0)	61.0 (231.0)	70.0 (265.0)	78.0 (295.0)

ORDERING INFORMATION — TANKJET® 28500 FLUID-DRIVEN ROTARY NOZZLES

To order, specify nozzle and coverage type, R for removable spray head (optional), inlet connection, and capacity size.



INTEGRATED LANCES AVAILABLE

The 28500 is also available as an integrated PTFE wand for CIP applications.



REVOJET® FLUID-DRIVEN ROTARY NOZZLE

PRODUCT OVERVIEW

RevoJet® rotary vessel cleaning nozzles provide high-impact, low volume cleaning of large vessels and reactors with difficult-to-remove residues.

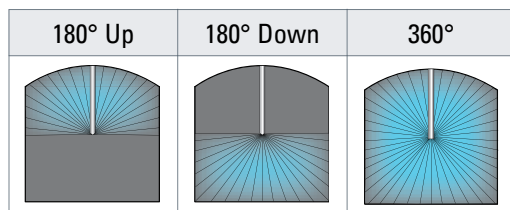
FEATURES AND BENEFITS

- Liquid-driven rotary nozzle device uses proprietary internal turbine geometry to ensure consistent rotation
- Eight capacity sizes to match performance to vessel size
- Available in NPT and BSPT, can be quoted with slip-joint connection
- Materials of construction: 316SS with PEEK bearings
- #300 electropolished exterior surfaces



RevoJet Fluid-Driven Rotary Nozzle

SPRAY COVERAGE




A = 180° Up, B = 180° Down, E = 360°

SPRAY TIP: CHOOSE FROM EIGHT DIFFERENT SIZES TO SUIT ANY APPLICATION

Available in eight different capacity sizes and three spray patterns, the RevoJet fluid-driven rotary nozzle is a versatile solution for many different hygienic vessel cleaning and CIP applications.



DIMENSIONS — REVOJET® FLUID-DRIVEN ROTARY NOZZLES

	Nozzle Number/ Capacity Size	Pipe Conn. in. (mm)	A in. (mm)	B in. (mm)
	ECRV-316SS1.7	.125 (3.2)	.63 (16)	1.50 (38)
	ECRV-316SS2.9	.125 (3.2)	.79 (20)	2.09 (53)
	ECRV-316SS4.5	.25 (6.4)	.98 (25)	2.68 (68)
	ECRV-316SS6.9	.375 (9.5)	1.18 (30)	3.82 (97)
	ECRV-316SS9.2	.375 (9.5)	1.18 (30)	4.53 (115)
	ECRV-316SS15	.5 (12.7)	1.63 (41.5)	4.84 (123)
	ECRV-316SS32	.75 (19.1)	2.36 (60)	5.47 (139)
	ECRV-316SS44	1.0 (25.4)	2.95 (75)	6.42 (163)

PERFORMANCE DATA

Pressure	GPM (LPM)							
	Capacity 1.7	Capacity 2.9	Capacity 4.5	Capacity 6.9	Capacity 9.2	Capacity 15	Capacity 32	Capacity 44
14.5 (1.0)	1.3 (4.9)	1.9 (7.5)	2.1 (8.0)	4.8 (18.0)	6.2 (23.5)	10.6 (40.0)	22.2 (84.0)	31.7 (120)
29.0 (2.0)	1.7 (6.5)	2.8 (10.5)	4.5 (17.2)	6.9 (26.0)	8.9 (34.0)	15.5 (58.5)	32.5 (123)	44.4 (168)
43.5 (3.0)	2.1 (8.0)	3.4 (13.0)	5.8 (22.0)	8.0 (30.5)	10.8 (41.0)	19.0 (72.0)	37.8 (143)	53.6 (203)
58.0 (4.0)	2.4 (9.0)	3.9 (15.0)	6.5 (25.0)	9.2 (35.0)	12.7 (48.0)	21.1 (80.0)	43.9 (166)	62.9 (238)
72.5 (5.0)	2.6 (10.0)	4.4 (16.5)	7.4 (28.0)	10.2 (38.5)	14.0 (53.0)	24.3 (92.0)	48.1 (182)	69.2 (262)
87.0 (6.0)	3.0 (11.5)	4.8 (18.0)	8.0 (30.5)	11.2 (42.5)	15.5 (58.5)	26.4 (100)	53.1 (202)	76.1 (288)
102 (7.0)	3.2 (12.0)	5.2 (19.5)	8.7 (33.0)	12.0 (44.5)	16.6 (63.0)	28.5 (108)	58.1 (220)	82.4 (312)
116 (8.0)	3.4 (13.0)	5.5 (21.0)	9.4 (35.5)	12.9 (49.0)	17.7 (67.0)	31.2 (118)	62.1 (235)	88.5 (335)
131 (9.0)	3.7 (14.0)	5.8 (22.0)	9.9 (37.5)	13.7 (52.0)	18.8 (71.0)	31.7 (120)	65.5 (248)	93.8 (355)
145 (10.0)	3.8 (14.5)	6.3 (24.0)	10.4 (39.5)	14.4 (54.5)	19.8 (75.0)	34.3 (130)	68.7 (260)	98.5 (373)

ORDERING INFORMATION — REVOJET® FLUID-DRIVEN ROTARY NOZZLES

To order, specify nozzle type, pinned or threaded connection, materials, spray coverage, and capacity.

Example

Blank=NPT B=BSPT	Nozzle Type	Conn. Type*	Material Code	Coverage Type	Capacity Size
---------------------	----------------	----------------	------------------	------------------	------------------

*Blank = threaded, P = pinned

— ECRV — P — 316SS — B — 4.5

TANKJET® 14 & TANKJET® 19 FLUID-DRIVEN ROTARY NOZZLES

PRODUCT OVERVIEW

TankJet 14 fluid-driven tank cleaning nozzles are dynamic, rotary devices which provide more efficient cleaning than comparable, static spray balls for tanks up to 12' (3.6m) in diameter.

TankJet 19 fluid-driven tank cleaning nozzles are dynamic, rotary devices with a slim, sleek design ideal for cleaning tanks with small openings or ports.

FEATURES AND BENEFITS

- Similar design and appearance to static spray balls; unit rotates to ensure effective impingement of cleaning solution on tank walls (TankJet 14 only)
- Solid stream pattern provides full coverage (TankJet 14 only)
- Spray head is easily removed for inspection and maintenance (TankJet 14 only)
- Fits in tank openings as small as 2" (51mm) with 7/8" (22mm) probe for even smaller openings (TankJet 19 only)
- Sleek design helps prevent residue buildup and simplifies maintenance (TankJet 19 only)
- Carefully drilled solid stream orifices are strategically placed to provide four different spray coverages (TankJet 19 only)
- Mount vertically, horizontally or at an angle (TankJet 19 only)
- Fluid-driven unit rotates at slow speeds – 3 to 15 rpm – for increased dwell time on tank surface compared to free-spinning units (TankJet 14 and 19)
- Suitable for CIP or portable installation (TankJet 14 and 19)
- Made of 316 stainless steel and PTFE materials (TankJet 14 and 19)

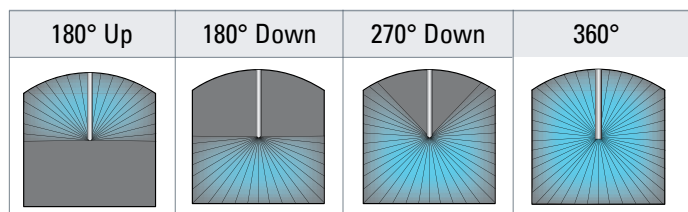


TankJet 14
Fluid-Driven Rotary Nozzle



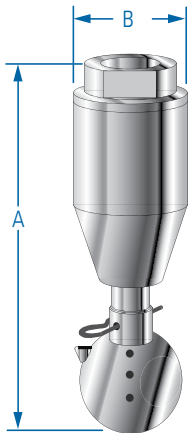
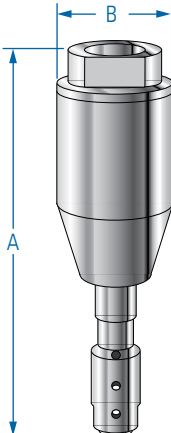
TankJet 19
Fluid-Driven Rotary Nozzle

SPRAY COVERAGE



A = 180° Up, B = 180° Down, D = 270° Down, E = 360°

DIMENSIONS – TANKJET® 14 & TANKJET® 19 FLUID-DRIVEN ROTARY NOZZLES

TankJet 14		TankJet 19		Nozzle Type	A in. (mm)	B in. (mm)
						
				TankJet 19	6.65 (169)	1.97 (50)

PERFORMANCE DATA

Model No.	Spray Coverage	Capacity gpm (l/min)								
		50 psi (3.4 bar)	70 psi (4.8 bar)	90 psi (6.2 bar)	100 psi (6.9 bar)	120 psi (8.3 bar)	140 psi (9.7 bar)	160 psi (11.0 bar)	180 psi (12.4 bar)	200 psi (13.8 bar)
TJ-14	D	13.0 (49.0)	16.0 (61.0)	18.0 (68.0)	19.5 (74.0)	21.0 (79.0)	23.0 (87.0)	25.0 (93.0)	27.0 (100)	28.0 (106)
	A, B	16.0 (61.0)	18.5 (70.0)	21.0 (79.0)	23.0 (87.0)	24 (91.0)	26.0 (98.0)	28.0 (106)	30.0 (114)	32.0 (121)
	E	17.0 (64.0)	19.5 (74.0)	22.0 (83.0)	25.0 (93.0)	26.0 (98.0)	28.0 (104)	30.0 (112)	32.0 (121)	34.0 (129)
TJ-19	A	10.0 (38.0)	13.0 (49.0)	15.0 (57.0)	16.0 (61.0)	18.0 (68.0)	19.5 (74.0)	21.0 (79.0)	22.5 (85.0)	24.0 (91.0)
	B	12.0 (45.0)	14.0 (53.0)	16.5 (62.0)	17.5 (66.0)	19.0 (72.0)	21.0 (79.0)	22.5 (85.0)	24.0 (91.0)	26.0 (98.0)
	D	16.0 (61.0)	18.0 (68.0)	20.0 (76.0)	21.0 (79.0)	22.5 (85.0)	24.0 (91.0)	26.0 (98.0)	27.5 (104)	28.5 (108)
	E	17.0 (64.0)	19.0 (72.0)	21.0 (79.0)	22.0 (83.0)	24.0 (91.0)	25.5 (97.0)	27.5 (104)	29.0 (110)	30.0 (114)

ORDERING INFORMATION – TANKJET® 14 & TANKJET® 19 FLUID-DRIVEN ROTARY NOZZLES

To order, specify model number, inlet connection type and spray coverage.

Example

Model Number	–	Inlet Type*	–	Coverage Type
TJ14	–	—	–	E

TANKJET® D41800E REGULATED FLUID-DRIVEN ROTARY NOZZLE

PRODUCT OVERVIEW

The TankJet D41800E is a regulated, liquid-driven rotary nozzle. Its hygienic three-piece design uses patented, self-flushing liquid hydraulic bearings, eliminating the need for traditional bearings with races and reducing the downtime required for cleaning and maintenance.

FEATURES AND BENEFITS

- Cleans, rinses and sanitizes medium-size tanks up to 12' (3.7 m) in diameter
- Material of construction is 316L, clip material is 316SS
- Operating pressure range: 30 psi (2 Bar) to 174 psi (12 Bar), maximum operating temperature: 300° F (150° C)
- Internal and external surface finish is 20µ in. Ra (0.5 micron) with electropolish
- Operates within a narrow speed range (2-30 rpm) over its entire operating pressure range
- The increase in impact of up to four times higher than a conventional rotating nozzle means cleaning efficiency is improved through minimized fluid consumption
- USP Class VI EPDM O-ring available



TankJet D41800E Regulated
Fluid-Driven Rotary Nozzle

SPRAY TIP: USE LARGER CAPACITY SIZES FOR HIGHER-IMPACT CLEANING IN CIP/WIP SYSTEMS

The MiniRokon™ regulated fluid-driven nozzle is available in four capacity sizes and is ideally suited for CIP/WIP applications with stringent cleaning requirements.



DIMENSIONS — TANKJET® D41800E FLUID-DRIVEN ROTARY NOZZLES

	Nozzle Type	Inlet Conn.	A in. (mm)	B dia. in. (mm)	C dia. in. (mm)	D dia. in. (mm)	Weight lbs. (kg)
	D41800E	0.75"	3.22 (81.8)	1-3/16 (30.0)	0.85 (22.0)	0.94 (2.4)	0.28 (0.13)
		DN19	3-7/32 (82.0)	1-3/16 (30.0)	27/32 (21.0)	.094 (2.4)	0.29 (0.13)

PERFORMANCE DATA

Capacity Size	Capacity gpm (l/min)				
	30 psi (2 bar)	40 psi (3 bar)	100 psi (5 bar)	150 psi (10 bar)	230 psi (16 bar)
3.2	2.9 (10.8)	3.5 (14.0)	5.3 (17.0)	6.5 (24.0)	7.9 (30.0)
4.5	4.0 (15.1)	4.8 (19.0)	7.5 (24.0)	9.1 (34.0)	11.3 (43.0)
9.9	8.8 (33.2)	10.1 (40.0)	16.1 (52.0)	19.7 (73.0)	24.0 (93.0)
13.6	12.1 (45.7)	14.0 (55.0)	22.0 (71.0)	27.0 (101.0)	34.0 (128.0)

ORDERING INFORMATION — TANKJET® D41800E FLUID-DRIVEN ROTARY NOZZLES

To order, specify nozzle type, inlet connection, and capacity.

Example

Nozzle Type	Material Code	Capacity Size	Conn. Type	O-Ring
-------------	---------------	---------------	------------	--------

D41800 -
 316L -
 9.9 -
 SJ -
 FDA

DATA PACKAGE AVAILABLE

We are able to supply the following documentation as part of a data package:

- Material test reports in conformance with EN10204 Type 3.1
- Certificates of conformance for surface finish and electropolish
- Certificate of conformance for FDA EPDM O-Ring

Material Code
316L= 316L stainless steel