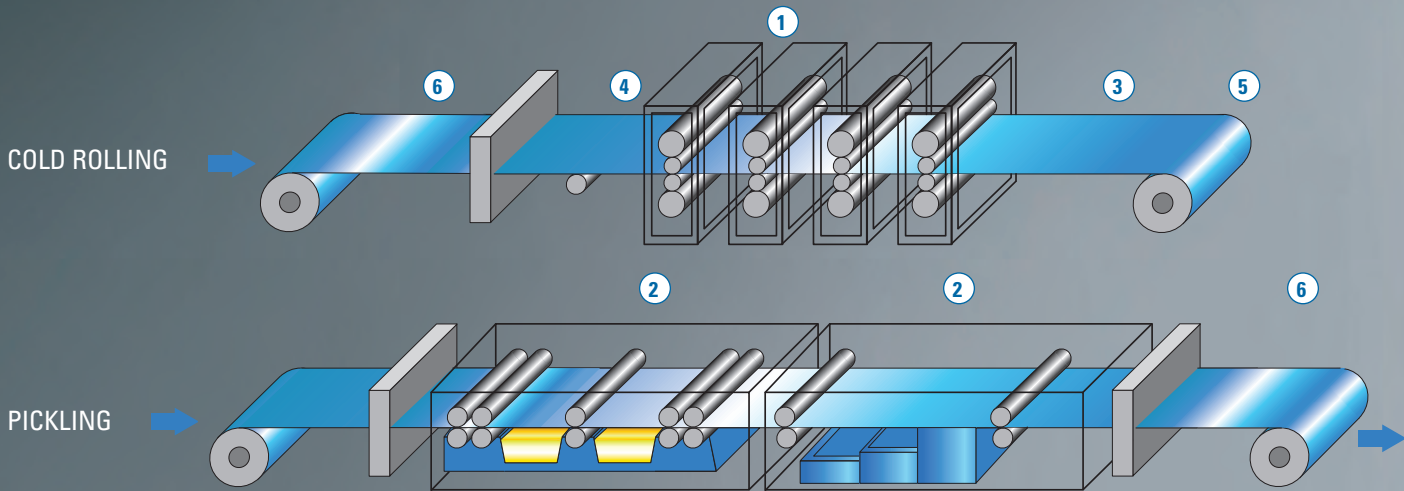


SOLUTIONS FOR COLD ROLLING MILLS

WASHING • RINSING • DRYING
OILING • ROLL COOLING
LUBRICATING • COATING



COLD ROLLING MILLS
INTRODUCTION



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ROLL COOLING	PICKLING AND RINSING	BLOW OFF AND DRYING	LUBRICATION	OILING	WASHING AND RINSING	DEGREASING AND QUENCHING
VeeJet® nozzles and headers	PVDF VeeJet nozzles and headers	WindJet® nozzles Air headers	Automatic and air atomizing nozzles	AccuOil™ system PulsaJet® nozzles VeeJet nozzles	FlatJet® nozzles FloodJet® nozzles VeeJet nozzles	VeeJet nozzles Brush headers

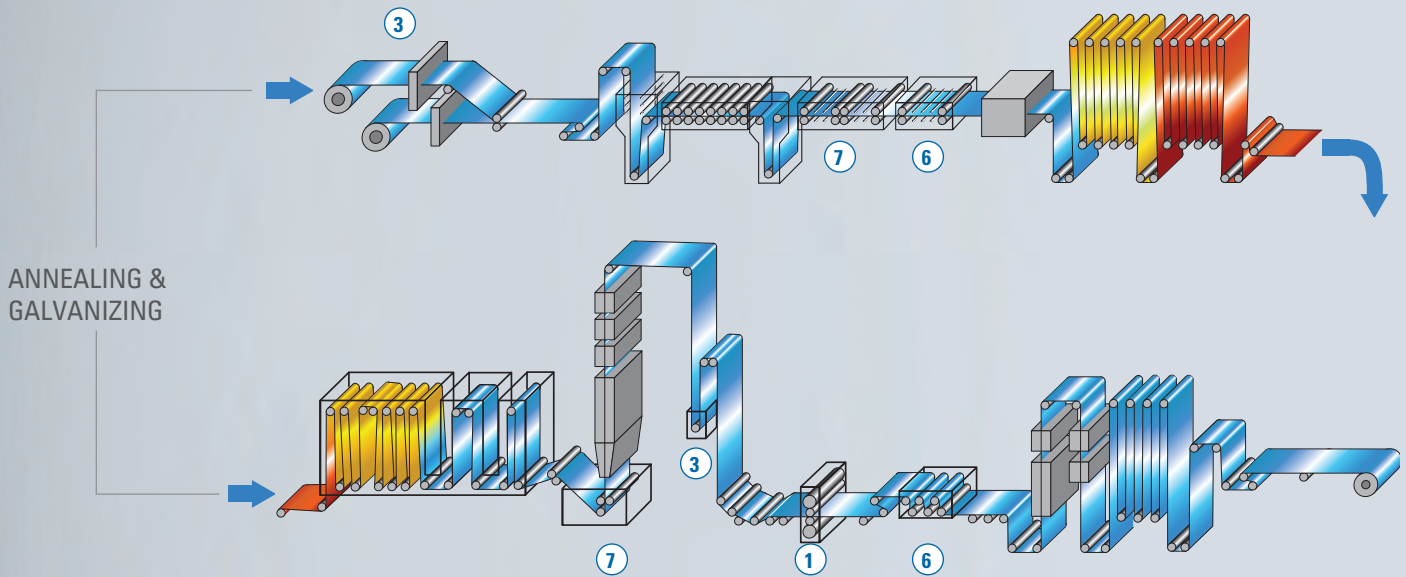
SPRAY TECHNOLOGY FOR ALL THE PROCESSES IN YOUR COLD ROLLING MILL

No matter what you need to wash, rinse, lubricate, cool or dry, Spraying Systems Co. has the ideal nozzle for your application. We offer hydraulic and air atomizing nozzles in a thousands of styles and sizes. Our VeeJet flat spray nozzles and headers are widely used in pickling, annealing and galvanizing operations and are available in acid- and corrosion-resistant plastics in addition to metal materials.

For oiling, zinc dip, galvanizing, soft quenching and more, consider our PulsaJet automatic spray nozzles. These unique nozzles provide superior spray performance and can help eliminate common quality problems. PulsaJet nozzles are part of our AccuOil system, which can dramatically reduce over-application of oil on strip, even when line speed changes. Our WindJet product line is ideal for drying and blow-off throughout your mill. Choose from headers and nozzles that use compressed air or air knife packages powered by energy-efficient regenerative blowers.

Contact your local steel specialist for a no-charge consultation to see how we can assist with process optimization and product selection.

**COLD ROLLING MILLS
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FLAT SPRAY NOZZLES

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Flat spray headers	D6 ▶	CONTACT LOCAL STEEL SPECIALIST ▶	

AUTOMATIC AND AIR ATOMIZING NOZZLES

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**MORE FULL CONE NOZZLES:
SEE SECTIONS B AND C**

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**MORE FLAT SPRAY NOZZLES:
SEE SECTIONS B AND C**



OVERVIEW: VEEJET® NOZZLES

- Flat spray nozzles are ideal for use in spray headers or manifolds, producing a fan-type, tapered-edge spray pattern to ensure even coverage when multiple nozzles are used in a series
- One-piece design
- Spray angles from 0° to 110°
- Uniform spray distribution with flow rates from .012 to 1237 gpm (.047 to 4720 lpm)
- Operating pressures up to 500 psi (35 bar)
- Ideal for use in pickling, annealing, galvanizing and rolling operations

VEEJET NOZZLE OPTIONS



H-VV and H-VVL

1/8" to 1/4" male conn.
Flow rates below 1 gpm at 40 psi (3.8 lpm at 2.8 bar)
H-VVL includes integral strainer



H-DT

1/8" to 1/4" female conn.
Flow rates below 1 gpm at 40 psi (3.8 lpm at 2.8 bar)



H-DU

1/8" to 1/4" female conn.
Flow rates of 1 gpm and greater at 40 psi (3.8 lpm and greater at 2.8 bar)



U

1" to 2" male conn.
Flow rates of 40 gpm and greater at 40 psi (151 lpm and greater at 2.8 bar)



H-U

1/8" to 3/4" male conn.
Flow rates of 1 gpm and greater at 40 psi (3.8 lpm and greater at 2.8 bar)

VEEJET NOZZLE QUICK REFERENCE GUIDE

Model	Connection/Type	Connection Size (in.)	Materials
H-VV	M	1/8 to 1/4	Brass, mild steel, 303 stainless steel, 316 stainless steel, PVDF
H-VVL	M	1/8 to 1/4	Brass, 303 stainless steel, 316 stainless steel
H-DT	F	1/8 to 1/4	Brass, 303 stainless steel
H-DU	F	1/8 to 1/4	Brass, 303 stainless steel, polyvinyl chloride
U	M	1 to 2	Brass, mild steel, 303 stainless steel
H-U	M	1/8 to 3/4	Brass, mild steel, 303 stainless steel, 316 stainless steel, polyvinyl chloride, PVDF

F = female thread; M = male thread.

PLACING YOUR ORDER

Call your local steel specialist for application assistance or to place an order.

FOR DETAILED NOZZLE PERFORMANCE DATA, SEE PERFORMANCE SECTION G



OVERVIEW: DOVETAIL SPRAY TIPS

- Flat fan spray pattern; widely use in spray headers
- Dovetail groove feature provides repeatable pattern positioning without an elastomeric seal
- Self-aligning, interchangeable spray tip slides into the groove in the nozzle body ensuring exact alignment every time the nozzle is reassembled
- Ideal for use in pickling, annealing, galvanizing and rolling operations

DOVETAIL SPRAY TIP OPTIONS



18897 and FSUN-S
dovetail spray tips



20799
dovetail spray tip

DOVETAIL SPRAY TIP QUICK REFERENCE GUIDE

Model	Connection/Type	Offset Angle	Flow Rate gpm (lpm)	Spray Angle	Materials
18897	Dovetail tip; threaded and weld body options	0°, 5°, 15°, 30°, 45° and 60°	1.0 to 44 (3.2 to 144)	15° to 110° at 40 psi (3 bar)	Brass, 303 stainless steel, hardened stainless steel, PVDF
FSUN-S	Dovetail tip; threaded and weld body options	0°, 5°, 15°	.06 to 109.7 (.2 to 353.6)	20° to 120° at 72 psi (5 bar)	Brass, 303 stainless steel, 316 stainless steel, PVDF
20799	Dovetail tip; threaded and weld body options	15°	.63 to 45 (2.0 to 144)	120° at 40 psi (3 bar)	Brass, stainless steel, hardened stainless steel

PLACING YOUR ORDER

Call your local steel specialist for application assistance or to place an order.

FOR DETAILED NOZZLE PERFORMANCE DATA, SEE PERFORMANCE SECTION G



OVERVIEW: UNIJET® NOZZLES

- UniJet quick-connect nozzles reduce maintenance time – bodies remain on pipe/header
- Save on nozzle replacement costs – bodies can be reused, only spray tips are replaced; tips fit on male or female bodies
- Produce a uniform distribution at flow rates up to 7 gpm (28 lpm) at 40 psi (2.8 bar); spray angles available from 15° to 110°
- Ideal for use in pickling, annealing, galvanizing and rolling operations

UNIJET NOZZLE OPTIONS



TPU spray tip



13802 spray tip

Self-aligning tip with wrench flats on top of tip; straight alignment flats connection



14784 spray tip

Self-aligning tip

UNIJET NOZZLE QUICK REFERENCE GUIDE

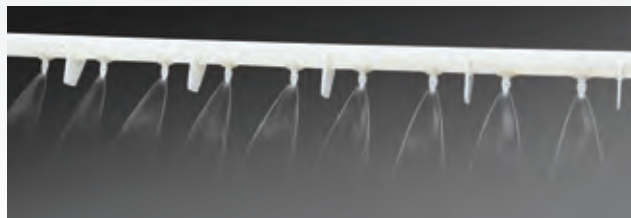
Model	Connection/Type	Materials
TPU	T male and TT female body options	Brass, 303 stainless steel
13802	T male and TT female body options	
14784	M	

F = female thread; M = male thread.

PVDF AND PVC VEEJET® HEADERS

OVERVIEW:

VeeJet nozzles are available in PVDF and PVC for operations such as pickling lines that require an acid wash. Built-to-order spray headers are also available in PVC and PVDF for corrosion-resistance. Plastic headers can be reinforced with steel to prevent sagging.



PLACING YOUR ORDER

Call your local steel specialist for application assistance or to place an order.

FOR DETAILED NOZZLE PERFORMANCE DATA, SEE PERFORMANCE SECTION G



OVERVIEW: ELECTRICALLY-ACTUATED PULSAJET® HYDRAULIC AND AIR ATOMIZING NOZZLES

- Hydraulic atomizing PulsaJet nozzles use only liquid pressure as the force for atomization; air atomizing PulsaJet nozzles use liquid mixed with compressed air as the atomization force
- Dozens of UniJet® spray tips and air atomizing spray set-ups are available for PulsaJet nozzles in a wide variety of flow rates and spray patterns
- When using a PulsaJet series nozzle and an AutoJet® spray controller, Precision Spray Control (PSC) is achieved:
 - Consistent application rates at varying line speeds
 - Low flow rates comparable to air atomizing nozzles for possible elimination of compressed air in some operations
- Ideal for oiling, zinc dip, galvanizing, soft quenching and more

ELECTRICALLY-ACTUATED PULSAJET HYDRAULIC NOZZLE OPTIONS



AA10000AUH-03
 Typical flow range:
 0.0017 - 0.47 gpm (0.006 - 1.8 lpm)
 Stainless steel, Viton® or EPDM seals, PPS and PEEK
 Up to 15,000 cycles per min
 Zone 1 use version also available



AA10000AUH-10
 Typical flow range:
 0.02 - 1.6 gpm (0.075 - 6.1 lpm)
 Stainless steel, Viton or EPDM seals, PPS and PEEK
 Up to 5,000 cycles per min



AA10000AUH-104210
 Rear liquid inlet
 Typical flow range:
 0.0017 - 0.47 gpm (0.006 - 1.8 lpm)
 Stainless steel, Viton or EPDM seals, PPS and PEEK
 Up to 15,000 cycles per min
 Side liquid inlet version for low profile mounting also available



AA10000AUH-104215
 Front port for liquid recirculation
 Typical flow range:
 0.0017 - 0.47 gpm (0.006 - 1.8 lpm)
 Stainless steel, Viton or EPDM seals, PPS and PEEK
 Up to 15,000 cycles per min



AA10000AUH-72440-1/4
 Jacketed design keeps nozzle and sprayed liquid at a consistent temperature
 Typical flow range:
 0.0017 - 0.47 gpm (0.006 - 1.8 lpm)
 Electropolished or chromium nitride coated magnetic stainless steel, stainless steel, Viton or EPDM seals, PPS and PEEK
 Up to 15,000 cycles per min



AA10000AUH-0050
 Miniature design for applications with limited space
 Typical flow range:
 0.0009 - 0.08 gpm (0.003 - 0.30 lpm)
 Stainless steel, Viton or EPDM seals, PPS and PEEK Available only as a part of the PulsaJet Mini Low Flow Spray System (with AutoJet spray controller)

PLACING YOUR ORDER

Call your local steel specialist for application assistance or to place an order.

FOR DETAILED NOZZLE PERFORMANCE DATA, SEE AUTOMATIC & AIR ATOMIZING C76



ELECTRICALLY-ACTUATED PULSAJET® AIR ATOMIZING NOZZLE OPTIONS



AA10000JJAU

Flow rates up to 0.16 gpm (0.61 lpm)
Stainless steel, PPS and PEEK construction with Viton® or EPDM seals
Up to 10,000 cycles per min



AA10000JAU-10

Flow rates up to 0.75 gpm (2.84 lpm)
Stainless steel, PPS and PEEK construction with Viton or EPDM seals
Up to 5,000 cycles per min

ELECTRICALLY-ACTUATED PULSAJET HYDRAULIC NOZZLE QUICK REFERENCE GUIDE

Model	Connection Size (in.)	Max Liquid Pressure psi (bar)	Power VDC (Amp)	Max Flow gpm (lpm)	Max Temp Liquid °F (°C)	Max Speed cpm	Spray Tips
AA10000AUH-03	1/8	100 (7)* 250 (17) (250 w/ AutoJet® 2008+ spray controller)	24 (0.36)	0.47 (1.8)	200 (93)	10,000 (15,000 with AutoJet 2008+ controller)	TPU
AA10000AUH-10	1/8	100 (7)	24 (1.05)	1.6 (6.1)	150 (66)	5,000	TPU
AA10000AUH-104210	1/8	100 (7)	24 (0.36)	0.47 (1.8)	200 (93)	10,000 (15,000 with AutoJet 2008+ controller)	PWMD w/ auto spray pattern alignment
AA10000AUH-104215	1/8	100 (7)	24 (0.36)	0.47 (1.8)	200 (93)	10,000 (15,000 with AutoJet 2008+ controller)	PWMD w/ auto spray pattern alignment
AA10000AUH-72440-1/4	1/4	100 (7)* 250 (17) (250 w/ AutoJet 2008+ spray controller)	48 (0.36)	0.47 (1.8)	150 (66)	10,000 (15,000 with AutoJet 2008+ controller)	TPU
AA10000AUH-0050	5/32 (4mm) tube fittings	200 (14)	48 (1.0)	0.08 (0.30)	150 (66)	25,000	PWMD w/ auto spray alignment pattern

*Higher pressure possible with AutoJet 2008+ spray controller.

ELECTRICALLY-ACTUATED PULSAJET AIR ATOMIZING NOZZLE QUICK REFERENCE GUIDE

Model	Connection Size (in.)	Max Liquid Pressure psi (bar)	Power VDC (Amp)	Max Air Pressure psi (bar)	Max Flow gpm (lpm)	Max Temp Liquid °F (°C)	Max Speed cpm	Spray Set-Ups
AA10000JJAU	1/8 (air and liquid)	100 (7) 250 (17) (w/ AutoJet 2008+ spray controller)	24 (0.36)	100 (7)	0.16 (0.61)	200 (93)	10,000	JJ set-ups
AA10000JAU-10	1/8 (air and liquid)	100 (7)	24 (1.05)	100 (7)	0.75 (2.84)	200 (93)	5000	Threadless 1/4J set-ups



OVERVIEW: AIR-ACTUATED AUTOMATIC AIR ATOMIZING NOZZLES

- Compressed air is used to control air cylinder operation for accurate intermittent spraying (up to 180 cycles per minute) and also for liquid atomization
- Wide variety of nozzle bodies is available for convenient mounting and positioning
- Models available with clean-out needles, shut-off needles, swivels and strainers to optimize performance
- Liquid lines can be pressure-fed, siphon-fed or gravity-fed
- Spray set-ups consisting of an air cap and a fluid cap can mix the fluids either internally or externally to produce a fine spray pattern
- Dozens of Drip Free™ air atomizing spray set-ups available for a wide range of flow capacity and spray patterns
- Ideal for zinc dip, galvanizing, soft quenching and more

AIR-ACTUATED AUTOMATIC AIR ATOMIZING NOZZLE OPTIONS



1/4JAU

Flow rates up to 1.2 gpm (4.5 lpm)
Drip Free spray set-ups provide complete shut-off
Nickel-plated brass or stainless steel



10535-1/4J

Self-contained air cylinder provides controlled intermittent spraying
Drip Free spray set-ups provide complete shut-off
Nickel-plated brass or stainless steel



D55500-JAU

Block design 30% smaller than standard 1/4JAU
Drip Free spray set-ups provide complete shut-off
Stainless steel

AIR-ACTUATED AUTOMATIC AIR ATOMIZING NOZZLE QUICK REFERENCE GUIDE

Model	Connection Size (in.)	Max Liquid Pressure psi (bar)	Min Air Cylinder Pressure psi (bar)	Max Flow gpm (lpm)	Max Temp Liquid °F (°C)	Max Speed cpm	Spray Set-Ups
1/4JAU	1/4 (air and liquid)	125 (8.6)	30 (2.1)	1.2 (4.5)	400 (204)	180	1/4J set-ups
10535-1/4J	1/4 (air and liquid)	125 (8.6)	30 (2.1)	1.2 (4.5)	400 (204) liquid 150 (66) air	180	1/4J set-ups
D55500-JAU	1/8 (air and liquid)	43 (3)	72 (5)	0.42 (1.6)	158 (70)	600	1/4J or DSU set-ups



OVERVIEW: J AND JJ SERIES AIR ATOMIZING NOZZLES

- Liquid and compressed air enter the nozzle body and are mixed by the spray set-up to produce a finely atomized spray pattern
- Spray set-ups, consisting of an air cap and a fluid cap, can mix the fluids either internally or externally
- Hundreds of spray set-ups are available to produce cone and flat spray patterns
- A wide variety of nozzle bodies are available for convenient mounting and positioning
- JJ compact nozzle bodies are available for applications where space is limited
- Models available with clean-out needles, shut-off needles swivels and strainers to optimize performance
- Ideal for zinc dip, galvanizing, soft quenching and more

J AND JJ SERIES AIR ATOMIZING NOZZLE OPTIONS



1/8J and 1/4J nozzles

Flow rates up to 72 gph (273 lph)
Liquid and air inlets on opposing sides
Removable plug so needle assemblies can be added
Nickel-plated brass or stainless steel



1/8JJ series nozzles

Compact version of 1/4J
Flow rates up to 33 gph (126 lph) in various spray patterns
Liquid and air inlets on opposing sides
Removable plug so needle assemblies can be added
Nickel-plated brass or stainless steel

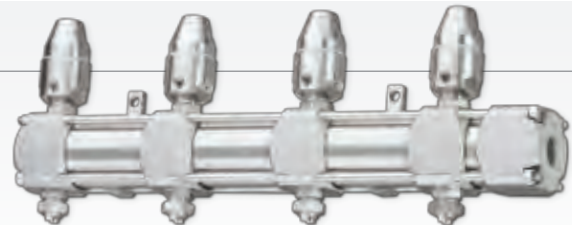
AIR ATOMIZING NOZZLE QUICK REFERENCE GUIDE

Model	Connection Size (in.)	Max Flow gph (lph)	Max Temp Liquid °F (°C)	Spray Set-Ups
1/8J and 1/4J	1/8 to 1/4	72 (273)	400 (204)	1/8J and 1/4J set-ups
1/8JJ	1/8	33.2 (126)	400 (204)	1/8JJ set-ups

AUTOMATIC AND AIR ATOMIZING NOZZLE HEADERS

OVERVIEW:

Headers equipped with automatic hydraulic or air atomizing nozzles are ideal for applications requiring zone control. A PLC equipped with AutoJet® precision spray control drivers automatically adjust sprays as needed to accommodate multiple strip widths. For air atomizing nozzles, options include block-style and standard headers.



Block manifold



63600 manifold

WINDJET® AIR KNIFE PACKAGES**OVERVIEW:**

- Powered by a rugged, regenerative blower; no compressed air required. Costs can be reduced by 95% or more
- A uniform high volume, constant heated air stream is produced along the entire edge of the knife eliminating spotting problems
- Low operating noise
- Large application area
- Packages are customized based on application
- Use when velocity is needed or the oil in compressed air is causing quality problems
- Knife lengths of 6", 12", 18", 24", 30" and 36" (152, 305, 457, 610, 762 and 914 mm)
- Air slot sizes of .040" and .060" (1 and 1.5 mm)
- Aluminum and 316 stainless steel material options
- Blower assemblies: 5.5, 10, 20, 25 and 30 Hp (4.1, 7.5, 14.9, 18.6, 22.3 kW). Include pressure relief valve, pressure gauge, air inlet filter, filter monitoring gauge, fittings, mounting adapter for flexible or rigid tubing
- Ideal for drying cut sheet and rolls and debris removal



Regenerative blower assemblies available in wide range of horsepower and air knife lengths

PLACING YOUR ORDER

Call your local steel specialist for application assistance or to place an order.

FOR DETAILED NOZZLE PERFORMANCE DATA, SEE WINDJET® AIR PROJECTS C20

WINDJET® COMPRESSED AIR NOZZLES

OVERVIEW:

- Economical alternative to drilled pipe
 - Air nozzles use compressed air use 25% to 35% less air than open pipe
 - Low flow air knives use 89% to 92% less air than open pipe
 - Air amplifiers use 75% to 90% less air than open pipe
- Perceived noise reductions ranging from 28% to 60% less than open pipe
- Improved worker safety
- AA727 nozzles produce controlled flat fan air pattern for uniform distribution
- AA707 nozzles produce tightly directed round spray pattern and feature color-coded aluminum caps for easy flow rate identification
- Y767 nozzles feature a short profile – less than half the height of the AA727
- Ideal for drying cut sheet and rolls and debris removal



AA727 WindJet nozzles
1/4" male or female conn.
Polyphenylene sulfide, aluminum, ABS plastic or 303 stainless steel



AA707 WindJet nozzles
1/4" male conn.
Polyphenylene sulfide, PVDF, aluminum, ABS plastic or 303 stainless steel



Y767 Compact WindJet Nozzles
1/4" male conn.
ABS plastic or 303 stainless steel

WINDJET COMPRESSED AIR LOW FLOW AIR KNIVES AND AIR AMPLIFIERS

OVERVIEW:

- Low flow air knives provide a uniform, high velocity air flow across the entire length of the knife with no temperature increase
- Air amplifiers deliver a targeted high-volume, high velocity amplified air stream



WindJet low flow air knives
3", 6", 12", 18" and 24"
(8, 15, 30, 46 and 61 cm) lengths
Aluminum or 316 stainless steel
Shim sets available to adjust air force and flow

WindJet air amplifiers
1/8" to 1/2" female conn.
Aluminum and 316 stainless steel material options

UNIJET® AIR NOZZLES

OVERVIEW:

- Blow-off spray tips specifically designed for use with air and steam to deliver a wide, uniform spray



UniJet blow-off nozzle
1/8" to 3/8" conn.
Brass or 303 stainless steel

LU-VK AIR NOZZLES

OVERVIEW:

- Round high-performance, multi-orifice air nozzle
- One-piece, compact design is well-suited for use in confined areas



LU-VK air nozzle
1/2" to 3/4" female conn.
Brass or 303 stainless steel

AIR NOZZLE HEADERS

OVERVIEW:

WindJet air nozzles can be mounted on a header to ensure uniform coverage of the target area. Standard manifolds are available with 4 to 30 nozzles. Impact can be increased from moderate to very high with a simple operating pressure adjustment.

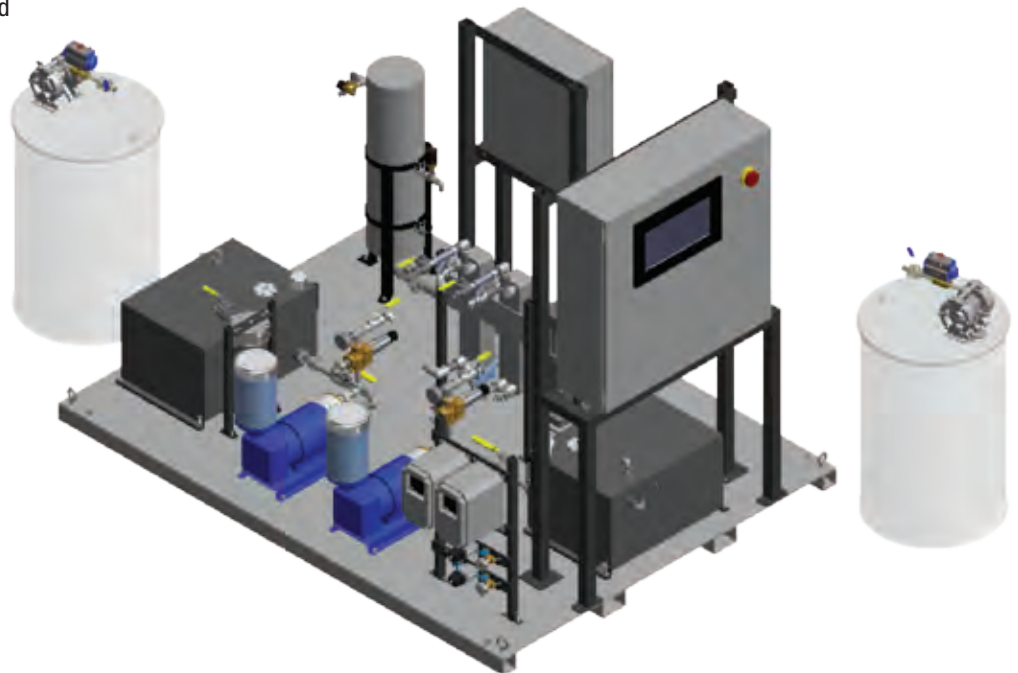


ACCUOIL™ SYSTEM**OVERVIEW:**

The AccuOil system enables precise, uniform application of oil on strip and reduces waste and quality problems. The system uses Precision Spray Control (PSC) to ensure the proper volume of oil is applied consistently, even when line speed changes and sheet width varies. Electrically-actuated hydraulic PulsaJet® nozzles mounted on headers and are controlled by a PLC equipped with AutoJet® PSC drivers. The need for compressed air is eliminated and only the nozzles required to cover the strip width are activated to spray, eliminating oil waste and hazardous overspray.

BENEFITS:

- Reduced scrap – uniform coverage across the entire strip eliminates scrap and costly rework
- Consistent application even when line speed changes
- Lower operating costs – reduces oil consumption, eliminates compressed air
- Reduced maintenance time – reduces messy, dangerous oil to remove from equipment and floors
- Flexible configurations – choose from heated versions with recirculating header and non-heated systems with standard header. Both versions are available with one or two channels
- Ideal for cold and temper mills

**PLACING YOUR ORDER**

Call your local steel specialist for application assistance or to place an order.

FOR DETAILED SYSTEM DATA, SEE PERFORMANCE SECTION G

SPRAY HEADERS

OVERVIEW:

Spray headers are available for a wide range of operations including cooling, cleaning strip before galvanizing and high-pressure rinsing in pickling operations. Headers are built-to-order to optimize nozzle performance and easily integrate into existing lines.

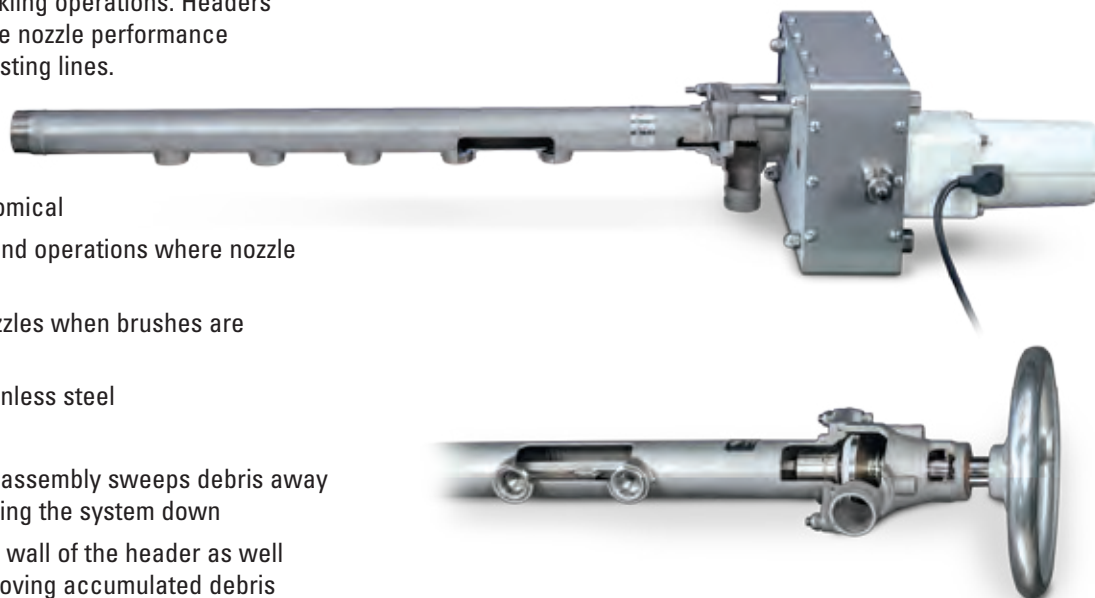
BENEFITS:

Brushless headers

- Basic, effective and economical
- For use with fresh water and operations where nozzle clogging is unlikely
- Use with self-cleaning nozzles when brushes are not desirable
- Available in PVDF and stainless steel

Brush headers

- An internal rotating brush assembly sweeps debris away from nozzles without shutting the system down
- Brushes scrub the interior wall of the header as well as the nozzle orifices, removing accumulated debris in a matter of seconds
- Debris is discharged through a flush-out valve
- Manually-operated brush headers use a handwheel for brush rotation
- Automatic spray headers are equipped with geared drive unit, smart motor and optional timer control



SLIT LAMINAR FLOW HEADERS

OVERVIEW:

The ultra-thin, uniform, continuous sheet of water or air produced by our laminar flow headers improves cleaning and drying in a wide range of operations and provides operating flexibility.

BENEFITS:

- Vertical sheet of liquid or air can be sprayed upward or downward
- Slit widths from .004" to .06" (.1 to 1.6 mm)
- Lengths from 2" to 118" (50 to 3000 mm)
- Flow rate range: 2 to 350 gpm (8.5 to 1325 lpm)
- Dual function operation works with both water and air, eliminating the need for two separate systems
- 304 or 316 stainless steel, PVC or CPVC

