BETE

NOZZLES FOR PULP & PAPERMAKING

Manual No. 104, PP
Choosing the Best Nozzles

Let BETE Help You Choose the Best Shower Nozzles and Spray Heads for Your Pulp and Papermaking Processes

Experience is the best teacher. Bete Fog Nozzle, Inc. has earned the reputation as the leader in Design Engineering of spray nozzles throughout the Pulp & Papermaking Process.

Why? Because we take the time and listen. Then we act!

BETE has complete in-house Design, Testing, and Manufacturing capabilities (including investment Cast Foundry), so turn around time from Design to Installation is controlled. Whether it's a new application or a replacement, BETE is able to recommend or furnish virtually any material. More than likely we will have "done it before".

A sampling of examples of BETE nozzles for specific applications are:

Pulp Mill
- Dabarking - NF
- DustControl - TF, TFXP, L, MP, and PJ
- Washing & Moistening Logs - NF, SPN

Wood Room
- Pulp Washing - MP
- Pulp Bleaching

Wet End Fourdriner
- Head Box
- Foam Control
- White Water
- Cleaning: Wire, Felts, Dandy Rolls

Finishing & Converting
- Humidification
- and...

Heat Recovery
Odor Control
Air Pollution

Cooling Ponds
Water Pollution

More than 65% of BETE's production is devoted to nozzles custom designed for application specific customer requests. Combine your process experience with our shower nozzle expertise today.

Call BETE and find out about the expertise that makes a difference... the BETE Difference.

The nozzles shown in this brochure are described in detail in Catalog 104 (available in metric 104.1M, and 4-language 104.4M.)
### Pulp Mill and Wood Room

#### Pulp Mill

**Debarking**
- **NF Fan showers**
  - High impact spray can run at (up to 1000 psi)
  - Constructed from one piece with no internals to clog

**Dust Control**
- **TF, TFXP, L, PJ showers**
  - Fine atomization, wide coverage for controlling dust at pulp piles and hoppers
- **MP Whirl showers**
  - Handles stringy lumpy liquids especially well
  - **Premier performer in white water service**

#### Washing Mud From Logs, Groundwood Stone Washing

- **NF or SPN Fan showers**
  - One-piece clog-resistant construction
- **SPN**
  - Yields higher flow rate at same pressure compared with the NF series
  - Highest impact shower with least atomization
  - Requires different mounting orientation than NF

#### Moistening Logs

- **WT, WTX, WTZ, or WL showers**
  - Produce wide spray coverage, coarse atomization with small quantities of water
  - **WT, WTX and WTZ are right angle types**
  - **WT and WTX hollow cone, available with large emitting angles (greater coverage) and a range of flow rates**
  - **WTZ and WL produce full cone, uniform spray patterns**

#### Wood Room

**Pulp Washing**
- **MP showers**
  - Unique, patented S-shaped vane easily handles difficult, lumpy, stringy, white water
  - Highly energy efficient and reliable
  - Full cone pattern excellent for leveling pulp in blow pit

**Pulp Bleaching**
- **NF and FF Fan showers**
  - Uniform high and medium impact showers with moderate flow rates for cost efficient coverage
**Paper Making**

**Wet End, Fourdrinier**

**WT, WL, NF, PSR, EZ**

**FF, SPN, CLUMP, LEM**

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**Wet End, Fourdrinier**

**Headbox, Foam Control, and White Water**

**WT, WTX, or WL showers**
- Large emitting angles, low flow rates maximize coverage, minimize water use

**WT and WTX**
- Right angle designs with hollow cone patterns
- No internals, recommended for very lumpy white water, greater clog-resistance

**WL**
- Mounts in-line, full cone pattern with slightly greater water requirements

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**Broke Chest**

**RTW, CLUMP or LEM nozzles**
- Tank, vat washing nozzles

**RTW**
- Self-powered rotary nozzle with high impact flat fan tips, covers entire surface

**LEM, CLUMP**
- Stationary 360° rinsing and washing nozzles
- LEM has spiral high atomization tips, CLUMP has MP clog-resistant tips

**Fourdrinier, Cleaning Wires, Felts, Suction and Dandy rolls**

**NF, SPN, FF, EZ-Change Fans or PSR straight stream shower nozzles.**

**NF, SPN, FF or EZ**
- High impact, 0° - 145° angles available for precise cleaning overlap of wires and felts
- Vaneless design

**NF 0° and PSR**
- Exceptionally hard driving jet, ideal for cleaning Dandy rolls and caked wires

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**SPN**
- Deflected shower spray ideal for directing at difficult locations

**PSR**
- Smallest mounting clearance with inverted orifice

**EZ-Change**
- Interchangeable tips enabling easy variation of setups and reduced maintenance
**Press Section**

**MP** large free-passage nozzles
- Unique, S-shaped vane easily handles lumpy liquid
- Full cone, medium flow rate and impact provides excellent uniform deluge coverage
- 3/8" - 4" male or female pipe sizes

**TH** hollow cone nozzle
- Vaneless design utilizes less water than the MP but produces a coarser shower spray

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**Dry End**

**XA Air Atomizing nozzles**
- Excellent for profiling the web
- Produce extremely fine atomization for humidification and remoistening

**Finishing and Converting**

**XA Air Atomizing series and PJ Impingement series** produce fine mists with low water consumption

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**XA Air Atomizing nozzle**
- Available with siphon, gravity, or pressurized liquid feed
- Automatic cylinders can be changed out without tools - a real boon in tight locations
- Interchangeable caps for variable spray effects and quick replacement

**PJ Impingement nozzle**
- Direct pressure nozzle
- One-piece compact design: excellent choice for humidification when compressed air is not available
- Available with mesh filters

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**Ideal for spraying laminates, glue and photographic coatings**

**Automatic XAs are ideal for high speed intermittent fluid applications**
Heat Recovery

MP, TH and THW are the nozzles of choice for maximizing heat recovery for your mill.

- MP nozzles
  - High energy efficiency
  - Easily handles white water and recirculated water with superior clog-resistance
  - 30° - 120° provides wide coverage

TH and THW Whirl
- Large free passage
- THW-Wide, even spray band
- Right angle design
- Flange connection available

Cooling Ponds

TFXP, TF, TH and MP nozzles

- Greater surface area spray; fine atomization for maximum gas-to-liquid transfer and heat reduction
- Excellent Free-Passage

TH
- Coarser atomization than TF’s and TFXP’s

MP
- Excellent for lumpy liquids, provides medium atomization

Odor Control

L Spiral, PJ Impingement, and XA, SA Air Atomizing nozzles

- Generate extremely fine atomization for injecting deodorants in open tower mist reactors at flow rates under 2 gpm

SA
- Generate fine droplets at higher flow rates (between 1 and 20 gpm)

L Spiral
- This direct pressure nozzle produces a slightly greater drop size than XA, SA, or PJ

PJ Impingement
- Direct pressure nozzles produce a finely atomized mist at lower flow rates than the L

Water Pollution

Settlement Ponds

FF, NF and MP for wall wash and sludge removal from ponds

FF and NF
- Driving, medium and high-impact, wide fan sprays - move sludge off walls and floor and into removal drains

MP
- Full cone pattern, medium impact, used for wall wash
**Foam Control**

MP, WL, TFXP and FF nozzles for controlling foam in settling basins, below weirs and spillways
- Require low pumping pressure and produce moderate-to-high flow rates.

MP
- Handles lumpy white water best, TFXP is also a good choice

FF
- High impact and wide spray angle make it excellent for perimeter weir foam control

**Aeration**

TF, TFXP and MP nozzles provide optimum performance in wastewater aeration in meeting EPA oxygen content requirements
- All provide superior clog-resistance

TF and TFXP
- Provide best atomization and turbulence

**Air Pollution**

BETE leading in nozzle design for pollution control and denoxification.

Quencher, Pre-Scrubber and Absorber nozzles
- TF, TFXP, ST, STXP or L nozzles
- Produce the best atomization and clog-resistance

MP
- Uniformly distributed spray

TH
- Right angle mounting

SA
- Two-fluid high flow air atomizers with superior atomization

**Mist Eliminator**

Nozzles keep mist eliminator blades clean and maintain high mist removal efficiencies.

WL
- Excellent low flow, wide coverage nozzle

SC Whirl nozzle
- Effective for higher flow rates

MP Whirl
- Best in high or low flow rates when particulates are present in the spray water