



# BETE<sup>®</sup>

NOZZLES FOR CHEMICAL PROCESSING

Manual 106.2CP





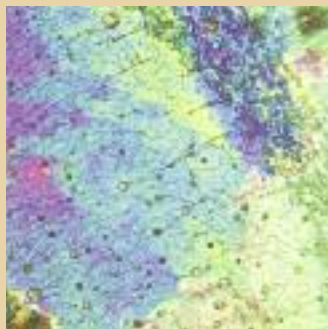
## Choosing the Best Nozzles

**BETE innovations provide solutions to problems encountered with traditional nozzle designs.**

Choosing the correct nozzle for your chemical processing application is critical. BETE's experience as the creator of the original spiral nozzle has put us in the unique position of understanding the best methods of producing very finely atomized spray.

When we design a nozzle, we begin by understanding what specific spray atomization characteristics are necessary for a particular chemical process to succeed. We then engineer a nozzle that performs to those characteristics. It is this understanding of what your chemical process requires that makes BETE the manufacturer to call.

BETE was the first nozzle manufacturer to achieve and maintain ISO 9001 certification. BETE innovations have provided solutions to problems encountered with traditional nozzle designs. Our pioneering spray laboratory is routinely commissioned to test and develop new designs. BETE's in-house casting facility gives us the ability to quickly manufacture special designs for any spraying challenge.



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

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

## For Your Chemical Process

**Gas Conditioning/Humidification:** Maximizing gas-liquid contact is the primary concern, nozzle selection focuses on the atomization and drop size characteristics of the spray nozzle design.

**Air Atomizing, Spiral, and Impingement** nozzle designs are usually recommended. *See page 4.*

**Distribution/ Mixing:** The nozzle characteristics of greatest interest for distributing and mixing should be flow rate and a non-clogging design. **Whirl** nozzles are most commonly used. *See page 5.*

**Pollution Control:** There are many areas of pollution control. A brief summary is given here; for greater detail refer to BETE's "High Efficiency Nozzles for Pollution Control" brochure. **Air Atomizing, Spiral and Whirl** nozzle designs are often specified. *See page 6.*

**Evaporative Cooling:** The nozzle design characteristics with the greatest effect in cooling processes are spray atomization, spray density, and spray pattern. **Air Atomizing, Spiral, and Impingement** nozzles are most commonly used. *See page 7.*

If your processing needs are not listed, please contact our Applications Engineering Department for help from our knowledgeable engineers.



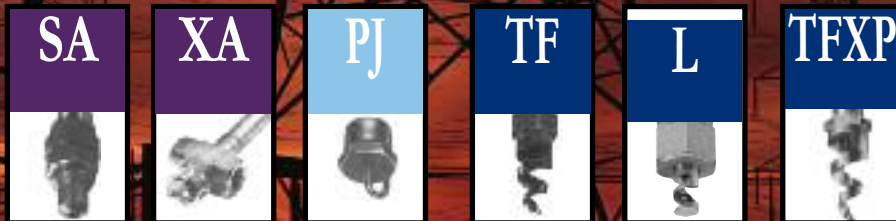
**Is the nozzle you are using better at straining liquids than atomizing them?**

**If you're finding that solids in your recirculated water tend to collect in your spray nozzles, you're probably using the wrong nozzle. BETE has the most effective clog-resistant nozzle designs available: the MaxiPass™ maximum free-passage nozzle and the TFXP.**



# Gas Conditioning, Humidification

## Drying Kilns, Curing Rooms, Electro-static Precipitators



BETE nozzles are frequently used to control static electricity in processing lines. BETE's superior drip-resistant air atomizing nozzles easily humidify ducts, kilns, and curing rooms. When air lines are not available, use BETE direct-pressure impingement nozzles. At higher flow rates, when clogging is a problem, or when greater coverage is needed, spiral nozzles may be used.

### FF Flat Fan

- Deflected flat fan sprays ideal for directing spray at difficult spraying locations
- High impact 0° - 145° angles available for overlap
- Clog-resistant construction
- Wide, flat band of spray excellent for oxygenating
- Good nozzle for wall wash, moving sludge into drains

### IS Specialty

- Specialty fan design produces a rectangular pattern when mounted in pairs.
- Lower-to-moderate flow rates 0.5 to 164 gpm (1.89 to 621 L/min) per pair
- Pattern widths of 18" to 120" (46mm to 3048mm) can be achieved
- Excellent for horticultural bed spraying and waste water treatment
- Good distribution with pressures as low as 0.5 PSI (0.035 BAR)

### L Spiral

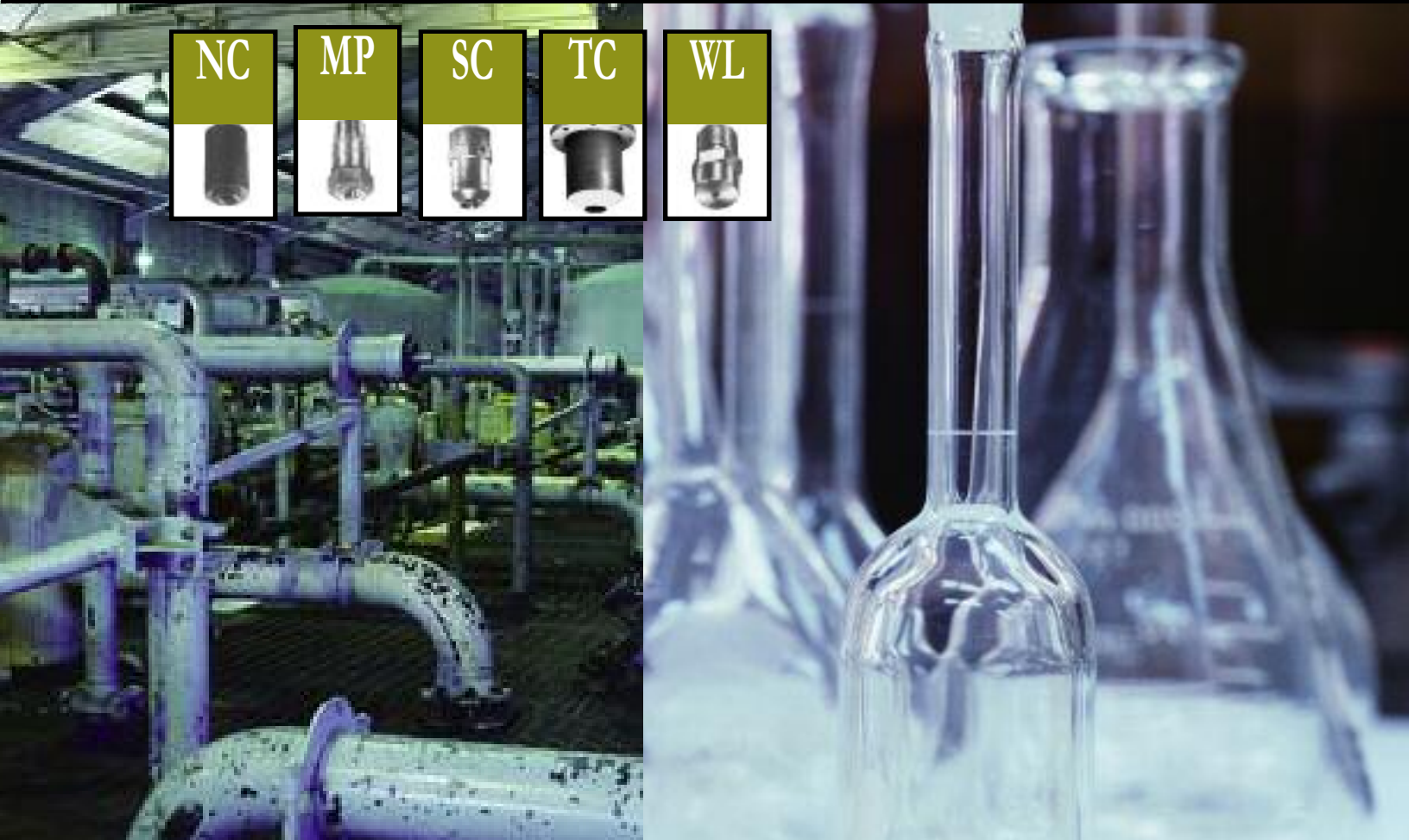
- A series of low flow spiral nozzles with flow rates 0.14 to 3.84 gpm (0.53 to 14.5 L/min)
- Very fine hollow cone fog

### MP MaxiPass™ Whirl

- Ultimate in clog-resistant, full cone whirl design
- Unique, patented, S-shaped vanes provide largest free passage of any full cone nozzle
- Uniformly distributed spray.
- High reliability under extreme conditions

# Distribution, Mixing

## Distribute Liquids on Packing, Horticultural Beds, Mixing



NC



MP



SC



TC



WL



BETE's nozzles are designed to handle many types of mixing and distribution, including FCCU feed distribution nozzles, distributing liquids onto packed beds or mixing chemical compounds. Distribution nozzles usually feature wide spray angles, high through-put, medium-to-coarse atomization, and moderate operating pressures. BETE has many unique designs specially developed for these applications.

### NC and SC Whirl

- Full cone nozzles available in a variety of plastic (**NC**), or metals (**SC**)
- Large range of flow rates including very high flow rates, 2 to 2150 gpm (7.6 to 8137 L/min)
- Also available with square patterns (**NCSQ**, **SCSQ**)
- 60°, 90°, and 120° spray angles available
- Whirl-plate constructed nozzle produces large full cone spray pattern

### P Impingement

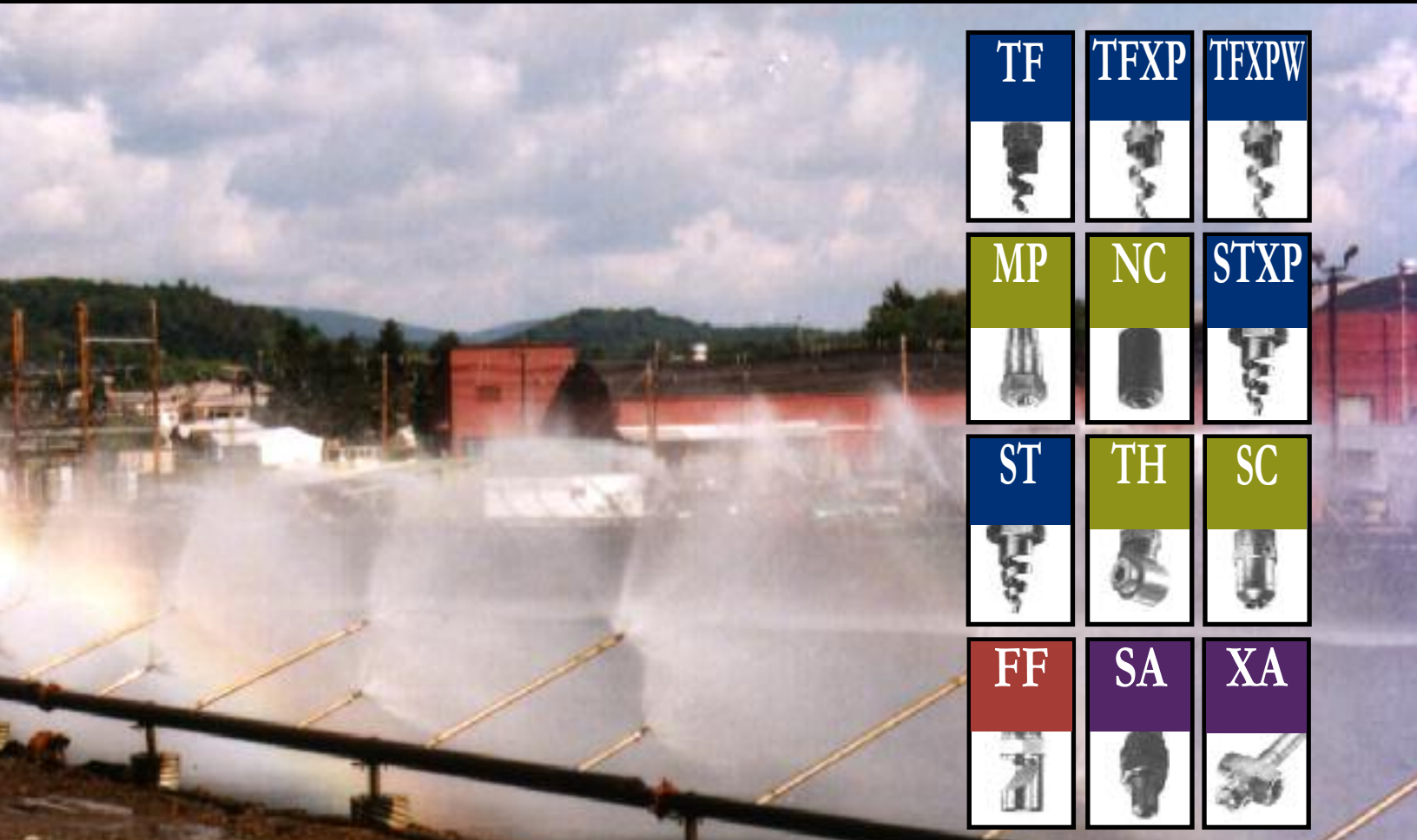
- Highly efficient laminar jet impinges on target pin, generating fine fog
- Produces high percentage of droplets in the 60-200 micron range
- One-piece construction

### PJ Impingement

- Finest fog of any direct pressure nozzle
- Produces high percentage of droplets under 50 micron range
- High energy efficiency
- One-piece construction

# Pollution Control

## Scrub Gases, Evaporate Ponds, and Suppress Dust



### Air Pollution

BETE is a world leader in nozzle design for pollution control and denoxification.

BETE nozzles are used for quencher, pre-scrubber, absorber, direct contact, open tower, and mist eliminator washing applications.

### Water Pollution

TF, TFXP, and MaxiPass nozzles give optimum performance in wastewater aeration in meeting EPA oxygen content requirements.

### ST, STXP Spiral

- Full cone spiral nozzles produce the best atomization and clog resistance of any direct pressure nozzle.
- Standard two- or three-piece construction with no internals for superior clog resistance.

### SpiralAir™ Air Atomizing

- Used for injecting lime slurry
- Two-fluid high flow air atomizers for superior atomization
- Successful operation under very corrosive conditions
- Three-stage atomization for highest reliability
- Low air-to-liquid ratios
- Three-stage atomization for highest reliability
- Superior for injecting deodorants in tower for odor control
- Flow rates from 0.3 to 20 gpm (1.13 to 75.7 L/min)
- Best used in indoor facilities where pressurized air or gas is available

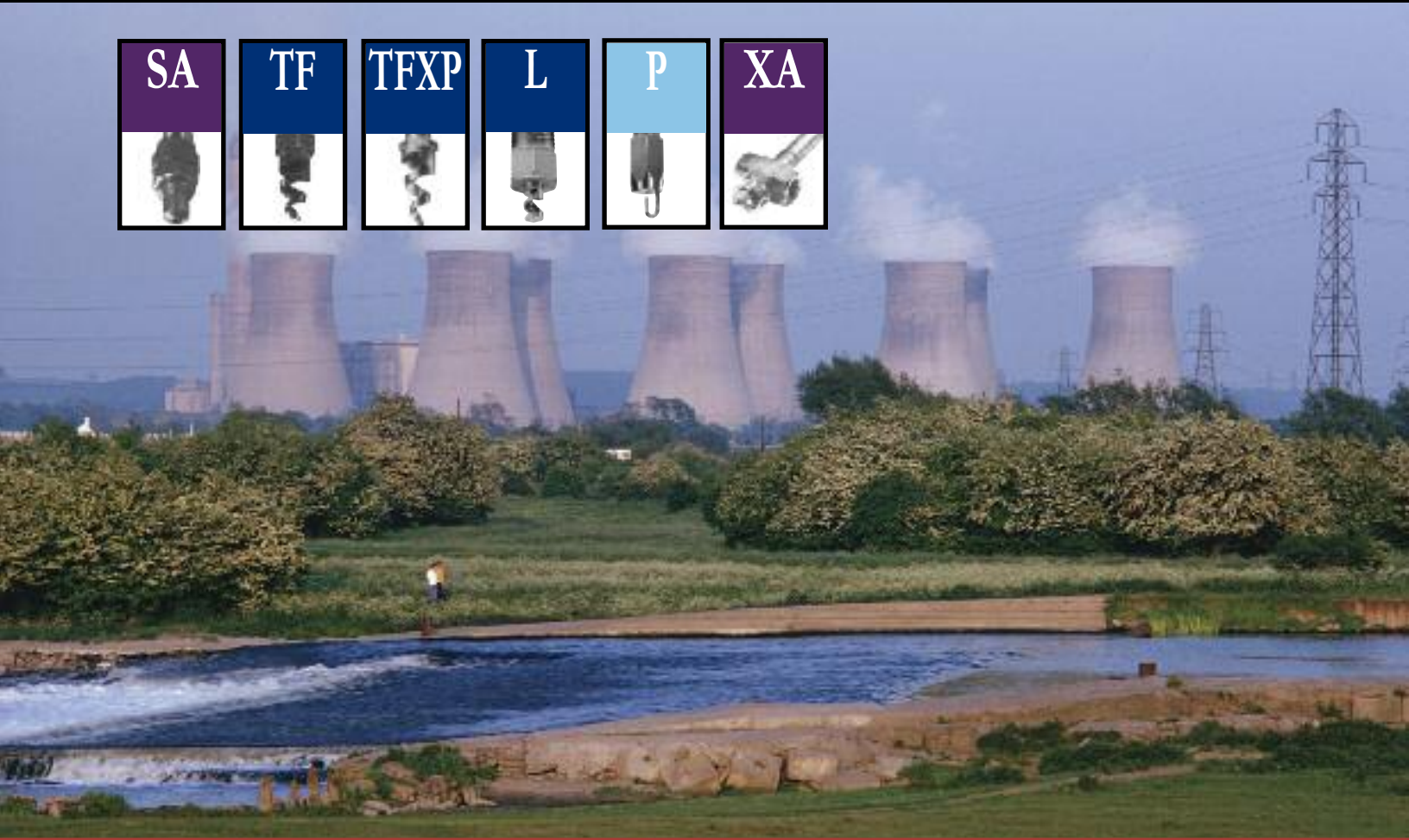
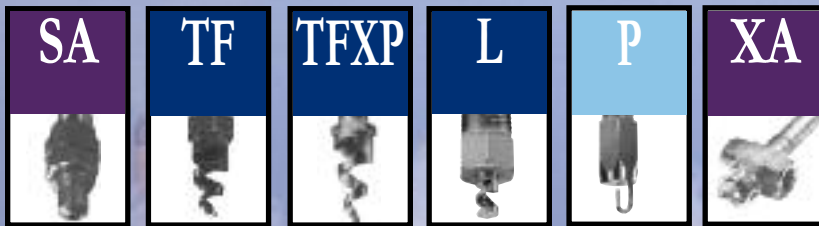
### TC Whirl

- One-piece body with integral vanes
- Extremely high flow rates up to 8730 gpm (33041 L/min.)



# Evaporative Cooling

## Cooling Flue Gases, Temperature Sensitive Equipment



### TF and TFXP Spiral

- One-piece spiral construction
- Very large free passage for greater clog resistance
- Spray angles available from 50° to 180°
- Produces high percentage of droplets in the 100 - 1,000 micron range
- Direct pressure nozzle
- Excellent when used for evaporative disposal with dirty, stringy liquids
- Fine atomization

### TH Tangential Whirl

- Right-angle mounting
- No internal parts
- Most even distribution of any hollow cone whirl in the industry
- Large range of flow rates: 5 to 1500 gpm (19 to 5677 L/min)

### WL Whirl

- Low flow rates: 0.13 to 59 gpm (0.492 to 223 L/min.)
- Full cone whirl, medium-to-coarse atomization
- Advanced whirl plate design

### XA Air Atomizing

- Large variety of spray patterns
- Low flow air atomizer measured in gallons *per hour*
- Automatic and non-automatic hardware options as well as self-cleaning options
- Internal or external mixing of air and liquid
- Complete filter and regulator kits available
- Flow rates from 0.2 to 222 **gph** (0.75 to 840 **l/hr**)
- Excellent for injecting ammonia or water upstream of electro-static precipitators.



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