LINEUP OF IKEUCHI'S SPRAY NOZZLES
IKEUCHI, “The Fog Engineers”

Based on accumulated advanced technology and know-how as the Fog Engineers, IKEUCHI continues to pursue methods to generate and utilize fog to meet the ever diversifying and sophisticated needs of its customers, and to contribute to the development of a greater industrial world.

**Guarantee of Precision Nozzle Performance**

All IKEUCHI’s precision-made hydraulic spray nozzles (except for air nozzles) are guaranteed for spray angles and spray capacities. Each pneumatic spray nozzle series also has spray capacity inspection standard, and only the nozzles that pass the inspection will be shipped.

**Classification of Spray Droplet Size**

<table>
<thead>
<tr>
<th>Spray Droplet Size</th>
<th>Mean Diameter (μm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultra-fine atomization</td>
<td>Under 10</td>
</tr>
<tr>
<td>Fine atomization</td>
<td>10–100</td>
</tr>
<tr>
<td>Semi-fine atomization</td>
<td>100–300</td>
</tr>
<tr>
<td>Semi-coarse atomization</td>
<td>0.3–1.0 mm</td>
</tr>
<tr>
<td>Coarse atomization</td>
<td>Over 1.0 mm</td>
</tr>
</tbody>
</table>

IKEUCHI, “The Fog Engineers” have classified spray droplet sizes as above.

**Variety of Spray Nozzles**

### Hydraulic Spray Nozzles

- Produce atomization using liquid pressure

### Pneumatic Spray Nozzles

- Produce atomization using air and liquid pressures

### Flat Spray Nozzles

- Provide a flat fan spray pattern with mountain-shaped or even distribution.
- Ideal for (high-pressure) cleaning and spraying.

### Cone Spray Nozzles

- Provide a hollow cone or full cone spray pattern (or square spray pattern).
- Suitable for gas cleaning, steel plate cooling, humidifying, etc.

### Solid Stream Jet Nozzles

- Solid stream with highest spray impact. Ideal for powerful cleaning.

### Fine Fog Spray Nozzles

- Widely used pneumatic nozzles for gas cooling, moisture control, precision cleaning, etc.
- Mean droplet diameter: 10–100 μm

### Semi-Fine, Semi-Coarse Fog Spray Nozzles

- Ideal for precision cooling in the steel industry, and for precision cleaning in the electronics industry.
- Mean droplet diameter: 100 μm or more (semi-fine atomization)

### Clog-resistant Spray Nozzles

- Designed specially for spraying viscous liquid.

### Blower-Air Driven, Ultra-Low Pressure Spray Nozzles

- Utilize blower air instead of compressed air for atomizing to save installation and running cost.

### Steam-Driven Spray Nozzles

- Innovative pneumatic nozzles using steam instead of compressed air for atomizing.
HYDRAULIC SPRAY NOZZLES — FLAT SPRAY

**Standard Flat Spray Nozzles**

- **Series**: V/VV
- **Structure**: 3-piece
- **Features**: Flat spray pattern with mountain-shaped distribution. Tapered spray pattern edges provide uniform spray distribution in multiple-nozzle arrangements.
- **Applications**: Cleaning, spraying, cooling, etc.

- **Series**: VE
- **Structure**: 3-piece
- **Features**: Cleaning, spraying, cooling, etc.
- **Applications**: For polishing, available in UPE material (UVVP series).

- **Series**: CVVP
- **Structure**: One-piece
- **Features**: Coin-shaped
- **Applications**: So thin that nozzle alignment in a narrow space is easy.

- **Series**: INVV
- **Structure**: Quick detachable
- **Features**: Easy installation without tools, which saves maintenance time.
- **Applications**: Applications that require accurate nozzle positioning. Etching, cleaning, etc. (Successor to ISVV series)

**Even Flat Spray Nozzles**

- **Series**: VE
- **Structure**: 3-piece
- **Features**: Flat spray with uniform distribution and even spray impact across the entire spray area.
- **Applications**: Cleaning, cooling and spraying.

- **Series**: VNP
- **Structure**: High-pressure
- **Features**: Flat spray with uniform distribution.
- **Applications**: High pressure cleaning (for cars, containers, tanks).

- **Series**: DSP
- **Structure**: Descaling nozzles
- **Features**: Powerful cleaning and descaling nozzle with a thin flat spray like a razor blade.
- **Applications**: Water saving & high impact descaling nozzle for steel industries. Longer lasting design, uniform spray impact. (See TDSS individual catalog.)

**Wide-angle Flat Spray Nozzles**

- **Series**: YYP
- **Structure**: Wide-angle
- **Features**: Produces wide-angle flat spray at low liquid pressure with minimal clogging.
- **Applications**: Cleaning, foam breaking, water screen applications.

- **Series**: LYP
- **Structure**: Wide-angle, ultra-low pressure
- **Features**: Low spray impact without bubbles. Uniform distribution produced at ultra-low pressure.
- **Applications**: Spraying developer in semi-conductor manufacturing processes.

**Off-center Even Flat Spray Nozzles**

- **Series**: OVVEP
- **Structure**: Off-center spray
- **Features**: With obliquely-angled flow, OVVEP series prevents accumulation of spray fluid in multiple-nozzle arrangements. No need for oblique installation, as the angle is built-in.
- **Applications**: Steel plate cooling, water rinsing after acid washing.

**Special Flat Spray Nozzles**

- **Series**: MOMOJet® C
- **Structure**: Self-cleaning
- **Features**: Produces flat spray pattern of air or steam.
- **Applications**: Cleaning, dust suppression, drying, air curtain, humidification, moisture control, etc.

- **Series**: UT+CP
- **Structure**: Universal-joint type
- **Features**: Easy installation just by drilling a hole on a pipe and inserting a nozzle. Spray direction is adjustable within 50 degrees as desired. Quick-detachable design to reduce maintenance time.
- **Applications**: Pre-treatment for painting, water cleaning, etc.
**HYDRAULIC SPRAY NOZZLES — CONE SPRAY**

### Hollow Cone Spray Nozzles

- **Features**: Fine fog, ultra-small capacity
  - **KB series**: Finest atomization among our hydraulic nozzles, with high wear-resistant ceramic tip. Suitable for humidifying, cooling, spraying, etc.

- **Main applications**: Cleaning, cooling, spraying, etc.

### Full Cone Spray Nozzles

- **Small capacity**
  - **J series**: Smallest spray capacity among full cone spray nozzles. Wear-resistant with ceramic orifice and closer. Suitable for spraying, cleaning, cooling, etc.

- **Standard type**
  - **JJXP series**: Spray capacity ranges from small to medium. X-shaped whirler provides large free passage for minimal clogging. Available in brass, stainless steel, or PVDF. Suitable for cleaning, cooling, spraying, etc.

- **Ceramic orifice & whirler**
  - **JUP series**: Ceramic disc whirler and ceramic orifice provide excellent wear-resistance. Suitable for cleaning, cooling, spraying, etc.

- **Alumina ceramic**
  - **JXP-AL92 series**: High wear-resistant alumina ceramic with a stainless steel socket. Suitable for cooling, cleaning, etc.

- **Quick detachable**
  - **INJJX(-Y) series**: No whirler, minimal clogging. Unique design to produce narrow-angle full cone spray. Suitable for spraying, cleaning, etc.

### Square Spray Nozzles

- **Square spray**
  - **SSXP series**: Square spray pattern with uniform distribution, which leaves no gaps in multiple-nozzle arrangements. Suitable for cleaning, cooling, spraying.

### Special Full Cone Spray Nozzles

- **Seven-head, fine fog**
  - **7KB series**: Seven KB hollow cone spray nozzles with a compact adaptor produce large volume of fine atomization. Suitable for flue gas cooling/cleaning, moisture control, humidification.

- **Seven-head, all metal**
  - **7JJXP series**: Seven JJXP full cone spray nozzles with a compact adaptor. Spray droplet diameter is about half the size of other full cone spray nozzles having the same spray capacity. Suitable for flue gas cooling/cleaning, dust suppression, etc.
### Solid Stream Spray Nozzles

<table>
<thead>
<tr>
<th>Type</th>
<th>Features</th>
<th>Main Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard type</td>
<td><strong>CP/CCP series</strong></td>
<td>Highest impact solid stream. Much larger flow of solid stream than other solid stream nozzles having the same orifice diameter.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High pressure cleaning.</td>
</tr>
<tr>
<td></td>
<td>Convex round inlet</td>
<td>Designed for minimal clogging. Convex round inlet inside pipe prevents foreign particles from flowing into nozzle.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cleaning in paper &amp; pulp making process.</td>
</tr>
<tr>
<td>Multiple-orifice Solid Stream Spray Nozzles</td>
<td><strong>2CP/2CCP series</strong></td>
<td>Multiple solid streams with high impact force. 2-orifice and 7-orifice types are available.</td>
</tr>
<tr>
<td></td>
<td><strong>7CP/7CCP series</strong></td>
<td>Bottle washing, cleaning dandy rolls and returnable containers, etc.</td>
</tr>
<tr>
<td>Special Solid Stream Spray Nozzles</td>
<td><strong>SO-CM series</strong></td>
<td>Quick spray ON/OFF function, regulated by pilot air ON/OFF, which prevents dripping after spraying stops.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trimming, cutting, marking, etc. For flat spray, SO-V series is available.</td>
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<tr>
<td></td>
<td><strong>Pipe cleaning RSP series</strong></td>
<td>Cleans inside pipes and tubes, moving itself by spraying high-impact solid stream jets in different directions as driving force.</td>
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<tr>
<td></td>
<td></td>
<td>Cleaning inside pipes/drains/tubes, removing scale and dirt inside tubes of heat exchangers and cooling machines.</td>
</tr>
</tbody>
</table>

### SPECIAL PURPOSE NOZZLES

#### Air Nozzles

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<thead>
<tr>
<th>Type</th>
<th>Features</th>
<th>Main Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slit laminar nozzles</td>
<td>Takes in surrounding air, boosting the volume of powerful air flow. Available in stainless steel or plastic.</td>
<td>Blowing off drying, blowing off dust, cleaning, cooling, etc.</td>
</tr>
<tr>
<td>Spillback nozzles</td>
<td>Spray capacity is variable without changing spray pressure. Available in a variety of types.</td>
<td></td>
</tr>
<tr>
<td>Tank cleaning nozzles</td>
<td>Compact rotating nozzle. Rotates by cleaning liquid force only. Ideal for tank and container cleaning.</td>
<td></td>
</tr>
<tr>
<td>Ejector nozzles</td>
<td>Spouts out 3–4 times the supplied amount. Ideal for solution agitation.</td>
<td></td>
</tr>
<tr>
<td>Universal joints</td>
<td>Universal joint adaptors to adjust spray direction. Made of metal or plastic.</td>
<td></td>
</tr>
</tbody>
</table>

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*Symbols key: ○: Features  ■: Main applications*
### Fine Fog Spray Nozzles

**Small capacity**
- **BIM series**
- **CBIM series**
- **SCBIM series**

- Fine atomization with mean droplet diameters 20–100 μm. Unique, minimal-clogging design. Available in flat spray, full cone spray, or hollow cone spray pattern. Spray ON/OFF can be regulated with controlling adaptors.
- CBIM series: Compact version of BIM series. Space-saving design.
- SCBIM series: Further miniaturized version of CBIM series. Capable of spraying smallest flow rate among all of our pneumatic spray nozzles.
- Spraying, cooling, moisture control, washing, etc.

**Medium/Large capacity**
- **GSIM series**

- Large spray capacity, low air-water ratio. Simple structure, easy maintenance.
- Gas cooling tower in waste incineration plant.

**Impinging-atomization**
- **AKIJet series**

- Atomized droplets are impinged against each other at optimum condition, which results in uniform distribution of droplet size.
- Moisture control, combustion, cooling, etc.

### Semi-Fine, Semi-Coarse Fog Spray Nozzles

**High impact, flat spray**
- **VVEA series**

- Thin and sharp spray pattern with high impact. Stable spray angle over large turndown ratio.
- Precision cleaning.

**Slit nozzles**
- **PSN series**

- Pneumatic slit nozzles providing uniform spray in the total width. Achieve higher spray impact by installing closer to the object.
- Glass substrate cleaning, etc.

**Flat spray**
- **DOVEA series**

- Secondary cooling nozzles developed to satisfy crucial requirements for spray nozzles in continuous casting processes in steel making.
- Minimal variation in spray angle, spray distribution and droplet size over a large turndown ratio. A large free passage diameter.
- DOVEA series for even flat spray pattern, DDA series for thick even flat spray, JJA series for full cone spray.

**Thick flat spray**
- **DDA series**

- Gas cooling, steel plate cooling, waste water combustion.

**Full cone spray**
- **JJA series**

### Clog-resistant Spray Nozzles

**Full cone spray**
- **SETOFJet series**

- Pneumatic spray nozzle specially designed for spraying viscous liquid. Clog-resistant design. External mixing type that air and liquid are mixed outside nozzle for atomization.
- Spraying viscous liquid (oil, lubricant, etc.) or slurry. Solenoid-activated type (SET-O-SD series) is also available.

**Flat spray**
- **SETOV series**

### Blower-Air Driven, Ultra-Low Pressure Spray Nozzles

**Fine, flat spray**
- **BAVV series**

- Flat spray pattern, fine atomization with mean droplet diameter of 40 μm or more. Energy-saving for blower-use. Low running cost. Large free passage diameter.
- Steel plate cooling, cleaning, etc.

**Semi-fine fog**
- **LSIM series**

- Semi-fine atomization by applying blower air pressure. Saves on installation and running cost due to utilizing blower air for atomizing.
- Gas cooling, etc.

### Steam-Driven Spray Nozzles

**Steam-driven**
- **JOKIJet series**

- Atomization by steam instead of compressor air. Drastic saving on running cost.
- Gas cooling, moisture control.
Spray Nozzle Headers

<table>
<thead>
<tr>
<th>BRASIKan® series</th>
<th>MOMOJet® Spray Header</th>
<th>Ring Header</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="BRASIKan® series" /></td>
<td><img src="image2" alt="MOMOJet® Spray Header" /></td>
<td><img src="image3" alt="Ring Header" /></td>
</tr>
</tbody>
</table>

- Rotated by the handwheel, brushes in the header pipe clear the clog.
- Spray header with MOMOJet® nozzles, purging foreign particles by reducing the pressure.
- Ring header equipped with pneumatic nozzles, providing uniform spray from all directions.

Related Products Applying Spray Nozzles

- **Fog + Fan cooling unit** COOLJetter.  
  - Combined unit of a fan and nozzles that can blow Semi-Dry Fogs further and broader using fan wind. Ideal for cooling and dust suppression.

- **Cooling system** COOLJetter® Dome  
  - Cooling system with COOLJetters, providing effective and low-cost cooling for large spaces.

- **Industrial cooling system**  
  - Industrial cooling solution for solid and gas.

- **LYOHM System** for outdoor cooling  
  - Energy-saving, outdoor cooling system with Semi-Dry Fogs, which provides effective evaporative cooling effect without wetting people.

- **Humidification unit** ULM®  
  - Easy-to-use, large-space humidification unit. One ULM® covers approx. 150 m².

- **Auto reverse self-cleaning filter** ARS Filter  
  - Auto reverse self-cleaning by powerful jet spraying. Water saving and minimal maintenance.

- **Hydraulic humidification system** AirULM®  
  - Humidifies large spaces at low running cost. Air compressor is not required.

- **Dry Fog humidifier** AKIMiste “E”  
  - Compact, high efficiency humidifier that produces a large volume of Dry Fog (non-wetting fog). Energy-saving design.

- **Industrial humidification system** AirAKI®  
  - The world’s first humidification system that guarantees the target humidity using the highest quality Dry Fog.
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