**Micro-bubble Generator**

Eliminates the need for troublesome piping connections or adjustments - Increases the scope of pressurized water applications

- **Features**
  - Anyone can produce highly dense, micro-bubbled water by performing a simple procedure.
  - This bubble generator can supply stabilized pressurized water even when the external environment (water level height, pressure, air volume, etc.) varies.
  - Takes in water and air with a pump’s suction power and without using a large-size dissolving tank, compressor, or ejector, thereby reducing the bubble generator size, providing increased space savings, and substantially decreasing the system cost.

Excellent bubble generator for exercising three functions: suction, mixing, and force-feed functions.

**NIKUNI Karyu Turbo Mixer**

This product makes use of vortex turbine pump characteristics to effectively mix a gas and liquid or two different liquids that are not readily soluble, dissolve them, and force-feed them. It eliminates the need for a chemical charging pump, compressor, large-size dissolving tank, pressurization tank, agitator, static mixer, and other auxiliary equipment, permits equipment downsizing, system simplification, and substantial cost reduction, and this product is used in water treatment and various other processes.

**Advantages of dissolved air flotation method**

- **Reduced time requirements**: The buoyant force of air bubbles is used to forcibly float a solid material. Therefore, solid/liquid separation can be achieved within a short period of time.
- **Reduced processing space requirements**: Even when the processing volume is relatively large, processing can be performed continuously in addition to rapid separation. Therefore, the space requirements for the system can be reduced.
- **Arbitrary gas selection**: Oxygen, ozone, carbon dioxide, chlorine gas, and other gases can be selected as desired in addition to air. Therefore, solid/liquid separation and other various reaction processes can be performed.

**Quick Comparison**

**Conventional System (Vortex Pump & Dissolving Tank)**

- Vortex pump
- Compressor
- Static mixer
- Large-size dissolving tank (with liquid level controller)

**New System (Karyu Turbo Mixer /KTM)**

- Karyu Turbo Mixer /KTM (with automatic air suction mechanism)
- Small-size excess air separation tank

**Simplified System Construction**

- Compressor
- Dissolving tank
- Liquid level controller
- Raw water
- Processed water
- Excess air
- Air
- Excess air separation tank
- Karyu Turbo Mixer (KTM)
The dissolved air flotation method is used to generate very small air bubbles in water, uses their buoyant force to float coagulate or solid items or deposited tiny solid materials and dissolved elements, and collect them when they surface. Micro-bubbles generated by the bubble generator play important roles in the following scenes.

Major applications

1. For removing impurities from well water in preparation for various industries including semiconductor pure water production
2. For pretreatment of kitchen waste water containing oils and fats
3. For excrement (of livestock) treatment after rough separation by vibratory screen
4. For recycling of high-grade paper fiber
5. For food, crystal, and chemical removal in pretreatment for waste water treatment
6. For removing sediments, suspended substances, sludge, and algae for pond/lake purification
7. For providing a micro-bubbled bath at a hotel or the like
8. For using the water surface as an image projection screen for various events
9. For decorating the water surface of a pond or swimming pool

Example of KTM Micro-Bubble Generator Installation

<table>
<thead>
<tr>
<th>Measurement of Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item (Unit)</td>
</tr>
<tr>
<td>pH</td>
</tr>
<tr>
<td>COD (mg/l)</td>
</tr>
<tr>
<td>BOD (mg/l)</td>
</tr>
<tr>
<td>Floated substance (mg/l)</td>
</tr>
<tr>
<td>Hexane extract (mg/l)</td>
</tr>
</tbody>
</table>
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**Example of KTM Micro-Bubble Generator Installation**

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**Measurement of Density**

<table>
<thead>
<tr>
<th>Item (Unit)</th>
<th>Regulated bath</th>
<th>Conventional system</th>
<th>Nikuni KTM system</th>
<th>Measurement method</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>6.5(2%)</td>
<td>6.5(1%)</td>
<td>7.1(1%)</td>
<td>K 0102-12.1(2,2)</td>
</tr>
<tr>
<td>COD (mg/L)</td>
<td>530</td>
<td>100</td>
<td>100</td>
<td>K 0102-17</td>
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<tr>
<td>BOD (mg/L)</td>
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<td>280</td>
<td>180</td>
<td>K 0102-21.32,3</td>
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<tr>
<td>Floated substance (mg/L)</td>
<td>1120</td>
<td>150</td>
<td>21</td>
<td>K 0102-14.1</td>
</tr>
<tr>
<td>Hexane extract (mg/L)</td>
<td>35</td>
<td>27</td>
<td>4</td>
<td>K 0102-24,2</td>
</tr>
</tbody>
</table>
Three-in-One
Kurdy Turbo Mixer (KTM)

KTM automatically suctions "not-easily-mix" two different liquids or gas and liquid.
→ Feed pump, air compressor and ejector are no more necessary.

Liquid mixture is swirled and repeatedly pressurized for better mixture, agitation and dissolution.
→ Agitator, static mixer and large-size dissolving tank are no more necessary.

Thanks to its high pumping capacity, KTM provides high-pressure feeding of dissolved liquid mixture.
→ Transfer pump is no more necessary.

Features
- Anyone can produce highly dense, micro-bubbled water by performing a simple procedure.
- Stable supply of pressurized water is possible even when the external environment (water level, pressure, air volume, etc.) may vary.
- Takes in water and air with a pump's suction power without using a large-size dissolving tank, compressor or ejector, making the system compact and space-saving with substantial reduction in system cost.

Advantages of NIKUNI Dissolved Air Floatation Innovation (DAFI)
- Simple construction and easy operation ensure a stable supply of micro-bubbles.
- Simple construction and easy operation eliminate the needs for skilled operator and full-time supervisor.
- Excellent air-liquid dissolving capacity with a large quantity of pressurized water enhances the efficiency of recovery.
- Ideal for retrofitting to increase process capacity.
- Installation is possible even in a limited space.
- Source of power consumption is KTM unit only, leading to substantial reduction in electricity cost.
- Trouble-free operation requires no full-time supervisor, significantly reducing the cost of maintenance.
- Quiet operation without compressor. No noise insulation measure is required for night shift.
- Quantity of retained water is limited, ensuring sufficient quantity of pressurized water immediately after start of operation.
- Flexible selection of gas is possible depending on application, such as air, oxygen gas, ozone gas, etc.

Selection Guide

<table>
<thead>
<tr>
<th>50Hz</th>
<th>60Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Just only KTM</strong></td>
<td><strong>Standard model</strong></td>
</tr>
<tr>
<td>KTM20(N)D</td>
<td>1.0</td>
</tr>
<tr>
<td>KTM25(N)D</td>
<td>1.5</td>
</tr>
<tr>
<td>KTM32(N)D</td>
<td>3.0</td>
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<tr>
<td>KTM40(N)D</td>
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<tr>
<td>KTM50S1(G)</td>
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<tr>
<td>KTM50S2(G)</td>
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<tr>
<td>KTM50S3(G)</td>
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<tr>
<td>KTM65S2(D)(G)</td>
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<tr>
<td>KTM65S2(D)(G)</td>
<td>42.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Whole unit with KTM</strong></th>
<th><strong>Standard model</strong></th>
<th>Pressurized Water Flow m³/h</th>
<th>Motor Power kW</th>
<th><strong>Standard model</strong></th>
<th>Pressurized Water Flow m³/h</th>
<th>Motor Power kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBG20N7CE</td>
<td>1.0</td>
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<td>MBG20N7CE</td>
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<tr>
<td>MBG25N15CE</td>
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<td>MBG25N15CE</td>
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<td>1.5</td>
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<tr>
<td>MBG32N22CE</td>
<td>2.0</td>
<td>2.2</td>
<td>MBG32N22CE</td>
<td>4.0</td>
<td>2.2</td>
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<tr>
<td>MBG40N37CE</td>
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<td>MBG52S75CE</td>
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<td>11.0</td>
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<tr>
<td>MBG65S22CE</td>
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<td>22.0</td>
<td>MBG65S22CE</td>
<td>58.0</td>
<td>30.0</td>
<td></td>
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</tbody>
</table>

- Standard material: Regeneratives turbine pump - SCS11/US304
- SCS14/US816 or PC (Ferrous) material is also available.
- Marks: (D) means motor (200V-400V multivoltage) integrated type model is available.
- (D) means gland-packing type is also available.

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