## UFO Series Specifications

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Vacuum Mixing &amp; Degassing Mixer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>UFO-2</td>
</tr>
<tr>
<td>Control Method</td>
<td>Rotation/Revolution independent motion</td>
</tr>
<tr>
<td>Max. Capacity (L)</td>
<td>2 (1.9 x 2 pc.)</td>
</tr>
<tr>
<td>Max. Load (kg)</td>
<td>4 (2.5 x 2 pc.)</td>
</tr>
<tr>
<td>Revolution speed (rpm)</td>
<td>400~600</td>
</tr>
<tr>
<td>Rotation speed (rpm)</td>
<td>200~450</td>
</tr>
<tr>
<td>Power Supply</td>
<td>AC 3-phase 200V</td>
</tr>
<tr>
<td>External size (mm)</td>
<td>W730xD840xH1100</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>App. 450</td>
</tr>
</tbody>
</table>

- Not including Controller
- External size of controller (mm): W760xD830xH2300
- Weight of controller (kg): 250
- UFO-12 and UFO-16 are the same size, but UFO-16 has SUS external panel and is designed for filling material to long-sized syringes.

## VMX Series Specifications

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Vacuum Mixing &amp; Degassing Mixer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>VMX-250</td>
</tr>
<tr>
<td>Control Method</td>
<td>Rotation/Revolution independent motion</td>
</tr>
<tr>
<td>Max. Capacity (L)</td>
<td>200 (200 x 1 pc.)</td>
</tr>
<tr>
<td>Max. Load (kg)</td>
<td>300 (300 x 1 pc.)</td>
</tr>
<tr>
<td>Revolution speed (rpm)</td>
<td>600~1600</td>
</tr>
<tr>
<td>Rotation speed (rpm)</td>
<td>300~400</td>
</tr>
<tr>
<td>Power Supply</td>
<td>AC Single-phase 100V or 200V</td>
</tr>
<tr>
<td>External size (mm)</td>
<td>W325xD422xH480</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>App. 33</td>
</tr>
</tbody>
</table>

## Vacuum Syringe Filling Device Specifications

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Vacuum Syringe Filling Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>VF-3</td>
</tr>
<tr>
<td>Available Syringe (mL)</td>
<td>5~55</td>
</tr>
<tr>
<td>No. of Syringes (mL)</td>
<td>1</td>
</tr>
<tr>
<td>Power Supply</td>
<td>AC Single-phase 100V</td>
</tr>
<tr>
<td>Air Source (psi)</td>
<td>0.3MPa (10N/L)</td>
</tr>
<tr>
<td>External size (mm)</td>
<td>W225xD485xH485</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>App. 70</td>
</tr>
</tbody>
</table>

- The filling devices can be made compatible with vessels to be filled, other than syringes. Contact EME CORPORATION or Special Agent.

- For specifications for peripheral devices such as Specialized Cleaning Device for removing sealing agent, etc., send separate inquiries.

- Laboratory center in our Head Office annex is equipped with Mixers and Syringe Filling Devices listed in this catalog. Visit this laboratory for tests of mixing, degassing and syringe filling, after making reservation.
Customers’ Needs are the very things our development themes start with, our technology growth is based on.

**EME CORPORATION** developed and commercialized Vacuum Mixing & Degassing Mixer some 9 years ago, which is widely used both in Japan and in Korea, Taiwan and China as essential equipment for liquid crystal dripping process, the latest fabrication method of LCD panel. We proudly believe that the market acceptance is the sign of recognition for complete degassing, heretofore inaccessible by mixer under atmospheric pressure.

Vacuum Mixing & Degassing Mixer not only performs mixing, dispersion and degassing, but also securely transfers and fills to syringe and odd-shaped vessels the mixed-and-degassed material from vessels, free of air-bubbles remixing. Since material is transferred and filled using centrifugal force under vacuum, transfer and filling can be finished in very short time. Defective products due to air-bubbles remixing can be reduced drastically, leading to substantial boost of yield. Plus, transfer and filling that use centrifugal force leave little remaining material in vessels. This reduces material loss, and also makes cleaning works easier.

### Topics
- Deliveries to all LCD panel makers adopting liquid crystal dripping process, as sole supplier
- Large-capacity Vacuum Mixing & Degassing Mixer UFO series nominated for Fabrication Equipment Div., in The 8th Advanced Display of the Year 2003
- Patent for Transfer and Filling granted in 2004
  - (in Japan, Korea, and Taiwan)
- CE label approved in Dec., 2005, 1st machine shipped to UK.
- Ultra-small sized machine V-mini300 (300cc) was commercialized (machine volume 1/4 the conventional model)
- UFO-96 of the world biggest capacity was materialized

### Application

**Major Areas of Application**

- Where air-bubbles in material affects quality
- Where multiple additives must be uniformly dispersed in base material, avoiding air-bubbles
- Where mixed and degassed material is filled in syringe or minute slit (glass substrates and metal plates), air-bubble-free

**Actual Examples of Major Applications**

- Mixing & degassing of sealing, encapsulating agents for LCD (TFT-LCD), Encapsulation agent for Organic EL, IR material for PDP
- LED, semiconductor and other ultra-precision miniature electronic component
- Various chemical materials like medicine, cosmetics base, paint, ink, etc.
- Epoxy and Silicone resin adhesives, Conductive material like Ag paste, other plastics and sealing agents
- Mixed & degassing & transfer to syringe of powder plus liquid as for dental material, packaging material, ultrasonic probe’s material, etc.

### 3 Functions in 1 Mixer

#### 1. Mixing & Dispersion

- **Mixing**
  - Start: 2 different color clay clays are overlapped and set in vessel.
  - 30 Sec. later: Upper blue colored clay penetrates into white colored clay, forming circular arc.
  - 5 Min. later: Uniform mixing is finished.

- **Dispersion**
  - Photo shows uniformly dispersed UV sealing agent and ultrafine gas material used for bonding LCD panel. (SEM photo)

#### 2. Complete Degassing Function

- **Atmospheric-pressure Mixing Mixer**
  - Material mixed by Atmospheric-pressure Mixing Mixer shows see-mingly creamy surface. But, when exposed to vacuum (133Pa=1 torr) minute bubbles contained within the material become inflated.
  - There are 50 to 150 µm air-bubbles.

- **Vacuum Degassing Mixer**
  - Material mixed by Vacuum Degassing Mixer in vacuum (133Pa=1 torr) for 5 minutes shows no change when exposed to vacuum, showing complete degassing has been done.

#### 3. Filling to Syringe

- Even the TFT-LCD sealing with high viscosity such as 40000cP can be filled to multiple syringes simultaneously in short time.
Principle of operation & Vacuum Mixing - Degassing Mixer

Mixing principle and material flow of Vacuum Mixing-Degassing Mixer adopting Rotation-Revolution method

Principle of mixing and degassing is extremely simple. Vessel that contains material is rotated under vacuum, and is revolved at certain radius, to generate powerful centrifugal force continuously that causes blending, mixing and complete degassing at the same time.

Material being mixed generates vertical circulation through concurrent rotation and revolution, and flows in spiral direction by twisting torque. This motion, when conducted in vacuum, causes minute bubbles to be quickly inflated by 960 times in volume, and be removed at the surface contacting vacuum, and thus enabling complete degassing in 2 to 5 minutes.

VMX Series (Small Capacity Machines)

- Lineup of small capacity units of rotation-revolution, propeller less type Vacuum Mixing-Degassing machine, for 1 vessel
- Easy to adjust weight balance through use of counterweight method
- Compact design, plus, superbly quiet and low vibration

VMX-50
Max. mixing Capacity 250x1 vessel=250cc
Specifications: W830xD840xH1030
Features: Best selling model, optimum for LCD panel fab. line

VMX-250
Max. mixing Capacity 250x1 vessel=250cc
Specifications: W830xD840xH1030
Features: Best selling model, optimum for LCD panel fab. line

VMX-500
Max. mixing Capacity 250x1 vessel=250cc
Specifications: W830xD840xH1030
Features: Best selling model, optimum for LCD panel fab. line

UFO Series (Medium to Large Capacity Machines)

- Lineup up to the world’s largest capacity unit of rotation-revolution, propeller less type Vacuum Mixing-Degassing machine
- One machine handling mixing, degassing and syringe filling
- Compact design, plus, superbly quiet and low vibration
- Compatible with Glass 1000 level clean room
- Explosion proof spec. machine available as option

UFO-2 / UFO-3
Max. mixing Capacity 1.0x2 vessel=20 cc
Specifications: W830xD840xH1030
Features: Best selling model, optimum for LCD panel fab. line

UFO-5
Max. mixing Capacity 1.0x2 vessel=20 cc
Specifications: W830xD840xH1030
Features: Best selling model, optimum for LCD panel fab. line

UFO-10
Max. mixing Capacity 2.5x4 vessel=10 cc
Specifications: W830xD840xH1030
Features: Best selling model, optimum for LCD panel fab. line

UFO-16
Max. mixing Capacity 6.0x2 vessel=12 cc
Specifications: W830xD840xH1030
Features: Best selling model, optimum for LCD panel fab. line

UFO-36
Max. mixing Capacity 18x2 vessel=36 cc
Specifications: W1740xD1740xH2220
Features: Best selling model, optimum for LCD panel fab. line

For detailed specifications, see the last page of this catalogue.
Syringe injection technology & Related device

Filling material to syringe is done, using centrifugal force, free of air-bubbles remixing.

Application area: High viscosity material, Small quantity production
(Several hundred to a few thousand)

Patents granted for transfer and filling technologies
Japan: Pat. No. 3731154
Taiwan: Invention No. 200846
Korea: Pat. No. 5529670

- Vacuum Mixing & De-gassing Mixer from EMÉ-CORPORATION securely transfers and fills to syringe and odd-shaped vessel the mixed and degassed material from vessel, free of air-bubbles remixing.
- Since centrifugal force is used, filling can be finished in very short time.
- Defective products due to unevenness of material quality and/or air-bubbles remixing can be reduced drastically, leading to substantial boost of yield.
- Filling to syringe using centrifugal force leaves little remaining material in vessel. This reduces material loss, and also makes cleaning works easier.
- Low-viscosity material can be filled to syringe, by using separate filling device, and by pressurizing vessel for mixing & de-aquasing under vacuum.

Why mixing & de-gassing cannot be done in syringes?

Syringe has small cylinder radius, so the rotation vector forces can not be sufficiently large. Accordingly, spin flow and vertical circulation are hard to be generated, making direct mixing & de-gassing in small radius syringe difficult. Therefore, material must be mixed & de-aquased in mixing & de-aquasing vessel, first, and then, must be filled to syringe using centrifugal force in case of high-viscosity material (above 200Pa·s), and using syringe-filling device in case of low-viscosity material (below 200Pa·s).

Syringe Filling Device

Application area: Medium to low-viscosity material, Small to large quantity production
(below 100Pa·s)

- Mixed material, after complete de-gassing, is filled to multiple syringes evenly, free of air-bubbles remixing.
- Compact design, simple operation, easy to clean.

Vacuum Storage & Pressure-transfer Tank

- Mixed material, after complete de-gassing in vacuum, is stored in tank, and is transferred to the next process by pressurizing.
- Storage capacity large enough (30L or greater) to cope with continuous fabrication line.
- Capacity to be specified on order.
- Mixing vessel of Vacuum Mixing & De-gassing Mixer UFO Series can be connectable.

- Controller is to be separately installed, and has built-in vacuum pump and pressurizing pump.