The Amazon Spheres:
Creating an Urban Cloud Forest with Fog Humidification

THE BENEFITS OF MEEFOG™ TECHNOLOGY

- Reliable system
- Achieve plume like clouds
- Non-toxic and chemical free

CHALLENGE
Create cloud forest conditions in three spherical conservatories in downtown Seattle.

SOLUTION
Mee Industries installed a fog humidification system to maintain an ideal environment for over 40,000 plants and 800 employees.

AMAZON SPHERES - SEATTLE, WA
Amazon wanted to create not only a workplace, but an oasis for employees. With this in mind, they created the Seattle Spheres, three spherical nature conservatories on the Amazon campus in downtown Seattle, Washington. The three glass domes are pentagonal hexecontahedrons (60-faced polyhedrons) constructed out of steel and glass. The spheres serve as employee lounges, workspaces, meeting areas, and some retail stores.

THE PHYSICAL SITE
The three intersecting spheres range from three to four stories in height and take up over half of a city block. The spheres house over 40,000 plants from 50 countries. The plants are sculpted into the architecture; open spaces allow trees to grow as high as 49 feet and “living walls” of plants are woven into mesh, creating vertical gardens that replicate the biodiversity and vertical stratification of forests. Visual effects are also incorporated, by using the MeeFog to add dimension, highlighting the natural elements.
Amazon obtains most of its plants from Teufel Nursery, a nearby satellite greenhouse. A MeeFog system installed in the nursery facilitates seedling development, plant propagation, and healthy plant growth. The MeeFog system generates a high volume of ultra-fine droplets that evaporate quickly, providing the perfect environment for the plants to grow until they are ready to be transported to the Spheres.

**INSTALLATION**
The domes must be kept at 72°F with 60% relative humidity to provide an ideal environment for the plants and trees. Mee Industries provided a fog system with controls to perfectly maintain the needed humidity. The system uses a high-pressure pump to direct water to an array of intricately placed impaction-pin nozzles.

Amazon was looking for a system that would keep energy needs low and they found that MeeFog humidification systems are extremely energy efficient. By taking advantage of the adiabatic process, existing heat in the air evaporates the water droplets. Compared to steam, compressed air, or ultrasonic systems, MeeFog systems yield substantial energy savings. A typical MeeFog system uses just one horsepower of energy for every 600 lbs of water evaporated.

### Energy Cost Comparison Chart (Annual)

<table>
<thead>
<tr>
<th>System</th>
<th>Cost</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>MeeFog™ System</td>
<td>$706</td>
<td>1%</td>
</tr>
<tr>
<td>Ultrasonic</td>
<td>$8,447</td>
<td>6%</td>
</tr>
<tr>
<td>Compressed Air</td>
<td>$13,054</td>
<td>9%</td>
</tr>
<tr>
<td>Steam to Steam</td>
<td>$113,263</td>
<td>74%</td>
</tr>
<tr>
<td>Gas to Steam</td>
<td>$74,966</td>
<td>49%</td>
</tr>
<tr>
<td>Electric Steam</td>
<td>$153,931</td>
<td>100%</td>
</tr>
</tbody>
</table>

Assumptions: $0.10 per kWh, $1.20 per therm, 3,500 hours operation, 1,000 lbs. per hour moisture output.

**ABOUT MEE INDUSTRIES**
For over 50 years Mee Industries has led the world with innovative water fog technology. MeeFog™ systems are used to humidify and cool many industrial, commercial and agricultural processes and to create interesting and dynamic special effects. Today there are over ten thousand MeeFog™ systems in use around the world. The MeeFog team looks forward to helping you with your fogging project. Mee Industries is an ISO 9001 certified corporation and manufactures components to meet UL or CE requirements.

Mee Industries is a privately held company with corporate headquarters in Irwindale, California.