Packaging service competitive advantages:

- High vacuum encapsulation
- Getter integration for long-term stability
- Flexibility
- Fast response
- Competitive costs
- Engineering and modeling capabilities
- Full customization
- Class 100 clean room operation
The use of state of the art sealing equipment installed in a class 100 clean room environment allows to deliver high quality service standards. Nonstop packaging production as well as fast and reliable sealing processes are essential for the development of reliable packaging solutions. To meet the demands of the MEMS industry, SAES offers a wide range of services, including packaging, sealing, and characterization services. The package design and engineering expertise are used to optimize sealing conditions and procedures.

Add-on Services

In combination with packaging service, SAES is also offering additional services to support customers in the development and realization of reliable systems and devices. Services include testing, characterization, and after packaging, for the characterization and check of vacuum levels and hermeticity of the sealing.
The use of state-of-the-art sealing equipment installed in a Class 100 clean room environment allows for high-quality service standards. Continuous packaging production, as well as fast and reliable packaging services, are available throughout the week. Dedicated design and engineering expertise are used to optimize sealing conditions and procedures.

Add-on Services

In combination with packaging service, SAES is also offering additional services to support customers in the development and evaluation of MEMS sensors and related vacuum packaging. These services include:

- Add-on services on top of the packaging service
- Manufacturing of packaging services
- Characterization and testing of packaging services
- Vac-Bay (vacuum environment for testing and validation)
- Leak detection
- Gas permeation testing
- Thermal cycling test
- Radiation testing

Ensuring a high vacuum environment for a packaged device over its lifetime requires both low pressure in the cavity after sealing and a small flux of gases into the package during the device lifetime. Various factors can contribute to vacuum degradation, including:

- Leak detection
- Gas permeation testing
- Thermal cycling test
- Radiation testing

Vacuum requirements for MEMS

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Working Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accelerometer</td>
<td>≈ 300-700 mbar</td>
</tr>
<tr>
<td>Absolute pressure sensor</td>
<td>≈ 1-10 mbar</td>
</tr>
<tr>
<td>Gyroscope</td>
<td>10⁻¹-10⁻⁴ mbar</td>
</tr>
<tr>
<td>Resistor (angular rate)</td>
<td>10⁻¹-10⁻⁴ mbar</td>
</tr>
<tr>
<td>RF switch</td>
<td>10⁻¹-10⁻⁴ mbar</td>
</tr>
<tr>
<td>Microbolometer</td>
<td>&lt; 10⁻⁴ mbar</td>
</tr>
<tr>
<td>Moisture free</td>
<td>&lt; 10⁻⁴ mbar</td>
</tr>
<tr>
<td>DMD-DLP</td>
<td>moisture free</td>
</tr>
</tbody>
</table>

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- Full instrumentation
- Class 100 clean room operation

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- High vacuum encapsulation
- Getter integration for long-term stability
- Flexibility
- Fast response
- Competitive costs
- Engineering and modeling capabilities
- Full encapsulation
- Class 100 clean room operation