

# Standardized Outgassing Characterization Capability: TML & CVCM Determination via ASTM E595

Jayeshkumar Das  
Oneida Research Services  
[JDas@orlabs.com](mailto:JDas@orlabs.com)

Industries like aerospace, semiconductors, and those relying on vacuum environments require rigorous material testing. The ASTM E595 test method plays a vital role, offering a standardized way to assess a material's outgassing properties. For example, the test can characterize outgassing properties for components in non-hermetic packages like underfilled BGAs (Ball Grid Arrays) and parylene coated plastic parts.

ASTM E595 simulates space-like conditions by exposing materials to a vacuum and elevated temperatures (typically 125°C). This test measures two key parameters:

- **Total Mass Loss (TML):** Quantifies the total amount of material that evaporates or releases gases (outgassing).
- **Collected Volatile Condensable Materials (CVCM):** Measures the specific volatile organic compounds (VOCs) that condense under these conditions. VOCs pose a high contamination risk in sensitive environments like spacecraft and cleanrooms.

Oneida Research Services (ORS) is adding new testing capability following the ASTM E595 standard. The testing will adhere to ASTM E595 rigorous guidelines, including:

- **Precise preconditioning:** Materials are conditioned at specific humidity and temperature for a designated period.
- **Vacuum exposure:** Samples undergo a 24-hour exposure to a defined vacuum level and elevated temperature.
- **Accurate TML measurement:** The net weight change of the sample before and after testing is measured.
- **CVCM quantification:** The weight gain of a collector plate capturing condensed VOCs is measured to quantify CVCM.

By following ASTM E595, ORS can provide reliable data for a wide range of materials. This testing can determine material's suitability for use in vacuum environments, minimizing contamination risks and ensuring optimal performance.