Materials Combustion Research Facility

Purpose:

To provide screening of materials for their combustibility and flammability properties and for their performance in oxygen-rich environments.

The Materials Combustion Research Facility (MCRF) tests materials, parts, and complete assemblies to determine how compatible the components are with the rigorous pressure, oxygen, thermal, and mechanical friction conditions common in the space environment. Materials that might be in contact with liquid oxygen (LOX), e.g., materials being considered for a liquid oxygen fuel tank, must be tested to determine the conditions under which they will burn or spark or otherwise threaten mission success. Materials that might be in contact with gaseous oxygen (GOX), e.g., materials for rocket injectors, or other reactive fluids, such as hydrogen peroxide, must also be tested. Astronaut safety must be assured by restricting materials that give off noxious or poisonous gases or that may promote combustion.

The Materials Combustion Research Facility is certified to perform many of the tests per NASA-STD-6001 “Flammability, Odor, Off-gassing and Compatibility Requirements & Test Procedures for Materials in Environments That Support Combustion” plus other special purpose tests. Test capabilities include:

- Testing of materials and assemblies for toxic offgassed products
- Mechanical impact testing in LOX or GOX in pressures from ambient up to 10,000 psi and temperatures up to 315 °C (600 °F)
- Flammability testing of non-metallic materials at various oxygen concentrations in pressures up to 50 psi
- Flammability testing of metallic materials and composites in GOX in pressures up to 10,000 psi.

Recently added to the MCRF are unique test systems for determining the LOX compatibility of composites and a new facility for thermal vacuum stability analysis.

Point-of-Contact:

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