



IGNITION SUSCEPTIBILITY AND FLAMMABILITY TESTING CAPABILITIES

SUMMARY

White Sands Test Facility (WSTF) conducts a large variety of tests designed to evaluate ignition susceptibility and flammability of materials and components under a wide range of conditions.

TEST CAPABILITIES

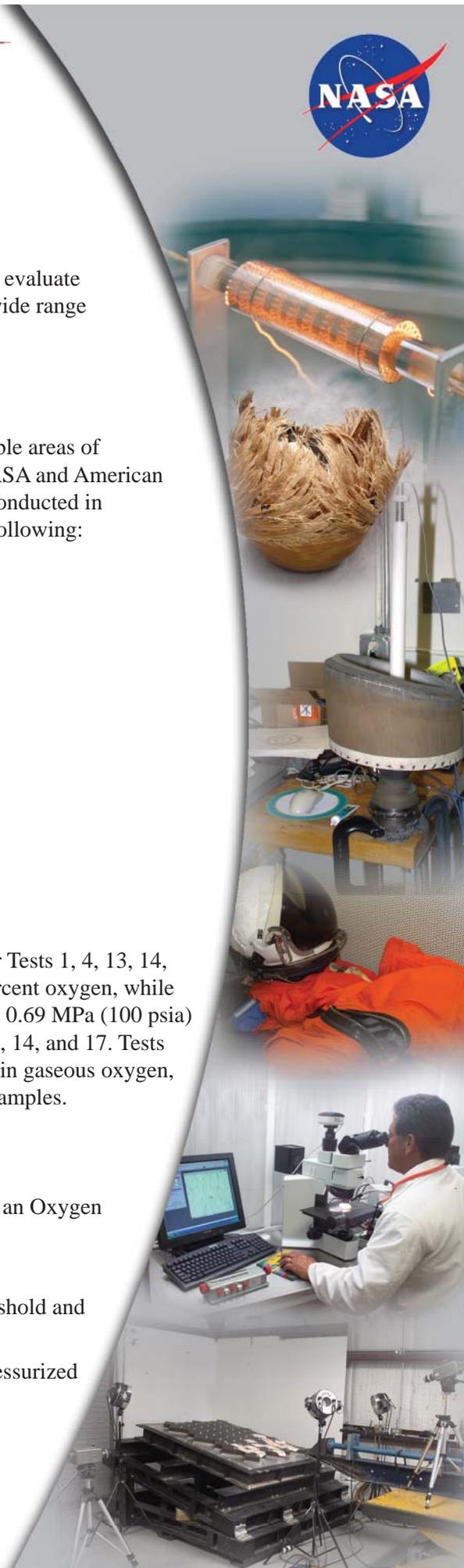
Evaluations of ignition sensitivity and flammability of materials used in habitable areas of spacecraft and liquid and gaseous oxygen systems are conducted following NASA and American Society for Testing and Materials (ASTM) test methods. The NASA tests are conducted in accordance with NASA-STD-6001 (formerly NHB 8060.1C) and include the following:

- Upward flame propagation (Test 1)
- Heat and visible smoke release rates by cone calorimetry (Test 2)
- Flash point of liquids (Test 3)
- Wire insulation flammability (Test 4)
- Impact sensitivity in liquid or gaseous oxygen (Test 13)
- Sensitivity to pneumatic impact (Test 14)
- Promoted combustion (Test 17)
- Arc tracking (Test 18)

The test environments include oxygen concentrations from 0 to 100 percent for Tests 1, 4, 13, 14, 17, and 18. Test 2 can be conducted in oxygen environments from 15 to 50 percent oxygen, while Test 3 is conducted in ambient air. The test pressures range from subambient to 0.69 MPa (100 psia) for Tests 1, 4, and 18, and from ambient to 68.8 MPa (10,000 psia) for Tests 13, 14, and 17. Tests 2 and 3 are conducted at WSTF ambient pressure (85 kPa, 12.35 psia), Test 13 in gaseous oxygen, and Tests 14 and 17 can be conducted with ambient temperature or preheated samples.

ASTM test methods capabilities include:

- Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter (ASTM E 1354)
- Flash Point by Pensky-Martens Closed Cup (ASTM D 93)
- Compatibility of Materials with Liquid Oxygen (Impact Sensitivity Threshold and Pass-Fail Techniques) (ASTM D 2512)
- Determining Impact Sensitivity of Materials to Mechanical Impact in Pressurized Oxygen Environments (ASTM G 86)
- Ignition Sensitivity of Materials to Gaseous Impact (ASTM G 74)
- Promoted Combustion (ASTM G 124)



National Aeronautics and Space Administration

LYNDON B. JOHNSON SPACE CENTER
WHITE SANDS TEST FACILITY



- Autogeneous Ignition Temperature of Liquids and Solids in a High-Pressure Oxygen Enriched Environment (ASTM G 72)
- Limiting Oxygen Index (ASTM D 2863 or ASTM G 125)
- Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index) (ASTM D 2863)
- Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (ASTM D 240). Other ignition and flammability evaluation capabilities include configurational testing, large scale fire testing, and special testing, such as frictional ignition and particle impact.

CONTACTS

Stephen F. Peralta, Project Manager, NASA White Sands Test Facility
stephen.f.peralta@nasa.gov, (575) 524-5561

Susana A. Harper, Project Manager, NASA White Sands Test Facility
susana.a.harper@nasa.gov, (575) 524-5418

