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LAB SERVICE

Fire and flammability testing provides quantifiable and usable results by rigorously testing a different materials resistance to heat, electrical current, open flames, and other conditions that might cause a fire.

At IGS we offer a range of flammability and fire testing services for various types of materials. Fire and flammability testing saves lives, but it can also take your products to a higher market value and reaching different markets and possibilities. We can make your company meet applicable local, state, federal codes as well International industries regulations and high safety standards.

FIRE REACTION

This element of fire and flammability testing helps us discern how your product reacts when exposed to a fire and can take place under predesigned conditions. This is not a test of the material's fire resistance, but rather what happens to its physical characteristics as a result of a fire. Because fire naturally causes materials to break down, this section of fire testing will also determine how the material's decomposition affects the burn as well as smoke and toxin generation.

FIRE RECISTANCE

Fire resistance testing measures your material's ability to withstand and resist catching fire. A useful outcome of this fire test is the time rating - that is, how long your material can withstand a fire.

FLAME SPREAD

Materials can spread fire, and the flame spread test is a fire testing method that uses different techniques to measure your material's tendency to expand.

Flammability testing standards for **building materials and structures**:

- **ASTM C1166:** Flame propagation of dense and cellular elastomeric gaskets and accessories
- **ASTM D229:** Rigid sheet and plate materials used for electrical insulation
- **ASTM E84:** Surface burning characteristics of building materials
- **ASTM E162:** Fire testing for surface flammability of materials using a radiant heat energy source
- **ASTM E648:** Critical radiant flux of floor-covering systems using a radiant heat energy source
- **DIN 4102, Part 1, Class A1:** Fire testing non-combustible building materials
- **ISO 9705:** Full-scale room test for surface products
- **UL 723:** Surface burning characteristics of building materials

Flammability and fire testing methods for **wires and cables**:

- **ASTM D3874:** Ignition of materials by hot wire sources
- **ASTM G21:** Resistance of synthetic polymeric materials to fungi
- **DOT 173.338-18(b)(7):** Flammability using a red hot platinum wire
- **IEC 60331:** Test on electric cables under fire condition
- **IEC 60332-1:** Test on electric cables under fire condition
- **IEC 60332-3:** Fire and flammability testing on electric cables under fire condition
- **IEC 695-2-2:** Fire hazard testing, needle flame test
- **IEC 754-1:** Test on gases evolved during combustion of materials from cables
- **IEC 754-2:** Test on gases evolved during combustion of materials from cables
- **IEC 1034 (1,2):** Fire testing for the measurement of smoke density produced by electric cables burning under defined conditions.
- **IEEE 383:** Class 1E electric cables and field splices for nuclear power generating stations

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- **IEEE 45:** Recommended practice for electric installations on shipboard
- **NES (DEF) 711:** Determination of the smoke index of the products of combustion from small specimens of materials
- **NES (DEF) 713:** Determination of the toxicity index of the products of combustion from small specimens of materials
- **UL VW-1:** Vertical flame test
- **UL 1685:** Vertical-tray fire-propagation and smoke-release test for electrical and optical-fiber cables.

Standard testing methods for **plastics**:

- **ASTM D229:** Rigid sheet and plate materials used for electrical insulation
- **ASTM D635:** Rate of burning and/or extent and time of burning of plastics in a horizontal position
- **ASTM D1929:** Fire testing to determine the ignition temperature of plastics
- **ASTM D2303:** Liquid-contaminant, inclined-plane tracking and erosion of insulating materials
- **ASTM D2584:** Ignition loss of cured reinforced resins
- **ASTM D2843:** Density of smoke from the burning or decomposition of plastics
- **ASTM D2863:** Measuring the minimum oxygen concentration to support candle-like combustion of plastics (oxygen index)
- **ASTM D3014:** Flame height, loss of mass, and time of burning of vertically positioned rigid thermoset cellular plastics
- **ASTM D3675:** Surface flammability of flexible cellular materials using a radiant heat energy source
- **ASTM D3801:** Measuring the comparative burning characteristics of solid plastics in a vertical position
- **ASTM D4804:** Fire testing to determine the flammability characteristics of nonrigid solid plastics
- **ASTM E119:** Fire and flammability testing of building construction and materials
- **ASTM E162:** Surface flammability of materials using a radiant heat energy source
- **ASTM E662:** Specific optical density of smoke generated by solid materials
- **ASTM E1354:** Heat and visible smoke release rates for materials and products using an oxygen consumption calorimeter
- **ASTM E2058 (FM 4910) [Modified]:** Measurement of material flammability using a fire propagation apparatus
- **ASTM G21:** Resistance of synthetic polymeric materials to fungi
- **BSS 7239:** Toxic gas generation by materials on combustion
- **EN 45545:** Fire protection of railway vehicles
- **ISO 4589-2:** Fire testing for the determination of burning behavior by oxygen index, ambient temperature test
- **NFPA 130:** Fixed guideway transit and passenger rail systems
- **NFPA 259:** Potential heat of building materials
- **SMP 800C:** Toxic gas generation
- **UL 94:** Flammability of plastic materials for parts in devices and appliances
- **UL 94 HB Series:** Horizontal flammability of plastic materials for parts in devices and appliances
- **UL 94 V Series:** Vertical flammability of plastic materials for parts in devices and appliances

The fire testing methods for **textiles**:

- **16 CFR Part 1610:** Flammability of clothing textiles
- **ASTM D2859:** Ignition characteristics of finished textile floor covering materials
- **CAL 133:** Flammability of office seating
- **FAR 25.853:** Flammability of aircraft seat cushions
- **FMVSS 302:** Testing for flammability of materials used in the occupant compartments of motor vehicles
- **NFPA 701:** Flame propagation of textiles and films

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- **UL 214:** Flame-propagation of fabrics and films

The fire testing methods for **transportation**:

- **ASTM E119:** Fire test of building construction and materials
- **ASTM E162:** Surface flammability of materials using a radiant heat energy source
- **ASTM D229:** Rigid sheet and plate materials used for electrical insulation
- **ASTM E662:** Specific optical density of smoke generated by solid materials
- **ASTM E1354:** Heat and visible smoke release rates for materials and products using an oxygen consumption calorimeter
- **ASTM D2303:** Liquid-contaminant, inclined-plane tracking and erosion of insulating materials
- **BSS 7239:** Toxic gas generation by materials on combustion
- **NFPA 130:** Fixed guideway transit and passenger rail systems
- **EN 45545:** Fire protection of railway vehicles
- **SMP 800C:** Fire testing for toxic gas generation
- **UL 94:** Flammability of plastic materials for parts in devices and appliances

The test methods for **furnishings**:

- **CAL 117, Sect A, Part I:** Flammability of upholstered furniture
- **CAL 117, Sect D, Part II:** Flammability of upholstered furniture
- **CAL 129:** Flammability of mattresses for use in public buildings
- **CAL 133:** Flammability of furniture for use in public buildings
- **CFR vol. 16, 1632.4:** Testing for flammability of mattresses and mattress pads
- **IMO A.652(16):** Fire testing for the flammability of upholstered furniture in marine environments
- **NFPA 258:** Smoke generation of solid materials
- **NFPA 264A:** Heat release rates for upholstered furniture components or composites and mattresses
- Other test methods include CAL 106, CAL 116 and CAL 121.

COMPLET TEST LISTING

At IGS Laboratories, we offer commercial testing services for a variety of commercial operations and industries. Some of our services include fire & flammability testing, materials testing, and more.

Product Safety Testing Methods

- 16 CFR Part 1610 - Flammability of clothing textiles
- AITM 2.0005 (7.1.6) - 60 degree flammability
- AITM 2.0007 - Smoke density (flaming)
- AITM 2.0008 - Optical smoke density
- AITM 3.0005 (7.4) - Toxicity
- API 607, 6A - Fire test for soft-seated quarter turn valves
- ASTM B117 - Salt spray exposure
- ASTM C1016 - Water absorption
- ASTM C109 - Compression strength of cement
- ASTM C1166 - Flame propagation of dense and cellular elastomeric gaskets and accessories
- ASTM C1363 exclude - Water absorption
- ASTM C177 - Thermal conductivity - guarded hot plate
- ASTM C201 - High-temperature thermal conductivity

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- ASTM C236 - Thermal conductivity - guarded hot box
- ASTM C335 - Heat transfer properties of horizontal pipe insulation
- ASTM C338 - Softening point of glass
- ASTM C351 - Mean specific heat
- ASTM C411 - Hot surface performance of high-temperature thermal insulation
- ASTM C473 - Environmental exposure
- ASTM C518 - Heat transfer properties - heat flowmeter
- ASTM C542 - Lock-strip gaskets
- ASTM C800 - Water repellency (11.8)
- ASTM D1002 - Shear strength for metal to metal
- ASTM D1037 - Linear variation w/ change in moisture content of wood-
- base fiber and particle materials
- ASTM D1055 - Specifications for flexible cellular materials - latex foam
- ASTM D1149 - Tests a material's ozone resistance by searching for the appearance of cracks
- ASTM D1239 - Melting index flow rate
- ASTM D1388 - Bending length and flexure rigidity
- ASTM D1474 - Indentation hardness of organic coatings
- ASTM D149 - Dielectric breakdown voltage and dielectric strength of solid electrical insulating materials at commercial power frequencies
- ASTM D150 - AC loss characteristics and permittivity (dielectric constant) of solid electrical insulation
- ASTM D1599 - Short-term hydraulic failure pressure of plastic pipes, tubes, and fittings
- ASTM D1621 - Compressive strength of rigid cellular plastics
- ASTM D1622 - Apparent density of rigid cellular plastics
- ASTM D1693 - Environmental stress-cracking
- ASTM D1822 - Tensile-impact energy
- ASTM D1929 - Determining ignition temperature of plastics
- ASTM D2017 - Accelerated wood decay
- ASTM D2020 - Mildew (fungal) resistance of paper and paperboard
- ASTM D2047 - Static coeff. of friction of polished-floor surfaces as measured by James Machine
- ASTM D2126 - Thermal and humidity aging (dimensional stability section)
- ASTM D2136 - Low-temperature bend test for coated fabrics
- ASTM D2240 - Shore hardness
- ASTM D229 - Rigid sheet and plate materials used for electrical insulation
- ASTM D2303 - Liquid-contaminant, inclined-plane tracking and erosion of insulating materials
- ASTM D2303 - Tracking resistance
- ASTM D256 - Izod impact, Method A
- ASTM D2563 - Classifying visual defects in glass-reinforced plastic laminate parts
- ASTM D257 - DC resistance of conductance of insulating materials
- ASTM D2583 - Indentation hardness of rigid plastics by means of a Barcol Impresser
- ASTM D2584 - Ignition loss of cured reinforced resins
- ASTM D2842 - Water absorption of cellular plastics
- ASTM D2843 - Density of smoke from the burning or decomposition of plastics
- ASTM D2859 - Ignition characteristics of finished textile floor covering materials
- ASTM D2863 - Measuring the minimum oxygen concentration to support candle-like combustion of plastics (oxygen index)
- ASTM D3014 - Flame height, time of burning, and loss of mass of rigid thermoset cellular plastics in a vertical position
- ASTM D3039 - Tensile properties of polymers
- ASTM D3065 - Flammability of aerosol products
- ASTM D3171 - Fiber content of resin-matrix composites by matrix digestion

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- ASTM D3273 - Resistance to mold
- ASTM D3359 - Tape adhesion
- ASTM D3410 - Compressive properties of polymers
- ASTM D3418 - Transition temperature
- ASTM D3574 - Test methods for flexible cellular materials
- ASTM D3675 - Surface flammability of flexible cellular materials using a radiant heat energy source
- ASTM D3801 - Measuring the comparative burning characteristics of solid plastics in a vertical position
- ASTM D3874 - Ignition of materials by hot wire sources
- ASTM D4060 - Taber abrasion
- ASTM D4103 - practice for preparation of substrate surfaces for coefficient of friction testing
- ASTM D412 - Die C-tensile properties
- ASTM D4226 - Impact resistance of rigid PVC building products (Methods A and B)
- ASTM D445 - Kinematic viscosity of liquids
- ASTM D4518 - Measuring static friction of coating surfaces
- ASTM D4541 - Pull-off strength of coatings using portable adhesion-testers
- ASTM D4565 - Cold bend
- ASTM D4742 - O2 stability of gasoline engine oils by Thin Film Oxygen
- ASTM D4804 - Determining the flammability characteristics of nonrigid solid plastics
- ASTM D523 - Specular gloss
- ASTM D570 - Water absorption
- ASTM D573 - Accelerated aging of rubber in an air oven
- ASTM D5942 - Charpy impact
- ASTM D624 - Die C-tear strength
- ASTM D635 - Rate of burning and/or extent and time of burning of plastics in a horizontal position
- ASTM D638 - Tensile strength
- ASTM D695 - Compressive properties
- ASTM D696 - Coefficient of linear thermal expansion
- ASTM D750 - Carbon arc weathering
- ASTM D751 - Tongue tear, grab tensile, strip tensile, low temp bend, & adhesion for coated fabrics
- ASTM D790 - Flexural properties
- ASTM D93 - Flash point by Pensky-Martens closed cup tester
- ASTM D952 - Bond strength
- ASTM E108 - Roof coverings fire test (small scale)
- ASTM E1131 - Mass loss over temperature range
- ASTM E119 - Fire test of building construction and materials
- ASTM E1225 - Thermal conductivity of solids; guarded-comparative-longitudinal heat flow technique
- ASTM E1317 - Flammability of marine surface finishes
- ASTM E1321 - Determining material ignition and flame spread properties
- ASTM E1354 - Heat and visible smoke release rates for materials and products using an oxygen consumption calorimeter
- ASTM E136 - Behavior of Materials in a Vertical Furnace at 750 °C
- ASTM E152 - Fire tests of door assemblies
- ASTM E1529 - Determining effects of large hydrocarbon pool fires on structural members and assemblies
- ASTM E162 - Surface flammability of materials using a radiant heat energy source
- ASTM E163 - Fire tests of window assemblies
- ASTM E1782 - Vapor pressure by thermal analysis
- ASTM E2058 (FM 4910) [Modified] - Measurement of material flammability using a fire propagation apparatus
- ASTM E2072 - Specification for photoluminescence
- ASTM E228 - Linear thermal expansion using a dilatometer

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- ASTM E23 - Notched bar Charpy impact testing for metallic materials
- ASTM E303 - Slip resistance
- ASTM E424, Method A - Solar energy transmittance and reflectance of sheet materials
- ASTM E603 - Room fire experiments
- ASTM E648 - Critical radiant flux of floor-covering systems using a radiant heat energy source
- ASTM E659 - Autoignition temperature of chemicals
- ASTM E662 - Specific optical density of smoke generated by solid materials
- ASTM E681 - Concentration limits of flammability of chemicals (vapors and gases)
- ASTM E761 - Compressive strength of SFRM applied to structural members
- ASTM E814 - Through-penetration fire stop test
- ASTM E831 - Linear thermal expansion by thermomechanical analysis
- ASTM E84 - Surface burning characteristics of building materials
- ASTM E859 - Air erosion of sprayed fire-resistive materials applied to structural members
- ASTM E906 - Heat release rates for materials and products
- ASTM E937 - Corrosion of steel by sprayed fire-resistive materials applied to structural members
- ASTM E96 - Water vapor transmission
- ASTM F1344 - Specification for rubber floor tile
- ASTM F814 - Specific optical density of smoke generated by solid materials for aerospace applications
- ASTM G12 - Nondestructive measurement of film thickness of pipeline coatings on steel
- ASTM G14 - Impact resistance of pipeline coatings
- ASTM G152: Induces moisture, heat and sunlight via carbon arc weathering for non-metallic items
- ASTM G153: Uses enclosed carbon arc light and water apparatus for accelerated weathering
- ASTM G154: Creates an accelerated weathering scenario through a QUV test chamber
- ASTM G155: Exposes non-metallic materials to weather conditions via a xenon arc light
- ASTM G21 - Resistance of synthetic polymeric materials to fungi
- ASTM G22 - Resistance to bacteria
- ASTM G26 - Xenon-Arc light and water exposure for non-metals
- ASTM G42 - Test methods for cathodic disbonding of pipeline coatings subjected to elevated temps
- ASTM G53 - QUV light and condensation exposure for non-metals
- ASTM G56 - Abrasion
- ASTM G62 - Holiday detection in pipeline coatings
- ASTM G8 - Test methods for cathodic disbonding of pipeline coatings
- ATS 1000.001 - Flammability, smoke, toxicity, and heat release
- BIFMA X5.7 - Seating flammability
- BMS 13-48 - Extruded cross-linked ETFE aircraft cable
- BSS 7230 - Flammability testing of aircraft materials to FAR Part 25, Appx F, Part 1
- BSS 7238 - Optical smoke density
- BSS 7239 - Toxic gas generation
- BSS 7322 - Rate of heat release using OSU
- BSS 7324 - 60-degree flammability, smoke, and toxicity
- CAL 106
- CAL 116
- CAL 117, Sect A, Part I - Flammability of upholstered furniture
- CAL 117, Sect D, Part II - Flammability of upholstered furniture
- CAL 121
- CAL 129 - Flammability of mattresses for use in public buildings
- CAL 133 - Flammability of furniture for use in public buildings
- CFR vol. 16, 1632.4 - Flammability of mattresses and mattress pads
- CPAI 84 - Flame-resistant materials used in camping tentage

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- DIN 4102, Part 1, Class A1 - Fire testing to building material (non-combustible materials)
- DIN 51900, Method 2 - Gross calorific value and calculating net calorific value
- DOT 173.338-18(b)(7) - Flammability using a red hot platinum wire
- Electrical Resistance
- Electron Microscopy — Determination of heavy metals and organic complexes
- EN 45545 - Fire protection of railway vehicles
- FAA/FAR 25.853 - Flammability requirements for aircraft seat cushions
- FAA/FAR 25.855 - Flammability requirements for aircraft interiors
- FAR AC 20-135 - Fireproof and fire resistance of propulsion systems
- FAR 25.853 - Flammability of aircraft seat cushions
- FED STD 191A, Method 5903.1 - General physical, chemical, and biological testing for textiles
- FED STD 191A, Method 5903.2 - General physical, chemical, and biological testing for textiles
- FM 4922 - Fume exhaust ducts or fume and smoke exhaust ducts
- FMVSS 302 - Flammability of materials used in the occupant compartments of motor vehicles
- Fungus
- IEC 1034 (1,2) - Measurement of smoke density of electric cables burning under defined conditions
- IEC 331 - Test on electric cables under fire condition
- IEC 332-1 - Test on electric cables under fire condition
- IEC 332-3 - Test on electric cables under fire condition
- IEC 60332-1-2 - Electrical Cable Flammability Test
- IEC 60587 - Electrical Insulating Materials Test
- IEC 695-2-2 - Fire hazard testing, needle flame test
- IEC 754-1 - Test on gases evolved during combustion of materials from cables
- IEC 754-2 - Test on gases evolved during combustion of materials from cables
- IEEE 383 - Class 1E electric cables and field splices for nuclear power generating stations
- IEEE 45 - Recommended practice for electric installations on shipboard
- IEEE 1202 - Standardized Flame Testing of Cables
- IMO A.652(16) - Test for upholstered furniture
- IMO A.653(16) - Surface flammability of materials
- IMO MSC 41 (64) - Measuring smoke and toxic products of combustion
- IR Analysis - Infrared spectroscopy analysis of organic material
- ISO 1182 - Reaction to fire tests for products
- ISO 15370 - Low-location lighting
- ISO 1716 - Determination of the gross heat of combustion (calorific value)
- ISO 17398 - Safety colors and safety signs
- ISO 4589-2 - Determination of burning behavior by oxygen index, ambient temperature test
- ISO 5658-2 - Lateral spread on building and transport products in vertical configuration
- ISO 5659-2 - Determination of optical density by a single-chamber test
- ISO 5660 - Heat release rate (cone calorimeter method) and smoke production rate (dynamic measurement)
- ISO 8256 - Tensile-impact strength
- ISO 834-1 - Elements of building construction
- ISO 9705 - Full-scale room test for surface products
- MIL C-24643 Fluid immersion - JP5, Hydraulic fluids, etc.
- MIL-C-13486B - Salt water exposure
- MIL-DTL 24640 - Cables, electric, low smoke halogen-free, for shipboard use
- MIL-DTL 24643 - Cables, electric, low smoke halogen-free, for shipboard use
- MIL-P-8053C - Shear strength of plywood and metal-to-plywood bonds
- MIL-STD-2031 - Fire and toxicity
- MIL-STD-810 - Tests of Rugged Computing Equipment

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- MIL-STD-202 - Test protocol for all system components and products with printed circuit boards
- NES (DEF) 711 - Determination of the smoke index of the products of combustion from small specimens of materials
- NES (DEF) 713 - Determination of the toxicity index of the products of combustion from small specimens of materials
- NES 715 - Temperature index of small specimens of material
- NFPA 130 - Fixed guideway transit and passenger rail systems
- NFPA 1971 - Protective ensembles for structural fire fighting and proximity fire fighting
- NFPA 225 - Model manufactured home installation
- NFPA 252 - Fire tests of door assemblies
- NFPA 258 - Smoke generation of solid materials
- NFPA 259 - Potential heat of building materials
- NFPA 264A - Heat release rates for upholstered furniture components or composites and mattresses
- NFPA 286 - Fire test for evaluating wall and ceiling room fire growth
- NFPA 701 - Flame propagation of textiles and films
- NFPA 705
- NFPA 80 - Fire doors and other opening protectives
- NF X 70-100 - Toxicity test assesses corrosive or toxic products during combustion or decomposition
- S. Coast Guard PFM-2-98 - Deck grating standards
- SMP 800C - Toxic gas generation
- UBC 26-2 - Evaluation of thermal barriers
- UBC 26-3 - Room fire test for interior of foam plastic systems
- UBC 42-2 - Evaluating room fire growth contribution of textile wall coverings
- UBC 8-2 - Evaluating room fire growth contribution of textile wall coverings
- UL 10B - Fire test of door assemblies
- UL 10C - Positive pressure fire test of door assemblies
- UL 1479 - Fire tests of penetration firestops
- UL 1685 - Vertical-tray fire-propagation and smoke-release test for electrical and optical-fiber cables
- UL 1709 - Rapid rise fire test of protection materials for structural steel
- UL 1715 - Fire test of interior finish material
- UL 2043 - Fire test for heat and smoke release
- UL 214 - Flame-propagation of fabrics and films
- UL 2335 - Fire tests of storage pallets
- UL 263 - Fire test of building construction and materials
- UL 555 - Fire dampers test
- UL 72 - Fire resistance of record protection equipment (fire resistance portion only)
- UL 723 - Surface burning characteristics of building materials
- UL 790 - Fire resistance of roof covering materials (small scale)
- UL 9 - Fire test of window assemblies
- UL 94 HB Series - Horizontal flammability of plastic materials for parts in devices and appliances
- UL 94 V Series - Vertical flammability of plastic materials for parts in devices and appliances
- UL 94 - Flammability of plastic materials for parts in devices and appliances
- UL VW-1 - Vertical flame test