

Automotive Interior Materials Flammability Test



The increasing automotive-related explosion and pyrophoric incidents in recent years had raised public concerns over safety conformity of automotive performance and automotive interior materials. In any case, automotive combustion or explosion can cause severe personal injuries or even fatalities, therefore automotive and automotive interior material manufacturers have to ensure their products meet the national flammability regulations and requirements. Recently the Ministry of Industry & Information Technology (MIIT) in China has issued penalties to numerous automotive enterprises who failed to comply with flammability regulations.

To minimize the risk of injuries attributable to flammability risk factors or combustible substances contained in automotive interior materials, MIIT has announced the new national standard on 'Flammability of Automotive Interior Materials'. The new standard applies to various automotive interior materials including textile, electrical and electronic accessories, as well as other furnishing items for vehicle interior decorations.

International Flammability Standards for Automotive Interior Materials

Country/Region	Testing Item	Testing Standard
ISO	Flammability Performance	ISO 3795 Road Vehicles, and Tractors and Machinery for Agriculture and Forestry-Determination of Burning Behaviour of Interior Materials
EU	Flammability	95/28/EC Fire Test for Interior Materials of Motor Vehicles
Germany	Flame Test	DIN 75200 Determination of Flammability Performance on Interior Material of Motor Vehicles
USA	Flame Test	FMVSS 302 Flammability of Materials used in the Occupant Compartments of Motor Vehicles
	Horizontal Flame Test	ASTM D 5132 Standard Test Method for Horizontal Burning Rate of Polymeric Materials Used in Occupant Compartments of Motor Vehicles
	Vertical Flame Test	FTMS 5903 The United States Federal Testing Methods: 5903 Flammability Testing
	Horizontal Flame Test	FTMS 5906 The United States Federal Testing Methods: 5906 Flammability Testing
	Horizontal Flame Test	SAE J369-2007 Flammability of Polymeric Interior Materials
Canada	Flame Test	CMVSS302 Flammability of Interior Materials
Japan	Automotive Interior Materials	JIS D 1201 Flammability of Organic Interior Materials for Automobiles
China	Horizontal Flame Characteristic	GB 8410-2006 Flammability of Automotive Interior Materials
	Vertical Flame Characteristic	GB/T 32086-2015 Requirement of Vertical Flammability Characteristic and Test Method for Certain Category Automobile Interior Material
	Smoke Density Grade (SDR)	GB/T 8627-2007 Test Method for Density of Smoke from the Burning or Decomposition of Building Materials
	Limited Oxygen Index (LOI)	GB/T 5454-1997 Textiles-Burning behaviour-Oxygen Index Method
	Needle Flame Test	GB/T 5169.5-2008 Fire Hazard Testing for Electric and Electronic Products-Part 5: Flames-Needle Test Method-Apparatus, Confirmatory Arrangement and Guidance
	Glow-Wire Test	GB/T 5169.11-2006 Fire Hazard Testing for Electric and Electronic Products-Part 11: Glowing/Hot-wire Based Test Methods-Glow-wire Flammability Test Method for End-Products
	50W Horizontal and Vertical Flame Test	GB/T 5169.16-2008 Fire Hazard Testing for Electric and Electronic Products-Part 16: Test Flames-50W Horizontal and Vertical Flame Test Methods
	Resistance to Secondary	GB/T 25085-2010 Road Vehicles-60V and 600V Single-core Cables

Country/Region	Testing Item	Testing Standard
Industry Standards	Flammability	BMW-N 60121.0 Bayerische Motoren Werke AG Standards
		BMW-N 60121.0 Mercedes-Benz-Interior Trim Parts Requirements and Test Specifications
		GM-L-T06-302G-79 General Motors Corporation, GM Standards
		VW-TL-1010 Vehicle Interiors Burning Behavior
		MITSUBISHI ES-X60410 Mitsubishi-Oxygen Index Test
		VOLVO STD 5031 Volvo-Flammability of Interior Materials

The Requirements of China National Standard (GB) on the Flammability Characteristic for Vehicle Interior Textile Materials.

Material(s)		Technical Requirements			
		Horizontal Flame (mm/min)	Vertical Flame (mm/min)	Limit Oxygen Index (%)	Smoke Density Grade (SDR)
		GB 8410-2006	GB 32086-2015	GB/T 5454-1997	GB/T 8627-2007
Textile Materials	Curtain, shade and other hanging materials	Not less than B ^①	≤100	≥30	≤75
	Used for seats and others			≥27	

① According to the technical requirements of GB 8410-2006, the burning speed of automobile interior materials should not exceed 100 mm/min, the burning distance and burning rate of automobile materials are divided into 5 grades: A/B/C/D/E.

The Requirements of China National Standard (GB) on the Flammability Characteristic for Vehicle Interior Electrical and Electronic Products.

Material(s)	Technical Requirements				
	Needle Flame Test (s)	Glow-Wire Test (s)	50W Horizontal and Vertical Flame Test		Resistance to Secondary
	GB/T 5169.5-2008	GB/T 5169.11-2006	GB/T 5169.16-2017		GB/T 25085-2010
			Horizontal Flame Test	Vertical Flame Test	
Electrical and Electronic Products	$t_b < 30$ ^②	$t_e \leq t_a + 30s$ ^③	Level HB ^④	Level V-0 ^④	The flame extinguishes in 70s, at least 50 mm insulation shall be retained at the end of the sample.

② According to the needle flame test requirements of GB/T 5169.5-2008, $t_b < 30s$, after removal of the needle-flame, the duration of flame or heat in test samples and surrounding components should be within 30s, fallen or burning particles should not spread flames to surrounding components or to specified bottom layer or packaging silk paper.

③ According to the technical requirements of GB 5169.11-2016, the flame extinction time for the glow-wire test (T_e) should not exceed the total time including the initiative burning time (T_a , it's usually set to 30 seconds) and sustained burning time (T_i).

④ Flame Rating (From HB, V-2, V-1 to V-0 increasing gradually)

- HB: For samples 3 to 13mm thick, the combustion rate is less than 40mm per minute, samples less than 3mm thick, the combustion rate is less than 70mm per minute, or extinguishes before 100mm mark.
- V-2: After two 10-second flame tests on the sample, the flame extinguishes in 60 seconds, allowing flaming particles to fall off.
- V-1: After two 10-second flame tests on the sample, the flame extinguishes in 60 seconds, does not allow flaming particles to fall off.
- V-0: After two 10-second flame tests on the sample, the flame extinguishes in 30 seconds.

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