CORIAN® SOLID SURFACE FIRE PERFORMANCE

Introduction

This technical bulletin discusses the fire performance of Corian® Solid Surface. Fire performance results are specific to the standard tested. It is important to understand which standard is appropriate and the meaning of the results. Standards are applicable for the regions specified, but may be used as material specifications in other regions.

A. Fire performance

	STANDARD	REGION	MATERIAL	CLASS/RESULT
Caloric Potential	EN ISO 1716	Europe (CEN Member States)	Glacier White, 12 mm	9,5 KJ/g
Reaction to fire – Building materials	EN 13501-1	Europe (CEN Member States)	Standard grade 6 & 12 mm, all colours	Euroclass C-s1, d0
			Made in USA, FR-Grade 12mm, all colours	Euroclass B-s1, d0
			Made in PRC, 12 mm, Glacier White	
			Deep Colour™ Technology, 12mm, all colours	
Marine	IMO MED – Marine Equipment Directive 2014/90/EU	Ships registered under the flags of the European Union Member States	Made in USA, FR-Grade, 12 mm, solid colours	Module B and Module D for MED/3.18a (see details in B.3.)
	46 CFR Part 164.117	United States	Made in USA, FR-Grade, 12 mm, solid colours	USCG Module B
Rolling Stock (Railway)	EN 45545-2	Europe (CEN Member States)	Standard Grade, 12 mm, all colours	R2 (HL1, HL2, HL3)
			Deep Colour™ Technology, 12mm, all colours	R1 (HL1, HL2) R2 (HL1, HL2, HL3)
			Made in USA, FR-Grade 12 mm, all colours	R1 (HL1, HL2) R2 (HL1, HL2, HL3)
			Standard grade, 6 mm solid colours	R1 (HL1, HL2) R2 (HL1, HL2, HL3)
Flammability of Interior Materials, Motor Vehicles	FMVSS 302	United States	Standard Grade, 6 &12 mm, all colours	Pass, Does not ignite
	CMVSS 302	Canada		
Flammability, Surface Burning Characteristics of Building Materials	NFPA 101® Life Safety Code®	United States	Standard Grade, 6 &12 mm, all colours	Class A
Flame Spread Index Surface Burning Characteristics of Building Materials	ANSI/UL 723 (ASTM E 84, NFPA 255)	United States	Standard Grade, 6 &12 mm, all colours	Flame Spread Index FSI <25 Smoke Developed Index SDI <25 UL File Num. BTAT.R19169
Flame Spread Surface Burning Characteristics of Flooring, Floor Covering, and Miscellaneous Materials	CAN/ULC-S102.2	Canada	Standard Grade, 6 &12 mm, all colours	Flame Spread Value 0 Smoke Developed Value 5 UL File Num. BTLIC.R19169
Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances	UL-94	United States	Standard Grade, 6 &12 mm, all colours	V-0 5VA

B. Fire performance Standards

B.1. ISO EN 1716

EN 1716 is used to determine the potential maximum heat release of a material that is completely burned under high pressure in a pure oxygen atmosphere.

B.2. EN 13501-1

EN 13501-1 standard describes the European classification for the reaction to fire of building materials.

Classification is based on the material's behaviour in reference scenarios. The classification for wall and ceiling materials is based on the contribution to fire development the material will give in a scenario with a fire starting in a small room by a single burning object (SBI).

	FIRE BEHAVIOUR CLASSIFICATION
Class A1	Non-combustible materials that will not contribute to the fire growth or to the fire
Class A2	Low-combustible materials that will not significantly contribute to the fire growth and fire load
Class B	Materials that will not lead to a flashover, however they can contribute to the fully developed fire after 20 minutes
Class C	Materials that may lead to a flashover only after more than 10 minutes
Class D	Materials that may lead to a flashover within 10 minutes
Class E	Materials that may quickly lead to a flashover situation, within the first two minutes of the test
Class F	No performance determined
	SMOKE CONTRIBUTION
s1	Little or no smoke
s2	Medium smoke
s3	Large smoke contribution
	BURNING DROPLETS
d0	No droplets
d1	Droplets
d2	Many droplets

B.3. Marine (IMO MED/United States Coast Guard)

Marine Equipment Directive (MED) 2014/90/EU, covers certain equipment and materials used in ships registered under the flags of the European Union Member States. MED was established to ensure that equipment and materials comply with the requirements of International Conventions e.g. Safety of Life at Sea, 1974 (SOLAS) as agreed upon by the International Maritime Organisation (IMO).

IMO MED – Module B and Module D. Both Module B and Module D are mandatory for certain materials used on ships. Module B certification by a Notified Body indicates that the material complies with criteria given in the standard IMO Res. MSC.307 (88)-(2010 FTP Code) Annex 1 Part 2 and Part 5. Corian® Solid Surface (FR-Grade, U-Series, Solid Colours, 12 mm) is certified compliant with the requirements for regulation item *MED/3.18a Surface Materials And Floor Coverings With Low Flame-Spread Characteristics: Decorative Veneers*.

Module D, which is linked to ISO 9001 certification, covers the overall manufacturer's production processes, quality management and systems used.

A manufacturer is allowed to affix the **United States Coast Guard** approval number (USCG Approval Category/NB number/ Unique Identifier) as allowed by the "Agreement between the European Community and the United States of America on Mutual Recognition of Certificates of Conformity for Marine Equipment" signed on 27 February 2004 and amended by Decision No.1/2018 dated 18 February 2019.

B.4. EN 45545-2

The Technical Committee CEN/TC 256 "Railway Applications" on behalf of the European Commission developed a new classification system for European rail fire safety requirements using fire safety regulations for railway vehicles from the International Union of Railways (UIC) and different European countries. The specifications for the reaction to fire performance requirements for materials and products used on railway vehicles are defined in EN 45545-2 (Railway applications - Fire protection on railway vehicles - Part 2: Requirements for fire behaviour of materials and components).

HAZARDS LEVEL (HL) CLASSIFICATION BY OPERATION CATEGORY WITH RESPECT TO DESIGN CATEGORY

	DESIGN CATEGORIES			
Operation Categories	N Standard Vehicle	A Automatic vehicle with no emergency trained staff on board	D Double decked vehicles	S Sleeping/couchette vehicles (Single or double decked)
1	HL1	HL1	HL1	HL2
2	HL2	HL2	HL2	HL2
3	HL2	HL2	HL2	HL3
4	HL3	HL3	HL3	HL3

Rail vehicles are divided into operation categories. These categories describe the infrastructure and the evacuation possibilities.

Design categories for vehicles are N - standard vehicles, A - automatic vehicles with no emergency trained staff on board, D - double decked vehicles and S - sleeping/ couchette vehicles. Vehicles used for freight are excluded.

Hazards level classification is based on performance of materials evaluated in accordance with EN ISO 5658-2 Lateral Spread of Flame Test, ISO 5660-1 Heat Release (Cone Calorimeter Method), EN ISO 11925-2 Ignition When Subjected to Direct Impingement of Flame and EN ISO 5659-2 Plastics – Smoke NF X70-100 parts 1 and 2 Smoke Toxicity.

B.5. FMVSS 302, CMVSS302

Federal Motor Vehicle Safety Standards (FMVSS) are USA federal safety regulations used for specifying the construction, performance, design and durability of motor vehicles. Canada Motor Vehicle Safety Standards (CMVSS) overlap substantially with the FMVSS. Standard 302 (FMVSS 302, CMVSS 302), Flammability of Interior Materials, is used to specify and test burn resistance of materials such as seat covers, instrument panel padding, etc. within 13 mm (0.5 inches) of interior compartment air space of the occupant. Standard 302 specifies that materials are not to burn or transmit a flame front across the surface of the material at a rate of more than 101.6 mm (four inches) per minute. ISO 3795 and ASTM D5132 are technically equivalent to Standard 302.

B.6. ANSI/UL 723 (ASTM E84, NFPA 255)

The ANSI/UL 723 (ASTM E84, NFPA 255) Surface Burning Characteristics of Building Materials standard is used to determine the relative surface burning characteristics of materials used as coverings for walls and ceilings. The test provides a means to describe a material's fire and heat response during a controlled burn. A photometer is used to indicate changes resulting from effluents, particulates or smoke. The distance travelled by the flame is used to calculate the Flame Spread Index (FSI). Flame spread ratings offer a general indication of the speed with which fire might spread across the surface of a material. The amount of smoke generated during the burn is measured optically and is used to calculate the Smoke Developed Index (SDI).

Fire performance is based on the test results in accordance with the NFPA 101, Life Safety Code® material classification. For all Interior Finishes, a flame spread rating of less than 25 results in a Class A classification if the smoke developed rating is less than 450. Any material with smoke developed rating greater than 450 is not classifiable.

NFPA 101, Life Safety Code®

CLASSIFICATION	FLAME SPREAD INDEX	SMOKE DEVELOPED INDEX
Class A	0-25	<450
Class B	26-75	<450
Class C	76-200	<450

B.7. CAN/ULC S-102, CAN/ULC S-102.2

The National Building Code of Canada requires that building materials be tested in accordance with CAN/ULC S102. The ULC S102 surface burning characteristics test for building materials is applicable to any type of building material that is capable of supporting itself in a manner comparable to its recommended use. Other types of materials which cannot be tested without the use of supporting material may be tested and classified in accordance to CAN/ULC-S102.2. Corian® Solid Surface, due to its thermoforming characteristics, does require supporting structure; therefore CAN/ULC-S102.2 applies.

B.8. UL-94

The UL 94: Flammability of Plastic Materials for Parts in Devices and Appliances standard relates to materials commonly used in manufacturing enclosures, structural parts and insulators found in consumer electronic products.

	UL-94 RATINGS
UL 94-5VA	Surface Burn; Burning stops within 60 seconds, test specimens MAY NOT have a burn-through (no hole). This is the highest (most flame retardant) UL 94 rating.
UL 94-5VB	Surface Burn; Burning stop within 60 seconds, test specimens MAY HAVE a burn-through (A hole may be present).
UL 94 V-0	Vertical Burn; Burning stops within 10 seconds, NO flaming drips are allowed.
UL 94 V-1	Vertical Burn; Burning stops within 60 seconds, NO flaming drips are allowed.
UL 94 V-2	Vertical Burn; Burning stops within 60 seconds, Flaming drips ARE allowed.
UL 94 H-B	Horizontal Burn; Slow horizontal burn test (H-B) are considered “self-extinguishing”. The lowest (least flame retardant) UL94 rating.

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