CORIAN® DESIGN

Make Your Space™

DUPONT™ CORIAN® FIRE PERFORMANCE

INTRODUCTION

This technical bulletin discusses the fire performance of DuPont™ 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 MJ / kg
Euroclass Reaction to fire	EN 13501-1	Europe (CEN member States)	Standard grade 6 and 12 mm, All colours	Euroclass C-s1,d0
Euroclass Reaction to fire	EN 13501-1	Europe (CEN member States)	FR-Grade 12 mm all colours	Euroclass B-s1,d0
Euroclass Reaction to fire	EN 13501-1	Europe (CEN member States)	Wide sheets* 6 and 12 mm	Euroclass B-s1,d0
Euroclass Reaction to fire	EN 13501-1	Europe (CEN member States)	12 mm, Deep Anthracite, Deep Cloud, Deep Espresso, Deep Nocturne, Deep Sable and Deep Titanium	Euroclass B-s1,d0
Marine	IMO MED – Marine Equipment Directive (European Directive 96/98/EC)	Ships registered under the flags of the European Union Member States	FR-Grade 12 mm, solid colours	Module B and Module D Certified: Certificate Nr. MED140414CS and Certificate Nr. MED003114NJ/002
Marine Smoke and Toxicity	IMO FTPC Part 2 (ISO 5659-2)	Global, Marine Applications	FR-Grade 12 mm, solid colours	Certified to meet requirements of IMO FTPC Part 2
Railway	EN 45545 (CEN/ TS 45545-2)	Europe (CEN member States)	Wide sheets 12 mm*	R1 (HL1, HL2, HL3) R2 (HL1, HL2, HL3)
Flammability of Interior Materials, Motor Vehicles	FMVSS 302	United States	6 mm and 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	6 mm and 12 mm, all colours	Class A
Flame Spread Index Surface Burning Characteristics of Building Materials	ANSI/UL 723 (ASTM E84, NFPA 255)	United States	6 mm and 12 mm, all colours	Flame Spread Index FSI <25
Smoke Developed Index Surface Burning Characteristics of Building Materials	ANSI/UL 723 (ASTM E84, NFPA 255)	United States	6 mm and 12 mm, all colours	Smoke Developed Index SDI <25
Flame Spread Surface Burning Characteristics of Flooring, Floor Covering, and Miscellaneous Materials	CAN/ULC-S102.2	Canada	6 mm and 12 mm, all colours	Flame Spread Value 0
Smoke Developed. Surface Burning Characteristics of Flooring, Floor Covering, and Miscellaneous Materials	CAN/ULC-S102.2	Canada	6 mm and 12 mm, all colours	Smoke Developed Value 5

* Country of Origin - Turkey

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. IMO MED

Marine Equipment Directive (MED), Marine Equipment Directive 96/98/EC (MED), 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). Approval requirements are harmonised therefore certificates issued in one Member State are accepted by all Member States across the EU.

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 Fire Test Procedures Code 1998 (IMO MSC 61(67). Module D, which is linked to ISO 9001 certification, covers the overall manufacturer's production processes, quality management and systems used. Corian® FR solid colours are Module B and Module D Certified by RINA, Notified Body N° 0474.

IMO FTPC Part 2: Smoke and Toxicity (ISO 5659-2). here material is required to not be capable of producing excessive quantities of smoke and toxic products or not to give rise to toxic hazards at elevated temperatures then IMO FTPC Part 2 applies. This test is specific for surface materials used for bulkheads, ceilings and similar exposed surfaces such as floor coverings.

The specific optical density should not exceed specified limits, and the gas concentration measured in any test mode should not exceed these specified limits:

CO 450ppm
HF 600ppm
HCI 600ppm
HCN 140ppm
NO_2 350ppm
SO_2 120ppm
HBr 600ppm

B.4. EN 45545-2 (CEN/TS 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 CEN/TS 45545-2 Part 2 (Requirements for fire behaviour of materials and components). CEN/TS 45545-2 became the harmonised standard EN 45545-2 for "Fire Safety in Railway Vehicles".

Railway Vehicle Operation Category	
R1	vehicles that are not designed or equipped to run on underground sections, tunnels and/or elevated structures
R2	vehicles that are designed or equipped to run on underground sections, tunnels and/or elevated structures, and where there are stations or emergency stations reachable within a short running time
R3	vehicles that are designed or equipped to run on underground sections, tunnels and/or elevated structures, and where there are stations or emergency stations reachable within a long running time
R4	vehicles that are designed or equipped to run on underground sections, tunnels and/or elevated structures, and where there is no possibility of evacuation

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.

Hazards Level 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)
R1	HL1	HL1	HL1	HL2
R2	HL2	HL2	HL2	HL2
R3	HL2	HL2	HL2	HL3
R4	HL3	HL3	HL3	HL3

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

Underwriters Laboratories evaluated DuPont™ Corian® solid surface and provided flame spread and smoke developed rating in accordance with ANSI/UL 723 results. DuPont™ Corian® solid surface sheets up to ½ inch (12.3 mm) thick maximum gauge have a Flame Spread Index of 20 and Smoke Developed Index of 10 and are UL Listed under UL File number BTAT.R19169.

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. Underwriters Laboratories of Canada evaluated DuPont™ Corian® solid surface and classified the product as to surface burning characteristics in accordance with CAN/ULC-S102.2. DuPont™ Corian® solid surface sheets up to 12.3 mm thick maximum gauge have a Flame Spread Value of 0 and Smoke Developed Value of 5 and are ULC Listed under ULC File number BTLIC.R19169.

K-28300-EMEA/UK-9/17