

RAPPORTO DI CLASSIFICAZIONE N. 414413

CLASSIFICATION REPORT No. 414413

Cliente / Customer

KEMICHAL S.r.l.

Via dell'Artigianato, 2 - 35010 TREBASELEGHE (PD) - Italia

Oggetto / Item#

vernice ignifuga intumescente lucida denominata "LCV851RFX"
glossy intumescent flame-retardant paint named "LCV851RFX"

Attività / Activity

classificazione al fuoco dei materiali
secondo la norma UNI EN 45545-2:2020

fire classification of materials
in accordance with standard UNI EN 45545-2:2020

Risultati / Results

SODDISFA
FULFILLS

il livello di rischio HL3 per i requisiti R1 / R7
the hazard level HL3 for the requirements R1 / R7



(#) secondo le dichiarazioni del cliente.
according to that stated by the customer.

Bellaria-Igea Marina - Italia, 6 marzo 2024
Bellaria-Igea Marina - Italy, 6 March 2024

L'Amministratore Delegato
Chief Executive Officer

Commessa:

Order:
99585

Luogo dell'attività:

Activity site:

Istituto Giordano S.p.A. - Strada Erbosca Uno, 80 -
47043 Gatteo (FC) - Italia

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The results relate only to the item examined, as received, and are valid only in the conditions in which the activity was carried out.

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Responsabile Tecnico: / Chief Technician:

Dott. Sacha Oliva

Responsabile del Laboratorio di Reazione al Fuoco /

Head of Reaction to Fire Laboratory:

Dott. Ing. Giombattista Traina

Compilatore: / Compiler: Francesca Manduchi

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Descrizione dell'oggetto classificato[#]

Description of classified item[#]

Descrizione generale dell'oggetto <i>General description of the item</i>	Densità superficiale (spessore umido applicato) <i>Surface density (wet thickness applied)</i> [kg/m ²]	Colore <i>Colour</i>
vernice ignifuga intumescente lucida <i>glossy intumescent flame-retardant paint</i>	0,400	trasparente <i>clear</i>

Descrizione dei singoli componenti partendo dalla faccia esposta al fuoco <i>Description of individual components from the face exposed to fire</i>			
Descrizione <i>Description</i>	Denominazione <i>Name</i>	Densità superficiale (spessore umido applicato) <i>Surface density (wet thickness applied)</i> [kg/m ²]	Colore <i>Colour</i>
vernice lucida ignifuga "851 RFX" + catalizzatore "C340S" al 100 % <i>"851 RFX" flame-retardant glossy paint + "C340S" 100 % catalyst</i>	LCV851RFX	0,100	trasparente <i>clear</i>
fondo poliester Ignifugo "916 RFX" + accelerante "A2%" + catalizzatore "C2%" <i>"916 RFX" fireproof polyester primer + "A2%" accelerator + "C2%" catalyst</i>	PFV916RFX	0,120	trasparente <i>clear</i>
fondo poliester Ignifugo "916 RFX" + accelerante "A2%" + catalizzatore "C2%" <i>"916 RFX" fireproof polyester primer + "A2%" accelerator + "C2%" catalyst</i>	PFV916RFX	0,120	trasparente <i>clear</i>
vernice ancorante ignifuga "821 RF" (LA9SARF) + catalizzatore "C319" al 20 % (C5M) <i>fireproof anchor paint "821 RF" (LA9SARF) + "C319" catalyst 20 % (C5M)</i>	LCV821RF (LA9SARF)	0,060	trasparente <i>clear</i>

In allegato "A" è riportata la documentazione tecnica dell'oggetto fornita dal cliente.

The item technical documentation provided by the customer is given in annex "A".

(#) secondo le dichiarazioni del cliente. Istituto Giordano declina ogni responsabilità sulle informazioni e sui dati forniti dal cliente che possono influenzare i risultati.

according to that stated by the customer. Istituto Giordano declines all responsibility for the information and data provided by the customer that may influence the results.



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Riferimenti normativi

Normative references

Norma Standard	Titolo Title
UNI EN 45545-2:2020	Applicazioni ferroviarie - Protezione al fuoco per i rotabili ferroviari - Parte 2: Requisiti per il comportamento al fuoco di materiali e componenti <i>Railway applications - Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components</i>
ISO 5658-2:2006	Reaction to fire tests - Spread of flame - Part 2: Lateral spread on building and transport products in vertical configuration (<i>Prove di reazione al fuoco - Diffusione di fiamme - Parte 2: Spargimento laterale su prodotti di costruzione e trasporto in configurazione verticale</i>)
ISO 5658-2:2006/AMD 1:2011	//
UNI EN ISO 5659-2:2017	Materie plastiche - Generazione di fumo - Parte 2: Determinazione della densità ottica per mezzo di una prova a camera singola <i>Plastics - Smoke generation - Part 2 : Determination of optical density by a single-chamber test</i>
UNI EN 17084:2020	Applicazioni ferroviarie - Protezione al fuoco per i rotabili ferroviari - Prove di tossicità su materiali e componenti <i>Railway applications - Fire protection on railway vehicles - Toxicity test of materials and components</i>
ISO 5660-1:2015	Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 1: Heat release (cone calorimeter method) (<i>Prove di reazione al fuoco - Velocità di rilascio di calore, di produzione di fumo e perdita di massa - Parte 1: Rilascio di calore (metodo del cono calorimetrico)</i>)

Rapporti e risultati in supporto a questa classificazione

Reports and results in support of this classification

Rapporti

Reports

Nome del laboratorio Name of laboratory	Nome del cliente Name of customer	Rapporto di prova n. Test report No.	Norma di riferimento Standard under reference
Istituto Giordano S.p.A.	KEMICHAL S.r.l.	414410	ISO 5658-2:2006 ISO 5658-2:2006/AMD 1:2011
Istituto Giordano S.p.A.	KEMICHAL S.r.l.	414411	UNI EN ISO 5659-2:2017
Istituto Giordano S.p.A.	KEMICHAL S.r.l.	414411	UNI EN 17084
Istituto Giordano S.p.A.	KEMICHAL S.r.l.	414412	ISO 5660-1:2015



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Risultati in supporto alla classificazione

Results in support of this classification

Metodo di prova <i>Test method</i>	Rapporto n. <i>Report No.</i>	Parametri <i>Parameter</i>	Risultati <i>Results</i>
ISO 5658-2:2006 ISO 5658-2:2006/AMD 1:2011	414410	CFE (flusso critico all'estinzione) <i>CFE (critical flux at extinguishment)</i>	24,8 kW/m ²
UNI EN ISO 5659-2:2017	414411	Densità Ottica Specifica Massima (Ds max) <i>Maximum Specific Optical Density (Ds max)</i>	128,1
		Densità Ottica Specifica a 4 min (Ds 4 min) <i>Specific Optical Density at 4 min (Ds 4 min)</i>	99,4
		VOF4	164,0
UNI EN 45545-2:2020	414411	CIT _G a 4 min <i>CIT_G at 4 min</i>	0,01
		CIT _G a 8 min <i>CIT_G at 8 min</i>	0,03
ISO 5660-1:2015	414412	MARHE	37,8 kW/m ²

Classificazione

Classification

Riferimento di classificazione

Reference of classification

Questa classificazione viene definita in accordo con la norma UNI EN 45545-2:2020.

This classification is assigned in accordance with standard UNI EN 45545-2:2020.

Classificazione

Classification

In base ai risultati ottenuti dalle prove eseguite, l'oggetto:

As results from the tests carried out, the item:

SODDISFA il livello di rischio HL3 per i requisiti R1 / R7
FULFILLS the hazard level HL3 for the requirements R1 / R7



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Campo di applicazione

Field of application

Questa classificazione è valida per i seguenti parametri dell'oggetto:

This classification is valid for the following item parameters:

Densità superficiale (spessore umido applicato) <i>Surface density (wet thickness applied)</i>	0,400 kg/m ²
Tipo di substrato <i>Type of substrate</i>	impiallacciatura in legno incollata con colla "D3" alta resistenza al calore quantità 150 g/m ² su lastra di alluminio spessore nominale 3 mm <i>wood veneer glued with high heat-resistant "D3" glue quantity 150 g/m², on aluminium sheet nominal thickness 3 mm</i>

Limitazioni

Limitations

Questo rapporto di classificazione è valido fintanto che la composizione e la struttura dell'oggetto non cambia.

Questo rapporto di classificazione non rappresenta un'approvazione di tipo o una certificazione di prodotto.

This classification report is valid so long as item composition and structure remain unaltered.

This classification report does not represent type approval or certification of the product.

Il Responsabile Tecnico
Chief Technician
(Dott. Sacha Oliva)

Il Responsabile del Laboratorio
di Reazione al Fuoco
Head of Reaction to Fire Laboratory
(Dott. Ing. Giombattista Traina)

ALLEGATO "A"
AL RAPPORTO DI CLASSIFICAZIONE N. 414413
ANNEX "A" TO CLASSIFICATION REPORT No. 414413

Cliente / Customer

KEMICHAL S.r.l.

Via dell'Artigianato, 2 - 35010 TREBASELEGHE (PD) - Italia

Oggetto / Item#

vernice ignifuga intumescente lucida denominata "LCV851RFX"
glossy intumescent flame-retardant paint named "LCV851RFX"

Contenuti / Contents

documentazione tecnica dell'oggetto
technical documentation of the item

Commessa:

Order:

99585

Luogo dell'attività:

Activity site:

Istituto Giordano S.p.A. - Strada Erbosa Uno, 80 -
47043 Gatteo (FC) - Italia

(#) secondo le dichiarazioni del cliente.
according to that stated by the customer.

Bellaria-Igea Marina - Italia, 6 marzo 2024
Bellaria-Igea Marina - Italy, 6 March 2024

Il presente allegato è composto da n. 9 pagine.

This annex is made up of 9 pages

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Ragione sociale / Company name:		KEMICHAL S.R.L.			
Denominazione commerciale / Trade name		LCV851RFX			
Prodotto n. / Product No. *		R1 – R7 – HL3			
DESCRIZIONE GENERALE DEL PRODOTTO GENERAL DESCRIPTION OF THE PRODUCT		Spessore Thickness	Densità superficiale Surface density	Densità Density	Contenuto Organico Organic Content
[//]		[mm]	[g/m ²]	[kg/m ³]	[%]
VERNICE IGNIFUGA INTUMESCENTE LUCIDA			400 Spessore umido applicato		trasparente
DESCRIZIONE DEI SINGOLI COMPONENTI PARTENDO DALLA FACCIA ESPOSTA AL FUOCO DESCRIPTION OF INDIVIDUAL COMPONENTS FROM THE FACE EXPOSED TO FIRE					
Descrizione Description	Denominazione Name	Spessore Thickness min- max	Densità superficiale Surface density min- max	Densità Density min- max	Colore Colour
[//]	[//]	[mm]	[g/m ²]	[kg/m ³]	[//]
Vernice Lucida Ignifuga 851 RFX + catalizzatore C340S al 100%	LCV851RFX		100		Trasp.
Fondo poliestere Ignifugo 916 RFX +accelerante A2% + catalizzatore C2%	PFV916RFX		120		Trasp.
Fondo poliestere Ignifugo 916 RFX +accelerante A2% +catalizzatore C2%	PFV916RFX		120		Trasp.
Vernice Ancorante Ignifuga 821 RF + catalizzatore C319 al 20% (C5M)	LCV821RF (LA9SARF)		60		Trasp.
INFORMAZIONI SULL' IMPIEGO E POSA IN OPERA / INFORMATIONS ABOUT USE AND INSTALLATION					
Impiego / Use					
Posa in opera Installation	<input type="checkbox"/> libero-non appoggiato su substrato / free standing -not laid on substrate <input type="checkbox"/> libero-non appoggiato su substrato, con air gap / free standing -not laid on substrate, with air gap <input type="checkbox"/> appoggiato su substrato / laid on substrate <input checked="" type="checkbox"/> incollato su substrato / glued on substrate <input type="checkbox"/> fissato su substrato con viti, rivetti, ecc / fixed on substrate with e.g. screws, rivets, etc <input type="checkbox"/> altro / other: _____				
Colla/glue	Tipo / Type ___D3 alta resistenza al calore___, quantità / quantity _150-200_ g/m ² ,PCS ___ MJ/kg				
Tipo di substrato Type of substrate	<input type="checkbox"/> inorganico (cemento, ecc) / inorganic (cement, ecc) <input type="checkbox"/> legno non ignifugo / wood, not fire retardant treated <input type="checkbox"/> metallo / metal <input checked="" type="checkbox"/> altro / other: _____ alluminio da 3 mm con impiallacciatura in legno _____				
ALTRE INFORMAZIONI / ANY OTHER INFORMATIONS					
Larghezza min-max / min-max width	[mm]				
Lunghezza min-max / min-max length	[mm]				
Altri colori / Other colours					
nota 1 / note1	il cliente non è stato in grado di fornire questa indicazione / the sponsor was unable to provide this information				
nota 2 / note2	il cliente non vuole fornire questa indicazione / the sponsor don't want to provide this information				
nota 3 / note 3	informazioni riservate ma conosciute dal laboratorio / reserved information but known by the laboratory				

* ricavabile dalla prima colonna della tabella 2 della norma EN 45545-2 allegata



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EN 45545-2:2013 (E)

Table 2 — Requirements of listed products (1 of 7)

Product No	Name	Details	Requirement
IN	Interiors		
IN1A	Interior vertical surfaces	Interior components (structure and covering) such as side walls, front walls / end-walls, partitions, room dividers, flaps, boxes, hoods, louvres. Interior doors, interior lining of the front-/end-wall doors and external doors. Windows (including plastics and glazing) Insulation material and interior surface of body shell. Kitchen interior surfaces (except those of kitchen equipment).	R1
IN1B	Interior horizontal downward-facing surfaces	Interior components (structure and coverings) such as ceiling panelling, flaps, boxes, hoods, louvres. Insulation material and interior surface of body shell.	R1
IN1C	Interior horizontal upwards-facing surfaces	Interior components (structure and coverings) such as flaps, boxes, hoods, louvres. Insulation material and interior surface of body shell. Compliance with the requirements of R1 is also considered to be compliant for this requirement.	R10
IN1D	Interior surfaces within cavities	The surfaces may be horizontal or vertical.	R1
IN1E	External surfaces of enclosures containing technical equipment	Enclosures which are located inside the body shell NOTE Fire resistance requirements may apply to enclosures containing technical equipment – see 4.2 and EN 45545-3.	R1
IN2	Limited surfaces	— they shall have an area $\leq 0,20 \text{ m}^2$; — they shall have a maximum dimension in any direction on the surface $\leq 1 \text{ m}$; — they shall be separated from any other limited surface or strip by a distance of R1 compliant material greater than the dimension of the limited surface, measured in the same horizontal direction as the separation direction.	R2



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EN 45545-2:2013 (E)

Table 2 (2 of 7)

Product No	Name	Details	Requirement
IN	Interiors		
IN3A	Strips	<ul style="list-style-type: none"> — they shall have a width < 200 mm and be separated from another limited surface or strip by > 200 mm of R1 compliant material; — they shall not have length limitation. For example, vertical cover strips on walls.	R3
IN3B	Light diffusers	For example, polycarbonate diffusers, light coverings for lamps. Light units themselves and indicators are not within the scope of IN3B.	R4
IN4	Luggage storage areas	Overhead luggage racks, vertical luggage racks, luggage stacks, luggage containers and luggage compartments.	R1
IN5	Driver's desk	Panelling and surfaces of the driver's desk (excluding electrical components/ equipment). ^a	R1
IN6A	Interior surfaces of gangways Type A – For railway vehicles in which there are no fire barriers at both bulk head ends of the gangway.	Interior side of gangway membrane (bellow), interior lining of the gangway, (except flooring).	R1
IN6B	Interior surfaces of gangways Type B – For railway vehicles in which there are fire barriers at both bulk head ends of the gangway.	Interior side of gangway membrane (bellow), interior lining of the gangway, (except flooring).	R7
IN7	Window frames	Window surround (including sealants and gaskets).	R1
IN8	Curtains and sunblind in passenger area and staff area, staff compartments	Curtains and sunblind except where they are enclosed within a double glazed window.	R1
IN9A	Tables, folding table tops, and toilet wash basins. Type A – Upper surfaces	All tables and toilet wash basins (including surrounds).	R2
IN9B	Tables, folding tables downward facing surface ^b Type B – Downward-surfaces	Bottom surface of a table, the exposed vertical sides of drop down tables or any surface of a folding table that may become a bottom surface.	R1
IN10	Containers	Outer surface of water containers and air containers.	R2
IN11	Litter bins and ashtrays	Inner and outer surfaces of litter bins and ashtrays.	R1
IN12A	Air ducts - Interior surfaces	Interior surfaces of ducts which are installed on the interior of the vehicle and from which air flows into the vehicle interior.	R1



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EN 45545-2:2013 (E)

Table 2 (3 of 7)

Product No	Name	Details	Requirement
IN	Interiors		
IN12B	Air ducts – Exterior surfaces	Exterior surfaces of ducts which are installed in the interior of the vehicle, but from which air flows into the vehicle interior.	R1
IN12C	Air ducts on locomotives	Exterior and interior surfaces of ducts, which are located in technical areas and from which no air flows to the passenger area and staff area of a vehicle.	R7
IN13	Air filters	Materials for air filters used for equipment ventilation, heating and air conditioning.	R5
IN14	Devices for passenger information	Information display screens in passenger areas, not those in staff areas. Products such as speakers, handsets and their holders shall be considered as non-listed products	R1
IN15	Floor composites	The floor composites include the floor substrate (together with any thermal insulation) and floor covering (together with any fixings or adhesives applied in end use conditions).	R10
IN16	Interior seals	Longitudinal seals such as window seals, door joints and panel connections.	R22
EX	Exterior located products		
EX1A	Walls of external body shell	Vertical parts of external structure of body shell and door leaves (including paint/coating systems, films and windows).	R7
EX1B	Cab housing – External surfaces	Front of the train up to the cab partition (including paint/coating systems, films).	R17
EX1C	External surfaces of enclosures containing technical equipment	Enclosures which are located outside the body shell	R7
EX2	Roof of external body shell	External roof structure of the car body (including paint/coating systems, films). Compliance with the requirements of R7 is also considered to be compliant for this requirement.	R8
EX3	Under frame of external body shell	External surfaces of under frame structure of the body shell (floor) including paint and coating systems (thermal, design and acoustic coating) and protective floor panelling.	R7
EX4	Exterior ducts	Exterior and interior surfaces of ducts which are not connected to the interior of the vehicle	R7



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EN 45545-2:2013 (E)

Table 2 (4 of 7)

Product No	Name	Details	Requirement
EX	Exterior located products		
EX5	External design features	External design features (e. g. streamlining parts, ventilation grills, flaps, skirts, coverings for HVAC systems, enclosures, etc.)	R7
EX6A	Containers mounted in under frame	Outer surfaces of water containers and air containers which are positioned in the under frame.	R7
EX6B	Containers mounted on roof	Outer surfaces of water containers and air containers which are positioned on the roof. Compliance with the requirements of R7 are also considered to be compliant to this requirement.	R8
EX7	Exterior surfaces of gangways	Outer membrane of intercommunication gangways.	R7
EX8	Bogie structure and parts	The bogie structure shall include frames, spring leaf guides and bolster.	R7
EX9	Air bags for pneumatic suspension		R9
EX10	Parts of the drive	Wheel sets and brake discs.	R9
EX11	Tyres		R9
EX12	Exterior seals	Longitudinal seals such as window seals, door joints and panel connections	R23
F	Furniture		
F1°	Complete passenger seats	Complete passenger seat, including seat shell, upholstery, arm and head rests. Tip-up seats and driver's seat (if it is accessible to passengers) are also included. Details of seat tests (including the conditions for vandalism testing) are given in Annex A and Annex B.	R18
F1A	Upholstery for passenger seats and head rest	Upholstery includes the trimming (e. g. suspension system), flexible foam core, intermediate layers (e. g. fire barrier, anti-vandal layer), seat covers (e. g. base, back, side cover) and head rest upholstery. Details of test specimen preparation are given in Annex D.	R21



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EN 45545-2:2013 (E)

Table 2 (5 of 7)

Product No	Name	Details	Requirement
F	Furniture		
F1B	Armrests for passenger seats	The surface on which the arm rests shall be tested. In addition, the downwards facing and vertical surfaces in the normal operating position shall comply with the requirements of 5.2.2.2 Fire integrity. Details of test specimen preparation are given in Annex D..	R21
F1C	Passenger seat shell - Base	The external surface of the base shell (including all coatings or coverings) shall be tested. Compliance with 5.2.2.2 Fire Integrity is also required.	R6
F1D	Passenger seat shell - Back	The external surface of the back shell (including all coatings or coverings) shall be tested. Compliance with 5.2.2.2 Fire Integrity is also required.	R6
F1E	Removable head rest	Removable head rests shall be tested as if they were loose cushions.	R21
F2	Seats in staff areas	Staff seat upholstery and supporting structure (including the back/base shell) shall be tested according to the following conditions: — top surface of seat; — back shell from external surface; — external surface of base shell. Test in the end use conditions referring to guidance in Annex D. If the fire integrity condition of 5.2.2.2 is additionally met, then it is not necessary to test the shell/upholstery composite from the shell face. Whole seat is qualified if the requirement set R19 is met. No further tests required.	R19
F3	Mattresses	Details of test specimen preparation are given in Annex D.	R21
F4	Loose upholstery items for seats, couchettes and beds	Bed clothes for couchettes and beds (cushions, blankets, duvets, pillows, sleeping bags and sheets, etc). Antimaccassars shall be considered as non-listed products.	R20
F5	Underside surface of couchettes and beds	Compliance with 5.2.2.2 Fire integrity is also required.	R1



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EN 45545-2:2013 (E)

Table 2 (6 of 7)

Product No	Name	Details	Requirement
E	Electrotechnical equipment		
EL1A	Cables for interior	Cables not compliant with one of the standards referenced in 4.2c	R15
EL1B	Cables for exterior	Cables not compliant with one of the standards referenced in 4.2c	R16
EL2	Cable containment (linear product)	Cable containment surface related (cable duct, cable conduit). See 5.3.5	See Table 8 and Table 9
EL3A	Arc resistant insulation materials Type A	See 5.3.2 in EN 45545-5:2013.	R11
EL3B	Arc resistant insulation materials Type B	See 5.3.3 in EN 45545-5:2013.	R12
EL3C	Arc splash barrier materials	See 5.3.1 in EN 45545-5:2013.	R7
EL4	Flammable insulation liquid		R14
EL5	Supply line system devices – Exterior	Surge arresters; isolators; switches; main circuit breakers	R23
EL6A	Supply line system and high power devices - Interior	Isolators; current and voltage transformers, main circuit breakers; contactors	R22
EL6B	Supply line system and high power devices – Exterior	Isolators; current and voltage transformers, main circuit breakers; contactors	R23
EL7A	Choke and coils – Interior	Chokes for supply line filtering, coils for air cooled transformers, including spacers and air guiding plates	R22
EL7B	Choke and coils – Exterior	Chokes for supply line filtering, coils for air cooled transformers, including spacers and air guiding plates and traction motor winding insulation	R23
EL8	Brake resistors	Casing and any heat shields	R13
EL9	Printed circuit boards	Printed circuit boards without any attached technical equipment	R24 or R25
EL10	Small electrotechnical products	Examples include low power circuit breakers, overload relays, contactors, contactor relay, switches, control or signalling switches, terminals, fuses	R26



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EN 45545-2:2013 (E)

Table 2 (7 of 7)

Product No	Name	Details	Requirement
M	Mechanical equipment		
M1	Flexible metal/rubber units	Flexible metal/rubber units including elements in bogies	R9
M2	Hoses - Interior	Pipes and hoses for fuel, oils, hydraulics, pneumatics, water and drainage	R22
M3	Hoses - Exterior	Pipes and hoses for fuel, oils, hydraulics, pneumatics, water and drainage	R23
^a Computer screens will be assessed as limited surface, IN2 and not assessed as electrical equipment. ^b Downward facing surfaces up to 0,2 m ² of folding tables shall be assessed according to the requirements of R2. ^c When assessing a seat design, results from all F1 tests (F1, F1A, F1B, F1C, F1D, F1E) are required for complete validation (except driver's seat).			

4.5 Non-listed products

Any product not listed in Table 2 shall be considered as a non-listed product or shall be assessed using the grouping rules stipulated in 4.3.

The requirements of non-listed products are given in Table 3.

Table 3 — Requirements for non-listed products according to the exposed area and location in the vehicle

Exposed area	Location	Requirement set in Table 5
> 0,20 m ²	interior	R1
> 0,20 m ²	exterior	R7
≤ 0,20 m ²	interior	R22
≤ 0,20 m ²	exterior	R23