ECE TYPE-APPROVAL CERTIFICATE

Communication concerning approval granted of a component type pursuant to UN Regulation No. 118

E5 Approval No: E5*118R04/01*0092*00 Corr.01

Reason(s) for correction : Correction of type name

Section I

General

1.1.	Make (trade name of manufacturer)	:	MOVON
1.2.	Type	:	MDSM-22S
1.3.	Means of identification of type, if marked on the device	:	DSM
1.3.1.	Location of that marking	:	On the package and product (Control Unit)
1.4.	Name and address of manufacturer	:	Movon Corporation 7, Seolleung-ro 94-gil, Gangnam-gu, Seoul Republic Of Korea
1.5.	Location of the approval mark	:	Not applicable
1.6.	Address(es) of assembly plant(s)	:	Qingdao Movon Electronics Co., Ltd. No. 70 Building-B, Song Hua JIang Road, Qingdao Economic & Technical Developmentzone, Shan-Dong P.R. China

Swedish Transport Agency
Road and Rail Department
Type Approvals
Box 267, SE-781 23 Borlänge, Sweden

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Jussi Björlings väg 19

transportstyrelsen.se
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Section II

1.	Additional information (where applicable)	:	See Appendix
2.	Technical Service responsible for carrying out the tests	:	Vincotte N.V. Jan Olieslagerslaan 35 1800 Vilvoorde Belgium
3.	Date of test report	:	28 May 2024
4.	Number of test report	:	H2461328178.001
5.	Remarks (if any):	:	None
6.	Place	:	Borlänge
7.	Date	:	13 August 2024
8.	Signature	:	 Johan Larsson Type Approval Certification Officer

9. The index to the information package lodged with the Type Approval Authority, which may be obtained on request, is attached.

Test report

Information document

Appendix to type approval communication form E5*118R04/01*0092*00 Corr.01

concerning the type approval of a component type pursuant to UN Regulation No. 118

1.	Additional information.		
1.1.	Interior materials		Not applicable
1.1.1.	The direction which the component may be installed	:	Not applicable
1.1.2.	Fulfils the requirements in paragraph 6.2.2.	:	~~yes~~ / not applicable [1]
1.1.3.	Compliance has been checked for components approved as complete devices	:	~~yes~~ / ~~no~~ [1]
1.1.4.	Any restrictions of use and installation requirements	:	Not applicable
1.2.	Insulation materials		Not applicable
1.2.1.	The direction which the component may be installed	:	Not applicable
1.2.2.	Compliance has been checked for components approved as complete devices	:	~~yes~~ / ~~no~~ [1]
1.2.3.	Any restrictions of use and installation requirements	:	Not applicable
1.3.	Electric cables	:	
1.3.1.	Any restrictions of use and installation requirements	:	None
2.	Remarks	:	None

[1] Strike out what does not apply.

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Information document :*MOV-AI-MDSM-22S-00*

for ECE type-approval of a vehicle with respect to burning behaviour and/or the capability to repel fuel of lubricant of materials used in the construction of certain categories of motor vehicles
(Regulation ECE-R118.04)

1.	**GENERAL**	
1.1.	Make (trade name of manufacturer):	*MOVON*
1.2.	Type and general commercial descriptions:	*MDSM-22S*
1.3.	Name and address of manufacturer:	*Movon Corporation* *7, Seolleung-ro 94-gil, Gangnam-gu, Seoul, Republic of Korea*
1.4.	In the case of components and separate technical units, location and method of affixing of the approval mark	On the package of cables
1.5.	Address(es) of assembly plant(s):	*Qingdao Movon Electronics Co., Ltd.* *No. 70 Building-B, Song Hua Jiang Road, Qingdao Economic & Technical Development, Shan-Dong, China*
1.6	Manufacturer's representative:	*VIGNAL SESALY* *71 Impasse de la Balme* *69800 Saint Priest* *FRANCE*

2.	**INTERIOR MATERIALS**	**N.A**
2.1.	Material(s) intended for horizontal / vertical / horizontal and vertical installation Material intended to be installed more than 500 mm above the seat cushion and/or on the ceiling of the vehicle: yes / not applicable	
2.2.	Base material(s)designation:	
2.3.	Composite/~~single~~ material~~,~~ number of layers(1) :	
2.4	Type of coating: Colour :	
2.5.	Minimum/maximum thickness:	

2.6.	Type-approval number, if available:	
3.	**INSULATION MATERIALS:**	*N.A*
4.	**ELECTRIC CABLES:**	
4.1.	Material(s) used for:	*PVC cable*
4.2.	Base material(s)/designation:	*100% PVC*
~~4.3.~~	~~Composite/~~single material, number of layers(1) :	*PVC cable*
4.4.	Type of coating:	*PVC*
4.5.	Minimum/~~maximum~~ thickness:	*3.8mm*
4.6.	Type-approval number, if available:	*N.A.*
5.	**ADHESIVE AGENTS**	*N.A*
5.1	List of the adhesive agents that can be used without deterioration of the burning behaviour of the material(s) :	

VINÇOTTE nv
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VAT BE 0462.513.222 ▪ RPM/RPR Brussels ▪ BNP Paribas Fortis: BE24 2100 4113 6338 ▪ BIC: GEBABEBB
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ISO/IEC 17020 Accredited inspection body - Accreditation certificate BELAC No. 016-INSP

1. **SUBJECT** : **BURNING BEHAVIOUR AND/OR THE CAPABILITY TO REPEL FUEL OR LUBRICANT OF MATERIALS USED IN THE CONSTRUCTION OF CERTAIN CATEGORIES OF MOTOR VEHICLES** R118-04 (PART II)

2. **REF.** : Report number : **H2461328178.001** No. of pages : 1 of 20 No. of annexes : 01
Update : 00

3. **GENERALITIES** :

Make of the component : MOVON

Manufacturer's type : MDSM-22S

Commercial description : Not applicable

Name and address of the manufacturer :
Movon Corporation
7, Seolleung-ro 94-gil,
Gangnam-gu, Seoul
Republic Of Korea

4. **TESTS** : Date and place : 2024.05.07 IAS – NILUFER – BURSA – TURKEY

Applied document(s) : MOV-AI-MDSM-22S-00 information document, issue date: 2024.05.16
(Corrected on 2024.09.05)

Inspector : Mr. O. OZGOREN | Vinçotte – ITAC
Mr. B. ASLAKCI | Vinçotte – ITAC

Manufacturer's representative : Mr. J. YEOM

Location of E-mark : Not applicable

5. **CONCLUSIONS** :

The tests were carried out according to the following specifications :

- UNECE Regulation 118 incorporating supplement 1 to 04 series of amendments (PART II)

The models presented comply with the requirements to be applied.

Date : 2024.05.28 *(Corrected on 2024.09.05)*

Signature :

VINÇOTTE nv/sa
Okan Özgoren
Automotive Certification

Worst case Selection :

	The material used for inside the dashboard or glove box cable was tested according to Annex 10 of ECE.R118.04. The manufacturer mentions the thickness of material min. 3.80 mm. Therefore 3.80 mm thickness of the material was tested.

Test specifications

Annex	Test required :	Applicated	Not applicated
Annex 6	Horizontal Burning Rate of Materials:		x
Annex 7	Melting Behaviour of Materials:		x
Annex 8	Vertical Burning Rate of Materials:		x
Annex 9	Capability of materials to repel fuel or lubricant		x
Annex 10	Resistance to Flame Propagation:	x	

Commponent specfication

Material Used For:	PVC cable
Base Material(s) Designation:	100% PVC
Colour:	Black
~~Composite~~/single material	PVC cable
Type of Coating:	PVC
Thickness:	Min. 3.80 mm
Restrictions of Use, if applicable:	Not applicable

PART II: APPROVAL OF A COMPONENT WITH REGARD TO ITS BURNING BEHAVIOUR AND/OR ITS CAPABILITY TO REPEL FUEL OR LUBRICANT

Characteristics concerned and prescriptions to apply	References	Conformity	Not applicated	Value
Specifications	6.2			
The following materials shall undergo the test described in Annex 6 to this Regulation	6.2.1.		x	
(a) Material(s) and composite material(s) installed in a horizontal position in the interior compartment and,				
(b) Insulation material(s) installed in a horizontal position in the engine compartment and any separate heating compartment.				
The result of the test shall be considered satisfactory if, taking the worst test results into account, the horizontal burning rate is not more than 100 mm/minute or if the flame extinguishes before reaching the last measuring point.				
Materials fulfilling the requirements of paragraph 6.2.3. are considered to fulfill the requirements in this paragraph.				
The following materials shall undergo the test described in Annex 7 to this Regulation:	6.2.2.		x	
(a) Material(s) and composite material(s) installed more than 500 mm above the seat cushion and in the ceiling of the vehicle,				
(b) Insulation material(s) installed in the engine compartment and any separate heating compartment.				
The result of the test shall be considered satisfactory if, taking the worst test results into account, no drop is formed which ignites the cotton wool.				
The following materials shall undergo the test described in Annex 8 to this Regulation:	6.2.3.		x	
(a) Material(s) and composite material(s) installed in a vertical position in the interior compartment				
(b) Insulation material(s) installed in a vertical position in the engine compartment and any separate heating compartment.				
The result of the test shall be considered satisfactory if, taking the worst test results into account, the vertical burning rate is not more than 100 mm/minute or if the flame extinguishes before the destruction of one of the first marker threads occurred.				
Materials achieving an average CFE (critical heat flux at extinguishment) value greater or equal to 20 kW/m^2, when tested according to ISO 5658-23, are deemed to comply with the requirements of paragraphs 6.2.2. and 6.2.3., provided no burning drops are observed when taking the worst test results into account.	6.2.4.		x	

Characteristics concerned and prescriptions to apply	References	Conformity	Not applicated	Value
All insulation material(s) installed in the engine compartment and any separate heating compartment shall undergo the test described in Annex 9 to this Regulation. The result of the test shall be considered satisfactory if, taking the worst test results into account, the increase of the weight of the test sample does not exceed 1 g. Recesses necessary for technical reasons, e.g. tubes or structural members that need to pass through the material shall be allowed as long as the protection is maintained (e.g. sealant, tape …).	6.2.5.		x	
Any electrical cable exceeding a length of 100 mm used in the vehicle shall undergo the resistance to flame propagation test described in Annex 10 to this Regulation. As an alternative to these requirements, the test procedure described in ISO Standard 6722-1:2011, paragraph 5.22. may be applied. Test reports and approvals of components obtained according to ISO 6722:2006, paragraph 12. shall remain valid. The exposure to the test flame shall be finished: (1) For single-core cables: (a) When the conductor becomes visible, or (b) After 15 s for cables with conductor sizes less or equal than 2.5 mm2, and (c) After 30 s for cables with conductor sizes greater than 2.5 mm2, or (2) For sheathed, screened and unscreened single- or multi-core cables with a sum of conductor sizes smaller than or equal to 15 mm2: (a) Until a conductor becomes visible or for 30 s, for all cables, whichever comes first, or (3) For sheathed, screened and unscreened single- or multi-core cables with a sum of conductor sizes greater than 15 mm2: (a) According to (1) or (2), whichever is applicable. Electrical cables according to (2) may be tested either completely or separately. Electrical cables according to (3) shall be tested separately. The result of the test shall be considered satisfactory if, taking into account the worst test result, any combustion flame of insulating material shall extinguish within 70 seconds and a minimum of 50 mm insulation at the top of the test sample shall remain unburned.	6.2.6.	x		

Any cable sleeve or cable conduit exceeding a length of 100 mm shall undergo the test to determine the burning rate of materials as specified in Annex 8. The result of the test shall be considered satisfactory if, taking the worst test results into account, the vertical burning rate is not more than 100 mm/minute or if the flame extinguishes before the destruction of one of the first marker threads occurred.	6.2.7.		x	
Materials which are not required to undergo the tests described in Annexes 6 to 8 are:	6.2.8.		x	
• Parts made of metal or glass; Parts made of metal or glass; Parts made of plastic glazing are not included in this exemption."	6.2.8.1.			
• Each individual seat accessory with a mass of non-metallic material less than 200 g. If the total mass of these accessories exceeds 400 g of non-metallic material per seat, then each material must be tested;	6.2.8.2.			
• Elements of which the surface area or the volume does not exceed respectively:	6.2.8.3.			
✓ 100 cm^2 or 40 cm^3 for the elements which are connected to an individual seating place;	6.2.8.3.1.			
✓ 300 cm^2 or 120 cm^3 per seat row and, at a max., per linear metre of the interior of the interior compartment for these elements which are distributed in the vehicle and which are not connected to an individual seating place;	6.2.8.3.2.			
• Elements for which it is not possible to extract a sample in the prescribed dimensions as specified in § 3.1. of Annex 6 and § 3. of Annex 7, and § 3.1. of Annex 8.	6.2.8.4			

TEST TO DETERMINE THE HORIZONTAL BURNING RATE OF MATERIALS (ANNEX 6) N.A.

Characteristics concerned and prescriptions to apply	References	Conformity	Not applicated	Value
Sampling and principle	1.			
Five samples shall undergo the test in the case of an isotropic material or ten samples in the case of a non-isotropic material (five for each direction).	1.1.			
The samples shall be taken from the material under test. In materials having different burning rates in different material directions, each direction has to be tested. The samples are to be taken and placed in the test apparatus so that the highest burning rate will be measured. When the material is supplied in widths, a length of at least 500 mm shall be cut covering the entire width. From this the samples shall be taken so as to be at least 100 mm from the material edge and equidistant from each other. Samples shall be taken in the same way from finished products, when the shape of the product permits. When the thickness of the product is more than 13 mm, it shall be reduced to 13 mm by a mechanical process applied to the side which does not face the respective compartment (interior, engine or separate heating compartment). If it is impossible, the test shall be carried out, in accordance with the Technical Service, on the initial thickness of the material, which shall be mentioned in the test report.	1.2.			
Composite materials (see paragraph 6.1.3.) shall be tested as if they were of uniform construction. In the case of materials made of superimposed layers of different composition which are not composite materials, all the layers of material included within a depth of 13 mm from the surface facing towards the respective compartment shall be tested individually.				
A sample is held horizontally in a U-shaped holder and is exposed to the action of a defined flame for 15 seconds in a combustion chamber, the flame acting on the free end of the sample. The test determines if and when the flame extinguishes or the time in which the flame passes a measured distance	1.3.			
Apparatus	2			
Combustion chamber (Figure 1), preferably of stainless steel and having the dimensions given in Figure 2. The front of the chamber contains a flame-resistant observation window, which may cover the front and which can be constructed as an access panel.	2.1.			
The bottom of the chamber has vent holes, and the top has a vent slot all around. The combustion chamber is placed on four feet, 10 mm high.				

Characteristics concerned and prescriptions to apply	References	Conformity	Not applicated	Value
The chamber may have a hole at one end for the introduction of the sample holder containing the sample; in the opposite end, a hole is provided for the gas line. Melted material is caught in a pan (see Figure 3) which is placed on the bottom of the chamber between vent holes without covering any vent hole area				
Sample holder, consisting of two U-shaped metal plates or frames of corrosion-proof material. Dimensions are given in Figure 4. The lower plate is equipped with pins, the upper one with corresponding holes in order to ensure a consistent holding of the sample. The pins also serve as the measuring points at the beginning and end of the burning distance. A support shall be provided in the form of 0.25 mm diameter heat resistant wires spanning the frame at 25 mm intervals over the bottom U-shaped frame (see Figure 5). The plane of the lower side of samples shall be 178 mm above the floor plate. The distance of the front edge of the sample holder from the end of the chamber shall be 22 mm; the distance of the longitudinal sides of the sample holder from the sides of the chamber shall be 50 mm (all inside dimensions). (See Figures 1 and 2)	2.2.			
Gas burner The small ignition source is provided by a Bunsen burner having an inside diameter of 9.5 ± 0.5 mm. It is located in the test cabinet so that the centre of its nozzle is 19 mm below the centre of the bottom edge of the open end of the sample (see Figure 2).	2.3.			
Test gas The gas supplied to the burner shall have a calorific value near 38 MJ/m^3 (for example natural gas).	2.4.			
Metal comb, at least 110 mm in length, with seven to eight smooth rounded teeth per 25 mm.	2.5.			
Stop-watch, accurate to 0.5 seconds.	2.6.			
Fume cupboard. The combustion chamber may be placed in a fume cupboard assembly provided that the internal volume is at least 20 times, but not more than 110 times, greater than the volume of the combustion chamber and provided that no single height, width, or length dimension of the fume cupboard is greater than 2.5 times either of the other two dimensions. Before the test, the vertical velocity of the air through the fume cupboard shall be measured 100 mm in front of and behind the final position where the combustion chamber will be located. It shall be between 0.10 and 0.30 m/s in order to avoid possible discomfort, by combustion products, to the operator. It is possible to use a fume cupboard with a natural ventilation and an appropriate air velocity.	2.7.			

Characteristics concerned and prescriptions to apply	References	Conformity	Not applicated	Value
Samples	3.			
Shape and dimensions	3.1.			
The shape and dimensions of samples are given in Figure 6. The thickness of the sample corresponds to the thickness of the product to be tested. It shall not be more than 13 mm. When taking the sample permits, the sample shall have a constant section over its entire length.	3.1.1.			
If the shape and dimensions of a product do not permit taking a sample of the given size, the following minimum dimensions shall be maintained (a) For samples having a width of 3 to 60 mm, the length shall be 356 mm. In this case the material is tested in the product's width; (b) For samples having a width of 60 to 100 mm, the length shall be at least 138 mm. In this case the potential burning distance corresponds to the length of the sample, the measurement starting at the first measuring point	3.1.2.			
The size of the sample shall be mentioned in the test report.	3.1.3.			
Conditioning	3.2.			
The samples shall be conditioned for at least 24 hours but not more than 7 days at a temperature of 23°C + 2°C and a relative humidity of 50 ± 5 per cent and shall be maintained under these conditions until immediately prior to testing.				
Procedure	4.			
Place samples with napped or tufted surfaces on a flat surface and comb twice against the nap using the comb (paragraph 2.5.).	4.1.			
Place the sample in the sample holder (paragraph 2.2.) so that the exposed side will be downwards to the flame.	4.2.			
Adjust the gas flame to a height of 38 mm using the mark in the chamber, the air intake of the burner being closed. Before starting the first test, the flame shall burn at least for 1 min for stabilization	4.3.			
Push the sample-holder into the combustion chamber so that the end of the sample is exposed to the flame, and after 15 seconds cut off the gas flow.	4.4.			

Characteristics concerned and prescriptions to apply	References	Conformity	Not applicated	Value
The measurement of the burning time starts at the moment when the foot of the flame passes the first measuring point. Observe the flame propagation on the side burning faster than the other (upper or lower side).	4.5.			
Measurement of burning time is completed when the flame has come to the last measuring point or when the flame extinguishes before coming to the last measuring point. If the flame does not reach the last measuring point, measure the burnt distance up to the point where the flame extinguished. Burnt distance is the decomposed part of the sample, which is destroyed on its surface or in the interior by burning.	4.6.			
In so far as the sample does not ignite or does not continue burning after the burner has been extinguished, or when the flame extinguishes before reaching the first measuring point, so that no burning time is measured note in the test report that the burning rate is 0 mm/min.	4.7.			
When running a series of tests or repeat tests, ensure that the combustion chamber and sample holder have a maximum temperature of 30°C before starting the next test.	4.8.			
Calculation	5.			
The burning rate, B[1] in millimetres per minute, is given by the formula: B = 60 s/t where: s = the burnt distance, in millimetres; t = the time, in seconds, to burn distance s				

[1] The burning rate (B) for each sample is only calculated in the case where the flame reaches the last measuring point or the end of the sample.

TEST TO DETERMINE THE MELTING BEHAVIOUR OF MATERIALS (ANNEX 7) N.A.

Characteristics concerned and prescriptions to apply	References	Conformity	Not applicated	Value
Sampling and principle	1.			
Four samples, for both faces (if they are not identical) shall undergo the test.	1.1.			
A sample is placed in a horizontal position and is exposed to an electric radiator. A receptacle is positioned under the specimen to collect the resultant drops. Some cotton wool is put in this receptacle in order to verify if any drop is flaming.	1.2.			
Apparatus	2.			
The apparatus shall consist of (Figure 1):				
(a) An electric radiator;				
(b) A support for the sample with grill;				
(c) A receptacle (for resultant drops);				
(d) A support (for the apparatus)..				
The source of heat is an electric radiator with a useful output of 500 W. The radiating surface must be made of a transparent quartz plate with a diameter of 100 ± 5 mm.	2.1.			
The radiated heat from the apparatus, measured on a surface which is situated parallel to the surface of the radiator at a distance of 30 mm, shall be 3 W/cm^2.				
Calibration	2.2.			
For calibration of the radiator, a heat flux meter (radiometer) of the Gardon (foil) type with a design range not exceeding 10 W/cm^2 shall be used. The target receiving radiation, and possibly to a small extent convection, shall be flat, circular, not more than 10 mm in diameter and coated with a durable matt black finish. The target shall be contained within a water cooled body the front face of which shall be of highly polished metal, flat, coinciding with the plane of the target and circular, with a diameter of about 25 mm. Radiation shall not pass through any window before reaching the target. The instrument shall be robust, simple to set up and use, insensitive to draughts, and stable in calibration. The instrument shall have an accuracy of within ± 3 per cent and a repeatability within 0.5 per cent. The calibration of the heat flux meter shall be checked whenever a recalibration of the radiator is carried out, by comparison with an instrument held as a reference standard and not used for any other purpose. The reference tandard instrument shall be fully calibrated at yearly intervals in accordance with a national standard.				

Characteristics concerned and prescriptions to apply	References	Conformity	Not applicated	Value
Calibration check The irradiance produced by the power input which the initial calibration has shown to correspond to an irradiance of 3 W/cm^2 shall be frequently checked (at least once every 50 operating hours) and the apparatus shall be recalibrated if such a check reveals a deviation greater than 0.06 W/cm^2.	2.2.1.			
Calibration procedure The apparatus shall be placed in an environment essentially free of air currents (not more than 0.2 m/s). Place the heat flux meter in the apparatus in the specimen position so that the target of the heat flux meter is located centrally within the radiator surface. Switch on the electricity supply and establish the power input of the controller required to produce irradiance at the centre of the radiator surface of 3 W/cm^2. Adjustment to the power unit to record 3 W/cm^2 should be followed by a five minute period without further adjustment to ensure equilibrium	2.2.2.			
The support for the samples shall be a metallic ring (Figure 1). On top of this support a grill, made of stainless steel-wire, is placed with the following dimensions: (a) Interior diameter: 118 mm, (b) Dimension of the holes: 2.10 mm square, (c) Diameter of the steel-wire: 0.70 mm.	2.2.3.			
The receptacle shall consist of a cylindrical tube with an interior diameter of 118 mm and a depth of 12 mm. The receptacle shall be filled with cotton wool.	2.4.			
A vertical column shall support the items specified in paragraphs 2.1., 2.3. and 2.4. The radiator is placed on top of the support in a manner such that the radiating surface is horizontal and the radiation is downwards. A lever/pedal shall be provided in the column to lift the support of the radiator slowly. It shall also be provided with a catch in order to ensure that the radiator can be brought back in its normal position. In their normal position, the axes of the radiator, the support for the sample and the receptacle shall coincide.	2.5.			
Samples The test samples shall measure: 70 mm x 70 mm. Samples shall be taken in the same way from finished products, when the shape of the product permits. When the thickness of the product is more than 13 mm, it shall be reduced to 13 mm by a mechanical process applied to the side which does not face the respective compartment (interior, engine or separate heating compartment). If it is impossible,the test shall be carried out, in accordance with the Technical Service, on the initial width of the material which shall be mentioned in the test report. Composite materials (see paragraph 6.1.3. of the Regulation) shall be tested as if they were of uniform construction.	3.			

Characteristics concerned and prescriptions to apply	References	Conformity	Not applicated	Value
In the case of materials made of superimposed layers of different composition which are not composite materials, all the layers of material included within a depth of 13 mm from the surface facing towards the respective passenger compartment (interior, engine or separate heating compartment) shall be tested individually The total mass of the sample to be tested shall be at least 2 g. If the mass of one sample is less, a sufficient number of samples shall be added. If the two faces of the material differ, both faces must be tested, which means that eight samples are to be tested. The samples and the cotton wool shall be conditioned for at least 24 hours at a temperature 23° C ± 2° C and a relative humidity of 50 + 5 per cent and shall be maintained under these conditions until immediately prior to testing. The size and the mass of the sample shall be mentioned in the test report. **Procedure** The sample is placed on the support and the latter is so positioned that the distance between the surface of the radiator and the upper side of the sample is 30 mm. The receptacle, including the cotton wool, is placed beneath the grill of the support at a distance of 300 mm. The radiator is put aside, so that it cannot radiate on the sample, and switched on. When it is on full capacity it is positioned above the sample and timing is started. If the material melts or deforms, the height of the radiator is modified to maintain the distance of 30 mm. If the material ignites, the radiator is put aside three seconds afterwards. It is brought back in position when the flame has extinguished and the same procedure is repeated as frequently as necessary during the first five minutes of the test. After the fifth minute of the test: If the sample has extinguished (whether or not it has ignited during the first five minutes of the test) leave the radiator in position even if the sample reignites; If the material is flaming, await extinction before bringing the radiator into position again.	3.1. 4.			

Characteristics concerned and prescriptions to apply	References	Conformity	Not applicated	Value
In either case, the test shall be continued for an additional five minutes. **Results** Observed phenomena shall be noted in the test-report, such as: (i) The fall of drops, if any, whether flaming or not, (ii) If ignition of the cotton wool has taken place	5.			

TEST TO DETERMINE THE VERTICAL BURNING RATE OF MATERIALS (ANNEX 8) N.A.

Characteristics concerned and prescriptions to apply	References	Conformity	Not applicated	Value
Sampling and principle	1.			
Three samples shall undergo the test in the case of an isotropic material, or six samples in the case of a non-isotropic material.	1.1.			
This test consists of exposing samples, held in a vertical position, to a flame and determining the speed of propagation of the flame over the material to be tested.	1.2.			
Apparatus	2.			
The apparatus shall consist of (a) A specimen holder (b) A burner (c) A ventilation system to extract gas and combustion products (d) A template (e) Marker threads of white mercerized cotton threads having a maximum linear density of 50 tex.				
The specimen holder shall consist of a rectangular frame of 560 mm high and shall have two rigidly connected parallel rods spaced 150 mm apart on which pins shall be fitted for mounting the test specimen which is located in a plane at least 20 mm from the frame. The mounting pins shall be not greater than 2 mm in diameter and at least 27 mm long. The pins shall be located on the parallel rods at locations shown in Figure 1. The frame shall be fitted onto a suitable support to maintain the rods in a vertical orientation during testing (for the purpose of locating the specimen on the pins in a plane away from the frame, spacer stubs 2 mm in diameter may be provided adjacent to the pins). The specimen holder shown in Figure 1 may be modified in width to allow the fixation of the sample. To fix the sample in a vertical position, a support may be provided consisting of 0.25 mm diameter heat resistant wires that horizontally span the sample at 25 mm intervals along the complete height of the specimen holder. Alternatively, the sample may be fixed by additional clamps to the specimen holder.	2.1.			

Characteristics concerned and prescriptions to apply	References	Conformity	Not applicated	Value
The burner is described in Figure 3. The gas supplied to the burner can be either commercial propane gas or commercial butane gas. The burner shall be positioned in front of, but below, the specimen such that it lies in a plane passing through the vertical centreline of the specimen and perpendicular to its face (see Figure 2), such that the longitudinal axis is inclined upwards at 30° to the vertical towards the lower edge of the specimen. The distance between the tip of the burner and the lower edge of the specimen shall be 20 mm	2.2.			
The test apparatus may be placed in a fume cupboard assembly. The size and shape of the fume cupboard shall be such that the test results are not affected.Before the test, the vertical velocity of the air through the fume cupboard shall be measured 100 mm in front of and behind the final position where the test apparatus will be located. It shall be between 0.10 and 0.30 m/s in order to avoid possible discomfort, by combustion products, to the operator. It is possible to use a fume cupboard with a natural ventilation and an appropriate air velocity.	2.3.			
A flat rigid template made of suitable material and of a size corresponding to the size of the specimen shall be used. Holes approximately 2 mm in diameter shall be drilled in the template and positioned so that the distances between the centres of the holes correspond to the distances between the pins on the frames (see Figure 1). The holes shall be located equidistant about the vertical centrelines of the template.	2.4.			
Samples	3.			
The samples dimensions are: 560 x 170 mm. If the dimensions of a material do not permit taking a sample of the given dimensions the test shall be carried out taking a sample having the dimensions of at least 380 mm in height and at least 3 mm in width. Cable sleeves and cable conduits: The samples dimensions are: length: 560 mm, but at least 380 mm if the dimensions of a material do not permit taking a sample of the given dimensions; width: actual compenent dimensions.	3.1.			
Materials according to paragraph 6.2.3. of this Regulation: When the thickness of the sample is more than 13 mm, it shall be reduced to 13 mm by a mechanical process applied to the side which does not face the respective compartment (interior, engine or separate heating compartment). If it is impossible, the test shall be carried out in accordance with the Technical Service the initial thickness of the material, which shall be mentioned in the test report. Composite materials (see paragraph 6.1.3.) shall be tested as if they were of uniform construction. In the case of materials made of superimposed layers of different composition which are not composite materials, all the layers of material included within a depth of 13 mm from the surface facing towards the respective compartment shall be tested individually	3.2.			

Characteristics concerned and prescriptions to apply	References	Conformity	Not applicated	Value
The size of the sample shall be mentioned in the test report.	3.3.			
The samples shall be conditioned for at least 24 hours at a temperature of 23°C ± 2° C and a relative humidity of 50 ± 5 per cent and shall be maintained under these conditions until immediately prior to testing.	3.4.			
Procedure	4.			
The test shall be carried out in an atmosphere having a temperature between 10°C and 30°C and a relative humidity between 15 per cent and 80 per cent.	4.1.			
The burner shall be preheated for 2 minutes. The flame height shall be adjusted to 40 ± 2 mm measured as the distance between the top of the burner tube and the tip of the yellow part of the flame when the burner is vertically oriented and the flame is viewed in dim light.	4.2.			
The specimen shall be placed (after the reward marker threads have been located) on the pins of the test frame, making certain that the pins pass through the points marked off from the template and that the specimen is at least 20 mm removed from the frame. The frame shall be fitted on the support so that the specimen is vertical.	4.3.			
The marker threads shall be attached horizontally in front of and behind the specimen at the locations shown in Figure 1. At each location, a loop of thread shall be mounted so that the two segments are spaced 1 mm and 5 mm from the front and rearface of the specimen. Each loop shall be attached to a suitable timing device. Sufficient tension shall be imposed to the threads to maintain their position relative to the specimen.	4.4.			
The flame shall be applied to the specimen for 5 seconds. Ignition shall be deemed to have occurred if flaming of the specimen continues for 5 seconds after removal of the igniting flame. If ignition does not occur, the flame shall be applied for 15 seconds to another conditioned specimen.	4.5.			
If any result in any set of three specimens exceeds the minimum result by 50 per cent, another set of three specimens shall be tested for that direction or face. If one or two specimens in any set of three specimens fail to burn to the top marker thread, another set of three specimens shall be tested for that direction or face.	4.6.			
The following times, in seconds, shall be measured: (a) From the start of the application of the igniting flame to the severance of one of the first marker threads (t1); (b) From the start of the application of the igniting flame to the severance of one the second marker threads (t2); (c) From the start of the application of the igniting flame to the severance of one the third marker threads (t3).	4.7.			
If the sample does not ignite or does not continue burning after the burner has been extinguished or if the flame extinguishes before the destruction of one of the first marker threads occurred, so that no burning time is measured, the burning rate is considered to be 0 mm/min.	4.8.			

Characteristics concerned and prescriptions to apply	References	Conformity	Not applicated	Value
If the sample does ignite and the flames of the burning sample do reach the height of the third marker threads without destroying the first and second marker threads (e.g. due to material characteristics of thin material sample), the burning rate is considered to be more than 100 mm/min.	4.9.			
Results	5.			
The observed phenomena shall be written down in the test-report, to include: (a) The durations of combustion: t1, t2 and t3 in seconds, and (b) The corresponding burnt distances: d1, d2 and d3 in mm. The burning rate V1 and the rates V2 and V3, if applicable, shall be calculated(for each sample if the flame reaches at least one of the first marker threads)as follows: Vi = 60 di/ti (mm/min) The highest burning rate of V1, V2 and V3 shall be taken into account.				

TEST TO DETERMINE THE CAPABILITY OF MATERIALS TO REPEL FUEL OR LUBRICANT (ANNEX 9) N.A.

Characteristics concerned and prescriptions to apply	References	Conformity	Not applicated	Value
Scope This annex lists prescriptions to test the capability of insulation materials used in engine compartments and separate heating compartments. **Sampling and principle** The test samples shall measure: 140 mm x 140 mm. The thickness of the samples shall be 5 mm. If the thickness of the test sample is more than 5 mm, it shall be reduced to 5 mm by a mechanical process applied to the side which does not face the engine compartment or separate heating compartment. The test liquid shall be diesel fuel according to standard EN 590:1999 (Market fuels). or alternatively diesel fuel according to Regulation No. 83 (Annex 10: Specification of reference fuels). Four samples shall undergo the test. **Apparatus (see Figures 4a and 4b)** The apparatus shall consist of: A a base plate, with a hardness of at least 70 Shore D. B an absorbant surface on the baseplate (e.g. paper); C a metal cylinder (inner diameter of 120 mm, outer diameter of 130 mm, height of 50 mm), filled with the test liquid; D-D' two screws with wing nuts; E the test sample; F top plate **Procedure** The test sample and the apparatus shall be conditioned for at least 24 hours at a temperature of 23°C ± 2°C and a relative humidity of 50 + 5 per cent and shall be maintained under these conditions until immediately prior to testing. The test sample shall be weighed. The test sample, with its exposed face uppermost, shall be placed on the base of the apparatus by fixing the metal cylinder in a centred position with sufficient pressure on the screws. No test liquid shall leak. Fill the metal cylinder with test liquid to a height of 20 mm and let the system rest for 24 hours. Remove the test liquid and the test sample from the apparatus. If residue of the test liquid is found on the test sample it shall be removed without compressing the test sample. The test sample shall be weighed.	1. 2. 2.1. 2.2. 2.3. 2.4. 3. 4. 4.1. 4.2. 4.3. 4.4. 4.5. 4.6			

TEST TO DETERMINE THE RESISTANCE TO FLAME PROPAGATION OF ELECTRICAL CABLES (ANNEX 10)

Characteristics concerned and prescriptions to apply	References	Conformity	Not applicated	Value
Scope	1.			
This annex defines prescriptions to test the resistance to flame propagation of electrical cables used in the vehicle.		x		
Sampling and principle	2.			
Five samples shall undergo the test	2.1.	x		
Samples	3.			
Test samples shall have a length of at least 600 mm of insulation.	3.1	x		
Procedure	4.			
Determine the resistance to flame propagation using a Bunsen burner with an appropriate gas, having a combustion tube of 9 mm internal diameter, where the flame temperature at the tip of the inner blue cone shall be (950 +/- 50) °C.		x		
Suspend the test sample in a draught-free chamber and expose the test sample to the tip of the inner cone of the flame, as shown in Figure 1. The upper end of the cable shall point away from the closest wall of the chamber. The sample shall be subject to a stress, e.g. by means of a weight over a pulley, in order to keep it straight at all times. The angle of the cable shall be 45° ± 1° relative to the vertical line. In any case, the shortest distance of any part of the sample shall be 100 mm minimum from any wall of the chamber. Apply the flame with the tip of the inner blue cone touching the insulation (500 ± 5) mm from the upper end of the insulation.		x		

FACILITIES AND EQUIPMENT

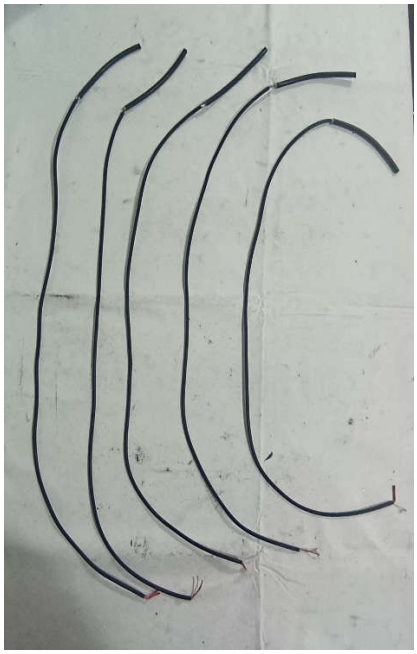
The facilities and equipment used to carry out the inspections are in compliance with the requirements of the applied Regulatory Act(s).

Results:

Results of the test							
Annex	**Test required**	**No of samples tested**	**Dimension (mm)**	**Sample weight (g)**	**Requirement**	**Observation**	**Result**
Annex 6	Horizontal Burning Rate of Materials:	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Annex 7	Melting Behaviour of Materials:	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Annex 8	Vertical Burning Rate of Materials:	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Annex 9	Capability of materials to repel fuel or lubricant	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Annex 10	Resistance to Flame Propagation:	5	600 x 3.80	N.A.	See item 6.2.6	Combustion time: 0 s Unburned length: 495 mm	OK

PHOTOS OF THE TEST TO DETERMNE THE RESISTANCE TO FLAME PROPAGATION OF ELECTRICAL CABLES (ANNEX 10)

Before :



After :