

Technical Construction File

Tcf No:	CE-MT25090201-GR-GPSR
Applicant:	MC TECHNOLOGY
Address:	No.1 Xingwang Road,Wuyi County Economic Development Zone
Manufacturer:	MC TECHNOLOGY
Address:	No.1 Xingwang Road,Wuyi County Economic Development Zone
Product:	FRESH AIR DUCT ACCESSORIES
Model:	Ø75, Ø90, Ø125 - 2*Ø75, Ø125 - 2*Ø90 - PIPE EPP Ø160 - Ø180
Test standard:	EN IEC 60320-1:2021
Conclusion:	The products meet the above standards.
Edit Date:	2025-09-02
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ASSESSMENT REPORT

TCF

Reference No.: CE-MT25090201-GR-GPSR

Tested by(+ signature).....: Project Engineer, Melody *Melody*

Reviewed by(+ signature).....: Manager, Tracy *Tracy*

Date of issue: 2025-09-02

Client

Name: MC TECHNOLOGY S.L.

Address: No.1 Xingwang Road,Wuyi County Economic Development Zone

Test specification

Standard: EN IEC 60320-1:2021

Test procedure: CE-GPSR

Non-standard test method: N.A.

Test item description:

Manufacturer.....: MC TECHNOLOGY

Factory.....: MC TECHNOLOGY

Trademark: Refer to the nameplate

Model, Type reference: Refer to page 1

Rating(s): refer to the nameplate.

General product information: The product is FRESH AIR DUCT ACCESSORIES

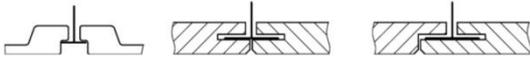
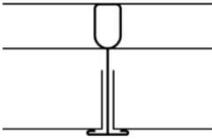
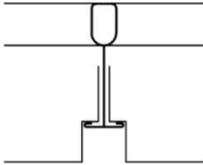
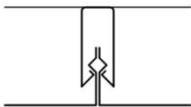
Test Result: PASS.

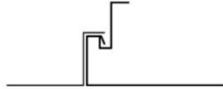
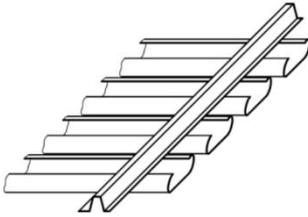
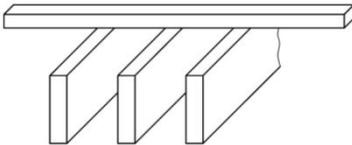
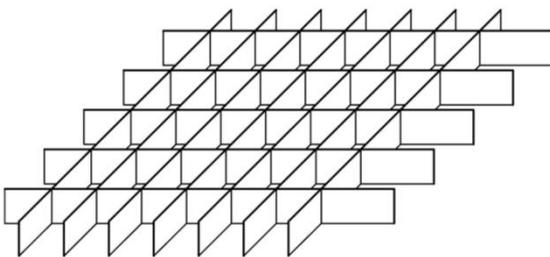
The product meets the all the test requirements. The details are listed in the following documents.

EN IEC 60320-1:2021			
Clause	Requirement + Test	Result - Remark	Verdict
1	Scope		-
	This part of IEC 60320 sets the general requirements for appliance couplers for two poles and two poles with earth contact and for the connection of electrical devices for household and similar onto the mains supply.		P
	This document is also valid for appliance inlets/appliance outlets integrated or incorporated in appliances.		P
	The rated voltage does not exceed 250V(AC)and the rated current does not exceed 16 A.		P
	Appliance couplers complying with this document are suitable for normal use at ambient temperatures not normally exceeding+40°C,but their average over a period of 24 h does not exceed+35°C,with a lower limit of the ambient air temperature of-5°C		P
	Appliance couplers are not suitable for:		P
	use in place of plug and socket-outlet systems according to IEC 60884-1;		P
	use in place of devices for connecting luminaires(DCLs)according to IEC 61995 or luminaire supporting couplers (LSCs);		P
	-use in place of installation couplers according to IEC 61535.		P
2	Normative references		-
	The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.For dated references,only the edition cited applies.For undated references,the latest edition of the referenced document (including any amendments)applies.		P

	IEC 60068-2-31,Environmental testing-Part 2-31:Tests -Test Ec:Rough handling shocks, primarily for equipment-type specimens		P
	IEC 60068-2-60,Environmental testing -Part 2-60:Tests -Test Ke:Flowing mixed gas corrosion test		P
	IEC 60068-2-75,Environmental testing-Part 2-75:Tests -Test Eh:Hammer tests		P
	IEC 60112:2020,Method for the determination of the proof and the comparative tracking indices of solid insulating materials		P
3	Terms and definitions		-
	For the purposes of this document,the following terms and definitions apply		P
3.1	ISO and IEC maintain terminological databases for use in standardization at the following addresses:		-
3.1.1	IEC Electropedia:available at http://www.electropedia.org/		P
	· ISO Online browsing platform:available at http://www.iso.org/obp		P
3.1.2	suspended ceiling		P
	connector(of an appliance coupler)		P
3.1.3	part of the appliance coupler integral with,or intended to be attached to,one cord connected to the supply		P
	[SOURCE:IEC 60050-442:1998,442-07-02,modified-"the cord"has been replaced with "one cord"and a reference to Figure 1 has been added.]		P
3.1.4	appliance inlet		P
	set of components that need to be put together to be installed permanently in the works		P
	part of the appliance coupler integrated		P

	as a part of an appliance or incorporated as a separate part in the appliance or equipment or intended to be fixed to it		
	appliance inlet		P
	part of the appliance coupler integrated as a part of an appliance or incorporated as a separate part in the appliance or equipment or intended to be fixed to it		P
3.1.5	interconnection coupler		P
	appliance coupler enabling the connection and disconnection of an appliance or equipment to a cord leading to another appliance or equipment		P
3.2	Suspended ceiling and substructure components(see Figure 1)		P
3.2.1	Note 1 to entry:An interconnection coupler is a type of appliance coupler.		-
3.2.1.1	plug connector		P
	suspending frame that supports the ceiling membrane		P
	part of the interconnection coupler integral with or intended to be attached to one cord		P
3.2.1.2	[SOURCE:IEC 60050-442:1998,442-07-09,modified-"the flexible cable"has been replaced with "one cord"and a reference to Figure 1 has been added.]		P
	substructure whose underside is exposed		P
3.2.1.3	Concealed substructure		P
3.4	non-rewirable appliance coupler		P
3.4.1	accessory so constructed that it forms a complete unit with flexible supply cable or cord after connection and assembly by the manufacturer of the accessory		P
	assembly with type A,B or F shaped edges (see Figure 3)where the boards are fixed on the substructure (concealed substructure)		P
	assembly consisting of one cable or cord fitted with one non-rewirable plug and one non-rewirable connector,intended		N

	for the connection of an electrical appliance or equipment to the electrical supply		
3.4.2	suspended ceiling system with various edge types(A,B,C,D,E-see Figure 3)for volume gauge materials and with type A and Q(see Figure 4)edges forthin gauge materials		P
	assembly in which different edge types are used		P
	Note 1 to entry: See Figure 6 that shows very common applications of how these systems are implemented.		P
	Note 2 to entry: The substructure can be exposed,semi-concealed orconcealed.		N
	 <p>Figure 6 — Examples for possible designs with various edge types</p>		N
3.4.3	lay-in suspended ceiling system		P
	 <p>NOTE Other designs may exist.</p> <p>Figure 7 — Example for a lay-in suspended ceiling system</p>		P
3.4.4	rebated lay-in suspended ceiling system		P
	 <p>NOTE Other designs may exist.</p> <p>Figure 8 — Example for a rebated lay-in suspended ceiling system</p>		P
3.5	assembly consisting of one cable or cord fitted with one non-rewirable plug and one non-rewirable connector,intended for the connection of an electrical appliance or equipment to the electrical supply		N
	<p>assembly, normally with Type R edges (see Figure 4) that are clipped onto a concealed substructure (see Figure 9)</p>  <p>NOTE Other designs may exist.</p> <p>Figure 9 — Example for a clip-in suspended ceiling system</p>		N

3.4.6	hook-on suspended ceiling system		N
	<p>assembly, one side of which has Type Q edge and the opposite side has a Type U edge (see Figure 4) supported by a concealed substructure (see Figure 10)</p>  <p>NOTE Other designs may exist.</p> <p>Figure 10 — Example for a hook-on suspended ceiling system</p>		N
3.4.7	linear suspended ceiling system(open or closed)		P
	 <p>NOTE Other designs may exist.</p> <p>Figure 11 — Example for a linear suspended ceiling system</p>		P
3.4.8	baffle		P
	<p>assembly of vertically placed linear membrane components installed at a certain distance from each other (see Figure 12)</p>  <p>NOTE Other design systems may exist.</p> <p>Figure 12 — Example for a baffle</p>		P
3.4.9	open cell		P
	 <p>NOTE Other designs may exist.</p> <p>Figure 13 — Example for an open grid cell</p>		P
4	General requirements		-
4.1	Dimensions and tolerances-General		P
	Appliance couplers shall be so designed and constructed that in normal use their performance is reliable and without danger to the user or to the surroundings.		P
	non-standardized appliance coupler shall comply with all safety requirements of this document and shall be tested together with its counterpart.		P
	The manufactured dimensions and		P

	tolerances for volume and thin gauge membrane components shall comply with Table 3 and Table 4 unless a separate product standard is available.		
	The manufactured dimensions and tolerances for linear components shall comply with Table 5.		P
	Where relevant, measurements shall be made with suitable accuracy.		P
	Dimensions and the corresponding tolerances shall be declared.		P
4.2	Modular dimensions		P
	The plan dimension of suspended ceiling substructure and membrane components shall be based on modular CO-ordination as standardized in ISO 1006.		P
	The commonly used modular dimensions of membrane components shall be based on $n \times 100$ mm or on sub-modules of $n \times 50$ mm or $n \times 25$ mm.		P
	If there is no separate product standard available, Table 2 applies.		P
	Dimensions and the corresponding tolerances shall be declared.		P
			P
4.3	Mechanical resistance and stability of load bearing components		P
4.3.1	General		P
	This clause covers only the load bearing components of the suspended ceiling. It does not cover the mechanical characteristics of membrane components, for which 4.6.2 applies.		P
4.3.2	Substructure		P
4.3.2.1	Load bearing performance		P
	The load bearing performance of the substructure shall be established by testing each of its components individually in accordance with the relevant test contained in Clause 5, unless the dimensions, nature and design of the material allow load bearing		P

	performance and deformation to be calculated.										
	The substructure shall be classified in accordance with its deflection limits as given in Table 6.		P								
	Where the component, once tested, is used in a configuration different to that used in the test, its admissible load bearing capacity, if required, shall be estimated by using data from the test.		P								
	<p style="text-align: center;">Table 6 — Classes of deflection - Substructure profiles</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Class</th> <th style="width: 70%;">Deflection (mm)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">L/500 and not greater than 4,0</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">L/300</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">No limit</td> </tr> </tbody> </table> <p style="font-size: small;">Where L is the span in millimetres between the suspension points.</p>	Class	Deflection (mm)	1	L/500 and not greater than 4,0	2	L/300	3	No limit		P
Class	Deflection (mm)										
1	L/500 and not greater than 4,0										
2	L/300										
3	No limit										
4.3.2.2	Substructure materials		P								
4.3.2.2.1	Steel substructure		P								
	Where the substructure is formed in hot-galvanized strip or sheet of unalloyed steel, the minimum steel grade used shall be DX51D+Z according to EN 10346.		P								
	If other steel types are used, they shall conform to EN 10152(ZE), EN 10169 or EN 10346 (ZA, AZ), as appropriate.		P								
	The thickness tolerances shall be in accordance with EN 10143.		P								
	For corrosion protection the minimum protection shall be in accordance with Table 9 related to the class of exposure (see Table 8) to be encountered.		N								
4.3.2.2.2	Aluminium substructure		P								
	Where substructure members are made of aluminium alloy, the alloy shall be in accordance with EN 573-3 and have 0,2% yield strength of at least 160 N/mm ² .		P								
	For corrosion protection, the minimum protection shall be that given in Table 9.		P								
4.3.2.2.3	Timber substructure		P								
	The timber used for substructure shall conform at least to quality grade S10 (MS 10) of EN 1912.		P								
	The moisture content of the timber shall		P								

	not exceed 20%by mass.		
	The minimum cross section of the primary timber element shall be (40 × 60)mm.The dimensions for secondary timber elements shall be at least (48 × 24)mm or(50×30)mm for both primary and secondary timber elements.		N
	Timber supporting elements fixed directly to the building structure(that is without any suspension)shall have a minimum cross section of(48×24)mm.		N
	For indoor applications,wood preservation is normally not necessary.Where protection against biological or other attack,is necessary,the relevant provisions of EN 335,EN 350,EN 351,EN 460 and/or EN 599 shall apply.		P
4.3.3	Suspension components and fasteners		P
4.3.3.1	Metal suspension components		P
	The admissible load of suspension components and their fasteners shall be tested in accordance with 5.3, unless the dimensions,nature and design of the material allow load bearing capacity and deformation to be calculated.		P
4.3.3.2	Timbersuspension components		P
	Timber suspension components shall either have a minimum cross section of 1000 mm ² and a minimum thickness of 20 mm,provided that a sufficiently secure connection (i.e.the timber cross section has to be enlarged when the force to be transmitted is larger than the minimum cross section allows)can be achieved by using nails or screws,or their strength shall be calculated according to EN 1995-1-1.		P
4.3.4	Resistance to fixings		P
	Where and as far as relevant,manufacturers shall ensure that products withstand the loads that may be expected load,in accordance with 5.3.		P
4.3.5	Wind load resistance		P

	Where the suspended ceiling is expected to be subject to interior wind load(e.g.in case of opening windows, doors),all necessary design measures shall be taken to enable the membrane components and the substructure to resist upward and/or downward load.		P
	Under interior wind loading conditions,the ceiling membrane and substructure shall retain their stability and integrity and although some deformations could be acceptable,suspended ceilings or their parts shall be designed not to fail nor to collapse under this action.		P
	In all other cases(circumstances)particularly buildings with large or permanent (e.g.parking houses) openings or in colonnades and open access ways the acceptance of wind loads (pressure/suction)by the suspended ceiling shall be proved,e.g.by calculation according to EN 1991-1-4.		N
	NOTE For further information,see Annex C.		N
4.3.6	Impact resistance		P
	Where the suspended ceiling is required to resist impact(e.g.in sports halls caused by ball throwing),the nature of the activity shall be ascertained and the required performance specified(e.g.classification of ball throwing resistance).The suspended ceilings shall be designed accordingly.		P
	Where required,the impact resistance shall be tested according to Annex D.		P
	The class of impact velocity under which the test ceiling withstands the impact without adversely affecting the strength,the function and safety of the suspended ceiling and which does not lead to a significant change in appearance shall be declared.		P
4.3.7	Seismic resistance		P

	Where the suspended ceiling is exposed to seismic shocks,EN 1998-1 shall be taken into consideration.The suspended ceiling shall be designed such that the vertical and horizontal actions caused by seismic impacts do not cause damage or collapse.		P
4.4	Safety in case of fire		P
4.4.1	Fire resistance		P
4.4.1.1	General		P
	Where fire resistance of suspended ceiling kits is required,EN 13501-2 shall be used for classification purposes in accordance with Decision 2000/367/EC ⁴),based on a test done in accordance with procedures described in the following subclauses.		P
	NOTE Some Member States may have limitations on the use of demountable suspended ceilings for fire resistant uses.		P
4.4.1.2	Test specimen preparation		P
	The suspended ceiling to be tested shall be representative of the complete ceiling system (suspension, substructure,membrane,etc.)for which the fire resistance rating is required.		P
	In addition,the specific provisions of the test standard(s)called up by EN 13501-2 shall be followed.		P
4.4.1.3	Testing and classification		P
	Suspended ceilings shall be tested in end use conditions and clasified in accordance with EN 13501-2. Suspended ceilings having fire resistant performanceshall be classified in one of the following three ways:		P
	— Ceilings with fire resistance in conjunction with the element(e.g.floor or roof)above.Such ceilings shall be tested in conjunction with the roof/floor assembly above and fire resistance classification shall be related to the whole assembly.		P

	—Ceilings which possess a fire resistant property independent of any element.The classification shall separately cover those ceilings that have a fire resistance performance from above and/or below independent of any element above the ceiling.		P
	—As horizontal protective membranes.		P
4.4.2	Reaction to fire		P
4.4.2.1	General		P
	Where use of suspended ceilings is subject to regulatory reaction to fire requirements,reaction to fire testing and classification shall be based on the performance of each component making up the ceiling(i.e.material- based testing approach),which shall be stated separately in the results.Where a substructure kit, substructure component or membrane component are sold separately,these are also subject to testing and classification.		P
	For suspended ceilings placed on markets of some countries outside European Economic Area,where a full-scale testing approach is required,the suspended ceiling may be tested according to the provisions valid therein.		P
	Where regulatory requirements exist,ceiling membrane components and substructure components shall be tested and classified in accordance with EN 13501-1 and the conditions described below,or they may be classified as reaction to fire Class A15)without the need for testing(CWT)or they may be classified without the need for further testing(CWFT)in accordance with the appropriate agreed CWFT cases,as specified in Annex K.		P
	Where the ceiling membrane and/or the substructure components have already been classified for reaction to fire in accordance with the provisions of EN 13501-1 and the prescriptions below		P

	(e.g.by conforming to a relevant product standard),the ceiling producer may use such classification of the ceiling membrane and/or the substructure components without the need to repeat the tests,provided that sufficient checks are in place to ensure the identification of the product.		
4.4.2.2	Membrane components		P
	The following possible options in relation to ceiling membranes may exist:		P
	a)the membrane is intended to be used as it is,with no addition of products above it when installed;		P
	b)the membrane is placed onto the market together with an insulation or other material to be installed above or below the membrane.		P
	In case a),the ceiling membrane component shall be tested and classified on its own.In case b),the membrane component shall be tested together with an insulation or other material.		P
	Where regulations require,the ceiling shall be tested either from the underside only (i.e.the side facing the room)or from the underside and top side(i.e.the side facing the ceiling void).Where this leads to different classifications,these shall be indicated in the results.Membrane components shall be mounted and fixed according to Annex I.		N
4.4.2.3	Substructure kits and substructure components		P
	When testing substructure components in the SBI apparatus according to EN 13823,either they shall be mounted and fixed according to Annex I and tested in a way that permits their class to be determined in an appropriate way,or the class of the substructure material itself(e.g.timber or plastic)may be determined.		P
	When testing substructure components		P

	in the small flame test apparatus according to EN ISO 11925-2, either they shall be mounted and tested in a way that permits their class to be determined in an appropriate way, or the class of the substructure material itself (e.g. timber or plastic) may be determined.		
4.4.2.4	Jointing products		P
	Where use of suspended ceilings is subject to regulatory requirements, the reaction to fire performance of jointing products shall be classified according to EN 13501-1.		N
	Where a component or material is used, and its reaction to fire class, according to EN 13501-1, has already been determined (e.g. by compliance with harmonized European technical specification), this class may be used for declaring the reaction to fire classification of the prefabricated element according to this European Standard without the need of re-testing it.		P
	Furthermore, the reaction to fire class of the component or material may be declared without the need for further testing (CWFT) according to relevant table in Annex K, if it meets all the requirements of that particular class given therein or where a higher class than the one in CWFT is sought.		P
	Likewise, the reaction to fire class of such component or material may also be declared without the need for testing (CWT) as Class A1, if it meets all the requirements for such materials or products (see footnote 5)).		P
4.5	Hygiene, health and environment-Toxic gases and dangerous substances		P
4.5.1	Release of Asbestos (content)		P
	No part of a ceiling shall release and/or contain asbestos. The indication "No content" shall be declared.		P

4.5.2	Release and/or content of formaldehyde		P
	Where formaldehyde-containing material is added to any of the components of the ceiling as a part of the production procedure, the component shall be tested and classified into one of two classes: E1 or E2. The classes and related test methods shall be as specified in Annex E.		P
	This requirement does not apply to components having naturally occurring levels of formaldehyde, which may be classified E1 without the need for testing.		P
	Components, which have neither formaldehyde containing materials added nor which have naturally occurring formaldehyde levels do not have to be classified and declared in respect of formaldehyde release.		N
4.5.3	Other dangerous substances		P
	National regulations on dangerous substances, other than those already covered in other clauses of this standard, may require verification and declaration on release, and sometimes content, when construction products covered by this standard are placed on those markets.		P
	In the absence of European harmonized test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.		P
4.5.4	Susceptibility to the growth of harmful micro-organisms		P
	Some products covered by this standard may be susceptible to the growth of harmful micro-organisms. Given the absence of a European evaluation method, manufacturers should inform contractors and/or users of this susceptibility in accordance with Table 7.		P

		Table 7 — levels of susceptibility		
		Level	Susceptibility	
		A	Not susceptible	P
		B	Susceptible	
		<small>In accordance with 4.8.1 and 4.10, thermal insulation/dew-point calculations, in accordance with EN ISO 6946 and EN ISO 10211, shall be made to demonstrate that the conditions producing such effects are avoided.</small>		
4.6	Safety in use			P
4.6.1	Shatter properties			P
	Where membrane components are made of materials for which shatter properties or safe breakage are required(e.g.glass),the performance of the membrane in case of shattering or breakageshall be determined, classified and declared according to EN 12600.			P
4.6.2	Flexural tensile strength			P
	The membraneshall have sufficient strength to support its own mass when installed in the substructure.When any additional load is to be applied,the load which may be applied shall be specified.In addition to the minimum requirement that the membrane shall not fall out,it shall be of adequate strength to ensure that safety in use is maintained.Relevant,adequate flexural tensile strength shall be determined,due account being taken of the span of the membrane component,any openings which may be made in it,and any load(in addition to its self weight)that may be attached to the membrane.Tests designed to assess the flexural tensile strength shall be performed according to Annex F,on representative samples of the membrane material,account also being taken of the end use design.The result of the test and the performance of the membraneshall be declared as one of the classes of exposure of Table 8 and the admissible type of load to be applied according to Table F.2.			P
4.6.3	Mechanical strength,safety against failure-baffles			N
	Testing for flexural tensile strength is not applicable to baffles.The mechanical strength and safety against failure of			N

	baffles shall be determined according to Annex J. Whether or not the baffles meet the requirement shall be expressed as "pass" or "fail".		
4.6.4	Electrical safety		P
	Where relevant, suspended ceilings shall be capable of allowing installation of electrical appliances without risk of electrocution.		P
	Where required, suspended ceilings shall be designed so that electrical wiring can be carried in exposed or concealed trays specifically designed and installed for that purpose.		P
	Where regulations require that the suspended ceiling is earthed and/or bonded, the ceiling and its components shall be designed to allow this, in accordance with the requirements valid in the intended place of use of the product. Manufacturers shall declare whether the suspended ceiling is safe against the risk of electrocution and is designed (or is not designed) including earthing or bonding.		N
4.7	Acoustics		P
4.7.1	Test specimen preparation		P
	Where acoustic performance is to be declared, the suspended ceiling to be tested shall be representative of the ceiling to be used in practice and for which the acoustic rating is required. In addition, the specific provisions of the test standard(s) listed below shall be followed.		P
	Designers should be aware that the laboratory test results will not necessarily be reproduced on site (see EN 12354-6). For special applications or special acoustical performances studies, laboratory tests and in situ tests may be required.		P
4.7.2	Sound absorption		P
	Where required, suspended ceilings having a sound absorption property shall		P

	be used and their sound absorption coefficients established according to EN ISO 354 and declared. The sound absorption coefficients shall be calculated as practical sound absorption coefficient α_p , expressed in a diagram or a table in octave bands, and into a single value α_w with shape indicator in accordance with EN ISO 11654.		
	NOTE Sound absorption is the reduction of sound energy that occurs when sound waves are absorbed by building surfaces and elements. The amount of sound absorption required and the location of the sound absorbing surfaces depend on a number of factors. These include the intended use of the room, the nature of the noise generated, the need to control reverberation, the shape of the room and the reflective characteristics of the enclosing surfaces.		P
	The required reverberation time is function of the quantity and the performance of the absorption material and the shape and volume of the room (see EN 12354-6).		P
4.7.3	Sound insulation		P
4.7.3.1	General		P
	Sound insulation concerns the acoustic performance of building elements in relation to their effect on the transmission of airborne and impact sound in a building. A suspended ceiling system may be required to:		P
	—assist structural floors in reducing the vertical transmission of airborne and impact sound through the floor (vertical transmission);		P
	—reduce the sound transmission from room to room. This relates to both direct and indirect sound and is of particular importance where suspended ceilings are carried over partitions (horizontal transmission).		P
	Where the suspended ceiling is required		P

	to contribute to the reduction of the vertical transmission of airborne and impact sound through a floor, and/or where the suspended ceiling is required to contribute to the reduction of direct and indirect horizontal sound transmission (including the situation where the suspended ceiling with a plenum crosses over partitions), the performance shall be measured and expressed as described in 4.7.3.2 and 4.7.3.3, respectively.		
4.7.3.2	Laboratory measurement of vertical sound reduction		P
	The laboratory measurement of vertical sound reduction of airborne sound shall be in accordance with EN ISO 10140 and declared in accordance with EN ISO 717-1.		P
4.7.3.3	Laboratory measurement of horizontal transmission		N
	The laboratory measurement of horizontal sound reduction of a suspended ceiling with a plenum above it shall be in accordance with EN ISO 10848-2 and declared in accordance with EN ISO 717-1.		N
4.7.4	Direct field of application		P
	The results of acoustic tests may be extended to other ceilings of similar design, without the need for re-testing, subject to the following conditions:		N
	— any changes shall demonstrably lead to an improvement in acoustic performance (e.g. increased thickness of the membrane, increased density or greater dynamic stiffness);		P
	— changes to the area shall be permitted, subject to the condition given above;		P
	— components and membranes from one manufacturer may be changed to those from another manufacturer having the same or improved acoustic		P

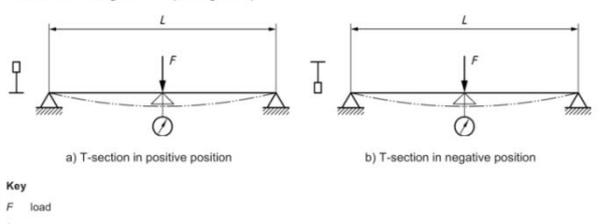
	specification.		
4.8	Durability		P
4.8.1	General		P
	Products meeting the requirements specified in this clause may be deemed to satisfy the expected economical lifetime for easily replaceable products.		P
	The exposure class in accordance with Table 8 shall be declared.		P
4.8.2	Dampness		P
	Suspended ceilings shall be designed to ensure that detrimental levels of water and condensation are not formed within or on the surfaces of the ceiling and adjacent building components, during the intended working life of the ceiling, in ways which could lead to a loss of flexural tensile strength of the membrane and/or loss of load bearing capacity of the whole suspended ceiling kit or the substructure. Thermal insulation/dew-point calculations, in accordance with EN ISO 6946 and EN ISO 10211, shall be made to verify and demonstrate that the conditions producing such effects are avoided.		P
	The level of protection against corrosion of steel and aluminium components when exposed in the range of exposure conditions given below shall be specified in accordance with Table 9. For the protection of timber, 4.3.2.2.3 shall apply.		N
4.8.3	Service life requirements		P
	The suspended ceiling shall retain its performance properties during its service life when exposed to the conditions for which it was designed (see 4.8.4), subject to receiving normal maintenance, as recommended by the designer, and not subject to ill treatment during its life.		P
	The following information relating to durability and maintenance shall be provided as indicated:		N

	—the ceiling manufacturer shall state if the visible surfaces of the ceiling membrane and substructure are cleanable and,if so,what cleaning technique is required and what limitations apply;		P										
	—the ceiling manufacturer shall state if the visible surface of the ceiling membrane and substructure is re-paintable and,if so,what materials and techniques are recommended and what,if any,aspects of the ceiling's performance would be affected;		P										
	— the ceiling manufacturer shall state the likely effect of the cleaning and painting on other aspects of the performance of the ceiling;		P										
	— the ceiling manufacturer shall state the minimum maintenance requirements necessary to enable the ceiling to continue to meet its claimed performance during its working life.		N										
4.8.4	Classification of ceiling exposure conditions		P										
	The ceiling or component manufacturer shall state which of the classes of exposure of Table 8 the suspended ceiling or component complies with the requirements of 4.6.2 and 4.8.3.		N										
	<p style="text-align: center;">Table 8 — Classes of exposure</p> <table border="1"> <thead> <tr> <th>Class</th> <th>Conditions</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Building components exposed to varying relative humidity up to 70 % and varying temperature up to 25 °C but without corrosive pollutants</td> </tr> <tr> <td>B</td> <td>Building components exposed to varying relative humidity up to 90 % and varying temperature up to 30 °C but without corrosive pollutants</td> </tr> <tr> <td>C</td> <td>Building components exposed to varying relative humidity up to 95 % and varying temperature up to 30 °C and accompanied by a risk of condensation but without corrosive pollutants</td> </tr> <tr> <td>D</td> <td>More severe than the above</td> </tr> </tbody> </table>	Class	Conditions	A	Building components exposed to varying relative humidity up to 70 % and varying temperature up to 25 °C but without corrosive pollutants	B	Building components exposed to varying relative humidity up to 90 % and varying temperature up to 30 °C but without corrosive pollutants	C	Building components exposed to varying relative humidity up to 95 % and varying temperature up to 30 °C and accompanied by a risk of condensation but without corrosive pollutants	D	More severe than the above		P
Class	Conditions												
A	Building components exposed to varying relative humidity up to 70 % and varying temperature up to 25 °C but without corrosive pollutants												
B	Building components exposed to varying relative humidity up to 90 % and varying temperature up to 30 °C but without corrosive pollutants												
C	Building components exposed to varying relative humidity up to 95 % and varying temperature up to 30 °C and accompanied by a risk of condensation but without corrosive pollutants												
D	More severe than the above												
4.8.5	Corrosion protection		P										
	Metal framing components,suspensions and connecting elements shall be protected against corrosion according to Table 9.		P										

Table 9 — Classes of corrosion protection of metal substructure components and membrane components			
Class (according to Table 8)	Profiles, suspensions, connecting elements and membranes		
	Components made of steel	Components made from aluminium	
A	Products with a continuously hot-dip metal coating Z100, ZA095 or AZ100 according to EN 10346 ^{a,b} . Products with electroplated zinc coating flat ZE25/25 according to EN 10152 ^c . Continuously organic coated (coil-coated) products of corrosion protection (interior) category CPI2 for the exposed side according to EN 10169 ^d (e.g. coating system ZE15/15-HDP25-2T-CPI2).	No additional corrosion protection required	P
B	Products with a continuously hot-dip metal coating Z100, ZA095 or AZ100 according to EN 10346 ^{a,b} . Products with electroplated zinc coating flat according to EN 10152 with or without an additional organic coating ^e as follows ^f : ZE25/25 + 40 µm per face ^g , ZE50/50 + 20µm per face ^g or ZE100/100 without OC. Continuously organic coated (coil-coated) products of corrosion protection (interior) category CPI2 for the exposed side according to EN 10169 ^d (e.g. coating system ZE15/15-HDP25-2T-CPI2).	No additional corrosion protection required or coil coating according to EN 1396:2007: corrosion index 2a	
C	Products with a continuously hot-dip metal coating Z100, ZA095 or AZ100 according to EN 10346 ^{a,b} with an additional organic coating ^e of 20 µm per face. Products with electroplated zinc coating flat according to EN 10152 with an additional organic coating ^e as follows ^f : ZE25/25 + 60 µm per face ^g , ZE100/100 + 40µm per face.	Anodizing ^h (15 µm < s < 25 µm) or coil coating according to EN 1396:2007: corrosion index 2a	
D	Special measures depending on use and corrosion action. Minimum corrosion protection according to Class C. Additional measures as required.	Anodizing ^h (s > 25 µm) or coil coating according to EN 1396:2007: corrosion index 2b	
<p>^a EN 10327 replaces EN 10142 (Zinc), EN 10214 (Zinc - Aluminium) and EN 10215 (Aluminium - Zinc) and EN 10346 replaces EN 10327.</p> <p>^b Any equivalent corrosion protection leading to a similar level of protection is permitted.</p> <p>^c Coating of exposed parts with zinc compatible organic coating according to EN ISO 12944-3 applied by a post-painting process or equivalent coil coating according to EN 10169.</p> <p>^d Applies only to membrane components.</p> <p>^e Applies only to "capping" material for substructure components.</p>			
4.8.6	Contact corrosion protection		P
	In order to avoid corrosion due to contact between dissimilar materials (e.g. steel and aluminium), intermediate layers of suitable protecting materials shall be applied according to EN ISO 12944-3.		P
	Where wood preservatives are used, the corrosion protection method for the metal components that are connected to the timber components shall be compatible with the wood preservative.		N
4.8.7	Durability of non-cellular PVC profiles		P
	The durability of non-cellular PVC-U profiles shall be demonstrated by testing the impact resistance at 23°C according to EN 13245-1:2010, Annex A, and declaring the result according to EN 13245-1:2010, Table 2. The durability of PVC-UE profiles shall be demonstrated by testing the impact resistance at 23°C according to EN 13245-2:2008, Annex B, and declaring the result according to EN 13245-2:2008, Table B.1.		P
4.8.8	Durability of wooden products		P
	With regards to biological durability of timber, the hazard classes in which a product may be used are specified in EN 335. Alternatively, an appropriate preservation treatment shall be chosen in		P

	accordance with EN 350,EN 351 and EN 460.The mechanical durability shall be determined by taking the appropriate modification factors k_{mod} and k_{def} from EN 1995-1-1.		
4.9	Colour,light reflectance and gloss factor for suspended ceiling components		P
4.9.1	General		P
	Colours,light reflectance and gloss factor shall be as agreed between designer and specifier and,where required,shall be tested and declared according to 4.9.2,4.9.3 and 4.9.4.		P
	NOTE The number of colour tests is left to the discretion of the designer.		P
4.9.2	Measurement method of colour composition		P
	The colour composition of suspended ceiling components shall be measured using a computerized measuring device,operating according to the CIE-Lab method in ISO 7724-2 and ISO 7724-3.		P
4.9.3	Measurement method for light reflectance		P
	The light reflectance value of suspended ceiling components shall be measured using a computerized measuring device,operating according to the CIE-Lab method in ISO 7724-2 and ISO 7724-3.The designer shall state what,if any,the effect of perforations of the components is on the recorded light reflectance value.		P
4.9.4	Measurement and value of gloss factor		N
	The gloss factor of suspended ceiling components shall be determined and classified in accordance with EN ISO 2813.		N
4.10	Thermal insulation		P
	Where the suspended ceiling is designed to provide thermal insulation,this shall be demonstrated by calculation using the methods of EN ISO 6946 and EN ISO		P

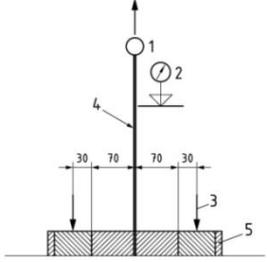
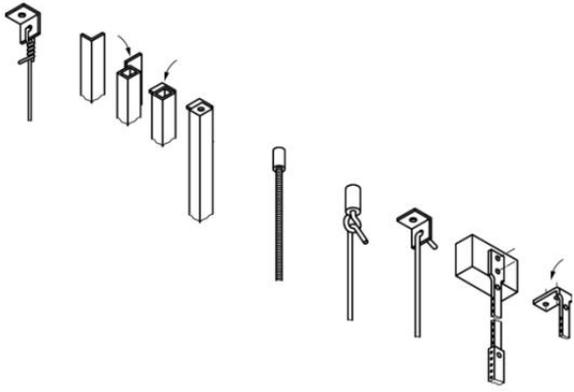
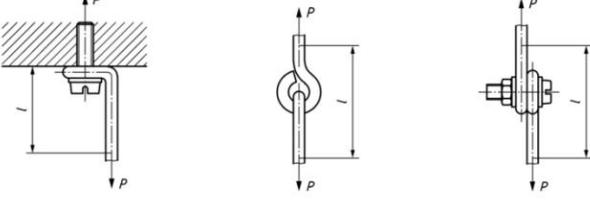
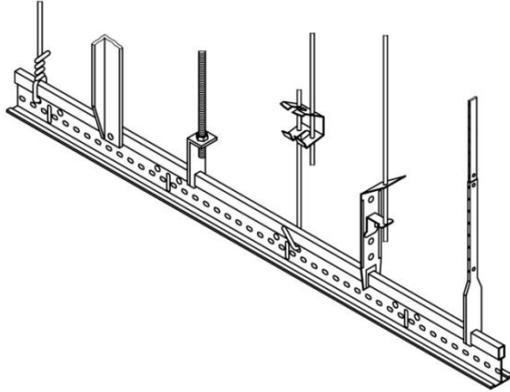
	10211 with data from one(or both)of the following:		
	— reference design data,as tabulated values,taken from EN ISO 10456;		P
	—test results(usually where the designer wishes to claim a better performance than obtained from reference design data),using either EN 12664 or EN 12667 with equipment calibrated according to the European level (using IRMM 440 reference material).The declared thermal resistance and/or thermal conductivity shall be calculated using one of the standards EN 13162 through EN 13171:2012,4.2.1,as appropriate.		P
	The thermal performance of the assembled suspended ceiling kit or component shall be declared.		P
5	Test methods		-
5.1	General		P
	This testing method is applicable for metal substructures,suspensions and connecting elements whose loading capacity cannot be determined by calculation.		P
	The specimen to be tested shall include all the characteristicsof those products as used on site.		P
	The test results allow determination of the deflection and the admissible loading of the substructure components.This includes various loading configurations,different spans of the profiles and different suspension and connecting components.		P
	The safety factor to be used in Formulae (3b)and(5)forthe admissible bending moment and the admissible loadshall be 2,5		P
5.2	Bending test of metal substructure profiles		P
5.2.1	General		P
	The load bearing capacity of metal		P

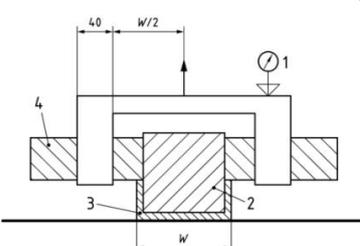
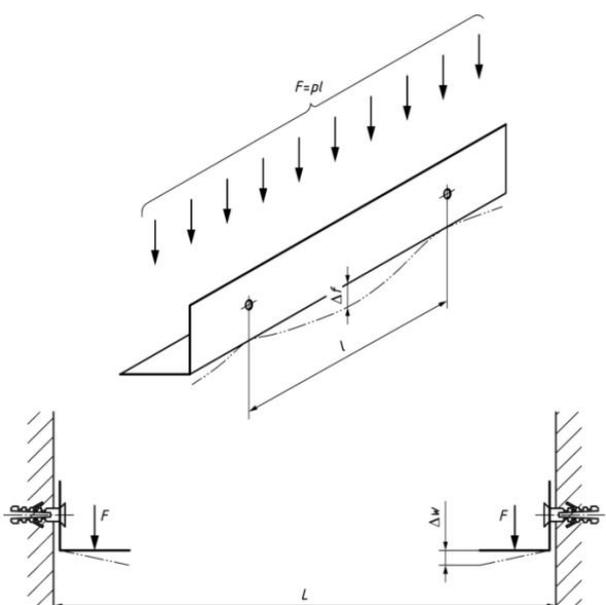
	structures shall be determined by the following tests on individual components at various spans and loads.		
	The bending test relates only to load bearing profiles. The profiles relevant for testing are those which carry the membrane elements and possible additional loads, and which transmit the load to the building structure.		P
	The deflection corresponding to the admissible load and/or admissible moment shall be classified in accordance with Table 6.		P
	Where the membrane components are only supported by perimeter trims (e.g. angle or U-channel), these perimeter trims shall be tested according to Annex H.		N
5.2.2	Procedure for testing		P
	For preliminary tests, each of 3 sections (i.e. 3 in positive and 3 in negative position) shall be tested as beams on two supports with a point load at mid-span at the maximum design span (max. L) moreover, at a minimum span of:		P
	<p>min $L = \max L / 2$; for lengths shorter than 2,0 m, min $L > 1,0$ m (1)</p> <p>Where perimeter channels are to be tested, a smaller span may be used if this results from the designed distance of the fixing elements (see Figure 14).</p>  <p style="text-align: center;">Figure 14 — Principle of a bending test of a T-section</p>		P
	Test seven further sections under the conditions of the least favourable case involving the smallest bending moment. The complete test includes 3 samples in 2 positions with each 2 spans (meaning 12 single tests) for preliminary tests and 7 further samples.		P
	The support conditions of the runner/channel shall be selected such that they are in accordance with the conditions in use. The loading point		N

	of the profiles shall be secured against twisting.		
	All substructure profiles intended to be used for this test shall have all punching details required for their normal use.		N
	Both the deflection at mid-span measured with gauges with an accuracy of 1/100 mm and at least up to a value equal to the intended deflection class of Table 6 and the corresponding test load (F) shall be determined.		N
	The load shall be temporarily relieved when the deflection reaches the designated class. After removing the load, the permanent deflection shall not exceed 0,2 mm. If this value is exceeded, the designated deflection and the corresponding load shall be reduced. This is to ensure that the load deformation curve is linear-elastic.		P
	The maximum load (Fu) and the corresponding maximum bending moment (Mu) shall be determined.		P
5.2.3	Assessment of results		P
	The bending rigidity (E/) and the admissible bending moment admM shall be determined from at least 10 tests. The bending rigidity (E/) for a single span beam with a point load in the centre shall be calculated using the following formula:		P
	$EI = \bar{F}L^3 / 48f_{max} \quad (2)$ <p>where</p> <ul style="list-style-type: none"> \bar{F} is the average load of 10 individual tests corresponding to the deflection class, in N (see Table 6); L is span of the specimen, in mm; f_{max} is deflection at centre span, in mm; E is elasticity modulus, in N/mm²; I is moment of inertia, in mm⁴. 		P
	It is the linear part of the load-deflection-curve that is relevant for determining the bending rigidity. If the deflection value according to Table 6 is outside this range, the load shall be reduced appropriately.		P
	The admissible bending moment results from two criteria:		P
	The first one relates to the		

	corresponding deflection value and shall be determined by:		
	$\text{adm } M_f = \bar{M}_f = \bar{F}L/4 \quad (3a)$ <p>where</p> $\bar{M}_f \text{ is the average value of bending moment } M_f$		N
	The second value of the admissible bending moment is related to the ultimate load Fu and shall be determined by:		P
	$\text{adm } M_u = M_u^{5\%}/v \quad (3b)$		P
	$M_u^{5\%} = \bar{M}_u - k_{\alpha} s \quad (4)$ <p>where</p> <ul style="list-style-type: none"> \bar{M}_u is the average value of the bending moment M_u (Nmm) related to the ultimate load F_u; k_{α} is a statistical factor (acceptance factor, see 5.4); s is the standard deviation, in Nmm; $M_u^{5\%}$ is the 5 % fractile; v is the safety factor = 2.5. 		P
	The lower value of admM and admMu shall be used as the definitive value admM.		P
	If no deflection limit is determined (Class 3),the admissible moment is related to the ultimate load Fu according to Formula (3b).		P
	In the case of other test configurations as described in 5.2.2(e.g.continuous beams and/or uniformly distributed loads or several point loads)the formula to calculate EI and the bending moment M and M shall be changed according to the corresponding support and load conditions.		N
5.2.4	Test report		P
	The test reportshall contain at least the following information:		P
	—manufacturer and manufacturing plant;		P
	—identification of the product(description and physical characteristics);		P
	—information about traceability of the products;		P
	—information about sampling:		P
	—date and time of sampling;		N
	—production line or unit,		P

	—personnel involved in sampling;		P
	—applied sampling method,if any;		N
	—identification of the organization and personnel executing the test;		P
	—applied test method(-s)according the relevant technical specification;		P
	—place and date of testing;		P
	—test results,including analysis of these when relevant:		N
	—load displacement curves at least up to the designated deflection class;		N
	—place and date of delivery of the test report;		P
	—registration number of the testing laboratory(when relevant);		P
	—signature of the head of the testing laboratory and stamp.		P
5.3	Testing of metal suspension and connecting components		P
5.3.1	General		P
	The suspension test shall include both its connections to the top fixing and to the substructure profile (supporting member,Figure 1).If relevant,preliminary tests may be necessary to clarify whether the suspension itself fails or the failure is between the connection to top fixing(e.g.using a wire with hook or eye to connect the wire with the top fixing(see Figure 15 to Figure 18))or to the framing member.In Figure 20,an example of a test set up has been presented.		P

	<p style="text-align: right;">Dimensions in millimetres</p>  <p>Key 1 top fixing 2 displacement measurement 3 support/ bracing 4 suspension (top fixing or substructure profile) 5 supporting member</p> <p style="text-align: center;">Figure 15 — Principle set-up of suspension test</p>		P
	 <p style="text-align: center;">Figure 16 — Examples of different suspension components</p>		P
	 <p style="text-align: center;">Figure 17 — Examples of different connections between top fixing and suspension</p>		P
	 <p style="text-align: center;">Figure 18 — Examples of different connections between suspension and supporting member</p>		P
	<p>Connecting components (e.g. wire clips, channel connectors, screws) shall be tested in a similar way using the components to be connected (e.g. primary and secondary profile, see Figure 19).</p>		P

	<p style="text-align: right;">Dimensions in millimetres</p>  <p>Key 1 displacement measurement 2 profile connector (e.g. cross connector) 3 supporting member 4 supporting profile W width of the connector</p> <p style="text-align: center;">Figure 19 — Principle set-up of connector test</p>		P
	<p>The test of the suspension and connecting components in conjunction with the profiles and the top fixing allows the weakest point of the substructure to be determined. This therefore allows the various components (e.g. the suspension itself, its connection to the supporting member and to the top fixing) to be optimized.</p>		P
	 <p style="text-align: center;">Figure 20 — Example for load bearing perimeter trim</p>		P
5.3.2	Static test		P
5.3.2.1	General		P
	<p>The tensile test as mentioned in 5.3.1 shall be carried out on 3 individual samples (components) fitted in the same way as in practice in a ceiling structure, including the connection to the top fixing as well as to the supporting member.</p>		P

	The test configuration shall be selected such that the largest displacement of the loading point and the minimum load capacity is to be expected. Diagonal pull or bending may need to be taken into account.		P
	For suspension components designed to be subjected to compression, the tests shall be carried out under compressive load in which the length of the suspension component has to be taken into account.		P
5.3.2.2	Test for suspension components		P
	The test conditions shall express standard laboratory conditions.		P
	Load rate: A preliminary test shall take place until failure or intended deformation. The load determined shall then be divided by 20. The value established in this way shall then be considered as steps to increase the load in the official test.		P
	Measurements taken and recorded shall be load and displacement.		P
	Number of test samples subjected to testing shall be 3 per suspension component type.		P
5.3.2.3	Test for connecting components		P
	The test conditions shall express standard laboratory conditions.		P
	Load rate: A preliminary test shall take place until failure or intended deformation. The load determined shall then be divided by 20. The value established in this way shall then be considered as steps to increase the load in the official test.		P
	Measurements taken and recorded shall be load and displacement.		N
	Number of test samples subjected to testing shall be 3 per connector type.		P
5.3.3	Functional test		P
	When a suspension		P

	component(e.g.hanger,connector)is used in a suspended ceiling exposed to wind load as described in 4.3.5 last paragraph,a functional test of the suspension component shall be carried out according to Annex G.		
5.3.4	Assessment of test results(static test)		P
	The admissible load(admF)shall be determined from the results of not less than 3 individual tests using the Formulae:		P
	$\text{adm } F = F_u^{5\%} / v \quad (5)$ $F_u^{5\%} = \bar{F}_u - k_\sigma \cdot s \quad (6)$ <p>where</p> <ul style="list-style-type: none"> \bar{F}_u is average value of ultimate load F_u, in N; k_σ is statistical factor (acceptance factor, see 5.4); s is the standard deviation, in N; $F_u^{5\%}$ is the 5 % fractile; v is the safety factor = 2,5. 		P
	The displacementof the loading point corresponding to admF shall be stated as:		N
	\bar{f} average value of displacement, in mm; f_{min} minimum value of displacement, in mm; f_{max} maximum value of displacement, in mm.		P
5.3.5	Test report		P
	The test report shall contain at least the following information:		P
	— manufacturer and manufacturing plant;		P
	— identification of the product (description and physical characteristics);		N
	— information about traceabilityof the products;		N
	— information about:		N
	—date and time of sampling;		P
	—production line or unit;		P
	—personnel involved in sampling;		P
	—applied sampling method,if any;		P
	— test configuration and point of deflection measurement,details on measurements,illustrations and		P

	photographs;																																																																												
	—identification of the organization and personnel executing the test;		P																																																																										
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5.4	Acceptance factor k		P																																																																										
	<p>The basis for the k_p value is the assumption of a random test with an unknown standard deviation of the result.</p> <p>The acceptance factor k_p shall be taken from Table 10.</p> <p>NOTE k_p depends on the number n of test samples (normally is $n = 10$). The minimum number of n is 3. It follows from this that $v = n - 1$ starts with 2.</p> <p style="text-align: center;">Table 10 — Acceptance factor k_p</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Fractile ϕ</th> <th colspan="14">$v = n - 1$</th> </tr> <tr> <th colspan="14">Number of test specimens</th> </tr> <tr> <th></th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> <th>7</th> <th>8</th> <th>9</th> <th>10</th> <th>11</th> <th>12</th> <th>13</th> <th>14</th> <th></th> </tr> </thead> <tbody> <tr> <td>W = 0,90</td> <td></td> </tr> <tr> <td>5%</td> <td>5,31</td> <td>3,96</td> <td>3,40</td> <td>3,09</td> <td>2,89</td> <td>2,75</td> <td>2,65</td> <td>2,57</td> <td>2,50</td> <td>2,45</td> <td>2,40</td> <td>2,36</td> <td>2,33</td> <td></td> </tr> </tbody> </table> <p>NOTE 1 Values for k_p depending on the number of test samples n, the probability (W) and the fractile value ϕ (assumption: the standard deviation is unknown).</p> <p>NOTE 2 For this standard, the probability W and the fractile value ϕ have been fixed at 0,90 and 5 %, respectively. For $n = 10$ test pieces, the prevailing k_p value is 2,57.</p>	Fractile ϕ	$v = n - 1$														Number of test specimens															2	3	4	5	6	7	8	9	10	11	12	13	14		W = 0,90															5%	5,31	3,96	3,40	3,09	2,89	2,75	2,65	2,57	2,50	2,45	2,40	2,36	2,33			P
Fractile ϕ	$v = n - 1$																																																																												
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6	Evaluation of conformity		-																																																																										
6.1	General		P																																																																										
	The compliance of the product(i.e.membrane,individual substructure components,substructure kit and/or suspended ceiling kit)with the requirements of this European Standard shall be demonstrated by:		P																																																																										
	—initial type testing;		P																																																																										
	— factory production control by the manufacturer,including the product's assessment.		P																																																																										
	The rest of the text in the following sub clauses uses the term "component"to mean 'finished product'.This should be replaced by'kit'when dealing with kits.		P																																																																										
	The manufacturershall ensure:		P																																																																										

	— that the initial type testing in accordance with this European Standard is initiated and carried out, and		P
	— that the component continuously complies with the declared performance, for which compliance with this European Standard has been verified.		P
	Initial type testing as covered by 6.2 also includes evaluation by calculation.		P
	The manufacturer is fully responsible for the conformity of that component with this European Standard. However, where the manufacturer uses components already shown to comply with the requirements relevant for that component (e.g. by CE marking) the manufacturer is not required to repeat the evaluation which lead to such compliance. Where the manufacturer uses components not shown to comply, it is his responsibility to undertake the necessary evaluation to show compliance.		P
6.2	Initial type testing		P
6.2.1	Initial type testing shall be performed to demonstrate conformity with this European Standard.		P
	All characteristics given in 4.1, 4.2, 4.3.2, 4.3.3, 4.3.4, 4.3.6, 4.4.1, 4.4.2.1, 4.4.2.2, 4.4.2.3, 4.4.2.4, 4.5, 4.6.1, 4.6.2, 4.6.3, 4.6.4, 4.7.2, 4.7.3, 4.8 and 4.10 shall be subject to this initial type testing, except as described in 6.2.3 to 6.2.4.		P
6.2.2	In the case of modification of the component or of the method of production (where these may affect the declared performances), initial type testing shall be performed. All characteristics given in 4.1, 4.2, 4.3.2, 4.3.3, 4.3.4, 4.3.6, 4.4.1, 4.4.2.1, 4.4.2.2, 4.4.2.3, 4.4.2.4, 4.5, 4.6.1, 4.6.2, 4.6.3, 4.6.4, 4.7.2, 4.7.3, 4.8 and 4.10, which may be changed by the modification, shall be		P

	subject to this initial type testing,except as described in 6.2.3 to 6.2.4.		
6.2.3	Tests previously performed in accordance with the provisions of this standard may be taken into account for the ITT purpose,providing that they were made in accordance with the provisions of this standard under the same system of attestation of conformity on the same component or components of similar design, construction and functionality,such that the results are applicable to the component in question,with the exception of tests performed in accordance with previous versions of test standards for acoustical performances(see 4.7),which can still be used to calculate the single value performances based on existing test reports,if correlation with the newest versions of the test method standards can be established and the single value performances adapted accordingly.		N
6.2.4	Components may be grouped into families where one or more characteristics are the same for all components within thatfamily or the test results are representative of all components within that family.In this case,not all components of the family have to be tested for the purposes of the initial type testing.		P
6.2.5	Test samples shall be representative of the component.If the test samples are pre-production components,they shall be representative of the intended future component.		P
6.2.6	Any initial type testing and its results shall be documented in a test report.		N
6.3	Factory production control (FPC)		P
6.3.1	General		P
	The manufacturer shall establish,document and maintain a FPC system to ensure that the components placed on the market conform to the		P

	declared performance characteristics.		
	If the manufacturer has the component designed,manufactured,assembled,packed,processed and labelled by subcontracting,FPC of the original manufacturer may be taken into account.However,where subcontracting takes place,the manufacturershall retain the overall control of the component and ensure that he receives all the information that is necessary to fulfil his responsibilities according to this European Standard.The manufacturer who subcontracts all of his activities may in no circumstances discharge himself of his responsibilities to a subcontractor.		N
	FPC is the permanent internal control of production exercised bythe manufacturer.		P
	All the elements,requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures.This production control system documentation shall ensure a common understanding of conformity evaluation and enable the achievement of the required component characteristics and the effective operation of the production control system to be checked.		P
	Factory production control therefore brings together operational techniques and all measures allowing maintenance and control of the conformity of the component with its technical specifications.Its implementation may be achieved by controls and tests on measuring equipment,raw materials and constituents,processes,machines and manufacturing equipment and finished components,including material properties in components,and by making use of the results thus obtained.		P
6.3.2	General requirements		P

	A FPC system shall be used.The requirements as described in the following clauses of EN ISO 9001:2008 shall be fulfilled,where applicable:		P
	—4.2 except 4.2.1 a),		P
	—5.1 e),5.5.1,5.5.2,		P
	—Clause 6,		N
	—7.1 except 7.1 a),7.2.3 c),7.4,7.5,7.6,		P
	—8.2.3,8.2.4,8.3,8.5.2.		P
	NOTE Manufacturers having an FPC system,which complies with EN ISO 9001 and which addresses the requirements of this European standard are recognized as satisfying the FPC requirements of the Council Directive 89/106/EEC.		N
6.3.3	Product specific requirements		P
6.3.3.1	The FPC system shall:		P
	—address this European Standard,and		P
	—ensure thatthe components placed on the market conform to the declared performances.		P
6.3.3.2	The FPC system shall include a component specific FPC-or quality-plan,which identifies procedures to demonstrate conformity of the component at appropriate stages,i.e.:		P
	a)the controls and tests to be carried out prior to and/or during manufacture according to a frequency laid down in Tables 11 to 13,as applicable;and/or		P
	b)the verifications and tests to be carried out on finished components according to a frequency laid down in Tables 11 to 13,as applicable		P
	If the manufacturer uses finished components,the operations under b)shall lead to an equivalent level of conformityof the component as if FPC had been carried out during the production.		N
	If the manufacturer carries out parts of		P

	<p>the production himself,the operations under b)may be reduced and partly replaced by operations under a).Generally,the more parts of the production that are carried out by the manufacturer,the more operations under b)may be replaced by operations under a).In any case,the operation shall lead to an equivalent level of conformity of the component as if FPC had been carried out during the production.</p>		
	<p>NOTE Depending on the specific case,it may be necessary to carry out the operations referred to under a)and b), only the operations under a)or only those under b).</p>		P
	<p>The operations under a)centre as much on the intermediate states of the component as on manufacturing machines and their adjustment,and test equipment,etc.These controls and tests and their frequency are chosen based on component type and composition,the manufacturing process and its complexity,the sensitivity of component features to variations in manufacturing parameters,etc.</p>		P
	<p>The manufacturer shall establish and maintain records that provide evidence that the production has been sampled and tested.These records shall show clearly whether the production has satisfied the defined acceptance criteria.Where the component fails to satisfy the acceptance measures,the provisions for non- conforming products shall apply,the necessary corrective action shall immediately be taken and the components or batches not conforming shall be isolated and properly identified.Once the fault has been corrected,the test or verification in questionshall be repeated.</p>		P
	<p>The results of controls and tests shall be properly recorded.The component description,date of manufacture, test</p>		P

	<p>method adopted, test results and acceptance criteria shall be entered in the records under the signature of the person responsible for the control/test. With regard to any control result not meeting the requirements of this European Standard, the corrective measures taken to rectify the situation (e.g. a further test carried out, modification of manufacturing process, throwing away or putting right of the component) shall be indicated in the records.</p>																																																																		
	<p>Each component of a kit shall comply with Tables 12 and 13, as relevant.</p>		<p>P</p>																																																																
	<p>Ancillary products shall be checked with a sufficient frequency to ensure that the ceiling kit maintains its declared performance.</p>		<p>P</p>																																																																
	<p>Table 11 — Minimum testing frequencies for membrane components, using direct or indirect testing or assessment</p> <table border="1"> <thead> <tr> <th rowspan="2">Characteristics</th> <th colspan="2">Direct testing</th> <th colspan="2">Indirect testing or assessment</th> </tr> <tr> <th>Test method</th> <th>Frequency</th> <th>Test method</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>Reaction to fire: (CWT or CWFT)</td> <td>-</td> <td>-</td> <td>Manufacturer's method to determine organic content and/or verification of supplier's declaration</td> <td>Each delivery of incoming materials</td> </tr> <tr> <td>Reaction to fire: classification through testing</td> <td>-</td> <td>-</td> <td>Manufacturer's method to determine organic content for all constituents influencing the RTF-performance and/or verification of supplier's declaration</td> <td>Once every 8 h and/or each delivery of incoming materials</td> </tr> <tr> <td>Dangerous substances</td> <td>-</td> <td>-</td> <td>As appropriate</td> <td>As appropriate</td> </tr> <tr> <td>Release of formaldehyde</td> <td>-</td> <td>-</td> <td>Manufacturer's method and/or verification of supplier's declaration</td> <td>Once every 8 h and/or each delivery of incoming materials</td> </tr> <tr> <td>Shatter properties (only brittle products, e.g. glass)</td> <td>-</td> <td>-</td> <td>Manufacturer's method and/or verification of supplier's declaration</td> <td>Once every 8 h and/or each delivery of incoming materials</td> </tr> <tr> <td>Flexural tensile strength</td> <td>-</td> <td>-</td> <td>Manufacturer's method and/or verification of supplier's declaration</td> <td>Once every 8 h and/or each delivery of incoming materials</td> </tr> <tr> <td>Sound absorption</td> <td>-</td> <td>-</td> <td>Manufacturer's method and/or verification of supplier's declaration</td> <td>Once every 8 h and/or each delivery of incoming materials</td> </tr> <tr> <td>Thermal conductivity</td> <td>4.10</td> <td>Once every day^a</td> <td>Manufacturer's method and/or verification of supplier's declaration</td> <td>Once every 8 h and/or each delivery of incoming materials</td> </tr> <tr> <td>Durability- Metal membrane components</td> <td>-</td> <td>-</td> <td>Manufacturer's method and/or verification of supplier's declaration</td> <td>Once every 8 h and/or each delivery of incoming materials</td> </tr> <tr> <td>Durability- Other materials</td> <td>Relevant product standard</td> <td>Once every 8 h</td> <td>Manufacturer's method and/or verification of supplier's declaration</td> <td>Once every 8 h and/or each delivery of incoming materials</td> </tr> <tr> <td>Dimensions, shapes and tolerances</td> <td>Relevant test method</td> <td>-</td> <td>Manufacturer's method and/or verification of supplier's declaration</td> <td>Once every 2 h and/or each delivery of incoming materials</td> </tr> </tbody> </table> <p>^a For thermal insulating products, once every day or once every three months and indirect testing.</p>	Characteristics	Direct testing		Indirect testing or assessment		Test method	Frequency	Test method	Frequency	Reaction to fire: (CWT or CWFT)	-	-	Manufacturer's method to determine organic content and/or verification of supplier's declaration	Each delivery of incoming materials	Reaction to fire: classification through testing	-	-	Manufacturer's method to determine organic content for all constituents influencing the RTF-performance and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials	Dangerous substances	-	-	As appropriate	As appropriate	Release of formaldehyde	-	-	Manufacturer's method and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials	Shatter properties (only brittle products, e.g. glass)	-	-	Manufacturer's method and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials	Flexural tensile strength	-	-	Manufacturer's method and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials	Sound absorption	-	-	Manufacturer's method and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials	Thermal conductivity	4.10	Once every day ^a	Manufacturer's method and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials	Durability- Metal membrane components	-	-	Manufacturer's method and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials	Durability- Other materials	Relevant product standard	Once every 8 h	Manufacturer's method and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials	Dimensions, shapes and tolerances	Relevant test method	-	Manufacturer's method and/or verification of supplier's declaration	Once every 2 h and/or each delivery of incoming materials		<p>P</p>
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Dimensions, shapes and tolerances	Relevant test method	-	Manufacturer's method and/or verification of supplier's declaration	Once every 2 h and/or each delivery of incoming materials																																																															

		Table 12 — Minimum testing frequencies for substructure components (profiles, connecting and suspension elements), using direct or indirect testing or assessment					
Characteristics	Direct testing		Indirect testing or assessment		Test method	Frequency	
	Test method	Frequency	Test method	Frequency			
Reaction to fire: (CWT or CWFT)	-	-	Manufacturer's method to determine organic content and/or verification of supplier's declaration	Each delivery of incoming materials			N
Reaction to fire: classification through testing	-	-	Manufacturer's method to determine organic content for all constituents influencing the RtF-performance and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials			
Dangerous substances	-	-	As appropriate	As appropriate			
Release of formaldehyde, when relevant	-	-	Manufacturer's method and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials			
Load bearing capacity	-	-	Manufacturer's method and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials			
Resistance to fixings	-	-	Manufacturer's method and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials			
Durability- Metal substructure components according to Table 9	-	-	Manufacturer's method and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials			
Durability- Other materials	-	-	Manufacturer's method and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials			
Dimensions, shape and tolerances	Not defined	-	Manufacturer's method and/or verification of supplier's declaration	Once every 2 h and/or each delivery of incoming materials			
		Table 13 — Minimum testing frequencies for suspended ceiling kits, using direct or indirect testing or assessment					
Characteristics	Direct testing		Indirect testing or assessment		Test method	Frequency	
	Test method	Frequency	Test method	Frequency			
Fire resistance	-	-	Manufacturer's method and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials			P
Shatter properties (impact resistance)	-	-	Manufacturer's method and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials			
Electrical safety	-	-	Manufacturer's method and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials			
Sound insulation	-	-	Manufacturer's method and/or verification of supplier's declaration	Once every 8 h and/or each delivery of incoming materials			
6.3.3.3	Individual components or batches of components and the related manufacturing details shall be identifiable and retraceable.						P
6.3.4	Initial inspection of factory and of FPC						P
6.3.4.1	Initial inspection of factory and of FPC shall generally be carried out when the production is already running and the FPC is already in practice.						P
	It is,however,possible that the initial inspection of factory and of FPC is carried out before the production is already running and/or before the FPC is already in practice.						P
6.3.4.2	The following shall be assessed:						P
	—the FPC-documentation,and						P

	—the factory.		
	In the assessment of the factory it shall be verified:		P
	a) that all resources necessary for the achievement of the component characteristics required by this European Standard are or will be (see 6.3.4.1) available, and		P
	b) that the FPC-procedures in accordance with the FPC-documentation are or will be (see 6.3.4.1) implemented and followed in practice, and		P
	c) that the component complies or will comply (see 6.3.4.1) with the initial type testing samples, for which compliance with this European Standard has been verified.		P
6.3.4.3	All factories of the manufacturer, where for the relevant component final assembling and/or final testing as part of the FPC is performed, shall be visited to verify that the conditions of 6.3.4.2 a) to c) are in place. One visit may cover one or more components, production lines and/or production processes. If the FPC system covers more than one component, production line or production process, and if it is verified that the general requirements (e.g. management structure, training policy) are fulfilled, these do not to be re-assessed when assessing other components, production lines or production processes but the detailed verification of the component-specific FPC requirements for individual components shall still take place.		P
6.3.4.4	Assessments previously performed in accordance with the provisions of this standard may be taken into account providing that they were made to the same system of attestation of conformity on the same component or components of similar design, construction and functionality, such that the results may		N

	be considered applicable to the component in question.		
6.3.4.5	Any assessment and its results shall be documented in a report.		P
6.3.5	Continuous surveillance of FPC		P
6.3.5.1	All factories which have been assessed according to 6.3.4 shall be re-assessed at a frequency sufficient to ensure that the FPC system continuous to satisfy the requirements of this standard.		P
	The frequency should be at least once a year.		P
6.3.5.2	Any assessment and its results shall be documented in a report.		P
6.3.6	Procedure for modifications		P
	In the case of modification of the component,the method of production or the FPC system(where these may affect the declared performances),a re-assessment of the factory and of the FPC system shall be performed for those aspects which may be affected by the modification.		P
	Any assessment and its results shall be documented in a report.		N
7	Marking,labelling and packaging		-
7.1	Marking and labelling		P
	Each productshall be clearly and indelibly marked by the manufacturer either directly on the product,a label affixed to the product,a label on the package,on the accompanying commercial documents or by data stored on electronic media:		P
	— the manufacturer's name,trade mark or identification mark,		P
	—the number and year of publication of this European Standard,EN 13964:2014,		P
	—symbols for the type and dimension,		N
	—identification ofthe material(s),		N
	—the year and month of manufacture.		P
	NOTE Where the marking required by		P

	ZA.3 gives the same information as above,the requirements of this clause are met.		
7.2	Packaging		P
	Where used,the packaging shall allow the product to be transported and delivered without damage.		P
8	Technical documentation		-
	The manufacturer's technical documentation shall specify how the constituent is part of the product and/or how the product or kit component is incorporated in the works.		P