SPRAWOZDANIE Z BADAŃ NR: BL-11/DCW/238/2020 z dnia: 24.02.2020

Nr zlecenia: BL-11/DCW/238/2020 Data otrzymania zlecenia: 2020.01.30

Zleceniodawca	**POLSTRAJ Sp. z o.o.** **ul. Bokserska nr 1. lok 304** **02-682 Warszawa**		
Nazwa wyrobu, symbol	Sufit Rastrowy		
Opis	System składa się z profili w kształcie litery U. Elementy konstrukcyjne systemu to: - profil nośny - profil poprzeczny - profil górny - niższy profil - zawiesie		
Rodzaj i zakres badań	Przeprowadzenie badań na zgodność z normą		
Metodyki badawcze	PN-EN 13964:2014-05 Sufity podwieszane -- Wymagania i metody badań		
Data przyjęcia próbek	**2019.001.30**	**Termin zakończenia badań**	**2020.02.24**
Dokumenty identyfikujące próbki	Dokumentacja techniczna		
Uwagi	Brak uwag		

Badania autoryzował:

mgr inż. Paweł Wiśniewski

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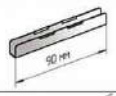
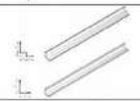
1. Aparatura pomiarowa i warunki badań

Przed przystąpieniem do badań sprawdzono poprawność dołączonych instrukcji montażowych wypoziomowano wyroby.
Badania przeprowadzono w temperaturze otoczenia 21°C.
Wykaz podstawowych urządzeń pomiarowych
Przed badaniem oceniono stan urządzeń pomiarowych.

Lp.	Nazwa	Oznaczenie
1.	Miara wzorcowana	M-15-515
2.	Suwmiarka wzorcowana	M-16-189
3.	Siłomierz	FB00
4.	Poziomica	S009
5.	Prasa hydrauliczna	

2. Opis wyrobu

System sufitów. System składa się z profili w kształcie litery U. Grubość blachy 0,155 mm. Wymiar pojedynczego rastra 600x600mm. Elementy konstrukcyjne sytemu to:

Profil	Typ profilu	Długość,мм	Wysokość,мм	Zdjęcia
Łożysko wzdłużne	U10	2400,1800, 1200	30,40,50	
Poprzeczny ściane	U10	1200,600	30,40,50	
Górny profil	U10	600	30,40,50	
Niższy profil	U10	600	30,40,50	
Złącze "Splice"	U8	90	13	
Montaż ścienny L Profil	L 30x25		30	
Zawieszenie				

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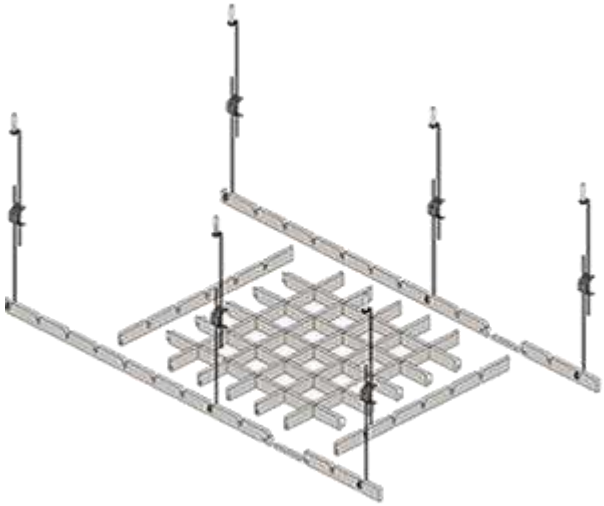
Schemat ideowy systemu:



Zdjęcia badanego systemu:

3. Wyniki badań

3.1. Badania na zgodność z normą PN-EN 13964:2014-05

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Clause	Requirement-Test	Result-Remark	Verdict
4.	**Requirements**		P
4.1	**Material and products – General**		P
	The materials and products used in the construction of suspended ceilings / ceiling linings shall comply with the requirements of this European Standard. If there is no separate product standard (e.g. prEN 14195) available, the tolerances for substructures shall comply with Tables 1 and 2. The substructure for linear components shall comply with Table 5. The manufactured dimensions and tolerances for volume and thin gauge membrane components shall comply with Tables 3 and 4 unless a separate product standard (e.g. prEN 520, prEN 14190, prEN 14126) is available. The manufactured dimensions and tolerances for linear components shall comply with Table 5. Where relevant, measurements shall be made with suitable accuracy.	accord with requirements	P
4.2	**Modular dimensions**		NA
	The plan dimension of suspended ceiling; substructure and membrane components should be based on modularco-ordination as standardised in ISO 1006.		NA
4.3	**Mechanical resistance and stability of load bearing components**		P
4.3.1	General		P
	The load bearing property of the substructure shall be established by testing each of its components individually in accordance with the relevant test contained in Clause 5 of this standard, unless the dimensions, nature and design of the material allow load bearing property and deformation to be calculated. The substructure shall be classified in accordance with its deflection limits as given in Table 6. 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
4.3.2.2	**Substructure materials**		P
4.3.2.2.1	**Steel substructure**		NA

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	Where the substructure is formed in hot-galvanised strip or sheet of unalloyed steel, the minimum steel grade used shall be DX 51D + Z according to EN 10142. If other steel types are used, they shall conform to either EN 10152 (ZE), EN 10169-1, EN 10214 (ZA) or EN 10215 (AZ), as appropriate. The thickness tolerance shall be in accordance with EN 10143. For corrosion protection the minimum protection shall be in accordance with Table 8 related to the class of exposure (see Table 7) to be encountered.		NA
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. For corrosion protection, the minimum protection shall be that given in Table 8.	250N	P
4.3.2.2.3	**Timber substructure**		NA
	The timber used for substructure shall conform at least to quality grade S 10 (MS 10) of EN 1912. The moisture content of the timber shall not exceed 20 % by mass.The minimum cross section of the primary timber element shall be (40 x 60) mm. The dimensions for secondary timber elements shall be at least (48 x 24) mm or (50 x 30) mm for both primary and secondary timber elements.		NA

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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..	. accord with requirements	P
4.3.3.2	**Timber suspension components**		NA
	Timber suspension components shall either have a minimum cross section of 1 000 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 ENV 1995-1-1.		NA
4.3.4	**Top fixing of suspension components, perimeter trim fixings**		P
	The type and number of top fixings or perimeter trim fixings shall be specified so that the loading capability of the fixing will not be exceeded. The type (e.g. concrete, light concrete, hollow bricks) and loading capability of the background shall be taken into account. The chosen (selected) top fixing method shall be detailed on the relevant drawings. Installation shall be carried out in accordance with the planning documents (design documents), if required with reference to the relevant ETAG (e.g. test loading on site). Where the top fixing or perimeter trim fixing is into a solid background normally the relevant ETAG shall be considered. When it is not possible to specify an ETA approved top fixing or perimeter trim fixing (e.g. in case of hollow brick masonry, aerated concrete or old building structure) then the factors listed in Annex B or national building regulations shall apply. It is recommended to consult the manufacturer of the top fixing or perimeter trim fixing. Where the top fixing or perimeter trim fixing is into steel or timber the requirements of ENV 1993-1-1 and ENV 1995-1-1 respectively shall apply. Where the suspended ceiling / ceiling lining is to meet fire protection requirements the information on suitable	fire protection requirements the information	P

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	top fixings or perimeter trim fixings is to be taken from the relevant fire protection (classification) document (e.g. test / classification report), if required the manufacturer of the top fixing shall be consulted.		
4.3.5 4.3.6	**Wind load resistance** **Impact resistance**		P P
	Where the suspended ceiling is required to resist impact (e.g. in sports halls caused by ball throwing), the designer shall ascertain the nature of the activity and specify the performance needed (e.g. classification of ball throwing resistance). The suspended ceiling has to be designed accordingly. Where required, the impact resistance shall be tested according to Annex D.	10 m/s	P
4.3.7	**Seismic resistance**		P
	Where the suspended ceiling is exposed to seismic shocks, ENV 1998-1-3 shall be taken into consideration. The suspended ceiling shall be designed such that the vertical and horizontal actions caused by seismic impacts do notcause 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 is claimed, it shall be proven by a test in accordance with the following:		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. In addition, the specific provisions of the test standard(s) called up by EN 13501-2 shall be followed.	accord with requirements	P
4.4.1.3	**Testing and classification**		
	Suspended ceilings shall be tested and classified in accordance with EN 13501-2. Suspended ceilings having fire resistant performance shall be classified in one of three ways: 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 thewhole assembly. −−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. −− As horizontal protective membranes.		P
4.4.2	**Reaction to fire**		P
4.4.2.1	**General**		P
	The provisions of this clause are valid in those Member States that accept a material-based testing approach. For Member States where a full scale testing approach is required, the suspended ceiling shall be tested according to the provisions valid in those countries. Reaction to fire testing and classification shall be based on the performance of each component making up the ceiling, 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. 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 reaction to fire Class A1 without testing1). Where the reaction to fire of the ceiling membrane and/or substructure component has already been classified in accordance with the provisions of EN 13501-1 and the prescriptions below (for example by conforming to a relevant product standard), the ceiling producer may use such classification without the need to repeat the tests, provided that sufficient checks are in place to ensure the identification of the product.		P
4.4.2.2	**Membrane components**		P
	Four possible options in relation to ceiling membranes may exist: a) the membrane is used as it is, with no addition of products above it when installed; b) the membrane is sold together with a defined insulation or other material to be installed above the membrane; c) the ceiling is intended to have insulation or other material added during installation; the ceiling producer specifies the type of insulation but does not supply it with the ceiling; d) the ceiling is intended to have insulation or other material added during installation but the ceiling producer does not specify or know the type and does not supply it with the ceiling.		P

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4.4.2.3	**Substructure kits and substructure components**		P
	When testing substructure components in the SBI and/or small flame test apparatus EN 13823 and/or EN ISO 11925-2, either the components 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 plastics) may be determined.		P
4.5	**Hygiene, health and environment – Toxic gasses and dangerous substances**		P
4.5.1	**Asbestos content**		P
	No part of a ceiling shall contain asbestos.	Not contain asbestos.	P
4.5.2	**Formaldehyde release**		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 are given in Annex E. This requirement does not apply to components having naturally occurring levels of formaldehyde, which may be classified E1 without the need for testing. Components which have neither formaldehyde containing materials added nor which have naturally formaldehyde levels occurring do not have to be classified and declared in respect of formaldehyde release.	accord with requirements	P
4.5.3	**Other dangerous substances**		P
	For the control of other dangerous substances for products sold in the European Economic Area (EEA), see Annex ZA; products sold outside the EEA shall conform to any regulatory provisions on dangerous substances applicable in the country of destination.		P
4.6	**Safety in use**		
4.6.1	**Shatter properties**		NA

4.6.2	**Flexural tensile strength**		P
	The membrane shall have sufficient strength to support its own mass when installed in the substructure. When any additional load is to be applied, the ceiling designer has to state where and how this load can be applied and how much this load is. In addition to the minimum requirement that the membrane shall not fall out, it shall be of adequate strength to ensure that aesthetic properties (in particular flatness and bow) are maintained. Where 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. Where relevant, tests designed to assess the flexural tensile strength shall be performed according to Annex F, on a representative sample of the membrane material, account also being taken of the end use design (flexural tensile strength does not apply to all membrane materials). The result of the test shall be declared as one of the classes of deflection of Table 6 in combination with one of the classes of exposure of Table 7 and the applied load.	B	P
4.6.3	**Electrical safety**		P
	The suspended ceiling shall be capable of being installed in accordance with the requirements of the CENELEC HD 384 series of documents. Electrical wiring may also be carried in exposed or concealed trays specifically designed and installed for that purpose, provided that the ceiling has been designed for this. 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 country of use of the product.	accord with requirements	P
4.7	**Acoustics**		P
4.7.1	**Test specimen preparation**		P
	Where acoustic performance is to be stated, 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
4.7.2	**Sound absorption**	accord with requirements	P

	Where the suspended ceiling has a sound absorption property, its sound absorption coefficients shall be established by testing according to EN ISO 354. The sound absorption coefficients shall be calculated as practical sound absorption coefficient αp, expressed in a diagram or a table in octave bands, and into a single value αw with shape indicator in accordance with EN ISO 11654.	accord with requirements	P
4.7.3	**Sound insulation**		P
4.7.3.1	**General** 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: −−assist structural floors in reducing the vertical transmission of airborne and impact sound through the floor(vertical transmission); −− 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). Where the suspended ceiling is required 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.	accord with requirements	P

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4.7.3.2	**Laboratory measurement of horizontal transmission**		P
	The laboratory measurement of vertical sound reduction of airborne sound shall be in accordance with EN ISO 140-3, expressed, and rated in accordance with EN ISO 717-1.		P
4.7.3.3	**Laboratory measurement of horizontal transmission**		P
	The laboratory measurement of horizontal sound reduction of a suspended ceiling with a plenum above it shall be in accordance with EN 20140-9 and expressed and rated in accordance with EN ISO 717-1.		P
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: −−any change shall demonstrably lead to an improvement in acoustic performance (e.g. increased thickness of the membrane, increased density or greater dynamic stiffness), −−changes to the area shall be permitted, subject to the condition given above, −− components and membranes from one supplier may be changed to those from another supplier having the same or improved acoustic specification.		NA
4.8	**Durability**		P
4.8.1	**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 related 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 ISO 6946 and ISO 10211-1, shall be made to demonstrate that the conditions producing such effects are avoided. The level of protection against corrosion of steel and aluminium components when exposed in the range of exposure conditions given below is contained in Table 8. For the protection of timber, see 4.3.2.2.3		P

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4.8.2	**Service life requirements**		
	The suspended ceiling shall retain its performance properties during its service life when exposed to the conditions for which it was designed (see 4.8.3), subject to receiving normal maintenance, as recommended by the designer, and not subject to ill treatment during its life. The following information relating to durability and maintenance shall be provided as indicated: −−the ceiling supplier 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, −− the ceiling supplier 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, −− the ceiling supplier shall state the likely effect of the cleaning and painting on other aspects of the performance of the ceiling, −− the ceiling supplier shall state the minimum maintenance requirements necessary to enable the ceiling to continue to meet its claimed performance during its working life.		P
4.8.3	**Classification of ceiling exposure conditions**		P
	The ceiling supplier shall state which of the classes in Table 7 the suspended ceiling will meet in complying with the requirements of 4.8.2.		P
4.8.4	**Corrosion protection**		P
	Metal framing components, suspensions and connecting elements shall be protected against corrosion according to Table 8.	A	P
4.8.5	**Contact corrosion**	accord with requirements	P
4.5.3	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. 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.		P
4.9	**Colour, light reflectance and gloss factor for suspended ceiling components**		
4.9.1	**General** Colours, light reflectance and gloss factor shall be as agreed between designer and specifier and, where required, shall be tested according to 4.9.2, 4.9.3 and 4.9.4.		NA

4.9.2	The colour composition of suspended ceiling components shall be measured using a computerised 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 computerised 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**		NA
	The gloss factor of suspended ceiling components shall be determined and classified in accordance with EN ISO 2813.		NA
4.10	**Thermal insulation** Where the suspended ceiling is designed to provide thermal insulation, this shall be demonstrated by calculation using the methods of ISO 6946 and ISO 10211-1 with data from one (or both) of the following: reference design data taken from EN 12524, test results (usually where the designer wishes to claim a better performance than that obtained from reference design data), using either EN 12664 or EN 12667. Where there is a danger of condensation in the insulated ceiling under a cold void, this shall be avoided either by the installation of a vapour barrier on the warm side of the ceiling or by providing adequate ventilation of the void, a combination of the two or by other means.	accord with requirements	P
6	**Evaluation of conformity**		P
6.1	The compliance of the component or kit with the requirements of this European Standard shall be demonstrated by: −−initial type testing, −− factory production control by the manufacturer		P
6.2	**Initial type testing**	See test report	P
6.3	**Factory production control (FPC)**		P
6.3.1	**General**		P
6.3.2	A FPC system shall be used. The requirements as described in the following clauses of EN ISO 9001:2000 shall be fulfilled, where applicable: 4.2 except 4.2.1 a), 5.1 e), 5.5.1, 5.5.2, Clause 6, 7.1 except 7.1 a), 7.2.3 c), 7.4, 7.5, 7.6, 8.2.3, 8.2.4, 8.3, 8.5.2. The FPC system may be part of a Quality Management system, e.g. in accordance with EN ISO 9001:2000.		P

6.6.3	**Product specific requirements**		P
6.6.3.1	The FPC system shall		P
	−address this European Standard and −ensure that the components placed on the market conform to the stated performance characteristics.		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 and/or b) the verifications and tests to be carried out on finished components according to a frequency laid down. If the manufacturer uses finished components, the operations under b) shall lead to an equivalent level of conformity of the component as if normal FPC had been carried out during the production. If the manufacturer carries out parts of 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 normal FPC had been carried out during the production.		P
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 FPC**		P
6.3.5	**Continuous surveillance of FPC**		P
6.3.6	**Procedure for modifications**		P

7	**Marking, labelling and packaging**		P
7.1	**Marking and labelling**		
	Each product shall be clearly and indelibly marked by the manufacturer either directly on the product or on the package or by a label with the following information, or on the accompanying commercial documents: —the manufacturer's name, trade mark or identification mark, — the number and year of this European Standard, EN 13964:2003, —symbols for the type and dimension, —identification of the material(s), — the year and month of manufacture.		
7.2	**Packaging**		P
	Where used, the packaging shall allow the product to be transported and delivered without damage.		P

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SPRAWOZDANIE Z BADAŃ NR: BL-11/DCW/238/2020 z dnia: 24.02.2020

Table 1 — Grids in assembled suspended ceiling systems – Cross sectional tolerances

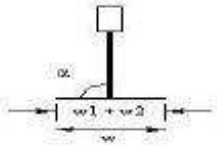
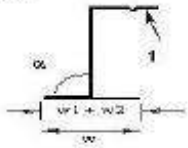
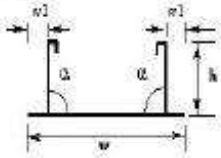
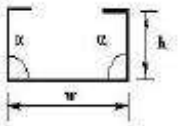
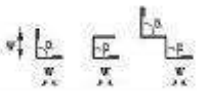
Cross section	Maximum permitted tolerances				
	W (mm)	w1 (mm)	w2 (mm)	h (mm)	α
T-section 	+ 0,3 - 0,3	+ 0,3 - 0,3	+ 0,3 - 0,3	–	+ 1,5° - 1,5°
Z-section  Key 1 Parallel to bottom flange	+ 0,3 - 0,3	+ 0,3 - 0,3	+ 0,3 - 0,3	–	+ 1,5° - 1,5°
Bandraster 	+ 0,3 - 0,3	+ 0,3 - 0,3	–	+ 0,3 - 0,3	+ 3° - 3°
Furring channel 	+ 0,3 - 0,3	–	–	+ 0,3 - 0,3	+ 3° - 3°
Perimeter trims 	+ 0,5 - 0,5	–	–	+ 0,3 - 0,3	+ 0° - 3°
NOTE 1 Measurements in mm are related to the manufactured size NOTE 2 α nominal = 90°					

Table 2 — Supporting components – Modular tolerance

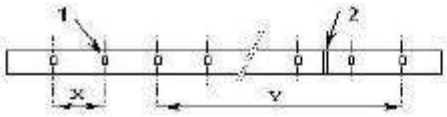
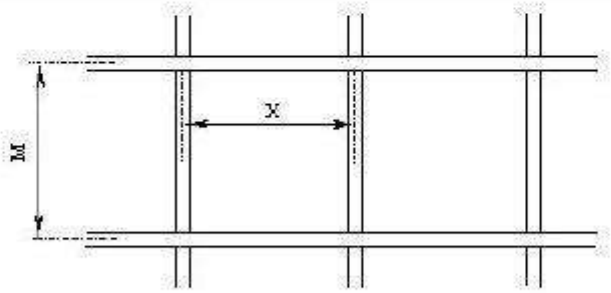
Main runners (T-section and bandraster) Substructure sections	 **Key** 1 Interlocking holes in section 2 Splice in supporting component Definition: X : 1 Slot distance Y : Sum of slot distances ≥ 1,25 m including or excluding one splice Tolerance: X : + / - 0,25 mm Y : + / - 0,30 mm
Centre point substructure	 Definition: M : Axis- axis distance between 2 main runners X : Axis- axis distance between 2 cross tees Tolerance: M : + / - 0,25 mm / m X : + / - 0,25 mm

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Table 2 *(continued)*

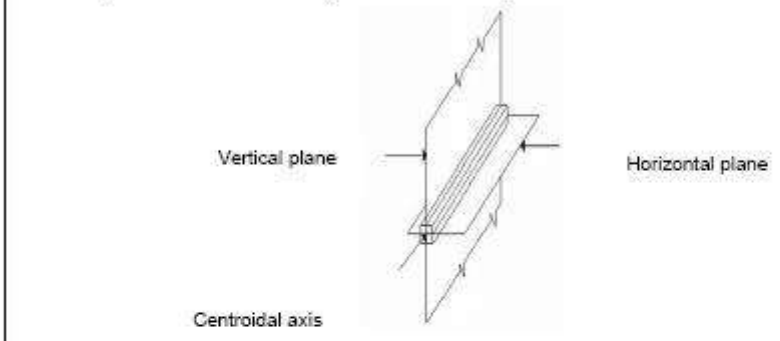
All profiles

Bow : ≤ 1,5 mm / m

Camber : ≤ 1,5 mm / m

Twist : ≤ 2° / m

NOTE Squareness and flatness depend on the accuracy of the installation.



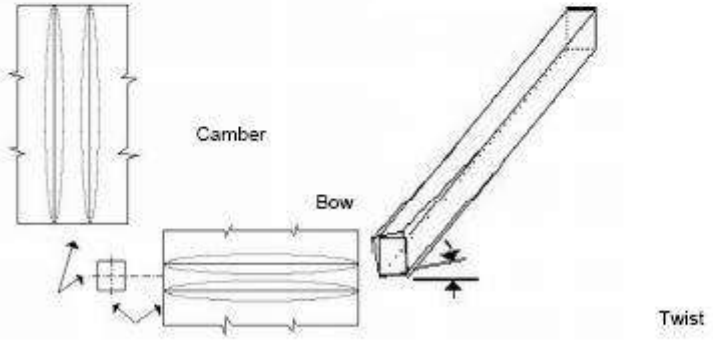


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Table 3 — Tolerances of volume membrane components

cross section		edge detail mm	length (mm)	width mm	thickness mm	squareness deviation from 90°	flatness positive and negative bending
A - squared edge B - bevelled edge			+ / - 1,5	+ / - 1,5	+ / - 1,5	1/500	maximum tolerance = 1/300 of the measured length
		A					
C - grooved edge	a b c	+ / - 0,5 + / - 0,3 + / - 0,3	+ / -Bl,5	+ / - 1,5	+ / - 1,5	1/500	maximum tolerance = 1/300 of the measured length
D - rebated and grooved edge	a b c	+ / - 0,3 + / - 0,5 + / - 0,3	+ / - 1,5	+ / - 1,5	+ / - 1,5	1/500	maximum tolerance = 1/300 of the measured length
E - rebated edge	a b	+ / - 0,5 + / - 0,6	+ / - 1,5	+ / - 1,5	+ / - 1,5	1/500	maximum tolerance = 1/300 of the measured length
F - tongued and grooved edge	a b c d	+ / - 0,5 + / - 0,3 + / - 0,3 + / - 0,3	+ / - 1,5	+ / - 1,5	+ / - 1,5	1/500	maximum tolerance = 1/300 of the measured length

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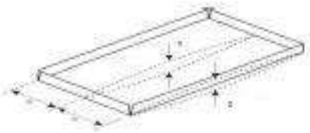
Table 4 — Tolerances of universal thin gauge membrane components

a. Panel sizes :

- for lengths ≥ 1000 mm $^{0}_{-0,4}$ mm / m
- for lengths < 1000 mm $^{0}_{-0,3}$ mm
- for width $^{0}_{-0,4}$ mm

b. Flatness :



Key

1 Tolerance b

2 Tolerance a

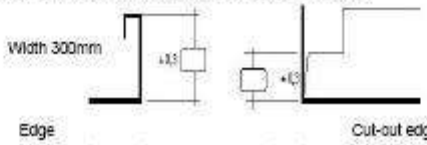
l = length (mm)	0 < l ≤ 1000		1000 < l ≤ 2000		2000 < l ≤ 3000	
b = width (mm)	a	b	a	b	a	b
0 < b ≤ 400	- 0,5	- 0,2	- 0,5	- 0,2	- 0,5	- 0,2
	+0,5	+3,0	+1,5	+4,0	+3,0	+6,0
400 < b ≤ 500	- 0,5	- 0	- 0,5	- 0	- 0,5	- 0
	+0,5	+4,0	+1,5	+5,0	+3,5	+7,0
500 < b ≤ 625	- 0,5	- 0	- 0,5	- 0	- 0,5	- 0
	+0,5	+6,0	+1,5	+7,0	+4,0	+9,0
625 < b ≤ 1 250	- 0,5	- 0	- 0,5	- 0	–	–
	+0,5	+10,0	+1,5	+13,0	–	–

c. Angularity of the long edge in relation to short edge

Panel width up to 625 mm ± 0,5 mm

Panel width 625 mm to 1 250 mm ± 0,6 mm

d. Depth of slops / supports ± 0,3 mm (measured on panel cut out edge)



Deviations from 90° angle on vertical upstand are dependent on the production process and the relative suspension systems. There are no fixed tolerances.

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Table 5 — Definitions and tolerances of linear ceiling systems

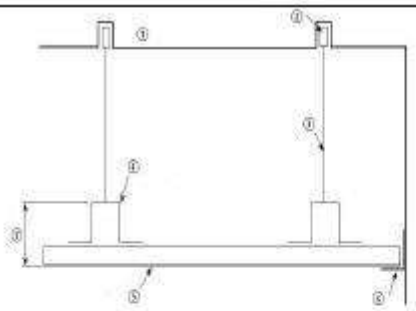
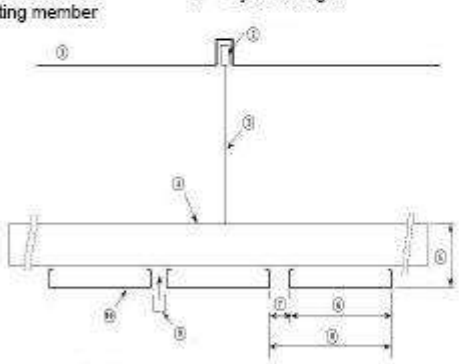
Definition	
Ceiling components of relative narrow width and of which the length is generally made to measure Width max. 400 mm The linear components attach with their sides to the carriers. In general the angle between linear panel and carrier is 90° The sides of the linear components can be executed in many different shapes At both ends the linear components are open The joint between the sides of the components can have a width of 0 mm to X mm The modular dimension is component-width + joint The open joints between the components may be closed with a joint profile	 Key 1 Load bearing structure 2 Top fixing 3 Suspension 4 Supporting member 5 Linear component 6 Perimeter trim 7 System height  Key 1 Load bearing structure 2 Top fixing 3 Suspension 4 Supporting member 5 System height 6 Linear component width 7 Joint 8 Linear component module 9 Join profile 10 Linear component

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Table 5 *(continued)*

Tolerances of linear components (dimensions in mm)

Dimensions:

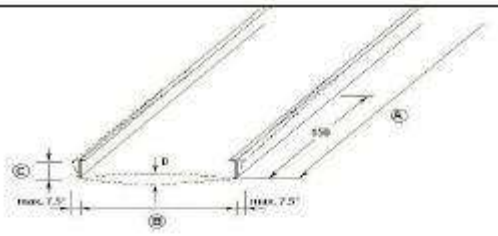
Component height + / - 0,5

Component length (850 < 3 000) mm + / - 1,25

(3 000 ≤ 8 000) mm + / - 2,0

Component width + / - 0,75

Due to material and production properties additional dimensional tolerances occur because of spring-back at the panel ends

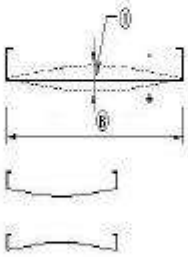


Key

A Linear component length
B Linear component width
C Linear component height

Plane and waves (dimensions in mm)

Plane

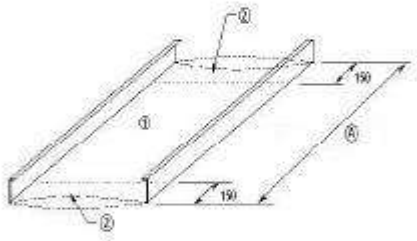


Convex = +

Concave = -

Key

1 Tolerance C
2 Tolerance D



Key

A Linear component length
B Linear component width

Linear component width (in mm)			
0 < b ≤ 100	100 < b ≤ 200	200 < b ≤ 300	300 < b ≤ 400
C	C	C	C
- 1,0 + 1,5	- 1,25 + 2,0	- 1,5 + 2,5	- 1,75 + 2,7
D	D	D	D
- 1,5 + 1,5	- 2,5 + 2,0	-3,5 +2,5	-4,0 +2,7

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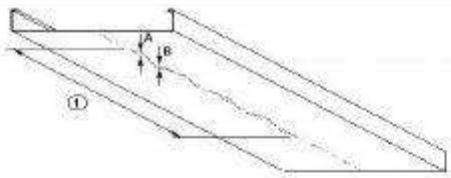
Table 5 *(continued)*

Waves



Key

1 Linear component span

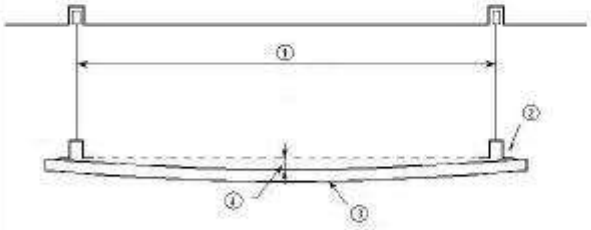
Linear component width (in mm)			
0 < b ≤ 200		200 < b ≤ 400	
A	B	A	B
- 0,5	+ 0,5	- 0,8	+ 0,8

Camber

The deviation is maximum 1/1 500 × linear component length, measured in the middle of the length of the linear component (equals 0,67mm over 1,0m length).

Deflection of the linear components

The maximum deflection between two supporting members/ points of support is 1/500 × supporting member distance, measured in the middle between the supporting members/ points of support.



Key

1 Supporting member distance (linear component span)
2 Supporting member
3 Linear component
4 Linear component deflection (1/500 × supporting member distance)

Tolerance of the supporting member module

The tolerance of the supporting member module is ± 0,06 mm on a linear component module of 100 mm.

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Table 5 *(continued)*

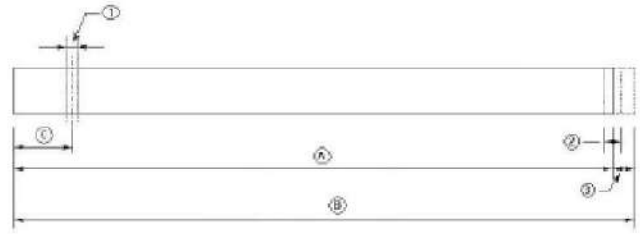
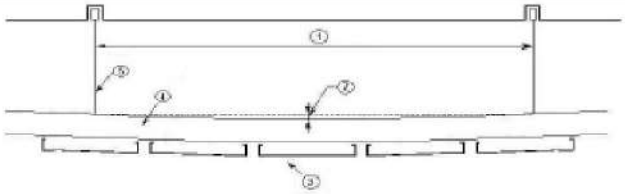
Tolerance of the supporting-member length The length of the supporting member is a multiple of the supporting members' module The total length of the supporting member follows from the number of supporting member modules, including the module-tolerance, minus a cutting tolerance that is determined by the manufacturer Production-wise each supporting member starts and ends in the joint of the punching module Supporting-member splices or manufacturer's installation instruction ensure the modular dimensions over the length of more supporting members	 **Key** A Supporting member length = X x Module – cutting tolerance B Modular length supporting member C Supporting members' module 1 Module tolerance 2 Length tolerance 3 Cutting tolerance
Deflection of the supporting members The maximum deflection of the supporting members between two suspension points is 1/500 x suspension distance, measured in the middle between two suspension points (Class 1, Table 6)	 **Key** 1 Suspension distance (supporting member span) 2 Supporting member deflection 3 Linear component 4 Supporting member 5 Suspension

Table 6 — Classes of deflection

Class	Maximum deflection in mm[A]
1	L^B / 500 and not greater than 4,0
2	L^B / 300
3	No limit

A The maximum deflection is the accumulative value of the deflection of the substructure component and the deflection of the membrane component

B *L* is the span in mm between the suspension components or the suspension points

Table 7 — Classes of exposure

Class	Conditions
A	Building components generally exposed to varying relative humidity up to 70 % and varying temperature up to 25 °C but without corrosive pollutants.
B	Building components frequently exposed to varying relative humidity up to 90 % and varying temperature up to 30 °C but without corrosive pollutants.
C	Building components exposed to an atmosphere with a level of humidity higher than 90 % and accompanied by a risk of condensation.
D	More severe than the above.

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Table 8 — Classes of corrosion protection of metal substructure components and membrane components

Class according to Table 7	Profiles, suspensions[a], connecting elements[a] 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 prEN 10327[b c]. 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 10169-3[f] (e.g. coating system ZE15/15-HDP25-2T-CPI2).	No additional corrosion protection required
B	Products with a continuously hot-dip metal coating Z100, ZA095 or AZ100 according to prEN 10327[b c]. Products with electroplated zinc coating flat according to EN 10152 with or without an additional organic coating[d] as follows[c]: ZE25/25 + 40 µ m per face[e], ZE50/50 + 20µ m per face[e] or ZE100/100 without OC. Continuously organic coated (coil-coated) products of corrosion protection (interior) category CPI2 for the exposed side according to EN 10169-3[f] (e.g. coating system ZE15/15-HDP25-2T-CPI2).	No additional corrosion protection required or coil coating according to EN 1396:1996: corrosion index 2a
C	Products with a continuously hot-dip metal coating Z100, ZA095 or AZ100 according to prEN 10327[b c] with an additional organic coating[d] of 20 µ m per face. Products with electroplated zinc coating flat according to EN 10152 with an additional organic coating[d] as follows[c] :ZE25/25 + 60 µ m per face[e], ZE100/100 + 40µ m per face.	Anodising[c] (15 µ m ≤ s < 25 µ m) or coil coating according to EN 1396:1996: corrosion index 2a
D	Special measures depending on use and corrosion action. Minimum corrosion protection according to Class C. Additional measures as required.	Anodising[c] (s > 25 µ m) or coil coating according to EN 1396:1996: corrosion index 2b

a Round steel wires used as suspensions or part of a suspension shall meet the requirements of EN 10244-2 (Zinc or Zinc alloy coating on steel wire).

b prEN 10327 replaces EN 10142 (Zinc), EN 10214 (Zinc - Aluminium) and EN 10215 (Aluminium - Zinc).

c Any equivalent corrosion protection leading to a similar level of protection is permitted.

d 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 10169-3.

e Applies only to membrane components.

f Applies only to "capping" material for substructure components.

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