TECHNICAL REQUIREMENTS

AND TEST METHODS FOR CONSTRUCTION

Application guideline

to the

EN 12825

Raised access floors

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PREFACE

System floors are meanwhile an integral and essential part of modern office, administration and industry construction and increasingly also of private construction. Not only the maximum of the currently requested flexibility is reached by them but also a sustainable added value and return of the real estate is made possible for owners, investors and landlords, also for the future.

System floors are a safety-relevant construction product according to the definitions of the European Commission.

Standard European technical requirements to system floors and test procedures for system floors, inclusively raised access floors, hollow floors, dry hollow floors as well as other floors which have an usable cavity are regulated in the EN 12825 Raised access floors and in the EN 13213 Hollow floors since 2001.

The implementation of the test and classification standard EN 12825 Raised access floors is made in the present application guideline regarding the suitability and roadworthiness of raised access floors in the sense of safety-technical minimum standards and in particular for the requirements in the German construction industry.

The EN 12825 describes the essential technical characteristics of raised access floors and divides them into classes.

These interior fit-out trades require specific verifications of the characteristic values which get verified by system-specific standard conformity certificates of an accredited certifier* for the practical use.

A construction type suited for the use is to be designed by the executing company in reference to the specific requirement.

The keeping of the requirements to the hygiene of the usable installation cavity is to be ensured by the planner.

Raised access floors are not only subject to a permanent technical-scientific development but are also meeting the requirements of sustainable construction and environmental friendliness to a special degree.

This makes it necessary to regularly amend the technical performance requirements of this application guideline to the state of the art.

Preface

The respectively valid version is to be obtained at the Bundesverband Systemböden e.V. Düsseldorf respectively is available as a download on the homepage www.systemboden.de.

Bundesverband Systemböden e.V.
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* The supervision of the safety standard, the permanent self-monitoring in the production facility as well as a permanent external control in view of the keeping of the necessary criteria of the suitability and roadworthiness of raised access floors can be made by independent certification associations as well as test laboratories. Thus the system supplier can provide the verification to comply to the generally recognised codes of practice in view of safety technology, liability and work safety.

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1 In general

The application guideline for raised access floors describes characteristic values for the safety and suitability of raised access floor systems and defines requirements to the design and production of the components on the basis of tests and properties according to the EN 12825 Raised access floors.

1.1 Applications

This application guideline is valid for raised access floors which are for example used

- in office and administration areas,
- in public buildings,
- in datacentres and periphery rooms,
- in workshops and working rooms with production,
- in combination with hollow floor systems.

1.2 Definitions

1.2.1 System floors

System floors as for example raised access and hollow floors are standardised fit-out systems elevated by a substructure for the interior fit-out. System floors provide a floor cavity below a load bearing layer for the flexible use and the accommodation of installations, supply and disposal lines of all kinds. Requirements and test procedures for raised access floors are regulated in the EN 12825 and for hollow floors in the EN 13213.

1.2.2 Raised access floors

1.2.2.1 In general

Raised access floors are a sub design type of system floor constructions for the interior fit-out of buildings which components consist of industrially premanufactured modular components (raised access floor panels, substructure elements and construction elements as accessories). This construction type is named raised access floor in the sense of the building rules list. The raised access floor system is erected by the assembly (installation in buildings) of the single components. A raised access floor system allows free access to the floor cavity anywhere by lifting of single raised access floor panels.

1.2.2.2 Raised access floor element

The smallest load-bearing modular component of a raised access floor consists of a raised access floor panel and the substructure and it is called the raised access floor element. The substructure consists mainly from 4 pedestals, the corresponding support elements resp. pedestal head gaskets and eventually horizontally stiffening and/or components which increase the loadability as e.g. stringers, profiles etc. Analogously the same definition is valid for raised access floors in switchgear version as the raised access floor element can also consist of more than one raised access floor panel with this version.

1.2.2.3 Components

Raised access floors consist in particular of single elements like:

- Raised access floor panels with or without floor covering,
- Raised access floor pedestals for different construction resp. installation heights,
- Additional parts as e.g. pedestal head gaskets/support elements, adhesives, stringers, C-profiles resp. traverses for load-bearing and/or sealing and/or horizontally stiffening tasks, bridgings, wall connection elements, connection profiles for different system floor constructions etc.

1.2.3 Terminology

- Barrier: Dividing of the cavity by suited measures into sections with eventually different requirements or as a separation.
- Floor height: Vertical measurement of the system floor defined as the measurement of the distance between subfloor and upper edge of the load-bearing layer/raised access floor panel.
- Ultimate load/failure load: Load at the moment of failure when no increase of the load is anymore possible with an increasing deflection.
- Floor covering: Walkable layer applied to the load-bearing layer/raised access floor panel, “wear layer”.
- C-profile: Rectangular formed profile which is mostly open on the lower side (fixation on top of pedestals) as a formed sheet metal part; component of the switchgear raised access floor.
- Expansion joint: Structure in system floors to make relative movements of partial areas possible.
- Raised access floor panel row: Rows integrated in hollow floors for the installation of telecommunication, electrical connections, heating, ventilation, etc.
- Deflection: The deformation of the raised access floor panel resulting from the effect of the load.
- Dynamic Load: Effecting loads which change over time resulting from the acceleration of masses. Dynamic loads cause an increase of the loads in horizontal and vertical direction compared to dead loads.
- Electrical outlets: Installations for the supply with electrical energy and/or communication connections.
- Clear height: The available height for installations in the cavity.
- Nominal load: Changing or variable load effects which are to be assessed on building parts acc. to the definition in the Eurocode 1. Not applicable to raised access floors in this form.

- Panel grid dimension: Horizontal direction-dependent grid dimension which results from the edge lengths of the raised access floor panels.
- Point load: The loadabilty of the system floor with single loads which is to be derived from the designated use.
- Switchgear raised access floor: Variant of a raised access floor with high requirements to the transverse stability. The system consists of pedestals and profiles (so-called C-profiles which are arranged on the pedestals and connected (e.g. screwed) with them. The raised access floor panels are laid on the profiles.
- Safety factor: A factor determined on the basis of load test results which results from the division of the failure load by the point load.
- Supporting element, pedestal: Substructure element for conducting forces from the load bearing layer into the structural floor.
- Pedestal grid dimension: Horizontal, direction-dependent grid dimension (distance) between the supporting elements which can also be indepedent of the panel grid dimension.
- Load bearing layer: Load-bearing raised access floor panels which are resting on the substructure or are as well connected to it.
- Substructure: Structure below the raised access floor panels (load bearing layer) for the discharge and transfer of the load.
- Vertical deviation: The displacement of a raised access floor panel in vertical direction based on the unloaded initial position which results from the effect of a load.
- Wall connection: Wall connection of a system floor with wall connection tape which enables a relative movement between building and system floor and reduces the transfer of structure-borne sound.
- Accessories: Components of a system floor for the completion of the designated use.

1.3 Prerequisites

1.3.1 Basics

The raised access floor is exposed to a stress by its designated use which the used components and materials need to correspond to in type and design.

Special requirements and conditions, especially safety-relevant ones, are to be announced in advance by the client/planner. The design and performance of the raised access floor shall respectively comply to these special requirements and conditions. The coordination between the requirements and the designed performance of the raised access floor requires a professional and engineered-based planning.

1.3.2 Materials

The characteristics of a raised access floor are closely related to the characteristics of the used materials. They have to correspond to the requirements of the purpose and have to be subject to a in-process quality assurance in the factory. A consistent safety resp. characteristic of the component can only be guaranteed thus.

Variations of dimensions and characteristics as a consequence of changes of temperature and/or humidity can present a natural physical behaviour and comply to the state of the art depending on the material. Adjustments to an ambient climate which is to be expected have to be considered with planning and design.

Raised access floor components can e.g. consist of

- Organic materials,
- Mineral materials,
- Metallic materials,
- As well as of combinations of different materials.

1.3.3 Hazarduous substances

The materials correspond to the provisions of the law regarding the hazarduous substances ordinance (e.g. GefStoffV in Germany) and other applicable provisions and regulations in their respectively relevant versions. E.g. only chipboard panels which correspond to minimum the emission class E1 may be used. If special stresses through e.g. aggressive liquids, gases or radiation are to be expected, this has to be stated by the client and suited measures for the guarantee of the requested characteristics have to be taken.

1.3.4 Area of application for raised access floors, climatic conditions

The used materials of the raised access floor components are designed for the usage under normal climate conditions as a standard, temperatures of 15 °C – 25 °C and a relative air humidity of 40 % – 65 %. It has to be stated by the client/planner if e.g. the expected climate conditions deviate from the normal climate conditions for system floors. Special meaures have to be taken resp. are to be agreed on the basis of this information.

1.3.5 Special raised access floor panels

Special raised access floor panels have deviating characteristics and require a special consideration. These are e.g. cut-out panels, cut and cut-in panels, electrical outlet panels, ventilation panels and panels which edge length deviates from the system dimension or from a rectangular panel format.

Constructional measures depending on the respective system design are necessary in connecting areas in order to ensure the required loadability. A deviation from the required loadability in partial areas is possible in consultation with the planner/client (e.g. with convectors in the perimeter area) as long as the usability of the raised access floor is ensured.

1.4 Test conditions

The test methods described in this application guideline are performed immediately after the production resp. in test laboratories under defined test conditions. This shall guarantee the accuracy and reproducibility of test results.

2 Load assumptions for the determination of the loadability

2.1 In general

Raised access floors are interior fit-out systems which require a special consideration due to the specific construction regarding the strength and deformation requirement. The Eurocode 1 which is the basis for the calculation of the building structure refers under 3.2.2 to the verification of usability acc. to conditions of use and requirements.

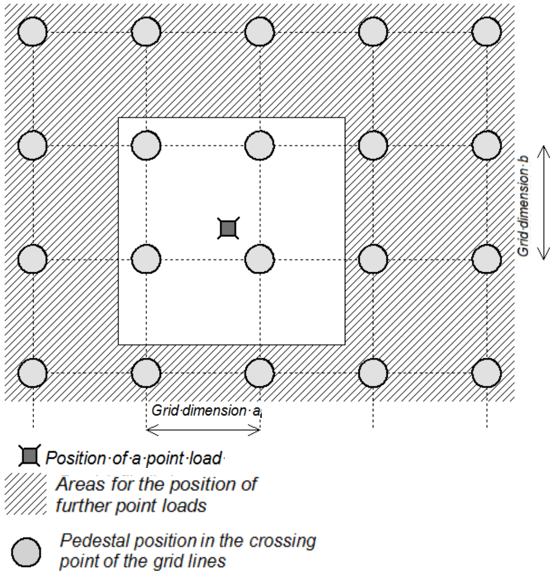
Decisive for the loadability/stability and the classification of raised access floors are generally single loads which are applied via small contact areas as so-called point loads onto the raised access floors.

The classification of raised access floors in load classes is made acc. to the EN 12825 Raised access floors on the basis of the failure load (ultimate load) in a short period test at the weakest load point of a raised access floor element. A point load relevant for the use results by the consideration of a safety factor ν of minimum 2.0. The vertical deviation of the raised access floor element (load bearing layer) which occurs under the effect of the point load may not exceed the vertical deviation values of the deviation classes A, B or C defined in the EN 12825.

2.2 Load distance

As load assumption, the following prerequisite is the basis with the evaluation resp. classification of raised access floors acc. to EN 12825:

- **Direction-dependent load distance ≥ panel grid dimension a resp. b**



Picture 1: Minimum distance of possible load application points with raised access floors

The panel grid dimension with raised access floors corresponds to the edge lengths a and b of the raised access floor panel. The edge lengths resp. the panel grid dimensions a and b can have unequal values with special constructions.

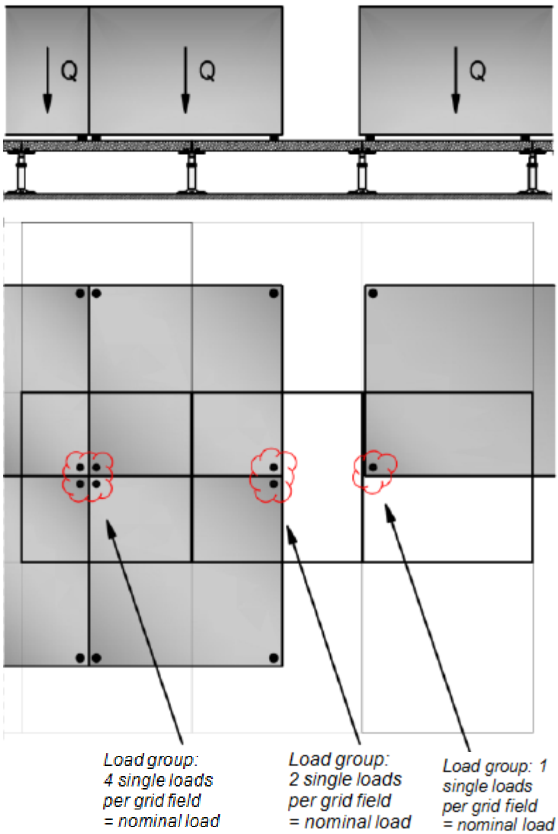
With single loads which application points are closer to each other than the minimum load distance are to be combined to single loads and their sum is to be considered for the calculation of point loads (see example 2.3 load configurations). A structural verification in the individual case acc. to section 3.1.3 is to be made as appropriate.

An increasing vertical deflection can occur with raised access floors with long-term effecting loads (permanent loads). The indication of the value for the permanent load can differ from the point load acc. to the load grade which was determined under static stress

. If such permanent loads are to be expected with the use of raised access floors, this requirement is to be named by the client/planner and suitable contructional measures (e.g. additional pedestals) are to be made as appropriate.

2.3 Load configuration of static loads

Picture 2: Examples of load configurations with raised acces floors



Special load situations can arise with vertical loads of system floors with which the distance of the load application points is smaller than the grid dimension.

Such loads occur with heavy objects placed in a row (e.g. cashpoints, control units, racks, server racks etc.) and cause multiple punctual load applications with low load distance. Multiple single loads e.g. 1,2 or 4 points loads depending on the assembly and the configuration of the objects can act on one grid field of the raised access floor.

The amount of the single loads per grid field may not exceed the maximum nominal load of the raised access floor.

2.4 Dynamic loads

Punctual loads occur via the wheels with transports of loads with e.g. pallet trucks, forklift trucks or similar. In the sequence of movement it is not about static loads anymore but about dynamic loads. The oscillation coefficient is to be considered with the calculation and determination of the point load to be applied for the system floor as follows:

Point load to be applied = occurring single load x oscillation coefficient φ

The following oscillation coefficients are applied as minimum values:

Manually operated transport devices: oscillation coefficient ≥ 1.3

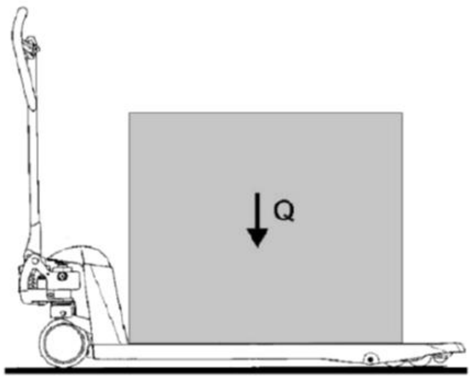
Motor-operated transport devices: oscillation coefficient ≥ 1.5

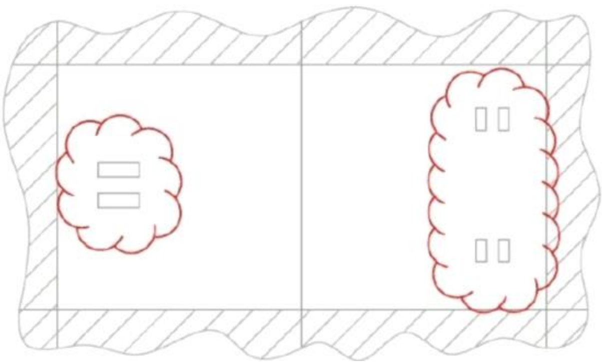
It has to be considered that jerky loads can occur depending on the use which require higher oscillation coefficients. It further has to be considered with planning that the wheel design, the wheel distance and the wheel material have a co-decisive influence on the oscillation coefficient.

The occurring acceleration forces of the transport device in horizontal and vertical direction (start and breaking sequences, cornering, load lowering etc.) with the use are to be considered with the determination of the effective single loads. Suitable constructive measures are to be taken as appropriate in order that the increased loads can be taken up by the raised access floor and transferred resp. discharged by the substructure.

2.5 Examples of a practical load configuration

The picture 3 shows a typical way of using a raised access floor with a pallet truck. The single loads which distances are lower than the panel grid dimension have to be combined. With this example it is valid with both the two single wheel loads of the steering axle as well as with the single loads of the four load wheels. The resulting axle loads are to be viewed separately as the distance between the steering and the load axle is larger than the panel grid dimension. Furthermore the oscillation coefficient acc. to section 2.4 has to be considered with the calculation and determination of the point loads to be assumed for the raised access floor.





Picture 3: Typical example of use of a raised access floor by a pallet truck (dynamic, several single loads)

2.6 Classification acc. to static stress

2.6.1 General requirements on the loadability

The requirements defined in the standard and a safety factor ν of minimum 2.0 are generally valid for the classification acc. to the EN 12825 Raised access floors.

2.6.2 Assignment of the element classes and point loads

Table 1: Assignment of the element classes and point loads acc. to the load levels with consideration of the safety factor ν ≥ 2.0.

Classification acc. to EN 12825		Point load acc. to load level[1] and ν ≥ 2.0
Element class	**Ultimate load**	
1	≥ 4,000 N	2,000 N
2	≥ 6,000 N	3,000 N
3	≥ 8,000 N	4,000 N
5	≥ 10,000 N	5,000 N
6	≥ 12,000 N	[2]

[1] The value for the classification of the point load acc. to the point load results from the ultimate load divided by the safety factor ν = 2.0. The point load acc. to the load level is to be stated in increments of 1,000 N.

[2] Further load levels (≥ 6,000 N) have to be defined for raised access floors of the element class 6 with in the individual case higher requirements by the use. These have to be determined in steps of 1,000 N depending on the respective use.

The required ultimate load resp. the point load acc. to the load level which is to be expected with the use with raised access floors of the element class 6 acc. to EN 12825 are to be determined by the client/planner.

2.6.3 Assignment of types of use and point loads acc. to load level

Examplary types of use and typical loadings of system floors are assigned to the respective element classes and point loads in the table 2. Standard values for that are stated in table 2. Respective values have to be defined for the cases where other loads are occurring.

Table 2: Exemplary assignment of types of use and point loads acc. to load level

Ser. no.	Use	Examples of use	Element class acc. to EN 12825 / 13213	Point load acc. to load level
1	**Residential rooms**	Rooms and corridors in residential buildings, hotel rooms	**1**	**2,000 N**
2	**Office areas, workshops, corridors**	Corridors in office buildings, office areas, surgeries, ward rooms, common rooms, including corridors, bed rooms in hospitals	**2**	**3,000 N**
3		Corridors in hospitals, hotels, retirement homes, boarding schools etc.; Kitchens and treatment rooms	**5**	**5,000 N**
4		Areas as running no. 1 to 3, but with heavy equipment	≥ **3**	To be calculated in the individual case
5	**Technical rooms**	Data centres, electrical distribution rooms and switchgear rooms	≥ **2**	To be calculated in the individual case
6	**Areas for the gathering of people**	Areas with tables; E.g. school rooms, cafés, restaurants, dining halls, reading rooms	**2**	**3,000 N**
7	**Meeting rooms and areas for the gathering of people**	Areas with tables; E.g. school rooms, cafés, restaurants, dining halls, reading rooms, reception rooms	**3**	**4,000 N**
8		Areas with fixed chairs, e.g. areas in churches, theatres or cinemas, congress rooms, auditoriums, assembly halls, waiting rooms	**5**	**5,000 N**
9		Freely accessible areas, e.g. museum areas, exhibition areas etc. and lobbies in public buildings and hotels	**5**	**5,000 N**
10		Sport and game areas, e.g. dancing halls, gymnasiums, fitness and athletic sport rooms, stages	≥ **5**	To be calculated in the individual case
11		Areas for large gatherings of people; E.g. concert halls, terraces and lobbies as well as stands with fixed chairs	≥ **3**	To be calculated in the individual case

Table 2 is continued

Table 2 continuation: Exemplary assignment of types of use and point loads acc. to load level

Ser. no.	Use	Examples of use	Element class acc. to EN 12825 / 13213	Point load acc. to load level
12	Sales rooms	Areas of sales rooms up to an area of 50 m² in residential, office and similar buildings	**3**	**4,000 N**
13		Areas of sales rooms	**5**	**5,000 N**
14		Areas in retail shops and department stores	**≥ 5**	To be calcu-lated in the individual case
15		Areas as running no. 12 to 14 but with increased single loads, e.g. due to high storage racks	**6**	To be calcu-lated in the individual case
16	Factories, work-shops and storage rooms	Areas in factories and workshops with light use	**≥ 3**	To be calcu-lated in the individual case
17		Storage areas inclusive libraries	**6**	To be calcu-lated in the individual case
18	Special areas	Rooms with the use of transport devices	**≥ 5**	To be calcu-lated in the individual case

3 Requirement and testing

3.1 Verification of loadability

3.1.1 Requirements

The classification of raised access floors is made by load tests of raised access floor elements in a test laboratory. The basis of these are failure loads. The minimum failure load is classified in prescribed ultimate loads acc. to table 1. The division of the classified ultimate load (value in table 1, column 2) by the safety factor of ν = 2.0 results in the point load acc. to the load level. The classification is made on the basis of the lowest single value of the ultimate load, an average value evaluation is not made here.

Vertical deviation values are recorded under the effect of the point load acc. to the load level with the loadability test and the raised access floor system gets assigned to the deviation classes A, B or C determined in the EN 12825.

The **residual vertical deviation** after the loading with the point load acc. to the load level may not exceed a value of 0.5 mm at the critical bending load point.

3.1.2 Test method

The tests of the loadability and the vertical deviation are made in accordance with the test processes and setups acc. to the EN 12825, section 5.2.1 with load application at all breaking and deviation-critical load application points of a raised access floor element.

A test with minimum 3 samples is to be made at each breaking and deviation-critical load application point of the substructure and the raised access floor panel.

The test of the residual vertical deflection is made at the critical bending load application point acc. to the EN 12825, section 5.4.

3.1.3 Individual verification

A application-related individual verification can be made **additionally** to the verification of the loadability acc. to EN 12825 with the loading of raised access floors with point loads acc. to the load level ≥ 8,000 N. This has to be made by loading tests on the basis of the application guideline with loads on the raised access floor element by load application elements which are use-related resp. corresponding to the specific case of application or alternatively with a test indentor with a contact area of 50 x 50 mm. The requirements of the EN 12825, the safety factor and the limit values of the vertical deviation classes are to be kept. The testing is to be performed at all load placements critical to breaking and deforming. The individual verification is no classifcation of the raised access floor acc. to EN 12825 and is only valid for the individual case of use (project-related).

3.1.4 Durability

3.1.4.1 In general

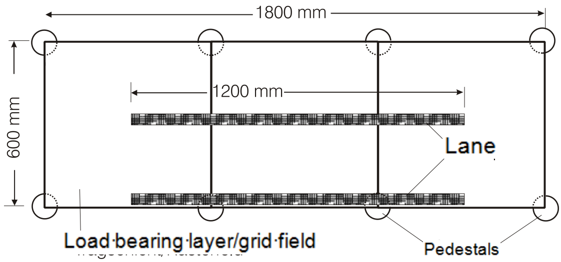
The so-called “Rolling Load Test” is used if in special cases, e.g. a very stressed floor, a verification of durability of raised access floors is required. Thereby, a rolling load in the height of the point load is moved over a partial area of the raised access floor. The test serves not for the determination of the dynamic loadability and does not replace the dynamic factors to be considered with dynamic loadings.

3.1.4.2 Requirement

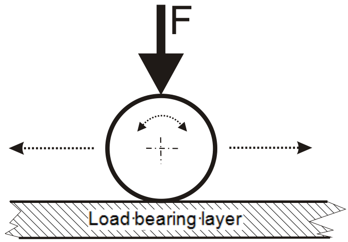
The test wheel loaded with the load level is rolled cyclically over the bearing layer of a system floor. The test setup may not collapse after 10,000 passes, corresponding to 5,000 load cycles, or show damages with limitation to the loadability.

3.1.4.3 Test method

The test setup results as a multiple of the panel grid dimension (edge length), preferably 3 raised access panels placed in a row. A test area of 1,800 mm x 600 mm results from a standard raised access floor with edge lengths of 600 x 600 mm. The installation of the test setup is made according to the manufacturer’s information including the system-specific horizontal fixing of the raised access floor panels. The necessary guide at the side is to be designed in a way that neither the raised access floor panels nor the substructure get supported additionally.



Picture 4: Test setup for the durability test



Picture 5: Application of the test load

The test frequence amounts to approximately 6 passes per minute. The pass length amounts to two panel grid dimensions (1,200 mm with standard system floors). The raised access floor panel in the middle shall thereby be passed completely, the other two adjoining raised access floor panels shall only be passed half. Two test runs are made subsequently in the centre of the grid and at the panel edge (picture 4). The wheel body of the load wheel consists of a stable, ball bearing mounted and welded steel construction with welded-in steel tube hub and vulcanised polyurethane path layer with a hardness of 92° Shore A. The diametre of the load wheel amounts to 152 mm (6”) and the wheel width touching the test area amounts to 51 mm (2”).
It suits the purpose if the respectively suitable resp. practice-oriented load wheels are used for special load types or with high loads.

3.2 Corrosion protection with raised access floor components

3.2.1 Requirements

All corrosion-exposed materials of the raised access floor components have to have a corrosion protection. The determined climate conditions for the standard use of raised access floors in interiors (see section 1.3.4) is based on the corrosion stress level 1 acc. to EN ISO 2081. The stress level 1 corresponds to an interior stress in warm and dry atmosphere. The verification of the corrosion protection is made by the neutral salt spray fog test (NSS) acc. to EN ISO 9227 with a test period of at least 72 hours.

Materials from non-ferrous metals like e.g. aluminium, copper and brass alloys do not need an additional corrosion protection with standard applications.

3.2.2 Zinc coatings

Raised access floor components from ferrous materials and zinc coatings are to be viewed as equivalent without corrosion test if a corrosion resistance with the salt spray fog test (NSS) acc. to EN ISO 9227 of at least 72 hours is determined for such coatings in applicable standards.

Acc. to the EN ISO 2081, attachment C, table C.1, the determined corrosion protection requirement is fulfilled by the following galvanic zinc coatings with additional treatment (passivation):

Fe/Zn5/C and Fe/Zn5/D
with a local minimum zinc coating thickness of 5 µm and a yellowish indescent (Code C) or non-transparent/olive green (Code D) passivation coating.

Fe/Zn8/A, Fe/Zn8/B and Fe/Zn8/F,
with a local minimum zinc coating thickness of 8 µm and a colourless/transparent (Code A), transparent, slightly indescent (Code B) or black (Code F) passivation coating).

Band resp. sendzimir zinc coatings without additional treatment fulfil in non-processed condition the requested corrosion protection requirement with a local minimum zinc coating thickness of 8 µm.

No zinc layers are applied in hollow cavities which is process-related with the galvanic zinc coating. Cut faces are not recoated with zinc.

3.2.3 Alternative protection processes

All corrosion protection processes are admissable if they correspond to the requirements with their effect of protection. The verification is to be made in the scope of the initial testing. The effectivity of the protection is substantiated with a test sample with the neutral salt spray fog test (NSS) acc. to EN ISO 9227 with a test period of 72 hours. The test is to be made with 5 test samples. The test sample dimensions and the test process are defined in the EN ISO 9227. The objective of determining the necessary layer thickness for the alternative corrosion protection layer is pursued with the neutral salt spray fog test (NSS).

3.2.4 Special requirements

Deviating corrosion protection requirments have to be announced by the planner/client for special areas of application and the respective measures have to be agreed. Such areas of use are e.g. photo and movie development rooms, laboratories, test bays, clean rooms and rooms with special corrosion stress.

3.2.5 Exception regulations

Thread surfaces, locking elements and standard parts as e.g. nuts, split washers, fan washers, sheet locking nuts, tooth washers etc. have to show a corrosion protection coating (zinc-coated, browned etc.) common for such mass parts. No tests are conducted. A note is made on the use of such parts in the test report.

3.2.6 Test method

The required corrosion protection is to be substantiated by measurements of the layer thicknesses of all used building parts. Thereby the layer thicknesses get measured at measurement locations of the essential area equally distributed over the single part. The essential area is the surface of the building part which can be touched with a ball with a diameter of 20 mm.

The required minimum layer thickness of the respective protection type has to be reached in average at each measurement location. Single layer thicknesses have to reach at least 80% of the required minimum layer thickness.

3.3 Raised access floor panels

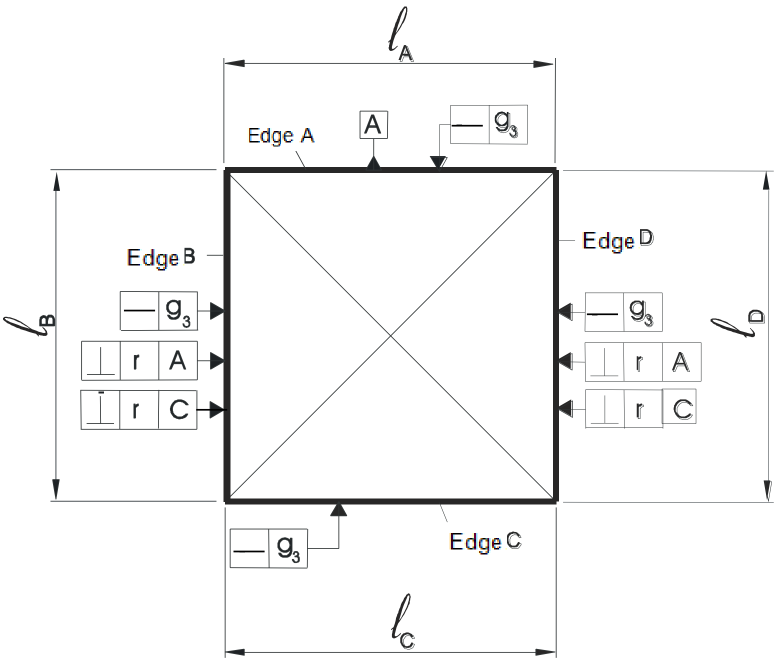
3.3.1 Dimensional accuracy

3.3.1.1 In general

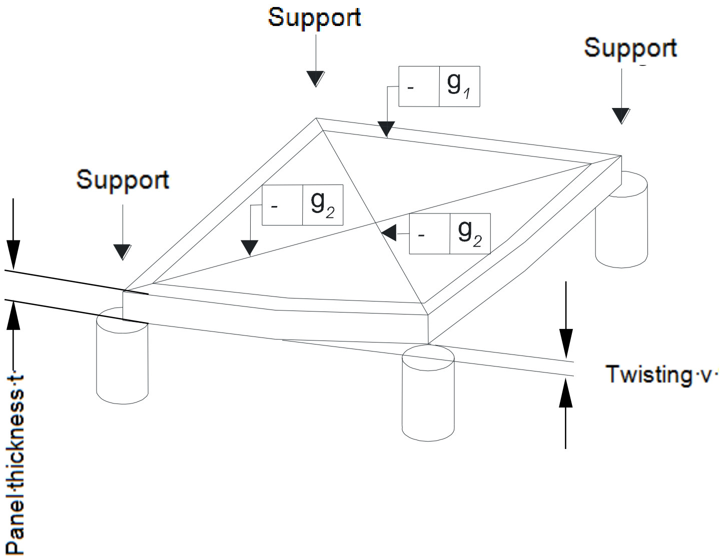
The dimensional accuracy of raised access floor panels is safety relevant as instabilities of the combination of the components can occur through inaccuracy of fit. Furthermore the interchangeability of single raised access floor panels shall be safeguarded with the later use.

3.3.1.2 Requirements to the dimensional stability

The stated form and location tolerances are defined acc. to EN ISO 1101.



Picture 6: Format-related dimensions of a raised access floor panel



Picture 7: Thickness-related dimensions of a raised access floor panel

Two dimension categories Mk1 and Mk2 are determined for the limit dimensions for the dimensional stability depending on the type of use.

Mk1: Limit dimensions of the raised access floor panels with increased visual or technical requirements.

Mk2: Limit dimensions of the raised access floor panels acc. to class 2 acc. to EN 12825. These limit dimensions are to be generally kept by all raised access floor panels, also with edge lengths > 600 mm.

Table 3: Limit dimensions of the dimension categories Mk1 and Mk2

Characteristic	Symbol	Mk1[1)] [mm]	Mk2 [mm]
Format-related dimensions			
1. **Edge lengths**	$l_A \dots l_D$	± 0.3 (± 0.4)	± 0.4
2. **Rectangularities** of the sides B and D to side A of the sides B and D to side C	r	0.3 (0.5)	0.5
3. **Straightness** of the four face areas (edges) in the area of the panel touching edges	g_3	0.3 (0.5)	0.5
Thickness-related dimensions			
4. **Panel thicknesses** at the four support corners[2)]	t	± 0.3	± 0.5
5. **Twisting** of a corner	v	0.5 (0.7)	0.7
6. **Straightness** of the upper panel side in the area of the edges	g_1	0.5 (0.6)	0.6
7. **Straightness** of the upper panel side in the area of the diagonals[3)]	g_2	0.9 (1.4)	
Projection with existing edge coating			
8. **Height difference** between edge coating and the panel surface		± 0.3	± 0.4

1) Limit dimensions of raised access floor panels with edge lengths up to 650 mm. Values in brackets for edge lengths of more than 650 mm

2) plus the limit dimension of the thickness of the covering

3) no requirement in EN 12825

3.3.1.3 Test method

The test of the dimensional stability under consideration of the limit dimensions shown in table 3 is made with finished raised access floor panels during or immediately after the production in the factory. The limit dimensions of the table 3 are valid at the time of the production control.

The documentation of the dimensions is made with suited control gauges and measurement equipment (see EN 12825). The used measurement devices shall have a measurement accuracy of less than 10 % of the limit dimensions defined in table 2 corresponding to the general rules of measurement technology.

3.3.2 Deflection

3.3.2.1 In general

The requirement described in the following refers exclusively to the bending behaviour of the component raised access floor panel under consideration of elements which increase the loadability as e.g. stringers, additional traverses etc. All parts fixed to the raised access floor panel have to be included in the test.

3.3.2.2 Requirements

The test of the deflection is to be made at the load application points centre of panel edge and centre of panel as tests during production. The deflections of the raised access floor panel shall keep the following limits (arithmetic average values from a sample of minimum three test samples):

With load application at the centre of panel edge:

The average value of the deflection measurments shall be smaller than 1/300 of the panel edge length and may not exceed 2.5 mm.

With load application in the centre of the panel:

The average value of the deflection measurements shall not be less than 1/300 of the panel diagonal length and may not exceed 3.5 mm.

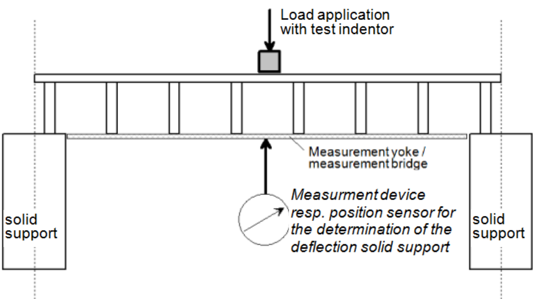
3.3.2.3 Test methods

The raised access floor panels rest on massive supports aligned in one level with the test. The support area is created by the 90° sector of a steel cylinder with a diameter of 90 mm as a corner support.

The deflection is measured in the centre of the load application at the lower side of the raised access floor panel with the reaching of the point load acc. to load level.

The load is applied on the raised access floor element with a test indentor with an edge length of 25 x 25 mm. The contact edges of the test indentor can be rounded with a radius of maximum 2 mm. The load is continuously increased with the test with an increase of load of 120 N/s ± 10 N/s.

A measurement yoke acc. to picture 8 is used with ribbed raised access floor panels for the measurement of the deflection.



Picture 8: Test setup for the measurment of the deflection with ribbed panels

Stringers are integrated in the deflection testing if they are used for the increase of the loadability of the raised access floor panels to be tested. The position of the stringers determined by the design is to be secured by suited equipment.

3.3.3 Permanent deformations

3.3.3.1 Requirements

Permanent deflections and permanent local deformations up to the limit values shown in table 4 may occur at raised access floor panels after removal of the point load acc. to the load level which was effective for 30 minutes.

Table 4: Limit values for the permanent deflection and permanent local deformation after removal of the point load acc. to load level

Characteristic	Permanent deflection	Permanent local deformation
Limit value	**0.3 mm**	**0.5 mm**
Valid for	all panel types	panels with ribbed support structure

3.3.3.2 Test of the permanent deflection

The raised access floor panels are loaded with the point load acc. to load level in the critical bending load point for a period of 30 minutes.

The deflection is measured in the centre of the load application at the lower side of the raised access floor panel and recorded over 30 minutes.

The load is applied to the raised access floor element with a test indentor with a edge length of 25 x 25 mm. The edges of the test indentor which are touching the panel can be rounded off with a radius of maximum 2 mm. The load is increased constantly with testing up to the point load acc. to load level with a load increase of 120 N/s± 10 N/s.

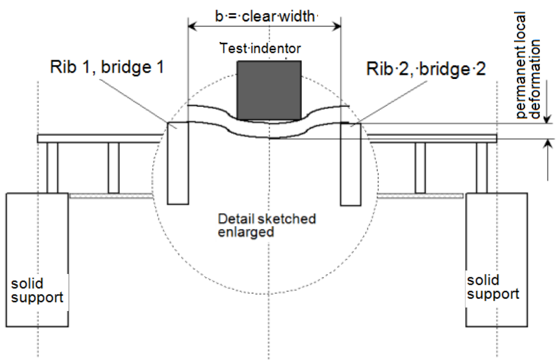
The permanent deflection is measured 5 minutes after the removal of the load. The admissible limit value is shown in the table 4.

A measurement yoke acc. to picture 8 is used for the measurement of the deflection with ribbed raised access floor panels.

3.3.3.3 Testing of the permanent local deformation

The test of the permanent local deformation is only necessary with raised access floor panels with a ribbed construction or a deformable load bearing layer.

The test is executed at the deformation-critical load point within one field area. The point load acc. to load level is thereby applied to the raised access floor panel with a test indentor (see section 3.3.3.2) over a period of 30 minutes. The permanent local deformation is measured 5 minutes after the removal of the load at the upper side of the raised access floor panel (visible side). The basis b of the measurement device corresponds to the clear width e.g. between the ribs resp. bridges. The thereby maximum admissible limit value is shown in table 4.



Picture 9: Test setup for the measurement of the permanent local deformation at the upper side of the raised access floor panels.

3.3.4 Floor coverings

3.3.4.1 In general

Peeling-off floor coverings represents a potential danger. The covering adhesion is therefore a safety-relevant criteria. The used floor coverings have to comply minimum to the respectively relevant product and material standards.

The compound system of covering, gluing, carrier panel has to be designed in a way that no damages occur with the compound in the scope of common climate variations within the climate conditions defined for system floors in the application section. The coverings used in the named compound system have to be able to take the deflections/deviations which can occur with the nominal load. Otherwise respective definitions have to be made by the planner.

3.3.4.2 Textile floor coverings

The variety of textile floor coverings in terms of manufacturing method, material and colour as well as the special stress with the processing on raised access floor panels and their later usage require a so-called “raised access floor suitability”.

Technical requirements to textile floor coverings for raised access floors:

a) The dimensional stability of the glued coverings must be given with appropriate cleaning.

b) Coverings with foam backing are not admissible.

c) The back coating has to be connected rigidly with the backing.

d) Peel-off values > 0.8 N/mm have to be achievable with standard adhesives without a splitting of the back coating.

3.3.4.3 Elastic floor coverings

The most different materials (PVC, caoutchouc, linoleum, etc.) have to be bonded permanently to the raised access floor panel similar to the textile floor coverings.

3.3.5 Peel-off resistance

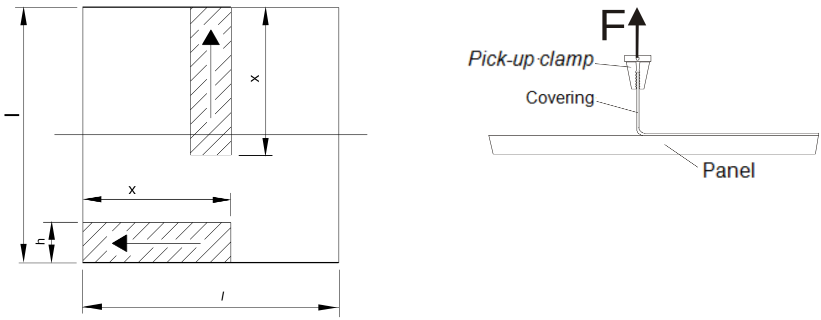
3.3.5.1 Requirement to the gluing

The peel-off resistance test evaluates the suitability of gluings of mainly textile and elastic coverings.

The peel-off resistance of each test strip has to be at least 0.8 N/mm (see EN 12825 section 4.6). The average value of the peel-off resistance may not fall below a value of 0.4 N/mm on a part test length of 100 mm.

3.3.5.2 Test method

The test of the peel-off resistance is made acc. to EN 12825, section 5.7 with a constant peel-off speed of 100 mm/min ± 10 mm/min.



h = Test strip width = 50 mm
x = Test strip length > edge length/2
l = Edge length
F = Peel-off force

Picture 10: Location of the test strip and test setup for the peel-off reistance test

3.4 Substructure

The substructure has to take up and deduct vertical and horizontal loads with the use of a raised access floor.

3.4.1 Vertical centric loading of the substructure

3.4.1.1 Safety factor

3.4.1.1.1. Requirement

The buckling safety of the support elements is to be substantiated with a safety factor of 4.0 in order to safeguard the loadabiltiy of the raised access floor systems with undefined contact conditions of the pedestals on the rough concrete and the tilting of pedestals which cannot be excluded with installation. The verification of the buckling safety of the support elements is made with the four-fold point load acc. to load level. This requirement to the substructure is derived analogously from the EN 12825 Raised access floors, section 4.2.3.

3.4.1.1.2. Test

The verification of the buckling safety of the pedestals is made acc. to EN 12825, section 5.3 with four-fold point load acc. to load level. The pedestals are loaded at maximum nominal height and highest admissible adjustment range excluding system elements such as e.g. load bearing layer, stringers, traverses etc. The test load is applied centric on the pedestals via a test indentor with a contact area of 50 mm x 50 mm.

3.4.1.2 Deformations

3.4.1.2.1. Requirement

The permanent change in length (deformation) of the pedestal after ensued first laoding may not be higher than 0.5 mm after removal of a vertical centric test load (two-fold single load acc. to load level).

3.4.1.2.2. Test method

The test is made acc. to EN 12825, section 5.3.2. whereas the load is removed after reaching the vertical centric test load and the permanent change in length of the pedestal is measured.

3.4.2 Vertical eccentric load of the substructure

3.4.2.1 Requirements

The test of the vertical eccentric point load acc. to load level is defined as test characteristic for the evaluation of the pedestal deformation. This test is to be conducted as a test of the substructure during production. The safety factor is to be verified by testing the raised access floor element at the so-called pedestal-critical load application point acc. to section 3.1.2.

The pedestal may only show a minimum plastic deformation with eccentric loading with the point load acc. to load level. A permanent vertical deviation after loading of 0.3 mm is defined as limit value. There are no requirements in this respect for substructures which are a component of a friction-locked construction in the form of e.g. a switchgear construction (see Application guideline, table 5, Substructure construction 5).

3.4.2.2 Test method

The pedestals are tested free-standing as complete construction part in maximum nominal height and the highest admissible adjustment range with the test of the substructure. The pedestal foot plate is clamped in the peripheral area or tightly connected to the test setup via mounting holes.

The point load acc. to load level is applied to the pedestal via a test indentor and an articulated mounted bracket with the testing of the vertical eccentric load. Support elements resp. pedestal head supports which belong to the pedestal are integrated in the test.

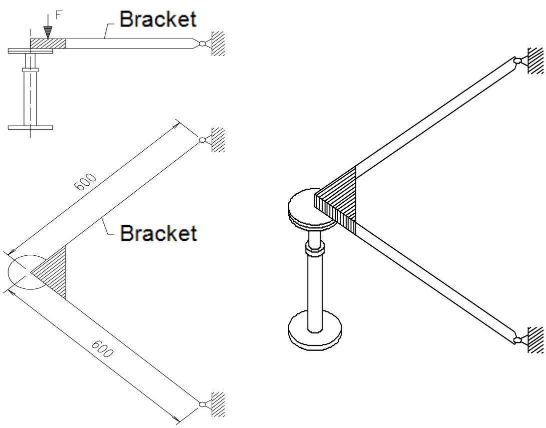
The load application is made in the centre of the test indentor with a contact area of 50 mm x 50 mm which is placed on the corner of the load application plate (bracket). Depending on the test purpose, one of the following load transfer elements has to be placed in between the load application plate and pedestal head:

- with tests of pedestals for different raised access floor panels during production: 20 mm thick rubber element with a hardness of 60° Shore D or e.g. a wooden element with a similar load-deformation behaviour;
- a system raised access floor panel as cut or full panel with system tests.

The vertical deviation of the load transfer element is measured in the area of the load application near the edge of the pedestal head.

The reference point (zero point) of the deformation indicator is defined under a pre-load of 200 N. Afterwards the loading is made with a load increase of constant 120 N/s ± 10 N/s up to the point load acc. to load level. The permanent vertical deviation of the load transfer element has to be lower than 0.3 mm after removal of the load.

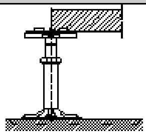
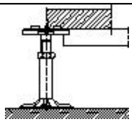
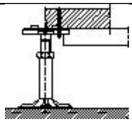
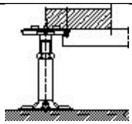
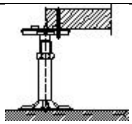
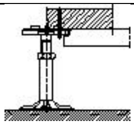
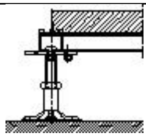
Picture 11: Test of the vertical eccentric load with point load acc. to load level



3.4.3 Horizontal pedestal loading

3.4.3.1 In general

Table 5: Examples of the design of substructures with raised access floors

Assembly of the components (sketch)	Components	Mechanic connection of the components	Pedestal fixation at the subfloor	Type of the substructure design
	Raised access floor panel, pedestal	Loose-laid raised access floor panel	Fixed pedestal	1
	Raised access floor panel, pedestal, stringer	Loose-laid raised access floor panel, hinged-in stringer (form-fit connection)	Fixed pedestal	2
	Raised access floor panel, pedestal, stringer	Raised access floor panel friction-locked with pedestal, hinged-in stringer	Fixed pedestal	3 (variant 1)
			Loose pedestal	4 (variant 1)
	Raised access floor panel, pedestal, stringer	Loose-laid raised access floor panel, stringer friction-locked with pedestal	Fixed pedestal	3 (variant 2)
			Loose pedestal	4 (variant 2)
	Raised access floor panel, pedestal	Raised access floor panel friction-locked with pedestal	Fixed pedestal	3 (variant 3)
			Loose pedestal	4 (variant 3)
	Raised access floor panel, pedestal, stringer	Raised access floor panel and stringer friction-locked with pedestal	Fixed pedestal	3 (variant 4)
			Loose pedestal	4 (variant 4)
	Raised access floor panel, pedestal, C-profile or traverse	Loose-laid raised access floor panel, pedestal and C-profile form a friction-locked layer e.g. switch gear construction	Loose or fixed pedestal	5

Each raised access floor is loaded with the practical use besides others in horizontal direction. The force application to the raised access floor system can be effected via the raised access panel as well as also via the substructure. The requirements of the horizontal pedestal load serves exclusively for the evaluation of the static rigidity of the components and not the bonding of the installation-typical fixation of the components with the subfloor. The minimum requirements to the horizontal pedestal loadability result on the basis of the substructure type (table 5) acc. to table 6.

Suitable special measures for the transfer of the horizontal loads to be expected with the use have to be provided and stated by the client/planner if construction-related requirements to horizontal loads for achieving a sufficient longitudinal and cross stiffness (heavy duty system floors with driving, safety against falling over etc.) are existing.

3.4.3.2 Requirement

The horizontal test load F_p is calculated project-specific according to the corresponding load level by the multiplication of the nominal load F_h by the reduction factor.

1. The permanent horizontal deformation (tilting) hv_{perma} after loading with the nominal test load F_p has to keep the following limit values within the average of a test batch (sample number of at least three):

   $hv_{perma} \leq 2$ mm; $hv_{perma} \leq 1$ % of the pedestal test height.

2. The safety factor for the horizontal pedestal loading has to be at least 2.0.
3. The maximum deviation of the pedestal head may not exceed the dimension D/2 with the double horizontal nominal load Fh with substructures of the type of substructure 1.

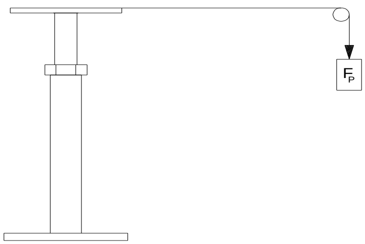
Table 6: Horizontal nominal loads and design-dependent reduction factors

Point load acc. to load level	**Horizontal nominal load F_h [N]**	**Reduction factors with substructure type acc. to table 5**		
		1	**2**	**3, 4 and 5**
2,000 N	60	1.0	0.5	0
3,000 N	90	1.0	0.5	0
4,000 N	120	1.0	0.5	0
5,000 N	150	1.0	0.5	0
From 6,000 N	Point load acc. to load level x 0.03	1.0	0.5	0

Table 7: Extent of testing with horizontal pedestal loading acc. to the substructure type

Test process, test extent		**Substructure type acc. to table 5**		
		1	**2**	**3, 4 and 5**
1.	Application of the horizontal test load F_p	√	√	
2.	Measurement of the permanent deformation after loading	√	√	
3.	Application of the double horizontal test load F_p	√	√	
4.	Measurement of the deviation at the pedestal head	√		
5.	Testing of the connection of the single components with double horizontal nominal F_h		√	√

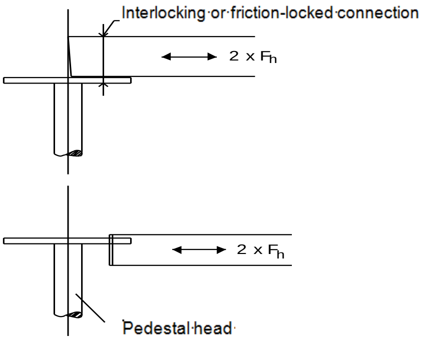
3.4.3.3 Test procedure



Picture 12: Test setup for the horizontal load testing with free-standing pedestals with the test load F_p

The pedestals are to be tested free-standing with maximum nominal height and the highest admissible adjustment range as a whole component. The foot plate is fixed tightly to the test facility. The value of the horizontal test load F_p is determined according to the point load as per load level and the reduction values corresponding to the substructure type (table 5). The horizontal test load F_p as per table 5 is charging the pedestal head (picture 12). The test extent resp. procedure is shown in table 7.

Raised access floors with interlocking or friction-locked connection of the single components for the transfer of horizontal forces acc. to substructure type 2, 3, 4 and 5 (table 5) are tested with the double horizontal test load F_h corresponding to picture 12. The connection (e.g.: screw, fixing hook etc.) may not fail.



Picture 13: Examples of the test of horizontal connections

3.4.4 Free horizontal pedestal play (clearance)

3.4.4.1 In general

The pedestal head can move freely in horizontal direction relative to the pedestal foot with pedestals with stuck or screwed connection (height adjustment e.g. by threaded bolt and pedestal tube). The reason for that is the play between the elements of the connection. A horizontal free clearance of the pedestal head can lead to a vertical deviation of neighbouring raised access floor panels with load effect on the raised access floor.

3.4.4.2 Requirement to the raised access floor element

A max. height difference of neighbouring raised access floor panels of max. 3 mm may occur with testing in the laboratory under the effect of the single load as per load level with the load application in the area near the pedestal.

3.4.4.3 Test method

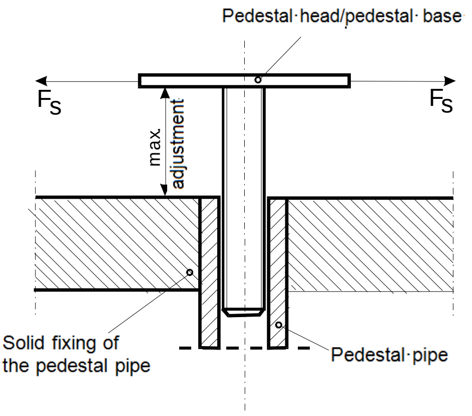
The tests of the effect of the possibility of free horizontal movement (pedestal play) of the raised access floor pedestal to the horizontal deviation (height shifts) of neighbouring loaded and unloaded raised access floor pedestals is made within the scope of the loadability test of the raised access floor element. The test procedure is made in compliance with the test procedures and setups acc. to EN 12825, section 5.2.1 with load application in the area near the pedestal and testing of the vertical height shift between the load-bearing and an unloaded raised access floor panel resp. a cut raised access floor panel. The determined height shift of 3 mm may not be exceeded with the effect of the point load as per load level.

3.4.4.4 Requirement to the pedestal

The maximum horizontal pedestal movement (play) may not exceed a limit value of maximum 4 mm as basis of tests during production and for the guarantee of the loadability of the pedestals. The requirement is valid for pedestals of the substructure type 1 and 2 (see table 5) under the effect of a horizontal test load F_S of 5 N.

3.4.4.5 Test procedure for the pedestal test

A horizontal test load F_S of 5 N acts alternating in both directions at the upper edge of the pedestal head resp. pedestal foot with maximum adjustment.



Picture 14: Test setup for the horizontal pedestal movement (play)

The complete dis tance is to be measured. The direction of the force action at the perimeter of the pedestal head resp. pedestal foot is determined by the direction of the maximum movement. The average value of the determined measuring values from one sample of minimum 3 test samples has to be less than the maximum value of 4 mm.

3.4.5 Structural analysis (individual verification)

3.4.5.1 Basis

The loadability of pedestals can be verified by a calculation on the basis of system test results with high construction heights > 800 mm as an addition to the loadability tests of raised access floor elements acc. to EN 12825. The basis of this method is a sufficiently designed horizontal load absorption of the pedestal by e.g. the use of stringers (substructure type 2 to 5 as per table 4). Thus it shall be guaranteed that the pedestal stays in its installation position with load transfer and a safe support for the raised access floor panel is guaranteed. The horizontal test of the connection of the single components (e.g. pedestal, stringer) is to be made acc. to table 7, point 5. The calculation method is to be used for pedestals with slenderness ratio λ less than 200 and higher than the material-dependent limit slenderness ratio λ_g.

3.4.5.2 Procedure

1. The basis is a raised access floor system test with a construction height of minimum 800 mm as well as vertical eccentric and centric load tests of the pedestals with the same height.
2. System-related calculation factors are determined from the evaluation of the pedestal failure loads. These are to be determined for the vertical centric loading as e.g. buckling length and for the vertical eccentric load direction as eccentric acting load distance.
3. The congruity between the test and calculation results is controlled and the factors are amended if necessary in a following calculation model by the use of the determined factors. Therefore the system-conform correlation (connection) between test results and calculation exists for the tested maximum construction height.
4. The verification of the loadabiltiy of the raised access floor system with high construction heights can then be made on the basis of the under 1. described system test (height minimum 800 mm) and by a structural analysis of the vertical centric and eccentric pedestal loadability. The constructional congruity of the tested and the calculated pedestal variants is a prerequisite with exception of the dimensions of the pedestal tube.
5. The calculation factors are system-related and influenced by the constructional design of the substructure as well as by the raised access floor panel. The factors are not to be transferred without additional review to other constructions resp. designs of the manufacturer.
6. The respective system-related calculation factors are to be revealed with conformity-certified raised access floor systems. A review of the factors is necessary with constructional changes and changes of the materials of the components.

4 Preventive constructional fire protection

4.1 In general

The reaction to fire performance acc. to DIN 4102-1 resp. EN 13501-1 assesses the combustibility of a building material and the possible flame spread at the material.

The fire resistance class acc. to DIN 4102-2 resp. EN 13501-2 assesses the resistance of the building component regarding the transition of fire, combustion gases, smoke and heat as well as the stability of the design over a certain period in order to keep escape and rescue routes open.

4.2 Requirements

General requirements to load-bearing, stiffening and space-enclosing building components are regulated besides others in the State Building Regulations, their Technical Building Regulations and particularly in the “Guideline for fire protection requirements to system floors” (**Sys**tem**Bö**den**R**ichtlinie = SysBöR).

4.3 Test procedures

4.3.1 In general

The test of the fire protection characteristics is made according to the construction-supervisional standards and guidelines by authorised test centres. The test result forms the basis for the classification of the fire behavior for building products (reaction to fire performance) and building components resp. construction types (fire resistance class). The fire protection characteristics of system floors are verified by General construction-supervisional test certificates (**AbP**). The AbP with conformity declaration of the manufacturer serves as verification of application with specific requirements.

4.3.2 Fire reaction performance of construction products

The assignment of building materials in fire reaction performances is made as per building rules list according to DIN 4102-1 or at the moment alternatively according to EN 13501-1.

4.3.3 Fire resistance performance of construction components

The EN 1366-6 defines a procedure for the determination of the fire resistance period of raised access and hollow floors for the fire stress from the floor cavity. The fire stress of the sample (test setup) is made as fire model with the construction-supervisional determined uniform temperature time curve (ETK).

The test setup is determined by the respectively valid test standards. The assignment of the fire resistance performances and and the construction-supervisional requirements is made as per the building rules list according to DIN 4102-2 or alternatively according to EN 13501-2.

5 Sound protection requirements

The system floor has insulating characteristics regarding airborne and impact sounds. Requirements result from the DIN 4109 or specific planning demands and regulations.

The assignment of specific number values is based on verifications in test laboratories of construction-supervisional authorised test centres.

6 Electrostatics

6.1 Requirements

The requirements to the electrostatic characteristics of raised access floors are to be determined specifically according to the area of application by the client/planner.

Limit values for the conductivity can be specified e.g. in production areas of electronic components and devices. As a rule the measurement is to be performed according to EN 1081.

There are as well areas of application which demand specific requirements to the isolation characteristics of the system floor construction. These requirements and tests are to be taken from the VDE 0100-600.

6.2 Test procedures

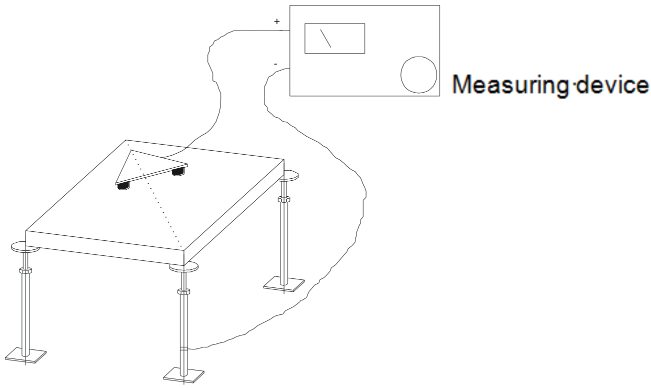
6.2.1 Laboratory measurements in general

Raised access floor panels rest on four pedestals of the substructure with laboratory measurements. Conductive supporting elements resp. pedestal head gaskets have to be inserted between the raised access floor panels and the pedestals as with the installation with construction.

The climatic conditions during the measurement are documented in the test report. The further test conditions are described in the listed standards.

6.2.2 Measurement according to EN 1081

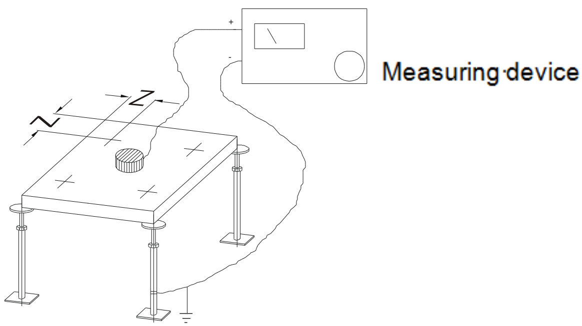
The test regulations for the determination of the electrical resistance for elastic coverings are determined in the EN 1081. The conductivity value R_1 is to be measured at two equally spread measuring points on a diagonal (see picture 15) with measurements at raised access floor elements according to EN 1081 in the laboratory.



Picture 15: Test setup for the measurement of the resistance R_1 according to EN 1081

6.2.3 Measurement according to EN 61340-4-1

The test regulations for the determination of the resistance of elastic and textile coverings is determined in the EN 61340-4-1 (VDE 0300 part 4-1). The conductivity value is to be measured at minimum five equally spread measuring points (see picture 16) with measurments at raised access floor elements in the laboratory.



Picture 16: Test setup for the measurement of the resistance according to EN 61340-4-1

6.2.4 Measurment of the isolation resistance according to DIN VDE 0100-600

Measurements for the determination of the isolation resistance of a system floor are made according to the DIN VDE 0100-600. The measurement procedure is described extensively in the attachment A of the standard.

7 Hygiene

Cavities which are partly enclosed from the room and outside air are formed by raised access floors.

Hygienic problems in cavities of system floors can occur from experience due to high air humidities. Relative air humidities which are differing from the determined climatic conditions in the area of application of system floors have to be avoided by the planner of the building by suited measures (see also the leaflet no. 3 of the Bundesverband Systemböden e.V.).

8 Seal of approval

Raised access floors which are certified according to the present Application guideline can be marked with a seal of approval.

The certification of conformity is made in the form of a product certification by certification bodies which are qualified and signed in at the Bundesverband Systemböden e.V. on the basis of intial tests and regular third party monitoring with sample tests. Details are regulated by the certification guideline of the certification society. The listed certification bodies are recorded on the internet page “www.systemboden.de”.

Picture 17: Seal of approval for product-certified raised access floors

9 Cited standards and guidelines

Table 8: Relevant standards and guidelines for raised access floors

Standard	Description	Issue
Eurocode 1	EN 1991-1-1 Actions on structures	2010-12
DIN 4102-1	Fire behaviour of building materials and building components - Part 1: Building materials; Terms, Requirements and tests	1998-05
DIN 4102-2	Fire behaviour of building materials and building components; Building components, Terms, Requirements and tests	1977-09
DIN 4109	Sound protection in building construction; Requirements and verifications	1989-11
DIN 50961	Galvanic coatings – Zinc coatings on iron materials – Terms, Corrosion testing and corrosion resistance	2000-09
EN 1081	Resilient floor coverings – Determination of the electrical resistance	1998-04
EN 12825	Raised access floors	2002-04
EN 13213	Hollow floors	2001-12
EN 13501-1	Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests	2007-05
EN 13501-2	Fire classification of construction products and building elements - Part 2: Classification using data from fire resistance tests, excluding ventilation services	2003-12
EN 1366-6	Fire resistance tests for service installations - Part 6: Raised access and hollow core floors	2005-02
EN 61340-4-1	Electrostatics - Part 4-1: Standard test methods for specific applications - Electrical resistance of floor coverings and installed floors	2004-12
EN ISO 1101	Geometrical product specifications – Geometrical tolerancing - Tolerances of form, orientation, location and run-out	2008-08
EN ISO 2081	Metallic and other inorganic coatings - Electroplated coatings of zinc with supplementary treatments on iron or steel	2008-12
EN ISO 2178	Non-magnetic coatings on magnetic substrates - Measurement of coating thickness - Magnetic method	1995-04
EN ISO 9227	Corrosion tests in artificial atmospheres - Salt spray tests	2006-10
DIN VDE 0100-600	Low voltage electrical installations - Part 6: Verification (IEC 60364-6:2006, modified)	2008-06
SysBöR	Guideline on fire protection requirements to system floors	

10 Attachment

10.1 Index of pictures

10.2 Index of tables