Deutsches Institut für Bautechnik

DIBt

A public-law institution jointly funded by the Federal Government and the Federal States

Approval and licensing body for construction products and construction designs

General Construction Approval / General Design Certification

Date: 14 February 2023

File number: I 87-1.14.7-36/22

Number

Z-14.7-882

Validity:

from: **14 February 2023**

until: **28 June 2026**

Applicant:

projekt w
Systeme aus Stahl GmbH
Geseker Straße 36
33154 Salzkotten

Subject matter of this official notice:

INTEGRA-pw 3.0 lattice elements as vehicle impact protection and personal fall protection equipment

The above-mentioned object of regulation is hereby generally approved/licensed for building installation.
This official notice comprises seven pages and eleven annexes.
This General Construction Approval/General Design Certification replaces the General Construction Approval/General Design Certification No. Z-14.7-882 of 14 June 2021. The object was first generally approved for building installation on 14 June 2021.

I GENERAL PROVISIONS

1 This official notice proves the usability or applicability of the object of regulation as defined by the State Building Regulations.

2 This official notice does not replace the permits, consents and certificates required by law for the execution of building projects.

3 This official notice is issued without prejudice to the rights of third parties, in particular private property rights.

4 Copies of this official notice shall be made available to the user of the object of regulation, without prejudice to more extensive provisions in the "Special Terms and Conditions". In addition, the user of the object of regulation must be informed that this official notice must be available at the place of use. Copies must also be made available to the authorities involved on request.

5 This official notice may only be reproduced in full. Publication of excerpts is not permissible without prior approval by Deutsches Institut für Bautechnik. Texts and drawings of advertising brochures shall not contradict this official notice. Translations must contain the note "Translation of the original German version not checked by Deutsches Institut für Bautechnik".

6 This official notice is revocable. The provisions may be subsequently supplemented and amended, in particular if new technical findings so require.

7 This official notice refers to the information and documents provided by the applicant. Any changes in these underlying documents are not covered by this official notice and must be notified to Deutsches Institut für Bau without delay.

II SPECIAL PROVISIONS

1 Object of regulation and scope of use or application

Subject of approval are lattice elements (railings) of the manufacturer "projekt w" labelled "INTEGRA-pw 3.0" consisting of galvanised steel mesh mats and corresponding special fastening components (see Annex 1).

The subject of approval is the planning, dimensioning and execution of the guardrails, which are used as fall protection for persons and vehicles in compliance with the introduced technical building regulations and the specifications of this official notice.

2 Provisions for the construction

2.1 Properties and composition

2.1.1 Steel mesh mats

The steel mesh mats consist of the material S235JRC according to DIN EN 102771 with the following special requirements.

- R_m ≥ 580 N/mm²
- $R_{p0,}$ ≥ 550 N/mm²
- A ≥ 10 %

Detailed information on the construction, geometry of the mesh mats and welding procedures is available at Deutsches Institut für Bautechnik [2].

2.1.2 Fastening components

The fastening components include the individual components mounting flange, counter lug, comb plate, screws, nuts and washers according to Annex 3.

The mounting flange consists of the material S355JR according to DIN EN 10025-2[3] with the following special requirements:

- R_m ≥ 510 N/mm²
- $R_{p0,2}$ ≥ 360 N/mm²

The components counter lug and comb plate are made of the material S235JR according to DIN EN 10025- 2[3].

Detailed information on the fastening components is available at Deutsches Institut für Bautechnik(DiBt) [2].

2.2 Manufacture, packaging, transport and labelling

2.2.1 Manufacture

After manufacture of the finished individual components, the material properties mentioned in section 2.1 must also be complied with in the final application or use.

DIN EN 1090-2[4] shall apply to the manufacture of mesh mats and fastening components unless this official notice contains any other information.

The mesh mats shall be manufactured in a mechanised welding process and subsequent manual reinforcement spot welds from individual wires of the material specified in section

2.1.1. Specifications and details of the welding process are filed with DIBt[2].

The galvanisation of the lattice elements is carried out in accordance with the documents filed with DIBt[2].

1	DIN EN 10277:2018-09	Bright steel products - Technical delivery conditions de
2	Document filed with Deutsches Institut für Bautechnik and dated 16.06.2021	
3	DIN EN 10025-2:2019-10	Hot rolled products of structural steels - Part 2: Technical delivery conditions for unalloyed structural steel
4	DIN EN 1090-2:2018 09	Execution of steel structures and aluminium structures - Part 2: Technical rules for the execution of steel structures.

2.2.2 Packaging and transport

The packaging and transport of the lattice elements and corresponding fastening components must be carried out in such a way as to avoid confusion with other similar construction products and to ensure a clear allocation to the intended use.

2.2.3 Labelling

The construction product or its packaging and the delivery note shall be marked by th manufacturer with the German mark of conformity (Ü mark) in accordance with the Regulatio on Conformity Marks of the Federal States. The marking may only be carried out if th requirements according to section 2.3 are fulfilled.

The manufacturing plant (plant identification mark) and the exact designation of the constructio product with reference to this official notice are to be specified on the delivery note.

2.3 Confirmation of conformity

2.3.1 General

The confirmation of the conformity of the construction product with the provisions of the general approval for construction purposes covered by this official notice shall be accompanied for each manufacturing plant by a manufacturer's declaration of conformity on the basis of an initial test carried out by the manufacturer and in-house production control. The declaration of conformity is to be issued by the manufacturer by marking the construction product with the mark of conformity (Ü mark) with reference to the intended use.

2.3.2 In-house production control

In-house production control shall be implemented and carried out in each manufacturing plant. In-house production control is understood to be the continuous monitoring of production to be carried out by the manufacturer to ensure that the construction products produced by the manufacturer comply with the provisions of the general approval for construction purposes covered by this official notice.

In-house production control shall include at least the following measures listed below:

- Grating elements, mounting flange, counter lug, comb plate
  The dimensions required in section 2.1 must be checked by means of regular measurements in the manufacturing plant. For every delivery of material, proof of the material properties of the raw material shall be provided by means of an inspection certificate 3.1 in accordance with DIN EN 10204[5]. The conformity of the information provided in the inspection certificate 3.1 with the material properties required in section 2.1.2 must be checked.
- Galvanisation of the grating elements
  The conformity of the galvanising process with the procedure2 filed with Deutsches Institut für Bautechnik must be checked.
- Welded joints
  The provisions for components of design class EXC 2 according to DIN EN 1090-2[4] shall apply.
  The resistance spot welds (welded joint of longitudinal double bar with transverse bar) must have a minimum shear force of 5.0 kN.
  The resistance spot welds located directly in the fastening area of the comb plate (welded joint of longitudinal double bar with transverse bar) must have a minimum shear force of 18.5 kN. The minimum shear forces of the welded joints must be checked in accordance with the test plan and test procedures filed with Deutsches Institut für Bautechnik [2].

[5] DIN EN 10204:2005-01 Metallic products - Types of inspection certificates

The results of in-house production control shall be recorded and evaluated. The records must contain at least the following information:
- designation of the construction product and/or of the basic material and of the components
- type of inspection or test
- date of manufacture and of testing of the construction product and/or of the raw material or the components
- result of the inspections and tests and comparison with the requirements
- signature of the person responsible for in-house production control.

The records shall be kept for at least five years. They must be submitted to Deutsches Institut für Bautechnik and the competent supreme building supervisory authority on request.

If the test result is unsatisfactory, the manufacturer shall immediately take the necessary measures to remedy the defect. Construction products which do not meet the requirements shall be handled in such a way as to exclude confusion with those meeting the requirements. After the defect has been remedied, the construction product shall be tested again if technically possible and necessary to prove that the defect has been rectified.

3 Provisions for planning, dimensioning and execution

3.1 Planning

3.1.1 General

In addition to the following planning specifications, the information regarding dimensioning in accordance with section 3.2 and regarding execution according to section 3.3 shall be considered in the planning process.

The "INTEGRA-pw 3.0" lattice elements (guardrails) can be used in parking garages to absorb exceptional loads from vehicle impact. Depending on the design of the fastening lugs, the resistance of the guardrails corresponds to the vehicles specified in section 3.2.2 or 3.2.3.

In order to ensure energy absorption in the event of a vehicle impact, the 3 M10 hexagonal screws must be tightened with a torque of 30 Nm in accordance with Annex 3. In order to exclude loosening of the screw connection over the service life, the screws can be secured with a suitable screw lock during installation, or alternatively compliance with the torque is to be checked in the course of maintenance in accordance with section 4.

The grating mats may be installed with the bead facing either inwards or outwards, see Appendix 4.

Attachments, such as guardrail posts and/or sheet metal cladding, may be fixed to the railings, provided they do not impair the fall protection function of the railings. Such attachments and their fastening are not covered by this official notice and must be separately verified.

3.1.2 Attachment to the shell supporting structure (load introduction and load transmission

The attachment of the mounting flange to the shell supporting structure (load introduction) and the load transmission are not covered by this official notice and must be verified by a static calculation in each individual case depending on the load and the design for the characteristic loads specified in Annexes 7, 10 or 11.

3.2 Dimensioning

3.2.1 General

The provisions of DIN EN 1991-1-7[6] in conjunction with DIN EN 1991-1-7/NA[7] shall apply. Furthermore, the verification concept specified in DIN EN 1990[8] in connection with the National Annex shall apply.

3.2.2 Car fall protection for parking garages (permissible total weight ≤ 30 kN)

For the "INTEGRA-pw 3.0" guardrails that are designed with 2 fastening lugs on each side in accordance with the Annexes 1 to 7, the verification of fall protection in parking garages for vehicles of ≤ 30 kN permissible total weight according to DIN EN 1991-1-7[6] in connection with DIN EN 1991-1-7/NA[7] table NA.2, line 9, taking into account the requirements of this official notice, shall be deemed to have been provided. Based on an impact surface for passenger cars at a height of 0.5 m above the road surface and impact areas of 250 mm x 1500 mm according to DIN EN 1991-1-7[6] and 200 mm x 500 mm according to DIN EN 1991-1- 7/NA[7] the verification shall be deemed to have been provided.

The guardrails fulfil the function as a protective measure in car parks in the driving direction and perpendicular to the driving direction.

3.2.3 Car/transporter fall protection for parking garages (permissible total weight ≤ 35 kN)

For the "INTEGRA-pw 3.0" guardrails that are designed with 4 fastening lugs on each side in accordance with the Annexes 3 to 6 and Annexes 8 to 11, the verification of fall protection in parking garages for vehicles of ≤ 35 kN permissible total weight (cars/transporters) according to DIN EN 1991-1-7[6] in connection with DIN EN 1991-1-7/NA[7] table NA.2, line 9, taking into account the requirements of this official notice, shall be deemed to have been provided. Based on an impact surface for passenger cars at a height of 0.5 m above the road surface and impact areas of 250 mm x 1500 mm according to DIN EN 1991-1-7[6] and 200 mm x 500 mm according to DIN EN 1991-1-7/NA[7] the verification shall be deemed to have been provided.

The guardrails fulfil the function as a protective measure in car parks in the driving direction and perpendicular to the driving direction.

Horizontal payload / guardrail spar load

3.2.4 For the guardrails, (with 2 or 4 fastening lugs on each side) a horizontal payload (line load) in accordance with DIN EN 1991-1-1[9] in conjunction with DIN EN 1991-1-1/NA[10],table 6.12DE, line 2 of $q_{R.k}$ = 1.0 kN/m at the upper edge of the mesh shall be deemed to have been provided.

3.3 Execution

The structural design of the mesh elements is shown in Annexes 2 to 4 and Annex 9 whereby either Annex 2 or Annex 9 shall be applicable. The manufacturer must prepare instructions for the installation of the grating elements and hand them to the company carrying out the construction work.

6	DIN EN 1991-1-7:2010-12	Eurocode 1: Actions on structures - Part 1-7: General actions - Exceptional Actions
7	DIN EN 1991-1-7/NA:2010-12	National Annex - Nationally determined parameters - Eurocode 1: Actions on structures - Part 1-7: General actions - Exceptional actions
8	DIN EN 1990:2010-12	Eurocode: Principles of structural design; in conjunction with DIN EN 1990/NA:2010-12
9	DIN EN 1991-1-1:2010-12	Eurocode 1: Actions on structures - Part 1-1: General actions on structures - Weights, dead loads and live loads in building construction
10	DIN EN 1991-1-1/NA:2010-12	National Annex - Nationally determined parameters - Eurocode 1: Actions on structures - Part 1-1: General actions on structures - Weights, dead loads and live loads in building construction

The screw connections of the 3 M10 hexagonal screws according to Annex 3 must be tightened to a torque of 30 Nm which must be documented by the company carrying out the construction work. Screw locking is to be provided if this is specified in the execution documents.
In order to confirm the conformity of the "INTEGRA-pw 3.0" guardrails with the general design certification covered by this official notice, the company carrying out the construction work must issue a declaration of conformity in accordance with Section 16a (5) in conjunction with Section 21 (2) MBO[11].

4 Provisions for use, maintenance and servicing

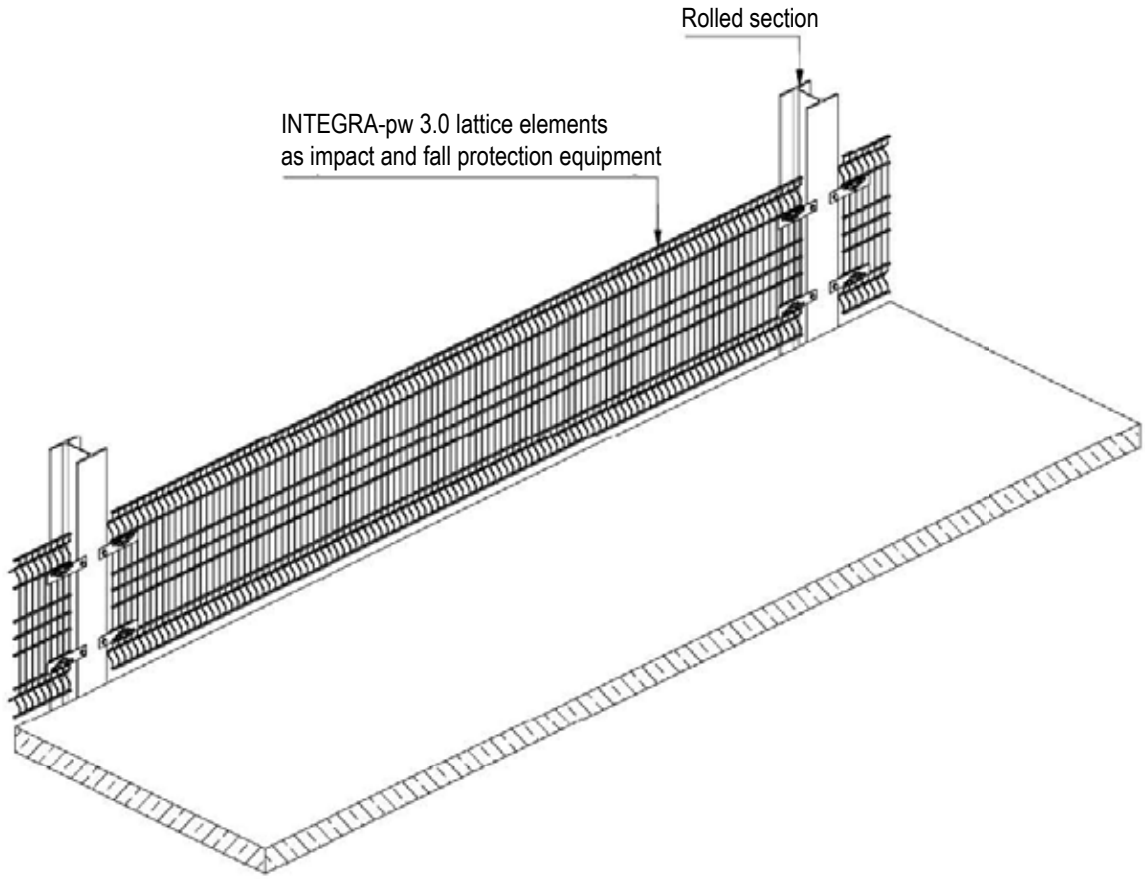
Damaged or plastically deformed mesh mats and fastening components (e.g. after an impact) must be replaced and may not be reused.

If the M10 screw connections according to Annex 3 are not secured with a screw lock, these screw connections must be checked regularly for compliance with the torque of 30 Nm.

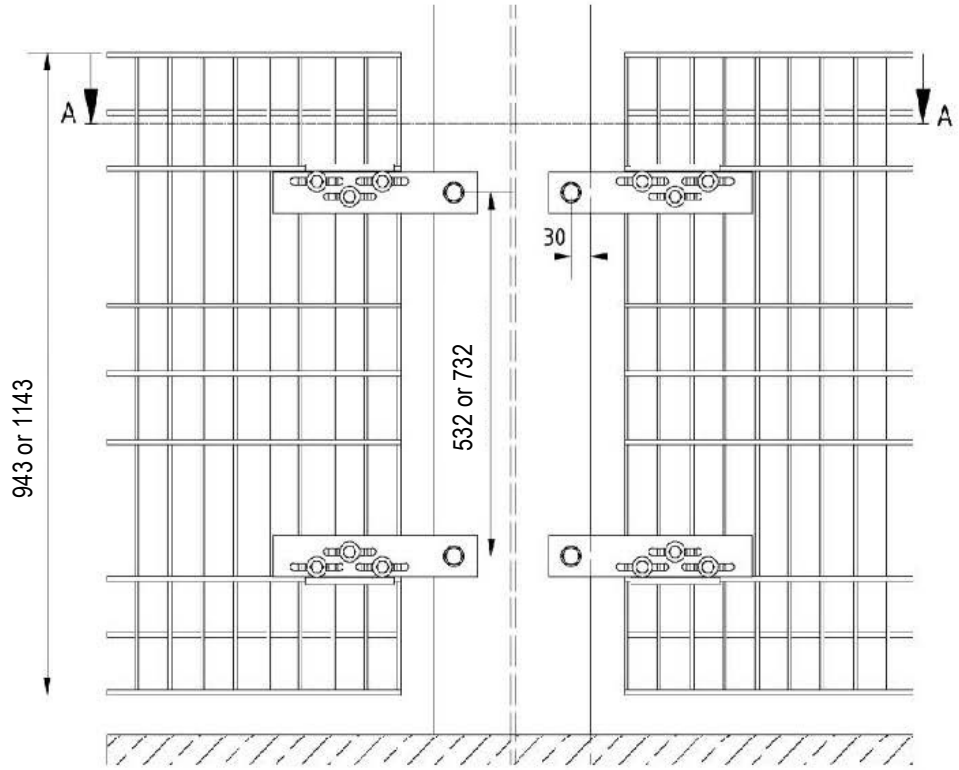
Dr.-Ing. Ronald Schwuchow
Head of Division

Certified
Bertram

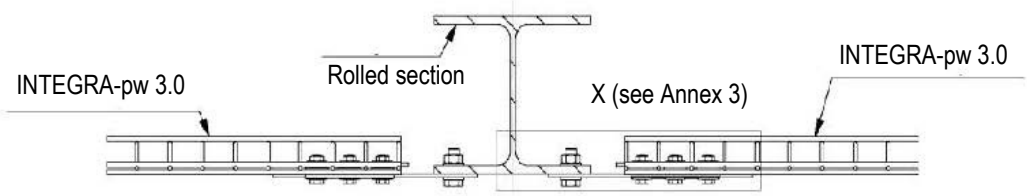
[11] or their implementation in the building codes of the German Federal States



INTEGRA-pw 3.0 lattice elements as impact and fall protection equipment	Annex 1
Example of an installation situation	



Section A-A

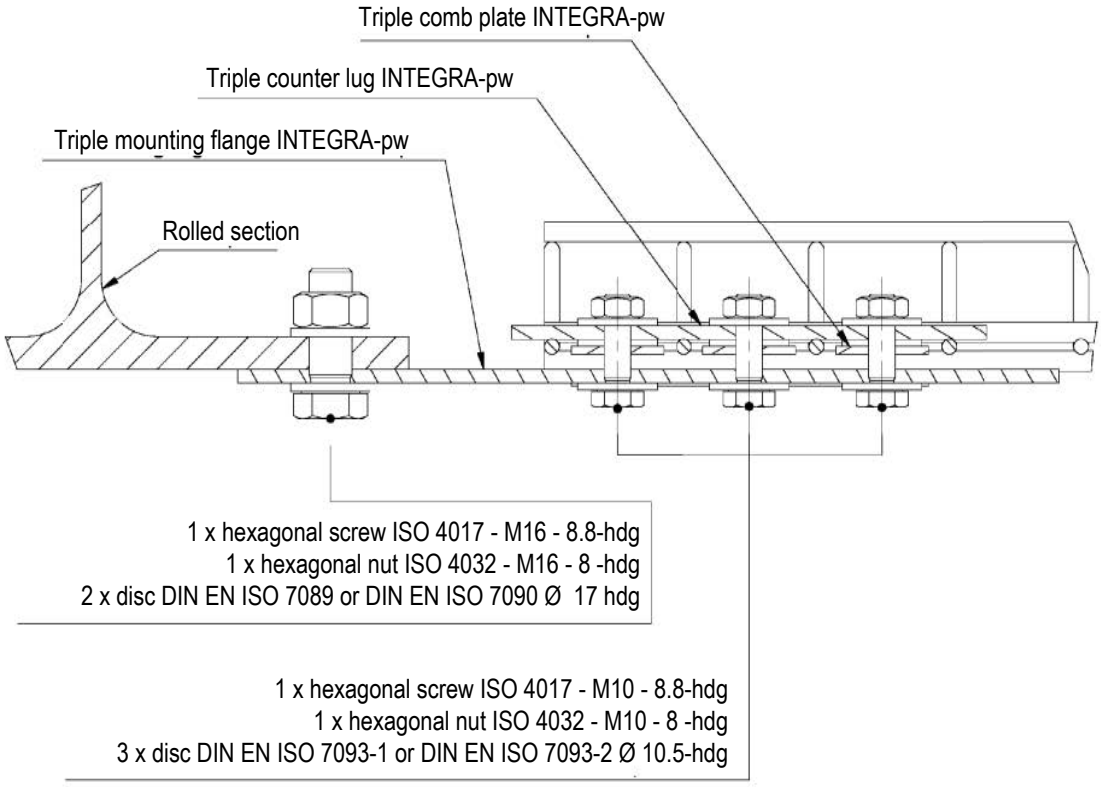


The beads can be directed either inwards or outwards for the two construction heights.

INTEGRA-pw 3.0 lattice elements as impact and fall protection equipment	Annex 2
Connection detail	

Detail X

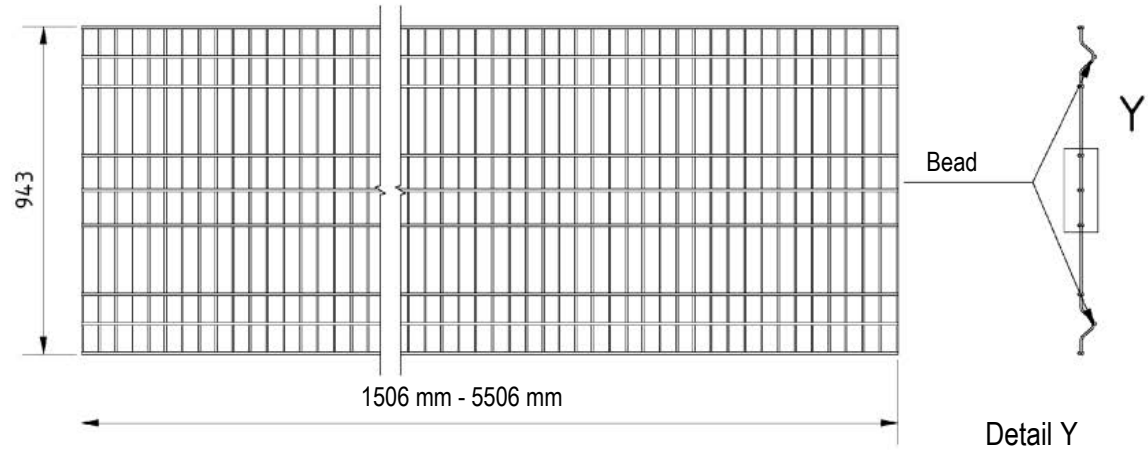
(see Annex 2)



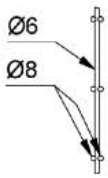
Tighten the screws with a torque of 30 Nm

INTEGRA-pw 3.0 lattice elements as impact and fall protection equipment	Annex 3
Detail X (see Annex 2)	

INTEGRA-pw 3.0 Height 943

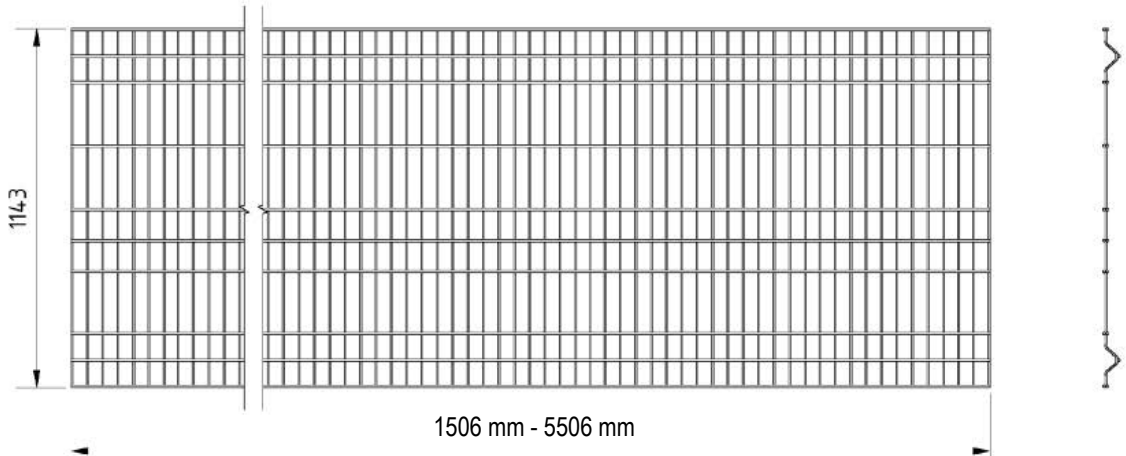


Detail Y



The beads can be directed either inwards or outwards for the two construction heights.

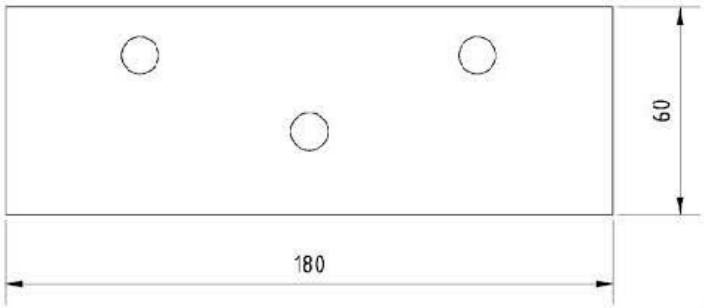
INTEGRA-pw 3.0 Height 1143



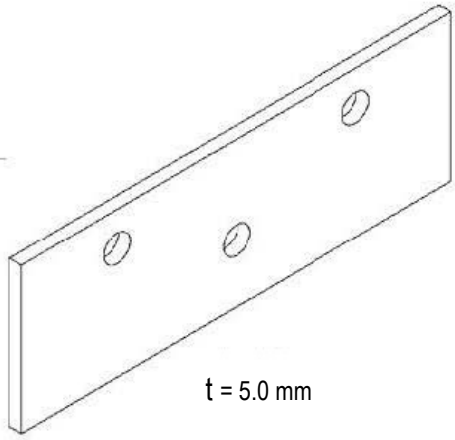
Detailed information on the components (e.g. dimensions and materials) is filed with DIBt.

INTEGRA-pw 3.0 lattice elements as impact and fall protection	Annex 4
Equipment INTEGRA-pw 3.0	

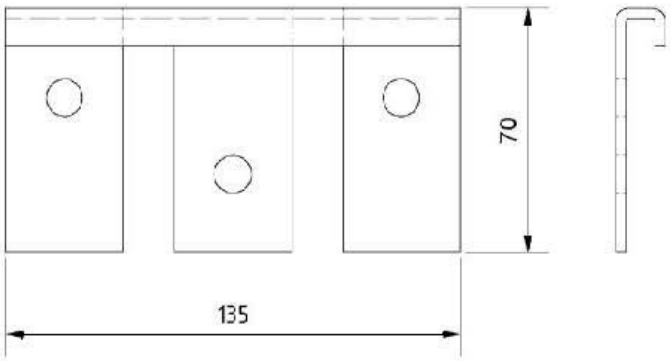
Triple counter lug INTEGRA-pw



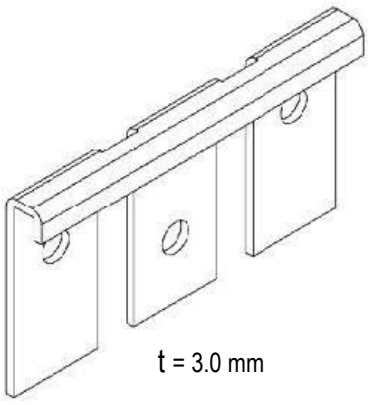
Isometry



Triple comb plate INTEGRA-pw



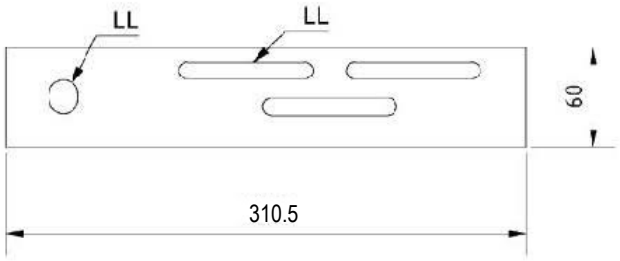
Isometry



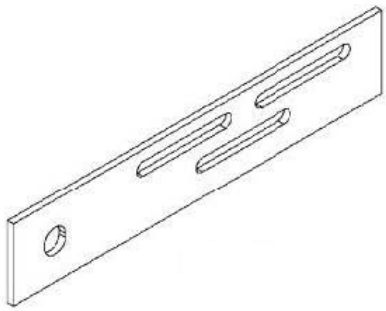
Detailed information on the components (e.g. dimensions and materials) is filed with DIBt.

INTEGRA-pw 3.0 lattice elements as impact and fall protection	Annex 5
Equipment Component parts 1/2	

Triple mounting flange INTEGRA-pw

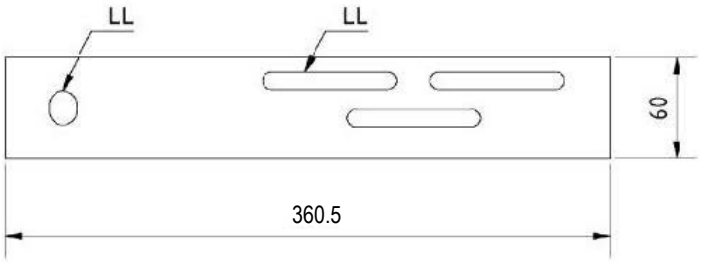


Isometry

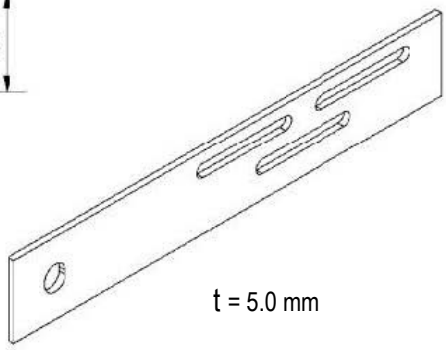


t = 5.0 mm

Triple mounting flange INTEGRA-pw - ramp



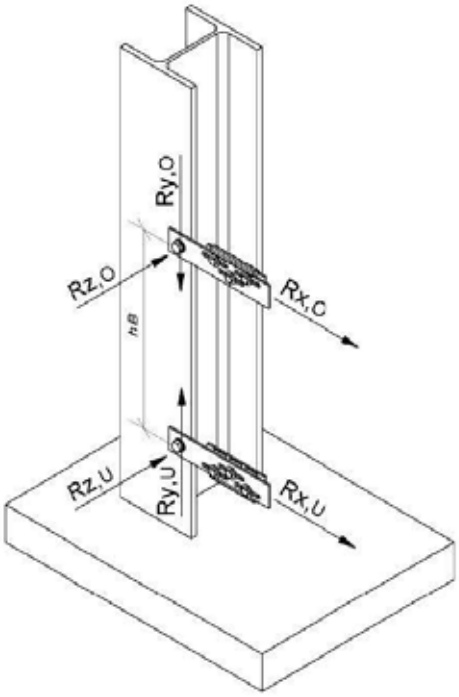
Isometry



t = 5.0 mm

Detailed information on the components (e.g. dimensions and materials) is filed with DIBt.

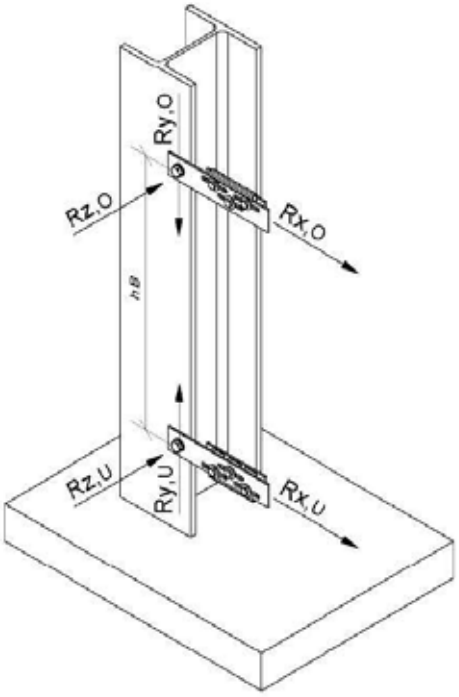
INTEGRA-pw 3.0 lattice elements as impact and fall protection equipment	Annex 6
Component parts 2/2	



INTEGRA-pw 3.0 Height 943
h_B = 532 mm

	Loading condition 1	Loading condition 2
Action	Impact on the rim	Impact in the centre
R_x o	27 kN	45 kN
R_x u		
R_y o	21 kN	10 kN
R_y u		
R_z o	20 kN	10 kN
R_z u		

The specified loads apply to mats with a span of 2.5 m to 5.5 m.



INTEGRA-pw 3.0 Height 1143
h_B = 732 mm

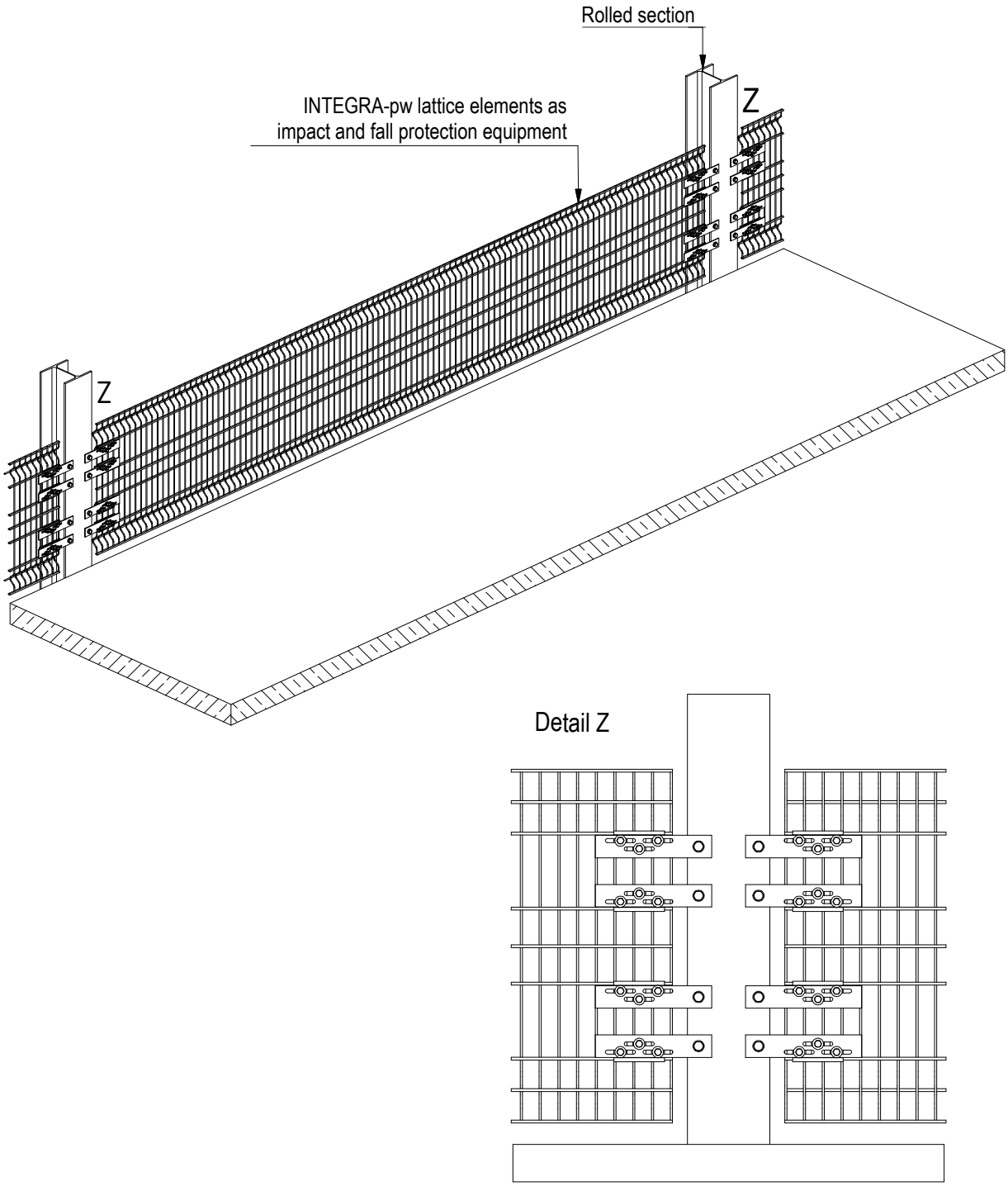
	Loading condition 1	Loading condition 2
Action	Impact on the rim	Impact in the centre
R_x o	30 kN	36 kN
R_x u		42 kN
R_y o	23 kN	16 kN
R_y u		
R_z o	14 kN	10 kN
R_z u	26 kN	20 kN

The specified loads apply to mats with a span of 2.5 m to 5.5 m.

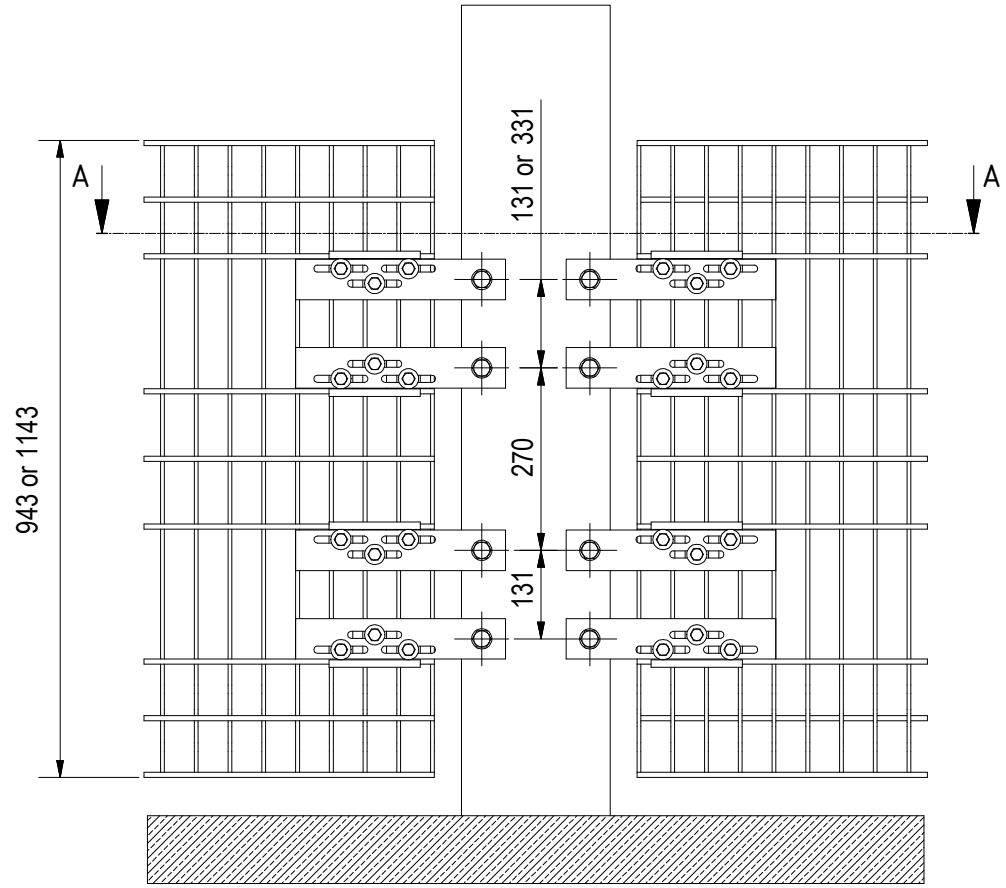
INTEGRA-pw 3.0 lattice elements as impact and fall protection equipment

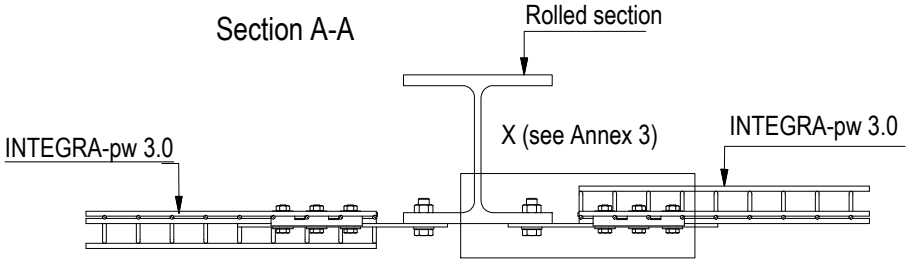
Load-bearing forces for the mathematical verification of the supporting structure

Annex 7



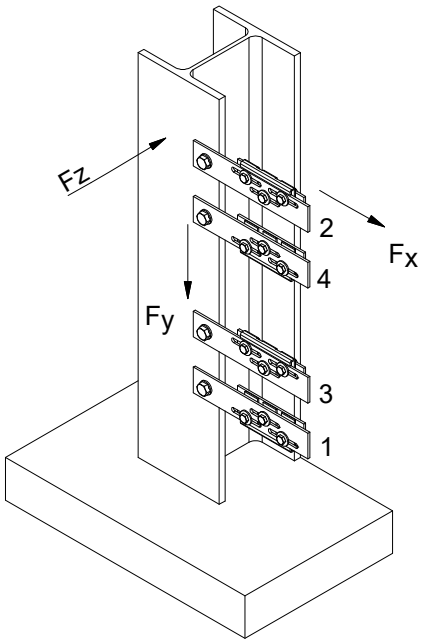
INTEGRA-pw 3.0 lattice elements as impact and fall protection equipment	Annex 8
Example of an installation situation with 4 fastening lugs on each side	





The beads can be directed either inwards or outwards for the two construction heights.

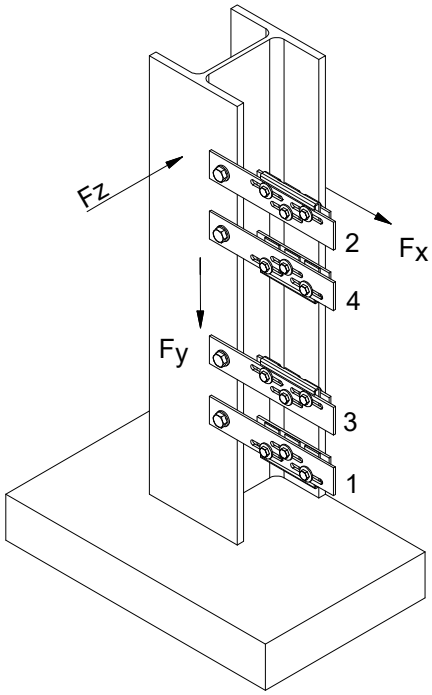
INTEGRA-pw 3.0 lattice elements as impact and fall protection equipment	Annex 9
Connection detail for mats with 4 fastening lugs on each side	



INTEGRA-pw 3.0 Height 943

Car impact and 4 fastening lugs on each side
(permissible total weight ≤ 30 kN)

	Loading condition 1	Loading condition 2
Action	Impact on the rim	Impact in the centre
F1x	18 kN	22 kN
F1y	-6 kN	-6 kN
F1z	6 kN	5 kN
F2x	18 kN	21 kN
F2y	6 kN	6 kN
F2z	6 kN	5 kN
F3x	24 kN	31 kN
F3y	-1 kN	-2 kN
F3z	13 kN	6 kN
F4x	24 kN	31 kN
F4y	1 kN	2 kN
F4z	13 kN	6 kN



INTEGRA-pw 3.0 Height 943

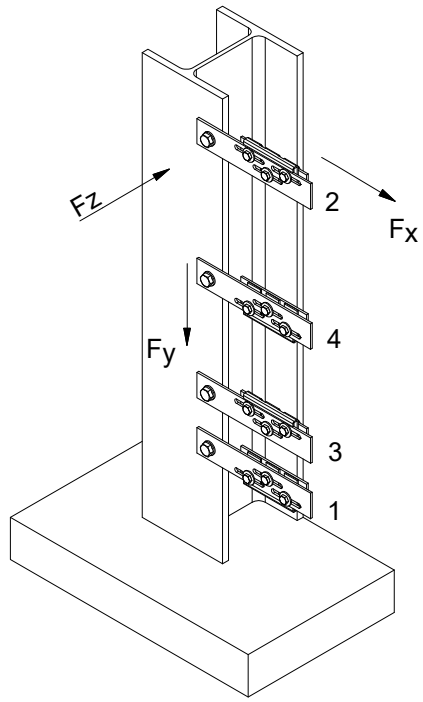
Transporter impact and 4 fastening lugs on each side
(permissible total weight ≤ 35 kN)

	Loading condition 1	Loading condition 2
Action	Impact on the rim	Impact in the centre
F1x	16 kN	22 kN
F1y	-9 kN	-5 kN
F1z	8 kN	5 kN
F2x	16 kN	22 kN
F2y	9 kN	5 kN
F2z	8 kN	5 kN
F3x	41 kN	51 kN
F3y	-1 kN	-6 kN
F3z	28 kN	17 kN
F4x	41 kN	51 kN
F4y	1 kN	6 kN
F4z	28 kN	17 kN

INTEGRA-pw 3.0 lattice elements as impact and fall protection equipment

Connection detail for mats with 4 fastening lugs on each side

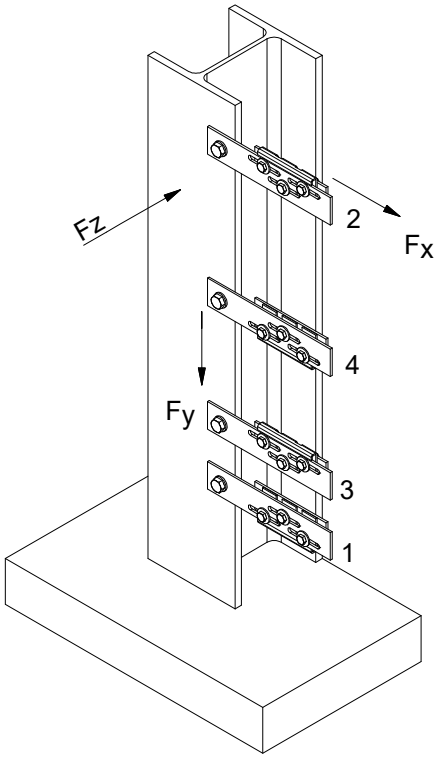
Annex 10



INTEGRA-pw 3.0 Height 1143

Car impact and 4 fastening lugs on each side (permissible total weight ≤ 30 kN)

	Loading condition 1	Loading condition 2
Action	Impact on the rim	Impact in the centre
F1x	16,6 kN	21,1 kN
F1y	-8,2 kN	-4,1 kN
F1z	7,5 kN	4,2 kN
F2x	16,8 kN	20 kN
F2y	6,9 kN	4,2 kN
F2z	3,3 kN	2,9 kN
F3x	24,3 kN	22,2 kN
F3y	3,2 kN	2,2 kN
F3z	13,6 kN	6,7 kN
F4x	23,5 kN	22,2 kN
F4y	-5,9 kN	-1,1 kN
F4z	13,9 kN	7,1 kN



INTEGRA-pw 3.0 Height 1143

Transporter impact and 4 fastening lugs on each side (permissible total weight ≤ 35 kN)

	Loading condition 1	Loading condition 2
Action	Impact on the rim	Impact in the centre
F1x	14,8 kN	22,6 kN
F1y	-9,8 kN	-3,6 kN
F1z	10,5 kN	5,8 kN
F2x	14 kN	21,2 kN
F2y	7,4 kN	4,9 kN
F2z	3,8 kN	4,2 kN
F3x	42 kN	48,7 kN
F3y	0,9 kN	-1,8 kN
F3z	26 kN	16,4 kN
F4x	42 kN	49,6 kN
F4y	-4,6 kN	0,5 kN
F4z	29,4 kN	17,1 kN

INTEGRA-pw 3.0 lattice elements as impact and fall protection equipment

Load-bearing forces for the mathematical verification of the supporting structure using mats with 4 fastening lugs on each side

Annex 11