



TYPE EXAMINATION CERTIFICATE

39 44 03

Modular scaffolding

Holder/Manufacturer/Supplier

Mon.Zon Development AB, Box 5238, SE-402 24 Göteborg

Product name

Modular

Product description

According to pages 2–18 in this type examination certificate. Technical documentation according to the documentation for SP, no 4P06704.

Requirements

The Swedish Work Environment Authority's Statute Book AFS 2013:4 Scaffolding, 10 § (SP's certification provisions SPCR 064) and SS-EN 12810-1.

Evaluated system configurations

Load class 2 – 5 (1.5 – 4.5 kN/m²), with conditions according to the product description.

Marking

The main components of the scaffolding such as base jacks, standards, horizontals, transoms, double guardrails, diagonal braces, platforms, stairways, lattice beams, brackets, collars, frames etc. must be clearly stamped with the year of manufacture (2 digits) and "monzon".

Validity

This type examination certificate is valid until not later than 9th May 2027.

Miscellaneous

SP carries out an annual verification of conformity of the type examined components according to section 5 of SPCR 064.

This type examination certificate replaces the certificate of the same number dated 28th September 2016 and originally issued on 28th February 2005.

SP Technical Research Institute of Sweden Certification

Lennart Aronsson

Kristina Follin

This is a translation from the Swedish original document. In the event of any dispute as to the content of the document, the Swedish text shall take precedence.



Type examination certificate no. 394403 issue 9, 2017-05-09

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Product description for Modular scaffolding

Design

Modular scaffolding consists of standards, horizontals, transoms, double guardrails, diagonal braces, platforms, stairways, lattice beams, brackets etc. according to the following list of components. The joint between standards is made up by a spigot in the top of a standard that the standard above is placed on. The attachment between the ledgers, diagonal braces and standards is by wedge coupling that is secured to collars welded to the standards. Access to the scaffolding is by stairways mounted on additional standards adjacent to the scaffolding.

The scaffolding is available in two variants, the traditional U-transom system with lengths of up to 3.07 m and the PSI-transom system, also called No Limits with meter dimensions in width and length.

The scaffolding can be erected in different combinations of width, length and height. Constituent components are given in the list below.



PSI (ψ) profil.

Component (design is given in the instruction manual, steel unless otherwise stated)	Sizes	Item ID
Base jack	40, 60, 80 cm	111.040—080
Base jack, hinged	60, 80 cm	111.061—081
Base collar	33 cm	201.000
Standard	50, 100, 150, 200, 250, 300 cm	200.50—300
Standard offshore without spigot	50, 100, 150, 200, 300 cm	231.50—300
Spigot for offshore standard	50 cm	231.000
Horizontal	39, 50, 73, 74, 75, 100, 109, 125, 140, 150, 157, 175, 200, 207, 225, 250, 257, 300, 307 cm	201.039—307
Double guardrail	73, 75, 100, 109, 125, 140, 150, 157, 175, 200, 207, 225, 250, 257, 300, 307 cm	217.073—307

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Component (design is given in the instruction manual, steel unless otherwise stated)	Sizes	Item ID
Double guardrail (alu)	73, 75, 100, 109, 125, 140, 150, 157, 175, 200, 207, 225, 250, 257, 300, 307 cm	251.073—307
U-transom	73 cm	202.073
U-transom, reinforced	109, 140 cm	202.109—140
U-beam	157, 207, 257, 307 cm	208.157—307
U-transom 15°-45°	73 cm	202.072
Vertical diagonal brace	Lift height 200 cm, length: 73, 75, 100, 109, 125, 140, 150, 157, 200, 207, 250, 257, 300, 307 cm	204.073—307
U-Deck 0.32	73, 109, 140, 150, 157, 207, 257, 307 cm	308.073—307
U-Deck 0.19	73, 109, 140, 150, 157, 207, 257, 307 cm	319.073—307
U-deck 0.32 (alu)	73, 109, 140, 150, 157, 207, 257, 307 cm	310.073—307
U-Platform 0.61 (plywood)	73, 109, 140, 150, 157, 207, 257, 307 cm	300.073—307
U-platform 0.61 (fibreglass)	73, 109, 140, 150, 157, 207, 257, 307 cm	317.073—307
U-Access deck 0.61 (plywood)	257, 307 cm	405.257—307
U-Access deck 0.61 (fibreglass)	257, 307 cm	417.257—307
Deck for tubular transom 0.3 (alu)	75, 100, 125, 150, 175, 200, 250, 300 cm	311.75—300
Deck for tubular transom 0.32 (alu)	73, 109, 140, 157, 207, 257, 307 cm	309.73—307
Corner platform	36 cm	313.036
Toeboard (wood)	73, 109, 140, 157, 207, 257, 307 cm	108.073—307
Toeboard (alu)	73, 109, 140, 157, 207, 257, 307 cm	118.073—307
Toeboard end (wood)	73 cm	108.000

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Component (design is given in the instruction manual, steel unless otherwise stated)	Sizes	Item ID
U-Staircase (alu)	257×200, 307×200 cm 160×100 cm	400.257—307 400.100
External handrail	257×200, 307×200 cm	404.257—307
Internal handrail (alu)	280 cm	412.280
U-brackets	39, 73 cm	206.039—073
Lattice beam 750 (alu)	225, 325, 425, 525, 625, 725 cm	901.225—725
Mounting spigot standard-lattice beam	75 cm	213.750
Wall tie	30, 50, 130 cm	112.030—130
Rosette coupler		809.023
U-transom 0.73, adjustable	73 cm	202.071
Bolt with spring lock	60 mm	500.008
Sole plate (wood)	45×450 mm	830.050
U-spigots		820.000
O-spigot		813.023
PSI-transom (alu)	25, 50, 75, 100, 125 cm	242.025—125
PSI-transom, reinforced (alu)	150, 175, 200, 225, 250, 300 cm	248.150—300
PSI-bracket 025 (alu)	25 cm	252.025
PSI-bracket 50 (alu)	50 cm	252.050
PSI-bracket 75 (alu)	75 cm	252.075
PSI-frame 2 m	200 cm	216.200
PSI-deck 025	25, 50, 75, 100, 125, 150, 175, 200, 225, 250, 300 cm	325.025—300
PSI-deck 025 (alu)	25, 50, 75, 100, 125, 150, 175, 200, 225, 250, 300 cm	312.25—300
PSI-platform 050 (alu)	50, 75, 100, 125, 150, 200, 250, 300 cm	315.050—300
PSI-platform 050 (fibreglass)	50, 75, 100, 125, 150, 175, 200, 225, 250, 300 cm	314.050—300
PSI-stair hatch (fibreglass)	75×100 cm	419.100
PSI-corner deck, 90° (alu)	25×25, 50×50 cm	313.025—050

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Component (design is given in the instruction manual, steel unless otherwise stated)	Sizes	Item ID
PSI-corner deck, 45° (alu)	25×25, 25×50, 25×75 cm	322.025—075
PSI-corner deck, variable (alu)	75×50 cm	303.050
Toeboard (alu)	50, 75, 100, 125, 150, 175, 200, 225, 250, 300 cm	252.0.50—300
PSI-lattice beam (alu)	250, 300, 400, 500, 600 cm	249.250-600
PSI-stairway (alu)	250×200, 300×200 cm 150×050, 150×100 cm 050×150 cm	402.250—300 402.050—100 402.150
Handrail external (alu)	250/257×200, 300/307×200 cm	445.250—307
PSI-connector, for ledgers for tubes		841.000 844.000
PSI-Double connector, for pigot with spigot		842.000 843.000

Other accessories: Deck locks, toeboard clamps

Dimensions

Component	Dimensions (mm)
Standards, horizontals, wall ties	∅ 48.3×3.2
Vertical diagonal brace	∅ 48.3×2.6
Base jack	Trapeze threaded ∅ 38×5
Base collar	∅ 60.0×4.0; ∅ 48.3×4.0
Double guardrail	∅ 38×1.5 and ∅ 10
Double guardrail (alu)	∅ 40×2 and □ 40×20×2
Lattice beam 750 Tube horizontal & vertical Diagonal braces	∅ 48.3×4.5; ∅ 28/42×4

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Evaluated system configurations

1. Evaluated system configurations.

Anchorage distance vertically (m)	4.0			2.0
	(1)	(2)	(3)	(4)
Load class	4	5		6
Permissible load (kN/m ²)	3.0	4.5		6.0
Bay length (m)	3.07	2.57	2.07	3.07
Bay width (m)	1.09			
Platform levels ¹⁾	Steel deck on each level			
Lift height (m)	2.0			
Erection height (m)				
- without brackets	25	25	25	25
- with brackets 0,39 on each level	25	25	25	25
- with bridging beam ²⁾ , without brackets	25	21	25	25

¹⁾ For the calculations, the weight of the platform levels has been assumed to be 19 kg/m².

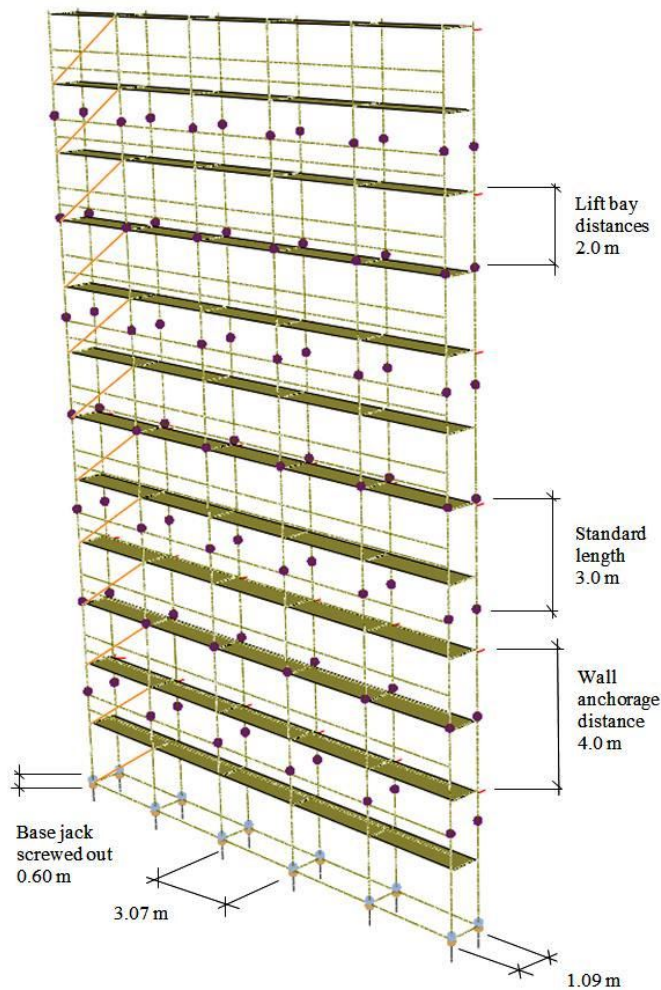
²⁾ Versions with bridging beam 750, see illustration on page 6.

- When evaluating the system configurations, the maximum load capacity of the scaffolding, that is the load capacity at an erection height of 25 m or higher, and the failure point of the scaffolding has been determined. This evaluation allocates loads to standards that can be used for simplified calculations, see **Conditions for use** point 1.
- The scaffolding is **anchored to the wall** according to **Conditions for use**, point 5.
Maximum design anchorage load perpendicular to the facade is 2.5 kN.
Maximum design anchorage load in anchorages that can withstand horizontal loads (V-anchorage) is 4.0 kN and 4.8 kN parallel respectively perpendicular to the facade.
- Maximum design load on the base (the ground or a structure) is 25 kN/standard, with brackets 25 kN/standard and when bridging 29 kN/standard.
- The calculations are made on the basis that work is only carried out at one lift level.
- The instruction manual edition 09-05-2017 has been inspected for the type examination.

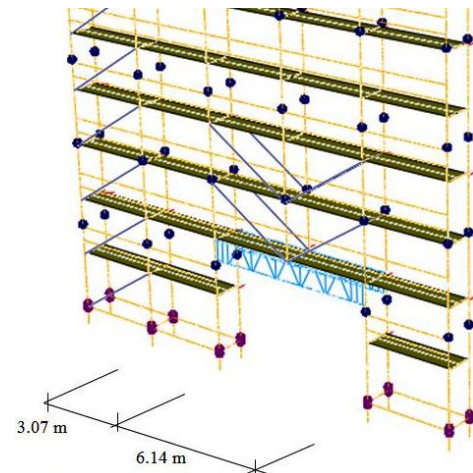
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System configurations 24 m



Scaffolding without/with brackets according to (1)/(2) in the table under point 1



Scaffolding with bridging beam 750 according to (1)/(2) in the table under point 1. Extra wall ties are mounted at 2.5 m height to the side of the opening. Otherwise wall ties as point 3.

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Conditions for use

1. For simplified design, a **permissible standard load** can be applied according to the following table, provided that all other applicable conditions are met. For simplified design using the partial coefficient method, a design load capacity is obtained by multiplying the permitted standard load by 1.5.

Anchorage distance vertically (m)	Permitted standard load (kN)	
	4.0	2.0
Without brackets	15.9	24.0
With brackets 0.39 on all levels, under the bracket*	16.7*	
With bracket 0.39 on all levels, not under the bracket	13.0	

* Refers to max. load on the standard below the bracket

2. Design value of the vertical load ($V_{z,d}$) for removable collars are given on page 16. If the rosette coupler is used as an alternative mounting point for system bearing components the global load bearing capacity and permitted standard load can be affected, which means that a specific investigation of the load bearing capacity must be carried out.
3. Each lift must be equipped with **decks**, horizontal/longitudinal beams on the inner and outer sides are only required when there are no decks. The bottom lift must always be positioned at the lowest possible level.
4. Lifts with decks must have **double guardrails** as well as **toeboards** if the fall height is two metres or more.
5. Horizontal diagonal braces are only required when there are no platforms and are then positioned every fifth bay, always in the outer bay and at least every four metres in height.
6. The scaffolding must be **anchored to the wall** by wall ties every 4 metres in height to the inner standard, close to the coupling between the standard and the transom. The lowest wall tie must not be higher than 4.8 m above ground.

Wall ties that can take horizontal loads must be used every 5th pair of standards longitudinally on each wall tie level.

For enclosed scaffolding and/or for heights greater than 25 m, greater wind loads may occur and thereby high anchorage loads may apply.
7. When **brackets** are used the area between the main level and the bracket level must be covered, usually by a horizontal or in another way.

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8. Access is by a **stairway** installed on two additional standards on the outside of the scaffolding with components intended for the purpose. The access route must have double guardrails on the outside, with two guardrails at the ends and a toeboard at the lower end. The upper level should be equipped with a short double guardrail to the stairway. On any level without adjacent platforms the landing must be supplemented with double guardrails towards the scaffolding.
9. **Scaffolding decks** must be type examined or designed according to the scaffolding provisions AFS 2013:4.
10. Platforms that are used must be type examined and designed so that they can be positioned on the scaffolding ledgers and transoms and secured against unintentional lifting at both ends.
11. Lattice beams and tube couplings that are used must be type examined.

Instruction manual

An instruction manual must be supplied with the scaffolding when it is supplied to the user.

Application

The type examination certificate is valid for scaffolding made and supplied by the manufacturers as stated on the certificate and of which materials, dimensions and design correspond with the type examined example.

The scaffolding must not be assembled incorporating other components unless a special investigation of the resulting load bearing capacity has been carried out.

Load bearing capacity components

Horizontals

For horizontals, the following permissible loads and load classes apply.

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Section length (m)	Beam length, as transom (m)						
	3.07	2.57	2.07	1.57	1.40	1.09	0.73
Distributed load (kN/m)	1.3	2.3	3.2	4.2	6.6	11.5	16.3
Point load (kN)	1.7	2.1	2.6	3.0	3.6	4.7	5.8
3.07					3	3	4
2.57					3	4	5
2.07				2	3	4	5
1.57			2	3	4	5	6
1.40			3	3	4	5	6
1.09		2	3	3	5	6	6
0.73	2	3	3	3	6	6	6

U-beams and U-transoms

The following permissible loads and load classes apply to U-beams and U-transoms.

Section length (m)	Beam length, as transom (m)							
	U-beam				U-transom			
	3.07	2.57	2.07	1.57	1.40	1.09	0.73	0.39
Distributed load (kN/m)	3.9*	7.4*	10.8*	16.8*	10.5*	18.1*	18.9*	16.9*
Point load (kN)	4.3*	5.5*	6.7*	11.1*	6.4*	8.7*	8.6*	7.6*
3.07		3	3	5	3	4	5	5
2.57		3	3	5	4	5	6	6
2.07	2	3	3	6	4	6	6	6
1.57	3	3	4	6	5	6	6	6
1.40	3	4	4	6	5	6	6	6
1.09	3	4	5	6	6	6	6	6
0.73	4	5	6	6	6	6	6	6
0.39	5	6	6	6	6	6	6	6

* Permitted load with single sided loading is obtained by multiplying by 0.8.

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PSI-transom

The following permissible loads and load classes apply to PSI-transoms.

Section length (m)	Beam length, as transom (m)									
	3.00	2.50	2.25	2.00	1.75	1.50	1.25	1.00	0.75	0.50
Distributed load (kN/m)	3.6*	5.1*	7.2*	9.3*	11.4*	13.3*	12.2*	21.9*	31.3*	41.1*
Point load (kN)	5.1*	6.2*	7.1*	8.0*	8.9*	9.8*	7.2*	9.4*	11.4*	13.7*
3.00		2	3	3	3	4	4	5	6	6
2.50		2	3	3	4	4	4	6		
2.25		3	3	4	4	5	4	6		
2.00	2	3	3	4	4	5	5	6		
1.75	2	3	4	4	5	5	5	6		
1.50	3	3	4	5	5	6	5	6		
1.25	3	4	4	5	6	6	6	6		
1.00	3	4	5	6	6	6	6	6		
0.75	4	5	6	6	6	6	6	6		
0.50	5	6	6	6	6	6	6	6		
0.25	6	6	6	6	6	6	6	6		

* Permitted load with single sided loading is obtained by multiplying by 0.8.

Platforms

The following permitted loads for evenly distributed loads and load classes apply to platforms.

Platform	Height (mm)	Width (mm)	Length (m)	Permitted load (kN/m ²)	Load class
U-deck 0.32 steel	78	320	0.73 – 2.07	6.0	6
			2.57	4.5	5
			3.07	3.0	4
U-deck 0.19 steel	76	190	0.73 – 2.07	6.0	6
			2.57	4.5	5
			3.07	3.0	4
U-deck 0.32 (alu)	90	320	0.73 – 1.57	6.0	6
			2.07	4.5	5
			2.57	3.0	4
			3.07	2.0	3

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Platform	Height (mm)	Width (mm)	Length (m)	Permitted load (kN/m ²)	Load class
U-platform 0.61 (alu/plywood/fibreglass)	78	610	0.73 – 2.57	3.0	4
			3.07	2.0	3
Deck for tubular transom 0.30/0.32 alu	90	295	0.73 – 1.57	6.0	6
			2.07	4.5	5
			2.57	3.0	4
			3.07	2.0	3
PSI-deck 0.25 steel	70	320	0.25 – 2.00	6.0	6
			2.50	4.5	5
			3.00	3.0	4
PSI-deck 0.25 alu	79	248	0.25 – 2.00	6.0	6
			2.50	4.5	5
			3.00	3.0	4
PSI-platform 0.50 alu	79	498	0.50 – 1.50	6.0	6
			1,75 – 2.00	4.5	5
			2.50	3.0	4
PSI-platform 0.50 fibreglass	79	498	0.50 – 1.50	6.0	6
			1.75 – 2.00	4.5	5
			2.50	3.0	4
PSI-corner deck	79	748	992	3.0	4

Brackets

The following permissible loads and load classes apply to U-brackets.

Bracket length (m)	Distributed load across bracket (kN)	Point load (kN)	Section length (m)		
			3.07	2.57-2.07	1.57-0.39
U 0.73	5.0	5.6	3		
U 0.39	6.7	8.5	4	5	6

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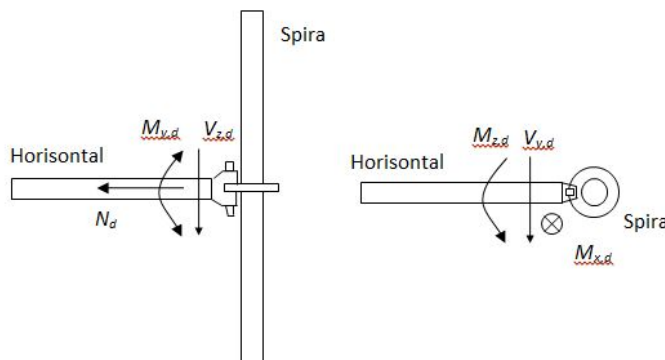
Appendix

The following permissible loads and load classes apply to PSI-brackets.

Bracket length (m)	Distributed load across bracket (kN)	Point load (kN)	Section length (m)		
			3.00	2.50-1.75	1.50-0.25
PSI 0.75	5.8	8.5	3		
PSI 0.50	7.5	6.9	4	5	6
PSI 0.25	9.0	5.8	6		

Input values when designing

The following values obtained from component testing can be used as input values when designing the load bearing capacity of the scaffolding in accordance with SS-EN 12811-1. All stated values are the designed values, R_d .



Torsional stiffness $M_{y,d}$ and $M_{z,d}$
 Torsional stiffness rotation $M_{x,d}$
 Shear force stiffness $V_{z,d}$ and $V_{y,d}$
 Normal force N_d

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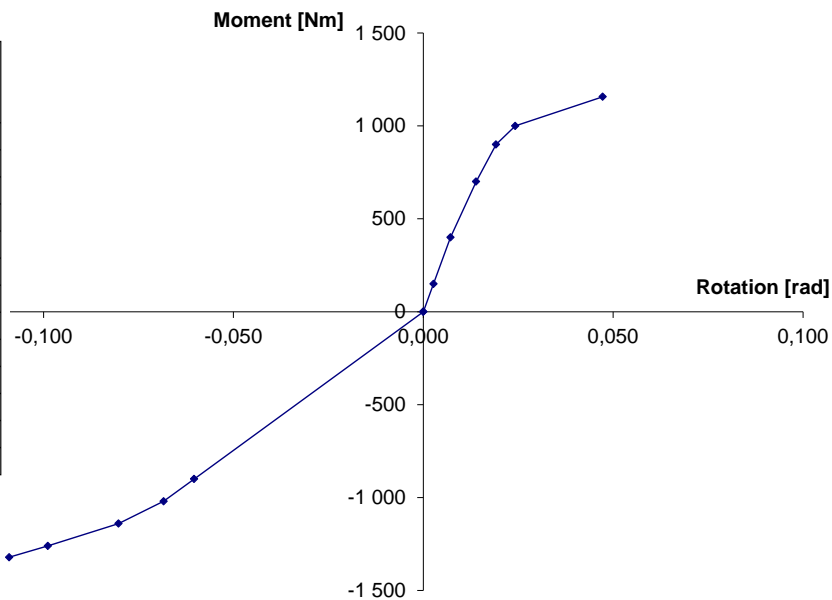
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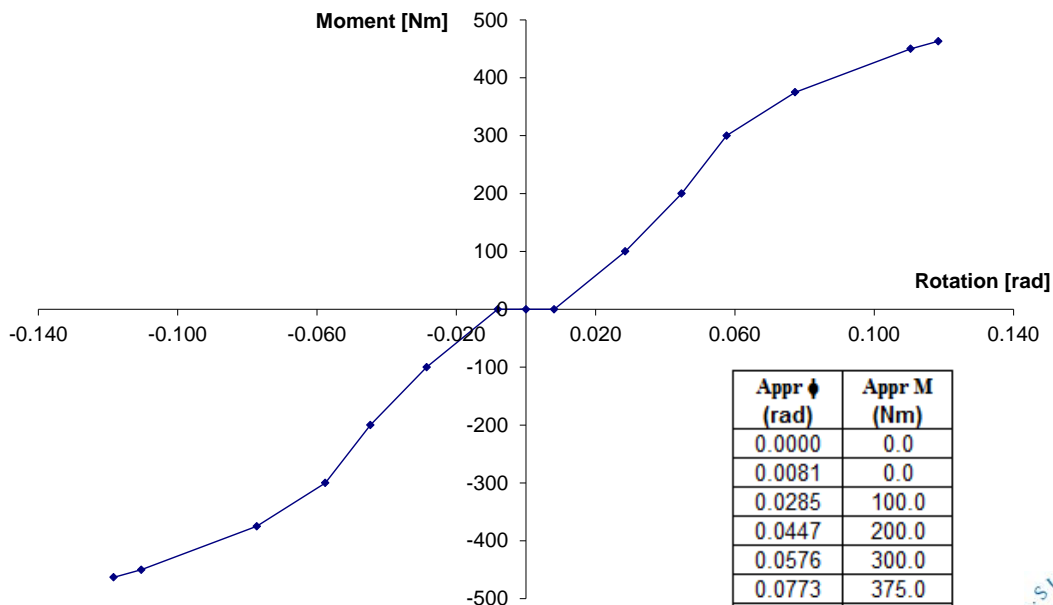
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Ledger connection – Torsional stiffness vertically, $M_{y,d}$

Appr ϕ (rad)	Appr M (Nm)
-0,1090	-1321,3
-0,0988	-1260,0
-0,0803	-1140,0
-0,0684	-1020,0
-0,0603	-900,0
0,0000	0,0
0,0000	0,0
0,0027	150,0
0,0072	400,0
0,0139	700,0
0,0192	900,0
0,0242	1000,0
0,0472	1156,7



Ledger connection – Torsional stiffness horizontally, $M_{z,d}$

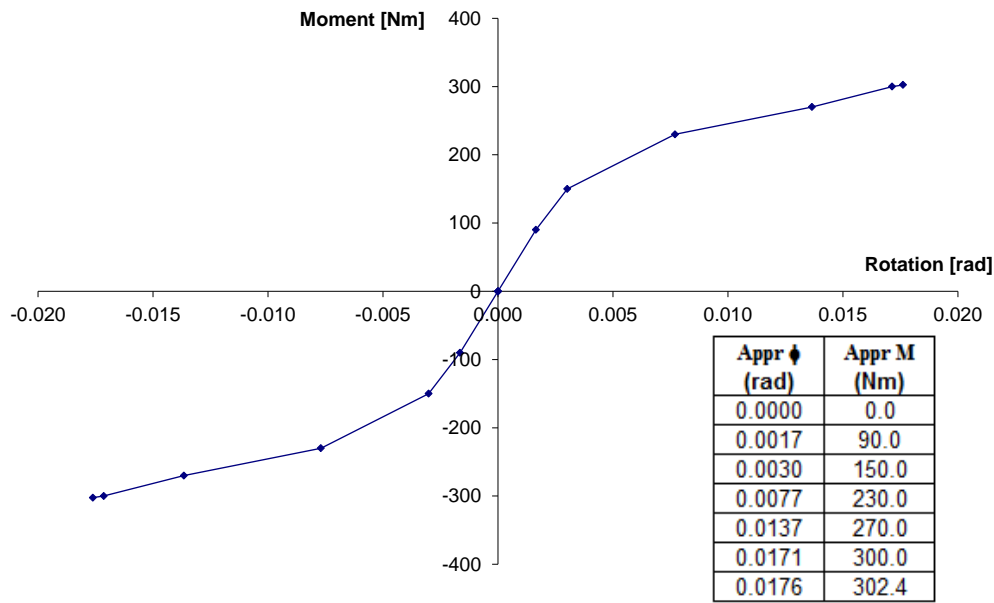


Appr ϕ (rad)	Appr M (Nm)
0.0000	0.0
0.0081	0.0
0.0285	100.0
0.0447	200.0
0.0576	300.0
0.0773	375.0
0.1105	450.0
0.1184	463.1

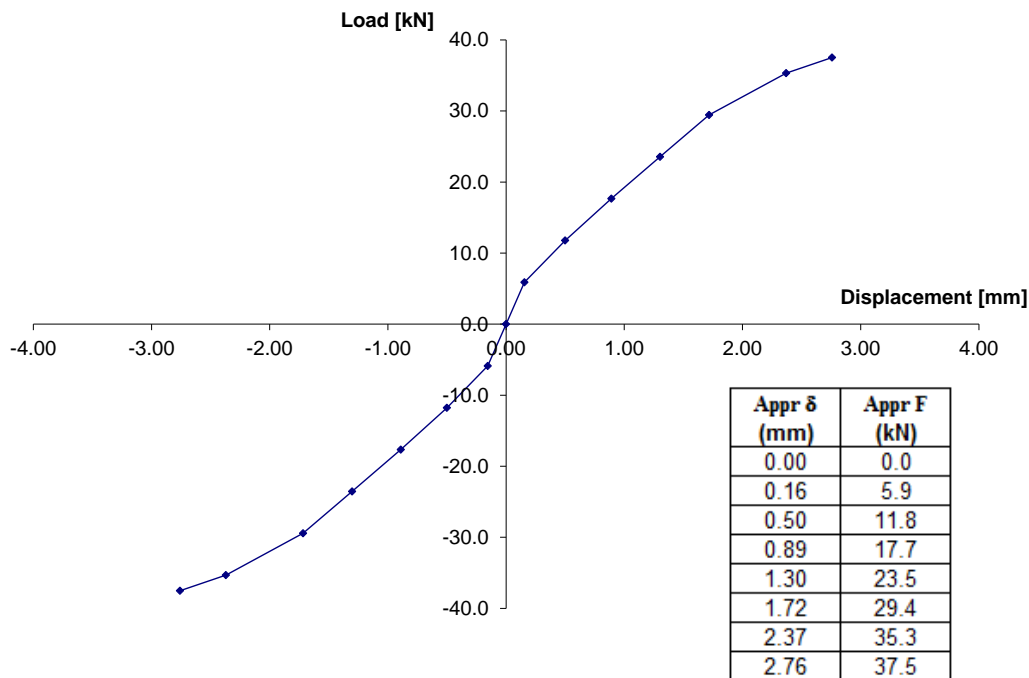
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Ledger connection – Torsional stiffness in event of ledger rotation, $M_{x,d}$



Ledger connection – Shear force stiffness vertically, $V_{z,d}$



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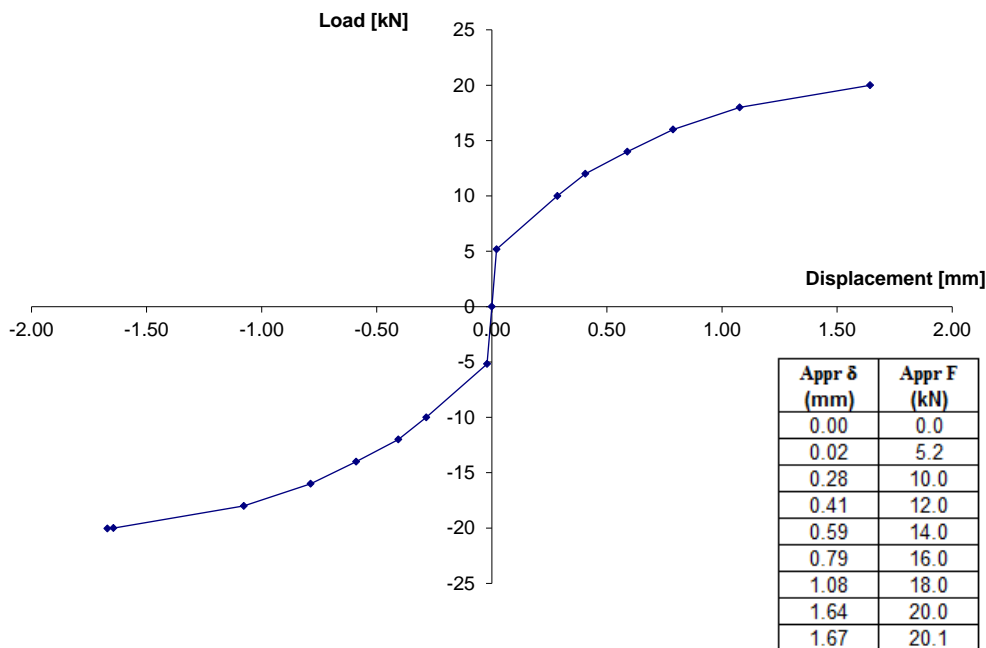
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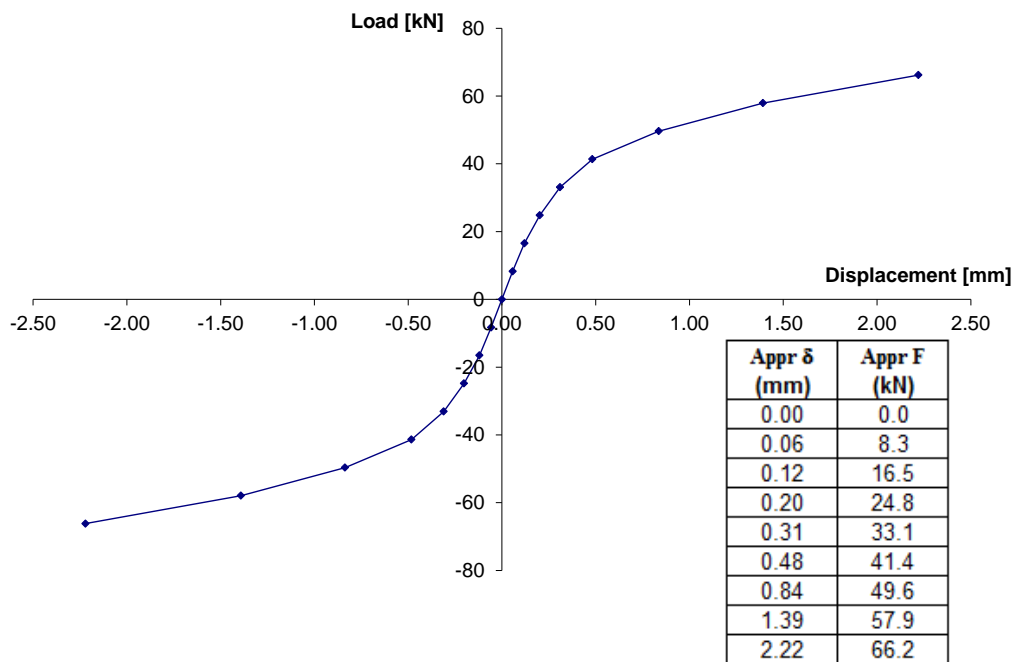
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Ledger connection – Shear force stiffness horizontally, $V_{y,d}$



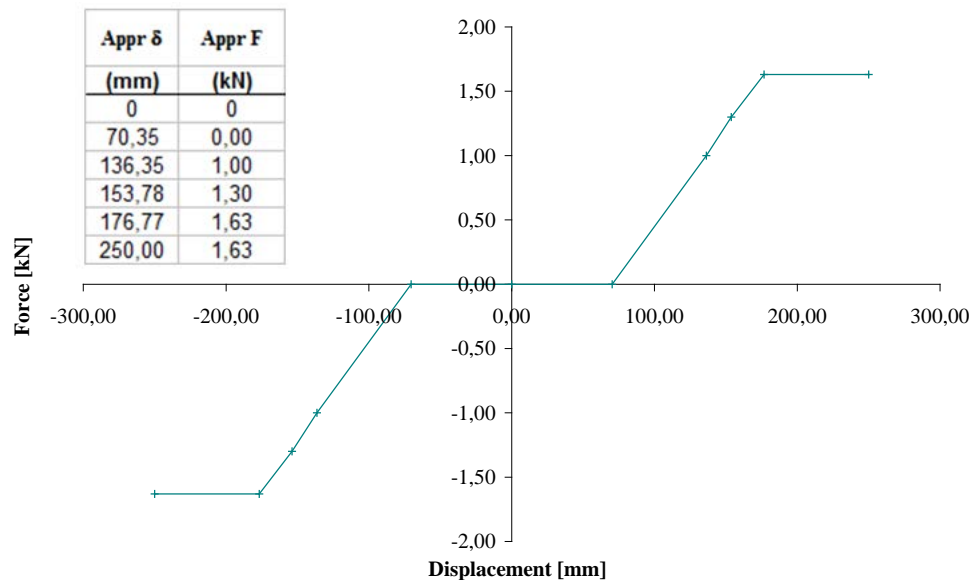
Ledger connection – Normal force stiffness horizontally, N_d



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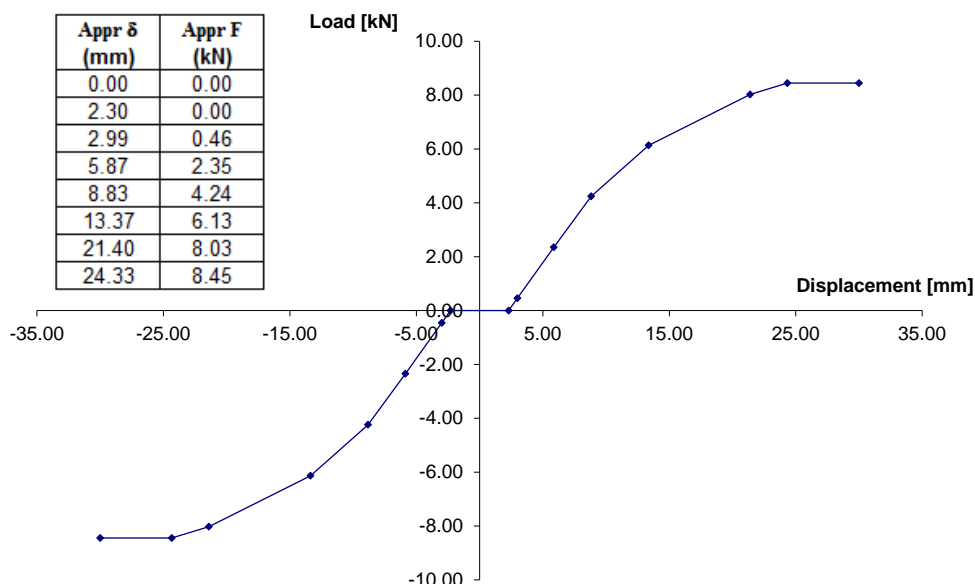
Appendix

Platform stiffness



The diagram illustrates the stiffness of the platform – scaffolding crosswise.

Vertical diagonal brace – Stiffness



The diagram illustrates the stiffness of the diagonal in that direction.

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Appendix

Rosette coupler – Shear force stiffness vertically, $V_{z,d}$

$$V_{z,d} = 7.4 \text{ kN}$$

$$V_{z,d,total} = 15,3 \text{ kN (double sided loading)}$$

Rosette coupler – Other input values

For other input values, the values for the ledger attachments on pages 12 – 15 can be used.



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