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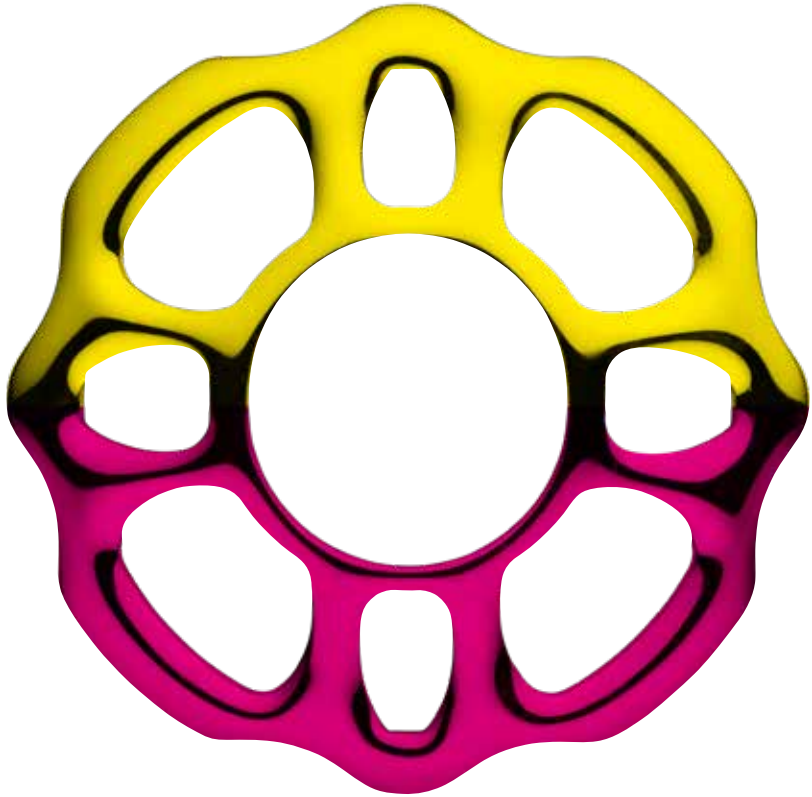
SUPPLIER

20 YEARS
1998-2018



PLETTAC METRIX®

COMPONENT CAPACITIES

FOCUSSED ON SERVICE

COMPONENT CAPACITIES

Loads given in this document are safe working loads, therefore they may be applied without any further reduction. They enable the user to estimate the capabilities of individual PLETTAC METRIX® scaffold configurations.

For more comprehensive calculation the detailed loading data supplied separately by the manufacturer shall be taken into account. The detailed loading data contains the complete set of loading and spring stiffness of the components. They are third party controlled and stated in the German approval Z-8.22-843, please contact your local TRAD Hire & Sales Ltd depot for further details.

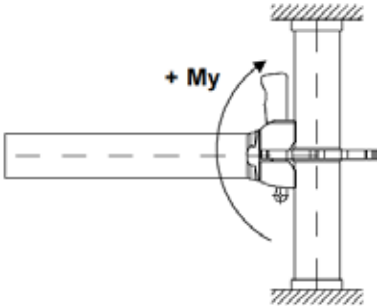
The load capacities given in this document are for individual components only and should not be used in isolation. The overall structural integrity and global stability of the scaffold structure must be checked by an appropriately qualified person, such as a competent temporary works / scaffold design engineer.

DISCLAIMER:

Whilst TRAD Hire & Sales Ltd and the author have made every reasonable effort to ensure that the information contained within this guide is correct at the time of printing, you should be aware that TRAD Hire & Sales Ltd and the author do not accept any liability for any inconvenience, loss or damage caused by the result of any inaccuracy, or omission, within this publication.

1 Ledger Wedge Head

The most often used loading values are shown by sketches. They shall only be taken into account where the junction is loaded without any other interaction.

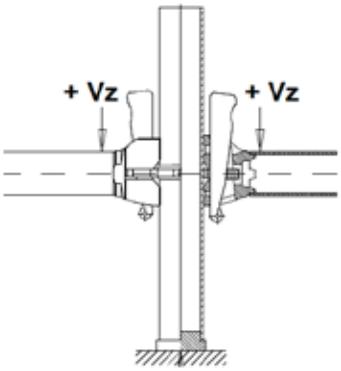


The bending moment My is the vertical cantilevering moment (Load x Distance).

Ledger: **Allowed My = ± 0.63kNm**

The normal load N is the tensile or compressive load along the ledger axis.

Ledger: **Allowed N = ± 20.20kN**

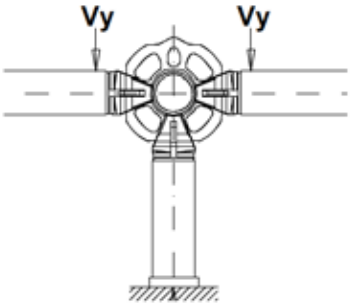


The vertical load Vz is the load to be transferred vertically by the ledger wedge head to the rosette. The full value given is only relevant when the load is applied just behind the wedge head, and there is no further effect from other bending moments.

Allowable Vz = ± 17.30kN

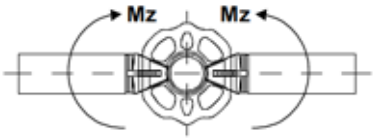
Where several ledgers are transferring loads to the same rosette , the sum of these loads may not exceed the following:

Allowable ΣVz = ±48.80kN



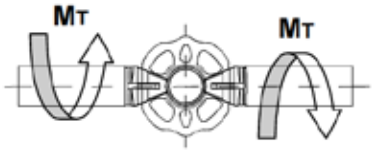
The horizontal load Vy represents loads from wind or other means to be transferred horizontally from the ledger wedge heads into the rosette.

Ledger: **Allowable Vy = ± 6.20kN**



The bending moment Mz is the horizontal cantilevering moment (Load * Distance).

Ledger: **Allowable Mz = ± 0.145kNm**



The twisting moment MT represents resistance against twisting for ledgers connected into the junction.

Ledger: **Allowable MT = ± 0.387 kNm**

2 Vertical Diagonal Brace

Vertical diagonal brace reinforce the scaffolding and are the key component for the stability of the entire scaffolding. The load to be transferred from brace to rosette may not exceed:

Allowable Nv = ± 16.3kN

In the case that this load is applied by tension all vertical brace will be able to transfer this load regardless of the length.

In the case that the load is applied by compression the axial stiffness of the tube becomes relevant. Table 1 contains the safe working loads for a single brace loaded by tension or compression (Nv). Also the horizontal (Q) and vertical (V) components of this load are shown.

All figures given are for a height of 2.0m between ledger levels (lift height). Data for 1.5m, 1.0m and 0.5m heights are available, please contact your local TRAD Hire & Sales depot for further details.

Note: Where several brace are used to support a certain load the addition of the capacities is only allowed if all braces have the same length and all are loaded in the same way (all with compression or all with tension). Where different types of brace are used, or in situations where the type of loading differs (compression or tension) the max. capacity of the system has to be calculated by taking the resistance of the single components into account. Relevant data is available from TRAD Hire & Sales Ltd, or on the basis of the German approval.

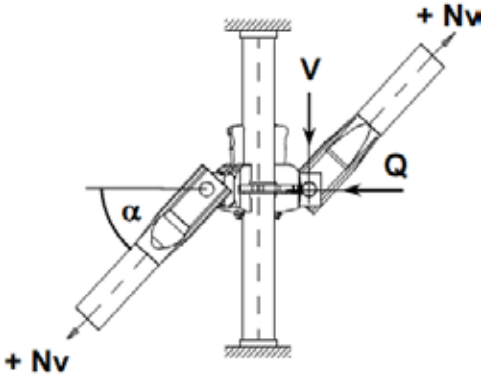


TABLE 1 — Capacity of Vertical Diagonal Brace							
Bay Length (m)	α (°)	Loading by Tension			Loading by Compression		
		All. Nv (kN)	All. Q (kN)	All. V (kN)	All. Nv (kN)	All. Q (kN)	All. V (kN)
Bay Height H = 2.0m							
3.0	35.1	+16.30	13.3	9.4	-5.12	4.2	2.9
2.5	40.5		12.4	10.6	-6.17	4.7	4.0
2.0	47.3		11.1	12.0	-7.62	5.2	5.6
1.5	56.1		9.1	13.5	-9.59	5.4	8.0
1.0	67.1		6.3	15.0	-12.32	4.8	11.4
0.7	74.8		4.3	15.8	-13.81	3.6	13.3

3 Standards

The given values for allowable loading of vertical standards are just applicable for preliminary estimations.

The allowable tension loads are applicable to bolted spigot standards only, with 4 bolts and nuts of Grade 5.6 (minimum) per joint*.

Where required, more detailed figures are available, please contact your local TRAD Hire & Sales Depot for further details.

TABLE 2 — Capacity of Standards					
Buckling Length (m)	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**
Allowable Compression Load (kN)	60.0	39.5	26.1	18.0	13.1
Allowable Tension Load (kN)	54.0*				

*Hypothesis: It is assumed that the loading within the bolted connection on one side occurs on the full diameter of the bolt, while, on the opposing side it occurs on the thread.

4 Adjustable Base Jacks / Swivel Base Jacks / U-Heads

TABLE 3 — Capacity of Base Jacks / Swivel Base Jacks / U-Heads						
Length of Thread Visible (m)	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**
Allowable Compression Load* (kN)	60.0	50.0	40.0	32.5	22.5	15.0

*Hypothesis: It is assumed there is 0.5kN applied horizontally to the base of the base plate, and a 2.5% deviation between the threaded tube of the jack and the axis of the scaffolding vertical.

5 Transoms and Ledgers

The following tables contain the capacities of transoms and ledgers. The data refers to the current design at the time of writing this guide.

The following transoms and or ledgers are regarded separately:

Table 4: Single Transoms / Ledgers; Tubular Support.

Table 5: Reinforced Transoms and Ledgers; Tubular Support.

Table 6: Intermediate Transoms.

For evaluating the capacity, the elastic reaction between ledger and standard has been taken into account (although this is not relevant for intermediate transoms). The self weight of decks has also been considered (Steel decks ~0.23 kN/m²).

The separate columns of the tables give the data as described:

allow. q: Allowable uniformly distributed load along the transom / ledger.

Deck Length: Bay size to be supported by the transom.

allow. p: Allowable safe working load for the area to be supported by the transom. Should this value be greater than the deck capacity, the maximum load allowable is that of the decks, otherwise the decks need to be reinforced to achieve the transom value.

1st column central transom, 2nd column perimeter transom *)

allow. P: 1x P = allowable single point load at the centre of the transom

2x P = allowable single point loads equally spaced, dividing the transom into three similar distances

*) On birdcage scaffolds, every transom may be considered as a perimeter transom as long as the deck orientation is changed every bay.

For single transoms and ledgers allowable traction load = 20.2kN for all lengths.

For single transoms and ledgers allowable compression load = 20.2kN for all lengths except 2.5m and 3m, these values are 15.67kN and 11.40kN respectively.

TABLE 4 — Capacity of Single Transoms and Ledgers; Tubular Support

Transom Length (m)	allow. q (kN/m)	Deck Length (m)	allow. p*) central transom (kN/m²)	allow. p*) perimeter transom (kN/m²)	allow. P (kN)
0.7	24.4	3.0	7.9	16.0	7.4
		2.5	9.5	19.3	
		2.0	12.0	24.2	
		1.5	16.0	32.3	
1.0	13.5	3.0	4.3	8.8	6.1
		2.5	5.2	10.6	
		2.0	6.5	13.3	
		1.5	8.8	17.8	

(Continued)

TABLE 4 — Capacity of Single Transoms and Ledgers; Tubular Support (continued)					
Transom Length (m)	allow. q (kN/m)	Deck Length (m)	allow. p*) central transom (kN/m²)	allow. p*) perimeter transom (kN/m²)	allow. P (kN)
1.3	8.2	3.0	2.5	5.2	4.7
		2.5	3.1	6.3	
		2.0	3.9	8.0	
		1.5	5.2	10.7	
1.5	5.6	3.0	1.6	3.5	3.8
		2.5	2.0	4.3	
		2.0	2.6	5.4	
		1.5	3.5	7.2	
2.0	3.3	3.0	0.9	2.0	2.9
		2.5	1.1	2.4	
		2.0	1.4	3.1	
		1.5	2.0	4.2	
2.5	2.1	3.0	0.5	1.2	2.4
		2.5	0.6	1.5	
		2.0	0.8	1.9	
		1.5	1.2	2.6	
3.0	1.5	3.0	0.3	0.8	2.0
		2.5	0.4	1.0	
		2.0	0.5	1.3	
		1.5	0.8	1.8	

TABLE 5 — Capacity of Reinforced Transoms and Double Ledgers; Tubular Support					
Transom Length (m)	allow. q (kN/m)	Deck Length (m)	allow. p*) central transom (kN/m²)	allow. p*) perimeter transom (kN/m²)	allow. P (kN)
1.0 (Transom)	28.8	3.0	9.4	19.0	1 x 13.6
		2.5	11.3	22.8	
		2.0	14.2	28.6	
		1.5	19.0	38.2	
1.3 (Transom)	18.5	3.0	5.9	12.1	1 x 11.4
		2.5	7.2	14.6	
		2.0	9.0	18.3	
		1.5	12.1	24.4	

(Continued)

TABLE 5 — Capacity of Reinforced Transoms and Double Ledgers; Tubular Support (continued)					
Transom Length (m)	allow. q (kN/m)	Deck Length (m)	allow. p*) central transom (kN/m²)	allow. p*) perimeter transom (kN/m²)	allow. P (kN)
1.5 (Transom)	12.8	3.0	4.0	8.3	1 x 9.2
		2.5	4.9	10.0	
		2.0	6.2	12.6	
		1.5	8.3	16.8	
1.5 (Ledger)	24.7	3.0	8.0	16.2	1 x 15.3 2 x 15.1
		2.5	9.7	19.5	
		2.0	12.1	24.5	
		1.5	16.2	32.7	
2.0 (Ledger)	14.0	3.0	4.4	9.1	1 x 11.3 2 x 8.7
		2.5	5.4	11.0	
		2.0	6.8	13.8	
		1.5	9.1	18.4	
2.5 (Ledger)	8.4	3.0	2.6	5.4	1 x 8.1 2 x 6.6
		2.5	3.1	6.5	
		2.0	4.0	8.2	
		1.5	5.4	11.0	
3.0 (Ledger)	4.6	3.0	1.3	2.9	1 x 7.2 2 x 5.4
		2.5	1.6	3.5	
		2.0	2.1	4.4	
		1.5	2.9	5.9	

TABLE 6 — Capacity of Intermediate Transoms		
Transom Length (m)	allow. q (kN/m)	allow. P (kN)
0.7	20.6	7.2
1.0	10.1	5.0
1.5	4.5	3.3
2.0	2.5	2.5
2.5	1.6	2.0
3.0	1.1	1.6

6 Decks & Steel Scaffold Boards

TABLE 7 — Capacity of Decks					
Type	Steel, 0.30m Wide	Steel, 0.20m Wide	Aluminium, 0.30m Wide	Aluminium, 0.60m Wide	Aluminium / Timber, 0.60m Wide
Length (m)	kN/m²	kN/m²	kN/m²	kN/m²	kN/m²
3.0	6.0	6.0	3.0	2.0	2.0
2.5	6.0	6.0	3.0	4.5	4.5
2.0	6.0	6.0	3.0	-	4.5
1.5	6.0	6.0	-	-	4.5
1.3	6.0	6.0	-	-	-
1.0	6.0	6.0	-	-	-
0.7	6.0	6.0	-	-	-

TABLE 8 — Capacity of Steel Scaffold Boards			
Type	0.3m Wide	0.2m Wide	Point Load
Length (m)	kN/m²	kN/m²	kN
3.0	2.0	2.0	1.5
2.5	3.0	3.0	3.0
2.0	6.0	6.0	3.0
1.5	6.0	6.0	3.0
1.0	6.0	6.0	3.0
0.7	6.0	6.0	3.0

7 Console (Hop-Up) Brackets

TABLE 9 — Capacity of Console Hop-Up Brackets			
Type	Uniformly Distributed Load	Point Load to Outer Wedge Head	Centre Point Load
	kN	kN	kN
0.22m Coupler	7.2	3.6	7.2
0.4m Lite	7.7	3.4	3.4
0.4m Reinforced	11.2	5.5	10.6
0.7m Reinforced	8.1	3.6	8.3
1.0m Reinforced	8.3	8.3	6.6

8 Galvanised Wedge Head Beams

Summary of total distributed loads on the top chord of the beam according to lacing length and beam length.

TABLE 10 — Capacity of Galvanised Steel Wedge Head Beams									
Length (m)	Tie Chord Centres								
	None	1.00m	1.25m	1.50m	2.00m	2.50m	3.00m	3.50m	4.00m
UDL	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m
10.0	-	2.5	-	-	1.1	0.8	-	-	-
9.0	-	3.1	-	2.1	-	-	0.6	-	-
8.0	-	4.1	-	-	2.9	-	-	-	0.9
7.0	-	4.8	-	-	3.8	-	-	2.0	-
6.0	-	5.8	-	4.2	-	-	2.4	-	-
5.0	-	-	7.30	-	-	4.7	-	-	-
4.0	5.0	-	-	-	9.4	-	-	-	-
3.0	13.1	-	-	-	-	-	-	-	-
2.5	15.7	-	-	-	-	-	-	-	-
CPL	kN	kN	kN	kN	kN	kN	kN	kN	kN
10.0	-	12.8	-	-	5.8	4.3	-	-	-
9.0	-	14.4	-	10.3	-	-	3.4	-	-
8.0	-	16.7	-	-	11.5	-	-	-	3.5
7.0	-	17.7	-	-	15.3	-	-	8.1	-
6.0	-	21.3	-	15.6	-	-	8.7	-	-
5.0	-	-	20.2	-	-	15.0	-	-	-
4.0	14.7	-	-	-	24.8	-	-	-	-
3.0	23.4	-	-	-	-	-	-	-	-
2.5	26.3	-	-	-	-	-	-	-	-

UDL = Uniformly Distributed Load; CPL = Centre Point Load
Elastic limit guaranteed: 320N/mm^2; Max shear load: 25kN; Max bending moment: 32.3kNm.

9 Rosette Coupler

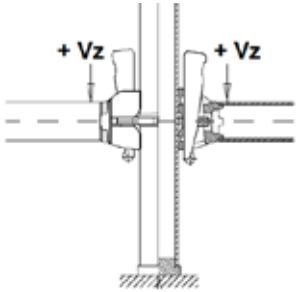
The rosette coupler is suitable to transfer longitudinal forces as well as vertical and / or horizontal shear forces into scaffolding tubes or vertical standards.

Maximum torque in the link between the coupler and the 48.3mm tube is limited to 50 Nm.

The stated safe working loads can be transferred from the connected component via the rosette coupler to the standard. It is in this case, not relevant whether the component is connected to either the big or small hole.

The longitudinal force N is a tensile or compressive force in opposite ledgers. Only the tensile force is critical.

Allowable N = + 20.00kN



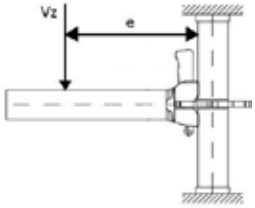
The vertical shear force Vz represents the reactive force for transoms. The max. allowable shear force for a single ledger or transom is:

Allowable Vz = ± 8.00kN

This value is also valid for a side bracket connected at one side.

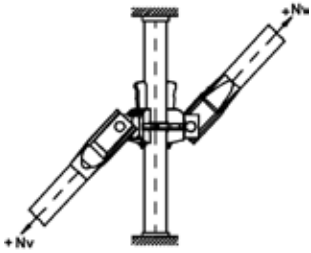
The sum of the vertical shear forces transferred by several components into one rosette may not exceed:

Allowable ΣVz = ±16.00kN



Using small ledgers as brackets a bending moment as well as a shear force has to be transferred ($M=V_z*e$)

Allowable M = 0.56kNm
Allowable Vz ≤ 7.00kN



The vertical braces are reinforce the scaffolding and determine significantly its load bearing capacity. In case of a connection to a rosette coupler the following loads may be considered for either compressive or tensile loading.

Allowable Nv = ± 5.00kN

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