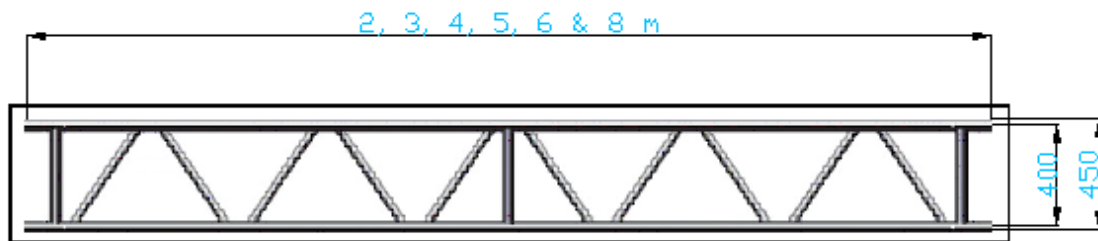
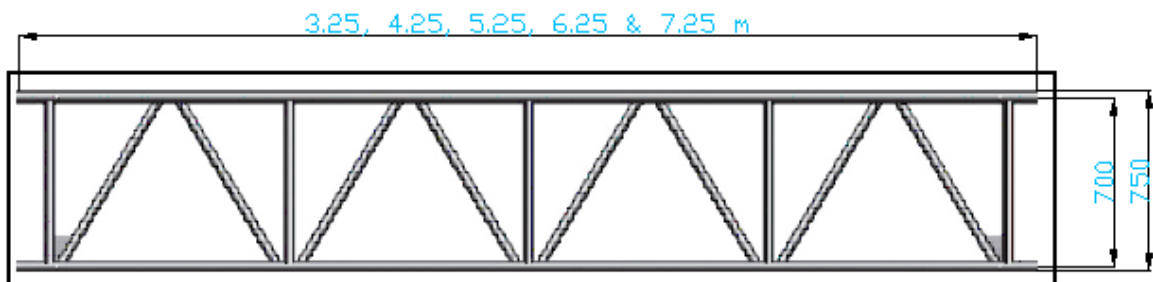


## Layher Aluminium Lattice Beams

### Information and User Guide



**Aluminium Lattice Beam 450 (Product Code 4902XXX)**



**Aluminium Lattice Beam 750 (Product Code 4903XXX)**

## Table of Contents

	Page
1 Introduction	2
2 General description	2
3 Coupler connections	2
4 Beam Bracing	2
5 Spigot connection	4
6 Methods for application of load and end supports	4
7 Permissible load capacity of beams	5
8 Permissible load capacity of couplers	7
9 Compliance of couplers	8
10 Extract from Layher Scaffolding Accessories Catalogue	9

### Copyright

All pictures, images and data of this Layher Aluminium Lattice Beams Information and User Guide are property of the company Wilhelm Layher GmbH & Co.KG, D-74363 Guglingen-Eibensbach, Germany; phone \*49 – 7135 - 70 233, Fax \*49 – 7135 – 70 372. [www.layher.com](http://www.layher.com)

They are furthermore protected according to the German copyright law. Copying, hiring or lending of these media to third parties is not permitted without the prior written permission of Wilhelm Layher GmbH & Co.KG.

The usage of this document and its contents is only allowed in connection with the sale of products produced by Wilhelm Layher GmbH & Co.KG.

If used, the document including all pictures and information must clearly indicate the origin and must refer to Wilhelm Layher GmbH & Co.KG.

## 1. Introduction

This document is intended as a quick reference guide and is to be read in conjunction with the **Layher Allround Instructions for Assembly and Use (Australia)**.

This guide is for original Layher aluminium lattice beams only. Separate information on Layher's steel lattice beams is available from your local Layher representative.

*It is strongly recommended that all calculations based on the technical information presented in this guide be independently verified and checked by a qualified person such as an Engineer.*

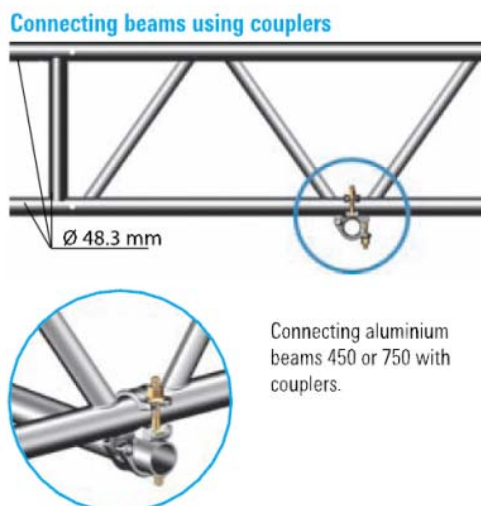
**The values in the below tables are base values only and are only for beams in a Simply Supported configuration. To achieve greater loads and spans, or obtain values for different beam configurations please contact your local Layher representative or a qualified engineer.**

## 2. General description

The top and bottom chords and the verticals of Layher aluminium lattice beams are made from 48.3mm diameter tube with thicknesses of 4.0mm for the 450 deep beams, and 4.5mm for the 750 deep beams, with oval sections for the diagonals. Beam lengths are generally at 1m increments up to 8m and sections can be joined together with 38mm diameter spigot connectors and 4 x M12 bolts.

## 3. Coupler connections

The spacing of the diagonals on the lattice girders allows for connection of couplers to the top and bottom chords everywhere except where the verticals and diagonals meet. In these cases, the couplers can be connected to the vertical members.

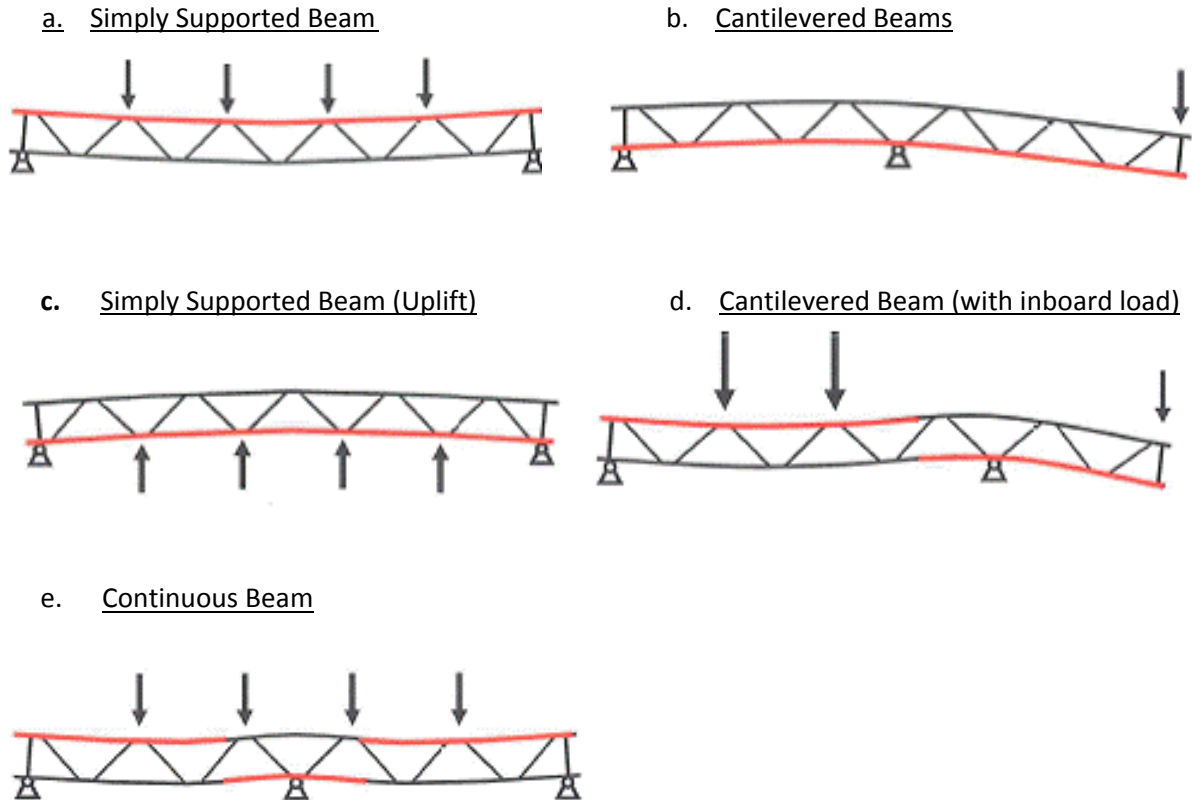


## 4. Beam Bracing

When the beam is spanning between two supports and the load is applied downwards, the compression chord is on the top. When load is upwards (predominantly wind uplift or cantilevers) the compression chord is on the bottom. See the following diagrams for a clearer explanation of how the compression chord changes from configuration to configuration.

## Beam Configurations

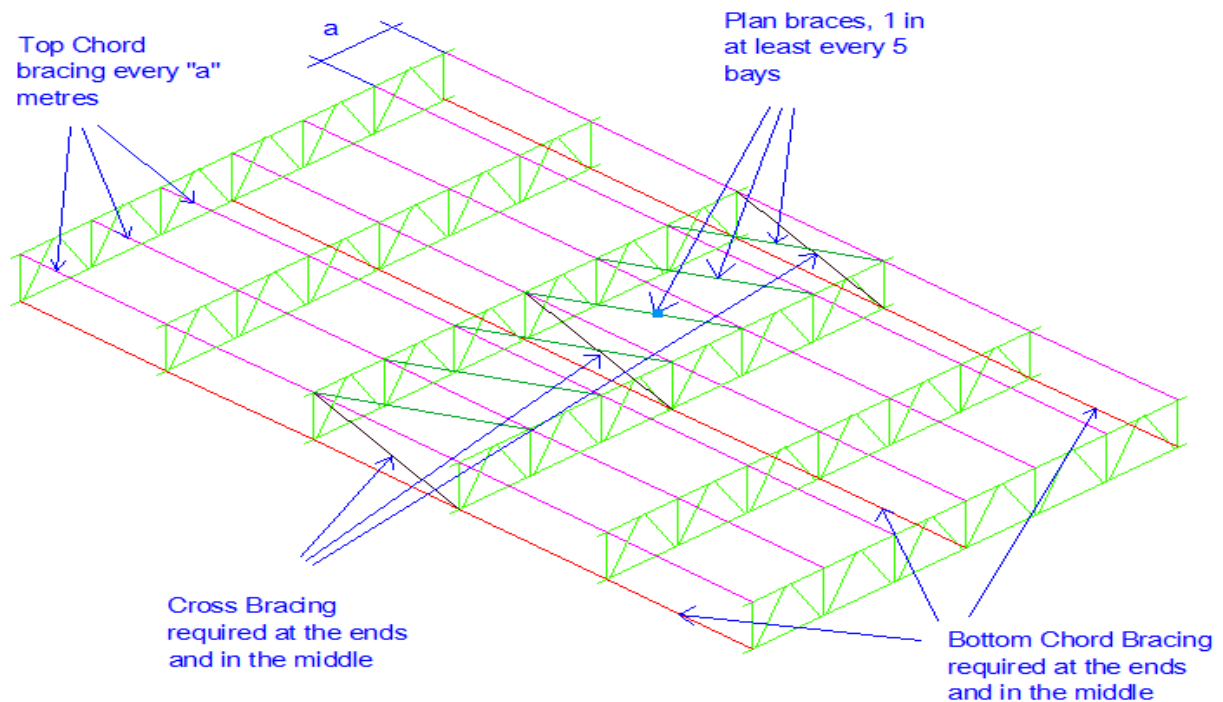
The chord highlighted in red is the compression chord.



When bracing the Layher beams, it is important to brace the compression chord perpendicularly (chord to chord bracing) and diagonally (plan bracing) as well as tying the beams together with fly-bracings and tension chord bracing to stop the beams from twisting. This means that with some beam configurations when the compression chord changes from top to bottom chord along the span at different places, such as in continuous beams, both the top and bottom chords need the chord to chord bracing and the plan bracing. For more information regarding the bracing of the different beam configurations please contact your Layher representative or a qualified engineer.

Warning: Incorrectly or inappropriately fitted beam bracing reduces the load bearing capacity and stability of the scaffolding structure significantly and can lead to its collapse.

The bracing arrangement below is for a Simply Supported Beam configuration with the load applied downwards.



As shown in the above diagram, bracing should always be installed to the beams, primarily to (or adjacent to) the top and bottom chords. The compression chord should be braced in accordance with the loading requirements from the following tables, up to a maximum spacing of 2m (for beams greater than 3m long), with tension chord bracing and cross bracing at the ends and in the middle of the span. For beams of a length 4m or less the middle cross brace is not required. Plan bracing should also be installed to either the vertical struts of the beam near to the chord bracing or to the chord bracing itself. For bracing of other beam configurations please contact Layher.

### 5. Spigot connection

The spigot to use in the spigot connection of both the aluminium lattice beam 450 and the aluminium lattice beam 750 is the Layher Unit beam spigot T4 (Product code 4922000) and 4 x Layher M12 bolts and nuts (Product code 4905060) or alternatively with 4 x Layher Lattice beam hinged pins dia. 12mm (Product code 4905555).

The permissible tension forces of the spigot connections are high enough for the safe transfer of the loads that occur during the stated permissible bending moments of the lattice beams.

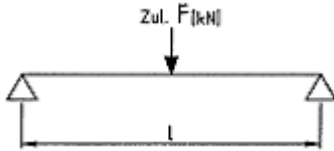
Permissible tension forces in the spigot connection of the 450mm Aluminium lattice beam:	39.1 kN
Permissible tension forces in the spigot connection of the 750mm Aluminium lattice beam:	49.1 kN

### 6. Methods for application of load and end support

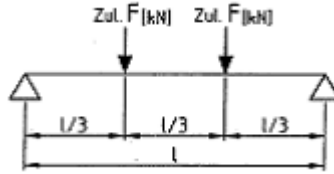
Preferably the beams shall be supported by both its top and bottom chords. Supporting the beam in any other way seriously reduces the capacity and could lead to localised damage of the beam.

## 7. Permissible load capacity of beams

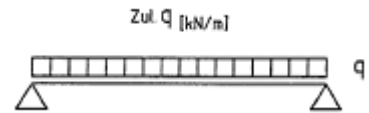
a. Central Point Load



b. Point load at third points



c. UDL



The values in the below tables are base values only and are only for beams in a Simply Supported configuration. To achieve greater loads and spans, or obtain values for different beam configurations please contact your local Layher representative or a qualified engineer.

### 450 Aluminium Beam

Material: Alloy 6082T5

Self Weight: 0.05kN/m

E: 70,000N/mm<sup>2</sup>

I: 4,481.00 cm<sup>4</sup>

Maximum Shear: 9.0kN

Maximum Moment: 13.2kNm

At 1m Bracing: 13.2kNm

At 2m Bracing: 6.2kNm

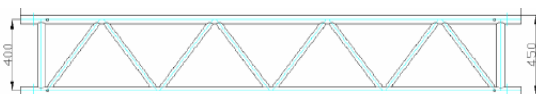


Image: Layher aluminium lattice beam 450

Length	Top chord bracing intervals	Central Point Load	Point Load at Third Points	UDL
l(m)	a [m]	(kN)	(kN)	(kN/m)
3	1.0	<b>13.29</b>	<b>6.30</b>	<b>5.35</b>
	1.5			
	3.0			
4	1.0	<b>11.14</b>	<b>5.89</b>	<b>3.63</b>
	1.3			
	2.0			
5	1.0	<b>10.78</b>	<b>6.80</b>	<b>2.99</b>
	1.65			
	2.5			
6	1.0	<b>8.65</b>	<b>6.09</b>	<b>2.33</b>
	1.5			
	2.0			
7 (3+4)	1.0	<b>3.65</b>	<b>5.18</b>	<b>1.83</b>
	1.4			
	1.75			
8	1.0	<b>6.36</b>	<b>4.54</b>	<b>1.56</b>
	1.6			
	2.0			

Caution: Layher aluminium lattice beams CANNOT be used as anchor points for fall arrest systems according to loads specified in AS/NZS 1891.4:2009.

**The values in the below tables are base values only and are only for beams in a Simply Supported configuration. To achieve greater loads and spans, or obtain values for different beam configurations please contact your local Layher representative or a qualified engineer.**

### 750 Aluminium Beam

Material: Alloy 6082T6

Self Weight: 0.06kN/m

E: 70,000N/mm<sup>2</sup>

I: 15,195.00 cm<sup>4</sup>

Maximum Shear: 14.4kN

Maximum Moment:

At 1m Bracing: 24.5kNm

At 2m Bracing: 12.0kNm

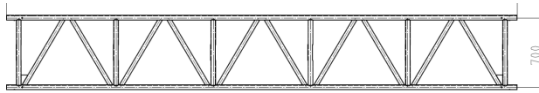


Image: Layher aluminium lattice beam 750  
(in "A" Arrangement)

Length	Top chord bracing intervals	Central Point Load	Point Load at Third Points	UDL
l(m)	a [m]	(kN)	(kN)	(kNm)
3.25	1.0	<b>18.00</b>	<b>10.90</b>	<b>8.97</b>
	3.0	<b>11.00</b>	<b>7.75</b>	<b>6.72</b>
4.25	1.0	<b>15.80</b>	<b>9.18</b>	<b>6.42</b>
	2.0	<b>11.70</b>	<b>8.43</b>	<b>5.54</b>
5.25	1.0	<b>14.80</b>	<b>8.60</b>	<b>5.00</b>
	2.0	<b>13.40</b>	<b>8.01</b>	<b>5.00</b>
6.25	1.0	<b>12.80</b>	<b>8.85</b>	<b>4.04</b>
	2.0	<b>7.13</b>	<b>5.23</b>	<b>2.30</b>
7.25	1.0	<b>13.30</b>	<b>7.49</b>	<b>3.30</b>
	2.0	<b>7.20</b>	<b>5.28</b>	<b>2.00</b>
8.50 (4.25+4.25)	1.0	<b>11.90</b>	<b>7.25</b>	<b>2.71</b>
	2.0	<b>4.61</b>	<b>3.05</b>	<b>1.07</b>

Caution: Layher aluminium lattice beams CANNOT be used as anchor points for fall arrest systems according to loads specified in AS/NZS 1891.4:2009.

"A" vs. "V" Arrangement:

The values in the table above for 750 aluminium beams are based on installation in "A" Arrangement. Significantly higher loads are achievable with the 750 aluminium beam in the "V" Arrangement. Please contact your Layher representative for more information.

Notes:

1. Point loads should always be applied via the top and bottom chords, or distributed over a minimum length of 280mm.
2. All values are permissible with a loading factor of safety of 1.5, and take into account the self weight of the beams and bracing components.
3. When multiple beams are joined by spigots to span a distance in a dance floor scenario, the joints should be staggered in order to achieve more uniform deflections within the structure.
4. Appropriate couplers are to be used to apply the load and to attach the beams to the supporting structure.
5. Vertical load application should be avoided to spigot connections and additional load distribution should be used.
6. These load tables should be read in conjunction with Layher Instructions for Assembly and Use (Australia).

## 8. Permissible load capacity of couplers

Layher Couplers, Layher Swivel couplers and Layher Sleeve couplers have received certification of compliance with EN74-1:2005-12. The characteristic values of resistance for these couplers are shown in table C1 of EN 12811-1:2003 and apply for connection to both steel and aluminium tubes. These figures should be divided by 1.65 to achieve safe working loads.

Coupler Type	Resistance	Characteristic Values of Resistance			
		Class A	Class B	Class AA	Class BB
Double Coupler (RA)	Slipping Force $F_{S,K}$ in kN	10.0	15.0	15.0	25.0
	Swivel Angle Torque $M_{B,K}$ in kNm	-	0.8		
	Head tear off force $F_{P,K}$ in kN	20.0	30.0		
	Moment of Torque $M_{T,K}$ in kNm	-	0.13		
Swivel Coupler (SW)	Slipping Force $F_{S,K}$ in kN	10.0	15.0		
Joint Coupler with Friction Fit (SF)	Slipping Force $F_{S,K}$ in kN	6.0	9.0		
	Bending Torque $M_{B,K}$ in kNm	-	1.4		

NB: For the above values to apply couplers need to be fastened with a torque of 50 Nm  $\pm$  10%.

Layher double couplers:

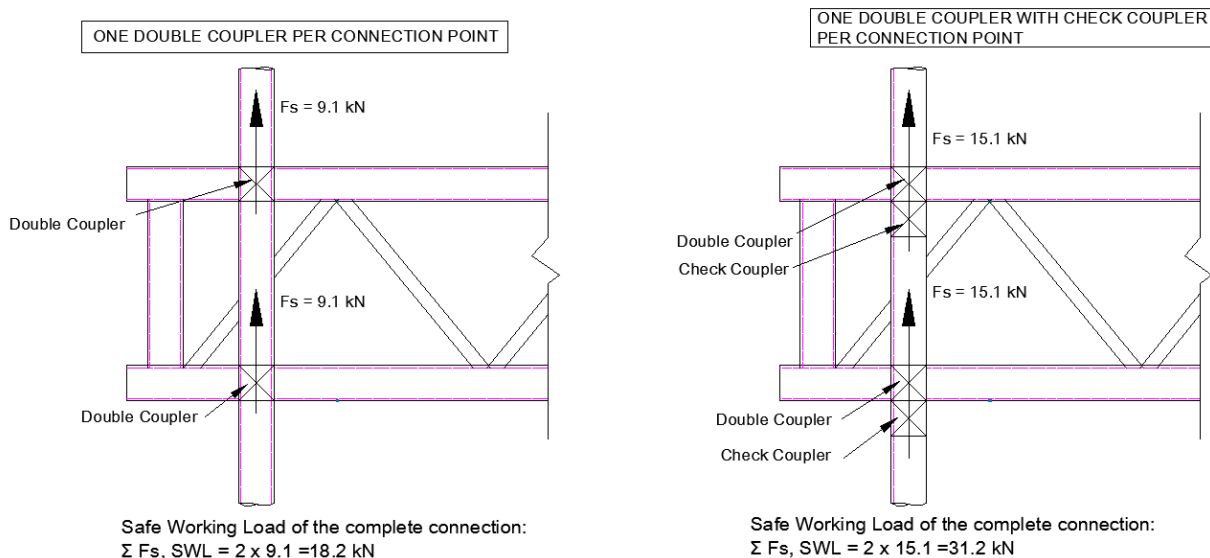
Layher Double couplers have been certified as Class BB couplers. If a Class BB coupler is used as a single coupler, then values of Class B apply.

Safe working load of slipping force:  $F_{S,SWL} = 9.1\text{kN}$  ( $F_{S,K} = 15.0\text{kN}$ )

The slipping force of Class BB applies when the Layher double coupler is used in conjunction with a check coupler.

Safe working load of slipping force:  $F_{S,SWL} = 15.1\text{kN}$  ( $F_{S,K} = 25.0\text{kN}$ )

Example - end support of an Aluminium Lattice beam by Layher double and check couplers:





## 9. Compliance of Layher couplers

AS/NZS 1576.2-2009 Scaffolding – Couplers and Accessories, Section 1 Compliance with International Standards, states the following:

“Couplers that have been tested and have demonstrated compliance with the performance requirements of BS EN 74-1:2005 for Class B right angle couplers and Class A swivel couplers, where these requirements are equivalent to the performance requirements of this Standard, are deemed to comply with this Standard and do not require further testing. Such couplers may not comply with dimensional requirements of this Standard and shall be assessed against these requirements before they are deemed acceptable.”

Layher couplers have received certification of compliance with BS EN74-1 and as per the above extract from AS/NZS 1576.2-2009 do not require any further testing.



A requirement of EN 74-1, clause 10 is to identify complying couplers with embossed lettering of which all Layher couplers have received.

Image: Embossment of a Layher double coupler

## Lattice girders, lattice girder connectors

The lattice girders Ref. Nos. 4912, 4922, 4902 and 4903 are connected to one another with **lattice girder connectors T4 dia. 38 mm** Ref. No. 4922 and **lattice girder bolts dia. 12 x 65 mm**, Ref. No. 4905.065, with **safety clip 2.8 mm**, Ref. No. 4905.000 or **special bolt M 12 x 60, with nut**, Ref. No. 4905.060.

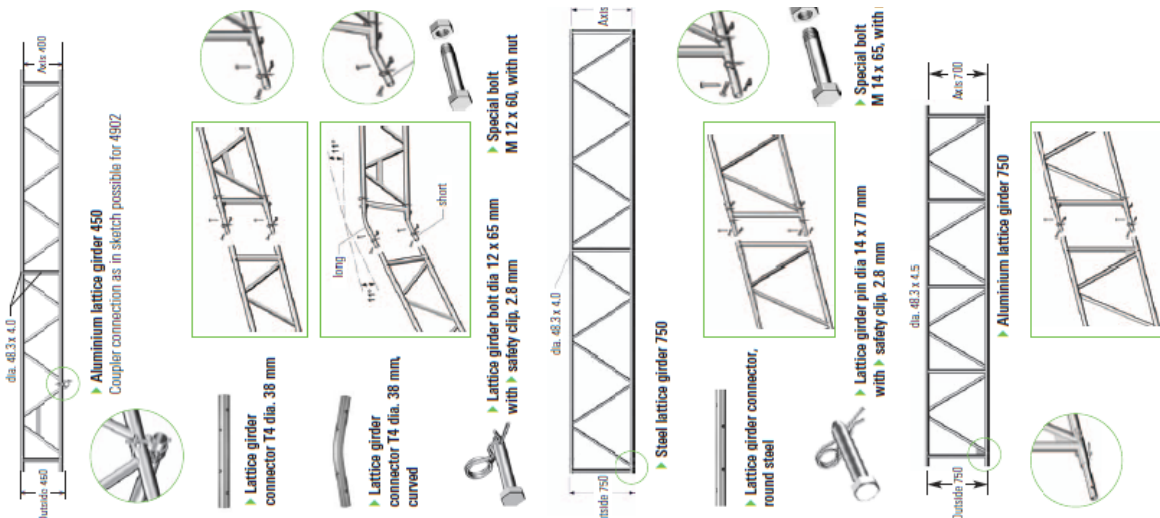
For lattice girders 4912, 4922, 4902 and 4906 the following applies: the standard lengths are extended using lattice girder connectors. Loading tables available on request.

In conjunction with the **lattice girder connectors T4 dia. 38 mm**, curved and standard lattice girders, 45 cm high, made from aluminium or steel, double-pitch roof structures (roof pitch 11°) can be built. See the Price List for the Layher Tarpsulin Roof System.

**Steel lattice girders 750**, 75 cm high, of steel design, are used to support high loads or to bridge wider spans. Loading tables available on request.

The heavy-duty lattice girders Ref. No. 4906 are connected to one another with **lattice girder connectors, round steel** Ref. No. 4916.000 and **lattice girder bolts dia. 14 x 77 mm**, Ref. No. 5906.077, with **safety clip 2.8 mm**, or **special bolts M 14 x 65 mm, with nut**, Ref. No. 4906.065.

The **aluminium lattice girder 750** is the lighter alternative for supporting higher loads or for bridging wider spans. Loading tables available on request.



Description	Dimensions L/H x W (m)	Weight approx. (kg)	PU (pcs.)	Ref. No.
<ul style="list-style-type: none"> <li>Aluminium lattice girder 450, 45 cm high, aluminium, more than 30 % weight saving compared to steel</li> <li>2.0 m long, with type approval</li> <li>3.0 m long, with type approval</li> <li>4.0 m long, with type approval</li> <li>5.0 m long, with type approval</li> <li>6.0 m long, with type approval</li> <li>8.0 m long, with type approval</li> </ul>	<ul style="list-style-type: none"> <li>2.0 x 0.45</li> <li>3.0 x 0.45</li> <li>4.0 x 0.45</li> <li>5.0 x 0.45</li> <li>6.0 x 0.45</li> <li>8.0 x 0.45</li> </ul>	<ul style="list-style-type: none"> <li>8.5</li> <li>13.5</li> <li>17.1</li> <li>21.0</li> <li>24.9</li> <li>32.1</li> </ul>	<ul style="list-style-type: none"> <li>50</li> <li>50</li> <li>50</li> <li>50</li> <li>50</li> <li>50</li> </ul>	<ul style="list-style-type: none"> <li>4902.200</li> <li>4902.300</li> <li>4902.400</li> <li>4902.500</li> <li>4902.600</li> <li>4902.800</li> </ul>
<ul style="list-style-type: none"> <li>Lattice girder connector T4 dia. 38 mm with type testing, for straight extension of lattice girder</li> </ul>	0.44	1.3		4922.000
<ul style="list-style-type: none"> <li>Lattice girder connector T4 dia. 38 mm, curved, long for angular extension of lattice girder (45 cm high) at top chord, for double-pitch roof structures, roof pitch 11°</li> </ul>	0.62	2.6		4922.001
<ul style="list-style-type: none"> <li>Lattice girder connector T4 dia. 38 mm, curved, short for angular extension of lattice girder (45 cm high) at top chord, for double-pitch roof structures, roof pitch 11°</li> </ul>	0.49	1.3		4922.002
<ul style="list-style-type: none"> <li>Lattice girder bolt dia. 12 x 65 mm with safety clip, 2.8 mm</li> </ul>	Required: 4 pcs. each	0.07	20	4905.065
<ul style="list-style-type: none"> <li>Alternative: Special bolt M 12 x 60, with nut</li> </ul>	Required: 4 pcs. each	0.01	20	4905.000
<ul style="list-style-type: none"> <li>Alternative: Special bolt M 12 x 60, with nut</li> </ul>	Required: 4 pcs. each	0.08		4905.060
<ul style="list-style-type: none"> <li>Steel lattice girder 750, 75 cm high</li> <li>2.0 m long</li> <li>3.0 m long</li> <li>4.0 m long</li> <li>5.0 m long</li> <li>6.0 m long</li> <li>7.0 m long</li> </ul>	<ul style="list-style-type: none"> <li>2.0 x 0.75</li> <li>3.0 x 0.75</li> <li>4.0 x 0.75</li> <li>5.0 x 0.75</li> <li>6.0 x 0.75</li> <li>7.0 x 0.75</li> </ul>	<ul style="list-style-type: none"> <li>35.5</li> <li>48.5</li> <li>61.0</li> <li>78.0</li> <li>90.0</li> <li>102.5</li> </ul>	<ul style="list-style-type: none"> <li>20</li> <li>20</li> <li>20</li> <li>20</li> <li>20</li> <li>20</li> </ul>	<ul style="list-style-type: none"> <li>4906.200</li> <li>4906.300</li> <li>4906.400</li> <li>4906.500</li> <li>4906.600</li> <li>4906.700</li> </ul>
<ul style="list-style-type: none"> <li>Lattice girder connector, round steel, dia. 38 mm for extending lattice girder Ref. No. 4906</li> </ul>	0.44	3.4		4916.000
<ul style="list-style-type: none"> <li>Lattice girder pin dia. 14 x 77 mm with safety clip, 2.8 mm</li> </ul>	Required: 4 pcs. each	0.11	20	5906.077
<ul style="list-style-type: none"> <li>Alternative: Special bolt M 14 x 65, with nut</li> </ul>	Required: 4 pcs. each	0.01	20	4905.000
<ul style="list-style-type: none"> <li>Alternative: Special bolt M 14 x 65, with nut</li> </ul>	Required: 4 pcs. each	0.13	20	4906.065
<ul style="list-style-type: none"> <li>Aluminium lattice girder 750, 75 cm high, aluminium</li> <li>2.25 m long, with type approval</li> <li>3.25 m long, with type approval</li> <li>4.25 m long, with type approval</li> <li>5.25 m long, with type approval</li> <li>6.25 m long, with type approval</li> <li>7.25 m long, with type approval</li> </ul>	<ul style="list-style-type: none"> <li>2.25 x 0.75</li> <li>3.25 x 0.75</li> <li>4.25 x 0.75</li> <li>5.25 x 0.75</li> <li>6.25 x 0.75</li> <li>7.25 x 0.75</li> </ul>	<ul style="list-style-type: none"> <li>14.0</li> <li>19.5</li> <li>26.0</li> <li>32.1</li> <li>38.1</li> <li>44.2</li> </ul>	<ul style="list-style-type: none"> <li>20</li> <li>20</li> <li>20</li> <li>20</li> <li>20</li> <li>20</li> </ul>	<ul style="list-style-type: none"> <li>4903.225</li> <li>4903.325</li> <li>4903.425</li> <li>4903.525</li> <li>4903.625</li> <li>4903.725</li> </ul>

MS – mesh size PU – packaging unit  – available as work  – delivery time on request  – only available in this packaging unit