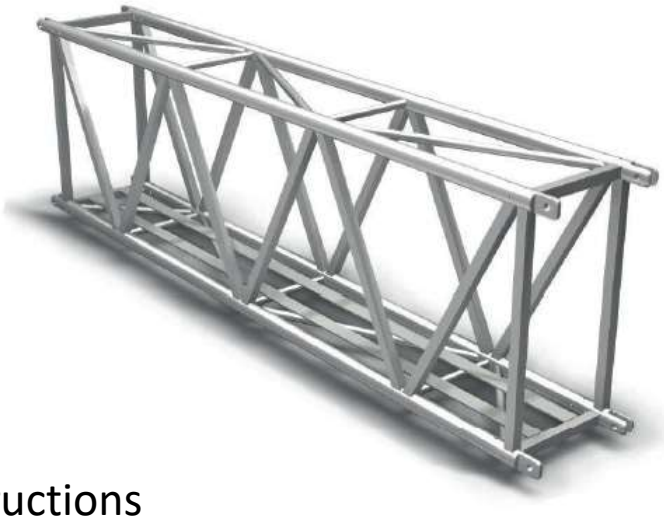
PROLYTE

Trusses

User manual

Part 1: General instructions



Original instructions

DN00163 Issue 1
April 2023

Area Four Industries

Manufacturer:

Area Four Industries s.r.o

Spindlerova 286

413 01 Roudnice and Labem

Czech Republic

Tel +420 416 810 800

If you have a warranty claim, malfunction or spare part inquiry, contact your point of sale or the manufacturer.

If you have comments or improvement ideas for this document, please contact us by using the e-mail address found on the back cover of the document. All comments and ideas will be carefully considered in the future development of the product or this document.

Contents

Change history

Issue	Date	Changes
1	July 2023	First issue.

1 Introduction

This manual is intended for truss owners, providers, skilled riggers and any person who has been trained in working safely with trusses.

This manual is Part 1 of the User Manual. The User Manual consists of the following parts:

- *Part 1: General instructions*
- *Part 2: Product-specific instructions*

This manual must be read in conjunction with *Part 2: Product-specific instructions* of the User Manual.

If there are discrepancies between *Part 1* and *Part 2*, the information given in *Part 2* is the information that applies to the product and overrides the information given in *Part 1*.

This manual assumes that you have been trained or work under the control of a competent or qualified person who has been trained in safety and assembly.

1.1 About this product

PROLYTE trusses are structural elements designed to be repeatedly assembled and disassembled to carry loads in temporary or permanent installations. Depending on the application, PROLYTE trusses can be referred to as lifting accessories or construction products. For information on the related standards, see Chapter 1.5.

We have paid special attention to product safety when designing the product.

The manufacturer is not liable for indirect consequential damage and financial loss. The manufacturer shall not be liable for any changes made to the product nor for any damage resulting from such changes.

1.2 Related information

For more information on the product, see www.prolyte.com/products/aluminium-truss.

1.3 About this manual

Before working with the product, read this manual carefully and pay attention to the information provided. Use this manual to familiarise yourself with the product, its proper use and safety regulations.

1.3.1 Safety conventions

Indicates a hazardous situation, which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations.

Indicates a hazardous situation, which, if not avoided, could result in death or serious injury.

Indicates a hazardous situation, which, if not avoided, could result in minor or moderate injury.

Indicates information considered important but not hazard-related.

1.4 Terminology

Truss modules are hereinafter referred to by the term “truss”.

Term	Definition
abrasion	Loss of material due to wear.
bent member	A component or assembly that has permanent deviation from the intended centre line.
cell clamp	Device that is used to attach loads to the truss or to connect the truss to a suspension point.
competent person	A person who is capable of identifying existing and predictable hazards in the workplace and who is authorised to take prompt corrective measures to eliminate them.
components	Parts of a whole.
conical connection	A type of connection used for connecting trusses together. See Figure 1.
conical truss pin	A pin used with a conical connection. See Figure 1.
connecting hardware	Connecting components such as straight or conical truss pins, bolts, washers and R-clips.
connector	A part of a connection.
crack	A crevice type of discontinuity in a material.
diagonal member	An element of a truss module that is not at a 90-degree angle to the main chords.
end member	An element of a truss module that is located at the end of the truss module, directly after the connector, at a 90-degree angle to the main chords.
female connector	A part of a conical connection. See Figure 1.
fork connector	A part of a pin/fork connection. See 2.
identification sticker	A sticker on the product on which several pieces of information about the product can be found.
Internal member	An element of a rectangular or square truss that connects diagonally the main chords at a 90-degree angle to the main chords.
main chord	An element of a truss that carries the forces associated with bending moments, axial forces, or combination of them.
male connector	A part of a conical and Verto connection. See Figure 1.
member	See “truss member”.
node point	A location where the centre line of the main chord intersects with the centre line of the diagonals or end braces.
ovalisation	Deformation of a circular pipe cross-section into an oval, measurable by the deviation of two outer diameters measured at a 90-degree angle to each other.
Pin/fork connection	A type of connection used for connecting trusses together. See Figure 32
pin hole	A hole in the connector that accommodates a conical or straight truss pin.
qualified person	A person who, by possession of a recognised degree or certificate of professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated the ability to solve problems relating to the subject matter or work. A qualified person supervises the competent persons. See "competent person".
R-clip	A clip used for securing a truss pin, for example. See Figure 1 and Figure 32.
repetitive use	Assembling and disassembling the same modules or assemblies on multiple occasions.

Safety clip	A clip used for securing a connection, for example. See Figure 13
shall	Indicates that a rule is mandatory and must be followed.
should	Indicates that a rule is a recommendation, the advisability of which depends on the facts and conditions in each situation.
single-span girder	A single truss module or a composition of several connected truss modules, supported at both ends of the span.
straight truss pin	A pin used with a pin/fork connector. See Figure 32.
truss member	A part of the truss module.
truss pin	A pin used for connecting trusses. See Figure 1 and Figure 32.
truss structure	An assembly made of truss modules.
truss module	Lattice structure intended to be used on its own or in combination with other modules.
user	A person or a company who assembles or uses modules or systems.
Verto connection	A type of connection used for connecting trusses together. See figure 3.

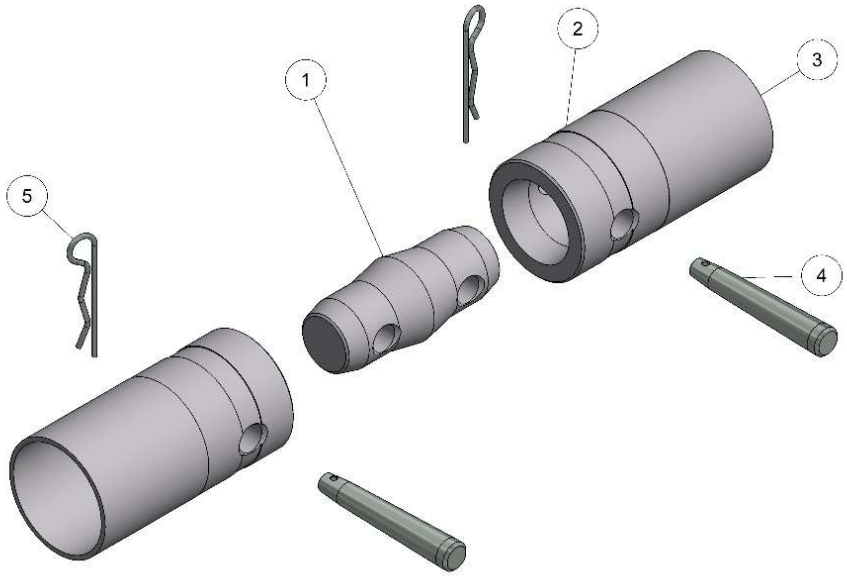


Figure 1: Conical connection

1 Male connector
2 Female connector
3 Main chord
4 Conical truss pin
5 R-clip

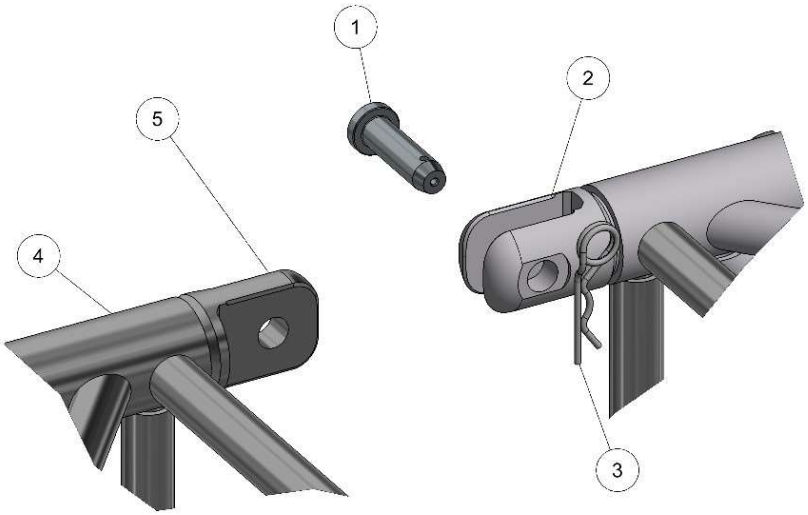


Figure 2: Pin/fork connection

1 Straight truss pin
2 Female fork connector
3 R-clip
4 Main chord
5 Male pin connector

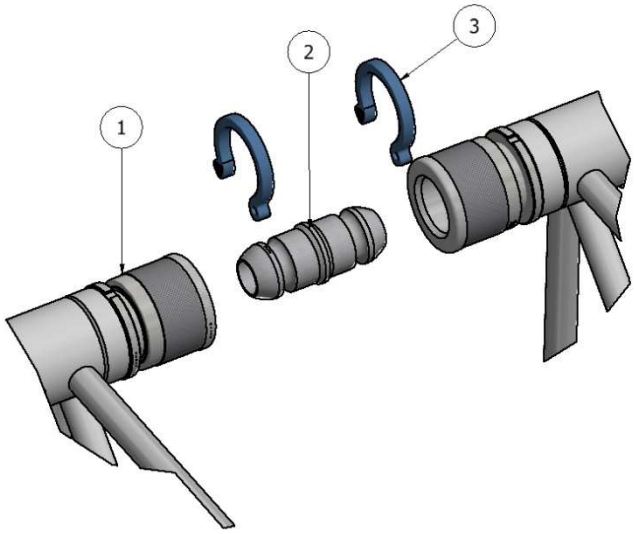


Figure 3: Verto connection

1 Female Verto connector
2 Male Verto connector
3 Safety clip

1.5 Standards

If used as lifting accessories, trusses are subject to the European Machinery Directive 2006/42/EC. If used as an integral part of a permanent structure, trusses are subject to the European Construction Product Regulation 305/2011/EC.

NOTICE

It is the sole responsibility of the owner or provider to check with the local authorities if the legislation used by Prolyte is acceptable in the country of use.

For manufacturing, the following standards are considered:

- 2006/42/EC, European Machinery Directive
- 305/2011/EC, European Construction Product Regulation
- EN 1990, Eurocode 0: Basis of structural design
- EN 1991, Eurocode 1: Actions on structures
- EN 1993, Eurocode 3: Design of steel structures
- EN 1999, Eurocode 9: Design of aluminium structures
- EN 1090-1, Execution of steel structures and aluminium structures - Part 1: Requirements for conformity assessment of structural components
- EN 1090-3, Execution of steel structures and aluminium structures - Part 3: Technical requirements for aluminium structures
- ANSI E1.2-2006, Entertainment Technology: Design, Manufacture and Use of Aluminium Trusses and Towers
- EN 17115: 2018, Entertainment technology - Specifications for design and manufacture of aluminium and steel trusses
- EN ISO 10042:2006, Arc welded joints in aluminium and its weldable alloys - Quality levels for imperfections
- EN ISO 3834-1 & 3, Quality requirements for welding - Fusion welding of metallic materials - Part 1: Guidelines for selection and use Part 3: Standard quality requirements
- EN 754 (all parts), Aluminium and aluminium alloys - Cold drawn rod/bar and tube
- EN 755 (all parts), Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles
- EN 515:2017, Aluminium and aluminium alloys - Wrought products - Temper designations
- EN 573 (all parts), Aluminium and aluminium alloys - Chemical composition and form of wrought products
- EN 10204:2004, Metallic products - Types of inspection documents

2 Safety

NOTICE

Read these safety texts carefully before working with the product.

NOTICE

Make sure manuals are available at all times for all users and employees.

Truss data published before October 2015 was based on calculations according to the German DIN 4113 standard, while truss data published after this date are based on the Eurocode EN1999. Due to a different safety principle in each standard, data such as allowable bending moment, shear force and normal force cannot be compared.

WARNING

. Do not mix structural data (such as bending moment, shear force and normal force) calculated according to different standards as they base on different safety principle.

WARNING

Be cautious when using data of structures based on Load and Resistance Factor Design (LRFD) standards, such as Eurocodes or data based on Allowable Stress Design (ASD). A structural engineer can provide help.

Trusses and structures from assembled trusses shall always be checked for their structural stability and strength by a structural engineer. The provided technical specifications should never be exceeded.

WARNING

Do not use damaged or malfunctioning parts.

WARNING

Mark any damaged or worn material clearly and discard the material immediately.

2.1 Electrical safety

2.1.1 Electrical potential bonding

WARNING

ELECTRICAL HAZARD

Truss structures that are in contact with electrical equipment might develop dangerous touch voltages in the event of an electrical fault. Before energising any of the electrical equipment, the user must ensure that the truss structure is properly earthed. This applies to all elements made of electroconductive material that have equipment placed on or attached to them, or across wire and cable runs that, if damaged, could make electrical contact with metal parts.

It is extremely important to earth the truss structures because the audience and installers very often come into direct contact with the truss structures when the suspended fixtures are electrically charged.

2.2 Personal protection equipment

For health and safety reasons, people moving, assembling, disassembling, maintaining or transporting the product should wear adequate Personal Protection Equipment such as, but not limited to, gloves, sound protection, hard hats and safety shoes.

All people working with trusses should be instructed and informed about the correct usage and possible dangers before use.

WARNING

PERSONAL INJURY HAZARD

Always wear hard hats, safety shoes, sound protection, and protective gloves when moving, assembling, disassembling, maintaining or transporting the product.

WARNING

PERSONAL INJURY HAZARD

Follow your local noise level regulations when assembling and disassembling the product.

WARNING

PERSONAL INJURY HAZARD

Follow your local regulations of the maximum allowed weight per person when carrying or moving the product.

3 Limitations of use

The truss shall always be used within the limits of the structural report and the declarations provided.

All our trusses are calculated according to the Eurocode 9 (DIN-EN 1999) standard. Eurocodes are standards based on Load and Resistance Factor Design (LRFD).

WARNING

The structural data provided before January 2016 was based on the German DIN 4113 standard. As this standard had a different safety principle, the structural values cannot be compared.

NOTICE

TÜV certificates issued after February 2015 are all based on Eurocode 9.

PROLYTE trusses described in this manual are not specifically designed for lifting people. Adequate load reduction and safety precautions, according to local legislation, must be considered when people are lifted.

Use the product only for its prescribed purpose. Any use other than that mentioned is considered to be a case of misuse. The user or operator and not the manufacturer shall be liable for any damage or injury resulting from such cases of misuse.

3.1 Load charts

All truss loading calculations and TÜV certifications are based on the following:

- The self-weight is already considered
- Static loads only
- Single-span girders (all other structures made of trusses need dedicated structural reports)
- Loads applied in the node points
- Spans can be assembled of several modules
- The interaction of shear force and bending moment at the connector is considered
- Considered safety factors: self-weight 1.35 / variable load 1.5

3.2 Load reduction factor for repetitive use

See *Part 2: Product-specific instructions* to find out if a load reduction factor for repetitive use needs to be taken into account to meet the BS 7905-2, ANSI E1.2-2006 and EN 17115 standards for truss elements in repetitive use. According to these standards, all loadings shall or should (depends on the standard) be multiplied by 0.85.

The truss calculations consider only static or virtual-static loads and no fatigue loads due to a high number of load cycles.

3.3 Compatibility with other products

. PROLYTE explicitly states that PROLYTE trusses may not be connected to the trusses or associated structural components of any other manufacturer in one span.

Truss elements from Prolyte, like the H30V, which have a redesigned main chord 48,1x3,05mm, are allowed to be connected with truss elements with the round48x3mm main chord in one span since they have the same characteristics.

3.4 Environmental influences

3.4.1 Temperature

Trusses can be used in environmental conditions varying from -20°C up to +80°C. However, take special care if trusses are used in temperatures below 0°C.

The open heel of the welds and capillary action of pin holes on some of our truss models can cause water intrusion inside the truss chords and diagonals.

In temperatures below 0°C, the captive water may freeze and cause damage to the truss members.

To avoid this situation, PROLYTE can provide the same trusses with drainage holes.

3.4.2 Aggressive environments

Take special care when trusses are used in aggressive environments or in the near vicinity. The aluminium alloys used in trusses might not be suitable for this environment.

Avoid direct contact with concrete by using a sealant.

The alloy used has good properties in a salt water environment, however, oxidation can occur on the surface. Clean regularly with fresh water or with a dedicated protection product.

The material used for the connectors is especially vulnerable to salt water. Anodise, coat or treat it with a sealant in such a way that no salt water particles can come in contact with the material.

4 Transport, handling and storage

PERSONAL INJURY HAZARD

Always wear hard hats, safety shoes, sound protection, and protective gloves when moving, assembling, disassembling, maintaining or transporting the product.

PERSONAL INJURY HAZARD

Vertical transportation or storage of the product can be hazardous for reasons of falling.

Handle the product with care. Do not drop it or drag it around. Do not throw truss modules on top of each other. Prevent damage from sharp edges such as the forks of a forklift.

Dedicated dollies can be a highly effective means for transportation and storage, while providing large truss elements or sections with some extra protection.

Make sure the product cannot move or shake during transport. The abrasive motion of moving or shaking can lead to severe damage.

5 Identification

PROLYTE products can be recognised by identification stickers.

⚠ CAUTION

Make sure only PROLYTEriginal components are used. For more information, contact your distributor or the manufacturer.

NOTICE

There is always an identification sticker delivered with the product. Replace any missing identification stickers. Contact the manufacturer or its representative for information on the correct procedure.

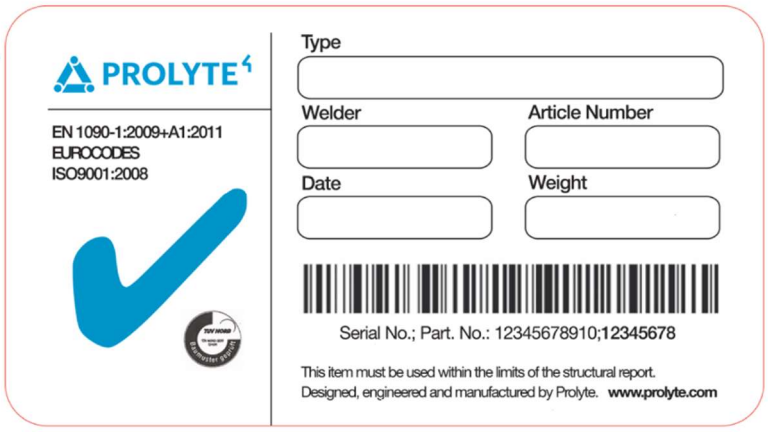


Figure 4: Example of an identification sticker (without product info)

6 Technical specifications

For information on technical specifications, see *Part 2: Product-specific instructions*.

7 Load capacity

For information on load capacity, see *Part 2: Product-specific instructions*.

8 Approved accessories

For a complete overview of approved accessories, see our brochures or www.prolyte.com.

WARNING

By using excessive force when tightening accessories such as lamp hooks or cell clamps, you may cause damage to the truss chords.

CAUTION

Pay special attention when using lamp hooks or cell clamps. Their inside radius may not meet the tube they need to be attached to. This can lead to severe damage.

NOTICE

You should never allow accessories to damage other products.

9 Coatings and surface treatments

Coatings and surface finishes should only be applied after consulting with the coating or finish manufacturer or other party qualified to evaluate the possible effects of the coating or surface finish on the structural properties and load bearing capabilities of the truss.

Powder coating is allowed with max. 180°C (356°F) for up to 20 minutes. If it is necessary to renew the powder coating, coordinate the process with PROLYTE.

Records should be kept detailing the application of any coating or surface finish, with particular attention to processes requiring the application of heat.

Chemical removal of coatings and surface finishes shall be carried out only after consulting with the chemical manufacturer to ensure that the chemical will not affect the mechanical properties of the aluminium.

Abrasive blasting should not be used, because it can cause loss of material.

10 Slinging methods

The load capacities listed in the load tables refer to truss that is loaded and suspended or supported under optimum conditions. Since the method of attachment can generate local stress that reduces the global strength, it is important to use the correct slinging method, especially with high payloads.

It is therefore recommended that you pay attention to the following points when slinging:

- Make sure the attachment point is in the node of the diagonal or end brace with the main chord or directly next to it.
- Make sure the hanging point is above the centre of gravity of the truss.
- Minimise the horizontal compression of the main chords by choosing the correct slinging positions and avoiding flat bridle angles.

WARNING

Apply slinging solely to the main chords, not to the connectors, diagonals or internal diagonals.

WARNING

Apply slinging to node points, aside end braces or aside horizontal cross braces.

NOTICE

Slinging equipment shall be made from non-abrasive and fire-retardant materials.

Use slinging devices that have a soft cover.

Direct contact between a steel wire rope and the truss chord should be avoided because of the abrasive surface of the steel wire rope.

For stability reasons, wrap at least 2 main chords.

Trusses can be suspended from either the top or bottom chords. The best method depends on the application.

NOTICE

Suspending and supporting have the same effect on the truss.

If the truss is not supported or loaded in the node point, the main chords will be subjected to an additional local bending moment. This effect should be considered in the structural analysis and could lead to reduction of the load capacity.

For a simple supported span at both ends, this might be less of a problem as the bending moment at the ends is almost zero.

In a multiple supported truss, the main chords at the mid-span supports are subjected to a bending moment and shear at the same time.

For optimum performance, suspensions should be attached to the node points. If not, the load capacity of the truss might be substantially reduced. Slinging to all main chords does not change this. The correct load can only be determined by studying each load case individually. This should be done by a structural engineer.

10.1 Recommended slinging methods

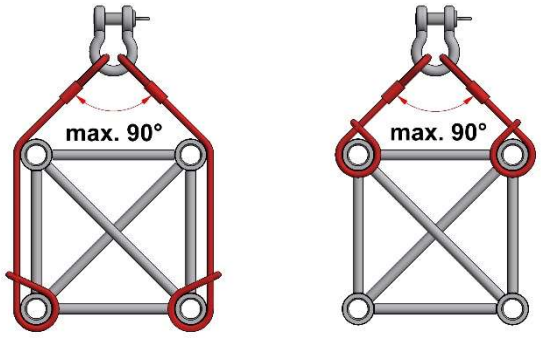


Figure 5: Slinging methods for PROLYTE square and rectangular trusses

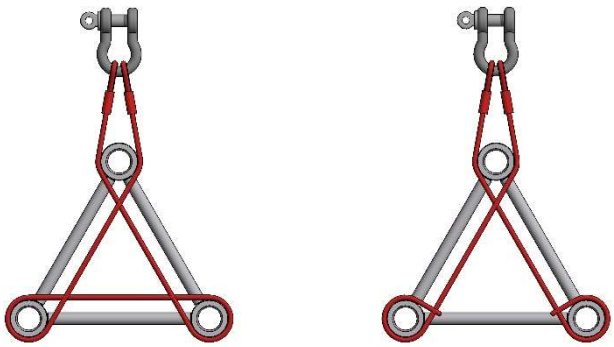


Figure 6: Slinging methods for PROLYTE triangular trusses

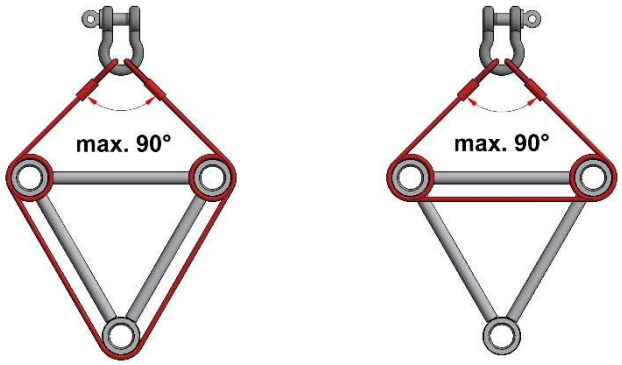


Figure 7: More slinging methods for PROLYTE triangular trusses

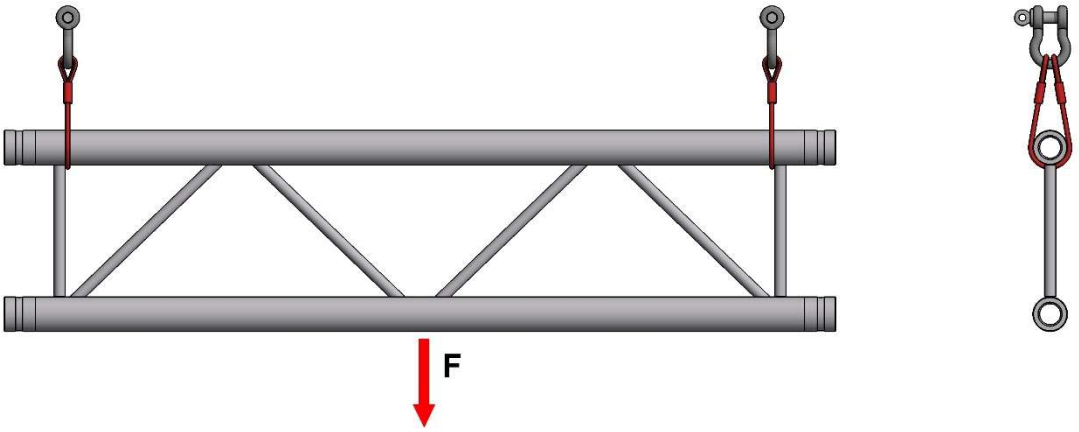


Figure 8: Ladder truss pick-up

NOTE: Ladder truss pick-up should only be done from the top chord.

⚠ CAUTION

Ladder trusses need very special attention when slinging. The top chord must be stabilised because of risk of lateral torsional buckling. Only load the bottom chord. Other types of loading need structural analysis before use.

11 Assembly and disassembly

11.1 Safety when assembling and disassembling

A competent person or sufficiently instructed personnel under the supervision of a competent person, should always assemble the product.

Before assembly, use, and disassembly, the competent person is responsible for, but not limited to:

- Carrying out all the instructions as described in this manual and in the specific instructions of the applicable truss product.
- Instructing the people doing the assembly and ensuring that all trusses and loads are suspended correctly.

You are strongly advised to show people carrying out the assembly or disassembly and how to orientate connectors and which tools to use.

11.2 Before you start

With trusses that have conical connectors, you can only place the pin from the outside inwards. Make sure that the conical hole in the connector is correctly placed, in other words, that the larger side of the hole faces outwards.

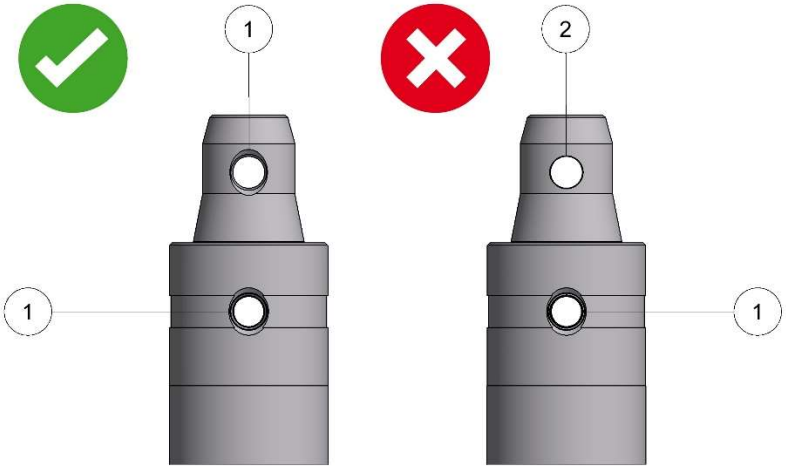


Figure 9: Holes in conical connectors

1 Large hole
2 Small hole

When two trusses with conical connectors are assembled, you can see a gap between them. This is done on purpose and has no negative influence on strength and function.

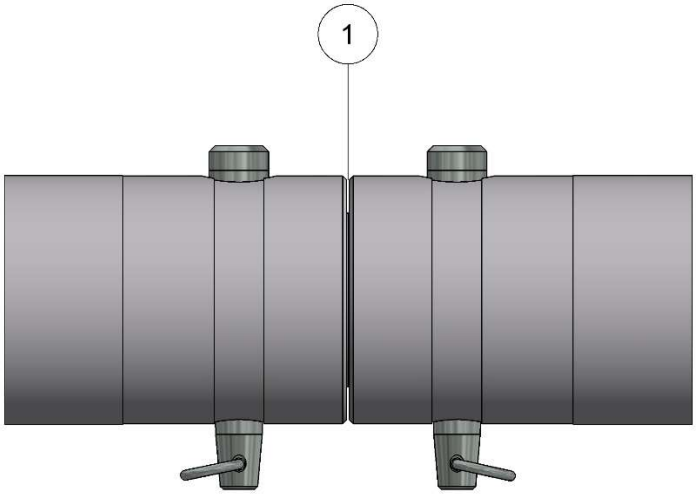


Figure 10: A gap between trusses assembled with a conical connector

1 Gap

When trusses with end braces are being assembled, it does not have any significance if the diagonals follow the alternating zigzag pattern.

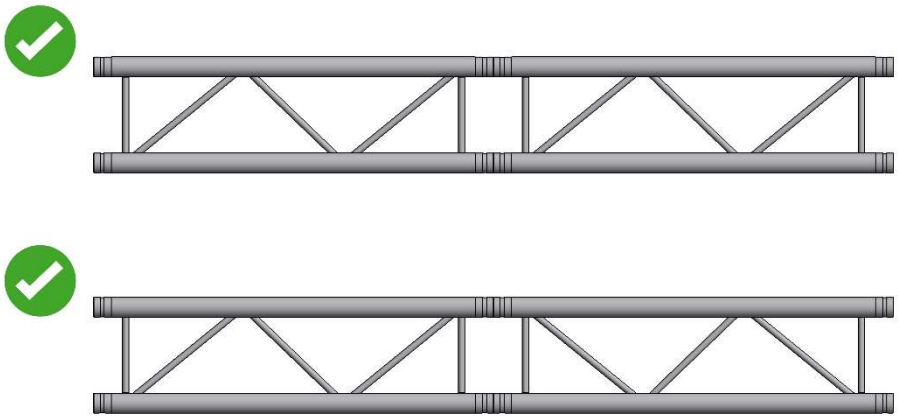


Figure 11: For trusses with end braces, both zigzag patterns can be used.

11.3 Required tools

- Torque wrench
- Copper hammer

11.4 Torque

Use a torque wrench to tighten all bolts and nuts under tension. When bolts are connected with threaded aluminium components, use the following torque settings:

- M12: 25 Nm
- M16: 50 Nm

11.5 Assembling a truss

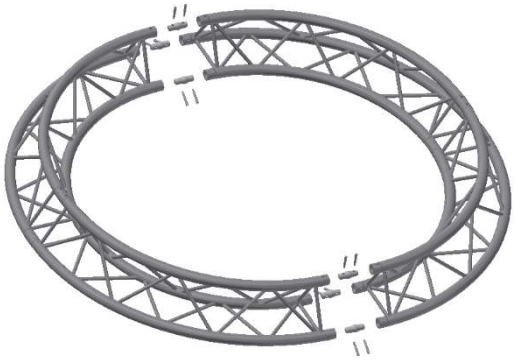
1. Slide both truss elements towards each other.
2. For conical or pin/fork truss, align the pin holes of the connectors. If the holes are not aligned, adjust the truss. Do not use excessive force.
3. Insert the pin through the pin holes, preferably with a copper hammer. Tip: Place the pin in such a way that the hole for the R-clip is perpendicular to the length of the truss. This makes it easy for you to mount the R-clip.
4. Secure the pin with the R-clip or safety clip.
5. Sling the truss as instructed in Chapter 10.
6. Check that all connections are made properly.
7. Attach loads as instructed in Chapter 11.7.
8. Lift the truss to working height and inspect all the connections. Correct if necessary.
9. Lift the truss to the required height. When lifting, avoid “bumping”, as it will lead to increased forces in the truss and load.

11.6 Assembling truss circles and ellipses

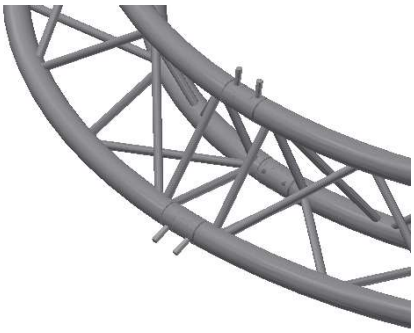
1. Slide both circle truss elements towards each other.
2. For conical or pin/fork truss, align the pin holes of the connectors. If the holes are not aligned, adjust the truss. Do not use excessive force.
3. Insert the pin through the pin holes, preferably with a copper hammer. Tip: Place the pin in such a way that the hole for the R-clip is perpendicular to the length of the truss. This makes it easy for you to mount the R-clip.

4. Secure the pin with the R-clip or safety clip.
5. Sling the circle truss as instructed in Chapter 10.
6. Check that all connections are made properly.
7. Attach loads as instructed in Chapter 11.7.
8. Lift the circle truss to working height and inspect all the connections. Correct if necessary.
9. Lift the circletruss to the required height. When lifting, avoid “bumping”, as it will lead to increased forces in the truss and load.

It is recommended to first create two half circles with truss pins that are not fully driven in and then connect them to form a full circle. After the full circle has been pre-assembled in this way, the truss pins can be fixed preferably with a copper hammer.



Connecting of two half circles



Loose connection

11.7 Attaching a load

WARNING

Before applying loads, a competent person should check if all trusses are connected properly.

Make sure loads are equally divided over both bottom and top chords. Loading a truss on one side leads to internal torsional forces which are not considered in the loading data provided.

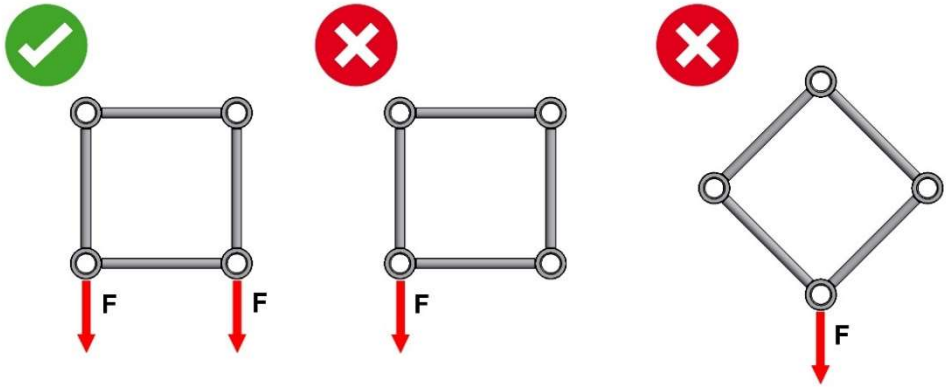


Figure 12: Attaching loads to a PROLYTE square truss

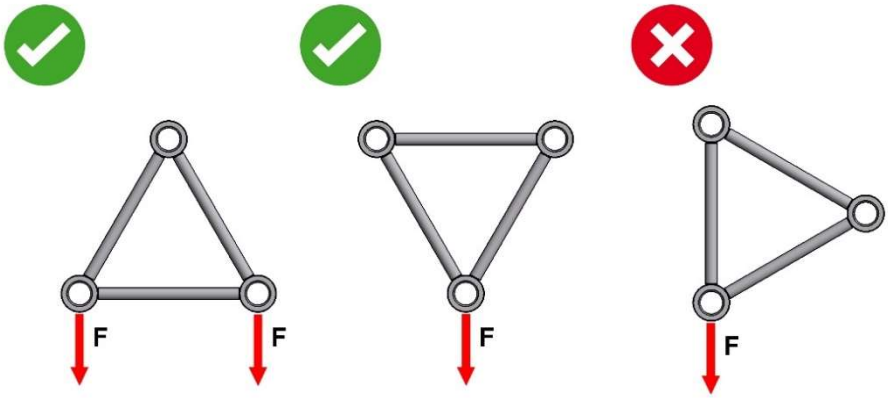


Figure 13: Attaching loads to a triangular truss

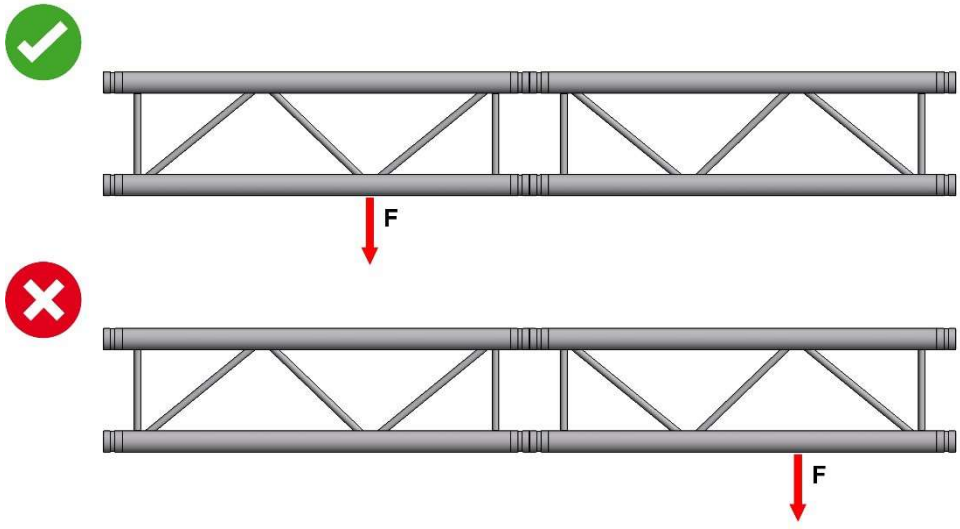


Figure 14: Attach the load in or as close to a node point as possible

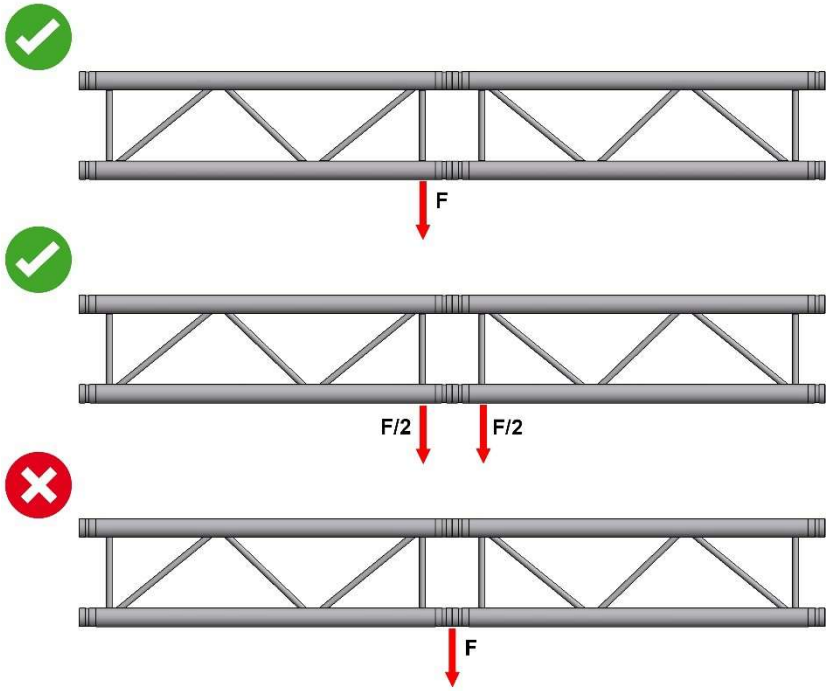


Figure 15: Attaching loads near the connector

NOTE: It may be possible to use some of denied methods, but only after consulting a structural engineer.

11.8 Disassembling a truss

1. Lower the truss to working height.
2. Detach the loads.
3. Inspect the truss for any damage. Mark the truss accordingly and discard it, if necessary.
4. Lower the truss to the floor level.
5. Disconnect the slings or lifting accessories.
6. Remove the R-clips or safety clips (Verto).
7. Hit the pins firmly to remove them.
8. Inspect the components for damage. Mark the components accordingly and discard them, if necessary.

12 Maintenance

Although aluminium may not develop corrosion the way many steel alloys do, ambient influences can have a corrosive impact on aluminium. Take special care with trusses that are placed outdoors for an extended period of time, especially in areas with a high level of industrial pollution, near salt water, near tram lines or near swimming pools. Trusses should be individually inspected before each use to find out if the expected pollution has had a corrosive effect.

Repairs should be carried out and warranted by either the manufacturer or a suitably qualified person approved by the manufacturer.

WARNING

Do not repair the product without first consulting the manufacturer.

Smooth the surface of coupling parts regularly. Use fine sandpaper or conventional abrasive materials.

Keep the coupling parts slightly lubricated with oil, silicone spray or similar lubrication. Lubricants should not be sticky, to avoid gathering dirt, dust or small debris.

Avoid painting the inner surface of the connector and pin holes. This has a negative effect on the fit.

Remove any kind of debris and dirt from truss and its components. Do not use any abrasive methods other than an abrasive cloth or sand paper grain 240 or higher.

13 Inspection

Depending on local regulations, we recommend that either a competent person or a certified body carries out a careful and documented inspection at least once a year or as often as required by the circumstances or the intensity of use.

WARNING

Perform the inspections as instructed in chapter 14 to ensure the safe use of the product.

In case of an accident, misuse or malfunction, the product should be marked, discarded and inspected by a qualified person to establish its structural integrity for re-use. The product should be identified accordingly, and records of identification numbers and photos should be kept.

WARNING

Do not use damaged trusses, connectors or pins.

Responsibility and liability for the safe use of the product lies predominantly with the user.

For conical truss, the open heel in the diagonal welds is part of the design and TÜV approved.

For information on the discard criteria, see Chapter 14.

13.1 Inspection levels

13.1.1 Regular inspection

A competent person shall visually perform regular inspections prior to each use. You do not have to keep records. The regular inspection includes a visual inspection for signs of external damage and wear. If any damage is detected during the visual inspection, a qualified person shall carry out a detailed inspection based on the criteria described in Chapter 14.

13.1.2 Periodic inspections

A qualified person shall perform periodic visual inspections on behalf of the user in accordance with Chapter 14, and a record of the inspections shall be maintained.

13.2 Inspection frequency

13.2.1 Initial inspection

When first acquired, whether new or used, inspect the product as instructed in Chapter 14. Keep a record of the inspections and identification numbers.

13.2.2 Inspections after accident, incident or malfunction

If the truss elements were subjected to any accidents, inspect the elements as instructed in Chapter 14.

Examples of accidents, incidents or malfunctions are:

- Dropping a truss on the floor from a height
- Lifting a truss with pins missing in joints, which might cause overloading
- Subjecting a truss to shock loads
- Tightening a truss during lifting

13.2.3 Truss in regular and non-regular service

Perform regular inspections prior to every use, or, when not in use for a period of one month or more, and periodic inspections at least once a year.

13.2.4 Permanent installations (stationary)

Perform periodic inspections on all truss elements permanently installed in a stationary configuration. A qualified person shall determine the frequency of inspections based on the prevalent conditions.

13.2.5 Permanent installations (moving)

Perform periodic inspections on all truss elements permanently installed in a configuration where movement of the truss is an integral part of use. Periodic inspections shall be carried out every three months, or in accordance with an inspection routine established by a qualified person.

13.3 Records

The owner shall keep records of initial and periodic inspections for each truss, which should be signed and dated by the person carrying out the inspections. An example for an inspection report can be found in the annex of this user manual.

14 Discard criteria

All the discard criteria must be considered when doing the inspection.

In addition to the normal requirements related to use, professional assembly and disassembly, transportation and storage of the product, regular inspections are vital. Carefully inspect each individual element visually before each use, regardless of the respective field of use.

For information on the required frequency of inspections, see Chapter 13.2.

If any damage is noted during an inspection of the product that precludes further safe use, the product must be discarded and disposed of. In most cases, it is not enough to just identify the damage.

Disposal through the manufacturer, supplier or a metal recycling company is the only safe way of protecting others from risks associated by damaged material.

Due to fabrication, the truss can have some dimensional deviation from the theoretical dimensions provided. These deviations are within the limits given in EN 1090-3.

14.1 Overview of discard criteria

Inspection	Failure symptoms							
Geometry	Bending	Twisting						
Identification	Identification sticker missing							
Main chords	Breaks, cracks	Bending	Deformations that do not allow easy assembly	Corrosion	Scratches, indentations, signs of attrition	Holes	Ovalisation	Distortion, constriction
Diagonals, end braces	Breaks, cracks	Missing	Bending	Corrosion	Scratches, indentations, signs of attrition	Holes	Ovalisation	
Connectors	Cracks in welds	Deformations that do not allow easy assembly	Corrosion	Scratches, cuts, hammer strokes	Oval signs of wear in pin holes	Ovalisation of pin holes due to overload		
Connecting hardware	Pressure area on pin or bolt	Bending	Deformation on R-clip hole	Reused self-locking nuts	Damages on smooth surface of pin	Mushroom heads	Corrosion	

14.2 General criteria

WARNING

If any part of the product shows significant visible damage or is suspected of containing a damaged element, visible or not, the product must be discarded and marked accordingly. A qualified person should assess the product.

WARNING

If in doubt when assessing individual damages, contact the manufacturer, supplier or a qualified person.

WARNING

Mark any damaged or worn material clearly and discard the material immediately.

Part	Failure symptoms
Truss	Welds which have cracks or other irregularities. Note that the incomplete welding seams around the diagonal braces are production-related and their stability has been TÜV approved.
Truss	Missing identification sticker that has the name of the manufacturer, the truss type and the date of production.
Truss	Excessive corrosion whereby the total cross-sectional area of the truss is reduced by more than 25% of the thickness or more than 10% of the cross-sectional area of the component.

14.3 Geometry of the truss

If any part of the product shows any of the following damages, the product is unfit for further use and must be discarded.

Part	Failure symptoms
Truss	The lasting deformation of the truss by twisting is more than 0.15° per meter of the truss length. Check the twisting with a digital leveller. The angular difference between the measurements at both ends of the truss, divided by the length of the truss, shall not exceed 0.15°.
Truss	The lasting deformation of the truss by bending exceeds the following limits: Max. Δ = 3 mm (0.12 in) if L < 2250 mm (7.38 ft) Max. Δ = L/750 (length divided by 750) if L > 2250 mm (7.38 ft). See the figure 16.

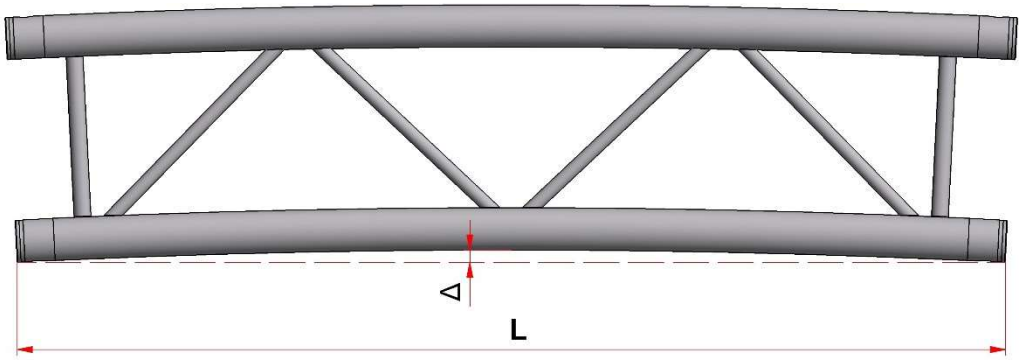


Figure 16: Limits for the lasting deformation of the truss by bending

14.4 Main chords

If any part of the product shows any of the following damages, the product is unfit for further use and must be discarded.

Part	Failure symptoms
Main chord	Breaks or cracks in the main chord.
Main chord	The main chord is bent more than 3 mm (0.12 in) between two node points. See Figure 17.
Main chord	The end of the main chord or connector is deformed to such an extent that the truss can only be connected to another truss by using considerable force.
Main chord	Scratches or signs of attrition on the surface of the main extrusions that reduce the wall thickness by more than 25% or the cross-sectional area of the tube by more than 10%.
Main chord	Indentations/dents deeper than the wall thickness.
Main chord	Holes appearing in the main chord after the truss was taken into use.
Main chord	The deformation of the main chord to an oval shape by more than 5% of the respective diameter.
Main chord	The main tube is distorted or constricted next to the welds due to excessive tensile force.
Main chord	Corrosion causing loss of material.

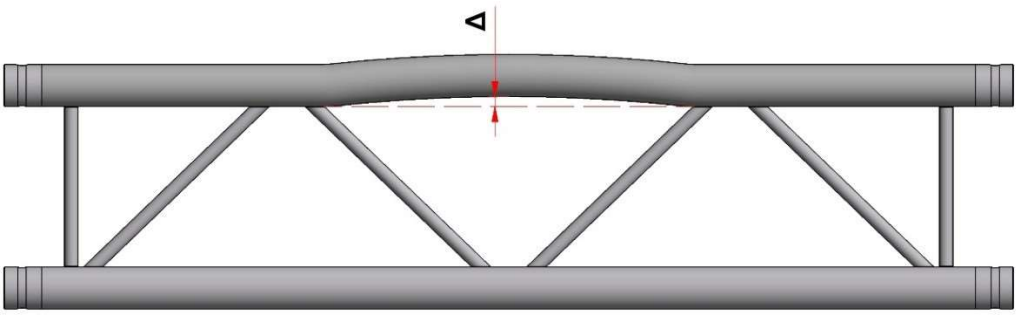


Figure 17: Main chord bent between two node points

14.5 Diagonals and end braces

If any part of the product shows any of the following damages, the product is unfit for further use and must be discarded. The term “brace” refers to a diagonal brace or an end brace.

Part	Failure symptoms
Braces	Breaks or cracks in a brace.
Braces	A brace no longer exists.
Braces	*A brace is displaced from the original centre line by L/300 (length divided by 300) or 3 mm (0.12 in), whichever has the smallest value. See Figure 18.*
Braces	Scratches, indentations or signs of attrition on the surface of the section that reduce the wall thickness by more than 25% or the cross-sectional area of the tube by more than 10%.
Braces	Holes appearing in the brace after the truss was taken into use.
Braces	1. A brace shows a deformation to an oval shape by more than 5% of the respective diameter.

Part	Failure symptoms
Braces	2. Corrosion causing loss of material.

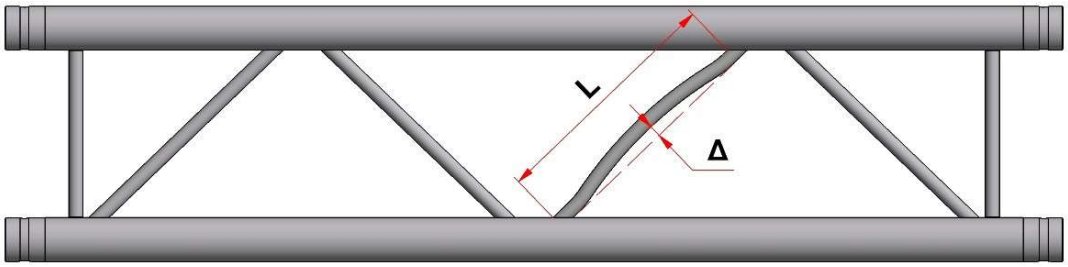


Figure 18: Bent diagonal

14.6 Connectors

If any part of the product shows any of the following damages, the product is unfit for further use and must be discarded.

Part	Failure symptoms
Connectors	Cracked or partially broken welding seams between the main tube and the connector.
Connectors	Oval signs of wear in the pin hole greater than 10% of their respective diameter. See the figures below.
Connectors	Any visible ovalisation of pin holes due to overload.
Connectors	If a connector is deformed to such an extent that the truss can only be connected to another element by using considerable force.
Connectors	Corrosion causing loss of material.
Connectors	Scratches, cuts or hammer stroke indentations on the connector to a depth of more than 2 mm (0.08 in) and that are longer than 10 mm (0.39 in), regardless of the direction.

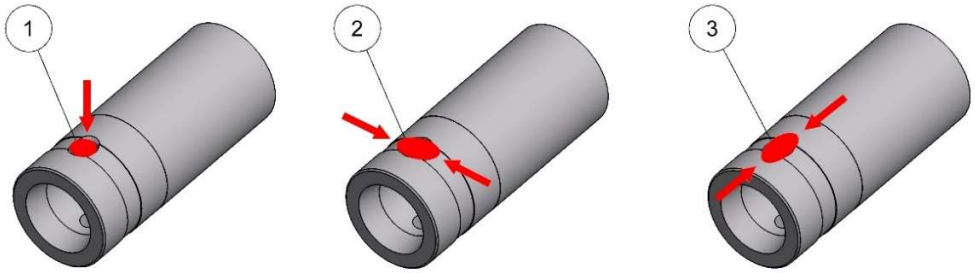


Figure 19: Conical connections

1 Normal conical drill
2 Oval signs of wear in the pin hole
3 Oval signs of wear in the pin hole

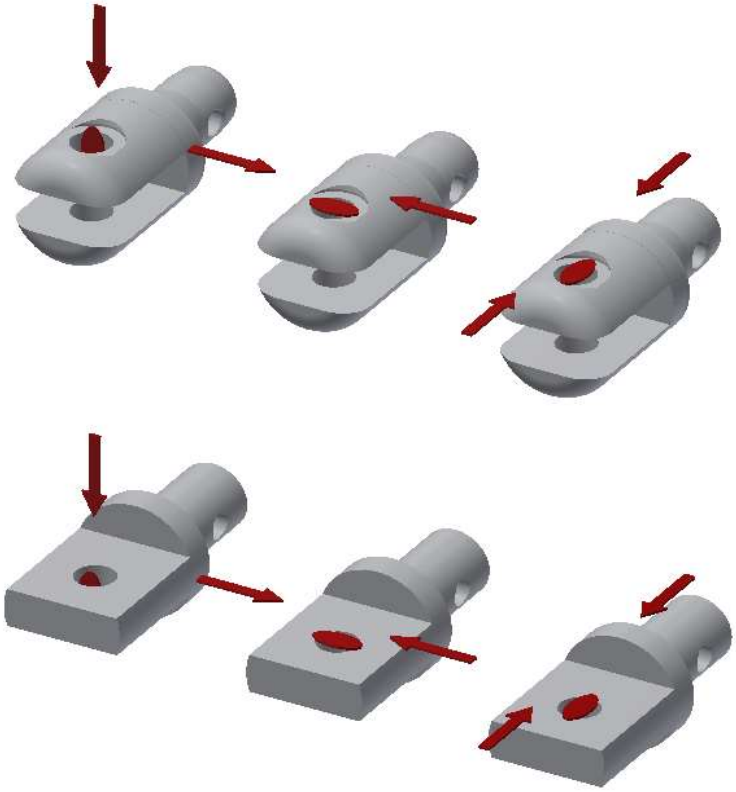


Figure20: pin fork connections

1 Normal drill
2 Oval signs of wear in the pin hole
3 Oval signs of wear in the pin hole

14.7 Connecting hardware

Connecting hardware is subjected to wear when inserted and removed frequently, especially due to hammer strokes. Connecting hardware can be regarded as consumables.

WARNING

Do not re-zinc truss pins, as they are made of high-grade steel. Re-zincing may cause hydrogen embrittlement.

If the connecting hardware shows any of the following damages, replace the connecting hardware in question.

Part	Failure symptoms
Connecting hardware	Signs of galvanic corrosion.
Pin or bolt	Signs of pressure areas on the pin or bolt.
Pin or bolt	A bent pin or bolt.
Pin	Any damage to the smooth surface of the pin.
Pin	Burrs, mushroom heads or other protruding, sharp or pointed edges at the narrower end of the pin. See Figure 21
R-clip hole	Deformations on the R-clip hole make it impossible to fit the R-clip.
Self-locking nut	A re-used self-locking nut. Self-locking nuts are for single use only.

Figure 200: Mushroom head on the pin

15 Warranty

For a period of 24 months, we undertake to repair, free of charge, any damage attributable to faulty materials or workmanship, provided that the product is forwarded, freight paid, to our factory or one of our contract service organisations.

The warranty period begins on the day of delivery, proven by a purchase receipt like an invoice, delivery note or their copies.

The warranty only is applicable for new products.

The warranty does not cover damage due to transport damage, negligent handling, overload or parts subject to normal wear and tear. Nor damages that originate from a case of misuse because of non-observance of the instructions in this manual.

The fitting of replacement parts not supplied by us, or modifications of our design by third parties, also invalidates the warranty.

Warranty repairs do not renew nor extend the warranty period.

Truss inspection documentation

Inspection date _____

Inspector _____

Reason for the inspection

- ☐ First purchase
- ☐ Inspection after accident, incident or malfunction
- ☐ Periodic inspection

Truss system _____

Type of component _____

Serial number _____

Overview of criteria to be checked for discard

(in accordance with the PROLYTE Truss User Manual Part 1: General instructions)

		A	B	C	D	E	F	G
1	Identification sticker	Sticker is missing						
2	Global geometry	Bending	Not easy to connect	Torsion				
3	Main chords	Breaks / Cracks	Bending	Not easy to connect	Corrosion	Scratches, Indentations, Abrasions	Ovalisation	Distortion, constriction
4	Diagonals / End frames	Breaks / Cracks	Not existing	Bending	Corrosion	Scratches, Indentations, Abrasions	Ovalisation	
5	Connector	Not easy to connect	Corrosion	Scratches, Indentations, Abrasions	Oval signs of wear in pin hole	Ovalisation of pin hole due to overload		

Legend	Failure mode does not exist	Failure mode exists
	✗	✓

If failure mode present:

Cell number	Description of failure mode
_____	_____
_____	_____
_____	_____
_____	_____

Should the component be discarded? ☐ Yes ☐ No

Contact details:
Prolyte BV.
Industriepark 9
9351PC Leek
Netherlands
T +31 594 851 515
info@prolyte.com

Area Four Industries

www.prolyte.com