

Instruction Sheet

“Suspension points, trusses and lifting equipment” 2019

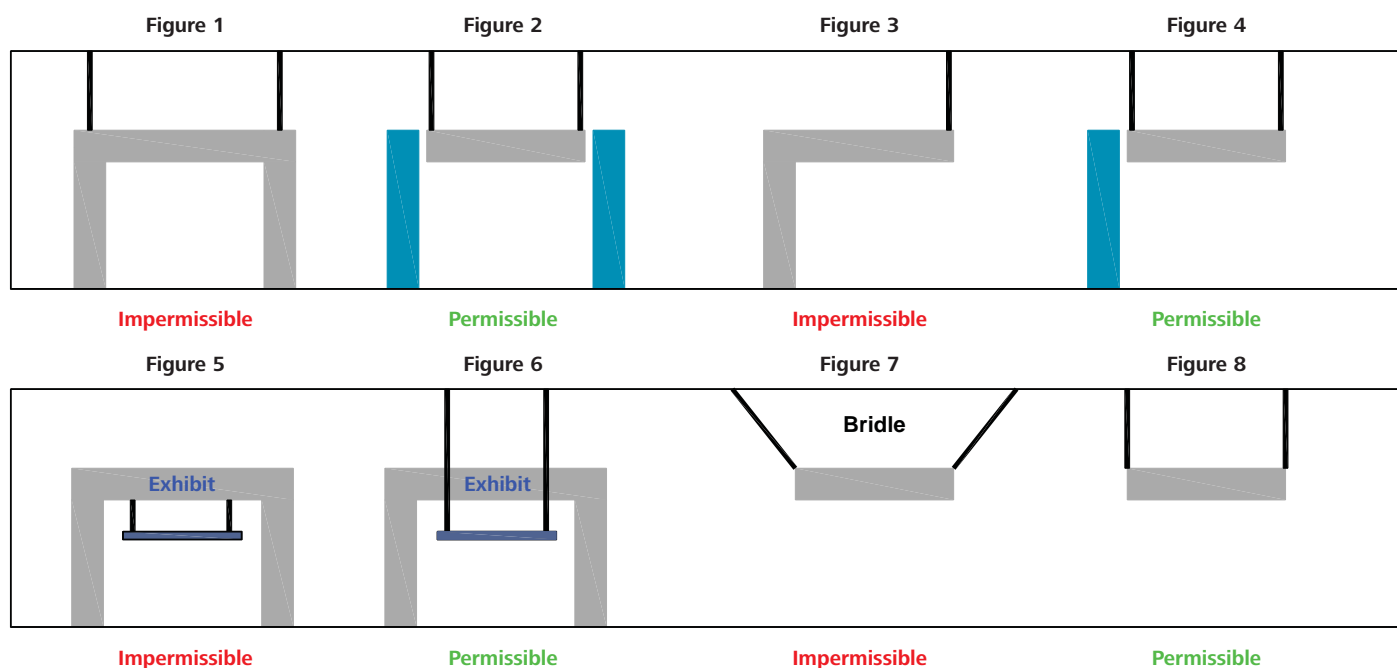
The suspension of objects from the hall ceiling, the provision of suspension points and the modification of suspension constructions are carried out exclusively by NürnbergMesse through its appointed ServicePartners. Suspension points must be ordered in writing from the Exhibition Services Dept. of NürnbergMesse using Form S2.15. The construction to be suspended must be located within the stand boundaries. The maximum vertical structural load capacity of each suspension point on the ceiling construction is 25 kg for halls 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 12. In halls **3A, 3C, 4A, 7A and 11**, the **maximum vertical structural load capacity is 240 kg (2.4 KN)**. Higher loads are only possible on request via the Facility & Event Services Department and after structural inspection by an engineer appointed by NürnbergMesse.

The exhibitor or client will be charged for the cost of such a structural inspection.

NürnbergMesse reserves the right to require the installation of load measuring systems in the case of statically indeterminate systems. The load measuring systems are to be supplied, installed and operated exclusively by SPIE SAG GmbH. The costs of the load measuring systems will be billed to the ordering party. We would like to advise that the use of load cells can reduce the maximum suspension height by up to 50 cm.

The following types of suspension are not permitted for safety reasons:

- Suspended constructions with a rigid or non-positive connection to the hall floor (see Figures 1 and 2)
- Suspension points used for securing stand components or exhibits (stand components or exhibits must stand securely on their own, see Figures 3 and 4)
- Suspension from exhibits (see Figures 5 and 6)
- The use of bridle suspension points is not permitted on the NürnbergMesse site (see Figure 7)



The use of lifting equipment (electric chain hoists, manual chain hoists, sling hoists) is only possible in halls 3A, 3C, 4A, 7A, 11 and NCC Ost and must be agreed with NürnbergMesse/Facility & Event Services.

The provision and use of attachment gear, load-bearing equipment, lifting equipment, load-bearing lines, fasteners, rope terminations, secondary safety equipment and equipotential bonding must comply with the relevant safety regulations and the recognized rules of engineering. The following regulations issued by the various German associations apply:

DGUV Regulation 1 (formerly BGV A1) – Principles of Prevention,
 DGUV Regulation 17 (formerly BGV C1) – Staging and Production Facilities for the Entertainment Industry,
 DGUV Regulation 54 (formerly BGV D8) – Winches, Lifting and Hoisting Equipment,
 DGUV Information 215-310 (formerly BGI 810) Guide to Safety at Productions and Events,
 DGUV Information 215-313 (formerly BGI 810-3) Safety at Productions and Events – Loads Suspended above Persons
 DGUV Information 215-314 (formerly BGI 810-4) Spotlights
 DGUV Information 215-315 (formerly BGI 810-5) Special Stage Effects and Operations

IGVV SQP1 “Trusses”
 IGVV SQP2 “Electric Chain Hoists”,
 IGVV SQP1 “Event Electrician”,
 IGVV SQP2 “Event Rigging Expert”
 IGVV SQP4 “Mobile Electrical Systems in Event Technology”
 Bavarian Venue Regulations (German: Bay. VStättV)

The following information on attachment gear, load-bearing equipment, lifting equipment, fasteners, rope terminations and secondary safety components is intended as a guide and is not exhaustive.

Attachment gear:

The maximum load on ropes and slings must not exceed one-tenth of the minimum breaking load. The maximum load for other attachment gear is half the manufacturer’s specified working load limit (WLL). Any dynamic forces occurring must be given special consideration (dynamic factor).

The edge radius for attaching loads must be greater than the nominal diameter of the attachment gear (rope, webbing sling and round sling). No further load reduction is necessary for an edge radius of more than three times the nominal diameter of the attachment gear.

The heat resistance of attachment gear varies. Webbing slings and round slings made of man-made fibers (PA, PES) and wire ropes with fiber cores (ferrule and thimble) are only to be used up to 100 °C and are not suitable for use close to spotlights. Webbing slings and round slings made of polypropylene (PP) are only designed for use up to 80 °C and therefore even less suitable.

Wire ropes with steel cores (ferrule and thimble) are suitable for use at temperatures up to 150 °C.

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Permissible attachment gear:

- Attachment ropes of steel wire with fiber or steel cores, ferrules and thimble rope terminations, and rope grade 1960 (corresponds to a minimum rated wire strength of 1770 N/mm²) to DIN EN 12385-4, Table 7 (rope class 6 x 19 for ropes ≥ 6 mm), Table 12 (rope class 6 x 19 M for ropes of 3 mm to 5 mm), DIN EN 13414-1, Table 3 and 4 (ropes ≥ 8 mm)
- Rope terminations must comply with DIN EN 13411-1 (thimbles) and DIN EN 13411-3 (ferrules)
- Short-link sling chains of quality grade 8 (DIN 5688-3:2007-3) or higher, with a breaking strength ≥ 20 %
- Webbing slings and round slings made of man-made fibers to DIN EN 1492-1, DIN EN 1492-2 with marking and using a secondary safety component comprising a steel rope with thimble, ferrule and fastener (to DIN 56927)
- Wire rope round sling with sheath of man-made fibers (“steelflex”)
- Aluminum or steel clips and truss adapter approved for the respective trusses (accessory), with marking (indicating load capacity and safety coefficient)

Impermissible attachment gear:

- Wire ropes not conforming to the above requirements
- Wire ropes with sheath (sheath > 1/3 of rope length)
- Long-link sling chains (inside length of chain link (pitch) > 3 x nominal diameter of chain material)
- Untested short-link sling chains or short-link lifting equipment chains (these must not be used as sling chains, as they have a breaking strength of only 5 to 15 %)
- Cable ties, pipe clips or perforated tape without the use of a secondary safety component comprising a steel wire rope with thimble, ferrule and fastener (DIN 56927)
- Webbing slings and round slings made of man-made fibers, without marking and indication of load capacity

- Webbing slings and round slings made of man-made fibers to DIN EN 1492-1, DIN EN 1492-2 with marking and indication of load capacity, BUT without the use of a secondary safety component comprising a steel wire rope with thimble, ferrule and fastener (DIN 56927)
- Damaged attachment gear (e.g. kinked ropes, slings with damaged sheath and sling without recognizable marking)
- One-sided load pickups at trusses with two upper straps (e.g. four-point trusses) are not permitted since this could cause an additional loading of the trusses through torsion. Deviations from this must be accompanied by a structural loading certificate and agreed upon beforehand with NürnbergMesse (Exhibition Technology Department)

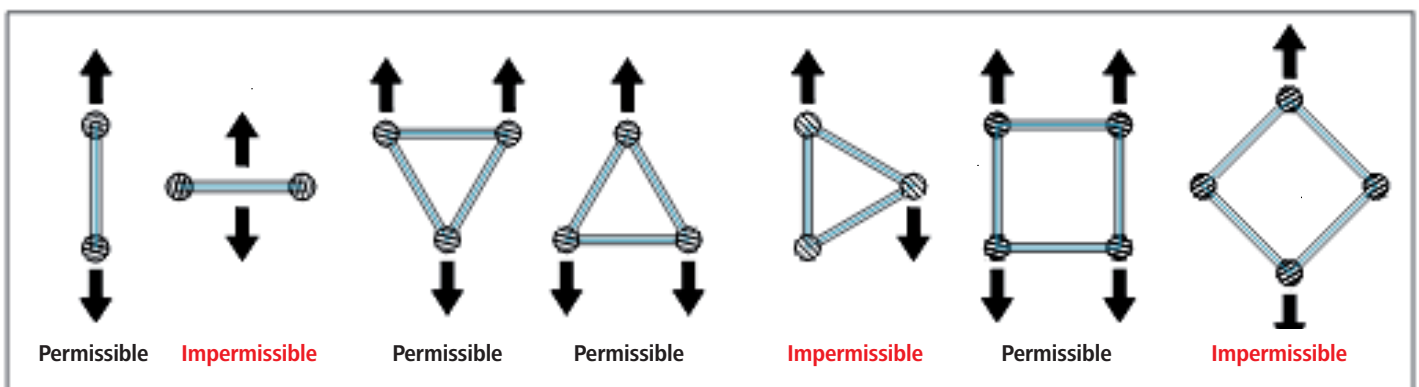
Permissible load-bearing equipment:

- Aluminum trusses to DIN EN 1999-1-1, DIN EN 1999-1-1/NA, GUV-I 8634/IGVV SQP1 “Trusses”
- Steel trusses to DIN EN 1090-2, DIN 18800-7, GUV-I 8634/IGVV SQP1 “Trusses”

Impermissible load-bearing equipment:

- Trusses not conforming to the requirements of GUV-I 8634/SQP1 “Trusses” and DIN EN 1999-1-1, DIN EN 1999-1-1/NA, DIN EN 1090-2, DIN 18800-7
- Trusses without a structural test certificate
- Trusses without marking
- Trusses those are no longer safe for use, i.e. damaged or worn (this also includes damage like dents, cracks, drill holes or other changes)
- Trusses without end struts, if the framework is ignored
- Trusses not used for their intended purpose, e.g. screwed to stand walls, on stand walls, frames, truss tower with base plates that are too small and/or too little ballasting
- Truss systems put together out of different types (manufacturers, versions, models)
- Variably bendable truss corners (“book corners”) should generally be load-free

Permissible and impermissible positions for installing trusses without additional structural safety certificate:



Equipotential bonding of truss systems¹

Truss systems that may carry hazardous contact voltages in the event of a fault must be incorporated in a common equipotential bonding system. This applies to all elements of electrically conductive material on which electrical equipment is installed or mounted or over which lines and cables are routed which could come into contact with metal parts in the event of damage. Connection to the equipotential bonding system can be made using clips, pipe clamps, screwed fasteners or special single-pole plug-in

connectors with locking device. The common equipotential bonding is to be connected to the ground conductor of the mains supply network. Suitable conductor cross-sections are 16 mm² Cu for conductor lengths of up to 50 meters and 25 mm² Cu for conductor lengths of up to 100 meters.

¹ IGVV SQP1 Provision and Use of Truss Systems, 5.3 Installation of Trusses, Equipotential Bonding on 2019 Trusses

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Permissible lifting equipment:

- **C 1 hoist** (Point hoist to DGUV Regulation 17 (formerly BGV C1), IGWW SQP2)
Nominal load as specified by manufacturer
- **D 8 hoist** (Electric chain hoist to DGUV Regulation 54 (formerly BGV D8) with secondary safety component for bypassing the electric chain hoist)
MOVING OR HOLDING LOADS ABOVE PERSONS WITHOUT A SAFETY DEVICE IS PROHIBITED!
Nominal load as specified by manufacturer
- **D 8 Plus hoist** (Electric chain hoist with secondary safety component/ second brake to DGUV Regulation 54 (formerly BGV D8) with special features to hold loads in place above persons without secondary safety component – IGWW SQP2)
MOVING LOADS ABOVE PERSONS IS PROHIBITED!
Nominal load as specified by manufacturer

Use of lifting equipment

The use of lifting equipment (electric chain hoists, manual chain hoists, etc.) is only possible in halls 3A, 3C, 4A, 7A and 11 requires prior approval by NürnbergMesse.

The use of lifting equipment (electric chain hoists, manual chain hoists, etc.) in halls 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 12 is strictly prohibited!

The use of lifting equipment is governed by the requirements and implementation instructions of DGUV Regulation 17 (formerly BGV C1/GUV C1), DGUV Information Sheet 215-313 (formerly BGI 810-3) and the industry standard SQ .

A suitable rope termination (e.g. ring or rope socket) must be provided.

Wire rope fasteners (holders, sliders) are only designed for static loads and must not be used in conjunction with lifting gear.

The use of lifting gear must be advised when ordering suspension points!

Electric chain hoists – general information

Electric chain hoists may only be used in halls with heavy duty suspension devices (halls 3A, 4A, 7A and 11).

The use of this lifting gear is subject to the Requirements for Electric Chain Hoists in Event Technology (IGVV SQ P2).

The dead weight of the electric chain hoists and dynamic coefficients must be taken account of in the load plan so as not to overload the slinging points.

The contractor must subject the hoists to an annual expert inspection. The test certification mark must be affixed to a visible location on the lifting equipment and the test documentation has to be available on site at all times. This inspection does not replace the inspection by an officially appointed expert every four years.

Manual chain hoists – general information

Manual chain hoists may only be used in conjunction with heavy-duty suspension devices (hall 3A, 3C, 4A, 7A and 11).

Manual chain hoists may only be used in the case of statically determinate systems, i.e. a line load on two hoists or a distributed load on three hoists. The use of manual chain hoists for complex systems is not admissible.

The carrying and load hook of the hoist must be in a perpendicular straight line above the centre of gravity of the load. Winding round the load with the chain (carrier) or guiding the load chain over corners is not admissible. Loads must always be moved with all attached manual chain hoists at the same time, i.e. there must be as many people lifting at the same time as there are manual chain hoists in use. It must be ensured that the lifting and lowering processes are uniform.

The dead weight of the manual chain hoists and dynamic coefficients must be taken account of in the load plan so as not to overload the slinging points.

Impermissible lifting equipment:

- Electric chain hoists to DGUV Regulation 54 (formerly BGV D8), without secondary safety component
- Electric chain hoists to DGUV Regulation 54 (formerly BGV D8) with inadequately rated secondary safety component (see Permissible secondary safety components)
- Untested electric chain hoists or electric chain hoists without test certificates (annual inspection; for C1 and D-Plus hoists: plus expert inspection every 4 years)
- Electric chain hoists showing obvious signs of damage
- Electric chain hoists not used for their intended purpose (see IGWW SQP2, e.g. stage use of an electric chain hoist to DGUV Regulation 54 (formerly BGV D8))

Permissible fasteners:

The nominal load is half the manufacturer's specified load-bearing capacity, maximum one-tenth of the minimum breaking load.

- Shackles, straight and curved, grade 6, to DIN EN 13889 with marking, with type X threaded bolt (with hexagonal head, hexagonal splint nut) if used with dynamic loads (e.g. for suspension of loudspeakers)
- High-strength shackle, grade 8, to DIN EN 1677-1
- Quick link for operation of lifting equipment, non-standard (safety factor 5), marked with load-bearing capacity
- Quick link for event equipment (safety factor 10) to DIN 56927 with marking
- Turnbuckles with closed eyes to DIN 1480, marked with load-bearing capacity, only with safety splint and safety nut if used with dynamic loads (e.g. for suspension of loudspeakers)
- Closed O-ring marked with load-bearing capacity, or with manufacturer's data sheet
- Shortening clutch with safety element to prevent unintentional unhooking, e.g. locking pins

Impermissible fasteners:

- Carabiners with/without screw lock
- Open hooks
- Open turnbuckles to DIN 1480
- Quick link with lock nut, not marked with load-bearing capacity
- Tensioning sets as connection between two truss parts
- Shackles to DIN 82101 (have a working coefficient of only 3)
- Shortening clutch without safety element to prevent unintentional unhooking, e.g. locking pins
- Other fasteners without marking/indication of load-bearing capacity/manufacturer's data sheet

Permissible rope terminations:

- Thimble to DIN EN 13411-1 and ferrules to DIN EN 13411-3
- Rope locks (straight) to DIN EN 13411-7, for dynamic loads (e.g. suspension of loudspeakers) only with rope clamp (frog) to DIN EN 13411-5

Impermissible rope terminations:

- Rope clamps (frogs) to former DIN 1141
- Rope clamps (frogs) to former DIN 741

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Secondary safety components:

A secondary safety component usually consists of a wire rope, rope termination and fastener to **DIN 56927**. The drop distance should be as short as possible, ideally zero.

This is best achieved with a safety rope together with a grade 8 shortening clutch equipped with a safety element to prevent unintentional unhooking (drop distance \leq length of one chain link (pitch)).

Only quick links to DIN 56927, grade 8 high-strength shackles to DIN EN 1677-1 may be used as fasteners for a secondary safety component.

If secondary safety components with a larger drop distance than one chain pitch are used, a structural certificate may be requested for the pulse load of all components of the secondary safety component, attachment gear, load-bearing lines, fasteners and load-bearing equipment.

Permissible secondary safety components:

- Wire rope of steel wire with fiber core, ferrule sling and thimble as rope termination, rope grade 1960, to DIN EN 12385-4, Table 7 (rope class 6 x 19 for ropes \geq 6 mm), Table 12 (rope class 6 x 19 M for ropes of 3 mm to 5 mm), DIN EN 13414-1, Table 3, or to former DIN 3060 (round-stranded rope 6 x 19 standard)
- Rope terminations must comply with DIN EN 13411-1 (thimbles) and DIN EN 13411-3 (ferrules)
- Fasteners conforming to the above standards

Impermissible secondary safety components:

- Wire ropes not conforming to the above requirements
- Inadequately rated wire ropes (see DIN 56927, DGUV Information 215-313 (formerly BGI 810-3))
- Fasteners not conforming to the above requirements
- Inadequately rated fasteners (see DIN 56927)
- Rope terminations not conforming to the above requirements (e.g. rope locks)