

**Z5080**  
**Flying bar**  
**Mounting instructions**

## Z5080 Flying bar

### References in the manual

#### **WARNING!**

This refers to a potentially dangerous situation which may lead to personal injury.

#### **CAUTION!**

This refers to a potentially dangerous situation which may lead to equipment damage.

#### **IMPORTANT!**

This refers to a situation which may cause the equipment to malfunction.

## Symbols on the equipment



Please refer to the information in the operating manual.

## General Information

Mounting instructions  
Z5080 Flying bar

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The information presented in this document is, to the best of our knowledge, correct. We will however not be held responsible for the consequences of any errors or omissions. Technical specifications, weights and dimensions can change and should always be confirmed with d&b audiotechnik AG prior to inclusion in any additional documentation.

d&b audiotechnik AG  
Eugen-Adolff-Strasse 134, D-71522 Backnang  
Telephone +49-7191-9669-0, Fax +49-7191-95 00 00

## General Safety and Installation Advice

### WARNING!

#### General safety advice

d&b loudspeakers should only ever be flown or installed using recommended d&b rigging accessories. The d&b rigging accessories described in the d&b rigging accessories manual and the specific mounting instructions are designed and manufactured to have a high load safety factor for their intended role. In order to ensure the highest safety standards, the information presented here on the assembly and safe use of d&b rigging accessories must be carefully understood and followed.

The installation of d&b loudspeakers using the rigging accessories described in the d&b rigging accessories manual and the specific mounting instructions should only ever be carried out by properly qualified personnel in full compliance with all required safety codes and safety standards in force at the place of installation. (In Germany, this means compliance with the recommendations of BGV C1 GUV 6.15)

d&b rigging accessories (components and assemblies) are supplied exclusively for use with specific d&b loudspeakers and are not designed or intended for use with any other loudspeakers or any other devices. The use of d&b rigging accessories to deploy loudspeakers and devices other than those indicated in the d&b rigging accessories manual and the specific mounting instructions is improper use. Improper use can compromise safety by overloading and damaging the rigging accessories. d&b will not be held responsible for any damage or injury resulting directly or indirectly from the improper use of d&b rigging accessories.

d&b rigging accessories must not be modified in any way nor should they be assembled in ways other than those indicated in the d&b rigging accessories manual and the specific mounting instructions. Rigging components supplied as part of a complete assembly are non-interchangeable and must not be exchanged with the component parts of any other assembly.

The component parts of a d&b rigging accessory must only be assembled using the fasteners and methods of assembly recommended in the d&b rigging accessories manual and the specific mounting instructions. The use of fasteners and methods of assembly not specified or approved by d&b may result in an unsafe rigging assembly. Welding, or any other means of permanently fixing rigging components to each other or to cabinet fixing points is not allowed.

#### General installation advice

### WARNING!

Only the screws, fasteners, plain and shakeproof washers specified on the relevant page(s) of the d&b rigging accessories manual and the specific mounting instructions shall be used to fasten together, where appropriate, suitable d&b rigging components.

d&b rigging components or assemblies must only be fixed to d&b loudspeaker cabinets using the cabinet fixing points, assembly methods and fasteners specified on the relevant page(s) of the d&b rigging accessories manual and the specific mounting instructions.

Any wall, floor or ceiling to which a d&b loudspeaker is fixed or

attached using a d&b rigging accessory must be capable of safely and securely supporting the actual load. The rigging accessory used must be safely and securely fixed both to the loudspeaker and to the wall, floor or ceiling.

Other points to consider are: When mounting rigging components on walls, floors or ceilings ensure that all fixings and fasteners used are of an appropriate size and load rating (DIN 18800 standards apply within Germany). Wall and ceiling claddings and the construction and composition of walls and ceilings all need to be taken into account when determining whether a particular fixing arrangement can be safely employed for a particular load. Cavity plugs or other specialist fixings, if required, must be of an appropriate type, fitted and used in accordance with the maker's instructions.

Use only the rigging accessory fixing holes indicated on the relevant page(s) of the d&b rigging accessories manual and the specific mounting instructions to fix d&b rigging accessories to walls, floors or ceilings. Where specified, the recommended maximum torque settings for screw fasteners must be strictly complied with.

### **Secondary safeties**

All loudspeakers flown in theatres, studios or other places of work and entertainment must, in addition to the principle load bearing means of suspension, be provided with an independent, properly rated and securely attached secondary safety.

Only steel wire ropes or steel chains of an approved construction and load rating may be used as secondary safeties. Plastic covered steel wire ropes are not permitted for use as secondary safeties. As recommended by BGV C1 (GUV 6.15), the secondary safety must prevent the load from dropping more than 20 cm if the principal means of suspension fails.

### **Safety inspections**

All rigging components and assemblies are subject to wear and tear, aging, corrosion etc. As safety critical components, it's imperative that, prior to each and every use or installation, all rigging components, rigging assemblies and cabinet fixing points are carefully inspected to ensure that they are free of defects and that they function flawlessly. Care should be taken to identify signs of undue wear and tear, dents, cuts, tears, splits and any indications of corrosion. If upon inspection, damage is discovered and there exists even the slightest doubt as to the physical integrity and safety of the damaged item, then the damaged item must not, under any circumstances, be deployed.

Regular, more rigorous test and inspection of rigging components must also be carried out. Safety legislation and test and inspection requirements will vary from country to country. In most cases, annual independent test and inspection by a suitably approved and qualified inspector will be required - users must ensure compliance with all applicable safety requirements.

d&b recommends regular safety inspections and further recommends that a logbook be kept detailing the test and inspection history of each d&b rigging accessory.

**WARNING!**

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## Load safety factors

Rigging accessories are safety critical components which can, by their failure, lead to injury or death. To maximise safety and to reduce the risk of the possible consequences of failure, there exist various recommendations which attempt to govern the safe design and construction of rigging components. Unfortunately, such recommendations vary from country to country and are frequently adaptations of building or construction safety codes which were never intended to specifically cover loudspeaker rigging.

A further complicating factor, frequently a result of insurance requirements, is that different load safety factors may be demanded for different applications. For example, the load safety factor of a rigging component suitable for a fixed, static application may be regarded as insufficient for a mobile application.

What exactly is a load safety factor?

It is accepted general engineering practice to design and build components to have a minimum 1.25X load safety factor. That means a component or assembly that can resist without breaking, a load 25% greater than its specified safe working load (SWL).

Load safety factors are tailored to the estimated level of risk presented by a particular application - the higher the estimated level of risk, then the higher the load safety factor demanded. Because of the high level of risk associated with the possible failure of rigging, load safety factors much greater than 1.25X are demanded. The EU Machinery Directive for example, specifies a 4X load safety factor for shackles. This means that a shackle specified for a SWL of 500 kg should be able to resist a 2000 kg load without breaking.

Even more stringent load safety factors than those specified under EU legislation can apply to applications where rigging is used. One of the most demanding safety codes, the one used to derive the high load safety factors for d&b rigging accessories, is the German BGV C1 safety code.

Section §9 of „Unfallverhütungsvorschrift Veranstaltungs- und Produktionsstätten für szenische Darstellung“ (BGV C1 GUV 6.15) draws a distinction between components used to rig a fixed, static load and components used to rig a moving load. Different load safety factors are required for otherwise similar components depending upon whether they are used with a fixed or with a moving load. A higher load safety factor being required for rigging subject to the higher stress of dynamic loading.

The recommendations are met if it can be shown that:

- The SWL of components such as ropes and slings used as rigging for a fixed load does not exceed 1/10 of their calculated ultimate stress

and

- The SWL of components such as ropes and slings used as rigging for a moving load does not exceed 1/12 of their calculated ultimate stress ..."

A 12X load safety factor is therefore recommended for the following components:

- Chains
- Steel wire ropes (for lifting and securing)
- Shackles
- Eyebolts etc.

In contrast, the EU Machinery Directive (EN292-2) specifies the following load safety factors for rigging components:

Rigging component	Safety factors
Steel wire ropes	factor 5 (EN292-2, chpt. 4.1.2.5a)
Welded link chains	factor 4 (EN292-2, chpt. 4.1.2.5b)
Fabric slings	factor 7 (EN292-2, chpt. 4.1.2.5c)
Metal components	factor 4 (EN292-2, chpt. 4.1.2.5d)

The regulations enshrined in the EU directive are general regulations - few in number and not always particularly clear or detailed. Loudspeakers and their rigging components are not specifically covered. The electrical and mechanical standards of construction for lanterns are covered by a DIN standard (DIN 15560). However, there is no specific DIN or Euro standard covering standards of construction for loudspeaker rigging components or assemblies.

To make matters clear, at least as far as d&b rigging accessories are concerned, we have adopted the following load safety factors:

**12X load safety factor:**

Chains, ropes, shackles, eyebolts, straps and hooks.

**10X load safety factor:**

Accessories and fixings for mobile use.

**5X load safety factor:**

Accessories generally employed in fixed, permanent installations.

The 12X load safety factor is derived from §9, GUV 6.15

The 10X load safety factor is likewise derived from §9 GUV 6.15. as a basic safety standard for rigging components.

From EN292-2 chpt. 4.1.2.5d a 4X minimum load safety factor can be derived for all metal rigging components used in fixed installations. Our choice of a 5X minimum load safety factor for such components provides an enhanced safety margin.

**Attaching rigging to loudspeaker cabinets**

d&b rigging accessories are supplied with specific mounting instructions and must only be assembled and used in the manner described in these instructions or as specified on the relevant page(s) of the d&b rigging accessories manual. Failure to fully observe specified load capacities or fitting instructions can overload the rigging accessories or the loudspeaker cabinet fixing points causing them to break.

The d&b rigging accessories described in the d&b rigging accessories manual and specific mounting instructions are directly



attached to d&b loudspeaker cabinets and are secured using either screws or bolts fastened to threaded inserts fitted in the loudspeaker cabinets. For attaching rigging, d&b loudspeaker cabinets are fitted threaded inserts.

## **WARNING!**

Where provided, the supplied screws or bolts should be used to attach rigging. Using screws or bolts other than those supplied or specified can result in an insecure and unsafe fixing. Additionally, using screws or bolts longer than those supplied or specified can physically damage a cabinet by penetrating its interior and causing an air leak.

### **Load ratings**

d&b rigging accessories are designed and constructed to have a load rating appropriate to their intended use. The safe working load (SWL) for each d&b rigging accessory is specified in its respective data sheet and on the relevant page(s) of the d&b rigging accessories manual.

In general, d&b rigging components are designed with a 10X load safety factor. Some components, specifically intended only for use in fixed, permanent installations are designed with a 5X load safety factor. Other components, for use with moving as opposed to static loads and therefore subject to the additional wear of dynamic loading, are designed to have a 12X safety factor.

### **Safety certificates**

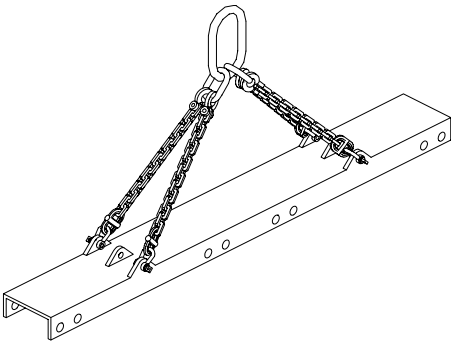
In Germany, the health and safety authority together with industrial and professional associations has published a safety code for stages and studios. Sound reinforcement equipment installed in these places has to comply with the provisions of this code, published as BGV C1 (GUV 6.15) „Unfallverhütungsvorschrift Veranstaltungs- und Produktionsstätten für szenische Darstellung“.

The code provisions include:

1. Plastic load bearing components are not permitted.
2. Plastic laminated or coated steel wire ropes are not permitted.
3. Load connector parts must have a load safety factor 10X greater than their stated SWL (Safe Working Load).
4. Load bearing chains must have a load safety factor 0.5X greater than the dynamic value specified by the manufacturer - equivalent to a load safety factor 12X the specified SWL.

Provision #4 needs some explanation. High tensile chains and related components conforming to EN 818, grade 8 are specified with a load safety factor 4X their SWL. To comply with the 12X load safety factor required for load bearing chains under BGV C1 (GUV6.15), the specified SWL for DIN certified chains must be derated by a factor of three.

## Z5080 Flying bar



**Flying bar and Flying bar chainset.**

The Z5080 Flying bar allows two vertical columns of C4 or F2/B1 loudspeakers to be flown - both columns consisting of the same loudspeaker cabinets.

The angle between the columns rows is preset to 30° for C4 loudspeakers and to 40° for F2/B1 systems. The resulting combined horizontal coverages are 70° (C4-TOP) and 100° (F2 loudspeaker). It's also possible to set a 0° horizontal angle for use with subwoofers.

Typical applications are:

- Fixed installations using C4 and F2/B1 systems
- Flown front-of-house system for small and medium-sized venues
- Delay clusters for larger venues and systems
- Supplementing the C4 Flying system, e.g. for a 2-wide F2 or C4 side fill for a 4-wide C4 main FOH system
- Monitor side-fills on larger stages

The Flying bar is manufactured for d&b by UK specialist MAN Flying Systems. It is made of powder-coated U-section steel with suspension eyelets. A matching Z5081 Flying bar chainset is also available. The Flying bar is 152 cm wide. The vertical distance from the suspension point to the fixing plane of the load chains is 63 cm. The Flying bar weighs 45 kg and the chainset 6.5 kg.

### Assembly

For use with the Flying bar chainset, two pairs of fixing lugs are provided, equidistantly spaced each side of the centre point of the bar. The four chains of the chainset are captively fitted at one end to an O ring used to suspend the bar and its speaker load from a central flying point. The free ends of the chains are attached to bar fixing lugs using 2 tonne shackles.

The loudspeaker columns are vertically suspended from the bar in the same manner as the C4/C7/F2/B1 Flying system using 1 tonne steel rigging chains, MAN Flying studs and 5t Ratchet straps. The assembly and use of these components is more fully described under C4/C7/F2/B1/MAX Rigging accessories.

The Flying bar also includes central fixing lugs for Ratchet straps between the chain fixing points for each of the two suspended loudspeaker columns. Each Ratchet strap attaches to its fixing point using a 1t Shackle and Delta link.

For parallel loudspeaker columns, all the load rigging chains attach to the U section of the Flying bar using Shackles. The fixing points for the Ratchet straps remain the same when the chain fixing points for angled loudspeaker columns are used. The Flying bar chainset is now attached to two fixing points on the outer edges of the bar and at two additional points at the centre of the U section of the Flying bar.



**Delta link (E6511) and Shackle used to attach Ratchet strap (E6510) to the Flying bar**



## Load safety information

The maximum permissible load including the loudspeakers and rigging hardware is 500 kg.

**Distribute the load symmetrically around the centre of the Flying bar since, unlike the Flying system for C4/C7/F2/B1/MAX, it is not possible to adjust the bar balance for unequal loads.**

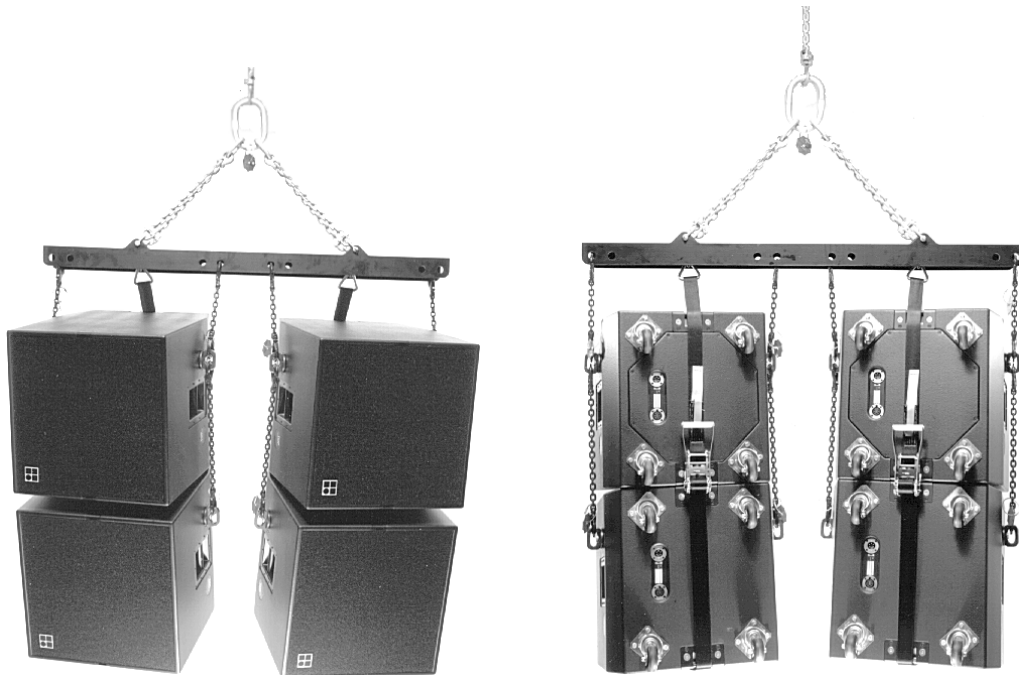
Secondary safeties must always be provided and used when flying loudspeaker loads.

The load capability stated above allows the following systems to be deployed:

- 8 x C4-TOPs or SUBs
- 4 x F2s or B1s (old version with flying eyes)
- 4 x F2 loudspeakers + 2 x B1-SUBs (new version with MAN studs)

Each Flying bar is individually tested to twice its rated load.

**WARNING!**



Flying bar with C4 system

## Declaration of Conformity to BGV C1

This declaration applies to the following components described in this Rigging Accessories Manual :

**Z5024 Loudspeaker stand adapter**

**Z5010 TV spigot with fixing plate** (shipped after 27/11/97)

**Z5012 Pipe clamp for TV spigot**

**Z0127 T bar adapter**

**Z5020 02 Flying adapter**

**Z5025 03 Flying adapter**

**Z5015 02 TV spigot**

**Z5021 02 Flying frame, 90°** (shipped after 12/2/98)

**Z5022 02 Flying frame, 60°** (shipped after 3/4/98)

**Z5023 02 Flying bracket** (shipped after 27/8/97)

**Rigging accessories C4/C7/F2/B1/MAX**

**Z5042 Flying plate**

**Z5080 Flying bar**

**Z5090 Single bar**

**Z5016 Heavy duty Pipe clamp**

**Z5017 Heavy duty TV spigot**

**Z0124 E1 Vertical bracket**

**Z0126 E1 Horizontal bracket**

**Z5033 E3 Ball joint adapter**

**Z5029 TV spigot for E3 ball joint adapter**

**Z5027 E3 Ball joint wall bracket**

**Z5031 E3 Standard bracket**

**Z5030 E3 x 2 Angle bracket**

**Z5032 E3 Swivel bracket**

**Z5028 E3 Horizontal bracket**

**Z5007 1220 Frame**

**Z5008 1220 Stand adapter**

**Z5043 MAX Horizontal bracket**

**Z5044 MAX Bracket connector**

**We hereby declare that the above listed products supplied by d&b audiotechnik AG comply with the relevant requirements of BGV C1(GUV 6.15).**

**d&b audiotechnik AG of Backnang accepts responsibility for this declaration.**