

Falls during the ascent of high structures such as transmission line masts/towers, chimneys, manholes etc., can be prevented by means of Söll-Fall Protection Systems devices. The different components of the modular system have been designed, proven & tested in accordance with European Standards.



Söll-Fall Protection Systems are used to secure a climber at work and will permit restricted travel along the rail. They will automatically stop an accidental fall within centimetres.

The Söll-Fall Protection System may be used by more than one person at a time.

The system consists of standard length guide-rails which can be endlessly joined. They are available as a plain track (for fixing to existing ladders) or with integrated rungs, so called safety ladders.

The Glideloc™ fall arrester is the heart of the Söll fall protection systems. It runs inside either guide-rail channel section and becomes connected to the front D-ring of a harness by means of a carabiner snap hook. The Glideloc™ fall arrester allows the climber freedom of movement whilst climbing, descending and work positioning. In case of a fall, the integrated drake cam engages the next catch and stops the person.

This positive physical brake system has many advantages over other systems, and is not affected by excess grease, weather conditions or weight variations. This brake system also prevents the galvanizing (for steel rails) or anodizing (for aluminium rails) coating of the guide-rail from being damaged during the locking of the brake cam.

By utilizing different mounting assemblies, Söll-fall protection systems may be attached to almost any structure that is required to climb. Due to the flexibility of the wide range of accessories, the system may also be used to continuously protect the climber when switching from vertical to horizontal climb path, around curves, corners and obstacles.

**Söll-fall protection systems can be used for a wide range of applications, such as:**

- Masts
- Chimneys
- Power Stations
- Bridges
- Wind Generators
- Aircraft Docking systems
- Towers
- Oil Rigs
- Shafts
- Silos

Glideloc™ systems are ideal for use in any area of industry where there is a possibility of a fall from a structure or into a shaft.

Guide rails, ladders, mounting brackets and all accessories are available in three basic materials to suit your needs.

- Anodized aluminium (AlMgSi 0,5 F 25), to E6 EV1
- Galvanized steel to DIN ISO EN 1461 or DIN 50976
- Stainless steel, 18/8, pickled.

**Use our experience for your advantage!**

For more than 20 years, Christian Dalloz Holding Deutschland GmbH & Co. KG has supplied thousands of fall protection systems all over the world. They have proved to be completely reliable in all adverse conditions from icy to desert locations.

Our products are guaranteed for 5 years.

**We guarantee the safety that you need.**

The technical advantages and reliability of the Söll systems have been recognized worldwide and numerous Authorities now specify Söll, including e.g. German and Belgium Telecom, German and Austria Railways as well as many domestic and foreign power supply companies.

We welcome your enquiries and we would be only too pleased to advise you at design stage.

All enquiries should include the following information:

- Drawing of the structure with marked position of required ladder/guide-rail, especially where curves are required.
- If possible, please quote Part Number of the chosen product/component.

Safety is paramount. Incorporate Söll-Fall Protection Systems into your new designs. Contact us now for the benefit of our extensive experience in all fields of climbing safety. Special requirements can be accommodated.

If you have questions about climbing safety, Christian Dalloz Holding Deutschland GmbH & Co. KG can advise you and provide solutions to meet European standards and safety regulations.

We are happy to meet all your requirements.

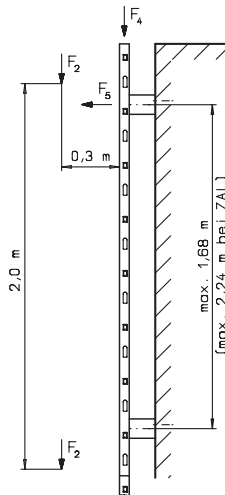
**One thing, you can be sure of: Söll means: Safety In Action.**

**Please ask for our videofilm.**

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# Statics

## Minimum dimensions - Bolts and solidium



General rules for calculations and dimensioning of anchoring forces are found in DIN 18799, version August 1999. We separate between practical usability and safety of installation. When referring to safety of installation the installer should consider dead weight, forces activated during use and occasional forces (fall accidents, other external forces). Different safety factors have to be considered to cover those effects.

The advice mentioned below are to be followed in which case always the most unfavourable case shall be considered when dimensioning attachments:

- Extreme influences (fall accident):  
In case a load  $F_4 = 6 \text{ kN}$  acting along the centre of the ladder is to be assumed. This load may be distributed over four mounting brackets (if available).
- Varying influences (loads appearing during use):  
In this case it shall be assumed that loads  $F_2 = 1,5 \text{ kN}$  appears at a distance of 30 cm in front of the ladder centre and in distances of 2 m from each other influence the installation. Also consider a horizontal load  $F_5 = 0,3 \text{ kN}$  influencing the attachment at the most unfavourable location.

The minimum dimension of bolts amounts to M 12. When installing ladders to chimneys, only M 20 bolts manufactured from grade A 4 stainless steel should be used. M 12 can only be used if the fixing centres are less than 1250 mm. When ordering brackets, ensure the holes will accommodate the chosen bolt size.

### For brickwork

there are still only few plugs which are generally accepted by the site inspection personnel. The approved plastic plugs for the fastening of facades which are recommended by our competitors have been approved for fastening facade elements only. Determine the anchoring forces as described above and select suitable attachment elements. Evidence must be provided that the carrying capacity of the attachment elements satisfies the requirements of the anchoring force.

### For concrete structures

we recommend the use of plugs which have been accepted by the site inspection personnel, such as Fischer, Zykon, Anker, FZA, Hilti, HSL-type heavy-duty bolts, Liebig safety plugs, UPAT Top undercut plugs. Follow the technical instructions given by the manufacturer. With regard to the carrying capacity of the selected attachment elements the details provided in paragraph „**For brickwork**“ apply.

### For lattice towers:

The installation method depends on the individual profile. For this application we recommend our Angle Corner Mounting Bracket Part No. 11025 or the Mounting Bracket for diagonal struts Part No. BB-DA, BB-DK and BB-DI. Customized brackets upon request.

### Mounting distance

The maximum permissible mounting distance for profile 51 x 52 mm and 50 x 32 mm according to design is 1.680 mm.

### Extension of guide rails

If the rising path ends on a platform, the guide rail must be laid at least 1000 mm above the upper edge of the platform as per VBG 74. A 50x30x3 mm spar reinforcement must be used for a projection of more than 380 mm above the final fixing point in case of steel/stainless steel guide rails and a 50x50x4 mm spar reinforcement must be used for a projection of more than 525 mm above the final fixing point in case of aluminium guide rails. The spar reinforcement must be joined with the guide rail firmly after every 560 mm and must be laid above both the final mounting brackets.

## Ladder projection

In Germany and most other countries the regulations require a ladder projection of 150 mm from the obstacle. Please check on your local regulations for this. **Note:** Our accessories are designed for a projection of 150 mm. Custom made projections upon request. When using rest platforms the following ladder projections must be observed:

Ladder, anodized aluminium	without reinforcement	mind. 150 mm
	with reinforcement	mind. 180 mm
Ladder, galvanized steel/stainless steel pickled	without reinforcement	mind. 150 mm
	with reinforcement	mind. 160 mm

### Exception:

When rest platforms in combination with work platforms are installed a bracket projection of 180mm is required (to give adequate room for mounting elements for the platform).

## Lightning Protection

Söll-fall arrest systems can be used as part of a lightning protection system. Follow the national lightning protection regulations.

## Wind Loads

Reference surfaces (maximum planned area):

The reference surfaces for our ladders per 1m ladder length do not contain any basic force coefficient and are as follows:

Ladder	dry	with 3 cm ice	ice load
Y-spar, aluminium TB 150mm	0,096m <sup>2</sup>	0,209m <sup>2</sup>	12,16kg
Twin ladder, aluminium TB 150mm	0,150m <sup>2</sup>	0,328m <sup>2</sup>	13,83kg
Y-spar, galvanised steel/stainless steel	0,079m <sup>2</sup>	0,199m <sup>2</sup>	10,67kg
Guide rail, galvanised steel/stainless steel	0,055m <sup>2</sup>	0,115m <sup>2</sup>	5,97kg
Guide rail, aluminium	0,059m <sup>2</sup>	0,119m <sup>2</sup>	6,18kg

Basic force coefficient:  $C_{fo} = 1,6$

## Use of fall protection systems

Our fall protection systems have been designed to protect a person every 2 m against falling, providing the condition of the obstacle is capable of securely holding a load (6 kN for the first person + 1.5 kN for every other person).

## Minimum Gap Width

Mounting recommendations (valid for aluminum, steel and stainless steel ladders)

- Under positive ambient temperature, gap width 2 mm
- Under negative ambient temperature, gap width 3 mm
- During re-examination, make sure that the maximum gap width of 5 mm is not exceeded (independently from the ambient temperature)

## Laws, ordinances, accident prevention regulations and rules and regulation

### Standards

<b>DIN EN 353-1:</b>	Personal protective equipment against falls from a height - Guided type fall arresters including a rigid anchorage line
<b>DIN EN 353-2:</b>	Personal protective equipment against falls from a height - Guided type fall arresters including a flexible anchorage line
<b>DIN EN 354:</b>	Personal protective equipment against falls from a height - Lanyards
<b>DIN EN 355:</b>	Personal protective equipment against falls from a height - Energy absorbers
<b>DIN EN 360:</b>	Personal protective equipment against falls from a height - Retractable type fall arresters
<b>DIN EN 361:</b>	Personal protective equipment against falls from a height - Full body harnesses
<b>DIN EN 362:</b>	Personal protective equipment against falls from a height - Connectors
<b>DIN EN 363:</b>	Personal protective equipment against falls from a height - Fall arrest systems
<b>DIN EN 365:</b>	Personal protective equipment against falls from a height - General requirements for instructions for use and for marking
<b>DIN 18799-1 and 2:</b>	Ladders for construction works

### Stop devices and arrester systems

<b>DIN EN 795:</b>	Protection against falls from a height - Anchor devices
<b>DIN EN 358:</b>	Personal protective equipment for work positioning and prevention of falls from a height

We expressly point out that regional rules and regulations must be observed!

## Minimum free space under a user of a personal protective equipment against falls

„Minimum free space“ serves to describe the required vertical distance between a user of PPE against falls to an existing floor/platform or other object under him to ensure that in the case of a fall, the user does not reach and get injured against that object/level.

### Fall arrest systems with a rigid anchorage line

Systems with a rigid anchorage line as per EN 353-1

Largest permissible fall to arrest including plastic deformation = 1,00 m

Deformation of full body harness (with sliding fall arrester connected to D-ring at waist belt) = 0,50 m

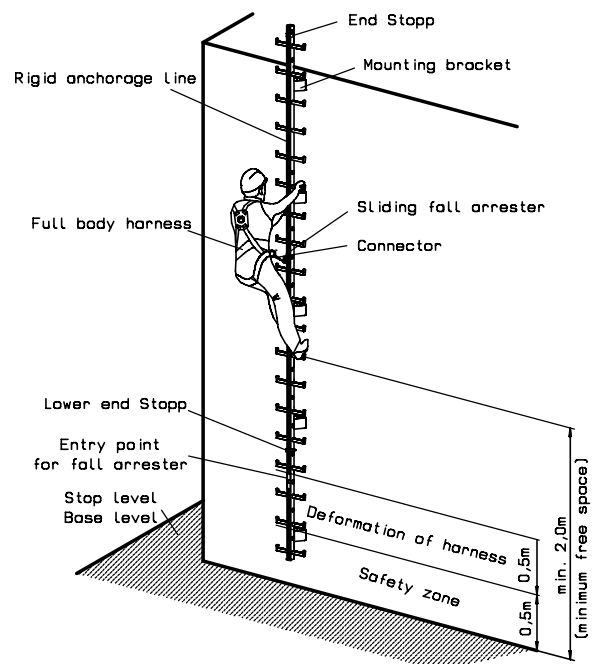
Safety zone = 0,50 m

**Smallest permissible free space = 2,00 m**

Above value is based upon largest allowed fall distance to arrest as per current standards. This distance is to be taken into consideration for fall arresters that stop a fall by means of braking against the rigid anchorage line.

Fall arresters that stop a fall by locking against fixed arrest points normally generate a shorter fall distance as they normally arrest the fall at the 3<sup>rd</sup> stop block in the anchorage line.

**Söll – Fall Protection Systems in use with fall arrester Comfort, Part. No. 22690, 22697. The minimum working height will be 1,50 m.**



### Notice:

The required free vertical space depends on the type of fall arrest system and the location of available anchorage points. Local safety regulations may give further advice and instructions regarding the locations and use of anchorage points.

## Minimum free space under a user of a personal protective equipment against falls

„Minimum free space“ serves to describe the required vertical distance between a user of PPE against falls to an existing floor/platform or other object under him to ensure that in the case of a fall, the user does not reach and get injured against that object/level.

### Fall arrest systems with a flexible anchorage line.

Systems with a sliding fall arrester on a flexible anchorage line ass per EN 353-2.

This configuration often includes longer connecting lanyards – rope lengths that stretch under load.

The values given are only valid when the sliding fall arrester is located on the anchorage line within a maximum distance of 0,5m from the upper anchorage point of the line. Should the fall arrester be further away from the anchorage point of the system, these values need to be increased, depending on the type and properties of the rope, by up to 0,2m per meter of distance between fall arrester and system attachment point.

Maximum permissible stopping distance, including plastic deformation  
(L = Length lanyard)

$$= 2 L + 1,00 \text{ m}$$

Deformation of harness

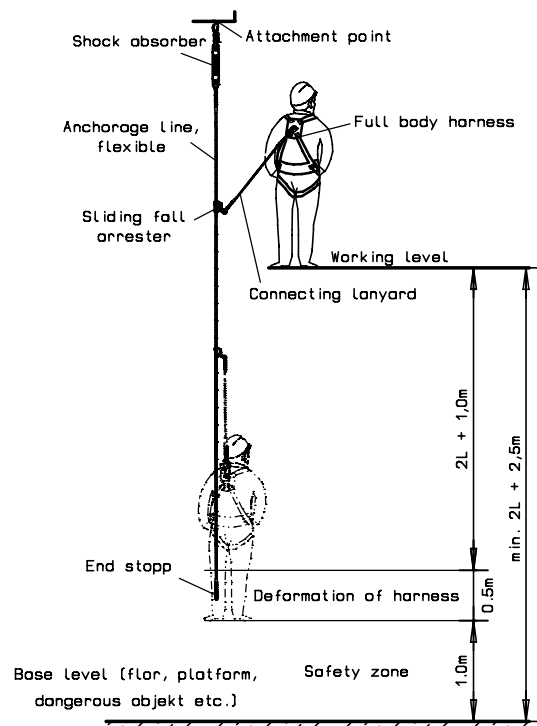
$$= 0,50 \text{ m}$$

Safety zone

$$= 1,00 \text{ m}$$

$$\text{Minimum safety space} = 2 L + 2,50 \text{ m}$$

for example if the lanyard has a length of 0,50 m, the minimum working height will be 3,50 m.



### Notice:

The required free vertical space depends on the type of fall arrest system and the location of available anchorage points. Local safety regulations may give further advice and instructions regarding the locations and use of anchorage points.

## Minimum free space under a user of a personal protective equipment against falls

„Minimum free space“ serves to describe the required vertical distance between a user of PPE against falls to an existing floor/platform or other object under him to ensure that in the case of a fall, the user does not reach and get injured against that object/level.

### Fall arrest system with shock absorber

Connecting lanyard with shock absorber acc.to EN355. The connecting lanyard could consist of a textile webbing, rope, chain or steel wire with shock absorber (tear-up webbing or friction-type). Its total length must not exceed 2,0m.

Maximum permissible fall arrest distance incl. plasticity deformation

( $L_t$  = shock absorber including lanyard)

$$\text{Safety zone} = 2 L_t + 1,75 \text{ m}$$

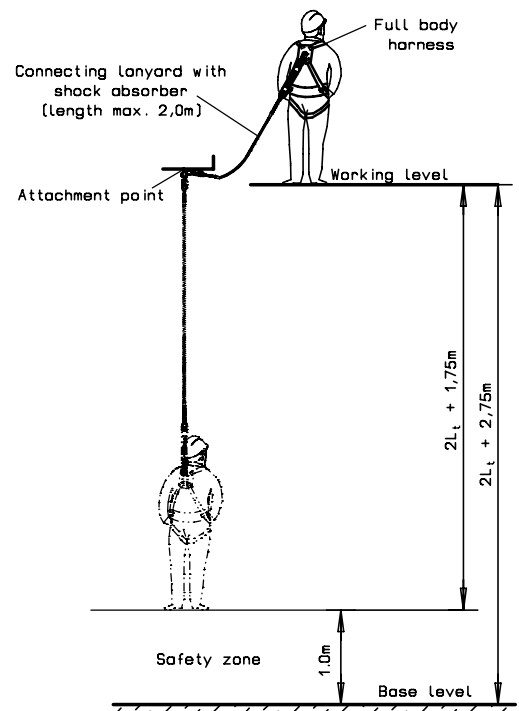
$$= 1,00 \text{ m}$$

$$\text{Minimum safety space} = 2 L_t + 2,75 \text{ m}$$

This value is based upon maximum values as per current standards.

Die Höhe kann reduziert werden, wenn eine andere Position des Anschlagpunktes verwendet wird.

- for example: if the length of the shock absorber including the lanyard is 1,30 m, the minimum working height will be 5,35 m.



### Notice:

The required free vertical space depends on the type of fall arrest system and the location of available anchorage points. Local safety regulations may give further advice and instructions regarding the locations and use of anchorage points.

## Minimum free space under a user of a personal protective equipment against falls

„Minimum free space“ serves to describe the required vertical distance between a user of PPE against falls to an existing floor/platform or other object under him to ensure that in the case of a fall, the user does not reach and get injured against that object/level.

### Fall arrest system with retractable lanyard

Retractable lanyard as per EN360.  
The retractable lanyard is attached to a location above its user's head.

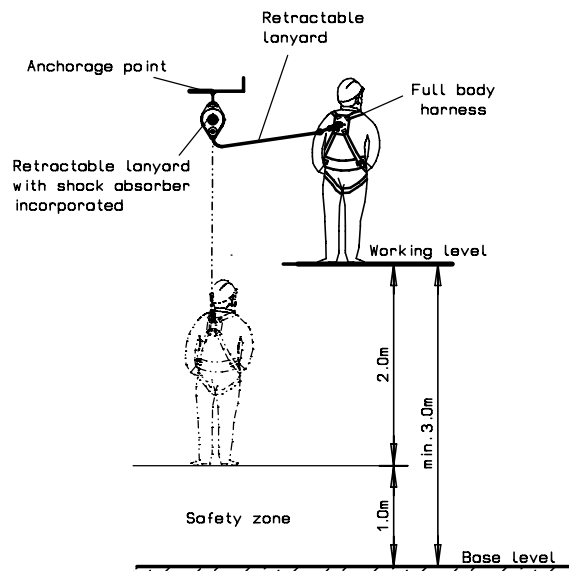
Maximum permissible fall arrest distance  
= 2,00 m

Safety zone  
= 1,00 m

**Minimum safety space = 3,00 m**

This value is based upon maximum values as per current standards.

Read and follow the applicable User's manual for the retractable lanyard for specific information on fall arrest distance.



### **Notice:**

The required free vertical space depends on the type of fall arrest system and the location of available anchorage points. Local safety regulations may further advise and instructions regarding the locations and use of anchorage points.