User Instructions

# Grade 10 Chain Assemblies

**Full details and safety information about Cobra Plus Grade 10 Chain Slings & Fittings**

## General precautions and recommendations

Load-lifting operations must always be carried out with due care and attention because they can constitute a threat to the safety of operators and to persons present in the vicinity of the equipment being used. For this reason, persons using lifting components must be properly trained and skilled. Prohibited or improper use must always be avoided and the condition of components to be used must always be checked prior to use.

Failure to observe even just one of the safety instructions given in this document can cause loss of control of the load with consequent injury or damage to persons or things. The precautions for use and maintenance do not cover all possible methods for use or all probable or possible use situations; nevertheless, reading and understanding this information is essential for safe use of lifting accessories.

## Terms & Definitions

Cobra Alloy products are manufactured in conformity with common international technical standards and meet the essential safety requirements of the Machinery Directive 2006/42/EC. For a better understanding of the terms and abbreviations used in this catalogue, brief definitions are given below:

**Sling:** An assembly consisting of one or more sections of chain or webbing slings, together with accessories at top and bottom ends for attaching loads to the hook of a crane or any other type of lifting device.

**Working Load Limit (WLL):** Maximum weight that the sling is certified to support, under normal lifting conditions.

**Manufacturing Proof Load (MPF):** The force applied during manufacture, to test the entire sling or any part of it.

**Breaking Factor (BF):** The maximum force that the component or chain can withstand during the destructive, static tensile stress test.

**Effective length (EL):** This is the length of a lifting sling with no load attached, measured between the lifting components at the points where the load is applied.

**Skilled person:** A designated person who is properly trained (see para. 4.18 of EN ISO 9001-1994), has the necessary knowledge and practical experience and has received the instructions needed to carry out the required inspections.

**Inspection:** Visual inspection of the condition of the sling to identify any obvious damage or wear which could adversely affect its operating capabilities.

**Thorough examination:** A visual examination performed by a skilled person who, if necessary, uses other means such as non destructive tests, in order to identify any damage or wear which could adversely affect the operating capabilities of the sling.

## Component Selection & Limitations of Use

The technical performances indicated in this document relate exclusively to new products, or products that may be considered as new, checked and properly maintained. The maximum operating load values for each product can be affected by the product's condition and wear, any overloading, corrosion, distortion, or any other type of improper use or unauthorised modification. The product dimensions shown in this catalogue are purely indicative and may be modified by , without notice, to comply with new regulations or technical requirements. For exact dimensions and tolerances, please contact George Taylor And Company Lifting Gear Limited. Factors to be considered for selection and correct use of the lifting system:

**Weight of the load to be lifted:**
It is essential to know the weight of the load to be lifted (if necessary estimated by calculation) and its centre of gravity in order to avoid dangerous tilting during lifting. Multiple-leg slings must be selected on the basis of angles for use specified in the tables contained in this catalogue and the working loads indicated must never be exceeded.

**Variation of load exerted on the legs due to the sling angle:**
Bear in mind that the load limit of the sling reduces as the angle between the legs is increased. In the case of multiple-leg slings, try to choose a configuration that allows equal angles to be maintained between the vertical and each of the legs. Multiple-leg slings must be selected on the basis of angles for use specified in the tables contained in this catalogue and the working loads indicated must never be exceeded.

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In asymmetrical lifting situations (where different angles are formed between the vertical and the chain legs - for example when one leg of a multiple-leg sling is shortened), the load supported is not uniformly distributed and so the sling must be used at half the working load limit (WLL) indicated on the identification tag.

### Effects of the environment:
Chain slings must not be used in acid environments or immersed in acid or caustic solutions or vapours; they must therefore never be subject to pickling, hot dip galvanising processes or to any other galvanising process in general. Bear in mind that strong oxidising agents corrode the metal of the sling.

The high tensile strength of the heat treated alloy material is susceptible to hydrogen embrittlement when exposed to acidic or caustic substances, atmospheres and environments.

Don’t use the items in offshore application or for the lifting of people or dangerous loads such as liquid metals, nuclear, corrosive or caustic substances and materials.

The possibility of using slings in the presence of mineral acids depends on the type of acid, its concentration, the temperature and the duration of contact. In any case, any sling contaminated by aggressive chemicals or their vapours must immediately be taken out of service, washed in cold water, dried and examined by a skilled person.

### Effect of high and low temperatures.
Variations of the working load limit (WLL) based on the operating temperature are shown in table 1. However difficult it may be to assess, never underestimate the temperature that might be reached during operation.

**Tab 1.**
**% Reduction of working load limit according to the temperature**

| Temp | less than -30°C | -30°C < T ≤ 200°C | more than 200°C |
|---|---|---|---|
| % reduction | Use not permitted | No reduction | Use not permitted |

## INFORMATION FOR USE

Safe use of slings

Never walk or stand under a suspended load. Before moving loads in the workplace, the danger must be adequately signalled and any persons in the danger area must be moved away. Avoid and try to prevent any dangerous swinging due to sudden slowing down or acceleration of the load, Also avoid jerky movements during lifting, otherwise reduce the load as indicated in table 2. Never leave a suspended load unattended.

If a multiple-leg sling is used with fewer than its total number of legs, the working load limit (WLL) marked on the identification tag must be reduced as indicated in table 3. Any unused legs of the sling must be gathered together and hooked out of the way to prevent any risk of them catching while the load is being moved.

Always keep hands and other parts of the body well clear of sling chains and components, in order to avoid injury as the sling is tensioned during lifting. Before starting to lift, slowly take up the slack in the sling legs and lift the load slowly and in a controlled way until it safely assumes the anticipated position. Do not hang onto the sling. If slings are to be used in extremely dangerous conditions, the degree of risk must be assessed by a skilled person and the working load limit must be reduced accordingly.

### Practical advice for use
The load’s anchor points are determined on the basis of its centre of gravity, in order to avoid swinging or tilting as the load is lifted.

Balancing of the load can be achieved by varying the position of the hooking points or by using the special shortening hooks on one or more of the legs (Fig.1).

Fig.1



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**Load limit variation in presence of impulsive load**

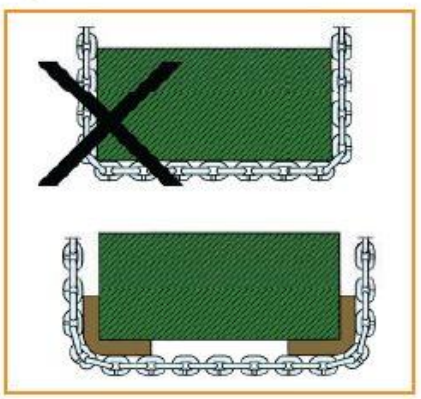
| Impulsive load | light impulse | medium impulse | strong impulse |
|---|---|---|---|
| Reduction factor | 1 | 0.7 | not allowed |

**Tab 3.**

| Type of sling | Number of legs used | WLL factor to be applied on I.D. tag |
|---|---|---|
| 2 legs | 1 | 1/2 |
| 3 or 4 legs | 2 | 2/3 |
| 3 or 4 legs | 1 | 1/3 |

The master link must be correctly located in the bottom of the crane hook and must never ever be placed on the tip of the hook or jammed onto the hook latch. The master link must be free to tilt in every direction and its movement must not be impeded by joining components or other obstructions. Prevent the chain slings from coming into contact with sharp edges which could damage them, when under load, by providing suitable protection if there is a risk of this happening (Fig. 2). When the chain slings rest on corners, the working load limit (WLL) must be reduced accordingly, as specified in Table 4.

Fig.2



**Tab 4.**

**Working load variation depending on use of chain in contact with edges.**



| Use of the chain on edge | R≥2 x d chain | R≥ d chain | Sharp edge |
|---|---|---|---|
| Reduction factor | 1 | 0.7 | 0.5 |

Do not knot or twist the chains to shorten them. Use only the shortening hook provided on the sling. For correct use of this hook, please see the paragraph ‘Use of hooks’. Clear the area in which the load is to be deposited ,of all obstructions and make sure that the floor or ground is able to support its weight. To avoid any dangerous damage, lower the load to the ground carefully, taking care to ensure that the sling does not become tangled in the load. The sling must not be removed from beneath the load while the load is resting on it, and must not be dragged across the floor or abrasive surfaces.

**Slinging methods**

Loads can be slung in various ways and the following are a few examples:

**a) Straight leg**

The bottom fitting is connected directly to the attachment point. Suitable for lifting loads with a single, well-balanced attachment point (Fig 3.).

**b) Running knot**

Consists of a running noose that tightens when the load is lifted (Fig. 4-5-5B). This method has the advantage of compressing the load and should be used when there are no suitable attachment points. if a running knot is used, the working load limit (WLL) of the sling must not exceed 80% of that marked on the identification plate.

Fig.3



Fig.4




Fig.5

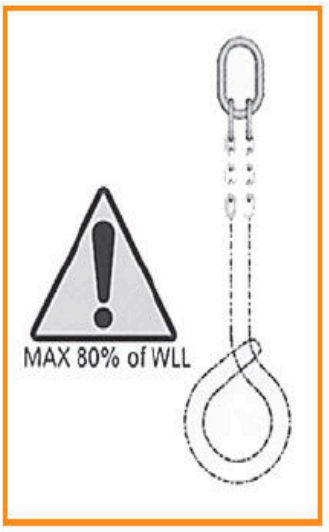
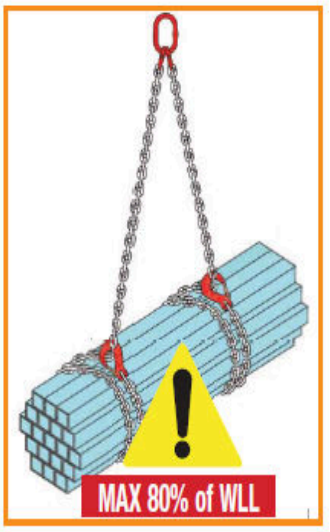



Fig.5B




## Use of hooks

**a) Shortening hook**

Insert the link into groove G, making sure it is correctly positioned; attach the load to the end hook of the shortened leg (Fig 6). No load must be applied to the tip of the shortening hook.

**b) Clevis Sling Hook**

Attach the load, taking care to locate it in the centre of the hook; never load the tip of the hook. When multiple-leg slings are used, arrange the hooks with their tops facing outward (Fig 7). Check that the closing device over the mouth of the hook (safety latch - which must never be subjected to a load) is working properly. Once the load has been hooked on, make sure that the safety latch closes correctly into its seating.

**c) Self Locking Hook**

To open the hook mouth locking device, operate the safety latch by pressing it downwards. Attach the load, taking care to locate it in the centre of the hook; never load the tip of the hook. when multiple-leg slings are used, arrange the self-locking hooks with their tips facing outwards. Always check that the safety lock is properly locked.

Fig.6

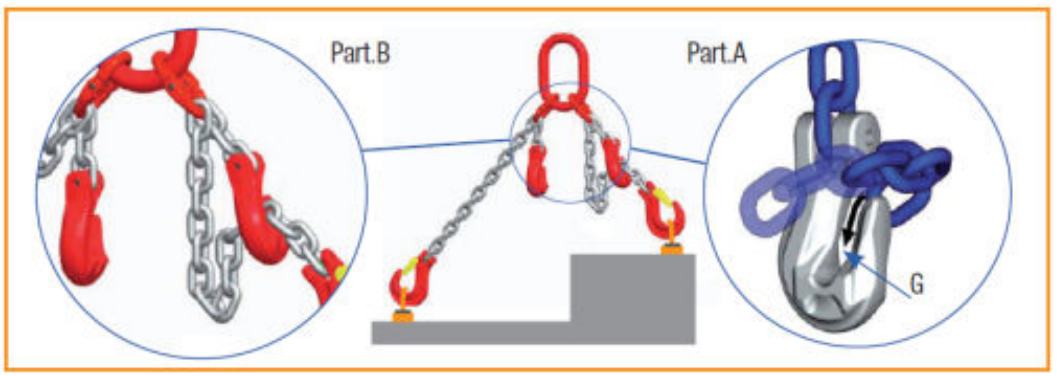



Fig.7



## STORAGE AND MAINTENANCE OF LIFTING SLINGS

### Storage

To avoid damage, chain slings must be stored hanging on suitable brackets and not left lying on the ground. If chain slings are to remain unused for long periods of time, it is advisable to clean and lightly oil them to protect them against corrosion.

### Periodic inspections

Regularly inspect the chains before each use, in a clean, well-lit plate, to make sure they are not defective or damaged. Keep a record of all periodic inspections, which must be carried out by a skilled person. The maximum interval between inspections is one year, but frequency may vary according to legislation in force in the country in which the chains are used. In the case of continuous or particularly heavy use the frequency of inspections must be increased accordingly.

### Maintenance and repair

Repair or maintenance of slings must be carried out by expert and skilled personnel. Components which show signs of distortion, cracks, breaks, serious corrosion or any other damage, or on which the maximum permissible wear limit has been reached, must be replaced with genuine spare parts (Fig 9-10).

When sling components have to be replaced, always use new pins and spring pins. If any of the chain links are damaged, always replace the entire leg of the sling. Minor defects such as small nicks or gouges should be removed with extreme care, using a file. The surface must never show signs of an abrupt variation in the cross sectional area of the material. Always check that removal of minor defects has not reduced the nominal diameter of the section by more than 5% . Never carry out any welding operations on the chain or its accessories. In conclusion, if any defects or damage are found which could affect safe use of the slings, they must be taken out of service and thoroughly inspected by skilled personnel.

### CONDITIONS REQUIRING IMMEDIATE WITHDRAWAL OF THE SLING FROM SERVICE

If any one of the following conditions occurs, the sling must immediately be taken out of service:

- Identification plate or label illegible or missing;
- One or more components showing distortion, cracks, breaks or any sign of damage (fig. 8-10);
- The opening of a hook mouth differs by more than 10% from the nominal size indicated in the catalogue (fig 10);
- The sling has been used for a load exceeding the permissible WLL;
- The sling has been exposed to temperatures higher or lower than those permissible;
- The chain links no longer move freely against each other;
- The chain is worn by more than 10% of the nominal diameter(table 5).

Fig.8

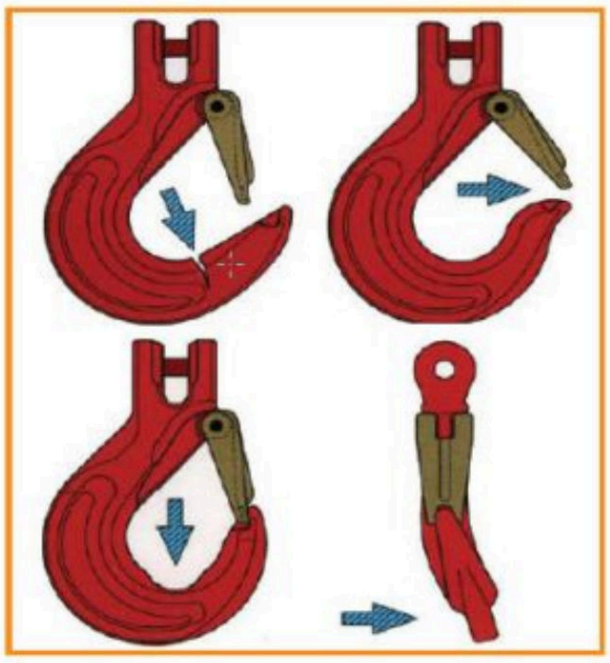


Fig.9

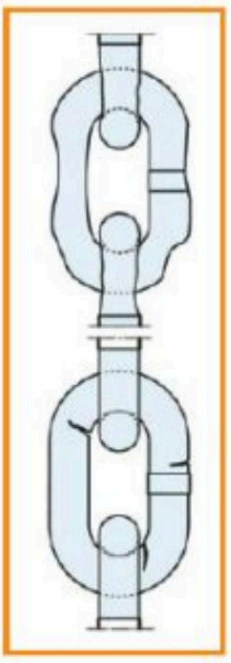
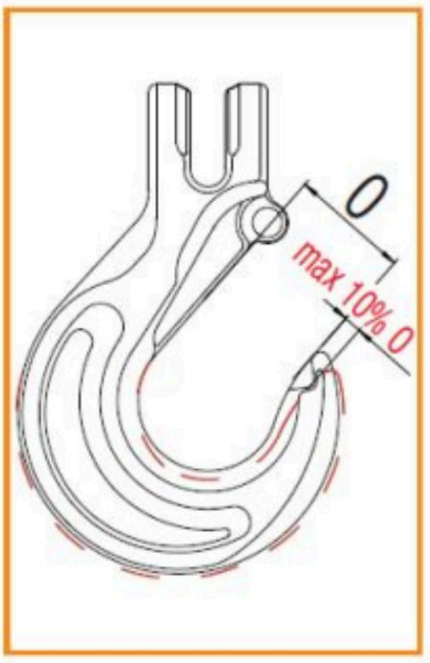
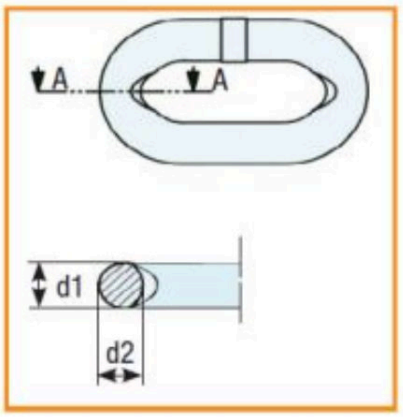


Fig.10



**Tab 5.**

| Chain | Nominal diameter (mm) | Minimum diameter (d1+d2) / 2 (mm) |
|---|---|---|
|  | 6 | <5.4 |
| | 7 | <6.3 |
| | 8 | <7.2 |
| | 10 | <9.0 |
| | 13 | <11.7 |
| | 16 | <14.4 |
| | 18 | >16.2 |
| | 20 | <18.0 |
| | 22 | <19.8 |