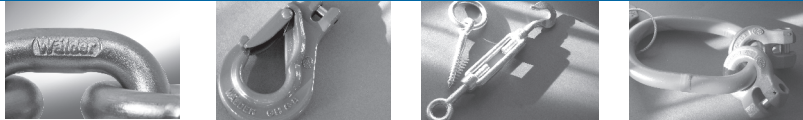


cromox[®] General Safety Notes for
Chain Slings (Grade 5)



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General Safety Notes for CROMOX® Chain Slings (Grade 5)

Instructions for safe use and avoidance of danger.

Keep this safety note/manufacturer's declaration for the entire utilisation time.

1. Choosing the appropriate chain sling:

- Application is only allowed for slinging and lifting loads.
- It is to be made sure that the safe working loads indicated on the attached tags are not exceeded.
- Changes in the safe working load in dependence of the temperature t are as follows:

	safe working load in dependence of the temperature t			
	$-45^{\circ}\text{C} < t \leq 350^{\circ}\text{C}$	$350^{\circ}\text{C} < t \leq 450^{\circ}\text{C}$	$450^{\circ}\text{C} < t \leq 550^{\circ}\text{C}$	above 550°C
working load in %	100	75	50	not permissible

Use within the admissible temperature range means no permanent reduction of the safe working loads after return to room temperature.

- Use in acids and alkalis or application in acid or alkaline vapours is only admissible if the material is resistant to corrosion.
- Any self-effected modifications, such as exchange of components, thermal or galvanic treatment, will invalidate the product liability of Ketten Walder GmbH.
- In the case of particularly endangering conditions (lifting of persons; caustic substances; liquid metals; etc.), the degree of endangerment is to be assessed by a competent person and the safe working load is to be adjusted accordingly.
- On continuous operation, i. e. at automated production lines with high work cycles and often repeated similar movements and ways of transportation, a high dynamic strain (\Rightarrow 20.000 stress cycles) occur. There is the risk of damage of the products due to the high dynamic strain. In these cases it is essential to reduce the tension i. e. corresponding to mechanism group 1Bm M3 acc. to DIN EN 818-7 by using a higher nominal thickness or size.

2. Visual inspection:

Prior to the first application, it is to be made sure that

- the chain sling delivered is exactly the one that was ordered,
- the test certificate has been provided,
- the chain sling is complete with markings and indications as to the safe working load and that those data are consistent with the test certificate,
- all the details concerning the chain sling have been included in the card index.



Prior to each use

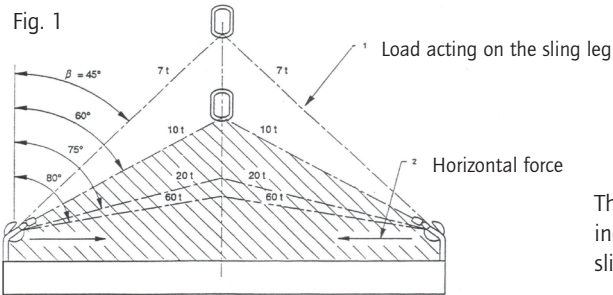
the chain has to be visually inspected to check if there is any apparent damage or sign of wear.

3. Handling of the load:

- Any particular specifications regarding the load have to be observed.
- Before starting the lifting operation, it has to be made sure that the load is freely movable and that it is not anchored or fixed.
- The mass of the load must be known. If not, it can be taken from documents or shall be determined by calculation.
- The location of the centre of gravity should be determined when choosing the sling points and should meet the following conditions:

chain slings	lifting point
single-leg	to be perpendicular over the centre of gravity
double-leg	for both legs to be over the centre of gravity
3- and 4-leg	if ever possible to be evenly distributed over a plane about the centre of gravity and located over the centre of gravity

- To ensure the stability of the load when using multi-leg chain slings, the sling angle β should be $> 15^{\circ}$ and should be within the indicated range. It must, however, not exceed 60° (see example in Fig. 1).



The hatched area shows angles of inclination greater than 60°, where sling chains must not be used.

- The load hook for attaching the chain sling should be directly over the centre of gravity.

4. When applying a load to a sling, the following has to be observed:

- Chain legs must not be twisted or knotted.
- A load should always be attached to the hook saddle and must never be applied to the tip of a hook.
- Hooks and suspension links must be freely movable in order to prevent deformation due to bending stress.
- When using a multiple leg chain sling in a vertical hitch, the hooks must face outwards.
- When using the choker hitch, the safe working load is reduced to 80 %.
- In order to avoid damage to chains or to the load when using choker hitches, it may be necessary to use intermediate layers or edge protection.
- In order to avoid that a load swings in a dangerous manner, it is recommended to use a holding rope.
- Do not shock-load chain slings or jerk loads.
- In indicating the safe working load, it is assumed that the individual legs of the chain sling are loaded symmetrically. Symmetrical loading can be assumed if all of the following conditions are met:
 - ▶ the load is less than 80 % of the rated safe working load and
 - ▶ the angle of inclination for each chain leg is not less than 15° and
 - ▶ the angles of inclination of the chain legs do not deviate by more than 15° from each other and
 - ▶ the sling attachment points for 3- and 4-legged chain slings are located in a sling plane of not more than 15°.
- For unsymmetrical loading, the classification of the lifting operation as well as the determination of the safe working load is to be entrusted to a competent person. Alternatively in the case of unsymmetrical loading, the safe working load should be reduced to 50 % of the rated value.
- When using multi-legged chain slings, the following is to be observed if not all of the legs are required for lifting:
 - ▶ Individual legs which are not being used should be hooked back onto the master link.
 - ▶ In such cases, the following load factors apply:

Type of chain sling	Number of individual legs used	Factor to be applied with respect to the rated SWL
2-legged	1	1/2
3- and 4-legged	2	2/3
3- and 4-legged	1	1/3

- All influencing factors are to be taken into account when determining a sling type and choosing the appropriate chain sling, with the safe working load to be greater than the load to be lifted.
- Safety during lifting operations:
 - ▶ ISO 12480-1 is to be observed in the planning and carrying out of lifting operations.
 - ▶ Hands and other body parts are to be kept clear when tautening the chain sling.
 - ▶ No other persons must be put in danger.

5. When putting the load down, the following is to be observed:

- The place where the load is to be put down should be prepared and made sufficiently accessible.
- The ground must have sufficient load-bearing capacity.
- It may be necessary to stabilise the load by using wooden blocks or the like.
- In order to prevent damage, the sling chain must not be wedged, nor pulled out by means of the lifting gear.
- Storage of chain slings that are not in use:
 - ▶ In order to minimise corrosion attacks on chain slings that have been used in acids or alkalis or in acid or alkaline vapours, those chain slings should be cleaned thoroughly also before removing them from operation temporarily.

- ▶ Chain slings should be stored on specially designed and provided racks.
If chain slings are lying on the floor, there is a risk that they might get damaged.
- ▶ Chain slings remaining on the crane hook should be hooked back onto the master link.
- ▶ If chain slings are not to be used in the foreseeable future, they are to be cleaned and protected against corrosion.

6. Maintenance:

Inspections should be performed by a competent person at intervals of no more than 12 months. If necessary, these intervals should be shortened in dependence of the circumstances of use.

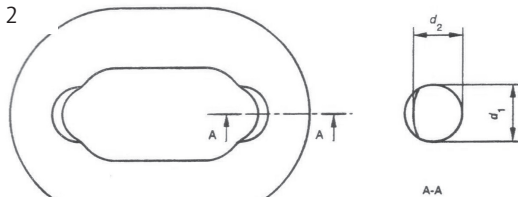
- Prior to inspection, the chain slings are to be cleaned thoroughly.
- Any cleaning method that does not attack the basic material is admissible, whereas any processes or procedures that may cause hydrogen embrittlement, overheating or material abrasion or which may hide surface damage are to be avoided.
- Sufficient lighting is to be provided during inspections, and all components of the chain sling are to be examined.
- By means of visual inspections, the chain slings are to be checked for unmistakable identification (tags) as well as for any visually noticeable defects.



If any of the following defects are found, the chain sling has to be removed from operation and inspected by a competent person or serviced/repaired:

- ▶ Marking/identification illegible or missing.
- ▶ Deformation of suspension or sling parts.
- ▶ Inadmissible elongation of chain links, differences in leg lengths.
- ▶ If, as a result of wear and tear, the nominal thickness of a chain link is < 90 % (see Figure 2).

Fig. 2



$$\frac{d_1 + d_2}{2} = < 0,9 \times d_n$$

- ▶ Damage (cuts, notches, grooves, cracks, discoloration due to heat, excessive corrosion, bent or twisted links, or other defects).
- ▶ Signs of widening (excessive throat opening) or deformation of hooks.
The widening must not exceed 10 % of the nominal measure; if hooks with safety catch are used, the catch must not become disengaged.
- Inspections are to be recorded and proved in writing.

7. When performing maintenance work, the following is to be observed:

- Each individual part of the chain sling has to meet the requirements of DIN 5687, DIN 5688 Part 1 and DIN 7541.
- Individual chain links are not to be replaced - replace complete legs instead.
- Any individual parts which are broken, noticeably deformed, seriously corroded, or show deposits which cannot be removed, are to be discarded or replaced.
- Minor notches or furrows in parts of chain slings may be evened out if the remaining material thickness in this point is > 90 % of the nominal thickness and no sudden cross-sectional change is noticeable.
- Welded chain slings may only be repaired by the manufacturer.
- If welding operations have been performed on chain slings, each individual leg which has been repaired has to be tested subsequently with twice the SWL value.
- Replacement of mechanical connection links requires no load testing if the individual part testing is certified.



- ▶ CE Label for completely assembled chains.
- ▶ The label guarantees that the technical requirements of the EC guideline have been met.

Caution:



It is prohibited to assemble chains and components of different grades.