



# Rope And Marine Services Limited

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## Information on the use and maintenance of polyester flat woven webbing slings (to EN 1492-1:2000+A1 2008) and polyester roundslings (to EN 1492-2:2000+A1 2008)

### Use in adverse conditions and hazardous applications.

The materials from which flat woven webbing slings and roundslings are manufactured have selective resistance to chemicals. The resistance of man-made fibres to chemicals may be summarised as:

- a) Polyester (PES) is resistant to most mineral acids but is damaged by alkalis;
- b) Polyamides (PA) are virtually immune to the effect of alkalis: however, they are attacked by mineral acids;
- c) polypropylene (PP) is little affected by acids or alkalis and is suitable for applications where the highest resistance to chemical solvents is required.

Solutions of acids or alkalis, which are harmless can become sufficiently concentrated by evaporation to cause damage. Contaminated slings should be taken out of service at once, soaked in cold water, dried naturally and referred to a competent person for examination. Slings with grade 8 fittings should not be used in acidic conditions. Contact with acids or acidic fumes causes hydrogen embrittlement to grade 8 materials. If exposure to chemicals is likely, the manufacturer or supplier should be consulted.

Roundslings and flat woven webbing slings are suitable for use and storage in the following temperature ranges:

- a) Polyester and polyamide: -40 degrees C to 100 degrees C,
- b) Polypropylene: -40 degrees C to 80 degrees C.

At low temperatures ice formation will take place if moisture is present. This may act as a cutting agent and an abrasive causing internal damage to the sling. Further, ice will lessen the flexibility of the sling, in extreme cases rendering it unserviceable for use.

These ranges vary in a chemical environment, in which case the advice of the manufacturer or supplier should be sought. Limited indirect ambient heating, within these ranges is acceptable for drying.

The man-made fibres from which roundslings and flat woven webbing slings are produced are susceptible to degradation if exposed to ultra- violet radiation. Roundslings and flat woven webbing slings should not be stored in direct sunlight or sources of ultra-violet radiation.

### Inspection of Roundslings and flat woven webbing slings in service.

Before first use of the sling it should be ensured that:

- a) The sling corresponds precisely to that specified on the order;
- b) The manufacturer's certificate is to hand;
- c) The identification and WLL marked on the sling correspond with the information on the certificate.



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Before each use, the sling should be inspected for defects and to ensure that the identification and specification are correct. A sling that is unidentified or defective should never be used but should be referred to a competent person for examination.

During the period of use, frequent checks should be made for defects or damage, including damage concealed by soiling, which might affect the continued safe use of the sling. These checks should extend to any fittings and lifting accessories with the sling. If any doubt exists as to the fitness for use, or if any of the required markings have been lost or become illegible, the sling should be removed from service for examination by a competent person.

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The following are examples of defects or damage likely to affect the fitness of slings for continued safe use. Any damage evident in the cover of a roundsling indicates potential damage to the load bearing core.

- a) Surface chafe. In normal use, some chafing will occur to the surface fibres of roundsling covers and flat woven webbing slings. This is normal and has little effect. However, with flat woven webbing slings, the effects are variable and as the process continues, some loss of strength should be expected. Any substantial chafe, particularly localised, should be viewed critically. Local abrasion, as distinct from general wear, can be caused by sharp edges whilst the sling is under tension and can cause serious loss of strength in the case of flat woven webbing slings, or can lead to a roundsling cover becoming cut.
- b) Cuts. On flat woven webbing slings, cross or longitudinal cuts, cuts or chafe damage to selvages, cuts to the stitching or eyes. On roundslings, cross or longitudinal cuts in the cover, or any damage to the stitching, raise serious doubts as to the integrity of the core.
- c) The exposed core on a roundsling.
- d) Chemical attack. Chemical attack results in local weakening and softening of the material. This is indicated by flaking of the surface which may be plucked or rubbed off. With roundslings, any sign of chemical attack to the cover raises serious doubts as to the integrity of the core.
- e) Heat or friction damage. This is indicated by the fibres of the webbing or the fibres of the roundsling cover material taking on a glazed appearance and in extreme cases fusion of the fibres can occur. With roundslings this would indicate a weakening of the core.
- f) Damaged or deformed fittings.

## Correct selection and use of roundslings & flat woven webbing slings

When selecting and specifying roundslings and flat woven webbing slings, consideration should be given to the required working load limit, taking into account the mode of use and the nature of the load to be lifted. The size, shape and weight of load, together with the intended method of use, working environment and nature of the load, all affect the correct selection.

The selected sling should be both strong enough and of the correct length for the mode of use. If more than one sling is used to lift a load, these slings should be identical. The material from which the sling is made should





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not be affected adversely by the environment or the load. Consideration should also be given to ancillary fittings and lifting devices which should be compatible with the slings. The termination of flat woven webbing slings should also be considered i.e. whether fittings or soft eyes are required.

When using flat woven webbing slings with soft eyes, the minimum eye length for a sling for use with a hook should be not less than 3.5 times the maximum thickness of the hook and in any event the angle formed in the eye of the sling should not exceed 20 degrees.

When connecting a sling with soft eyes to a lifting appliance, the part of the lifting appliance which bears on the sling should be essentially straight, unless the bearing width of the sling is more than 75mm in which case the radius of curvature of the lifting appliance attachment should be at least 0.75 times the bearing width of the sling. Wide webbings may be affected by the radius of the inside of the hook as a result of the curvature of the hook preventing uniform loading across the width of the webbing.

Slings should not be overloaded: the correct mode factor should be used. Working load limits for some modes are shown on the label. In the case of multi-leg slings the maximum angle to the vertical should not be exceeded.

Good slinging practises should be followed: the slinging, lifting and lowering operations should be planned before commencing the lift. Slings should be correctly positioned and attached to the load in a safe manner. Roundslings should be placed on the load such that they are able to adopt the flattened form and the loading is uniform across their width. Flat woven webbing slings should be placed on the load such that the loading is uniform across their width. Slings should never be knotted or twisted.

Stitching should never be placed over hooks or other lifting devices: the stitching should always be placed in the standing part of the sling. Damage to labels should be prevented by keeping them away from the load, the hook and the angle of choke.

In the case of multi-leg slings, the WLL values have been determined on the basis that the loading of the sling assembly is symmetrical. This means that when the load is lifted the sling legs are symmetrically disposed in plan and subtended at the same angle to the vertical. In the case of three leg slings, if the legs are not symmetrically disposed in plan the greatest tension is in the leg where the sum of the plan angles to the adjacent legs is greatest. The same effect occurs in 4 leg slings except that the rigidity of the load should also be taken into account.

NOTE With a rigid load the majority of the weight may be taken by only three, or even two, of the legs, with the remaining legs only serving to balance the load.

Slings should be protected from edges, friction and abrasion, whether from the load or the lifting appliance. Where reinforcements and protection against damage from edges and/or abrasion is supplied as part of the sling, this should be correctly positioned. It may be necessary to supplement this with additional protection.

The load should be secured by the sling(s) in such a manner that it cannot topple or fall out of the sling(s) during the lift. Sling(s) should be arranged so that the point of lift is directly above the centre of gravity and the



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load is balanced and stable. Movement of the sling over the lifting point is possible if the centre of gravity of the load is not below the lifting point.

When using basket hitch, the load should be secure since there is no gripping action as with choke hitch and the sling can roll through the lifting point. For slings which are used in pairs, the use of a spreader is recommended so that the sling legs hang as vertically as possible and to ensure that the load is equally divided between the legs.

When a sling is used in choke hitch, it should be positioned so as to allow the natural (120 degrees) angle to form and avoid heat being generated by friction. A sling should never be forced into position nor an attempt made to tighten the bite. A double choke hitch provides greater security and helps to prevent the load sliding through the sling.

Care should be taken to ensure the safety of personnel during the lift. Persons in the danger area should be warned that the operation is to take place and, if necessary, evacuated from the immediate area. Hands and other parts of the body should be kept away from the sling to prevent injury as the slack is taken up. Reference should also be made to ISO 12480-1 for planning and management of the lifting operation and the adoption of safe systems of working. A trial lift should be made. The slack should be taken up until the sling is taut. The load should be raised slightly and a check made that it is secure and assumes the position intended. This is especially important with a basket or other loose hitches where friction retains the load. If the load tends to tilt, it should be lowered and attachments repositioned. The trial lift should be repeated until the stability of the load is ensured. Care should be taken when making the lift to ensure that the load is controlled, e.g. to prevent accidental rotation or collision with other objects. Snatch or shock loading should be avoided as this will increase the forces acting on the sling. A load in the sling or the sling itself should not be dragged over the ground or rough surfaces. The load should be lowered in an equally controlled manner as when lifted. Trapping the sling when lowering the load should be avoided. The load should not rest on the sling, if this could cause damage and pulling the sling from beneath the load when the load is resting on it should not be attempted.

On completion of the lifting operation the sling should be returned to proper storage. When not in use, slings should be stored in clean, dry and well ventilated conditions, at ambient temperature and on a rack, away from any heat sources, contact with chemicals, fumes, corrodible surfaces, direct sunlight or other sources of ultra-violet radiation. Prior to placing in storage, slings should be inspected for any damage which may have occurred during use. Slings should never be returned damaged to storage. Where slings have come into contact with acids and/or alkalis, dilution with water or neutralisation with suitable media is recommended prior to storage. Depending on the material of the sling and the chemicals in point it may be necessary to refer to the supplier for additional recommendations on the cleaning procedure. Slings which have become wet in use, or as a result of cleaning, should be hung up and allowed to dry naturally.

## Examination and repair

Examination periods should be determined by a competent person, taking into account the application, environment, frequency of use and similar matters, but in any event, slings should be visually examined at least annually by a competent person to establish their fitness for continued use. Records of such examinations should be maintained. Damaged slings should be withdrawn from service. Never attempt to carry out repairs to the slings yourself.