

## Textile slings – lifting belts and round slings

### User instructions

#### 1. General information

**The following are key factors in relation to the use of textile slings:**

- Laws, regulations and directives
- Load (dimensions, weight and centre of gravity)
- Load surface (roughness, shape, edges)
- Area of use (temperatures of the loads and the environment, chemicals, aggressive substances)
- Fastening method (depending on the lifting equipment) and the properties of the load)

**The benefits of textile slings:**

- High working load limit with low tare weight
- Multiple selection options based on working load limit, shape and dimensions
- Suitable for production in any length
- Suitable for use with aggressive substances providing an appropriate material is selected
- Low moisture absorption (max. 0.4%)
- Anti-slip due to the wide load support area
- Excellent durability (non-rotting)
- Inherent rigidity in the case of lifting belts
- Loads protected by the slings adapting well to their shape
- Suitable for compact storage
- High wear resistance
- Non-electrically-conductive when dry
- Simple handling without risk of injury to the people using the sling

#### **Securing and safety are mandatory**

Transportation involves a broad range of risks for not only people but also loads/transported goods. These risks have to be prevented or minimised to the greatest possible extent as the consequences of loads slipping, tipping over or dropping due to being improperly or unsuitably fastened or transported are simply too serious.

It is for this reason that in addition to the self-responsibility of company owners, vehicle owners, load masters, riggers and drivers, compliance with applicable laws, regulations and directives is also mandatory.

Examples of key legislation include:

- European Machinery Directive (EC 2006/42/EC) for all EU Member States on compliance with the CEN standard
- European standards:
 

<b>EN 1492-1</b>	‘Flat woven webbing slings made of man-made fibres for general purpose use’
<b>EN 1492 2</b>	‘Round slings made of man-made fibres for general purpose use’

**The following is classed as a German standard:**

- BGR100-500; Section 2.8 ‘Operating lifting equipment in hoist mode’

## 2. Basic rules on the use of lifting belts and round slings

*(Note: SHZ primarily manufactures these products from polyester (PES), single-strap)*

### Selecting the right sling type:

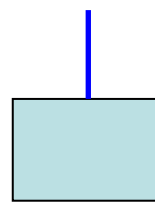
- Prior to its initial use, always ensure that the round sling or lifting belt precisely matches the item that was ordered and that the manufacturer's certificate has been provided. Prior to use, the appropriate lifting belt or round sling must be selected under consideration of the weight, the intended fastening method and the surface properties of the load.
- Textile slings must not be overloaded. In other words, the permissible working load limit must never be exceeded.
- In view of the above, the load's weight and centre of gravity must be precisely determined and slings selected of a suitable length and with a suitable working load limit under consideration of the selected fastening method.
- The working load limit (WLL) of a round sling or lifting belt must be calculated as follows for every use under consideration of the fastening factor (M) for the selected fastening method: (see figure on the right)

$$WLL = M \times \text{nominal carrying capacity}$$

(can also be found in EN 1492-2 and tables 1 and 2 below)

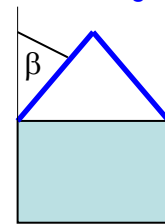
- An appropriate fastening factor is assigned to each fastening method, for example:

Direct attaching



M = 1

Direct attaching with an inclination angle of  $\beta$






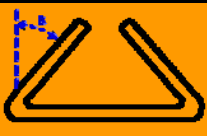
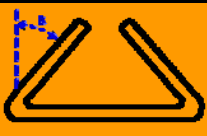
0° M = 1  
0° - 45°: M = 1.4  
45° - 60°: M = 1.0

*Note: never select an angle of inclination  $\beta$  greater than 60°*

Table 1: Working load limit of lifting belts

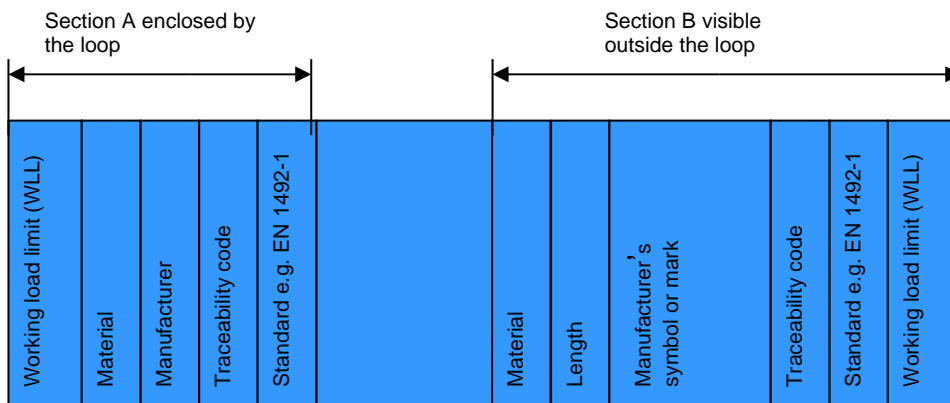
Picture		Simple direct	Simple threaded	Simple hooked on with an inclination angle $\beta$		
				0°	0° - 45°	45° - 60°
Performance fastening factor		1.0	0.8	2.0	1.4	1.0
1,000	Purple	1,000	800	2,000	1,400	1,000
2,000	Green	2,000	1,600	4,000	2,800	2,000
3,000	Yellow	3,000	2,400	6,000	4,200	3,000
4,000	Grey	4,000	3,200	8,000	5,600	4,000
5,000	Red	5,000	4,000	10,000	7,000	5,000
6,000	Brown	6,000	4,800	12,000	8,400	6,000
8,000	Blue	8,000	6,400	16,000	11,200	8,000
10,000	Orange	10,000	8,000	20,000	14,000	10,000

**Table 2: Working load limit of round slings**

Picture		Simple direct	Simple threaded	Simple hooked on with an inclination angle $\beta$		
				0°	0°- 45°	45°-60°
						
Performance fastening factor		1.0	0.8	2.0	1.4	1.0
1,000	Purple	1,000	800	2,000	1,400	1,000
2,000	Green	2,000	1,600	4,000	2,800	2,000
3,000	Yellow	3,000	2,400	6,000	4,200	3,000
4,000	Grey	4,000	3,200	8,000	5,600	4,000
5,000	Red	5,000	4,000	10,000	7,000	5,000
6,000	Brown	6,000	4,800	12,000	8,400	6,000
8,000	Blue	8,000	6,400	16,000	11,200	8,000
10,000	Orange	10,000	8,000	20,000	14,000	10,000

- All necessary information must be displayed on a durable manufacturer label in a clearly legible and non-deletable manner as follows (EN 1492-2, point 7.2):

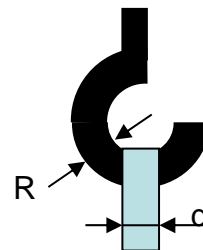
**Colour-coded label (general):** *Blue for polyester*



**Note:** *slings must always bear their manufacturer's label!*

**Basic rules for attaching and lifting loads**

- The load must be attached in such a way that the crane hook and therefore the lifting point are located directly over the load's centre of gravity.
- The lifting belts and round slings used must not be twisted or knotted and must be positioned so that the load is borne by their full width, not just one edge.
- The curvature radius of the crane hook and the width of the lifting belt must be tailored to one another in such a way that ensures that the support surface of the lifting belt is straight and the full cross-section of the belt is therefore subjected to the load (see the figure in the right-hand column).



- To ensure that round slings evenly bear the load across their entire width, do not place these on top of one another in a hook.

- A crane hook width must be selected that ensures that the opening angle in the lifting belt's loop does not exceed 20°.

**Rule of thumb:**

*Loop length = min. 4 x hook width*



- Textile slings and loads must be protected against damage caused by sharp load edges or the lifting equipment. Effective protection can be achieved by using special protective sleeves or profiles. Edges are classed as sharp if the edge radius is smaller than the sling thickness.
- Friction and therefore abrasion can be caused by rough surfaces and/or movement between the load and the lifting belts. This can simply occur as a result of the normal elongation of the belts under load (approx. 3 to 5%).
- Polyester lifting belts and round slings are suitable for use in temperatures of between -40°C and 100°C.
- In the case of temperatures near to or below the freezing point, particular caution is required and risks must be considered.
- Despite the low moisture absorption, ice can still form on wet belts. This reduces their pliability and increases their roughness.

**Note:**

*Only dry lifting belts and round slings may be used in temperatures below freezing.*

- Under consideration of the usage period (up to approx. 50 hours) and temperature (up to approximately 50°C), polyester lifting belts and round slings can be safely used with low-concentration acids (up to approx. 10%), oil, grease and fuels.

**Note:**

*Polyester lifting belts and round slings lose strength in the case of higher temperatures, concentrations and alkalines (use polyamide for alkalines).*

- When lifting loads, ensure that they do not rotate. Avoid impact loads on the round sling or lifting belt.
- Personnel safety should be ensured throughout the entire lifting process. People in the hazard area should be informed that a lifting process is being conducted and that they must leave the hazard area.
- The load should be set down in the same controlled manner in which it is lifted.
- When setting down the load, do not place it on the round sling or lifting belt as this can damage the webbing.
- Set down the load safely: inspect the surface on which the load is to be set down prior to doing so to prevent it from subsequently tipping over.
- Always wash textile slings in clean water after using them with chemicals or if they are extremely dirty.

## Safety when securing loads – inspections and maintenance

### Textile slings:

- Must never be used without a complete and clearly legible label
- May only be repaired and modified by the manufacturer
- Should be stored in clean, dry and well-ventilated conditions
- Must be stored away from strong sunlight, heat sources and aggressive substances
- Must be checked for visible defects prior to and during each use and inspected by a qualified professional at least once a year (sign and store inspection record) in relation to:
  1. Yarn breaks or cuts (not suitable for use if more than 10%)
  2. Damage caused by chemical influences or heat (hardening, fibre breakage, deformation, melting, softening)
  3. Damage to the sheath or its stitching and load-bearing seams
  4. Damage to the metal fittings (cracks, nicks, welds, embrittlement)

**Damaged slings must immediately be set aside and removed from use.**

*These operating instructions have been created to be best of our knowledge and belief. Accuracy and completeness cannot be guaranteed.*

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