



# ■ SOCKETS

### Open - Closed Spelter Socket

Socket installation must be performed in accordance with TS EN 13411-4 standard. After socket installation there is no loss of strength in wire and provides 100% performance.

#### Installation

- ★ Socket selection should be determined according to the rope diameter as well as relevant to work. Oversized socket should not be used.
- ★ During socket installation process the rope must be connected with the appropriate length of wire. This wire should not be aluminum or copper (Figure 1).
- ★ The wire rope wrapped by wire can be placed in the socket in two different ways; the first is before the wires are separated, the second is after the wires are separated. However, It is more practical to place the rope in the socket before the wires are separated.
- ★ Strands should be separated in strands including the core of wire rope. The opening angle of the strands should not exceed 45° (Figure 2).
- ★ After the wires are separated from each other, the oil and the plastic pieces should be cleaned completely if the wire rope is filled by plastic. It is important to separate the wires completely from each other and the resin must be well filled to the base. Most of the load capacity of the termination is concentrated in one third of the socket bottom (Figure 3 - 4).
- ★ After drying the wire rope we have to assure that it is properly placed in the center of the socket. A clamp can be used for this purpose (Figure 5 - 6).
- ★ To prevent resin leakage, it is necessary to seal off the bottom of the socket before casting. To do this, plastic or clay based paste (window or glass paste) should be used (Figure 7).
- ★ After the resin is mixed, it must be poured by the side of the socket to get a good yield. This allows the air to flow out and the spaces to be filled better. The bulk process should be done quickly before the resin get hardened (Figure 8).
- ★ Resin - poured socket should not be moved. Socket slots should not be moved for at least 10 minutes after the material in the socket has hardened.



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7



Figure 8

#### Control and re - use

- ★ To check the influence of resin to the socket by visual means, clamp or paste should be removed.
- ★ After removing the rope from the clamp, it should be re - lubricated from the bottom of the socket.
- ★ The rope must be mounted to the system after the hardening process has occurred and recommended to use after working for one hour in a safe load. If possible, try the rope with a test load before giving it to the actual load.
- ★ For re - use of the sockets necessary tests should be done and suitability should be stated by the manufacturer. It is also important to clean the interior of the sockets suitable for reuse.

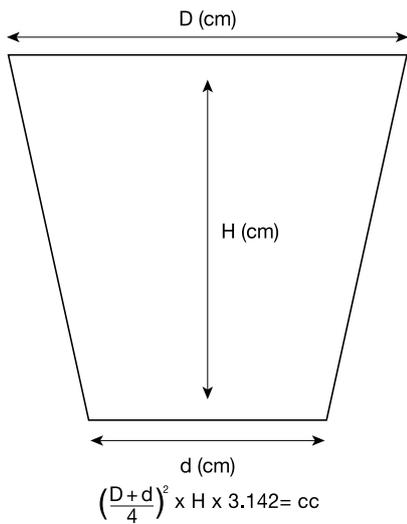
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### Removing resin from the socket

#### To remove the resin from the socket:

- Cut the rope off from the end point of the socket.
- Heat the socket externally and apply pressure from the bottom to remove the material out outside. After heating process wait for 3-4 minutes and remove the material out of the socket.
- It is recommended that sockets exposed to heat to be cooled down before re-use.

### Approximate calculation of the resin required for the socket



Quantity of Glue Required According to The Rope Diameter			
Rope Diameter (mm)	Quantity of Glue (cc)	Rope Diameter (mm)	Quantity of Resin (cc)
6 - 7	9,0	44 - 48	700
8 - 10	17,0	50 - 54	1.275
11 - 13	35,0	56 - 60	1.400
14 - 16	52,0	64 - 68	1.850
20	86,0	70	2.250
22	125,0	76	3.200
26	160,0	82	3.800
28	210,0	88	4.920
32 - 36	350,0	94	6.000
40	420,0	102	7.750
42	500,0	-	-

### Heat Effect

The following operating temperature limits applied to sockets, unless specified by the socket designer or socket manufacturer.

**For lead - based alloys:** -45 °C to 80 °C

#### Zinc and zinc - based alloys:

- ★ Fiber core braided rope: -40 °C to 80 °C,
- ★ Steel core wire rope: -40 °C to 120 °C,
- ★ Spiral rope: -40 °C to 120 °C.

#### Resin:

- ★ Fiber core braided rope: -50 °C to 80 °C,
- ★ Steel core wire rope: -50 °C to 110 °C,
- ★ Spiral rope: -50 °C to 110 °C.

Especially to consider installation conditions at a higher temperature, decision should be made by the socket manufacturer or the socket system designer.

The percentages of capacity at certain temperatures are given below in socket installed systems.

Temperature °C	Capacity %
110	100
150	92
200	83
250	75
300	67

## Bonding sockets with metal and resin

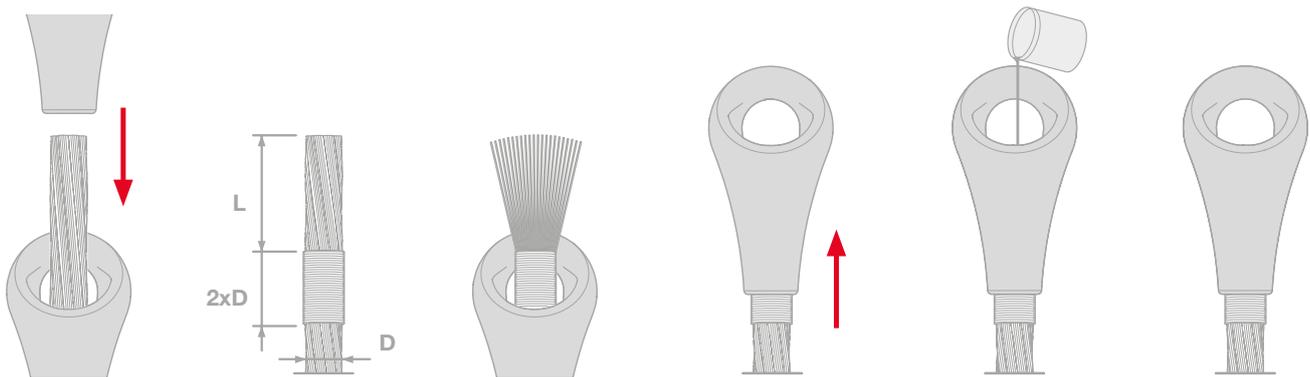
### Pear type socket

Socket installation must be performed in accordance with TS EN 13411-4 standard. After socket installation there is no loss of strength in wire and provides 100% performance.

### Installation

Pear type socket is mounted in steel wire rope in two ways

1-) Resin 2-) Smelted metal



- ★ Make sure the conical area inside the pear socket does not contain any paint, oil or metal pieces.
- ★ Place the pear socket on the steel wire rope as shown.
- ★ Carefully connect the steel rope with at least 2D diameter length wire. Start to wire down to L range. You can find the distance of L in the following table. (Table 1 – Table 2).
- ★ Separate the L - length part of the steel wire rope into its strands as shown in Figure.
- ★ Clean the wires thoroughly. While cleaning the wires, the direction should be downwards. Otherwise, the cleaner liquid will flow right into the steel rope. Leave the cleaned end of the steel wire rope to dry.
- ★ Insert the steel wire rope into the socket up to the cast level of the pear socket. Then secure the steel wire rope and socket in a vertical position. Steel wire rope should be centered with the body of pear socket, and should be hung 24 times the length of the diameter.
- ★ If resin is used for casting
  - a. First, pour the resin until it is slightly out of the bottom. This will prove that the resin works well inside.
  - b. Then seal off the bottom of the pear socket with a flexible sealing material. This will prevent the resin from leaking more.
- ★ If metallic casting is used, block the bottom of the pear socket before casting.
- ★ Pour resin or cast mass from above to level. Also, it is useful to have a look at the instructions that come with the casting material.



S Type Pear Socket Number	Steel Rope Diameter (mm)	L (mm)	Required Casting Quantity (cc)
924	22 - 24	96	205
1026	25 - 27	108	290
1130	28 - 30	122	340
1232	31 - 33	118	460
1336	34 - 36	118	700
1440	37 - 40	142	750
3221	42 - 44	144	800
1548	46 - 48	157	970
1648	46 - 48	157	1.150

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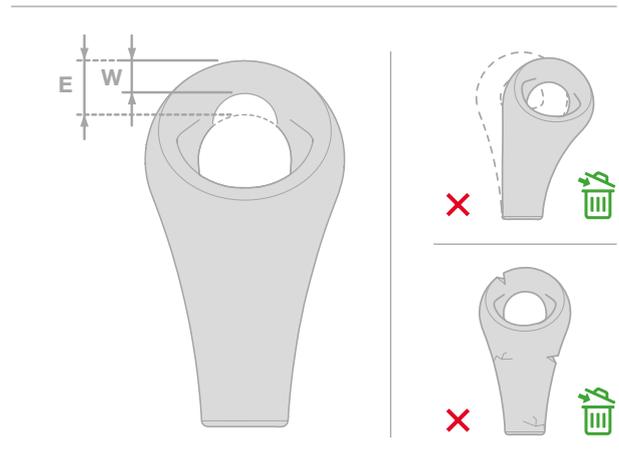
Socket Number	Steel Rope Diameter (mm)	L (mm)	Required Casting Quantity (cc)
4	16 - 17	58	70
5	18 - 19	64	85
6	20 - 21	74	125
7	22 - 24	78	150
8	25 - 27	90	175
9	28 - 30	98	195
10	31 - 33	110	200
11	34 - 36	110	400
12	37 - 39	130	400
13	40 - 42	132	700
14	43 - 45	155	700
15	46 - 48	170	700
17	52 - 56	200	1.550

### Maintenance

- ★ Lubricating the contact points prolongs the life of both the socket and the connection part. Contact points can be lubricated with greases every 24 hours. Do not lubricate when used in abrasive or dusty ores environments.
- ★ During use, particles that cause corrosion may stick on oil. Therefore, clean the contact point of the socket regularly.
- ★ Visual inspection of the socket should be made every 200 hours.
- ★ Preventing roughness on the contact surfaces will prolong the life of the socket. In the penetrant tests, the limit of En 1371-1 Level 3 should not be exceeded.

### Discard criteria

- ★ If any of the following criteria are exceeded, the pear socket should be removed and destroyed.
- ★ Wear is more than 15% of the nominal dimension at any place.
- ★ Dimension "W" must be  $\geq$  than 85% of the nominal dimension "E".
- ★ Heting in excess of 350 °C has taken place.
- ★ Any form of welding work or heat treatment has taken place.
- ★ Any permanent deformation or serious damage.
- ★ Any cracks, or indication of cracks, in the material.
- ★ The number of undergone load cycles is more than 250,000 loads at SWL.
- ★ Overloading by more than 200% has taken place.
- ★ When it has become highly magnetic



### Storage

The sockets should be kept in a dry environment to conserve against humidity. Avoid contact with materials that cause corrosion. If this is not possible, the sockets should be checked periodically.

### Lifetime indication and Documentation

In the marking of socket systems, the traceability code identifying the installation process with the manufacturer's certificate for socket manufacturing must be legibly and permanently attached to the wide end of the socket. Marking can be done with a stamp or embossed label.

The manufacturer must present at least the following information in the document.

- Name, address and representative (if necessary) of the company that makes the socket installation
- Definition of the assembly (rated length, structure)
- Maximum working load
- Conformity of the socket installation procedure to the relevant standard

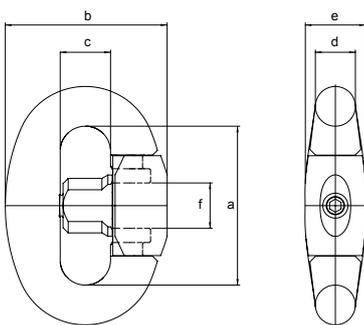


### Pear socket lock

Easy and reliable way to connect to bucket and other Lifting Hardware. Fast and reliable clamping method with quality locking system. Through its hardened surface, it provides longer service life. Traceability is provided in quality certificate and the product can be easily supplied in market.



### Technical Specifications Table

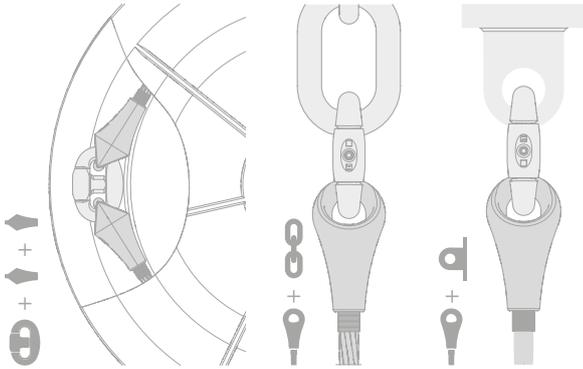


Socket Number	Working Load (kg)	Breaking Load (kg)	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)	Weight (kg)
4	3.000	25.000	76,0	76,0	24,5	19,0	30,0	21,0	0,9
5	4.500	33.000	84,0	84,0	27,0	21,0	32,5	23,0	1,2
6	5.000	37.500	92,0	92,0	29,5	23,0	35,0	25,0	1,5
7	7.000	49.000	100,0	100,0	32,0	25,0	38,0	28,0	2,0
8	8.000	54.000	108,0	108,0	34,5	27,0	40,5	31,0	2,5
9	9.500	60.000	116,0	116,0	37,0	29,0	43,5	34,0	3,1
10	12.000	75.000	128,0	128,0	40,5	32,0	48,0	37,0	4,4
11	15.000	95.000	140,0	140,0	44,0	35,0	53,0	40,0	5,7
12	17.000	110.000	152,0	152,0	47,5	38,0	57,0	43,0	7,2
13	21.000	135.000	164,0	164,0	51,0	41,0	61,5	46,0	8,7
14	26.000	160.000	176,0	176,0	54,0	44,0	66,0	50,0	11,0
15	30.000	175.000	188,0	188,0	58,0	47,0	70,5	52,0	13,5
17	42.500	260.000	222,0	222,0	68,0	56,0	84,0	62,0	23,0

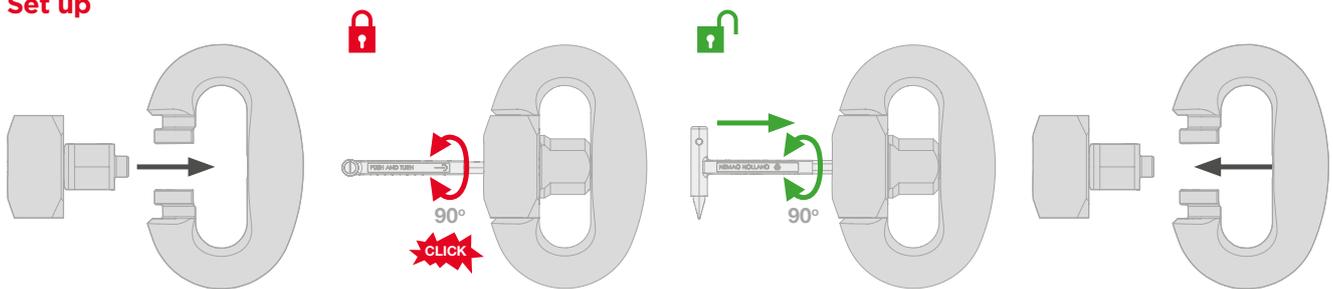
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### Connection methods

As the connection locks connect two pear sockets, if there is no incompatibility in the working load capacities, the connection can be safely made with the map, ring, chain and other connecting elements.



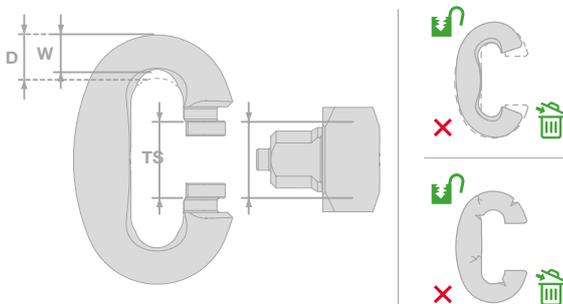
### Set up



### Discard criteria

Socket locks should be discarded in the following circumstances.

- ★ Physical expansion of locks
- ★ Broken locks, cracks and wear when seen
- ★ In case of measurement values change frequently



Number	S - T (mm)	W (%)	Number of cycle
4	> 0,60	> 85% D	> 250.000
5	> 0,60	> 85% D	> 250.000
6	> 0,80	> 85% D	> 250.000
7	> 0,80	> 85% D	> 250.000
8	> 0,80	> 85% D	> 250.000
9	> 0,80	> 85% D	> 250.000
10	> 0,10	> 85% D	> 250.000
11	> 0,10	> 85% D	> 250.000
12	> 0,10	> 85% D	> 250.000
13	> 0,10	> 85% D	> 250.000
14	> 0,10	> 85% D	> 250.000
15	> 1,25	> 85% D	> 250.000
17	> 1,25	> 85% D	> 250.000

