

Detailed Instructions for the use of Wirelock®

With Strand or General Purpose Wire Rope

These instructions explain the proper use of WIRELOCK® for socketing wire rope terminations. When reading and following these instructions, pay close attention to warnings and safety information presented in bold print.

For maximum safety and efficiency, use WIRELOCK® only as instructed.

1. Warning on Correct Application of WIRELOCK®

It is very important when deciding upon the use of WIRELOCK® to note the following:

WARNING

- Incorrect use of WIRELOCK® can result in an unsafe termination which may lead to serious injury, death, or property damage.
- Do not use WIRELOCK® with stainless steel rope in salt water environment applications without reading and understanding the information given on page 7.
- Use only soft annealed iron wire for seizing.
- Do not use any other wire (copper, brass, stainless, etc.) for seizing. Never use an assembly until the WIRELOCK® has gelled and cured.
- Remove any non-metallic coating from the broom area.
- Sockets with large grooves need to have those grooves filled before use with WIRELOCK®.
- Read, understand, and follow these instructions and those on the product containers before using WIRELOCK®.

2. Safety and Health Precautions for Using WIRELOCK®

It is important that certain precautions be taken when using WIRELOCK® for a wire rope socket termination. When using the product be sure to read information on product containers and note the following:



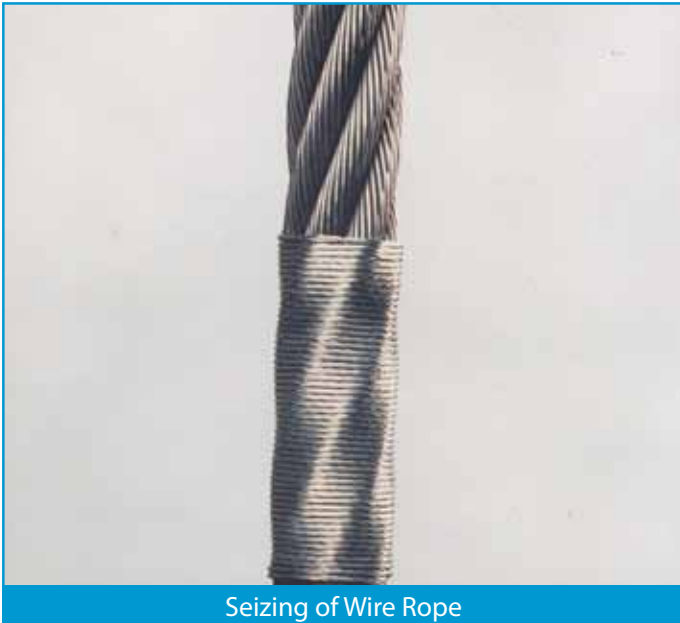
CAUTION

- WIRELOCK® resin, in liquid state, is flammable.
- Chemicals used in this product can give off toxic fumes and can burn eyes and skin.
- Use only in well-ventilated work areas.
- Never breathe fumes directly or for an extended time.
- Always wear safety glasses to protect eyes.
- Always wear gloves to protect hands.
- Avoid direct contact with skin anywhere.

3. Selection of Socket

- 3.1 WIRELOCK® is recommended for use with sockets that comply with International, European or National (ISO, CEN) Standards.
- 3.2 WIRELOCK® as with all socketing media, depends upon the wedging action of the cone within the socket basket to develop full efficiency. A rough finish inside the socket may increase the load at which seating will occur. Seating is required to develop the wedging action.
- 3.3 Measure the rope ends to be socketed. The rope end should be of sufficient length so that the ends of the unladen wires (from the strands) will be at the top of the socket basket.
- 3.4 Next, apply the seizing one (1) socket basket length from the end of the rope minus one (1) rope diameter. The length of the seizing must be at least two (2) rope diameters long. Additional information can be secured from your Wire Rope Users Manual or your Wire Rope Manufacturers Catalogues or National Standard.

Seizing wire should be a soft annealed iron wire.



- 3.5 Plastic coated or plastic filled wire ropes must have all plastic material (non-metallic materials) removed from within the broomed area.
- 3.6 The socket basket should be examined prior to use and loose scale, dirt or grease removed.

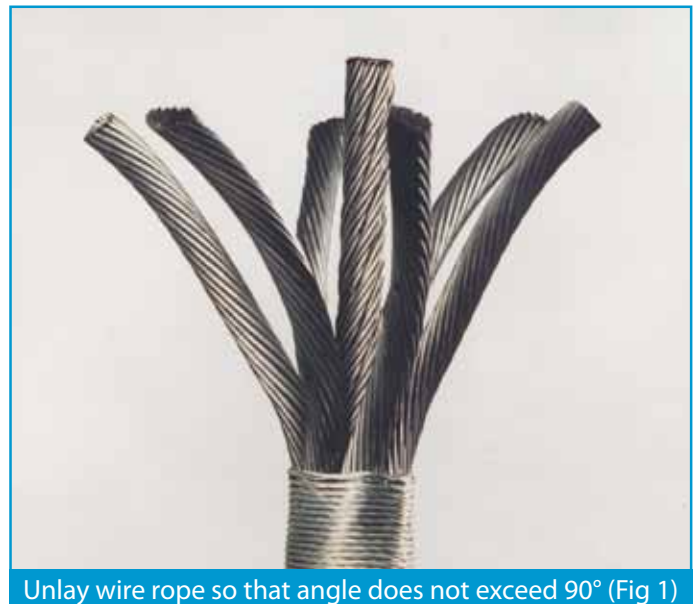
Do not use oversized sockets for Wire Rope.

- 3.7 When socketing Strand, the time honoured method of one size up when choosing the socket is generally still applicable in the vast majority of cases. However, caution should be exercised as tests have shown that the length of the socket basket should be five (5) times the strand diameter or fifty (50) times the maximum wire diameter, whichever is the greater.
- 3.8 **Inserting the broom into the socket.** There are two procedures that can be used to position the broom within the socket. The rope can be inserted into the socket prior to brooming. Subsequently the socket can be pulled up over the broom. The second method requires that the broom is closed and compacted to enable it to be inserted into the socket without damaging the rope.

For detailed explanation of Resin Socketing of Steel Wire Rope, see Page 19.

4. Preparation of Broom

- 4.1 The rope is secured in a vice directly below the seizing to allow the strands to be unlaid to the seizing. They should be bent outwards to a total included angle not exceeding 90 degrees (Fig 1)
- 4.2 Internal leakage of resin in ropes 75mm (3") in diameter and larger can occur because of gaps between strands and the IWRC (Independent Wire Rope Core). These gaps should be sealed (before brooming), by pushing small plugs of the sealing compound down into the served portion.
- 4.3 If the rope has a fibre core, it should be cut out ensuring that the remaining fibre core extends $\frac{1}{2}$ rope diameter into the bottom of the socket. In the case of fibre cores, resin is the preferred socketing medium.



- 4.4 If the rope has an IWRC, the IWRC shall be completely unlaid to form part of the broom.
- 4.5 **All the wires in each strand and in the IWRC must be unlaid completely down to the seizing to form a broom, being careful not to disturb or change the lay of the wires and strands under the seizing band. The wires should not be straightened.**

Brooming is one of the most critical parts of any socketing operation.

Note: The wires must be unlaid from the end of the rope to the seizing because a good fill of resin must occur to the bottom (small end) of the socket (Fig 2). Most of the load capacity of the termination is concentrated in the bottom one third of the socket.

- 4.6 Except in the case of wire ropes of coarse construction e.g. 6 x 7, it is not necessary or desirable to hook the wires in the broom. When the rope contains large numbers of wires, hooking the ends causes congestion within the socket and can create penetration problems for the socketing medium although this is less of a problem with resin than with zinc or white metal.
- 4.7 The open broom shall be thoroughly cleaned (degreased). **Be sure that the cleaning is confined to the broom and does not extend to the rope beyond.**



Properly Broomed Wire Rope (Fig 2)



Incorrectly Broomed Wire Rope

- 4.8 The method of cleaning will depend on the lubricant and / or coating on the wire.
- 4.9 The methods and materials used for cleaning should comply with the current Environmental Protection regulations.
- 4.10 Consult your Wire Rope supplier or the Wire Rope Manufacturer for recommended materials and methods.
- 4.11 **Do not clean the Wire Rope broom with acid, soda, methol hydrate, or acetone. A flux should not be used.**
- 4.12 The wire rope broom, after cleaning and drying, should be kept in an upright position to prevent any grease, or mixture of grease and cleaner, from running back down from the main body of the rope and contaminating the clean wires.

5. Positioning of Broom and Alignment of Socket

- 5.1 The broom should be inserted into the socket using one of the methods described in 3.8. Place rope in a vertical position with the broom end up. It is recommended that there be thirty (30) rope diameters below the socket before any bending occurs in the rope, or twenty (20) rope diameters if securely clamped to a beam.

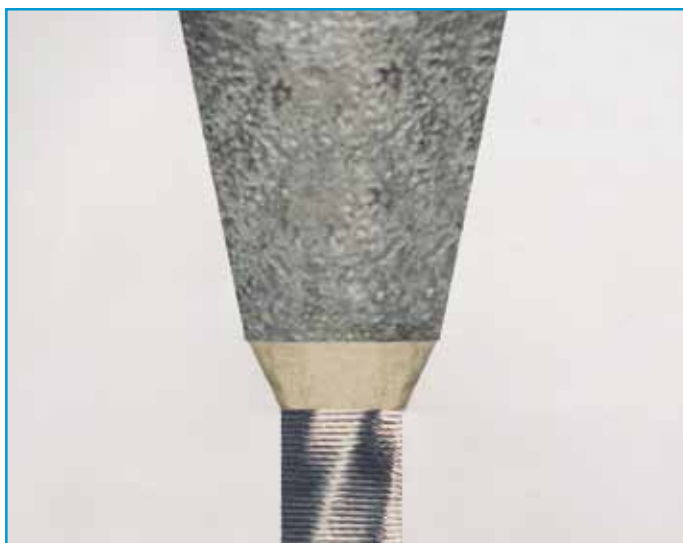
Make certain the broomed wires are uniformly spaced in the basket, with wire ends at the top edge of the basket, (Fig 3), and that the axes of the rope and the fitting are aligned. A centralizing clamp should be used to assist in the alignment of the axes of the socket and the rope (Fig 4 and Fig 5).

Correct alignment will avoid premature failure of the assembly due to unequal loading of the wires.



Properly positioned broom with the wire ends protruding slightly (Fig 3)

- 5.2 Plasticine or clay based putty, i.e. window or glazing putty, is required to seal the base of the socket prior to pouring, thus preventing resin leakage which may cause voids (Fig 4 and Fig 5).



Axes of socket and rope properly aligned and sealed with plasticine (Fig 4)



Clamp used to align rope and socket before sealing with plasticine (Fig 5)

6 Materials

- 6.1 Always check the expiry date on the cans. Never use out of date material. **WIRELOCK®** should be stored in a cool (10°C - 24°C) dry place.
- 6.2 **WIRELOCK®** is formulated for mixing and pouring in the ambient temperature range; from -3°C to 35°C (27°F - 95°F). At lower temperatures the gel time will increase. Below 9°C (48°F) the gel time of approximately 20 minutes can be maintained by the use of booster packs.



CAUTION

- Chemicals used in this product can give off toxic fumes and can burn eyes and skin.
- Always check the expiry date on the cans. Never use out of date material.
- Use only in well ventilated work areas.
- Never breathe fumes directly or for an extended time.
- Always wear safety glasses to protect eyes.
- Always wear gloves to protect hands.
- Avoid direct contact with skin anywhere.

- 6.3 At ambient temperatures below 9°C (48°F) and above 2°C (35°F), one (1) booster pack should be used. Below 2°C (35°F) and above -3°C (27°F), two (2) booster packs should be used. The booster pack compensates chemically for the slower gel time experienced at lower temperatures. In order to comply with all the approvals granted, **WIRELOCK®** should not be mixed and poured at temperatures below -3°C (27°F). Knowing the ambient temperature is useful, however, it should be remembered **WIRELOCK®** will for some time afterwards tend to cure according to the temperature at which it, the socket and the wire rope were stored. The temperature of the socket and the rope should conform to

the temperature at which the **WIRELOCK®** has been stored for the last 24 hours. when the sockets, rope and **WIRELOCK®** are stored at normal room temperature 18°C - 21°C (65°F - 70°F), booster packs must not be used even if the ambient temperature is below 9°C (48°F). If the temperature is above 35°C the **WIRELOCK®** kit should be refrigerated for two hours before use.

- 6.4 It is possible to combine various kit sizes to achieve any required volume, e.g. 2500cc = 1 x 1000cc plus 3 x 500cc, etc. In this case, all of the liquid resin should be placed in the mixing container and then all of the powder added to it (or vice versa) before mixing. **Always mix all of the resin with all of the powder. Never mix less than the total contents of all cans.**



Some kits can be mixed in the original packaging (Fig 6)

- 6.5 **Only the 100cc, 250cc & 500cc can be mixed in the original packaging by pouring the resin into the granular materials container. In the case of other kits, a proper mixing vessel should be used (Fig 6).**

Mixing vessels should be clean. They can be of metal, polythene or polypropylene. Polymerization products of styrene, i.e. styrofoam cups and similar products should not be used. A flat wooden or metal paddle, not a spike or screwdriver, should be used as a stirrer.

- 6.6 Immediately upon pouring the resin into the granular compound (or vice versa), mix vigorously for two (2) minutes or until a homogenous mixture has been obtained. Make sure that no unmixed granular compound remains on the bottom of the mixing container. For larger sizes, a mechanical mixer is ideal.

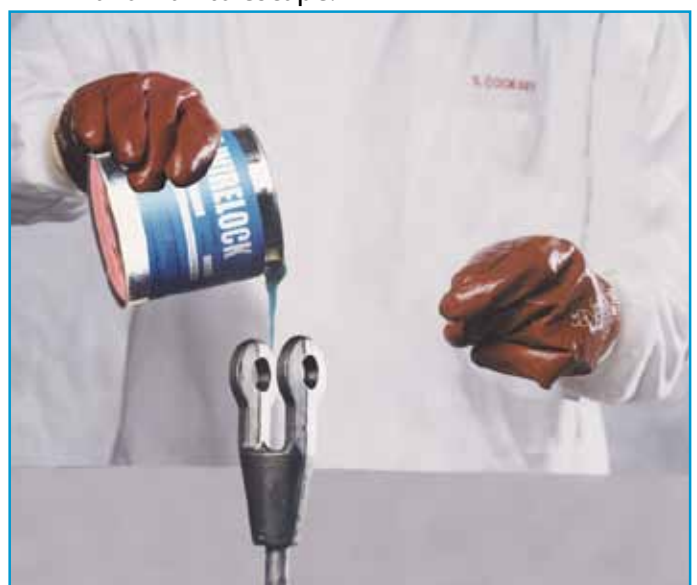
Upon mixing, the WIRELOCK® will turn to a greenish / turquoise colour. If the mix remains a pale straw yellow colour, do not use the kit. Always mix all of the resin with all of the powder. Never mix less than the total contents of both cans.

7 Use of Heat

- 7.1 Do not apply heat to sockets to accelerate the curing process prior to pouring. The application of external heat may cause the resin to gel before it reaches the bottom of the socket and lead to assembly failure. Used sockets cleaned out by heating (see appendix C) should be allowed to cool to room temperature before re-use. **Hot sockets must not be used.**

8 Pouring

- 8.1 Once the **WIRELOCK®** is mixed, it should be poured immediately (Fig 7) into the socket to ensure good penetration, preferably down the side of the socket to allow air to escape.



Upon mixing the compound should be poured immediately (Fig 7)

Immediate pouring will ensure that the gelling stage occurs in the socket and not in the mixing container. Sufficient **WIRELOCK®** should be mixed so that the socket can be completely filled at one pouring. **WIRELOCK®** is designed to gel in approximately 20 minutes and to cure within 60 minutes after gel. To provide an adequate safety margin, no load should be applied to the wire rope assembly until a minimum of one (1) hour has elapsed from the time the **WIRELOCK®** gels in the socket. As the **WIRELOCK®** cures, a chemical (exothermic) reaction occurs, causing a considerable rise in temperature.

Temperatures in excess of 100°C (212°F) may be reached in large volume kits in the mixing container. In the socket where the wires of the rope and the socket itself act as a heat sink, the maximum temperature likely to be achieved will be in the order of 70°C - 80°C (160°F - 175°F)

9 Movement

- 9.1 Movement of resin poured sockets may damage the soft resin and reduce the efficiency of the termination. Resin poured sockets should not be moved for a minimum of ten (10) minutes after the material **in the socket** has gelled.

10 Check on Penetration

- 10.1 A visual check for penetration of the resin into the socket bottom can be made by removing the centralizing clamp and the plasticine or putty. Seizing on the rope adjacent to the neck of the socket should be removed up to the point where it enters the socket.

11 Re-Lubrication

- 11.1 After removing the rope from the vice, any degreased area of the rope below the socket should be re-lubricated.

12 Loading

- 12.1 The rope can be put into service or proof loaded one (1) hour after the material in the socket has gelled.
- 12.2 Whenever possible, the assembly should be proof loaded.

13 Re-use of Socket

- 13.1 To remove the resin from the socket:
 - a. Cut the rope close to the base of the socket.
 - b. Press the cone out of the socket or,
 - c. Using a gas torch, heat the exterior of the socket. Keep the torch moving around the outside of the socket to avoid any hotspots. Heat the socket until there are fumes coming from the neck of the socket and the top (wide end). when this occurs stop heating, leave for 3 to 4 minutes and then knock the cone out of the socket.
 - d. It is recommended that sockets subjected to heat should be normalised before re-use.
- 13.2 For additional information on Re-use of sockets, See Appendix C "Technical Bulletin #1, by Crosby Group Inc. (Page 25)