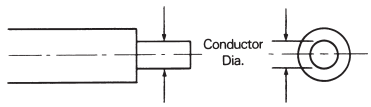
Wire-Wrap®

Bit and Sleeve Selection

Required Information

(1) Wire gauge/conductor diameter. From engineering drawing, specifications, or can be measured. Refer to wire size chart.



Wire size chart

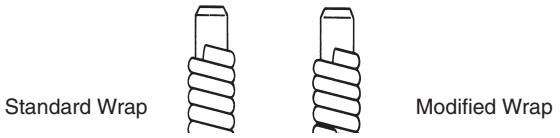
Wire Gauge	Inches	mm
18	0.0403	1.020
20	0.0320	0.813
22	0.0253	0.643
23	0.0226	0.574
24	0.0201	0.511
25	0.0179	0.455
26	0.0159	0.404
27	0.0142	0.361
28	0.0126	0.320
29	0.0113	0.287
30	0.0100	0.254
31	0.0089	0.226
32	0.0079	0.201
34	0.0063	0.160

(2) Wire type. From wire specifications. OFHC, alloy, silver-plated, tin-plated, etc.

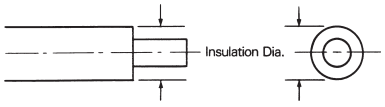
(3) Wrap type, standard or modified. From engineering drawing or specifications. If not specified, modified wrap is preferred method with standard wrap generally accepted for 18 through 24 gauge.

Types of Wrap

A standard bit wraps only the bare wire around the terminal. A modified bit wraps a portion of insulation around the terminal in addition to the bare wire. This greatly increases the ability of the connection to withstand vibration.

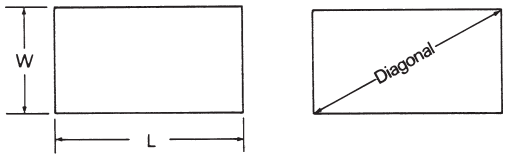


(4) Insulation diameter. From wire specifications or can be measured. Not required if using standard wrap.



(5) Terminal size. From engineering drawings, specifications, or can be measured.

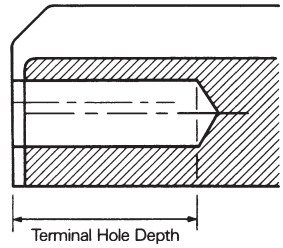
(6) Terminal diagonal. Can be measured, calculated from width and length dimensions, or obtained from popular terminal sizes chart.



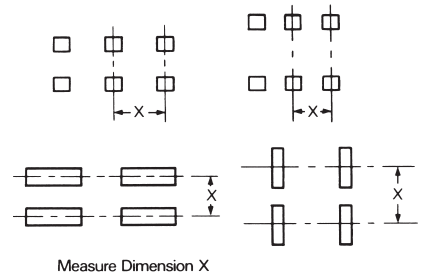
Popular terminal sizes

Terminal Size		Nominal Diagonal	
in.	mm	in.	mm
.020 sq.	0.51 sq.	0.027	0.69
.020 x .030	0.51 x 76	0.035	0.89
.025 sq.	0.64 sq.	0.034	0.86
.022 x .036	0.56 x .91	0.041	1.04
.035 sq.	0.89 sq.	0.048	1.22
.035 x .050	0.89 x 1.27	0.060	1.52
.045 sq.	01.14 sq.	0.061	1.55
.031 x .062	0.79 x 1.57	0.067	1.70
.030 x .080	0.76 x 2.03	0.082	2.08

(7) Terminal hole depth. Should be deep enough to allow wrapping at the terminal base.

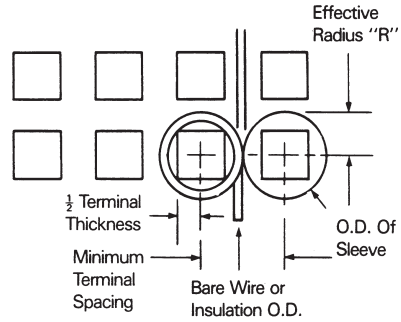


(8) Terminal spacing. Determine minimum center-to-center terminal spacing.



Minimum Terminal Spacing

Formula: 1/2 terminal thickness actual wire diameter (including insulation, if modified wrap) effective radius (from bit chart) "R" minimum terminal spacing.



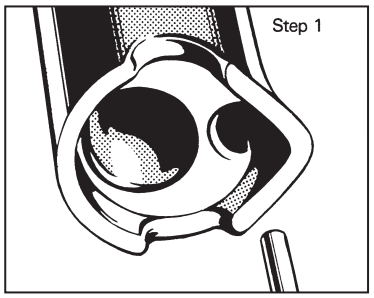
Solderless Wrapping Bits and Sleeves

Wire-Wrap® has always been the leader in developing and supplying bits and sleeves for every kind of application. Over 500 wrapping bits have been designed and produced. More than 100 of these are currently active. Many additional bit and sleeve designs may be supplied upon request. Your distributor will gladly advise you on special requirements.

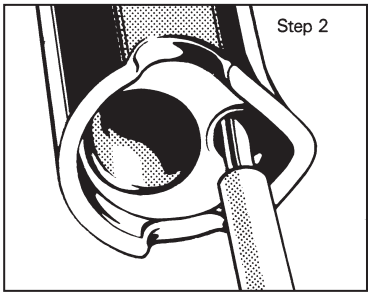
How To Make Good Wire-Wrapped Connections

How to make Wire-Wrap® connections

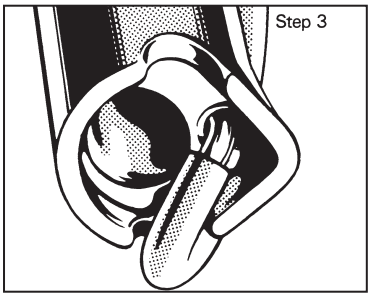
Bit, Sleeve, and Pre-Stripped Wire



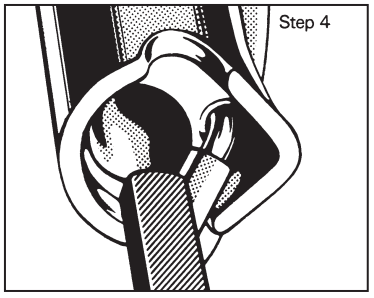
Wire Insertion



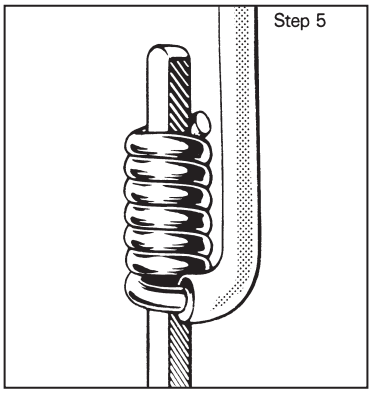
Wire Anchoring



Terminal Insertion



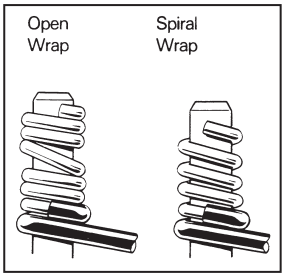
Finished Connection



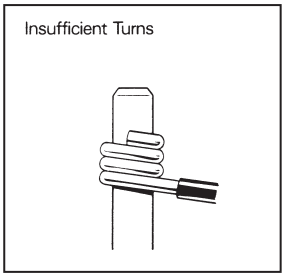
Hints for good Wire-Wrapped connections

Let the Wire-Wrap tools do the work. Don't press too hard because excess pressure can lead to overwrapping. Overwrap may also occur when the wrapping bit has not been selected correctly in function of wire gauge and terminal dimension.

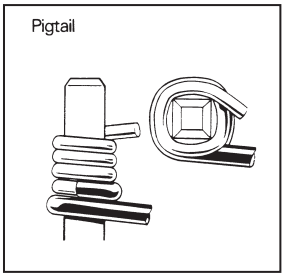
Keeping the tool on the terminal until the wrap is complete is important. If removed too soon, spiral and open wraps may result.



Feeding wire into the slot in the bit correctly is not difficult. The stripped end of the wire should be pushed in all the way.



Wire-wrapping is a precision technique. Proper bit and sleeve selection is important. Incorrect choice can lead to problems ranging from pigtails to loose wraps.



Wire-Wrap®

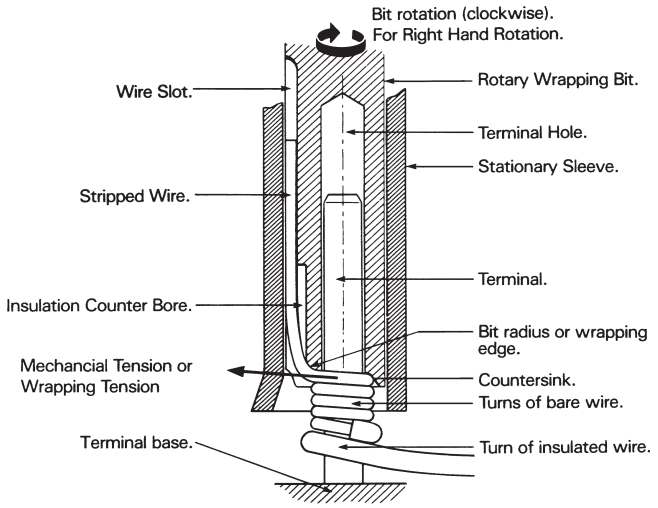
The Wire-Wrap® Connection

Cooper Tools now includes wrapping bits and sleeves for virtually limitless applications.
The proper selection of bits and sleeves is vital to good wrapping. Selection charts are provided in this catalog. In addition, your Cooper Tools Wire-Wrap® distributor and Wire-Wrap® specialists are ready to advise you.

Intimate Contact of Bare Wire and Terminal Corners

During the wrapping process, the wire is pulled from the wire slot by the rotation of the bit around the terminal. The wire is drawn over the wrap radius that intersects the bit face and the wire slot, placing tension on the wire in the process. This tension causes stretch of the wire.
As the wire is wrapped under mechanical tension, the sharp corners of the terminals penetrate into the surface of the wire and an intimate and large surface of contact is established.
As the turns of wire are hooked at each corner of the terminal, the mechanical tension produced by the wrapping bit remains stored in the wrapped wire and a permanent gas-tight connection is established.
After the wrapping operation, the terminal that has been twisted in the direction of wrapping will slightly untwist and some relaxation will occur in the wire material. After some hours, when the connection is stabilized, the compression between wire and terminal corners is from 50.000 psi (35Kg/mm^2) to 100.000 psi (70 Kg/mm^2), depending on the wire diameter and on the wire material.
Four turns of wire, i.e. 16 contact points provide a surface of contact equivalent to the cross section of the wire.
The electrical resistance of a wire wrapped connection is in the range of 1 milli ohm, which is less than the electrical resistance of one inch of length of the wire used to establish the connection. When the connection ages solid state diffusion at the interface corners and wire will often increase the conductivity of the connection.

Modified Connection



Standard Connection