The Wire-Wrap Connection

CooperTools now include 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 catalogue 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.
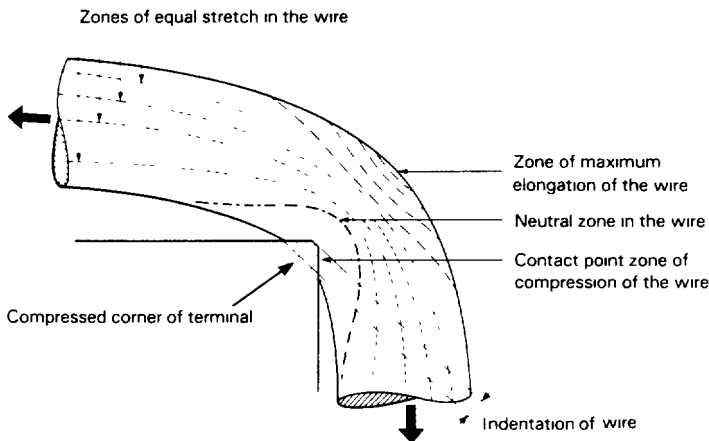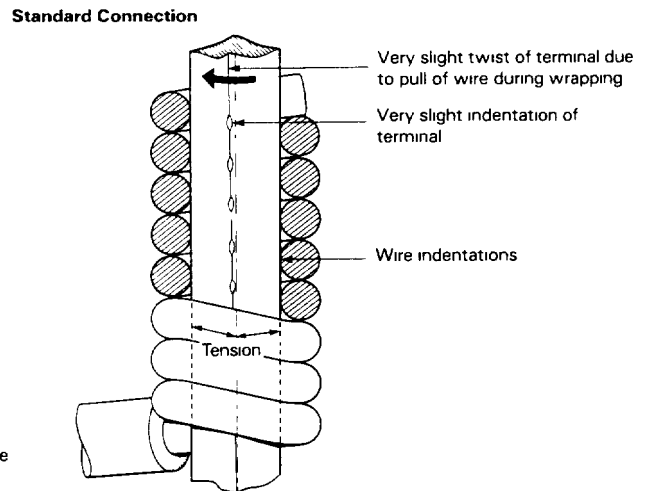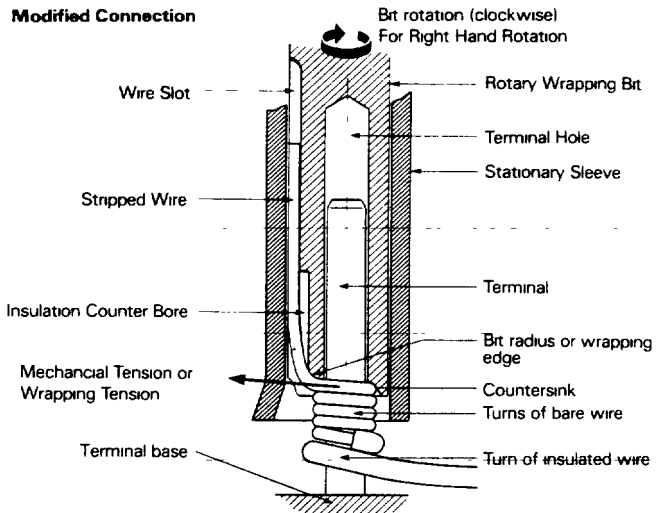
As the wire is wrapped under mechanical tension, the sharp corners of the terminals penetrate into the surface of the wire and an intimate and large surface of contact is established.

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 (35 Kg/mm²) to 100 000 psi (70 Kg/mm²), 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 inch one 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

Bit rotation (clockwise)
For Right Hand Rotation
Rotary Wrapping Bit
Wire Slot
Terminal Hole
Stationary Sleeve
Stripped Wire
Terminal
Insulation Counter Bore
Bit radius or wrapping edge
Mechancial Tension or Wrapping Tension
Countersink
Turns of bare wire
Terminal base
Turn of insulated wire

Standard Connection

Very slight twist of terminal due to pull of wire during wrapping
Very slight indentation of terminal
Wire indentations
Tension

Zones of equal stretch in the wire

Zone of maximum elongation of the wire
Neutral zone in the wire
Contact point zone of compression of the wire
Compressed corner of terminal
Indentation of wire

Farnell
COMPONENTS

Solderless Wrapping Bits and Sleeves

(1) Wire Size AWG	in	mm	(3) Wrap Type	Bit Part No	Sleeve Part No	(2) Wire Type	(6) Terminal Diagonal Minimum "/mm	Maximum "/mm	(7) Terminal Hole Depth "/mm	(4) Maximum Insulation Diameter "/mm	Minimum No of Turns of Insulation	Effective Radius "/mm
18	040	102	M	504908	18640	A, O	061/1 56	074/1 88	1 00/25 4	0 70/1 78	1	151/3 84
20	032	081	S	507356	18840	A, O	042/1 07	074/1 88	1 00/25 4			121/3 07
			M	26495	26245	A, O	042/1 07	074/1 88	1 00/25 4	059/1 50	9/10	150/3 81
			S	18633	26245	A, O	059/1 50	091/2 31	1 00/25 4			147/3 73
20-22			M	519904	18640	A, O	054/1 37	069/1 75	1 00/25 4	070/1 78	3/4	142/3 61
22	025	064	S	505413	18840	A, O	049/1 24	074/1 88	1 00/25 4			119/3 02
			M	504939	507939	A, O	049/1 24	074/1 88	1 00/25 4	052/1 32	1	131/3 33
			M	26498	18640	A, O	049/1 24	074/1 88	1 00/25 4	059/1 45	1	135/3 43
			M	26699	18640	A, O	049/1 24	074/1 88	1 00/25 4	059/1 45	1-1/4	135/3 43
			S	37014	18840	A, O	061/1 55	076/1 93	1 00/25 4			125/3 17
			S	18632	18840	A, O	061/1 55	066/2 18	1 00/25 4			125/3 17
			S	18635	18640	A, O	098/2 49	123/3 12	1 00/25 4			142/3 61
22-24			S	500131	18840	A, O	054/1 37	074/1 88	1 00/25 4			112/2 84
24	020	051	S	502134	502129	A, O	024/0 61	044/1 12	1 00/25 4	044/1 12	1	084/2 13
			M	505415	502129	O	024/0 61	044/1 12	1 00/25 4	041/1 04	9/10	098/2 49
			M	506991	506999	A	047/1 19	067/1 70	1 00/25 4	050/1 27	9/10	100/2 54
			M	504155	18840	O	049/1 24	069/1 75	1 13/28 5	046/1 17	9/10	119/3 02
			M	26262	18840	A, O	054/1 33	074/1 88	1 13/28 8			117/2 97
			M	512058	512056	A, O	055/1 40	074/1 88	1 00/25 4			105/2 67
			S	37013	512056	A, O	055/1 40	074/1 88	1 50/38 1			105/2 67
			S	26589	512056	A, O	055/1 40	074/1 88	1 00/25 4			114/2 90
			S	509301	502129	A, O	059/1 50	067/1 70	1 00/25 4			087/2 21
			S	20420	512056	A, O	073/1 85	092/2 34	1 00/25 4			105/2 67
24-26			M	519070	18840	A, O	054/1 37	074/1 88	1 13/28 8	046/1 17	9/10	117/2 97
26	016	041	S	505279	507100	A, O	023/0 58	039/0 99	0 75/19 1	031/ 079	1-1/4	068/173
			M	506445	507100	A, O	023/0 58	039/0 99	0 75/19 1	044/1 12	1-1/8	074/1 88
			M	506420	502129	A, O	028/0 71	044/1 12	0 75/19 1	034/0 86	1	098/2 49
			M	509405	502129	O	034/0 86	051/1 29	1 00/25 4			086/2 18
			S	528412	507100	O	031/0 79	038/0 97	041/10 4			086/2 18
			M	502118	512056	A, O	053/1 35	069/1 75	1 00/25 4	041/1 04	9/10	111/2 82
			S	504910	512056	A, O	058/1 47	074/1 88	1 00/25 4	041/1 05	1	105/2 67
			M	517104	512056	O	054/1 33	058/1 47	1 00/25 4	041/1 04	9/10	100/2 54
			M	506781	512056	A, O	059/1 50	069/1 75	1 00/25 4			111/2 82
28	013	033	M	509278	507100	O	031/0 79	031/0 79	0 75/19 1	030/0 76	9/10	067/1 70
			S	501389	502129	A°, O°	033/0 84	036/0 91	0 75/19 1	036/0 91	9/10	087/2 21
			S	508748	507100	A, O	034/0 86	037/0 94	0 75/19 1			063/1 60
			S	506633	507100	O	041/1 04	044/1 12	0 75/19 1			066/1 68
			M	505412	512056	A, O	056/1 42	063/1 60	1 00/25 4	035/0 89	9/10	104/2 64
			S	505373	512056	A, O°	066/1 68	069/1 75	0 75/19 1			105/2 67
			M	511304	512056	O	066/1 68	069/1 75	1 00/25 4	038/0 97	9/10	100/2 54
30	010	025	M	501097	507100	A, O	026/0 66	031/0 79	0 75/19 1	027/0 69	9/10	068/1 73
			S	500352	507100	O	029/0 74	031/0 79	0 75/19 1			067/1 70
			M	511208	507100	O	031/0 79	034/0 86	0 75/19 1	023/0 58	1-1/2	061/1 55
			M	507063	507100	O	031/0 79	034/0 86	0 75/19 1	023/0 58	9/10	061/1 55
			M	511440	507100	O	031/0 79	034/0 86	0 75/19 1	027/0 69	1-1/8	064/1 63
			M	519936	507100	A	031/0 79	038/0 97	0 75/19 1	028/0 71	1	068/1 73
			S	500353	507100	A°, O	032/0 81	035/0 89	0 75/19 1			061/1 55
			S	507573	507100	A	033/0 84	036/0 91	0 75/19 1	023/0 58	1-1/4	061/1 55
			M	507502	507100	A°, O°	041/1 04	044/1 12	0 75/19 1	027/0 69	1-1/4	071/1 80
			M	501381	512056	A	060/1 52	063/1 60	1 00/25 4	027/0 69	1	107/2 72
			M	501194	502129	A	066/1 68	069/1 75	1 00/25 4	027/0 69	9/10	089/2 26

A = Alloy wire   O = OFHC wire   A° = Alloy if terminal diagonal at low end   O° = OFHC if terminal diagonal at low end   NOTE Tin plated wire should be considered as Alloy in bit selection

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