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Director, EPTAC



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Selecting the Correct Crimp Terminal for the Job



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Processes for Crimping

- Wire stripping
- Selecting the correct terminal
- Selecting the correct crimping tool



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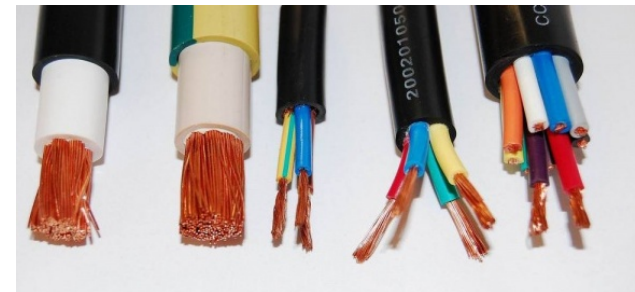


Stripped Wire

- Solid Wire



- Stranded Wire





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Damaged Wire Criteria from 620

Table 3-1 Allowable Strand Damage^{1,2,3}

Number of Strands	Maximum allowable strands scraped, nicked or severed for Class 1,2	Maximum allowable strands scraped, nicked or severed for Class 3 for wires that will not be tinned before installation	Maximum allowable strands scraped, nicked or severed for Class 3 for wires that will be tinned prior to installation
1 (solid conductor)	No damage in excess of 10% of conductor diameter		
2-6	0	0	0
7-15	1	0	1
16-25	3	0	2
26-40	4	3	3
41-60	5	4	4
61-120	6	5	5
121 or more	6%	5%	5%

Note 1: No damaged strands for wires used at a potential of 6 kV or greater.

Note 2: For plated wires, a visual anomaly that does not expose basis metal is not considered to be strand damage.

Note 3: Nicks or scrapes less than 10% of conductor diameter are not considered to be strand damage.



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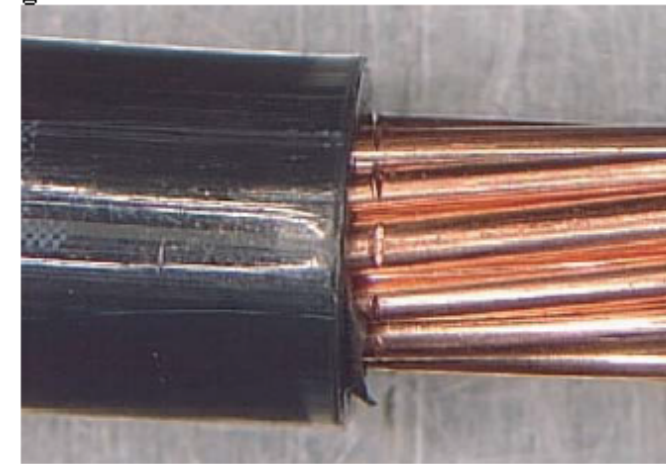
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Examples of Damaged Wires

Figure 03-2



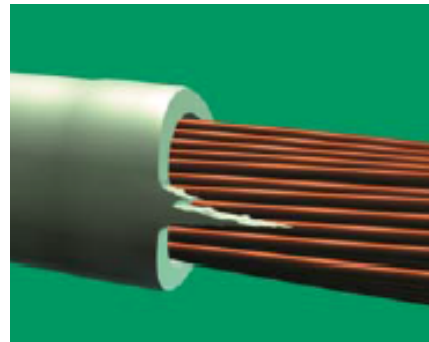
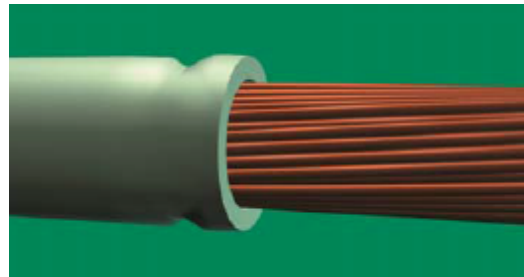


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Stripping Damage





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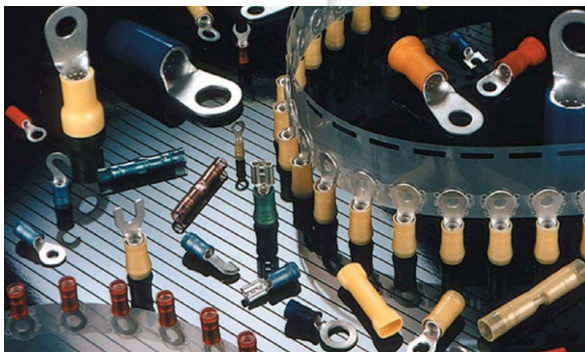
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AWG	Wire Area		Stranding		Wire Diameter		Circular Mills	Wire Break	
	Sq. mm	Sq. inch	No.	Dia.	mm	In.		N	Lbf.
18	.823	.00128	1	.0403	1.02	.040	1624	215.60	48.5
18	.897	.00139	7	.0159	1.22	.048	1770	234.93	52.8
18	.811	.00126	16	.0100	1.19	.047	1600	212.40	47.8
18	.963	.00149	19	.0100	1.24	.049	1900	252.23	56.7
18	.825	.00128	41	.0063	1.19	.047	1627	216.03	48.6
18	.823	.00128	65	.0050	1.19	.047	1625	215.72	48.5
20	.519	.00080	1	.0320	.81	.032	1024	135.94	30.6
20	.563	.00087	7	.0126	.97	.038	1111	147.53	33.2
20	.507	.00079	10	.0100	.89	.035	1000	132.75	29.8
20	.616	.00096	19	.0080	.94	.037	1216	161.43	36.3
20	.523	.00081	26	.0063	.91	.036	1032	136.99	30.8
20	.519	.00081	41	.0050	.91	.036	1025	136.07	30.6
22	.324	.00050	1	.0253	.64	.025	640	84.97	19.1
22	.355	.00055	7	.0100	.76	.030	700	92.93	20.9
22	.382	.00059	19	.0063	.79	.031	754	100.11	22.5
22	.329	.00051	26	.0050	.76	.030	650	86.29	19.4
24	.205	.00032	1	.0201	.61	.024	404	53.63	12.1
24	.227	.00035	7	.0080	.58	.023	448	59.47	13.4
24	.201	.00031	10	.0063	.61	.024	397	52.69	11.8
24	.241	.00037	19	.0050	.58	.023	475	63.06	14.2
24	.200	.00031	41	.0031	.58	.023	394	52.31	11.8
26	.128	.00020	1	.0159	.40	.016	253	33.56	7.5
26	.141	.00022	7	.0063	.53	.021	278	36.88	8.3
26	.127	.00020	10	.0050	.51	.020	250	33.19	7.5
26	.154	.00024	19	.0040	.48	.019	304	40.36	9.1



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Selecting the Terminal

Insulation Color Code

Insulation Color Code	Wire Size Range AWG	Comments
Yellow	26-22	—
Transparent	24-20	—
Red	22-16	—
Blue	16-14	—
Yellow/Black	16-14	Heavy Duty
Yellow	12-10	—
Red	8	—
Blue	6	—
Yellow	4	—
Red	2	—
Blue	1/0	—
Yellow	2/0	—
Red	3/0	—
Blue	4/0	—

AMP Standard Terminals and Splices Catalog



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Selecting the Terminal

- Verify wire size and terminal size
- Verify the stud diameter to its application
- Determine whether or not insulation should be captured for stress relief.





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Terminal Pull Forces

The following charts show the UL and US Government specifications (MIL-T-7928) for wire pull-out forces of various wire sizes. The tensile strength is shown in lbf (pound-force). It indicates the minimum acceptable force to break or separate the terminal from the conductor.

Color Code	Wire Size (AWG)	*UL - 486 A	*UL - 486 C	*UL - 310	*Military Class 2
Yellow	26	3	N/A	N/A	7
Yellow	24	5	N/A	N/A	10
Red	22	8	8	8	15
Red	20	13	10	13	19
Red	18	20	10	20	38
Blue	16	30	15	30	50
Blue	14	50	25	50	70
Yellow	12	70	35	70	110
Yellow	10	80	40	80	150
Red	8	90	45	N/A	225
Blue	6	100	50	N/A	300

*UL - 486 A - Terminals (Copper conductors only)

*UL - 486 C - Butt Splices, Parallel Splices, Closed End Connectors, and Wire Nuts

*UL - 310 - Quick Disconnects, Flag and Couplers

*Military Class 2- Military Approved Terminals only as listed



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Selecting the Crimping Tool

The Tool

- The word crimping in this context means to join two pieces of metal together by deforming one or both of them to hold the other. The deformity is called the crimp.



The metal has been deformed to pinch the wire and hold it in place

Adapted from Working with Wire , [PAUL SMITH](#)



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Selecting the Crimping Tool



- Full cycle or diagonal type crimpers.



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More than One wire in the Terminal

- How to decide the equivalent wire gage with two wires?
 - Compute the total CMA
 - Add up the CMA of each conductor for a total CMA of the combined conductors
 - Compare this number to the wire chart to find the best match



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More than One wire in the Terminal

- If there are two wires going into a single contact or terminal, and if they are the same wire gage, the following rule will provide the combined equivalent wire gage.



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More than One wire in the Terminal

Rule of Threes

- Two 22 awg wires into a single contact,
- 22 awg -3 = 19 awg is the estimated size of the terminal to be used.



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Thank You
Any Questions?



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Further Information

For questions regarding this webinar, please contact
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