Written by Chad Smith, Thomas & Betts
Tuesday, 12 March 2013 13:16

What you use and how is key to ensuring secure, trouble-free terminations.

Editor's Note: This article is based on one that first ran in the November/December 2012 issue of IEC Insights*, a publication of the Independent Electrical Contractors organization.*

Flexible-conductor cable, or flex cable, has become increasingly popular for its ease in maneuvering in tight spaces, particularly where larger conductors are needed, as well as where cable movement may be an issue (as in the wind turbine application shown here, for example). The increased use of flex cable has led to the need for guidance in selecting the proper compression connectors and terminals appropriate for these applications, as well as the proper method for installing these connectors for secure, trouble-free termination. In April 2012, the National Electrical Manufacturers Association (NEMA) issued Bulletin No. 105, which advises that mechanical set-screw connector lugs and terminals are not intended for use with fine-stranded conductors.

Even though mechanical set-screw connectors are commonly used with solid, B- or C-Code cables, they are not recommended for fine-stranded flexible conductor cable because the fine strands break too easily from the stress of a mechanical connection. Broken strands can cause overheating and wire pullout. NEMA recommends compression connectors for termination of fine-stranded flexible conductor cable.

Table I. Flex Cable Classifications & Strands

Cond Size AWG/ MCM	Cir Mils	Stranded Code	Approx Diam	G	H Strands	I #24 (.020 in)	K #30 (.010 in)	M #34 (.006 in)	DLO #24 (.020 in)
8	16510	7, 19, 37	0.146	49	133	41	168	420	37
6	26240	7, 19, 37	0.184	49	133	63	266	665	61
5	33090	7, 19	0.206	49	133	84	336	836	91
4	41740	7, 19, 37	0.232	49	133	105	420	1064	105
3	52620	7, 19	0.26	49	133	133	532	1323	125
2	66300	7, 19, 37	0.292	49	133	161	665	1666	150
1	83690	7, 19, 37, 61	0.332	133	259	210	836	2107	225
10		7, 19, 37, 61		133	259	266	1064	2646	275
20	133100	7, 19, 37, 61	0.419	133	259	342	1323	3325	325
30	167800	7, 19, 37, 61	0.47	133	259	418	1666	4256	450
40	211600	7, 19, 37, 61	0.528	133	259	532	2107	5320	550
250		37	0.575	259	427	637	2499	6384	
262									650
300		37	0.63	259	427	735	2989	7581	
313									775
350		37	0.681	259	427	882	3458	8806	
373									925
400		37	0.728	259	427	980	3990	10101	
444									1100
450				259	427	1127	4522	11396	
500		37, 61	0.813	259	427	1127	4522	12691	
535									1325
550				427	703	1372	5054	13364	
600		61	0.893	427	703	1470	5985	14945	1600
750		61	0.998	427	703				
777									1925
800		61, 91	1.032	427	703	1995	7980	20069	
900				427	703	2261	9065	22631	
1000		61, 91	1.153	427	703	2527	10101	25193	

Table I lists flex cable classifications and strands. Some connectors are dual-rated for code and flex cable, while others require a different connector for each application: the connector should identify the proper application clearly, whether B- or C-Code or flex cable (Fig. 1). According to the UL standard, 486 A–B:

"A connector, a unit container or an information sheet packed in the unit container for a connector tested with conductors other than Class B, SIW or Class C stranding shall also be marked with the conductor class or classes and the number of strands."

Fig. 2. Indent-style crimp

Fig. 3. Hex-style crimp

Fig. 4. Hex-Flex® Die System

Fig. 5. Wire stripped

BLACK

[illegible]

[illegible]