



NEWSLETTER

July 2021

90°C IS BETTER THAN 80°C

What might seem like a small detail can have a big impact on your overall cable dimensions and ampacity. Learn how the new 90°C UL approval can be beneficial for high performance flexing PUR cables.

INTRODUCTION TO PUR CABLES

PUR (Polyurethane) is a great jacket material for heavy duty industrial cables. It performs extremely well in continuous flexing applications and has become a standard for many motion control applications. PUR has high tear and abrasion resistance and generally offers a longer lifetime in flexing applications as PVC.

Temperature rating for PUR Cables

Most industrial cables for automation applications are available in 300, 600 and 1000V options with 80°C rating per UL 758. This was the status quo in automation cables for over a decade. As materials technology has improved over time, we were one of the first manufacturers to upgrade our polyurethane cables to 90°C and applying a new UL standard.

Q: How does this benefit the end-user?

A: The main benefit for installers in the USA lies in the way ampacity is calculated per NEC and NFPA 79 standards. The ampacity tables in both standards allow higher ampacity ratings at the same copper conductor size for the 90°C column compared to the 75°C column.

Q: Where do I find these references?

A: we will explain how this works, but if you like to look at the source reference please review NFPA 79 table 12.5.1 and NEC table 310.16.

Q: How does this benefit me?

A: There are two potential benefits:

1. You can get more ampacity for the same amount of copper and money invested.
2. It can help you to keep your cable diameter small. Remember that space in a drag chain comes at a premium.



TKFF 390, new with 90°C rating

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Connectorized servo motor cables

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AMPACITY PER NFPA 79 AND NEC

NFPA 79 Table 12.5.1 Conductor Ampacity Based on Copper Conductors with 60°C (140°F), 75°C (167°F), and 90°C (abbreviated, AWG22-2 only)

Conductor size		Ampacity			75° to 90°C gain
AWG	60°C	75°C	90°C		
< 22		
22	3	3	3	-	
20	5	5	5	-	
18	7	7	14	100%	
16	10	10	18	80%	
14	20	20	25	25%	
12	25	25	30	20%	
10	30	35	40	14.2%	
8	40	50	55	10%	
6	55	65	75	15.4%	
4	70	85	95	11.7%	
3	85	100	115	15%	
2	95	115	130	13%	
> 2		

NEC Table 310.16 (abbreviated AWG18 -2 only)

Conductor size		Ampacity (Copper)			75° to 90°C gain
AWG	60°C	75°C	90°C		
18	-	-	14	-	
16	-	-	18	-	
14	15	20	25	25%	
12	20	25	30	20%	
10	30	35	40	14.2%	
8	40	50	55	10%	
6	55	65	75	15.4%	
4	70	85	95	11.7%	
3	85	100	115	15%	
2	95	115	130	13%	
> 2		

CONCLUSION

Depending on gage size, the rated ampacity gain is significant between 80°C and 90°C rated PUR cable. 80°C rated cable must apply the 75°C column. Whether or not this gain is available to you depends on other factors such as the temperature rating of your terminals for example. When buying a cable a lot of the cost goes towards the copper. This example shows that you get more from that copper by choosing the right materials. The 90°C rating allows to maximize the energy transfer or in some cases may help to choose a smaller conductor keeping the cable diameter small and allowing for a smaller bending radius in your cable drag chain.

Like we said: **90°C is better than 80°C!**