

## IEEE 802.3 Ethernet Working Group Liaison Communication

Source: IEEE 802.3 Working Group<sup>1</sup>

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From: David Law [Chair, IEEE 802.3 Ethernet Working Group  
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Subject: Power Delivery over Communications Cabling

Dear Dr Oehler,

We would like to bring to your attention that the USA 2017 National Electrical Code® revisions in Table 725.144 have effectively created a “new” class of communication cables for operating temperatures greater than 60°C with designated ampacity limits (current capacity) for powering, without consideration for the transmission characteristics related to the application usage.

At this time, no known IEEE 802.3 communications and/or power delivery have been specified for operation on data center or enterprise Ethernet based communications circuits at 90°C conductor temperature. IEEE 802.3 references TIA and ISO/IEC cabling functionally specified over the temperature range from -10°C to +60°C. Cabling transmission characteristics beyond 60°C are not specified, therefore 802.3 operation may not be supported. This is independent of whether the cabling itself may survive exposure to such temperatures.

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<sup>1</sup> This document solely represents the views of the IEEE 802.3 Working Group, and does not necessarily represent a position of the IEEE, the IEEE Standards Association, or IEEE 802.

**TABLE 725.144, Ampacities of Each Conductor (in Amperes) in a 4-Pair Class 2 or Class 3 Data Cable, Based on Copper Conductors at Ambient Temperature of 30°C (86°F) with All Conductors in All Cables Carrying Current, 60°C (140°F), 75°C (167°F) and 90°C (194°F) Rated Cables**

AWG	Number of 4-Pair Cables in a Bundle																				
	1			2-7			8-19			20-37			38-61			62-91			92-192		
	Temp Rating			Temp Rating			Temp Rating			Temp Rating			Temp Rating			Temp Rating					
	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C
26	1.0	1.0	1.0	1.0	1.0	1.0	0.7	0.8	1.0	0.5	0.6	0.7	0.4	0.5	0.6	0.4	0.5	0.6	NA	NA	NA
24	2.0	2.0	2.0	1.0	1.4	1.6	0.8	1.0	1.1	0.6	0.7	0.9	0.5	0.6	0.7	0.4	0.5	0.6	0.3	0.4	0.5
23	2.5	2.5	2.5	1.2	1.5	1.7	0.8	1.1	1.2	0.6	0.8	0.9	0.5	0.7	0.8	0.5	0.7	0.8	0.4	0.5	0.6
22	3.0	3.0	3.0	1.4	1.8	2.1	1.0	1.2	1.4	0.7	0.9	1.1	0.6	0.8	0.9	0.6	0.7	0.8	0.5	0.6	0.7

*Note 1: For bundle sizes over 192 cables, or for conductor sizes smaller than 26 AWG, ampacities shall be permitted to be determined by qualified personnel under engineering supervision. Note 2: Where only half of the conductors in each cable are carrying current, the values in the table shall be permitted to be increased by a factor of 1.4. Informational Note: The conductor size in data cables in widespread use are typically 22-26 AWG.*

The Table 725.144 2017 National Electrical Code® revision applies to communication cables carrying power and data with the implication of applicability to balanced twisted pair structured cabling. IEEE 802.3 would value any observations you may have on this subject.

Sincerely,

David Law

Chair, IEEE 802.3 Ethernet Working Group