DOCUMENT SUBMITTED TO: *TR-42.7 Single-Pair Thermal Task Group*

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TITLE:	Single Pair Ethernet - PoE Testing	
PROJECT NUMBER (PN):	-	
DISTRIBUTION:	TIA TR42 Thermal Performance of 1-pair cables task group	
INTENDED PURPOSE OF DOCUMENT:	__	**FOR INCORPORATION INTO TIA PUBLICATION**
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ABSTRACT: Temperature Rise in Single Pair Ethernet Cable Bundle with dissimilar supply of current .

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16 October 2020

Single Pair Ethernet PoE Testing

Construction of the Cable

Single Pair with S/FTP Construction:

Diameter of Jacket – 4.9 mm

Diameter Of Conductor – 23 AWG

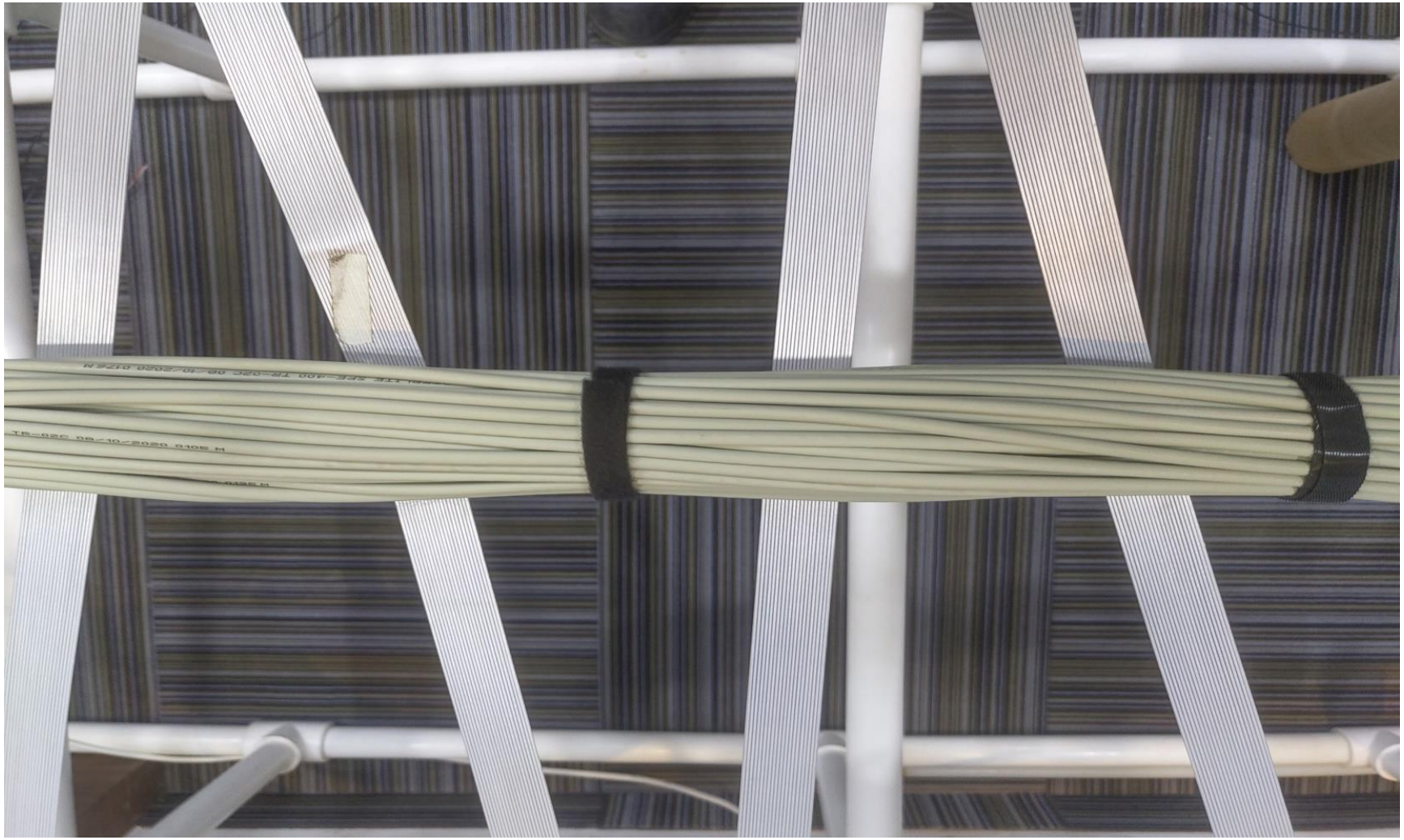
Resistance – 0.0610 ohm/m

Test Setup

Goal was to see the performance of Single pair Ethernet 23 AWG with 37 and 61 Bundles, then use the data to extrapolate the temperature rise as we increase the number of bundles.

- The Cable bundle was mounted on a rope frame with no conduit.
- Temperature probe was placed inside the cable and on the jacket.
- Temperature difference (ΔT) was measured between the highest temperature rise and the Maximum Ambient Temperature.

Test Setup Pictures



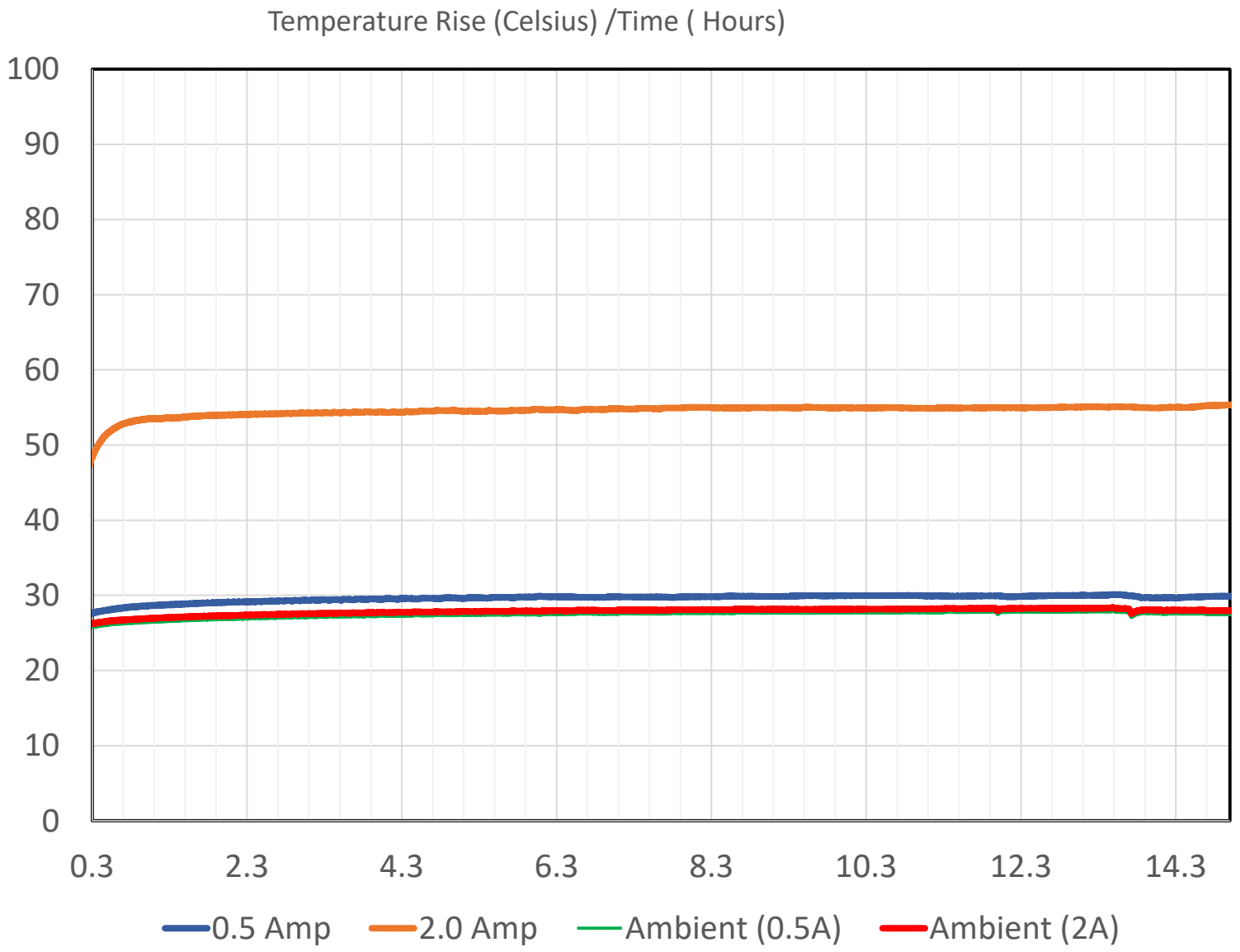
PoE Test Parameter

Bundles	CD (mm)	Resistance (ohm/m)	Current (Amp)	Power (Watt)	ΔT (°C)
37	23 AWG	0.0610	0.5	2.9	2.54
			2	46.2	21.92
61			0.5	6.7	2.59
			2	79.6	31.01

Two cable Bundles 37 and 61 were tested with the current supply of 0.5 Ampere , Later the same Bundle was tested with supply of 2.0 Ampere.

The Temperature Rise in the 37 bundle by supplying 0.5 A and 2.0 A is compared in the Graph upon next slide.

Temperature Rise Comparison – 37 Bundle Size



Objective is to complete the Table

We will be measuring the Temperature rise in different number of bundles and current supply in it.

Bundles Size/Current Supply (A)	Temperature Rise ΔT (°C)			
	0.5	0.75	1.75	2
19				
37	2.54			21.92
61	2.59			31.01
97				

Conclusion & Future action plan

- 2A Current with 37 Bundle size is well within the cable operating temperature range. But in 61 Bundle size & 2A current gives 59.6 deg C which is on the edge of highest temperature rating.

- We will be conducting more Trials to study the PoE performances with different gauges(18 and 26 AWG) and Bundle Size.

- **Model an equation which predicts the Temperature Rise in the different number of bundles. Compare the modelled and actual measured value for validating the model accuracy.**