The POWER Behind Your Designs

Proposal for Cable Current Baseline

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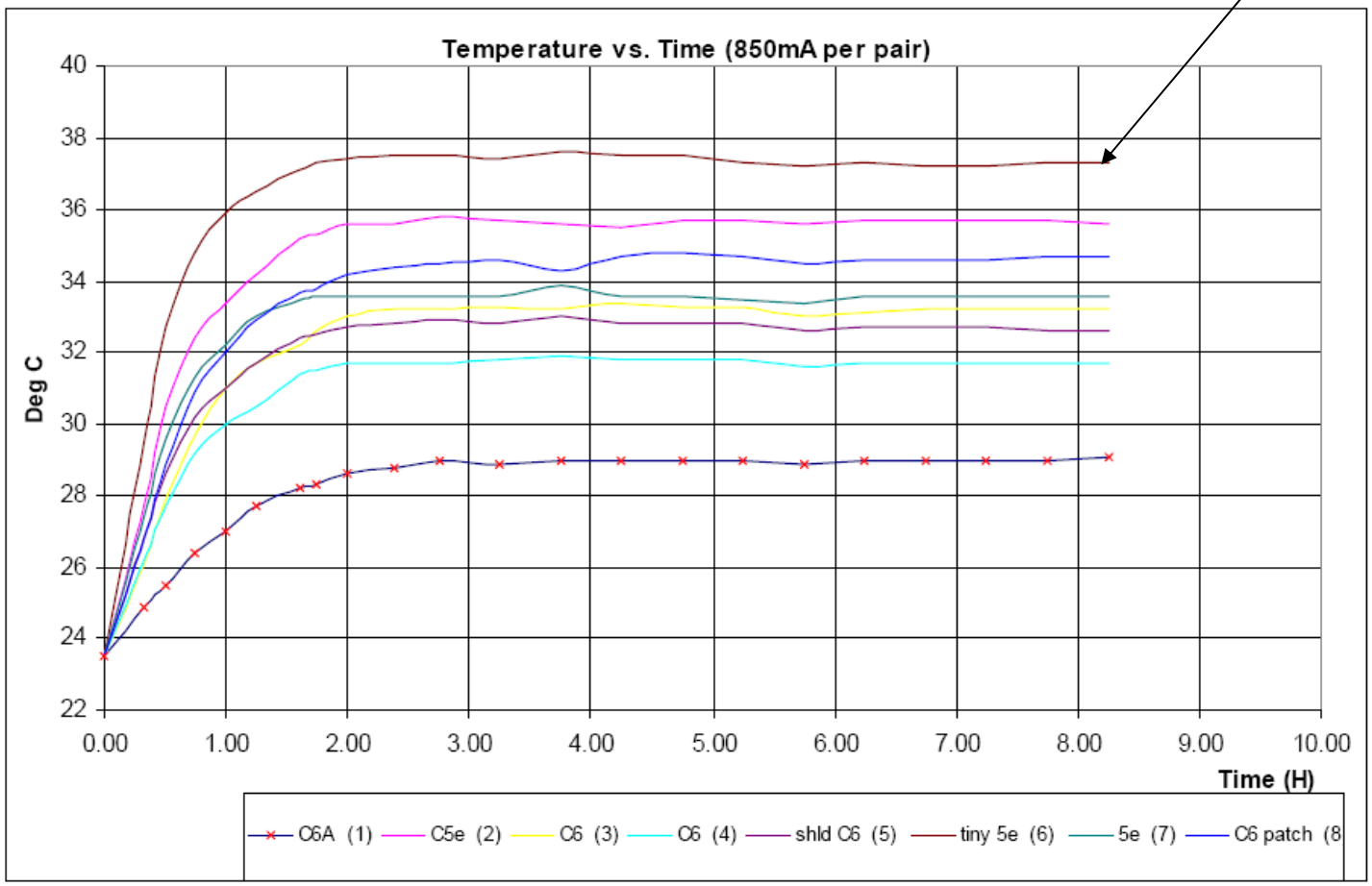
Background

- Cable current determines power delivery
- Must work on installed base of ISO Class D (CAT5)
- J. Walling presented material that existing standards did not address thermal derating
- Need to set reasonable set of baseline assumptions
- Need to provide Addendum in .at to describe assumptions and “what to do if your installation doesn’t match”

Data Presented in May

850mA / pair, 150 cable bundle

Tiny 5e ~15°C

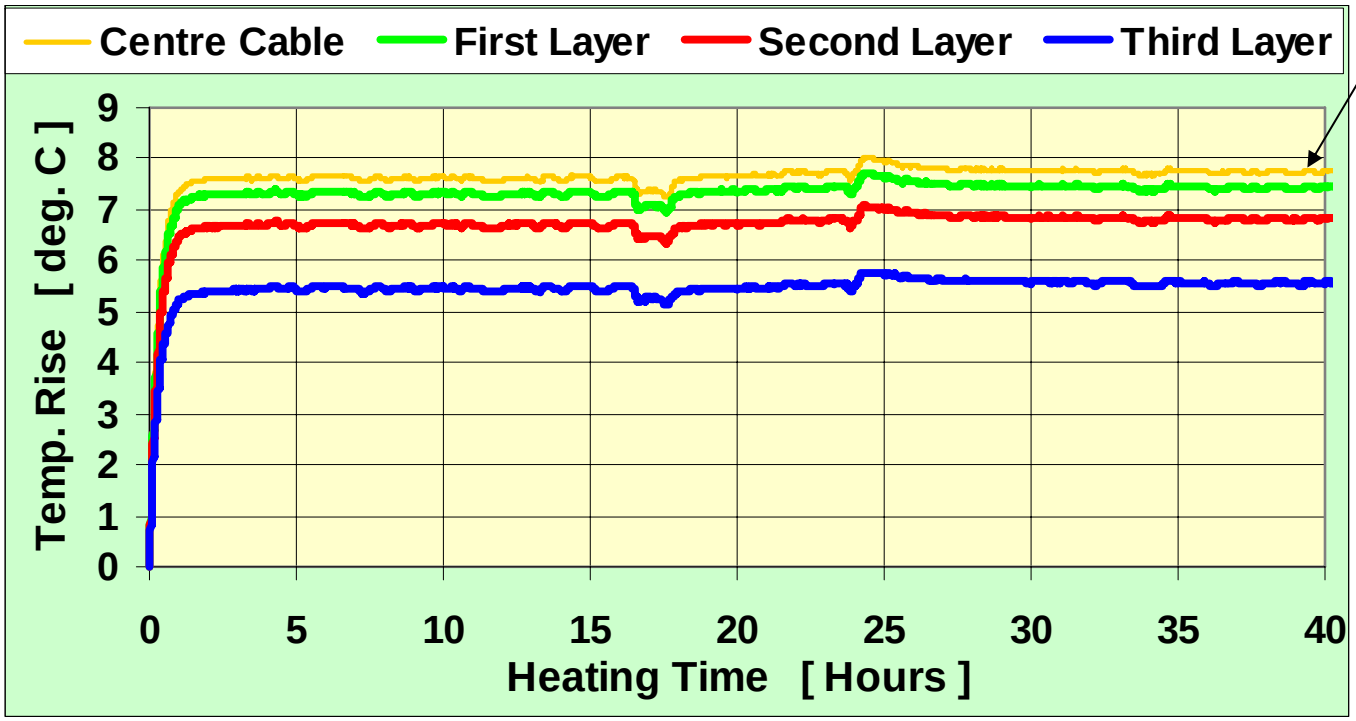


IEEE 802.3at 7/06 MP

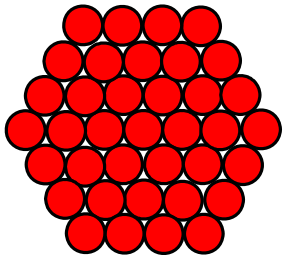
Presented by Joe Dupuis / Hubbell 5/06

Data Presented 7/06

~7.5°C hotspot
840mA/ pair
4 pair
CAT5e Solid



Horizontal Cable



Presented by Delveaux / Nordin 7/06

Thermal Derating Assumption

- Joe Dupuis mentions a desired ambient derating of 10°C
- This translates to operation to 50°C based on 60°C insulation systems prevalent today in installed base
- Traditional Telecom used similar short-term temperature numbers for Central Office – there is accepted practice
- How do we meet this given the data?

Strawman Baseline Assumptions

- Operation to local ambient temperature of 10°C below cable insulation temperature rating
- Class D UTP cable
- Bundles substantially surrounded by air or laying in cable tray – not tight packed or otherwise insulated
- Every cable can deliver an AVERAGE current of 550mA per pair, 4 pairs on every cable when bundled (suggested per J. Dupuis) . This is approximately 50W per cable
- Bundles can deliver 840mA per pair, 2-Pair, on every cable
- Bundles up to and including 37 cables may carry 840mA on all 4 pairs
- Bundles larger that 37 cables MAY NOT support 840mA on all 4 pairs for every cable

Strawman Requirements

- Installation Requirements
  - Operation to local ambient temperature of 10°C below cable insulation temperature rating
  - Class D UTP cable, 4 pair (25Ω Loops, CAT5e)
  - Bundles substantially surrounded by air or laying in cable tray – not tight packed or otherwise insulated
  - Infrastructure that does not meet this requirement may need remediation
- Equipment Requirements
  - Deliver or draw (PSE and PD) no more that 840mA on two pairs, or 550mA on 4 pairs
  - Average power per port supplied is no more than 30W per port.

Discussion

- Delivery of 840mA (30W requires 735mA from 50V source) on 2 pairs
  - 735mA yields 22% less power
  - 2 Pair provides an additional 50% reduction
- Equivalent heating of 840mA 2 pair , is ~1.16 times 550mA, 4 pair. Joe D's temperature rise for the 550mA case was 7 degrees. 7*1.16 = 8 which is "in the noise"

Discussion

- Anticipation for .at is that the majority (e.g. 95%) of applications will be 2 pair implementations, or 4 pair implementations at less than full load
- Out of a larger bundle, the odds that every pair is powered, and at maximum current, over a period of hours, is vanishingly small
- The average allows 50W per cable. This is an aggregate of 7.5*K*W in a 150 cable bundle
- This also allows for installations with 100% of 2 pair, 30W delivery
- There are things that can be done at the installation level if these assumptions cannot be met
- The cable rating covers cases where the installation has used both pair sets to support two different devices. It provides guidance to the system operator. We cannot control this at the per-pair spec level.

Motion

The 802.3at task force proceed with the 775mA (387.5mA per conductor), 2 pair, design constraint.

All Present	802.3 Voters
For:	For:
Against:	Against:
Abstain:	Abstain: