

Qualification of Fiber Optic Cables for Nuclear Power Plants

A proposed new standard

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Why a New Standard? Fiber Use is Increasing

While fiber has been used in nuclear power plants for more than 20 years, it has ***exploded*** in the last 5 years.

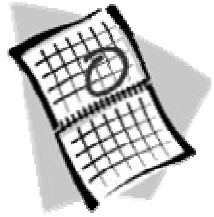
Most usage has been in non safety related systems, but this is changing.

How has fiber qualification been handled to date?

- Since non-safety related, most installations only have considered flame resistance and have used 383 or commercial fire test standards
- Some investigation of radiation performance
- Some investigation of temperature rating
- Some look at non-PVC materials

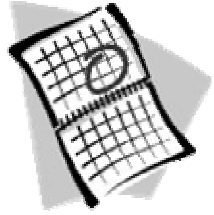
Usage

- Traditional voice and data communication
- Sensing
- Security



Timeline

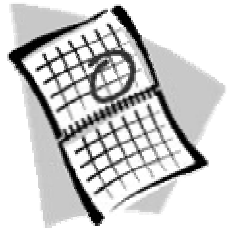
- April 2004 – SC2 Request, Ad Hoc Group



Timeline

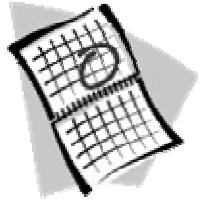
- April 2004 – SC2 Request, Ad Hoc Group
- **July 2004 – Ad Hoc Survey**

The survey indicated by 8-1 that there is a need to develop a qualification standard for fiber optic cables, separate from 383.



Timeline

- April 2004 – SC2 Request, Ad Hoc Group
- July 2004 – Ad Hoc Survey
- **October 2004 – SC2**



Timeline

- April 2004 – SC2 Request, Ad Hoc Group
- July 2004 – Ad Hoc Survey
- October 2004 – SC2 Las Vegas brief presentation
- **April 2005 – Request SC2 approval for new standard**

Writing the Standard

Propose that the standard be jointly developed by NPEC and ICC, analogous to 383.

Three “specialist” areas needed to prepare the standard - fiber knowledge, qualification expertise and cable design.

Specialist Areas

Fiber Expertise

Knowledge of fiber manufacturing, composition and processing.

What are the key parameters?

Radiation effects, long term life, chemical resistance,.....

Specialist Areas

Fiber Expertise

■ **Qualification Expertise**

Knowledge and experience in the qualification process of safety related equipment

Broad based knowledge of variety of products – cable, microprocessors, other gear

Define key parameters

Specialist Areas

- Fiber Expertise
- Qualification Expertise
- **Cable Expertise**

Knowledge of and experience in cable design, materials and applications in nuclear power plants

Specialist Areas

■ **Cable Expertise - Continued**

Defining type classes and/or typical configurations

- Copper vs. fiber critical parameters
- Insulation vs. buffer function
- Performance criteria



We Need Your Help

Both SC2 and ICC have knowledge and experience in designing and qualifying electrical cables and other equipment for nuclear power plants. We need your help and support!

Let's make this new standard as useful and enduring as 383!

Why Get Involved?

- It's new and different! Fiber is the “cable of the (near) future” in nuclear plants
- You can learn about fiber and contribute your cable design, material and qualification expertise
- Only you will make the new standard truly useable!