Technical Note

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TRITON™ MOCSY®7 Coaxial Cable

TRITON® – Superior Cable Shielding

PCT's MOCSY®7 coaxial cable with TRITON technology incorporates an enhanced layer of foil to provide superior shielding performance while maintaining a standard physical profile and ease of installation.

MOCSY7 coaxial cable with TRITON technology is designed for extended use in harsh environments. With the enhanced layer of foil, TRITON provides a 13 to 25 dB improvement in shielding after 10,000 flexes as compared to other manufacturer's cable.

The Problem with Shielding

Every cable operator knows the importance of cable shielding to prevent ingress (r.f. noise entering the cable plant) and signal egress (leakage of r.f. into the air). However, it is now becoming apparent that cable shielding can be compromised by flexing or bending the cable.

Aerial installations are exposed to the wind which causes repeated flexing of the cable as it sways. Underground cable in conduit installations may undergo multiple bends with high tension on the cable. Also, indoor cable pulls can torture a cable as it bends and slides over walls, floor joists or attic rafters.

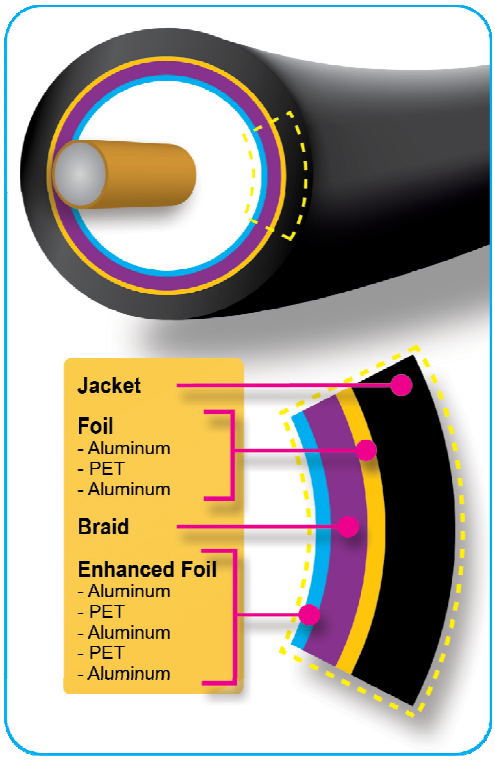
The Society of Cable Telecommunications Engineers (SCTE) has developed a test standard to simulate, in a laboratory environment, this kind of flexing. Using this new conditioning method and the GTEM shielding test, we can now evaluate cables when new (unconditioned) and more importantly - after flexing.

Problem Solution

Laboratory testing showed that when a cable is flexed, the shielding components begin to break down. In particular the inner tape or foil, which is bonded to the dielectric, will develop micro-cracks in the aluminum foil. These cracks disrupt the current flow in the shield and allow r.f. energy to leak through.

It is common for the inner tape to be constructed from a laminate of Aluminum / PET / Aluminum or APA. Even with two layers of aluminum, there are places where the cracks caused by flexing will align creating a r.f. leakage path. PCT engineers attacked this problem by recognizing that an additional layer of aluminum in the tape laminate would significantly reduce the possibility of cracks aligning in all three metal layers.

Cable made with APAPA inner tape laminate was built and tested with excellent results. The diagram shows how a tri-shield using this new technology is constructed. This same TRITON concept can be implemented in bi-shield or quad-shield.



To maintain standard dimensions for connector installation, the slight thickness increase for this APAPA tape is compensated for by reducing the foam core diameter a bit and the amount of gas injected into the foam is adjusted so that a 75 ohm impedance is achieved. In this way, TRITON technology has no impact in connector installation force.

A patent has been applied for to protect PCT's intellectual property and this new technology.

Lab Test Results

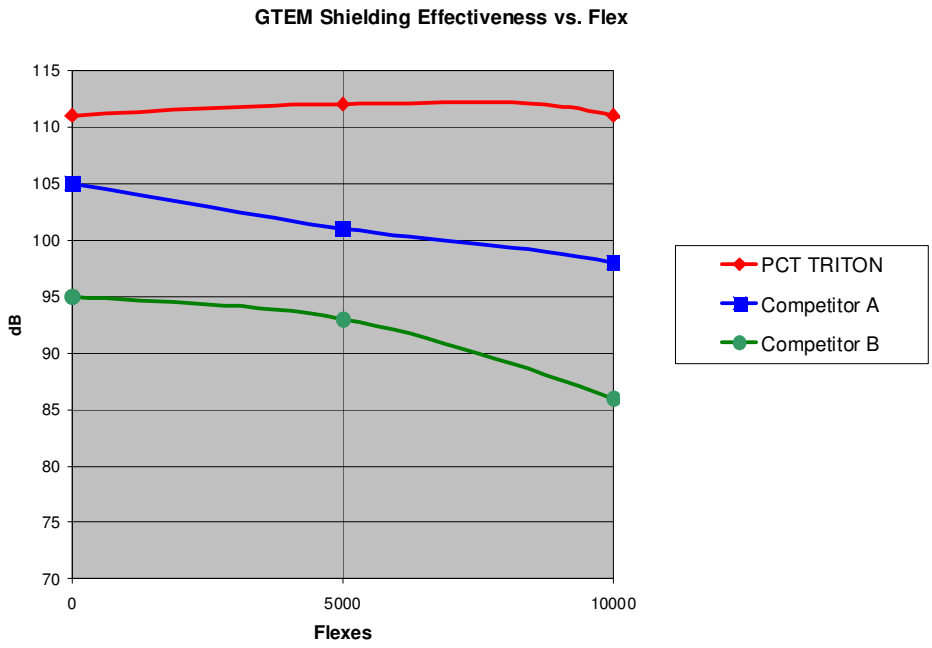
Shielding performance of drop cable is often measured in a GTEM cell. Our testing was done according to SCTE 48-3 "Test Procedure for Measuring Shielding Effectiveness of Braided Coaxial Drop Cable Using a GTEM Cell".

Conditioning of the cable was done according to SCTE IPS TP 020 Rev 08 "Flexure Method for Drop Cable Conditioning". Flexing is done at a rate of 500 rpm inside a ¾" SDR11 conduit bent with a radius of 40 inches (to simulate a 3.5%- 4.0% installed sag).

Samples of 77% tri-shield were used in this comparison. Sample types are:

- PCT 77% tri-shield with TRITON technology
- Competitor A with 77% tri-shield with APA
- Competitor B with 77% tri-shield with APA

Shielding performance is measured from 5 to 1000 MHz and the results are averaged to produce a single value expressed in dB. Higher dB values represent better shielding. Results were obtained unconditioned and after 5,000 flexes and 10,000 flexes as recommended by the SCTE.



Flexes	PCT TRITON	Competitor A	Competitor B
0	111	105	95
5000	112	101	93
10000	111	98	86

The TRITON cable can be seen to maintain excellent shielding performance, even after 10,000 flexure cycles. The competitor cables degrade significantly after flexing 5,000 cycles and much more after 10,000 cycles.