STE Datacom Cabling Safety

Information for tenants to make safer & smarter choices in cabling October 2005

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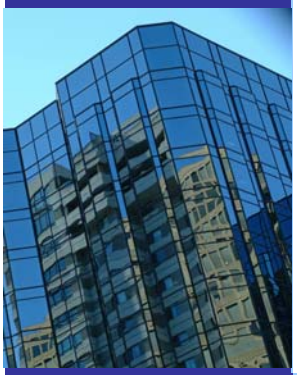
Communications cabling - a necessary infrastructure

The computer has introduced many exciting capabilities and benefits into the workplace. Now they are a way of life. From the 1980's until today, the cabling infrastructure (voice, data, video) has made much advancement in technology. We now have copper and fiber optic cables that can deliver speeds that were unimagined a few years ago. Cabling may account for less than 10 percent of the cost of your network infrastructure, but unless we all go wireless, it might just be the most important 10 percent.

It's likely that your network cabling will be one of your most long-lived assets. The typical cabling system might be used for 10 - 15 years. Imagine what kind of applications and bandwidth it will have to support in 2019! By one estimate, nearly 70 percent of all network-related problems can be traced to either poor cabling installation work or problems with the cabling components.

Your network probably depends on cable to transport data. To help assure reliable long-term network operation, you need cable that will deliver consistently good electrical performance to support signal transmission. When your network is upgraded to meet the needs for faster data transfer, you will place greater demands on your cable. If your cable can't handle faster data rates, you will have to replace it (at significant expense). That's why many network managers prepare for tomorrow's data rates by specifying the highest performance cable available today.



For more than two decades, the most common outer jacketing material used in communications cabling (plenum & non-plenum rated), has been Polyvinyl Chloride (PVC), which probably contained high amounts of Lead in the stabilizers.

Get The LEAD Out….

What is plenum cable?

"Plenum" is the technical term for the space above a suspended ceiling or below raised floor when it is used to return air from ventilated spaces such as offices to heating and air conditioning equipment. Plenum cable is installed in building plenums for voice and data circuits. For safety in fire situations, this cable meets rigid electrical and building code requirements for low smoke generation and low flame spread.

In the early 1970's New York City approved the use of plenum rated cable under Local Law 5. The National Electrical Code (NEC) finally recognized plenum cable in 1978. This safety offering gained quick acceptance and popularity in the marketplace because of reduced expenses. The installed cost of plenum rated cable was substantially lower (usually better than 50%) than the cost of homerun cable and metal conduit. Initially almost all plenum cables were insulated and jacketed with FEP fluoropolymer material (FEP - Fluorinated Ethylene Propylene). Competitive pressures and high market demand spawned numerous other constructions using materials that could also meet the test requirements for the NEC code (CMP rating).

TECHNO – TIP

What are the most frequently installed typical PLENUM DATACOM CABLES?

The most frequently installed horizontal cable in the plenum for datacom is a "mouthful",

4 PAIR #24 AWG UTP CATEGORY 5e, or 6 - PLENUM CABLE.

A typical plenum cable for data or voice transmission has two main components: (I) a cable core made up of insulated copper wires twisted in pairs and (II) a jacket. The industry standard cable is 4-pair UTP, with four twisted pairs of insulated wire, with "U" meaning "unshielded" and "TP" meaning "twisted pair". When all individual wires are insulated with FEP (Fluorinated Ethylene Propylene), the construction is often called "4x0". This insulation construction is the number one choice in the cabling industry.

The wire insulation, FEP (Fluorinated Ethylene Propylene) is an extremely stable and fire resistant material, which also provides good electrical performance due to its low dielectric constant. The jacketing material for plenum cables has usually been FRPVC (Fire Resistant Polyvinyl Chloride) or PVC for non-plenum. Both plenum & non-plenum PVC jackets have been compounded with additives such as LEAD and Phthalates for many years. Today, we have new choices that are *free of heavy metals.*

NOW AVAILABLE: LEAD-FREE CABLES

Krone, Mohawk/CDT, and several other cable manufacturers have introduced LEAD-FREE cables that are NEC (National Electrical Code) approved for use in the return air plenum. The most common horizontal copper based datacom cabling is 4 pair 24 gauge Unshielded Twisted Pair (UTP) plenum rated cables in CAT 5e, and CAT 6 (the newest high performance standard). Fiber Optic cables are also available in plenum-approved constructions. However, most horizontal installations still use copper-based cabling

The best way to get the LEAD out is not to put it in

Many PVC products have been stabilized using LEAD compounds. However, these LEAD compounds are controlled by regulations that cover workplace exposure, water and air pollution, and water disposal. There are increasing demands on a global scale for alternatives to heavy metals like LEAD.

Today, many cables contain high levels of LEAD in the PVC jackets. The good news is the companies that supply compounded PVC materials have developed alternative LEAD-FREE PVC compounds, and they are available at no additional cost. www.wireville.com/hots/hots0110.html There is no reason to continue purchasing and installing cables that contain LEAD. http://www.turi.org/business/wire_and_cable.htm

In The Pharmaceutical Basis of Therapeutics, (the "bible" of chemical therapeutics in medicine), LEAD is defined in Latin as, "materia non grata," or, an absolutely unwelcome compound, of absolutely no value and causing great harm to human health. Physicians and observers of industrial disease have sensed the danger of LEAD for generations, but never quite understood the low-dose risk.

LEAD has long been recognized as a harmful environmental pollutant. There are many ways in which humans are exposed to LEAD: through air, drinking water, food, contaminated soil, deteriorating paint, and dust. Airborne LEAD enters the body when an individual breathes or swallows LEAD particles or dust once it has settled. Before it was known how harmful LEAD could be, it was used in paint, gasoline, water pipes, and many other products.

Low levels of LEAD can cause adverse health effects on the central nervous system, kidney, and blood cells. Blood LEAD levels as low as 10 micrograms per deciliter can impair mental and physical development.
EPA's Integrated Risk Information System (IRIS) profile on LEAD

Installing cabling that contains LEAD and other health hazards is an avoidable health risk.

and LEAD Compounds -epa.gov/iris/subst/0277.htm

INDOOR AIR QUALITY (IAQ)

On average, we spend about 90 percent of our time indoors, where pollutant levels are often higher than those outside. Indoor pollution is estimated to cause thousands of cancer deaths and hundreds of thousands of respiratory health problems each year. " www.epa.gov/iaq/hbhp/index.html (Healthy Buildings, Healthy People: A Vision for the 21st Century)

Flexible PVC can harm indoor air quality.

Flexible vinyl products appear to contribute to the health hazards of poor indoor air by releasing phthalates and facilitating the growth of hazardous molds.

PVC products can release heavy metals into the building environment. Metal stabilizers, particularly LEAD, cadmium, and organotins, can be released from vinyl products. Significant quantities of LEAD have been found to be released from vinyl window blinds into air and from PVC pipes into water. Toxicological effects of these substances include neurological, development, and reproductive damage.

Installed return-air plenum approved UTP cable, which contains LEAD, **MAY** have an impact on IAQ (Indoor Air Quality) and IEQ (Indoor Environmental Quality) in the building. LEAD dust is a known health hazard for building occupants. LEAD Dust may be released from some PVC products as they deteriorate over time and through exposure to heat or sunlight.
http://www.greenaction.org/healthybuildings/documents/hb_health_hazards.pdf

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In 2000, in response to growing concerns over LEAD, the vinyl industry developed a LEAD-FREE PVC stabilizer compound. It was introduced to the manufacturers on a trial basis. Subsequently, this safer compound was improved and offered to the cable manufacturers on a widespread basis. Today, you have a choice. There are LEAD-FREE cables available. Educated consumers will demand LEAD-FREE communications cabling products.
http://www.alphagary.com/newsletter/pr3.html

Today, cabling may be removed and disposed of in normal construction & demolition (C&D) waste disposal methods. In the near future, the cables that contain LEAD and other heavy metals may be reclassified to require special handling as HAZMAT (Hazardous Materials). The general disposal costs of HAZMAT are higher than normal C&D disposal.

OLDER PVC COMPOUNDS

Stabilizers are added to the PVC compound to help slow down the degradation of the PVC polymer. Stabilizers found in PVC may include **LEAD** and other potentially toxic heavy metals. Both the stabilizers and the plasticizers (to make the material more flexible) additives are not chemically bound in the PVC, they can be released over time resulting in a range of potential exposures from PVC products in normal use raising risks from endocrine disruption, to asthma; and even from LEAD poisoning to cancer.

A new analysis by the Environmental Working Group (www.ewg.org) found many studies in the peer reviewed literature that showed toxic effects at doses below those considered to cause no effects by regulators. Dr. Christina Thayer of EWG says, " Traditional testing misses important toxic effects at very low doses."

For more Info: Environmental Impacts of Polyvinyl Chloride (PVC) Building Materials
A briefing paper for the Healthy Building Network
by Joe Thornton, Ph.D.
http://healthybuilding.net/pvc/ThorntonPVCSummary.html

PVC DISPOSAL IS A WORLD WIDE PROBLEM

When PVC is incinerated in medical waste and garbage waste disposal furnaces, it is among the largest single sources of dioxin in those burners. The United States Department of Environmental Protection (EPA) suggests that there is NO SAFE level of dioxin exposure. Extremely toxic heavy metals in PVC, such as LEAD, cadmium, and chromium, are also released from the stacks and end up in the ash of these incinerators. Virtually all of the products made of PVC have safer substitutes available, making the risks posed by PVC completely unnecessary and unacceptable.

PVC CONTAINING LEAD CANNOT BE READILY RECYCLED

The multitudes of additives required to make PVC useful make large-scale post consumer recycling nearly impossible and interfere with the recycling of other plastics. The LEAD cannot be effectively removed during the recycling process at this time.
http://www.vinyloop.com/anglais/display_faq.asp?Targetfaq=2

In 1999 almost 600 Million pounds of PVC was used in wire and cable applications

Many communities and numerous countries are assessing costs to the

In 1999 almost 600 million pounds of PVC was used in wire and cable applications

full life cycle of products. Products that contain materials which present costly challenges in safe disposal or recycling, may be front end loaded on price. Changing the material selection to "green" products may have big dividends in cost avoidance downstream. PVC in cabling is cheap and plentiful. Downstream problems and life-cycle costs for PVC may be very expensive and widespread.

PVC is extremely difficult to recycle. Very little PVC is recycled, and this situation is unlikely to change in the foreseeable future. Because each PVC product contains a unique mix of additives, post-consumer recycling of mixed PVC products is difficult and cannot yield vinyl products with equivalent qualities to the original. Even in Europe, where PVC recycling is more advanced than in the United States, less than 3 percent of post-consumer PVC is recycled, and most of this is merely "downcycled" into other products which means there is no net reduction in the production of virgin PVC. By 2020, only 9 percent of all post-consumer PVC waste in Europe is expected to be recycled, with a maximum potential of no more than 18 percent.
http://www.healthybuilding.net/pvc/ThorntonPVCSummary.html

Buying a safer tomorrow - Green Procurement

Designing for the future will include choices in materials and components that can be reused or recycled. The materials that you choose to include in your building will make a significant contribution to its overall impact on the indoor environment. Avoiding unnecessary indoor air pollution sources is the most obvious method to improve indoor air quality. There is strong support to design low-polluting buildings and recommendations on low-polluting building materials. Advocate safe, energy-efficient, and long-lasting products and services. Things that last and are useful are the greatest hedge against waste and are better than reuse or recycling.

Most consumers are unaware of the toxic materials in the products they rely on for word processing, data management, and access to the Internet like the LEAD that may be present in your PVC jacketing data communications cabling. Many companies are "going Green". Purchasing agents are looking to safer alternatives. Requesting LEAD-Free data communications cabling is one way to ensure a safer purchase What is Green Purchasing?
It's considering the environmental impacts of a product when you make purchases. These products should have a lesser or reduced effect on human health and the environmental when compared to competing products that serve the same purpose. Specifying LEAD-Free communications cabling is one way to aid in committing to "green purchasing".

Avoiding stabilizers, containing LEAD, in flexible PVC cabling materials and using safer, nontoxic materials may be the best way to eliminate potential downstream hazards and liability.

LEAD phase out is coming?

The European Commission is considering a proposal to restrict the use of LEAD in electronics and electrical equipment: *"Member States shall ensure that new electrical and electronic equipment put on the market after 1 January 2006 do not contain **LEAD**...."*

Major corporations, particularly those in Japan, are setting phase out dates for LEAD. Sony has already implemented the use of LEAD-Free solder in most printed wiring board soldering processes, and has set a target of 2005 year-end to be using LEAD-Free solder in all products.. LEAD, when dissolved by acid rain, may pollute groundwater and other parts of the environment. Sony is forging ahead with the reduction and elimination of PVC, which may release toxic substances when burned, from products. Sony has already developed and commercialized PVC Free headphone cords. PVC has also been eliminated from the POP (Point of Purchase) advertising for electronics products handled by Sony Marketing of Japan.
http://www.sony.net/SonyInfo/Environment/publication/en_koukoku_0130.html

NEC 2002
REQUIREMENT FOR REMOVAL OF ABANDONED CABLE

The National Electrical Code (**NEC)** contains the pertinent mandatory Codes. These Codes are rules intended to ensure the safety during installation, use and/or disposal of materials, components, fixtures, and systems. The Codes ensure ***minimum*** construction quality and ensure safety of life, health and property.

The new fire safety provision to require the removal of abandoned cable is the first major change to cabling requirements in the National Electrical Code in more than 20 years. In 1978, NFPA (National Fire Protection Association) made an exception to NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems, which requires any materials installed in a plenum space to be “noncombustible”. The exception, which allowed cables tested and rated as CMP to be installed in the return air plenum, was drafted more than 25 years ago. In the 1970's, no cables were available which could meet the requirements of non-combustible. www.nfpa.org

The **NEC** is revised on a three-year cycle. The next revision of the NEC will be in 2005. The NEC code (when recognized and accepted) is enforced by the AHJ (Authority Having Jurisdiction), which includes

There is an estimated 85 billion feet of abandoned cable

state, local, county and city code authorities. Each AHJ can adopt the **NEC** code in whole or partially.
(See attached current pending NEC 2002 Adoption Schedule by State). Some cities may elect to adopt the entire or partial current NEC code on a timetable not included in the attached schedule. **The new NEC 2002 requires that accessible abandoned cable be removed for both copper and fiber.**

The accumulation of miles and miles of cabling left in the ceilings and walls of facilities has become a **major concern for life safety** over the years. A recent Toxics Use Reduction Institute presentation at the RCRA National Conference - January 16, 2002) conservatively estimated that there is over ***45 billion feet*** of plenum cable in place. Cables that are abandoned in ceilings, riser systems, and air handling systems have always been a source for fueling fire, smoke and sublethal toxic fumes that can incapacitate. The NEC 2002 **requires the removal of abandoned cable.** The buildup of layers upon layers of cabling has become a major concern to life and safety over the past 10 years.

RCRA is the Resource Conservation and Recovery Act, which was enacted by Congress in 1976. RCRA's primary goals are to protect human health and the environment from the potential hazards of waste disposal, to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner. In 1984, Congress enacted the Hazardous and Solid Waste Amendments (HSWA) which significantly expanded the scope and requirements of RCRA.
http://www.epa.gov/epaoswer/hazwaste/ca/backgnd.htm#1
www.turi.org
The definition of abandoned cable, as found in paragraphs 800.2 and 770.2 of the **NEC 2002** Book, states "....*Installed communications cable that is not terminated at both ends at a connector or other equipment and not identified "For Future Use" with a tag."* Admittedly, this definition of abandoned cable in the NEC is somewhat vague. There is a concerted effort in the NFPA to draft a set of clearer definitions for this portion of the NEC 2002. The definition clarity problem associated with the NEC 2002 - removal of abandoned cable - does not make the code invalid. Hopefully, the local authorities will use good judgment and discretion in the application and enforcement of this code when accepted by the AHJ.

For copper cable, paragraph **800.52**(**B**) of the **NEC** Code states "...*The accessible portion of abandoned communications cables shall not be permitted to remain*.." Additionally, paragraph **800.52**(1) states that *abandoned cables in vertical runs shall not be permitted to remain*. **Article 770** states the same requirements for

optical fiber risers and horizontal cables.

BIG CHANGES ON THE HORIZON FOR COMMUNICATIONS & DATA CABLING

A proposed change in the **National Electrical Code** for the NEC 2005 may force far-reaching changes in communications cabling. A move to replace CMP (plenum rated cable listing) with a variation on "limited combustible" cable listing could force cable manufacturers to rework their entire plenum cable product lines.

Throughout the 3 year development cycle for the NEC (National Electrical Code) 2002, there was a significant jousting match between two groups over the **NFPA**'s (National Fire Protection Assoc.) acceptance of a "limited combustible" cable listing as an OPTION to NFPA 262 - CMP plenum rated cable. The only cables that have passed the test for limited combustible are insulated and jacketed with FEP (fluorinated ethylene propylene). In the end, the group representing the interests of several chemical and testing companies won the match and the NFPA approved the option.

Since then, the optional "limited combustible" CMP cable has had almost no market acceptance. A poll of more than 50 distributor locations found the limited combustible product in stock at only ONE location. Most of the distributors that were contacted were unfamiliar with this product.

The group that pushed the limited combustible cable as "just an option" has changed their tune. Now, they want the code (law) to REQUIRE the consumer to purchase the limited combustible type cable for use in air systems. Under this new strategy, the NEC 2005 would no longer recognize the current CMP listing for new installations. Unfortunately, the strategy of manipulating the code process may run afoul of the legal system that regulates the code (law) making process.

Important Note:

This information comes from the **United States Army Medical Research Institute of Chemical Defense, Medical Management of Chemical Casualties Handbook.**

TOXIC TEFLON - Pulmonary Agents

Check the MSDS for Teflon® FEP.

Perfluoroisobutylene (PFIB) is a toxic pyrolysis product of tetrafluoroethylene polymers encountered in military materiel (e.g., Teflon7, found in the interior of many military vehicles). The oxides of nitrogen (NO_xs) are components of blast weapons or may be toxic decomposition products. Smokes, e.g., HC, contain toxic compounds that cause the same effects as phosgene does. The remainder of this chapter will deal solely with phosgene because it is the prototype of this class of agents; however, the principles of medical management of phosgene exposure also apply to casualties from compounds such as PFIB or NO_xs.
http://www.fas.org/nuke/guide/usa/doctrine/army/mmcch/PulmAgnt.htm

On August 19-21, 2003, the NFPA Air Conditioning Technical Committee met in Santa Ana, CA. The NFPA 90A committee (NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems) voted to take the first step towards revamping the code (NEC 2005) that covers all plenum cables. Essentially, the proposal included revising the testing and listing for limited combustible cable (for use in Air-Conditioning and Ventilating Systems), AND dropping the current listing for CMP (NFPA 262/UL910) return-air plenum approved cables. Almost half of the attendees and guests were connected with the group (chemical & testing companies) pushing for this proposed change.

The NFPA 90A committee member that we spoke with said, " What concerns us is the committee's failure to address the incapacitation factor." The debate continues to rage over the question "Is limited combustible cable really safer?"

The FEP jacketing and FEP insulating materials used in limited combustible cable are subject to heat decomposition and the emission of sublethal toxic fumes. Some of the fumes can incapacitate (by blinding and choking) building occupants. Current and proposed testing makes no provision to recognize toxicity or emissions that are essentially colorless (i.e., hydrogen fluoride, which converts to hydrofluoric acid upon contact with any moisture).

FEP materials are normally very stable. But, when they burn or are heated, the halogens separate and become highly reactive - forming toxic and highly corrosive gases that can significantly damage organic, inorganic and metallic materials. Hydrogen fluoride is one of the gases produced from heat decomposition of FEP.

Hydrogen fluoride vapor causes severe irritation and deep-seated burns of the eye and eyelids if it comes in contact with the eyes. If the chemical is not removed immediately, permanent visual defects or blindness may result. Hydrofluoric acid is a severe irritant to the nose, throat, and lungs. Severe exposure causes rapid inflammation and congestion of the lungs. Death may occur from breathing this chemical.

The cabling industry is inundated by a media blizzard reminding the users about the high performance (electrical) properties and the low fire hazard associated with FEP. Face it, FEP is hard to burn.

There are two major areas of concern that remain un-addressed in the NEC 2002 (National Electrical Code). As the building industry is besieged with litigation revolving around the mold toxicity issue, we asked the question: "Does the testing process for fire safety measure the TOXICITY of the cables when overheated or burned?" The answer is shockingly "NO".

Most of the cabling industry participants understand the meaning of terms like: fire, smoke and fuel load. The testing for the current code measures only flame spread, and smoke index. The testing does not measure heat decomposition, thermal toxicity, toxic gases or the incapacitation factor.

Many safety experts feel that the NFPA revision of the scope that defines the safety issues should include sublethal toxicity and the incapacitation factor. If the testing does not recognize these other areas, then the full safety factor is not included. As a simple example: imagine chaining your legs to a large anchor and dropping to the bottom of the pool. The chain and anchor won't kill you, drowning will.

Communications infrastructure (cabling & connectors) is focused on two major areas - performance and safety. Typically, performance is placed in the arena of standards (EIA/TIA) and safety is related to codes (NFPA/NEC). Most of the information provided by the manufacturers deals with performance and interoperability. The information about safety is usually described in relationship to meeting certain codes.

Remarkably, fire safety performance SUSTAINABILITY is not measured. Who wants a product that is safe today and useless tomorrow? You should know how long these products maintain their fire safety performance. This important aspect of safety is also completely absent from the criteria of the current of the NEC (2002) and the proposed criteria of the upcoming NEC (2005).

Cables that are listed and approved for use in air spaces (CMP & LC) should be tested and monitored to determine if the safety performance falls below the minimum code threshold. Fire safety equipment such as sprinkler systems and extinguishers are periodically monitored to assure performance that meets a code requirement. Fire safety performance is required over time. Currently the cable fire safety performance is only tested once.

During the past several decades, you may have seen the effect of product “toxicity” on various industries and the victims. No one can ignore the echoing repercussions from tobacco, asbestos, and lead. The finger pointing and lawsuits continue to be prominent in the news. One common area of the litigation over these products seems to be *the failure to warn the buyers/users about the dangers.*

In the last cycle of the National Electrical Code (NEC 2002) another important safety development for the cabling industry took place. The need to reduce the fuel load in the return air plenums was identified and the code added a provision for the removal of "abandoned" cable.

In the commercial real estate world, cable removal is a hot topic. Most building owners can work with existing tenants to comply with the NEC 2002 mandate for the removal of abandoned cable. The tenants may minimize the downstream costs associated with cable removal by maintaining proper labeling and keeping good cable management records. By working with the building owners the new tenant might accept your cabling infrastructure. The old tenant and the new tenant will both save money.

SAFETY

The tragedy at the World Trade Center on September 11, 2001, has burned an image into almost everybody's conscious thoughts. Safety in the commercial and office building environment is a renewed priority.

Modern office buildings use open, concealed spaces for return-air plenum as well as pathways for data and communications cabling. **Ceiling cavity plenums** (the space between the top of the finished ceiling and the underside of the floor or roof above) or **raised floor plenums** (the space between the top of the finished floor and the underside of the raised floor) are spaces used to return environmental air and often contain large amounts of data and communications cabling, sometimes several generations. Because of the volume of airflow in these spaces, they are particularly vulnerable to the spread of fire yet are virtually free of fire protection systems such as sprinklers. Investigation reports have shown that fires in these concealed (plenum) spaces can travel rapidly, be very difficult to locate and extinguish, and can actually be fueled by cables. We must always take great care in selecting materials for the data and communications cables installed in these plenums.

We should select materials that have low smoke generation; low flame spread characteristics, and reduced toxicity (how harmful the smoke is to human beings). ***Flame travel, smoke and toxic fumes from wires and cables installed in air handling spaces should be minimized.*** US codes only address two (2) of these criteria. The NEC (National Electrical Code) is silent when it comes to toxicity.

If there is a fire, heating and air conditioning ducts could become conduits for hydrogen fluoride and other gases, which can cause fatalities. Halogen in the insulation and the jacketing of Limited Combustible cables helps prevent the cables from catching fire, but if the cable jackets overheat, the fumes may drive up the death toll.

IMPORTANT NOTE: Many cable manufacturers are adding LEAD-FREE cables to their product lines. Remember to request: LEAD-FREE cables.

CABLING CATEGORIES

- **5e LEAD-FREE Non-Plenum**
- **5e LEAD-FREE Plenum (CMP)**
- **5e+ LEAD-FREE Non-Plenum**
- **5e+ LEAD-FREE Plenum (CMP)**
- **6 LEAD-FREE Non-Plenum**
- **6 LEAD-FREE-Plenum**
- **6+ LEAD-FREE Non-Plenum**

CAT 6+ LEAD-FREE-Plenum (CMP)

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Cabling Support Hardware may be the Hidden Treasure

By Frank Bisbee

For more than two decades, the communications industry has focused most of its attention on the cable. We have seen a churn of technological advances in both fiber optic and copper based communications cabling. The barrage of the "newest & greatest" types of cable has almost exhausted the bank accounts of the customers. From the earliest releases of the Levels & Categories Program (adopted by TIA/EIA www.tiaonline.org), we saw a stream of more than 25 different variations & generations new cable designs. The net result is today's fiber optic cables and copper cables deliver more performance than we even dreamed possible only a few years ago. However, one of the resultant damages from this technological race is a huge volume of abandoned cable.

The National Electrical Code (NEC 2002) has been adopted by most local authorities having jurisdiction (AHJ's). In a move to reduce fire hazards and fuel load, NEC 2002 requires the removal of abandoned cable that is not identified for future reuse. This volume of abandoned cable could exceed 8.5 million miles of cabling waste materials. Some industry experts have concluded, "Most of the expense for this corrective safety action to reduce fuel load in the structure will be placed on the shoulders of the building owners. Many former tenants left their cable in place when they moved out."

There are some valuable assets that may remain after the abandoned cable is identified and removed. Those hidden treasures are the wire and cable management and support systems. Cable support hardware includes cable runways, cable trays, wire baskets, flexible steel cable trays, bridle rings and a myriad of J-Hooks and J-Hook trees. www.erico.com The focus on a substantial investment in support hardware has been absent from the building owners priorities. Today's **structured cabling systems must allow for both the installation and the removal of datacom cabling in the workplace** (particularly the multi-tenant environment). Several key Building Owners and Managers Association (BOMA www.boma.org) committees are studying these issues and reviewing the language in leases to maximize the values for both the tenant and the building owner.

A well designed and installed cable support hardware system will reduce installation and removal expense substantially. This asset is highly reusable and will generate repetitive savings throughout many generations of tenant or occupant turnover. This is the permanent highway for the information systems in buildings.

A serious look at the people, policies and technologies that will dominate the agenda in 2004 will include a focus on cabling infrastructure hardware. When the tenant moves out, this valuable asset will be transferred to the building owner as an " As Built Improvement".

A consultation session with your support team at the distributor will help to illustrate some of the technical underside to this misunderstood and under-valued hidden asset. We found numerous offerings from the shelves of Our favorite distributor that were a perfect fit for current requirements, adaptable to cable removal and reuse for future installations. When it comes to SELECTING WIRE AND CABLE MANAGEMENT SYSTEMS, Our favorite distributor had all of the answers. In most projects, proper support hardware is mandatory to maintain performance and the capability to handle MARCs (Moves, Adds, Removals, & Changes) without affecting working networks.

The cable support system (overhead, perimeter, infloor, or underfloor) is a critical component of a properly designed voice-data-video communications system. To find out more about this arcane technology check out EIA/TIA-569 "Commercial Building Standard for Telecommunications Pathways and Spaces. When designing the cable tray support system, be sure to consider the (current and future) load capacity and grounding requirements.

In summary, many of the key BICSI (www.bicsi.org) insiders are forecasting that there will be an increased demand for substantially more robust structured connectivity components and support hardware for structured cabling systems. Several large commercial real estate firms have already begun the process of evaluating the cabling facilities in their buildings in order ***to covert the trash to treasure***. One building owner told us, "We bought a Fluke Networks DSP 4300 cable tester and starting down the road to recovery." Additionally, there is already an increased demand for software systems to document and record the asset (i.e. Fluke Networks LinkWare ™ Cable Test Management software and facility documentation) www.flukenetworks.com

It turns out that there are literally millions of dollars of fully functional installed cabling that has been abandoned in some buildings. You don't have to be a rocket scientist to see that there are big savings to be captured.

The proper installation, labeling and documentation of the entire cabling system make the installed asset potentially transferable from tenant to tenant through the building owner. There will be language in the leases that cover the responsibility for removal if the incoming tenant does not find the asset acceptable. If a successful transfer of this asset is accomplished, then both the outgoing and incoming tenants will realize substantial savings. In any event, the building owner gets ownership of the cabling support hardware asset. This approach is definitely a win/win scenario.

Sidebar:

TIA - Telecommunications Industry Association www.tiaonline.com
TIA is accredited by the American National Standards Institute (ANSI) to develop voluntary industry standards for a wide variety of telecommunications products. TIA's Standards and Technology Department is composed of five divisions which sponsor more than 70 standards-setting formulating groups. We will review the standard from User Premises Equipment, Network Equipment group, including:
TIA/EIA-568-B Series, Commercial Building Telecommunications Cabling Standard
TIA/EIA-569-A, Commercial Building Standards for Telecommunications Pathways and Spaces

TIA/EIA-569-A-6, Commercial Building Standards for Telecommunications Pathways and Spaces for Multi-Tenant Buildings
TIA/EIA-606, Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
TIA/EIA-570, Residential Telecommunications Cabling Standard

TR-42 Scopes:

TR-42 - User Premises Telecommunications Infrastructure

The TR-42 Engineering Committee is responsible for commercial, industrial and residential cabling standards including telecommunications infrastructure administration, pathways and spaces, and copper and optical fiber systems requirements. These standards include information and requirements necessary for implementing telecommunications infrastructure.

TR-42.1 - Commercial Building Cabling

The TR-42.1 Commercial Building Cabling Subcommittee develops and maintains telecommunications cabling standards for commercial buildings. This Subcommittee specifies cabling system topology, architecture, design, installation, testing and performance requirements for commercial buildings, and campuses. The telecommunications cabling specified is intended as an open system designed to support a wide variety of voice, data, video, building control and other low voltage, power limited applications.

Where applicable, TR-42.1 integrates systems requirements and recommendations generated by other TIA Sub-committees into its standards, and provides joint approval with TR-42.4, TR-42.7 or TR-42.8 on any TIA publication that is intended to add to or modify cabling system requirements specified in standards developed by TR-42.1.

TR-42.2 - Residential Telecommunications Infrastructure

TR-42.3 - Commercial Building Telecommunications Pathways and Spaces

TR-42.4 - Customer-owned Outside Plant Telecommunications Infrastructure

TR-42.5 - Telecommunications Infrastructure Terms and Symbols

TR-42.6 - Telecommunications Infrastructure and Equipment Administration

The TR-42.6 Subcommittee develops and maintains standards for telecommunications administration. These standards include requirements for alphanumeric identification, labeling, color-coding and record-keeping for the telecommunications infrastructure consisting of cabling, pathways and spaces, firestopping, and grounding and bonding. In addition, these standards provide guidance for the administration of equipment assets.

TR-42.7 - Telecommunications Copper Cabling Systems

TR-42.7.1 - Copper Connecting Hardware

TR-42.7.2 - Copper Cable

TR-42.8 - Telecommunications Optical Fiber Cabling Systems

TR-42.9 - Industrial Telecommunications Infrastructure

The TR-42.9 Industrial Telecommunications Infrastructure Subcommittee develops and maintains standards for telecommunications infrastructure in industrial buildings, structures and campuses that are beyond the scope of the commercial building standards. Industrial buildings, structures and campuses can be large, dusty, corrosive, and can contain explosive and severe environmental conditions such as extreme temperature, EMI/RFI, and hazardous gasses. The standards developed by this Subcommittee address both occupied work areas and remotely controlled equipment.

The telecommunications cabling specified is intended as an open system designed to support a wide variety of voice, data, video, building controls, industrial controls and other low voltage, power limited applications. The standard addresses special needs for

design, materials, processes and installation practices.
Where practicable, the standards developed by this Subcommittee will harmonize and incorporate requirements of standards developed and approved by TR-42 Subcommittees and Working Groups through normative reference.
http://www.wireville.com/news/Cabling%20Support%20Hardware%20may%20be%20the%20Hidden%20Treasure.pdf

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"Limited Combustible Cable" is 100% Recyclable?
"Hype - Hype - Hooray"
Technically, yes...Functionally, NO.
In the USA, there is a huge volume of installed communications cabling. Some estimates place the volume of the installed cable at more than 65 billion feet. Recent estimates indicate that there may be as much as 8.5 million miles of abandoned cable in the workplace. The National Electrical Code (NEC 2002) has a provision, which requires the removal of accessible abandoned cable not identified and tagged for future use. http://www.wireville.com/story.php?id=00049

Under the new code requirements, we expect a swelling torrent of communication cabling entering the waste stream. This flood of waste material is mixed like a sea of colored spaghetti. There are many different cabling constructions installed in the workplace. The churn of cabling continues at an alarming rate as we move, add, and change our cabling network infrastructures.

At a recent jobsite, which was refurbishing rental space in an office building, we observed the abandoned cabling that was being removed. In the waste dumpster, we found a myriad of communication cables in a wide spectrum of colors. There appeared to be no universal color code to identify construction or materials of the cable. On closer inspection, we found the majority of the cables were 4 pr UTP (unshielded twisted pair) communications cable. However, there were a host of other hybrid constructions, i.e. single & multimode fiber optic cables of different counts, 4 pr STP (shielded twisted pair), 6 pr UTP, 8 pr UTP, 24 pr UTP, 25 pr UTP,
and a mixture of UTP copper cables and fiber optic cables in the same sheath. Don't forget to include signal wire, coaxial, twinaxial, alarm, fire alarm, and specialty video cables. All of these cables come in a wide selection of colors. There are no jacket color standards to recognize one type of construction versus another. To separate these cables for specialized recycling, you must have an extensive list of manufacturers' part numbers and understand the code and category markings on the cable. The predominant cable jacketing material in communications cabling is PVC containing LEAD stabilizers. At this time, there is no cost effective method to remove the LEAD stabilizer compounds from the PVC in the recycling process. Additionally, many

municipalities are reviewing the types of hazardous materials (HAZMAT) that are in the waste stream for their landfills. Some municipalities have begun to route the heavy metal wastes from the unlined C&D (construction & demolition) landfills to the lined HAZMAT waste facilities.
There are additional costs associated with specialized waste disposal. Every indication is there will be significant cost increases in these areas of waste disposal. Some governments have begun adding front-end charges on products to cover the additional cost associated with the full life cycle and waste disposal.

Yes, FEP is 100% recyclable (hype), if you can afford to identify it and separate it. At this time, cost effective separation does not seem to be a reasonable expectation. www.wireville.com

INSTALLED 4 pr UTP COMMUNICATIONS CABLE TYPES

CAT3 Plenum w/LEADed FRPVC jacket & FEP insulation
CAT3 Non-Plenum w/LEADed PVC jacket & PE insulation
CAT3 Plenum w/Kynar PDVF jacket & FEP insulation
CAT3 Plenum w/Halar ECTFE jacket & FEP insulation
CAT4 Plenum w/LEADed FRPVC jacket & FEP insulation
CAT4 Non-Plenum w/LEADed PVC jacket & PE insulation
CAT4 Plenum w/LEADed FRPVC jacket & 3 pr FEP x 1 pr FRPE insulation
CAT5 Plenum w/LEADed FRPVC jacket & FEP insulation
CAT5 Non-Plenum w/LEADed PVC jacket & PE insulation
CAT5 Plenum w/LEADed FRPVC jacket & 3 pr FEP x 1 pr FRPE insulation
CAT5 Plenum w/LEADed FRPVC jacket & 2 pr FEP x 2 pr FRPE insulation
CAT5 Plenum w/fluoropolymer jacket & 2 pr FEP x 2 pr FRPE insulation
CAT5 Plenum w/fluoropolymer jacket & FEP insulation
CAT5 Plenum w/Kynar PDVF jacket & FEP insulation
CAT5 Plenum w/Halar ECTFE jacket & FEP insulation
CAT5 Plenum w/fluoropolymer jacket & FRPE insulation
CAT5 Enhanced Plenum w/LEADed FRPVC jacket & FEP insulation
CAT5 Enhanced Non-Plenum w/LEADed PVC jacket & PE insulation
CAT5 Enhanced Plenum w/LEADed FRPVC jacket & FEP insulation
CAT5 Enhanced Non-Plenum w/LEADed PVC jacket & PE insulation
CAT5 Enhanced Plenum w/LEADed FRPVC jacket & 3 pr FEP x 1 pr FRPE insulation
CAT5 Enhanced Plenum w/LEADed FRPVC jacket & 2 pr FEP x 2 pr FRPE insulation
CAT5e Plenum w/LEADed FRPVC jacket & FEP insulation
CAT5e Non-Plenum w/LEADed PVC jacket & PE insulation
CAT5e Plenum w/LEADed FRPVC jacket & FEP insulation
CAT5e Non-Plenum w/LEADed PVC jacket & PE insulation
CAT5e Plenum w/LEADed PVC jacket & FRPE insulation
CAT5e Plenum w/FEP jacket & FEP insulation
CAT5e Plenum w/unLEADed FRPVC jacket & FEP insulation
CAT5e Non-Plenum w/unLEADed PVC jacket & PE insulation
CAT5e Plenum w/LEADed FRPVC jacket & 3 pr FEP x 1 pr FRPE insulation
CAT6 Plenum w/LEADed FRPVC jacket & FEP insulation
CAT6 Non-Plenum w/LEADed PVC jacket & PE insulation
CAT6 Plenum w/FEP jacket & FEP insulation
CAT6 Plenum w/unLEADed FRPVC jacket & FEP insulation
CAT6 Non-Plenum w/unLEADed PVC jacket & PE insulation
CAT6e Plenum w/LEADed FRPVC jacket & FEP insulation
CAT6e Non-Plenum w/LEADed PVC jacket & PE insulation
CAT6e Plenum w/FEP jacket & FEP insulation

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