

## **Cabling: What You Don't See Can Blind You**

**By Frank Bisbee**

Imagine a fire drill (office building, hospital, or school) where everyone was required to wear a blindfold while exiting the building. That seems sort of ridiculous, but that may replicate part of the scenario that may occur if there is a real fire. Thick black smoke or colorless and odorless gas can have the same effect on the individual.

Gas emissions, due to the heat decomposition of some return-air plenum (CMP) communications cable materials, are dangerous, because when they come in contact with water (even minute amounts), they immediately form acid. The water source that the gasses use to form these acids can be found almost anywhere-moisture in the eyes, throat and lungs of individuals with whom it comes in contact. For example: due to the heat decomposition, FEP (fluorinated ethylene propylene), may emit a colorless and odorless hydrogen fluoride gas, which becomes hydrofluoric acid in the eyes, nose and throat of the individuals exposed to the gas.

During a fire, the occupants should try to exit the structure immediately. However, they may be blinded and choking from either heavy smoke or acids from invisible gasses. Typically, fire injuries and death can occur as a result of a two-stage process. The first stage is incapacitation, which results from exposure to fire effluent consisting of smoke and a range of toxic products. This is followed by the second stage of death resulting from continued exposure to heat and toxic gasses, with carbon monoxide particularly important as an ultimate cause of death.

The INCAPACITATION HAZARD from smoke, irritant and asphyxiant toxic gases is a critically important factor. Conditions in most fires rapidly become lethal within a few minutes of those conditions causing incapacitation.

For many years we have acknowledged the issues of reduced flame spread and low smoke generation. The cables that are located in the plenum space (usually above the ceiling) are potential concealed highways for a fire to spread. Reduced flame spread is part of the safety formula. The low smoke generation property of the cable is designed to inhibit the obscuration factor associated with thick smoke. We need to see the exit signs and the pathways to safety. Smoke also has a choking effect when inhaled. That is one more reason to limit the smoke. Both flame spread and smoke are part of the testing criteria (UL910/NFPA 262 for CMP) for communications cables for use in return-air plenum space.

Safety is too important to ignore. There are two major areas of concern that remain undressed in the NEC 2002 (National Electric Code). As businesses are besieged with higher insurance premiums and liability litigation about the safety issue, we asked the "BIG" question. Does the testing process for fire safety measure the TOXICITY of the cables when overheated or burned? The answer is shockingly "NO".

Measuring toxicity output from cables used in building air systems is NOT part of the testing criteria for communications cables. This important aspect of safety is completely absent from the criteria of the current of the NEC 2002 (National Electric Code) and the proposed criteria of the upcoming NEC 2005.

During the past several decades, we 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 these products seems to be the failure to warn the buyers/users about the dangers.

Currently in the cabling marketplace, limited combustible cable is touted as the premier cable construction for fire safety. Limited combustible cable (by all current manufacturers) is only insulated and jacketed with FEP.

The fire testing (per NFPA 90A-National Fire Protection Association) includes maximum potential heat value of 3500 btu/lb, and maximum smoke developed index of 50 for the NFPA 255 surface burning characteristics test. The cable is UL (Underwriters Laboratories) approved and marked CMP-Limited Combustible. The testing (NFPA 90A) for smoke generation and flame spread is more stringent than the tests (UL910/NFPA 262) for CMP. At this time, FEP appears to be the only material commercially available that will pass the LC test.

In the last cycle of the National Electric Code (NEC 2002) an important 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. Currently, the National Fire Protection Association (NFPA) is wrestling with new issues for cabling safety that will be considered for the

next cycle of the NEC (NEC 2005). In mid August, the NFPA 90A committee is scheduled to meet to deal with several areas of concern. Topics included in their published agenda, are the discussions about the use and applications of limited combustible cable. Several parties have discussed the use of limited combustible cables in air ducts in addition to the currently approved return air plenums.

One of the underlying issues of the limited combustible cable is safety. Is limited combustible cable really safer? We looked into the question of toxicity. Toxicity is an important area that can affect the overall safety of cables that are installed in the building air systems. Can cables emit toxic gases when heated beyond their operating threshold? Currently, cable products are tested for smoke generation and flame spread. Toxicity is not measured. However, toxicity can have a major impact on the safety issue because toxicity can affect the same functions that we are trying to control with low smoke and reduced flame spread materials in the cabling.

In summary, what you can't see can blind you and what you don't know about cabling might kill you. After of years of research we have determined that there is no PERFECT cable. The best solution seems to be a fully informed buyer/user. What is the safety performance rating of your cable?

#### Further Info: Web Resources

For more information on fire safety or the abandoned cable removal issue, see these locations on the Web:

\* Combustion atmosphere toxicity of materials intended for internal cables - white paper by Borealis  
[http://www.borealisgroup.com/public/pdf/customer\\_centre/0202toxicity\\_FROCC.pdf](http://www.borealisgroup.com/public/pdf/customer_centre/0202toxicity_FROCC.pdf)

\* Hydrofluoric Acid MSDS (Material Safety Data Sheet) by DuPont  
[http://msds.dupont.com/msds/pdfs/EN/PEN\\_09004a2f801b4efc.pdf](http://msds.dupont.com/msds/pdfs/EN/PEN_09004a2f801b4efc.pdf)

\* Environmental Working Group – [www.ewg.org](http://www.ewg.org)

\* Toxics Use Reduction Initiative – [www.turi.org](http://www.turi.org).

\* Explanation of NEC abandoned cable requirements (from a contractor's site): Go to this URL, click on "Abandoned Cable NEC Code Summary" [www.henkelsandmccoy.com/LOB/NetworkCablingSolutions/ncs.asp](http://www.henkelsandmccoy.com/LOB/NetworkCablingSolutions/ncs.asp) .

\* "Cabling: What You Don't Know Can Kill You" article by Stephen Saunders  
<http://www.wireville.com/news/Cabling%20Can%20Kill%20You.html>

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