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CORRUGATED STAINLESS STEEL TUBING:

TURNING LIGHTNING INTO A BLOWTORCH

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If your insured's home was built within the last five years, there is a good chance it is plumbed with corrugated stainless steel tubing (CSST) to distribute fuel gas throughout the home and to all of the gas appliances and fireplace. Over the last few years, CSST has begun to replace black-iron pipe as the contractors' product of choice. One estimate suggests that as many as 15% of all homes built in the United States last year utilized CSST. CSST manufacturers rave about the cost-effectiveness, ease of installation and safety of their product. But is it safe? As the use of CSST becomes more prevalent in new construction, concerns about its safety and utility are being raised.

Enter the City of Frisco, a North Texas town of about 33,000 people, just outside of Dallas. In 2002-2003 alone, the Frisco fire department identified six fires caused when CSST failed as a result of lightning. Each of the fires involved a lightning strike that discharged energy through the gas piping. The energy from the lightning compromised the thin, flexible walls of the stainless steel tubing, and thus, caused a gas leak. At the same time, the lightning strike also provided the ignition source necessary to ignite the now escaping gas. In effect, the lightning turned the CSST into a blowtorch. After these six fires, the City of Frisco banned the use of CSST in new construction.

The problem of lightning induced fires involving CSST is not limited to one town in Texas. More homes across the country with CSST have suffered the same fate in the last few years. With each fire, it is becoming more and more clear that these fires are not the result of bad luck or acts of nature. They are the result of poor design and inadequate material strength of the CSST. Thus, don't simply close your subrogation file when you learn that lightning was involved in causing a fire. The fire may actually have been caused, or exacerbated by the failure of CSST.

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I. Before CSST

The construction industry traditionally relied on black-iron piping to distribute fuel gas throughout homes to serve gas appliances. Contractors complained, however, that black-iron pipe was expensive, heavy and difficult to work with because the pipe's sidewalls are thick. A typical black-iron-piped home features one continuous system of piping, which requires a plumber to carefully measure, cut, and thread numerous individual pieces of pipe. Each piece must be installed and connected one at a time, which makes the installation process slow and expensive. Moreover, a black-iron-pipe gas system usually features many 90 degree turns and numerous couplings, which in turn can increase the risk of leaks if the connections are not made properly. Lastly, after the system is installed, it must be leak-tested. If a leak is detected, it is often difficult and time consuming to isolate the leak.

II. The New Alternative to Black-Iron Piping - CSST

CSST is marketed as a promising alternative to traditional black-iron piping. CSST is made up of a thin stainless steel tube with an exterior polymer coating. The sidewalls for CSST are typically about 10 mils thick[1], which is about 40 times thinner than the average black-iron pipe. The thin sidewalls make CSST lightweight and extremely flexible and maneuverable. Because CSST is so maneuverable, many of the drawbacks commonly associated with the installation of black-iron pipe are eliminated. CSST can bend whereas black pipe cannot. Therefore, the installers do not need to carefully measure and cut lengths of tubing. The tubing can be routed around joists and beams and easily fed through walls, floor spaces and attics – much like electrical cable. This results in fewer connections and the reduction of potential leaks. Because there are fewer connections, CSST can also operate at much higher pressures than black pipe.

CSST was first introduced into the American market in 1987 when it was listed by the American National Standards Institute (ANSI). The next year, CSST was recognized as a suitable product by the National Fire Protection Association's (NFPA) Fuel Gas Code. However, The International Association of Plumbing and Mechanical Officials (IAPMO) refused to accept the use of CSST in its codes until 2003 because of "reasons of safety." Interestingly, lightning resistance was not a factor considered by any of these associations when analyzing the utility and safety of CSST.

CSST can only be installed by authorized installers certified by each CSST manufacturer. To become certified, each installer must complete the manufacturers' certification program, wherein the installation process is "explained". Because of this, CSST is not available to the general public at large and cannot be purchased at do-it-yourself type stores.

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[1] A mils is a unit of measurement that is measured in thousandths of an inch. (ie, .001 = one thousandth of an inch or 1.0 mil).

III. Lightning and CSST

Lightning is one of Mother Nature's most powerful, dynamic and unpredictable forces. A typical lightning charge contains at least 30 million volts discharged at 100,000 amperes. As lightning leaves its storm cloud, its looks for a good conductor of electricity, such as a tall structure anchored to the ground. While it was previously believed that lightning only took the most direct path to ground, many scientists now agree that lightning will take every available path to ground, and even create new ones by jumping through the air from one conductor to another.

A lightning strike can easily overwhelm CSST's thin corrugated steel skeleton. If the CSST is not properly bonded to the home's grounding system, the current from the lightning will jump from the CSST to some grounded object in what is known as an arcing event. Arcing events produce temperatures of several thousands of degrees and are capable of burning holes through the stainless steel tubing. Even if the CSST is properly bonded to the home's grounding system, many engineers believe the corrugated steel is particularly poor in handling the high energy from lightning. Comparatively, it takes fifteen times as much electrical energy to burn a hole into a black-iron pipe as it does to burn the same hole in CSST tubing.

Once the CSST is compromised, the escaping gas is easily ignited by the heat from the lightning strike. While many may assume that the gas lines to fireplaces are most at risk, this has not proven to be the case. While lighting has caused many CSST lines to fireplaces to fail, the danger has not been limited to this area. A lightning strike, no matter where it hits, can cause CSST to fail anywhere within the home. Fires have been discovered in attics, in crawl spaces between floors, at fireplaces and at appliances. In fact, one lightning strike was reported to have caused several failures in the CSST in one home.

IV. CSST Manufacturers Respond

Faced with mounting evidence that their product is unreasonably dangerous, CSST manufacturers have responded by emphatically denying there is a problem with their product. They even threatened to sue the City of Frisco for prohibiting the use of their product. Alternatively, they argued that if there is a problem with the product, then fault must lie with the installers for failing to properly bond the CSST to the homes' grounding system. This response is interesting because the training materials and instructions provided by CSST manufacturers during certification do not even cover grounding or bonding. This is especially disconcerting because the NFPA's fuel gas code contains certain references to grounding.

One manufacturer, Omegaflex, while continuing to deny a problem with their product, has tacitly recognized the dangers of CSST and lightning and changed its design. The redesigned product features a new

polymer coating that contains conductive materials. It is believed that the conductive materials will help dissipate the current from the lightning over the entire length of the CSST, as opposed to allowing the energy to jump to another conductor. Omegaflex has also produced gas excess flow devices that shut down the flow of gas once a leak occurs. Lastly, Omegaflex has begun distributing literature about methods to better bond its CSST to the homes' grounding system.

V. Pursuing Recoveries for CSST Fires

While certain objects and structures are more prone to be struck by lighting than others, lightning does not discriminate. Whether your home is in sunny southern California, Tornado Alley in the Midwest or Lightning Alley in Florida, lightning can strike anywhere and no home containing CSST is safe. Too often, there is a temptation to assume that a fire following a lightning strike has no subrogation potential because the fire is the result of an act of nature. But if the home has CSST, there is a chance that the fire is the result of or was spread by the inherent dangers of CSST. Every effort must be made early on to identify whether the fire was caused or exacerbated by the failure of CSST.

CSST fire scenarios present several potentially responsible third-parties. First and most obvious, is the manufacturer. However, other potential tortfeasors are the general contractor, the plumber and the electrician, since all have responsibility to build a safe structure. Each has an obligation to make sure the products used in construction are safe and that they are properly installed. In addition, the failure of general contractors, plumbers and electricians to properly ground the home or bond the gas system may increase the risks posed by CSST.

Making a recovery in these situations is no small task. CSST manufacturers have already demonstrated they will resist all challenges to the integrity of their product. At Cozen O'Connor, we are already handling many CSST claims. We stand ready to assist you in proving these claims with assertion of the appropriate legal theories of liability, supported by relevant scientific data and technical expertise. Should you need additional information, please feel free to contact us.

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