

POTENTIAL EFFECTS OF ARTIFICIAL LIGHTING ON CROSSLINKED POLYETHYLENE (PEX) PIPE AND TUBING AND RECOMMENDED INSTALLATION PRACTICES

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Foreword

This technical note was developed and published with the technical help and financial support of the members of the Plastics Pipe Institute (PPI). These members have shown their commitment to developing and improving quality products by assisting standards development organizations in the development of standards and also by developing design aids and reports to help engineers, code officials, specifying groups, contractors and users.

The purpose of this technical note is to provide information about the potential effects of certain types of artificial lighting on PEX pipe and tubing and to provide recommended installation practices for PEX that is installed in proximity to artificial light sources.

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POTENTIAL EFFECTS OF ARTIFICIAL LIGHTING ON CROSSLINKED POLYETHYLENE (PEX) PIPE AND TUBING AND RECOMMENDED INSTALLATION PRACTICES

1.0 INTRODUCTION

Many polymers and plastics are affected by exposure to various forms of natural and artificial light. The effects can manifest themselves as simple color changes (e.g., fading) or as more significant polymer degradation via oxidation or other mechanisms.

The most common form of light exposure is natural sunlight. The electromagnetic energy of sunlight is normally divided into infrared (IR) light, visible light, and ultraviolet (UV) light. Short wavelength UV light has long been recognized as being responsible for most polymer damage. Stabilizers or carbon black are frequently added to polymers intended for outdoor use to protect the materials from deterioration due to the exposure to UV light. For example, the black high-density polyethylene (HDPE) covering on exposed telephone lines is considered to be resistant to UV light for several decades.

Artificial light is primarily used for illumination of indoor living and work areas. Apart from visible light, many forms of artificial light also produce some UV light in their spectra.

Crosslinked polyethylene (PEX) pipe and tubing manufacturers warn against long-term exposure to natural sunlight because of the damaging effects of UV, but is it necessary to protect PEX from long-term exposure to artificial light as well? This Technical Note aims to address this question and to provide recommended installation practices for PEX pipe and tubing in proximity to artificial light sources for long-term and permanent installations.

2.0 SOURCES AND TYPES OF ARTIFICIAL LIGHT

There are numerous technologies used to produce artificial light, but there is a limited selection of lighting types used within typical homes, office buildings, and retail establishments, as well as commercial and industrial buildings. Two of the oldest and most common types of lighting are the incandescent light bulb and the tubular fluorescent bulb. In industrial settings, high-pressure-mercury vapor, high-pressure-sodium (HPS), or metal-halide lighting are often used, though mercury vapor lights were banned in the U.S. as of 2008 and have mostly been replaced with newer technology. More recent developments in artificial lighting are the compact fluorescent light (CFL) and the light emitting diode (LED) lights.