

**INSTALLATION OF PLASTIC PRESSURE
PIPING MATERIALS NEAR INSULATION
CONTACT-RATED AND NON-
INSULATION CONTACT-RATED
RECESSED LIGHTING FIXTURES**

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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 regarding the installation of plastic pressure pipe materials used for applications such as hot- and cold-water plumbing, fire protection and hydronic heating or cooling systems, in the vicinity of recessed lighting fixtures.

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INSTALLATION OF PLASTIC PRESSURE PIPING MATERIALS NEAR INSULATION CONTACT-RATED AND NON-INSULATION CONTACT-RATED RECESSED LIGHTING FIXTURES

1.0 INTRODUCTION

This Technical Note will provide guidance about the recommended proximity of certain types of plastic pressure pipe and tubing to various types of recessed lighting fixtures, which are also known as “pot lights” or “can lights”.

These recessed light fixtures are typically classed as IC-rated (insulation contact) or non-IC-rated (no insulation contact).

This Technical Note applies to the following types of plastic pressure pipes and tubing:

- CPVC: Chlorinated polyvinyl chloride
- PEX: Crosslinked polyethylene
- PEX/AL/PEX: Crosslinked polyethylene/aluminum composite pipe
- PE-RT: Polyethylene of raised temperature
- PE-RT/AL/PE-RT: Polyethylene of raised temperature/aluminum composite pipe
- PP: Polypropylene
- PP-R: Random copolymerized polypropylene
- PP-RCT: Polypropylene random copolymer with modified crystallinity & temperature resistance

These piping materials are commonly used in applications such as hot- and cold-water plumbing, fire protection, and hydronic heating and cooling including radiant heating and cooling systems. The information within this document may apply differently to each of these materials.

Note 1: For more information about non-IC-rated and IC-rated lighting, contact lighting trade associations such as the Illuminating Engineering Society of North America (<https://www.ies.org/>) and the National Electrical Manufacturers Association (<https://www.nema.org/>).

2.0 DISCUSSION

In residential and commercial plumbing, residential fire protection, and most hydronic applications, plastic pipes and tubing (“pipes”) are typically required to have pressure ratings at 180°F (82°C) operating temperature. Pipes approved for such applications will have their operating pressure at 180°F included in the pipe markings (e.g., “100 psi at 180°F”).

In certain construction situations, these plastic pipes may be installed near recessed light fixtures in ceilings. These recessed light fixtures are typically classed as IC-rated or non-IC-rated.

Light fixtures that are evaluated to the UL 1598¹ standard for an IC rating may have exterior temperatures as high as 194°F (90°C).

The plastic pipes included in this Technical Note (e.g. CPVC, PEX, PE-RT, and PP {PP-R and PP-RCT}) will not melt at 194°F and they will typically retain sufficient pressure ratings to exceed the service requirements of the installation at this temperature. However, frequently repeated or long-term exposure to air or surface temperatures above 180°F may have negative effects on certain plastic pipe materials, potentially leading to shorter service life.

For this reason, it is recommended, even with IC-rated light fixtures, that the pipe installer allow adequate spacing around plastic pipes or install enough insulation on the pipes to ensure that the surface temperature of the plastic pipe is kept to 180°F or less. See Section 3.0 RECOMMENDATIONS for details.

According to UL 1598, recessed light fixtures that are not IC-rated may have surface temperatures as high as 300°F (150°C), and it is imperative that plastic pipes be protected from exposure to this temperature. This can be accomplished by:

1. Installing the pipes with adequate space from the recessed light fixture,
2. Installing insulation between the pipe and recessed light fixtures, keeping in mind that the insulation should not contact a non-IC-rated fixture, or
3. Some combination of both.

CAUTION! Regardless of which type of plumbing pipe material (e.g., plastic, metal) is used, if any plumbing supply pipe is installed too close to a hot light fixture, the ambient heat from the fixture may increase the temperature of the water within the pipe, potentially delivering a short burst of excessively hot water to a user of the plumbing system when a valve is opened, and potentially scalding the user. This is a potentially dangerous situation.

3.0 RECOMMENDATIONS FOR INSTALLATION

If the plastic pipe manufacturer has published recommendations regarding the proper installation of their pipe in the vicinity of recessed light fixtures, PPI recommends that those recommendations be followed.

In the absence of specific recommendations from the plastic pipe manufacturer related to IC-rated or non-IC-rated lights, follow the most relevant recommendation(s) below, starting with recommendation 3.1:

¹ UL 1598 Standard for Safety Luminaires available from Underwriters Laboratories at <https://www.ul.com/>

3.1. Protection of Plastic Pipe and Tubing with Distance

It is recommended that, even with IC-rated recessed light fixtures, the pipe installer should ensure that adequate spacing exists so that the surface temperature of the plastic pipe is kept to 180°F (82°C) or less when lights are in operation and the environment surrounding the pipes represents a typical situation of the building when occupied (e.g., after construction is complete and the house or building is occupied).

See **Figure 1** for illustration.

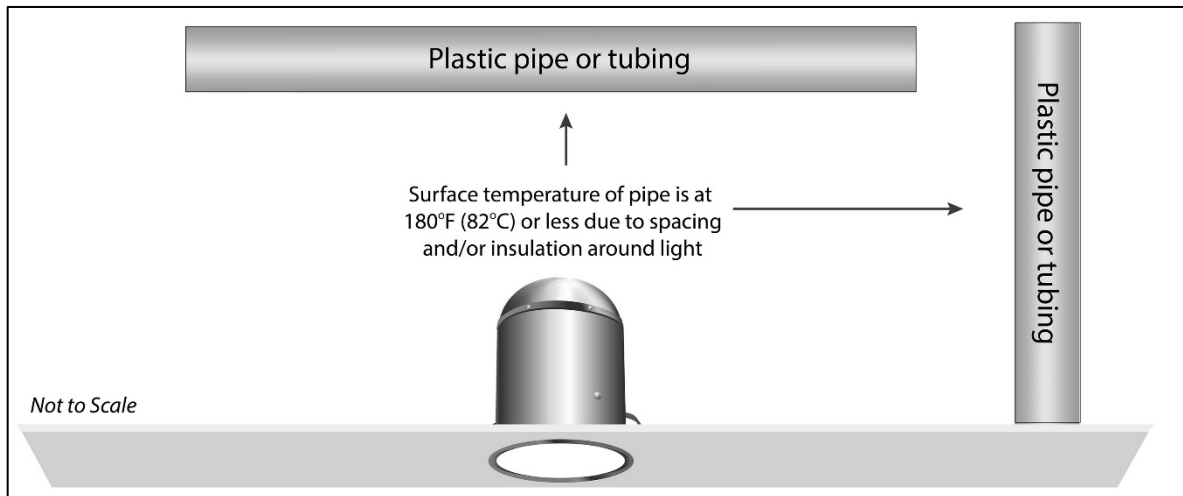


Figure 1: Protecting plastic pipe or tubing against excessive air temperature with distance

3.2. Protection of Plastic Pipe and Tubing with Insulation

If the available air space is not sufficient to ensure that the surface temperature of the pipe is 180°F (82°C) or less, then pipe installers should protect the pipe with adequate thickness of insulation of a type that is approved by the pipe manufacturer for use with the specific type of pipe *and* recommended by the insulation manufacturer for that type of installation to ensure that the surface temperature of the pipe is 180°F or less when recessed lights are in operation and the environment surrounding the pipe(s) represents a typical situation of the building when occupied (e.g., after construction is complete and the house or building is occupied).

See **Figure 2** for illustration.

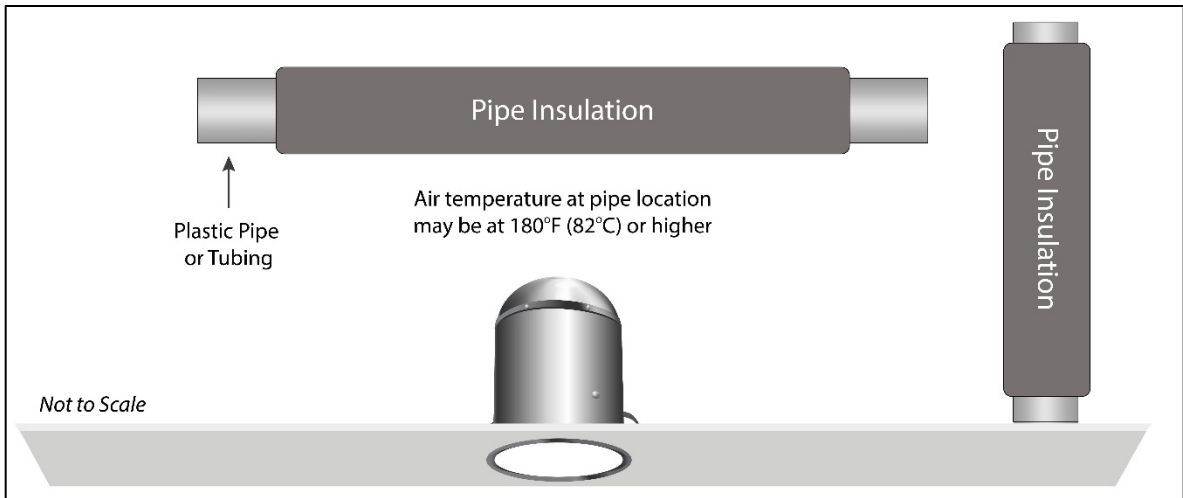


Figure 2: Protecting plastic pipe or tubing against excessive air temperature with approved insulation

3.3. Protection of PEX, PE-RT, or PP Pipe or Tubing with Default Spacing

In the absence of specific recommendations from the pipe manufacturer or an inability to measure the pipe surface temperature near the closest recessed light(s) while in operation, it is recommended that for PEX, PE-RT, and PP (PP-R and PP-RCT) pipe that the pipe installer maintains a minimum space of 6 inches (15 cm) horizontally and 12 inches (30 cm) vertically between non-insulated plastic pipes and recessed lighting fixtures. See **Figure 3** for illustration.

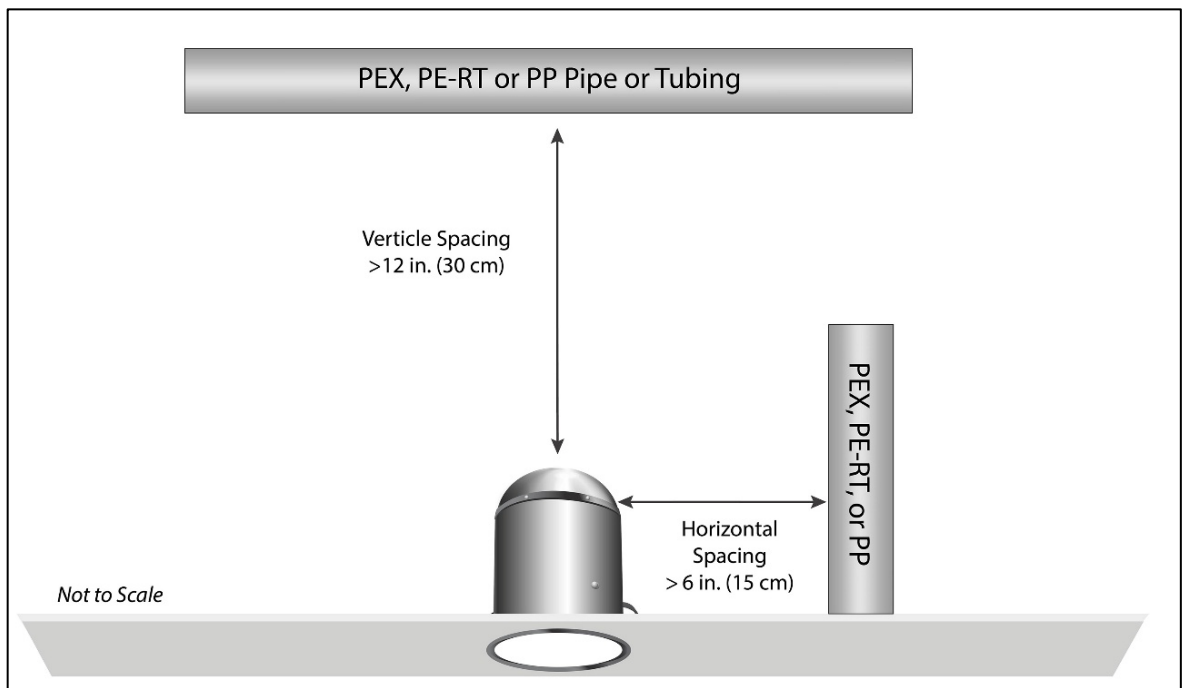


Figure 3: Protecting PEX, PE-RT, or PP pipe or tubing against excessive air temperature with default minimum spacing

Note 2: The recommendations of Section 3.3 do not apply to CPVC pipe or tubing.

4.0 SUMMARY

For both the long-term viability of the plastic pipes listed in this document and for the protection of the building occupants, it is the responsibility of the pipe installer to maintain a safe minimum distance between pipes and recessed lighting fixtures so that the recommended pipe surface temperature limitation of 180°F (82°C) is not exceeded.

For additional instructions, please contact the specific pipe or tubing manufacturer.