

**Odorants In Plastic
Fuel Gas Distribution Systems
TN-4/2015**



Foreword

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The purpose of this Technical Note is to provide recommendations for the use of odorants in gas pipelines that are manufactured of plastic materials.

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The Plastics Pipe Institute, Inc.
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ODORANTS IN PLASTIC FUEL GAS DISTRIBUTION SYSTEMS

1. INTRODUCTION

To enhance safety, the fuel gas industries add chemical compounds, with a unique odor, to alert the user if a leak occurs. This odor is designed to be readily detectable by smell when the fuel gas reaches a concentration in air of one-fifth of the lower explosive limit.

CFR 192, Minimum Federal Safety Standards, paragraph 192.625 establishes requirements for odorization of fuel gases supplied through regulated distribution systems. National Fire Protection (NFPA) Bulletins, No. 58: Storage and Handling of Liquefied Petroleum Gases, and No. 59: Liquefied Petroleum Gases at Utility Gas Plants provide the requirements for odorization of LP Gas and LP-Air gases. For detailed information on current regulations review these documents.

The compounds used as odorants usually consist of aliphatic mercaptans, such as propyl and tertiary butyl mercaptan, and sulfides, such as thiophene or dimethyl sulfide at ordinary temperatures. Most gas odorants are liquids at full concentrations under ambient conditions, and, in this state, might be harmful to some plastic pipe materials. However, in the concentrations typically needed to odorize the gas being transported and distributed by pipeline, they are in the vapor state and cause no harm to plastic piping.

2. SCOPE

This technical note provides recommendations when using odorants in fuel gas systems that contain plastic pipelines in whole or in part.

3. PROCEDURE

The mercaptans and sulfides used as odorants are liquid hydrocarbons. Liquid hydrocarbons, in sufficient concentration, can swell and soften most plastic pipe materials. The appearance and fusibility of the plastic pipe may also be affected due to odorant saturation. Odorants should never be introduced into a plastic pipe system in a concentrated liquid state. Also, liquid odorants in concentrate form should not be used to locate leaks in plastic pipelines.

Odorants are typically carefully introduced either at odorization stations or, in some cases, by direct injection of small amount into the distribution main in a liquid form which quickly vaporizes and mixes with the gas stream. Concentrations, in the gaseous form, should be low enough to prevent condensation at the lowest temperature and/or the highest pressure encountered in the system. When odorants are injected at nominal rates the concentration rarely exceeds 25 parts per million by weight in gaseous form. It must achieve a level in air of one-fifth of the lower explosive limit of natural gas to comply with Federal requirements. At this concentration, odorants are not harmful to plastic pipe.

Odor fade is unlikely to occur in plastic pipe systems due to the inert nature of plastic. If odor fade is a concern in plastic gas mains and service lines, as is possible in dead end mains made from steel, it may be necessary to pre-treat the piping with odorant in the same manner normally used to saturate mill scale and rust in steel pipe. If odor fade is noticed in plastic gas mains and service lines, additional odorants should be introduced in vapor phase, preferably in the gaseous form.