



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

**Date:** April 30, 1998

**In reply refer to:** P-98-20

Mr. Dale B. Smith  
President  
Mueller Company  
500 W. Eldorado Street  
Post Office Box 671  
Decatur, Illinois 62525

Despite the general acceptance of plastic piping as a safe and economical alternative to piping made of steel or other materials, the Safety Board notes that a number of pipeline accidents it has investigated have involved plastic piping that cracked in a brittle-like manner. For example, on October 17, 1994, an explosion and fire in Waterloo, Iowa, destroyed a building and damaged other property.<sup>1</sup> Six persons died and seven were injured in the accident. The Safety Board investigation determined that natural gas had been released from a plastic service pipe that had failed in a brittle-like manner at a connection to a steel main.

Almost all of the plastic pipeline accidents the Safety Board has investigated involving brittle-like cracking have been linked to stress intensification generated by external forces acting on the pipe. Examples of conditions that can generate stress intensification include differential earth settlement, particularly at connections with more rigidly anchored fittings; excessive bending as a result of installation configurations, especially at fittings; and point contact with rocks or other objects.

The Safety Board's special investigation determined that much of the available guidance to gas system operators for limiting stress intensification at plastic pipeline connections to steel mains is inadequate or ambiguous. The Safety Board attempted to identify every U.S. steel tee manufacturer that currently manufactures steel tees with a compression end for plastic gas service connections.<sup>2</sup> The Safety Board identified and contacted representatives of Continental

<sup>1</sup>For more information, see National Transportation Safety Board Pipeline Special Investigation Report--*Brittle-like Cracking in Plastic Pipe for Gas Service* (NTSB/SIR-98/01).

<sup>2</sup>J. B. Rombach Inc., which manufactures M. B. Skinner Pipeline products, told the Safety Board that it no longer manufactures or markets its "Punch-It-Tee" line of steel tapping tees. Chicago Fittings Corporation told the Safety Board it no longer manufactures or markets its line of steel tapping tees. The Safety Board therefore made no further inquiry with these companies.

Industries, Dresser Industries, Inc., Inner-Tite Corporation,<sup>3</sup> and Mueller Company. None of these manufacturers has published installation recommendations to limit shear and bending forces on the plastic pipe that connects to their steel tapping tees.

Based on its review of this guidance and on the history of the plastic pipeline accidents it has investigated, the Safety Board concluded that, because guidance covering the installation of plastic piping is inadequate for limiting stress intensification at plastic service connections to steel mains, many of these connections may have been installed without adequate protection from shear and bending forces.

The National Transportation Safety Board therefore make the following safety recommendation to Mueller Company:

Develop and publish recommendations and instructions for limiting shear and bending forces at locations where your steel tapping tees are used to connect plastic service pipe to steel mains. (P-98-20)

Also, the National Transportation Safety Board issued Safety Recommendations P-98-1 through -5 to the Research and Special Programs Administration; P-98-6 to the Gas Research Institute; P-98-7 through -9 to the Plastics Pipe Institute; P-98-10 to the Gas Piping Technology Committee; P-98-11 and -12 to the American Society for Testing and Materials; P-98-13 to the American Gas Association; P-98-14 and -15 to MidAmerican Energy Corporation; P-98-16 and 17 to Continental Industries, Inc.; P-98-18 to Dresser Industries, Inc.; and P-98-19 to Inner-Tite Corporation.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation P-98-20 in your reply. If you need additional information, you may call (202) 314-6469.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

By:



Jim Hall  
Chairman

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<sup>3</sup> Inner-Tite did not manufacture steel tees; it purchased them, affixed its own compression connections, and marketed the complete assembly.