

FAX TRANSMISSION

US DOT/RSPA/OPS Eastern Region

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To: Richard Sanders **Date:** August 16, 1996
Fax #: 405-954-0206 **Pages:** 5, including this cover sheet.
From: Paul P. Gustilo
Subject: Repair of Plastic Pipe - Use of Band Clamps

COMMENTS: (Bill will talk to Paul)

Richard,

I was wondering whether you could shed some light on this subject, or maybe lead me in the right direction.

Is the use of full encirclement band clamps an appropriate permanent repair method for plastic pipe? In windot, I found a 1981 interpretation (actually the full text of the information was not there but I found it at HQ) regarding the use of band clamps (letter attached). It appears that the letter states it is OK to use in some circumstances. In the 1989 edition of the AGA plastic manual, it states that "DOT has taken the position that full encirclement type band clamps in compliance with the guidance of ASTM F 1025 are acceptable for permanent repairs of polyethylene pipe." Have we (DOT) indeed taken this position? And if so, do we have anything in writing?

Your help is much appreciated.

Paul P. Gustillo

Feb 27 1981

Mr. Keith A. Chen, P.E.
Director - Research
Wisconsin Gas Company
626 East Wisconsin Avenue
Milwaukee, Wisconsin 53202

Dear Mr. Chen:

Your letter to this office of February 6, 1981, concerns the use of full encirclement stainless steel band clamps for permanent repair of damaged plastic pipe. We agree with your interpretation that Subpart G of 49 CFR Part 192 (and, thus, 192.311) is only applicable during the construction of a transmission line or main. However, as further discussed below, even if the band clamp were considered a "patching saddle," as intended by 192.311 (which it is not), its use to permanently repair plastic pipe either during construction or after operation may be prohibited under 192.703(b).

In regard to the term "patching saddle" as used in 192.311, these words were added to the final rule as a result of comments to the proposed rule stating that defective plastic pipe should be permitted to be repaired. These comments clearly had in mind the use of a saddle made of material similar to that of the pipe being repaired that would be joined to the pipe by fusion, solvent cement, adhesion, or similar methods. Typical comments that prompted the Office of Pipeline Safety to permit use of a "patching saddle" were:

"We feel that patching of a plastic main should be allowed. Should be no difference between a patch over a gouge or the installation of a service tee."
(Iowa Public Service Company)

"The use of solvent weld half-soles on polyvinyl chloride pipe has proven to be a safe, economical method of repair for scratches, gouges, and grooves on mains in service." (Central Telephone and Utilities Corporation)

Thus, a band clamp is inconsistent with the meaning intended by "patching saddle."

Another reason why "patching saddle" does not mean a band clamp is that when 192.311 was issued, 192.281(e)(2) was also issued, requiring a rigid internal tubular stiffener to be used in conjunction with each compression type mechanical coupling. This requirement recognizes the compressive forces of the sealing gasket used in a compression coupling and the fact that plastic materials under constant stress will tend to cold flow. A full encirclement stainless steel band clamp, like a compression coupling, subjects the plastic pipe to compressive stress but does not provide internal support for the pipe that may be needed to prevent cold flow of the plastic.

Because of the question of cold flow of plastic pipe, we believe that the safety of a permanent repair by use of a band clamp is questionable under some conditions, depending on the stiffness of the plastic pipe involved. Where unsafe conditions would result, 192.703(b) would forbid use of the band clamp as a repair method.

In your letter, you state that "Wisconsin Gas conducted tests on the stainless steel clamp used as a patching saddle which determined that the performance met the required safety and serviceability tests of

the code." We would appreciate your sending us these data and any other data available on the problem of cold flow of plastic pipe under continuous gasket pressure as discussed above.

Sincerely,

Melvin A. Judah
Acting Associate Director for
Pipeline Safety Regulation
Materials Transportation Bureau

February
1989

**A.G.A.
PLASTIC PIPE
MANUAL
FOR
GAS SERVICE**

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by**

**American Gas Association
1515 Wilson Boulevard
Arlington, VA 22209**

precautionary measures must be taken in the use of odorants for pinpointing leaks and antifreeze agents such as alcohols and glycols which are used in thawing out frozen water vapor or condensates (freeze-ups).

RODENT DAMAGE

While the incidents of rodent attacks have been slight, several companies have reported damage. Information available indicates the damage usually occurs in the first year or two after installation and in areas of high rodent population. Soil is generally loose around the pipe during this period and this offers an attractive area to burrow. The damage appears to be a by-product of burrowing activity and not directly related to the search for food. Treatment of backfill with certain rodent repellants are reported to be successful in controlling these hits.

REPAIRS

It will be necessary to replace or repair plastic piping on occasion. The more common occurrences will be during installation prior to initiating service and because of mechanical damage by others once in service. The repair or replacement must be made in accordance with requirements of 49 CFR 192.311 that each imperfection or damage that would impair the service ability of the plastic pipe must be repaired by a patching saddle or removed.

Mechanical couplings appropriate for plastic gas piping systems are frequently used for economical and convenient replacement of damaged plastic pipe segments. The gas flow is stopped, the damaged section cut out and replaced with a new segment using either two mechanical couplings, a fusion joint and a mechanical coupling, or a single mechanical coupling of the slide type or elongated repair fitting type that facilitates replacement of the damaged section. Joints fabricated from mechanical fittings used in replacement must be designed to restrain the pipe against pull-out forces and, if metallic fittings are utilized, be protected from corrosion. Electrofusion socket fittings may also be used in repairs.

Where repairs are feasible, a bonded patch or full encirclement sleeve may be used with a wall thickness at least equal to that of the pipe. It is essential the repair patch or sleeve be of the same

grade and material as the pipe wall if applied by solvent cement and preferable [sic] if applied by fusion. All repairs should be made by qualified procedure.

Full encirclement type band clamps have been successfully used with plastic pipe to make repairs. ASTM F 1025 "Standard Guide for Selection and Use of Full-Encirclement-Type band clamps for Reinforcement or Repairs of Punctures or Holes in Polyethylene Gas Pressure Pipe" provides guidance regarding use of this fitting for repair and reinforcement of polyethylene pipe. The important consideration is that the clamp permanently exert limited unit-bearing pressure on the plastic pipe since it is not possible to install metal stiffeners inside the plastic pipe. A soft gasket formulation with waffle-type inner surface would thus generally be preferred for this application. In all cases the method used should follow procedures which have been established and qualified by test.

DOT has taken the position that full encirclement type band clamps in compliance with the guidelines of ASTM F 1025 are acceptable for permanent repairs of polyethylene pipe.

(I can't find documents to support this claim - still looking!)

IMPORTANT OPERATING PRECAUTIONS:

1. Do not squeeze-off plastic pipe or use repair techniques unless approved procedures verified by test are available for the application.
2. Escaping gas should always be handled with caution. Static charges can be generated and accumulated on plastic pipe and isolated fittings, increasing the possibility of ignition.
3. Whenever possible work should be done upwind of a repair and remote from blowing gas.
4. Do not pour liquid odorants into plastic piping systems to find leaks.
5. Do not use induction-type electric heaters to thaw frozen plastic services.
6. Proper safety procedures are always necessary. Keep an approved fire extinguisher available when making repairs and installations with gas present.