# SynthoGlass® is at the Core of Maintaining Midwestern Utility Infrastructure

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US Midwest

## Summary

Pipeline infrastructures for Midwestern energy utilities face harsh winters with repeated freeze-thaw cycles, as well as the corrosive effects of salt used throughout the winter to address icing issues. These conditions can shorten the life of midstream and downstream assets. The utility has taken a forward-thinking stance with preventative maintenance and executes a solid, timely plan to virtually eliminate the incidence of repair.

For more than a decade, the utility has recognized that the incremental costs of proactively executing maintenance and engaging in protective measures to help preserve the life of infrastructure beneficially outweighs the costs of emergency repairs, outages, and cutouts. This preventative practice also enhances service to the customer base by minimizing pipeline downtime and ensuring customers have consistent access to energy during winters with daily highs in the range of 20°-25°F degrees. With a systematic process dating back to 2010, the utility has employed a pre-emptive approach that includes the use of **SynthoGlass®** for mechanical protection of pipeline coatings. SynthoGlass is used as a composite overwrap to maintain pipeline integrity while addressing future corrosion.

## Benefits

- Preventative application of SynthoGlass virtually eliminates downtime
- Increases longevity of infrastructure components when used preventatively
- Reduces the likelihood of corrosion
- Factory saturation of moisture-cured polyurethane resin reduces composite preparation time by more than 50%
- Easy installation and rapid curing for quick back-fill
- Reduces time spent on coating inspection
- When used on risers, mitigates future coating maintenance due to frost-based ground movement
- Protects above-ground pipe from mechanical damage, grounds maintenance equipment and atmospheric conditions
- Performance reliability reduces or eliminates the need for coating repairs, resulting in cost savings

### Preventative Maintenance

Keeping pipelines that provide natural gas to energy consumers fully operational is critically important, especially in areas with temperature extremes. Ongoing inspection and maintenance, as well as preventative measures, are necessary to protect infrastructure and ensure that energy supplies are not interrupted.

In the geographic area served by the utility, station risers experience a great deal of corrosion with frost conditions. Frost heaves can produce as much as three to four inches of displacement during freeze and thaw cycles, compromising the pipeline.

### Meeting Code of Federal Regulations (CFR)

**49 CFR § 192.461 External corrosion control: Protective coating,** requires protective coating for all gas piping. While the utility applies a protective coating to all piping, in the past, they had experienced coating damage or failure, largely due to cold tapes that didn't perform well in the harsh environment. Since the utility began using SynthoGlass pre-emptively as a protective wrap for epoxy coating, they have been able to reduce the amount of time required for coating inspections and have experienced a dramatic drop in the need for repairs. The owner has found that the cost of proactively protecting pipes greatly outweighs the costs of outages and emergency repairs.

*SynthoGlass® applied over epoxy coating reduces time invested in coating inspection.*

The code for **Atmospheric corrosion control: Monitoring (49 CFR § 192.481)** requires owners to inspect and evaluate each pipeline or portion of the pipeline that is exposed to the atmosphere for evidence of atmospheric corrosion. Onshore pipeline, other than service pipeline, must be inspected at least once every three calendar years, with intervals not exceeding 39 months. Inspection of onshore service lines is required at least once every five calendar years, with intervals not exceeding 63 months, with exceptions for more frequent inspection if atmospheric corrosion is found on a service line during the most recent inspection. Offshore pipeline requires inspection at least once each calendar year, but with intervals not exceeding 15 months.

During inspections, the operator must give particular attention to pipe at soil-to-air interfaces, under thermal insulation, under disbonded coatings, at pipe supports, in splash zones, at deck penetrations, and in spans over water. If atmospheric corrosion is found during an inspection, the operator must provide protection against the corrosion as required by 49 CFR § 192.479.

The utility routinely engages in more aggressive intervals of inspection for onshore pipeline than those required by federal code. They perform an operation inspection on each station monthly, with a full inspection performed annually. Where necessary, inspection is followed by immediate treatment with SynthoGlass, which has been shown to protect the epoxy pipe coating so well that it essentially eliminates service interruptions due to coating failure.

The utility had previously experienced coating failures when other materials were used to protect the pipeline, including bunching, which left risers unprotected, and led to frequent repairs. When they changed their approach from one of inspect and repair to prevent and protect with the use of SynthoGlass, the need for repeated repairs the owner previously encountered were effectively eliminated, resulting in greater infrastructure longevity and lower long-term costs for the owners.

*SynthoGlass® used to protect vault wall link seal.*

**Protection for the Future**

To guard against future damage, risers were excavated and any corrosion or extraneous materials were removed with an abrasive blaster. This was followed with an epoxy coating. SynthoGlass was used as an overcoat to protect the epoxy application. Where exposed above ground, the wrapped riser was painted for UV protection. Treatment of each riser was completed in roughly two to four hours with a two-person team. This preventative treatment saves both time and money when compared to the average cost of $1000 to $1500 per riser to repair pipe coating. The utility has actively engaged in this pre-emptive approach for more than 10 years, saving time and money, while also avoiding service interruptions.

Over the course of a decade, existing utility infrastructure was evaluated and treated with epoxy and SynthoGlass, including:

- Inlet and outlet station risers
- Through-wall piping in regulator underground vaults
- Risers on four-inch and larger rotary meter set assemblies
- Exposed bridge pipe hangar/roller area
- Above ground station piping pipe supports

In each of these situations, SynthoGlass was applied preventatively to increase longevity and ensure the safe and continued operation of all infrastructure in the natural gas delivery system. Once previously installed components were addressed, the focus shifted to new construction. Currently, new construction is treated proactively with SynthoGlass over epoxy, and prefabricated in the shop whenever possible.

The utility found shop prefabrication to be much more efficient than traveling to a site, excavating, sandblasting and dealing with the elements. The use of epoxy with a SynthoGlass overcoat in a shop environment not only increased efficiency but also provided the added benefit of significantly reducing installation costs, including eliminating the need for rock shield, sand padding or specialized non-abrasive backfill.

*Abrasive blasting used to prepare for application of epoxy and SynthoGlass®.*