

# Project Profile: NASA

## US Pipelining Restores Intercondenser Line for NASA's In-Space Propulsion Facility (ISP) at John Glenn Plum Brook Center Using Cured-In-Place Pressure-Pipe-Lining System

NASA Receives Class IV Structural Pressure Pipe Lining Restoration of High-Temperature, High Pressure Return Line

Philadelphia, PA - US Pipelining, LLC., an emerging leader in Cured-In-Place-Pipelining solutions (CIPP), announces the completion of a US Government project for NASA's John H. Glenn Research Center in Cleveland, Ohio. The project called for the structural restoration of a 24-inch diameter high pressure Intercondenser line at NASA's In-Space Propulsion Facility (ISP).

The In-Space Propulsion Facility (ISP) at NASA's John Glenn Plum Brook Plum Brook Station is a remote test facility for the NASA Glenn Research Center in Cleveland, Ohio. Located on 6,400 acres in the Lake Erie community of Sandusky, OH, Plum Brook is home to four world-class test facilities, which perform complex and innovative ground tests for the international space community.

"The NASA specifications called for a Class IV structural restoration of their Intercondenser Line which operates at a pressure of 80 psi and tests out to 120 psi", states Jeremy Bowman, General Manager of US Pipelining. "Additionally, the line temperature operates at 170 degrees F requiring the use of a specialty hightemperature, two-part epoxy resin system."

A Pressure-Pipe-Lining system (PPL), was designed for the NASA product using materials from Manufactured Technologies Corporation, (MTC) of Chesterfield, MO., a subsidiary of Aegion. To meet NASA's operating pressure requirements a project-specific liner was designed and manufactured by MTC using two layers of glass reinforcement. The PPL was then impregnated with a two-part, high temperature epoxy resin and transported by US Pipelining to the NASA site. The PPL was installed by US Pipelining using the air inversion/steam cure method.

"This was an extremely technical project from both a materials and construction viewpoint", states Mark Wetzel, Senior Director of MTC. "A Class IV restoration with both high pressure and operating temperature requires a great deal of advanced planning. To complicate the installation further, the line location was extremely difficult to access," continued Wetzel. "The conditions were far from ideal, congratulations to US Pipelining."



### Project Name

NASA IN-SPACE PROPULSION FACILITY (ISP) NASA John Glenn Plum Brook Center  
Class IV Structural Restoration of Intercondenser Line

### Application:

Structural Restoration  
24-Inch Diameter Carbon Steel  
High Pressure High Temperature Intercondenser Line  
Operating Pressure 80PSI  
Operating Temperature 170 F

### Method:

ASTM F-1216 Cured-In-Place Pipe Glass Reinforced Pressure Pipe Lining (RPP)  
ASTM F-1216 Air Inversion/Steam Cure High Temperature L085-PPA-33 Vinyl Ester Resin

### Design Team

US Pipelining, LLC.  
1100 Wood Lane  
Langhorne, PA 19067

### Material Manufacturer

Manufactured Technologies Corporation (MTC)/AZURIA  
580 Goddard Avenue  
Chesterfield, MO 63005

### Resin Supplier

AOC Resins  
955 Highway 57  
Collierville, TN 38017

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The Space Power Facility (SPF) houses the world's largest and most powerful space environment simulation facilities including the Space Simulation Vacuum Chamber measuring 100 ft. in diameter by 122 ft. high. The Reverberant Acoustic Test Facility is the world's most powerful spacecraft acoustic test chamber, which can simulate the noise of a spacecraft launch up to 163 decibels or as loud as the thrust of 20 jet engines. The Mechanical Vibration Facility is the world's highest capacity and most powerful spacecraft shaker system, subjecting test articles to the rigorous conditions of launch.



In-Space Propulsion Facility (ISP) is the world's only facility capable of testing full-scale, upper-stage launch vehicles and rocket engines under simulated high-altitude conditions. The engine or vehicle can be exposed for indefinite periods to low ambient pressures, low-background temperatures and dynamic solar heating to simulate the environment of orbital or interplanetary travelspace environment and propulsion test facilities

Based in Langhorne, PA, U.S. Pipelining, LLC is a leading U.S. provider of pipelining services, including large diameter projects for storm sewer, sanitary sewer, pressure pipe, under-slab lining, and vertical pipe lining. Since entering the pipe rehabilitation industry more than 25 years ago, US Pipelining has gained recognition for their ability to offer highly specialized rehabilitation solutions to a vast array of clients including Global Fortune 500 Companies, high-rise residential communities, heavy industry, the US Military and government agencies.

Manufactured Technologies Corporation, Chesterfield, MO, specializes in the manufacture of high-quality CIPP & PPL liners available for wet or dry delivery. They can accommodate water or air inversion and handle the demands of steam curing for optimal installation and long-term performance.

About Cured-In-Place technology: Cured-In-Place Pipe technology (CIPP) is one of several "No-Dig" trenchless rehabilitation methods used to "noninvasively" repair existing pipelines. CIPP is a jointless, seamless, pipe-within-a-pipe with the capability to structurally rehabilitate pipes ranging in diameter from 4" - 120". With a design life of 50 years CIPP is one of the most widely used rehabilitation methods and has application in water, sewer, gas, and chemical pipelines.

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