



Miller Pipeline



EX Method®
trenchless pipe rehabilitation

Miller Pipeline

Replace and improve sanitary sewer, storm water and industrial pipelines with high strength EX pipe.

For municipalities and industries that can't afford the time and expense to dig up damaged pipes, there is a fast, high quality solution. The EX Method® from Miller Pipeline. This trenchless installation of EX pipe causes no disruption to the natural environment or to urban residential areas.



EX pipe is high strength, un-plasticized PVC manufactured under strict quality procedures using odorless, environmentally-safe materials. EX pipe is expanded-in-place, not cured-in-place, so factory-controlled, ASTM F-1504 uniform quality is assured for every

installation. The high strength and flexibility of EX pipe allow it to withstand ground movement and failure of the host pipe without affecting its integrity.

The EX pipe material is softened with heat and continuously inserted into existing manholes for access. After insertion, the pipe is then expanded, approximately 10 percent, to fit tightly within the host pipe, resulting in a continuous, jointless pipe-within-a-pipe without ribs or folds.

A new EX pipe can be installed in a fraction of the time required by other methods. When work is completed, the new pipe exhibits maximum durability and corrosion resistance, and in most cases, no loss of flow capacity.



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Install high strength PVC EX pipe fast, with minimal or no excavation.

Save Money

- The cost of installing EX pipe is much less than total replacement by conventional trenching techniques
- Installation is fast using existing manholes
- Less pipe maintenance

Reduce Inconvenience

- Drastically reduces the public inconvenience and disturbance to the environment caused by traditional repairs
- No offensive styrene odors

A Safe, Smart Choice

- Material of choice for new pipe
- High strength, un-plasticized PVC with 35% higher modulus
- Environmentally safe
- Resistant to chemicals and abrasion
- Jointless EX pipe stops water infiltration and exfiltration, root intrusion and soil loss
- Smooth pipe finish improves flow characteristics
- Meets ASTM F-1504 and F-1947, and is ASTM D-2990 tested
- Controlled, uniform heating during installation for consistent factory-controlled quality with no folds or ribs

- Low coefficient of thermal expansion means service cutouts will not move
- High pipe stiffness, yet flexible enough to withstand ground movement
- Flexible pipe size applications
- Available in the 6-inch to 15-inch rehabilitation size range

Why choose Miller Pipeline

We Do the Job Right

- Pride in our engineering capabilities, quality workmanship and project management expertise
- Dedication to exceeding customer expectations

Miles of Experience

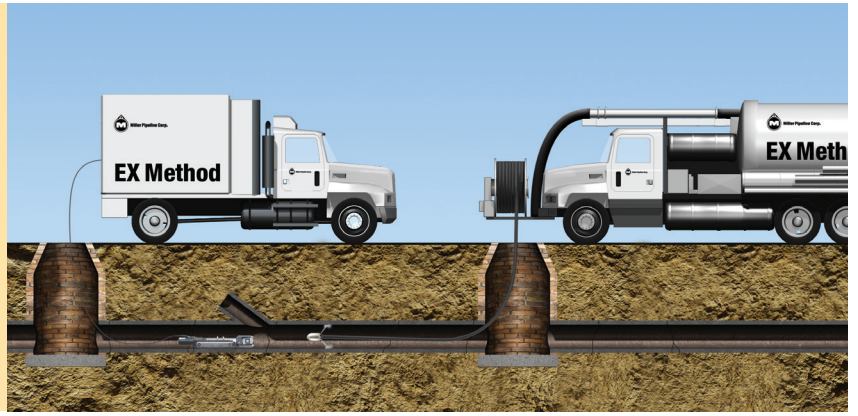
- More than a half century of contracting experience
- Over 35 years of trenchless rehabilitation experience
- Miller Pipeline crews have installed over a million feet of EX pipe in the last 10 years
- Wide geographic service footprint ensures local support and expertise



Installation

Step 1: TV inspection and pipe cleaning

The existing pipe is first cleaned and televised. Protruding service connections are removed; partially collapsed sections are then repaired and all debris in the pipe is removed and disposed of properly. A detailed video of the pipe's condition is produced.



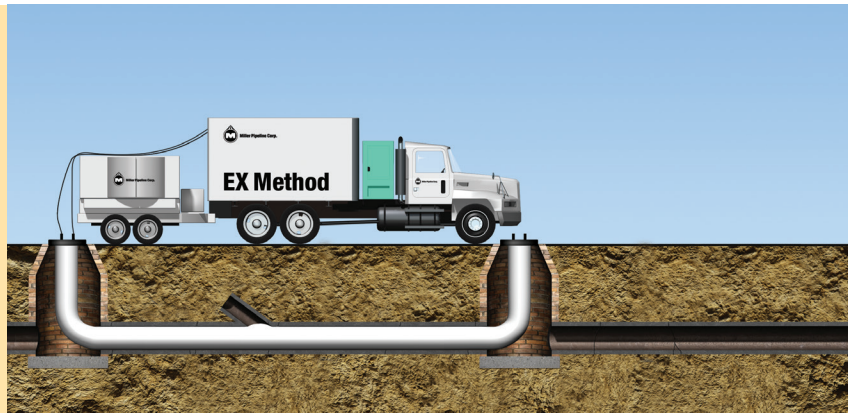
Step 2: EX pipe installation in the host pipe

The EX pipe contained in the pipe warmer trailer is preheated to soften the PVC material. Once softened, the EX pipe is winched through the existing manhole into the pipe to be reconstructed. Winching continues until the EX pipe reaches the next designated manhole.



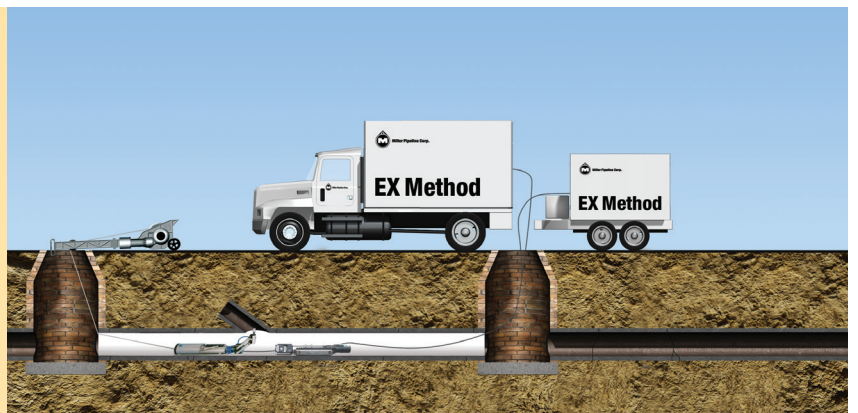
Step 3: EX pipe expansion and shaping

After the EX pipe is winched into the existing pipeline, steam and pressure are applied to expand the PVC tightly against the host pipe. Steam is then replaced by air, while maintaining a constant pressure, and the PVC is cooled. The PVC is trimmed at each pipe end and excess material is removed from the manhole.



Step 4: Service connection reinstatement

After the cooling of the PVC pipe, the house service connections are reopened, using a specially designed robotic cutting device and a closed circuit television camera. The EX pipe installation is then complete — having taken only hours, not days, and accomplished without excavation. The new pipe is now ready for use.

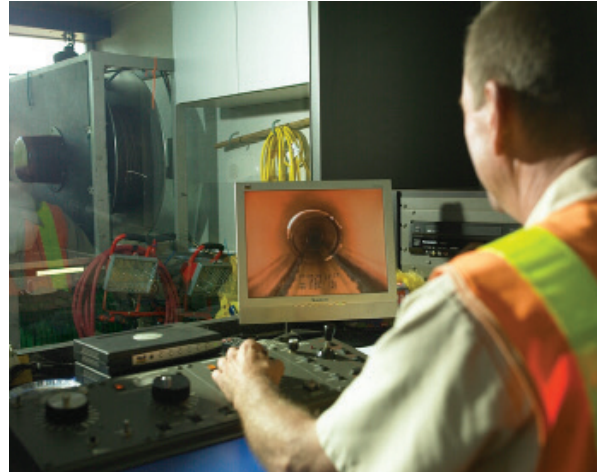


Material Specifications

EX pipe is produced from a base of PVC, conforming to ASTM D-1784 cell classification 12334-B, tested to ASTM F 1504-Standard Specifications for folded Poly Vinyl Chloride (PVC) Pipe for existing sewer and conduit rehabilitation. The PVC material is specifically designed to meet the stringent requirements of the EX Method® of pipeline reconstruction. The high strength EX pipe delivers chemical, earthquake and abrasion resistance, which results in a superior pipeline with long-term, proven stability.

EX Pipe Physical Properties

Flexural Modulus of Elasticity	ASTM D-790	340,000 psi
Flexural Strength	ASTM D-79	9,000 psi
Tensile Strength	ASTM D-638	6,000 psi
Coefficient of Thermal Expansion	3.0 X 10-5	in / in °F



EX Pipe Flow Characteristics

Flow Capacity Before EX pipe Installation	Flow Capacity After EX pipe Installation
Original Pipe “n”	“n” = 0.009 (DR 35)
0.010	95%
0.011	104%
0.012	114%
0.013	123%
0.014	133%
0.015	142%
0.021	199%

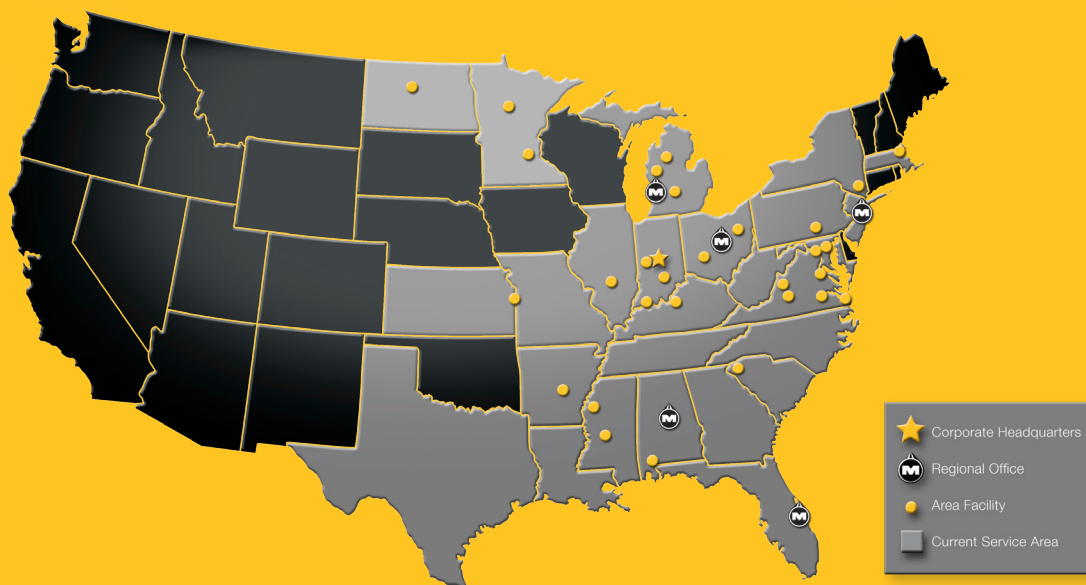


With an extremely smooth material surface and only minimal reduction of pipe diameter, the new EX pipe meets or exceeds the flow capacity of the original pipe, while forming a new, exceedingly strong and corrosion-resistant pipe-within-a-pipe. The EX pipe can be installed in lines with bends up to 90 degrees and small diameters changes with minimal or no wrinkles.



Miller Pipeline

Miller Pipeline is one of the nation's premier natural gas distribution, transmission pipeline and utility contractors. We provide a comprehensive range of pipeline contracting and rehabilitation services for natural gas, liquids, water and wastewater pipelines. Specialty products and services for the industrial and telecommunication industries are also offered. With our corporate headquarters in Indianapolis, Indiana, and area facilities throughout the country, our steadily expanding geographic footprint enables us to ensure the availability of local resources and expertise to support your project.



Our representatives will be glad to discuss your pipeline needs. For further information, or to arrange an on-site inspection, please contact us.

Corporate Headquarters

P.O. Box 34141
8850 Crawfordsville Road
Indianapolis, IN 46234
Toll-Free: 800-428-3742
Tel: 317-293-0278
Fax: 317-293-8502

Regional Offices

Ohio Operation
4990 Scioto Darby Road
Hilliard, OH 43026
Tel: 614-777-8377
Fax: 614-771-5651

Alabama Operation
3611 Industrial Parkway
Birmingham, AL 35217
Tel: 205-849-5331
Fax: 205-849-5311

New Jersey Operation
378 Whitehead Avenue
South River, NJ 08882
Toll-Free: 800-524-1002
Tel: 732-238-2151
Fax: 732-238-2265

Florida Operation
727 Cheston Street
New Smyrna Beach, FL 32168
Toll-Free: 866-423-6621
Tel: 386-423-6621
Fax: 386-423-6627

millerpipeline.com

Michigan Operation
4575 Clay Avenue
Wyoming, MI 49548
Tel: 616-530-9034
Fax: 616-530-8384