

TRANSMITTAL

To: Wenger Excavating, Inc./ Jeff Gaul/Gjorgi Kondev Date: 1/27/14

From: Frederick P Werner

Re: 2013 Levee Infrastructure Improvement Project Date Submitted: 1/27/14

WE ARE SENDING YOU:

☒ ATTACHED ☐ DRAWINGS ☒ SHOP DRAWINGS/ SUBMITTAL ☐ CONTRACTS ☐ CHANGE ORDER

Notes: Layne Inliner submittals-, **APPROVED**,
East Jordan Aluminum Hatches-, **APPROVED**
Hymaxx Couplings for use with Cast Iron Pipe-, **APPROVED**
Clow Corp Flanged Valves -, **APPROVED**

Submittals have been reviewed with the following exceptions:

SUBMITTAL/ SHOP DRAWING REVIEW

CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS ONLY FOR REVIEW OF THE GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. NOTHING HERE IN AUTHORIZES ADDITIONAL COST. THE CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING: CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; PERFORMANCE; SELECTING FABRICATION PROCESS AND TECHNIQUES OF CONSTRUCTION; COORDINATING HIS OR HER WORK WITH THAT OF ALL OTHER TRADES, AND PERFORMING ALL WORK IN A SAFE AND SATISFACTORY MANNER.

CITY OF MASSILLON
151 LINCOLN WAY EAST
MASSILLON, OHIO 44646

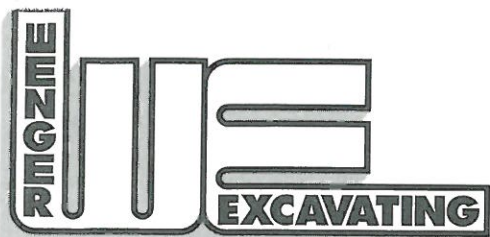
BY Frederick P. Werner
DATE 1-27-2014

(x) APPROVED
() APPROVED AS NOTED

() NOT APPROVED
() REVISE/RESUBMIT

CC: File, RPR

SIGNED: JML



Phone 330-837-4767
Fax 330-828-8158

26 N. Cochran St. • P.O. Box 499 • Dalton, Ohio 44618-0499

City of Massillon - Division of Engineering
Municipal Government Annex
City Administration Building
Massillon, Ohio 44646

January 22nd, 2014

Att'n: Mr. Fred Werner

Re: Massillon Levee / Submittals

Dear Mr. Werner:

Enclosed please find the following shop drawings for your review:

- 1) Layne Inliner submittals,
- 2) East Jordan Aluminum Hatches,
- 3) Hymaxx Couplings for use with Cast Iron Pipe,
- 4) Clow Corp Flanged Valves.

Your Prompt attention to the above submittals will be greatly appreciated.

If you have any questions please feel free to call me at (330) 837-4767.

Sincerely,

Jeff Gaul

Jeff Gaul

Wenger Excavating, Inc.

SUBMITTAL SHOP DRAWING REVIEW

CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING THE REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS ONLY FOR REVIEW OF THE GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. NOTHING HERE IN AUTHORIZES ADDITIONAL COST. THE CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING: CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; PERFORMANCE, SELECTING FABRICATION PROCESS AND TECHNIQUES OF CONSTRUCTION; COORDINATING HIS OR HER WORK WITH THAT OF ALL OTHER TRADES AND PERFORMING ALL WORK IN A SAFE AND SATISFACTORY MANNER.

CITY OF MASSILLON
151 LINCOLN WAY EAST
MASSILLON, OHIO 44646

BY *Jeff Gaul*
DATE 1-27-2014

☒ APPROVED
☐ APPROVED AS NOTED

☐ NOT APPROVED
☐ REVISE/RESUBMIT

"An Equal Opportunity Employer"



RECORD OF SUBMITTAL

City of Massillon
2013 Levee Infrastructure Improvements
Wenger Excavating

Layne Inliner Job No.

Submittal # 1G.1.A
Supplier: Layne Inliner
Contact: Jeremy Ingle
Phone #: 614-529-6440

Sent to Engineer: 1/21/2014

Received from Engineer: _____

Number of Copies: 6

Description of Submittal

- 1 Product Information
- 2
- 3
- 4

APPROVED AS NOTED
NOT APPROVED
REVIS/RESUBMIT
DATE
1-27-2014
BY
151 LINCOLN WAY EAST
MASSILLON, OHIO 44646
CITY OF MASSILLON
REVIEW OF THE GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE
REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS ONLY FOR
CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING THE
SUBMITTAL SHORTLY AFTER REVIEW
REVIEW OF THE GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE
CONTRACT DOCUMENTS, NOTHING HERE IN AUTHORIZES ADDITIONAL COST THE
CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING: CONFIRMING AND
FABRICATING ALL QUANTITIES AND DIMENSIONS, FIELD DIMENSIONS, SELECTING HIS
OR HER WORK WITH THAT OF ALL OTHER TRADES AND PERFORMING ALL WORK IN
ASAP AND SATISFACTORY MANNER.

LAYNE INLINER STAMP

☒ APPROVED
☐ APPROVED AS NOTED
☐ REJECTED
By: [Signature]
Layne Inliner, LLC
Date: 1-21-14

Reviewed
Approved [Signature]
Wenger Excavating, Inc.

ENGINEER'S STAMP

LINER PRODUCTS

1468 WEST HOSPITAL ROAD • PAOLI, INDIANA 47454 • PHONE: (812) 723-0244 • FAX: (812) 723-0405

PRODUCT INFORMATION

POLYESTER FELT CURED-IN-PLACE PIPE LINING TUBE FOR INSTALLATION USING THE DIRECT INVERSION METHOD

REVISED MARCH 1, 2004

COMPANY PROFILE

PRODUCT TYPES

OVERVIEW OF TUBE CONSTRUCTION

QUALITY ASSURANCE

RAW MATERIALS

PRODUCT DESIGN, DOCUMENTATION, AND SCHEDULING

FINISHED PRODUCTS

PRODUCT SPECIFICATIONS

LINER PRODUCTS, LLC
PRODUCT INFORMATION
POLYESTER FELT CURED-IN-PLACE PIPE LINING TUBE FOR INSTALLATION
USING THE DIRECT INVERSION METHOD

COMPANY PROFILE

Liner Products, LLC is a worldwide supplier of quality lining tubes to the cured-in-place pipe (CIPP) industry. The Liner Products manufacturing facility, located in Paoli, Indiana, occupies approximately 78,000 square feet of production and administrative area.

PRODUCT TYPE

The information contained in this book pertains to polyester felt CIPP lining tubes designed for installation using the direct inversion and curing method. This installation technique generally utilizes a flexible, multiple layer tube with an exterior thermoplastic coating. The tube is impregnated with resin and everted into place inside the host pipe. The resin is then cured to produce a finished liner which is continuous, seamless, and fits tightly inside the original pipe. A preliner may be everted into the host pipe prior to inversion of the resin impregnated tube to control resin migration and contamination.

OVERVIEW OF TUBE CONSTRUCTION

Polyester felt lining tubes for CIPP applications are generally manufactured from one or more needed polyester felt layers constructed together to form a tube. Each tube is tailor made to be the proper diameter, thickness, and length per the customer's specifications. These customer specifications usually originate from measurements of the host pipe and a CIPP thickness design.

The proper diameter of each tube is achieved by slitting felt for individual layers to a calculated width before closure into tubular form. Seams in the butted or overlapped edges are formed through a technique known as heat bonding, where a controlled heat source is applied to the felt and the heated felt surfaces are pressed together to form a strong, consistent bond which allows resin passage between the two surfaces.

Appropriate sizing for each tube is determined in the tube design phase. Tubes are typically undersized to prevent wrinkling of the liner along the length of the pipe and minimize wrinkling at bends and points where the diameter of the pipe may be substantially reduced, such as offset joints and areas of significant deflection. This provides a smooth interior surface for the finished liner.

The specified thickness of each tube is achieved through combinations of the number of layers and the respective thicknesses of each of the layers. The outermost layer of each tube is coated with an impermeable thermoplastic film to allow for vacuum-assisted resin impregnation of the tube, resin containment, and containment of the fluid(s) used to invert the tube and cure the thermosetting resin. Seams in this coated layer are sealed with an impermeable thermoplastic sealing strip which is bonded to the exterior of the coated layer. All seams are inspected to ensure an adequate bond between the coated layer and the sealing strip.

QUALITY ASSURANCE

Liner Products maintains an advanced quality control laboratory in which quality assurance testing and documentation is performed for all component materials, manufacturing processes, and finished tubes to ensure conformance with customer specifications and applicable standards. All lining tubes comply with applicable ASTM standards, including ASTM D-5813, ASTM F-1216, and ASTM F-1743.

All felt used in the manufacture of lining tubes is individually numbered and quality tested to rigid specifications for thickness, weight, and density in accordance with ASTM standards and material specifications. Thermoplastic coated felts are also tested for coating thickness and porosity. Each roll is individually tested before incorporation into inventory; any materials not meeting specifications are rejected.

All finished tubes are quality tested for length, circumference, thickness, and quality of construction in accordance with ASTM standards and manufacturing specifications.

RAW MATERIALS

Specifications for each raw material component are formalized in a Material Specification. Each lot of incoming materials is inspected and quality tested for conformance with the governing Material Specification.

POLYESTER FELT:

Polyester felt is generally received in the form of rolls, each of which is uniquely numbered for identification. The properties of polyester felt which are measured and recorded are given in Table 1.

Table 1. Tested Polyester Felt Properties

Property	Description of Test
Roll width	Measured with approved steel rule
Thickness	Measured with ASTM specified gage
Weight	Measured with approved electronic balance
Density	Calculated from thickness and weight measurements
Tensile strength	Supplier certified

THERMOPLASTIC COATED POLYESTER FELT:

Direct inversion tubes have a polyurethane coating to allow for resin impregnation of the tube and containment of the fluid(s) used for inversion and curing.

Polyester felt which is coated with a thermoplastic film is received in roll form. Each roll is uniquely numbered for identification. The properties of thermoplastic coated polyester felt which are measured and recorded are listed in Table 2.

Table 2. Tested Thermoplastic Coated Polyester Felt Properties

Property	Description of Test
Roll width	Measured with approved steel rule
Felt thickness	Measured with ASTM specified gage
Felt weight	Measured with approved electronic balance
Felt density	Calculated from thickness and weight measurements
Coating thickness	Measured with approved gage
Coating weight	Calculated from thickness and felt weight measurements
Tensile strength	Supplier certified

THERMOPLASTIC SEALING STRIPS:

Seams in the outermost, coated layer are sealed with an impermeable thermoplastic sealing strip which is bonded to the exterior of the coated layer.

Thermoplastic sealing strips are received in rolls wound on a core or reel as specified in an approved Material Specification. The properties which are measured and recorded are provided in Table 3.

Table 3. Tested Thermoplastic Sealing Strip Properties

Property	Description of Test
Sealing strip thickness	Measured with approved gage
Sealing strip weight	Measured with approved electronic balance
Sealing strip density	Calculated from thickness and weight measurements

PRODUCT DESIGN, DOCUMENTATION, AND SCHEDULING

PRODUCT DESIGN:

Before production, a tube design is generated to determine the planned construction of the tube. The design of each tube requires the determination of the sequence and specific attributes of individual layers to be combined in the construction of the tube in order to meet the customer's specifications. The specific attributes of each layer include:

1. Felt thickness
2. Coating type (if applicable)
3. Coating thickness (if applicable)
4. Total layer width (or circumference)
5. Individual felt width(s)
6. Overlap width(s)
7. Number of seam(s)
8. Location of seam(s)

Liner Products, LLC

Product Information

Polyester Felt CIPP Lining Tubes For Installation Using The Direct Inversion Method

TUBE CONSTRUCTION WORKSHEET:

A Tube Construction Worksheet is generated for each tube to be manufactured. The Tube Construction Worksheet identifies the tube and planned product design and serves as the primary quality control document. Information regarding specific attributes of each tube (i.e., diametrical transitions, thickness changes, etc.), the felt rolls used in fabrication, certain process information, and identification of the manufacturing technicians participating in each phase of production are recorded on the Tube Construction Worksheet.

TUBE IDENTIFICATION:

Each tube is assigned a unique tube number for identification purposes. These numbers are generated sequentially. The tube number is included on the Tube Construction Worksheet.

PRODUCTION SCHEDULING:

Production of tubes is scheduled to best meet customer delivery requirements. After each tube has been designed it is entered into the production schedule. The production schedule is kept current by updating schedule information as the manufacture of individual tubes is commenced and completed.

FINISHED PRODUCTS

Each finished tube is quality control tested to ensure it meets customer specifications. A quality control technician takes a sample from the full circumference of each end of each tube to be destructively tested. The properties of finished tubes which are measured and recorded are listed in Table 4.

Table 4. Tested Finished Product Properties

Property	Description of Test
Tube length	Measured with footage counter or other approved means
Tube circumference	Measured with approved flexible rule
Tube thickness	Measured with ASTM specified gage
Coating thickness and quality	Measured with approved gage and visual inspection
Sealing strip bond	Visual inspection
Quality of construction	Visual inspection

The seams of all inversion tubes are subjected to a separate visual inspection to ensure a watertight bond between the outer coating and thermoplastic sealing strips. Any finished lining tube not meeting customer specifications is rejected.

LINER PRODUCTS

1468 WEST HOSPITAL ROAD • PAOLI, INDIANA 47454 • PHONE: (812) 723-0244 • FAX: (812) 723-0405

- PRODUCT SPECIFICATIONS -

PRODUCT TYPE

Polyester Felt Cured-In-Place Pipe Lining Tube For Installation Using the Direct Inversion Method

PRODUCT DESCRIPTION

Thermoplastic coated polyester felt cured-in-place pipe lining tube.

GENERAL INSTALLATION TECHNIQUE

A flexible, multiple layer tube is vacuum impregnated with resin and inverted into place inside the host pipe and the resin is cured. A preliner may be everted into the host pipe prior to inversion of the resin impregnated tube to control resin migration and contamination.

RESIN TYPES

Compatible with polyester, vinyl ester, and epoxy resins. Resins may be cured in a variety of ways, including ambient and semi-ambient cures, hot water, and steam.

TUBE COATINGS

Inversion tubes have a polyurethane or polyurethane-based coating. Coating thickness is dependent upon specific application.

TUBE SIZES

Diameter: 4" to 120"
Thickness: 4.5 mm to 84.0 mm
Length: Customer specified

MINIMUM TUBE TENSILE STRENGTH

750 psi
Longitudinal and transverse directions

Complies with applicable ASTM standards, including ASTM D5813 and ASTM F1216.

Variations of this general product type may be manufactured for specific applications. Consult Liner Products, LLC for technical guidance.



Layne Inliner Job No.

Received from Engineer: _____

Number of Copies: 6

4

4143 Weaver Court Hilliard, OH 43026
Phone: (614) 529-6440 Fax: (614) 529-6441



1468 West Hospital Road
Paoli, Indiana U.S.A. 47454-9215
voice: 812/723-0704
fax: 812/723-5998
internet: www.inliner.net

August 30, 2012

To: Layne Inliner
Attn: Jeremy Ingle
4143 Weaver Court
Hilliard, OH 43026

Re: Certification of Compliance

To Whom it May Concern:

Please be advised that Layne Inliner, LLC (formerly Reynolds Inliner, LLC) is an authorized licensed installer of Inliner Technologies, and as such, is trained in the installation of the Inliner® Cured-in-Place Pipe (CIPP) renewal system in accordance with both ASTM F1216 and AFTM F1743.

We also certify that the Inliner® CIPP is designed per the requirements of ASTM F1216, and the installed product fully meets all the requirements of ASTM F1216 and ASTM F1743.

Should you have any questions or require additional information or details, please contact me directly at (812) 723-0704.

Sincerely,
INLINER TECHNOLOGIES, LLC

A handwritten signature in black ink, appearing to read "Geoff Yothers", written over a horizontal line.

Geoff Yothers
Director



1468 West Hospital Road Paoli,
Indiana U.S.A. 474549215 voice:
812/7230704 fax: 812/7235998
internet: www.inliner.net

March 8, 2013

Ms. Angela Russell
Layne Inliner, LLC
4520 North State Road 37
Orleans, IN 47452

Re: Certification of Installer; Layne Inliner, LLC

To Whom It May Concern:

This letter certifies that over 15,000,000 linear feet of Inliner® Cured-in-Place Pipe renewal systems have been installed for the rehabilitation of wastewater collection lines in the United States over the last ten years. The Inliner® method consists of the application of non-woven tubes manufactured by Liner Products, LLC and specially engineered thermosetting resins to provide lining systems designed for a useful life of 50 years or more.

Layne Inliner, LLC has been an authorized, trained, and certified licensed installer of the Inliner® Cured-in-Place Pipe renewal system since 1991. Layne has crews based in Alabama, Colorado, Florida, Georgia, Indiana, Maine, Maryland, North Carolina, Ohio, and Texas. Layne Inliner's extensive experience qualifies them to install the product in accordance with both ASTM F1216 and ASTM F1743.

Inliner Technologies, LLC, through our network of certified installers, is proud to provide high quality, cost-effective, trenchless products to meet our customers' needs and requirements. If you require any additional information, please feel free to contact me directly at (812) 723-0704.

Sincerely,
Inliner Technologies, LLC

Geoff Yothers
Director



**City of Massillon
2013 Levee Infrastructure Improvements
Wenger Excavating**

Number of Copies: 6

1 Storage and Delivery

2 _____

3 _____

4 _____

4143 Weaver Court Hilliard, OH 43026
Phone: (614) 529-6440 Fax: (614) 529-6441



1468 West Hospital Road
Paoli, Indiana U.S.A. 47454-9215
voice: 812/723-0704
fax: 812/723-5998
internet: www.inliner.net

August 14, 2007

Reynolds Inliner, LLC
4143 Weaver Court
Hilliard, OH 43026

Re: Storage and Delivery of Resin-Impregnated CIPP Tubes

To Whom It May Concern:

Inliner Technologies recommends the following in regards to storage and delivery of resin-impregnated CIPP tubes:

- Impregnated tubes shall be stored and transported in a refrigerated truck with a typical temperature of 40 degrees Fahrenheit.
- When properly stored, impregnated tubes may be stored for 7-10 days prior to installation. When at all possible, we would recommend applying a guideline of installing the tubes within 96 hours of impregnation.

Should you have any questions or require additional information, please contact me directly at (812) 723-0704.

Sincerely,
INLINER TECHNOLOGIES, LLC

Geoff Yothers
Director



Layne Inliner Job No.

Sent to Engineer:	<u>1/21/2014</u>
Received from Engineer:	<u> </u>
Number of Copies:	<u>6</u>

1 Third party test results

2

3

4

4143 Weaver Court Hilliard, OH 43026
Phone: (614) 529-6440 Fax: (614) 529-6441



June 4, 2013

HTS Report #:	LIF311.013.Doc
Mr. Dave Picard Layne Inc 4143 Weaver Ct Hilliard, OH 43026	Customer Project Name: Penn Hills PA Customer Project #: Date Sample Received: 5/30/13 Date Sample Tested: 5/31/13

Four (4) plate samples were delivered to HTS's laboratory for testing. The samples were tested in accordance with ASTM D790, Method I, Procedure A. A Support Span-to-Depth Ratio of 16 to 1 was used as specified in the test standard. Thickness measurements, flexural stress and flexural modulus of elasticity tests were performed on each sample. Five (5) specimens were cut and tested from each sample. The results summarized and reported below are averages of the five (5) specimens. A test report for each sample is attached.

REPAIR	MANHOLE TO MANHOLE	MAXIMUM FLEXURAL FIBER STRESS, psi ASTM D 790	FLEXURAL MODULUS OF ELASTICITY, psi ASTM D 790
2255	SC-1-395 to SC-1-394	6523	458,654
2220	SC-1-142A to SC-1-141	5221	378,489
2031	PC-27-85 to PC-27-84	7092	588,034
2121	PC-21-17 to PC-21-17	6181	609,728

The following table contains the thickness measurements for each individual specimen tested.

MEASUREMENT OF THICKNESS FOR CURED IN PLACE PIPE LINER ASTM D 2122											
Date	Manhole to Manhole									Combined Total Average/Specimen	
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	In	mm
2255	SC-1-395 to SC-1-394	.402	.435	.390	.464	.455	.398	.423	.402	0.421	10.7
2220	SC-1-142A to SC-1-141	.365	.351	.342	.366	.372	.379	.364	.368	0.363	9.2
2031	PC-27-85 to PC-27-84	.389	.383	.394	.438	.431	.399	.398	.401	0.404	10.3
2121	PC-21-17 to PC-21-17	.384	.385	.370	.409	.408	.401	.396	.388	0.393	10.0

Technician	E. Carrillo
Time	4 hrs

Sincerely,

Rick Eastwood
Vice President

This test report relates only to the items tested and shall not be reproduced except in full without approval of HTS, Inc.



September 17, 2013

HTS Report #:	LIF311.024.Doc
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Mr. Dave Picard Layne Inc 4143 Weaver Ct Hilliard, OH 43026	Customer Project Name: Muskegon Customer Project #: Date Sample Received: 9/11/13 Date Sample Tested: 9/13/13
--	--

Three (3) plate samples were delivered to HTS' laboratory for testing. The samples were tested in accordance with ASTM D638 Type III and ASTM D790 Method I Procedure A. A Support Span-to-Depth Ratio of 16 to 1 was used as specified in the test standard ASTM D790. Tensile Strength, thickness measurements, flexural stress and flexural modulus of elasticity tests were performed on each sample. Five (5) specimens were cut and tested from each sample. The results summarized and reported below are averages of the five (5) specimens. A test report for each sample is attached.

SAMPLE ID	MANHOLE TO MANHOLE	MAXIMUM FLEXURAL FIBER STRESS (psi) ASTM D 790	FLEXURAL MODULUS OF ELASTICITY (psi) ASTM D 790	STRENGTH @ BREAK (psi) ASTM D 638	ELONGATION @ BREAK (%) ASTM D 638
30" MCGroft Park	26-27	6371	484,909	3494	9.2
A, 24" Sherman Blvd	1-2-3	8015	574,072	3795	8.3
B, 24" Sherman Blvd	1-2-3	6847	491,428	3751	12.5

The following table contains the thickness measurements for each individual specimen tested.

MEASUREMENT OF THICKNESS FOR CURED IN PLACE PIPE LINER ASTM D 2122											
										Combined Total Average/Specimen	
Sample ID	Manhole to Manhole	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	In	mm
30" MCGroft Park	26-27	.530	.522	.521	.510	.529	.528	.526	.519	0.523	13.3
A, 24" Sherman Blvd	1-2-3	.438	.467	.458	.479	.480	.459	.483	.475	0.467	11.9
B, 24" Sherman Blvd	1-2-3	.482	.488	.495	.498	.497	.498	.492	.498	0.494	12.5

Technician	E. Carrillo
Time	3 hrs

Sincerely,


Rick Eastwood
Vice President

This test report relates only to the items tested and shall not be reproduced except in full without approval of HTS, Inc.



March 28, 2013

HTS Report #:	LIF311.005.Doc	
Mr. Dave Picard	Customer Project Name:	Pickerington
Layne Inc	Customer Project No.:	
4143 Weaver Ct	Date Sample Received:	3/15/13
Hilliard, OH 43026	Date Sample Tested:	3/27/13

Four (4) plate samples were delivered to HTS' laboratory for testing. The samples were tested in accordance with ASTM D638 Type III and ASTM D790 Method I Procedure A. A Support Span-to-Depth Ratio of 16 to 1 was used as specified in the test standard ASTM D790. Tensile Strength, thickness measurements, flexural stress and flexural modulus of elasticity tests were performed on each sample. Five (5) specimens were cut and tested from each sample. The results summarized and reported below are averages of the five (5) specimens. A test report for each sample is attached.

Note: Two samples (30x27.5) were milled down for flexural strength ASTM D790 and four (4) specimens were tested for tensile strength ASTM D638 due to not enough material.

SAMPLE ID	MANHOLE TO MANHOLE	MAXIMUM FLEXURAL FIBER STRESS (psi) ASTM D 790	FLEXURAL MODULUS OF ELASTICITY (psi) ASTM D 790	STRENGTH @ BREAK (psi) ASTM D 638	ELONGATION @ BREAK (%) ASTM D 638
30x27.5	5-4	5748	546,191	3370	6.8
18x11	10-9-8	6278	502,937	3278	7.6
24x22	8-7-6-5	6388	494,565	3687	8.4
30x27.5	4-3-2-1	6345	569,837	2718	8.5

The following table contains the thickness measurements for each individual specimen tested.

MEASUREMENT OF THICKNESS FOR CURED IN PLACE PIPE LINER ASTM D 2122											
Sample ID	Manhole to Manhole	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Combined Total Average/Specimen	
										In	mm
30x27.5	5-4	.980	.992	.985	.988	1.010	.965	.989	.987	0.987	25.1
18x11	10-9-8	.428	.428	.413	.448	.448	.433	.440	.437	0.434	11.0
24x22	8-7-6-5	.826	.845	.810	.788	.835	.815	.809	.790	0.815	20.7
30x27.5	4-3-2-1	1.060	.975	1.013	1.005	1.001	1.022	.980	1.025	1.010	25.7

Technician	E. Carrillo
Time	8 hrs

Sincerely,

RJA

Rick Eastwood *RP*
Vice President

This test report relates only to the items tested and shall not be reproduced except in full without approval of HTS, Inc.



City of Massillon
2013 Levee Infrastructure Improvements
Wenger Excavating

Submittal #	1G.1.A
Supplier:	Layne Inliner
Contact:	Jeremy Ingle
Phone #:	614-529-6440

Sent to Engineer: 1/21/2014

Received from Engineer: _____

Number of Copies: 6

1 Installation Procedures

2

3

4

LAYNE INLINER STAMP	ENGINEER'S STAMP
 ☒ APPROVED ☐ APPROVED AS NOTED ☐ REJECTED By: _____ Date: _____ Layne Inliner, LLC Reviewed Approved <u>OK ETPG</u> Wenger Excavating, Inc.	

8.1. Recommended CIPP Installation Procedures

Introduction and Scope

The inversion installation procedure has many of the same elements as the pull-in procedure. The main difference is in how the tube is installed into the pipe. Depending on the size of the tube, this can be done by either the top inversion or bottom inversion. This section explains the differences between the two and, in order to be complete, may repeat the likenesses.

With the site and materials ready as described in the previous sections, the order of recommended options as described below is as follows:

- Position the refrigerated truck and tubes
- Attach the tube
- Position the platform/column/tube assembly
- Position the thermocouples
- Invert the tube halfway
- Attach the rope(s) and hoses
- Construct the end/back stop
- Finish inverting
- Prepare for sampling
- Heating and cooling the tube
- Cutting and finishing ends
- Remove rope and hoses
- Open laterals
- Take samples
- Record and document necessary information
- Restore services
- Restore site

Experienced, licensed Inliner installers are always testing and trying new techniques for the installation of the Inliner product. As these techniques are reviewed and approved by the Inliner training personnel, they may be added into this procedural document as improvements to the system. Therefore, these recommendations should be considered as a living document that is constantly undergoing change and improvement. Lastly, when on the job site, varying conditions of pipe and site around the pipe may require these recommendations to be modified to accommodate the on-site conditions.

Section 8: Inversion Installation

8.2. Top or Bottom Inversion

The different methods of inverting a tube have been found to be diameter related. The difference between the methods is the use of a column assembly. Tubes with a diameter of 15 inches or less are more likely to be bottom inverted and tubes with a diameter of 24 inches or more are normally top inverted. Experience with the range in between 15 and 24 inches has not shown an advantage toward either one. Benefits of the top inversion process include keeping personnel from needing to enter into the manhole at the start of the inversion. Benefits of the bottom inversion process include not having to remember to order an extra long tube and being able to have a reusable column. As with any installation, make sure the pipe that is going to be lined has been cleaned and televised. Neither of these inversion methods needs the rope that was left by the cleaning process. Both methods start with the positioning of the refrigerated truck and the positioning of the thermocouples (see section 7.4). If a bottom inversion is to be done, skip to section 8.4.

8.3. Top Inversion

8.3.1 Attach the Tube

Top inversions attach the tube directly to the "top ring" on the floating platform. The refrigerated truck and the platform are positioned at the manhole. The open end of the tube is brought up to the platform where it is feed down into the ring. It is then inverted back over the ring and strapped into position. The diameter of the top ring should be about 80 percent of the size of the tube. This will allow the tube to be easily positioned and still fit snugly over the ring.

8.3.2 Start the Tube

A special rope (or ropes) called "starter rope(s)" is (are) manufactured into the start of tube and is (are) used to control and guide the tube into host pipe. Take control of the rope(s) as the process continues. The position of the attachment point of the starter rope(s) is (are) important and very dependant on the position of the refrigerated truck and host pipe. See section 4.6 for more details.

The tube is strapped to the top ring. The inversion is started by hand feeding the tube into the ring until it is about three feet in. When the tube is large enough, it is possible to stand in the ring, using body weight to get the tube to three feet in. Water is now added to assist in inverting the tube. Add only enough water to aid in the pushing of the tube. If too much water is added, it becomes difficult to turn the tube into the pipe. Water can be

removed with the careful use of a submersible pump as not to damage the inside of the tube. Once the attachment point of a rope is visible, it should be at the crown of the pipe. Continue inverting until the second rope's attachment point is visible. Pull on the ropes to bunch the tube creating an elbow. Guide the tube into the host pipe. (This section of tube does not need to have resin). Once the tube is started into the pipe, add water and continue with section 8.5.

8.4. Bottom Inversion

8.4.1 Start the Tube

In the bottom inversion method, a column assembly is used (see section 7.6). The column is normally fifteen inches in diameter. The platform is raised high enough so that the elbow attached to the column is above ground. In this position, the process of attaching the tube is easier.

The open end of the tube is folded and a half-inch diameter rope is attached. The rope needs to be the length of the column plus about six feet. The beginning end of the tube with the rope is then moved to the platform and the rope is feed into the column. A weight can be placed on the end of the rope to assist its travel through. As the tube is feed into the column, the rope is pulled. Visually inspect the tube's position. Use the seam as a reference point and verify that the tube does not have a twist. Check for twists from the truck through the elbow. Pull the tube out of the elbow approximately two feet.

8.4.2 Attach the Tube

Turn each layer back onto the elbow one at a time. The first layer that is turned back will be the coated layer and is the first to be strapped. Using a 2" wide strip of felt under the length of each double strap, wrap the felt and straps around the elbow so that they are positioned separately between two beads. Turn back the next layer(s) and strap it (them) the same way.

8.4.3 Position the Platform/Column/Tube Assembly

With the tube connected to the elbow and the column on the platform, lower the platform until the elbow is lined up with the host pipe. Verify the positioning of the thermocouples. Brace the elbow to prevent it from moving backwards or forwards. When all personnel are out of the manhole, the inversion process can proceed.

Section 8: Inversion Installation

8.5. Bulk Heading

Provisions must be made to restrain the end of the resin-saturated tube at the downstream manhole. The same formulas that are used in section 6.6 can be use here to check the size of the stop end.

8.6. Water Filling and Tube Inversion

Be sure to have a large ball valve on a smooth piece of pipe used to add water into the column. Make sure that there are no sharp edges or hose clips, which could rip a hole in the felt, are covered with black electrical tape. Personnel standing over the top of the column must continuously regulate the water to control the installation of the tube.

8.6.1 Unfolding and Feeding

As the tube is fed into the water column, take care to insure the tube is **not** twisted at any time. The tube should also be held back with a minimum of several feet (1 m) of water head pressure in the column in order to fully inflate the tube. This will also push out any water in the host pipe.

When the tube is at the halfway point, the lay flat hoses and hold back ropes need to be attached (see section 7.8). Then continue filling the tube.

Once the end of the tube becomes too short to handle, use the hold back rope to restrain the inversion of this hose. **Do not** pull or holdback with the PVC discharge hose; it will more easily tear since it does not have the strength of the braided rope. In addition, as the PVC circulation hose is being fed into the standpipe, constantly monitor this hose to ensure it also goes in without any twists and that the splices are made in correct manner. Twisted circulation hoses are ineffective for water delivery. If the discharge hose becomes detached, broken or is suspected to be twisted, contact Inliner Technical Department, personnel for corrective measures.

8.7. Final Filling

After the tube has been fully installed and the receiving end secured, fill the standpipe according to the recommendations in Graph 10.1. Ideally, the liner should be filled to the recommended level for maximum hot head. Allow the liner to expand and fit tightly against the host pipe.

However, one must also consider the conditions surrounding the pipe being rehabilitated when determining the final proper initial and curing water head pressures. The standpipe head pressure

should be a minimum of 3 psi (7 feet of water) greater than that of the known ground water around the pipe or full service lateral pressures.

8.8. Sample Preparation

Before proceeding with the curing and cool down procedures, place the plate-molded sample into the water column if this method of sampling is being utilized.

8.9. Recording Temperature and Time

Ideally, thermocouples should be connected to a recording device at the heater truck that is capable of continuous measurements of the thermocouples on the tube, as well as the intake and output water temperatures at the water heater.

If a permanent recording device is not available or inoperable, then a hand held thermocouple-recording device should be used to measure all temperature readings during the curing and cooling procedure. Remotely located thermocouple readings and the temperature of the circulating water at the downstream end of the liner (away from the heater truck) should be recorded every 15 minutes if possible, but not less than every 30 minutes. All readings monitored with a hand held thermocouple-recording device should be recorded on a curing record as a function of time.

Temperature recordings are retained as a permanent part of the documentation related to the installation.

8.10. Documentation

All written readings as well as recording charts should be kept together with one summary sheet that describes specifics of the project, the pipe, its location, and the liner used in the renewal. This cure summary is often required by the client and is helpful for review in the installation of CIPP.

8.11. Curing And Cool Down

As the liner is initially heated in the first stage of the curing process, the lining tube will have stretched and the water head may be lowered to where it is between the maximum hot and recommended water-column heights.

Section 8: Inversion Installation

Variable or Staged Cure Strategy

The temperature and times for curing Inliner tubes vary as a function of tube thickness. The design is to optimize the water temperature so the resin is cured completely without producing an exotherm so hot as to produce damage to the tube. If the resin is allowed to exotherm above 270° F the styrene in the resin will vaporize, producing a liner having a porous, foam-like consistency. This phenomenon is sometimes referred to as "styrene boil". When a liner experiences styrene boil, the properties of the final product may be reduced from that of an optimally cured CIPP.

For optimum physical properties and corrosion resistance it is recommended that the fabric tube be cured under varying conditions, based on the thickness of the liner being installed.

8.12. Sampling

8.12.1 General

Considering the various aspects of tube wet out and installation, final CIPP sampling is probably one of the most important procedures of the entire process. Although sampling may seem like a troublesome afterthought to the whole process, it is most important because this is the item by which the installed liner is accepted or rejected. Every client specification calls for minimum thickness and physical property requirements for the installed product and the sample taken from the CIPP represents the installed product. If the sample is poorly handled or damaged and the properties measured are substandard, the liner will be rejected based on a poor sample.

8.12.2 Sampling and Sample Size

The following is a summary of recommended Inliner® CIPP sampling procedures. There are basically two accepted methods of obtaining samples from installed CIPP:

- A plate molded sample of resin and felt from the installed tube.
- A restrained piece of CIPP cut from the liner itself.

In addition to proper sampling it is critical to obtain enough CIPP to perform the flexural property testing that is typically used to evaluate the minimum physical requirements. For either type of sampling procedure, the required sample sizes should be in the following range in order to have enough material to evaluate. Sampling is according to ASTM D790 "Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials".

- For 4.5 - 13.5 mm thick CIPP, the sample should be 6 inches (150 mm) wide and 10 inches (250 mm) long.
- For 15 - 21 mm thick CIPP, the sample should be 8 inches (200 mm) wide by 15 inches (380 mm) long.
- For 22.5 - 28.5 mm CIPP, the sample should be 10 inches (250 mm) wide by 24 inches (600 mm) long.

For alternative liner thickness or material test requirements (such as tensile testing) contact Inliner Technical Service personnel.

8.13. Finishing Steps

8.13.1 Cutting Ends

After the liner has been cured and cooled down, each end should be cut approximately 2 inches beyond the pipe face. Allow this outer portion of the liner to protrude into the manhole or pipe access because it helps lock the liner into the pipe face and provides an area for facing the pipe with the specified thermosetting or cementitious grouting material.

8.13.2 Removing Rope and Lay Flat

Once the liner is cured and cooled down you can now remove the end of the CIPP with specialized air tools, now pull the hold back rope and discharge hose out of the CIPP liner.

8.13.3 Cutting Laterals

Enter the pipe with camera and cutting equipment and reinstate the service laterals (see section 9).

8.13.4 Facing Ends

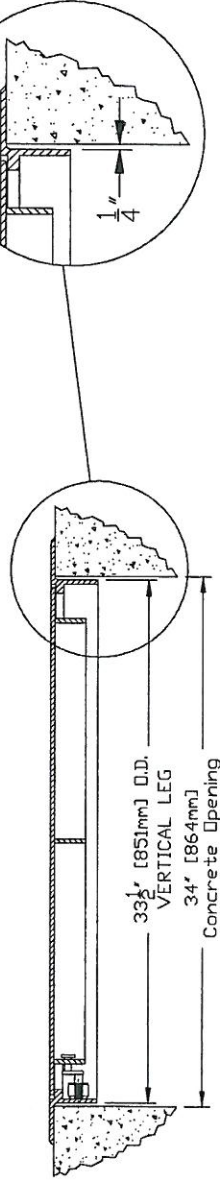
Face the ends of the pipe with the specified thermosetting or cementitious grouting material. For optimal resistance to hydrogen sulfide-related corrosion, Inliner recommends the use of a polymer-based grout or polymer coating designed for such purposes. Quick setting cementitious materials will also seal the ends of the CIPP as it enters the manhole, but may not be resistant to hydrogen sulfide corrosion.

8.13.5 Final Underground CCTV Inspection and Review

After the laterals have been opened and the ends of the pipe coated or sealed, perform the final CCTV inspection through the entire length of the CIPP. It is recommended that all of the aforementioned finishing steps should be accomplished before

Section 8: Inversion Installation

taking down any by-passed sewerage plugging and pumping. The final inspection should show the full diameter of the CIPP throughout the length of the pipe being inspected.



EACH HATCH SHALL BE EQUIPPED WITH AN ALUMINUM LIFT HANDLE.

BY THE PEOPLE

-Country of Origin: Made in USA

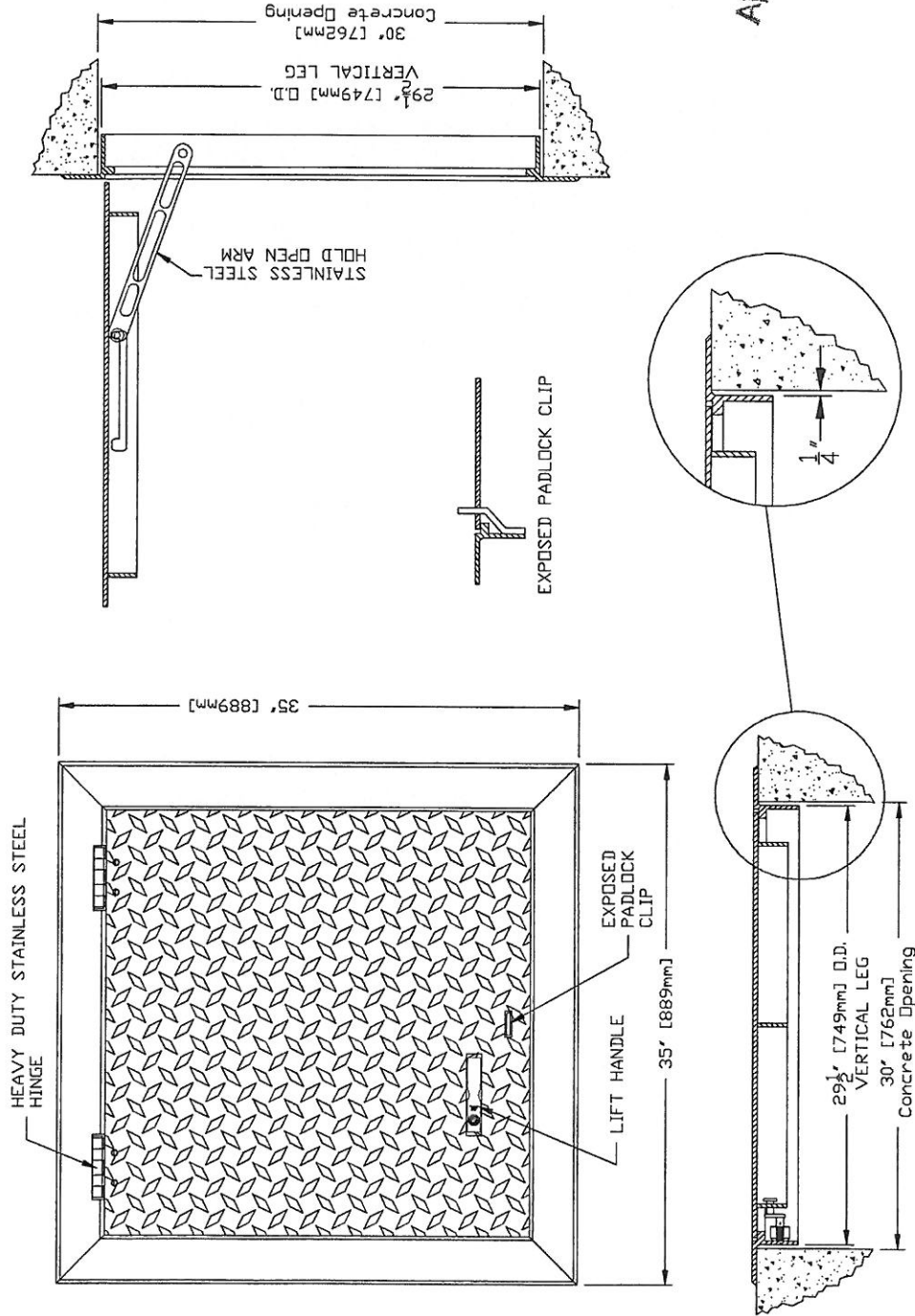
Approved CK S Jorg
Wenger Excavating, Inc.

Revised By:

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800 626 4653

SLN1 Pedestrian Rated Aluminum Hatch



Product Number
NPR14-0123_H3030240x

Design Features

- Materials
Aluminum
- Design Load
Pedestrian Rated 300 psf

SLN1
-Coating
Mill Finish

Certification

NPR14-0123
Est. Weight: 58 lbs

-Country of Origin: Made in USA

Reviewed

Approved *GV JRG*
Wenger Excavating, Inc.

Drawing Revision

01/13/14 Designer: MAW
Revised By:

Disclaimer

Weights (lbs/kg), dimensions (inches/mm) and drawings provided for your guidance. We reserve the right to modify specifications without prior notice.

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Contact

800 626 4653
ejco.com

STYLE 'SLN1' ACCESS HATCH, AS MANUFACTURED BY EJ

MATERIAL SHALL BE 6061-T6 ALUMINUM FOR BARS, ANGLES, AND EXTRUSIONS. 1/4" DIAMOND PLATE SHALL BE 5086 ALUMINUM.

UNIT DESIGNED PEDESTRIAN RATED, FOR A MINIMUM LIVE LOAD OF 300 LBS./SQ.FT.

FRAME SHALL BE OF EXTRUDED ALUMINUM HAVING THE SEAT AS AN INTEGRAL PART OF THE EXTRUSION. TOP FLANGE SHALL HAVE BEVELED EDGE.

EACH HATCH SHALL BE EQUIPPED WITH A STAINLESS STEEL HOLD OPEN ARM. DOOR SHALL LOCK OPEN IN THE 90 DEGREE POSITION. EACH HOLD OPEN ARM SHALL BE FASTENED TO THE FRAME WITH A 1/2" GRADE 316 STAINLESS STEEL BOLT.

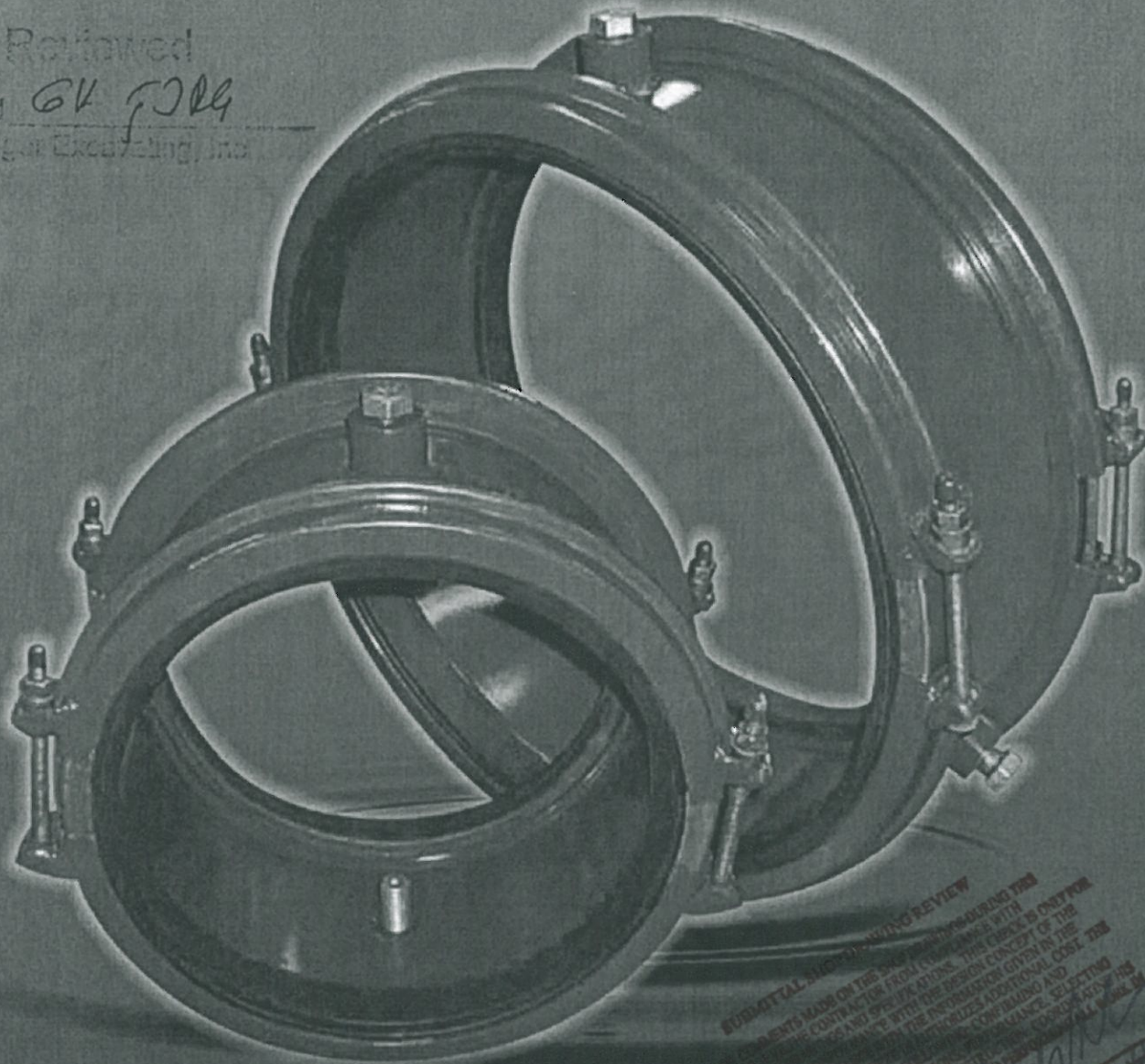
EACH HATCH SHALL BE SUPPLIED WITH GRADE 316 STAINLESS STEEL HINGES.

EACH HATCH SHALL BE SUPPLIED WITH AN EXPOSED PADLOCK CLIP (PADLOCK BY OTHERS).

EACH HATCH SHALL BE EQUIPPED WITH AN ALUMINUM LIFT HANDLE. LIFT HANDLE SHALL BE FLUSH WITH TOP OF 1/4" DIAMOND PLATE.

Large Diameter
HYMAX[®] COUPLING

Reviewed
Approved *GV JDR*
Wong & Excavating, Inc.



The Proven Time-Savers . . .
Plus, Reduces Your Need for Inventory



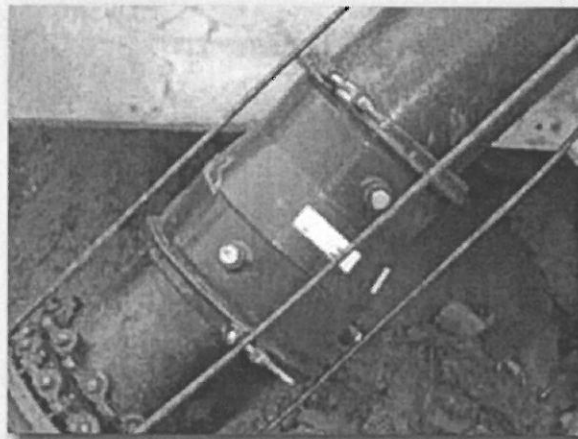
Total Piping Solutions, Inc.

FOR SUBMITTAL AND REVIEW ONLY
NOT TO BE USED FOR CONTRACTING OR CONSTRUCTION WITHOUT THE WRITTEN APPROVAL OF THE
CITY OF MASSACHUSETTS
BY *[Signature]* DATE *7-2-2011*
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MASSACHUSETTS

Large Diameter **HYMAX[®] COUPLING**

The Proven Time-Savers

- *For Water and Sewerage Applications, above and below ground*
- *Inventory Reduction*
- *Joins Pipe with diameter differences of up to 2.10 inches*
- *Superior Two-Stage Hydraulic Sealing Capabilities*
- *Easy fitting...four bolts total, two to tighten per end*
- *Light weight materials of construction*
- *High Deflection – Up to maximum 4 degrees per end for a total of 8 degrees per coupling*
- *Stab type installation (no disassembly required)*
- *Standard 12-inch or optional 19-inch long middle rings allow for more pipe end gap*
- *260 psig working pressure for 14-16 inch/232 psi for 18-24 inch*
- *Meets or exceeds AWWA C-219 Standard*
- *NSF61 EPDM Available*
- *14" and 16" units test per AWWA to 390 psi; 18" to 24" units test per AWWA to 350 psi or 1.5X working pressure.*
- *Dry lube stainless steel bolts, nuts and washers to prevent galling – Use of any additional wet-type lubricant on the bolts will void the warranty of the product.*
- *Cathodic Protection option is available*



The Large Diameter Hymax® 2000 Coupling Line

Large diameter Hymax couplings are suited to a wide range of pipe joining conditions, and each size will replace between three and four dedicated range couplings in your inventory. Each coupling will join pipes with diameter differences up to 2.1 inches. The large diameter Hymax coupling series can handle pipe end gaps up to 7.5 inches and will accommodate maximum total angular deflections of 8 degrees.



The Hymax 2000 offers an efficient range adjustable pressure assisted hydraulic sealing system. NSF61 EPDM Gasket available. .

The large diameter Hymax 2000 is a stab type coupling requiring no disassembly. Installer simply adjusts gasket and tightens two bolts on each end of the coupling to required torque. All work is performed from topside of the coupling, eliminating need for extra excavation and under-dig for the wrench.



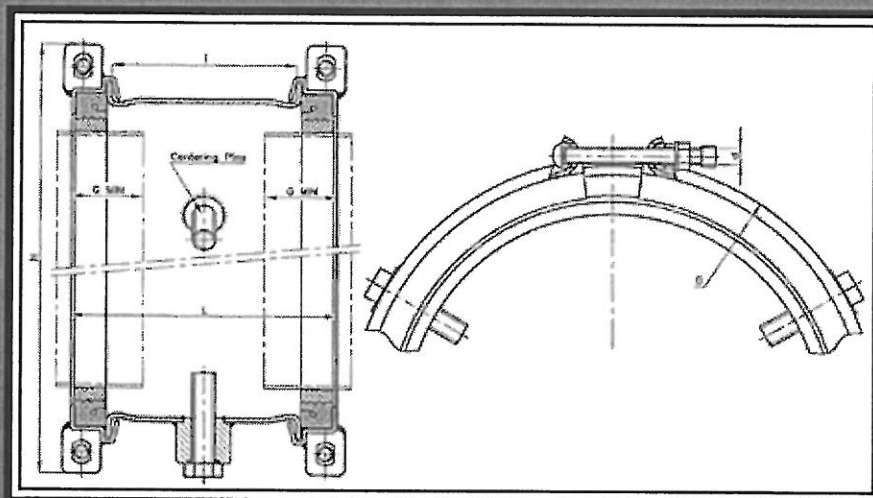
The large diameter Hymax 2000 is easily handled due to the durable nature of its superior lightweight materials of construction. Coupling is equipped with a corrosion-resistant coating of fusion-bonded epoxy and comes with a stainless steel

spanner and 304 stainless steel nuts and bolts.

Large Diameter Hymax Specifications:

- Meets or exceeds AWWA C-219 Standard
- Center Ring – ASTM A53 Grade A Steel
- End Rings – ASTM A795 Steel
- Gaskets - NSF 61 EPDM Available for water and sewerage -20° to 180°F
- Nuts, Bolts, Washer, Bridge and other Misc. Hardware – Corrosion Resistant Type 304 Stainless Steel
- Nuts, Bolts and Washers include an anti-gall dry lube coating
- Coating – 100% Fusion Bonded Epoxy for enhanced corrosion protection with average thickness of 14 Mills
- Minimum Pipe Insertion Depth – 2.25 inches
- Working Pressure, 14-16 inch – 260 psi; 18-24 – 232 psi

Large Diameter **HYMAX[®]** COUPLING



Nom. Diameter (inch)	Part Number	Overall Range (inch)	Before Removal the Inner Layer (inch)	After Removal the Inner Layer (inch)	Pressure (PSI)	D Overall Diameter (inch)	H Overall Width (inch)	L Overall Length (inch)	I Middle Ring Length (inch)	Approx. Weight (Lbs.)
14"	2000-1710-260	15.00 - 17.10	15.00 - 16.10	16.02 - 17.10	260	Ø21.0	23.2	11.6	8.0	82
16"	2000-1920-260	17.10 - 19.20	17.10 - 18.19	18.11 - 19.20	260	Ø23.2	25.6	11.6	8.0	94
18"	2000-2130-232	19.20 - 21.30	19.20 - 20.29	20.21 - 21.30	232	Ø25.3	27.8	11.6	8.0	101
20" L.R.	2000-2170-232	19.60 - 21.70	19.60 - 20.69	20.61 - 21.70	232	Ø25.6	28.1	11.6	8.0	110
20"	2000-2335-232	21.25 - 23.35	21.25 - 22.35	22.27 - 23.35	232	Ø27.3	29.8	11.6	8.0	110
24"	2000-2595-232	23.85 - 25.95	23.85 - 24.96	24.88 - 25.95	232	Ø29.1	31.7	11.6	8.0	125
24" O.S.	2000-2670-232	24.60 - 26.70	24.60 - 25.67	25.59 - 26.70	232	Ø30.6	33.2	11.6	8.0	125

All entering bolts are M16

All dimensions are subject to change.

NOTE: For specific information, dimension, or special applications on the Hymax 2000 Series, consult Total Piping Solutions, Inc.

NOTE: To extend product life in corrosive soil or corrosive environments, poly-wrapping and/or cathodic protection of the coupling is required.

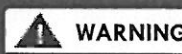


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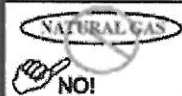
Total Piping Solutions, Inc.
1760 Haskell Road, Olean, New York 14760
TEL: 716-372-0160, FAX: 716-372-1767
E-Mail: sales@tps.us
VISIT OUR WEBSITE: <http://tps.us>

Form LD HYMAX 4-12



WARNING

This product is not intended for use on natural gas piping or any other type of gas piping. To do so could result in escaping gas that could ignite and cause property damage, serious injury or death.

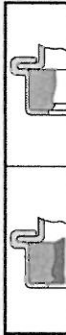


WARNING

This is a non-restraining product. If pipe pullout can occur, proper anchoring of the pipe joint is required. Failure to anchor the pipe could result in the escape of line content, and may cause property damage, serious injury or death.



Hymax® Couplings



Nominal Diameter in	Part No.	Overall Range in	Low range Before removal the inner layer in	High range After removal the inner layer in	"L" Overall Length in	"D" Overall Width in	"T" Coupling Middle Ring in	"B" Max Gap Between Pipes in	Approx Weight (lb)
1.5"	2000-0213-250	1.61-2.13	1.61-1.97	1.96-2.13	5.9	4	3.9	2.35	5
2"	2000-0303-260	2.10-3.03	2.10-2.60	2.56-3.03	6.7	5.24	3.9	3.35	6
3"	2000-0433-260	3.46-4.33	3.46-3.90	3.86-4.33	8.7	6.69	5.9	5.50	9
4"	2000-0563-260	4.25-5.63	4.25-5.00	4.92-5.63	8.7	7.87	5.9	5.50	15
5"	2000-0633-260	5.12-6.36	5.12-5.75	5.71-6.36	10.8	9.45	8.0	5.50	17
6"	2000-0768-260	6.42-7.68	6.42-7.05	7.01-7.68	10.8	10.75	8.0	7.50	23
7"	2000-0874-260	7.48-8.74	7.48-8.11	8.07-8.74	10.8	11.25	8.0	7.50	26
8"	2000-0984-260	8.54-9.84	8.54-9.17	9.13-9.84	10.8	12.91	8.0	7.50	33
10"	2000-1200-260	10.70-12.00	10.70-11.37	11.33-12.00	10.8	15.04	8.0	7.50	33
10" o.s.	2000-1226-260	10.95-12.25	10.96-11.63	11.59-12.25	10.8	15.28	8.0	7.50	39
12"	2000-1355-260	12.40-13.65	12.40-13.03	12.99-13.65	10.8	16.61	8.0	7.50	39
12" o.s.	2000-1441-260	13.15-14.41	13.15-13.78	13.74-14.41	10.8	17.32	8.0	7.50	39

Kraus

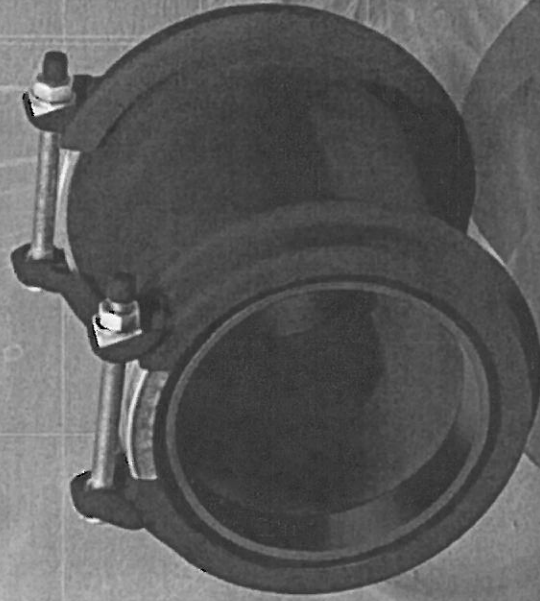
All dimensions are subject to change.
NOTE: For specific information, dimensions, or special applications on the Hymax 2000 Series, consult Total Piping Solutions, Inc.
NOTE: To extend product life in corrosive environments poly-wrapping and/or cathodic protection of the coupling is recommended.
*Hymax is a patented product & re-banded by Kraus Industries, Ltd. The Hymax Trademark is the property of Kraus Industries Ltd.



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E-mail: sales@tps-us
Visit Our Website at: <http://tps-us>

Form # 2000-04/12

Hymax® Couplings



Total Piping Solutions, Inc.



...The Proven Time-Savers

- * For Water and Sewage Applications, above and below ground
- * Inventory Reduction
- * Joins Pipe with Diameter differences of up to 1.30 inches
- * Superior Two Stage Sealing Capabilities
- * Easy Fitting... two bolts total, one to tighten per end
- * Lightweight... can be handled by one person
- * High Deflection-8 degrees
- * Stab type installation (no disassembly required)
- * Standard long body to allow for more pipe end gap
- * 260 PSIG Working Pressure
- * Meets and Exceeds "AWWA C-219 Standard"
- * NSF 61 available



Hymax coupling



Hymax reducer



Hymax elbow



Hymax flange outlet

Series Pipe Repair Couplings and Reducers

Note: All Stainless Steel Bolts are Coated with a Dry Anti-Seize Lubricant that prevents galling. Use of any additional wet-type lubricant on the bolts will void the warranty of the product.

The Hymax 2000 coupling line is suited to a wide range of pipe joining conditions, and each size will replace between three and four modular type couplings in your inventory.

Each coupling will join pipes with diameter differences up to 1.30 inches. Reducers (Hymax 2200 Series) can handle pipe diameter differences of up to 2 inches in nominal diameter. In addition, the Hymax 2000 coupling can handle pipe end gaps up to 7.5 inches, and will accommodate angular deflection of up to 8 degrees.

The Hymax 2000 offers an efficient range adjustable pressure assisted Hydraulic Sealing system, and NSF 61 EPDM Compounded gaskets available. Temperature range is -20° to 180°F.

The Hymax 2000 is a stab type coupling requiring no disassembly. The installer simply adjusts the gasket, and tightens one bolt on each end of the coupling to the required torque. All work is performed from the outside of the coupling, eliminating the need for extra excavation and under-dig for the trench.

The Hymax 2000 can be easily handled by one person due to the durable nature of its superior lightweight materials of construction. The coupling is equipped with a corrosion resistant coating of fusion-bonded epoxy, and comes with stainless steel spacers, nuts and bolts.

Hymax 2000 Series Specification

Materials:
Carbon Steel with NSF-61 Registered
Fusion-bonded Epoxy Coating - Approx. 14 mils

Bolts & Nuts:
(ANSI 304/303) Stainless Steel with
No Gall Zinc Coating. Use of
any additional wet-type lubricant will
void the warranty of the product.

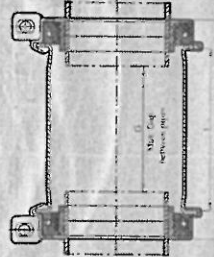
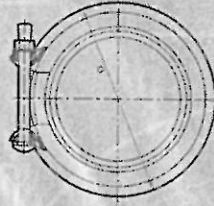
Pressure Assisted Gasket:
Chlorine Resistant Gasket NSF 61
EPDM Gasket Available. The gasket is
made in two layers, with a removable
inner layer that allows for pipe diameter
range expansion.

Long Body Lengths
Are Available in All
Diameters from 3"
through 24".

The 2-layered gasket provides a built-in wide range.

1. The low range is provided by the 2-layered gasket.
2. Removing the inner layer enables the high range.

Each side self-seals





Quality – Service – Commitment – Delivered.

ZIP FLANGE FIELD INSTALLED FLANGE ADAPTER

**Connects Plain End Ductile Iron or Steel Pipe
to Flanged Fittings, Pumps, Valves ...**

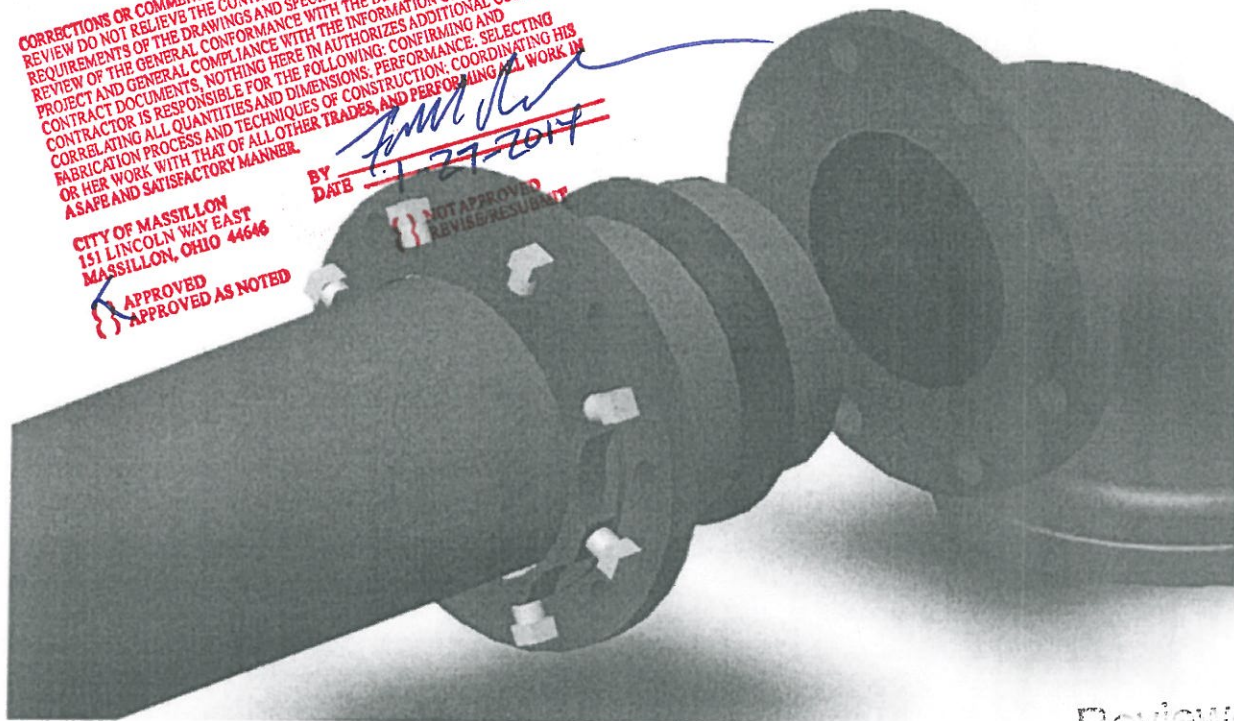
SUBMITTAL SHOP DRAWING REVIEW
CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS ONLY FOR REVIEW OF THE GENERAL COMPLIANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND DOCUMENTS, NOTHING HERE IN AUTHORIZES ADDITIONAL COST. THE CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING: CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS OF CONSTRUCTION; COORDINATING HIS FABRICATION PROCESS AND TECHNIQUES OF CONSTRUCTION; PERFORMING ALL WORK IN OR HER WORK WITH THAT OF ALL OTHER TRADES, AND PERFORMING ALL WORK IN A SAFE AND SATISFACTORY MANNER.

BY [Signature]
DATE 1-27-2014

CITY OF MASSILLON
151 LINCOLN WAY EAST
MASSILLON, OHIO 44646

APPROVED AS NOTED

NOT APPROVED
REVISE/RESUBMIT



**ZIP FLANGE is manufactured to
American National Standards Institute
(ANSI) specification ANSI B16.1**

Reviewed
Approved CK [Signature]
Wenger Excavating, Inc.



SIGMA Corporation

700 Goldman Drive
Cream Ridge, NJ 08514

800 999 2550 p
609 758 1163 f
crm-sales@sigmaco.com

www.sigmaco.com

ZIP FLANGE FIELD INSTALLED FLANGE ADAPTER

FLANGE

Manufactured from Ductile Iron - ASTM A536, Grade 65-45-12. Drilling to ANSI B16.1 - 125lb.

SET SCREWS

Manufactured from AISI 4140 steel.
Heat Treated and Zinc Plated.

GASKET

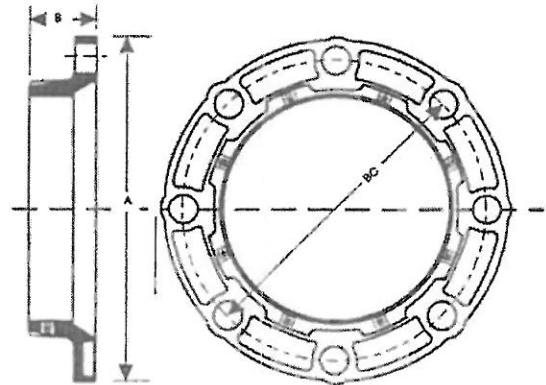
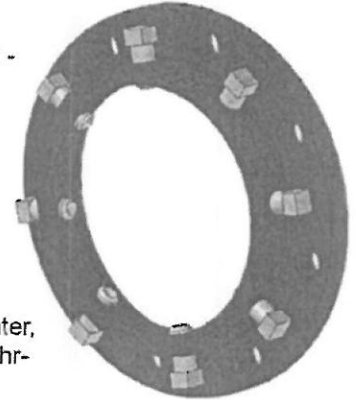
Standard Gasket supplied with SIGMA ZIP FLANGE is SBR (BUNA-S), suitable for water, wastewater, and most moderate chemicals. Temperature range: -10 - 160 degrees Fahrenheit.

Alternative Gaskets include:

EPDM - Green: -10 to 250°F (Ethylene Propylene)

CR - Yellow: -10 to 225°F (Neoprene)

NBR - Orange: 20 to 180°F (Buna-N, Nylril, Hycar)



Dimensions in Inches, Weights in Pounds

ZF2 Series - STANDARD (2-8" 200psi / 10-12" 175psi)

Pipe Size	for Cast Iron Pipe		for Steel Pipe		A	B	BC	Bolt Hole Diameter	Set Screw		Weight lbs.
	Item No.	Pipe O.D.	Item No.	Pipe O.D.					No.	Size	
2	ZF2-C2	2.50	ZF2-S2	2.375	6	1 4/5	4 3/4	3/4	2	1/2 X 1	4
3	ZF2-C3	3.96	ZF2-S3	3.500	7 1/2	1 4/5	6	3/4	4	1/2 X 1	5
4	ZF2-C4	4.80	ZF2-S4	4.500	9	1 7/8	7 1/2	3/4	4	1/2 X 1	8
6	ZF2-C6	6.90	ZF2-S6	6.625	11	1 7/8	9 1/2	7/8	8	1/2 X 1	10
8	ZF2-C8	9.05	ZF2-S8	8.625	13 1/2	2 1/4	11 3/4	7/8	8	5/8 X 1 1/4	16
10	ZF2-C10	11.10	ZF2-S10	10.750	16	2 1/4	14 1/4	1	12	5/8 X 1 1/4	22
12	ZF2-C12	13.20	ZF2-Z12	12.750	19	2 1/4	17	1	12	5/8 X 1 1/4	31

ZF4 Series - HEAVY DUTY (14-24" 200psi / 30-48" 100psi)

Pipe Size	for Cast Iron Pipe		A	B	BC	Bolt Hole Diameter	Set Screws		Weight lbs.
	Item No.	Pipe O.D.					No.	Size	
14	ZF4-C14	15.30	21	2 5/8	18 3/4	1 1/8	12	5/8 x 1 1/4	70
16	ZF4-C16	17.40	23 1/2	2 11/16	21 1/4	1 1/8	16	5/8 x 1 1/4	79
18	ZF4-C18	19.50	25	3	22 3/4	1 1/4	16	3/4 x 2	90
20	ZF4-C20	21.60	27 1/2	3 3/16	25	1 1/4	20	3/4 x 2	145
24	ZF4-C24	25.80	32	3 3/8	29 1/2	1 3/8	20	3/4 x 2	175
30	ZF4-C30	32.00	38 3/4	4 1/2	36	1 3/8	28	1 x 2 1/4	270
36	ZF4-C36	38.30	46	4 3/4	42 3/4	1 5/8	32	1 x 2 1/4	400
42	ZF4-C42	44.50	53	5	49 1/2	1 5/8	36	1 x 2 1/4	602
48	ZF4-C48	50.80	59 1/2	5 1/8	56	1 5/8	44	1 x 2 1/4	680

RESILIENT
WEDGE VALVES

CLOW VALVE COMPANY

CLOW AWWA Resilient Wedge Gate Valves
Meet or Exceed the Requirements of
AWWA Standard C509

Size Range	Water Working Pressure psi	Bubble Tight Test psi	Hydrostatic Shell Test psi
AWWA 2"-12"	250	250	500
ULFM 2 1/2"-12"	200	200	400

Available in either non-rising stem, outside screw & yoke.

Available End Connections & Size Range		Figure No.
FLG End (NRS)	2"-12"	F-6102
M.J.	2"-12" (except 2 1/2")	F-6100
FLG & M.J.	3"-12"	F-6106
Push-on for PVC (SDR)	2"-12"	F-6110
FLG End (OS & Y)	2"-12"	F-6136
M.J. for Tapping	3"-12"	F-6114
Tyton for D.I. & C900 PVC	4"-12"	F-6112
M.J. Cutting-in	4"-12"	F-6111
Tyton for D.I. X FLG	4"-12"	F-6113
Threaded	2"-3"	F-6103

Accessories (Illustrated in the Gate Valve Section)

Indicator Posts	2" Sq. Operating Nuts
"T" Handles	Handwheels
Stem Guides	Extension Stems
Electric Motor Actuators	Floor Boxes
	Chain Wheels

Floorstands (non-rising stem)

MODEL	2639	AWWA	C509	FULL BODY DUCTILE IRON
MODEL	2640	AWWA	C509	FULL BODY GRAY IRON

Reviewed

Approved GK JTRg
Wongor Excavating, Inc.

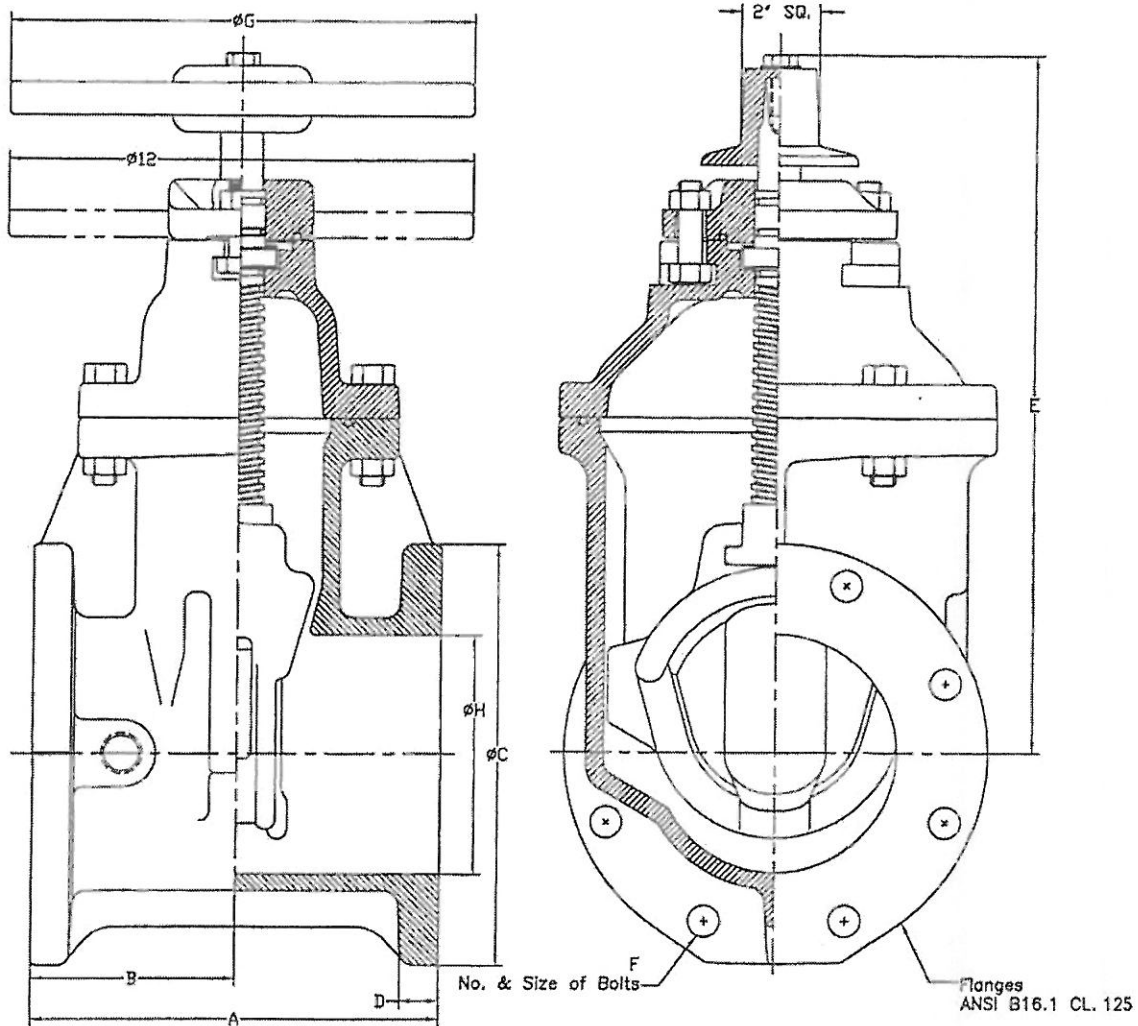
Complies with applicable
requirements of AWWA C509

2"-12" R/W VALVE FLANGED ENDS
GENERAL DIMENSION

CLOW VALVE COMPANY

MODEL 2639 & 2640

F-6102



VALVE SIZE	A	B	C	D	E	F	G	H
2	7	3 1/2	6	1/2	10 1/2	4-1/2	7 1/4	2
2 1/2	7 1/2	3 3/4	7	1 1/16	11 1/2	4-5/8	7 1/4	2 1/2
3	8	4	7 1/2	3/4	12 1/2	4-3/4	10	3
4	9	4 1/2	9	1 1/16	14 1/4	8-5/8	10	4 1/4
6	10 1/2	5 1/4	11	1	19	8-3/4	12	6 1/4
8	11 1/2	5 1/2	13 1/2	1 1/8	22 1/2	8-3/4	14	8 1/4
10	13	6 1/2	16	1 1/16	26 1/2	12-1/2	18	10 1/4
12	14	7	19	1 1/4	30	12-1/2	18	12 1/4

2"-12" R/W VALVE AWWA SERVICE
Performance Information

CLOW VALVE COMPANY

MODEL 2639 & 2640

1. Valve complies with AWWA C509 specs where applicable.
2. Valve is rated at 250 psi working pressure.
3. Valve is bubble-tight at all pressures up to full rated pressure (250 psi).
4. Valve is capable of bubble-tight seal at twice the rated pressure (500 psi) for short periods of time.
5. 2" thru 12" valve sizes have been hydrostatically shell tested at 2.5 times the rated pressure (625 psi).
6. Valve has been subjected to torques 150 percent of the designated minimum required torques.
7. Valve has been cycle tested 5,000 times without loss of bubble-tight seal.
8. Rubber to iron bond on wedge is inspected for strength as per ASTM D 429 specification.

RESILIENT
WEDGE VALVES

CLOW VALVE COMPANY

CLOW AWWA Resilient Wedge Gate Valves
Meet or Exceed the Requirements of
AWWA Standard C515

Size Range	Water Working Pressure psi	Bubble Tight Test psi	Hydrostatic Shell Test psi
AWWA 4"-48"	250	250	500
ULFM 4"-16"	200	200	400

Available in either non-rising stem, outside screw & yoke.

Available End Connections & Size Range	Figure No.
FLG End (NRS) 4"-48"	F-6102
M.J. 4"-48"(except 2 1/2")	F-6100
FLG & M.J. 4"-48"	F-6106
Push-on for PVC (SDR) 4"-12"	F-6110
FLG End (OS & Y) 4"-24"	F-6136
M.J. for Tapping 4"-24"	F-6114
Tyton for D.I. & C900 PVC 4"-12" & 16"	F-6112
M.J. Cutting-in 4"-12"	F-6111
Tyton for D.I. X FLG 4"-12"	F-6113

Accessories (Illustrated in the Gate Valve Section)

Indicator Posts	2" Sq. Operating Nuts
Enclosed Gearing (14"-24")	Handwheels
"T" Handles	Extension Stems
Stem Guides	Floor Boxes
Electric Motor Actuators	Chain Wheels
Floorstands (non-rising stem)	

NOTE:

It is recommended that valves be installed with stems vertical when used in raw sewage or sludge applications or in water with excessive sediment.

MODEL 2638 AWWA C515 REDUCED WALL DUCTILE IRON

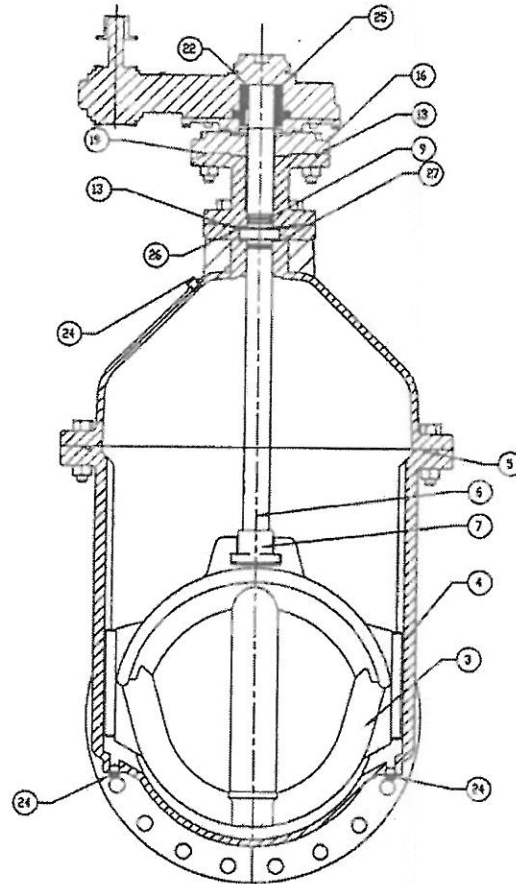
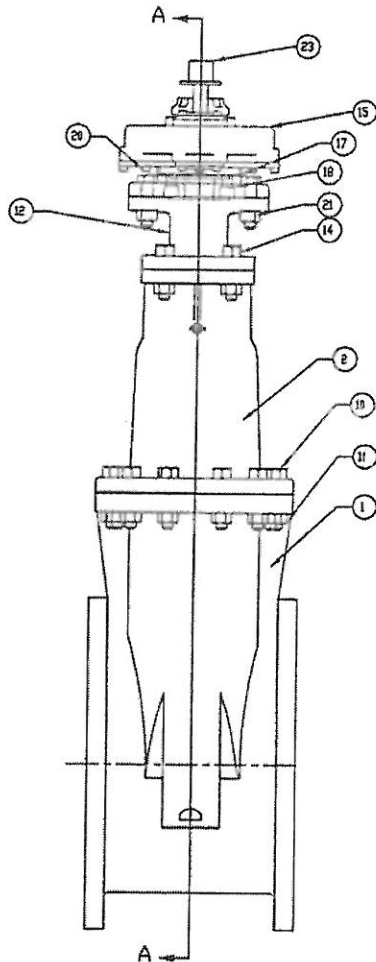
Reviewed
Approved 
Wenger Excavating, Inc.

Complies with applicable
requirements of AWWA C515

14"-20" R/W VALVE
SPUR GEAR MATERIAL LIST

CLOW VALVE COMPANY

MODEL 2638



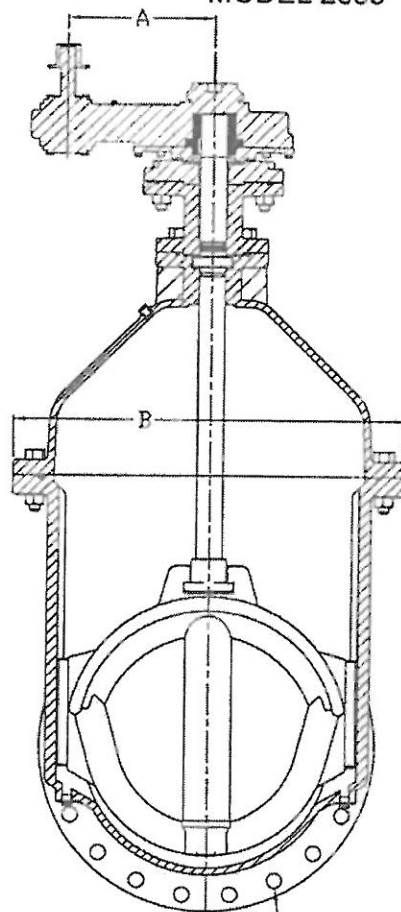
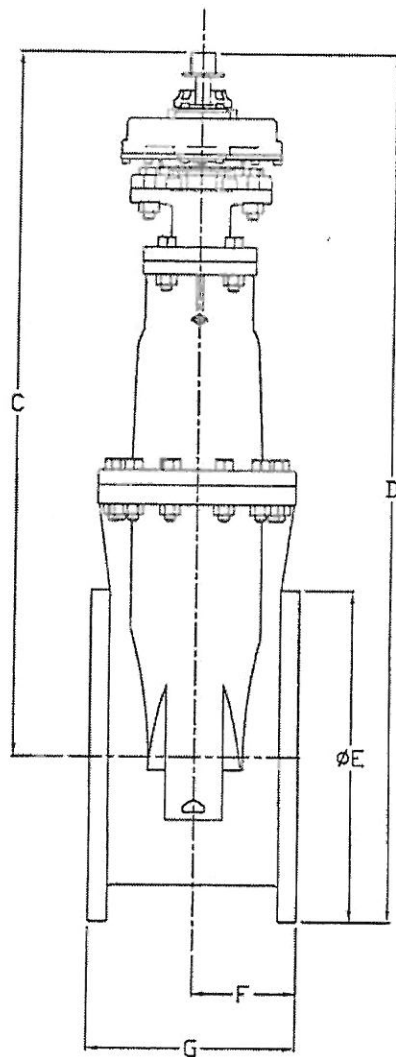
ITEM NO.	DESCRIPTION	MATERIAL
1	Body	Ductile Iron
2	Cover	Ductile Iron
3	Wedge	Ductile Iron/Rubber
4	Wedge Cap (18"-24" only)	Delrin
5	O-ring	Rubber
6	Stem	Copper Alloy
7	Stem Nut	Copper Alloy
8	O-ring	Rubber
9	Hex Head Bolt	Stainless Steel
10	Hex Nut	Stainless Steel
11	Extension	Ductile Iron
12	O-ring	Rubber
13	Hex Head Bolt	Stainless Steel
14	Actuator - 3:1 (18"-24") 2:1 (14-16")	
15	Adaptor Plate	Ductile Iron
16	Actuator Gasket	Rubber
17	Socket Head Bolt	Alloy Steel
18	O-ring	Rubber
19	Hex Bolt	Stainless Steel
20	Hex Nut	Stainless Steel
21	Key	Steel
22	Op Nut	Ductile Iron
23	Pilot Plug - 3/4 NPT with square hd	Stainless Steel
24	Drive Sleeve	Steel
25	Thrust Bearing	Delrin
26	Thrust Bearing (18"-20" only)	Delrin

Complies with applicable
requirements of AWWA C515

14"-20" R/W VALVE FLANGE
SPUR GEAR GENERAL DIMENSIONS

CLOW VALVE COMPANY

MODEL 2638



H - No. & size of bolts
Drilling per ANSI B16.1
Class 125

VALVE SIZE	A	B	C	D	E	F	G	H
14	8	26 11/16	52 1/8	63	21	7 1/2	15	12-1
16	8	26 11/16	51 1/8	63	23 1/2	8	16	16-1
18	12	32 1/4	58	70 1/2	25	8 1/2	17	16-1 1/8
20	12	32 1/4	57	70 1/2	27 1/2	9	18	20-1 1/8

14"-48" R/W VALVE AWWA SERVICE

Performance Information

CLOW VALVE COMPANY

MODEL 2638

1. Valve complies with AWWA C515 specs where applicable.
2. Valve is rated at 250 psi working pressure.
3. Valve is bubble-tight at all pressures up to full rated pressure (250 psi).
4. Valve is capable of bubble-tight seal at twice the rated pressure (500 psi) for short periods of time.
5. Valve has been subjected to torques 150 percent of the designated minimum required torques.
6. Valve has been cycle tested 5,000 times without loss of bubble-tight seal.
7. Rubber to iron bond on wedge is inspected for strength as per ASTM D 429 specification.

NOTE:

It is recommended that valves be installed with stems vertical when used in raw sewage or sludge applications or in water with excessive sediment.