



Department of Environmental Protection

2600 Blair Stone Road ♦ Tallahassee, Florida 32399-2400

DEP Form: 62-761.900(9)

Form Title: Storage Tank Equipment

Registration Form

Effective Date: July 2019

Incorporated in Rule 62-761.850, F.A.C.

Storage Tank System Equipment Registration Form

Fill out completely

General Information

Company Name: Perma Pipe, Inc.

Contact Name: Anthony Palozzolo

Company Address: 6410 West Howard Street

City, State: Niles, IL

Zip: 60714

E-mail: anthony.palozzolo@permapipe.com

Contact Number: 847-929-1849

Product Name: Type FS

Model Number(s): Type FS

Product Type: Secondary contained pipe systems

Rule(s) citation that registration is being requested within Chapter 62-761 (UST), and/or 62-762 (AST),
62-761.500 (8)(b) and 62-762-501(2)(b)

F.A.C.: Write a brief description of equipment registration request including product limitations:

Custom fabricated secondary contained piping systems, consisting of a metal carrier pipe inside a Epoxy fiberglass outer containment pipe. The design of the system can include the installation of a liner sensing leak detection cable alarm system, probes or other detection devices.

Information Checklist (Choose Yes, No, or N/A - Not Applicable):

- Third-party Certification by a Nationally Recognized Testing Laboratory? (Required)
- Documentation of third-party evaluation that the equipment meets DEP Rules?
- Documents included about the qualifications of the Nationally Recognized Testing Laboratory?
- Technical information and drawings included?
- Installation instructions included?
- Annual Operability Testing Requirements (Rules 62-761.500, 62-762.501, & 62-762.502 F.A.C.)?
- Integrity Testing Requirements (Rules 62-761.700, 62-762.701, & 62-762.702, F.A.C.)?
- Compatible with fuel blends containing >10% ethanol or >20% biodiesel?
- Has the product been approved or registered in other countries or states? (If so provide list)
- Any requirements for company-certified installers or trainers?
- Was this product(s) previously approved or registered by the Department? If yes, EQ- 825
- Any changes or modifications to the equipment since the last submittal to DEP?

Yes	No	N/A
☐	☒	☐
☐	☒	☐
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Document Information: Provide supporting documents indicated as "Yes" above including this form via email to Tanknotify@floridadep.gov, or documents can be sent to FDEP, Division of Waste Management, 2600 Blair Stone Road, MS 4560, Tallahassee, FL 32399.

Write a brief description of equipment installation and performance in the U.S.:

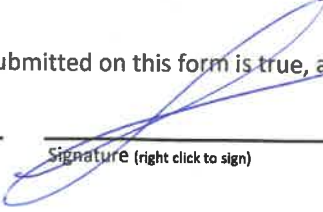
Perma Pipe, Inc., has supplied systems at Tampa Airport, Miami Airport, Fort Lauderdale airport, for jet fuel systems, and fuel oil AST and UST piping systems using this product

Equipment Registration Certification:

To the best of my knowledge and belief, all information submitted on this form is true, accurate and complete.

Anthony Palozzolo

Printed Name and Title


Signature (right click to sign)

08/15/2022

Date

For Department Use Only:

Date Application Received: 8/15/2022

Application complete:

Yes: ☒ No: ☐

EQ- 825

Date of complete or incomplete letter sent: 8/22/2022

Date Equipment Requires Renewal:

8/22/2027

Storage tank system equipment requires renewal every 5 years in accordance with subsection 62-761.850(2), F.A.C.



Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Secretary

VIA ELECTRONIC MAIL
david@hurtado.cc

Mr. David Hurtado
Hurtado.cc
Post Office Box 290608
Port Orange, FL 32129

Subject: Approval of the Perma-Pipe, Inc.
Perma-Pipe Ultra-FS™ Secondary Containment Piping for fuel-oil applications,
File No. EQ-856

Dear Mr. Hurtado:

The Office of District and Business Support has concluded its review of the Equipment Approval request that was submitted by Hurtado.cc for the Perma-Pipe Ultra-FS™ Secondary Containment Piping for fuel-oil applications, pursuant to Rules 62-761.500(8)(b), 62-761.850(2), 62-762.501(3)(b), and 62-762.851(2), Florida Administrative Code (F.A.C.). The Perma-Pipe Ultra-FS™ Secondary Containment Piping for fuel-oil applications is a double-walled steel piping system with a 100 mil thick fiberglass cladding on the outer steel piping.

Based on the information provided by Perma-Pipe, Inc., the Ultra-FS™ Secondary Containment Piping for fuel-oil application provides environmental protection that is equivalent to those requirements established in Rules 62-761.500(8)(b), and 62-762.501(3)(b), F.A.C. The Perma-Pipe Ultra-FS™ Secondary Containment Piping for fuel-oil applications may be used as part of an integral piping system associated with underground and aboveground storage tanks in accordance with the requirements of Chapters 62-761, and 62-762, F.A.C.

Pursuant to Rules 62-761.850(2), and 62-762.851(2), F.A.C., the request for the use of the Perma-Pipe Ultra-FS™ Secondary Containment Piping for fuel-oil application is approved in the State of Florida as integral piping associated with underground or aboveground storage tanks. The installation, operation and maintenance shall be made in accordance with the manufacturer's recommendations.

Please be advised that the above referenced DEP rules are subject to change. If the above rule standards are modified in the future, this order may be modified or rescinded for future upgrades and installations. Additionally, if the product(s) show a consistent pattern of failure(s), and therefore does not provide substantially equivalent environmental protection, the Department may rescind this order.

The Department's Order shall become final unless a timely petition for an administrative hearing is filed under sections 120.569 and 120.57, F.S., within 21 days of receipt of this Order. Persons who have filed such a petition may seek to mediate the dispute and choosing mediation will not adversely affect the right

to a hearing if mediation does not result in a settlement. The procedures for petitioning a hearing and pursuing mediation are set forth below.

Persons affected by this Order have the following options:

- A. If you choose to accept the Department's decision regarding the Order, you do not have to do anything. This Order is final and effective as of the date it is clerked and filed (see page 4).
- B. If you choose to challenge the decision, you may do the following:
 - 1. File a request for an extension of time to file a petition for hearing with the Department's Agency Clerk in the Office of General Counsel within **21** days of receipt of this Order. This request should be made if you wish to meet with the Department in an attempt to resolve any disputes without first filing a petition for hearing or negotiate an agreement to mediate; or
 - 2. File a petition for administrative hearing with the Department's Agency Clerk in the Office of General Counsel within **21** days of receipt of this Order.

In addition to requesting an administrative hearing, any petitioner may elect to pursue mediation under Section 120.573, F.S., and must negotiate an agreement to mediate within **10** days after the deadline for filing a petition.

How to Request an Extension of Time to File a Petition for Hearing

For good cause shown, pursuant to Rule 62-110.106(4), F.A.C., the Department may grant a request for an extension of time to file a petition for hearing. Such a request must be filed (received) by the Agency Clerk in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000, within **21** days of receipt of this Order. Petitioner, if different from the applicant, shall mail a copy of the request to the applicant at the time of filing. Failure to file a petition within this time period shall waive the right of anyone who may request an administrative hearing under Sections 120.569 and 120.57, F.S.

How to File a Petition for Administrative Hearing

A person whose substantial interests are affected by this Order may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, F.S. The petition must contain the information set forth below and must be filed (received) by the Agency Clerk in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, MS 35, Tallahassee, Florida, 32399-3000, within **21** days of receipt of this Order. Petitioner, if different from the applicant shall mail a copy of the petition to the applicant at the time of filing. Failure to file a petition within this time period shall waive the right of anyone who may request an administrative hearing under Sections 120.569 and 120.57, F.S. Pursuant to Subsection 120.569(2), F.S., and Rule 28-106.201, F.A.C., a petition for administrative hearing shall contain the following information.

- a) The name, address, and telephone number of each petitioner; the name, address, and telephone number of the petitioner's representative, if any, the site owner's name and address, if different from the petitioner, the DEP facility number, and the name and address of the facility;
- b) A statement of when and how the petitioner received notice of the Department's action or proposed action;
- c) An explanation of how each petitioner's substantial interests are or will be affected by the Department's action or proposed action;
- d) A statement of the disputed issues of material fact, or a statement that there are no disputed facts;

- e) A concise statement of the ultimate facts alleged, including a statement of the specific facts the petitioner contends warrant reversal or modification of the Department's action or proposed action;
- f) A statement of the specific rules or statutes the petitioner contends requires reversal or modification of the Department's action or proposed action; and
- g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the Department to take with respect to the Department's action or proposed action.

How to Pursue Mediation

In addition to requesting an administrative hearing, any petitioner may elect to pursue mediation. The election may be accomplished by filing with the Department a mediation agreement with all parties to the proceeding (i.e., the applicant, the Department, and any person who has filed a timely and sufficient petition for hearing). The agreement must contain all the information required by Rule 28-106.404, F.A.C. The agreement, signed by all parties, must be received by the Agency Clerk in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000 within 10 days after the deadline for filing a petition, as set forth above. Choosing mediation will not adversely affect the right to a hearing if mediation does not result in a settlement.

Pursuant to Rule 28-106.404, F.A.C., an agreement to mediate must include the following.

- (i) The name, address, and telephone number of the persons who may attend the mediation, (also the DEP facility number, the name and address of the facility if applicable);
- (ii) The name, address, and telephone number of the mediator agreed to by the parties;
- (iii) How the costs and fees associated with the mediation will be allocated (the Department will not pay any of the costs of mediation);
- (iv) The agreement of the parties regarding the confidentiality of discussions and documents introduced during mediation to the extent authorized by law;
- (v) The date, time, and place of the first mediation session;
- (vi) The name of the party's representative who shall have authority to settle or recommend settlement; and
- (vii) The signature of the parties.

As provided in Section 120.573, F.S., the timely agreement of all parties to mediate will toll the time limitations imposed by Sections 120.569 and 120.57, F.S., for holding an administrative hearing and issuing a final order. Unless otherwise agreed by the parties, the mediation must be concluded within sixty days of the execution of the agreement. If mediation results in settlement of the administrative dispute, the Department must enter a final order incorporating the agreement of the parties. Persons seeking to protect their substantial interests that would be affected by such a modified final decision must file their petitions within 21 days of receipt of this notice, or they shall be deemed to have waived their right to a proceeding under Sections 120.569 and 120.57, F.S. If mediation terminates without settlement of the dispute, the Department shall notify all parties in writing that the administrative hearing processes under Sections 120.569 and 120.57, F.S., are resumed.

This Order is final and effective as of the date it is clerked and filed (see page 4). Timely filing a petition for administrative hearing postpones the date this Order takes effect until the Department issues either a final order pursuant to an administrative hearing or mediation settlement.

Judicial Review

Any party to this Order has the right to seek judicial review of it under Section 120.68, F.S., by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the

Mr. David Hurtado
EQ-856
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Agency Clerk of the Department in the Office of General Counsel, Mail Station 35, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice of appeal must be filed within thirty days after this order is filed with the clerk of the Department (see below).

Questions

Any questions regarding the Department's review of your equipment approval should be directed to John Svec at (850)245-8845. Questions regarding legal issues should be referred to Betsy Hewett, Office of General Counsel, at (850)245-2267. Contact with any of the above does not constitute a petition for administrative hearing, a request for a time extension to file a petition for hearing or an agreement to mediate.

Sincerely,



John A. Coates, PE, Assistant Division Director
Division of Waste Management

JAC/js

FILING AND ACKNOWLEDGMENT FILED,
on this date, pursuant to §120.52 Florida Statutes,
with the designated Department Clerk, receipt of
which is hereby acknowledged.

11/24/2015

X



Judith Pennington

Signed by: Penningto_JA

Clerk
(or Deputy Clerk)

Date



October 9th, 2015

Mr. John Svec
Florida Dept. of Environmental Protection
Tallahassee, FL
Via email

Dear Mr. Svec,

This is a formal request, on behalf of Perma-Pipe, for approval and issuance of an EQ# for Perma-Pipe's Ultra-FS™ secondary containment piping for fuel-oil applications.

This product consists of a fiberglass-clad steel conduit system with no need for cathodic protection. The outer conduit consists of a smooth wall, minimum 10 gauge steel conduit. The exterior of the conduit is clad with Perma-Pipe's filament wound fiberglass cladding, 100 mils thick, and designed to withstand a 35,000 volt holiday test. The primary carrier pipe consists of schedule 40 steel piping. The Ultra-FS piping system can be equipped with PermAlert's PAL-AT cable sensor leak detection system (EQ#091) to provide precise detection and location of a potential leak.

We understand that the carbon steel piping meets the performance standards of Rule 62-761(8)(b)2., F.A.C., and the fiberglass exterior cladding provides equivalent protection to the individual performance standards contained in Chapter 62-761, F.A.C..

Please see the enclosed documentation for additional details on this product. Should you require additional information to complete your review, please contact me at your convenience.

Thank you,

David Hurtado
Representative for Perma-Pipe, Inc.

A Subsidiary of MFRI, Inc.
7720 North Lehigh Avenue
Niles, Illinois 60714-3491
Phone (847) 966-2235
Fax (847) 470-1204

Installation Manual

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INTRODUCTION

PERMA-PIPE's UltraTherm, GalvaGard and Ultra Series Containment are all Ultra coated products.

- **UltraTherm** is an Ultra coated steel conduit system.
- **GalvaGard** is an Ultra coated galvanized steel conduit system for additional corrosion protection.
- **Ultra Series Containment** is an Ultra coated steel or stainless steel containment system.

ULTRA coated conduit / containment piping consists of a customer specified service pipe(s) and service pipe insulation (for conduit systems) all within a steel conduit or containment pipe coated with a 100 mil thick fiberglass reinforced plastic (FRP) cladding. The conduit / containment pipe is drainable, dryable and testable (DDT) and designed to be vented to atmosphere to prevent pressure build-up in the conduit / containment pipe (unless the conduit / containment pipe is specially designed for pressure service).

ULTRA coated conduit / containment piping is ideally suited for belowground and severe aboveground environment applications. ULTRA coating is highly resistant to typical acids, alkalis, salts and chemicals found in soil. The high dielectric strength of the ULTRA coating is designed to withstand 35,000 volt holiday testing, eliminating the need for cathodic protection in belowground applications.

ULTRA coated conduit / containment piping is supplied factory fabricated to field dimensions or as standard factory fabricated components with field cutting of the components to accommodate actual field dimensions.

PREFACE

The objective of this Installation Manual is to provide the installer with recommended installation procedures for PERMA-PIPE's ULTRA coated conduit and containment piping systems – UltraTherm and GalvaGard conduit systems and Ultra Series containment piping systems. This Installation Manual should be used in conjunction with all other applicable Installation Manual Supplements and engineering drawings and documentation supplied by PERMA-PIPE for the specific project. This Installation Manual addresses all common aspects of the installation process, from initial receiving and storage through final backfill and operation and maintenance.

If leak detection, heat tracing, and / or other ancillary equipment is included with your ULTRA coated conduit / containment piping system, refer to the appropriate Installation Manual(s) in conjunction with this Installation Manual. If a particular procedure is not addressed in this Installation Manual, contact PERMA-PIPE for additional information, if needed.

The actual realized success of the installed system is highly dependent upon proper product application, installation, operation, and maintenance. PERMA-PIPE is committed to supporting the proper application and installation of a complete, high quality conduit / containment piping system. This support includes clear and concise product information, and installation recommendations and expert applications engineering support and field technical assistance.

When installed, tested, operated, and maintained in accordance with these recommendations, a successful installation should be achieved and PERMA-PIPE's ULTRA coated conduit / containment piping system will provide excellent service, meeting or exceeding expectations.

GENERAL PRECAUTIONS

Due to the many possible variations in applications, use, installation conditions, and environment, these installation recommendations cannot address all possibilities. These recommendations are for general applicability, they are believed to be reasonably accurate and reliable. The installer is ultimately responsible for a proper installation. Trained and qualified personnel should be used for all phases of handling, installation, testing, operation and maintenance. The importance of proper installation, operation and maintenance cannot be overstated.

PERMA-PIPE cannot anticipate every circumstance that might involve hazard. The warnings in this Installation Manual are, therefore, not all-inclusive. The installer must satisfy himself that each procedure, tool, work method and technique is safe.

If these recommendations conflict with the project contract specifications or drawings or PERMA-PIPE's engineering drawings, the more stringent documents should take precedence. If in doubt contact PERMA-PIPE for assistance. Any deviations from these recommendations or PERMA-PIPE's engineering drawings should be reviewed with the appropriate PERMA-PIPE personnel.

Carefully plan and execute the installation sequence to avoid errors and expensive mistakes. **Do Not** skip steps.

For underground installations, **Do Not** complete trench backfilling until all testing and inspection is completed and accepted by the appropriate authority. Backfilling prior to all necessary testing and inspection can result in costly re-excavation and is not PERMA-PIPE's responsibility.

FIELD TECHNICAL ASSISTANCE

PERMA-PIPE Field Technical Assistance (FTA) is available for on site technical assistance. PERMA-PIPE recommends the use of FTA to support the proper installation of the ULTRA coated conduit / containment piping system by the installer. Field Technical Assistance is provided when included as part of the customer's purchase order or when purchased separately

NOTICE

This Installation Manual and the recommendations it contains are reasonably believed to be accurate and reliable. However, due to variations in environment, application or installation, and because the conditions of use are beyond PERMA-PIPE's control, the user of this Installation Manual assumes all risk connected with the use thereof. The installer is ultimately responsible for his own work and, thus, the integrity of the overall installed system. PERMA-PIPE assumes no responsibility for the use of information presented herein and, hereby, expressly disclaims all liability in regard to such use.

Any technical recommendations, suggestions or advice with respect to storage, handling, installation, testing, operation, maintenance or use of PERMA-PIPE's materials, by, or on behalf of PERMA-PIPE is an accommodation to the Purchaser for which PERMA-PIPE shall have no responsibility, unless responsibility has been expressly assumed in writing by the President or a Vice-President of PERMA-PIPE.

Receiving, Handling and Storage

RECEIVING

All materials have been factory inspected and carefully loaded and braced to prevent damage in shipment to the job site. However, even these efforts are sometimes not enough to prevent damage in transit. It is the carrier's responsibility to deliver the shipment in good condition. It is the receiver's responsibility to report any loss or damage upon receipt. PERMA-PIPE's standard terms are F.O.B. our factory, full freight allowed to job site.

When a shipment arrives at the job site, obtain the following documentation from the carrier before offloading;

- Packing List.
- Bill of Lading
- Material Safety Data Sheets (MSDS Sheets).
- PERMA-PIPE's Part Drawing Layout (PDL), (if applicable)
- Quality Assurance Documentation as applicable (x-ray film/reports, CMTR's, pressure test reports, etc.)

Contact PERMA-PIPE for any missing documentation.

During off-loading, perform the following;

- Check all piping units, cartons, and pallets against the Packing List.
- Visually inspect the piping units, cartons and pallet materials for damage.
- Review the Material Safety Data Sheets (MSDS) for safe handling and use procedures.

If there are any damaged or missing materials;

- Any shortage or damage must be noted on the Bill of Lading and Packing List.
- Do not dispose of any damaged materials until advised to do so by PERMA-PIPE.
- Immediately submit any claims to the carrier. Failure to do so will result in loss of compensation for missing or damaged materials.
- Notify PERMA-PIPE of these claims if assistance is required.
- If replacement materials are required, they can be ordered from PERMA-PIPE. You will be advised of replacement purchase costs, which will also be required for your freight claim.

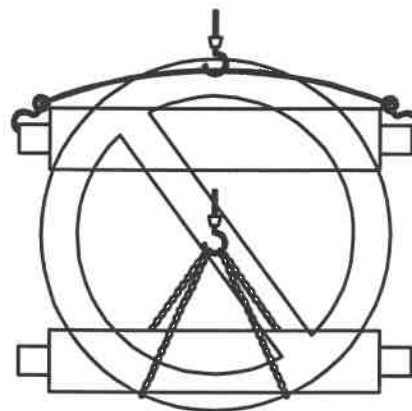
HANDLING

The method(s) by which the piping units are unloaded and handled at the job site is the responsibility of the receiver. It is imperative that proper care and handling techniques are used to avoid damage. Damaged piping units may result in costly repairs, cause property damage or personal injury. Safety and careful handling should be top priorities when handling any piping units.

PERMA-PIPE supplies two nylon slings with each shipment. If additional slings are required, they can be purchased from PERMA-PIPE.

The following procedures are recommended for handling piping units;

- Support each piping unit with nylon slings during all phases of handling. Nylon slings prevent damage to the piping units.
- **Do Not** use a nylon sling that has been damaged or is fraying. Damaged slings should be cut in half and disposed of.
- **Do Not** use hooks, steel cables or chains for handling piping units.

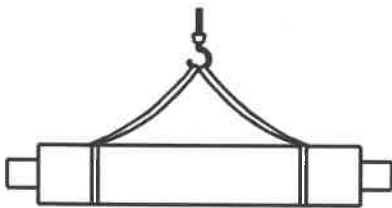


- **Do Not** drag, drop or strike piping units against hard surfaces at any time.
- **Do Not** use forklifts for handling piping units.
- If possible, use a spreader bar to maximize control of the piping units during handling. PERMA-PIPE does not supply spreader bars.

Receiving, Handling and Storage (cont.)

HANDLING (continued)

- Use two nylon slings where possible to provide much more control of the piping unit. A piping unit suspended with a single nylon sling is more likely to swing out of control, potentially causing a safety hazard.



- Space the slings approximately 15 - 20 feet apart depending on the size of the piping unit.
- If a piping unit is damaged during handling, refer to Section 7 for repair recommendations.

SAFETY CONSIDERATIONS

Safety should always be a primary consideration when unloading and handling piping units.

- Never lift more weight than your equipment can safely handle.
- Never lift more weight than the rating of the slings.
- **Do Not** use damaged slings. Cut up and dispose of any damaged slings.
- PERMA-PIPE chocks only the outer piping units in each layer (or tier) on the truck. It is important to recognize that as you lift piping units off the truck, nearby piping units may become unstable and roll. Chock piping units that are not being unloaded.

STORAGE

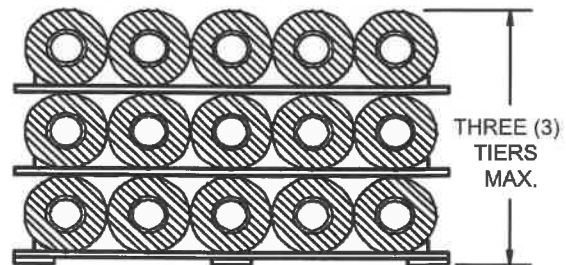
Proper storage of piping units and loose shipped materials is very important. These materials can deteriorate or sustain damage if not properly stored. Proper storage is the responsibility of the receiver. The following procedures are recommended;

PIPING UNITS

- If possible, store the piping units in a warehouse or temperature controlled shelter. If this is not possible, store the piping units on high ground to avoid ingress of water into the pipe ends. **Do Not** allow water to accumulate in the conduit /

containment pipe as this may lead to corrosion of the conduit / containment pipe or service pipe.

- When stacking, stack piping units in the same fashion they were received.
- **Do Not** stack piping units more than three (3) tiers high.
- Use wooden shipping braces, foam or other padding as runners between layers of pipe.



- If the ends of piping units were shipped with plastic covers and/or plastic pipe end caps, **Do Not** remove them when storing the piping units. If any of the protective covers were damaged in shipping or handling, they must be restored by replacing the protective plastic cover where necessary.
- For outdoor long term storage (longer than 3 months), use a light colored or opaque tarp to cover piping units to protect the piping units from weather and the Sun's ultraviolet (UV) rays that can discolor or degrade the materials.

LOOSE SHIPPED MATERIALS

- Store all field joint and ship loose materials indoors and in a dry area.
- Keep the materials in their original shipping containers. The recommended storage temperature range for chemicals is 60°F to 85° F (18°C to 29°C).
- Refer to the Material Safety Data Sheets (MSDS Sheets) for proper handling, storage and use. Some materials may be flammable or hazardous. Extreme care must be taken so they are stored away from any open flames.
- **Do Not** allow chemicals to freeze as this may hinder effectiveness or render useless.
- Contact PERMA-PIPE if additional MSDS Sheets are needed.

Excavation

EXCAVATION

Underground conduit / containment pipe derives some of its strength from the passive soil resistance around it. Therefore, proper excavation and backfilling of the trench is very important to insure a structurally sound installed conduit / containment system.

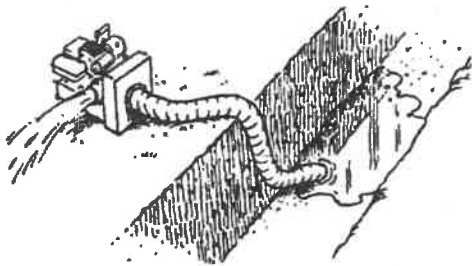
ULTRA coated conduit / containment piping is designed to handle normal soil and H-20 traffic loading when the recommendations in this Installation Manual are followed and a minimum of 2 feet of properly compacted cover is provided. See Section 6 for backfilling and compaction recommendations.

Special burial depths and compaction requirements may be required at taxiways, runways, railways, roadways, and other areas of high surface loading conditions. It is recommended that the customer contact both PERMA-PIPE and the local authority for more specific requirements and instructions in these cases.

NOTE: All federal, state and local regulations concerning jobsite safety should be observed.

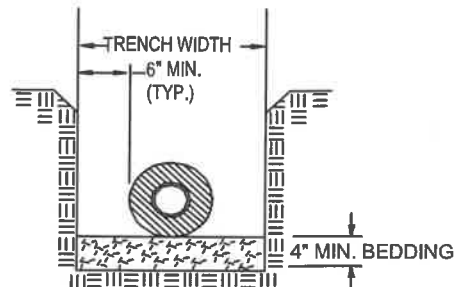
TRENCH DEWATERING

After the trench has been excavated and once piping units are ready to be placed in the trench it is critical the trench be kept dry until all conduit / containment system field joints have been fully completed to prevent flooding of and damage to the conduit / containment system. Dewater trenches as necessary. Plan and be aware of weather conditions.



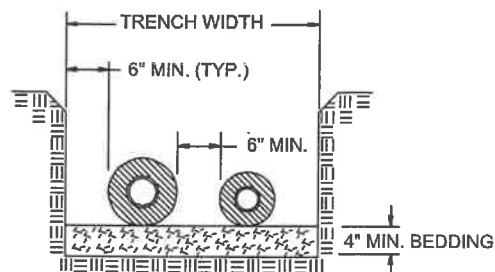
TRENCH WIDTH

The minimum recommended trench width for a single pipe trench is the conduit / containment outside diameter plus 12 inches (6 inches between the conduit / containment OD and trench wall).



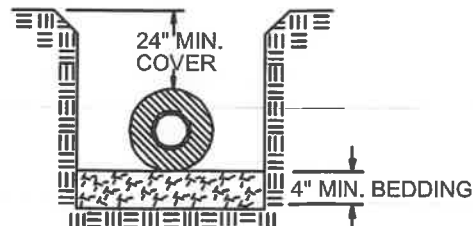
For multi-pipe trenches, pipe centerline dimensions can usually be found on the layout drawings.

The minimum recommended trench width is the sum of all conduit / containment outside diameters, plus 6 inches between each conduit / containment OD plus 12 inches (6 inches between conduit / containment OD's and 6 inches from the conduit / containment OD to trench wall).



TRENCH DEPTH

The total trench depth should allow for 4 inches of bedding, the largest conduit / containment pipe outside diameter and a minimum 24 inches cover above the largest conduit / containment pipe OD. See the contract specifications or drawings for specific burial depth requirements. For cover depths less than 24 inches, contact PERMA-PIPE. If special loading conditions, such as railroads, taxiways or runways are encountered contact PERMA-PIPE and the local authority.



Excavation (cont.)

TRENCH BEDDING

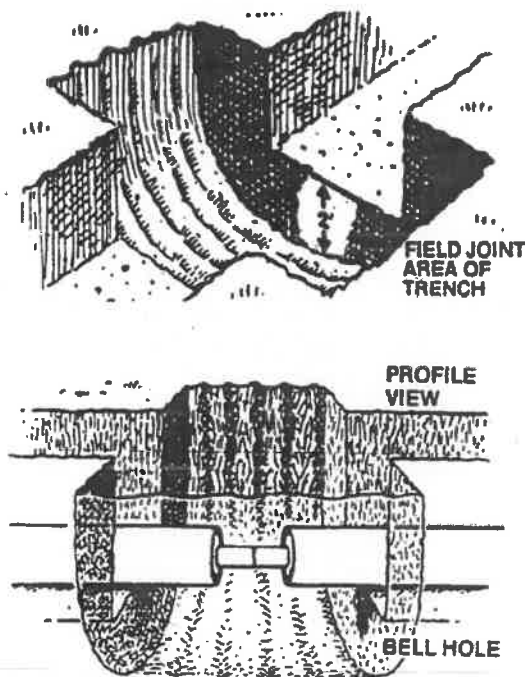
Clear the trench floor of stones and rocks and then cover with 4 inches of compacted bedding. Rake the bedding uniformly along the entire length of the trench and graded to a minimum slope of 1 inch per 40 feet to allow for gravity draining of the conduit / containment system.

Trench bedding material and compaction should be in accordance with the recommendations provided in Section 6.

BELL HOLES

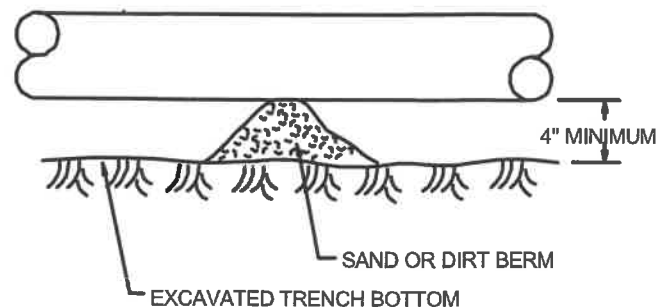
Digging bell holes at field joint locations allows room for service pipe and conduit / containment pipe joining, coating and testing. A common way to dig bell holes is to cut across the trench with a backhoe.

The bell holes should be cut into the trench wall and between 1½ and 2 feet below the trench floor. Bell hole locations should be identified and dug before lowering piping units into the trench.



ALTERNATE SAND OR DIRT BERMING

An alternate method to trench bedding is to sandbag or dirt berm the bottom of the excavated trench. If the berms elevate the bottom of the conduit / containment pipe above the trench floor sufficiently, bell holes may not be required. However, the space under the conduit / containment pipe will require backfilling and compacting as described in Section 6.



The material used for the berms should be in accordance with the recommendations provided in Section 6. If bags are used the bags should be cut open to allow proper compacting of the berm material. **Do Not** use wood or other degradable materials for berms.

The trench floor should be completely cleared of stones and rocks before placing the berms. The berms should be elevated to provide a minimum slope of 1 inch per 40 feet to allow for gravity draining of the conduit / containment system.

Berm spacing should be approximately 10 feet and berm width at least 6 inches. These values may need to be increased or decreased depending on the conduit / containment pipe size and weight and should be adequate enough to prevent the conduit / containment pipe from sagging between berms and to prevent the conduit / containment pipe from being overloaded at the berms.

Refer to Section 6 for backfilling and compacting recommendations. It is critical that the space under the pipe be properly backfilled and compacted to provide a stable trench bed for the conduit / containment pipe.

Excavation (cont.)

SPECIAL SOIL CONDITIONS

UNSTABLE SOIL

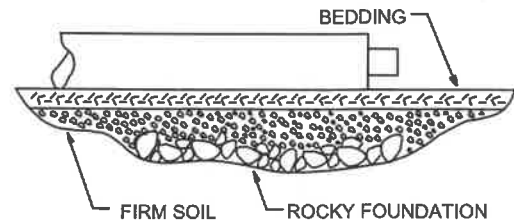
During excavation unstable soil conditions may be encountered, particularly in installations with deep burials. If this occurs, shore the trench walls before lowering the piping units into the trench. As the shoring is removed, replace it with compacted backfill material.



Organic soils or plastic clays and silts with high liquid limits may be encountered that are incapable of supporting the conduit / containment pipe. Remove the poor soil, and replace it with proper bedding soil to a depth that will provide a firm stable foundation.

ROCK BOTTOM TRENCH

A rocky or uneven trench floor should be covered with a firm soil or gravel before the trench bedding is placed.



GRANULAR SOIL

In granular soil, the trench wall should be sloped at the natural angle of repose.

OVER EXCAVATION

Any accidental over-excavation should be filled with bedding material and properly compacted. See Section 6 for backfilling and compacting recommendations.

Assembly

GENERAL

Assembly of the ULTRA coated conduit / containment piping system must be in accordance with the engineering design of the piping system. Proper placement of end seals, gland seals, anchors, expansion loops, expansion elbows, Z-bends and tees is critical to prevent overstressing of the piping system due to thermal expansion and other mechanical loads.

ULTRA coated conduit / containment piping ordered and supplied as a PERMA-PIPE pre-engineered system has been designed for the specified conditions. PERMA-PIPE supplies a Part Drawing Layout (PDL) that indicates the routing and dimensions of the piping system and piece numbers of each piping unit and their designated locations. Correct placement of the piping units is critical. Piping units installed out of order and / or with unapproved alterations may lead to operating hazards, system failure and / or voiding of PERMA-PIPE's warranty.

If the ULTRA coated conduit / containment piping ordered and supplied is not a PERMA-PIPE pre-engineered system, the engineering design of the piping system is the responsibility of others and should be performed by a qualified piping system designer.

If the ULTRA coated conduit / containment piping system being installed includes any ancillary equipment such as leak detection or heat trace, refer to the appropriate Installation Manual(s) and / or PERMA-PIPE documentation in conjunction with this Installation Manual.

When installing ULTRA coated conduit / containment pipe in temperatures below 60°F or in rain or snow, refer to the Installation Manual Supplement for Cold / Wet Weather Conditions.

CAUTION: Do not allow water to enter the conduit / containment pipe. Take the precautions required such as trench dewatering and keeping the ends of the conduit / containment pipe plastic wrapped and taped. If the conduit / containment pipe becomes wet it will require draining and drying. Contact PERMA-PIPE for recommended conduit / containment pipe drying procedures.

PREPARATION AND SET-UP

Personnel performing any phase of installation should be trained and qualified in the procedures they will perform and be familiar with the appropriate sections of this Installation Manual, Installation Manual Supplements, and all applicable engineering drawings and documentation supplied by PERMA-PIPE for the specific project.

Proper tools, equipment, and materials should be used for handling and installation of the piping units to prevent damage. All tools, equipment, and materials needed for a particular operation or procedure should be made readily available before starting. Refer to other sections of this Installation Manual for specialty tools that may be required.

ABOVEGROUND SYSTEMS – SUPPORTING

ULTRA coated conduit / containment piping installed aboveground should be properly supported to prevent damage to the ULTRA coating. Support saddles or equivalent should be used at support locations to prevent point loading and prevent friction wear of the ULTRA coating due to movement. Proper support type (fixed, guide, roller, etc.) and spacing is required to prevent overstressing of the piping system and limit deflection between supports. Sloping, if required, must be provided for in the support system elevations.

SLOPING

Each run of conduit / containment piping should be sloped a minimum of 1 inch / 40 ft. so the conduit / containment and service pipes can be drained. If the conduit / containment piping is not properly sloped it may be difficult to drain any fluid that accumulates in the conduit / containment pipe and may be very difficult to dry out the conduit / containment pipe if it becomes wet.

Assembly (cont.)

PIPING UNIT LAYOUT

LOWERING / LIFTING

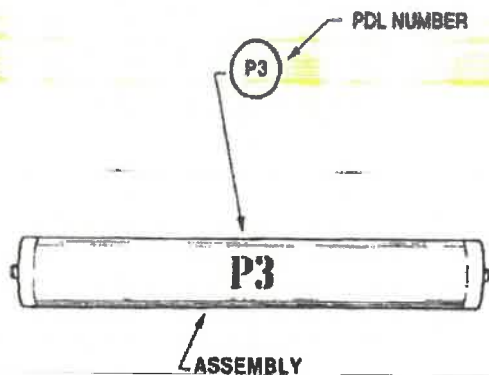
If sufficient handling equipment (multiple cranes, spreader bar, etc.) is available, it may be easier to complete some field joints before lowering piping units into the trench or lifting onto supports. This may require more than one crane and / or a spreader bar to lower or lift the joined piping units into place. **Do Not** allow joined piping units to bow when handling.

Piping units should be moved into place in the following manner;

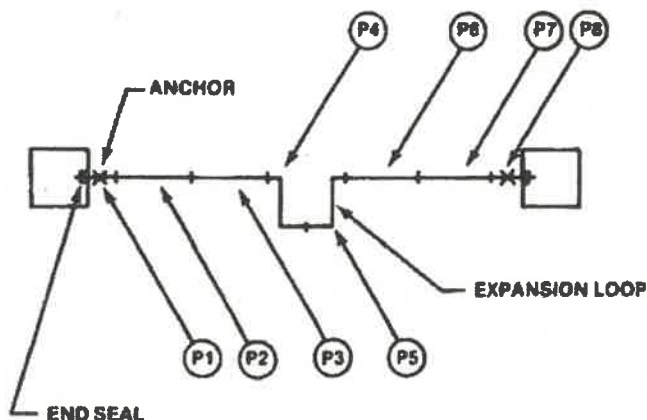
- Remove all free standing water from trenches and bell holes before lowering piping units. Bell holes and trench bedding must be dry during piping unit installation. Dewater trenches as necessary.
- Lower or lift the piping units into place. **Do Not** drop the piping units. Spreader bars or more than one crane may be required depending on the size of the piping unit being handled.
- If the piping units have been supplied with end protection, **Do Not** remove the end protection materials until the service pipes are to be joined.

PIPING UNIT PIECE NUMBERING

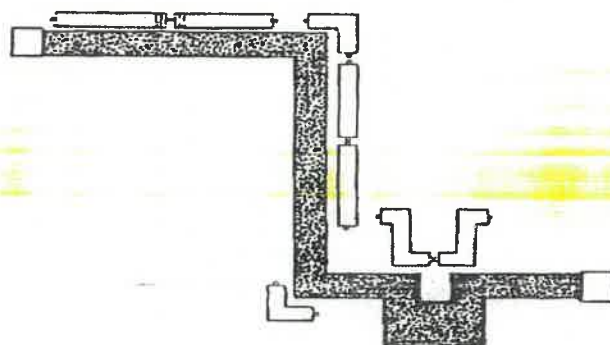
When supplied as a PERMA-PIPE pre-engineered system, each piping unit is marked with a piece number that corresponds to the piping unit piece number shown on the Part Drawing Layout (PDL). Each piping unit is located and dimensioned on the PDL drawing.



Assemble the piping units in accordance with the PDL drawing.



After the trench excavation and bedding or structural supports are complete and the installation of the conduit / containment system is ready to begin, distribute the piping units along the conduit / containment pipe route in the sequence shown on the PDL drawing. To avoid damaging the piping units, they should not be laid out until trenching and bedding is complete for belowground systems or structural supports are complete for aboveground systems.



Verify the legs of elbows are at the correct angle to the adjacent piping units.

CAUTION: If the legs of elbows are not correctly positioned it will affect the overall length of the pipe run and may affect the thermal expansion design of the conduit / containment system.

Assembly (cont.)

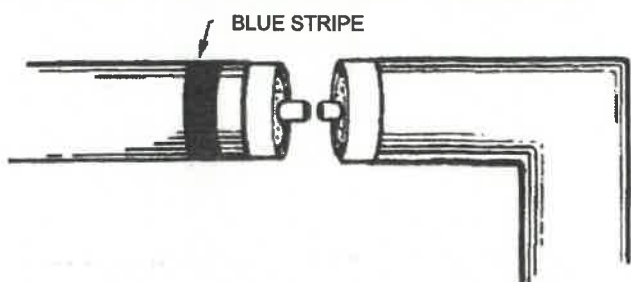
PIPING UNIT ORIENTATION

It is critical each piping unit is correctly orientated. In addition to piece numbers PERMA-PIPE proves the additional marking describe below to guide the proper orientation of piping units.

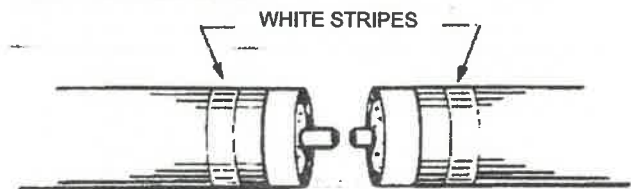
CAUTION: Special care must be taken when the ULTRA coated conduit / containment piping system includes leak detection or heat tracing because each pipe unit to pipe unit orientation is critical. See the appropriate Installation Manual Supplement(s).

"TOP" is marked on each piping unit. The piping unit is to be orientated so the "TOP" mark is installed at the 12 o'clock position.

Blue Stripe indicates the end of a piping unit that has oval type supports and is to be positioned at the field joint connecting that piping unit to an expansion elbow piping unit or another piping unit with oval supports.



White Stripe indicates the end of a piping unit that is to be positioned against another piping unit end with a white stripe. The field joint at this location requires cold springing. See the paragraph on cold springing in this section for additional instructions for field joints that require cold springing.



CUTTING TO FIELD DIMENSIONS

Piping units may need to be cut to field dimensions or to accommodate actual field conditions. If cutting is required, the cut should be made in a straight piping unit that does not have oval supports or on the end of the piping unit that does not have oval supports.

CAUTION: Do Not reduce the length of oval supports in the conduit / containment system, this can reduce the piping system flexibility and cause overstressing of the piping system that may result in a hazardous condition and damage to or failure of the conduit / containment system.

Cuts should be made in the following manner;

- If the piping unit has been supplied with end protection, remove all end protection materials just prior to cutting. Replace all end protection materials whenever not working on the piping unit.
- Use a pipe wrap around to squarely mark cut locations on the ULTRA coating.
- Mark the location where the service pipe is to be cut on the Ultra coating.
- Mark 6 inches back from this mark to locate where the conduit / containment pipe is to be cut.
- Mark 4 inches back from this mark to locate where the ULTRA coating will be stripped back to.
- Cut through the ULTRA coating, conduit / containment pipe and service pipe at the respective locations marked. Grind, chip or peel the ULTRA coating to bare metal to the location marked. Be careful not to damage the service pipe or conduit / containment pipe.
- Restore the service pipe end to its pre-cut condition (beveled or square cut).
- Grind any rough edges on the service pipe or conduit / containment pipe smooth.
- Repair any nicks or gouges to the service pipe or conduit / containment pipe. See Section 7 for repair recommendations.

When the above has been completed the new end cut on the piping unit should look identical to the ends as received from the factory.