



FTPI RP T-95-1 Remanufacturing of Fiberglass Reinforced Plastic (FRP) Underground Storage Tanks

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Foreword

This recommended practice describes requirements and procedures for the remanufacture of fiberglass reinforced plastic (FRP) underground storage tanks. It is intended for the use of local authorities so that they may better evaluate the safety and technical procedures used by tank manufacturers performing these procedures, although it may also be useful to others. The remanufacturing process can be applicable to both existing underground tanks as well as tanks damaged prior to installation.

This recommended practice also includes a procedure for modifying existing underground tanks for the storage of products other than those for which the tank was originally intended.

It should be noted that certain field modifications or repairs may affect the tank warranty. Only the tank manufacturer is qualified to specify if remanufacturing procedure will affect the warranty coverage. The manufacture may also determine that the tank is not recommended for remanufacturing procedures. The FRP tank owner/operator may employ a contractor of his choice to make "repairs," however it should be noted that repairs not authorized by the tank manufacturer may void the tank warranty.

Introduction

Purpose

This procedure has been prepared to document FRP tank industry accepted practices for remanufacturing of fiberglass reinforced thermosetting plastic (FRP) underground petroleum storage tanks. This document is intended to provide a guide for local code authorities to better evaluate the safety and technical aspects of performing these field procedures.

These technical specifications are intended to assure that a restoration of a damaged tank will meet or exceed original performance specifications. The techniques are based on the manufacturer's Underwriters Laboratories (UL) Listings for production of new tanks.

This document is not intended to be used as a detailed remanufacturing procedure manual for tank repairs. It is recommended that all tank remanufacturing be performed by an employee of the tank manufacturer or their designated agent.

Scope

The remanufacturing procedures apply for all field procedures to tanks that are designated to store petroleum products, alcohol or alcohol/gasoline blend motor fuels.

This remanufacture procedure is based on using the same UL Listed materials and procedures detailed in the tank manufacturer's UL Manufacturing Specifications.

This standard also includes procedures for modifying FRP tanks to store products other than those for which the tank was originally intended.

Field safety requirements for tank entry are also specified.

Reference Publications

The following standards, recommended practices, codes and specifications that are in effect at the time of publication of this recommended practice are cited herein:

1. **American Petroleum Institute (API)**
RP2003 - Protection against Ignition Arising Out of Static, Lightning, and Stray currents
Publ 2015. Cleaning Petroleum Storage Tanks
Publ 2015 A. A Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning
RP 1631. Interior Lining of Underground Storage Tanks
2. **American Society for Testing Materials (ASTM)**
STD.D 4021-86-Standard Specification for Glass-Fiber Reinforced Polyester Underground Petroleum Storage Tanks
3. **National Fire Protection Association (NFPA)**
30 Flammable and Combustible Liquids Code
30A Automotive and Marine Service Station Code
327 Cleaning Small Tanks and Containers
329 Underground Leakage of Flammable and Combustible Liquids
4. **Underwriters' Laboratories (UL)**
STD 1316 Glass-Fiber Reinforced Plastic Underground Storage Tanks for Petroleum Products
5. **OSHA**
29 CFR PARTS 1910 Permit Required. Confined Spaces for General Industry & Final Rule

Definitions

- CATALYST - A substance which speeds up or causes the cure of a compound. The higher the catalyst concentration the faster the compound cures.
- COMPATIBILITY - The ability of two or more substances to maintain their physical and chemical properties upon contact with one another for the design life of the tank.
- CRAZING - Hairline cracks either within or on the surface of a laminate, usually caused by impact stresses or excessive flexing.
- CRACK - A split or break in the FRP which can extend through tank wall.
- CURE - The crosslinking or polymerization of the molecules of resin, alters the properties of the materials changing it from a liquid to a solid.
- DEFLECTION - A geometric distortion of the tank diameter. Diameter measurements determine slump or out-of-round status of the tank.
- DELAMINATION - The rupture of internal bonding between layers of fiberglass and resin.
- DOME - The end section of a cylindrical tank. Some are hemispherical and some are elliptical.
- FITTING - See NPT fitting.
- FRP - Fiberglass reinforced plastic thermosetting resin laminate.
- FLAT - the tank wall portion between the rib structures.
- FRACTURE - A crack in the FRP sometimes causing delamination.
- HAND LAY-UP - A technique in which fiberglass materials and catalyzed resin are laid over or onto another fiberglass part, by hand. These materials are then compressed with a roller to eliminate entrapped air.
- LAMINATE - A unit of material composed of several layers of fiberglass and resin.
- LEAK - See "Release"
- LIFT LUG - Lugs fastened to the tank top for use in lifting and positioning the tank.
- MAT - A randomly distributed felt of glass fibers, held together with a bonding agent.
- NPT FITTINGS - ("Bung") - National Pipe Thread (NPT) steel fittings of half or full coupling and steel mounting plate bonded to the tank top.
- PUNCTURE - A hole or penetration in the surface of the FRP laminate.
- RELEASE - (leak) Any spilling, leaking, emitting, discharging, escaping, leaching or disposal from a tank into groundwater, surface water or soil.
- REMANUFACTURE - A procedure for restoring a tank so that it meets all of the tank manufacturer's new tank requirements.
- RESIN - A liquid plastic substance used as a matrix for glass fibers. It is cured by adding a catalyst resulting in crosslinking.
- RESIN PUTTY - resin that has been thickened with filler to a putty consistency.
- RIB - Structural member of a tank designed to provide tank stiffness and resistance to external loads.
- SPLASH - A portion of FRP which is formed on the tank on an identical area to the one that was damaged. It is used to replace the damaged or missing section.
- STRIKERPLATE - (wear plate, gauge plate, deflector plate) A plate (usually steel) laminated and positioned on the inside of the tank bottom under fittings for protection from potential dip stick puncture or other mechanical abuse.
- WAX COAT - A wax bearing resin.
- WET-OUT - the ability of a resin to quickly saturate the glass reinforcement.

Safety Procedures

Field Safety Policy

Unusual and unexpected hazards may be encountered when tanks or other confined spaces are being remanufactured. For

this reason, field personnel who enter underground storage tank spaces must exercise proper safety precautions as outlined in this procedure. All of these safety procedures shall be observed whenever remanufacturing procedures take place. Those individuals who enter those spaces should be trained in accordance with OSHA Regulations 29 CFR Parts 1910.

HAZARDS

Tank entry BEWARE! People involved with this work should be knowledgeable of reference materials published by API, NFPA, National Institute for Occupational Safety and Health (NIOSH), and Occupational Safety and Health Administration (OSHA).

Toxic Vapors in fatal concentrations may result from known materials in the tank or other confined space. These vapors come from fuel sludge or scale in the tank, or by leakage from product lines not capped prior to entry. Applicable material safety data sheets (MSDS) for the material stored in the tank should be obtained from the tank owner/operator and reviewed prior to entry.

Lack of oxygen may result from chemicals absorbing or replacing the oxygen in the tank or other confined space. Air in clean tanks, closed for extended periods, may become oxygen deficient. Improper or inadequate ventilation during tank work will also result in a lack of oxygen. The safe breathing level is between 19.5% to 21.4% oxygen.

Fire and explosion may result from combustible liquid vapors in the tank or other confined space. Fire and explosion may be ignited by the sparks from tools, non-related electrical equipment or static electricity.

Be aware of the basic fire triangle:

- Fuel
- Oxygen
- Ignition All three points of the triangle are necessary to support combustion. These three elements need to be recognized, evaluated, and controlled to make a safe work place.

General Requirements – Tank Entry & Remanufacturing

The requirements in this section shall apply to tank entry and the remanufacturing process.

Safety Equipment

The following safety equipment is required to be on site for tank entry and remanufacturing procedures.

- A reliable, battery operated explosion meter, also capable of detecting oxygen levels in enclosed areas. An approved light source designed for explosive atmospheres.
- An appropriate fire extinguisher.
- An approved safety harness with lifeline.
- A reliable organic respirator capable of handling the fumes and vapors of the tank environment.
- A venture or tank de-fuming apparatus, air operated.
- A compressed air, or other air purifying system, for use when grinding or for rescue.
- Approved goggles, safety glasses or face shield, earplugs, rubber gloves and rubber boots.
- An appropriate first aid kit.
- An approved air feed mask. A five minute egress air supply will be provided and worn by the person making the tank entry.

Personnel Requirements and Responsibilities

A typical field crew will consist of three people.

The Entrant

This is the person who will enter the tank for inspection, and will perform the necessary remanufacturing procedures. He will be in charge of the work crew and have total responsibility for the work group.

The Attendant (Helper)

This person is the assistant to The Entrant. This person will remain at the entrance to the tank at all times when someone is inside. This person will:

1. Be trained in emergency Procedures, CPR, the use of respiratory protection equipment, and have a good general knowledge of first aid and fire fighting techniques.
2. In an emergency, summon the Back-up person prior to assisting in the rescue operation.
3. Maintain the equipment, control the safety rope for The Entrant and do the air quality monitoring.

The Back-up

This person is an emergency Back-up to the Attendant. The Back-up must remain within voice calling distance of the Attendant in case of any emergencies. If this person is needed, he must call for help PRIOR to aiding the Attendant.

Tank Classification for Safe Entry

Oxygen levels and combustible fumes must be at safe concentrations prior to any work commencing. The tank atmosphere can be improved by venting to insure safe tank entry. After measuring the oxygen and combustible fume level, the technician can determine the appropriate entry restrictions based on the following tank classifications: NO ENTRY, RESTRICTED ENTRY, SPECIAL ENTRY and GENERAL ENTRY. (API Publication 2015 "Cleaning Petroleum Storage Tanks" and API Publication 2015A "A Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning" may be used for

reference.)

NO ENTRY

Absolutely NO ENTRY is allowed if the oxygen levels are below 16% and/or the explosion levels are above 20% L.E.L. (lower explosion level). Absolutely NO ENTRY is allowed until the atmosphere inside the tank is improved using venting procedures.

RESTRICTED ENTRY

If the oxygen levels in the tank are between 16.1% and 19.4% and explosion levels are less than 10% L.E.L., the technician can enter the tank only if equipped with the proper breathing and safety equipment.

In this case the proper safety equipment is either a self contained breathing apparatus (SCBA) or a supplied air respirator (SAR). The technician must also wear a safety harness or belt with a retrieval line attached and attended by the Attendant.

SPECIAL ENTRY

This covers tanks that have stored flammable or combustible products but are temporarily above ground during remanufacturing/recertification.

This must have oxygen levels between 19.5% and 21.4% and lower explosion limits (L.E.L.) of less than 10%.

With Special Entry Tanks, The Entrant must still wear a safety harness with a retrieval line, but can enter the tank wearing an approved organic cartridge respirator. Several types of NIOSH approved respirators are available for this purpose.

GENERAL ENTRY

The oxygen levels in this tank are between 19.5% and 21.4% and explosion levels are below 3% L.E.L. This tank is safe to enter, but, as always, a safety harness and retrieval line must be worn. The oxygen and explosion levels must be maintained by continuous venting during the remanufacturing or inspection process.

Tank Venting

Prior to venting, remove stored product from the tank. The tank must be cleaned by washing/rinsing and removing all fuel residue. Venting reduces fume levels and increases oxygen concentrations in the tank. It must be done continually while a technician is in the tank, and monitored every 15 to 30 minutes throughout the inspection/evaluation and remanufacturing process.

Disconnect electrical wires from the pump, and lock-out the power supply. Remove the pump.

Completely isolate the tank. This is done by removing, disconnecting or plugging where accessible the following: product line, manifold vent piping, vapor recovery equipment and pump.

Install and properly ground the venting apparatus. The fumes must be vented at least 12 feet above grade.

Begin venting the tank and monitor fume levels until the L.E.L. is 10% or less. Venting and monitoring shall continue during the entire remanufacturing operation.

Tank Entry - Safety Requirements

In addition to the items listed under Safety Equipment, it is the field technician's and supporting contractor's joint responsibility to comply with all applicable state, local and federal regulations.

General Requirements for Tank Entry

1. The "Tank Entry Work Permit," shall be reviewed and completed.
2. All sources of ignition must be eliminated. Only air operated tools shall be used. Smoking and the use of open flames, lighters or matches are not allowed within 50 feet of the confined space entrance.
3. The tank is to be forced air vented at all times when a worker is inside.
4. The Attendant must be available at all times during the remanufacturing procedure(s). He will monitor the tank ventilation, oxygen levels, and combustible gas levels every 15 to 30 minutes. The levels shall meet the tank classification for safe entry requirements.
5. Tanks with internal temperatures exceeding 130 degrees F shall NOT be entered.
6. Cameras with flash units will NOT be used in the tank. High-speed film (ASA 1000) can be used to compensate for limited lighting conditions.
7. Other than the remanufacture materials, no other materials will be allowed in the tank. (Example: containers of volatile solvents, or other flammable chemicals).

Cutting an Entry into the Tank

Prior to cutting into the tank the dome of the tank or entry area must be exposed and the excavation properly shored. A working area of five square feet must be available. Review the "Tank Entry Work Permit." The Attendants and Back-up person must be instructed on their duties and on site, and are quality monitoring must be in progress. All systems must be in order before any attempts to cut the tank can be made.

Cut an opening in the dome section or entry area a minimum of 24 inches square. Keep the first cut of the opening a minimum of five inches from the first rib of the tank.

Make a bevel cut on the opening so the square cut out piece will not fall through the hole when it is replaced.

Inspection and Evaluation of the Problem

The tank manufacturer is qualified to evaluate the problem and make specific recommendations for field remanufacturing or removal and replacement.

Preliminary Evaluation

After inspecting the tank, consult with the tank manufacturer's technical staff. It must be determined whether or not the tank is suitable for remanufacturing.

Inspection Checklist

Prior to starting work, consider the following:

- Evaluation of the Damage
Can the work to be done inground at the site, or should it be taken to the nearest plant? Consult the tank manufacturer for evaluation and specific instructions.
- Weather Conditions
If the remanufacturing procedure is to be done outside, check upcoming weather conditions. If rain or snow conditions are possible do not start repairs unless a covered area is available.
- Tools, Materials and Supplies
Check to make sure that all the correct tools, materials, and supplies are available.
- Aesthetic Requirements
Along with the proper procedures, the general appearance of the field work shall be neat and present a good appearance.

Tank Damage - Classified by Seven Category Types

1. Fracture
A crack in the fiberglass sometimes causing delamination. This is usually caused by a significant impact. Some tank sections may be torn out of the tank and may need rebuilding.
2. Puncture
A hole or penetration in the surface of the fiberglass laminate. A sharp object may pierce the tank wall. A puncture is usually "clean" with little distortion to the area around the damage.
3. Delamination
The rupture of internal bonding between layers of fiberglass and resin. A separation in the layers of Fiberglass, or a peeling away of secondary bond laminate. This type of damage occurs mostly at the fittings, lift lug or other tank attachments. However, it may also be seen at the ribs or the inside of the tank.
4. Missing Sections
A portion of the tank that was damaged may become lost. In this case a new section, called a splash, must be made and installed.
5. Surface Cracking
These are generally small cracks that appear in the surface of the tank, inside or out. For the most part they do not penetrate the tank wall. These are minor in nature but need the same professional attention as the other types of damage.
6. Geometric Distortion
This is an out-of-round condition with unequal vertical and horizontal measurements or bottom flattening. Tank geometry changes are usually the result of improper installation methods, which can be detected by measuring the tank diameter after installation and before the tank is placed in service.
7. Local buckling
This is a distortion of the shell wall between the ribs.

Method of Remanufacturing

General Procedures The owner/operator or designated agent shall obtain all permits required by the local authority having jurisdiction.

It is recommended that all work be performed by the tank manufacturer or his authorized representative.

NOTE: Unauthorized repairs may void the tank manufacturer's warranty.

All procedures are to be made only under safe working conditions.

All remanufacturing procedures are to be made using only UL listed materials, or materials approved by the tank manufacturer ... resin, glass, catalyst and fittings ... where appropriate and in accordance with the UL construction standards of the tank manufacturer.

Prepare an area larger than that area to be repaired.

All structural repair laminates are to be, at a minimum, as thick as the tanks section being replaced.

All remanufacturing laminates will extend beyond the damaged area and onto undamaged areas in all directions.

Tanks that have deflected beyond the manufacturer's allowance must be evaluated by the tank manufacturer to determine whether or not it...

1. Can be remanufactured inground, or
2. Must be removed, remanufactured and reinstalled, or
3. Is determined not to be suitable for remanufacturing and should be removed from service

All remanufactured tanks must be tested using five PSIG air pressure or another method approved by the tank manufacturer to ensure the tank is tight. (Use three PSIG for tanks over 10' in diameter.) When tanks are remanufactured above ground, use an air/soap test. Local codes and regulations must be followed.

Resin coat (with optional wax included) all remanufactured laminate so there are no exposed glass fibers.

Remanufacturing Specifications

External Only Work Procedure

Shell flat, rib or dome section. This procedure is for damage defined as a crack or break in the fiberglass which has NOT penetrated through the wall and is characterized by a bruised impact type mark on the exterior of the tank.

Grind the entire area around the damage so the prepared surface extends at least five inches in all directions beyond the area to be remanufactured.

Cut the fiberglass mat large enough to make sure that it will extend at least three inches beyond the damaged area in all directions.

Apply sufficient mat and resin to equal or exceed the original tank thickness. The resin and glass used shall be the same as the UL Listed materials that were used during the original tank manufacturing, or other materials approved by the tank manufacturer.

Internal and External Work Procedures Shell flat, rib or dome section. This is defined as a crack, break or hole in the FRP which has penetrated through the tank and is characterized by delamination of the FRP. This includes internal crazing produced by minor exterior damage.

This procedure will vary depending on the size and severity of the damage and may require tank entry to service the interior. If the damage is large, a determination will be made by the tank manufacturer as to whether or not the structural integrity of the tank will be maintained.

NOTE: Tank resins may differ. The internal work must be made with a UL Listed resin, or other material approved by the tank manufacturer, and compatible with the product to be stored.

The surface shall be prepared by grinding the damaged area and removing all loose and delaminated glass. An area of at least five inches minimum around the damage should be prepared on either the inside or the outside.

For certain punctures or rib sections that may be crushed or missing, a fiberglass "splash" or form may be required. The "splash" will maintain the original shape of the tank.

All damage that penetrates through the tank wall, holes, cracks, etc., should be covered with multiple layers of mat that extend at least three inches beyond the damage in all directions and onto structurally sound tank wall. The thickness of the laminate shall equal or exceed the original tank wall thickness.

If a "splash" is required, the "splash" should be trimmed on-half inch larger than the hole or missing section, and attached with small pieces of tape or resin putty. Grind the edges of the "splash" so it tapers to the undamaged sections of the tank. Grind the entire "splash" section and the surrounding area at least five inches in all direction from the "splash" seam.

Cover the entire "splash" with fiberglass laminate consisting of multiple layers of mat to equal or exceed the original wall thickness. Structural sections being replaced should be layed up with laminates as thick as the adjoining fiberglass cross section. This covering laminate should extend at least three inches onto the structurally sound tank wall. Grind the inside areas of the "splash" at least five inches on both sides of the "splash" seam, for a total width of at least 10 inches. Apply multiple layers of fiberglass mat to cover this "splash" seam, at least six inches wide, (three inches onto the tank and three inches onto the "splash") and roll out all entrapped air. Resin putty can be used if the "splash" seam is ragged or if the tow edges are not level with each other. Resin coat the entire area.

Fitting Damage Procedure

This section covers procedures for fitting layup leaks, and/or the replacement of fittings due to damage caused by severe bending and distortion.

Fitting Leaks

Grind off all the existing FRP around the suspect area down to the fitting plate. Prepare enough area so that the new laminate will cover the problem area.

WARNING: Be especially careful when grinding near the steel plate in order to prevent contact with the steel so that sparks do not cause an ignition source. Fuel residue may be trapped under the fitting plate.

To achieve a smooth transition at the edge of the fitting plate, layup the entire area with multiple layers of glass laminate to equal or exceed the original fitting overlay.

Fitting Replacement Procedure

At times this repair may require some restructure work under the fitting.

Remove the fitting plate assembly by grinding or cutting along the perimeter edges of the steel plate. Pry the fitting

assembly loose.

Grind the entire area, removing all loose glass, putty and delaminated pieces. Grind an area larger in all directions than the original fitting plate layup.

Fix all damage to the tank that has been caused by the fitting distortion.

When the fitting area work has been completed, re-cut a hole for the fitting. Resin coat all exposed edges prior to attaching a new fitting plate. Some grinding may be needed and/or additional laminate applied as required to match the tank curvature. The surface must be smooth for the new fitting plate to sit on.

Cut multiple layers of glass mat to fit under and over the fitting plate. This may be the same size as the plate. Wet out glass mats and apply them on the tank. Place the fitting plate assembly on this laminate and secure the plate with clamps. Wet out glass mats and place them over the fitting plate. Let this initial laminate cure.

Cut the appropriate number of layers to go over the fitting plate, three inches larger than the plate all around. Layup and roll these layers. Allow to cure.

Resin coat (with optional wax) the entire lay-up area. This should be done after final cure.

Manway Replacement Procedure

Remove manway by carefully cutting around manway neck at the surface of the tank. Make this cut carefully, so the hole in the tank is only slightly larger than the manway that will be installed.

Grind the opening, as necessary. If the opening is oversized then stabilize the manway for installation with shims.

Level and center the manway, in both directions. The elevation of the manway flange shall be as designated by the tank manufacturer.

Once the manway is leveled, apply resin putty to the joint. Allow this to cure.

The FRP laminate around the manway neck shall equal or exceed the tank wall thickness

Overlaps of the layup sections shall be a minimum of one inch and the laminate must extend onto the tank at least the original width. This laminate will extend onto the manway neck a minimum of three inches. Allow this layup to cure.

The manway neck shall not extend into the tank. It should be trimmed to follow the inside curve of the tank. Grind smooth the putty that was pushed through from above. Remaining voids may need to be filled with more putty.

Layup the inside of the manway with multiple layers of glass laminate. The laminate shall extend from the inside manway wall onto the inside of the tank shell wall at least the original width.

Allow this layup to cure and resin coat (with wax optional) the entire manway layup.

Closure and Final Test

After interior work is completed, prepare the edges of the opening and the cut out piece by grinding four inches wide area around the perimeter of each.

Upon completion of the remanufacturing procedure or inspection and evaluation, or recertification, the cut out piece will be reglassed in the tank. Make certain that all cut edges on the tank and cut out pieces are resin coated.

Install the cut out piece and layup five layers of mat so that the total thickness of the laminate will equal or exceed the tank wall thickness. This material should be a minimum of six inches wide (lapping three inches on each side of cut). As an option, after final cure apply a resin wax coat to the entire prepared area.

The Entrant shall complete the Post Entry portion of the "Tank Entry Work Permit" and note when the work has been completed.

Allow the remanufactured area to properly cure while the contractor's crew sets up the tank with fittings for the air test.

Pressurize the tank with five PSIG (use three PSIG for tanks over ten feet in diameter). Completely soap all the remanufactured surfaces which are accessible or use another test method approved by local authorities to make sure all damages have been taken care of and the remanufactured area is sound.

Change of Contents

Change of Contents - Procedures

The following procedure must be followed when tanks are to be used to store products other than those for which the tank was originally intended.

Determine what new product is proposed for storage. Obtain a detailed definition of the product to be stored and the storage temperature. The tank manufacturer must be contacted to determine whether or not the new product is

recommended for use with the tank.

NOTE: Prior to making a change in contents, the tank owner/operator shall consult all appropriate authorities and obtain any required permits.

If the tank is not recommended for storage of the new product, the tank manufacturer shall specify what procedures must be performed to modify the tank so that it will be compatible with the new contents.

If tank lining is recommended, the tank manufacturer will specify the resin and glass to be used and the method of application. All safety procedures and all applicable state, local and federal regulations shall be followed.

Surface Preparation

The entire surface of the tank interior must be roughened by Grinding, or other tank manufacturer approved method, to expose glass fibers to provide a mechanical bond for the new liner.

Application

Spray up or hand lay-up layers of glass and resin (ratio 25% glass - 75% resin) to a thickness of not less than 100 mils. Wax coating optional.

Curing

The tank lining shall be allowed to cure until barcol hardness has developed to 90% of the rest manufacturer's recommendations.

Testing Pressurize the tank with five PSIG. Use 3 PSIG for tanks 12 feet in diameter. Hold for 1 hour. There shall be no drop in pressure. Other test methods may be used upon approval of the tank manufacturer, or as requested by the tank owner/operator. Temperature and pressure (i.e. weather condition) can affect gauge pressure readings. **WARNING:** EPA has designated several hundred chemicals as "hazardous substances." Tanks storing these chemicals must have "secondary containment," such as double wall tanks and pipe. A list of these hazardous substances can be found in Section 101 (14) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, better known as "CERCLA" or "SUPERFUND." Because methanol is listed as a hazardous substance, both M185 and M100 motor fuels require secondary containment.

NOTE: High concentrations of methanol, like M85 and M100, must not be stored in a single wall tank unless some means of secondary containment is provided. Lining a single wall tank to provide methanol compatibility does not provide secondary containment.

Methanol gasoline blends with up to 5% volume methanol have been EPA approved for use as standard motor fuels and meet most automobile manufacturers' fuel requirements. At this time, these EPA-approved methanol blends are regulated as petroleum products and may be stored in standard single-wall FRP tanks and pipe.

Review local, state and federal laws and regulations.

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