North Carolina Department of Environment and Natural Resources Underground Storage Tank Section



UST System Design Part III





Engineered Plans

- Scale Drawings
- UST-6C "Schedule of Materials"
- UST-20 "Alternative Fuel / Hazardous Substances Compatibility Checklist"

"...the design of petroleum storage tank systems, incorporating the tank, piping, ancillary equipment and containment systems, is an engineering function as defined by G.S. 89C-3 and must therefore be certified by a Professional Engineer."

> - NC Board of Examiners for Engineers and Surveyors (December 20, 1993)

Scale Drawing(s):

- ||" × |7"
- Should include the scale
- Compass rose / North arrow
- Must be sealed by a North Carolina licensed Professional Engineer
- Additional sheets showing an overview of the UST facility or UST system details may be necessary

Scale Drawing(s):

- Must show the proposed locations of: UST system features Tanks Product piping Vent piping Manifold piping Detectable tape
 - Flex connectors

Scale Drawing(s):

 Must show the proposed locations of: UST system features (cont.) Leak detection equipment Spill prevention equipment Overfill prevention equipment Vapor recovery equipment Dispensers Containment sumps

Scale Drawing(s):

- Must show the locations of:
 - Adjacent roadways
 - Onsite structures
 - Water supply wells (within 500 feet)
 ✓ If no wells exist that should be indicated.
- UST system components should be crossreferenced with UST-6C "Schedule of Materials"

Scale Drawing(s):

- All USTs must be noted with the following information:
 - Corresponding Tank ID from UST-6A
 - Tank capacity
 - Tank diameter
 - Product to be stored
 - Method of anchoring

Example Plans



Example Plans



Scale Drawing(s):

 Include installation notes on drawings to indicate maximum burial depth of detectable tape, absence of wells, etc.

INSTALLATION NOTES:

- 1. ALL TANKS TO BE ANCHORED WITH CONCRETE DEADMEN
- 2. TANKS TO BE INSTALLED IN STRICT ACCORDANCE WITH TANK MANUFACTURER'S INSTALLATION GUIDELINES AND PEI RP-100
- 3. PIPING TO BE INSTALLED IN STRICT ACCORDANCE WITH PIPING MANUFACTURER'S INSTALLATION GUIDELINES AND PEI RP-100
- 4. UTILITY TRACER TAPE TO BE INSTALLED ABOVE ALL PRODUCT PIPING
- 5. ANY MODIFICATIONS TO THESE PLANS MUST BE APPROVED BY ENGINEER FIRST

Scale Drawing(s):

• Use "revision cloud" and revision dates on drawings to indicate changes, as necessary



UST-6C "Schedule of Materials"

- Tanks
- Piping
- Spill prevention equipment
- Overfill prevention equipment
- Containment sumps
- Vapor recovery equipment
- Detectable tape

UST-6C "Schedule of Materials" (cont.)

 Leak detection equipment Leak detection monitoring console Interstitial sensor (tank) Interstitial sensor (piping) Automatic Line Leak Detectors (for pressurized piping) Containment sump monitoring Interstitial sensor (spill bucket)

Enter Number of Monitoring Points	Monitoring Point / Sensor Location	Other Sensors	Monitoring Point / Sensor Location
	UDC Sumps		Tank Interstitial Sensors
	Piping Systems / STP Sumps		
	Other Sumps		
	Spill Buckets (for ones w/o built in sensors)		Spill Buckets (for ones w/ built in sensors)
	Total Number of Sump Sensors Used at Site		



It may be useful to create a checklist to account for each needed sensor

UST-6C Application to Install or Replace Underground Storage Tank Systems (SCHEDULE OF MATERIALS)



Facility ID No.	Facility Name		Attachment to	(check one): UST-6A	UST-6B 🗖
UST System	components installed (Check one):		If attached to	UST-6B, have any modificatio	ns YES 🗖
Tanks and	Piping 🔲 Tanks Only 🔲 Piping O	nly	been made to	approved design plan?	NO 🗖
INSTRUCTIO flexible conne overfill preven equipment tog additional pag	NS: List the manufacturer, model or part number ctors; leak detection equipment including the mon tion equipment; vapor recovery equipment; contai gether in the list. The item number provided below les as necessary.	and quantity for the fol itoring console, intersti nment sumps and met must correspond to th	llowing equipm itial monitoring thod of locating the location(s) o	ent installed at the facility: tan sensors and automatic line le the piping once it is buried. Of the equipment shown on the	ks; piping including ak detectors; spill and Group like categories of scale drawing. Attach
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			Affix PE s	eal here:	
Print Nan	ne of North Carolina Professional Engineer	_			
Company	/ Name	_			
Date		_			

"Alternative Fuel / Hazardous Substances Compatibility Checklist"

Required for:

- Greater than 10% Ethanol
- Greater than 20% Biodiesel
- Any hazardous substance

"Alternative Fuel / Hazardous Substances Compatibility Checklist"

Accepted documentation to be attached to UST-20 form:

- Certification by manufacturer
- UL listing

"Alternative Fuel / Hazardous Substances Compatibility Checklist"

Must be certified as compatible:

- Tank
- Spill prevention equipment
- Overfill prevention equipment
- Submersible turbine pump
- Leak detection probes
- Interstitial and sump sensors

"Alternative Fuel / Hazardous Substances Compatibility Checklist"

Must be certified as compatible:

- Piping material
- Pipe dope / sealant / adhesive
- Gaskets / seals
- Flex connectors
- Angle check valves
- Emergency shear valves
- Line leak detectors

Example of Corrosion Due to E-85

Standard, non-E85 fuel STP



Photos courtesy Iowa DNR

E85 STP

"Alternative Fuel / Hazardous Substances Compatibility Checklist"

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Write "NA" in the manufacturer box if the UST system does not have a particular component on the list.

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Sections I, II, and VI are to be completed by the UST owner/operator. Sections III through V of this form are to be completed by a UST Equipment Contractor. Complete one form for each UST system that will be storing the ethanol, biodiesel blend fuel or hazardous substances. Keep a copy of this form and all supporting documentation for your records to be made available for inspection.

For equipment items below that have manufacturer approved checked, you must provide copies of the applicable documents from the manufacturer stating the approval for use with the ethanol, biodiesel or hazardous substance concentration to be stored. If the manufacturer provides a warranty for the item, then you must provide a copy of the manufacturer's warranty that states the component is warranted for use with that concentration of alternative fuel blend/hazardous substance.

If any component is not Underwriters Laboratory (UL) listed or manufacturer approved for use with ethanol blend fuels greater than 10%, biodiesel blends greater than 20% or hazardous substances, then it cannot be stored and/or dispensed from the UST system. For "Tank Material" in Section III, if the tank is a steel tank that has not been internally lined and will not contain hazardous substances, write "steel" in the "manufacturer" box. UL or Manufacturer approval is not required.

For "Pipe Material" in Section IV, if the piping is steel and will not contain hazardous substances, write "steel" in the "manufacturer" box. UL or Manufacturer approval is not required.

Write "NA" in the manufacturer box if the UST system does not have a particular component on the list.

Please note that the Fire Marshal must be notified prior to dispensing ethanol blend fuels.

I. Ownership of Tanks			II. Location of Tanks	a tion of Tanks Name:			
Owner's Name (Corporation	n, Individual, Public	Agency or Other Entity):	Facility Name:				
Contact Person for UST Loc	ation:	Phone Number:	Address:				
E-mail Address			City (nearest):	County:			
III. Tank Information							
Tank ID No.	Tar	k Size:	Insta	II Date:			
Product formerly stored:		New product	t stored:	% Ethanol or Biodiesel:			
Is tank lined: 🔲 Yes	□ No Not	e: Tanks that have an inte exception is FRP tanks	rior lining are not approved for that were lined under certificati	storage of ethanol or biodiesel blend fuels. The on by the tank manufacturer to provide the			
		companionity.					
k Detection:	Automatic Ta	nk Gauge (ATG)	Inventory control & tank tight	tness testing			

Component	Manufacturor	Medel/Brand		UL	
Component	Manufacturer	ModerBrand	Listed	Number	Approved
Tank material					
Spill bucket					
Overfill / Auto shut-off / Ball float (circle)					
Submersible pump					
Leak detection probes					
Interstitial & sump sensors					
 <u>Attach</u> documents from fuel/hazardous substan 	n the manufacturer stating the ce.	approval and warranty (if one is pro	vided) for us	se with specific alt	ernative
IV. Pipe Information	Install Date:	Pipe: Pi	ressurized [Suction	
Component	Manufacturer	Model/Brand	Listed	UL Number	Manufactur Approved
Configuration: Single	wall 🗌 Double wall 🛛 Ty	/pe: 🗋 Steel 🔲 Fiberglass 🔲	Flexible	Other (specify):	
Pipe material		8			
Pipe dope/sealant / adhesive					
Gaskets / Seals					
Flex connector					
Angle check valve (suction pipe systems)					
Emergency shear valve					
Line leak detector					
* <u>Attach</u> documents from	n the manufacturer stating the ce.	approval and warranty (if one is pro	vided) for us	e with specific alt	ernative
				Pag	e 2
					such IV/

(suction pipe systems)			
Emergency shear valve			
Line leak detector			
 Attach documents from the manufactu fuel/hazardous substance. 	rer stating the approval and warranty	(if one is provided) for use v	vith specific alternative
V. Petroleum Equipment Contractor Sig	Inature		
certify by signing below that the compone JL listed and/or manufacturer approved for substances.	ents checked in the "UL" and/or "Man or use with the specified ethanol blend	ufacturer Approved" column: d, specified biodiesel blend o	s of sections III through IV are or specific listed hazardous
Signature of petroleum equipm	ient contractor	Date	
Print petroleum equipment co	ntractor name		
Contractor Company Name:		Pho	ne:
Address	City:	Stat	e: Zip:
I. Owner / Operator Signature			
By signing below you are acknowledgin	g that all of the items in sections I thro	ough V have been complete	:d.
Tank owner / operator s	ignature	Date	
Print tank owner / operat	or name	Comp	any
Failure to submit this form with all sect non-issuance of your operating permit.	ons completed and any appropriate a	attachments could result in a	an enforcement action and/or



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North Carolina Department of Environment and Natural Resources Underground Storage Tank Section



Questions?

