The ConVault System

ConVault is an above ground, fuel and oil storage system manufactured for the purpose of above ground storage. The purpose of this testing procedure document is to aid ConVault owners and engineers in complying with the requirements of the Spill Prevention Control and Containment regulations for integrity testing or inspection as found at 40 CFR 112.8(c)(6) in effect as of January 14, 2010.

The ConVault system includes:

1. **Primary containment**: Inner shop fabricated steel tanks built in accordance with UL 142 Standard. The tank is pressure tested for 24 to 48 hours after fabrication process, again pressure tested during the precasting process, and also prior to shipment of the tank.

2. **Secondary containment**: Consists of a high density polyethylene (HDPE) liner. This secondary containment is vacuum tested prior to shipment of the tank.

3. **Encasement**: inner steel tank and the HDPE liner are encased on all sides in 6” thick reinforced concrete. The entire system is elevated upon 4” to 6” high integral concrete legs.

*The ConVault above ground fuel storage system is manufactured and tested in accordance with the UL 2085 Standard.*

ConVault is thus a three layered containment system; Primary steel tank, secondary HDPE liner and exterior concrete layer acting as a dam or dike. The integrity of each layer will be addressed in the following steps.
Note regarding Steel Tank Institute Standard Inspection Guidelines STI SP001: STI SP001 requirements are not prepared or issued with inspection criteria that are readily applicable to other AST manufacturers especially to the concrete tanks. The STI SP001 should make a notation to say: Inquire with the manufacturer of the tank before utilizing SP001 to inspect your ConVault tank. Some portions of STI SP001 are applicable to the inspection of ConVault, such as inspection frequency. A copy of the STI SP001 Standard can be found at:


In no case should a pressure test be performed on the secondary containment. Serious damage to the tank system may result from pressure testing.

Refer to manufacturer’s drawings and specifications to confirm the configuration of your tank. If you do not have drawings and specifications please contact the supplier or, manufacturer or call 1-888-965-3227.

- Testing of ConVault tanks may be completed by qualified personnel following this testing methodology.
  If you require assistance sourcing a qualified testing professional please call 1-800-965-3227 or visit www.convault.com.
- Testing should proceed only after reviewing all previous test records and any documentation detailing modifications, repairs, and visible or known damage to the tank.
- ConVault tank systems feature a nameplate which will provide the Underwriters Laboratory listing serial number. Include this number in the documentation of inspections.
- This testing procedure will not apply or may not be adequate if:
  - The ConVault has been moved from its original location;
  - The ConVault has sustained known or apparent trauma or impact;
  - Products incompatible with the inner steel tank have been put into the ConVault.
Test Protocol

1. Examine the area under and around the ConVault (pavement, drip pan, soil) for signs of movement or settlement that could lead to system performance problems.

2. Examine the area under and around the ConVault for signs of spills and if any are found, document the location relative to the ConVault tank.

3. Examine the exterior (sides and bottom) of the ConVault noting any cracks and/or damage to the concrete outer layer.

4. During the inspection of the ConVault exterior pay particular attention to any signs of fuel or oil leaks that may manifest as staining on the exterior of the concrete or dirt, dust or soil that may adhere to spilled fuel or oil. Document the location and nature of any signs of fuel or oil on the exterior (sides and bottom).

5. Fuel or oil spills on the side of a ConVault emanating from the top of the tank will be addressed in later sections of this document.

6. If fuel or oil is found in specific areas of the side or bottom of the ConVault the owner/user should be notified immediately.
   i. Inquire as to the time frame the owner/user first noticed the spill.
   ii. Note whether any fuel or oil has accumulated on the surface under the ConVault which can be specifically related to the location of fuel or oil present on the exterior (side and bottom). If any fuel or oil is noted on the surface under the ConVault, the owner/user should be notified immediately and the owner/user should take immediate steps to notify any appropriate governing authorities.

If no evidence of leakage is noted on the exterior of the concrete containment layer then the inspection report indicate so.

7. Examine the top of the ConVault. Note: Examination of the top of the ConVault may involve persons walking on top of the tank and appropriate safety precautions should be implemented to insure the safety of the inspector from falls or injury related to tripping upon hardware. If appropriate a second person should be utilized to assist.

8. While inspecting the top of the tank, first locate and note the location, configuration, condition and types of any plumbing, meters and dispensing equipment.
   i. Minor fuel spillage on top of the ConVault is not uncommon and may make it difficult to determine the actual source of leaks. Any leaks directly related to the plumbing, meters, dispensing equipment or other hardware used to load or dispense fuel should be noted. Rust or other deterioration should also be noted.
   ii. Closely inspect the interfaces between the steel connections protruding from concrete. Note any areas that should be resealed to prevent the introduction of rain water into the system.
      a. Consult with the tank manufacturer or call 1-800-965-3227 for recommendations.
   iii. Note the condition of the concrete surface. The surface should be relatively clean and smooth without cracks, holes or other deteriorations. A functioning layer of sealant (waterproof) paint should be present across the entire surface of the concrete top.
      a. Use only recommended products to re-coat the top of the ConVault after thoroughly cleaning with bio-degreaser and light pressure cleaning.
9. Inspection of the primary steel tank
   i. At this point the inspector should locate and note the leak detection port.
   ii. The integrity of the inner steel primary tank is accomplished by checking for fluid between the steel tank and the HDPE liner. See below.

   The inspector should obtain a clean wood or plastic inspection (non-pointed) rod of sufficient length to reach the full depth of the inner steel tank. With the inspection port cap opened, insert the rod to the bottom of the tube.

   iii. Withdraw the inspection rod and visually examine it.
       a. If the rod is dry and there is no liquid present then the primary steel tank is not leaking and the ConVault is suitable for continued use.

   See next page if the rod is wet.
b. If the rod is wet then the inspector must determine the nature of the liquid, water or fuel.
   1. If the liquid on the inspection rod is water then rainwater has entered the system due to inspection port cap being left off or water has entered the system due to a gap between the concrete outer layer and plumbing on top of the tank.
      - The water should be extracted from the tank interstice. Consult with ConVault or the manufacturer of your ConVault or call 1-800-965-3227 for recommendations as to water removal techniques.

   c. If the rod is wet and smells of fuel or oil or has a sheen then:
      1. The owner/user should be notified immediately.
      2. It is possible that fuel or oil was introduced into the interstice through the inspection port. The fuel or oil should be extracted from the interstice. At this point and after complete extraction of the fuel or oil the rod should be re-introduced into the inspection port to check for the presence of fuel or oil. If the interstice contains fuel, after pumping out the fuel, the fuel entrapped in the secondary containment will flow down and fuel might be seen in the leak detector tube again. In this case, the best way of insuring the integrity of the primary tank is a pressure or vacuum test, using the ConVault testing manual: www.convault.com/testingmanual.pdf
      3. The inner steel primary containment tank may have leaked and the tank should be tested to determine if primary has failed.
         - At this point, the owner/user should contact the installer or manufacturer of the ConVault or call 1-800-695-3227 for recommended next steps.
Industry Standard Requirements for Tank Inspection Frequency

For the sake of consistency, the standard for testing frequency for ConVault fuel and oil containment systems should be consistent with the requirements of STI SP001 which is detailed below and is normally a function of the size of the tank and its Category per SP001 Standard.

Tank Categories

The tank categories and inspection schedule from SP001 are to be utilized for ConVault tanks. Among other factors, owners should take a number of aspects into consideration such as the tank leak detection system, and that the monitoring equipment is in good working condition.

Based on many considerations, the SP001 standard classifies tanks into three categories. Depending on the risk a tank system poses to the environment if kept in service it is ranked as a category 1, 2 or 3 tank. Category 1 tanks pose the least amount of risk and category 3 the highest.

See Table 5.4 of the standard, reproduced here, for examples of tank configuration and AST category. Please note that if the AST bottom plate, other than its legs or supports, is in contact with the ground or a concrete slab, it is prone to corrosion and increased susceptibility to leakage. Shop Fabricated Tanks in contact with the ground or a concrete base are almost always vertical tanks. Such tanks are placed in Category 2 or 3. ASTs which are elevated, have a leak detection system, have spill control and have no part of the tank in contact with the ground (other than legs or supports) are classified as category 1 tanks.

Table 5.4: Example Tank Configurations and AST Category

<table>
<thead>
<tr>
<th>Tank Configuration</th>
<th>Tank has CRDM</th>
<th>AST Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>AST in contact with ground</td>
<td>No</td>
<td>2 or 3</td>
</tr>
<tr>
<td>Elevated tank w/ spill control &amp; no part of AST in contact w/ ground</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>Vertical tank w/ RPB &amp; spill control</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>Vertical tank w/ double bottom &amp; spill control</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>Double-wall AST</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>AST w/ secondary containment dike/berm</td>
<td>Yes</td>
<td>1</td>
</tr>
</tbody>
</table>

CRDM: Continuous Release Detection Method – or Leak Detection System
RPB: Release Prevention Barrier

Inspection Type and Frequency

The SP0001 standard requires different inspection types and different inspection intervals based on the tank size, tank category, and the risk it poses. The tank inspection intervals from SP001 are to be followed for ConVault tanks.

In Table 5.5 of SP0001 (see next page), those portions pertaining to shop fabricated tanks up to 30,000 gallons have been highlighted showing inspection schedules for the different AST categories.
Industry Standard Requirements for Tank Inspection Frequency (cont.)

In Table 5.5 use the following designations:

- **P** - Periodic AST inspection
- **E** - Formal External Inspection by Certified Inspector
- **L** - Leak test by owner’s designee
- **I** - Formal Internal Inspection by Certified Inspector

() indicates maximum inspection interval in years. For example; **E (5)** indicates formal external inspection every 5 years.

*Owners shall either discontinue use of portable container for storage or have the portable container DOT (Department of Transportation) tested and recertified per following schedule (refer to Section 9.0):
Plastic containers – every 7 years; steel portable container – every 12 years
Stainless Steel container – every 17 years

### SP001 Table 5.5: Inspection Schedules

<table>
<thead>
<tr>
<th>Shop Fabricated AST Size (US Gallons)</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1100 (0-4,164 liters)</td>
<td>P</td>
<td>P</td>
<td>P, E &amp; L (10)</td>
</tr>
<tr>
<td>1,101 - 5,000 (4,168 - 18,927 liters)</td>
<td>P</td>
<td>P, E &amp; L (10)</td>
<td>P, E &amp; L (5), I (10) or P, L (2), E (5)</td>
</tr>
</tbody>
</table>

*Portable Containers* | P | P | P*
Periodic Inspection Requirements

ConVault tanks of 5,000 gallons or less capacity are CATEGORY 1 TANKS. Owners of ConVault ASTs of this size are NOT required to employ Certified AST Inspectors to inspect their tanks to comply with the standard’s requirements, but can be in compliance with the standard by inspecting the tanks themselves or having their employees inspect them. ConVault tanks larger than 5000 gallons, are also self-inspected and only require inspection by a Certified Inspector after 20 years of service.

What qualifications are required for the owner to self-inspect his tank, and how does the owner need to know what to inspect?

Section 4 of the SP001 standard defines the qualifications of the Owner’s Inspector as follows: “Periodic inspections are to be performed by an owner’s inspector. The personnel performing these inspections shall be knowledgeable of storage facility operations, the type of AST and its associated components, and characteristics of the liquid stored.”

Section 6 of the standard STI SP001 explains what is meant by the PERIODIC AST INSPECTION – and what needs to be inspected and kept in the owner’s AST records. These are simple and straight-forward tasks which can be performed by any competent owner or his employees. The standard makes it very easy to know what to do and what to check for by providing a check list in the standard’s Appendix C. The first section requires filling in information about the owner and the ID of the tank. The second section is the SP001 Monthly Inspection Checklist which consists of 9 easy to check, Yes or No questions such as; is there water in primary or secondary containment, are there visible signs of leakage around the tank, concrete pad, or ground, are all tank openings properly sealed, etc. The third section is the SP001 Annual Inspection Checklist which contains 27 questions with Yes or No answers and a space for comments. It should be noted that the Periodic Inspection must be performed in addition to the Formal External Inspections.

Simply put, the periodic inspection requirements are visual, documented inspections conducted by an owner’s inspector, to assess the general AST conditions, as best as possible, without suspending AST operations or removing the AST from service.

ConVault strongly encourages the use of the Monthly and Annual Inspection Checklists provided in SP001, and, in fact, requires some of these items be checked on a weekly basis as part of the ConVault warranty.

See Pages 10-12 for a ConVault specific Maintenance Checklist.

A copy of ConVault’s weekly/monthly/yearly checklist is available online at http://www.convault.com/pdfdoc/checklist.pdf.
Summary

- As an owner of a ConVault you are NOT required to employ Certified Inspectors or a registered Professional Engineer to perform inspections on ConVault ASTs up to 5,000 gallons for most installations.
- For ConVault ASTs from 5,001 to 12,000 gallons you will need an External Inspection by a Certified Inspector once every 20 years for most installations.
- Monthly and yearly inspections by the tank owner or a designated employee are required by SP001, and Inspection Checklists are provided in Appendix C of the document.
- ConVault requires that the interstice be checked on a weekly basis using the inspection port and rod method described on Page 4.
- A newly installed ConVault AST will meet all the requirements of the SP001 checklists.

Visit:  www.epa.gov/emergencies/docs/oil/spcc/integrity-testing-factsheet.pdf if you have any questions regarding the EPA Spill Prevention, Control and Countermeasure Plan (SPCC) Program
Maintenance Checklist

Inspection Date ____________________ Inspector ____________________

Note: This checklist is designed for general use. Some items may not apply. All equipment inspections and maintenance should be documented. You are encouraged to make copies of this checklist. See the corresponding maintenance procedures and your owner’s manual for corrective actions and more details.

Weekly Maintenance:

☐ 1. Check leak detector for indication of fluid in interstice. (This is required by warranty.) If checked with a stick gauge, ensure the stick is clean and dry before insertion.
☐ 2. Check for leaks on the pumps, filters, hoses, nozzles, joints and fittings.
☐ 3. Check nipples, spill containment and manholes for paint or powder coating decay (required by warranty). Check piping and fitting for rust.
☐ 4. Check pump meter and reset button.
☐ 5. Check fuel gauge for proper operation. If you have a Kruger At-A-Glance Gauge, check the clear cap for weathering or cracks.
☐ 6. Check spill containment for debris.
☐ 7. Check for small cracks in concrete.
☐ 8. Check readability of signs and decals.

Monthly Maintenance:

☐ 9. Check for water in the primary tank bottom under the fuel (required by warranty).
☐ 10. Visually check the tank, including under the tank for any signs of leakage as required by the Environmental Protection Agency 40 CFR 112.
☐ 11. Check leak detector tube cap for corrosion and proper operation. If a Kruger manual leak indicator is installed, remove the red ring and clear cap and check to see that the red indicator moves up and down about 1 inch freely. Also, check for weathering or cracks in the clear cap. If electronic leak detection is installed, check it by using the test button.
☐ 12. Check all nozzles, hoses and fittings for wear and tear.
☐ 13. Check trigger mechanism on nozzle for metal fatigue or mechanical failure.
☐ 14. Check pump motor for signs of over-heating or excessive wear.
☐ 15. Check body of tank for cleanliness, need of paint, or rusting where applicable. Check signs and decals for need of replacement. Check slab and supports of unit for structural soundness.
☐ 16. Check grounding wires to see that they are properly attached to the tank terminals and grounding rod.

Other Periodic Maintenance:

☐ 17. Replace the dispenser filter at least every six (6) months or as needed (mark the date replaced on the filter).
☐ 18. Check fuel for bacterial infestation or microbial growth.
☐ 19. Have a qualified person periodically check all electrical wiring.
☐ 20. Check the emergency relief vent at least once a year by lifting the top cap and releasing it to ensure freedom of movement.
☐ 21. At least once a year, remove the leak detection device and check for proper operation.
☐ 22. At least once a year, check the calibration of the fuel gauge.
☐ 23. Follow the pump manufacturer’s recommendation for frequency and procedures of maintenance.
☐ 24. Document significant storage events per 40 CFR 112 and your state regulations.
Maintenance Procedures

Please note that item numbers on this sheet corresponds with the item numbers on the Maintenance Checklist. Most of the maintenance requirements and procedures are also covered in the Convault owner’s manual.

Weekly Checks:
1. If leak detector indicates fluid in the interstice, remove any devices and determine what the fluid is. Call your Convault representative.
2. If leaks are detected, contact the appropriate authorities as necessary. Tighten, repair as necessary, replace components, or contact your installer or service company.
3. If paint or powder coating deterioration occurs on nipples, spill containment or manholes, clean to bare metal, prime with a good quality zinc based primer, and repaint. If corrosion is severe, contact your Convault representative as soon as practical.
4. If the emergency relief vent exhibits signs of motion restriction, promptly call your service company.
5. If the fuel gauge fails to operate properly, repair/replace it, or call your service company before the next delivery. It is the owner/operator’s responsibility to prevent the overfilling of the tanks. The gauge is part of the required system to prevent overfilling.) If the Kruger cap has deteriorated, it could be allowing rainwater into the primary tank and should be replaced.
6. Keep spill containment clear of debris at all times. A contaminated spill containment will cause the fuel to be contaminated when any spill is released through the drain into the primary tank. Materials such as rags or paper products used to clean the spill containment must be disposed of properly, as they will usually contain fuel from the spill containment.
7. If there are small cracks in the concrete, fill and repair them. If you have questions, call your local Convault representative.
8. If signs or decals lose visibility, order replacements from your local Convault representative before the next time the tank is filled.

Monthly:
9. If there is water in the tank it will collect at the bottom, under the fuel. Water in the tank will cause increased corrosion. If you discover water in the primary tank it must be removed. One method is to pump it out with a “Thief Pump”, a small pump that pulls the water from the bottom 1/8” of the tank. Check tank openings for possible water entry points. If you find that you are pumping out more than one half gallon of water for every 1000 gallons of product stored, see your fuel dealer, or call your Convault representative. Also consult item (I) in the maintenance section of the owner’s manual.
10. If you detect leakage, determine what the liquid is, if possible, and call your Convault representative and appropriate authorities as necessary.
11. If there are problems with the leak detector tube or lock, clean and lubricate them as necessary. See item (G) in the maintenance section of the owner’s manual. If the Kruger leak indicator does not function properly, remove it and repair or replace it. Due to ultraviolet radiation, the clear cap on the Kruger leak indicator will deteriorate over time. If it has deteriorated, it could be allowing rainwater into the interstitial area and should be replaced. New caps and rings or entire units can be purchased from Kruger, your service company, or your Convault representative. Kruger now offers a guard, which will prolong the life of the cap. If electronic leak detection test fails, call your service company.
12. If nozzles, hoses or fittings exhibit signs of wear and tear, repair/replace as necessary or call your service company.
13. If trigger mechanism on nozzle exhibits signs of metal fatigue or mechanical failure, replace nozzle or call your service company.
14. If pump motor shows signs of overheating or excessive wear, repair as necessary or contact your service company.
15. Clean, paint, and repair problem areas as necessary. Order replacements signs or decals from your local Convault representative. If the slab is cracking or settling, contact your local Convault representative and your slab installer. If you have questions, call your local Convault representative.
16. If grounding wires are not attached properly, make appropriate changes or call your installer or your service company.

**Other Periodic Maintenance:**
17. Filters can be purchased from your Convault representative or local service company. The date can be scratched on with a sharp object, or written with a permanent marker.
18. If bacterial infestation is detected, consult item (H) in the maintenance section of the owner’s manual.
19. Repair as necessary. Wiring (other than intrinsically safe items) in a class 1 area requires special sealing to prevent explosions.
20. If the emergency relief vent exhibits signs of motion restriction, promptly call your installer, your service company, or your Convault representative. Proper operation of this device is critical as most injuries and fatalities that happen in conjunction with fuel fires are due to improper, non-functional emergency relief vents or emergency relief vents replaced with normal pipe caps.
21. Most leak detection devices use a float. By removing the device from the leak detector tube and turning it upside down (simulating a floating situation) you can easily check for movement of the float and proper mechanical or electronic indication. If the leak detection device fails to operate properly, call your installer or your service company.
22. The fuel gauge can be checked by “sticking” the tank and comparing it to the gauge reading. Some gauges are more accurate than the stick. If the gauge reading varies substantially from the stick reading, contact the gauge manufacturer or service company. If your stick reads in inches only and you need a calibration chart, contact your Convault representative.
23. Pump maintenance requirements vary by manufacturer. If you have questions, contact your installer, local service company, or the manufacturer of the equipment.
24. If you have a warranty or environmental problem down the road, documentation will be very helpful. We recommend that you keep a copy of the “Maintenance Checklist” with items marked for every maintenance inspection. Notes about problems and corrections can be written on the back of the sheet and used for future reference. Many sites are now required to have a SPCC plan for emergencies on file. If you need a recommendation for companies that do this, please call your Convault representative. **The name, phone number and location of your local representative can be obtained from the Convault web site by clicking on “Local Distributor” and your state or country at http://www.convault.com.**