ATTACHMENT 3

15-DAY CHANGES TO TP-501, TEST PROCEDURE FOR DETERMINING INTEGRITY OF PORTABLE FUEL CONTAINER SYSTEMS

California Environmental Protection Agency

Air Resources Board

Test Procedure for Determining Integrity of ~~Spill-Proof Spouts and Spill-Proof~~Portable Fuel Container Systems

TP-501

NOTE: ~~This is a new Certification Procedure. For clarity the proposed text is shown in normal type.~~ This document is written in a style to indicate changes from the existing provisions. All existing regulatory language is indicated by plain type. All additions to the regulatory language are indicated by underlined type. All deletions to the regulatory language are indicated by strikeout. The suggested 15-day modifications to the proposed regulation are shown in double underline to indicate additions and ~~double strikeout~~ to indicate deletions.)

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California Environmental Protection Agency
Air Resources Board

TP-501

Test Procedure for Determining Integrity of
~~Spill-Proof Spouts and Spill-Proof~~Portable Fuel Container Systems

The definitions in ~~S~~section 2467.1, ~~Article 6, Chapter 9 of~~ ~~T~~title 13, California Code of Regulations ~~(CCR) applies~~apply to this test procedure.

For the purpose of this procedure, the term "ARB" refers to the California Air Resources Board, and the term "Executive Officer" refers to the ARB Executive Officer or his or her authorized representative or designate.

1. APPLICABILITY

This ~~T~~test ~~P~~procedure is used to verify the performance of the automatic closure and leak free features of ~~spill-proof~~portable fuel container (PFC) systems~~ or spill-proof spouts~~ as required by ARB Certification Procedure "CP-501, *Certification Procedure for Portable Fuel Container Systems*." It is applicable in all cases where~~ portable fuel containers, spouts or both~~ portable fuel container~~s and spouts~~ systems or their components are manufactured for sale, sold, advertised for sale, or offered for sale in California or~~ that~~ are introduced, delivered, or imported into California for introduction into commerce.

1.1. Requirement to Comply with All Other Applicable Codes and Regulations

Certification or approval of a portable fuel container system by the Executive Officer does not exempt the portable fuel container system from compliance or with other applicable codes and regulations such as local, State, or federal safety codes and regulations.

1.2. Safety

This test procedure involves the use of flammable materials and should only be used by or under the supervision of those familiar and experienced in the use of such materials. Appropriate safety precautions should be observed at all times while performing this test procedure.

2. PRINCIPLE~~AL~~ AND SUMMARY OF TEST PROCEDURE

This procedure is used to verify the performance of the automatic closure and leak free features of a sample of ~~spill-proof spout when installed on a~~ six (6) portable fuel container ~~(spill- proof~~ system~~s)~~. Using water, the portable fuel container is

filled to its rated capacity and inverted for a period of time for an initial check for leaks. The liquid is then dispensed through the ~~spill-proof~~ spout into a test fixture. The ~~spill-proof spout~~automatic closure is ~~allowed to close~~actuated when approximately 25~~%~~ percent of the container rated capacity has been dispensed to verify ~~the automatic closure~~this feature is operational, and it is then checked for leaks and liquid retention in any open parts of the spout. This procedure is repeated twice more without refilling the container to check the performance at three different fill levels. ~~The spill-proof~~portable fuel container ~~system is then pressurized to 34.5 kPa (5.0 pounds per square inch, (psig) with compressed air and immersed in a water bath for five minutes to test for high-pressure leaks.~~ Durability is also demonstrated on the portable fuel container systems by cycling pressure, exposure to ultraviolet light, and fuel sloshing.

~~3. BIASES AND INTERFERENCES~~

~~This section is reserved for future specifications.~~

~~4. SENSITIVITY, RANGE, AND PRECISION~~

~~This section is reserved for future specifications.~~

~~5~~3. EQUIPMENT

~~5.1~~(a) Test fixture as shown in Figure 1~~2~~.

~~5.2~~(b) Pressure gauge, 0-100 kPa, 1 kPa graduation (0-15 psig, 0.2 psig graduation), Grade 2A accuracy or better.

~~5.3~~(c) ~~Pressure gauge adapter and container pressurization assembly as shown in Figure 23.~~

(c~~d~~) Ultraviolet light source of at least 24 W/m^2 (0.40 W-hr/m^2/min) (optional).

(d~~e~~) Certification fuel as described in part II, section A.100.3.1.2 of the "California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light Duty Trucks, and Medium-Duty Vehicles" or in 40 C.F.R. Part 1065.710 (b), which are incorporated by reference herein.

~~6~~4. CALIBRATION PROCEDURE

~~This section is reserved for future specifications.~~Calibrate the pressure gauge according to the manufacturer's recommended procedure and schedule.

~~7~~5. TEST PROCEDURE

~~7~~5.1 System Preparation

Fill the portable fuel container to its rated capacity with water and ~~attach~~ install and tighten the spout per ASTM F852-08 section 4~~the manufacturer's instructions.~~ ~~For spill-proof spouts that are not part of a spill-proof system, select the largest portable fuel container specified for use by the spill-proof spout manufacturer for the test procedure. Fill the selected portable fuel container to its rated capacity with water and attach the spill-proof spout per manufacturer instructions.~~ This assembly is now considered a ~~spill-proof~~portable fuel container system.

~~7~~5.2 ~~Verify~~Initial Leak ~~Free System~~Check

Invert the ~~spill-proof~~portable fuel container system with the spout pointing down in a vertical ~~axis~~ axial position for a period of five minutes~~ to ensure that there are no leaks~~. Any leak from any point in the portable fuel container system during this five minute period constitutes a failure. Record the outcome on the field data sheet (see Figure 2~~3~~1). If the ~~spill-proof~~portable fuel container system is observed leaking, place the ~~spill-proof~~portable fuel container system in the upright position and ensure that the ~~spill-proof~~ spout is correctly and firmly attached. Invert the container again for a period of five minutes and check for leaks. Record the outcome on the field data sheet.

~~7~~5.3 ~~Verify~~ Automatic Closure Test

Pre-fill the test fixture with ~~0.25 multiplied by (5.0 gallons minus the container's rated capacity) gallons of~~ water as shown in the following equations:

~~Pre – fill Volume = 0.25 * (5 gallons – capacity in gallons)~~

Pre-fill Volume = Volume of Test Fixture – (0.25 × Capacity of PFC)
For PFC ≤ 5 gallons

Pre-fill Volume = 0
For PFC > 5 gallons

Following the manufacturer's instructions, carefully insert the ~~spill-proof~~ spout into the opening on top of the test fixture (see Figure 1~~2~~) and dispense water until the tip of the spout is immersed in water. ~~Engage the automatic closure feature~~ Remove the spout from the test fixture and allow the spout to close. ~~and~~ Gently~~gently~~ tap the spout against the opening of the test fixture to

remove any water that may adhere to the exterior surface of the spout. The spout must return to the closed position without the operator pushing or pulling the spout closed. Verify that the spout remains closed and sealed by observing the spout for any water leakage while still in the inverted position for 10 seconds. Return the system to the normal upright position and check for leaks and liquid retention while repositioning, and for 10 seconds after repositioning. If at any point the spout fails to return to the closed position, the container fails the test. Record observations on the field data sheet.

Empty test fixture and repeat test procedure two more times in sequence without refilling the fuel container.

~~7~~5.4 Pressurized Leak Check~~Test~~

~~Remove the spill-proof spout and modify the portable fuel container as detailed in figure 3. Fill the portable fuel container to its rated capacity with water and attach the spill-proof spout per manufacturer's instructions. Using a sufficient ballast, place the modified spill-proof system upright in a water bath large enough to completely cover the portable fuel container and at least six inches. Using a compressed air source, as detailed in Figure 2, slowly pressurize the empty spill-proofportable fuel container system to 34.5 kPa (5.0 psig) by actuating the spout while the compressed air source is turned on and record the pressure at which any leaks (i.e., bubbles) may appear. After reaching 34.5 kPa (5.0 psig), stop actuating the spout to prevent air from entering the fuel container. No modifications (e.g., cutting or drilling) are to be made to the container. If the spout is not intended to be used to apply pressure, alternative pressurization methods may be used upon approval from the Executive Officer. The six portable fuel containers must continue to be tested for the subsequent TP-501 steps as well as for TP-502. Using a sufficient ballast, submerge the pressurized portable fuel container system upright in a water bath to a depth of at least six inches. Oobserve the system for any leaks for a period of five minutes. Leaks are determined through the evidence of any bubbles coming from the portable fuel container or spout. Any leak constitutes a failure. Record observations on the field data sheet.~~

5.4~~5~~ Pressure Cycling Test

Perform a pressure test by sealing the container and cycling it between +13.8 and −1.7 kPa (+2.0 and −0.5 psig) for 10,000 cycles at a rate of 60 seconds per cycle. For this test, the spout may be removed and the pressure applied through the opening where the spout attaches. The purpose of this test is to represent environmental wall stresses caused by pressure changes and other factors (such as vibration or thermal expansion). If the container cannot be tested using the pressure cycles specified by this paragraph, the use of an

alternative test procedure may be requested. Record observations on the field data sheet.

5. 5~~6~~UV Exposure Test

Perform a sunlight-exposure test by exposing the portable fuel container system to an ultraviolet light of at least 24 W/m^2 (0.40 W-hr/m^2/min) on the container surface for at least 450 hours. Alternatively, the container may be exposed to direct natural sunlight for an equivalent period of time, as long as the container is exposed to at least 450 daylight hours. Record observations on the field data sheet.

5. 6~~7~~Slosh Test

Perform a slosh test by filling the portable fuel container to 40 percent of its capacity with the fuel specified in section 3 (d~~e~~) and rocking it at a rate of 15 cycles per minute until one million total cycles have been completed. Use an angle deviation of +15° to −15° from level. Record observations on the field data sheet.

~~8. QUALITY ASSURANCE / QUALITY CONTROL (QA/QC)~~

~~This section is reserved for future specification.~~

~~9~~6. RECORDING AND REPORTING DATA

Record data on a form similar to the one shown in Figure 2~~3~~1. Data forms, field notes, and any supporting documentation shall be made available to ARB upon request. The manufacturer shall maintain these documents for a period of not less than 5 years after the completion of testing.

~~10. CALCULATING RESULTS~~

~~This section is reserved for future specifications.~~

~~11~~7. ALTERNATIVE TEST PROCEDURES

Test procedures, other than specified ~~above~~herein, shall only be used if prior written approval is obtained from the ~~ARB~~ Executive Officer. In order to secure the ~~ARB~~ Executive Officer's approval of an alternative test procedure, the applicant is responsible for demonstrating to the ~~ARB~~ Executive Officer's satisfaction that the alternative test procedure is equivalent to this test procedure as described in section 6 of ARB Certification Procedure "CP-501, *Certification Procedure for Portable Fuel Container Systems*." The Executive Officer reserves the right to require the applicant of an innovative system to develop an alternative test procedure which demonstrates the intent of each test requirement not achieved due the innovative design.

~~Such approval shall be granted on a case-by-case basis only.~~

~~Documentation of any such~~ ~~approvals, demonstrations, and approvals shall be maintained by the ARB Executive Officer and shall be made available upon request.~~

~~12~~8. REFERENCES

~~This section is reserved for future specification.~~

Control of Evaporative Emissions From New and In-Use Portable Fuel Containers. Title 40, Code of Federal Regulations, Part 59. United States Environmental Protection Agency, Subpart F.

California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light Duty Trucks, and Medium-Duty Vehicles. Part II, section A.100.3.1.2.

Engine Fluids, Test Fuels, Analytical Gases and Other Calibration Standards. Title 40, Code of Federal Regulations Part 1065, United States Environmental Protection Agency, Subpart H.

ARB Certification Procedure ~~501~~ for Portable Fuel Container Systems, CP-501.

ARB Test Procedure for Determining Diurnal Emissions from Portable Fuel Container Systems, TP-502.

Standard Specification for Portable Gasoline Containers for Consumer Use, ASTM F852-08.

~~13~~9. FIGURES

Figure 1. ~~Field Data Sheet~~Test Fixture

~~Figure 2. Test Fixture~~~~Elevated Pressure Test Setup~~

Figure 2~~3~~. ~~Elevated Pressure Test Setup~~Field Data Sheet

Figure 1. Field Data Sheet

Portable Fuel Container Compliance Tests

I.D. Number _____ **Container Volume (gallons)** _____

System Mfg. _____ **Spout Model** _____

Container Model _____

Initial Leak Check P F

Tested by: _____ **Test Date:** _____

Initial Leak Test Results (pass/fail)		Comments
Trial 1	Trial 2 (If necessary)	

Automatic Closure Test

Tested by: _____ **Test Date:** _____

Automatic Closure Test Results (pass/fail)			Comments
Trial 1	Trial 2	Trial 3	

Elevated Pressure Test

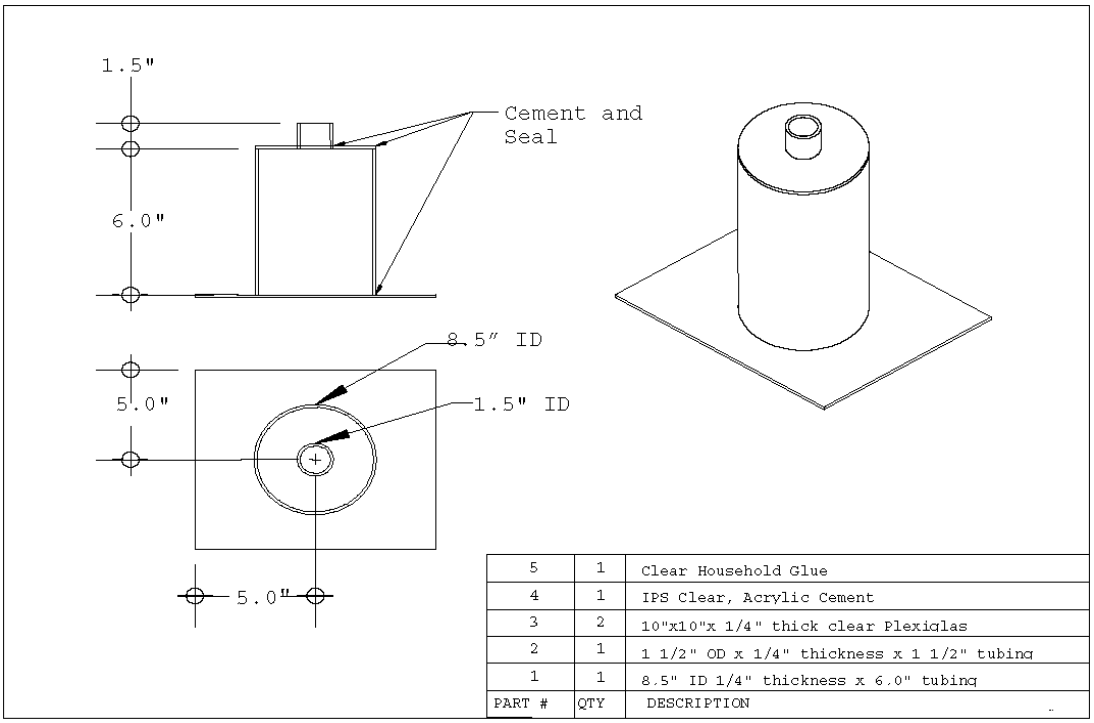
Tested by: _____ **Test Date:** _____

Pressure Test Results				Comments
Start Time	Stop Time	Total (minutes)	Results (pass/fail)	

I.D. # of Container Used _____

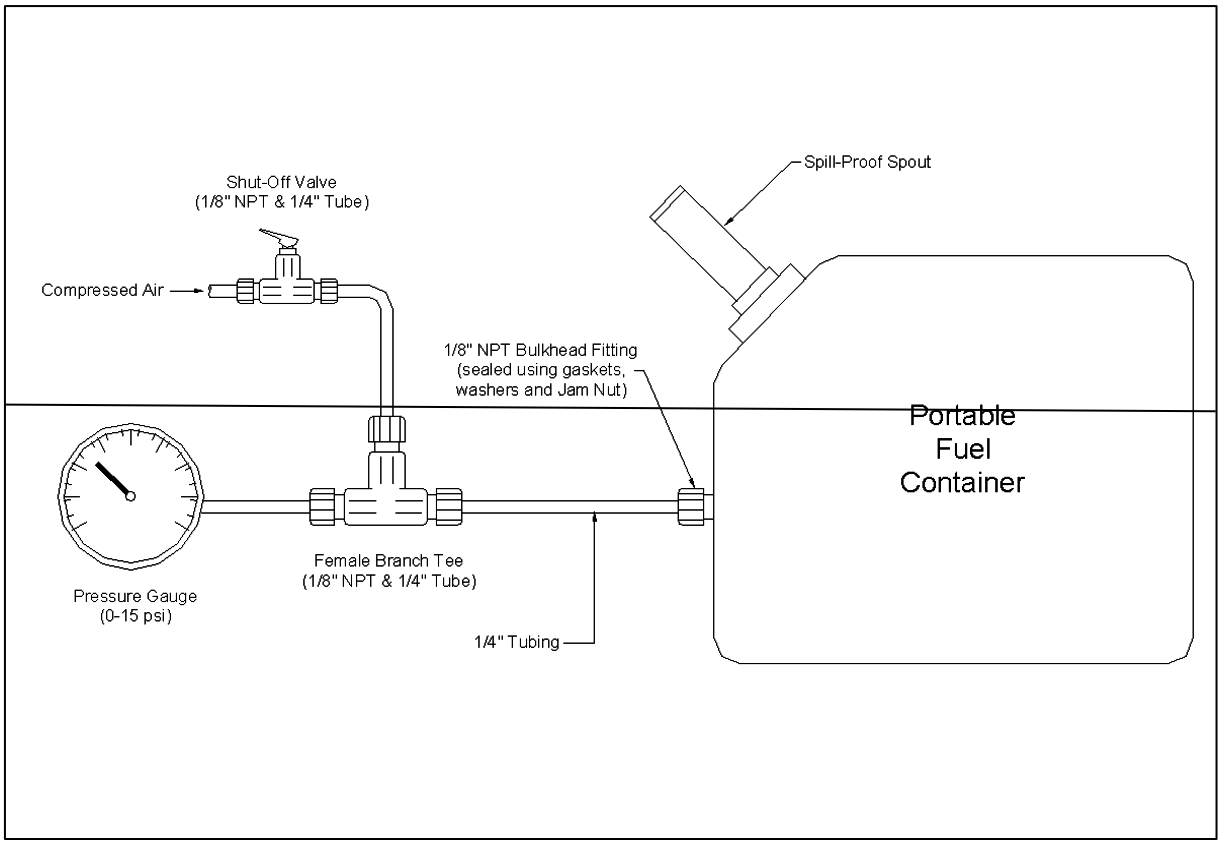
Additional Comments:

Figure 12. Test Fixture



PART #	QTY	DESCRIPTION
5	1	Clear Household Glue
4	1	IPS Clear, Acrylic Cement
3	2	10"x10"x 1/4" thick clear Plexiglas
2	1	1 1/2" OD x 1/4" thickness x 1 1/2" tubing
1	1	8.5" ID 1/4" thickness x 6.0" tubing

~~**Figure 23. Pressurized Leak Check Assembly**~~**Elevated Pressure Test Setup**


Shut-Off Valve
(1/8" NPT & 1/4" Tube)
Compressed Air
Spill-Proof Spout
1/8" NPT Bulkhead Fitting
(sealed using gaskets,
washers and Jam Nut)
Portable
Fuel
Container
Female Branch Tee
(1/8" NPT & 1/4" Tube)
Pressure Gauge
(0-15 psi)
1/4" Tubing

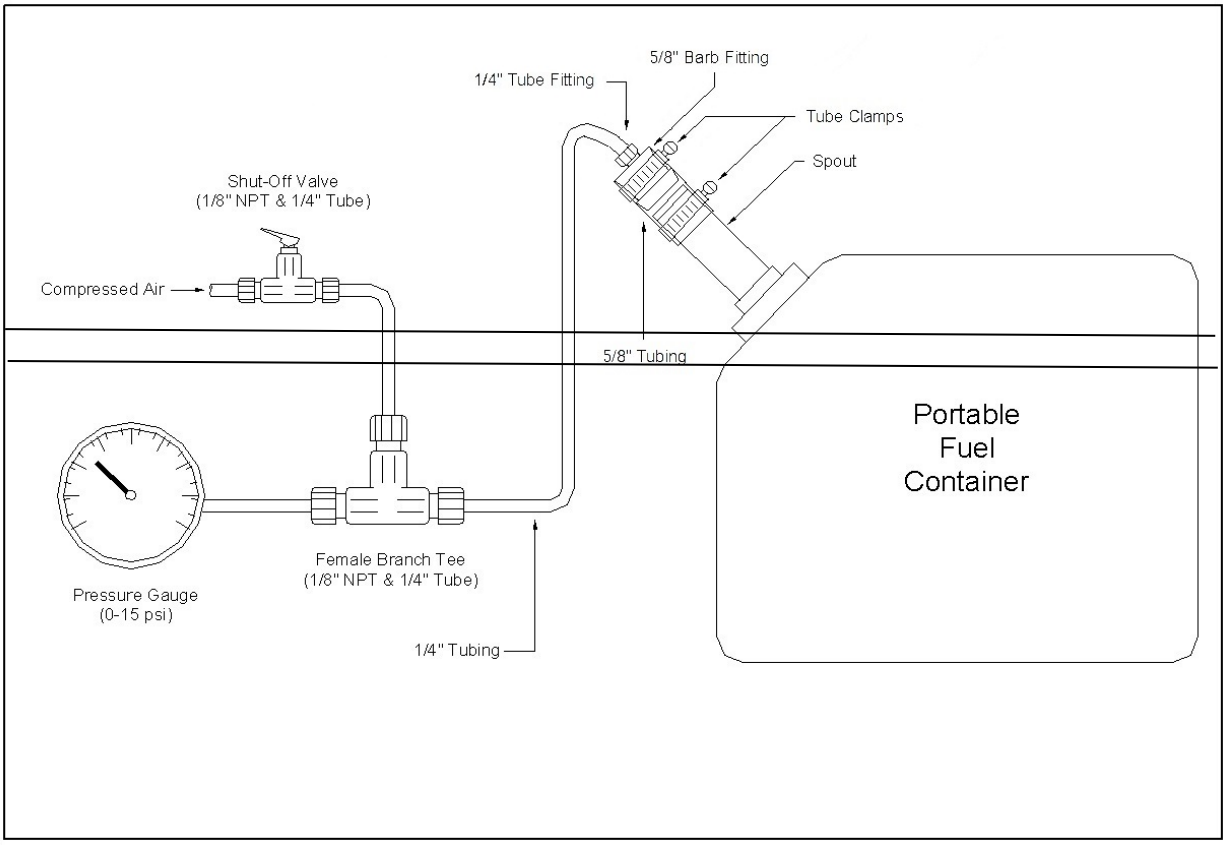

1/4" Tube Fitting
5/8" Barb Fitting
Tube Clamps
Spout
Shut-Off Valve
(1/8" NPT & 1/4" Tube)
Compressed Air
5/8" Tubing
Portable
Fuel
Container
Female Branch Tee
(1/8" NPT & 1/4" Tube)
Pressure Gauge
(0-15 psi)
1/4" Tubing

Figure 23. Field Data Sheet

Portable Fuel Container Compliance Tests

I.D. Number _____ **Container Volume (gallons) _____**

System Mfg. _____ **Spout Model _____**

Container Model _____

Initial Leak Test

Tested by: _____ Test Date: _____

Initial Leak Test Results (pass/fail)		Comments
Trial 1	Trial 2 (If necessary)	

Automatic Closure Test

Tested by: _____ Test Date: _____

Automatic Closure Test Results (pass/fail)			Comments
Trial 1	Trial 2	Trial 3	

~~**Pressurized Leak Test**~~

~~**Tested by: _____ Test Date: _____**~~

~~Pressure Test Results~~				~~Comments~~
~~Start Time~~	~~Stop Time~~	~~Total (minutes)~~	~~Results (pass/fail)~~	

Pressure Cycling Test

Tested by: _____ Test Date: _____

Pressure Cycling Test Results			Comments
Start Date & Time	Stop Date & Time	Total (hours)	

Figure 23. Field Data Sheet (continued)

UV Exposure Test

Tested by: _____ Test Date: _____

UV Exposure Test Results			Comments
Start Date & Time	Stop Date & Time	Total (hours)	

Slosh Test

Tested by: _____ Test Date: _____

Slosh Test Results			Comments
Start Date & Time	Stop Date & Time	Total (hours)	

I.D. # of Container Used _____

Additional Comments:

_____
_____
_____
_____
_____
_____
_____