State of New Jersey
Department of Environmental Protection

Fuel Compatibility Issues

Ultra-Low Sulfur Diesel

&

E-10/E-15 Gasoline

NJDEP- HW/UST Compliance & Enforcement

NJDEP- HW/UST Enforcement Appreciates the Contributions of:

Thomas Ruga [Spark Contractors]
John Sieger [Tanknology]

Ultra-Low Sulfur Diesel

15PPM

94921
DIESEL
15,000 GAL

The fuel test kit is used for detecting the presence of microbial growth in the diesel USTs.

This fuel sample does not show the presence of microbial growth in the ULSD.

The red layer of liquid shows a positive test for microbial activity in the diesel fuel.

Access port for bronze dispenser screen

A dispenser screen located in the meter housing.
Measures ~ 4.5” X 1.5”

Inside of the filter screen showing the results of contaminated fuel. The operator was not aware that this was the reason he was not able to dispense fuel.

Another view of the meter filter screen. <u>Many owner/operators are not aware of these screens</u>, only the cartridge spin on filters.

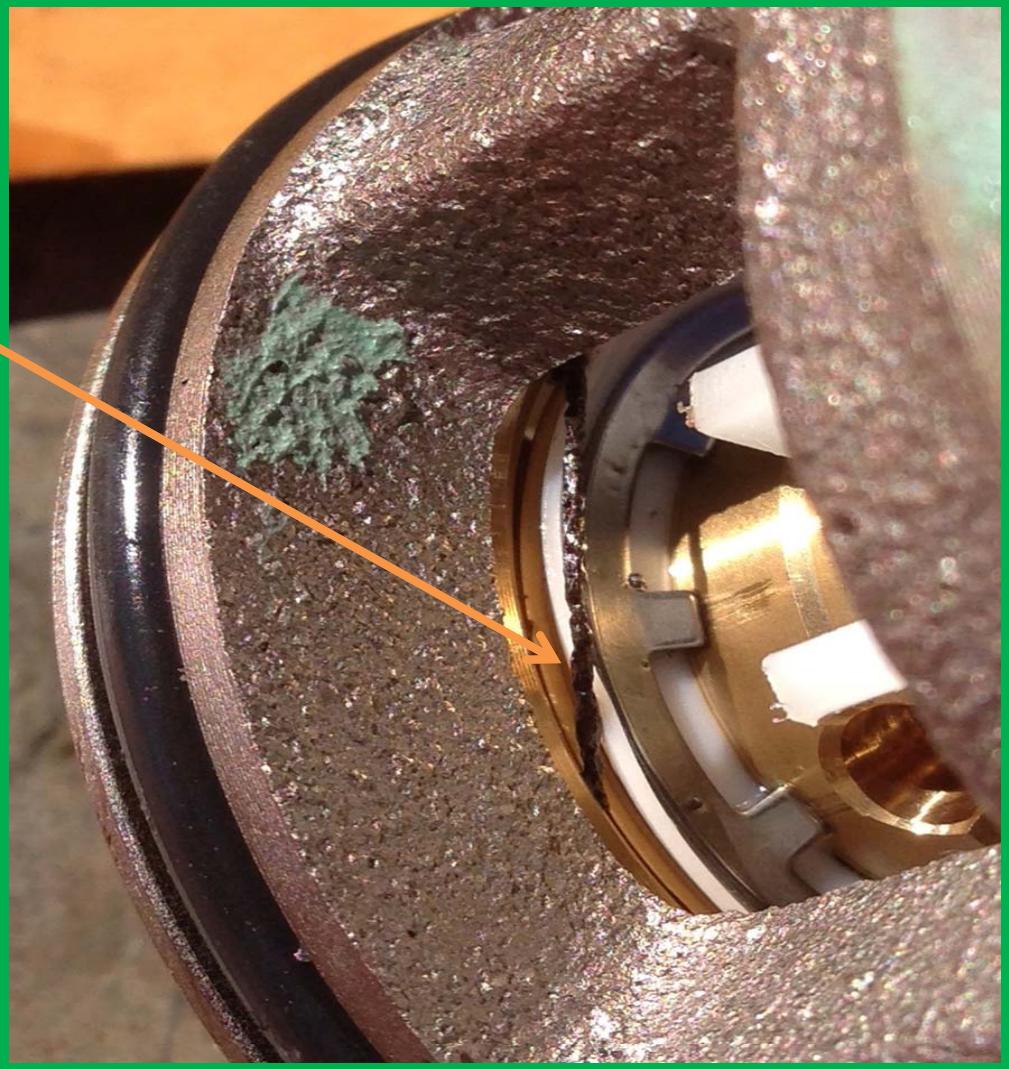
A wireless line leak detector, WLLD.

The screen of the WLLD is located in the STP output line. Note the turbine pressure has collapsed the debris screen.

Another view of the collapsed screen caused by the contaminated fuel present in the tank.

Spring and piston from Red Jacket ALLD. The bottom one (ULSD) is totally inoperative

Piece of rotted spring from former ALLD



Replacement ALLD (new), but a piece of the rotted spring jammed the piston open rendering the unit inoperative. This was found only because the contractor tested it.

ULSD can also cause shear valves to cease operating, typically the actuation spring corrodes. This is an all stainless valve which is not affected by the corrosive process.

An STP Lower Assembly
ULSD Tank

ULSD STP

Corrosion found in the Red Jacket/Marley functional element.

Additional corrosion found in the functional element.

Another functional element showing corrosion (ULSD)

A sample of carbon based sludge recovered from the bottom of a Diesel UST.

Tank “sweeping” recovered these pieces of metal from a steel Diesel UST which is corroding from the inside. CP does not alleviate this condition.

If bacterial growth is present, the underside of the toggle cap tends to be pale green from corrosion. A painted cap (above) tends not to show the presence of microbes.

If bacterial growth is present, the underside of the toggle cap tends to be pale green from the corrosion resulting from microbe presence

E-10/15 GASOLINE

A turbine sump and equipment. Since it is a diesel tank, the effects of E10 corrosion are not present

Tank riser showing E10 vapor corrosion.

A view of the inside of a metallic riser fitted to an E10 tank.

PLLD

Condenser Housing

Advanced corrosion on an STP. PLLD is doing somewhat better. The condenser/capacitor housing cap is almost gone.

Another STP with progressing corrosion.

Stainless Flex Piping

Except for the plastic sump sensor and stainless flex, the steel and copper are seriously impacted by E10 vapors. The presence of water in the sump seems not to add to the situation.

Red Jacket/Marley STPs are not alone. This F.E. Petro unit is also showing heavy corrosion. Even the fire extinguisher is affected.

Fire Extinguisher

F.E. Petro STP. Even the in-sump fire extinguisher is subject to the E10 corrosion.

CAUTION

Stainless Steel Flex with Carbon Steel Piping

Stainless Steel Flex with Carbon Steel Piping

Bolt

Bolt

A tank manway with liquid sensor and ATG probe. Note the condition of the metallic fittings, especially the manway lid bolts.

A manway sump with liquid sensor, ATG riser and possible poppet valve. (American Suction?)

A manway sump. Note the advanced corrosion of the bolts which make lid removal almost impossible.

Another view of heavily corroded manway bolts.

A dispenser meter filter screen. The tank contained E85 gasoline. Note the contamination is on the outside of the screen.

ATG PROBES

Probe Canister

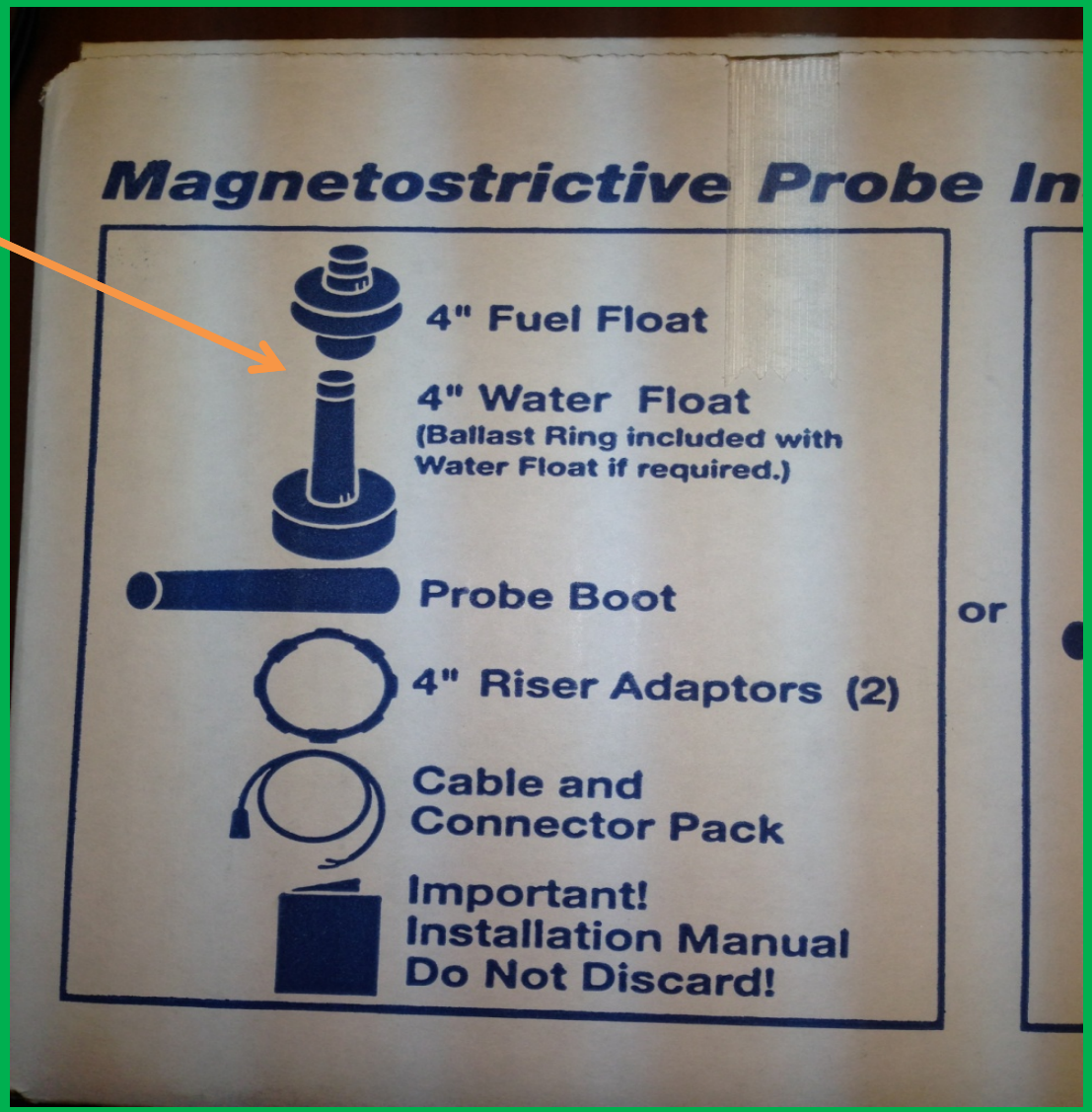
Non-magnetic Float Guide Rod

A Veeder-Root MAG 1 Probe.

MAG 1 Tank Probe

The canister contains the electronics that pulse a current through the float guide wires.

NOTE: Only two floats



MAG One Probe

e Installation (This Kit Contains:)

or

2" Fuel Float

2" Water Float
(Ballast Ring included with Water Float if required.)

Probe Boot

3" Riser Adaptors (2)

Cable and Connector Pack

Important!
Installation Manual
Do Not Discard!

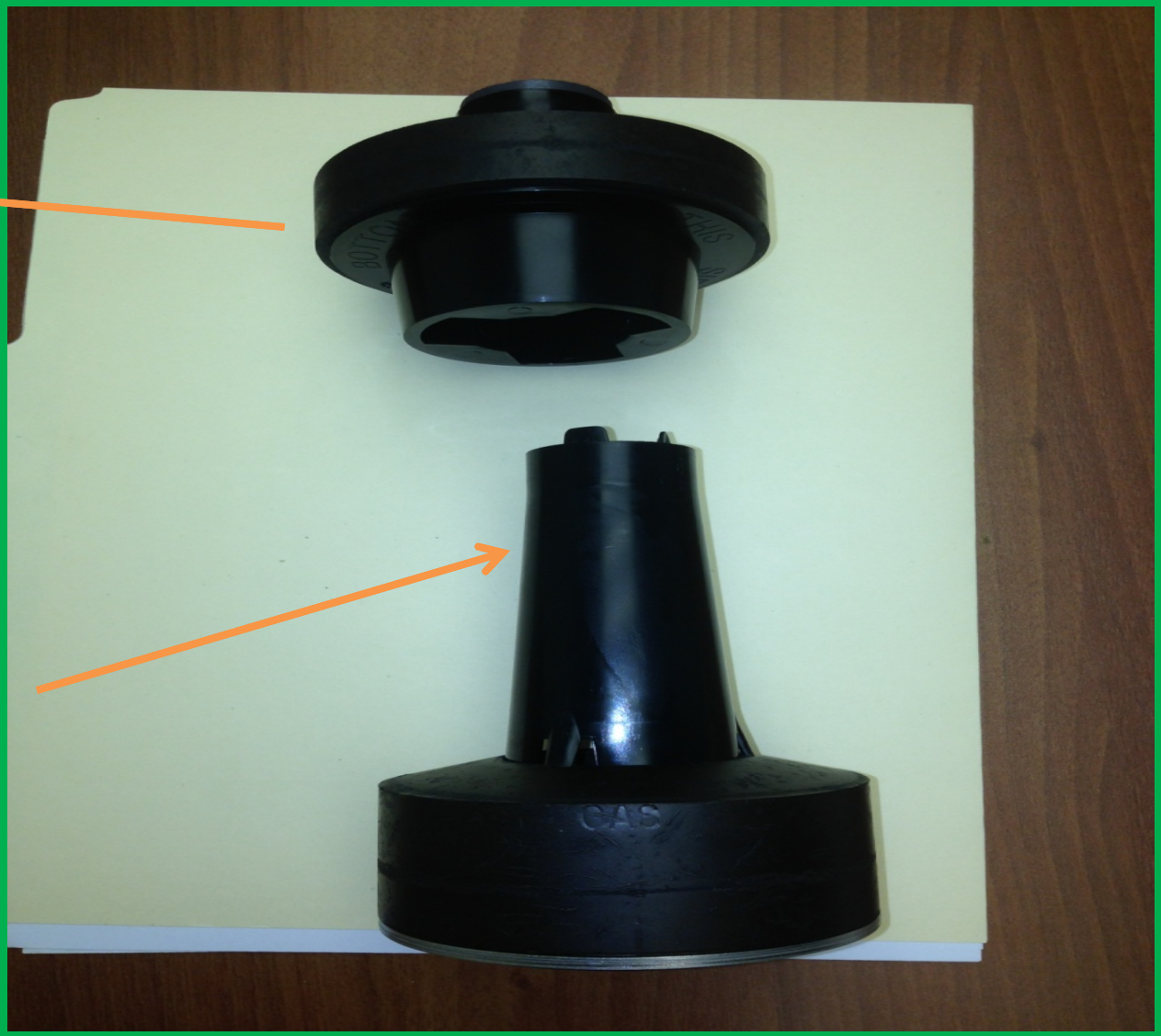
Product Float

Water Float

Water & Fuel Floats

Product Float

Water Float



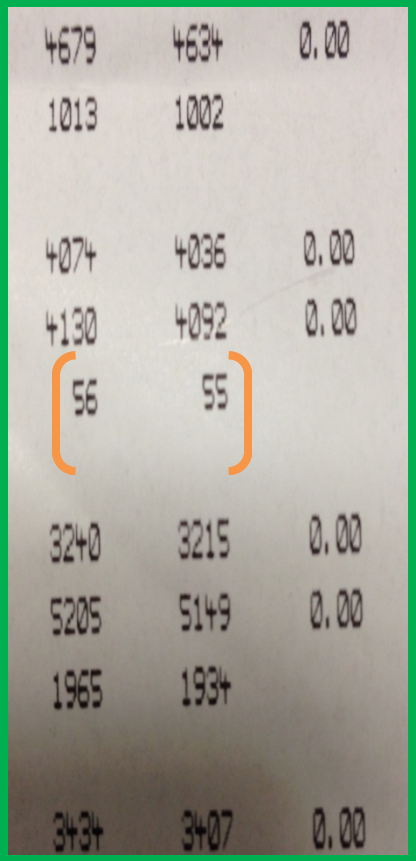
MAG 1 Float Assembly

MAG 1 Float Assembly

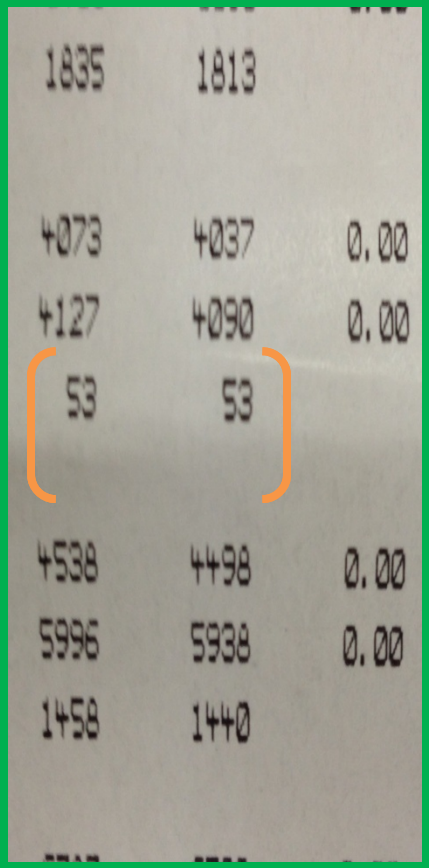
MAG One Probe

Water Float of a MAG One Probe
Water Float Would not Lift due to
Contamination Deposits

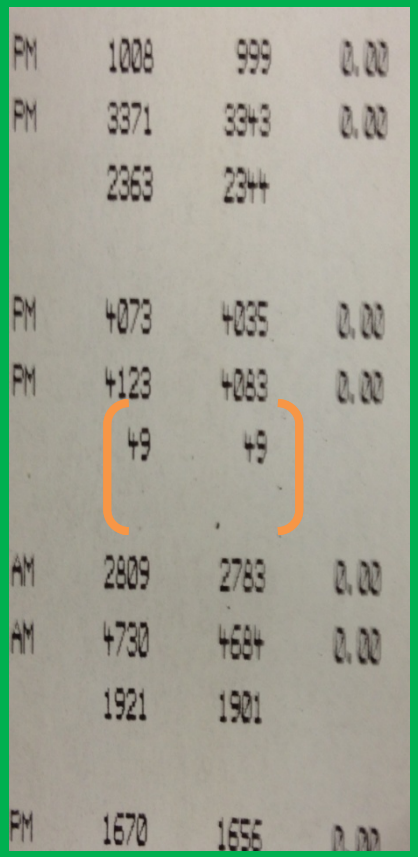
Note Heavy Deposits on Product Float and Magnet Ring. Product Level Could Not Be Determined



4679	4634	0.00
1013	1002	
4074	4036	0.00
4130	4092	0.00
56	55	
3240	3215	0.00
5205	5149	0.00
1965	1934	
3434	3407	0.00



1835	1813	
4073	4037	0.00
4127	4090	0.00
53	53	
4538	4498	0.00
5996	5938	0.00
1458	1440	



PM	1008	999	0.00
PM	3371	3343	0.00
	2363	2344	
PM	4073	4035	0.00
PM	4123	4083	0.00
	49	49	
AM	2809	2783	0.00
AM	4730	4684	0.00
	1921	1901	
PM	1670	1656	0.00

“Ghost Deliveries” (in gallons) caused by fuel float sticking, then freeing up to show true inventory

OPW Q0400 Probe Canister

Note heavy corrosion

Heavily corroded probe suspension chain

ATG Probe Riser: ULSD AST

Water Float

Product Float

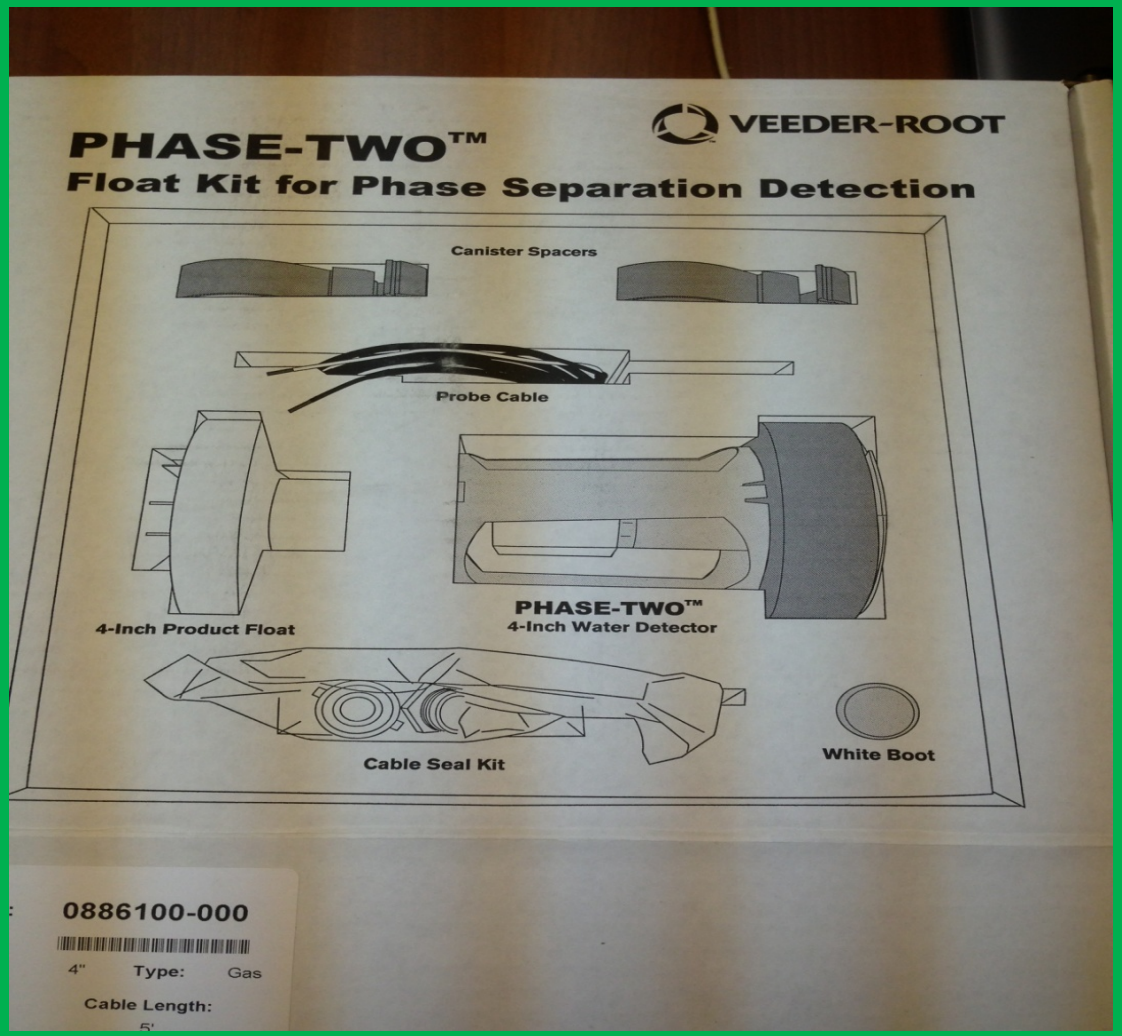
OPW Q0400 Float Assembly

Product float NOTE heavy deposits of iron and carbon

OPW Q0400 Product Float

Veeder-Root ATG Canister (ULSD)

Identical Veeder-Root ATG Canister showing severe corrosion from ULSD

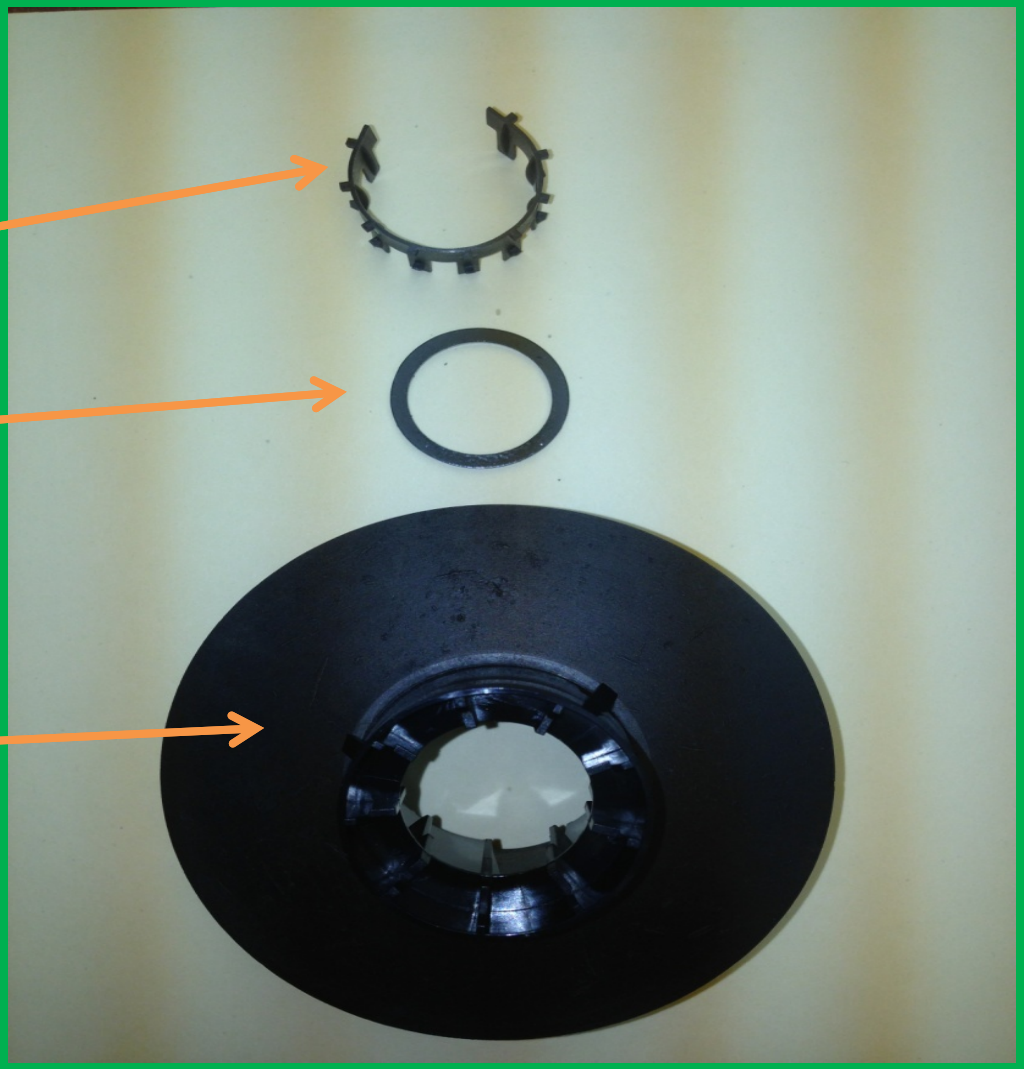


The Phase-Two float kit only works with a MAG Plus (7,8,9). The TLS-450 must have 3A software and the TLS-300/350 require version 30B software.

A Veeder-Root Phase-Two Float Assembly.

MAG Plus Phase-Two float unit.
Product float, separate phase float and water float.

Phase-Two Product Float.



Product Float Assembly

Water Float

Weight Plates

Phase-Two Float Unit
Water float with stainless steel plates that set displacement to lift only in water.

Separate Phase float top and water float on bottom.

Locking retaining boots. The white one is only compatible with MAG Plus probes. The black boot will fit the probe but lifts the water float triggering a continuous water alarm.

Tank Sweeping/Cleaning

Fuel Treatment Unit

500 gallon reserve tank

Filter units

Water Knock-out unit

Fuel Treatment Unit

Return Line

In-Line Screen

Intake Line

Trailer mounted tank sweeping/fuel cleaning unit

Water Knock-Out Unit

In-Line Screen

In-Line Screen
Pre-Treatment

Unused Cloth Filter Media

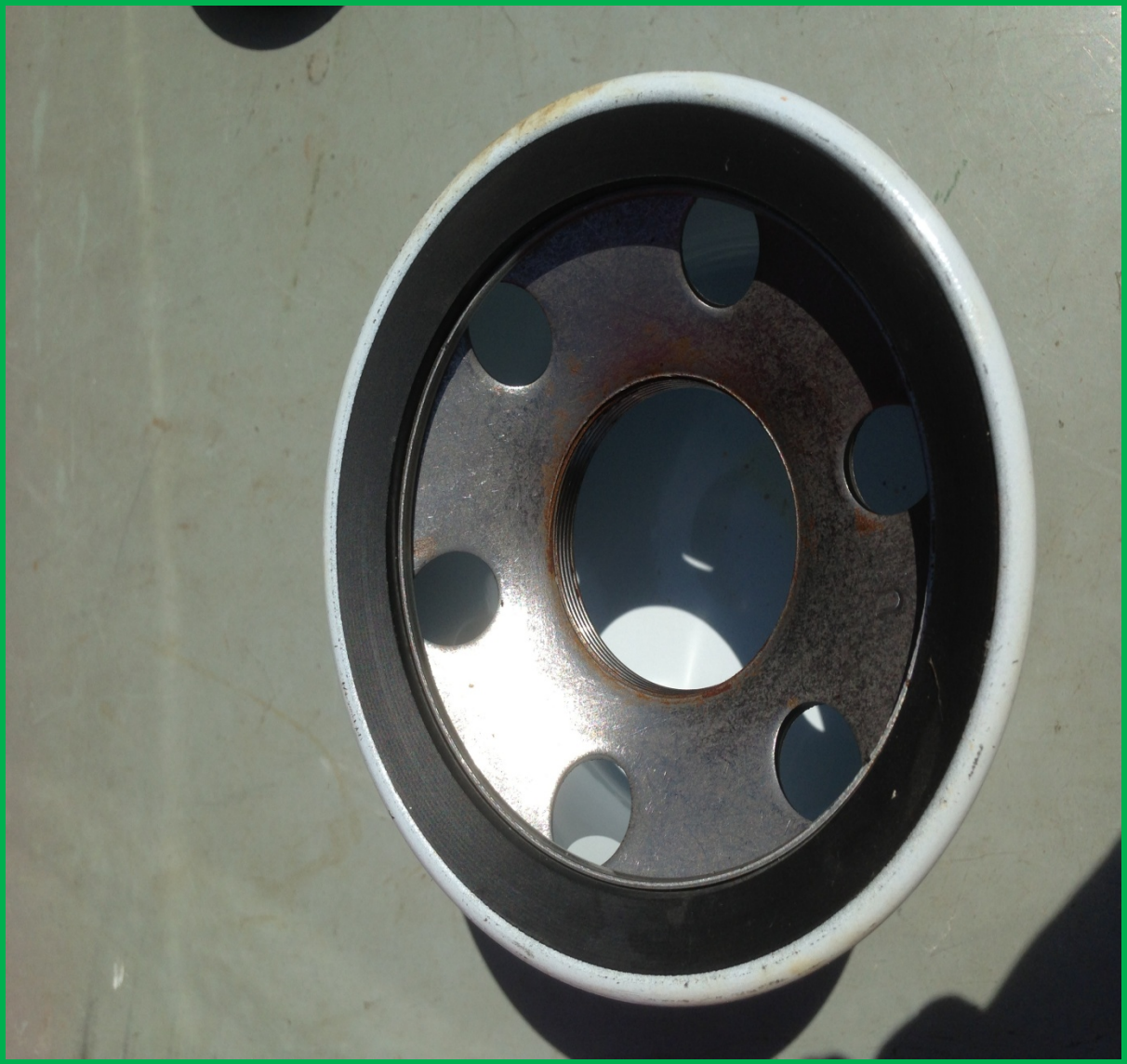
Cloth filter media contamination already present

Main Filter Units
Left Filter Shows Contamination After Just 30 Minutes Run Time

Steel Corrosion Particles
USLD Tank

Tank Bottoms Collected From Pre-Treatment Screen

Many operators use these test units to save money.
These devices are NOT filters and will not help with contamination removal.
They are ~ half the length of a true filter unit.



Obviously NOT a True Filter

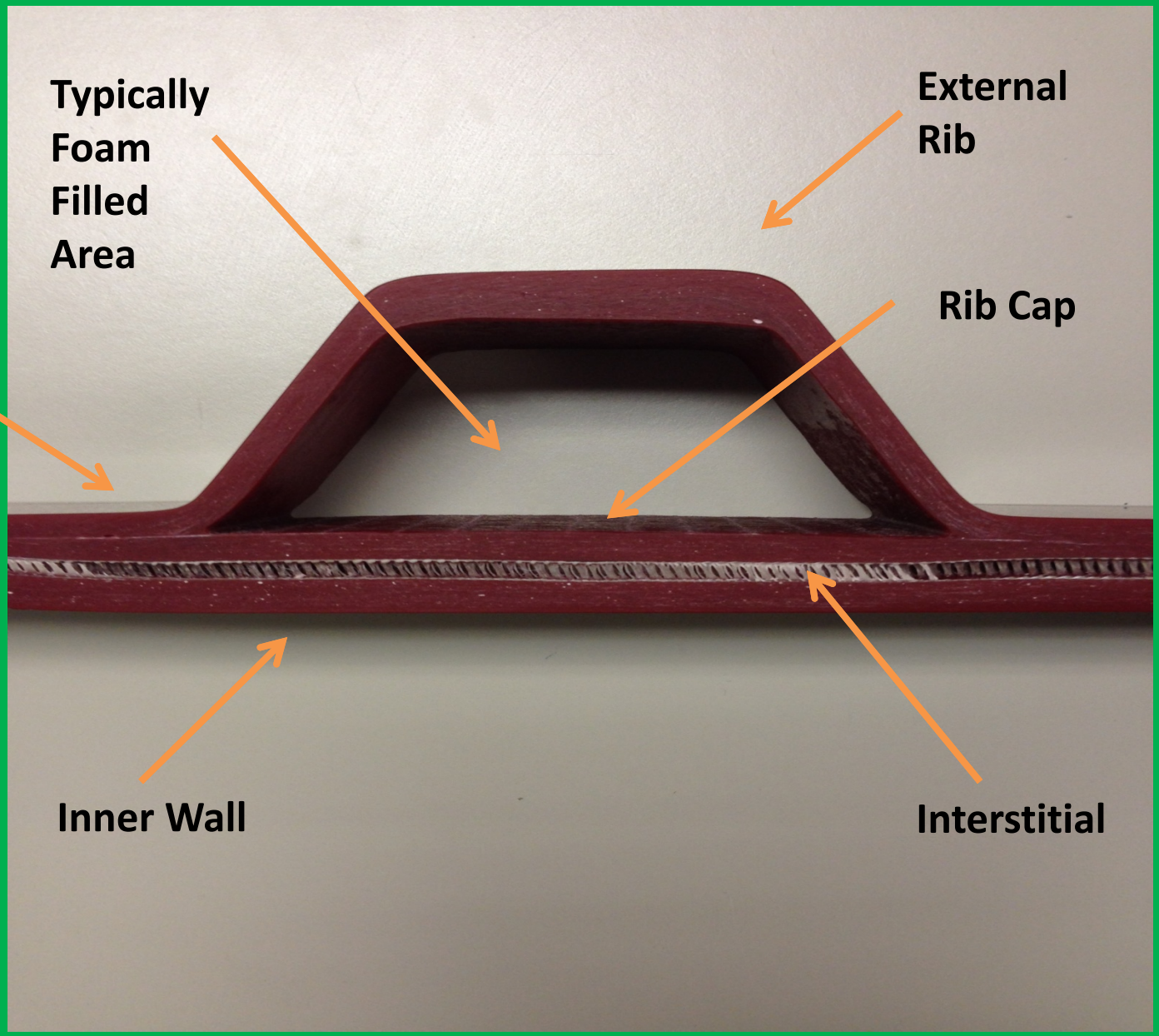
PLLD screen crushed by STP pressure and contamination blockage

Inoperative Unit from ULSD UST

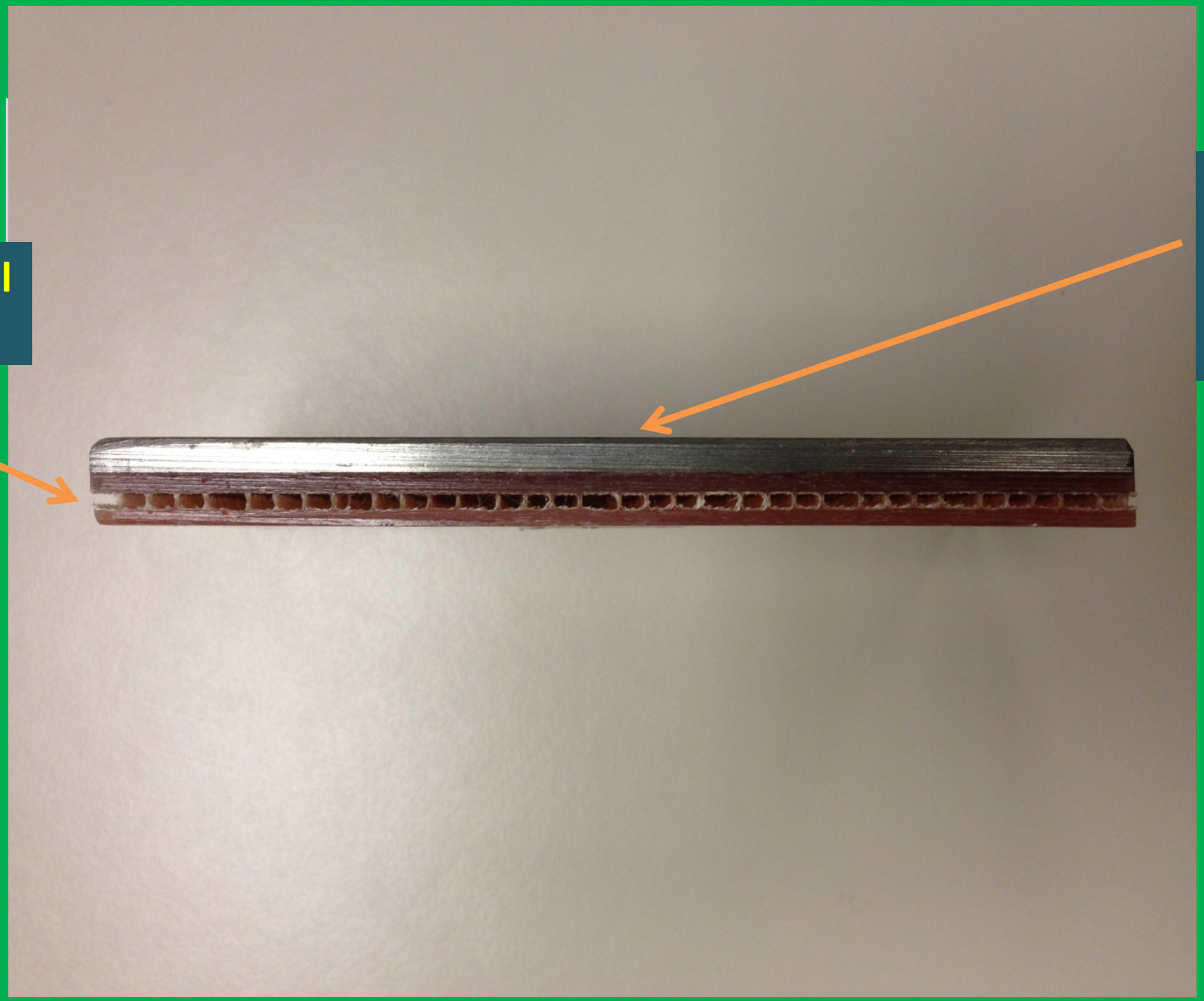
A Universal overfill from an E10 UST

Universal Drop Tube Overfill Units

TANK INSPECTIONS



XERXES Double Wall FRP UST X-section



Phoenix Double Wall Tank Lining System

XERXES Single Wall FRP UST X-section

Xerxes SW FRP Tank

Fuel Leak from Tank Rib Seen from Inside of UST

Wall Failure Fuel Leak

SW FRP Tank

SW FRP Tank
Outside View