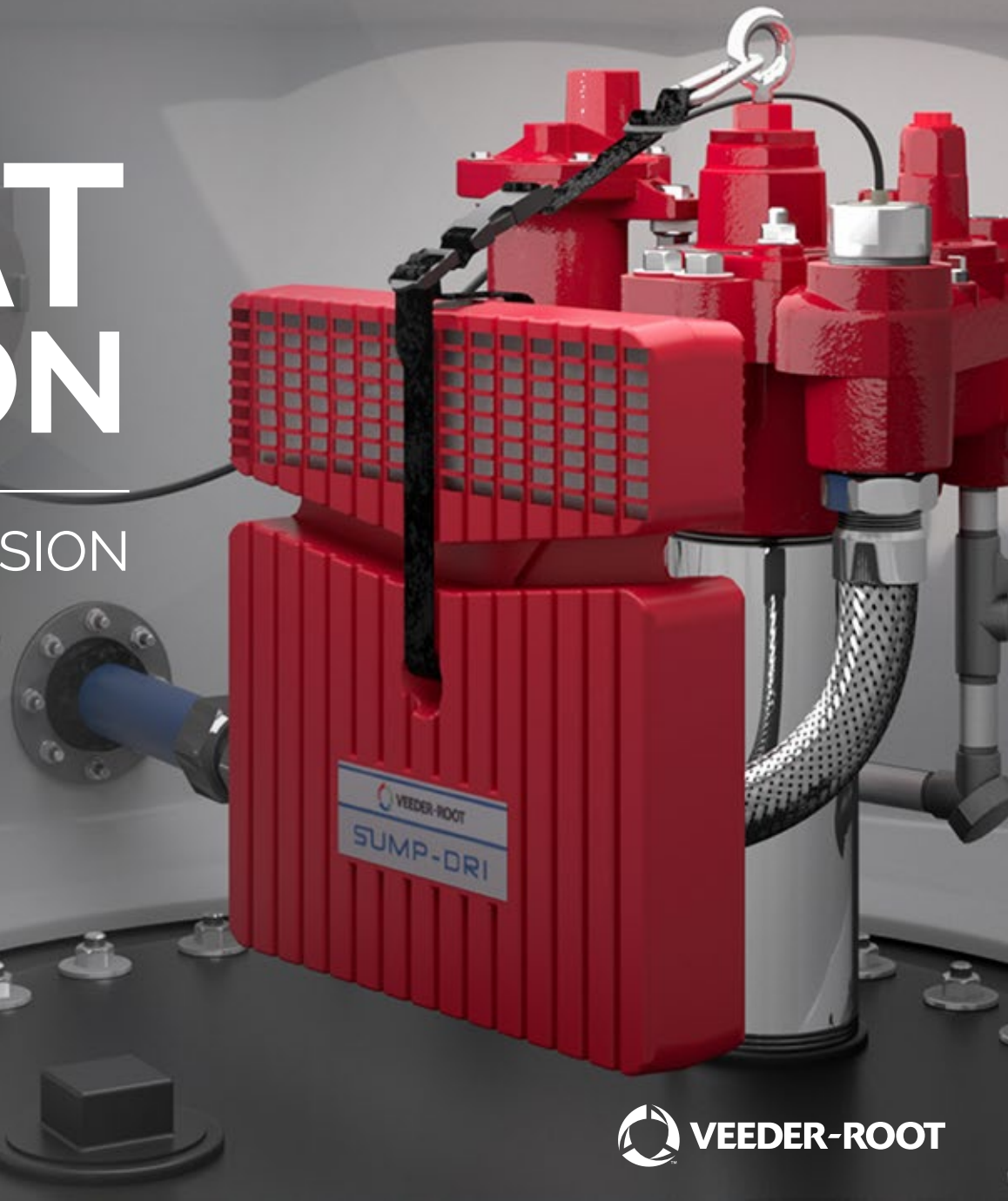


COMBAT CORROSION



— PROTECT IN-SUMP —
EQUIPMENT FROM CORROSION



DID YOU KNOW?

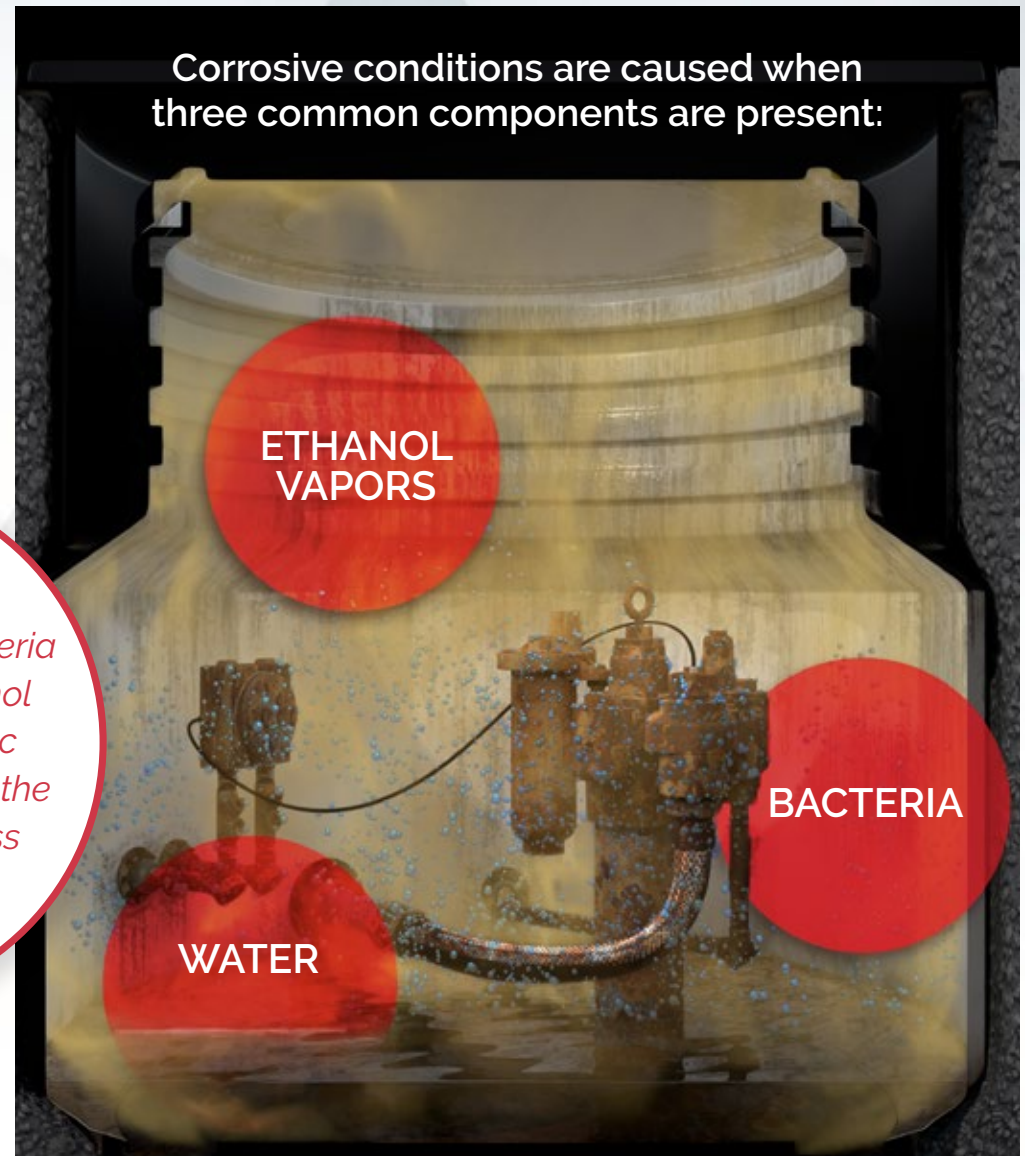
- An EPA Study of Underground Storage Tanks used for Diesel Service found that **83%** *[35 of 42 USTs tested]* showed signs of corrosion.¹
- During that same study only **25% of owners** reported knowing about corrosion in their UST systems.¹
- The predicted concentration of ethanol and acetic acid is roughly **100-fold higher** in sumps that had visible signs of corrosion.²
- Wet sumps are over **4.5X more likely** to have rust tubercles, and over **8X more likely** to have blue corrosion, than dry sumps.²

*Every effort has been made to accurately represent our product and their abilities. Actual results may vary depending on environmental conditions.

WHY IS CORROSION OF IN SUMP EQUIPMENT AN ISSUE?

Corrosion of equipment in sumps causes deterioration and shortens its useful life span. As corrosion advances it has the potential to affect the integrity of piping and electrical systems, and the serviceability of submersible turbine pump [STP] equipment.

Water provides an environment where bacteria can degrade the ethanol vapors to create acetic acid. Acetic acid is then the catalyst for the process of corrosion to begin.





WHAT ARE THE FIRST STEPS TO LIMITING CORROSION?

The corrosive process needs ethanol vapors, water and bacteria to create acetic acid. To reduce the likelihood of corrosion in a sump, eliminate the presence of any one of these components.

Limiting the amount of ethanol vapor in a sump is done by eliminating any possible vapor paths in sump equipment.

While limiting the presence of water is more difficult, the goal for limiting corrosion should always be to maintain a dry sump.

ENSURE FITTINGS
are fuel tight



**CHECK VENT TUBES
AND FITTINGS**
where vapors may have a path
through from tank head space



CHECK
cord grips, manway caps,
gaskets and electrical conduit
for potential water ingress.



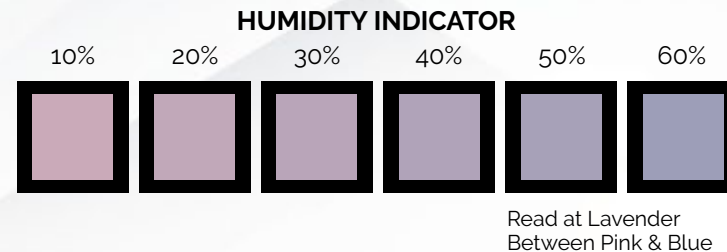
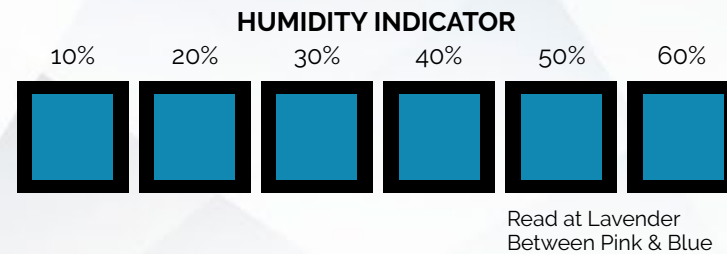
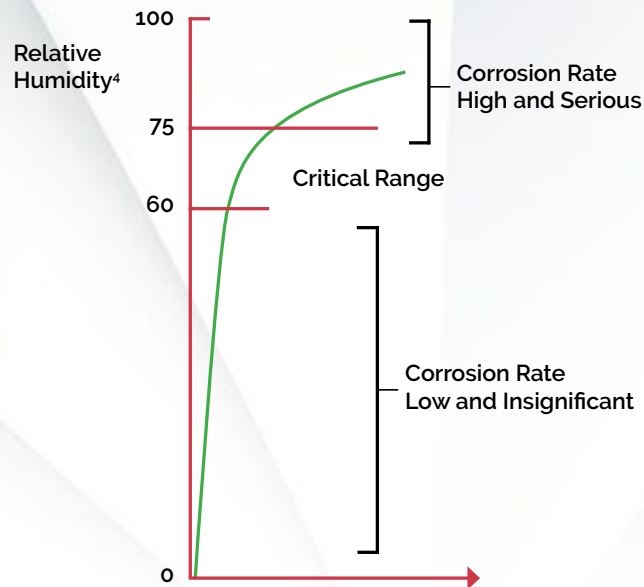
**ENSURE THAT RISER
PIPES AND FITTINGS**
are installed appropriately

LIMITING IN-SUMP CORROSION

To combat corrosion it's important to understand the conditions in your sump.

Corrosion is 'controlled' if humidity levels below 60% are maintained³.

If humidity is greater than 60%, corrosion will not be controlled and will be accelerated with the presence of ethanol vapors.



Depending on the conditions in a specific sump there are a number of different solutions to help mitigate the effects of corrosion and reduce the likelihood that it will occur. This includes if:

The sump frequently has increased moisture or ethanol vapors.

OR

The sump frequently has standing water and water in the tank is an issue.

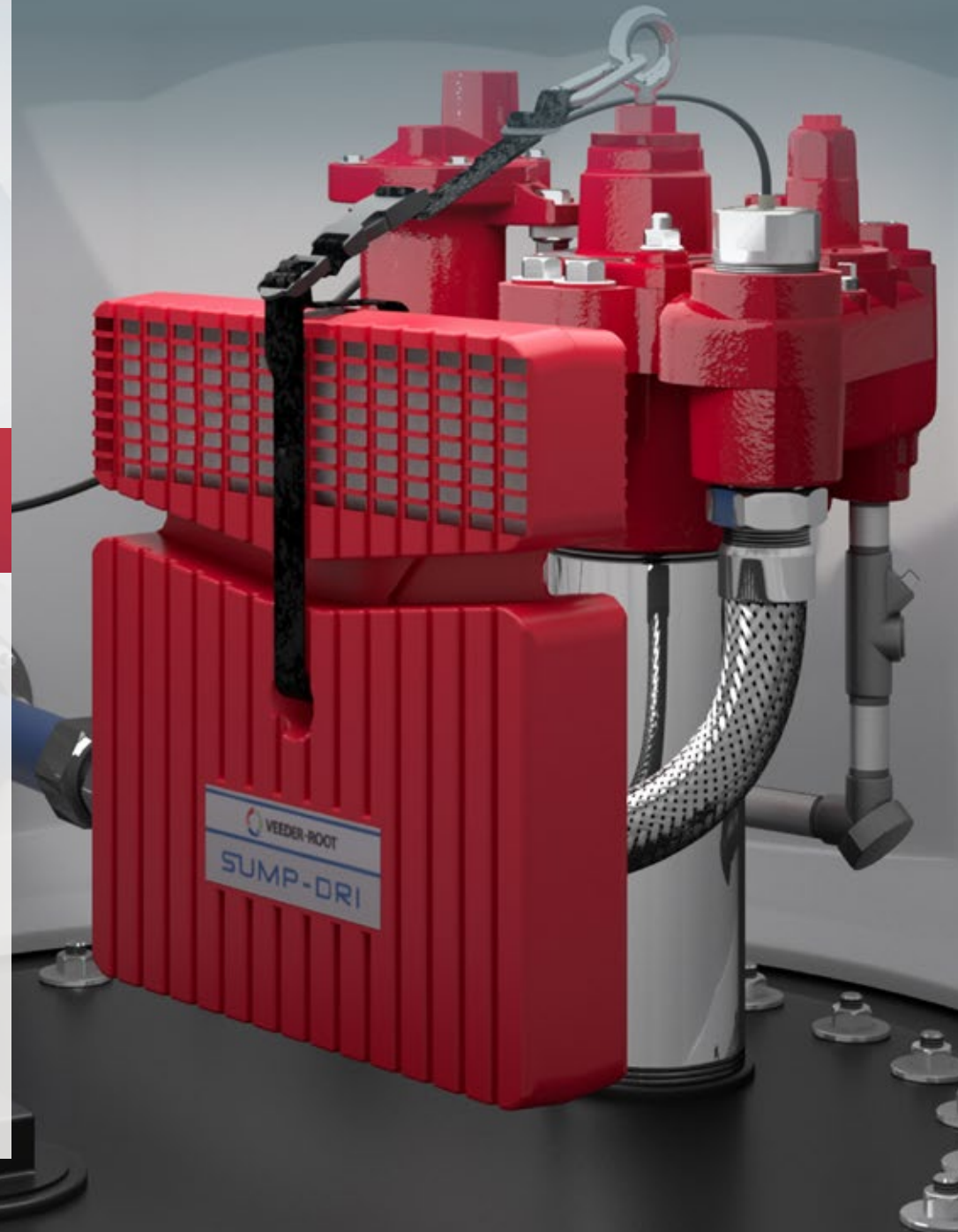
OR

Both conditions are present or an existing STP is being replaced due to corrosion.

IF THE SUMP FREQUENTLY HAS INCREASED MOISTURE OR ETHANOL VAPORS

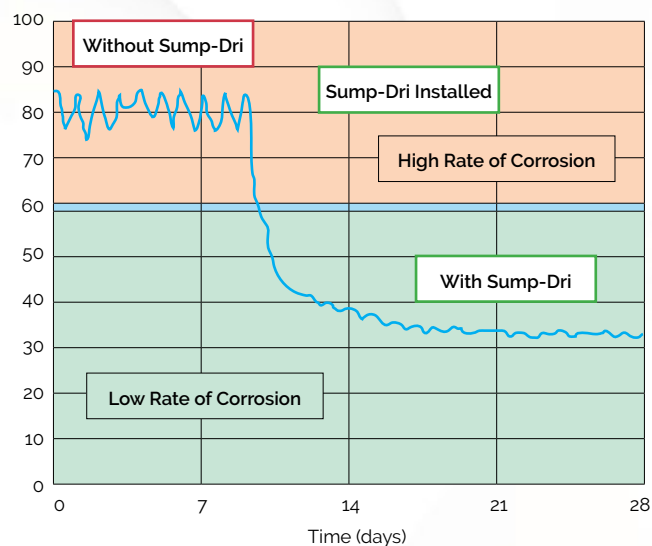
Consider installing the Sump-Dri Desiccant System

Sump-Dri keeps the sump in better condition and ensures longer life of parts contained in the sump. Any moisture in the sump, either through high humidity, condensation or water ingress, can combine with ethanol fuel or vapors to create conditions for corrosion.

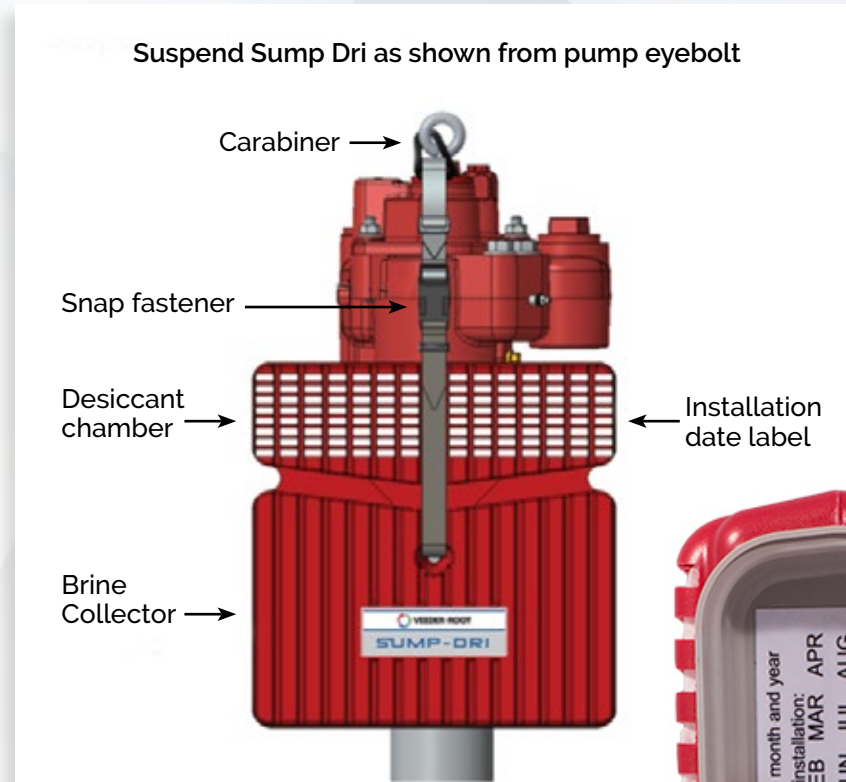


SUMP-DRI DESICCANT SYSTEM

- Ensures the safety and serviceability of your sump-space equipment
- Specifically formulated to protect equipment in the STP sump from corrosive conditions
- Reduces relative humidity
- Neutralizes corrosive acetic acid vapors
- Use alone or in conjunction with protective coatings for added insurance
- Sump Requirements: For maximum effectiveness, sump should be tight and free from standing water
- One gallon collection capacity



USING THE SUMP-DRI DESICCANT SYSTEM



ESTABLISH A MAINTENANCE REGIMEN

- To start, expect to change out Sump-Dri Desiccant every 3 months
- Gauge how much desiccant is left during your monthly inspections
- If 3-4" of brine is accumulating in a month, validate you have an air-tight sump.
- A single unit will cover a 75-100 cu.ft. sump space for three months. Larger spaces or extended maintenance periods may increase the rate of desiccant depletion

IF THE SUMP FREQUENTLY HAS STANDING WATER AND WATER IN THE TANK IS AN ISSUE

**Consider installing a
4" Red Jacket Stainless Steel Riser Pipe**

Accelerated corrosion of the threads on the existing riser pipe maybe allowing water intrusion. The 4" stainless steel riser pipe is impervious to in-sump corrosion and directly replaces standard 4" riser pipes.



Available in 7.5", 10.5", 15.5", 19.5", and 27.5" lengths

IF STANDING WATER AND VAPORS ARE PRESENT OR AN EXISTING STP IS BEING REPLACED DUE TO CORROSION

Consider installing the Red Jacket Red Armor STP

THE ULTIMATE SURVIVOR IN YOUR FUELING INFRASTRUCTURE.

The Red Armor STPs are built to last in the harshest corrosive environments created by Ultra Low Sulfur Diesel [ULSD] and ethanol blends.

The Red Armor STP has a specialty coating on the manifold and discharge head that withstands acetic acid exposure to prevent corrosion and pitting to the cast iron surface over time.

Packer manifold contains stainless steel hardware to ensure ease of maintenance throughout the life of the pump, and the pump also features stainless-steel column piping and quick-set connector.

The stainless steel construction of all exposed surfaces ensures the Red Armor STP will maintain its integrity and stand up to corrosion in the sump and in the tank.

Built upon the same field-proven Red Jacket STP platform with identical sizes as the long standing "Red Jacket" and the "Red Jacket AG" models.



RED JACKET STPs: THREE LEVELS OF PROTECTION

*All built on the same field-proven
Red Jacket STP platform*

THE RED
JACKET STP



THE RED JACKET
ALCOHOL GAS
[AG] STP

30% increase
in Stainless Steel
Hardware from
Red Jacket STP



RED ARMOR STP

Additional 30% increase
in Stainless Steel
Hardware from The Red
Jacket AG STP



COMBAT CORROSION

PROTECT IN-SUMP EQUIPMENT FROM CORROSION

	If Yes, Consider Installing:
Do you anticipate Standing Water in the Sump?	Red Armor STP
Are you concerned about corrosion from ULSD?	Red Armor STP
Are you concerned about in-sump corrosion from high-ethanol blends?	Red Armor STP + Sump Dri Desiccant
Are you operating in E85 or B-20 – B-100?	Red Jacket Alcohol Gas STP
Are you operating in E10 – E15?	The Red Jacket STP + Sump Dri Desiccant
Are you operating in Clear Gas [no ethanol] or 100% Diesel	The Red Jacket STP



REFERENCES:

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2. Wilson, John, Ph.D., U.S. EPA ORD, etc. "Corrosion in STP Sump: What Causes It and What Can Be Done About It?" PEI Journal. Third Quarter 2013. <https://archive.epa.gov/ada/web/pdf/corrosion-in-stp-sumps-2.pdf>
3. E. Cano, J. M. Bastidas, J. L. Polo, and N. Moraa. "Study of the Effect of Acetic Acid Vapor on Copper Corrosion at 40 and 80% Relative Humidity". Journal of The Electrochemical Society 148, (September 20, 2011): B431-B437
4. University of Ljubljana, Faculty of Civil and Geodetic Engineering. ESDEP WG 4A. Protection: Corrosion. Lecture 4A.4: Corrosion Protection of Bridges. [Lecture notes, Internet] <http://fgg-web.fgg.uni-lj.si/~pmoze/esdep/master/wg04a/10400.htm>