

DIESEL FUEL STORAGE CORROSION - DECAY

Dieselpure

The unexpected problem

- the new bio-blended diesel fuel absorbs water: much more water
- this water stays suspended or emulsified
- traditional filters are ineffective against emulsified water
- high-pressure diesel injectors are delicate:
premature wear and corrosion – premature replacement
- fuel falls out of spec in as little as six months
- previously unseen - signs of excessive, aggressive corrosion

Bio-Blended ULSD

- all natural + clean burning
- excellent lubricant
- absorbs more water + deteriorates faster
- mandated around the world
- higher concentration expected 20% (B20)
- removing emulsified water is difficult... but critical

Emulsified Water

- most important component to remove
- hardest component to remove
- more emulsified water accumulates in biodiesel
 - faster decay
 - formation of solids
 - wears internal engine parts
 - corrosion on wet and dry infrastructure, and equipment

Corrosion

- bio-blended fuel = new signs of excessive + aggressive corrosion
- attributed to acetic acid bacteria (Battelle Report)
- emulsified water corrodes internal engine parts
- damage greatest when sitting or standby
- recommendation (Battelle Report):
 - dry fuel
 - remove all water continually... especially emulsified water

EPA, latest corrosion findings July 2016

“The major finding from our research is that moderate or severe corrosion on metal components in UST systems storing diesel fuel in the United States could be a very common occurrence. “

“We observed 83 percent of the inspected tanks had moderate or severe metal corrosion. Prior to our research inspections, less than 25 percent of owners reported knowledge of corrosion in their UST systems.”



“... variables that were the closest to being significant predictors (of corrosion) were particulates in the fuel and entrained (emulsified) water content in the fuel”

EPA, latest corrosion findings July 2016

“Our research suggests that MIC (Microbial Induced Corrosion) is likely involved in the moderate or severe internal corrosion in USTs storing diesel.”

“taking action to limit microbial growth. Recommended by multiple industry groups “

“The best way to minimize the risk of corrosion is to regularly monitor the diesel for water and remove it.”

“However, diesel blended with biodiesel can hold in solution more water than diesel. This means more water is likely in USTs entrained (emulsified) in fuel today since biodiesel is more common in diesel than prior to 2007. “

“Filter fuel for water and particulates before it is delivered into the UST or recirculate and filter water and particulates while it is stored”

Why Corrosion Now?

Adoption of ULSD and Biodiesel Blending

Lubricity – Pure ULSD cannot act as a lubricant, severe engine damage, fixed with additives, including biodiesel

Bonding – biodiesel, additives and water molecules are polar, H₂O tightly bonds to biodiesel as emulsified water

Surfactancy - 100% biodiesel absorbs **15 to 25** x emulsified water than pure diesel

Microbial Induced Corrosion – excessive emulsified water = increased MIC

Legacy filters – They cannot remove emulsified water as marketed

Corrosion is already here

Tanks Sumps Piping



SAE J1488 Ver. 2010_10

Industry recognized test for rating the performance of a filter

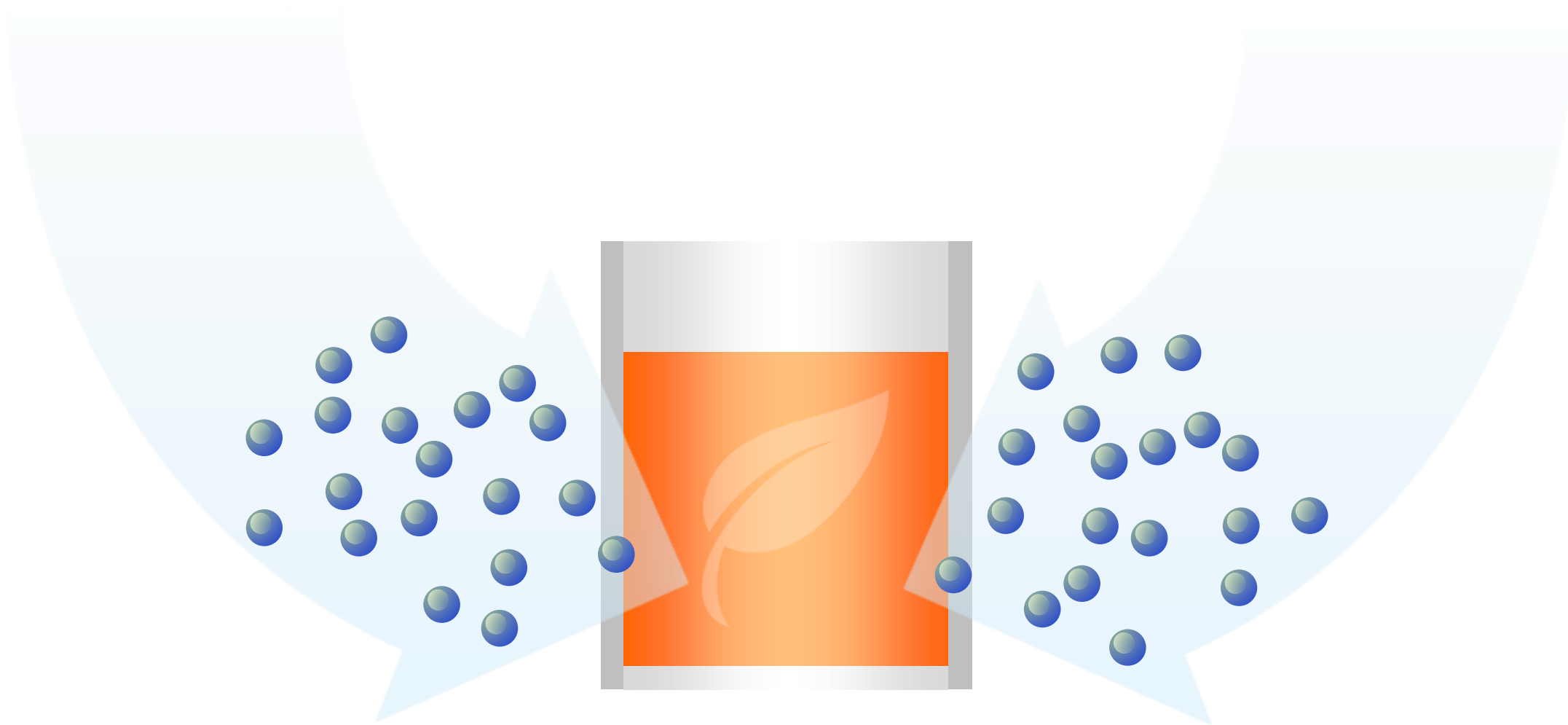
SAE independently tests + assigns an efficiency rating for removing emulsified water from:

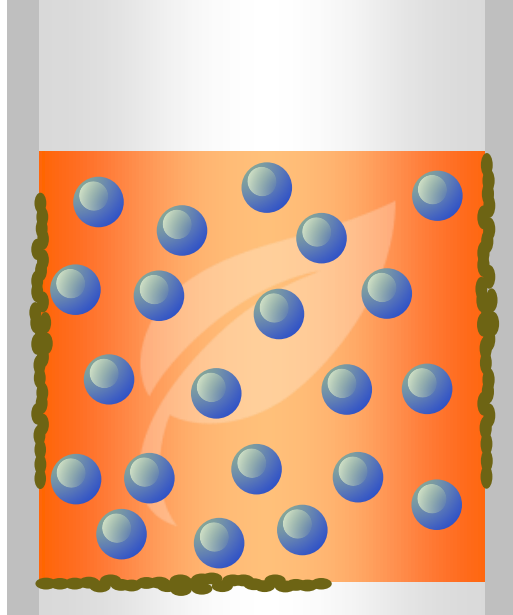
ULSD fuel

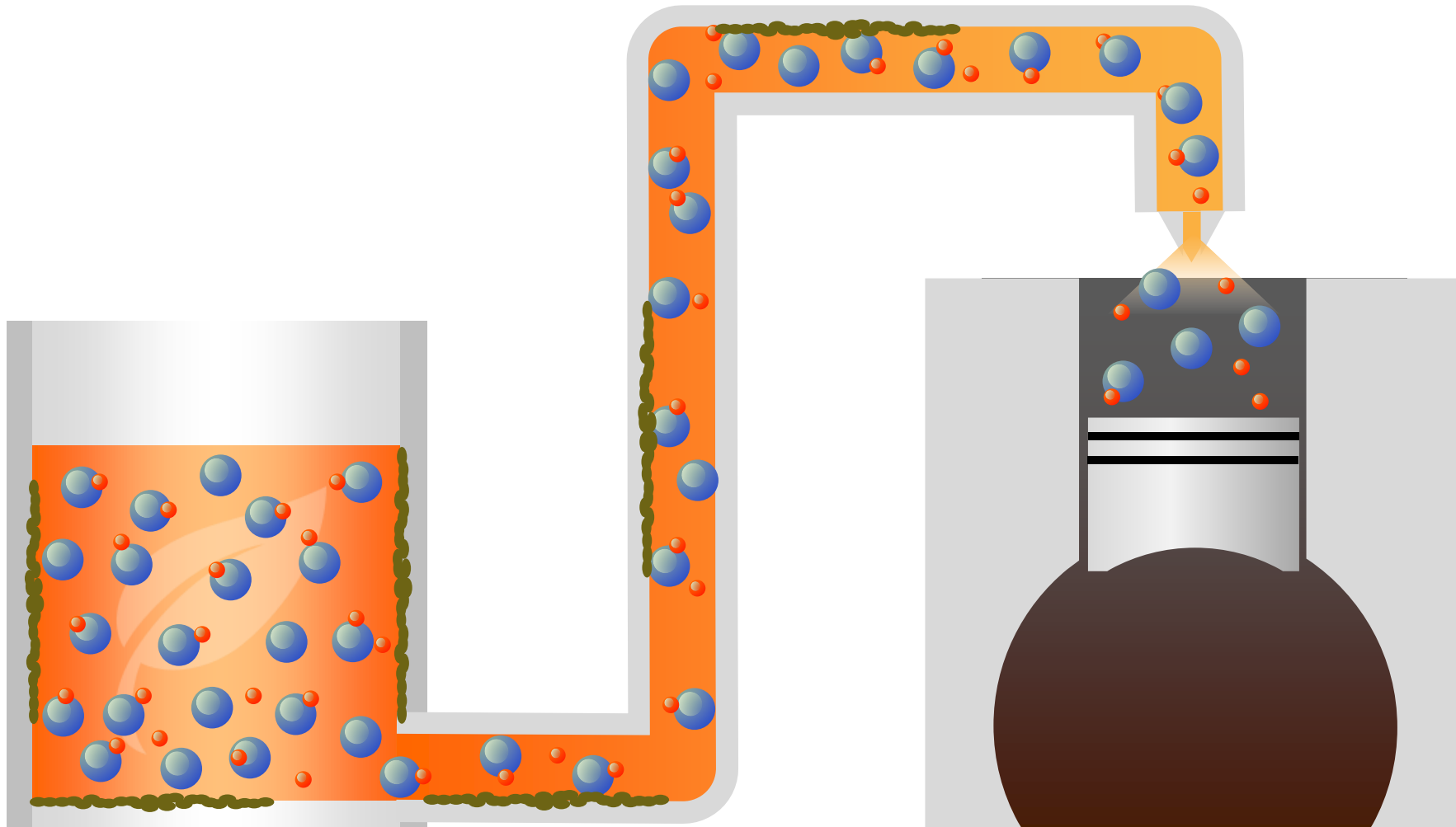
bio-blended fuel

JetA fuel









Warranty Disclaimers – GenSets

CAT: "The repair of any engine or after treatment components due to such contamination or due to other biodiesel impacts would not be covered under the CAT warranty for materials and/or the warranty for workmanship."

Deutz: "Only biodiesel-free fuels may be used for emergency power supply units in standby operation. "

Cummins: "Engine damage, service issues, and /or performance issues determined by Cummins Inc. to be caused by the use of biodiesel fuel not meeting the specifications outlined in this Service Bulletin are not considered to be defects in material or workmanship and are not covered under Cummins Inc. engine warranty."

DieselPure Technology

- keeps fuel emergency ready
- cleans + removes:
 - Sludge
 - Particulates
 - microbial growth
 - free water + emulsified water
- continual drying of fuel mitigates risk of corrosion in tank + internals of engine

DieselPure Efficiency Automated Filtration System

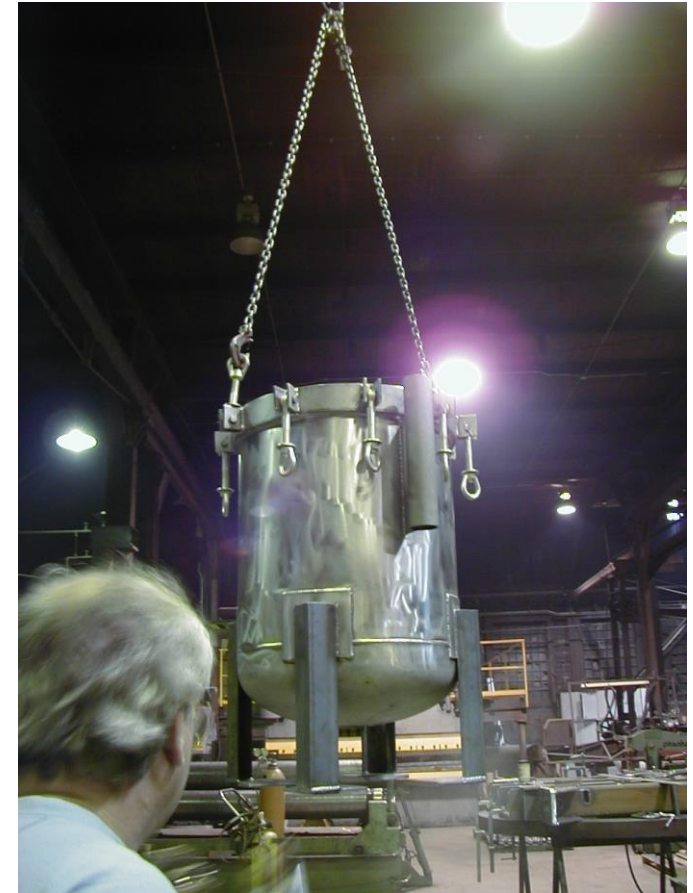
scalable (50 gallon tanks - storage silos)

SAE J1488 rated (removes emulsified water)

emergency ready (cleans fuel tanks).

maintains ASTM975 quality.

returns fuel to within ISO 4406 limit



DieselPure Test Certifications

sub-micron removal (ASTM D4807)

sediment + water removal (ASTM D2709)

Karl Fisher water removal (ASTM D4377)

100% efficient = ULSD (SAE J1488 Ver. 2010)

96.3% efficient = B20 (SAE J1488 Ver. 2010_10)



Portable on-site cleaning meet the codes, protect your fuel



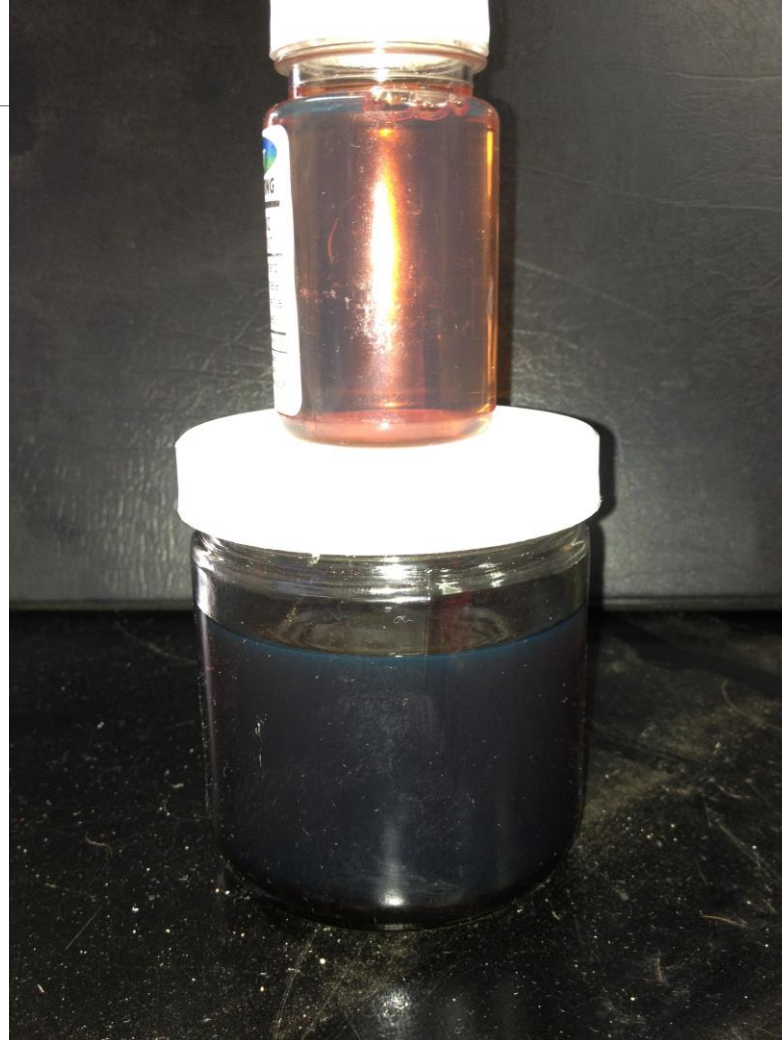
Perfect for meeting NFPA 110 version 2013

Can provide compliance

While at the same time removing all:

1. free standing water
2. particulate to sub-micron level
3. emulsified water to SAE J1488

Before and after SAE J1488 portable cleaning





DieselPure™ summary

exceeds fuel management protocols

fully customizable + scalable

optimal fuel quality

SAE J1488 Ver. 2010_10 rated

proven protection against emulsified water and corrosion

100 Series for tanks up 1200 gallons



200 Series for tanks to 5,000 gallons



400 Series for tanks over 10,000 gallons





Thank you