

Maintaining your storage tanks



MISSOURI DEPARTMENT OF AGRICULTURE

*Weights, Measures & Consumer
Protection*

How water enters tanks

- ▣ Water accumulates in storage tanks several ways.
- ▣ Natural condensation / product temperature.
- ▣ Broken vent lines, fill caps, vent caps.
- ▣ Leaking storage tank / spill bucket drains.
- ▣ Contaminated delivery.

**Common sources of water contamination
in underground storage tanks.**



Common sources of water contamination in aboveground tanks



Water detecting paste



Examples of Water Finding Paste



- Missouri inspectors use a variety of pastes.
- If found, water is confirmed with a 2nd product.
- If results conflict, tank is sampled with tank thief.

A thief can also be used to visually inspect product



Water detecting paste should be used frequently
and confirmed by visual inspection



Water in gasoline

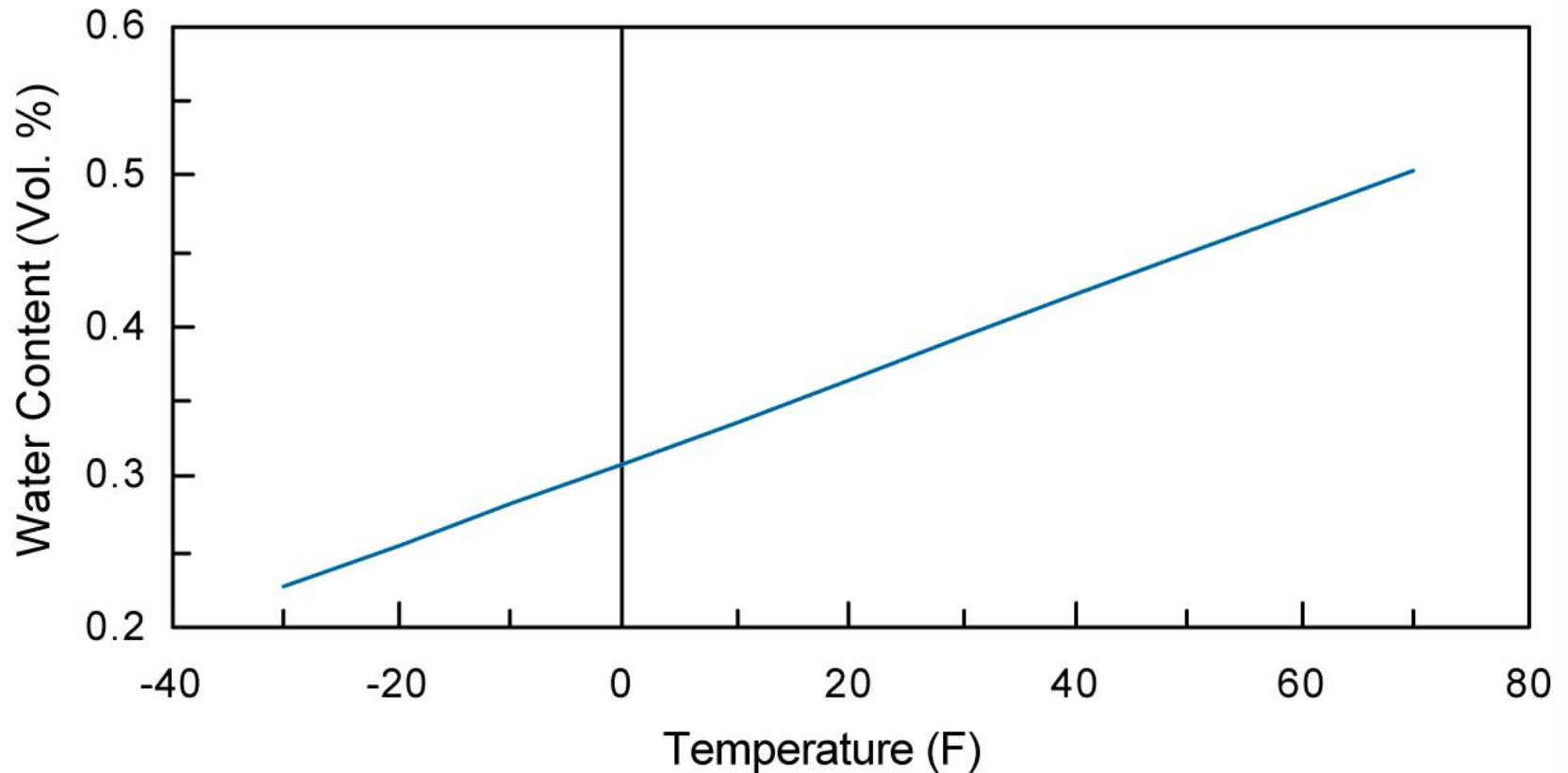


Visual inspection

- ▣ Inspectors visually observe all products through the sight glass on the field standard during device accuracy inspections.
- ▣ If product does not appear to be clear and bright a stop sale will be issued and samples will be pulled for lab testing.
- ▣ Fuel quality inspectors will then follow up with the owner / operator and make recommendations for corrective action.

- ▣ Missouri Law prohibits water from exceeding 1 inch in any fuel storage tank
- ▣ Fuel must be “clear and bright” and free of water and sediment
- ▣ Many stop sales occur on ethanol blends when water is <1 inch in tank.
- ▣ Maximum phase separation temperature varies year round.

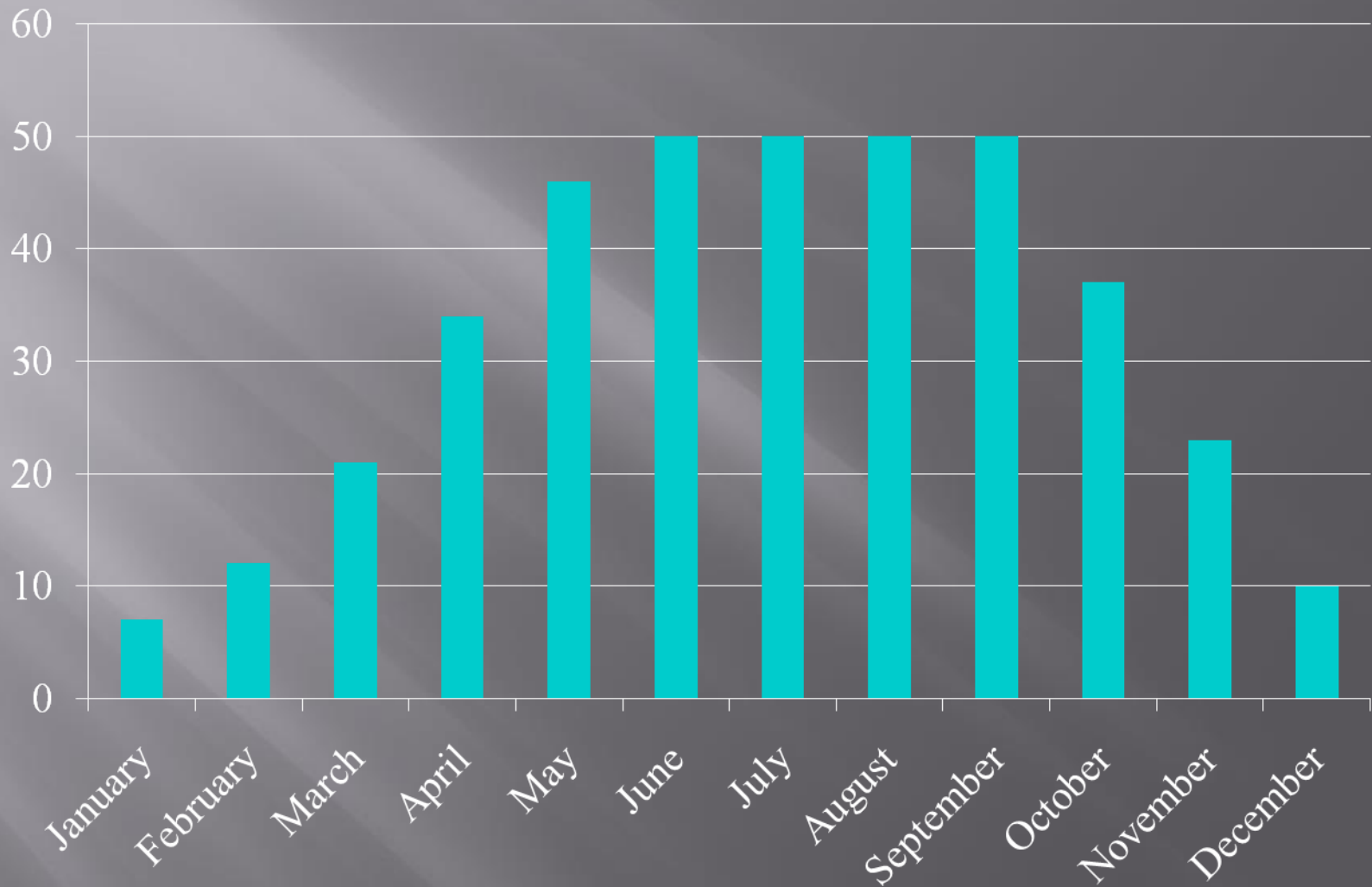
Water Tolerance of 90% Gasoline/10% Ethanol Blends



Water Contamination Effects in Ethanol Blended Gasoline

- ▣ Maximum phase separation temperature varies year round. Samples are chilled to temperatures in the following chart to ensure no water/alcohol phase separation occurs as the product drops in temperature.

Missouri Maximum Phase Separation Temperatures Degrees Fahrenheit



Methods of water removal for aboveground tanks



Methods for removing water and maintaining storage tanks including (Diesel and non-ethanol)

- ▣ Pumping out water bottoms from the fill openings.
- ▣ Difficult to entirely remove all water and especially difficult with vertical aboveground tanks without water draws.
- ▣ Water absorbing materials can be a great tool to completely remove water and maintain zero water bottoms.

Water Contamination Effects in Ethanol Blended Gasoline

- When ethanol blended gasoline is exposed to water, the water will combine with the ethanol and cause it to separate into an alcohol-poor upper phase, and an alcohol rich lower phase.
- The upper phase will remain unstable causing ethanol and water to continue separating from the mixture.

Water Contamination Effects in Ethanol Blended Gasoline

- ▣ Virtually all regular unleaded gasoline sold in Missouri is sub-grade (~83 octane) blended with 10% ethanol.
- ▣ When ethanol is removed from this gasoline the octane of the gasoline is lowered below minimum requirements.
- ▣ Contaminated gasoline must be analyzed to determine the ethanol concentration if blending this product with fresh fuel to correct.

Ultra low sulfur diesel

IDENTIFICATION OF SYMPTOMS ULSD STORAGE

When dispenser flow rates slow to about half their normal flow, the filters need to be replaced.

If filter changes are required more frequently than normal this is a good indicator you could have a more serious problem.

Identification of symptoms

Signs of fuel or fuel system issues include plugged fuel lines, erratic gauge readings, a rotten-egg odor (in the fuel or filter), and frequent replacement of other components such as valves, seals and hoses.

IDENTIFICATION OF SYMPTOMS ULSD STORAGE

Solid and Semi-Solid Contaminants —
Solid contaminants, such as scaly, gritty deposits, consisting of reddish-orange metal, may be indication of corrosion and /or silt introduction into the tank. Black, brown, or other semi-solid deposits may indicate product degradation.

Bottom line

- ▣ The best way to prevent corrosion of any kind is to keep tanks clean and free of water.
- ▣ Watch for the visual indicators.
- ▣ Correct any condition as soon as possible.
- ▣ Microbial corrosion progresses very quickly.

Corrective Measures for Water in Ethanol Blended Gasoline

- ▣ Identify the source of water in tank and repair
- ▣ Remove the water/ alcohol phase separation from storage tank and place in approved containers.
- ▣ Remove all contaminated ethanol blended gasoline and replace with fresh product.
- ▣ Purge all dispensers into separate containers until product flows clear.
- ▣ Install new dispenser filters (10micron or less)
- ▣ Contact regulatory authority for release of stop sale and follow-up inspection.



Thank you

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