
INDUSTRIAL GEAR OIL FOAM CONTROL

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Problem Definition

Foaming in industrial gearboxes is possibly the most frequent complaint that gear lubricant support staff face. Foam doesn't pump or circulate, and is not an effective lubricant. The customer wants it fixed, and right now!

The first step is to define the problem by asking a few pertinent questions.

- Are you sure you have a foam problem?
- Does the new oil meet specification?
- What may be causing the oil to foam?

Visual Inspection of the System

1. Is the oil foaming out of the unit?
2. Do you see persistent foam on the surface of the oil?
3. Are you having trouble seeing the oil level in the sight glass?
4. Is the oil at the correct level?
5. Does the oil look creamy?
6. Does the oil look hazy or contain droplets or “fish eyes”?

Testing the New Oil

Does the new oil meet specification?

- Standard new oil specification for antiscuff (EP) gear oil according to AGMA 9005-E02, tested by ASTM D892:
 - Seq. I Tendency/Stability (mL/mL)= 50/0
 - Seq. II Tendency/Stability (mL/mL)= 50/0
 - Seq. III Tendency/Stability (mL/mL)= 50/0
- Requires 2 times 200 mL, or about 15 oz. oil.
- Customer not likely to have sufficient sample.
- May not have any new oil retain.

Inspection of the New and In-Service Oil

Know your oil.

- If a new oil retain is available, how does it compare with retains of other deliveries?
 - Color
 - Odor
 - Drop-out/deposits
- Does the in-service oil show signs of contamination?
 - Color
 - Odor
 - Drop-out/deposits

In-Service Oil Testing

- What are the ASTM D892 test results?
- Is the issue actually poor air release?
- Does comparison of metals by ASTM D5185 for new oil vs. in-service oil show evidence of contamination?
- Is there a phase separation, either liquid or solid?
- What is the ISO particle count?
- What is the nature of the particles?

Defoamant/Antifoam Additives

- Polymeric materials of two basic types:
 - Silicon-containing: polysiloxane.
 - Non-silicon: polyacrylate, polymethacrylate.
- Not oil soluble.
 - Typically blended into a carrier before adding to the oil.
 - Must be properly dispersed in the oil.
 - Particles too large or excess treat results in drop-out.
 - Excess can be pro-foamant or can result in poor air release.
- Addition of defoamant directly to the oil in the gearbox is not a good practice.

Filtration Considerations

- Defoamant additives can be removed by filters.
 - Chemically similar to filter media.
 - Filters are designed for and used to remove insoluble material from oil.
 - Laboratory examination of filter medium may show accumulated defoamant additive.
 - No standardized filterability tests available for gear oil.
- Multi-pass filtration to achieve a high level of cleanliness may result in really clean oil that foams.
- Lubricant suppliers and filter manufacturers are aware of this problem.

Can the Oil Continue in Service?

- The oil should be replaced with fresh oil that meets specification if:
 - The problem is lack of defoamant additive.
 - The oil is contaminated with another oil.
- The oil can continue in service if:
 - The issue was a mechanical problem that was fixed.
 - Residence time too short.
 - Air getting sucked into the oil.
 - It was due to an oil level problem that was corrected.
 - Particulate contamination was reduced to an acceptable level without loss of defoamant additive performance.

An Ounce of Prevention

- Take a retain of every product delivery.
 - Visual inspection is the minimum action.
 - ASTM D5185 is highly recommended.
- Use desiccant air breathers on vents to prevent ingestion of air-born debris and moisture.
- Take steps to prevent topping-up with the wrong lubricant.
- Keep the oil dry during storage, transfer and use.
- Don't over- or under-fill the gearbox.
- Monitor the unit for wear particle generation and oil condition, and take appropriate steps.