Sample Bottle Cleanliness Can Impact Maintenance Costs

If your sample bottles aren't clean enough for the fluids you're testing and the maintenance goals you're trying to achieve, testing results could be compromised. Working with your laboratory to determine appropriate sample jar cleanliness is just as important as working with them to determine proper testing.

Selecting an appropriate sample bottle has both a direct and an indirect impact on maintenance costs. A cleaner, certified bottle is more expensive than a standard bottle, which directly affects material costs. A standard bottle may falsely elevate particle count results, which can result in unnecessary filter and lubricant changes that can indirectly affect maintenance costs.

Sample jar cleanliness is most relevant when doing Particle Count testing, which is most often requested in applications where a certain level of cleanliness is required. For example, GE requires a 19/16/13 ISO Cleanliness Code for some of its turbines. This level of precision should be a major consideration in selecting an appropriate sample bottle.

High Density Polyethylene Jar

High Density Polyethylene (HDPE) bottles – or "milk jug-type," opaque plastic sample containers – are commonly used throughout most applications. Although HDPE bottles will tolerate samples taken at high temperatures, clarity is low and the manufacturing process can leave enough residue behind to impact cleanliness levels and Particle Count results in applications where a particular level of precision must be achieved. **See Table 1.**

Polyethylene Terephthalate Jar

Polyethylene Terephthalate (PET) bottles have a much lower heat tolerance than the HDPE but are made of a clear plastic that allows for easier visual inspection of the fluid making it easier to identify contamination. The manufacturing process exposes PET bottles to less contamination, which can impact particle count test results.

Kostrate bottles are also an opaque plastic but can withstand higher temperatures and be cleaned to an acceptable cleanliness level. However, they have been found to react with diesel fuel to the extent that the jar material becomes soft enough to collapse.

Table 1 – Bottle Characteristics

Bottle Material	Available Sizes	Clarity	Heat Tolerance
HDPE	4oz	Low	High
Kostrate	4oz, 8oz	Medium	High
PET	4oz, 8oz	High	Low

ISO Standard 3722 has become the industry practice generally accepted for classifying sample jar cleanliness. It specifies a method and establishes a means for ensuring that the accuracy of particulate contamination analyses in hydraulic systems is not degraded by a lack of sample container cleanliness. It defines three bottle cleanliness classifications based on the number of particles present of a specific size per milliliter of sample bottle.

ISO Clean and Super Clean sample bottles are made of clear, PET plastic that is injected into the mold to eliminate flashing, then chemically cleaned, dried and sealed to prevent any inherent environmental contamination. They are then tested to ensure that the appropriate cleanliness classifications have been met. Your ISO Clean bottle supplier should be able to provide a certificate of analysis that certifies your shipments as having been cleaned to one of the standard's three cleanliness classifications.

ISO Clean sample bottles have no more than 100 particles >10 microns in size per ml of sample bottle and are typically sufficient for most industrial applications requiring Particle Count testing. ISO Super Clean sample bottles have no more than 10 particles >10 microns in size per ml of sample bottle and ISO Ultra Clean bottles have no more than 1 particle >10 microns per ml of sample bottle.

Cleanliness levels are typically based on OEM requirements. Taking the time to determine optimal sample bottle cleanliness will minimize sample bottle interference with Particle Count results. Eliminating falsely elevated particle counts will prevent your laboratory from recommending unnecessary fluid and/or filters changes that can result in increased lubricant, parts and labor costs.