



How to take an oil sample for testing



There are different methods and tools employed to take a sample of oil from machine compartments. Outlined below are sampling techniques for most common systems. The number one rule of sampling equipment for trending analysis is consistency.

General

- Use safe sample extraction methods.
- Use consistent practices.
- Use optimal sampling points, choosing a representative location.
- Minimize sources of bad data.
- Never sample directly from a filter.
- Take samples before the oil is changed or adding make up oil.
- Have the oil hot and thoroughly mixed before sampling.
- In-line sample ports for circulating systems are best.
- Sample in areas of turbulence, such as bends, avoiding straight sections of pipe.
- Always use clean sample containers and equipment.
- Use well-sealed containers, so they don't leak after replacing the container cap.
- Provide required sample information.

- Keep sample bottles sealed and clean for sending to the lab.
- Keep paperwork clean.
- Establish procedures for forwarding samples to the laboratory.
- Send the sample to the testing lab immediately to help ensure applicable test results.

Circulating system: in-line sample

Use in-line sampling ports whenever possible. The best in-line samples are obtained from the return line after the oil has passed through the operating equipment and before entry on the return side of the reservoir. This contains the most information relating to the health of the equipment.

- Taking a sample after a filter only removes information.
- Sampling valves with or without a sampling pump provide the easiest sampling method. Pressure reducing petcock ports will also work if designed properly.
- Clean the area around the sampling valve. Place the open end of the tubing into an oil waste bottle for flushing and the needle probe end into the sampling valve.

- Flush a volume of at least three times the sample tubing to ensure a representative sample. After flushing, place the open end of the tubing into the sample bottle and fill the sample bottle 80% to 90% full.
- Allow the new sample to cool slightly before replacing the bottle cap. Seal tightly. It is recommended to not re-use the used insert needle and tubing for sampling other systems.

Possible in-line sampling locations

Engine Oil › Filter mount on engine block, before filter inlet

Transmission › Filter head, before filter inlet

Hydraulic › Manifold or return lines

Axle › Oil pump

Circulating system reservoir sample

- Obtain a sample from the reservoir only if an inline sample is unobtainable.
- Fill ports or breathers are usually the best access for entering a reservoir with a pump and sample tube from the top.
- Sample from the inlet side of the reservoir, if possible.
- Clean area before opening sampling access.
- Do not sample from the drain port.
- Do not obtain samples from the very top or the very bottom of the fluid level. Aim for 1/3 to 2/3 from the surface of the fluid.

CAUTION: Some reservoirs operate under pressure.

Remove access covers carefully.

Sumps

- Non-circulating systems for some rotating equipment such as gears and some bearings use sump lubrication.
- A sampling port at the proper fluid level located on the sump casing provides the best means for obtaining a sample.
- Fill ports can sometimes provide access for entering a sump reservoir with a pump and sample tube from the top, if the tube path is unimpeded.
- If sampling from a drain port, flush the drain port thoroughly before obtaining a sample.
- If sampling from a drain port during the oil change, sample halfway through the drain.
- Clean area before opening sampling access.

Clean systems requiring particle count

Always take extra precaution to prevent contamination of the oil during the sampling process.

- Clean all entryways before opening access.
- If using a sample port valve and pump, clean the area around the sampling valve. Flush the sample port valve access by placing the needle probe end into the sampling valve and the open end of the tubing into an oil waste bottle for flushing.
- Flush three times the volume of the sample valve and tubing.
- Do not use shop towels or any other wiping material that create lint.
- Samples can be contaminated with particulate during the sampling process without being visible.
- Use dedicated sampling equipment and bottles for obtaining samples from clean systems for particle count.
- Flush everything thoroughly.

Engine samples, using in-line sampling ports

- The engine oil should be warm and circulating.
- Leave the engine idling during the sampling procedure. Locate the sampling valve that is fitted to the engine block. The sampling valve should be located before the oil filter.
- Clean the area around the sampling valve.
- Flush a volume of at least three times the sample tubing to ensure a representative sample. After flushing, place the open end of the tubing into the sample bottle and fill the sample bottle 80% to 90% full.
- Allow the new sample to cool slightly before replacing the bottle cap. Seal tightly.

Engine samples, using a sampling pump and siphon tube through the dipstick tube

- Connect an adequate length of new siphon tubing to the sampling pump. The tubing should be long enough to reach from the oil sump through the oil dipstick tubing to where a person will be located for the sampling procedure.
- The oil should be warm and circulating just prior to obtaining a sample.
- Shut off the engine and immediately insert the tubing into the oil reservoir through the oil dipstick tube. Lower the open end of the sample tubing to approximately one-quarter to one-half the distance from the top of the oil level in the sump. Do not lower the tubing to the bottom of the sump.
- Draw oil into the sample bottle using the sampling pump. Fill sample bottle 80% to 90% full. Vent bottle and pump. Remove the sample bottle from the sample pump.
- Allow excess oil in the tubing to drain back into the engine.
- Discard the used tubing. Replace dipstick.
- Allow the new sample to cool slightly before replacing the bottle cap. Seal tightly.

Engine samples, taking engine oil samples through the oil pan drain plug

- Sampling from the oil pan drain plug should only be used if no other sampling procedure is available.
- Samples are to be taken before the oil is changed or before adding make-up oil to the sump.
- Samples are to be taken after the engine has been running and the oil is hot and well mixed, at around 110F.
- Immediately shut off the engine and clean around the oil pan drain plug. Remove the drain plug and begin draining the warm engine oil from the oil pan into a waste receptacle. Obtain a sample during mid-drain as the oil flows out of the oil pan by carefully holding the sample bottle up to the stream of oil and filling the bottle 80% to 90% full.
- **CAUTION:** The oil may be hot and can cause burns.
- Wear protective gloves. Do not take the oil sample at the start of the drain flow.
- Wipe off the outside of the sample bottle. Allow the new sample to cool slightly before replacing the bottle cap. Seal tightly.



Transformers and specialized equipment

- Consult maintenance engineers.

If you require any assistance with instructions on taking your sample or understanding the analysis report that you receive from ALS, please contact us via email: reliability@alsglobal.com