

## **Cylinder Inspection Instructions**

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Below are the typical pictures you should take during a cylinder inspection. The most important photos for a prebuy inspection are the exhaust valve face and the cylinder wall. These photos were taken with a Vividia Ablescope VA-400. The scope is currently available for \$200 on Amazon and can be purchased in several other places. It connects to a computer or Android device via a USB cable. It can also be connected to an Apple device via a wireless adapter. You can use the scope with a laptop and the built in Windows 10 camera app. The larger laptop screen can make viewing easier. The downside to the Windows camera app is it does not support the shutter button. This is the best scope on the market for cylinder inspections.

You should take the photos in the same order for each cylinder, so they are easy to sort when finished. Most airplanes allow you to work through the upper spark plug. Start by positioning the piston at the bottom of the cylinder. Take the following photos, piston face, exhaust valve face and intake valve face. When taking photos of the valve faces position the scope so the whole valve face is visible in the photo and fills the frame. Also take note of any reflections on the exhaust valve. It is sometimes beneficial to shift the camera around since a reflection on the exhaust valve face can sometimes give the false appearance of an uneven heat signature.

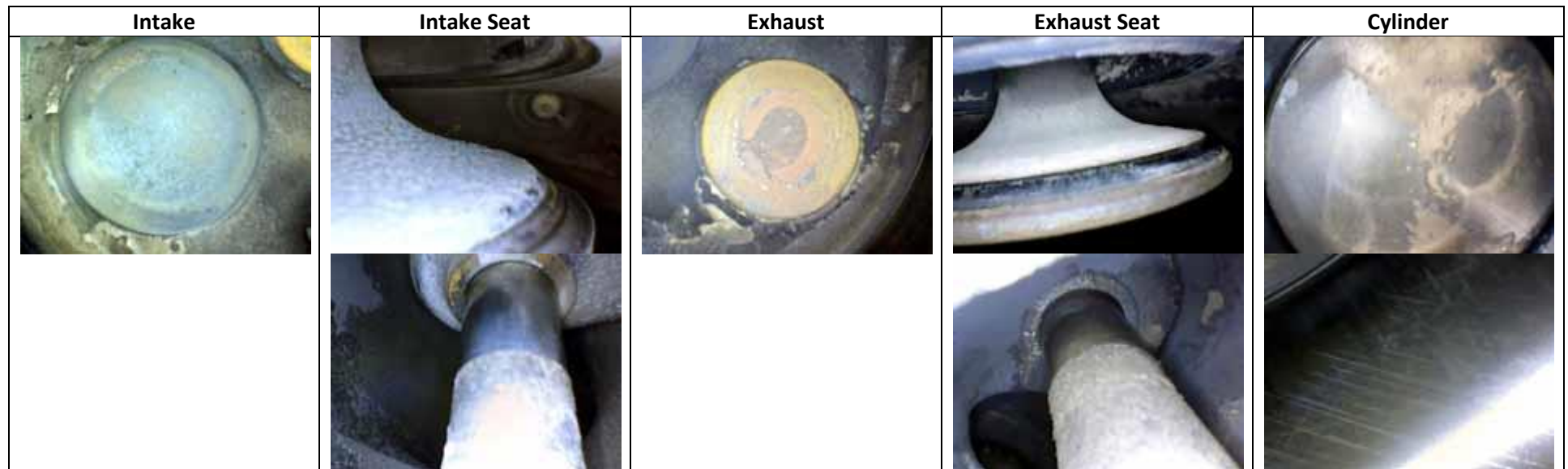
The next step is to move the piston to mid stroke with the exhaust valve open fully. Take a photo with the edge of the valve seating area and the valve seat in the photo. Next position the camera, so you can get a photo of the stem and guide. Use extreme caution when moving the crankshaft while the camera is in the cylinder and when taking photos of the valve stem and guide. You want to make sure the camera doesn't get broken in the cylinder and/or caught in the valve. It may be necessary to shift the camera slightly when taking the valve stem and guide photo because the camera will adjust the exposure depending on how much light is reflected.

After looking at the exhaust valve pull the cylinder through top center and position the piston at mid stroke with the intake valve open. Take the same photos of the valve seating area, valve seat and guide on the intake valve.

Finish the inspection by moving the piston to the bottom of the stroke and take photos of the cylinder wall. It is usually necessary to push the scope against the piston and take photos on an angle looking back towards the cylinder head. The photos taken will vary depending on what is found. Piston scuffing usually happens at 12 and 6 O'clock. Piston pin plug scoring happens at 3 and 6 O'clock. Corrosion pitting is usually most prominent at the top of the cylinder.

Some engines have baffle configurations that can limit access into the cylinders. Usually this will not allow the camera to be positioned for the stem and guide photos. If this is the case, you should still be able to get photos of the valve faces and cylinder walls which are the most important photos anyway. It is sometimes beneficial to use the opposite spark plug hole.

### Cylinder 3



On engines with an oil filler neck in the top of the case it is possible to see some of the cam and lifters. The photos below are of an Continental IO550F sandcast case engine. The permold case engines don't have access to the inside of the case. Lycoming engines that have the short filler neck in the case are accessible. An example is the IO540K1E5. Lycoming engines with the long dipstick tube attached to the sump are not accessible.

For the Continental engines start at the front of the engine and work along the cam going aft. Lycoming engines like the IO540K1E5 are the opposite, start at the back and work forward. The most important photos are of the apex of the cam. If there is pitting or galling it will happen here. You will need to experiment with camera position and crankshaft position. Use extreme caution to keep the camera from getting caught or broken in the engine. Tolerances are tight in the crankcase. It is best to remove the camera when rotating the crankshaft.

Often during the inspection dirt or oil will get on the camera lens. If your Ablescope is an early unsealed version, it is difficult to clean, and you should contact Ablescope for instructions. For the later sealed versions, you can use alcohol and a lint free cloth. LPS CFC free NU contact cleaner will also work. The down side to the LPS is it seems to deteriorate the rubber tube over time. A dirty lens will have low contrast and clarity. It may also have the appearance of cloudy circles when the camera is in a dark area. This is from the lights reflecting off the contamination on the lens.

### Cam and lifter Last

