

## MANUFACTURER GUIDANCE

According to the FAA records, the original ICA, FM2007-01, was released in September 2007. In May 2011 an amended version, revision B, included a caution that “The oil filter adapter must be installed using new gaskets,” and “Operate the engine and check for leaks following installation of the oil filter adapter and whenever replacing gaskets.”

### **08.27.2012 (REV. 3): INSTALLATION INSTRUCTIONS<sup>1</sup>**

Instructions for installation for the C6LC-L stated that both the copper crush gasket and fiber gasket were required. The instructions state that the mechanic should, “Slide the copper crush gasket (with the open side facing the flange of the oil transfer cylinder) onto the oil transfer cylinder,” and “Carefully slide the fiber gasket onto the oil transfer cylinder,” with a bold and underlined note emphasizing “Do not use gasket compounds or glues!” The instructions state that the oil filter adapter body should be torqued to 65 ft/lbs. The last instruction emphasizes to “Re-torque the oil filter adapter after 10 hours of operation.”

### **10.08.2013 (REV. D): INSTRUCTIONS FOR CONTINUED AIRWORTHINESS FM2007-01<sup>2</sup>**

[Applicable to C6LC series adapters]

On October 08, 2013 F&M Enterprises released a continued airworthiness instruction document, FM2007-01, that stated that gaskets were to be removed at 300 hours or three years, whichever occurs first.

**CAUTION**.....New gaskets are to be installed anytime the oil filter adapter assembly is removed from the engine and re-installed. Replace gaskets at 300 hours or 3 years whichever occurs first. Refer to the respective F&M Installation Instructions for gasket part numbers.

The instructions further state that the mechanic should perform the following inspections at “each annual inspection whichever occurs first”:

Inspect the oil filter adapter and joints for oil seepage. If oil seepage is detected, remove the safety wire and replace gaskets. Re-install the oil filter adapter in accordance with F & M Installation Instructions using new gaskets... Check and verify the adapter will not rotate when pressure is applied to rotate the adapter. If the adapter moves, remove the safety wire and re-torque the adapter.

### **04.06.2017 (REV. - ): INSTRUCTIONS FOR CONTINUED AIRWORTHINESS DN ST001<sup>3</sup>**

[Applicable to C6LC series adapters]

On April 06, 2017 Stratus Tool Technologies, LLC (part of Tempest who purchased the STC), issued instructions for continued airworthiness. The document gave instructions that at each oil change and each 100-hour or annual inspection, the mechanic should “inspect the oil filter adapter for oil seepage,” and “if oil seepage is detected, replace the fiber and copper gaskets on the transfer cylinder with new gaskets.” It stated that the “use of a torque wrench is mandatory when installing or reinstalling the filter adapter,” and to “safety-wire the transfer cylinder to an appropriate safety-wire location on the engine accessory case.” Following that maintenance, the mechanic should “Check and verify that the body does not move (rotate around the transfer cylinder) when 10 to 20 pounds of force is applied to the body in a manner that would tend to rotate it around the transfer cylinder,” and “if the body rotates around the transfer cylinder, remove the safety-wire and tighten the adapter.” There was a note that the mechanic

<sup>1</sup> See Attachment 06: 08.27.2012 Installation Instructions

<sup>2</sup> See Attachment 07: Instructions for Continued Airworthiness 2013

<sup>3</sup> See Attachment 10: FAA Copies of Installation Instructions

should “Always install new fiber and copper (where used) gaskets each time the filter adapter is removed and reinstalled on the engine.”

There was no listed 300 hours or 3 year requirement and a note that stated “There are no mandatory replacement times for any components.”

**04.06.2017 (REV. -): INSTALLATION INSTRUCTIONS DN ST002 AND DN ST003**

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The instructions stated that “the oil filter adapter transfer cylinder must be re-tightened to 65 foot pounds of torque between 8 and 12 hours of operation after its installation or any time the adapter is removed and reinstalled. use of a torque wrench is mandatory.”

**08.02.2017 (REV. A): INSTRUCTIONS FOR CONTINUED AIRWORTHINESS DN ST001<sup>4</sup>**

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The August 02, 2017 revision included “added text, drawings, and a table.” The added table listed the Installation Document Number to be used with different adapters.

STC Number	Stratus P/N	STC Approved Engine Model List (AML)	Ref Engine Operation Manual	Ref Engine Overhaul Manual	Stratus Installation Document Number
SE09356SC	C6LC-L C6LC-S	CMI O-470 Series	CMI X30097	CMI X30586	ST002 (-L) ST003 (-S)
		CMI IO-470 Series	CMI X30024	CMI X30588	ST002 (-L) ST003 (-S)
		CMI IO-520 Series	CMI X30041	CMI X30039	ST002 (-L) ST003 (-S)
		CMI IO-550 Series	CMI X30605	CMI X30607	ST002 (-L) ST003 (-S)
		CMI TSIO-520 Series			ST002 (-L) ST003 (-S)

**10.25.2019: SERVICE BULLETIN SB-001<sup>5</sup>**

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Following the accident and testing, Stratus issued a Service Bulletin (SB) SB-001 dated October 25, 2019. It stated that the adapter should be inspected for oil leakage and gasket damage. If no discrepancies are found, the mechanic must:

- a. Use a fine point felt pen to make a match mark on the oil transfer cylinder and oil pump housing as shown on Figure 1. While standing beside the aircraft, grasp the oil filter and, using the filter as a lever (or ‘handle’), apply 30 to 50 pounds of force in an attempt to rotate the filter body in a counter-clockwise direction around the oil transfer cylinder, see Figure 2. (Note: You are not trying to unscrew the filter itself. You are trying to make the body rotate about the oil transfer cylinder). Check the match marks for movement of the body. If ANY displacement of the match marks occurred and/or any movement of the body, the oil transfer cylinder, or both was detected, no matter how slight, proceed directly to Paragraph 3.
- b. If neither the body or oil transfer cylinder moved when tested in accordance with Paragraph 2 a, apply a bead of Torque Seal (Cross Check ITW PRO Brand or equivalent) across the gasket at the oil transfer cylinder/oil pump housing joining as shown below in Figure 3.

<sup>4</sup> See Attachment 08: Instructions for Continued Airworthiness 2017

<sup>5</sup> See Attachment 09: Service Bulletin 2019

The SB further stated:

If, during ANY inspection, the Torque Seal applied to an adapter is broken or missing, thoroughly inspect and investigate the oil filter adapter for leaks, seepage, bulging, and security. If defects are found, make necessary repairs prior to approving the aircraft for return to service. ALWAYS INSTALL NEW COPPER AND FIBER GASKETS ANY TIME THE ADAPTER IS REMOVED, ADJUSTED, LOOSENED, OR REPAIRED. NEVER ATTEMPT TO CORRECT AN ADAPTER OIL LEAK OR LOOSE BODY BY TIGHTENING THE OIL TRANSFER CYLINDER ON USED GASKETS.

The SB also detailed a different process to install the adapter:

Fabricate a wooden block/wedge that will fit snugly between the filter mount flange and an adjacent structurally sound part of the engine or airframe that is competent to resist the turning forces encountered when tightening the oil transfer cylinder. Place the block so that as the oil transfer cylinder is tightened the body cannot rotate with the oil transfer cylinder.

With the block in place, tighten the oil transfer cylinder to 65 ft/lbs torque. If the match marks misalign by more than 1/32 inch after tightening the oil transfer cylinder, i.e., the body has moved relative to the oil pump housing, remove the adapter assembly from the engine as previously described. Replace both gaskets with new gaskets and reinstall the adapter in accordance with the instructions contained in the Installation Instructions and ICA applicable to your model adapter. When the installation is successful, i.e., the match marks are aligned within limits, and the oil transfer cylinder is tightened to 65 ft/lbs torque, safety-wire the: a. oil transfer cylinder to the engine and, b. the body to the engine. Wrap the wire around the body in such a manner that the oil transfer cylinder cannot turn counter-clockwise. [figure references are omitted for ease of reading]

At the time of the accident, the oil filter adapter required one fiber gasket, p/n FM-07, and one copper crush gasket, p/n AN900-28 to be used in the installation. In addition, manufacturing guidance indicated that at each annual inspection or 100-hour inspection, the mechanic was to inspect the oil filter adapter for oil seepage, the safety wire, the security of the adapter, and record the results of the inspections in the logbook. Maintenance guidance for the oil filter adapter included instructions for replacing the gaskets anytime the oil filter adapter was removed from the engine and reinstalled, and at 300 hours or 3 years, whichever occurred first.

The C6LC-S Installation Manual, released April 06, 2017 contained a note that “The oil filter adapter transfer cylinder must be re-tightened to 65 foot pounds of torque between 8 and 12 hours of operation after installation or any time the adapter is removed and reinstalled.” There was another note that stated that the mechanic must include the following statement in the Form 337 (in pertinent part): “If the oil filter adapter is loosened, or removed from the engine for any reason, it must be re-installed using new gaskets, tightened in accordance with these installation instructions and properly safety-wired.”