

Aeronca Aircraft Conversions

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Abstract – This article outlines several methods commonly used for converting and/or making major modifications to Aeronca aircraft. This article also addresses some of the specific requirements for marking and some of the conversion limitations.

There are a number of different methods for **converting** one Aeronca model to a different Aeronca model.

There are also a number of Supplemental Type Certificates (STC's) that "add" to an existing type certificate to authorize major modifications or repairs to an existing aircraft, engine, or propeller type certificate.

Probably the most well known methods for **conversion** are the Aeronca Service Letters (SL).

- SL 7 covers the conversion of a 15AC to a S15AC (Seaplane Conversion)
- SL 811CC to a S11CC (Seaplane Conversion)
- SL97DC to a S7DC (Seaplane Conversion)
- SL13.....7AC to a 7BCM with a C 85-8 engine
- SL14.....7AC to a 7DC with C 85-8 engine
- SL15.....7AC to a 7CCM with a C 90-8 engine
- SL16.....7CCM to a S7CCM (Seaplane Conversion)
- SL17.....11AC to a 11BC with a C 85-8 engine
- SL23.....11BC to a S11BC (Seaplane Conversion)
- SL29.....7EC to a S7EC (Seaplane Conversion)
- SL56.....7AC to a 7EC with a C 90-8 or a C 90-12 engine
- SL60.....7EC to a 7GC with an O-290 D2B engine

Conversion from one model to another using an Aeronca Service Letter can be documented with a standard FAA 337 and log book entry. It is important that the conversion be performed exactly as described in the Service Letter with no additions, deletions, or deviations. On conversions involving engine changes, the make and model of engine installed must be exactly as described in the service letter. Deviation from even one requirement of the Service Letter could violate the conversion. For example Service Letters 13 and 14 includes the installation of a Teledyne Continental Motor (TCM) C85-8 engine but does not cover the installation of a C85-12 engine. Other methods that address the installation of a C85-12 engine are described below. It should be noted that deviations from specific requirements within a Service Letter may be implemented through a Field Approval for the specific deviation. Typically a Field Approval would not be issued if the deviation was already covered by an existing STC. As an example, if a Service Letter conversion specified the use of Hanlon Wilson exhaust, one

might consider obtaining a Field Approval for the use of a Cessna exhaust with the Service Letter conversion.

According to the requirements of the Service Letters, conversions other than seaplane conversions, requires stamping the aircraft nameplate with the new aircraft model designation followed by the letters CONV. For example a 7AC aircraft nameplate for a SL 13 conversion would be marked with the model designation 7BCM CONV. Seaplane conversions in accordance with Service Letters do not have requirements for restamping aircraft nameplates.

However some confusion exists related to the correct method for indicating the aircraft model on the aircraft nameplate. The FAA issued Order 8130.2 with a paragraph indicating that for aircraft model changes, the original aircraft nameplate should not be stamped and instead a duplicate nameplate with the new model designation should be mounted next to the original aircraft nameplate (see extraction below). The current revision of this order is Order 8130.2H, revised 2/4/2015. Therefore it would at first appear that there is a Service Letter/STC nameplate stamping requirement that is in conflict with an FAA order.

On several occasions Bill Pancake has discussed this apparent conflict with various FSDO and other FAA representatives. The consensus opinion of these various FAA experts is that FAA Order 8130.2 does not apply to the service letter instructions because the service letter requirements were published and reviewed by the CAA many years before the FAA issued order 8130.2. The consensus opinion further indicated that the FAA Order 8130.2 DOES NOT apply to STC directed modifications because they do not result in aircraft model changes. (Note that for older STC's such as the Lasher STC, 8130.2 does not apply because the STC was approved prior to the issuance of the FAA Order.

We would suggest that if you are contemplating converting your aircraft, you discuss this potential conflict with your I/A and FSDO before you modify your original aircraft nameplate.

As a side note, Bill Pancake's STC's for modifying Chiefs and Champs have no requirements for modifying or otherwise changing aircraft nameplates in applying the STC's.

FAA Order 8130.2H

2/4/2015

Title of Order: Airworthiness Certification of Aircraft and Related Products

The following Chapter 2, Section 2, Paragraph 219 related to aircraft model change was extracted from the FAA order listed above. The order can be downloaded from the FAA.gov web site by searching on the order number 8130.2H.

219. AIRCRAFT MODEL CHANGE.

- a.** When an aircraft has been modified to conform to another model of the same make, the aircraft registration, airworthiness certificate, and aircraft ID plate must reflect the new model designation.
- b.** In addition to the existing ID plate, a new fireproof ID plate as specified in § 45.13 to include the new model designation must be attached as close as physically possible to the original ID plate without obscuring it.
- c.** To maintain an accurate and continuous operating history for the aircraft, the original ID plate must not be altered in any manner.
- d.** The normal procedures, including any applicable inspections, apply when processing Form 8130-6. The amended airworthiness certificate will be identified with a capital "A" preceding the current date of the certificate being issued. If ownership of the aircraft has not changed, an application for aircraft registration, reflecting the new model designation, need not be submitted. AFS-750 will issue an amended registration certificate.

Note that you can search the FAA's STC data base on the FAA website at www.faa.gov. Near the bottom left side of the home page, there is a link titled "Get Important Info/Data". This link will take you to the searchable STC page. You can enter search parameters such as "Aeronca", "7AC", or a name such as "Pancake" or "Lasher".

Some of the older STC's related to Aeronca 7 and 11 series aircraft were developed by Charlie Lasher in the mid 50's and 60's. The Lasher STC SA232SO covers the change out of an Aeronca 7AC engine from a TCM model A65-8 to a TCM model C85-12 or C85-12F or the change of the Aeronca 7BCM engine from a TCM model C85-8 to a TCM model C85-12 or C85-12F. [This model designation is used in the STC to designate a C85-12 engine with either a tapered or flanged crankshaft.]

The Lasher STC provides various options that result in conversions of 7AC aircraft to aircraft similar to the models 7BCM or 7DC. The Lasher STC has an option for increasing the gross weight to 1300 lbs. provided the requirements of the STC are followed. Among other things, the gross weight increase requires the addition of a larger tail fin and airframe braces.

The Lasher STC has requirements for restamping the aircraft nameplate that differs from the guidance and philosophy used in the service letters. The Lasher STC requires that the aircraft nameplate be restamped as 7AC CONV no matter which conversion options are selected, i.e. ALL aircraft converted under the Lasher STC should be designated as a 7AC CONV. The Lasher STC are still available from David Lasher, Charlie's grandson.

Coleman Wagner has two STC's for installing either a Lycoming O-235 engine or a Continental O-200 engine in Chiefs and Champs.

1. STC SA3-372 covers the engine installation in 7AC and 7AC Conv model aircraft.
2. STC SA57RM covers the engine installation in 11AC, S11AC, 11BC, S11BC, 11CC, and S11CC model aircraft.

Like the Lasher STC, the Wagner STC's have specific nameplate stamping requirements, and like the Lasher STC and conversion letters, the requirements are in conflict with the FAA Order 8136.

Pancake STC's

There are currently three STC's that were developed and issued by Bill Pancake that relate to Aeronca aircraft.

SA04301CH This STC modifies Aeronca type certificates A-759 and A-761 for all model 7 and 11 aircraft listed in the STC to permit the attachment of fabric covering using "pop rivets" and rib stitching.

Description of Type Design Change:

Attachment of fabric covering and wing leading edge per C. William Pancake, Jr. document number BP-MDL-1, Rev. A, dated May 24, 2017 or later FAA Approved Revision.

Limitations and Conditions:

1. Compliance has been established to the regulations listed in AML SA04301CH. This approval should not be extended to aircraft with a regulatory basis differing from that listed in AML SA04301CH without written permission from the Certificate Management Aircraft Certification Office.
2. This approval allows for the substitution of blind fasteners or conventional rib stitching as a replacement for P.K. Screws. In cases where the Type Certificate holder has recommended a different fabric attachment method, the original instructions for continued airworthiness should be followed.
3. Compatibility of the design change with previously approved modifications must be determined by the installer.
4. If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

Cost: \$210 for use on one airplane, with the FAA registration number shown on the certificate furnished with the STC.

SA04205CH This STC modifies Aeronca type certificate A-759 for certain engine replacements for models 7AC, 7BCM/L-16A, 7CCM/L-16B, and 7DC.

The following details tend to apply to the application of this STC to any of the Series 7 aircraft. They also generally apply to STC for Series 11 aircraft.

Propeller: Changing from an A65 engine to a C85 or C90 engine will require a propeller change. Additional wood and metal propeller requirements outlined in STC.

Firewall/nose cowl: If not already done, the firewall and nose cowl will need to be modified in accordance with Aeronca Helps and Hints #26.

Tachometer: The tachometer drive direction is reversed when converting from a -8 (CCW) to a -12 engine (CW). This requires the tachometer to be changed to the type that will be of proper rotation. Additional tachometer replacement recommendations are included in the STC.

Motor Mount: The existing A-65 aircraft motor mount can be used for any of the engine replacements.

Motor Baffles: Engine baffles requires no change. Options such as starters or oil filters may require baffle modifications.

Mufflers: The existing “Wye” mufflers may be used for any of the engine replacements. The STC also permits the use of Hanlon-Wilson or Cessna 150 mufflers.

Carb Heat and Cabin Heat: No change required.

Flight Controls: Flight controls will be rigged in accordance with the appropriate type certificate specified in the STC.

Engine Controls: No changes are necessary with regards to the engine controls. The addition of a carburetor mixture control is optional.

Aircraft Nameplates: The STC does not require any modification of the existing aircraft nameplate and does not require the addition of any additional nameplate. The application of the STC does not modify or change the aircraft’s existing model designation. FAA order 8130.2 does not apply to this STC.

Aircraft Tail: The STC does not require, but does permit the use of the larger tail with any of the engine replacement options.

Landing Gear: The STC permits, but does not require the use of “no-bounce” landing gear.

Gross Weight: The aircraft gross weight associated with all engine replacement options, with either the small or large tail, and with either the standard or no bounce landing gear is 1320 lbs.

Starter: The STC permits the use of a “light weight” starter. The original Delco starter is not permitted due to weight.

Center of Gravity (CG) Limits: Specific details associated with various engine options are listed below. Within the details under the title “Approved Engine Propeller Combinations” are requirements for engine/propeller model

requirements. The CG envelope specified in the Type Certificate for the engine/propeller also applies to the specific CG envelope. For example, applying a C85-12 engine to a 7AC would result in the 7BCM CG limits applying to the engine replacement. Applying a C-90 engine to a 7AC would result in the 7CCM CG limits applying to the engine replacement. The STC requires that the aircraft be weighed following the engine replacement.

Airframe Braces: When an engine is replaced on a model 7-AC, two additional airframe braces must be installed.

Below are **model specific details** for the various Series 7 aircraft.

Model: American Champion Model 7AC

Approved Replacement Engine(s)

Continental C90-8, -12F or -14F or Continental C85-8, -8F, -12, -12F, or -14F

Approved Engine Propeller Combinations

For Continental C-85 series engines use Engine/Propellers combinations approved for 7BCM aircraft by FAA Type Certificate Data Sheet A-759 or otherwise FAA Approved airplane engine / propeller configuration . Install engine/propeller per 7BCM requirements.

For Continental C-90 series engines use Engine/Propellers combinations approved for 7CCM aircraft by FAA Type Certificate Data Sheet A-759 or otherwise FAA approved airplane engine / propeller configuration. Install engine/propeller per 7CCM requirements.

Required Engine Mounts

Continental C85-14F and Continental C90-14F must be installed with Dawley Part DA 85-90-14-0-2 Conical Engine Mounts.

Limitations

Aircraft Maximum Gross Weight: 1320 lbs.
Airspeed (VNE) 129 MPH

Model: American Champion 7CCM/L-16B

Approved Replacement Engine(s)

Continental C90-12F or -14F

Approved Engine Propeller Combinations

For Continental C-90 series engines use Engine/Propellers combinations approved for 7CCM aircraft by FAA Type Certificate Data Sheet A-759 or otherwise FAA approved airplane engine / propeller configuration. Install engine/propeller per 7CCM requirements.

Required Engine Mounts

Continental C90-14F must be installed with Dawley Part DA 85-90-14-0-2 Conical Engine Mounts.

Limitations

Aircraft Maximum Gross Weight: 1320 lbs.

Airspeed (VNE) 129 MPH

Model: American Champion Model 7DC

Approved Replacement Engine(s)

Continental C85-12, -12F, or -14F or Continental C90-8F, -12F, or -14F.

Approved Engine Propeller Combinations

For Continental C-85 series engines use Engine/Propellers combinations approved for 7DC aircraft by FAA Type Certificate Data Sheet A-759 or otherwise FAA Approved airplane engine / propeller configuration . Install engine/propeller per 78BCM requirements.

For Continental C-90 series engines use Engine/Propellers combinations approved for 7CCM aircraft by FAA Type Certificate Data Sheet A-759 or otherwise FAA approved airplane engine / propeller configuration. Install engine/propeller per 7CCM requirements.

Required Engine Mounts

Continental C85-14F and Continental C90-14F must be installed with Dawley Part DA 85-90-14-0-2 Conical Engine Mounts.

Limitations

Aircraft Maximum Gross Weight: 1320 lbs.

Airspeed (VNE) 129 MPH

Model: American Champion Model 7BCM/L-16A

Approved Replacement Engine(s)

Continental C85-12, -12F, or -14F or Continental C90-8F, -12F, or -14F.

Approved Engine Propeller Combinations

For Continental C-85 series engines use Engine/Propellers combinations approved for 7BCM aircraft by FAA Type Certificate Data Sheet A-759 or otherwise FAA Approved airplane engine / propeller configuration . Install engine/propeller per 78BCM requirements.

For Continental C-90 series engines use Engine/Propellers combinations approved for 7CCM aircraft by FAA Type Certificate Data Sheet A-759 or otherwise FAA approved airplane engine / propeller configuration. Install engine/propeller per 7CCM requirements.

Required Engine Mounts

Continental C85-14F and Continental C90-14F must be installed with Dawley Part DA 85-90-14-0-2 Conical Engine Mounts.

Limitations

Aircraft Maximum Gross Weight: 1320 lbs.

Airspeed (VNE) 129 MPH

Cost: \$310 for use on one airplane, with the FAA registration number shown on the certificate furnished with the STC.

SA0402AT. This STC modifies Aeronca type certificate A-761 for models 11AC, S11AC, 11BC, and S11BC. The general comments listed above for the Series 7 aircraft also apply to this STC.

Background

The main reason for conversion to the Continental engine C85-12F is to enhance safety by permitting the installation of a light weight starter. Hand propping to start the engine can be a hazard for some pilots. The Aeronca Chief was manufactured in several different models. The S11AC is the seaplane version of the 11AC Chief. The 11ACS (Scout) was a cheaper or stripped down version of the 11AC series so this STC will apply to all 11 series Aeronca aircraft. Conversion to the Continental C85-12 engine also permits the installation of a generator or alternator to support an aircraft electrical system. Electrical systems are beneficial in supporting navigation and strobe lighting, transponders, navigation and communication devices which also enhances safety. The Aeronca Chief 11AC is approved by Aeronca Service Letter #17 for upgrading with a Continental C85-8F or -8 engine, which has no provision for a starter or generator. The C85-12 engine installation uses the same engine mount as is used with the A65-8 or C85-8 engine. The Aeronca Model 11BC is the factory version with a C85-8 engine. The weight increase of the C85-12F (without starter or generator) over the -8F series engine is about 2.0 lbs. Aircraft weight increase with the engine conversion using either a B&C or Sky-Tec starter is about 10 lbs.

Description of Type Design Change:

Replacement of either a 65 horsepower Continental A65-8 or A65-8F engine with an 85 horsepower Continental C85-8 or C85-8F engine in the Aeronca 11AC in accordance with Aeronca Service Letter 17; or Replacement of a 65 horsepower Continental A65-8, A65-8F, or 85 horsepower Continental C85-8 or C85-8F engine, with an 85 horsepower Continental C85-12F or C85-12 engine which have provisions for an electrical starter in accordance with Installation Instructions for Continental C85-8, -8F, C85-12 or -12F engine in the Aeronca 11AC or 11BC aircraft, dated November 3, 2017 or later FAA Approved Revision.

Limitations and Conditions:

The installer must determine whether this design change is compatible with previously approved modifications. If the holder agrees to permit another person to use this certificate to alter a product, the holder must give the other person written evidence of that permission. The modified aircraft must be operated in accordance with Airplane Flight Manual Supplement for Aeronca model 11AC, S11AC, 11BC, S11BC dated December 4, 2017 or later FAA Approved Revision. Instruction for Continued Airworthiness, STC for removing Continental A65-8 or A65-8F engine and installing Continental C85-12 or C85-12F engine on certain model Aeronca aircraft, dated January 16, 2015, or later revision must be made available to the operator at the time of installation.

Cost: \$310 for use on one airplane, with the FAA registration number shown on the certificate furnished with the STC.

There are also a number of either seldom used or no longer active STC's related to Aeronca aircraft conversions. The Aeronca.com website has a link listing a number of STC's for Aeronca Champs. As previously mentioned, the FAA website has a searchable STC database.

One last point is that Don Sword has an **STC SE0192AT** that permits conversion of a Continental -12 engines to -8 engines for C-75, 85, 90, and O-200 engines. Application of this STC would permit modifying a -12 to a -8 engine to comply with requirements in some Aeronca Service Letters that specify the use of -8 engines. Of course, when an engine is converted from a -12 to a -8, one cannot later add a starter or alternator. You should contact Don if you need additional information about his conversions. It should also be noted that a -12 engine cannot be "converted" to a -8 engine merely by installing the starter and generator cover plates on the back of the accessory case. Continental Service Bulletin M75-6 does cover the conversion of one engine model to another, but a cover plate conversion is not included under this service bulletin.

Don Sword also has an **STC SE02004AT** that covers the installation of Teledyne Continental Motors (TCM) model O-200 crankshaft, connecting rods and pistons (Superior Air Parts pistons are also approved) in TCM model C-85 engines.

Don Sword also has an **STC SE02172AT** that permits using a TCM model O-200 crankcase on a TCM series C85, C75, and C90 engine.

Don Sword's STC's can be obtained through Aircraft Speciality Services in Tulsa, OK. or through Don's Dream Machines.

Bill Pancake's STC's can be obtained directly from Bill Pancake.

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