

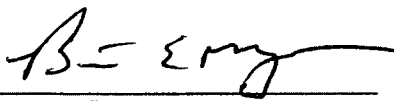
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**INSTRUCTIONS FOR INSTALLATION
 OF A HARTZELL HC-C2YR-1BFP/F7497 PROPELLER
 ON MOONEY M20(A-G,J) AIRCRAFT
 STC SA02414CH-D**

LOG OF REVISIONS

Revision	Revised Pages	Description of Revision	Date
New	All	Original Release	1/10/07
A	All	Added original type-certificated spinner models 835-20(P) and 835-33(P) to M20A through M20G aircraft models for clarification	8/15/08
B	All	Added STC compatibility note on page 2, re-paginated	10/16/09
C	All	Corrected typographical error in dates on page headings, and added "End" to page 6.	12/11/09
D	All	Added clarification Note 3, page 2; 103585 composite spinner model option, pages 2 and 3; 103585 spinner weight and balance data, page 6; Revision D header, all pages; repaginated.	1/7/10
E	2,3,4,6	Added "blunt" aluminum spinner model 835-58(P) that is equivalent to the 835-20(P) and 835-33(P) models.	10/13/10

NOTE: All changes are indicated by a black vertical line along the left margin.

FAA Approved 
 Brian E. Meyer
 STC ODA administrator
 Hartzell STC ODA-100082-CE

Date OCTOBER 15, 2010

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COMPATIBILITY NOTES:

- 1) The HC-C2YR-1BFP/F7497 propeller is compatible with all pressure-to-increase pitch governor models listed in the Aircraft Type Certificate Data Sheet (TCDS) 2A3 or Hartzell Propeller TCDS P-920.
- 2) This STC is compatible with the following Power Flow Systems, Inc STCs for tuned exhaust systems:

Mooney M20B, M20C, M20D, M20G:	STC SA02549AT
Mooney M20E, M20F, and M20J:	STC SA02871AT
- 3) Hartzell spinner models 835-20(P) and 835-33(P) are approved under the aircraft Type Certificate 2A3 and are compatible with this STC.
- 4) Hartzell spinner assembly model 835-58(P) is approved and is equivalent to spinner models 835-20(P) and 835-33(P). The 835-58(P) assembly consists of a 103937(P) dome and C-4549-1(P) bulkhead adapter.

Application Table

Airplane Model	S/N Range	Engine	Spinner Model**
M20A	1201 – 1700, 1700A	O-360-A1(A,D)	835-20(P), 835-33(P), 835-54(P), 835-58(P), 103585
M20B	1701 – 1851 1853 – 1939	O-360-A1(A,D)	835-20(P), 835-33(P), 835-54(P), 835-58(P), 103585
M20C	1852, 1940 – 3466 670001 – 670123 670125 – 670134 670136 – 670149 680001 – 680077 680079 – 680099 680101 – 680198 690001 – 690096, 690098 700001 – 700052 700055 – 700089, 700091 20-0001 - 20-1258	O-360-A1(A,D)	835-20(P), 835-33(P), 835-54(P), 835-58(P), 103585
M20D*	1, 101 - 260	O-360-A1D	835-20(P), 835-33(P), 835-54(P), 835-58(P), 103585
	Table continued on next page		

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Airplane Model	S/N Range	Engine	Spinner Model**
M20E	101 – 400 470 – 1217 1219, 1221 1223 – 1308 670001 – 670062 690001 – 690073 700001 – 700039 700041 – 700043 700045 – 700052, 700055, 700056, 700060, 700061 21-0001 – 21-1180	IO-360-A1A	835-20(P), 835-33(P), 835-54(P), 835-58(P), 103585
M20F	660002 – 660004 670001 – 670363 670365 – 670385 670387 – 670482 670484 – 670539 680001 – 680206 690003 – 690090, 690092 700001 – 700061 700063 – 700066 700070 – 700072 22-0001 – 22-1439	IO-360-A1A	835-33(P), 835-54(P), 835-58(P), 103585
M20G	680001 – 680164 690001 – 690020 700001 – 700006	O-360-A1D	835-20(P), 835-33(P), 835-54(P), 835-58(P), 103585
M20J	24-0002 and up	IO-360-A(1,3)B6(D)	A-2295-5(P)

*Fixed pitch installation on M20D must first be converted to constant-speed configuration for eligibility.

**Models M20(A-G) with M20J-style cowling modifications may require the A-2295-5(P) spinner

1. Remove the original propeller and spinner per the applicable Mooney Service Manual.

NOTE: Some Hartzell steel-hub propellers incorporate a phenolic spacer between the propeller and engine-mounting flange. When installing an aluminum hub propeller, this spacer is to be discarded. The aluminum hub propeller mounting o-ring is located on the inside diameter of the propeller hub. There should not be an o-ring on the engine flange when installing an aluminum hub propeller.

2. Install new propeller and spinner in accordance with Hartzell Owner's Manual Number 115N. Follow installation instructions for "Installation of "K" and "R" Flange Propellers" in Section 3 of Manual 115N.

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NOTE: Follow the instructions for "Spinner Bulkhead to Propeller Hub Installation" in the "Spinner Pre-Installation" section of Manual 115N for the A-2295-5(P) spinner. Use the "Spinner Adaptor to Starter Ring Gear Installation" instructions for the 835-20(P), 835-33(P), 835-54(P) and 835-58(P) spinners.

3. Attach applicable Hartzell Propeller Inc. Airplane Flight Manual Supplement AFMS_011007_(1,2, or 3) to the existing M20() Pilot's Operating Handbook / FAA Approved Airplane Flight Manual.
4. Based on aircraft model, re-mark tachometer as shown below:

For M20A-D, G, J (models with 180 Hp O-360-() or damped 200 Hp IO-360-()1()6 engines)

Radial Red Line (Rated)	2700 RPM
Green Arc	2100-2700 RPM

For M20E, F (models with un-damped 200 Hp IO-360-()1() engines)

Radial Red Line (Rated)	2700 RPM
Green Arc	2100-2350 RPM & 2550-2700 RPM
Yellow Arc – No continuous ops >24" MP	2350-2550 RPM

NOTE: The HC-C2YR-1BFP/F7497 STC propeller alleviates the requirement to comply with the RPM restrictions of Hartzell Propeller AD 77-12-06R2 (superceeded), AD 2002-09-08, and/or Mooney AD 65-12-03.

The colored arcs can be marked with Operating Range Decals from Aircraft Spruce and Specialty (www.aircraftspruce.com), P/N 10-03905 or equivalent green decal, tape, or paint. If needed, Advisory Circular AC 20-88A provides guidelines on marking aircraft powerplant instruments.

5. On M20E, F models only (un-damped 200 Hp IO-360-()1() engines), install the following placard near the tachometer. Placard is either supplied with STC documentation or can be fabricated by the installer.

Continuous operation is prohibited above 24" MP between 2350 – 2550 RPM

6. Revise weight and balance records to show:

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Removal of the original Type Certified propeller and spinner. Reference the Mass Properties table below for the appropriate weight and moment arm.

Mooney Type Certificated Propellers Mass Properties

Aircraft Model	Type Certified Propeller	Weight	Moment Arm
M20A or B	<u>McCauley</u> 2D36C14/78KM-4	59 lbs	-31.5
	D-2135/2136 Spinner	3 lbs	-31.5
	<u>Hartzell</u> HC-92ZK-8D/8447-12A	65 lbs	-29.5
	835-6 Spinner	3 lbs	-28.0
M20C or D	<u>Hartzell</u> HC-C2YR-1()/()7666()-2	53.75 lbs	-30.16
	835-20 Spinner	3.25 lbs	-29.18
	<u>McCauley</u> 2D34C53-A/74E-0	49.25 lbs	-30.31
	D-2808/3148 Spinner	3.28 lbs	-29.18
M20E	<u>Hartzell</u> HC-C2YR-1()/()7666()-2	53.75 lbs	-30.16
	Mooney 680014-000 Spinner	3.6 lbs	-29.18
	Mooney 680014-501 Spinner	3.6 lbs	-29.18
	or 835-20 or 835-33(P) Spinner	3.25 lbs	-29.18
M20F or G	<u>Hartzell</u> HC-C2YR-1()/()7666()-2	53.75 lbs	-35.16
	Mooney 680014-501 Spinner	3.6 lbs	-34.18
	or 835-20 or 835-33(P) Spinner	3.25 lbs	-34.18
	<u>McCauley</u> 2D34C53-A/74E-0	49.25 lbs	-35.31
M20J	D-2808/3148 Spinner	3.28 lbs	-34.18
	<u>McCauley</u> B2D34C212/78CDA-4	49.5 lbs	-35.5
	or B2D34C214/90DHB-16E(P)	4.8 lbs	-35.0
	Mooney 680031-505	4.8 lbs	-35.0
M20J	<u>Hartzell</u> HC-C2YR-1()/()7666()-3Q	54.25 lbs	-35.5
	Mooney 680031-507 Spinner	4.8 lbs	-35.0

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Installation of Hartzell HC-C2YR-1BFP/F7497 propeller and spinner per the Application Table (pages 2 & 3). Use the weights provided in the following table and the moment arms provided in the Mass Properties table for the propeller and spinner you are replacing.

STC Propeller & Spinner	Weight
<u>Hartzell</u>	
HC-C2YR-1BFP/F7497	58.1 lbs
835-20(P) Spinner	3.25 lbs
835-33(P) Spinner	3.25 lbs
835-54(P) Spinner	4.1 lbs
835-58(P) Spinner	3.1 lbs
103585 Spinner (composite)	3.35 lbs
Or	
A-2295-5P Spinner	5.8 lbs

M20J weight and balance example:

Remove -

Weight of Hartzell HC-C2YR-1()/()7666()-3Q propeller = -54.25 lbs

Moment arm = -35.5 inches (forward of datum)

Weight of spinner 680031-507 = -4.8 lbs

Moment arm = -35.0 inches

Install -

Weight of HC-C2YR-1BFP/F7497 propeller = +58.1 lbs

Moment arm = -35.5 inches

Weight of spinner A-2295-5(P) = +5.8 lbs

Moment arm = -35.0 inches

7. Perform ground engine run for a functional and leak check of the Hartzell propeller installation.
8. Make the appropriate logbook entries and return aircraft to service with FAA Form 337 referencing STC.

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9. Fly a functional check-flight using normal procedures, note maximum RPM setting and readjust governor high-RPM stop if necessary.
10. Post-installation dynamic balance of the propeller/engine combination is recommended, but not required, per Section 61-00-15 of Hartzell Owner's Manual 115N.

END