Airman Knowledge Testing Supplement for Aviation Mechanic General, Powerplant, and Airframe; and Parachute Rigger

U.S. Department of Transportation
Federal Aviation Administration

DO NOT MARK IN THIS BOOK
Preface

This Airman Knowledge Testing Supplement is designed by the Federal Aviation Administration (FAA) Flight Standards Service with assistance from Safety Research Corporation of America (SRCA). It is intended for use by Airman Knowledge Testing (AKT) Organization Designation Authorization (ODA) Holders and other entities approved and/or authorized to administer airman knowledge tests, on behalf of the FAA, in the following knowledge areas:

Aviation Mechanic General—AMG
Aviation Mechanic Powerplant—AMP
Aviation Mechanic Airframe—AMA
Parachute Rigger—RIG, RMC, RMP


Comments regarding this supplement, or any AFS-630 publication should be sent to the following address:

AFS630comments@faa.gov
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APPENDIX 1

Aviation Mechanic General

\[
\frac{(-5 + 23)(-2) + (3^{-3})(\sqrt{64})}{-27 ÷ 9} =
\]

\[
(\sqrt{(-4)^0} + 6 + (\sqrt[4]{1296})(\sqrt{3})^2) =
\]

60 POUNDS
\[ C_T = \frac{1}{1/C_1 + 1/C_2 + 1/C_3...} \]

Figure 1. Equation.
$C_T= \frac{1}{1/C_1 + 1/C_2 + 1/C_3}$

Figure 2. Equation.
\[ L_T = \frac{1}{1/L_1 + 1/L_2 + 1/L_3\ldots} \]
Figure 4. Circuit diagram.
$$Z = \sqrt{R^2 + (X_L - X_C)^2}$$

- $Z$ = Impedance
- $R$ = Resistance
- $X_L$ = Inductive reactance
- $X_C$ = Capacitive reactance

Figure 5. Formula.
Figure 6. Circuit diagram.
Figure 7. Circuit diagram.
Figure 8. Circuit diagram.
Figure 9. Circuit diagram.
Figure 10. *Battery circuit.*
Figure 11. Circuit diagram.
\( R_a = \frac{1/R + 1/R}{4} \)

\( R_b = R_a + R_2 \)

\( R_c = \frac{1}{1/R_b + 1/R_3} \)

\( R_t = R_c + R_1 \)

**Figure 12.** Circuit diagram.
Figure 13. Circuit diagram.
Figure 14. Circuit diagram.
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NOTE: Switches shown gear down - on the ground
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Notes:
1. Drill 31/64 inch ream ½ inch.
2. All tolerances ±1/32 unless otherwise specified.
3. Finish all over 25

Figure 36. Aircraft drawing.
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Figure 51. Marshalling signals.
\[ (\sqrt{(-4)^0} + 6 + (\sqrt[4]{1296}) (\sqrt{3})^2) = \]
\[ \frac{\sqrt{31} + \sqrt{43}}{(17)^2} = \]

**Figure 53. Equation.**
Figure 54. Trapezoid area.
Figure 55. Triangle area.
Figure 56. Trapezoid area.
Figure 57. Triangle area.
\[
\frac{(-35 + 25)(-7) + (\pi)(16^{-2})}{\sqrt{25}} = \]

Figure 58. Equation.
Figure 59. *Equation.*
\[
(-5 + 23)(-2) + (3^{-3})(\sqrt{64}) = \\
\frac{-27}{9}
\]

Figure 60. Equation.
Figure 61. Physics.
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<td>0.040 sheet 7075-0 AL.</td>
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DASH NUMBERS SHOWN DASH NUMBERS OPPOSITE UNIT WT. DWG. AREA

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<th>NAME</th>
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<th>MAT'L SPEC.</th>
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<td></td>
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</tr>
</tbody>
</table>

| 1 | 1 | 1 | 200 | 100 |  |

UNLESS OTHERWISE NOTED

Break all sharp edges

Scale full

No. req. per Airplane Type A/C EFF

1 | 200 | 36TCP | 001-All 088-All 001-087

1 | 200 | 36P | 36P

992-148-XXX

1

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TAH

Figure 62. Maintenance data - part 1 of 3.
AREA 2

GENERAL NOTES - 100

1. ALL BENDS +/-.5 deg.
2. All holes +/-.003.
3. Apply Alodine 1,000.
4. Prime with MIL-P-23377 or equivalent.
5. Trim S-1 C just aft of the clip at STA. 355.750 and forward of the front face of the STA. 370.25 frame and remove from the airplane.
6. Position the –101 doubler as shown. Install wet with NAS1097AD-4-4 and -4-5 rivets and a faying surface seal of PR 1,422.
   Pick up the rivet row that was in S-1 C and the aft rivets in sta. 370.25. Tie doubler into front frame with clips as shown using MS20470AD-4-4 rivets through the clips and the frame.
7. Install 4 NAS1473-3A nutplates with NAS1097-3-4 rivets through the skin and doubler to retain the antenna.
8. Strip paint and primer from under the antenna footprint.
9. Treat skin with Alodine 1,000.
10. Install antenna and apply weather seal fillet around antenna base.

AREA 3

GENERAL NOTES - 200

1. ALL BENDS IAW PS. 1,000.
2. All holes IAW PS. 1,015.
4. Alodine IAW PS. 10,000.
5. Prime IAW PS. 10,125.
6. Trim S-1 C just aft of the clip at STA. 355.750 and forward of the front face of the STA. 370.25 frame and remove from airplane.
7. Position the –102 doubler as shown. Install wet with NAS1097AD-4-4 and -4-5 rivets, and a faying surface seal IAW PS. 41,255. Pick up the rivet row that was S-1 C and the aft rivets in STA. 370.25. Add two edge rows as shown. Tie doubler into front frame with clips as shown using MS20470AD-4-4 rivets through the clips and the frame.
8. Install 4 NAS1473-3A nutplates with NAS 1097-3-4 rivets through the skin and doubler to retain the antenna.
9. Strip paint and primer from under the antenna footprint.
10. Treat skin IAW PS. 10,000.
11. Install antenna and apply weather seal fillet around antenna base.

Note: PS. = Process Specification
      IAW = in accordance with
Figure 62B. Maintenance data - part 3 of 3.
The following is the compliance portion of an Airworthiness Directive.

“Compliance required as indicated, unless already accomplished:

I. Aircraft with less than 500 hours total time in service: Inspect in accordance with instructions below at 500 hours total time, or within the next 50 hours time in service after the effective date of this AD, and repeat after each subsequent 200 hours in service.

II. Aircraft with 500 hours through 1,000 hours total time in service: Inspect in accordance with instructions below within the next 50 hours time in service after the effective date of this AD, and repeat after each subsequent 200 hours in service.

III. Aircraft with more than 1,000 hours time in service: Inspect in accordance with instructions below within the next 25 hours time in service after the effective date of this AD, and repeat after each subsequent 200 hours in service.”

Figure 63. Airworthiness directive excerpt.
Figure 64. Resistance total.

\[ R_t = E^2/P \]
1. $3.47 \times 10^4 = 34,700$. 
2. $2(4^{10}) = 2,097,152$. 

Figure 65. Scientific notation.
\[-4 + 6 + 10^3 (\sqrt{1296}) =\]

Figure 66. Equation.
\[
\frac{\sqrt{31} + \sqrt{43}}{(17)^2} = 
\]
Figure 68. *Alternative answer.*
Figure 69. *Equation.*

\[
(\sqrt{100} + \sqrt{36} - \sqrt{16}) =
\]
1. \((\sqrt{31}) + (\sqrt{43}) \div 17^2\)
2. \((\sqrt{31}) + \sqrt{43}) \div 17^2\)
3. \((\sqrt{31}) + (\sqrt{43}) - 17^2\)

Figure 70. Alternative answer.
Figure 71. *Volume of a sphere.*

\[ V = \frac{1}{6}\pi D^3 \]
APPENDIX 2

Aviation Mechanic Powerplant

Electric Wire Chart

Container Pressure Versus Temperature

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<tr>
<th>Temperature °F</th>
<th>Minimum</th>
<th>Maximum</th>
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<tbody>
<tr>
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<td>60</td>
<td>145</td>
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<tr>
<td>-30</td>
<td>83</td>
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<td>483</td>
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<tr>
<td>100</td>
<td>438</td>
<td>523</td>
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Curves:
1. Continuous rating-amperes calculated in conduit and bundles.
2. Continuous rating-amperes calculated in free air.
3. Intermediate rating-amperes maximum of 2 minutes.
This is the compliance portion of an FAA Airworthiness Directive.

Compliance required as indicated:

(A) For model O-690 series engines, serial Nos. 101-40 through 5264-40 and IO-690 series engines, serial Nos. 101-48 through 423-48, compliance with (C) required within 25 hours’ time in service after the effective date of this AD and every 100 hours’ time in service thereafter.

(B) For model O-690 series engines, serial Nos. 5265-40 through 6129-40 and IO-690 series engines, serial Nos. 424-48 through 551-48, compliances with (C) required as follows.

(1) Within 25 hours’ time in service after the effective date of this AD and every 100 hours’ time in service thereafter for engines with more than 275 hours’ time in service on the effective date of this AD.

(2) Prior to the accumulation of 300 hours total time in service and every 100 hours’ time in service thereafter for engines with 275 hours or less time in service on the effective date of this AD.

(C) Inspect the oil pump drive shaft (P/N 67512) on applicable engines in accordance with instructions contained in Connin Service Bulletin No. 295. Any shafts which are found to be damaged shall be replaced before further flight. These inspections shall be continued until Connin P/N 67512 (redesigned) or P/N 74641 oil pump drive shaft is installed at which time the inspections may be discontinued.

Figure 1. Airworthiness directive excerpt.
## Container Pressure Versus Temperature

<table>
<thead>
<tr>
<th>Temperature °F</th>
<th>Container Pressure (PSIG)</th>
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</table>

*Figure 2. Fire extinguisher pressure chart.*
Figure 3. *Fire extinguisher pressure chart.*
Figure 4. Electric wire chart.
Figure 5. Starter-generator circuit.
Figure 6. Fuel/air ratio graphs.
Figure 7. Fuel system.
APPENDIX 3
Aviation Mechanic Airframe

\[ D = 0.00327AV^2 \]
Figure 1. Rivets.
Figure 2. Countersinking.
Figure 3. Grip length.
Setback = R+T
Bend allowance = \( \frac{2\pi (R + \frac{1}{2}T)}{4} \)

Figure 4. Bending sheet metal.
Figure 5. Sheet metal layout.

Setback = $R + T$

Bend allowance = $\frac{2\pi (R + \frac{1}{2}T)}{4}$
Setback = \( R + T \)
Bend allowance = \( \frac{2\pi (R + \frac{1}{2}T)}{4} \)

Figure 6. Sheet metal layout.
Figure 7. Sheet metal layout.
Figure 8. Control cable.
All Cable Tension Readings Have a Tolerance of ±10 Percent

Figure 9. Cable tension chart.
$F = \frac{A \cdot Tw}{L}$

Figure 10. Torque value.
Figure 11. Fittings.
Figure 12. Backup rings.
Figure 13. Cooling system.
Correction of pressure during leakage test for change in temperature. Add pressure change if temperature rises. Subtract pressure change if temperature falls.

Figure 14. Pressure temperature correction chart.
D = 0.000327AV^2

Figure 15. Formula.
Figure 16. *Antennas.*
Figure 17. Fuel system.
Figure 18. Battery connections.
Figure 19. Landing gear circuit.
Figure 20. Landing gear circuit.
## Container Pressure Versus Temperature

<table>
<thead>
<tr>
<th>Temperature °F</th>
<th>Container Pressure (PSIG)</th>
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**Figure 21.** Fire extinguisher chart.
Figure 22. Antenna.
Figure 23. Antenna.
Figure 24. Antenna.
Figure 25. Antenna.
Figure 26. Antenna.
Figure 27. Antenna.
Figure 28. *Antenna.*
Figure 29. Antenna.
Figure 30. Antenna.
Figure 31. *Antenna.*
Figure 32. Antenna.
Figure 33. Antenna.
Figure 34. Antenna.
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Parachute Rigger
Figure 1. Tacking knot.
Figure 2. Parachute material.
Figure 3. Seam stitching.
Figure 4. Suspension line attachment.
Figure 5. Suspension lines.
Figure 6. *Fittings.*
Figure 7. *Radial seam stitching.*
Figure 8. Lift web stitching.
Figure 9. Knots.
Figure 10. Machine stitching.
Figure 11. French fell seam.
Figure 12. English fell seam.
Figure 13. Machine stitching.
| Sewing Machine Table |

**Figure 14.** Machine stitching.
Figure 15. *Machine stitching.*
Figure 16. Hardware threading.