



Aviation Mechanic **HANDBOOK**



EIGHTH EDITION

Based on original text by **Dale Crane**
Edited by **Keith Anderson**

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AVIATION SUPPLIES & ACADEMICS, INC.
NEWCASTLE, WASHINGTON

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Edited by Keith Anderson

Aviation Supplies & Academics, Inc.

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Introduction

Even though ways to look up mechanics reference information via the internet are widely available today, there is still significant benefit to keeping a printed “quick reference” guide handy in a toolbox or workbench drawer. Your time as an aviation mechanic is too valuable to be spent looking through stacks and pages of reference books to find a particular chart, formula or diagram you need on a particular job. The editorial staff at ASA has done this job for you and compiled this *Aviation Mechanic Handbook* to be a handy toolbox source of useful information.

For your convenience, this handbook is arranged in 18 sections with a table of contents at the beginning of each section, as well as complete contents at the front of the book and index at the back.

This information has been compiled from a large number of industry and government publications, and every effort has been made to ensure its applicability and accuracy.

The *ASA Aviation Mechanic Handbook* is a companion volume to the *ASA Dictionary of Aeronautical Terms*. The two books are the core of ASA’s training materials for aircraft mechanics.

ASA is dedicated to providing quality training materials for the aviation industry. Your feedback regarding our books will help us to continue to produce the materials you need. Visit the ASA website often (asa2fly.com) to find updates to operations and procedures due to FAA changes that may affect this publication.

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Contents

Introduction	iii
Section 1: General Information	1
1.1 Fraction, Decimal, and Metric Equivalents	3
1.2 Conversions.....	4
Notes	12
1.3 Aircraft Nomenclature.....	13
Axes of an Airplane	13
Forces Acting on an Aircraft in Flight.....	13
Types of Aircraft Structure	14
Truss	14
Monocoque	14
Semimonocoque	15
1.4 Joint Aircraft System/Component (JASC) Code.....	16
1.5 Aircraft Nationality Identification	28
1.6 Title 14 of the Code of Federal Regulations	31
1.7 Standard Taxi Signals.....	34
1.8 Troubleshooting	35
Section 2: Physical and Chemical	37
2.1 Temperature Conversion	39
Absolute Temperature	44
2.2 ICAO Standard Atmosphere.....	45
2.3 Density of Various Solids and Liquids	46
Density of Various Gases	46
2.4 Hydraulic Relationships.....	47
2.5 Quantity of Liquid in a Drum.....	49
Estimating Quantity of Liquid in a Standard 55-Gallon Drum.....	49

Section 3: Mathematics 51

3.1 Measurement Systems..... 53

 The International System of Units (SI) 53

 The Metric System 54

 U.S. – Metric Conversion 54

 Length 54

 Weight 55

 Volume 55

3.2 Mathematical Constants..... 56

3.3 Mathematical Symbols 57

3.4 Squares, Square Roots, Cubes, Cube Roots of Numbers 58

3.5 Diameter, Circumference and Area of a Circle 61

3.6 Geometric Formulas..... 64

 Triangle..... 64

 Square..... 64

 Rectangle 64

 Parallelogram 64

 Trapezoid 64

 Regular Pentagon..... 65

 Regular Hexagon 65

 Regular Octagon 65

 Circle 65

 Ellipse..... 65

 Sphere..... 66

 Cube..... 66

 Rectangular Solid 66

 Cone..... 66

 Cylinder 66

3.7 Trigonometric Functions 67

Section 4: Aircraft Drawings 71

4.1 Types of Aircraft Drawings..... 73

 Sketches..... 73

 Detail Drawings 73

 Assembly Drawings 73

 Installation Drawings 73

 Sectional Drawings..... 73

 Cutaway Drawing..... 73

 Exploded-View Drawing 73

 Schematic Diagram 74

	Block Diagram	74
	Repair Drawings	74
	Wiring Diagrams	74
	Pictorial Diagrams	74
	Orthographic Projections	74
4.2	Meaning of Lines	75
4.3	Material Symbols	76
4.4	Location Identification	77
	Fuselage Stations	77
	Water Lines	77
	Butt Lines	77
	Wing and Horizontal Stabilizer Stations	77
	Section 5: Aircraft Electrical Systems	79
5.1	Electrical Symbols	81
5.2	Alternating Current Terms and Values	89
5.3	Ohm's Law Relationships	90
5.4	Electrical Formulas	92
	Formulas Involving Resistance	92
	Formulas Involving Capacitance	93
	Formulas Involving Inductance	95
	Formulas Involving Both Capacitance and Inductance	98
	Resonant Frequency	98
	Total Reactance	98
	Impedance	98
5.5	Electrical System Installation	99
	Selection of Wire Size	99
	Notes on Wire Installation	104
	Switch Derating Factors	106
	Wire and Circuit Protectors	107
	MS Electrical Connectors	108
	Resistor Color Code	113
	Aircraft Storage Batteries	115
	Lead-Acid Batteries	115
	Nickel-Cadmium Batteries	116
	Lithium-ion Batteries	117

Section 6: Aircraft Materials	119
6.1 Composition of Wrought Aluminum Alloys.....	121
6.2 Four-Digit Designation System for Wrought Aluminum Alloys.....	122
6.3 Weldable and Unweldable Aluminum Alloys	123
6.4 Mechanical Properties of Aluminum Alloys	124
6.5 Temper Designations for Aluminum Alloys	125
Heat-Treatable Alloys	125
Non-Heat-Treatable Alloys.....	125
6.6 Temperatures for Heat Treatment of Aluminum Alloys.....	126
6.7 Bearing Strength (in pounds) of Aluminum Alloy Sheet	127
6.8 Shear Strength of Aluminum Alloy Rivets.....	128
Single-Shear Strength (in pounds) of Aluminum-Alloy Rivets	128
Double-Shear Strength (in pounds) of Aluminum-Alloy Rivets...	128
6.9 SAE Classification of Steel.....	129
6.10 Strength of Steel Related to its Hardness	130
6.11 Color of Steel for Various Temperatures	131
6.12 Color of Oxides on Steel at Various Tempering Temperatures	132
Section 7: Tools for Aircraft Maintenance	133
7.1 Measuring and Layout Tools.....	135
Steel Rule.....	135
Hook Rule.....	135
Combination Set.....	135
Dividers	136
Outside Calipers.....	136
Inside Calipers.....	136
Hermaphrodite Calipers	136
Scriber	136
Vernier Calipers.....	136
How to Read the Vernier Scale	137
Micrometer Caliper	138
How to Read the Vernier Micrometer Scale	139
Dial Indicator	140
Feeler Gauges.....	140
Small-Hole Gauges	140
Telescoping Gauges.....	140

7.2	Holding Tools	141
	Vises.....	141
	Bench Vise	141
	Drill Press Vise.....	141
	Pliers	141
	Combination/Slip Joint Pliers	141
	Water Pump Pliers	142
	Vise-Grip® Pliers	142
	Needle-Nose Pliers.....	142
7.3	Safety Wiring Tools	143
	Diagonal Cutting Pliers.....	143
	Duckbill Pliers.....	143
	Safety Wire Twisting Tool	143
7.4	Bending and Forming Tools	144
	Tools for Making Straight Bends and Curves	144
	Cornice Brake	144
	Box Brake	144
	Press Brake	144
	Slip Roll Former	145
	Forming Compound Curves in Sheet Metal	145
	English Wheel.....	145
7.5	Cutting Tools.....	145
	Shears.....	145
	Throatless Shears.....	145
	Squaring Shears	146
	Scroll Shears	146
	Hand Shears	146
	Tin Snips.....	146
	Compound Shears.....	147
	Saws.....	147
	Band Saw.....	147
	Hacksaw	148
	Wood Saws	148
	Crosscut Saw.....	148
	Ripsaw	148
	Compass, or Keyhole Saw.....	148
	Backsaw.....	149
	Chisels.....	149
	Flat Chisel.....	149
	Cape Chisel	149
	Diamond Point Chisel	149
	Round Nose Chisel.....	149
	Files.....	150

7.6	Hole Cutting Tools	151
	Twist Drills	151
	Twist Drill Sizes	154
	Drill Gauge.....	154
	Twist Drill Sharpening.....	154
	Drill Point Gauge.....	155
	Large Hole Cutters	156
	Hole Saws.....	156
	Fly Cutter	156
	Countersink	156
	Reamers.....	157
	Drills for Wood and Composite Materials	157
	Auger Bits	157
	Forstner Bits.....	158
	Flat Wood-Boring Bits	158
	Brad-Point Drills	158
	Spade Drill	158
7.7	Threads and Threading Tools	159
	Unified and American Standard Thread Form.....	159
	Thread-Cutting Tools	159
	Taps.....	160
	Body and Tap Drill Sizes.....	160
	Screw Pitch Gauge.....	161
7.8	Torque and Torque Wrenches.....	162
	Click-Type Torque Wrench.....	162
	Deflecting-Beam Torque Wrench.....	162
	Torque Conversions.....	164
	Recommended Torque Values.....	164
7.9	Pounding Tools	166
	Carpenter's Claw Hammer	166
	Ball Peen Hammer	166
	Metalworking Hammers.....	166
	Straight Peen and Cross Peen Hammers	166
	Body, or Planishing Hammer	166
	Mallets and Soft-Face Hammers	167
	Sledge Hammers	167
7.10	Punches	167
	Prick Punch	167
	Center Punch	167
	Drift, or Starting Punch.....	167
	Pin Punch.....	168
	Transfer Punch	168
	Automatic Center Punch	168

7.11	Wrenches	169
	Open End Wrench	169
	Adjustable Open End Wrench	169
	Ratcheting Open End Wrench	169
	Box End Wrench	170
	Ratcheting Box Wrench	170
	Combination Wrench	170
	Flare Nut Wrench	170
	Socket Wrenches	171
	Socket Wrench Handles	171
	Hand Impact Tool	171
	Typical Socket Wrenches	172
	Extensions and Adapters	172
	Allen Wrenches	172
7.12	Screwdrivers	173
	Slot Screwdrivers	173
	Offset Screwdriver	173
	Recessed-Head Screwdrivers	173
	Phillips Head Screwdriver Sizes	174
	Screw Heads for Special Structural Screws	174
	 Section 8: Aircraft Hardware	 175
8.1	Standards	177
8.2	Threaded Fasteners	177
	Bolts	177
	Genuine A/C Hardware AN3–AN20 Bolts	178
	Hex-Head Bolts	179
	Flush-Head Bolts	180
	Drilled-Head Bolts	180
	Twelve-Point, Washer-Head Bolts	180
	Internal Wrenching Bolts	180
	Clevis Bolts	181
	Eye Bolts	181
	Bolt Installation	181
	Bolt Fits	182
	Screws	182
	Aircraft Screw Heads	183
	Set Screws	184
	Self-Tapping Sheet-Metal Screws	184
	Nuts	185
	Nonlocking Nuts	185
	AN310 and AN320	185
	AN315 and AN316	185
	AN355	186

	Self-Locking Nuts.....	186
	Low-temperature locking nuts:	186
	High-temperature locking nuts:.....	187
	Wing Nuts	187
	Anchor Nuts	187
	Channel Nuts	188
	Pressed-Steel Nuts	188
	Instrument Nuts	189
	Rivnuts	189
	Threaded Fastener Safeying	190
	Locking Washers.....	190
	Cotter Pins	190
	Safety Wire and Safety Wire Twisting.....	191
	Safety Cable	193
8.3	Washers	194
8.4	Special Rivets.....	196
	Blind Rivets	196
	Friction-Lock Rivets.....	197
	Mechanical-Lock Rivets	198
	CherryMax Rivets, Olympic-Lok Rivets, Huck Rivets	199
	High-Strength Pin Rivets	199
	Hi-Shear Rivet.....	199
	Hi-Lok Fasteners.....	201
	Hi-Tigue Fasteners	202
8.5	Cowling Fasteners.....	203
8.6	Thread Repair Hardware.....	204
	Helicoil Insert.....	204
	Acres Sleeves.....	205
	Section 9: Metal Aircraft Fabrication.....	207
9.1	Sheet Metal Layout and Forming	209
	Definitions.....	209
	Layout Procedure	210
	Example	210
	Forming.....	212
9.2	Minimum Bend Radii for 90° Bends in Aluminum Alloys	213
9.3	Setback	214
	Setback (K) Chart.....	214
9.4	Bend Allowance Chart.....	217

9.5	Rivets and Riveting.....	220
	Alternatives to Riveting.....	220
	Aircraft Solid Rivets	220
	Rivet Head Shapes	220
	Rivet Material.....	221
	Rivet Diameter	221
	Examples of Rivet Selection	225
	Rivet Length.....	225
	Riveting Tools	226
	Rivet Sets.....	226
	Bucking Bars.....	226
	Installing Flush Rivets	227
	Blind Rivet Code.....	227
	Removal of Damaged Rivets.....	227
	Minimum Rivet Spacing and Edge Distance	228
9.6	Aircraft Welding	229
	Types of Welding:	229
	Welding Gases:	229
	Characteristics of a Good Weld.....	229
Section 10: Aircraft Fabric Covering		231
10.1	Rib Stitch Spacing	233
10.2	Rib Stitch Knots.....	234
Section 11: Corrosion Detection and Control.....		237
11.1	Types of Corrosion	239
11.2	Oxidation	241
11.3	Surface and Pitting Corrosion.....	242
11.4	Intergranular Corrosion.....	243
	Exfoliation Corrosion	243
11.5	Stress Corrosion.....	244
11.6	Galvanic Corrosion.....	244
11.7	Concentration Cell Corrosion	245
11.8	Fretting Corrosion.....	246
11.9	Filiform Corrosion	246
11.10	Corrosion Control	247

Section 12: Nondestructive Inspection	249
12.1 Visual Inspection	251
NDI	251
Visual Inspection	251
Surface Visual Inspection.....	251
Internal Visual Inspection.....	251
12.2 Tap Testing	252
12.3 Penetrant Inspection.....	253
12.4 Magnetic Particle Inspection	254
12.5 Eddy Current Inspection.....	255
How it works	255
What it is suited for	256
Method	256
Detection of corrosion	256
12.6 Ultrasonic Inspection	257
12.7 Radiography	257
X-Rays.....	257
Gamma Rays	258
Inspection—Steps	258
Considerations	259
Safety	259
Section 13: Aircraft Control Systems.....	261
13.1 Types of Control Systems.....	263
Torque Tubes	263
Push-Pull Rods.....	263
13.2 Control Cables.....	264
13.3 Control Cable Terminals	265
13.4 Turnbuckles	266
Turnbuckle Safetying	266
Clip-Locking Turnbuckles.....	267
13.5 Control Cable Tension	268
Section 14: Aircraft Fluid Lines.....	271
14.1 Rigid Fluid Lines.....	273
Materials recommended for rigid fluid lines.....	273

14.2	Flexible Fluid Lines.....	275
	Types of Flexible Fluid Lines	275
14.3	Installation of Flexible Hose.....	277
14.4	Fluid Line Identification.....	278
Section 15: Oxygen System Servicing		281
15.1	Oxygen System Servicing	283
	Filling Pressure for 1,850 PSI Oxygen Cylinders	283
Section 16: Aircraft Weight and Balance		285
16.1	Locating the Center of Gravity.....	287
16.2	Datum Forward of the Airplane—Nose Wheel Landing Gear.....	288
16.3	Datum Aft of the Main Wheels—Nose Wheel Landing Gear	289
16.4	Datum Forward of the Main Wheels—Tail Wheel Landing Gear	290
16.5	Datum Aft of the Main Wheels—Tail Wheel Landing Gear	291
16.6	Location of CG with Respect to the Mean Aerodynamic Chord	292
Section 17: Composites		295
17.1	Resin Systems—Typical Properties	297
17.2	Resin Mix Ratios	298
17.3	Fiber/Resin Ratio Formulas.....	299
17.4	Reinforcing Fibers	300
17.5	Textile and Fiber Terminology	301
	Roll of Fabric or Prepreg	301
	Filaments	301
	Strands.....	301
	Yarns/tows.....	301
	Warp yarns	301
	Fill yarns	301
	Selvage edge	302
	Warp face.....	302
	Fill face.....	302
17.6	Yarn Part Numbering Systems	302
	Carbon	302
	Aramid (Kevlar®)	302
	Fiberglass	302

17.7	Fabric Weave Styles	303
	Plain weave	303
	Harness satin weaves	304
	Twill weave	304
17.8	Common Weave Style Numbers and Features	305
17.9	Ply Orientation Conventions	306
17.10	Damage Removal—Scarfig and Stepping	306
17.11	Core Materials	308
17.12	Bleeder Schedules	309
Section 18: Turbine Engines		311
18.1	Turbine Operating Principles	313
18.2	Types of Turbine Engines	313
18.3	Turbine Engine Sections	314
Appendices		315
Appendix 1: Hydraulic Fittings		317
Appendix 2: Engines		321
Appendix 3: Lead Acid Aircraft Batteries		323
Appendix 4: Aircraft Tires		351
Appendix 5: Aviation Fuels		363
Index		365

Section 1: General Information

1.1	Fraction, Decimal, and Metric Equivalents	3
1.2	Conversions	4
1.3	Aircraft Nomenclature	13
1.4	Joint Aircraft System/Component (JASC) Code	16
1.5	Aircraft Nationality Identification	28
1.6	Title 14 of the Code of Federal Regulations	31
1.7	Standard Taxi Signals	34
1.8	Troubleshooting	35

1.1 Fraction, Decimal, and Metric Equivalents

Fraction	Decimal	MM	Fraction	Decimal	MM
1/64	0.0156	0.397	33/64	0.5156	13.097
1/32	0.0313	0.794	17/32	0.5313	13.494
3/64	0.0469	1.191	35/64	0.5469	13.891
1/16	0.0625	1.588	9/16	0.5625	14.287
5/64	0.0781	1.984	37/64	0.5781	14.684
3/32	0.0938	2.381	19/32	0.5938	15.081
7/64	0.1094	2.778	39/64	0.6094	15.478
1/8	0.1250	3.175	5/8	0.6250	15.875
9/64	0.1406	3.572	41/64	0.6406	16.272
5/32	0.1563	3.969	21/32	0.6563	16.669
11/64	0.1719	4.366	43/64	0.6719	17.066
3/16	0.1875	4.762	11/16	0.6875	17.463
13/64	0.2031	5.159	45/64	0.7031	17.860
7/32	0.2188	5.556	23/32	0.7188	18.256
15/64	0.2344	5.953	47/64	0.7344	18.653
1/4	0.2500	6.350	3/4	0.7500	19.049
17/64	0.2656	6.747	49/64	0.7656	19.447
9/32	0.2813	7.144	25/32	0.7813	19.844
19/64	0.2969	7.541	51/64	0.7968	20.239
5/16	0.3125	7.937	13/16	0.8125	20.638
21/64	0.3281	8.334	53/64	0.8281	21.034
11/32	0.3438	8.731	27/32	0.8438	21.431
23/64	0.3594	9.128	55/64	0.8594	21.828
3/8	0.3750	9.525	7/8	0.8750	22.225
25/64	0.3906	9.922	57/64	0.8906	22.622
13/32	0.4063	10.319	29/32	0.9063	23.018
27/64	0.4219	10.716	59/64	0.9219	23.416
7/16	0.4375	11.112	15/16	0.9375	23.812
29/64	0.4531	11.509	61/64	0.9531	24.209
15/32	0.4688	11.906	31/32	0.9688	24.606
31/64	0.4844	12.303	63/64	0.9844	25.003
1/2	0.5000	12.700	1	1.0000	25.400

1.2 Conversions

Multiply	By	To Get
acres.....	43,560	square feet
acres.....	4,047	square meters
acre feet.....	3.259×10^5	gallons
amperes / sq. cm	6.452	amperes / sq. inch
amperes / sq. inch	0.1550	amperes / sq. cm.
ampere hours	3,600	coulombs
ampere hours	0.03731	faradays
ampere turns	1.257	gilberts
ampere turns / cm.....	2.540	ampere turns / inch
ampere turns / cm.....	1.257	gilberts / cm.
ampere turns / inch.....	0.4950	gilberts / centimeter
ampere turns / meter.....	0.01257	gilberts / centimeter
atmospheres.....	76.0	centimeters of mercury
atmospheres.....	33.9	feet of water
atmospheres.....	29.92	inches of mercury
atmospheres.....	10,332	kilograms / sq. meter
atmospheres.....	14.69	pounds / sq. inch
barrels of oil	42	gallons
bars.....	0.9869	atmospheres
bars.....	106	dynes / sq. centimeter
bars.....	14.50	pounds / sq. inch
Btu	1.0550×10^{10}	ergs
Btu	778.3	foot-pounds
Btu	252.0	gram-calories
Btu	1,054.8	joules
Btu	107.5	kilogram-meters
Btu	2.928×10^{-4}	kilowatt-hours
Btu / hour.....	0.2162	foot-pounds / second
Btu / hour.....	3.929×10^{-4}	horsepower-hours
Btu / hour.....	0.2931	watts
Btu / minute	12.96	foot-pounds / second
Btu / minute	0.02356	horsepower
Btu / minute	17.57	watts
bushels	1.2445	cubic feet
bushels	2,150.4	cubic inches
bushels	35.24	liters
bushels	4	pecks
bushels	64	pints (dry)

Multiply	By	To Get
centimeters	3.281×10^{-2}	feet
centimeters	0.3937	inches
centimeter-dynes	1.020×10^{-3}	centimeter-grams
centimeter-dynes	7.376×10^{-8}	pound-feet
centimeter-grams	980.7	centimeter-dynes
centimeter-grams	7.233×10^{-5}	pound-feet
cm of mercury	0.01316	atmospheres
cm of mercury	0.4461	feet of water
cm of mercury	136.0	kilograms / sq. meter
cm of mercury	27.85	pounds / sq. foot
cm of mercury	0.1934	pounds / sq. inch
cm / second	1.9685	feet / minute
cm / second	0.03281	feet / second
cm / second	0.036	kilometers / hour
cm / second	0.0194	knots
cm / second / second	0.03281	feet / second / second
cm / second / second	0.02237	miles / hour / second
circular mils	5.067×10^{-6}	square centimeters
circular mils	0.7854	square mils
circular mils	7.854×10^{-7}	square inches
coulombs	1.036×10^{-5}	faradays
cubic centimeters	3.531×10^{-5}	cubic feet
cubic centimeters	0.06102	cubic inches
cubic centimeters	10^{-6}	cubic meters
cubic centimeters	1.308×10^{-6}	cubic yards
cubic centimeters	2.642×10^{-4}	gallons (U.S.)
cubic centimeters	0.001	liters
cubic centimeters	2.113×10^{-3}	pints (U.S.)
cubic feet	0.8036	bushels
cubic feet	28,320	cubic centimeters
cubic feet	1,728	cubic inches
cubic feet	0.02832	cubic meters
cubic feet	7.48052	gallons (U.S.)
cubic feet	28.32	liters
cubic feet / minute	0.1247	gallons / second
cubic feet / minute	0.4720	liters / second
cubic feet / second	448.831	gallons / minute
cubic inches	16.39	cubic centimeters
cubic inches	5.787×10^{-4}	cubic feet
cubic inches	1.639×10^{-5}	cubic meters
cubic inches	2.143×10^{-5}	cubic yards
cubic inches	4.329×10^{-3}	gallons (U.S.)

Multiply	By	To Get
cubic inches	0.01639	liters
cubic meters	28.38	bushels
cubic meters	35.31	cubic feet
cubic meters	61,023	cubic inches
cubic meters	1.308	cubic yards
cubic meters	264.2	gallons (U.S.)
cubic yards	27	cubic feet
cubic yards	46,656	cubic inches
cubic yards	0.7646	cubic meters
cubic yards	202	gallons (U.S.)
cubic yards	764.6	liters
cubic yards / minute	3.367	gallons / second
cubic yards / minute	12.74	liters / second
days	24	hours
days	1,440	minutes
days	86,400	seconds
degrees (angular)	60	minutes
degrees (angular)	0.01111	quadrants
degrees (angular)	0.01745	radians
degrees (angular)	3,600	seconds
degrees / second	0.01745	radians / second
degrees / second	0.1667	revolutions / minute
degrees / second	2.778×10^{-3}	revolutions / second
drams	1.7718	grams
drams	0.0625	ounces
dynes	1.020×10^{-3}	grams
dynes	10^{-7}	joules / centimeter
dynes	10^{-5}	joules / meter (newtons)
dynes	7.233×10^{-5}	poundals
dynes	2.248×10^{-6}	pounds
dynes / sq. centimeter	10^{-6}	bars
ergs	9.480×10^{-11}	Btu
ergs	1.0	dyne-centimeters
ergs	7.367×10^{-8}	foot-pounds
ergs	0.2389×10^{-7}	gram-calories
ergs	3.7250×10^{-14}	horsepower-hours
ergs	10^{-7}	joules
ergs	0.2778×10^{-13}	kilowatt-hours
ergs / second	5.688×10^{-9}	Btu / minute

Multiply	By	To Get
ergs / second	1.341×10^{-10}	horsepower
ergs / second	10^{-10}	kilowatts
faradays	26.8	ampere-hours
faradays	9.649×10^4	coulombs
fathoms	6	feet
feet	30.48	centimeters
feet	0.3048	meters
feet	1.645×10^{-4}	miles (nautical)
feet	1.894×10^{-4}	miles (statute)
feet of water	0.02950	atmospheres
feet of water	0.8826	inches of mercury
feet of water	62.43	pounds / square foot
feet / minute	0.5080	centimeters / second
feet / minute	0.01667	feet / second
feet / second	1.097	kilometers / hour
feet / second	0.5921	knots
feet / second	0.6818	miles / hour
feet / second / second	0.6818	miles / hour / second
foot-pounds	1.286×10^{-3}	Btu
foot-pounds	1.356	joules
foot-pounds	3.24×10^{-4}	kilogram-calories
foot-pounds	0.1383	kilogram-meters
foot-pounds / minute	3.030×10^{-5}	horsepower
foot-pounds / minute	2.260×10^{-5}	kilowatts
furlongs	660	feet
gallons	3,785	cubic centimeters
gallons	0.1337	cubic feet
gallons	231	cubic inches
gallons	3.785	liters
gallons (Imperial)	1.20095	gallons (U.S.)
gallons (U.S.)	0.83267	gallons (Imperial)
gallons / minute	2.228×10^{-3}	cubic feet / second
gausses	6.452	lines of flux / sq. inch
gausses	10^{-8}	webers / sq. centimeter
gilberts	0.7958	ampere-turns
gilberts / centimeter	2.021	ampere-turns / inch
gills	0.1183	liters
grains (troy)	0.06480	grams
grains (troy)	2.0833×10^{-3}	ounces (avoir.)
grams	980.7	dynes

Multiply	By	To Get
grams.....	9.807×10^{-5}	joules / centimeter
grams.....	0.03527.....	ounces (avoir.)
grams.....	0.07093.....	pounds
grams.....	2.205×10^{-3}	pounds
grams / cubic cm.....	62.43.....	pounds / cubic foot
grams / square cm.....	2.0481.....	pounds / square foot
gram-calories.....	3.9683×10^{-3}	Btu
gram-calories.....	4.1868×10^7	ergs
gram-calories.....	3.0880.....	foot-pounds
gram-calories.....	1.1630×10^{-6}	kilowatt-hours
gram-centimeters.....	9.297×10^{-8}	Btu
gram-centimeters.....	980.7.....	ergs
gram-centimeters.....	9.807×10^{-5}	joules
hectares.....	2.471.....	acres
horsepower.....	42.44.....	Btu / minute
horsepower.....	33,000.....	foot-pounds / minute
horsepower.....	550.....	foot-pounds / second
horsepower (metric).....	542.5.....	foot-pounds / second
horsepower (metric).....	0.9863.....	horsepower
horsepower.....	10.68.....	kilogram-calories / min.
horsepower.....	745.7.....	watts
hours.....	3,600.....	seconds
inches.....	2.540.....	centimeters
inches.....	8.333×10^{-2}	feet
inches.....	2.540×10^{-2}	meters
inches.....	25.40.....	millimeters
inches.....	1,000.....	mils
inches of mercury.....	3.342×10^{-2}	atmospheres
inches of mercury.....	1.133.....	feet of water
inches of mercury.....	345.3.....	kilograms / sq. meter
inches of mercury.....	0.4912.....	pounds / sq. inch
inches of mercury.....	33.864.....	millibars
inches of water.....	7.355×10^{-2}	inches of mercury
inches of water.....	3.613×10^{-2}	pounds / sq. inch
joules.....	9.480×10^{-4}	Btu
joules.....	10^7	ergs
joules.....	0.7376.....	foot-pounds
joules.....	2.389×10^{-4}	kilogram-calories
joules.....	0.1020.....	kilogram-meters

Multiply	By	To Get
joules	2.778×10^{-4}	watt-hours
joules / centimeter	10^7	dynes
joules / centimeter	723.3	poundals
joules / centimeter	22.48	pounds
kilograms	980,665	dynes
kilograms	9.807	joules / meter (newtons)
kilograms	70.93	poundals
kilograms	2.205	pounds
kilograms	9.842×10^{-4}	tons (long)
kilograms	1.102×10^{-3}	tons (short)
kilograms / cubic meter	0.06243	pounds / cubic foot
kilograms / sq. meter	9.687×10^{-5}	atmospheres
kilograms / sq. meter	0.2048	pounds / square foot
kilogram-calories	3.968	Btu
kilogram-calories	3,088	foot-pounds
kilogram-calories	4,186	joules
kilogram-meters	9.294×10^{-3}	Btu
kilogram-meters	7.233	foot-pounds
kilometers	3,281	feet
kilometers	0.6214	miles
kilometers / hour	0.9113	feet / second
kilometers / hour	0.5396	knots
kilometers / hour	0.6214	miles / hour
kilowatts	56.92	Btu / minute
kilowatts	4.426×10^4	foot-pounds / minute
kilowatts	1.341	horsepower
kilowatt-hours	3,413	Btu
kilowatt-hours	2.655×10^6	foot-pounds
kilowatt-hours	3.6×10^6	joules
knots	6,080	feet / hour
knots	1.8532	kilometers / hour
knots	1.151	miles (statute) / hour
knots	1.689	feet / second
leagues	3.0	miles
lines of flux / sq. cm.	1.0	gausses
lines of flux / sq. inch	0.1550	gausses
lines of flux / sq. inch	1.550×10^{-9}	webers / sq. centimeter
liters	1,000	cubic centimeters
liters	61.02	cubic inches
liters	0.2642	gallons (U.S.)
liters / minute	5.886×10^{-4}	cubic feet / second

Multiply	By	To Get
lumens / sq. foot	1.0	foot-candles
lux	0.0929	foot-candles
maxwells	10^{-8}	webers
meters	3.281	feet
meters	39.37	inches
meters	5.396×10^{-4}	miles (nautical)
meters	6.214×10^{-4}	miles (statute)
meters	1.094	yards
meters / second	3.6	kilometers / hour
meters / second	2.237	miles / hour
meter-kilograms	9.807×10^7	centimeter-dynes
meter-kilograms	7.233	pound-feet
miles (nautical)	6,076.103	feet
miles (nautical)	1.852	kilometers
miles (nautical)	1.1508	miles (statute)
miles (statute)	5,280	feet
miles (statute)	1.609	kilometers
miles (statute)	0.8689	miles (nautical)
miles (statute)	1,760	yards
miles / hour	1.467	feet / second
miles / hour	1.609	kilometers / hour
miles / hour	0.8684	knots
millimeters	3.281×10^{-3}	feet
millimeters	0.03937	inches
mils	2.54×10^{-3}	centimeters
mils	0.001	inches
minutes (angular)	0.01667	degrees
minutes (angular)	1.852×10^{-4}	quadrants
minutes (angular)	2.909×10^{-4}	radians
ounces	16.0	drams
ounces	437.5	grains
ounces	28.3495	grams
ounces	0.0625	pounds
ounces (fluid)	1.805	cubic inches
ounces (fluid)	0.02957	liters
ounces (troy)	1.09714	ounces (avoir.)
pint (dry)	33.60	cubic inches
pint (liquid)	0.4732	liters
poundals	13,826	dynes
poundals	14.10	grams

Multiply	By	To Get
poundals	0.1383	joules / meter (newtons)
poundals	0.01410	kilograms
poundals	0.03108	pounds
pounds	453.5924	grams
pounds	4.448	joules / meter (newtons)
pounds	0.4536	kilograms
pounds	16	ounces
pounds	32.17	poundals
pounds	0.0005	tons (short)
pounds of water	0.1198	gallons
pounds / cubic foot	16.02	kilograms / cubic meter
pounds / cubic inch	27.68	grams / cubic centimeter
pounds / square inch	0.06804	atmospheres
pounds / square inch	2.307	feet of water
pounds / square inch	2.036	inches of mercury
quadrants (angular)	90	degrees
quadrants (angular)	5,400	minutes
quadrants (angular)	1.571	radians
quarts (liquid)	57.75	cubic inches
quarts (liquid)	0.9463	liters
radians	57.30	degrees
radians	3,438	minutes
radians	0.6366	quadrants
radians / second	9.549	revolutions / minute
revolutions / minute	6.0	degrees / second
revolutions / minute	0.1047	radians / second
rods	16.5	feet
square centimeters	1.973×10^5	circular mils
square centimeters	0.1550	square inches
square inches	1.273×10^6	circular mils
square inches	6.452	square centimeters
square meters	10.76	square feet
square meters	1.196	square yards
square miles	640	acres
square millimeters	1,973	circular mils
square mils	1.273	circular mils
tons (long)	1,016	kilograms
tons (long)	2,240	pounds
tons (metric)	1,000	kilograms
tons (metric)	2,205	pounds

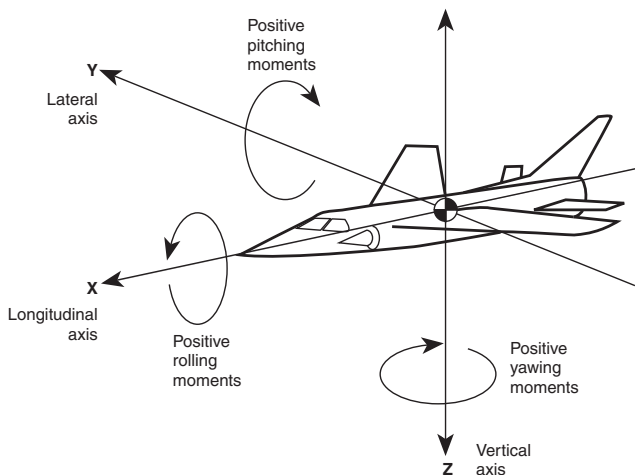
Multiply	By	To Get
tons (short)	907.185	kilograms
tons (short)	2,000	pounds
watts	3.413	Btu / hour
watts	10^7	ergs / second
watts	44.27	foot-pounds / minute
watts	1.341×10^{-3}	horsepower
watt-hours	3.413	Btu
watt-hours	2,656	foot-pounds
watt-hours	367.2	kilogram-meters
webers	10^8	maxwells
webers / sq. inch	1.55×10^7	gausses
yards	36	inches
yards	0.9144	meters

Notes

1.3 Aircraft Nomenclature

Axes of an Airplane

An airplane in flight is free to rotate about three axes: horizontal, longitudinal and vertical. Each axis is perpendicular to the others and each passes through the center of gravity.

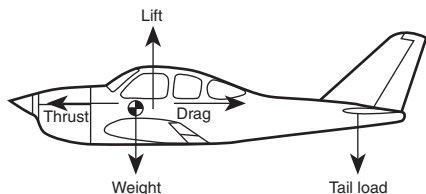


The three axes of an aircraft are mutually perpendicular, and all pass through the center of gravity of the aircraft.

Forces Acting on an Aircraft in Flight

In straight-and-level, unaccelerated flight the forces about the aircraft center of gravity are balanced. Lift acts upward and is opposed by weight and the aerodynamic tail load which act downward. Thrust acting forward is opposed by drag which acts rearward.

In straight-and-level, unaccelerated flight the forces about the center of gravity are balanced.



In straight-and-level, unaccelerated flight, the forces about the center of gravity are balanced.

Types of Aircraft Structure

Truss

A type of structure made up of longitudinal beams and cross braces. Compression loads between the main beams are carried by rigid cross braces called compression struts. Tension loads are carried by stays, or wires, that go from one main beam to the other and cross between the compression struts.

Most fabric-covered wings are constructed with a Pratt truss. The spars are the main beams and the cross braces are the compression struts or compression ribs. The stays are the drag and antidrag wires. The drag wires run from the front spar inboard to the rear spar outboard, and oppose the drag forces that try to move the wing tips backward. The antidrag wires run from the rear spar inboard to the front spar outboard. They oppose the aerodynamic forces that try to move the wing tips forward.

The Warren truss is used for the fuselage of most steel tube and fabric aircraft. The main beams are the longerons and the cross braces are steel tube diagonals which carry both compression and tension loads.

Monocoque

A single-shell that carries all of the flight loads in its outer surface. A chicken egg is a perfect example of a natural monocoque structure.

Metal monocoque aircraft fuselages have a minimum of internal structure, usually with just formers to provide the shape. Thin sheets of metal (called skins) riveted to the formers provide a rigid, strong, streamlined structure. Dents in the skins destroy the integrity of a monocoque structure.

Wooden monocoque aircraft structures are similar to those of metal. Thin sheets of aircraft plywood are glued to the formers to provide a strong, lightweight structure.

Modern composite structures are made of resins reinforced with special fabrics and formed in molds or over patterns; these provide a shell sufficiently strong to carry all the flight loads.

Semimonocoque

Most larger metal aircraft have a semimonocoque structure. This differs from the monocoque by having a series of longerons and stringers between the formers to support the skins and provide additional strength.

1.4 Joint Aircraft System/Component (JASC) Code

Based on ATA-100 and ATA-2200 Systems of Identification

The Joint Aircraft System/Component (JASC) Code table is a modified version of the Air Transport Association of America (ATA) Specification 100 code, developed by the FAA's Regulatory Support Division (AFS-600). Over the years, the JASC Code format of the ATA-100 Specifications has gained widespread industry acceptance. In a harmonized effort, the FAA's counterparts in Australia and Canada have adopted the JASC Code with only a few exceptions. Some Canadian aircraft manufacturers have also adopted this new standard.

This table can be used as a quick reference chart, to assist in the coding and review of aircraft structures or systems data. It uses the new JASC code four (4) digit format, in which the first two digits represent the code "chapter" title. The titles have been modified in some cases to clarify the intended use of the accompanying code.

Note: The JASC Code divides the engine-related codes into two groups to separate turbine and reciprocating engines. The codes for the turbine engines are in JASC Code Chapter 72, Turbine/Turboprop Engine. The codes for the reciprocating engines are now exclusively found in Chapter 85, Reciprocating Engine.

11 Placards And Markings

1100 Placards And Markings

12 Servicing

1210 Fuel Servicing

1220 Oil Servicing

1230 Hydraulic Fluid Servicing

1240 Coolant Servicing

14 Hardware

1400 Miscellaneous Hardware

1410 Hoses And Tubes

1420 Electrical Connectors

1430 Fasteners

1497 Miscellaneous Wiring

18 Helicopter Vibration

1800 Helicopter Vib/Noise Analysis

1810 Helicopter Vibration Analysis

1820 Helicopter Noise Analysis

1897 Helicopter Vibration System Wiring

21 Air Conditioning

2100 Air Conditioning System

2110 Cabin Compressor System

2120 Air Distribution System

2121 Air Distribution Fan

2130 Cabin Pressure Control System

2131	Cabin Pressure Controller
2132	Cabin Pressure Indicator
2133	Pressure Regul/Outflow Valve
2134	Cabin Pressure Sensor
2140	Heating System
2150	Cabin Cooling System
2160	Cabin Temperature Control System
2161	Cabin Temperature Controller
2162	Cabin Temperature Indicator
2163	Cabin Temperature Sensor
2170	Humidity Control System
2197	Air Conditioning System Wiring

22 Auto Flight

2200	Auto Flight System
2210	Autopilot System
2211	Autopilot Computer
2212	Altitude Controller
2213	Flight Controller
2214	Autopilot Trim Indicator
2215	Autopilot Main Servo
2216	Autopilot Trim Servo
2220	Speed-Attitude Correction System
2230	Auto Throttle System
2250	Aerodynamic Load Alleviating
2297	Autoflight System Wiring

23 Communications

2300	Communications System
2310	HF Communication System

2311	UHF Communication System
2312	VHF Communication System
2320	Data Transmission Auto Call
2330	Entertainment System
2340	Interphone/Passenger Pa System
2350	Audio Integrating System
2360	Static Discharge System
2370	Audio/Video Monitoring
2397	Communication System Wiring

24 Electrical Power

2400	Electrical Power System
2410	Alternator-Generator Drive
2420	AC Generation System
2421	AC Generator-Alternator
2422	AC Inverter
2423	Phase Adapter
2424	AC Regulator
2425	AC Indicating System
2430	DC Generating System
2431	Battery Overheat Warning System
2432	Battery/Charger System
2433	DC Rectifier/Converter
2434	DC Generator-Alternator
2435	Starter-Generator
2436	DC Regulator
2437	DC Indicating System
2440	External Power System
2450	AC Power Distribution System
2460	DC Power/Distribution System
2497	Electrical Power System Wiring

25	Equipment/Furnishings
2500	Cabin Equipment/ Furnishings
2510	Flight Compartment Equipment
2520	Passenger Compartment Equipment
2530	Buffet/Galleys
2540	Lavatories
2550	Cargo Compartments
2551	Agricultural Spray System
2560	Emergency Equipment
2561	Life Jacket
2562	Emergency Locator Beacon
2563	Parachute
2564	Life Raft
2565	Escape Slide
2570	Accessory Compartment
2571	Battery Box Structure
2572	Electronic Shelf Section
2597	Equip/Furnishing System Wiring

26 Fire Protection

2600	Fire Protection System
2610	Detection System
2611	Smoke Detection
2612	Fire Detection
2613	Overheat Detection
2620	Extinguishing System
2621	Fire Bottle, Fixed
2622	Fire Bottle, Portable
2697	Fire Protection System Wiring

27 Flight Controls

2700	Flight Control System
2701	Control Column Section

2710	Aileron Control System
2711	Aileron Tab Control System
2720	Rudder Control System
2721	Rudder Tab Control System
2722	Rudder Actuator
2730	Elevator Control System
2731	Elevator Tab Control System
2740	Stabilizer Control System
2741	Stabilizer Position Indicating
2742	Stabilizer Actuator
2750	TE Flap Control System
2751	TE Flap Position Ind. System
2752	TE Flap Actuator
2760	Drag Control System
2761	Drag Control Actuator
2770	Gust Lock/Damper System
2780	LE Slat Control System
2781	LE Slat Position Ind. System
2782	LE Slat Actuator
2797	Flight Control System Wiring

28 Fuel

2800	Aircraft Fuel System
2810	Fuel Storage
2820	Aircraft Fuel Distrib. System
2821	Aircraft Fuel Filter/Strainer
2822	Fuel Boost Pump
2823	Fuel Selector/Shut-Off Valve
2824	Fuel Transfer Valve
2830	Fuel Dump System

- 2840 Aircraft Fuel Indicating System
- 2841 Fuel Quantity Indicator
- 2842 Fuel Quantity Sensor
- 2843 Fuel Temperature Indicator
- 2844 Fuel Pressure Indicator
- 2897 Fuel System Wiring

29 Hydraulic Power

- 2900 Hydraulic Power System
- 2910 Hydraulic System, Main
- 2911 Hydraulic Power Accumulator, Main
- 2912 Hydraulic Filter, Main
- 2913 Hydraulic Pump, (Electric/Engine, Main
- 2914 Hydraulic Handpump, Main
- 2915 Hydraulic Pressure Relief Valve, Main
- 2916 Hydraulic Reservoir, Main
- 2917 Hydraulic Pressure Regulator, Main
- 2920 Hydraulic System, Auxiliary
- 2921 Hydraulic Accumulator, Auxiliary
- 2922 Hydraulic Filter, Auxiliary
- 2923 Hydraulic Pump, Auxiliary
- 2925 Hydraulic Pressure Relief, Auxiliary
- 2926 Hydraulic Reservoir, Auxiliary
- 2927 Hydraulic Pressure Regulator, Auxiliary
- 2930 Hydraulic Indicating System
- 2931 Hydraulic Pressure Indicator

- 2932 Hydraulic Pressure Sensor
- 2933 Hydraulic Quantity Indicator
- 2934 Hydraulic Quantity Sensor
- 2997 Hydraulic Power System Wiring

30 Ice And Rain Protection

- 3000 Ice/Rain Protection System
- 3010 Airfoil Anti/De-Ice System
- 3020 Air Intake Anti/De-Ice System
- 3030 Pitot/Static Anti-Ice System
- 3040 Windshield/Door Rain/Ice Removal
- 3050 Antenna/Radome Anti-Ice/De-Ice System
- 3060 Prop/Rotor Anti-Ice/De-Ice System
- 3070 Water Line Anti-Ice System
- 3080 Ice Detection
- 3097 Ice/Rain Protection System Wiring

31 Instruments

- 3100 Indicating/Recording System
- 3110 Instrument Panel
- 3120 Independent Instruments (Clock, etc.)
- 3130 Data Recorders (Fit/Maint)
- 3140 Central Computers (EICAS)
- 3150 Central Warning
- 3160 Central Display
- 3170 Automatic Data
- 3197 Instrument System Wiring

32 Landing Gear

- 3200 Landing Gear System
- 3201 Landing Gear/Wheel Fairing
- 3210 Main Landing Gear
- 3211 Main Landing Gear Attach Section
- 3212 Emergency Flotation Section
- 3213 Main Landing Gear Strut/Axle/Truck
- 3220 Nose/Tail Landing Gear
- 3221 Nose/Tail Landing Gear AttachSection
- 3222 Nose/Tail Landing Gear Strut/Axle
- 3230 Landing Gear Retract/Extend System
- 3231 Landing Gear Door Retract Section
- 3232 Landing Gear Door Actuator
- 3233 Landing Gear Actuator
- 3234 Landing Gear Selector
- 3240 Landing Gear Brake System
- 3241 Brake Anti-Skid Section
- 3242 Brake
- 3243 Master Cylinder/Brake Valve
- 3244 Tire
- 3245 Tire Tube
- 3246 Wheel/Ski/Float
- 3250 Landing Gear Steering System
- 3251 Steering Unit
- 3252 Shimmy Damper
- 3260 Landing Gear Position And Warning
- 3270 Auxiliary Gear (Tail Skid)

- 3297 Landing Gear System Wiring

33 Lights

- 3300 Lighting System
- 3310 Flight Compartment Lighting
- 3320 Passenger Compartment Lighting
- 3330 Cargo Compartment Lighting
- 3340 Exterior Lighting
- 3350 Emergency Lighting
- 3397 Light System Wiring

34 Navigation

- 3400 Navigation System
- 3410 Flight Environment Data
- 3411 Pitot/Static System
- 3412 Outside Air Temperature Indicator Sensor
- 3413 Rate of Climb Indicator
- 3414 Airspeed/Mach Indicator
- 3415 High Speed Warning
- 3416 Altimeter, Barometric/Encoder
- 3417 Air Data Computer
- 3418 Stall Warning System
- 3420 Attitude and Direction Data System
- 3421 Attitude Gyro and Indicator System
- 3422 Directional Gyro and Indicator System
- 3423 Magnetic Compass
- 3424 Turn and Bank/Rate of Turn Indicator
- 3425 Integrated Flight Director System
- 3430 Landing and Taxi Aids

3431	Localizer/VOR System
3432	Glide Slope System
3433	Microwave Landing System
3434	Marker Beacon System
3435	Heads Up Display System
3436	Wind Shear Detection System
3440	Independent Position Determining System
3441	Inertial Guidance System
3442	Weather Radar System
3443	Doppler System
3444	Ground Proximity System
3445	Air Collision Avoidance System (TCAS)
3446	Non Radar Weather System
3450	Dependent Position Determining System
3451	DME/TACAN System
3452	ATC Transponder System
3453	LORAN System
3454	VOR System
3455	ADF System
3456	Omega Navigation System
3457	Global Positioning System
3460	Flt Management Computing Hardware System
3461	Flight Manage. Computing Software System
3497	Navigation System Wiring

35 Oxygen

3500	Oxygen System
3510	Crew Oxygen System
3520	Passenger Oxygen System

3530	Portable Oxygen System
3597	Oxygen System Wiring

36 Pneumatic

3600	Pneumatic System
3610	Pneumatic Distribution System
3620	Pneumatic Indicating System
3697	Pneumatic System Wiring

37 Vacuum

3700	Vacuum System
3710	Vacuum Distribution System
3720	Vacuum Indicating System
3797	Vacuum System Wiring

38 Water/Waste

3800	Water And Waste System
3810	Potable Water System
3820	Wash Water System
3830	Waste Disposal System
3840	Air Supply (Water Press. System)
3897	Water/Waste System Wiring

45 Central Maint. System

4500	Central Maint. Computer
4597	Central Maint. System Wiring

49 Airborne Auxiliary Power

4900	Airborne APU System
4910	APU Cowling/Containment
4920	APU Core Engine

4930	APU Engine Fuel and Control
4940	APU Start/Ignition System
4950	APU Bleed Air System
4960	APU Controls
4970	APU Indicating System
4980	APU Exhaust System
4990	APU Oil System
4997	APU System Wiring

51 Standard Practices/Structures

5100	Standard Practices/Structures
5101	Aircraft Structures
5102	Balloon Reports

52 Doors

5200	Doors
5210	Passenger/Crew Doors
5220	Emergency Exits
5230	Cargo/Baggage Doors
5240	Service Doors
5241	Galley Doors
5242	E/E Compartment Doors
5243	Hydraulic Compartment Doors
5244	Accessory Compartment Doors
5245	Air Conditioning Compart. Doors
5246	Fluid Service Doors
5247	APU Doors
5248	Tail Cone Doors
5250	Fixed Inner Doors
5260	Entrance Stairs
5270	Door Warning System
5280	Landing Gear Doors
5297	Door System Wiring

53 Fuselage

5300	Fuselage Structure (General)
5301	Aerial Tow Equipment
5302	Rotorcraft Tail Boom
5310	Fuselage Main, Structure
5311	Fuselage Main, Frame
5312	Fuselage Main, Bulkhead
5313	Fuselage Main, Longerons/Stringer
5314	Fuselage Main, Keel
5315	Fuselage Main, Floor Beam
5320	Fuselage Miscellaneous Structure
5321	Fuselage Floor Panel
5322	Fuselage Internal Mount Structure
5323	Fuselage Internal Stairs
5324	Fuselage Fixed Partitions
5330	Fuselage Main, Plate/Skin
5340	Fuselage Main, Attach Fittings
5341	Fuselage, Wing Attach Fittings
5342	Fuselage, Stabilizer Attach Fittings
5343	Landing Gear Attach Fittings
5344	Fuselage Door Hinges
5345	Fuselage Equipment Attach Fittings
5346	Powerplant Attach Fittings
5347	Seat/Cargo Attach Fittings
5350	Aerodynamic Fairings
5397	Fuselage Wiring

54 Nacelles/Pylons

5400	Nacelle/Pylon Structure
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- 5410 Nacelle/Pylon, Main Frame
- 5411 Nacelle/Pylon, Frame/Spar/Rib
- 5412 Nacelle/Pylon, Bulkhead/Firewall
- 5413 Nacelle/Pylon, Longerons/Stringer
- 5414 Nacelle/Pylon, Plate Skin
- 5415 Nacelle/Pylon, Attach Fittings
- 5420 Nacelle/Pylon Miscellaneous Structure
- 5497 Nacelle/Pylon System Wiring

55 Stabilizers

- 5500 Empennage Structure
- 5510 Horizontal Stabilizer Structure
- 5511 Horizontal Stabilizer, Spar/Rib
- 5512 Horizontal Stabilizer, Plate/Skin
- 5513 Horizontal Stabilizer, Tab Structure
- 5514 Horiz Stab Miscellaneous Structure
- 5520 Elevator Structure
- 5521 Elevator, Spar/Rib Structure
- 5522 Elevator, Plates/Skin Structure
- 5523 Elevator, Tab Structure
- 5524 Elevator Miscellaneous Structure
- 5530 Vertical Stabilizer Structure
- 5531 Vertical Stabilizer, Spar/Rib Structure

- 5532 Vertical Stabilizer, Plates/Skin
- 5533 Ventral Structure
- 5534 Vertical Stabilizer Miscellaneous Structure
- 5540 Rudder Structure
- 5541 Rudder, Spar/Rib
- 5542 Rudder, Plate/Skin
- 5543 Rudder, Tab Structure
- 5544 Rudder Miscellaneous Structure
- 5550 Empennage Flight Control Attach Fitting
- 5551 Horizontal Stabilizer, Attach Fitting
- 5552 Elevator/Tab, Attach Fittings
- 5553 Vertical Stabilizer Attach Fittings
- 5554 Rudder/Tab, Attach Fittings
- 5597 Stabilizer System Wiring

56 Windows

- 5600 Window/Windshield System
- 5610 Flight Compartment Windows
- 5620 Passenger Compartment Windows
- 5630 Door Windows
- 5640 Inspection Windows
- 5697 Window System Wiring

57 Wings

- 5700 Wing Structure
- 5710 Wing, Main Frame Structure
- 5711 Wing Spar
- 5712 Wing, Rib/Bulkhead