

CHAPTER

70

STANDARD

PRACTICES - ENGINE



MD-80 AIRCRAFT MAINTENANCE MANUAL

CHAPTER 70 STANDARD PRACTICES - ENGINE

Subject/Page	Date	COC	Subject/Page	Date	COC	Subject/Page	Date	COC
EFFECTIVE PAGES			70-00-00 (cont)			70-00-00 (cont)		
1 thru 2	Feb 01/2007		R 231	Feb 01/2007		O 270	Feb 01/2007	
70-CONTENTS			R 232	Feb 01/2007		O 271	Feb 01/2007	
O 1	Feb 01/2007		R 233	Feb 01/2007		O 272	Feb 01/2007	
2	BLANK		O 234	Feb 01/2007		O 273	Feb 01/2007	
70-00-00			R 235	Feb 01/2007		O 274	Feb 01/2007	
1	Nov 01/2004		O 236	Feb 01/2007		O 275	Feb 01/2007	
2	BLANK		R 237	Feb 01/2007		O 276	Feb 01/2007	
70-00-00			R 238	Feb 01/2007		O 277	Feb 01/2007	
201	Aug 01/2006		R 239	Feb 01/2007		O 278	Feb 01/2007	
O 202	Feb 01/2007		R 240	Feb 01/2007		O 279	Feb 01/2007	
R 203	Feb 01/2007		R 241	Feb 01/2007		O 280	Feb 01/2007	
R 204	Feb 01/2007		R 242	Feb 01/2007		O 281	Feb 01/2007	
R 205	Feb 01/2007		R 243	Feb 01/2007		O 282	Feb 01/2007	
R 206	Feb 01/2007		R 244	Feb 01/2007		O 283	Feb 01/2007	
R 207	Feb 01/2007		R 245	Feb 01/2007		R 284	Feb 01/2007	
R 208	Feb 01/2007		R 246	Feb 01/2007		O 285	Feb 01/2007	
R 209	Feb 01/2007		R 247	Feb 01/2007		O 286	Feb 01/2007	
R 210	Feb 01/2007		R 248	Feb 01/2007		O 287	Feb 01/2007	
R 211	Feb 01/2007		O 249	Feb 01/2007		O 288	Feb 01/2007	
R 212	Feb 01/2007		O 250	Feb 01/2007		R 289	Feb 01/2007	
R 213	Feb 01/2007		O 251	Feb 01/2007		O 290	Feb 01/2007	
R 214	Feb 01/2007		R 252	Feb 01/2007		O 291	Feb 01/2007	
R 215	Feb 01/2007		R 253	Feb 01/2007		R 292	Feb 01/2007	
R 216	Feb 01/2007		R 254	Feb 01/2007		R 293	Feb 01/2007	
R 217	Feb 01/2007		O 255	Feb 01/2007		R 294	Feb 01/2007	
R 218	Feb 01/2007		R 256	Feb 01/2007		O 295	Feb 01/2007	
R 219	Feb 01/2007		O 257	Feb 01/2007		O 296	Feb 01/2007	
R 220	Feb 01/2007		O 258	Feb 01/2007		R 297	Feb 01/2007	
R 221	Feb 01/2007		O 259	Feb 01/2007		R 298	Feb 01/2007	
R 222	Feb 01/2007		O 260	Feb 01/2007		R 298.1	Feb 01/2007	
R 223	Feb 01/2007		O 261	Feb 01/2007		R 298.2	Feb 01/2007	
R 224	Feb 01/2007		O 262	Feb 01/2007		R 298.3	Feb 01/2007	
R 225	Feb 01/2007		O 263	Feb 01/2007		O 298.4	Feb 01/2007	
R 226	Feb 01/2007		R 264	Feb 01/2007		O 298.5	Feb 01/2007	
R 227	Feb 01/2007		R 265	Feb 01/2007		O 298.6	Feb 01/2007	
R 228	Feb 01/2007		O 266	Feb 01/2007		O 298.7	Feb 01/2007	
R 229	Feb 01/2007		O 267	Feb 01/2007		O 298.8	Feb 01/2007	
R 230	Feb 01/2007		O 268	Feb 01/2007		R 298.9	Feb 01/2007	
			O 269	Feb 01/2007		O 298.10	Feb 01/2007	

A = Added, R = Revised, D = Deleted, O = Overflow, C = Customer Originated Change

70-EFFECTIVE PAGES



MD-80
AIRCRAFT MAINTENANCE MANUAL

CHAPTER 70
STANDARD PRACTICES - ENGINE

Subject/Page	Date	COC	Subject/Page	Date	COC	Subject/Page	Date	COC
70-00-00 (cont)								
O 298.11	Feb 01/2007							
O 298.12	Feb 01/2007							
O 298.13	Feb 01/2007							
R 298.14	Feb 01/2007							
O 298.15	Feb 01/2007							
O 298.16	Feb 01/2007							
O 298.17	Feb 01/2007							
O 298.18	Feb 01/2007							
O 298.19	Feb 01/2007							
O 298.20	Feb 01/2007							
R 298.21	Feb 01/2007							
R 298.22	Feb 01/2007							
O 298.23	Feb 01/2007							
O 298.24	Feb 01/2007							
O 298.25	Feb 01/2007							
R 298.26	Feb 01/2007							
R 298.27	Feb 01/2007							
R 298.28	Feb 01/2007							
O 298.29	Feb 01/2007							
O 298.30	Feb 01/2007							
R 298.31	Feb 01/2007							
R 298.32	Feb 01/2007							
O 298.33	Feb 01/2007							
R 298.34	Feb 01/2007							
R 298.35	Feb 01/2007							
O 298.36	Feb 01/2007							
R 298.37	Feb 01/2007							
R 298.38	Feb 01/2007							
A 298.39	Feb 01/2007							
A 298.40	Feb 01/2007							
A 298.41	Feb 01/2007							
A 298.42	Feb 01/2007							
A 298.43	Feb 01/2007							
A 298.44	BLANK							
70-10-00								
A 201	Feb 01/2007							
A 202	Feb 01/2007							
A 203	Feb 01/2007							
A 204	Feb 01/2007							

A = Added, R = Revised, D = Deleted, O = Overflow, C = Customer Originated Change

70-EFFECTIVE PAGES



MD-80
AIRCRAFT MAINTENANCE MANUAL

CHAPTER 70
STANDARD PRACTICES - ENGINE

<u>Subject</u>	<u>Chapter Section Subject</u>	<u>Conf</u>	<u>Page</u>	<u>Effect</u>
<u>STANDARD PRACTICES - ENGINE - DESCRIPTION AND OPERATION</u>	70-00-00		1	ZT ALL
<u>STANDARD PRACTICES - ENGINE - MAINTENANCE PRACTICES</u>	70-00-00		201	ZT ALL
<u>MARKING PARTS (TEMPORARY AND PERMANENT) - MAINTENANCE PRACTICE</u>	70-10-00		201	ZT ALL

70-CONTENTS



MD-80

AIRCRAFT MAINTENANCE MANUAL

STANDARD PRACTICES - ENGINE - DESCRIPTION AND OPERATION

1. General

CAUTION: CADMIUM-PLATED TOOLS SHOULD NOT BE USED ON TITANIUM PARTS, PARTICULARLY IF PARTS ARE MOUNTED NEAR ENGINE AND SUBJECT TO HEAT. SMALL CADMIUM DEPOSITS WHICH MAY BE LEFT ON SUCH PARTS WILL REACT WITH TITANIUM WHEN HEATED RESULTING IN BRITTLENESS AND POSSIBLY CRACKS.

- A. Procedures and practices peculiar to the maintenance of the power plant are described in the Standard Practices chapter.

NOTE: Lead, zinc, silver, and tin react in a similar manner with titanium at temperatures above 121°C(250°F).

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 1
Nov 01/2004



MD-80

AIRCRAFT MAINTENANCE MANUAL

STANDARD PRACTICES - ENGINE - MAINTENANCE PRACTICES

1. General

CAUTION: IT IS POSSIBLE TO ASSEMBLE CERTAIN ENGINE PARTS IN A LOCATION OR IN OTHER MODELS OF ENGINES FOR WHICH THESE PARTS WERE NOT INTENDED. BECAUSE SUCH MIS-ASSEMBLY CAN POSSIBLY RESULT IN A FAILURE, CHECK EACH PART TO BE SURE CORRECT PART IS USED.

- A. To ensure proper reinstallation, tag and mark all parts, clips, and brackets as to their location.
- B. During removal of tubes or engine parts, look for indications of scoring, burning, or other undesirable conditions. To facilitate reinstallation, observe location of each part during removal. Tag unserviceable parts and units for investigation and possible repair.
- C. Extreme care shall be taken to prevent dust, dirt, lockwire, nuts, washers or other foreign matter from entering engine. If at any time such items are dropped, assembly process must stop until dropped articles are located, even though this may require considerable amount of time and labor. Before assembling or installing any part, be sure it is thoroughly clean. Suitable plugs, caps, and other covering shall be used to protect all openings as they are exposed.

NOTE: Dust caps used to protect open lines against contamination shall always be installed over tube ends and not in tube ends. Flow through lines may be blocked off if lines are inadvertently installed with dust caps in tube ends.

- D. Lockwire, lockwashers, tablocks, tabwashers, or cotter pins shall never be reused. All lockwire and cotter pins must fit snugly in their holes. Install cotter pin so that head fits into castellation of nut, and unless otherwise specified, bend one end of pin back over stud or bolt and other end down flat against nut. Only lockwire and cotter pins made of corrosion-resistant steel shall be used. Bushing plugs shall be lock-wired to assembly boss or case. Do not lockwire plug to bushing.
- E. Replace all gaskets, packings, and rubber parts at every removal/installation. Make sure that new nonmetallic parts to be installed (such as an oil seal) show no sign of having deteriorated in storage. If necessary, coat gasket surfaces with Gredag Lubricant to reduce possibility of gasket adhering to surfaces of mating parts.

NOTE: Gasket lubricant is known as Gredag Lubricant No. 55 Graphited, and may be procured from Acheson Industries Inc., Acheson Colloids Division, 1635 Washington Street, Port Huron, Michigan 48061.

CAUTION: BEFORE USING TOOLS WITH COVERED SURFACES, MAKE CERTAIN THAT THERE IS SUFFICIENT PROTECTIVE MATERIAL PRESENT TO PRECLUDE POSSIBILITY OF DAMAGING ENGINE PARTS.

- F. In order to protect critical areas of engine parts (such as compressor and turbine disks) against scratches and nicks, tool surfaces contacting these areas must be covered with protective material.
- G. If any part was coated with corrosion preventive compound all traces of this compound and accumulated foreign matter must be removed.
- H. Tubes which incorporate fixed ferrule and loose nut shall have seal retaining nut at fixed ferrule end of tube tightened first.

2. Equipment and Materials

A. General

- (1) Pratt & Whitney has made the subsequent list of consumable materials that are specified for engine line maintenance. See the consumable materials index for data on materials for use in powerplant maintenance.
- (2) The subsequent consumable materials list is identified as follows:

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 201
Aug 01/2006



MD-80
AIRCRAFT MAINTENANCE MANUAL

CODE	CATEGORY
01	Fuels
02	Hydraulic Fluids
03	Oils
04	Common Greases
05	Special Materials
06	Lubricants
07	Lacquers
08	Bonding and Adhesive Compounds
09	Sealants
10	Anti-Ice and Deicing Materials
11	Cleaning Agents
12	Strippers
13	Pretreatment for Painting
14	Disinfectants
15	Storage Preservation
16	Structure Paints
17	Microbiological Contamination Protection Materials
18	Primer

WARNING: BEFORE YOU USE ANY OF THE MATERIALS SHOWN IN THIS PUBLICATION, YOU MUST KNOW ALL OF THE PRECAUTIONS RECOMMENDED BY THE MANUFACTURER OR THE SUPPLIER. THESE PRECAUTIONS TELL YOU HOW TO: - USE THE MATERIAL SAFELY - KEEP THE MATERIAL SAFELY - DISCARD THE MATERIAL SAFELY. YOU MUST READ THE MATERIAL SAFETY DATA SHEETS (OSHA FORM 20 OR EQUIVALENT) TO LEARN THE RECOMMENDED PRECAUTIONS. THE SAFETY DATA SHEETS ARE SUPPLIED BY THE MANUFACTURER OR THE SUPPLIER OF THE MATERIAL.

- (3) The subsequent list of consumables gives the item number, material designation, specification department, material manufacturers reference and/or specification, and supplier code.

NOTE: All supplier/vendor codes are in alphanumeric sequence in a vendor manufacturers code and address list at the end of this section.

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 202
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
01- FUELS				
01-001	Fuel/Engine	PWA 522		Refer to SB2016
02- HYDRAULIC FLUIDS				
02-001	Hydraulic Fluid	Spec NSA 307.110	Hyjet IV or IVA Skydrol 500/84 Skydrol LD4	94548 76541
03- OILS				
03-001	Lubricant, Aircraft Turbine Engine, (Synthetic Base)	PWA 521, Type I (Latest Revision) MIL-PRF-7808, Grade 3 PWA 521, Type II (Latest Revision) MIL-PRF-23699, All Classes		S0001 S0001
03-002	Oil, Lubricating	MIL-PRF-6081 Grade 1010 (Latest Revision) (Lubricating Oil, Jet Engine): PMC 9852	Royco 481 Winsor L-110-A Brayco 460 Aeroshell Turbine Oil 2	07950 1M647 2R128 KA832
03-003	Fluid, Calibrating	MIL-C-7024, TYPE II (Latest Revision) PMC 9041		LOCAL
03-005	Oil Lubricating Molybdenum Disulfide Silicone Base	MIL-L-25681 (Latest Revision)		12474
03-006	Oil, Lubricating (Low Temperature)	MIL-PRF-7870 (Latest Revision) PMC 9851	Instrument Oil	1PWD8
03-007	Oil, Gage Lubricant	PMC 9534	Marvel Mystery Oil	95015
03-015	Fluid, Penetrating (Oil Type)	PMC 9545	318 Versatoil LPS LST Penetrant	27732 66724

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 203
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
			Knock'er Loose 03020 Aerosol - or - 03021, 03022, 03023, Bulk - or- Technician Grade Aerosol 401712 401724 Metal Guard 500 or Metal Guard Spray Formula	023V4 94853
I 03-016	Fluid, Penetrating (Oil Type)	PMC 9503-1 & -3 PMC 9503-2	Aerokroil Kroil	13868 13868
I 03-017	Oil, Penetrating	SPMC 188	Solvo-rust 81252 Super Penetrating Oil	05972
I 03-019	Oil, Lubricating and Preservation, Aircraft Instrument and Bearings, Low Volatility	MIL-PRF-6085 PMC 9123		LOCAL
I	04- COMMON GREASES			
I 04-001	Grease, Aircraft And Instrument, Gear and Actuator Screw	MIL-G-23827 (Latest Revision)		29700
I 04-005	Grease (Extreme Pressure)	PMC 9630	Lubriplate No. 1200-2	73219
I 04-006	Grease	PMC 9631	Plastilube No. 3	1V074
I 04-007	Grease	MIL-G-81322 (Latest Revision)	Thrust Reverser System Lubrication	19135
I	05- SPECIAL MATERIALS			
I 05-001	(Deleted)			
I 05-004	Tape		Scotch Magic Mending Tape #810	52152
I 05-005	Cloth, Cotton, Lint Free			LOCAL
I 05-006	Compound, Lapping Silicone Carbide (280 Grain Size)	PMC 3011	Clover Silicone Carbide Grease Mix (39401 or 39403)	05972
I 05-007	Leak Check, Bubble Type	PMC 9569	Leak TEC #372	03530

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 204
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
	Liquid Leak Detector, Alternate	OR PMC 2277	Snoop Liquid Leak Detector	02570
I 05-012	Tape, Adhesive (Double Sided)		Permacel 94, 96, 306, ED8112, ED8117 or ST8117	99742
I 05-014	(Deleted)			
I 05-015	Primer Silicone Rubber (Moved to 18-009)	PWA 556		
I 05-017	Wipers, Cotton (Lint Free)			LOCAL
I 05-018	Pencil, Metal Marking	PMC 4059-2 (Blue)	Stock No. 02443 for Prismacolor Verithin 741 Or Stock No. 20044 for Col-Erase 1276 Or Stock No. 03332 for Prismacolor Thick Lead 901	86874
		PMC 4059-3 (Light Green)	Stock No. 03341 for Prismacolor Thick Lead 910 Or Stock No. 20046 for Col-Erase 1278	86874
		PMC 4059-5 (Pink)	Stock No. 03357 for Prismacolor Thick Lead 929	86874
		PMC 4059-6 (Red)	Stock No. 00750 for Prismacolor Verithin 750 Or Stock No. 20045 for Col-Erase 1277 Or Stock No. 20066 for Col-Erase 1297 Or Stock No. 03351 for Prismacolor Thick Lead 922	86874
		PMC 4059-7 (Silver)	Stock No. 02460 for Prismacolor Verithin 753 Or Stock No. 03375 for Prismacolor Thick Lead 949	86874

EFFECTIVITY
ZT ALL

70-00-00

TP-80MM-ZT

Page 205
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
		PMC 4059-8 (White)	Stock No. 03365 for Prismacolor Thick Lead 938 Or Stock No. 02429 for Prismacolor Verithin 734 Or Stock No. 20055 for Col- Erase 1286	86874
		PMC 4059-9 (Yellow)	Stock No. 03346 for Prismacolor Thick Lead 916 Or Stock No. 02431 for Prismacolor Verithin 735	86874
		PMC 4059-10 (Red)	Stock No. 00750 for Prismacolor Verithin 750	86874
		PMC 4059-11 (Orange)	Stock No. 02435 for Prismacolor Verithin 737 Or Stock No. 03348 for Prismacolor Thick Lead 918	86874
		PMC 4059-12 (Dark Green)	Stock No. 20046 for Col- Erase 1278	86874
I 05-019	(Deleted)			
I 05-020	(Deleted)			
I 05-021	(Deleted)			
I 05-022	(Deleted)			
I 05-023	(Deleted)	MISC 41 (Deleted. Use PMC 4058, 05-232)		
I 05-024	(Deleted)			
I 05-025	Ink (Deleted, Refer to 05-411)	PMC 4021		
I 05-026	Ink, Metal Marking	PMC 4057-1	Black Metal Marking Ink No. 977-9	0ER09 LOCAL
I 05-027	(Deleted)			
I 05-028	Chromate Conversion Salts, Aluminum	PMC 1794	Alodine #600	71410

EFFECTIVITY
ZT ALL

70-00-00

Page 206
Feb 01/2007

TP-80MM-ZT



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
05-029	Chromate Conversion Salts, Aluminum	PMC 1631	Iridite No. 14-2 Compound	76071
05-030	Wetting Agent	PMC 1632	ARP No. 2	76071
05-031	(Deleted)			
05-032	Penetrant, Fluorescent Post- Emulsified	PMC 4353-1	600	K2063
		PMC 4353-2	ZL27A	37676
		PMC 4353-3	RC65	21405
		PMC 4353-4	P230	S9502
		PMC 4353-5	(Deleted)	
		PMC 4353-6	985-P13	D1940 K6858 02CA7 23373
		PMC 4353-7	FP95A(M)	98733
		PMC 4353-8	F-6A/1P	S0126
05-033	(Deleted)			
05-034	(Deleted. See 05-237)			
05-035	(Deleted)			
05-036	(Deleted, See 18-020)			
05-037	Enamel, Aluminized Epoxy	PWA 569	Enamel Base 529K002 Curing Solution 910K021	23354
05-038	Cheesecloth Bleached, New, Woven, Unsized	GA 100-2	100% Cotton, 12x18 Inches (Minimum) to 20x40 Inches (Maximum), 40x32 Yarns/Inch	2A851 4N020 80769
05-039	(Deleted)			
05-040	(Deleted)			
05-041	Coating, Clear	PMC 1641	Crystal Clear Acrylic Spray (No. 1303)	54636
05-042	(Deleted)			
05-043	(Deleted)			
05-044	(Deleted)			

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 207
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
05-045	Pen and Ink, Marking	PMC 4092-1 (Replaced by PMC 4050-7 in 05-423) PMC 4092-2 (Replaced by PMC 4050-12 in 05-423)		
05-046	(Deleted)			
05-047	(Deleted)			
05-048	Stamping Ink, White (Deleted; use 05-049)	PMC 4027	Dykem KXX-122 (No longer available; use PMC 4057-2)	
05-049	Ink, Metal Marking	PMC 4057-2	White Metal Marking Ink No. 977-9	0ER09 LOCAL
05-050	Abrasive Rod, Rubberized	.3750 OD x 6.0 in. (9.525 OD x 152.400 mm)	0066XF	86297
05-052	Tape, Tying, Glass Fiber			00768
05-053	Coating, Polyurethane	PWA 36013	Laminar X-500 Black Conductive Resin Plus Pigment Component (8-B-6) and Hardener Component (50-C-3)	0KXA5
05-054	Coating, Polyurethane	PWA 36014	Laminar X-500 White Surfacer Resin Plus Pigment Component (8-W-5) and Hardener Component (50-C-3)	0KXA5
05-055	Emery Paper		No. 200-325 Grit	LOCAL
05-056	Emery Paper		No. 60 Grit	LOCAL
05-057	Tape, Tie		PN 190L0F21GIG/A	83309
05-058	Brush, Plater's Tampico	GA 55-1	8313 M-904	33684 74291
05-059	Wax, Paraffin	PMC 9552	Parvan 1300	1PWD8
05-060	Demineralized Water	PMC 1737		LOCAL
05-061	Crocus Cloth	P-C-458	1.500 in. (38.100 mm) Width	LOCAL
05-062	Emery Cloth		No. 400	LOCAL
05-063	Solvent Reducer	PWA 36060	Thinning Agent 020-324	22873

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 208
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
05-064	Adhesive Precoat for Greaseless Compound	PMC 3091	Ad-Lea-Sive	75554
05-065	Compound, Polishing, Medium Fine Greaseless	PMC 3048	Grade E	75554
05-066	Compound, Polishing Buffing	PMC 3061	No. 418 No. 50	75554 0JYZ0
05-067	Brush, Soft Bristle, Nonmetallic			LOCAL
05-068	Nitrogen	PMC 2214		00741 07098 3GMN8 36346
05-069	Applicator, wood, cotton-tip		5-5-405	92469
05-074	Tape, Insulating (Glass Cloth, Adhesive)		No. 27	26066
05-076	Abrasive Paper, Silicone Carbide Waterproof	P-P-101	No. 400 Grit	LOCAL
05-087	Tape, Pressure Sensitive, Flat Black		No. 250	26066
05-089	Color, Staining		Prussian Blue	98148
05-094	Paper, Aluminum Oxide			LOCAL
05-095	Coating, Conversion	MIL-C-5541, Class 1A (Latest Revision)		LOCAL
05-099	Tape, Water Resistant, Adhesive (ASTM-D-5486 Type IV), Olive Drab	PMC 4141-1 thru -5 PMC 4141-1 thru -6:	AC50 Polyken 231 P-691 Tesa 53910	1VJW7 12861 S0176 99742 S0099
05-104	Cloth, Emery		240 Grit	LOCAL
05-110	Lockwire	MS9226-03		LOCAL
05-113	Release Agent, Fluoro-carbon			18598

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 209
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
05-124	Tie, Twist			LOCAL
05-125	Tape, Teflon		6 Mil	71643
05-126	Brush, Short Bristle Nylon			LOCAL
05-127	Alodine, Brush		No. 1200 (Touch-up)	84063
05-131	Non-metallic Grit Cloth		No. 90 Grit	LOCAL
05-132	Abrasive Paper		Light Grade 0	LOCAL
05-133	Mold Release	PWA 36007-1 (Aerosol)	MS122N/C02 (Solvent Based)	18598
		PWA 36007-2 (Liquid)	MS-143DF (Solvent Based)	18598
NOTE: When PWA 36007 is specified, use PWA 36007-1. When PWA 36007-1 is specified, use PWA 36007-1, or -2 as applicable. See 05-355 for water based alternative.				
05-135	Tape, Heat Reflective (Aluminum Foil Backed, Glass Cloth Laminated)	PMC 4235 36 Yard Roll Width as Follows: -1, -6: 1/2 Inch -2, -7: 1 Inch -3, -8: 2 Inches -4, -9: 4 Inches -5, -10: 1/4 Inch -11: 1/8 inch	(-1 Thru -11:) No. 363 No. P-100 No. 390 No. 407 No. 2925-7 (-6 Thru -11:) No. C642	 52152 99742 1A319 60890 07512 07512

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 210
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
05-136	Tape, High Temperature Glass Cloth	PMC 4273 Length = 36 or 60 yards Width as Follows: -1 = 1/4 Inch -2 = 1/2 Inch -3 = 1.0 Inch -4 = 2.0 Inch -5 = 4.0 Inch -6 = 6.0 Inch -7 = 4.0 Inch -8 = 3.0 Inch	All Dash Numbers Except - 7: No. 361 Cloth Tape D/W 469 497 2915-7 All Dash Numbers: Permacel No. 212	52152 60890 3TYN6 07512 99742
05-137	Bonding Preventative, Teflon S	PWA 36038	No. 954-101	23037 (D)
05-142	Tape, Silicone Glass Cloth		Scotch No. 361	26066
05-145	Tape, Masking, Polyester Film (Mylar)	PMC 4188	Scotch No. 8402 or 8403 CT-931 Temp-R-Tape M50	52152 9X057 07512
05-146	Abrasive Paper, Silicone Carbide		120 Grit	39428
05-147	Milled Glass		Owens-Corning	45255
05-152	Wetting Agent	PMC 1610	Alconox	17534
05-153	Abrasive Paper, Silicone Carbide		240 Grit	LOCAL 03251 39428
05-154	Coating, polyurethane, Erosion Resistant	PWA 36510	Chemglaze M331 and Chemglaze M201	30676
05-155	Paper, Kraft Medium Duty	PMC 4128		80861
05-169	Foil, Aluminum			LOCAL

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 211
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
05-182	Cloth, Wire	PWA 1170-3	Wire: AMS5690; Weave: Plain Dutch; Warp: Nominal Wire Diameter = 0.0055 in. (0.14 mm); Nominal Wire Count = 50 / in. (25.4 mm); Fill: Nominal Wire Diameter = 0.0045 in. (0.114 mm); Nominal Wire Count = 250 / in. (25.4 mm).	S0190 S0118 S0119 S0172 1CXA3
05-185	Paper, Test, pH		No. 345, Short Range 6.0 - 8.0	93255
05-191	Tape, Electrical Insulating, Self Adhering, High Temperature		RL-6000 SA Series	LOCAL
05-198	Gloves, Plastic Polyethylene	GA 660-4	Edmont And Wilson No. 35-152	44926
05-203	Paper, Kraft Light Duty	PMC 4127	No. 40 Kraft Paper	80861
05-214	Cloth, Abrasive Impregnated Nylon, Fine Silicone Carbide	GA 814-3	Type S Fine Scotch - Brite Cleaning and Finishing Sheets	52152
05-221	Filler, Aerodynamic Dent		800000-328	73168
05-231	Tape, Adhesive Transfer	PWA 36745	No. Y-9732	26066
05-232	Crayon, Metal Marking (Soft)	PMC 4058-1 (Black)	02089	86874
		PMC 4058-6 (Red)	02059	86874
		PMC 4058-8 (White)	02412 or 02060	86874
		PMC 4058-10 (Orange)	Phano #92 02094	70362 86874
05-233	Brush, Tube Nylon Bristle		1/2 Inch OD and 18 Inch Long Minimum	LOCAL

EFFECTIVITY
ZT ALL

70-00-00

Page 212
Feb 01/2007

TP-80MM-ZT



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
05-234	Penetrant Fluorescent, Post- Emulsified, Normal Sensitivity (Level 2)	PMC 4352-1	555	K2063
		PMC 4352-2	ZL2C	37676
		PMC 4352-3	RC50	21405
		PMC 4352-4	P220	S9502
05-235	Penetrant Fluorescent, Post- Emulsified, Ultra High Sensitivity (Level 4)	PMC 4352-5	(Deleted)	none
		PMC 4352-6	985-P12	D1940
				K6858
				02CA7
05-236	Penetrant Fluorescent, Water Washable, High Sensitivity (Level 3)			23373
		PMC 4352-7	FP93A(M)	98733
		PMC 4352-8	F-5-SP/1P	S0126
05-237	Developer Fluorescent Penetrant Non-aqueous	PMC 4354-1	668	K2063
		PMC 4354-2	ZL37	37676
		PMC 4354-3	RC77	21405
		PMC 4354-4	P240	S9502
05-238	Developer Fluorescent Penetrant Non-aqueous	PMC 4354-5	(Deleted)	none
		PMC 4354-6	985P14	D1940
				K6858
				02CA7
05-239	Developer Fluorescent Penetrant Non-aqueous			23373
		PMC 4354-7	FP97A(M)	98733
		PMC 4354-8	F-6A-SP/1P	S0126
05-240	Developer Fluorescent Penetrant Non-aqueous	PMC 4360-1	446	K2063
		PMC 4360-2	ZL67	37676
		PMC 4360-3	HM604	21405
		PMC 4360-4	P130	S9502
05-241	Developer Fluorescent Penetrant Non-aqueous	PMC 4360-5	(Deleted)	none
		PMC 4360-6	970-P25E	D1940
				K6858
				02CA7
05-242	Developer Fluorescent Penetrant Non-aqueous			23373
		PMC 4360-7	FP923	98733
		PMC 4360-8	F-4A-C/1P	S0126
05-243	Developer Fluorescent Penetrant Non-aqueous	PMC 4357	Chemtall	D1940
			Oakite	K6858
			9D1B	02CA7
				23373
05-244	Developer Fluorescent Penetrant Non-aqueous		Eishin Kagaku F-4S(NT)1	S0126

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 213
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
			Ely LD3 Magnaflux ZP9F Marktec D701 Met-L-Chek D70 Sherwin D100	K2063 37676 S9502 98733 21405
05-238	(Deleted)			
05-240	(Deleted, Use 05-459)	PMC 4470 (No Longer Available)		
05-243	Paper, Emery		No. 320 Grit	LOCAL
05-248	Tape, Rubber		Moxness 620-1 (Red or Black)	07099
05-249	Coating, Urethane	Mil-C-83286, Type I, No. 26306 (Latest Revision)		97460
05-250	Coating, Urethane	Mil-C-83286, Type II, No. 26251 (Latest Revision)		97460
05-252	Pad, Scotch Brite			04963
05-253	Paper, Abrasive		Silicone Carbide, 180 Grit	LOCAL
05-254	Knife, Acrylic			LOCAL
05-255	Tape, Masking		Scotch 8402 or 8403	52152
05-256	Brush, Acid		No. 225	20696
05-258	Coating, Silicone Insulation		MI-15 Type II Parts A, B, and C	53100
05-259	Topcoat, Silicone Insulation		MI-15 Parts A and B, Thinner	53100
05-260	Spatula, Acrylic or Fiber			LOCAL
05-262	Lockwire	MS20995C32		LOCAL
05-264	Film, Bagging (VAC-PAC)		2 Mil Nylon	66442
05-268	Film, Release	PMC 9977 -1, -3, -5, & 9	A4000 (Perforated) A5000P (Perforated)	53912 3BEV4
		PMC 9977 -2, -4, -6, thru -8, & 10	A4000 (Non-Perforated)	53912
			A5000 (Non-Perforated)	3BEV4

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 214
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
I 05-272	Tape, Sealing		Scotch 425 or Scotch Y427	52152
I 05-273	Syringe, Plastic Nozzle			LOCAL
I 05-274	Paper, Abrasive		Silicone Carbide, 80 Grit	LOCAL
I 05-277	Sheet, Rubber, Silicone		0.125 Inch (3.175 mm) Thick	LOCAL
I 05-278	Tape, Protective Polyurethane		3M Part No. 8672	52152
I 05-279	Coating, Clear Polyurethane		683-2	98502
I 05-285	Fabric, Fiberglass, Epoxy		Type I HMF 2398D/76 Type II HMF 2367D/76	07314
I 05-287	Safety Wire (Lockwire)	MS20995C20	0.020 in. (0.508 mm) Diameter	LOCAL
I 05-288	Safety Wire (Lockwire) - steel Corrosion Resistant	AS3214-01 (AMS 5689, AISI 321)	0.020 in. (0.508 mm) Diameter	LOCAL 1A053 94129
I 05-289	Safety Wire (Lockwire) - steel Corrosion Resistant	AS3214-02 (AMS 5689, AISI 321)	0.032 in. (0.813 mm) Diameter	LOCAL 1A053 94129
NOTE: 05-332 is an approved alternative to 05-289.				
I 05-291	Cable, Safety		C30B AS3510-0212C AS3510-0218C AS3510-0221C AS3510-0224C 0.032 Inch (0.813 mm) Diameter	70958
I 05-292	Ferrule, Safety Cable		F30B50 AS3510-02F 0.032 Inch (0.813 mm) Diameter	70958
I 05-317	Adhesion Promoter, Polyurethane Protective Tape		Adhesion Promoter 86A	52152
I 05-332	Safety Wire (Lockwire)	MS9226-04	0.032 in. (0.813 mm) Diameter	LOCAL
NOTE: 05-289 is an approved alternative to 05-332.				
I 05-350	Wheel, Grinding Rubber Bonded "Radiac"		C100-102CHSC	54916 S0055

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 215
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
I 05-351	(Deleted, Not Available)			
I 05-353	Wheel, Cloth			LOCAL
I 05-354	Compound, Aluminum Oxide Polishing and Buffing	PMC 3017	Moco 1062	S0055
I 05-360	Applicator, Manual (LP-50 Cartridge)		9MGUN509X	30676
I 05-361	Nozzle, Mixing		9742	30676
I 05-370	Coating, Fluoroelastomer protective	PWA 36516-1	PLV 2000 (Black Accelerator #4)	24802
I 05-371	Coating, Fluoroelastomer protective	PWA 36516-2	PLV 2100 (Black Accelerator #4)	24802
I 05-372	Coating, Fluoroelastomer protective	PWA 36516-4	PELSEAL 2112 (Black Accelerator #4)	24802
		PWA 36516-3	PLV 2038 (White Accelerator #4)	24802
		PWA 36516-5	PLV 3111 (Black Accelerator #4)	24802
		PWA 36516-6	PLV 3018 (Black Accelerator #4)	24802
I 05-376	Tape, Masking (Crepe Paper Backing) Length: 60 Yards; Width/Suffix: 1/8 Inch: (-1,-11,-21) 1/4 Inch: (-2,-12,-22) 3/8 Inch: (-3,-13,-23) 1/2 Inch: (-4,-14,-24) 3/4 Inch: (-5,-15,-25) 7/8 Inch: (-6,-16,-26) 1 Inch: (-7,-17,-27) 2 Inch: (-8,-18,-28) 4 Inch: (-9,-19,-29) 1 1/2 Inch: (-10,-20,-30)	PMC 4000-1 Thru -8 and -10	PG-500 PG-16 Clipper Tape 7100 P-791 #2505 Utility Paper Tape or Tartan Brand No. 200 Paper tape	12861 12861 0A9Y2 99742 52152
		PMC 4000-1 Thru -8, -10, -20	PG-21	12861

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 216
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
		PMC 4000-9	PG-500	12861
		PMC 4000-21 Thru -30		52152
05-384	Compound, Silicone Carbide Deburring (150 Grit and Finer)	PMC 3088	Burring Compound No. 7280	S0055
05-395	Beeswax	PMC 9463	White Beeswax S.P. 422	0A341
			W-27 Beeswax (Yellow - Natural)	22527 94480
			Beeswax (Yellow - Natural)	33629
			Yellow Beeswax S.P. 6	0A341
NOTE: The alternative to 05-395 Beeswax is 05-396 paraffin Wax Blend, which is softer and more pliable.				
05-396	Paraffin Wax Blend	PMC 9462	Schaefer No. 7 Wax (1 lb. (0.45 kg) Slab)	24269
NOTE: 05-396 Paraffin Wax Blend is softer and more pliable than 05-395 Beeswax or 05-059 Paraffin Wax and can be used as an alternative to these materials.				
05-399	Cloth, Aluminum Oxide		240 Grit	04963 06565 44197
05-408	Marker, Felt Tip, White	SPMC 198-1	High Purity Action Marker #44729 - 4.5 X 25.4 mm Tip #33729 - 2.0 X 14.5 mm Tip	98148
05-409	Marker, Metal Tip, Black	SPMC 198-2	High Purity Texpen #17470 - Fine Tip #17473 - Medium Tip #17474 - Broad Tip	98148
05-410	Marker, Felt Tip	SPMC 198-3	Sharpie Fine Point Marker "Yellow"	86874
05-411	Ink, Stamping (For Marking on Non-Porous Surfaces with a Rubber Stamp)	PMC 4021	Permanent Stamp Pad Ink No. 58757	86874
05-412	Ink, White, Stamping (Deleted; use 05-049)	PMC 4027 (Deleted; use PMC 4057-2)	Dykem KXX-122 (No longer available)	
05-413	Ink, Temporary Marking	PMC 4500	16-2000 VideoJet Ink, (Black)	0V0Z6

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 217
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
05-414	Marker, Extra Fine Point (Black)	PMC 4557	Pilot SCA-UF Dixon RediSharp	58595 70362
05-415	(Deleted Refer to 05-423)	(PMC 4556-1 Replaced by PMC 4050-20)		
05-416	Chalk, White	PMC 4552	No. 1400 Crayola An-Du-Septic White Chalk	85419
05-417	Marking Pen (Paint)	PMC 4554	63613 (White) and 63605 (Yellow)	86874
05-418	Dye, Layout and Identification (Blue)	PMC 4504	Dykem Steel Blue DX-100	98148
05-420	Marking Pencil (Hard)	PMC 4094	02460 or 21628	86874
05-421	Nylon Pads and Rolls, Abrasive-impregnated	PMC 4095	Scotch Brite, General Purpose Pads #7447	52152
			Norton Non-woven Pad #747	44197
			Weiler #54970	17699
05-422	Pad, Scrub	PMC 4435	Scotch Brite, Ultra Fine Pad #7448	52152
05-423	Marker, Felt Tip, Rapid Drying	PMC 4050-1 (Black, Chisel Point)	Marks-A-Lot (08888 or 17888)	16956
		PMC 4050-2 (Blue, Chisel Point)	Deluxe Marker #10101 or King Size Marker #15101 or Magnum 44 #44101	86874
			Marks-A-Lot (08886 or 17886)	16956
		PMC 4050-3 (Red, Chisel Point)	Magnum 44 #44103 or King Size Marker #15103	86874
			Marks-A-Lot (08887 or 17887)	16956
		PMC 4050-4 (Black, Fine Point)	Magnum 44 #44102 or King Size Marker #15102	86874
			Marks-A-Lot (17878)	16956
			Dixon Redisharp	70362

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 218
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
			Sharpie 30000 Series - Black (Product Code #30001)	86874
		PMC 4050-5 (Green, Chisel Point)	Marks-A-Lot (08885 or 17885)	16956
		PMC 4050-6 (Blue, Fine Point)	Sharpie 30000 Series - Blue (Product Code #30003)	86874
		PMC 4050-7 (Red, Fine Point)	Sharpie 30000 Series - Red (Product Code #30002)	86874
		PMC 4050-9 (Red, Chisel Point)	Marks-A-Lot (08887 or 17887)	16956
		PMC 4050-10 (Yellow)	Sharpie 30000 Series (Product Code 30005)	86874
		PMC 4050-11 (Black)	Sharpie 35000 Series (Product Code 35001)	86874
		PMC 4050-12 (Red)	Sharpie 35000 Series (Product Code 35002)	86874
		PMC 4050-13 (Blue)	Sharpie 35000 Series (Product Code 35003)	86874
		PMC 4050-14 (Black)	Sharpie 37000 Series (Product Code 37001)	86874
		PMC 4050-15 (Red)	Sharpie 37000 Series (Product Code 37002)	86874
		PMC 4050-16 (Blue)	Sharpie 37000 Series (Product Code 37003)	86874
		PMC 4050-17 (Black)	Sharpie 33000 Series (Product Code 33001)	86874
		PMC 4050-18 (Red)	Sharpie 33000 Series (Product Code 33002)	86874
		PMC 4050-19 (Blue)	Sharpie 33000 Series (Product Code 33003)	86874
		PMC 4050-20	TEC #13401 Fine Tip	86874
NOTE: Sanford Corporation TEC #13501 Broad Tip (was PMC 4050-21) is not available. It is permitted to use remaining supplies.				
05-424	Penetrant, Fluorescent, Water Washable High Sensitivity	PMC 4351-1 PMC 4351-2	Ely Chemical 4455 Magnaflux ZL60D	K2063 37676

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 219
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
		PMC 4351-3	Sherwin HM406	21405
		PMC 4351-4	Marktec P121	S9502
		PMC 4351-5	(Deleted)	
		PMC 4351-6	Chemetall 970-P24	D1940 23373
		PMC 4351-7	Met-L-Chek FP922	98733
05-425	Marker, Felt Tip	PMC 44421 (Replaced by PMC 4050 Refer to 05-423)		
05-426	Compound, Polishing Greaseless, Coarse	PMC 3022	Greaseless Compound Grade 3022-1	75554
05-427		PMC 3023 (Deleted)		
05-437	Pressure Sensitive polyester Tape	PMC 4096	Flashbreaker 1 Flashtape 1	53912 3BEV4
05-441	Ink, Metal Marking	PMC 4057-10	White Drawing Ink #9065-D	0ER09
05-442	Wheel Abrasive Impregnated Nylon (80 Grit)		2 X 1/2 Bear-TEX	06565
05-443	Wheel Abrasive Impregnated Nylon (120 Grit)		2 X 1/2 Bear-TEX	06565
05-444	Wheel Abrasive Impregnated Nylon (180 Grit)		2 X 1/2 Bear-TEX	06565
05-453	Tape, Masking (Cloth Backing)	PMC 4001	Tesa 53958 Shurtape PC-622	38XJ0 S0202
05-454	Tape (High Temperature)	PMC 4009	PG-8 Clipper Tape 110 Permacel P-703 Tesa 53134 Scotch High Temperature #213	3EU06 0A9Y2 99742 S0099 28112
05-455	Tape, Fiberglass PTFE Coated	PMC 4107	5453 M520	52152 5R603

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 220
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
05-459	Blue Dye	PMC 4513	Oil Blue B Liquid Dye	1ML15
NOTE: Refer to 70-00-00-20, for Preparation of Blue Dye Oil System Leak Check Solution (PS 197). (Paragraph 27.)				
05-462	Tape, Fluorocarbon, Pressure Sensitive	PMC 4467 -1: -2: -3 thru -27, -30 thru -37: -28:	Teflease MG2 TM6115 Tooltec CSC TM6115-03 TM6115 Tooltec CA5	53912 59688 53912 59688 59688 53912
05-464	Mold Release Agent for Silicone (Water-Based)	PMC 1104	Perma-Mold 2580W	2W738 72430
05-465	Ink, Metal Marking	PMC 4057-5	Green Metal Marking Ink #977-9	0ER09
05-466	Ink, Metal Marking	PMC 4057-11	White Metal Marking Ink #977-9	
05-467	Wire, Welding	AMS 5802	UNS #N19907	58401 LOCAL
05-468	Wire, Welding	AMS 5823	UNS #S41780	2R602 55596 58401
05-469	Developing Powder, Fluorescent Penetrant	PMC 4356	Chemetall Oakite 9D4A Ely Chemical PD3 Magnaflux ZP4B Marktec D700 Met-L-Chek D72A Sherwin D90G Eishin Kagaku F-5D/1	D1940 K6858 02CA7 23373 K2063 37676 S9502 98733 21405 S0126
06- LUBRICANTS				
06-001	Lubricant, Dry Film	PMC 9934-1	DGF-123 (CFC-free) Stock No. K5200	16837

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 221
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
06-002	Petrolatum, White	PMC 9609	White Fonoline or White Protopet 1S Vaseline Penreco Regent or Penreco Snow	S0212 S0212 92469 00BA9
06-003	Compound, Antigalling	PWA 586 (Replaces PWA 586-3)	Loctite C-200 Kaylube No. 3	05972 15653
06-004	Lubricant, Spray-Type	PMC 1714	Everlub 620C	8F024
06-005	Compound Antigallant Metal Assembly Paste	PWA 587	G-N Metal Assembly Paste	71984
06-007	Petroleum Jelly (Deleted; use 06-002)		Vaseline	
06-009	Lubricant, Molydenum Disulfide powder	PMC 9523	Molykote Powder	71984
06-013	Lubricant, Solid Film (Air Cure)	MIL-L-23398 (Latest Revision)	3402C Bonded Lube	71984
06-014	Lubricant, Gasket	PMC 9652	Gredag R-3	70079
06-015	Beeswax	(Deleted; refer to 05-395)		
06-016	Compound, Antiseize and Antigalling (Cancelled)	PMC 9936 (Is No Longer Manufactured)		
06-017	Lubricant, Anti-seize	PWA 541	Molybdenum Disulfide Powder: Z Moly Powder -PLUS- Grade 1010 Oil: Brayco 460 or Royco 481 or Winsor L110-A	71984 2R128 07950 1M647
06-019	Lubricant, Bolt	PMC 9866 (Not available; use 03-001)	All-Oil Gear Lube SAE 250 (No longer available; use any remaining supply)	

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 222
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
06-020	Lubricant Molybdenum Disulfide, Silicone	DOD-L-25681 (Superseding MIL-L-25681)	Chemsol Royco 81MS Stock #9150005437220 Braycote 868	012L8 00BB6 07950 0PGK2 1UGB2
06-021	Compound, Antigalling	PWA 550-3	Hi-T 650 Lubri-Bond HT	34227 8F024
06-023	Lubricant, thread	PWA 36001 PMC 9940	Silver Goop	02570
06-035	Fluid, Lubricating	PWA 36511	3M Company FC-43	28112
06-036	Compound, Antigallant	PWA 36035	Loctite Moly Dry Film	05972
06-037	Compound, Anti-seize	PWA 36053-4	JET-LUBE NIKAL	0A307 8F024
06-038	Compound, Antigallant	PWA 36545-3	Everlube Esnalube 382	8F024
06-039	Lubricant, Anti-seize (Deleted; use 06-055)			
06-044	Compound, Antigallant	PWA 36240	Dow Corning 321 Dry Film Lubricant Spray	5D028
06-053	Lubricant, Sealing Ring	PWA 36500	Ultrachem Assembly Fluid #1 ROYCO HF825	56385 07950
06-054	Paste, Anti-seize	PWA 36246	Molykote P-37 Tiodize T8E	71984 34568
06-055	Compound, Anti-seize	PMC 9566 (-1, -2, -3, -4)	C5-A Copper Based Anti-Seize	05972
06-059	Lubricant, Fluorinated Grease	PWA 36230	Krytox 283 AD High Temperature Anti-Corrosion Grease	23037(A)
07- LACQUERS				
	None Designated			
08- BONDING AND ADHESIVE COMPOUNDS				

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 223
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
I 08-001	Epoxy, Multi-Component Type	PWA 604-1	Resin Base, Eccobond 45 Hardener, Eccobond 15	04552
I 08-002	Liquid Epoxy Resin (Medium Viscosity)	PWA 421-2	Epon No. 828	18598 54527 74230
I 08-005	Adhesive	PWA 36027	Scotch Grip Rubber Adhesive No. 1300	52152
I 08-011	Thickening Agent	PWA 424-2	CAB-O-SIL-MS	3F733
I 08-012	Epoxy Resin Curing Agent (Amine Type)	PWA 422-1	Epon Curing Agent "U" or Epicure 3282	18598 54527 74230
I 08-016	Adhesive Paste, Epoxy, Non-Thixotropic, Aluminum-Filled	PWA 457-1	EA 934 NA	33564
I 08-020	Thickening Agent	PWA 424-1	Cab-O-Sil HS-5	3F773 65483
I 08-021	Compound, Potting, Epoxy	PWA 603	Eccobond SF-40	04552
I 08-024	Compound, Retaining	MIL-S-46163 (Latest Revision)		05972
I 08-025	Adhesive Paste, Epoxy, Thixotropic, Aluminum-Filled	PWA 457-2	EA 9394	33564
I 08-026	Adhesive, Epoxy Film		FM-300, Supported	07542
I 08-030	Epoxy Potting Compound (Two Component Type)	PWA 36756	EC3524 B/A	6A670
I 08-036	Resin and Curing Agent, Liquid Epoxy	PWA 466	EPON 828/ Curing Agent U Sempak or Epicure 3283	23354 74230
I 08-038	Adhesive, Urethane		7520A/B, LP-50 Cartridge	30676
I 08-044	Adhesive Paste, Epoxy (Toughened), Thixotropic, Aluminum - Filled	PWA 457-5	EA 9392	33564

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 224
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
08-047	Fabric, Fiberglass, Epoxy Resin Impregnated	PWA 36437	Cycom 306/7781	04622
08-048	Fabric, Fiberglass, Epoxy Resin Impregnated	PWA 36406	Cycom 950/120 Fiberglass	1KU10
08-049	Adhesive Film, Epoxy Scrim Supported	PWA 477	Hysol EA9628 Supported	33564
08-050	Adhesive/Sealant Flame Resistant	PWA 36751-1 Liquid Adhesive and Liquid Curing Agent PWA 36751-2 Liquid Sealant and Liquid Curing Agent	DAPCO 18-4F DAPCO #2030	OJWE8 1XNT8 74230 1XNT8
NOTE: When PW 36751 is specified, PWA 36751-1 must apply. PWA 36751-1 is used as a filler material for sealing gaps in firewall structures. Compound is applied over a primer. PWA 36751-2 is used as a flame retardant coating and a cryogenic sealant.				
09- SEALANTS				
09-001	Sealant, Silicone With Catalyst		DC-90-006 DC-90-006-2	71984
09-002	Compound, Thread Locking and Retaining* *Specify Grade	PWA 549-1 PWA 549-2 PWA 549-3 PWA 549-4 PWA 549-5 PWA 549-6 PWA 549-7 PWA 549-8	Loctite Grade 609 Green - Retaining Loctite Grade 640 Green - Retaining Loctite Grade 635 Green - Retaining Loctite Grade 222 Purple - Thread Lock Loctite Grade 242 Blue - Thread Lock Loctite Grade 271 Red - Thread Lock Loctite Grade 290 Green - Thread Lock Loctite Grade 567 Offwhite - Thread Lock	05972

EFFECTIVITY
ZT ALL

70-00-00

Page 225
Feb 01/2007

TP-80MM-ZT



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
		PWA 549-9	Loctite Grade 272 Red - Thread Lock	
		PWA 549-10 (can be a substitute for PWA 549-2)	Loctite Grade 620 Green - Retaining	
09-003	Sealant, Silicone Rubber	PMC 9926	DC-4	71984
09-005	Sealing Compound	PWA 36000 (Supersedes PWA 36000-3)	Hylomar Advance Formulation (methylene chloride free)	S0156 B1050 S0101
09-006	Sealing Compound	PWA 36000-4 (Replaced by PWA 36000; see 09-005)		
09-007	Sealing Compound (Deleted. See 09-008)	PMC 9925 (Replaced by PWA 36002)		
09-008	Sealing Compound	PMC 9931 (Canceled) PWA 36002 (Supersedes PMC 9931 and PMC 9925)	Gasket Sealant No. 2	05972
09-009	Sealing Compound	PMC 9929	Parker O-Lube	02697
09-013	Sealing and Coating Compound, Corrosion Inhibitive	MIL-S-81733 (Latest Revision)	AC-665 B-2 AC-665 C-12 Type IV-12 Class 1 Grade A	1DWR5
09-027	Sealant, Silicone Rubber		RTV 157 (Gray)	01139B
09-035	Compound, Sealing	MIL-S-83430 Class B 1/2 PR-1750, Class B (Latest Revision)		LOCAL
09-051	Sealant, Silicone Rubber	PWA 36028	RTV 630	01139
11- CLEANING AGENTS				
11-001	Solution, Cleaning		Bendix 25-1 Detergent (Mixed with De-Ionized Water)	99251
11-002	(Deleted)			
11-003	Kerosene	PMC 9021		LOCAL
11-004	Solvent, Petroleum	PMC 9010 140°F Flash Point	SAFETY-KLEEN Premium Solvent #6605 or Premium Gold Solvent 6638	30530

EFFECTIVITY
ZT ALL

70-00-00

TP-80MM-ZT

Page 226
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
			Solvent 142 3% Aromatics Maximum	34897
11-005	Methyl Ethyl Ketone (MEK)	PMC 9076	Technical Grade Wt. = 6.7 lbs/gal (804 g/l)	LOCAL
11-005A	Methyl Ethyl Ketone (MEK)	PMC 1820	ACS Reagent Grade	LOCAL
11-006	(Deleted)			
11-009	Alcohol, Denatured	PMC 9009 (AMS 3002) Denatured Ethanol; Specific Gravity 60/60°F: 0.800-0.820 Flash Point; 30°F (-1°C), minimum Boiling Range: Initial Boiling Point: 165°F (74°C), minimum 95% Over: 175°F (79°C), maximum Water: 5.0%, maximum Vapor Pressure at 68° F (20°C): 45 mm Hg, maximum		LOCAL
Do not denature with methanol.				
11-013	Trichloro- ethylene	O-T-634, Type II: PMC 9004	Trichloro- ethylene	96717
11-014	Alcohol, Isopropyl	PMC 9094	Technical Grade, 99% Minimum: (Liquid) R-503 (Aerosol) #1001-0911 (Saturated Wipers) SW420034 (Presaturated Wipers)*	LOCAL 98733 S0210 OM3C8
* Must meet the requirements of the latest issue of AMS 3819 (Cloths, Cleaning for Aircraft Primary and Secondary Structural Surfaces).				
11-014A	Alcohol, Isopropyl	(11-014A is deleted. Refer to 11-078)		

EFFECTIVITY
ZT ALL

70-00-00

Page 227
Feb 01/2007

TP-80MM-ZT



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
11-021	Cleaner, Gaspath *Solvent Type **Detergent Type (recommended in place of solvent-Type products for environmental reasons)	SPMC 87-1	*Ardrox 6343	D1940 K6858 02CA7 23373
		SPMC 87-2	**Ardrox 6345	D1940 K6858 02CA7 23373
		SPMC 87-3	*Ardrox 252-L	D1940 K6858 02CA7 23373
		SPMC 87-4	*B & B 3100	21361
		SPMC 87-5	**B & B TC100	21361
		SPMC 87-6	*Cee-Bee R-674	71361
		SPMC 87-7	*Penair M-5704A	56883
		SPMC 87-8	Deleted	
		SPMC 87-9A	**ECT R-MC (Part No. 4070 Pre-Mixed)	S0141
		SPMC 87-9B	**ECT R-MC (Part No. 4072 Concentrate)	S0141
		SPMC 87-10A	**Ardrox 6367	D1940 K6858 02CA7 23373
		SPMC 87-10B	**Ardrox 6368	D1940 K6858 02CA7 23373
		SPMC 87-11A	**Turco 6783-3	71410
		SPMC 87-11B	**Turco 6783-10	71410
		SPMC 87-11C	**Turco 6783-50	71410
		SPMC 87-12	*Turco T-5884	71410
		SPMC 87-13	**ZOK 27	1NCU0 U4628

EFFECTIVITY
ZT ALL

70-00-00

Page 228
Feb 01/2007

TP-80MM-ZT



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
		SPMC 87-14	**Turbo-K	S0170
11-027	Solvent, Stoddard Petroleum	PMC 9001, MIL-PRF-680 Type II	141° - 199°F (61° - 93°C) Flash Point, TCC	LOCAL
11-031	Cleaner, Alkali	PMC 1284	Blue Gold Cleaner	0GA37
11-032	Acetone, Phenol-free	PMC 9008-1, -2, -5, -6, -7 PMC 9008-3, -4 PMC 9008-8	R-504 (Aerosol) SW420053 #1003-0911 (presaturated Wipers)	LOCAL 98733 0M3C8 S0210
NOTE: Do not use 11-032 for bonding applications where reagent-grade solvent is required. For those applications, 11-065 must be used.				
11-037	Solution, Cleaning		Turco 4366	71410
11-038	(Deleted)			
11-039	Solvent, Cleaner	PMC 9060	DeSo Clean 45 Solvent Cleaner	23354
11-040	Cleaner, Alkali	SPMC 106	Blue Gold Spray Washer	0GA37
11-041	(Deleted)			
11-042	Cleaner/Remover, Fluorescent penetrant	PMC 4366	Magnaflux SKC-S	37676
11-043	Solvent, Methyl Isobutyl Ketone (MIBK)	PMC 9079	Technical Grade	LOCAL
11-044	Cleaner, Alkali (General Purpose)	SPMC 104	Cee-Bee A-7X7	71361
11-045	Cleaner, Alkali (General Purpose)	SPMC 105	Turco 5948 DPM	71410
11-046	(Deleted)			
11-047	Cleaner, Alkaline Gel	SPMC 109	Turco 5948 DPM Thick	71410
11-048	Cleaner, Alkaline Gel	SPMC 110	Aviawash Green Gel	D1940 K6858 02CA7 23373
11-049	Cleaner, Aqueous	SPMC 148-1	Turco 6780 ECO-SOLV	71410

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 229
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
		SPMC 148-2	Ardrox 6077 Window Cleaner Plus	D1940 K6858 02CA7 23373
		SPMC 148-3	MAG-CHEM Evasol	35502
		SPMC 148-4	MC Spray & Wipe	0GA37
11-050	(Deleted)			
11-052	Cleaner, Heavy Duty		CALLA 855	8E913
11-53	Remover, Alkaline Gel Carbon	SPMC 136	Turco 5805	71410
	Remover, Alkaline Gel Carbon	SPMC 137	Cee-Bee Alko	71361
11-54	(Deleted)			
11-055	Solvent, Cleaner	PMC 8914 PMC 8914-1: Aerosol PMC 8914-2: 1 Gallon (3.79 liter) container	Envirosolv 655	05867
11-056	Solvent, Cleaner	SPMC 156	MAG-CHEM Teksol	35502
11-057	Solvent, Cleaner	SPMC 168	Aviation C.I.C. Remover	023V4
11-058	Solvent, Cleaner	SPMC 175	Quantum 2000 (CE-SX-94)	86938
11-059	Solvent, Cleaner	SPMC 176	Isoblast (GB-SX-94)	86938
11-060	Solvent, Cleaner	SPMC 179	CRC Precision Plus Cleaner	023V4
11-062	Solvent, Dielectric (Ultra-High Purity)	PMC 8920	Positron	OWU71
11-063	Solvent, Hand-Wiping	PMC 8917	EZE 662	89524
11-064	Solvent, Cleaner	SPMC 185	Cynergy (L-SX-94)	27674
11-065	Acetone	PMC 1914	Regent Grade, A.C.S. (Liquid) JT Baker 9006-05 (Liquid) PC0048A-3 SW420030 #1004-0911 (Presaturated Wipers) TX8346	LOCAL 0AL61 70829 1HX90 0M3C8 S0210 S0207

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 230
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
			AX0116	OAL61
NOTE: It is permissible to substitute Semiconductor grade acetone for reagent grade. Semiconductor grade is a higher purity chemical.				
11-066	Solvent Hand-wiping	PMC 8929	Bioact 105, Precision Cleaner	OWUA8
11-068	Enhancer, Electrical Contact	SPMC 205	Stabilant 22	38948
11-069	Cleaner, Alkaline Gel	SPMC 112	Ardox 1900B	D1940 K6858 02CA7 23373
11-070	Cleaner, Alkaline Gel	SPMC 159	McGean-Rohco Super Bee 262	71361
11-071	Cleaner, Alkaline Gel	SPMC 113	Mag-Chem DG Kleen	35502
11-072	Degreaser, Aqueous	SPMC 151	NU-Gear-SC	1EYE7
11-073	Degreaser, Aqueous	SPMC 195	Mirachem 500	63247
11-074	Solvent, Cleaner	SPMC 213-1	Skysol Wipe Solvent	35502 F6892
11-075	Wipe, Cleaner Solvent	SPMC 213-2	Skysol Wipe Solvent Pre-saturated Wipes	33502 F6892
11-076	Solvent, cleaner	SPMC 216-1	Lotoxane Fast	U3115 3YAK8
11-077	Wipe, Cleaner Solvent	SPMC 216-2	Lotoxane Fastwipes	U3115 3YAK8
11-078	Alcohol, Isopropyl	PMC 9016 (all dashes except -7, -11, -12) PMC 9016-7 PMC 9016-11 PMC 9016-12	Reagent Grade, or Semiconductor grade: (Liquid) SW420078 #1002-0911 (Presaturated Wipers) TX8347 PX1834	LOCAL OM3C8 S0210 S0207 OAL61
NOTE: It is permitted to substitute semiconductor grade isopropyl alcohol for reagent grade. Semiconductor grade is a higher purity chemical.				
12- STRIPPERS				

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 231
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
	None Designated			
13- PRE-TREATMENT FOR PAINTING				
	None Designated			
14- DISINFECTANTS				
	None Designated			
15- STORAGE PRESERVATION				
15-001	Dehydrating Agent (Desiccant)		MIL-D-3464 SPMC 214	LOCAL
15-002	Coating Peelable		AZ 534-2B	0A3C8
16- STRUCTURE PAINTS				
16-001	Thinner		TL-29	98502
16-002	Catalyst		Catalyst X-304	98502
16-003	Base, Gloss, Black		443-3	98502
16-004	Paint, (red color No. 11136)		MIL-PRF-85285 Type I, FED STD 595	LOCAL
17- MICROBIOLOGICAL CONTAMINATION PROTECTION				
	None Designated			
18- PRIMER				
18-001	Primer, Epoxy Polyamide			71191
18-003	Primer, Zinc Chromate (Alternate to 18-023)	TT-P-1757 AMS 3110 (Alternate to Ams 3117)		LOCAL 77672
18-007	Primer, Silicone	PWA 36086-2	Dapco No. 1-100	58093
18-009	Primer, Silicone Rubber (Red or Clear)	PWA 556	DC-1200	71984 98500
18-011	Primer, Urethane Compatible	(Deleted)		
18-012	Primer, Epoxy Resin		463-12-8	98502
18-013	Primer, Epoxy Adhesive		BR-127	07542
18-015	Primer, Epoxy (Replaced By 18-016)		Base 463-6-27; Converter X337; Thinner TL52-66	98502

EFFECTIVITY
ZT ALL

70-00-00

Page 232
Feb 01/2007

TP-80MM-ZT



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

CONSUMABLE MATERIALS INDEX				
ITEM NO.	MATERIAL DESIGNATION	SPECIFICATION NUMBER	MATERIAL MANUFACTURERS REFERENCE AND/OR SPECIFICATION	SUPPLIER CODE
18-016	Primer, Epoxy		Base 10P4-2	0KXA5
18-018	Primer, Epoxy	PWA 36515	44-GN-36 (Preferred) 44-GM-54	33461
18-020	Primer, Epoxy	PWA 36519-1 (Green) PWA 36519-2 (Black)	EEAE 152A/B Eco-prime EWAE 118A/B Eco-prime	23354 23354
18-023	Primer, Zinc Molybdate (Alternate to 18-003)	AMS 3117 (Alternate to AMS 3110)		LOCAL 77672

(4) Supplier Code Address List

NOTE: The addresses of the material manufacturers are included in alphanumeric order in the table that follows.

NOTE: All SOURCE CODES, except those in the S-series, refer to CAGE (Commercial and Government Entity) codes. The present CAGE code numbers were formerly called FSCM (Federal Supply Code for Manufacturers) and FSCNM (Federal Supply Code for Non-Manufacturers) codes. The actual five-digit codes assigned to companies as FSCMs or FSCNMs have remained the same but have been redesignated as CAGE codes. All SOURCE CODES in the S-series (that is, S0001 thru S0213) are assigned by P&W to those consumable material suppliers that have no CAGE code.

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
A0001	(Refer to LOCAL)
A0014	(Refer to 12861)
A0056	(Refer to S0029)
A0073	Speedry Products, Inc. Richmond Hill, NY (Current Address Unavailable)
A0075	(Refer to S0036)
A0285	(Refer to 98500)
A0290	(Refer to 95015)
A0292	(Refer to 97361)
B0006	(Refer to 93255)
B0007	(Refer to 71410)
B0008	Products Research & Chemical Co. Gloucester, NJ (Current Address Unavailable)

EFFECTIVITY
ZT ALL

70-00-00

TP-80MM-ZT

Page 233
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
B0009	Paul & Co. - Steinhau, Germany (Refer to S0119)
B1050	Antwerp Lion Oil Works N.V. VLAMSE KAAI 2-5 Antwerpen, Belgium
B1571	Dow Corning S.A. Parc Ind. Zone C Seneffe, Belgium
C4298	Pruftechnik Dieter Busch AG Oskar-Messter-Strasse 19 to 21 Postfach/P.O. Box 1263 D-85737 Ishmaning, Germany
D1940	Chemetall GMBH Trakehner Strasse 3 D-60487 Frankfurt am Main, Germany
EQ032	Foucault International Corp. 920 36th Court SW Vero Beach, FL 32968 USA
F6892	Socomor Finishing Technologies Zone Industrielle du Prat R. P. 3707 56037 Vannes, Cedex, France
KA832	Shell Aviation LTD Shell Centre London SE17NA, UK
K2063	Ely Chemical Co., Ltd. Lisle Lane Ely CB7 4A5, United Kingdom
K2884	(Refer to D1940)
K6858	Chemetall Plc 65 Denbigh Road Bletchley Milton Keynes, MK1 1PB, United Kingdom
LOCAL	Local Purchase
S0001	Refer to Service Bulletin SB 238
S0004	(Refer to 86874)
S0005	(Deleted)
S0006	(Refer to S9502)
S0007	(Refer to 08FS3)

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 234
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
S0008	(Refer to 0XB37)
S0025	(Refer to 1A319)
S0027	(Refer to 0GA37)
S0029	National Tape Corp. 5140 Storey Street New Orleans, LA 70123-5320 USA
S0036	Texrite Products Co. 10333 Shoemaker Street Detroit, MI 48213 USA
S0045	(Refer to 23037(D))
S0055	Mosher Co., Inc. 15 Exchange Street Chicopee, MA 01014 USA or P. O. Box 177 Chicopee, MA 01014-0177 USA
S0057	(Refer to 05972)
S0066	(Refer to B1571)
S0075	(Refer to 1TGF9)
S0076	(Refer to OJWE8)
S0077	(Refer to 35502)
S0078	(Refer to 23373)
S0083	(Refer to 1M647)
S0092	(Deleted)
S0099	TTI (Was: Tesa Tape, Inc.) 5825 Carnegie Boulevard Charlotte, NC 28209 USA
S0101	Power in Motion 16A Montesano Road Fairfield, NJ 07004 USA
S0113	(Refer to 0V0Z6)
S0117	Rhodia VSI (Was: Rhone-Poulenc Silicone VSI) 405 Jordan Road Troy, NY 12180 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 235
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
S0118	G. K. D. Kufferath & Co. P.O. Box 101155 Metallweberstrasse 46 5160 Duren, Germany
S0119	Paul GmbH & Co. P.O. Box 1228 Industriegebiet West 36396 Steinau an der Strasse, Germany
S0126	Eishin Kagaku Co., Ltd. 1-2-13, Higashi-Shinbashi Minato-Ku Tokyo, Japan-105
S0141	ECT, Inc. Bridgeport Business Park 401 East 4th St., Building 20 Bridgeport, PA 19405 USA
S0150	(Refer to 70362)
S0156	(Refer to 1ZC62)
S0163	Polyflow, Inc. 100 Pratt's Junction Road Sterling, MA 01564 USA
S0170	Turbo-K, Ltd. 31 Meadow Close London Colney AL2 1RH, England
S0171	Sefar America Inc. 333 South Highland Avenue Briarcliff Manor, N.Y. USA
S0172	G. Bopp & Company AG Bachmannweg 20 CH -8046 Zurich, Switzerland
S0176	Tyco Adhesives, A Tyco International Ltd. Co. 1400 Providence Highway Norwood, MA 02062-5044 USA
S0178	(Refer to K6858)
S0190	Gerard Daniel Worldwide - Europe Mountmahon Industrial Estate Abbeyfeale, Limerick, Ireland

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 236
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
S0202	Shurtape Technologies LLC 1506 Highland Avenue NE Hickory, NC 28601 USA
S0207	ITW Texwipe 300 B Route 17 South Mahwah, NJ 07430 USA
S0210	Telesto Industrie, LLC 3718 Highway 90 Liberty, TX 77575
S0212	Sonneborn, LLC 575 Corporate Drive Suite 415 Mahwah, NJ 07430 USA
S0213	Aviation Fluids Services, Inc. 950 Kingsland Avenue St. Louis, MO 63130 USA
S9502	Marktec Corp. 3-10, Sanno 2-Chome OHTA-KU Tokyo, Japan
U0638	(Refer to S0203)
U3115	Arrow Chemicals, Ltd. Div. of Reabrook, Ltd. Rawdon Road Moir, Swadlincote, Derbyshire, UK DE12 6DA
U4628	Airworthy, Ltd. Elsted Station Elsted, Midhurst West Sussex, GU29 0JT United Kingdom
00BB6	Indestructible Paint Inc. 66 Erna Avenue Midford, CT 06460-3115 USA
0AH54	(Deleted)
0AL61	EMD Chemicals, Inc. 480 Democrat Road Gibbstown, NJ 08027 USA
0A341	Strahl And Pitsch Inc. 230 Great E. Neck Rd. P. O. Box 1098 West Babylon, New York 11704 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 237
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
0A3C8	AZTEC Chemical Inc. 10770 Lower Azusa Road El Monte, CA 91731 USA
0A9Y2	Cantech Industries Inc. 2222 Eddie Williams Road Johnson City, TN 37601 USA
OBYN5	(Refer to 71410)
0ER09	American Marking Systems, Inc Harrisburg Stamp Company Division 2741 Paxton Street Harrisburg, PA 17111 USA
0EWP0	Garvey 871 Redna Terrace Cincinnati, OH 45215 USA
0GA37	Modern Chemical Inc. 7023 Centennial Road P. O. Box 368 Jacksonville, AR 72078 USA
0JWE8	Adchem, Inc. 369 Progress Drive, Suite 101 Manchester, CT 06040-2296 USA
0JYZ0	SCI Corporation 812 East Broadway Streator, IL 61364 USA
0KX05	Bayside Industrial Supply, Inc. 4663 Halls Mill Road P. O. Box 91566 Mobile, AL 36691 USA
0NYS9	(Refer to 23354)
0PGK2	S D B Consultants LTD 401 Whitney Avenue, Suit 120 Gretna, LA 70056-2500 USA
0V0Z6	Videojet Technologies, Inc. (Was Marconi Data Systems, Inc.) 1500 Mittel Boulevard Wood Dale, IL 60191-1073 USA
0WU71	Ecolink, Inc. (Was: Div. of Sentry Chemical Co., Inc.) 1481 Rock Mountain Blvd., Stone Mountain, GA 30083-1505 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 238
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
00BA9	Penreco, Div. of Pennzoil - Quaker State Co. 138 Petrolia Street Karns City, PA 16041-9799 USA
00046	(Deleted, Refer to 0ER09)
00741	BOC Gases (Was: Airco Industrial Gases, Div. of The BOC Group) 575 Mountain Avenue New Providence, NJ 07974-2097 USA
00768	Western Filament, Inc. 630 Hollingsworth Street Grand Junction, CO 81505 USA
01058	Michigan Chrome & Chemical Co. 8615 Grinnell St. Detroit, MI 48213-1152 USA
01139(B)	GE Silicones (Was: General Electric Co., Silicone Sales Dept.) ATTENTION: Customer Service 260 Hudson River Rd. Waterford, NY 12188 USA
012L8	Chemsol Inc. 8423 Boettner Road Bridgewater, MI 48115 USA
02CA7	Chemetall Oakite (Was: Oakite Products Inc.) 50 Valley Road Berkeley Heights, NJ 07922 USA
02SG7	Octel America, Inc. 200 Executive Dr. Newark, DE 19702 USA
02ZK3	(Refer to 1NCU0)
023V4	CRC Industries, Inc. 885 Louis Drive Box 5000 Warminster, PA 18974-0586 USA
02570	Swagelok Co. 29500 Solon Road Solon, OH 44139-3492 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 239
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
02697	Parker-Hannifin Corp. O-Ring Div. 2360 Palumbo Drive P.O. Box 11751 Lexington, KY 40512-1751 USA
03042	(Refer to 16956)
03530	American Gas & Chemical Co. Ltd. 220 Pegasus Ave. Northvale, NJ 07647-1904 USA
04457	Mark-Tex Corp. 160 West Forest Ave. Englewood, NJ 07639 USA
04552	Emerson & Cuming Specialty Polymers (Was: Grace W. R. and Co. Emerson and Cuming, Dewey and Almy Chemical Div.) 869 Washington Street Canton, MA 02021-2513 USA
04621	Hexcel Corp. 2350 Airport Fwy., Suite 550 Bedford, TX 76022-6027 USA
04622	CYTEC Engineered Materials, Inc. (Was: BASF Corp.) 1440 N. Kraemer Blvd. Anaheim, CA 92806 USA
04963	3M Company, Tape And Specialties Div. 3M Center, Bldg. 220-7E-01 St. Paul, MN 55144-1000 USA
05045	The BG Service Co., Inc. 1400 Alabama Avenue - Suite 15 P. O. Box 2259 West Palm Beach, FL 33401 USA
05160	(Refer to S0190)
05867	Fine Organics Corp. 205 Main St. P.O. Box 687 Lodi, NJ 07644-0687 USA
05972	Henkel Loctite Corp. (Was: Loctite Corp.; Permatex Industrial Div. Of Loctite North America Group; and, Loctite VSI, Inc.) 1001 Trout Brook Crossing Rocky Hill, CT 06067-3582 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 240
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
06565	Norton Co., (for domestic orders) Coated Abrasive Div. Tenth Avenue & 25th Street Watervliet, NY 12189 USA
07098	Praxair - Industrial Gases (Was: Union Carbide Corp., Linde Div.) 175 E. Park Drive P. O. Box 44 Tonawanda, NY 14151-0044 USA
07099	Flexfab Molded Products (Was: Moxness Molded Products; and, Moxness Products, Inc.) 2030 Young Street East Troy, WI 53120 USA
07314	Fiberite Corp. - Winona, MN (Obsolete)
07512	Saint-Gobain Performance Plastics 150 Dey Road Wayne, NJ 07470 USA
07542	CYTEC Engineering Materials (Was: CYTEC Fiberite, Inc.; and, American Cyanamide Co., Industrial Chemical and Plastics Div./Bloomington Dept.) 1300 Revolution Street Havre De Grace, MD 21078-3800 USA
07950	Anderol, Inc. (Was: Royal Lubricants Co., Inc.) 215 Merry Lane P. O. Box 518 E. Hanover, NJ 07936-0518 USA
08FS3	Vulcan Chemical Technologies (Was: Vulcan Chemicals, Div. of Vulcan Materials Co.) 1200 Urban Center Drive Birmingham, AL 35242 USA
09785	AGA Gas, Inc. 3300 Lakeside Ave. Cleveland, OH 44114-3751 USA
1A053	AAA Aircraft Supply Co. 36 Suffield Street P. O. Box 411 Windsor Locks, CT 06096-1320 USA
1CXA3	Sefar America Inc. 111 Calumet Street Depew, New York 14043-3734 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 241
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
1DWR5	Advanced Chemistry & Technology, Inc. 7341 Anaconda Avenue Garden Grove, CA 92841-2921 USA
1EYE7	Nuvite Chemical Compounds 213 Freeman Street Brooklyn, NY 11222-1404 USA
1HX90	Brand-Nu Laboratories Inc. 377 Research Parkway Meriden, CT 06450-7155
1KGE8	Fisher Scientific Company Global Exports 3970 Johns Creek Court, Suite 500 Suwanee, GA 30024-1297 USA
1KU10	Cytec Engineered Materials Inc. 1300 Revolution Street Havre De Grace, MD 21078-3800 USA
1ML15	Octel Starreon, LLC 8375 S. Willow Street - 5th Floor Littleton, CO 80124 USA
1M647	Fuchs Lubricants Co. 281 Silver Sands Road P. O. Box 328 East Haven, CT 06512-4140 USA
1NCU0	Zokman Products, Inc. 1220 E. Gump Road Fort Wayne, IN 46845-9794 USA
1PWD8	Exxon Mobil Corp. 3225 Gallows Road - Room 4W917 Fairfax, VA 22037 USA
1TGF9	Ohio Industrial Lubricants, Inc. 250 Mahoning Avenue Cleveland, OH 44113 USA
1UGB2	Air BP Lubricants Division of BP Products North America Inc. Parsippany, NJ 07054-4406 USA
1VJW7	Intertape Polymer Management Corp. 3647 Cortez Road West Bradenton, FL 34210-3169 USA
1V074	Sulflo, Inc. 1158 Erie Avenue North Tonawanda, NY 14120-3507 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 242
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
1XNT8	D Aircraft Products 1191 N. Hawk Circle Anaheim, CA 92807 USA
1ZC62	Valco Cincinnati, Inc. (Was: W. Canning, Inc.) 411 Circle Freeway Drive Cincinnati, OH 45246 USA
10009	RM Engineered Products, Inc. N. Charleston, SC (Current Address Unavailable)
11770	(Refer to 8F024)
11851	Daniels Manufacturing Corp. 526 Thorpe Road Orlando, FL 32824-8133 USA
12474	Bel-Ray Co., Inc. 1201 Bowan Avenue Wall, NJ 07719 USA
12861	Intertape Polymer Group, Inc. (Was: Armak Co., Tape Div.) 317 Kendall Avenue Marysville, MI 48040-1911 USA
13868	Kano Laboratories, Inc. 1000 Thompson Lane Nashville, TN 37211-4101 USA
15653	Fairchild Fasteners - Fullerton Operations (Was: Kaynar Manufacturing Co.) 800 S. State College Blvd. Fullerton, CA 92831-3004 USA
16193	(Obsolete)
16837	Miracle Power Products Corp. 1101 Belt Line Street Cleveland, OH 44109-2849 USA
16956	Avery Dennison (For Orders) (Was: Dennison Mfg. Co., Identification Systems Div.) 50 Pointe Drive Brea, CA 92821-3699 USA
17125	(Deleted)
17209	(Deleted)

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 243
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
17534	Alconox Inc. (Was: Standard Scientific Supply Co.) 30 Glenn Street Suite 309 White Plains, NY 10603 USA
17699	Weiler Brush Co. 1 Wildwood Drive RD 1 P.O. Box 149 Cresco, PA 18326 USA
18034	(Refer to 02570)
18598	Miller-Stephenson Chemical Co. Inc. 55 Backus Ave. Danbury, CT 06813 USA
18873	E. I. duPont de Nemours and Co., Inc. 1007 Market St. P. O. Box 1635 Wilmington, DE 19899 USA
19135	Mobil Oil Co. Interstate 10 P. O. Box 3311 Beaumont, TX 77704 USA
19354	Daniel Gerard & Co., Ltd. 5 Plain Avenue New Rochelle, NY 10801-2204 USA
2A851	John R. Lyman Co. 60 Depot Street Chicopee, MA 01013-1251 USA
2B975	Hexcel Corp. 1913 N. King Street Seguin, TX 78155-2115 USA
2G152	(Deleted)
2M749	SKF Industries, Inc. Bearing Group 1100 1st Avenue King of Prussia, PA 19406 USA
2R128	Castrol Industrial Americas (Was: Castrol Industrial North America Div. of Endurance Technology) 1001 West 31st Street Downers Grove, IL 60515-5509 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 244
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
20696	Maryland Brush Co. 3221 Frederick Avenue Baltimore, MD 21229-3807 USA
21361	B & B Tritech, Inc. (Was: B & B Chemical Co., Inc.) 875 West 20th Street Hialeah, FL 33010-2310 USA
21405	Sherwin Inc. 5530 Borwick Ave. South Gate, CA 90280-7402 USA
22527	Fisher Scientific Co. 2000 Park Lane Pittsburgh, PA 15275 USA
22873	(Refer to 23354)
23037(A)	E. I. duPont de Nemours Co., Inc. Chemical And Pigments Dept. 1007 Market St. Wilmington, DE 19898 USA
23037(D)	E. I. duPont de Nemours Co., Inc. Fabrics & Finishes Dept. 1007 Market St. Wilmington, DE 19898 USA
23354	PRC-Desoto International, Inc. A PPG Industries Company 823 East Gate Drive Mount Laurel, NJ 08054 USA
23373	Chemetall Oakite 16961 Knott Avenue La Mirada, CA 90638-6015 USA
24269	Schaefer Machine Co., Inc. 200 Commercial Drive Deep River, CT 06417 USA
26066	Minnesota Mining & Mfg. Co., Industrial Tape Div. (Obsolete. Refer to 04963)
27674	ZEP Aviation A Unit of the ZEP Group 1310 Seaboard Industrial Boulevard Atlantic, GA 30318 USA
27732	Ensign Products Co., Inc. 3528 East 76th Street Cleveland, OH 44105-1510 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 245
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
28112	Minnesota Mining and Mfg. Co., Performance Materials Div. (Was: Performance Chemicals and Fluid; and, Industrial Chemical Products Div.) 3M Center Building 223-06-S-04 St. Paul, MN 55144-0001 USA
28139	(Refer to 92469)
28506	(Refer to 00741)
29700	(Refer to 1PWD8)
3A487	(Refer to 97361)
3DYZ1	Crompton Corp. (Was: Witco/A Crompton Business) 1 American Lane Greenwich, CT 06831 USA
3F773	Cabot Corp. Cab-O-Sil Div. 700 East U.S. Highway 36 Tuscola, IL 61953 USA
3EU06	Intertape Polymer Group Inc. DBA American Tape 317 Kendall Avenue Marysville, MI 48040-1911 USA
3FBZ6	Hexion Specialty Chemicals, Inc. Division of Epoxy & Phenolic Resins 1600 Smith Street, Floor 24 Houston, TX 77002-7362 USA
3TYN6	CS Hyde Company, Inc. 1351 N Milwaukee Avenue Lake Villa, Illinois 60046 USA
3YAK8	Atlenco, Inc. No. 2 Bomar Street Inman, SC 29349 USA
30479	Van Straaten Chemical Co. 149 Grant St. P.O. Box 227 North Aurora, IL 60542-1603 USA
30530	Safety-Kleen Corp. 1301 Gervais Street - Suite 300 Columbia, SC 29201 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 246
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
30676	Lord Corp., Chemical Products Div. 2000 W. Grandview Boulevard Erie, PA 16514-0038 USA
32988	(Refer to S0163)
33461	Deft, Inc. 17451 Von Karmen Avenue Irvine, CA 92614 USA
33564	Henkel Loctite Corp. (Was: Dexter Corp. Dexter Adhesive & Coating Systems) P. O. Box 312 2850 Willow Pass Road Bay Point, CA 94565-0031 USA
33629	The Kindt-Collins Co. 12651 Elmwood Ave. Cleveland, OH 44111-5911 USA
33629	Kindt-Collins Co. 12651 Elmwood Ave. Cleveland, OH 44111-5911 USA
33684	Stanley Home Products, Inc. Industrial Div. 116 Pleasant St. East Hampton, MA 01027-1118 USA
34227	Sandstrom Products Co. 224 South Main St. Port Byron, IL 61275 USA
34568	Tiodize Co., Inc. 5858 Engineer Drive Huntington Beach, CA 92649 USA
34897	Ashland Chemical Co., A Div. of Ashland Oil, Inc. P. O. Box 2219 Columbus, OH 43216-2219 USA
35502	Magnus Chemicals, Ltd. (Was: Mag-Chem, Inc.) 1271 Ampere Boucherville, Quebec, Canada J4B 5Z5
36023	(Refer to 19354)
36346	Praxair - Industrial Gases (Was: Union Carbide Corp., Linde Div.) Old Ridgebury Road Danbury, CT 06817 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 247
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
37676	Magnaflux Corp., Div. of Illinois Tool Works, Inc. 3624 W. Lake Avenue Glenview, IL 60025 USA
37995	Burmah-Castrol Canada Ltd. 3660 Lakeshore Boulevard W. Toronto, Ontario, Canada M8W 1P2
38XJ0	Tesa Tape, Inc. 5825 Carnegie Boulevard Charlotte, NC 28209 USA
38597	Lockheed Martin Corp. (Was: Martin Marietta Corp. Aero And Naval Systems) 2323 Eastern Boulevard E-5 Baltimore, MD 21220-4207 USA
38948	D. W. Electrochemicals, Ltd. 3-97 Newkirk Road (North), Richmond Hill, Ontario L4C 3G4 Canada
39428	McMaster-Carr Supply Co. 600 County Line Road Elmhurst, IL 60126-2034 USA
4G117	BGF Industries, Inc. 401 Amherst Avenue P. O. Box 592 Altavista, VA 24517 USA
4N020	CCP Industries, Inc. (Was: Cleveland Cotton Products Co.) 670 Alpha Drive Highland Heights, OH 44143 USA
44197	Saint-Gobain Abrasives, Inc. (Was: Saint-Gobain/Norton Industrial Ceramics Corp.; and, Norton Co.) 1 New Bond Street P. O. Box 15137 Worcester, MA 01615-0137 USA
44926	Olympic Glove and Safety Company 75 Main Avenue Elmwood Park, NJ 07407 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 248
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
45255	Owens-Corning Fiberglas Corp. Fiberglas Tower - T/11 One Owens Corning Parkway Toledo, OH 43659-0001 USA
45681	Parker Hannifin Corp. 6035 Parkland Boulevard Mayfield Heights, OH 44124 USA
47695	PPG Industries, Inc. Chemical Group One PPG Place Pittsburgh, PA 15272-0001 USA
5D028	Dow Corning Corp. 3901 South Saginaw Road Midland, MI 48640 USA
5R603	Merco Company 205 Lee Place Hackensack, NJ 07601-3304 USA
5Y661	Shurtape Technologies, Inc. (Was: Shuford Mills, Inc. Tape Div.) 1620 Highland Avenue P. O. Box 1530 Hickory, NC 28603-1530 USA
52152	Minnesota Mining And Mfg. Co., Industrial Tape And Specialties Div. 3M Center St. Paul, MN 55144-1000 USA
53100	Lockheed Martin Space Systems Co. - Michoud Operations (Was: Lockheed Martin Corp.; and, Martin Marietta Corp.) 13800 Old Gentilly Road - MS 2300 P. O. Box 29304 New Orleans, LA 70129-2218 USA
53912	Airtech International, Inc. 5700 Skylab Road Huntington Beach, CA 92647-2055 USA
54527	Shell Oil Company 1 Shell Plaza P. O. Box 2463 Houston, TX 77001 USA
54636	The Sherwin-Williams Co., Krylon Products Group 101 Prospect Street Cleveland, OH 44115 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 249
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
54916	Radiac Abrasives, Inc. 1015 South College Avenue Salem, IL 62881-2428 USA
56385	Ultrachem 900 Centerpoint Boulevard Newcastle, DE 19720 USA
56883	Penetone Corp. 74 Hudson Avenue Tenafly, NJ 07670 USA
57635	(Refer to 1PWD8)
58093	(Refer to 1XNT8)
58401	U.S. Welding 3579 Highway 50 East Carson City, NV 89701 USA
58595	Pilot Corp. of America 60 Commerce Drive Trumbull, CT 06611 USA
58913	Sermatech International, Inc. 155 S. Limerick Road Limerick, PA 19468-1699 USA
6A670	3M, ITSD Aerospace (Was: Adhesives, Coatings & Sealers Div.) 3211 E. Chestnut Expressway P. O. Box 300 M Springfield, MO 65802-2548 USA
60218	Graphite Products Corp. 5756 Sharon-Warren Road P. O. Box 207 Brookfield, OH 44403-9507 USA
60890	Dewal Industries, Inc. 15 Ray Trainor Drive P. O. Box 372 Saunderstown, RI 02874 USA
61637	Danbury Union Carbide Corp. 39 Old Ridgebury Road Danbury, CT 06817-0001 USA
62758	(Refer to 23354)
63247	Mirachem Corp. 4645 McDowell Road - Unit 103 Phoenix, AZ 85035 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 250
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
64220	Ruger Chemical Co., Inc. 83 Cordier Street Irvington, NJ 07111-4035 USA
65483	Deleted, (Current address not available)
66442	Richmond Aircraft Products 13503 Pumice Street Norwalk, CA 90650 USA
66724	LPS Laboratories, Inc. 4647 Hugh Howell Road Tucker, GA 30085-5052 USA
70079	Acheson Colloids Co., Div. of Acheson Industries, Inc. 1600 Washington Avenue P. O. Box 611747 Port Huron, MI 48061-1747 USA
70362	Dixon Ticonderoga Co. (World Headquarters) 195 International Parkway Heathrow, FL 32746 USA
70752	Bay State/Sterling, Inc. (Was: Tyrolit North America, Inc.; and, Abrasive Industries, Inc. Bay State Abrasives Div.) 12 Union Street Westborough, MA 01581-1427 USA
70829	Mallinckrodt Baker Inc. 222 Red School Lane Phillipsburg, NJ 08865-2219 USA
70958	Bergen Cable Technologies, Inc. 343 Kaplan Drive Fairfield, NJ 07004 USA
71191	Kop-Coat, Inc. 5431 District Boulevard Los Angeles, CA 90040 USA
71361	McGean, Cee-Bee Aviation Products (Was: McGean-Rohco, Inc. Cee-Bee Chemical Div.) 2910 Harvard Avenue Cleveland, OH 44105 USA
71410	Henkel Aerospace Div. of Henkel Technologies, Surface Treatments 32100 Stephenson Highway Madison Heights, MI 48071 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 251
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
71643	Saint-Gobain Performance Plastics, Inc. (Was: CHR Industries, Inc. An Armco Co.) 407 East St. New Haven, CT 06511 USA
71984	Dow Corning Corp. 2200 W. Salzburg Road Auburn, MI 48611 USA
72008	(Deleted)
73165	(Refer to 05972)
73168	Kidde - Fenwal (Was: Fenwal, Inc. Div. of Kidde, Inc.) 400 Main Street Ashland, MA 01721-2150 USA
73219	Fiske Brothers Refining Co. 129 Lockwood St. Newark, NJ 07105-4720 USA
73277	Houghton International, Inc. (Was: E. F. Houghton & Co.) P.O. Box 930 Madison & VanBuren Ave. Valley Forge, PA 19482 USA
74230	FMI Paint & Chemicals (Was: FMI Chemical Corp.) 158 Hartford Rd. Manchester, CT 06040 USA
74291	Solo-Horton Brushes, Inc. 122 Summer Street Torrington, CT 06780 USA
75273	Witco Chemical Corp. Kendall/Amalie Motor Oil (Was: Kendall Refining Co. Div. of WITCO Chemical Co.) 77 N. Kendall Avenue P. O. Box 2000 Bradford, PA 16701-1726 USA
75364	(Deleted. Only sells to distributors. Refer to local art supply for source.)
75554	Jacksonlea Division of Jason, Inc. (Was: Lea Manufacturing Co.) 121 Mattatuck Heights Waterbury, CT 06705-3832 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 252
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
75668	Sherwin-Williams Co. 2390 Arbor Boulevard Dayton, OH 45439 USA
75957	LUDECA Inc. 1527 NW 89th Street Miami, FL 33172 USA
76071	MacDermid, Inc. 245 Freight Street Waterbury, CT 06702-1802 USA
76381	3M Company 3M Center - Building 225-3S-20 St. Paul, MN 55144-1000 USA
76541	Monsanto Co. 800 N. Lindbergh Blvd. St. Louis, MO 63167 USA
77163	(Refer to 1V074)
77359	(Refer to 75668)
77445	United Technologies Corp. Pratt & Whitney Large Comercial Engines, Spare Parts Sales 400 Main Street East Hartford, CT 06108-0969 USA
77490	Quaker Chemical Corp. One Quaker Park 901 Hector Street Conshohocken, PA 19428-0809 USA
77672	Randolph Products Co. Inc. 33 Haynes Circle Chicopee, MA 01020 USA
77988	(Deleted)
78369	(Refer to 3DYZ1)
78520	Stanchem Inc. 401 Berlin St. East Berlin, CT 06023 USA
8E913	Zip-Chem Products 408 Pickering Drive Pinkerington, OH 43147-1367 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 253
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
8F024	Everlube Products, (Was: E/M Co.) Div. of Morgan Advanced Ceramics 100 Cooper Circle Peachtree City, GA 30269-3025 USA
8S927	(Refer to 0WU71)
80769	Polyken Technologies, A Div. of The Kendall Co. (Was: The Kendall Co., Polyken Div.) 15 Hampshire Street Mansfield, MA 02048 USA
80798	(Refer to 3F733)
80861	International Paper Co. One Penn Plaza - Suite 2814 New York, NY 10119 USA
82110	Gudebrod, Inc. 274 Shoemaker Road Pottstown, PA 19464 USA
82726	(Deleted)
83309	Electrical Specialty Co. - South San Francisco, CA (Current Address Unavailable)
83334	Tuck Industries, Inc. - New Rochelle, NY (Current Address Unavailable)
84063	(Refer to 71410)
84163	Borden, Inc. Chemical Div. 180 East Broad Street Columbus, OH 43215-3705 USA
85419	Binney and Smith, Inc. 1100 Church Lane P.O. Box 431 Easton, PA 18042-9010 USA
85570	(Refer to 23354)
86297	Cratex Manufacturing Co., Inc. 328 Encinitas Blvd. - Suite 20 Encinitas, CA 92024 USA
86459	(Refer to 00BA9)

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 254
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
86460	Elf Atochem North America, Inc. 2000 Market Street Philadelphia, PA 19103-3222 USA
86874	Sanford Corp. 2711 Washington Boulevard Bellwood, IL 60104 USA
86938	Selig Industries 1420 Seaboard Industrial Atlanta, GA 30318 USA
87187	(Refer to 84163)
88597	Volger's Ink Manufacturers (Out of Business)
89524	Ondeo Nalco Co. 1 Ondeo Nalco Center Naperville, IL 60563-1198 USA
9X057	Technical Laminations & Coatings (Was: Custom Tapes, Inc.) 7125 Gunnison Street Harwood Heights, IL 60656-3830 USA
91342	AKZO Nobel Aerospace Coatings, Inc. (Was: Dexter Specialty Coatings) 1 E. Water Street Waukegan, IL 60085-5652 USA
92469	Unilever Home Products & Personal Care Was: Chesebrough-Ponds, Inc.) 33 Benedict Pl. Greenwich, CT 06830-5339 USA
94129	Brookfield Wire Co. Route 9 - P. O. Box 248 Brookfield, MA 01506 USA
94480	(Deleted. Refer to 1KGE8)
94548	Chevron Chemical Co. Agriculture Chemical Div. 575 Market St. San Francisco, CA 94119 USA
94853	The Hubbard-Hall Chemical Co. 563 South Leonard Street P. O. Box 790 Waterbury, CT 06708 USA
95015	Marvel Oil Co., Inc. 331-337 N. Main Street Port Chester, NY 10573-3305 USA

EFFECTIVITY
ZT ALL

70-00-00

TP-80MM-ZT

Page 255
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
95643	(Deleted)
96717	Dow Chemical Co. 2030 Willard H. Dow Center Midland, MI 48674-0001 USA
97361	Unisource & Alco Standard Co. (Was: Chatfield Paper Co.) 21 Dodge Ave. North Haven, CT 06473 USA OR (Was: Rourke-Eno Paper Co.) 100 Helmsford Way Windsor, CT 06095-0740 USA
97460	(Refer to 23354)
97854	(Deleted)
98079	CVC Products, Inc. 525 Lee Road Rochester, NY 14606-4236 USA
98148	ITW Dykem/Dymon (Was: Dykem Co.) 805 East Old 56 Highway Olathe, KS 66061 USA
98500	AGC Inc. 106 Evansville Ave. Meriden, CT 06450-5135 USA
98502	Akzo Coatings Inc. Aerospace Finishes Div. 434 W. Meats St. Orange, CA 92665 USA
98733	Met-L-Chek Co. 1639 Euclid Street Santa Monica, CA 90404-3723 USA
99251	Bendix Corp., Instrument and Life Support Div. 2734 Hickory Grove Road P. O. Box 4508 Davenport, IA 52808 USA
99384	Huntsman Advanced Materials Americas, Inc. (Was: Vantico, Inc.) 5121 San Fernando Road West Los Angeles, CA 90039-1071 USA

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 256
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SUPPLIER LOCATION	
SUPPLIER CODE	NAME/ADDRESS
99742	Permacel Nitto Denko Co. (Was: Permacel, Div. Of Nitto Denko America; and, Permacel, Div. of Johnson & Johnson) U. S. Highway 1 P. O. Box 671 New Brunswick, NJ 08903 USA
99891	Products Research and Chemical Corp. 5430 San Fernando Rd. Glendale, CA 91203 USA

3. Standard Torques

- A. Use standard torque values in locations where no specific torque is given in the test or clearance charts (Fits and Clearances sections).
- B. The torque limits listed in this section shall be interpreted as follows:
 - (1) Torque values in pound-inches.
 - (2) Angles of turn in degrees.
 - (3) Stretch values in inches.
- C. Unless otherwise specified, thread lubricants shall be applied to parts which are to be torqued. Thread lubricants shall be engine oil, or equivalent, or specific antiseize compound.
- D. In order to facilitate subsequent disassembly, apply antiseize/ antigalling compound (Fel-Pro C-200 or C-300) to all threaded parts in hot section of engine, except on silver plated threaded parts, fuel fittings, and locations where another compound is specified.
- E. If part to be tightened is hot, allow sufficient time to elapse to allow temperature of part to reach a temperature equilibrium with surrounding area before final torquing.
- F. Flange bolts shall be drawn up evenly by having two mechanics working simultaneously 180 degrees apart.
- G. Torque applications should be done slowly and evenly for consistency and best possible accuracy. There may be instances where other than specific torque limits are used and where it is obvious that standard torque required should not be used due to the kind of material or design of engine part involved. Common sense and good judgment should of course be exercised in such cases.

4. Torque Indicating Devices

- A. Check torque indicating devices daily and calibrate by means of weights and a measured lever arm to make sure that there are no inaccuracies. Checking one torque wrench against another is not sufficient. Some wrenches are quite sensitive to the way they are supported during tightening operation, and every effort must be made to adhere to instructions furnished by respective manufacturers.
- B. Torque Wrench and Extensions
 - (1) Occasionally, it is necessary to use a special extension, or adapter wrench together with a standard torque wrench. (Figure 201)
 - (2) Example: A torque of 1440 lb-in. is desired on a part, using special extension having a length of three inches from center to center of its holes, and a torque wrench, measuring 15 inches from center of handle or handle swivel pin to center of its square adapter.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 257
Feb 01/2007



MD-80 AIRCRAFT MAINTENANCE MANUAL

$$\text{THEN:} \quad R = \frac{LT}{L + E} = \frac{15 \times 1440}{15 + 3} = 1200$$

With axis of extension or adapter and torque wrench in a straight line, tightening to wrench reading of 1200 lb-in. will provide the desired torque of 1440 lb-in. on the part.

NOTE: Effective length of P&WA special extensions, adapters, and wrenches is stamped on tool.

EFFECTIVITY
ZT ALL

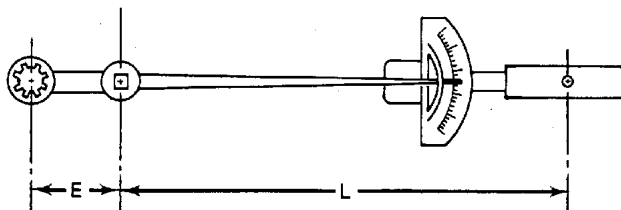
TP-80MM-ZT

70-00-00

Page 258
Feb 01/2007

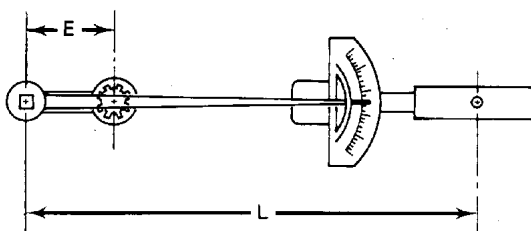
MD-80

AIRCRAFT MAINTENANCE MANUAL



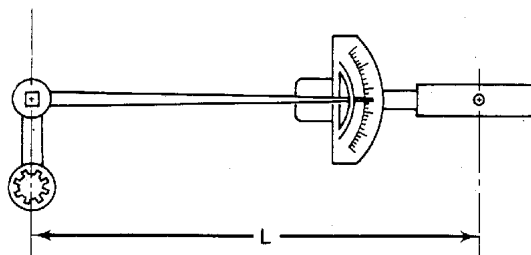
A CORRECTION OF THE INDICATED TORQUE READING IS REQUIRED WHEN AN ADAPTER IS USED, WHICH CHANGES THE EFFECTIVE LENGTH OF A TORQUE WRENCH. APPLY FOLLOWING FORMULA TO OBTAIN THE CORRECTED TORQUE READING.

$$R = \frac{L \times T}{L + E}$$



A CORRECTION OF THE INDICATED TORQUE READING IS REQUIRED WHEN AN ADAPTER IS USED, WHICH CHANGES THE EFFECTIVE LENGTH OF A TORQUE WRENCH. APPLY FOLLOWING FORMULA TO OBTAIN THE CORRECTED TORQUE READING.

$$R = \frac{L \times T}{L - E}$$



A CORRECTED TORQUE READING IS NOT REQUIRED WHEN AN ADAPTER IS USED WHICH DOES NOT CHANGE THE EFFECTIVE LENGTH OF THE TORQUE WRENCH.

LEGEND

T = DESIRED TORQUE
E = EFFECTIVE LENGTH OF EXTENSION OR ADAPTER
L = EFFECTIVE LENGTH OF TORQUE WRENCH
R = CORRECTED TORQUE READING

NOTES

- (1) DO NOT USE A HANDLE EXTENSION ON ANY TORQUE WRENCH.
- (2) EFFECTIVE LENGTH OF PWA SPECIAL EXTENSIONS, ADAPTERS, AND WRENCHES IS STAMPED ON TOOL.

L-47816
4-75

B8B2-70-1

Torque Wrench and Extension
Figure 201/70-00-00-990-801

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 259
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

5. General Torque Recommendations

A. Lubricants and Lubrication

(1) Oil Lubricated Parts

- (a) Torque limits given in this section for oil lubricated parts apply specifically to the use of engine oil, or equivalent, on the parts.

(2) Antiseize Lubricated Parts

- (a) Torque limits given in this section for antiseize coated parts apply specifically to the use of antiseize compounds applied per SPOP 146, 156, 160, or 161, or to wet applications of Fel-Pro C-200 and C-300 or to Kaylube 3.

B. Standard Nuts, Bolts, and Screws

- (1) Torque values listed in Figure 202 for nuts, bolts, and screws have been established to provide sufficient preload without overstressing parts and are based on materials having minimum ultimate tensile strengths of 125,000 pounds per square inch, equivalent to Rockwell C26 hardness for steel parts.

NOTE: These torque values do not apply to hollow bolts or screws. Torque value specified apply to bolts in helical coil inserts as long as full thread engagement of the insert is accomplished.

- (2) Torque values in Figure 202 shall apply to nuts where height of nut is greater than 75 percent of major diameter of thread. For thin nuts, where height of nut is 40 percent to 75 percent of size of major diameter, reduce torque values 50 percent. Slots in slotted nuts should be disregarded figuring height of nuts. Values do not apply to hollow bolts and screws.
- (3) After castle nut, screw, or bolt has been tightened to proper torque, it should not be loosened to permit insertion of lockwire or cotter pin. If slot in nut or lockwire hole in bolt or screw is not properly aligned at minimum torque limit, nut, screw or bolt should be further tightened to next aligning position, but maximum torque limit must not be exceeded. If alignment cannot be accomplished without exceeding maximum limit, back off nut, screw or bolt, half turn, then retighten. Occasionally it may be necessary to select a new part.

C. Self-Locking Nuts

(1) Free Spinning Locknuts

- (a) Free spinning locknuts are nuts that spin freely on bolt or stud until it contacts mating surface with activation of the locking feature produced with additional torque. Use torque values listed in Figure 202.

(2) Prevailing Torque Type Locknuts

- (a) Prevailing torque type locknuts are nuts that spin freely on a bolt or stud until threads enter locking position of nut. At this point bolt interferes with deformed section of nut causing tight frictional hold on bolt thread flanks. Use torque values listed in Figure 203 except when nut is on stud, then use Figure 202.

NOTE: Helical coil self-locking inserts are categorized as prevailing torque type locknuts. The torques for bolts used in such inserts are listed in Figure 203.

- (b) Effective locking of slotted steel locknuts on bolts or studs requires full engagement of all locknut threads. It is not necessary for bolt or stud to protrude beyond outer end of locknuts because chamfered part of locknut ID does not exceed locking force on bolt or stud.

D. Steel Pipe Plugs in Aluminum and Magnesium Cases

- (1) Do not tighten a pipe plug beyond the limits given in Figure 204 if it is found to leak and antiseize white lead base sealing compound has been applied. Remove plug and apply more sealing compound to thread; then reinstall and retighten to desired limits.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 260
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

(2) Torque limits shall be reduced about 20 percent when installing steel plugs in a hot engine.

E. PWA Flexible Fittings and Sealastic Type Fittings (Figure 205) (Figure 206)

NOTE: For identification purposes, the material composition and part number of each packing is marked on the packing package. Unless otherwise indicated, it is the current design practice to specify using AMS 7260 synthetic rubber, 70-80 durometer A, packings for fuel seals, and PWA 401 fluorocarbon rubber, 70-77 durometer C (95-100 durometer A), for oil, air, or water seals. The maximum allowable temperature exposure for this latter material is 450°F (232°C).

(1) When assembling flexible fittings, the packing and fitting threads must be lubricated with a light film of engine oil, PMC 9609 Petrolatum or PWA 36500 Assembly Fluid. The packing must be bottomed and tube aligned before applying torque listed in Figure 206.

NOTE: It is expected that these flexible tube connections will experience loss of torque over a period of time due to seating of rubber in mating parts. To minimize this condition, parts should be torqued to the listed value, then loosened, and torqued again to the listed value.

It is optional to use petrolatum as a replacement for PWA 36500 Assembly Fluid, but it is better to use the assembly fluid. Use petrolatum only if assembly fluid is not available.

F. Conical Seat Connectors (Figure 207)

- (1) Refer to Figure 209 for torque values for 37 degrees conical seat connectors without gaskets.
- (2) Refer to Figure 208 for torque values for 37 degrees conical seat connectors with nickel gaskets.
- (3) Do not attempt to correct leakage at the point by over-torquing. Disassemble fitting and check for nicks, burrs, or foreign matter. Use new parts if necessary.

G. Jamnuts (Figure 207) (Figure 210)

(1) The torques listed in Figure 211 are to be used for all steel and aluminum jamnuts (locknuts) of the type used on fittings for tube and hose connections.

NOTE: Refer to paragraphs Paragraph 5.L. or Paragraph 5.M. for procedure for recutting 37 degree conical seats on male or female tube connectors.

(2) On elbow type fittings, the jamnut must be torqued after the connecting tube or hose has been installed and properly aligned.

NOTE: The thread sizes shall be used for determining torque rather than the listed tubing sizes.

H. Installation of Crush Type, Asbestos Filled Gaskets

WARNING: ASBESTOS IS AN AGENT THAT IS CARCINOGENIC. MAKE SURE ALL PERSONS OBEY ALL OF THE PRECAUTIONS WHEN ASBESTOS IS USED.

- DO NOT GET ASBESTOS IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE ASBESTOS CONTAMINATION MATERIAL.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 261
Feb 01/2007



MD-80 AIRCRAFT MAINTENANCE MANUAL

(WARNING PRECEDES)

WARNING: REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR:

- MORE PRECAUTIONARY DATA
- APPROVED SAFETY EQUIPMENT
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

- (1) Install all crush type gaskets except the self-centering type, with the unbroken surface against the flange of the plug or part being tightened against the seal. Turn mating part until sealing surfaces are in contact and tighten to the angle of turn shown in Figure 212 for the appropriate thread pitch.

I. Hex-Head Straight Threaded Flange Plugs (MS9015, MS9193, or Similar)

CAUTION: EXCESSIVE TIGHTENING WILL RESULT IN DAMAGE TO THREADS OF MATING PARTS.

- (1) The torques in Figure 213 are based on strength of thread in cast aluminum or magnesium; they may also be used in stronger materials.

J. Installing and/or Attaching the Various Components of Ignition System and Thermocouple Systems (Figure 214)

- (1) Torque all plug-in type threaded connections finger-tight plus a 45° maximum turn.
- (2) Torque spark igniter plugs 300 - 360 lb-in.

CAUTION: INSUFFICIENT TORQUE ON IGNITION SYSTEM HIGH TENSION LEAD NUTS AT IGNITION EXCITER AND/OR IGNITER PLUG END CAN CAUSE IGNITION-RADIATED NOISE IN AIRCRAFT RADIO EQUIPMENT.

- (3) All cigarette-type electrical connections (intermediate voltage leads and high tension leads) should be torqued until connection is bottomed on its shoulder. This normally takes approximately 140 - 160 lb-in. of torque. (Figure 214).
- (4) All exhaust temperature probe terminal attaching nuts and thermocouple harness-to-lead attaching screws shall be torqued per Figure 215.
- (5) In the exhaust gas temperature junction box, all harness terminal and bus bar attaching nuts shall be torqued per Figure 216.

K. Torque Check for Reuse of Self-Locking Fasteners

- (1) Check self-locking nuts for adequate torque before reuse. Discard nut if locking capability is impaired. Do not attempt repair.
- (2) Torque Limits
 - (a) Self-locking nuts, bolts and helical coil inserts shall be capable of meeting torque requirements in Figure 217.

NOTE: Minimum break-away torque: minimum torque required to turn unseated nut or bolt initially in self-locking fastener shall not be less than value given in Figure 217.

Maximum break-away torque: torque required to turn unseated nut or bolt continually in self-locking fastener shall not exceed value given in Figure 217.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 262
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

- (b) For torque testing stainless steel, corrosion and heat resistant steel, nickel alloy steel, and AMS 6304 nuts, major, minor, and pitch diameters of bolts should be reduced 0.003 inch below dimensions specified for listed 0.190-32 UNF-3A, 0.190-24 UNC-3A and larger bolt sizes.
- (3) Unplated Nuts
 - (a) Unplated stainless steel, corrosion resistant steel, nickel alloy steel, and AMS 6304 steel nuts that have threads undercut for plating at assembly, shall be silver plated 0.0003 - 0.0006 inch thick for test purposes, and check for requirements of unplated bolts threaded per Figure 217.
 - (b) Unplated stainless steel, corrosion-resistant steel, nickel alloy steel, and AMS 6304 steel nuts that are permanently attached to brackets as other similar parts, and that are not subsequently plated at assembly, shall be checked for requirements of Figure 217 with bolts that are plated 0.0003 - 0.0006 inch thick. Plated bolts 0.190 inch in diameter and larger shall have threads reduced 0.0003 from class 3A limits on major, minor, and pitch diameters. Bolts smaller than 0.190 inch in diameter shall have class 2A tolerances.
 - (c) Unplated carbon or alloy steel nuts shall be cadmium plated 0.0002 - 0.0005 inch thick and checked with cadmium plated bolts threaded per Figure 217.
 - (d) Unplated aluminum nuts shall be checked with cadmium plated bolts threaded per Figure 217.
- L. Tube Connector Male Conical Seat Repair (Figure 218)
 - (1) Check
 - (a) Install bluing gage detail of appropriate tool through screw and then insert bar through hole in gage detail. Thread sleeve detail onto male end of tube.
 - (b) Charge conical surface of gage with the carbon from carbon paper lightly moistened with AMS 3160 Stoddard Solvent.
 - (c) Turn screw detail of tool into sleeve detail until conical surfaces are in contact. Seat gage by rotating once, 45 degrees maximum, then return to starting point. After seating, rotate gage one-half turn and return to starting position to define pattern of contact.
 - (d) Check Limits
 - 1) Circumferential ridging is acceptable on sealing surface seats provided ridges are uniform around entire circumference and do not exceed 0.003 inch in height.
 - 2) Conical surfaces containing ridges which are not uniform or do not extend around entire circumference or are over 0.003 inch but do not exceed 0.005 inch in height may be refaced.
 - 3) Vertical scratches are not acceptable. Vertical scratches not exceeding 0.005 inch in depth may be removed by refacing.
 - (2) Repair
 - CAUTION:** OPERATORS MUST WEAR CLEAN, LINT-FREE GLOVES WHEN HANDLING REWORKED FITTINGS TO PREVENT STAINING FINISHED CONICAL SEAT SURFACES.
 - (a) Install cutter detail of appropriate tool through screw and then insert bar through hole in cutter detail. Thread sleeve detail onto male end of tube.
 - (b) Assemble screw to sleeve then rotate cutter to machine off least amount of material necessary to remove damage and obtain required cone. Surface Y may be machined to obtain dimensions shown. Axis of conical surface must be concentric with respective thread pitch diameter within 0.005 inch FIR.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 263
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

- (c) Check refaced conical seat per Paragraph 5.L.(1). If acceptable seat has been obtained, omit steps (d) through (g).
- (d) Install lap detail of appropriate tool through screw and then insert bar through hole in lap detail. Thoroughly degrease male seat surface then thread sleeve detail onto male end of tube.
- (e) Charge lap detail with PMC 3014 Silicone Carbide Lapping Compound, 240 grain size.
- (f) Assemble screw to sleeve then hand lap conical seat.
- (g) Check lapped conical seat per Paragraph 5.L.(1). If necessary, repeat sequence of operations until an acceptance cone is obtained.
- (h) Degrease fitting. If fitting has been lapped, ensure all lapping compound is removed. Install threaded protective cap on fitting.

M. Tube Connector Female Conical Seat Repair (Figure 219).

(1) Check

- (a) Install bluing gage detail of appropriate tool through screw and then insert bar through hole in gage detail.

WARNING: CLEANING OPERATIONS USING SOLVENTS SHOULD BE PERFORMED IN A WELL-VENTILATED ATMOSPHERE. EXERCISE NORMAL SAFETY PRECAUTIONS DURING USE.

- (b) Charge conical surface of bluing gage with the carbon from carbon paper lightly moistened with cleaning solvent (P-D-680).
- (c) Turn screw detail of tool into tube nut until conical surfaces are contacted. Seat gage by rotating once, 45 degrees maximum, then return to starting point. After seating, rotate gage one-half turn and return to starting position to define pattern of contact.
- (d) Check Limits
 - 1) Circumferential ridging is acceptable on sealing surface seats provided ridges are uniform around entire circumference and do not exceed 0.003 inch in height.
 - 2) Conical surfaces containing ridges which are not uniform or do not extend around circumference or are over 0.003 inch but do not exceed 0.005 inch in height may be refaced.
 - 3) Vertical scratches are not acceptable. Vertical scratches not exceeding 0.005 inch in depth may be removed by refacing.

(2) Repair

CAUTION: OPERATORS MUST WEAR CLEAN, LINT-FREE GLOVES WHEN HANDLING REWORKED FITTINGS TO PREVENT STAINING FINISHED CONICAL SEAT SURFACES.

- (a) Install cutter detail of appropriate tool through screw and then insert bar through hole in cutter detail.
- (b) Assemble screw to tube nut then rotate cutter to machine off least amount of material necessary to remove nicks, chatter marks, low spots, etc. Surface E must be square with axis of Surface C within 0.005 inch FIR. Surface C must be concentric with Diameter A within 0.005 inch FIR.
- (c) Check refaced conical seat per Paragraph 5.M.(1). If acceptable seat has been obtained, omit steps (d) through (g).
- (d) Install lap detail of appropriate tool through screw and then insert bar through hole in lap detail. Thoroughly degrease female seat surface.

EFFECTIVITY
ZT ALL

70-00-00

Page 264
Feb 01/2007

TP-80MM-ZT



MD-80

AIRCRAFT MAINTENANCE MANUAL

- I
- (e) Charge lap detail with PMC 3014 Silicone Carbide Lapping Compound, 240 grain size.
 - (f) Assemble screw to tube nut then hand lap conical seat.
 - (g) Check lapped conical seat Paragraph 5.M.(1). If necessary, repeat sequence of operations until an acceptable cone is obtained.
 - (h) Degrease fitting. If fitting has been lapped, ensure all lapping compound is removed. Install threaded protective cap on fitting.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 265
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

Thread Size**	Torque (lb.—in.)					
	Oil Lubricated			Antiseize Coated		
	Max.	Min.*		Max.	Min.*	
		Type I	Type II		Type I	Type II
.112-40	6	4.5	5	4.5	3.5	4
.138-32	11.5	8.5	10	8.5	6.5	7.5
.164-32	22	16	20	16.5	12.5	15
.164-36	24	18	22	18	13.5	16
.190-24	30	23	27	21.5	16	19.5
.190-32	36	24	32	26	19.5	23
.216-24	48	35	43	35	26	31
.216-28	50	35	45	38	28	34
.250-20	70	50	65	50	37	45
.250-28	85	65	75	60	45	54
.3125-18	150	110	135	105	80	95
.3125-24	170	125	150	120	90	110
.375-16	270	200	250	185	140	170
.375-24	300	225	275	215	160	190
.4375-14	425	325	375	300	225	270
.4375-20	475	350	425	340	255	310
.500-13	650	500	600	450	340	400
.500-20	750	550	675	515	390	460
.5625-12	950	700	850	675	500	600
.5625-18	1050	800	950	750	550	675
.625-11	1300	1000	1200	900	675	800
.625-18	1500	1150	1350	1025	775	925
.750-10	2300	1700	2100	1600	1200	1450
.750-16	2600	2000	2400	1800	1350	1600
.875-9	3700	2800	3400	2600	1950	2350
.875-14	4200	3200	3800	2900	2200	2600
1.000-8	5600	4200	5100	3900	2900	3500
1.000-12	6400	4800	5800	4300	3200	3850
1.125-7	7900	5900	7200	5400	4100	4900
1.125-8	8400	6300	7600	5700	4300	5100
1.250-7	11200	8400	10100	7700	5800	6900
1.250-8	11700	8800	10600	7900	5900	7100
1.375-6	14700	11000	13300	10100	7600	9100
1.375-8	15900	11900	14400	10600	8000	9500
1.500-6	19600	14700	17700	13300	10000	12000
1.500-8	21100	15800	19000	14000	10500	12600
1.750-5	30900	23200	27900	21100	15800	19000
1.750-8	34500	25900	31100	22700	17000	20400
2.000-4.5	46600	35000	42000	31700	23800	28500
2.000-8	52600	39500	47400	34400	25800	31000

* Use Type I minimum torque values where alignment of locking holes (for cotterpins, lockwire, etc.) is required at assembly. Use Type II minimum values where locking hole alignment is not required at assembly.

** For screws larger than 0.164 thread size having screwdriver slots only (no external wrenching provision):

1. For non-self-locking applications, 22 lb.—in. minimum is permissible.
2. For self-locking applications, permissible minimum torque is 22 lb.—in. plus torque required to turn screw through nut.

7-75 L-41653

BBB2-70-2

Nuts, Bolts, Screws, and Self-Locking Nuts on Studs
Figure 202/70-00-00-990-802

EFFECTIVITY
ZT ALL

70-00-00

Page 266
Feb 01/2007

TP-80MM-ZT



MD-80
AIRCRAFT MAINTENANCE MANUAL

Thread Size	Torque (lb.—in.)	
	Oil Lubricated	Antiseize Coated
.112-40	6-7	5-6
.138-32	12-14	9-11
.164-32	23-26	18-20
.164-36	25-28	20-22
.190-24	32-35	24-27
.190-32	36-40	27-30
.216-24	48-54	36-40
.216-28	50-56	40-44
.250-20	74-82	55-62
.250-28	85-95	62-72
.3125-18	160-175	115-130
.3125-24	180-200	125-140
.375-16	270-300	200-220
.375-24	290-325	225-250
.4375-14	420-465	315-350
.4375-20	450-500	340-380
.500-13	630-700	450-500
.500-20	720-800	515-575
.5625-12	950-1050	675-750
.5625-18	1050-1150	750-825
.625-11	1250-1400	900-1000
.625-18	1450-1600	1030-1150
.750-10	2200-2450	1600-1750
.750-16	2500-2750	1750-1950
.875-9	3600-4000	2500-2850
.875-14	4000-4450	2800-3100
1.000-8	5400-6000	3800-4200
1.000-12	6000-6700	4000-4500
1.125-7	7600-8200	5300-5700
1.125-8	8000-8700	5500-6000
1.250-7	10500-11600	7300-8100
1.250-8	11000-12100	7500-8300
1.375-6	13800-15100	9600-10500
1.375-8	14900-16300	10000-11000
1.500-6	18200-20100	12500-13800
1.500-8	19500-21600	13100-14500
1.750-5	28500-31500	19600-21700
1.750-8	31700-35100	21000-23300
2.000-4.5	42800-47400	31800-32500
2.000-8	48200-53400	29300-35200

L-41645
7-75
BBB2-70-3

Torques For Self-Locking Nuts and Bolts
Figure 203/70-00-00-990-803

EFFECTIVITY
ZT ALL

TP-80MM-ZT

BOEING PROPRIETARY - Copyright © Unpublished Work - See title page for details

70-00-00

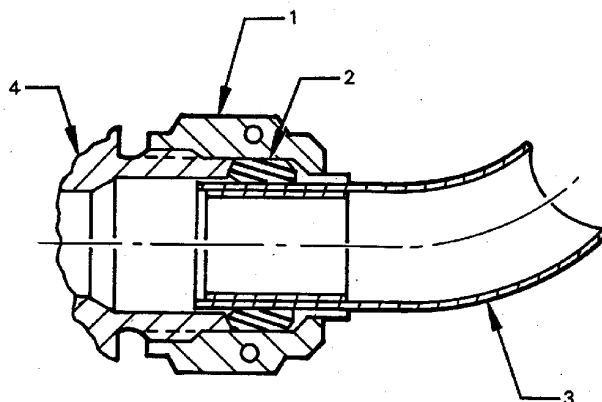
Page 267
Feb 01/2007

MD-80 AIRCRAFT MAINTENANCE MANUAL

Thread size (ANPT or NPT)	Torque, (lb.—in.)	Thread size (ANPT or NPT)	Torque (lb.—in.)
.062	30— 40	.500	140—160
.125	30— 40	.750	210—230
.250	70— 85	1.000	285—315
.375	95—110	1.250	355—385

L—41637
BBB2-70-4

Steel Pipe Plugs in Aluminum or Magnesium Cases
Figure 204/70-00-00-990-804



1. NUT (REF FIGURE 206)
2. PACKING
3. TUBE
4. FITTING

L-29739
3-72
BBB2-70-5

PWA Flexible Fitting Figure
Figure 205/70-00-00-990-805

EFFECTIVITY
ZT ALL

70-00-00

Page 268
Feb 01/2007

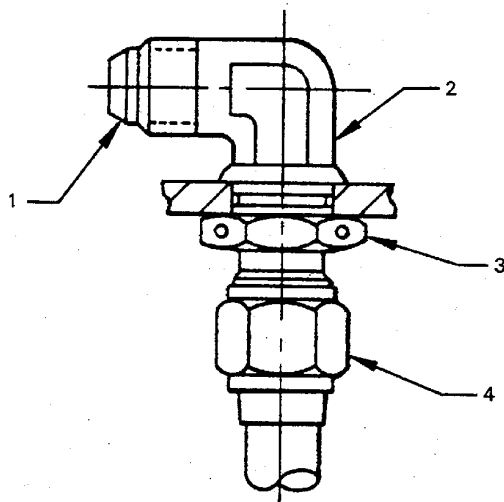
TP-80MM-ZT

MD-80 AIRCRAFT MAINTENANCE MANUAL

TUBE DIA.	THREAD SIZE	PART NUMBER FOR 75 DUROMETER A PACKINGS: AMS 7260, 7267, OR 7273	TORQUE LB-IN	PART NUMBER FOR 77 DUROMETER (100 DUROMETER A PACKINGS: PWA 401	TORQUE LB-IN
0.250	0.625-18	227407	25-30	399615	55-60
0.3125	0.6875-16	227413	30-35	451083	65-70
0.375	0.750-16	226366, 626155	30-35	410629	65-70
0.4375	0.8125-16	227419	45-50		
0.500	0.875-14	227401, 598643, 669480	55-60	391009	110-120
0.5625	1.000-12	227425	60-65		
0.625	1.0625-12	226195	65-70	443330	130-140
0.750	1.1875-12	227427	70-80	389114	140-160
0.875	1.375-12	227431	75-85	452427	150-170
1.000	1.500-12	227433	100-110	389847	200-220
1.125	1.625-12	227451	100-110	409309	200-220
1.250	1.750-12	227439, 598678	100-110	414121	200-220
1.500	2.125-12	227445	100-110	409179	200-220

L-41621
0385
BBB2-70-6A

**Flexible Tube Connections
Figure 206/70-00-00-990-806**



1. CONICAL SEAT CONNECTOR
2. BULKHEAD FITTING
3. JAMNUT
4. CONICAL SEAT CONNECTOR NUT

L-29740
BBB2-70-7

**Conical-Seat Connector and Bulkhead Fitting
Figure 207/70-00-00-990-807**

EFFECTIVITY
ZT ALL

70-00-00

Page 269
Feb 01/2007

TP-80MM-ZT



MD-80
AIRCRAFT MAINTENANCE MANUAL

Hose size	Tubing OD	Thread size	Torque, lb.—in.		
			Steel fittings		Titanium fittings
			Oil lubricated	Anti-seize coated	Anti-seize coated*
—3	.1875	.375 —24	50— 60	40— 45	50— 60
—4	.250	.4375—20	90— 100	65— 75	90— 100
—5	.3125	.500 —20	135— 150	100— 110	135— 150
—6	.375	.5625—18	200— 220	150— 165	200— 220
—	.4375	.625 —18	250— 270	185— 200	250— 270
—8	.500	.750 —16	350— 400	270— 300	350— 400
—	.5625	.8125—16	400— 450	300— 350	400— 450
—10	.625	.875 —14	500— 550	360— 400	500— 550
—	.6875	1.000 —12	600— 700	480— 530	600— 700
—12	.750	1.0625—12	700— 800	540— 600	700— 800
—	.875	1.1875—12	800— 900	600— 675	800— 900
—16	1.000	1.3125—12	1000—1100	750— 825	1000—1100
—	1.125	1.500 —12	1300—1400	900—1000	1300—1400
—20	1.250	1.625 —12	1400—1500	1000—1100	1400—1500
—24	1.500	1.875 —12	1600—1700	1200—1300	1600—1700

L—41605
7—75
BBB2-70-9

Conical-Seat (37 Degrees) Connectors With Nickel Gaskets
Figure 208/70-00-00-990-808

EFFECTIVITY
ZT ALL

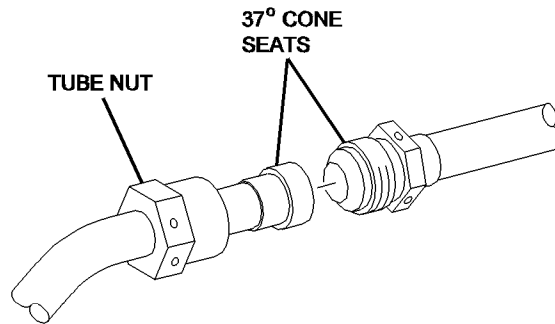
70-00-00

Page 270
Feb 01/2007

TP-80MM-ZT

MD-80

AIRCRAFT MAINTENANCE MANUAL



HOZE SIZE	TUBIING OD (INCH)	THREAD SIZE (INCH)	TORQUE, lbf-in (Nm)*					
			ALUMINUM FITTINGS**		STEEL FITTINGS		STEEL FITTINGS	
							TITANIUM FITTINGS***	
			ALL LUBRICANTS		OIL LUBRICATED		ANTI-SEIZE COATED	
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
-3	0.1875	0.375-24	30 (3.390)	50 (5.649)	70 (7.909)	80 (9.039)	50 (5.649)	60 (6.779)
-4	0.250	0.4375-20	40 (4.519)	65 (7.344)	90 (10.169)	100 (11.298)	65 (7.344)	75 (8.474)
-5	0.3125	0.500-20	60 (6.779)	80 (9.039)	135 (15.253)	150 (16.948)	100 (11.298)	110 (12.428)
-6	0.375	0.5625-18	75 (8.474)	125 (14.123)	270 (30.506)	300 (33.895)	200 (22.597)	225 (25.422)
--	0.4375	0.625-18	100 (11.298)	175 (19.772)	320 (36.155)	350 (39.545)	225 (25.422)	250 (28.246)
--	--	0.6875-24	--	--	320 (36.155)	350 (39.545)	225 (25.422)	250 (28.246)
-8	0.500	0.750-16	150 (16.948)	250 (28.246)	450 (50.843)	500 (56.492)	340 (38.415)	375 (42.369)
--	0.5625	0.8125-16	175 (19.772)	300 (33.895)	550 (62.142)	600 (67.791)	400 (45.194)	450 (50.843)
-10	0.625	0.875-14	200 (22.597)	350 (39.545)	650 (73.440)	700 (79.089)	475 (53.668)	525 (59.317)
--	--	0.875-16	200 (22.597)	350 (39.545)	650 (73.440)	700 (79.089)	475 (53.668)	525 (59.317)
--	0.6875	1.000-12	275 (31.071)	450 (50.843)	800 (90.388)	900 (101.686)	600 (67.791)	675 (76.265)
--	--	1.000-14	275 (31.071)	450 (50.843)	800 (90.388)	900 (101.686)	600 (67.791)	675 (76.265)
-12	0.750	1.0625-12	300 (33.895)	500 (56.492)	900 (101.686)	1000 (112.985)	675 (76.265)	750 (84.739)
--	0.875	1.1875-12	400 (45.194)	600 (67.791)	1100 (124.283)	1200 (135.582)	825 (93.212)	900 (101.686)
--	--	1.250-12	400 (45.194)	650 (73.440)	1150 (129.933)	1300 (146.880)	900 (101.686)	1000 (112.985)
-16	1.000	1.3125-12	500 (56.492)	700 (79.089)	1300 (146.880)	1400 (158.179)	950 (107.336)	1050 (118.634)
--	1.125	1.500-12	600 (67.791)	900 (101.686)	1500 (169.477)	1600 (180.776)	1050 (118.634)	1200 (135.582)
-20	1.250	1.625-12	600 (67.791)	900 (101.686)	1700 (192.074)	1800 (203.373)	1150 (129.933)	1300 (146.880)
-24	1.500	1.875-12	600 (67.791)	900 (101.686)	2100 (237.268)	2200 (248.567)	1500 (169.477)	1600 (180.776)
* IF THE NUT OR EITHER OF THE MATING SEALING SURFACES IS ALUMINUM, THE REQUIRED TORQUE LIMITS FOR ALUMINUM FITTINGS APPLY. ** FOR THRUST REVERSER AIR LINE FITTINGS, USE TORQUES FOR ALUMINUM FITTINGS, REGARDLESS OF MATERIAL, UNLESS OTHERWISE SPECIFIED. *** FOR MIXED MATERIAL ASSEMBLY (STEEL CONNECTOR WITH TITANIUM CONNECTOR WITH STEEL NUT), USE TITANIUM TORQUE.								

L-61898 (0703)
PWV
BBB2-70-40
S0000195266V1

Torques For 37 Degree Cone Seat Connectors (Without Gaskets)
Figure 209/70-00-00-990-835

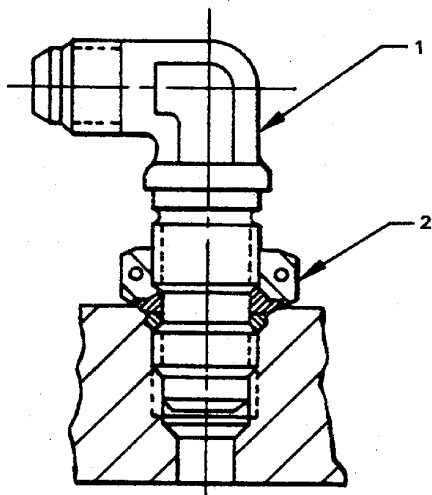
EFFECTIVITY
 ZT ALL

70-00-00

Page 271
 Feb 01/2007

TP-80MM-ZT

MD-80 AIRCRAFT MAINTENANCE MANUAL



1. Boss Fitting
2. Jamnut

L-29741
BBB2-70-10

Preformed Packing and Jamnut-Type Connector
Figure 210/70-00-00-990-809

Thread size	Torque, lb.—in.	Thread size	Torque, lb.—in.
.250 —28	14— 16	1.000 —12	260—290
.3125—24	22— 24	1.0625—12	285—315
.375 —24	28— 32	1.1875—12	350—390
.4375—20	38— 42	1.250 —12	380—420
.500 —20	58— 62	1.3125—12	475—525
.5625—18	70— 80	1.500 —12	570—630
.625 —18	95—105	1.625 —12	570—630
.750 —16	145—155	1.875 —12	570—630
.8125—16	165—185	2.250 —12	570—630
.875 —14	190—210	2.500 —12	570—630

L-41597
BBB2-70-11

Jamnuts
Figure 211/70-00-00-990-810

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 272
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

Thread Pitch on Part to be Tightened (Threads per inch)	Angle of Turn (Degrees, + 5 Degrees)*	
	Aluminum/Asbestos	Copper/Asbestos Nickel/Asbestos Steel/Asbestos
8	135	67
9	135	67
10	135	67
11	180	90
12	180	90
13	180	90
14	180	90
16	270	135
18	270	135
20	270	135
24	360	180
28	360	180

*These values provide for compression of approximately 40 percent for aluminum/asbestos and 20 percent for copper/asbestos, nickel/asbestos, and steel/asbestos gaskets.

L-41589
7-75
8882-70-12

Crush Type Asbestos Filled Gaskets
Figure 212/70-00-00-990-811

Thread size	Torque, lb.—in.	Thread size	Torque, lb.—in.
.250 -28	15- 20	1.0625-12	375-425
.3125-24	35- 40	1.1875-12	450-550
.375 -24	40- 50	1.250 -12	500-600
.4375-20	65- 75	1.3125-12	525-625
.500 -20	90-100	1.500 -12	600-700
.5625-18	110-120	1.625 -12	650-750
.625 -18	150-170	1.750 -12	650-750
.750 -16	200-225	1.875 -12	650-750
.8125-16	225-250	2.250 -12	650-750
.875 -14	250-275	2.500 -12	650-750
1.000 -12, -14	275-300		

L-41629
7-75
8882-70-13

Hex-Head Straight Threaded Fittings and Plugs
Figure 213/70-00-00-990-812

EFFECTIVITY
ZT ALL

70-00-00

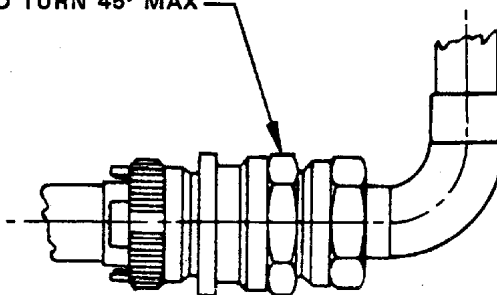
Page 273
Feb 01/2007

TP-80MM-ZT

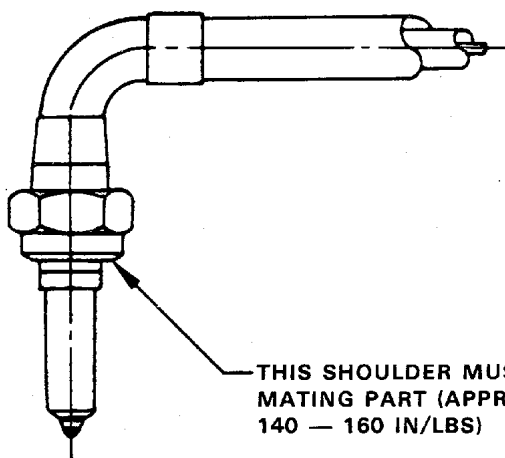


MD-80
AIRCRAFT MAINTENANCE MANUAL

TORQUE REQUIREMENT FOR THIS NUT
FINGER TIGHT AND TURN 45° MAX



ELECTRICAL CONNECTORS
AN 3100 THRU AN 3108



LEADS —
ELECTRICAL CONNECTIONS

L-50247
7-75
BBB2-70-14

Ignition Connector Installation
Figure 214/70-00-00-990-813

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 274
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

Thread size	Torque, lb.—in.
.138—32	8—10
.164—32	8—12
.190—32	10—15
.216—32	30—35
.250—32	35—40

L—41581
BBB2-70-15

Temperature Probe Nut and Screw Torque
Figure 215/70-00-00-990-814

Thread size	Torque, lb.—in.
.190—32	25—30
.164—32	20—25

L—41573
BBB2-70-16

EGT Harness and Terminal Nut Torque
Figure 216/70-00-00-990-815

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 275
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

Fine Thread Series			Coarse Thread Series		
Mating Bolt Thread Size**	Max Locking Torque*	Min Break-away Torque	Mating Bolt Thread Size**	Max Locking Torque*	Min Break-away Torque
.112 -48NF-2A	3	0.5	.112 -40NC-2A	3	0.5
.138 -40NF-2A	6	1.0	.125 -40NC-2A	4	1.0
.164 -36NF-2A	9	1.5	.138 -32NC-2A	6	1.0
.190 -32UNF-3A	13	2.0	.164 -32NC-2A	9	1.5
.250 -28UNF-3A	30	3.5	.190 -24UNC-3A	13	2.0
.3125-24UNF-3A	60	6.5	.250 -20UNC-3A	30	4.5
.375 -24UNF-3A	80	9.5	.3125-18UNC-3A	60	7.5
.4375-20UNF-3A	100	14.0	.375 -16UNC-3A	80	12.0
.500 -20UNF-3A	150	18.0	.4375-14UNC-3A	100	16.5
.5625-18UNF-3A	200	24.0	.500 -14UNC-3A	150	24.0
.625 -18UNF-3A	300	32.0	.5625-12UNC-3A	200	30.0
.750 -16UNF-3A	400	50.0	.625 -11UNC-3A	300	40.0
.875 -14UNF-3A	600	70.0	.750 -10UNC-3A	400	60.0
1.000 -14NF-3A	800	92.0	.875 -9UNC-3A	600	82.0
1.125 -12UNF-3A	900	117.0	1.000 -8UNC-3A	800	110.0
1.250 -12UNF-3A	1000	143.0	1.125 -8UNC-3A	900	137.0

* Installation or removal.

** Use the listed bolt sizes for torque testing cadmium plated nuts, carbon steel nuts, alloy steel nuts, and aluminum nuts.

L-18667
BBB2-70-17

Torque Limits For Reuse of Self-Locking Nuts, Bolts and Helicoil Inserts (Inch-Pounds at Room Temperature and Lubricated with Engine Oil)
Figure 217/70-00-00-990-816

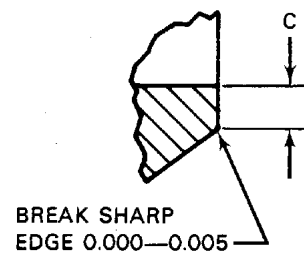
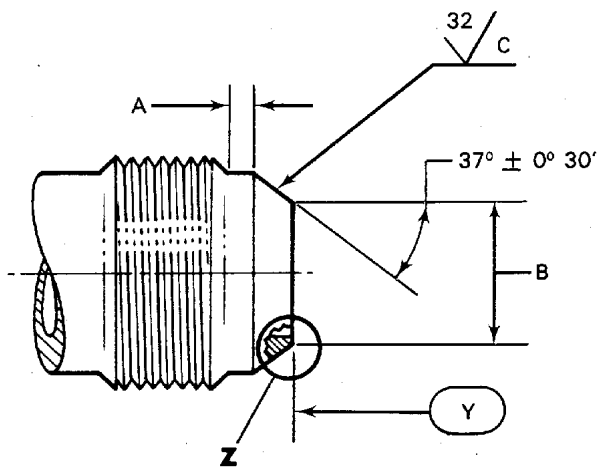
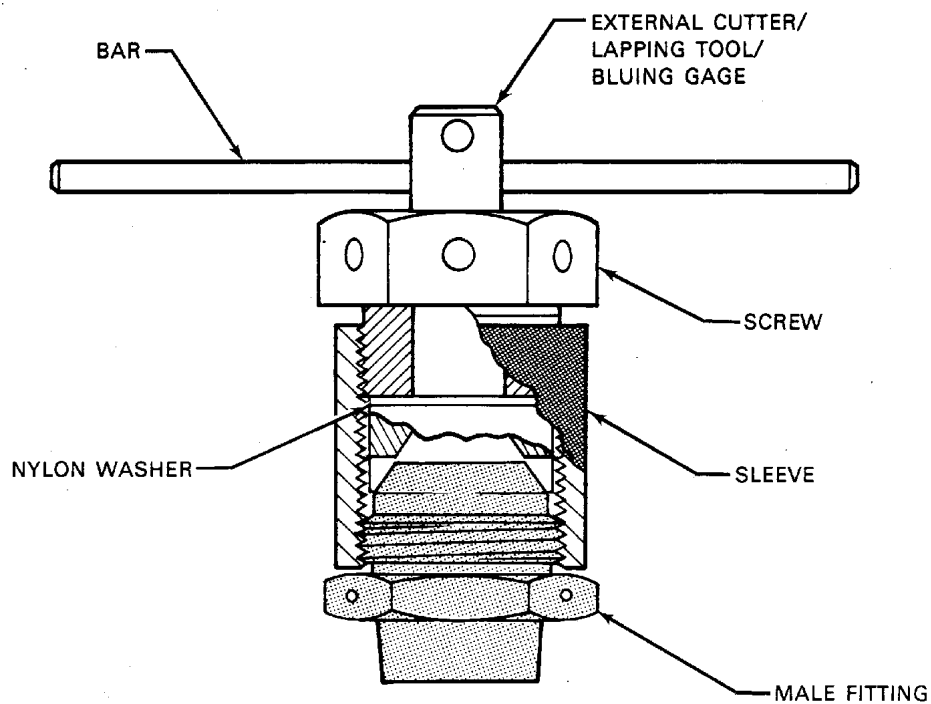
EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 276
Feb 01/2007

**MD-80
AIRCRAFT MAINTENANCE MANUAL**



VIEW Z

L-60668
BBB2-70-18

**Tube Male Connector Conical Seat Repair
Figure 218/70-00-00-990-817**

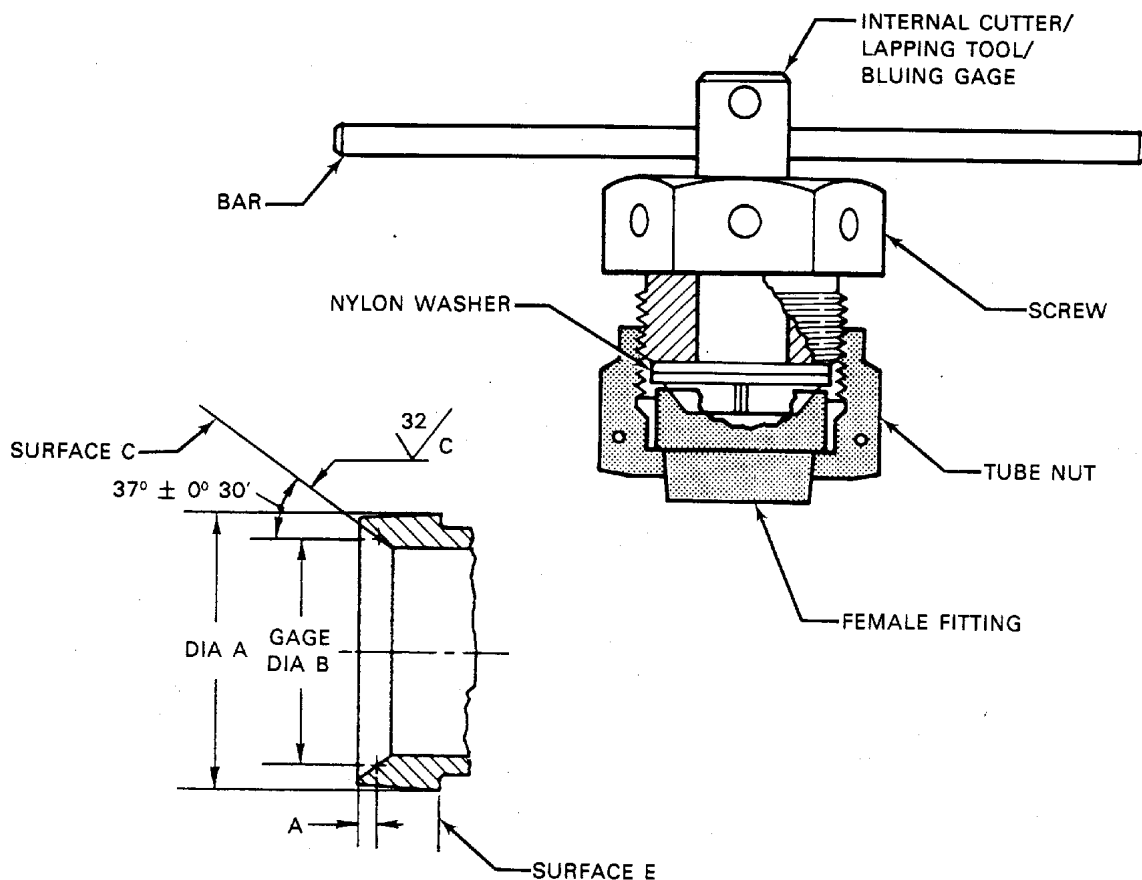
EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 277
Feb 01/2007

MD-80 AIRCRAFT MAINTENANCE MANUAL



NOMINAL TUBE OD	THREAD	DIA A REF	DIA B GAGE	A MAX	PWA TOOL NO
0.250	0.4375 -20	0.380-0.383	0.242	0.054	18810
0.3125	0.500 -20	0.442-0.445	0.302	0.053	18811
0.375	0.5625 -18	0.499-0.502	0.358	0.049	18812
0.4375	0.625 -18	0.561-0.564	0.430	0.054	23444
0.500	0.750 -16	0.679-0.682	0.504	0.062	18813
0.5625	0.8125 -16	0.740-0.743	0.555	0.054	18814
0.625	0.875 -14	0.794-0.797	0.621	0.057	18815
0.750	1.0625 -12	0.969-0.972	0.769	0.072	18816
0.875	1.1875 -12	1.094-1.097	0.894	0.072	18817
					26608
1.000	1.3125 -12	1.219-1.222	1.021	0.073	18818
1.250	1.625 -12	1.531-1.534	1.299	0.092	18819

L-60667
BBB2-70-19

Tube Female Connector Conical Seat Connector
Figure 219/70-00-00-990-818

EFFECTIVITY
ZT ALL

70-00-00

Page 278
Feb 01/2007

TP-80MM-ZT



MD-80

AIRCRAFT MAINTENANCE MANUAL

6. Identification Of Nuts And Bolts

A. General

CAUTION: USE PARTS THAT HAVE EITHER NO IDENTIFICATION OR THE MANUFACTURER'S OWN CODE IDENTIFICATION ONLY IN THE COLD SECTION OF THE ENGINE.

DO NOT USE PARTS WITH THE SAME MATERIAL CODE TOGETHER WITH PHYSICALLY SIMILAR PARTS THAT HAVE ANOTHER MATERIAL CODE.

USE ONLY NUTS AND BOLTS MADE OF SPECIAL HEAT RESISTANT ALLOYS IN THE HOT SECTION OF THE ENGINE. DO NOT USE HOT SECTION PARTS IN THE COLD SECTION OF THE ENGINE; DO NOT USE COLD SECTION PARTS IN THE HOT SECTION OF THE ENGINE.

DO NOT USE CADMIUM PLATED PARTS IN THE HOT SECTION OF THE ENGINE. CADMIUM PLATED PARTS MUST NOT TOUCH TITANIUM PARTS.

IF PARTS WITH CORRECT CODES ARE SERVICEABLE, INSTALL THEM IN THEIR ORIGINAL LOCATION DURING ASSEMBLY OF THE ENGINE OR ITS COMPONENTS. DO NOT ASSEMBLE A "C"-CODED PART IN AN "H"-CODED PART LOCATION; DO NOT ASSEMBLE AN "H"-CODED PART IN A "C"-CODED PART LOCATION.

DO NOT PUT PARTS FROM ONE ENGINE TOGETHER WITH THOSE FROM ANOTHER DURING DISASSEMBLY AND CLEANING.

- (1) Permanent material codes used on engine hardware are important for the safety of the engine. Refer to the Illustrated Parts Catalogs for part numbers and the equivalent manufacturer's numerical code identification.

B. The Material Code System Used on AN, MS, and AS/Company Parts

(1) The Letter Code (Prefix)

NOTE: The letter "E" in the material code system is used to show that a part is a standard AN, MS, or AS part with a six-digit part number.

The letter "E" is not used in the material code system for parts that are made by Pratt & Whitney.

- "EC" or "C" = Corrosion resistant steels
- "EH" or "H" = Heat resistant alloys for hot section parts
- "ET" or "T" = Titanium alloys
- "E" or "S" = Common temperature range alloys

NOTE: The prefix "E" is superseded by the prefix "S" in common temperature range material codes.

(2) The Number Code (Suffix)

- (a) A one-or two-digit number follows the stamped or embossed letter code. Explanations of two example material codes, listed in the Materials Codes List are as follows:

EC1 = Standard AN, MS, or AS engine parts made of AMS 5640 corrosion resistant steel.

H17 = Pratt & Whitney engine parts made of AMS 5649 heat resistant material.

(3) Location of Bolt and Nut Code Identification

- (a) Bolt code identification will usually be found on the top of the bolt head. (Figure 220)

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 279
Feb 01/2007



MD-80 AIRCRAFT MAINTENANCE MANUAL

- (b) Nut code identification will usually be found on one side of the hex. (Figure 220)
- (4) New Code Identifications
- (a) From time to time it will be necessary to add new code identifications. Refer to Special Materials in the Material Codes List.
- (b) These new code identifications have the prefix "B" or "P" before the material code number. This is a temporary P&W code. Later, an "S", "C", "B" or "T" number will replace the temporary number. For example, refer to C15, H21, and T1 in the Material Codes List.
- C. For lists of Common Temperature Range, Corrosion Resistant, Heat Resistant, Titanium or Titanium Alloy, and Special Materials, refer to the Material Codes List.

Table 201/70-00-00-993-802 MATERIAL CODES LIST

Material Code		Material Specification
Standard Parts AN, MS, AS	Company Parts	
COMMON TEMPERATURE RANGE MATERIALS		
E1	S1	AMS 6282, AMS 6320, AMS 6357, AMS 6535
E2	S2	AMS 7225
E3	S3	AMS 4121, AMS 4135, AMS 4153
E4	S4	AMS 5061
E5	S5	AMS 5045
E6	S6	AMS 6357 (Now E1/S1)
E7	S7	AMS 6280, AMS 6281, AMS 6355, AMS 6530, AMS 6550
E8	S8	AMS 6327, (Now E11/S11)
E9	S9	AMS 5024
E10	S10	AMS 5040
E11	S11	AMS 6322, AMS 6323, AMS 6325, AMS 6327, AMS 6358
E12	S12	AMS 4037, AMS 4120, AMS 4152
E13	S13	AMS 4045, AMS 4122, AMS 4139, AMS 4154
E14	S14	AMS 4152 (Now E12/S12)
E15	S15	AMS 4153 (Now E3/S3)
E16	S16	AMS 4154 (Now E13/S13)
E17	S17	AMS 5060
E18	S18	AMS 5062
E19	S19	AMS 5120
E20	S20	AMS 5121
E21	S21	AMS 6324

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 280
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

Material Code		Material Specification
Standard Parts AN, MS, AS	Company Parts	
E22	S22	AMS 6328
E23	S23	AMS 6350, AMS 6370, AMS 6371
E24	S24	AMS 6352 (Non-current), AMS 6365, AMS 6372
E25	S25	---
E26	S26	AMS 6355 (Now E7/S7)
E27	S27	AMS 6358 (Now E11/S11)
E28	S28	AMS 6323 and AMS 6371 (Now E23/S23)
E29	S29	---
E30	S30	AMS 6381, AMS 6382
E31	S31	AMS 6412, AMS 6413
E32	S32	AMS 6440, AMS 6441
E33	S33	AMS 4500
E34	S34	AMS 6359, AMS 6415
E35	S35	---
E36	S36	AMS 6300 (Non-current)
E37	S37	AMS 6304, (Was PWA 722, P5), AMS 7454, AMS 7455, AMS 7458
E38	S38	AMS 6418
E39	S39	AMS 6485
E40	S40	AMS 4003
E41	S41	AMS 4150
E42	S42	AMS 4352
CORROSION RESISTANT MATERIALS		
EC1	C1	AMS 5640
EC2	C2	AMS 5628
EC3	C3	AMS 5515, AMS 5516, AMS 5517, AMS 5518, AMS 5519, AMS 5636 (Was EC5/C5), AMS 5637, AMS 7472
EC4	C4	AMS 7228
EC5	C5	AMS 5636 (Now EC3/C3)
EC6	C6	AMS 5354, AMS 5508, AMS 5616, AMS 7470
EC7	C7	AMS 5610

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 281
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

Material Code		Material Specification
Standard Parts AN, MS, AS	Company Parts	
EC8	C8	AMS 5504 (Was EC11/C11), AMS 5612, AMS 5613
EC9	C9	AMS 5624
EC10	C10	AMS 5513, AMS 5560, AMS 5565, AMS 5566, AMS 5639
EC11	C11	AMS 5504 (Now EC8/C8)
EC12	C12	AMS 5738
EC13	C13	AMS 5630
EC14	C14	AMS 5643
EC15	C15	AMS 5625 (Was P10)
EC16	C16	AMS 5506, AMS 5620 (Was P3), AMS 5621
EC17	C17	AMS 5644 (Inactive for New Design)
EC18	C18	AMS 5743
Heat Resistant Materials		
EH1	H1	AMS 7229
EH2	H2	AMS 7232
EH3	H3	AMS 5526, AMS 5527 (Inactive for New Design), AMS 5721 (Inactive for new Design), AMS 7476
EH4	H4	AMS 5642
EH5	H5	AMS 5512, AMS 5571, AMS 5646
EH6	H6	AMS 5733 (Inactive for New Design) (Was PWA 746)
EH7	H7	AMS 5510, AMS 5557, AMS 5559, AMS 5570, AMS 5576, AMS 5645
EH8	H8	AMS 5524, AMS 5648
EH9	H9	AMS 5540, AMS 5580, AMS 5665
EH10	H10	AMS 5667 (Now EH14/H14)
EH11	H11	AMS 5521, AMS 5572, AMS 5651
EH12	H12	AMS 5522 (Inactive for New Design), AMS 5652
EH13	H13	(Now EH3/H3)
EH14	H14	AMS 5542, AMS 5667 (Was EH10/H10), AMS 5668
EH15	H15	Chromel
EH16	H16	Alumel

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 282
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

Material Code		Material Specification
Standard Parts AN, MS, AS	Company Parts	
EH17	H17	AMS 5649
EH18	H18	AMS 5532, AMS 5768
EH19 ^{*[1]*}	H19 ^{*[1]}	AMS 5525, AMS 5731, AMS 5732, AMS 5734,
		AMS 5736, AMS 5737, AMS 7481
EH20	H20	AMS 5511, AMS 5647
EH21	H21	AMS 5754 (Was P19)
EH22	H22	AMS 5530, AMS 5750 (Inactive for New Design)
EH23	H23	AMS 5545, AMS 5712, AMS 5713, AMS 7469
EH24	H24	AMS 5551, AMS 5756, and AMS 5757 (All Inactive for New Design)
EH25	H25	AMS 5660, PWA 1003 (Was PWA 1002, P11)
EH26	H26	AMS 5706, AMS 5708 (Was PWA 90), AMS 5709 (Was P15), AMS 7471, PWA 686, PWA 687 (Was CF236, P18), AMS 5707 (Was PWA 1004)
EH27	H27	AMS 5759
EH28	H28	AMS 5662, PWA 1009
EH29	H29	AMS 5666 (Was P28)
Titanium or Titanium Alloy Materials		
ET1	T1	AMS 4921 (Was P8)
ET2	T2	AMS 4923
ET3	T3	AMS 4925
ET4	T4	AMS 4927
ET5	T5	AMS 4928 (Was PWA 682, P12), AMS 4967, AMS 7461
ET6	T6	AMS 4929
SPECIAL MATERIALS		
---	B7	ASTM A 193 Grade B7
---	B16	ASTM A 193 Grade B16
---	B660	ASTM A 453 Grade B660
---	P3	AMS 5620 (Now EC16/C16)
---	P5	PWA 722 (Now AMS 6304, E37/S37)
---	P8	AMS 4921 (Now Et1/T1)

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 283
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

Material Code		Material Specification
Standard Parts AN, MS, AS	Company Parts	
---	P9	AMS 6302 (Inactive)
---	P10	AMS 5625 (Now EC15/C15)
---	P11	PWA 1002 (Now PWA 1003, EH25/H25)
---	P12	PWA 682 (Now AMS 4928, ET5/T5)
---	P15	AMS 5709 (Now EH26/H26)
---	P18	CF236 (Now EH26/H26)
---	P19	AMS 5754 (Now EH21/H21)
---	P20	PWA 1202
---	P21	PWA 1010
---	P23	AMS 7477
---	P24	AMS 7461
---	P25	PWA 91
---	P26	PWA 1006, PWA 1008, PWA 1013
---	P27	AMS 7236
---	P28	AMS 5666 (Now EH29/H29)
---	P29	PWA 92, AMS 5828
---	P30	AMS 5758

*[1] or Knurl (A knurl on the washer face diameter is sometimes used on double hex castellated nuts for material identification instead of the code.

D. Stainless Steel Bolts With Reduced Pitch Diameters

- (1) At engine manufacture, it is the practice to provide bolts with reduced pitch diameter for use in the hot sections of the engines. This will minimize the possibility of bolt and nut seizure. This is standard practice for locations where the parts are subjected to temperatures in excess of 500°F (260°C).

EFFECTIVITY
ZT ALL

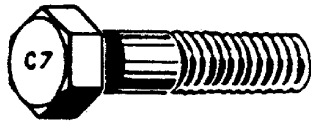
TP-80MM-ZT

70-00-00

Page 284
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL



BOLT CODE IDENTIFICATION



NUT CODE IDENTIFICATION

L-20884
BBB2-70-20

Bolt and Nut Code Identification
Figure 220/70-00-00-990-819

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 285
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

7. Installation of Preformed Packing and Jamnut Type Connector (Universal Fittings)

A. Install jamnut type connectors as follows: (Figure 221)

WARNING: FAILURE TO ACCOMPLISH INSTALLATION PER INSTRUCTIONS MAY RESULT IN SUBSEQUENT FAILURE, FIRE, EXTENSIVE DAMAGE AND LOSS OF LIFE.

- (1) Coat male threads of fittings, preformed packing and backup ring with PMC 9609 Petrolatum, PWA 36500 Assembly Fluid or jet engine oil. Plastic packing requires no lubrication.

It is optional to use petrolatum as a replacement for PWA 36500 Assembly Fluid, but it is better to use the assembly fluid. Use petrolatum only if assembly fluid is not available.

- (2) Assemble nut on fitting with counterbored face toward engaging end.

WARNING: USE OF LEATHER BACKUP RINGS HAS BEEN DISCONTINUED TO PREVENT POSSIBILITY OF FUEL LEAKAGE.

- (3) Work packing into nut counterbore.
- (4) Install preformed packing on non-threaded annulus of fitting.
- (5) Turn nut down until preformed packing is positioned in annulus firmly against threads to be installed in mating part.
- (6) Install fitting into mating part, turning nut with fitting until preformed packing contacts mating part boss. This point can be determined by increasing torque. With fitting in this position and while holding nut to prevent its turning, screw fitting into mating part an additional one and one-half turns.

NOTE: From this point, fitting can be turned inward to a maximum of one additional turn for alignment purposes. If fitting tightens in nut before completing one and one-half turns or before fitting can be aligned, it is permissible for nut to turn with fitting for remainder of distance.

- (7) With fitting held in properly aligned position, tighten jamnut to recommended torque and lockwire.
 - (8) Metal to metal contact between nut and mating part boss must be obtained without exceeding recommended torque values and no extrusion of preformed packing or backup ring is permitted. It is essential that proper values based on metal to metal contact mentioned above be observed when tightening jamnut. This will minimize possibility of fitting loosening and resultant thread wear.
- B. Recommended torque limits and thread protrusion limits for various fitting are outlined in Figure 222. Measure thread protrusions as shown in Figure 221.
- C. Figure 223 should be consulted before and/or after installation of fittings to prevent and/or correct leakage at various fittings.

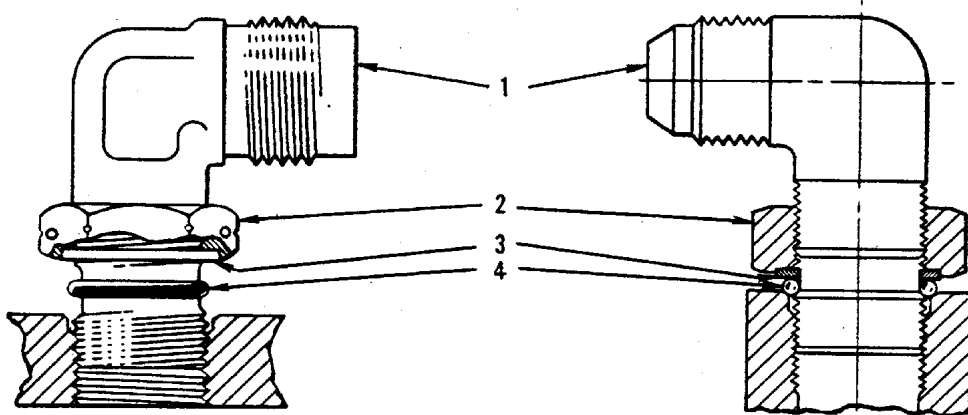
EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 286
Feb 01/2007

**MD-80
AIRCRAFT MAINTENANCE MANUAL**



- 1. CONNECTOR ELBOW
- 2. JAMNUT
- 3. PACKING
- 4. SEAL

INITIAL CONTACT BETWEEN SEAL AND HOUSING

L-29972
5-75
BBB2-70-21

**Jamnut Type Connector and Fitting
Figure 221 (Sheet 1 of 2)/70-00-00-990-820**

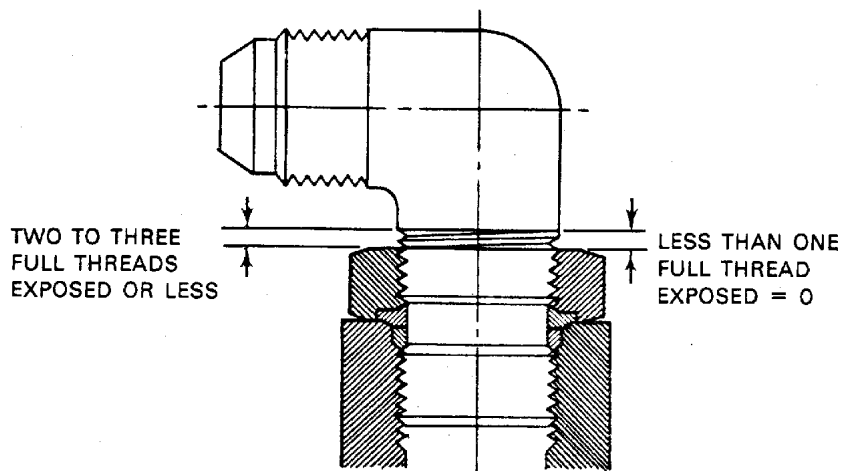
EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

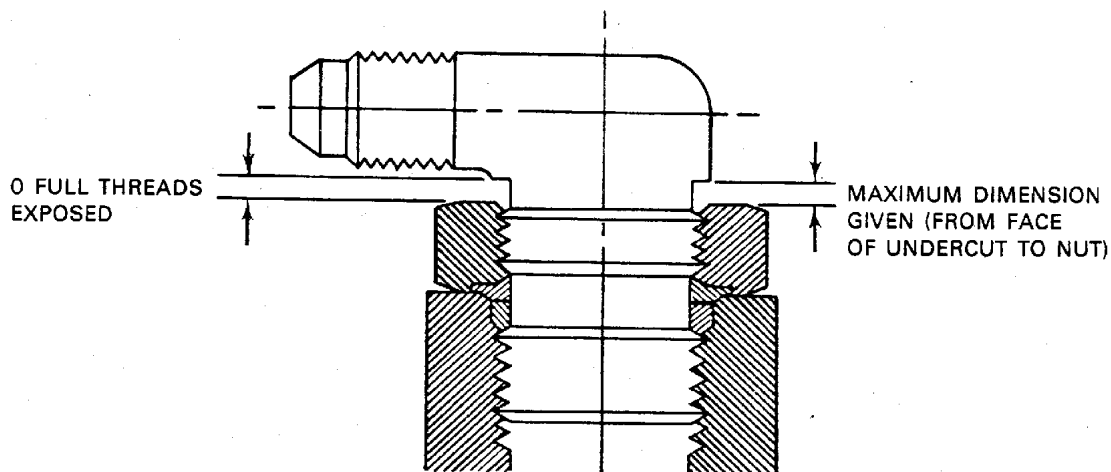
Page 287
Feb 01/2007

**MD-80
AIRCRAFT MAINTENANCE MANUAL**



A
TYPICAL POSITION AFTER
INSTALLATION (STANDARD FITTING)

$$\left(\begin{array}{l} \text{THREADS EXPOSED} = 1/2 \\ \frac{0 + 1}{2} = 1/2 \end{array} \right)$$



B
TYPICAL POSITION AFTER
INSTALLATION (UNDERCUT FITTING)

L-7523
5-75
BBB2-70-22

**Jamnut Type Connector and Fitting
Figure 221 (Sheet 2 of 2)/70-00-00-990-820**

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 288
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

8. Assembly of Flexible Type Fittings

A. Flexible Fitting, Packing, and Retainer (Figure 224)

- (1) Moisten rubber seal with PMC 9609 Petrolatum, PWA 36500 Assembly Fluid or engine oil and install on tube end against ferrule. It is optional to use petrolatum as a replacement for PWA 36500 Assembly Fluid, but it is better to use the assembly fluid. Use petrolatum only if assembly fluid is not available.
- (2) Install retainer on tube positioning against packing or seal. Minimize stretching of retainer to ensure tight fit.
- (3) Install tube to properly aligned connector and tighten nut to recommended torque.

CAUTION: IF RETAINER IS NOT USED, PACKING OR SEAL MAY PRO-TRUDE BETWEEN TUBE AND CONNECTOR AND PIECES OF RUBBER MAY ENTER SYSTEM.

B. Flexible Fitting, Lock, and Stopnut (Figure 225)

- (1) Back off stopnut, install key washer on coupling nut, then install packing per Paragraph 8.A.(1).
- (2) Position stopnut against stop on tube ferrule, then tighten stopnut fingertight on coupling nut. Back off one-half turn to next slot on stopnut and bend tabs of key washer to clinch stopnut.
- (3) Check thread engagement between stopnut and coupling nut. Thread engagement must be to extent that a number 60 wire will not pass through the 0.063 inch diameter hole (both walls) of stopnut.

CAUTION: BEFORE TIGHTENING TUBE COUPLING NUTS BE SURE THAT ELBOWS ARE PROPERLY ALIGNED. TUBE ENDS MUST BE CENTERED AT THE ELBOWS AND BE FREE TO MOVE. BINDING OF TUBE AND FITTING OR MISALIGNMENT MUST NOT BE PRESENT.

C. Installation of Elbow Type Fittings

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 289
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

THREAD PROTRUSION AND TORQUE LIMITS

THREAD SIZE	TORQUE LIMITS	FITTING PART NUMBERS	THREAD PROTRUSION LIMITS*
1.625-12	600-900	332627, 462254	0.166" MAX FROM UNDERCUT
1.3125-12	500-700	183649	0-1
		226110, 227470, 323462	1/2 — 2-1/2
		170987 (WITH THREAD UNDERCUT)	1/2 — 1-1/2
		170987 (WITHOUT THREAD UNDERCUT)	2-3
1.0625-12	300-500	307450, 317408	0-1
		226112	1-2
		418842	5-8
0.875-14	200-350	321677	1-2
0.750-16	150-250	278121	0.100" MAX FROM UNDERCUT
		218217, 331583	0.234" MAX FROM UNDERCUT
		155974, 321675	1-2
		150697, 227456	2-3
0.5625-18	75-125	229161	1-2
0.500-20	60-80	222172, 265050	1/2 — 1-1/2
		303035, 315335, 363010	1-2
		431952	0.105" MAX FROM UNDERCUT
0.4375-20	40-65	240875	1/2 THREAD MAX
		168974, 170493, 237346	0-1
		243308, 252790, 331097, 433116, 454210	0-1
		164433, 224877	1/2 — 1-1/2
		266284	1/2 — 1-1/2
		210247	2-3
0.375-24	30-50	274359	1-3

* Limits shown are "Full Threads" exposed on the fitting, beyond the jamnut. A full thread is defined here as a thread crest with a complete root radius on each side of it.

High limit on thread protrusion is set to be sure that at least three full lower threads of fitting are engaged under all tolerance conditions. Thread protrusions below low limit indicate possible connection faults associated with fittings installed too deep (Seal or packing omission or extrusion, very loose nut, or inadequate seal annulus). If fitting is found to have too many threads exposed upon periodic service check, fitting must be removed and reinstalled. If there are still too many threads exposed, fitting must have extreme tolerances and if installation procedure was followed correctly, proper thread engagement may be assumed.

L-19071
BBB2-70-23

Thread Protrusions and Torque Limits
Figure 222/70-00-00-990-822

EFFECTIVITY
ZT ALL

70-00-00

Page 290
Feb 01/2007

TP-80MM-ZT



MD-80

AIRCRAFT MAINTENANCE MANUAL

UNSATISFACTORY CONNECTION CONDITIONS AND METHODS OF PREVENTION

CONDITION	POSSIBLE RESULT	INSPECTION INDICATION
1. No Packing and/or seal	Leakage	Possibly beyond Thread Limits or Leakage Check
2. Inadequate Seal Groove - Fitting too deep	Leakage	Too few threads protruding or visible packing extrusion
3. Inadequate Seal Groove - Fitting too high	Leakage or See No. 4	Too many threads protruding
4. Insufficient lower thread engagement	Lower thread failure	Too many threads protruding
5. Loose Nut - Nut Under-torqued	Vibration failure of Lower threads	Test torque, or too few threads protruding or no metal to metal contact
6. Seal or packing Extrusion	See No. 5 (Torque lost due to relaxation of pinched packing)	No metal to metal contact or visible extrusion
7. Re-use of seals, repositioning of fitting after tightening nut	Leakage	Leakage Check

L-7522

BBB2-70-24

Fitting Inspection Chart
Figure 223/70-00-00-990-823

EFFECTIVITY
ZT ALL

70-00-00

Page 291
Feb 01/2007

TP-80MM-ZT



MD-80

AIRCRAFT MAINTENANCE MANUAL

9. Antigalling and Antiseize Compounds

A. General

- (1) This task provides the general instructions for the application of approved antigalling and antiseize compounds.

B. Consumable Materials

NOTE: Equivalent substitutes may be used instead of the following listed items.

NOTE: It is possible that some materials in the Equipment and Materials List cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Name and Number	Manufacturer
Oil, Lubricating (Mil-L-6081) 03-002 (PMC 9852)	
Grease 04-005 (PMC 9630)	
Grease 04-006 (PMC 9631)	
Lubricant, Dry Film 06-001 (PMC 9934)	
Compound, Antigalling 06-003 (PWA 586)	
Compound, Antiseize 06-009 (PMC 9523)	
Lubricant, Antiseize 06-017 (PWA 541)	
Compound, Antigalling 06-021 (PWA 550)	
Compound, Antigalling 06-036 (PWA 36035)	
Compound, Antigallant 06-038 (PWA 36545-3)	
Paste, Antiseize 06-054 (PWA 36246)	

C. Procedure - General Instructions

CAUTION: BE VERY CAREFUL THAT YOU APPLY THE CORRECT TYPE OF ANTIGALLING AND ANTISEIZE COMPOUND AS SPECIFIED BY THE AMM MAINTENANCE TASK. IF YOU APPLY THE INCORRECT LUBRICANT, YOU CAN CAUSE ENGINE DAMAGE.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 292
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

(CAUTION PRECEDES)

CAUTION: BE VERY CAREFUL THAT YOU APPLY THE ANTIGALLING AND ANTISEIZE COMPOUNDS IN A THIN EQUAL LAYER AND THAT YOU FULLY REMOVE UNWANTED MATERIALS. IF YOU APPLY TOO MUCH MATERIAL, IT GETS INTO OR ON PARTS, OPENINGS, OR SURFACES WHERE IT CAN CAUSE A MALFUNCTION, ENGINE DAMAGE, OR ENGINE FAILURE.

- (1) Always obey the specific procedures and limits in the specific AMM maintenance tasks.
- (2) Use penetrating oil at disassembly to make disassembly easier. Refer to Application of Penetrating Oils (SPOP 427).
- (3) When specified, apply extreme pressure lubricants to areas such as splined drives, various case joints, and bearing journals at assembly to prevent galling of surfaces with high stresses.
- (4) When specified, apply antiseize compounds at assembly to make disassembly of some hot section threaded fittings easier.
- (5) For bolts, brackets, nuts, and nut plates that are treated with molybdenum disulfide-type dry film lubricants, such as (06-038) Antigallant Compound (PWA 36545-3), it is possible that the parts may show a yellowish white residue after thermal exposure. This occurs because the molybdenum disulfide lubricant in the antigalling compound oxidizes to a molybdenum trioxide compound. This oxidation can start as low as 750°F (399°C) but increases rapidly at over 900°F (482°C). The molybdenum trioxide compound is not harmful to the structural integrity or functionality of the parts. Pratt & Whitney laboratory analysis tests show that this compound is not corrosive.

D. Procedure - Materials

- (1) Always obey the specific procedures and limits in the specific AMM maintenance tasks.
- (2) (06-003) Antigalling Compound (PWA 586) and (06-036) Antigalling Compound (PWA 36035) are for mating surfaces and threaded parts.
 - (a) (06-003) Antigalling Compound (PWA 586) which is baked on gives the best results, but it is permitted to apply wet with a brush without preparation or baking. Wet application does not have as long an effect as baked. Remove unwanted compound after assembly.
 - (b) (06-036) Antigalling Compound (PWA 36035) is a wet application which air dries without preparation or baking. Remove unwanted compound after assembly.
- (3) (06-021) Antigalling Compound (PWA 550) is for mating surfaces of titanium and some nickel alloy parts.
- (4) (06-001) Dry Film Lubricant (PMC 9934) in a volatile carrier is for ball sockets and for the assembly of parts that have a tight fit such as bearing races, spacers, and seals on hubs and shafts. This lubricant is not approved to use on magnesium alloy parts.
- (5) (04-005) Grease (PMC 9630) is for use on interference fit splines.
- (6) (04-006) Grease (PMC 9631) is for use on accessory spline drives (external to the engine) with a loose fit without any other source of lubrication.

CAUTION: THE ANTISEIZE COMPOUND (P06-009) IS NOT STABLE ABOVE 800°F (427°C). DO NOT USE THIS COMPOUND IN LOCATIONS WHERE THE ENGINE OPERATES AT TEMPERATURES OF MORE THAN 800°F (427°C). THE ANTISEIZE COMPOUND WILL BECOME DEFECTIVE AT TEMPERATURES MORE THAN 800°F (427°C) AND LUBRICATION WILL NOT BE SUFFICIENT. (FOR EXCEPTION, SEE BOLTS, BRACKETS, NUTS, AND NUT PLATES IN THE GENERAL INSTRUCTIONS ABOVE.)

EFFECTIVITY
ZT ALL

70-00-00

Page 293
Feb 01/2007

TP-80MM-ZT



MD-80 AIRCRAFT MAINTENANCE MANUAL

(CAUTION PRECEDES)

CAUTION: DO NOT USE (P06-009) ANTISEIZE COMPOUND (PMC 9523) ON STUDS IN ALUMINUM AND MAGNESIUM CASES BECAUSE IT CAN CAUSE INTERFERENCE FIT STUDS TO BACK OUT OF THE HOLES.

- (7) (06-009) Antiseize Compound (PMC 9523) (in powder form) is for dry applications. Do not use unless specified. Remove unwanted compound after assembly.
- (8) (06-017) Antiseize Lubricant (PWA 541) is a mix of (06-009) Antiseize Compound (PMC 9523) and (03-002) Lubricating Oil (PMC 9852). Remove unwanted compound after assembly. Make the Antiseize Lubricant as follows:
 - (a) Fully mix the Antiseize Compound and Lubricating Oil as follows:
 - 1) (06-009) Antiseize Compound (PMC 9523) 77 - 83% by weight.
 - 2) (03-002) Lubricating Oil (PMC 9852) 17 - 23% by weight.
 - (b) Continue to mix until the lubricant is smooth and there are no lumps, cakes, skins, or powder.
 - (c) Keep the lubricant in a closed container to keep out contamination.
- (9) (06-054) Antiseize Paste (PWA 36246) is applied wet with a brush without preparation or baking. Remove unwanted compound after assembly.

E. Torque Specifications

- (1) The torque values for parts lubricated with antiseize and antigalling compounds are found in Standard Torques Paragraph 3..

F. Restrictions

- (1) Unless otherwise specified, antiseize or antigalling compounds must not be used at the following locations.
 - (a) All face splines.
 - (b) All main rotor disk, hub, and spacer tight fits.
 - (c) Conical seats.
 - (d) Fuel fittings.

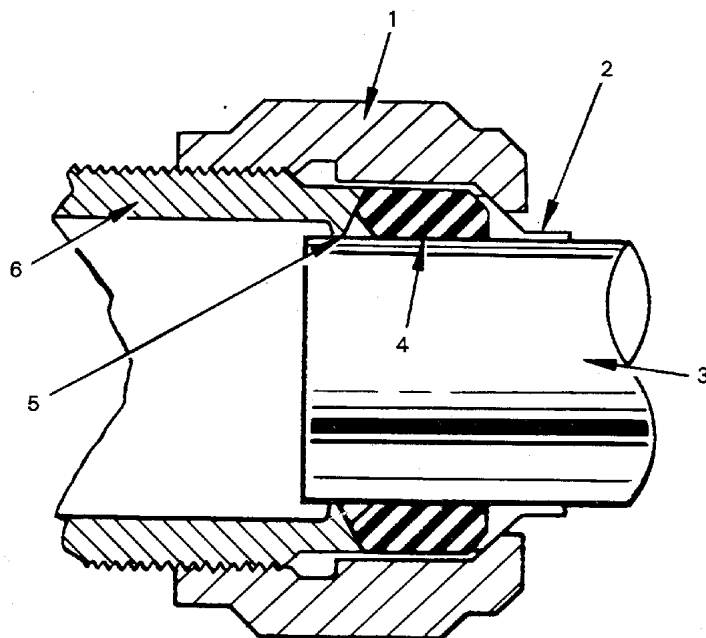
EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 294
Feb 01/2007

**MD-80
AIRCRAFT MAINTENANCE MANUAL**



- 1. NUT
- 2. FERRULE
- 3. TUBE
- 4. PACKING OR SEAL
- 5. RETAINER
- 6. CONNECTOR

L-23237
6—75
BBB2-70-26

**Assembly of Flexible Fitting, Packing, and Retainer
Figure 224/70-00-00-990-824**

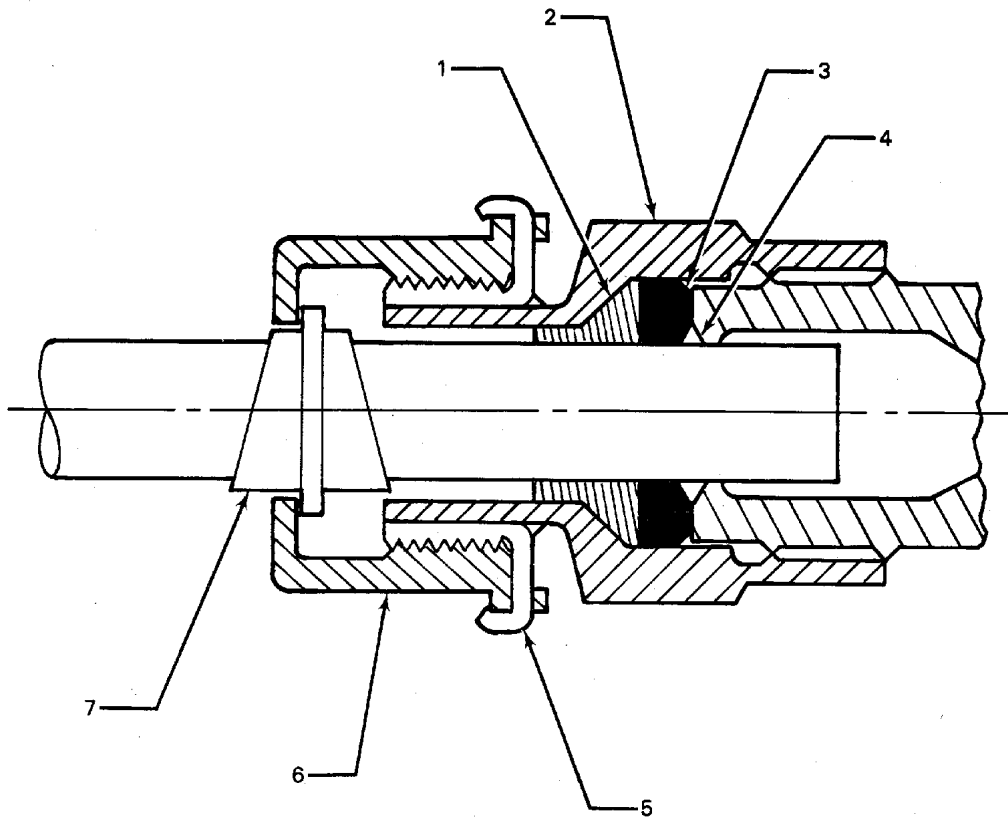
EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 295
Feb 01/2007

**MD-80
AIRCRAFT MAINTENANCE MANUAL**



- 1. FERRULE
- 2. COUPLING NUT
- 3. PACKING
- 4. RETAINER
- 5. KEY WASHER (LOCK)
- 6. STOPNUT
- 7. TUBE FERRULE

L-25240
5-69
8882-70-26

**Assembly of Flexible Fitting, Lock, and Stopnut
Figure 225/70-00-00-990-825**

EFFECTIVITY
ZT ALL

70-00-00

Page 296
Feb 01/2007

TP-80MM-ZT



MD-80

AIRCRAFT MAINTENANCE MANUAL

10. Gage Check

- A. When a check procedure requires a very accurate measurement, a micrometer, vernier, or dial indicator must be used. If a micrometer is to be used, check it for accuracy before taking a measurement. Make sure that the contacting surfaces of the micrometer are clean and that the contacting surfaces of the part to be measured are clean and free from burrs. When using a depth micrometer, be sure to hold the anvil tightly and squarely against the contacting surface. If a dial indicator is used, make sure that the indicator support is firmly anchored and any swivel connections tightened securely.
- B. When taking a measurement with a feeler gage, the final size of the feeler must be reasonably snug fit. Both the plug type and the flat type gages are used for measuring the amount of wear of liners and similar parts.
- C. Except when otherwise stated, if the "no-go" end of a plug gage enters, the part is worn beyond the allowable limit. Because certain parts do not always wear evenly, the flat type gage must be tried at several different diameters. If the gage enters at any point, the part is worn beyond the allowable limit.

11. Periodic Check of Calibrated Tools

- A. Suggested time intervals for monitoring the accuracy of the various types of tools used during engine check, repair and assembly. It is expected that individual departments or shop areas will adjust these time intervals to correspond more closely to actual tool usage. (Table 202)

Table 202/70-00-00-993-803 Periodic Tool Check

Tools	Time Intervals
Snap Gages (Special or Adjustable)	6 Weeks
Alignment Gages (Progressive Plug Type)	3 to 4 Weeks
Mounting Distance Gages	16 to 24 Weeks
Spacer Calculation Gages	16 to 24 Weeks
Flatness Checking Gages	3 to 4 Weeks
Stretch Gages	6 to 8 Weeks
Special Size Blocks Used as Width Gages	1 to 2 Weeks
Flushpin Gages or Depth Gages	6 to 8 Weeks
Reaming Fixtures	24 to 52 Weeks
Drilling Fixtures	24 to 52 Weeks
Spline Rings	12 to 16 Weeks
Runout Fixtures	24 to 52 Weeks
Oil Flow Target Fixtures	6 Months
Size Block Set	6 Months
Torque Wrenches - Set Type	1 Week
Torque Wrenches - Nonset Type	4 Weeks
Hydraulic Wrenches	4 Weeks
Cylinder Plugs	6 Weeks

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 297
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

Tools	Time Intervals
Thread Plugs	2 Weeks
Setting Rings	24 Weeks
Setting Disks	24 Weeks
Engine Weight and Flow Calibration Weight Scales	12 Weeks
"Last Word" Type Dial Indicators	3 Months
All Other Dial Indicators	6 Months
Horizontal Balancing Machines	1 Month
Vertical Balancing Machines	1 Month
Horizontal Balancing Fixtures, Hubs, Pulleys and Auxiliaries	3 Months
Vertical Balancing Fixtures and Auxiliaries Except Peg Plates	6 Months
Vertical Balancing Fixture Peg Plates	3 Months
Balancing Machine Test Weights	24 Weeks
Dowel or Stud Height Tools (Not Copper Flashed)	24 Weeks
Catalog Equipment Such as Micrometers, Verniers, Radius Gages, Steel Measuring Tapes, etc.	4 Weeks
All Final Dimension Tools, Fixtures, and Gages Which Are Not Listed Above	4 Weeks

12. Installation of Preformed Packings

NOTE: This task gives the general instructions for the lubrication and installation of preformed packings.

NOTE: Preformed rubber o-ring packings are referred to as packings.

CAUTION: PREFORMED PACKINGS MUST BE COATED WITH THIN FILM OF LUBRICANT PRIOR TO ASSEMBLY. THIS LUBRICATION, PLUS PROPER ASSEMBLY, WILL PREVENT DAMAGE TO PACKINGS THAT COULD CAUSE ENGINE MALFUNCTION OR FAILURE.

CAUTION: DO NOT APPLY PETROLATUM TO PACKINGS USED IN FUEL OR OIL SYSTEMS. PETROLATUM DOES NOT DISSOLVE EASILY IN FUEL OR OIL AND CAN CAUSE BLOCKAGES IN SMALL PASSAGES AND CLOGGED FILTERS. CORRECT LUBRICATION AND ASSEMBLY WILL PREVENT DAMAGE TO THE PACKING THAT CAN CAUSE ENGINE DAMAGE OR A SHUTDOWN.

A. Apply the correct lubricant to each packing before engine assembly as follows:

- (1) Find the material specification of the packing. This is often shown on the package.
- (2) Determine the type of system (fuel, oil, or air) where the packing will be installed.
- (3) Refer to Table 203 and select the necessary lubricant. Use only the lubricant specified for the packing material.
- (4) Apply the necessary lubricant to each packing.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

Table 203 Packing Lubricant Specification

Engine System	Packing Material and Specification	Lubrication Specification
Fuel	Fluorosilicone (AMS 7273)	Engine Oil, PWA 521, Type I or II, or Seal Ring Lubricant, (PWA 36500)
Oil	Fluorocarbon (AMS 7276, 7278, 7280)	Engine Oil, PWA 521, Type I or II or Seal Ring Lubricant, (PWA 36500)
Air, Water, or alcohol	Silicone (AMS 3301, 3302, 3303, 3304, 3305, 3315, 3320, 3332, 3334, 3335, 3336, 3338, 3345, 3346, 3356, 3357, 7267)	White Petrolatum (PMC 9609)
NOTE: Use only a small amount of White Petrolatum (PMC 9609) on silicone packings used in air systems. Hot air can move this lubricant into downstream components and cause contamination. Never use Engine Oil (PWA 521) on silicone packings.		

B. Instructions for the installation of preformed packings are as follows:

- (1) Always use new packings at each assembly.
- (2) Check the package for a date. This date is called the shelf life.
 - (a) Do not use packings that have gone past the shelf life date.
 - (b) If there is no date on the package, there is no shelf life.
- (3) Examine the packings for deterioration or damage before you install packings.
- (4) Make sure that the grooves and mating faces of engine parts are clean, smooth, and not damaged before you install packings.
- (5) Push or slide the packing into position. Do not twist the packing when it is installed.
- (6) Do not install packings on engine parts which are hot (hot parts will cause damage to a packing).
- (7) Use an approved tool to install the packings on a part which has more than one packing groove (this is to prevent damage to the packing).
- (8) Correctly align the mating parts when you assemble them to be sure not to accidentally cut the packing. Always push parts with packings on to the mating part when they are installed. This will make sure that the part does not twist as it is installed and will prevent subsequent damage to the packing.

13. Installation and Handling of Ball and Roller Bearings

CAUTION: DO NOT TOUCH ENGINE BEARINGS WITH YOUR BARE HANDS. USE GLOVES TO PROTECT ENGINE BEARINGS. IF YOU DO NOT OBEY THIS CAUTION, DAMAGE TO BEARING CAN OCCUR.

- A. Always obey specific procedures and limits in specific AMM maintenance tasks.
- B. Wear a clean pair of gloves, made of an approved lint-free material, when handling bearings.
- C. When assembling inner races of bearings on their mating shafts, it will be necessary to expand inner race by using controlled heating.
 - (1) You can heat the inner race of demountable bearings and complete bearing assembly of nondemountable bearings to necessary temperature by immersion in a controlled hot oil bath, or with an oven or induction heater.
 - (2) Check shafts and bearing races for size and trueness before heating to prevent abnormal fits.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.1
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

D. It is important to keep area clean regardless of whether you use a hot oil bath, an oven, or induction heater.

E. Hot Oil Bath

- (1) This use to be the typical heating method for bearings and other parts because of the anti-corrosion characteristics of oil. there are now environmental and safety concerns which make other methods a better choice.
- (2) Be sure to put a cover on the oil tank to minimize contamination of the oil by airborne dirt and abrasives. It is important to change the oil and clean the tank regularly, as necessary.
- (3) Do not permit bearings to rest on bottom of the tank because the settlings can cause contamination and the bearing temperature will be much greater than the indicated oil temperature. A heavy screen or series of rods extending at least 3 inches (76.2 mm) above the tank bottom will keep bearings surrounded by oil at a equal temperature and will permit any dirt to settle at bottom of tank.
- (4) Use clean Engine Oil (Material No. 03-001) or Lubricating and Preservation Oil (Material No. 03-019) in the hot oil bath with a temperature not exceeding 250°F (121°C) unless specified differently in the specific AMM maintenance task.

F. Oven

- (1) An oven may not increase the temperature of the part as fast as an induction heater, but there is less potential to increase the temperature of the part too much. An oven gives an equal amount of heat to large or complex parts and thus minimizes distortion and thermal stress.
- (2) A film of Engine Oil (Material No. 03-001) or Lubricating and Preservation Oil (Material No. 03-019) must be on each part before it goes into the oven. Engine Oil (Material No. 03-001) or Lubricating and Preservation Oil (Material No. 03-019) prevents corrosion before, during, and after assembly.
- (3) The oven temperature must not be more than 250°F (121°C) unless specified differently in the specific AMM maintenance task.

G. Induction Heater

- (1) A film of Engine Oil (Material No. 03-001) or Lubricating and Preservation Oil (Material No. 03-019) must be on each part before the induction heater is used to increase the temperature of the part. Engine Oil (Material No. 03-001) or Lubricating and Preservation Oil (Material No. 03-019) prevents corrosion before, during, and after assembly.
- (2) An induction heater increases the temperature of a part quickly and does not have the environmental concerns of the hot oil bath, but to know how to get the correct temperature takes experience. Be sure to follow the manufacturer's instructions, warnings, and cautions.
 - (a) PW has induction heater experience with units (Models TIH 020, TIH 050, TIH 100, and TIH 120) supplied by SKF Industries, units (Models 1x and 4x) supplied by Eddytherm and units (Foucault 22 ESD Swing Arm (PWA 89127)) by Foucault International Corporation.
- (3) Magnetism can be induced by induction heaters. Therefore, after induction heating, be sure to examine bearings for any remaining magnetism as follows:
 - (a) Ball and roller bearings are at all times susceptible to magnetic adherence of small unwanted particles.
 - (b) Limits for remaining magnetism are $\bar{n}2$ gauss.
 - (c) Demagnetize nonseparable bearings as assemblies. Slowly turn the inner and outer races in opposite directions when the bearing goes through the demagnetizer.
 - (d) Demagnetize separable bearings one component at a time.
 - (e) The components of disassembled bearing must be kept together.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.2
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

- (f) Remove bearing from the demagnetizer.
 - (4) There frequently is a degaussing feature built into the induction heater, but it may be inoperative (no indicating device to define if or when the degausser is functional or if there is a degausser feature).
 - (5) Bearing temperature must not be more than 250°F (121°C) unless specified differently in the Engine Manual. Be sure to wear insulated, clean, lint-free gloves when you touch heated bearings.
- H. Handle the bearing as follows:
- CAUTION:** DO NOT TOUCH ENGINE BEARINGS WITH YOUR BARE HANDS. USE GLOVES TO PROTECT ENGINE BEARINGS. IF YOU DO NOT OBEY THIS CAUTION, DAMAGE TO BEARING CAN OCCUR.
- (1) Do not touch the bearing with your bare hands.
 - (2) Put clean gloves on your hands.
 - (3) Put the bearing on a piece of clean bearing paper.
 - (4) Separate the outer race from the inner race.
 - (5) For separable bearings, verify that the serial numbers on the inner and outer races are the same.
- I. Before you install the main bearings, wipe excess oil from the journals of the shaft, hub, or gear with a clean Lint Free Cotton Cloth (Material No. 05-005) and apply a lubricant, as specified in the AMM maintenance task. Force must not be used in the assembly of parts. If there is any difficulty, disassemble parts and examine them for burrs or other interference.
- J. When a roller bearing is installed, turn the rollers with respect to the outer race. This will reduce the possibility of hang up of the rollers and will also increase the sensitivity of detection of the hang up.
- K. Manufacturer's number on bearing races must face the operator, as bearing is installed, unless specified differently in the specific AMM maintenance task.
- L. Large spannernuts used to secure main bearings or seals to shafts and housings frequently have small burrs at spanner slots. These burrs can cause damage to the bearing surfaces and cause incorrect torques. Deburr spannernuts with this condition.

14. Key Washers

A. Definition and Purpose

- (1) A key washer is a washer-like locking device which uses keys (tabs) to lock parts together.
- (2) These instructions concern single or multiple hole key washers with two or three unbent keys (or tabs) per hole.
- (3) An unbent key is one which is bent, or locked, following installation of the part, but which may be partially bent or preformed during manufacture.

B. Locking Procedure - General

- (1) Use only a new key washer at assembly. Use key washer only one time.
- (2) All keys on the key washer are to be bent as a safeguard against reuse.
- (3) When locking a single hole key washer bend one key full against a flat face on the nut or bolthead to be locked. Other keys may be bent in any convenient manner.
- (4) When locking a multiple hole key washer, bend one key for each hole full against a flat face of the nut or bolthead being locked. Other keys may be bent in any convenient manner.
- (5) When installing key washers which have ID tabs which mate with slotted shaft, proceed as follows:

EFFECTIVITY
ZT ALL

70-00-00

Page 298.3
Feb 01/2007

TP-80MM-ZT

AIRCRAFT MAINTENANCE MANUAL

- (a) Use fine crocus cloth, stone, or file to remove spalled or rough surface from face of nut. Remove sharp edges from inside tool slots and around outside diameter of nut face.
- (b) Use new washer, apply one to one mixture of molybdenum disulfide powder, Molykote Type Z, and engine oil to face of washer which contacts nut. Remove excess lubricant.
- (c) Install washer, aligning ID tab with slot in shaft and retaining nut fingertight.
- (d) Install alignment mark across exposed area of washer and shaft or part which mates with washer ID tab.
- (e) Torque nut.
- (f) Check alignment mark. Any misalignment indicates sheared or weakened ID locking tab. Remove washer and repeat above procedure using new washer, as necessary, to ensure proper locking of retaining nut.
- (g) Bend external locking tabs of washer against nut. At least one tab shall be bent full against one flat of nut. Key washers not having external tabs, crimp side into mating nut slot 180 degrees apart.

NOTE: If no special tool is provided for bending tabs, use brass drift.

(6) Acceptable standards.

- (a) Key washers shall be considered properly locked when all keys for each hole have been bent against the nut or head to be locked.
- (b) One of the keys must be full against a flat face of the nut or head with a gap which does not exceed 0.020 inch.

C. Installation of Cup Type Key Washers (Figure 226)

- (1) After nut has been correctly seated and tightened to required torque, cup type key washer shall be indented as specified. Where number of rounded slots in nut or bolt is less than required indentations listed, crimping must be accomplished at each available location. Portion of tool that forms indentations shall be spherically shaped and have spherical radius of not less than 0.050 inch.
- (2) To preclude shearing of tabs, position on cup washer shall be indicated by marking cup washer and adjacent surface so that any rotation of cup washer can be detected when torquing nut.
- (3) Acceptance Standards
 - (a) New cup type key washer was used.

CAUTION: CUP TYPE KEY WASHERS THAT ARE LOOSE ENOUGH TO SHAKE OR RATTLE ARE NOT ACCEPTABLE.

- (b) Indentations were formed as shown. A properly secured cup washer will normally be tight, but in instances where there is not axial pinch on the diaphragm portion of washer, washer may be moved by hand through limits of tab clearance.
- (c) Indentations in any one washer shall be approximately same shape and size, and shall not be broken, cracked or torn.
- (d) Indentations in cup washer shall have been formed into rounded slots in nut when nut is provided with such slots.
- (e) Cup washer has not moved during assembly.

D. Installation of Tab and Elliptical Type Key Washers

- (1) Installation of tab type key washers. (Figure 227)
 - (a) Key washers must be used only one time.



MD-80

AIRCRAFT MAINTENANCE MANUAL

- (b) Key washer shall be positioned such that unbent keys are as far as possible from axis of part to be locked. Prebent key, Key B, shall be tight to overhanging surface or braced against side of hole as shown to prevent possible movement of part being locked.
 - (c) All unbent keys on key washer are to be bent as safeguard against reuse.
 - (d) To preclude shearing of internal tabs, position of key washer shall be indicated by marking key washer and adjacent nonrotating surface so that any rotation of key washer can be detected when tightening nut.
- (2) Installation of Elliptical Key Washers. (Figure 228)
- (a) Install elliptical type key washers as shown in referenced figure.

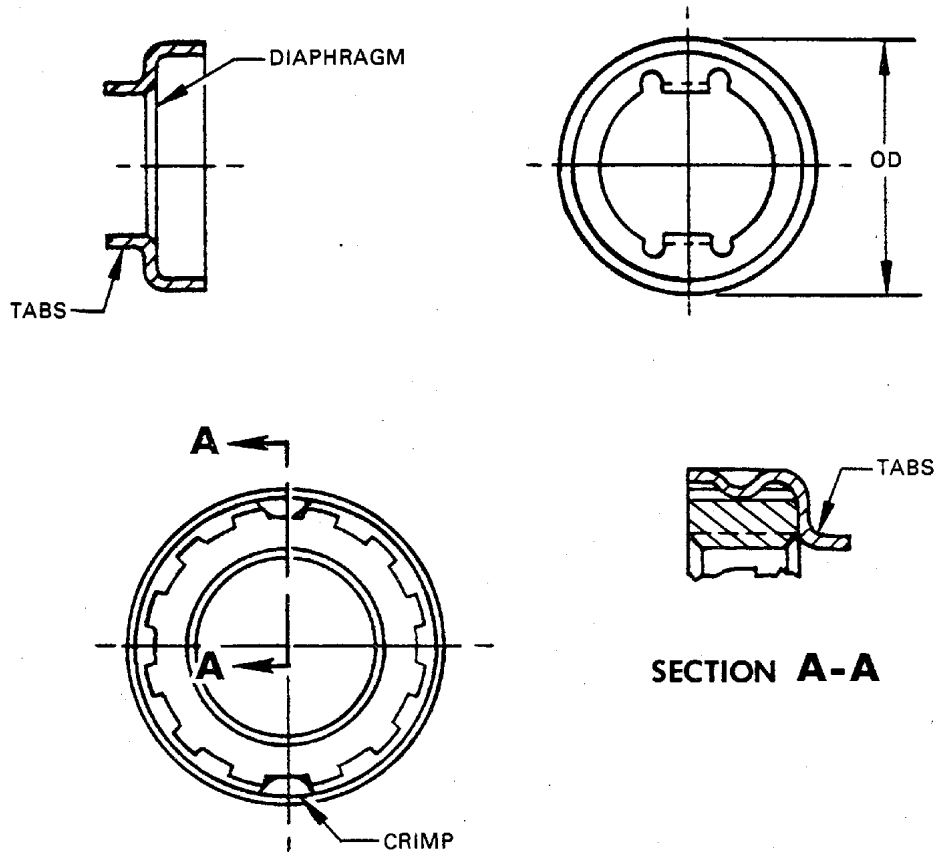
EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.5
Feb 01/2007

**MD-80
AIRCRAFT MAINTENANCE MANUAL**



THREAD SIZE (INCHES)	INDENTATIONS REQUIRED	
	NUMBER	SPACING
0.000 — 1.500	2	180° ± 30° APART
1.500 — 2.500	4	90° ± 30° APART
2.500 — 4.000	6	60° ± 15° APART
OVER 4.000	8	45° ± 15° APART

L-47817
4-75
BBB2-70-27

**Typical Crimping of Internal and External Cup Type Key Washers
Figure 226/70-00-00-990-826**

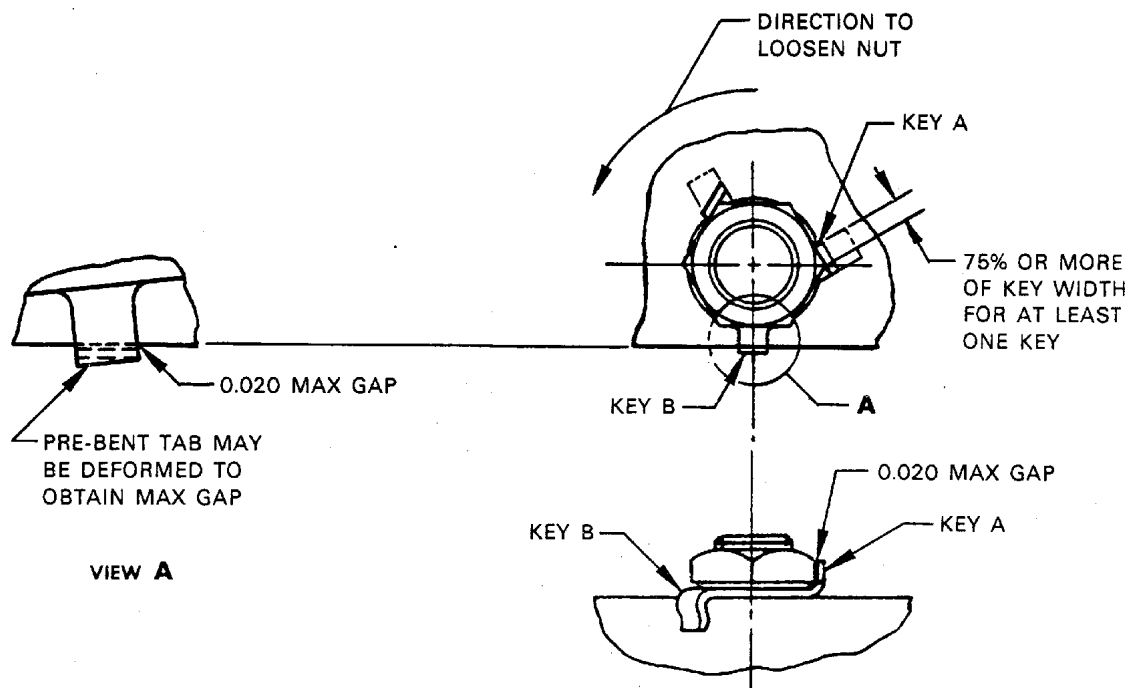
EFFECTIVITY
ZT ALL

TP-80MM-ZT

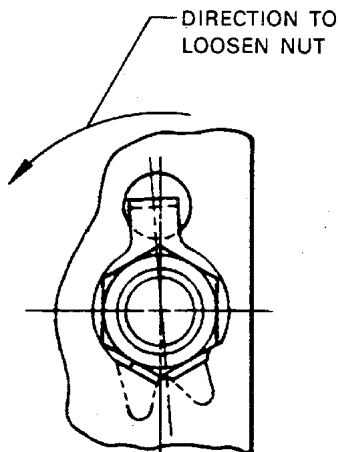
70-00-00

Page 298.6
Feb 01/2007

**MD-80
AIRCRAFT MAINTENANCE MANUAL**



PRE-BENT KEY OVERHANGING ADJACENT SURFACE



PRE-BENT KEY ANCHORED IN ADJACENT HOLE

L-47860
4-75
88B2-70-28

**Installation of Tab Type Key Washer
Figure 227/70-00-00-990-827**

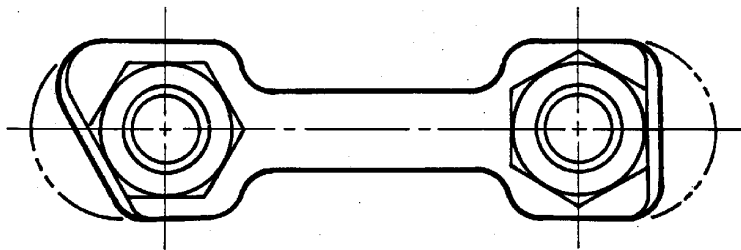
EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.7
Feb 01/2007

**MD-80
AIRCRAFT MAINTENANCE MANUAL**



NOTE: KEY WASHER MUST BE USED ONLY ONE TIME.
INSTALLATION OF THIS TYPE OF KEY WASHER
SHALL BE ACCOMPLISHED BY BENDING WASHER
UP ACROSS ONE WHOLE FACE OF HEXAGON AS
SHOWN WITH A 0.020 INCH MAXIMUM GAP
BETWEEN FLAT OF NUT AND WASHER.

L-44461
BBB2-70-29

**Installation of Elliptical Type Key Washer
Figure 228/70-00-00-990-828**

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.8
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

15. Lockwiring Procedures

- A. Check fasteners to be lockwired to make sure that they have been correctly torqued and that lockwire holes are properly positioned in relation to each other. Never overtorque or loosen fasteners to obtain proper alignment of lockwire holes. Select another fastener, if necessary, to obtain proper alignment of lockwire holes with specified torque limits.
- B. Install lockwire so that, after installation, neither the wire nor its adjacent parts will be subject to wear or excessive load. (Figure 229) (Figure 230)
- I C. To prevent mutilations on twisted section of wire when using pliers, grasp wire at ends or at a point that will not be twisted. Lockwire must not be nicked, kinked, or mutilated. Never twist excess wire ends off with pliers.
- D. Lockwire must be taut when installed to prevent failure due to rubbing or vibration. Lockwire shall have approximately 7 to 10 twists per inch; one twist is defined as being produced by twisting the wires through an arc of 180 degrees and is equivalent to one-half a complete turn. Do not overtighten.
- E. When trimming ends, leave at least three complete turns after loop, exercising due care to prevent wire ends from falling into the engine.
- F. Ends of lockwire must be bent toward part to avoid sharp or projecting ends which might present a safety hazard.

EFFECTIVITY
ZT ALL

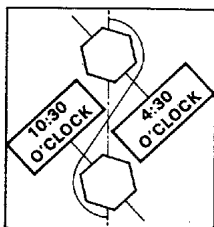
TP-80MM-ZT

70-00-00

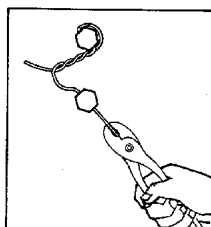
Page 298.9
Feb 01/2007

MD-80

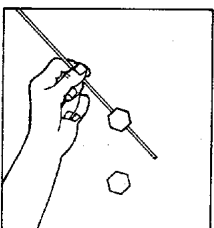
AIRCRAFT MAINTENANCE MANUAL



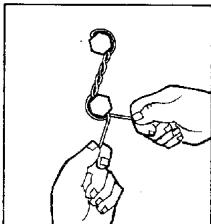
POSITION THE HOLES.



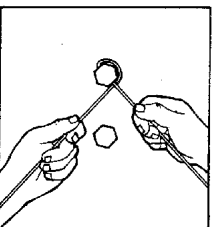
INSERT THE UPPERMOST WIRE, WHICH POINTS TOWARDS THE SECOND BOLT, THROUGH THE HOLE WHICH LIES BETWEEN THE NINE AND TWELVE O'CLOCK POSITIONS. GRASP THE END OF THE WIRE WITH A PAIR OF PLIERS AND PULL THE WIRE TIGHT.



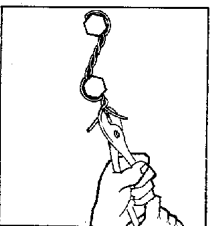
INSERT PROPER GAGE WIRE. TO DETERMINE THE PROPER WIRE TO BE USED IN CONJUNCTION WITH A PARTICULAR TIGHTENING OPERATION REFER TO THE CORRESPONDINGLY DESIGNATED ENGINE PARTS CATALOG OR ILLUSTRATED PARTS BREAKDOWN. LOCKWIRE WHICH IS SPECIALLY TREATED FOR 1800°F (982°C) APPLICATIONS HAS A DARK GRAY TO BLACK COLOR.



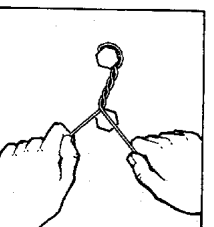
BRING THE FREE END OF THE WIRE AROUND THE BOLTHEAD IN A COUNTERCLOCKWISE DIRECTION AND UNDER THE END PROTRUDING FROM THE BOLT HOLE. TWIST THE WIRE IN A COUNTERCLOCKWISE DIRECTION.



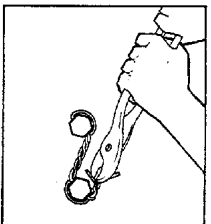
GRASP UPPER END OF THE WIRE AND BEND IT AROUND THE HEAD OF THE BOLT, THEN UNDER THE OTHER END OF THE WIRE. BE SURE WIRE IS TIGHT AROUND HEAD.



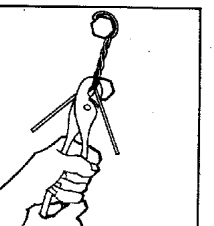
GRASP THE WIRE BEYOND THE TWISTED PORTION AND TWIST THE WIRE ENDS COUNTERCLOCKWISE UNTIL TIGHT.



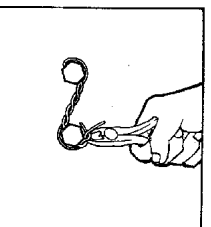
TWIST WIRE UNTIL WIRE IS JUST SHORT OF HOLE IN THE SECOND BOLT.



DURING THE FINAL TWISTING MOTION OF THE PLIERS, BEND THE WIRE DOWN AND UNDER THE HEAD OF THE BOLT.



KEEPING WIRE UNDER TENSION, TWIST IN A CLOCKWISE DIRECTION UNTIL THE WIRE IS TIGHT. WHEN TIGHTENED THE WIRE SHALL HAVE APPROXIMATELY 7—10 TWISTS PER INCH.



CUT OFF EXCESS WIRE WITH DIAGONAL CUTTERS.

L-5254
11-75
BB82-70-30

Lockwiring Technique
Figure 229/70-00-00-990-829

EFFECTIVITY
ZT ALL

TP-80MM-ZT

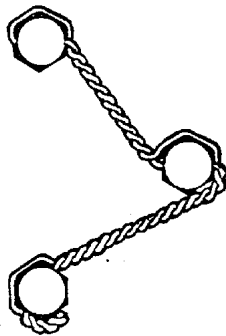
70-00-00

Page 298.10
Feb 01/2007

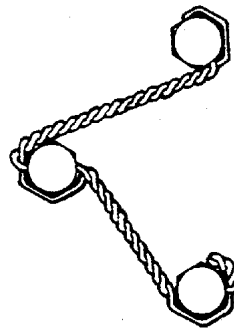
MD-80 AIRCRAFT MAINTENANCE MANUAL



EXAMPLE 1



EXAMPLE 2



EXAMPLE 3



EXAMPLE 4



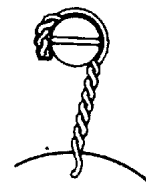
EXAMPLE 5



EXAMPLE 6

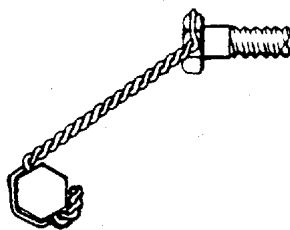


EXAMPLE 7



EXAMPLE 8

EXAMPLES 5, 6, 7, AND 8 SHOW METHODS FOR WIRING VARIOUS STANDARD ITEMS. WIRE MAY BE WRAPPED OVER THE UNIT RATHER THAN AROUND IT WHEN WIRING CASTELLATED NUTS OR ON OTHER ITEMS WHERE THERE IS A CLEARANCE PROBLEM.



EXAMPLE 9



EXAMPLE 10



EXAMPLE 11

EXAMPLE 9 SHOWS THE METHOD FOR WIRING BOLTS IN DIFFERENT PLANES. NOTE THAT WIRE SHOULD ALWAYS BE APPLIED SO THAT TENSION IS IN THE TIGHTENING DIRECTION.

HOLLOW HEAD PLUGS SHALL BE WIRED AS SHOWN WITH THE TAB BENT INSIDE THE HOLE TO AVOID SNAGS AND POSSIBLE INJURY TO PERSONNEL WORKING ON THE ENGINE.

CORRECT APPLICATION OF SINGLE WIRE TO CLOSELY SPACED MULTIPLE GROUP.

L-61082

BBB2-70-31

Examples of Proper Lockwiring
Figure 230 (Sheet 1 of 3)/70-00-00-990-830

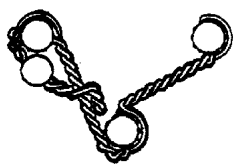
EFFECTIVITY
ZT ALL

TP-80MM-ZT

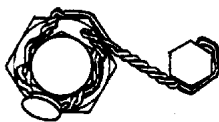
70-00-00

Page 298.11
Feb 01/2007

**MD-80
AIRCRAFT MAINTENANCE MANUAL**



EXAMPLE 12



EXAMPLE 13

EXAMPLES 12 AND 13 SHOW METHODS FOR ATTACHING LEAD SEAL TO PROTECT CRITICAL ADJUSTMENTS.



EXAMPLE 14

EXAMPLE 14 SHOWS BOLT WIRED TO A RIGHT ANGLE BRACKET WITH THE WIRE WRAPPED AROUND THE BRACKET.



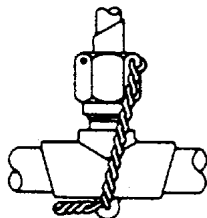
EXAMPLE 15

EXAMPLE 15 SHOWS CORRECT METHOD FOR WIRING ADJUSTABLE CONNECTING ROD.



EXAMPLE 16

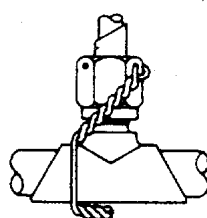
EXAMPLE 16 SHOWS CORRECT METHOD FOR WIRING THE COUPLING NUT ON FLEXIBLE LINE TO THE STRAIGHT CONNECTOR BRAZED ON RIGID TUBE.



EXAMPLE 17



EXAMPLE 18

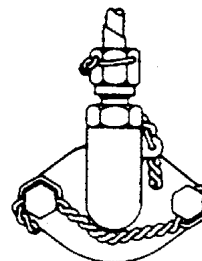


EXAMPLE 19



EXAMPLE 20

FITTINGS INCORPORATING WIRE LUGS SHALL BE WIRED AS SHOWN IN EXAMPLES 17 AND 18. WHERE NO LOCKWIRE LUG IS PROVIDED, WIRE SHOULD BE APPLIED AS SHOWN IN EXAMPLES 19 AND 20, ENSURING THAT WIRE IS WRAPPED TIGHTLY AROUND THE FITTING.



EXAMPLE 21

SMALL SIZE COUPLING NUTS SHALL BE WIRED BY WRAPPING THE WIRE AROUND THE NUT AND INSERTING IT THROUGH THE HOLES AS SHOWN.

L-51366
11-75

BBB2-70-32

**Examples of Proper Lockwiring
Figure 230 (Sheet 2 of 3)/70-00-00-990-830**

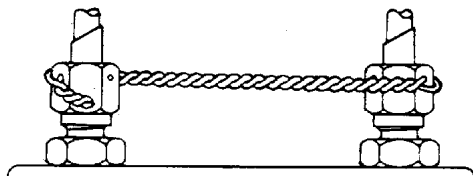
EFFECTIVITY
ZT ALL

TP-80MM-ZT

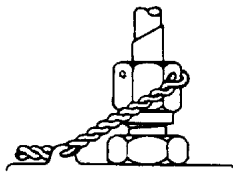
70-00-00

Page 298.12
Feb 01/2007

**MD-80
AIRCRAFT MAINTENANCE MANUAL**

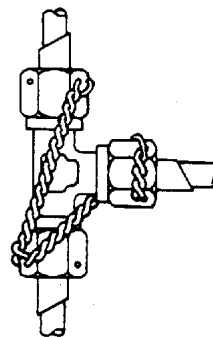


EXAMPLE 22



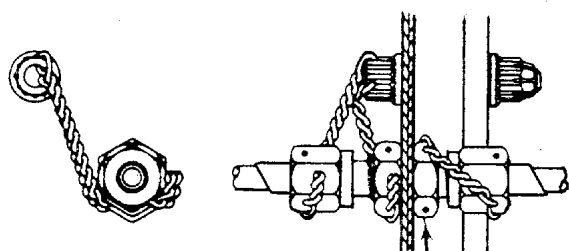
EXAMPLE 23

COUPLING NUTS ATTACHED TO STRAIGHT CONNECTORS SHALL BE WIRED AS SHOWN WHEN HEX IS AN INTEGRAL PART OF THE CONNECTOR.



EXAMPLE 24

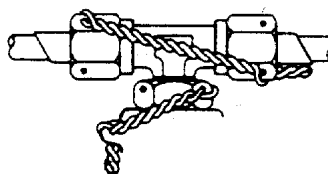
COUPLING NUTS ON A TEE SHALL BE WIRED AS SHOWN ABOVE SO THAT TENSION IS ALWAYS IN THE TIGHTENING DIRECTION.



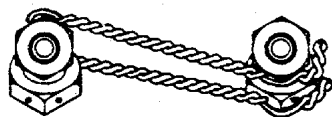
EXAMPLE 25

STRAIGHT CONNECTOR
(BULKHEAD—TYPE)

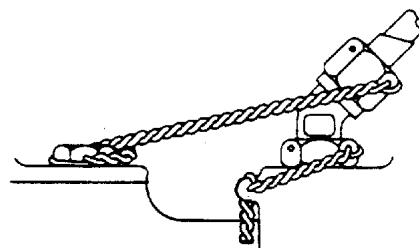
HEX IS INTEGRAL
WITH FITTING.



EXAMPLE 26



EXAMPLE 27



EXAMPLE 28

EXAMPLES 26, 27, AND 28 SHOW THE PROPER METHOD FOR WIRING VARIOUS STANDARD FITTINGS WITH LOCKNUT WIRED INDEPENDENTLY SO THAT IT NEED NOT BE DISTURBED WHEN REMOVING THE COUPLING NUT.

L-51368
11—75
BBB2-70-33

**Examples of Proper Lockwiring
Figure 230 (Sheet 3 of 3)/70-00-00-990-830**

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.13
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

16. Cotter Pinning

A. General

- (1) Cotter pins are not reusable. New cotter pins must be used for each application.

B. Locking Nuts With Cotter Pins (Figure 231)

- (1) Before installing cotter pin, tighten nut to low side of torque range, unless otherwise specified, then continue tightening until slot aligns with hole in bolt. If slot in nut does not line up with hole before maximum allowable torque is reached, back off nut, then retighten. If slot still does not line up, select new nut and repeat assembly procedure.
- (2) While preferred installation would locate centerline of hole in bolt midway into nut slot, any installation wherein more than 50 percent of cotter pin diameter is located below nut castellation is acceptable. In event 50 percent or more of cotter pin diameter is located above nut castellation, new nut must be selected and installed.
- (3) Install each cotter pin with head seated firmly in slot of nut with axis of eye at right angles to bolt. Bend prongs so that head and upper prong are firmly seated against bolt, and lower prong is firmly seated against corresponding nut flat. Upper prong may be cut off even with top of bolt to provide necessary clearance. Lower prong may also be cut off to provide necessary clearance and/or a snug fit against corresponding nut flat.

C. Retaining Pins and Rod Ends With Cotter Pins (Figure 232)

- (1) Install cotter pin with axis of eye parallel to shank of clevis pin or rod end. Bend prongs around shank of pin or rod end. Prongs may be cut to obtain normal end position.

17. Installation of Retaining Rings

- I
- A. General. Retaining rings must be installed using approved retaining ring pliers. Internal type rings must not be compressed beyond point where ends of rings meet. External type rings must be expanded only enough to allow installation without becoming bent. After installation, ensure that each retaining ring is completely seated, without looseness or distortion, in its groove. Distorted or loose retaining rings must be replaced.

B. Plain Retaining Rings

- (1) Plain retaining rings may contain slightly rounded edges on one side and sharp edges on opposite side. Slight rounding, caused by stamping die, is not a bevel and ring must not be classified as a beveled ring.
- (2) Plain retaining rings must be installed only in square sided grooves. When one side of a plain ring has visibly sharper corners, this side must be installed away from detail part(s) being retained, so that sharp-edged side thrusts against groove.

EFFECTIVITY
ZT ALL

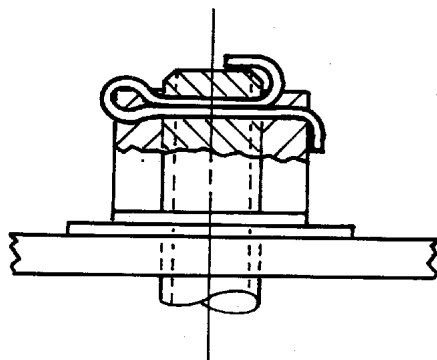
TP-80MM-ZT

70-00-00

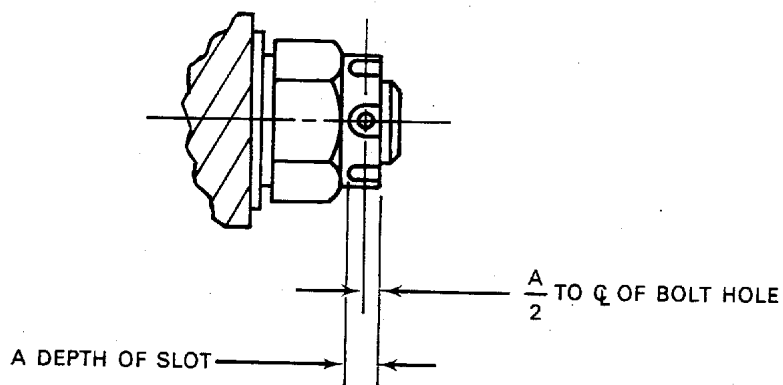
Page 298.14
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL



PREFERRED INSTALLATION



LOCATION OF LOCKING
HOLE IN SLOT OF NUT

L-28805
BBB2-70-34

Locking Nuts With Cotter Pins
Figure 231/70-00-00-990-831

EFFECTIVITY
ZT ALL

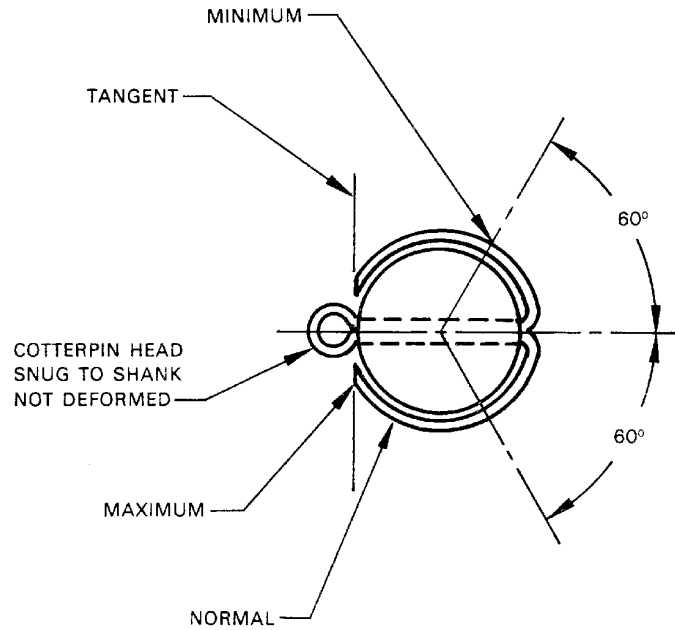
TP-80MM-ZT

70-00-00

Page 298.15
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL



L-28806
BBB2-70-35

Installing Cotter Pin on End of Retaining Pin/Rod
Figure 232/70-00-00-990-832

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.16
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

18. Guidelines For Reuse Of Damaged Engines And Engine Parts

A. General

- (1) The following guidelines are provided to assist owners, operators and maintenance facilities in the disposition of engines and engine parts involved in Abnormal Operational Circumstances. Abnormal Operational Circumstances are defined as accidents or other events which fall outside of the operating envelope for the engine, aircraft and/or the engine/aircraft combination as originally certified and where inspection, refurbishment, and repair data are not addressed by FAA approved publications, i.e., engine manuals, service bulletins, etc. The data contained in these FAA approved publications normally address engine and engine parts which experience wear, deterioration, or damage through exposure to the normal day-to-day operating environment. The guidelines apply to the following engine associated abnormal operation circumstances:
 - (a) Engine And Engine Parts Unacceptable For Continued Aircraft Usage. (Paragraph 18.B.)
 - (b) Engines And Engine Parts Potentially Acceptable For Continued Aircraft Usage. (Paragraph 18.C.)
- (2) For Abnormal Operational Circumstances not addressed by these guidelines, Pratt & Whitney considers engines and engine parts unacceptable for continued aircraft usage unless reviewed and approved on a case-by-case basis.
- (3) The guidelines are based upon Pratt & Whitney's general experience in this area and therefore are to be used as general guidelines. In any particular incident, however, more complete information or inspection results may require alternate action. The engine or engine part owner should not rely upon the information in these guidelines without a thorough understanding of the damage to the engine or engine parts and its effect on engine operation.

NOTE: IT SHOULD BE UNDERSTOOD THAT THE FOLLOWING ARE ONLY GUIDELINES AND THAT ANY AND ALL RESPONSIBILITY FOR RETURNING ANY ENGINE OR ENGINE PART TO SERVICE REMAINS WITH THE ENGINE OR PART OWNER.

- (4) The following are definitions of technical terms used in these guidelines:
 - (a) Definitions from ATA World Airlines Technical Operations Glossary (WATOG).
 - 1) Accident:

An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight, until such time as all such persons have disembarked, in which:

 - a) Any person suffers death or serious injury as a result of being in or upon the aircraft, or by direct contact with the aircraft or anything attached thereto; or
 - b) The aircraft receives substantial damage; or
 - c) Any damage is caused to the property of a third party.
 - 2) Damage, Accidental:

Physical deterioration of an item caused by contact or impact with an object or influence which is not a part of the aircraft, or by improper manufacturing or maintenance practices.
 - (b) Non-WATOG definitions used in the guidelines
 - 1) Engine:

Engines manufactured by Pratt & Whitney Division of United Technologies Corporation.
 - 2) Engine parts:

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.17
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

Parts sold by Pratt & Whitney and delivered as original equipment in an engine installed on an aircraft or in a spare engine or parts sold by Pratt & Whitney as new spare parts in support of an engine. Engine parts include Pratt & Whitney authorized vendor supplied accessories and components.

3) Abnormal operational circumstances:

Accidents or other events which fall outside the operating envelope for the engine, aircraft, and/or the engine aircraft combination as originally certified and where inspection, refurbishment, and repair data are not addressed by FAA approved publications, i.e., engine manuals, service bulletins, etc.

B. Abnormal Operational Circumstances - Engines And Engine Parts Unacceptable For Continued Aircraft Usage

(1) Pratt & Whitney considers engines and engine parts involved in the following types of circumstances unacceptable for continued aircraft usage:

NOTE: It is recognized that an aircraft could be damaged beyond economical repair without any resulting engine involvement. In such cases the engine and engine parts can be considered "not involved" in an abnormal operational circumstance.

- (a) Engines and engine parts installed in an aircraft totally destroyed by fire.
- (b) Engines and engine parts totally engulfed in fire to the extent that outer cases have been heat discolored and/or distorted or the engine is otherwise damaged by heat over a significant area of the engine, either external or internal.
- (c) Engine and engine parts installed in an aircraft totally destroyed by impact damage.

C. Abnormal Operational Circumstances - Engines And Engine Parts Potentially Acceptable For Continued Aircraft Usage

(1) Accidents

(a) Pratt & Whitney considers engines and engine parts involved in the following types of accidents potentially acceptable for continued aircraft usage:

- 1) Engines and engine parts involved in an accident in which the nacelles and engines remain undamaged.
- 2) Engines or engine parts involved in a fire wherein a portion of the aircraft was destroyed but the engines were not subjected to fire damage.
- 3) Engines and engine parts involved in an accident wherein engines rotate freely, although impact damage to cases or other engine parts is evident.
- 4) Partially damaged engines which will not rotate freely as a result of superficial damage to cases, etc.
- 5) Engines subjected to partial or full immersion in fresh or salt water for a brief period of time.

(b) Acceptance criteria for Paragraph 18.C.(1)(a) engines or engine parts:

- 1) Engines and engine parts involved in accidents described in Paragraph 18.C.(1)(a)1) and Paragraph 18.C.(1)(a)2) can be considered "not involved" in an abnormal operational circumstance.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.18
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

- 2) Engines and engine parts involved in accidents described in Paragraph 18.C.(1)(a)3 paragraph, Paragraph 18.C.(1)(a)4, and Paragraph 18.C.(1)(a)5 should be 100 percent disassembled and inspected.

NOTE: Owners who are unable to perform the necessary tests or who are in doubt whether to accept or reject a part should contact Pratt & Whitney for assistance.

D. Serious Operational Events

- (1) Pratt & Whitney considers engines and engine parts involved in the following types of serious operational events as potentially acceptable for continued aircraft usage provided the criteria defined are observed.

- (a) Single fan blade fractures outboard of mid span shroud.

NOTE: A single fan blade fracture occurring outboard of the mid span shroud can cause varying degrees of engine damage. Refer to ENGINE GENERAL, SUBJECT 72-00-00, Inspection/Check-01 for bird or object ingestion inspections and damage limits. In general, the following inspection guidelines can be applied to events where a single blade has fractured outboard of the mid span shroud.

- 1) Check for evidence of core ingestion.
- 2) Inspect fan blade shrouds for evidence of shingling.
- 3) Inspect fan rubstrip for damage beyond limits.
- 4) Check fan exit guide vanes for damage.
- 5) Inspect engine externals for broken or cracked brackets and case flanges.
- 6) Borescope inspect compressor gaspath for excessive blade tip rub and blade-to-vane clash.

- (b) Single blade fracture inboard of mid span shroud or multiple fan blade fractures.

NOTE: A fan blade fracture inboard of the mid span shroud or multiple fractures generate a significant amount of rotor vibration. More extensive inspections with disassembly of the N1 rotor modules is required as a minimum. Further disassembly is required as inspection findings dictate.

- (c) Engines experiencing sudden stoppage.

- 1) Engines experiencing sudden stoppage usually as a result of significant ingestion or distress. In every instance of sudden stoppage a complete engine disassembly and 100 percent engine part inspection should be accomplished.

- (d) Engines involved in an operational fire (burn-through, bearing compartment, etc.).

- 1) Engines involved in an operational fire should be completely disassembled and all engine parts inspected.
- 2) If extinguishing agents have been applied to the engine, gaspath cleaning is to be accomplished per ENGINE GENERAL - CLEANING-01, PAGEBLOCK 72-00-00/701 as quickly as practical to prevent corrosion.

E. "Impacted" And "Dropped" Engines

- (1) The damage or circumstances which can result in an "Impacted" engine include impact with the ground, a collision with a service vehicle, etc. An engine dragged on the ground or against another object is considered an impacted engine. "Dropped" engines refer to engines which are dropped entirely or on either end.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.19
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

Inspection requirements for impacted and dropped engines are similar and progressive in scope; that is, proceeding with further disassembly is dependent on the degree of damage found at each level of inspection.

- (a) For engine mounted on aircraft where pylon or nacelle damage has occurred, inspect engine mount flanges, cases, external components and plumbing, and gearbox housing and mounts. If the impact was such that debris may have entered the engine inlet, inspect engine for ingestion, and check bleed system filters and valves for debris.
 - 1) If no damage is noted, no further action is required.
 - 2) If damage is noted to external components and plumbing, replace damaged items.
 - 3) If damage is noted to mount flanges, gearbox or gearbox mounts or cases, remove engine.
 - 4) Monitor chip detectors and oil filter on a more frequent basis during the initial return of the engine to service.
- (b) For dropped engines removal and disassembly are required.

F. Tailpipe Fires

- (1) In general tailpipe fires of short duration and extinguished by "motoring" the engine will probably have little detrimental effect on exhaust area engine parts. (Refer to PWA Operating Instructions 190).
 - (a) Inspect exhaust area for signs of scorching. Any parts which exhibit scorching including fan duct acoustic liners if so equipped, should be replaced.
- (2) Engines which experience a more persistent tailpipe fire or when starting overtemperature limits are exceeded during a tailpipe fire present a greater potential for thermal stress. Engine removal is required.

G. Engine Contamination - Fire Extinguishing Agents

NOTE: The following general information is provided to assist operators in determining appropriate actions for engines subjected to fire extinguishing agents. This information is applicable in instances where fires have been confined to burner and turbine gaspath areas, and overtemperature limits have not been exceeded.

It should be noted that detailed gaspath cleaning procedures for engines exposed to fire extinguishing agents, as well as instructions for subsequent disassembly, cleaning and inspection, are provided in ENGINE GENERAL - CLEANING-01, PAGEBLOCK 72-00-00/701.

- (1) There has been considerable effort expended to determine the effects of commonly used fire extinguishing agents (sodium bicarbonate, potassium bicarbonate and bromotrifluoreomethane (CBrF₃) on turbine engine parts.
- (2) The major concern with introducing dry powder chemicals into the engine is corrosion during subsequent engine operation. This material can be extremely detrimental to hot section parts, as exposure to the engine operating environment converts the bicarbonate compounds to carbonates, which then form a highly corrosive liquid flux.
- (3) Test results reveal stainless steels, nickel base alloys, (coated or uncoated), and cobalt base alloys, show a high degree of susceptibility to chemical corrosion, even at temperatures considerable below the engine operating range of approximately 1200°F (649°C). Titanium, aluminum, magnesium, cadmium plated and nickel-cadmium plated low alloy steels evidenced no corrosion from bicarbonate compounds at engine operating temperatures.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.20
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

- (4) Regarding the use of CBrF₃, used primarily as an inflight fire extinguishing agent, one manufacturer of the compound stated that the products of decomposition will include certain acids which may have a slight corrosive effect on metals when exposed to high temperatures. PWA 45, PWA 47, PWA 73, PWA 273, and PWA 275 coatings degrade completely from CBrF₃ contact at 1800°F for short periods of time.
- (5) Although no specific testing has been done relative to the effects these agents have on the oil system, the oil system should also be considered because agents could enter the oil system through labyrinth seals.
- (6) Cleaning methods specified in ENGINE GENERAL - CLEANING-01, PAGEBLOCK 72-00-00/701 for engines subjected to fire extinguishing agents should be carefully adhered to in order to minimize damage.

19. Engine Gaspath Cleaning Solutions

A. The quality specifications for potable water approved to clean the engine gaspath are as follows:

Physical	Maximum Permitted Levels
Color	15 units
pH	6.4 - 8.5
Temperature	75°F (24°C)
Total Dissolved Solids	500 mg/l
Threshold Odor Number	2
Turbidity	5 units

Table 204

Inorganic	Milligrams/Liter
Arsenic	0.05
Barium	1.
Cadmium	0.01
Chlorides	250
Chromium	0.05
Copper	1.0
Cyanide	0.2
Fluoride	2.0
Iron	0.3
Lead	0.05
Magnesium	125
Manganese	0.05
Mercury	0.002
Nitrite Nitrogen	1.0 (as N)
Nitrite plus Nitrate Nitrogen	10.0 (as N)

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.21
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

Inorganic	Milligrams/Liter
Selenium	0.01
Silver	0.05
Sodium	20
Sulfate	250
Zinc	5.0

B. Prepare detergent solution to clean the engine gaspath as follows:

- (1) See ENGINE GENERAL - CLEANING-01, PAGEBLOCK 72-00-00/701 for approved engine gaspath detergent wash procedures.

Table 205

Material	Proportion
Gaspath Cleaner (SPS 87-1,-2,-3,-4,-6,-7, -8,-10,-11,-12, or -13	20 percent by volume with potable water. Refer to Potable Water Quality Specifications in Paragraph 19.A..
Gaspath Cleaner (SPS 87-5 or -9)	100 percent by volume

WARNING: REFER TO THE MANUFACTURER'S MATERIAL SAFETY DATA SHEETS FOR CONSUMABLE MATERIALS INFORMATION SUCH AS: HAZARDOUS INGREDIENTS, PHYSICAL/CHEMICAL CHARACTERISTICS, FIRE, EXPLOSION, REACTIVITY, HEALTH HAZARD DATA.

- (2) Detergent Sources

Table 206 PRECAUTIONS FOR SAFE HANDLING, USE AND CONTROL MEASURES

Name and Number	SPECIFICATIONS	SOURCE CODE
SPS 87-1 thru -13 Cleaner - Gaspath	SPS 87-1: Ardrex 6343	23373 or K6858
	SPS 87-2: Ardrex 6345	23373 or K6858
	SPS 87-3: Ardrex/Leeder 252-L	23373 or K6858
	SPS 87-4: B & B 3100	21361
	SPS 87-5: B & B TC100	21361
	SPS 87-6: Cee-Bee R-674	71361
	SPS 87-7: PENAIR M-5704	56883
	SPS 87-8: Penetone 19A	56883
	SPS 87-9: IVAR RIVENAES RMC	58913
	SPS 87-10: TURBO CLEAN	K2884
	SPS 87-11: TURCO JET WASH K3	OBYN5
	SPS 87-12: TURCO T-5884	OBYN5
	SPS 87-13: ZOK 27	U4628

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.22
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

20. Service Process Operation Procedures

A. General

- (1) Some procedures are referred to in the maintenance text with the abbreviation "SPOP" and a number. These procedures are under P&W Engineering control.
- (2) A SPOP is a Service Process Operation Procedure. If a process has this designation, it will be necessary to use approved procedures and materials.

21. Engine External Cleaning (SPOP 1)

- A. This task gives the general instructions for the cleaning of the exterior of the assembled engine.
- B. This task gives the necessary instructions for the removal of oils, grease, hydraulic fluid, and loose soil by Method A or Method B. It does not remove hard, baked-on carbon.
- C. It will be necessary to put covers on all openings into the engine (this includes inlet and exhaust, bleed openings, open fuel, oil, or air tubes, and open electrical connectors).
- D. Consumable Materials

(1) METHOD A - SOLUTION-TYPE CLEANERS:

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

NOTE: Equivalent replacements are permitted for the items that follow.

REFERENCE	DESIGNATION
Alkali Cleaner (PMC 1284)	
Alkali Cleaner (SPMC 106)	
Alkali Cleaner (SPMC 104)	
Alkali Cleaner (SPMC 105)	
Aqueous Cleaner (SPMC 113)	
Aqueous Degreaser (SPMC 151)	
Aqueous Degreaser (SPMC 195)	

(2) METHOD A - GEL-TYPE CLEANERS

REFERENCE	DESIGNATION
Alkaline Gel Cleaner (SPMC 109)	
Alkaline Gel Cleaner (SPMC 110)	
Alkaline Gel Cleaner (SPMC 112)	
Alkaline Gel Cleaner (SPMC 159)	

(3) METHOD B - APPROVED CLEANER

REFERENCE	DESIGNATION
Aqueous Cleaner (SPMC 148-1 thru SPMC 148-4)	

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.23
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

WARNING: REFER TO THE MANUFACTURER'S MATERIAL SAFETY DATA SHEETS FOR CONSUMABLE MATERIAL INFORMATION SUCH AS: HAZARDOUS INGREDIENTS, PHYSICAL/CHEMICAL CHARACTERISTICS, FIRE, EXPLOSION, REACTIVITY, HEALTH HAZARD DATA, PRECAUTIONS FOR SAFE HANDLING, USE AND CONTROL MEASURES.

- E. Method A removes oils, grease, hydraulic fluid, and loose soil with gel-type or solution-type cleaners.

NOTE: For very dirty engines, the gel-type cleaners are more effective because they bond to the parts during the soak and do not spill off the surface of the part.

- (1) Gel-type cleaners.

NOTE: Gel-type cleaners must have a special applicator. Do not apply by steam machines or make a solution or dilute them for application.

- (a) Use these gel cleaners 100 percent by volume, as received:

REFERENCE	DESIGNATION
Alkaline Gel Cleaner (SPMC 109)	
Alkaline Gel Cleaner (SPMC 110)	
Alkaline Gel Cleaner (SPMC 112)	
Alkaline Gel Cleaner (SPMC 159)	

- (2) Solution-type cleaners

- (a) Make a solution of one of the solution-type cleaners as specified:

- Alkali Cleaner (PMC 1284) at 25 percent by volume
- Alkali Cleaner (SPMC 106) at 30 percent by volume
- Alkali Cleaner (SPMC 104) at 25 percent by volume
- Aqueous Cleaner (SPMC 105) at 25 percent by volume
- Aqueous Cleaner (SPMC 113) at 10 percent by volume
- Aqueous Cleaner (SPMC 113) at 20 percent by volume
- Aqueous Cleaner (SPMC 151) at 25 percent by volume
- Aqueous Cleaner (SPMC 195) at 50 percent by volume.

- (b) Fill the container with clean water until the container is approximately 50 percent full.

- (c) Slowly and carefully add the specified quantity by volume of the applicable material.

- (d) Mix the solution fully.

- (e) Fill the remaining volume of the container with clean water and mix fully.

- (f) Mix the solution fully immediately before you use it.

- F. Method B removes oils, grease, hydraulic fluid, and loose soil by local application of one of the cleansers that follow:

- (1) Aqueous Cleaner (SPMC 148-1 thru SPMC 148-4).

- (2) A solvent from SPOP 208.(Paragraph 24.)

- G. Clean exterior of assembled engine as follows:

- (1) Method A

- (a) Install covers on all openings into the engine (this includes the inlet and exhaust, bleed openings, open fuel, oil or air tubes and open electrical connectors).

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.24
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

- (b) Clean by one of the methods that follow:
 - 1) Apply the gel-type cleaner in spray form.
 - 2) Apply the solution-type cleaner in spray, steam, or foam form.
- (c) Permit the cleaner to stay on the engine for 10 - 20 minutes.
- (d) Flush the cleaner fully off the engine with warm or hot water or steam.
- (e) Remove the covers from all the openings on the engine.
- (2) Method B (Local Application only)
 - (a) Remove oils, grease, hydraulic fluid, and loose soil from the exterior of the assembled engine by one of the methods that follow:
 - 1) Spray or wipe the part with aqueous cleaner (SPMC 148-1 thru SPMC 148-4), used 100 percent by volume, as received. If necessary, scrub with a soft brush (not made of metal) or a pad.

WARNING: CLEANING SOLVENTS ARE HIGHLY FLAMMABLE, VOLATILE AND TOXIC. THEY SHOULD BE USED WITH ADEQUATE VENTILATION. AVOID PROLONGED BREATHING OF VAPORS AND REPEATED OR PROLONGED CONTACT WITH THE SKIN.

- 2) Use a brush (not made of metal), a scrub pad, or a clean cloth to apply a solvent from SPOP 208. (Paragraph 24.)

22. Fluorescent Penetrant Check (Local Application) Normal or High or Ultra High Sensitivity (SPOP 70)

A. General

WARNING: REFER TO THE MANUFACTURER'S MATERIAL SAFETY DATA SHEETS FOR CONSUMABLE MATERIAL INFORMATION SUCH AS: HAZARDOUS INGREDIENTS, PHYSICAL/CHEMICAL CHARACTERISTICS, FIRE, EXPLOSION, REACTIVITY, HEALTH HAZARD DATA, PRECAUTIONS FOR SAFE HANDLING, USE AND CONTROL MEASURES.

- (1) This task gives the general instructions and the approved materials for fluorescent penetrant inspection (local application) normal or high or ultra high sensitivity.

NOTE: SPOP 70 is for the inspection of the small areas of a part (such as, bosses, weld repaired areas, rout outs or grind outs, and blended areas). It is not for full circumference (360 degree) inspections (for example, on flanges, seals, knife-edges) or to replace a 100 percent inspection.

B. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed items.

NOTE: It is possible that some materials in the Equipment and Materials List cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.25
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

Table 207

Name and Number	Manufacturer
UV Light (No specific)	
UV Light Meter (No specific)	
White Light Meter (No specific)	
Fluorescent Penetrant (Post-Emulsified) (05-032) (PMC 4353)	
Dry Developer (05-034) (PMC 4356)	
Fluorescent Penetrant (Post-Emulsified) (05-234) (PMC 4352)	
Fluorescent Penetrant (Post-Emulsified) (05-235) (PMC 4354)	
Fluorescent Penetrant (Water Washable) (05-236) (PMC 4360)	
Fluorescent Penetrant Developer Nonaqueous (05-237) (PMC 4357)	
Fluorescent Penetrant (Water Washable) (05-424) (PMC 4351)	
Isopropyl Alcohol (11-014) (PMC 9094)	
Acetone (11-032) (PMC 9008)	
Solvent Cleaner (11-038) (PMC 8904)	

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.26
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

Name and Number	Manufacturer
Solvent Cleaner (11-039) (PMC 9060)	
Fluorescent Penetrant Cleaner/Remover (11-042) (PMC 4366)	

C. Procedure - General Instructions

CAUTION: DO NOT USE A VISIBLE DYE PENETRANT ON AN ENGINE PART BEFORE YOU CHECK THE PART WITH FLUORESCENT PENETRANT. FLUORESCENT PENETRANTS AND VISIBLE DYE PENETRANTS ARE NOT COMPATIBLE WITH EACH OTHER. THE ABSORPTION OF VISIBLE DYE PENETRANT WILL MASK INDICATIONS AND DECREASE THE SENSITIVITY OF THE FLUORESCENT PENETRANT CHECK. DURING CHECK, DO NOT WEAR EYE GLASSES THAT HAVE LENSES WHICH DARKEN WHEN THEY ARE IN UV LIGHT.

- (1) Always obey the specific procedures and limits in the AMM maintenance task.
- (2) Always use "ultra" high sensitivity (Level 4) penetrant when you do SPOP 70 on major rotating parts (fan blades; compressor blades, drums, disks, airseals, and hubs; and turbine disks, airseals, hubs, seal plates (full rings and segments), and shafts). In some tasks the "ultra" high sensitivity penetrant is not specified on these major rotating parts. Service experience shows that "ultra" high sensitivity penetrant must be used (instead of high) on all major rotating parts.

D. Procedure - Cleaning Instructions

- (1) To remove all unwanted material, wipe the inspection area with a clean cloth, wet with solvent from (Paragraph 24. and ENGINE GENERAL - CLEANING-01, PAGEBLOCK 72-00-00/701).
- (2) Do not let the solvent run over or flood any surface.

E. Procedure - Inspection Instructions

- (1) Mask the adjacent area with masking tape, as necessary, to prevent penetrant contamination where it is not wanted.
- (2) Apply the applicable penetrant (normal, high, or ultra high), as specified by the specific AMM maintenance task, with a brush, cloth, or cotton swab. Let the penetrant stay on the surface of the part for 20 - 60 minutes.
 - (a) Do not mix different types or brands of penetrant.
 - (b) Normal Penetrants
 - 1) (05-234) Fluorescent Penetrant (Post-Emulsified) (PMC 4352).
 - 2) (05-424) Fluorescent Penetrant (Water Washable) (PMC 4351).
 - (c) High Penetrants
 - 1) (05-032) Fluorescent Penetrant (Post-Emulsified) (PMC 4353).
 - 2) (05-236) Fluorescent Penetrant (Water Washable) (PMC 4360).
 - (d) Ultra High Penetrants
 - 1) (05-235) Fluorescent Penetrant (Post-Emulsified) (PMC 4354).

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.27
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

- (3) To remove surface penetrant, wipe surfaces area with a clean cloth or paper towel, moisten with solvent from (Paragraph 24. and ENGINE GENERAL - CLEANING-01, PAGEBLOCK 72-00-00/701). Use the solvent only to moisten the wiper, if necessary. Do not let the solvent run over or flood any surface.

NOTE: It is very important to prevent too much solvent wiping, which can remove too much penetrant from the part.

- (4) Use the UVL to make sure that there is no more penetrant on the surface.
(5) Very lightly apply one of the developers that follow.

(a) (05-237) Fluorescent Penetrant Developer (Nonaqueous) (PMC 4357).

- 1) Apply the nonaqueous developer in an even coat, thick enough to be visible but not thick enough to obscure the color of the part.

(b) (05-034) Dry Developer (PMC 4356).

- (6) Let the developer absorb the penetrant for 10 minutes, minimum.

CAUTION: YOU MUST DO THIS CHECK IN A DARK AREA. WHITE LIGHT MUST NOT BE MORE THAN 2 FOOTCANDLES AT THE CHECK SURFACE. TO MAKE THE AREA DARK, YOU CAN COVER IT WITH A BLACK SHEET.

- (7) Examine the part under UVL for indications.
(8) If any area shows moderate fluorescent background or any marginally unacceptable or questionable indication, continue as follows.
(a) Lightly rub the area with a soft brush or cotton swab wet with solvent from (Paragraph 24. and ENGINE GENERAL - CLEANING-01, PAGEBLOCK 72-00-00/701).
(b) Do not let the solvent run over or flood any surface.
(c) Let the solvent evaporated from the surface, and then examine the area again under UVL.
(d) If the indication reappears immediately, then examine the indication.
(e) If the indication does not reappear immediately, then apply the dry or nonaqueous developer to the area. Let the developer absorb the penetrant for 10 minutes, minimum, and then examine the questionable area again under UVL.

NOTE: No cracks are permitted unless specified differently by an AMM task.

- (f) Use this evaluation procedure only once on any indication.
(9) Remove the developer.

NOTE: Removal of the developer is necessary only if it interferes with subsequent processing or part function.

- (a) For parts with no areas that can cause entrapment that are to go to visual/dimensional inspection, blow off any remaining developer, if necessary.
(b) For parts that can cause entrapment of dry developer, flush with hot water to clean.
(c) If a nonaqueous developer was used, remove developer by using (Paragraph 24. and ENGINE GENERAL - CLEANING-01, PAGEBLOCK 72-00-00/701)

23. **Anodize Touch-Up Application (SPOP 42)**

A. PS 607 Anodize Touch-Up Solution

- (1) Fill a container one-half full with PMC 1737 demineralized water with chloride content of 10 PPM maximum (you can use tap water if the chloride content is less than 10 PPM).

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.28
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

WARNING: REFER TO MANUFACTURER'S SAFETY DATA SHEETS FOR INFORMATION SUCH AS HAZARDOUS INGREDIENTS, PHYSICAL/CHEMICAL CHARACTERISTICS, FIRE, EXPLOSION, REACTIVITY, HEALTH HAZARD DATA, PRECAUTIONS FOR SAFE HANDLING, AND USE AND CONTROL MEASURES.

- (2) Add PMC 1631 salts, four ounces to a gallon of water (30 g/liter) of the total water volume.

NOTE: It is possible to get PMC 1631 chromate conversion salts as Iridite #14-2 compound from Witco Allied-Kelite, Division of Witco Chemical Corp. PMC 1632 wetting agent is ARP No. 2 from Witco Chemical Corp.

- (3) Add PMC 1632 wetting agent, two ml/gallon (0.53 g/liter) of the total water volume.

- (4) Mix the solution fully.

- (5) Fill the container with PMC 1737 demineralized water (chloride content of 10 PPM maximum).

NOTE: Discard the solution if not used after 14 days. It is possible to weigh the PMC 1631 salts and put them in storage until it is necessary to use them, then to add the water and PMC 1632 wetting agent.

B. Procedure

- (1) Use a clean cloth, wet with PMC 9015 perchlorethylene and/or crocus cloth and/or No. 400 emery cloth, to clean the bare surface.

- (2) Use a swab or brush to apply the PS 607 anodize touch-up solution.

NOTE: If the solution does not make the surface wet, remove with a clean cloth and clean the area again. See Paragraph 23.B.(1).

- (3) Let the solution become dry, or use a cloth wet with clean water to remove the remaining solution.

- (4) Examine the surface for a brown color (this will show that the solution is fully applied on the surface).

- (5) Use a cloth to make all the coating as much the same color as possible.

24. **Degreasing of Parts by Solvent Wiping (SPOP 208)**

A. General

- (1) This task gives the general instructions and the approved materials for degreasing of the engine parts by wiping.

B. Consumable Materials

Name and Number	Manufacturer
Lint Free Cotton Cloth	
Solvent, Methyl Ethyl Ketone (Technical Grade) (PMC 9076)	
Solvent, Methyl Ethyl Ketone (Reagent Grade) (PMC 1820)	
Isopropyl Alcohol (Technical Grade) (PMC 9094)	

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.29
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

Name and Number	Manufacturer
Isopropyl Alcohol (Reagent Grade) (PMC 9016)	
Acetone (Phenol-free) (PMC 9008)	
Solvent, Cleaner (PMC 9060)	
Remover, Cleaner (PMC 4366)	
Solvent, Cleaner (PMC 8914)	
Solvent, Cleaner (SPM 156)	
Solvent, Cleaner (SPMC 168)	
Solvent, Cleaner (SPMC 175)	
Solvent, Cleaner (SPMC 176)	
Solvent, Dielectric (PMC 8920)	
Solvent, Hand-Wiping (PMC 8917)	
Solvent, Cleaner (SPMC 185)	
Acetone (Reagent Grade) (PMC 1914)	
Solvent, Hand-Wiping (PMC 8929)	
Solvent, Cleaner (SPMC 169)	
Solvent, Cleaner (SPMC 213-1)	
Solvent, Cleaner (SPMC 213-2)	
Solvent, Cleaner (SPMC 216-1)	

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.30
Feb 01/2007



MD-80 AIRCRAFT MAINTENANCE MANUAL

(Continued)

Name and Number	Manufacturer
Solvent, Cleaner Wipe (SPMC 216-2)	

C. General Instructions

- (1) Always obey the specific procedures and limits in the specific AMM maintenance tasks.

WARNING: REFER TO THE MANUFACTURER'S MATERIAL SAFETY DATA SHEETS FOR CONSUMABLE MATERIAL INFORMATION SUCH AS: HAZARDOUS INGREDIENTS, PHYSICAL/CHEMICAL CHARACTERISTICS, FIRE, EXPLOSION, REACTIVITY, HEALTH HAZARD DATA, PRECAUTIONS FOR SAFE HANDLING, USE AND CONTROL MEASURES.

CAUTION: DO NOT IMMERSE THOSE PART ASSEMBLIES THAT CONTAIN NON-METALLIC MATERIALS IN SOLVENTS. SIZED CHEESECLOTH CONTAINS RESIN BINDERS THAT CAN DISSOLVE IN SOLVENTS AND CAUSE CONTAMINATION OF BOND SURFACES. USE SOLVENT DISPENSERS THAT SQUIRT OR POUR TO PREVENT REPEATED DIPPING AND CONTAMINATION BY WORK CLOTHS.

- (2) This SPOP 208 procedure is for use on titanium and non-titanium parts.
(3) Do not immerse parts that are non-metallic.
(4) Do not use sized cheesecloth with solvents.

D. Degrease Engine Parts by Solvent Wipe

- (1) Wipe the part with a clean lint free cotton cloth wet with one of the solvents that follow. See Table 208 for solvents approved for use on metallic parts. See Table 209 for solvents approved for use on non-metallic parts.
- (a) To maintain the cleanliness of the wiping solvent, pour the solvent onto the cloth.
(b) Do not dip the cloth into the solvent container.
(c) The cloth must be clean, lint free, plastic free, white cotton.
(d) Wear clean cotton gloves to touch clean parts to be bonded.
- (2) Permit the part to air dry.
- (a) Do not use compressed air to dry parts before adhesive bonding or painting. Some compressed air can contain oil vapors.
- (3) Solvents.

Table 208 Solvents Approved For Use On Metallics

SOLVENTS APPROVED FOR USE ON METALLICS		
	FLASH POINT < 140°F (60°C)	FLASH POINT > or = 140°F (60°C)
When to Use:	PMC 9076*, PMC 1820*, PMC 9094**, PMC 9016, PMC 9008*, PMC 9060, PMC 4366*, SPMC 175, SPMC 176, PMC 1914,*, PMC 8929*, SPMC 213-1, SPMC 213-1, SPMC 216-1#, or SPMC 216-2#	PMC 8914, SPM 156, SPMC 168, PMC 8920, PMC 8917, SPMC 185, or SPMC 169
FPI (Local)	X (#)	-

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.31
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SOLVENTS APPROVED FOR USE ON METALLICS		
	FLASH POINT < 140°F (60°C)	FLASH POINT > or = 140°F (60°C)
When to Use:	PMC 9076*, PMC 1820*, PMC 9094**, PMC 9016, PMC 9008*, PMC 9060, PMC 4366*, SPMC 175, SPMC 176, PMC 1914*, PMC 8929*, SPMC 213-1, SPMC 213-1, SPMC 216-1#, or SPMC 216-2#	PMC 8914, SPM 156, SPMC 168, PMC 8920, PMC 8917, SPMC 185, or SPMC 169
General Wipe	X	X
Pre-Adhesive Bonding	X (** and #)	-
Pre-Painting	X (**)	-
* = Vapor Pressure is greater than 45mm Hg ** = Do not use Technical Grade Isopropyl Alcohol (PMC 9094) before adhesive bonding or painting; it is not always sufficiently pure for these purposes. # = Do not use Cleaner Solvent (SPMC 216-1) or Cleaner Solvent Wipes (SPMC 216-2) before FPI or adhesive bonding.		

Table 209 Solvents Approved For Use On Non-metallics

SOLVENTS APPROVED FOR USE ON NON-METALLICS FOR GENERAL WIPING, PRE-PAINTING, AND PRE-ADHESIVE BONDING			
Non-Metallic Part		FLASH POINT < 140°F (60°C)	
Spec. No.	Description of Material	PMC 9016	PMC 9076*, PMC 1820*, PMC 9016, PMC 9008*, PMC 9060, PMC 4366, SPMC 175, SPMC 176, PMC 1914*, or PMC 8929*
PWA 410	Fiberglass Structures, Laminated Moldings	X	X
PWA 411	Cloth, Glass, Epoxy Resin Impregnated	X	X
PWA 446	Polyurethane Resin, Foaming	X	---
PWA 459	Fabric, Aromatic Polyamide, Epoxy Resin Impregnated	X	X
PWA 460	Laminated Structures, Aromatic Polyamide Fabric- Epoxy resin Matrix	X	X
PWA 479	Molding Compound, Polyamide, Composite	X	X
PWA 628	Foam, Molded Polyurethane	X	---
PWA 36013	Plastic Film, Special Quality Fluorohalocarbon	X	---
PWA 36014	Teflon Coating	X	---

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.32
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

SOLVENTS APPROVED FOR USE ON NON-METALLICS FOR GENERAL WIPING, PRE-PAINTING, AND PRE-ADHESIVE BONDING

Non-Metallic Part		FLASH POINT < 140°F (60°C)	
Spec. No.	Description of Material	PMC 9016	PMC 9076*, PMC 1820*, PMC 9016, PMC 9008*, PMC 9060, PMC 4366, SPMC 175, SPMC 176, PMC 1914*, or PMC 8929*
PWA 36151	Composite Airfoils, Carbon Fiber Reinforced	X	X
PWA 36408	Fabric, Carbon Fiber and Fiberglass, Polyimide Resin Impregnated	X	X
PWA 36414	Fabric, Aluminum Borosilicate Glass Fiber, Epoxy Resin Impregnated	X	X
PWA 36422	Fabric, Fiberglass, Epoxy Resin Impregnated	X	X (#)
PWA 36426	Molding Compound, Polyetherimide Composite	X	---
PWA 36442	Fluoroelastomer Sheet	X	---
PWA 36509	Primer, Polyurethane	X	---
PWA 36510	Coating, Polyurethane, Erosion Resistant	X	---
PWA 36516	Fluoroelastomer Coating	X	---
* = Vapor Pressure is greater than 45 mm Hg. # = Reagent Grade Acetone (PMC 1914) only.			

25. Cleaning Requirements After Chemical Contact With Fire Extinguishing Agents, Hydraulic Fluid, Oil, or Fuel (SPOP 425)

A. General

- (1) This task gives the general instructions and the approved materials for cleaning of the engine after chemical contact with fire extinguishing agents, hydraulic fluid, oil, or fuel.

B. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed items.

NOTE: It is possible that some materials in the Equipment and Materials List cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.33
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

Table 210

Name and Number	Manufacturer
Agueous Cleaner 11-049 (SPMC 148)	

C. Procedure - General Instructions (Figure 233)

- (1) Always obey the specific procedures and limits in the specific AMM maintenance tasks.
- (2) This task (SPOP 425) gives data to clean and disassemble engines as necessary if they have come into contact with fire extinguishing agents, hydraulic fluid, oils, or fuel. If the fire has been contained to the burner or gaspath areas, the operator must find if overtemperature limits were more than the permitted limits.

NOTE: Necessary detailed gaspath cleaning procedures, as well as instructions for subsequent disassembly, cleaning, and inspection instructions, are provided in the applicable Engine Manuals.

NOTE: Any operators who know of fire extinguishing agents that are not specified in Figure 233, but are used at airports, in test cells and in hangers, should provide their local Pratt & Whitney representative technical data and Material Safety Data Sheets for forwarding to Pratt & Whitney Customer Service in East Hartford, CT 06108 USA.

- (3) The most important problem with the introduction dry powder or foam chemicals into the engine is corrosion during subsequent engine operation. These materials can be very harmful to cold and hot section parts. These dry powder chemicals cause chemical reactions during engine operation.
- (4) Tests show the results that follow:
 - (a) Stainless steels alloys, nickel base alloys, (coated or uncoated), and cobalt base alloys, show a high degree of susceptibility to chemical corrosion, even at temperatures considerably below the engine operating range.
 - (b) Titanium, aluminum, magnesium, cadmium plated and nickel-cadmium plated low alloy steels show no signs of corrosion from bicarbonate compounds (dry powders) at engine operating temperatures.
 - (c) Titanium in the high compressor can experience stress corrosion from foam chemicals at service operation temperatures. However, overspray on the fan blades can be removed by hand wipe cleaning with (P11-049) Aqueous Cleaner (SPMC 148).
- (5) About the use of Halon 1301 fire extinguishing agents, products of decomposition will include certain acids which can have a small corrosive effect on gaspath materials when exposed to high temperatures. Turbine airfoil coatings can degrade from Halon 1301 contact at 1800°F (982°C) for short exposure if discharged directly into the core of the engine from a ground unit. However, onboard nacelle fire extinguisher systems (Halon 1301) on turbofan engines do not discharge directly into the core but rather into the nacelle compartment which would not result in contact with the turbine airfoils.
- (6) Although no specific testing has been done relative to the effects of these agents on oil systems, the oil system should be analyzed for contamination because agents could enter the oil system for those engine models which use labyrinth seals.

D. Procedures and Notes Specific to Figure 233.

- (1) Procedures
 - (a) Visual/Borescope Inspection (On-Wing or Off-Wing).

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.34
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

- 1) Do an exterior inspection and an internal borescope inspection to determine which parts are contaminated by the chemical fire extinguishing agent.
 - 2) Do a visual/borescope inspection of the Engine Nacelle and look for fire damage. An internal or external engine wash is not necessary after contact with Halon 1301 (CFC), typically used in nacelle fire extinguishing systems.
- (b) Freedom of Movement Check
- 1) Rotate the rotor and listen for mechanical damage or interference.
- (c) External/Internal Wash (On-Wing or Off-Wing).
- 1) Remove, disassemble, and clean the parts as soon as possible to minimize possible corrosion of engine parts by the agents and contaminants marked "YES" in Figure 233, Columns 3, 4, and 6. Do not operate the engine after contamination.
 - 2) When the gaspath is exposed to foam chemical agents, remove, disassemble, and clean the engine parts as soon as possible. Do not wash the gaspath before disassembly and cleaning of the affected parts. It is not possible to remove all remaining foam agent and chemical residue from the engine by a water or detergent wash of the gaspath.
 - 3) Do not gaspath wash the engine after exposure to dry chemical powder fire extinguishing agents. These agents are not water soluble. A water wash on dry chemical powder fire extinguishing agents causes caking, sticking of these materials on engine parts, and clogging of air holes and cavities.
 - 4) When dry chemical powder fire extinguishing agents get into the engine gaspath, these materials at service operation temperatures can cause severe corrosion damage to the compressor, the hot section, and the turbine area parts. It is possible that they can also enter and cause contamination of the engine oil system. Do not start the engine. Remove the engine from on-wing and disassemble to remove and clean immediately all contamination of parts. Do visual and borescope inspections to look for signs and amount of contamination and/or mechanical or fire damage.
 - 5) If the exterior of the engine had chemical contact, clean the external parts of the engine by using Paragraph 21..
 - 6) If a part had contact with any Dry Chemicals listed in Figure 233, only an external wash by using Paragraph 21. is permitted for cleaning. Do not compressor wash.
- (d) Visual Disassembly Inspection (After Engine Shop Disassembly)
- 1) Clean all parts by the applicable Maintenance Manual instructions.
 - 2) Do a visual inspection of all parts suspected to have chemical contact; use the applicable inspection limits.
- (2) Notes Figure 233
- (a) Do an inspection to determine how much contamination there is; then you will know how much disassembly is necessary.
 - (b) SPOP 1 and SPOP 28
- 1) Use Paragraph 21. and Paragraph 24., as applicable, for cleaning parts that have come in contact with hydraulic oil, fuel, or engine oil. as necessary.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.35
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

CHEMICAL EXTINGUISHER	VISUAL/ BORESCOPE INSPECTION	EXTERNAL WASH	INTERNAL WASH	REMOVE ENGINE	DISASSEMBLE/ CLEAN BY ENGINE MANUAL
GASEOUS AGENTS:					
CARBON DIOXIDE	YES	NO	NO	NO	NO
NITROGEN	YES	NO	NO	NO	NO
SULFUR HEXAFLUORIDE (SF6)	YES	YES	NO	YES	YES
ANSEL-INERGEN	YES	NO	NO	YES	YES
VAPORIZING LIQUIDS:					
HALON 1301 (CFC) - NACELLE DISCHARGE	NO	NO	NO	NO	NO
HALON 1301 (CFC) - IN PRIMARY GASPATH	YES	NO	NO	YES	YES
HALON 1211 (CFC)	YES	NO	NO	YES	YES
HALON 1011 (CFC)	YES	NO	NO	YES	YES
HALON 1202 (CFC)	YES	NO	NO	YES	YES
HALON 2402 (CFC)	YES	NO	NO	YES	YES
HALOTRON (HCFC)	YES	NO	NO	YES	YES
DUPONT FE232 (HFC)	YES	NO	NO	YES	YES
DUPONT FE236 (HFC)	YES	NO	NO	YES	YES
GREAT LAKES FM100 (HFC)	YES	NO	NO	YES	YES
GREAT LAKES FM200 (HFC)	YES	NO	NO	YES	YES
FOAM:					
AFFF	YES	NO	NO	YES	YES
PROTEIN	YES	NO	NO	YES	YES
SODA-ACID	YES	NO	NO	YES	YES
WATER-GLYCOL	YES	NO	NO	YES	YES
TMB-TRIMETHOXYBOROXINE	YES	NO	NO	YES	YES
DRY CHEMICAL:					
SODIUM BICARBONATE	YES	NO	NO	YES	YES
PURPLE K	YES	NO	NO	YES	YES
AMMONIUM PHOSPHATE (ABC)	YES	NO	NO	YES	YES
MED-X (SODIUM CHLORIDE)	YES	NO	NO	YES	YES
PYRENE G-1	YES	NO	NO	YES	YES
M-1	YES	NO	NO	YES	YES
METAL FYR	YES	NO	NO	YES	YES
DOW 230 FLUX	YES	NO	NO	YES	YES
ANSUL FORAY	YES	NO	NO	YES	YES
AMEREX DRY	YES	NO	NO	YES	YES
HYDRAULIC OIL					
YES	YES	YES	YES	YES	YES
FUEL					
NO	YES	YES	YES	NO	NO
ENGINE OIL					
NO	YES	YES	YES	NO	NO

G-08181 (0804)
PW V

BBB2-70-41
S0000217525V1

Cleaning Requirements After Chemical Contact With Fire Extinguishing Agents, Hydraulic Fluid, Oil,
or Fuel (SPOP 425)
Figure 233/70-00-00-990-836

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.36
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

I 26. Safety Cable Procedures

A. General

- (1) Safety cable is permitted at limited locations as an alternate to lockwire. Install safety cable by PWA Specification 316 (Ref. Standard Practices Manual, Section 70-53-00). Safety cable is permitted at all external and fan stream locations where the lockwire hole is sufficiently large for the cable, except as specified below. Use safety cable PN AS3510-0218C (0.032 inch diameter) and safety cable ferrule PN AS3510-02F.
- (2) Do not use safety cable at the following locations
 - (a) Locations where lockwire hole is more than 0.100 inch diameter (safety cable ferrule will pull through hole larger than this).
 - (b) Internal engine, gearbox, and accessory areas.
 - (c) Heat shields (as lacing).
 - (d) Vendor-controlled (Category 1) components.

NOTE: Where safety cable is permitted in the Engine Manual, use the procedure that follows to install the cable.

- (3) Maximum span of safety cable between two end points is 6 inches (152.4 mm), unless specified differently by assembly illustrations.
- (4) Any cable defect (such as, nick, fray, kink, or any damage to safety cable) found before, during, or subsequent to installation, at or between end points, is not permissible.

CAUTION: IF THE HOLES ARE MORE THAN 0.100 IN. (2.54 MM) IN DIAMETER, DO NOT USE A SAFETY CABLE. THE FERRULES ON THE END OF THE SAFETY CABLE ARE 0.106-0.108 IN. (2.692-2.743 MM) IN DIAMETER AND WILL GO THROUGH HOLES THAT ARE LARGER THAN THIS.

- (5) Always install safety cable through safety cable holes given on part.
- (6) Safety cable and its ferrule must be new for each application. It is not permissible to use safety cable and ferrule again.
- (7) Installation
 - (a) Various examples of safety cable methods are shown in Figure 234. Other methods are possible.
 - (b) Unless specified differently in assembly procedure, install safety cable in two-or three-bolt patterns. Two-bolt pattern is preferred when you apply safety cable to an even number of fasteners.
 - (c) Although every possible combination is not shown in Figure 234, every combination must follow basic rules for safety cable.
- (8) Pull-off load is force necessary to pull cable out of either ferrule or cable end fitting.
- (9) Crimp ferrule to cable with crimper (such as, Bergen Mechanical Crimper Model M303, M305, or M307, or equivalent).

NOTE: This tooling (or use units with equivalent features and safeguards) is available from the source that follows by source code. Ref. Section 70-91-00 for the source name/address identified by this number.

70958

- (10) Safety cable must meet minimum crimp requirements as follows:

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.37
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

Table 211

Nominal Cable Diameter	Minimum Pull-off Load
0.020 inch (0.508 mm)	30 in-lbs (3.390 N·m)
0.032 inch (0.813 mm)	70 in-lbs (7.909 N·m)

Safety Cable Minimum Crimp Requirements (Pull-off Load)

B. Installation

(1) Hole alignment

- (a) Do not decrease or increase torque on parts to correctly align holes for cable.

(2) Adjacent units

- (a) Install safety cable so that any tendency for fastener to loosen is counteracted by more tension on cable.
- (b) P&W recommends that there be no sharp turns more than 90°, if possible, when cable goes through fasteners. Result is installation of safety cable with either a positive or neutral pull.

(3) Cable flex limits

- (a) Cable installation tools (such as, Bergen Mechanical Crimper Model M303, M305, or M307, or equivalent) will give the flex limits specified in Figure 235. These values are the maximum flex limits between the end points when light finger pressure of approximately 2 pounds (8.9 N) is applied at midspan.

NOTE: This tooling (or use units with equivalent features and safeguards) is available from the source that follows by source code. Ref. Section 70-91-00 for the source name/address identified by this number.

70958

(4) Excess cable

- (a) After installation of safety cable, cut off excess cable from crimped ferrule.
- (b) Maximum length of unwanted cable that is permissible to extend past crimped ferrule is 0.031 inch (0.787 mm).

(5) Lead seals

- (a) Where specified by assembly drawing, apply and crimp lead seals to safety cable.

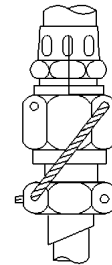
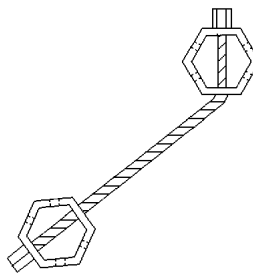
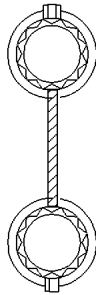
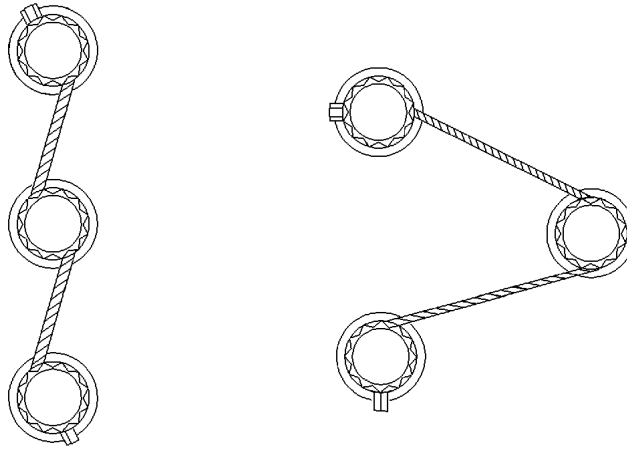
EFFECTIVITY
ZT ALL

TP-80MM-ZT

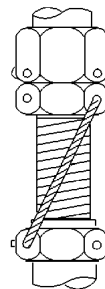
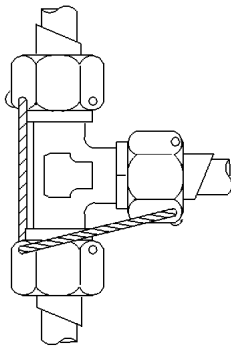
70-00-00

Page 298.38
Feb 01/2007

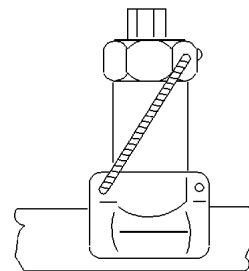
**MD-80
AIRCRAFT MAINTENANCE MANUAL**



**EXAMPLE 1
STANDARD HARDWARE**



**EXAMPLE 2
COUPLINGS**



L-S0006 (0000)

CAG(IGDS)

BBB2-70-37

**Examples of Safety Cable Methods
Figure 234 (Sheet 1 of 2)/70-00-00-990-833**

EFFECTIVITY
ZT ALL

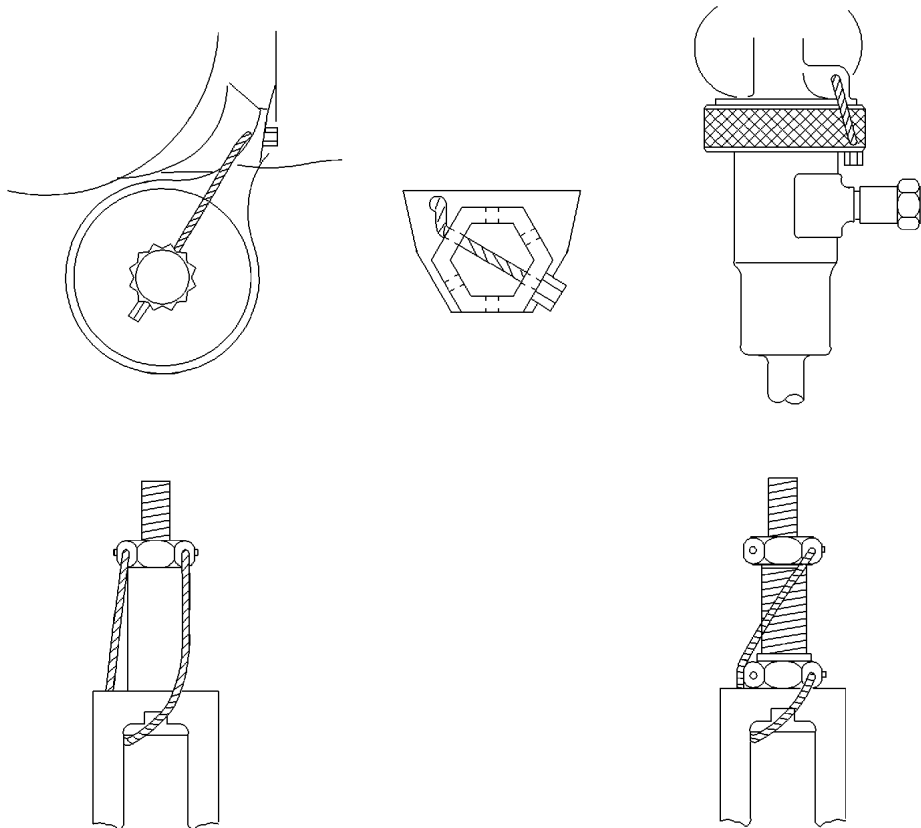
TP-80MM-ZT

70-00-00

Page 298.39
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL



EXAMPLE 3
OTHER APPLICATIONS

L-S0007 (0000)

CAG(IGDS)

BBB2-70-38

Examples of Safety Cable Methods
Figure 234 (Sheet 2 of 2)/70-00-00-990-833

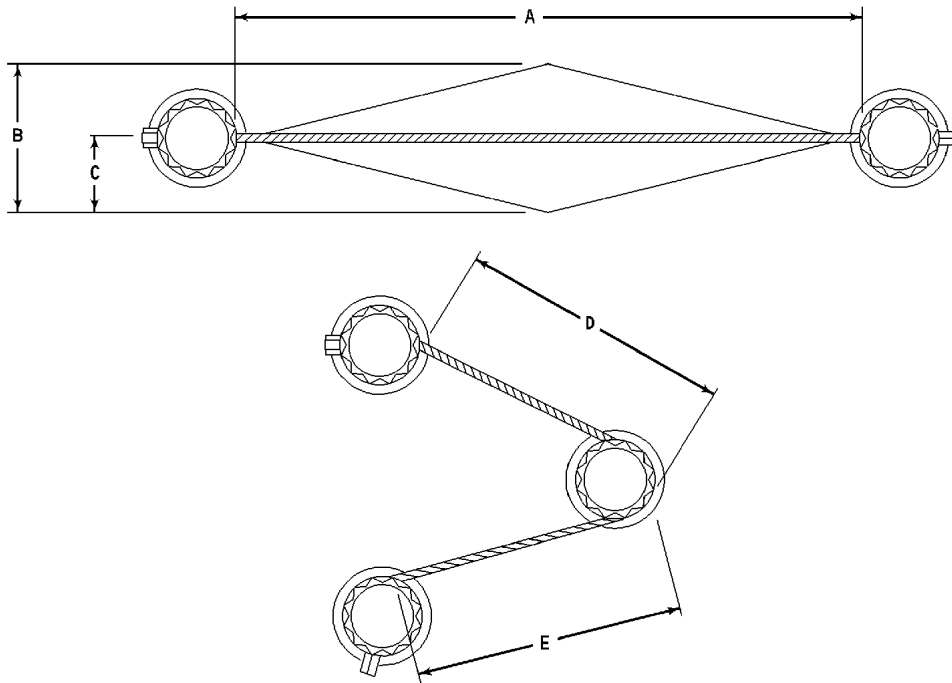
EFFECTIVITY
ZT ALL
TP-80MM-ZT

70-00-00

Page 298.40
Feb 01/2007

MD-80

AIRCRAFT MAINTENANCE MANUAL



FOR THREE BOLT PATTERNS
 $A = D + E$

FLEX LIMITS, DIMENSIONS		
A INCH	B INCH	C INCH
0.5	0.125	0.062
1.0	0.250	0.125
2.0	0.375	0.188
3.0	0.375	0.188
4.0	0.500	0.250
5.0	0.500	0.250
6.0	0.625	0.312

L-S000B (0000)

CAG(IGDS)

BBB2-70-39

Safety Cable Flex Limits

Figure 235/70-00-00-990-834

EFFECTIVITY
 ZT ALL

TP-80MM-ZT

70-00-00

Page 298.41
 Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

27. Preparation of Blue Dye Oil System Leak Check Solution (PS 197)

A. General

- (1) This task provides the general instructions to make up the PS 197 Blue Dye Solution used in oil system leak checks.

B. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed items.

NOTE: It is possible that some materials in the Equipment and Materials List cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Name and Number	Manufacturer
Container, Mixing (No Specific)	
Oil, Engine Lubricating 03-001 (PWA 521, Type II)	
Dye, Blue 05-459 (PMC 4513)	

C. Procedure - General Instructions

WARNING: REFER TO THE MANUFACTURER'S MATERIAL SAFETY DATA SHEETS FOR CONSUMABLE MATERIAL INFORMATION SUCH AS: HAZARDOUS INGREDIENTS, PHYSICAL/CHEMICAL CHARACTERISTICS, FIRE, EXPLOSION, REACTIVITY, HEALTH HAZARD DATA, PRECAUTIONS FOR SAFE HANDLING, USE AND CONTROL MEASURES.

- (1) Always obey the specific procedures and limits in the AMM maintenance task.

D. Procedure - Make-Up of PS 197 Blue Dye Solution

Materials	Make-up	Operating Limits
Dye, Blue (Material No. 05-459)	5 to 6 milliliters	150 ñ 40 ppm
Oil, Engine Lubricating (Material No. 03-001)	10 gallons (37.85 liters)	

NOTE: When the engine is first refilled with non-dyed oil, the non-dyed oil will mix with the remaining (that is, residual) dyed oil. The color of this mixture will likely be darker than the non-dyed oil that was just added. The color of various oil brands can be different. This color change is permitted and is not a negative indication of the condition of the lubrication system.

E. Procedure - Preparation Instructions

- (1) Add the specified amount of Engine Lubricating Oil (Material No. 03-001) to the mixing container.

NOTE: The selection of base oil (Approved PWA 521, Type II) will make it easier for the operator to see the blue color of the dyed oil. Pratt & Whitney experience finds that light color PWA 521, Type II base oils are more easily detected with the Blue Dye (Material No. 05-459).

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.42
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

- (2) Add the specified amount of Blue Dye (Material No. 05-459).
 - (a) It is necessary to put Blue Dye (Material No. 05-459) through a five-micron or less membrane filter six weeks or less before you mix it with Engine Lubricating Oil (Material No. 03-001) for PS 197.
- (3) Stir to mix.

F. Procedure - Precaution Instructions

NOTE: This solution is organic.

- (1) Do not permit the solution to touch the skin, eyes, nose or throat
- (2) Do not take this solution internally.
- (3) Be sure to wash fully after handling and before you drink or smoke.
- (4) Keep this solution away from food.
- (5) Do not breath the dust, vapors, mists, or gases.
- (6) Use this solution with sufficient ventilation.
- (7) Keep this solution away from heat or flames; toxic mixtures can occur.
- (8) Be sure to wear the necessary safety equipment.
- (9) Keep this solution away from oxidizers.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-00-00

Page 298.43
Feb 01/2007



MD-80 AIRCRAFT MAINTENANCE MANUAL

MARKING PARTS (TEMPORARY AND PERMANENT) - MAINTENANCE PRACTICE

1. General

A. This section provides general instructions and approved materials for marking of engine parts.

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed items:

NOTE: Some materials in the Equipment and Materials list may not be permitted to be used in your location. Persons in each location must make sure they are permitted to use these materials. All persons must obey all applicable federal, state, local, and provincial regulations for their location.

REFERENCE	DESIGNATION
P05-018	Pencil
P05-025	Ink (PMC 4021) Deleted
<u>NOTE:</u> The P05-025 is replaced by P05-411.	
P05-026	Ink (PMC 4057-1)
P05-045	Red Marker Pen (PMC 4092-2 - Replaced by PMC 4050-12 (Red) in P05-423)
P05-048	White Ink (PMC 4027 - Deleted; use PMC 4057-2)
<u>NOTE:</u> If the P05-048 is not available, use P05-049.	
P05-049	White Ink (PMC 4057-2)
P05-232	Metal Marking Crayon (Soft) (PMC 4058)
P05-408	Marker (Felt Tip) (SPMC 198-1)
P05-409	Marker (Metal Tip) (SPMC 198-2)
P05-410	Yellow Marker (Felt Tip) (SPMC 198-3)
P05-411	Black Stamping Ink (PMC4021)
P05-412	White Stamping Ink (PMC 4027 - Deleted; use PMC4057-2)
<u>NOTE:</u> If P05-412 is not available, use the P05-049.	
P05-413	Black Permanent Marking Ink (PMC 4500)
P05-414	Black Marker (Extra Fine Point) (PMC 4557)
P05-415	Trace Element Certified (TEC) Permanent Marking Pen (PMC 4556)
P05-416	White Chalk (Low Dust) (PMC 4552)
P05-417	Marking Pen (White or Yellow Paint) (PMC 4554)
P05-418	Blue Layout and Identification Dye (PMC 4504)
P05-423	Felt Tip Marker (PMC 4050)

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-10-00

Page 201
Feb 01/2007



MD-80
AIRCRAFT MAINTENANCE MANUAL

(Continued)

REFERENCE	DESIGNATION
P05-425	Water Resistant Marking Pen (Fine Point) (PMC 4421 - Replaced by PMC 4050)
<u>NOTE:</u> P05-425 is deleted, use P05-423. It is permitted to use remaining supplies.	
P05-441	White Ink (PMC 4057-10)
P05-465	Green Metal Marking Ink (PMC 4057-5)
P05-466	White Metal Marking Ink (PMC 4057-11)

3. Marking of Parts

A. Marking of Parts - General

CAUTION: THE MARK MUST NOT CHANGE THE CONDITION OR THE OPERATION OF THE PART. ONLY USE THE APPLICABLE PROCEDURE TO MAKE THE MARKS. THIS WILL PREVENT DAMAGE TO THE PART.

- (1) Always obey the specified procedures and limits in the specified AMM maintenance tasks.
- (2) Marks made on engine parts and assemblies must be easily read and must not be easily removed.
- (3) Except where specified differently, reidentification of parts, reapplication and/or relocation of part markings must be done adjacent to, or in a location similar to that of the original marking. Where reidentification or corrective marking is required, deletion of existing marking, or portions thereof, can be necessary. In such cases, using an allowable marking method, draw a wavy line, loop, flat oval, or X's through the character (s) or symbol (s) to be deleted.
- (4) All marking characters, unless specified differently, must be 0.060 - 0.160 inch (1.5 - 4.1 mm) high. In special cases, when marking is governed by size or configuration of part, characters not less than 0.016 inch (0.406 mm) nor more than 0.500 inch (12.700 mm) in height are permitted.
- (5) Electric arc scribing, particularly hand arc scribing, whereby characters are produced by action of an electric arc between surface and an electrode (scraper), has been found unsuitable for jet engine parts and must not be used.
- (6) Acid etching, whereby characters are formed by action of an acid on surface of parts, is not recommended because of its possible corrosive effect.
- (7) Soapstone must not be used to mark engine parts.

CAUTION: DO NOT USE THE VIBRATION PEENING, ETCH, OR MECHANICAL METHODS TO APPLY MARKS TO THE MATING SURFACES OF PARTS. YOU CAN DO THESE PROCEDURES ONLY WHEN SPECIFIED IN THE APPLICABLE MANUAL SECTION. THIS WILL PREVENT DAMAGE TO THE MATING SURFACES PARTS.

- (8) It is permitted to identify offset holes in mating parts by vibration peening an "X" mark adjacent to the offset hole unless a specified marking procedure for that area is specified and as long as the condition or operation of the part is not changed.

B. Permanent Marking Methods

(1) General Information

- (a) Permanent methods of marking are those in which marking is legible during the entire service life of the part.

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-10-00

Page 202
Feb 01/2007



MD-80

AIRCRAFT MAINTENANCE MANUAL

- (b) Permanent markings must not extend onto any radius, chamfer, sharp edge, bead, or fillet adjoining designated marking surface.
- (2) Permanent Marking Materials
 - (a) Inks
 - 1) P05-411 - Black Stamping Ink (PMC 4021) (For the marking on non-porous surfaces with a rubber stamp).
 - 2) P05-412 - White Stamping Ink (PMC 4027) (For the marking on the non-porous surfaces with a rubber stamp).
 - 3) P05-413 - Black Permanent Marking Ink (PMC 4500).
 - (b) Markers
 - 1) P05-408 - Felt Tip Marker (SPMC 198-1).
 - 2) P05-409 - Metal Tip Marker (SPMC 198-2).
 - 3) P05-410 - Felt Tip Yellow Marker (SPMC 198-3).
 - 4) P05-414 - Black Marker (Extra Fine Point) (PMC 4557).
 - (c) Pens
 - 1) P05-415 - Trace Element Certified (TEC) Permanent Marking Pen (PMC 4556).
- C. Temporary Marking Methods
 - (1) General Information
 - CAUTION:** DO NOT USE LEAD AND/OR METALLIC PENCILS OR ANY TEMPORARY MARKING PROCEDURE THAT LEAVES PARTICLES OF CARBON, ZINC, COPPER, LEAD, OR SIMILAR PARTICLES. THESE PARTICLES CAN CAUSE A DECREASE IN FATIGUE STRENGTH BECAUSE OF CARBURIZATION OR INTERGRANULAR ATTACK WHEN HIGH HEAT IS USED ON PARTS. IF AN UNAPPROVED MARKING MATERIAL IS USED, IT CAN CAUSE DAMAGE TO THE ENGINE AND MUST BE THOROUGHLY REMOVED BY A PROCEDURE CORRECT FOR THE MARKING PROCEDURE AND PART MATERIAL.
 - (a) Temporary methods of marking are those in which the marking will ensure identification during ordinary handling, and storage, and final assembly.
 - (b) When you use a marking pencil, do not apply marks to the surfaces of carbon seal plates or to mating surfaces of finished machined parts. Heavy deposits of marking materials could have a harmful effect on clearances and runout.
- D. Applied Marking Methods
 - (1) Ink Marking
 - (a) Characters are made by any type of ink application that does not cause damage to the surface.
 - NOTE:** Usually, ink stampings, when used as a temporary marking method, can be applied to any surface which, after assembly, does not move in relation to a contacting surface.
 - (b) Inks used to apply marks are permitted to etch the surface by a very small amount if this does not damage the part surface.
- E. Temporary Marking Materials, Hot and Cold Section Engine Parts
 - (1) Chalks
 - (a) (P05-416) Low Dust White Chalk (PMC 4552).

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-10-00

Page 203
Feb 01/2007



MD-80 AIRCRAFT MAINTENANCE MANUAL

(2) Crayons

- (a) (P05-232) Metal Marking Crayon (Soft) (PMC 4058).

(3) Dyes

- (a) (P05-418) Blue Layout and Identification Dye (PMC 4504).

(4) Inks

- (a) (P05-026) Metal Marking Ink (PMC 4057-1).

- (b) (P05-049) White Ink (PMC 4057-2).

- (c) (P05-441) White Ink (PMC 4057-10).

(5) Markers

- (a) (P05-423) Felt Tip Marker, Rapid Drying (PMC 4050).

(6) Pencils

- (a) (P05-018) Metal Marking Pencil (PMC 4050).

(7) Pens

- (a) (P05-045) Red Felt Tip Marking Pen (PMC 4092-2)

NOTE: This red marker is replaced by (P05-423) Red Felt Tip Marker, Rapid Drying (PMC 4554).

- (b) (P05-417) White or Yellow Paint Marking Pen (PMC 4554).

- (c) (P05-425) Fine Point Water Resistant Marking Pen (PMC 4351).

NOTE: This pen is superseded by (P05-423) Felt Tip Marker, Rapid Drying (PMC 4050).

EFFECTIVITY
ZT ALL

TP-80MM-ZT

70-10-00

Page 204
Feb 01/2007