DEPOT MAINTENANCE

WORK REQUIREMENT

FOR

MAIN DRIVE SHAFT
NSN 1615-01-072-5670
P/N SKCP2281-103

THIS PUBLICATION IS A REPRINT OF DMWR 55-1615-278, DATED 1 AUGUST 1979, INCLUDING CHANGES 1 THROUGH 5.

US Army Aviation
and Troop Command
1 August 1979

WARNING

PRECAUTIONARY DATA

Personnel performing operations, procedures and practices that are included or implied in this work requirement shall observe all the following warnings. Disregard of these warnings and precautionary information can cause serious injury, death, or destruction of material.

CLEANING SOLVENTS

Cleaning solvents may be toxic. Use all solvents in a well ventilated area. Avoid prolonged inhalation of fumes or direct contact with skin. Do not use solvents near open flame or in areas where very high temperatures prevail.

COMPRESSED AIR

Do not direct compressed air near or directly against skin. Do not use air under high pressure, or from a source not having a moisture trap when drying parts. Do not roll bearings with compressed air.

FLIGHT SAFETY PARTS

This manual contains procedures identifying critical characteristics of flight safety parts. Critical characteristics may be identified as dimensions, tolerances, finishes, materials, assembly, or inspection procedures. Some processes may require, qualified sources. Flight safety parts indicating a maximum allowable limit shall not be continued in use when limits have been exceeded. These parts must be replaced.

LIST OF EFFECTIVE PAGES

Insert latest changed pages; dispose of superseded pages in accordance with regulations.

NOTE: On a changed page, the portion of the text affected by the latest change is indicated by a vertical line, or other change symbol, in the outer margin of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to wiring diagrams are indicated by shaded areas.

Dates of issue for original and changed pages are:

Original	1 August 1979	Change 3	15 June 1990
Change 1	1 July 1980	Change 4	8 March 1991
Change 2	30 April 1985	Change 5	15 October 1993

Total number of pages in this manual is 48 consisting of the following:

Page No.	*Change No.
Title	5
a/b	5
A	5
B blank	5
i	5
ii blank	5
iii	5
iv blank	0
1-1 and 1-2	5
1-2.1	5
1-2.2 blank	5
2-1 and 2-2	4
2-2.1	5
2-2.2 blank	5
3-1	4
3-2	0
3-3	1
3-4 thru 3-7	0
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3-12 blank	0
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4-3 thru 4-5	0
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5-1 thru 5-4	5
6-1	5
6-2 blank	3
A-1	5
A-2 blank	3
B-1	5
B-2 blank	5

*Zero in this column indicated an original page.

Depot Maintenance
Work Requirement
No. 55-1615-278

US ARMY AVIATION
AND TROOP COMMAND
1 August 1979

Depot Maintenance Work Requirement for MAIN DRIVE SHAFT

P/N SKCP2281-103 NSN 1615-01-072-5670

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedure, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, Headquarters, U.S. Army Aviation and Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. A reply will be furnished directly to you.

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited

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CHAPTER 1

INTRODUCTION

Section I

General

1-1. Scope. These instructions are for use by depot/contractor personnel. They apply to the main drive shaft, part number SKCP2281-103, manufactured by the Kamatics Corporation, Bloomfield, Ct. In case of conflict, these instructions take precedence over all other documents pertinent to its overhaul and inspection.

1-2. Deviation and Exceptions.

a. Contractor Deviation. When any work segment as set forth in this depot maintenance work requirement cannot be accomplished, or can be accomplished only in a manner other than specified, the Contractor shall submit a Request for Action Form AMSAT-I-M 1379 through the Contracting Officer to AMSAT-I-MC with a copy to AMSAT-I-MD. If the problem is publications related or requires a change to a publication, a DA Form 2028 shall also accompany the request for action. Blank forms are located at the back of this manual. The request for action shall state the problems, the reason for urgency, and give the following specifics:

(1) Serial number (if applicable), part number, and NSN of affected equipment.

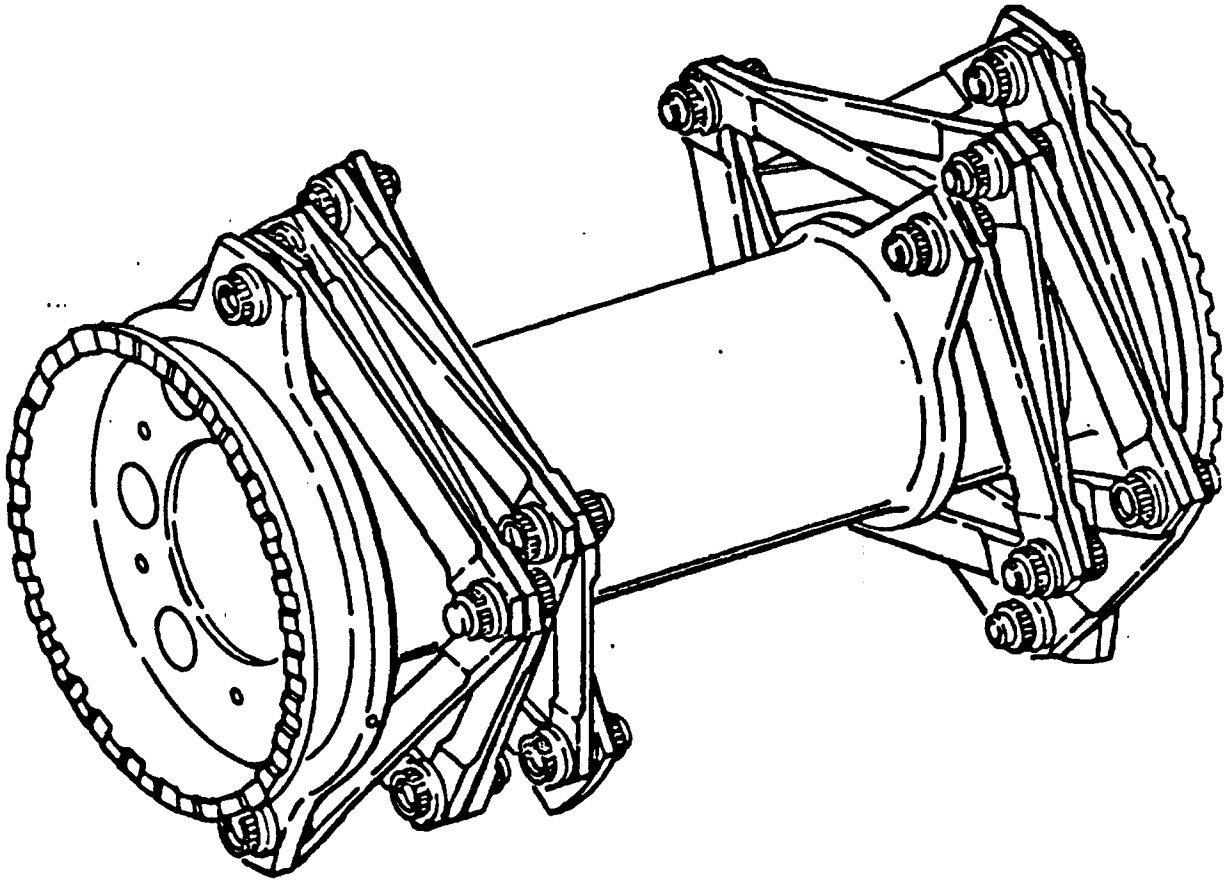


Figure 1-1. Main Drive Shaft

(2) Work elements which will not be completed or which will not be accomplished exactly as specified herein.

(3) Reason for nonaccomplishment or deviation.

(4) Action taken to correct condition causing nonaccomplishment or need for deviation.

(5) Data relative to availability of parts required, if applicable.

(6) Estimated man-hours.

(7) Instructions and inspection required to maintain the integrity of the end item because of such omission or deviation.

b. Depot Deviation. Defects shall be processed in accordance with DESCOM-R 702-1.

1-3. Maintenance Forms and Records. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-751 and/or by contract.

1-4. Reporting Equipment Improvement Recommendations (EIR). EIR will be prepared using SF 368, Quality Deficiency Report (QDR). Instructions for preparing EIR's are provided in DA Pam 738-751. The Army Maintenance Management System AVIATION (TAMMS-A). EIR's should be mailed directly to Headquarters, U.S. Army Aviation and Troop Command, ATTN: AMSAT-I-MDO, 4300 Goodfellow Boulevard, St. Louis, Missouri, 63120-1798. A reply will be furnished directly to you.

Section II

Description and Data

1-5. Description. (See figure 1-1.) The Main Drive Shaft is a constant velocity universal joint which accommodates misalignment by elastic deformation of a metallic structure. This metallic structure is a trusswork in which torque loads are carried as axial loads in straight members. Misalignment, both angular and axial, are accommodated as bending deflections distributed throughout the numerous elements of each coupling. The drive shaft consists of a stiff center section or interconnect, with a stack of four flex plates attached to each end. Outboard of the flex plates are the outer hubs which provide the aircraft interface.

1-6. Data Plates. There are no data plates on this equipment. The word "KAFLEX" is engraved on the interconnect as is the assembly part number and serial number.

1-7. Overhaul Data. Overhaul data shall be painted on the interconnect with 1/4 (0.250) inch black lettering by any suitable means. The following minimum information shall be included:

a. OVHL BY. (Name or identification of facility performing overhaul.)

b. DATE. (Date of completion of overhaul.)

c. OVHL CONTR NO. (Government contract number under which overhaul was performed.)

1-8. Tabulated Data. Pertinent data is listed in Table 1.1.

Table 1-1. Leading Particulars

Weight 16 lb. 9oz.	
Length 11.35 In.	
Dia. 8.137 In.	
Normal Operating Speed 6400/6600 rpm.	
Torque Rating:	
Max. Continuous 12,950 lb.-in.	
Displacement limits:	
Continuous Operating Angle:	3°
Intermittent Operating Angle:	5°
Maximum Static Angle:	7°
Axial Extension or Compression:	
Continuous operation	±0.250 in
Transient	±0.500 in
Static	±0.750 in
Operating Temperature Range: -65°F to +200°F	
Dynamic Balance within 0.25 ounce-inches at each end.	

1-9. Reidentification. Following overhaul, any drive shafts inducted in as part number SKCP2281-1, shall be reidentified to SKCP2281-103 by engraving 03 at the end of the existing part number on the interconnect. The reidentification is the result of mandatory replacement of bolts and washers (items 4,5,7, and 9, figure 3-1), with like items less susceptible to stress corrosion plus the application of zinc chromate to the bolt holes.

CHAPTER 2

REQUIREMENTS

Section I

General

2-1. Facilities. Vapor degreasing or sonic cleaning equipment is required to clean the drive shaft assembly and its detail parts. Equipment to provide a hot bath of corrosion removing compound (Item 5, Table 2-3) is required for stripping the metallic-ceramic coating. Equipment for applying metallic-ceramic coating (Item 3, Table 2-3) in compliance with Kamatics Specification KCS51, is required to recoat parts.

2-2. Support Items.

2-3. Special Tools and Test Equipment. Refer to Table 2-1.

Table 2-1. Special Tools and Equipment

NOMENCLATURE	NSN OR PART NO.	REF. PARA. OF USE
Assembly Fixture	VKCP2180-1T68	3-5, 4-2
Hydraulic Expansion-Arbor	SKCP2180-1T74	4-4
Balancing Machine	Stewart Warner Corp. Series 2000 (or equivalent)	4-4

2-4. Fabricated Tools and Equipment. None.

2-5. Finite Life and Time Between Overhaul (TBO) Items. None.

2-6. Mandatory Replacement Parts. See Table 2-2.

Table 2-2. Mandatory Replacement Parts

PART NO.	NSN	DESCRIPTION	UNITS
SKCP2187-11		Nut	20 ea.
AN960-10		Washer	AR for balance
AN970-3		Washer	AR for balance
SKCP2189		Screw	AR for balance
SKCP2314-15		Bolt	4 ea.
SKCP2314-13		Bolt	4 ea.
SKCP2314-11		Bolt	12 ea.
SKCP2161-11		Washer	36 ea.
SKCP2315-11		Washer	8 ea.

2-7. Repair Parts. Refer to TM 55-1520-210-23P and Chapter 3 for repair parts required for overhaul of the drive shaft.

2-8. Consumable Materials. Table 2-3 lists those consumable materials required to successfully perform the operations described in this manual.

Table 2-3. List of Consumable Materials

Item	Nomenclature/ Manufacturer	Specification/ Part No.
1	Primer/Thread Adhesive (Accelerator)	MIL-S-22473 (Latest Revision) Grade N or T
2	Adhesive Threadlock	MIL-S-22473 (Latest Revision) Grade AVV or AV
3	Coating, Metallic-Ceramic (use Sermetal 196 for retouching) Sermetal Div. Titeflex Corp. Limerick, Pa.	MIL-C-81751 Type I, Class 4
4	Primer, Zinc Chromate	TT-P-1757
5	* Compound, Corrosion removing/ Turco Products, Inc. Div. of Purex Corp., Ltd. 24600 So. Main St. Box 6200 Carson, Ca. 90749 or * Oakite Rust Stripper/ Oakite Products, Inc. 50 Valley Road Berkeley Heights, N.J. 07922	Turco 4181 (1/2 lb per gallon of water) 2-3 lbs per gallon of water
6	Sealing, Locking, and Retaining Compound, Single-component	MIL-S-22473 Grade AA
7	Solvent, Dry cleaning	P-D-680
8	Swab, Cotton	(Local Purchase)

* Or approved equivalent

Section II

Standards

2-9. Quality of Material. Parts and material used for replacement, repair, or modification shall meet the requirements of the drive shaft drawings and specifications.

2-10. Man-Hour Standards. See Table 2-4.

Table 2-4. Man-Hour Standards

TASK	MAN-HOURS
Disassembly	0.50
Repair (Typical)	1.00
Reassembly	0.75
Inspection	
Details	1.00
Assembly	0.25
Balancing	0.40
Stripping	0.30
Recoating	1.00

2-11. Flight Safety Parts Program. Parts, assemblies, or installations identified under the flight safety parts program require special handling during overhaul. Throughout the overhaul procedures warnings appear emphasizing critical instructions to be followed. These warnings are identified "Flight Safety Parts" warnings and are inserted whenever and wherever necessary. Flight Safety Part assembly, Main Drive Shaft, P/N SKCP2281-103 is considered a Flight Safety Part.

a. A flight safety part is defined as a part, assembly, or installation procedure with one or more critical characteristic that, if not conforming to the design data or quality requirements, could result in serious injury or death of crew members and/or serious damage to the aircraft.

b. A critical characteristic is any dimension, tolerance, finish, material, manufacturing, assembly or inspection process, or other feature which, if nonconforming or missing could cause failure or malfunction of the critical item.

c. Flight safety parts are listed in table 2-5.

Table 2-5. Flight Safety Parts

Nomenclature	Part No.	Critical Characteristic
Main Drive Shaft	SKCP2281-103	1. Magnetic Particle Inspect per MIL-STD-1949. 2. Torque nuts (2, fig. 3-1) 460-500 inch pounds.

CHAPTER 3

MAINTENANCE, OVERHAUL, AND REPAIR

Section I

Preshop Analysis

3-1. Purpose. The purpose of this requirement is to determine general condition of shaft as received and to determine operating history. Unusual conditions shall be noted so that proper disposition of parts can be made during disassembly/inspection.

3-2. Records Check. Remove main drive shaft from shipping container. Physically check all tags and forms received with container and shaft to determine reason for removal from service and operating time. Determine what open items of work or delayed discrepancies exist, including any technical bulletins or modifications/MWO's which have not been accomplished.

3-3. Operating Hour History. This component does require operating time to be maintained in accordance with DA PAM 738-751 as a selected condition item. If operating time cannot be determined or obtained from the shipped activity, contractor shall request instructions from the contracting office.

3-4. Inspection. Visually inspect shaft for evidence of failure and/or extensive damage due to operation or handling. Inspect for broken parts, plate contact with end fitting(s), interconnect contact with end fitting(s), contact of fail-safe surfaces and bolt contact with plates. If any one of these conditions exists, it shall be noted. Appropriate action will be taken during disassembly and/or parts shall be kept together for a thorough evaluation during inspection to determine extent of damage.

Section II

Disassembly and Repair

NOTE

Before attempting disassembly, clean the entire assembly using solvent, (Item 7, Table 2-3), vapor degreasing, sonic cleaning, or any other suitable means.

CAUTION

Caustic and alkaline cleaners may attack the metallic-ceramic coating. Use of such cleaners is prohibited.

WARNING

Flex plates that were determined to be defective during preshop analysis shall be condemned and locally scrapped. Retain plates in sets (a set comprises all of the plates from one end of the shaft assembly - two sets per shaft assembly) along with applicable end fitting until scrapped.

3-5. Disassembly. (See figure 3-1.)

a. Install drive shaft on assembly fixture as shown in figure 3-2 with the two bolt heads seated in the sockets. Remove balance screws (12) and washers (13). Loosen the two nuts.

b. Turn the drive shaft over and repeat step a.

c. Remove the drive shaft from the assembly fixture and remove the four loosened nuts, bolts, and washers separating the two end subassemblies from the center (interconnect) subassembly.

CAUTION

As a result of the use of a thread lock adhesive during assembly, some difficulty may be encountered in removing the bolts and washers. Use care not to damage plates, end fittings, or interconnect.

d. Install the 2.50 inch long phenolic guide (11, figure 3-3) on the assembly fixture post.

e. Slide the interconnect subassembly onto the assembly fixture post so that two bolt heads fit into the sockets. Install the 3.00 inch long phenolic guide (12, figure 3-3) onto top of post. Loosen the two nuts.

f. Rotate interconnect and repeat for the other two nuts.

g. Turn interconnect over and repeat steps e and f procedures.

h. Remove interconnect subassembly and phenolic guides from the assembly fixture.

i. Remove the loosened nuts, bolts, and washers, observing the step c caution, and separate the flex plates from the interconnect.

j. Install one of the two end fitting subassemblies on the assembly fixture (see figure 3-4) so that two bolt heads fit into the assembly fixture sockets. Loosen the nuts.

k. Turn the subassembly over and loosen the other two nuts. Remove the subassembly from the fixture.

m. Repeat steps j and k for the other end fitting subassembly.

n. Remove the loosened nuts, bolts, and washers, observing the step c caution, and separate the flex plates from the end fittings.

p. Discard all nuts, washers, bolts, and screws.

3-6. Cleaning.

a. Clean all parts thoroughly using cleaning solvent (Item 7, Table 2-3), vapor degreasing equipment, ultrasonic cleaning equipment, or any other suitable means.

CAUTION

Caustic and alkaline cleaners may attack the metallic-ceramic coating. Use of such cleaners is prohibited.

3-7. Stripping.

a. Strip coating from parts, as required by paragraph 3-9, by immersing in corrosion removing compound (Item 5, Table 2-3), heated to 140-190°F (60-88°C).

3-8. Inspection.

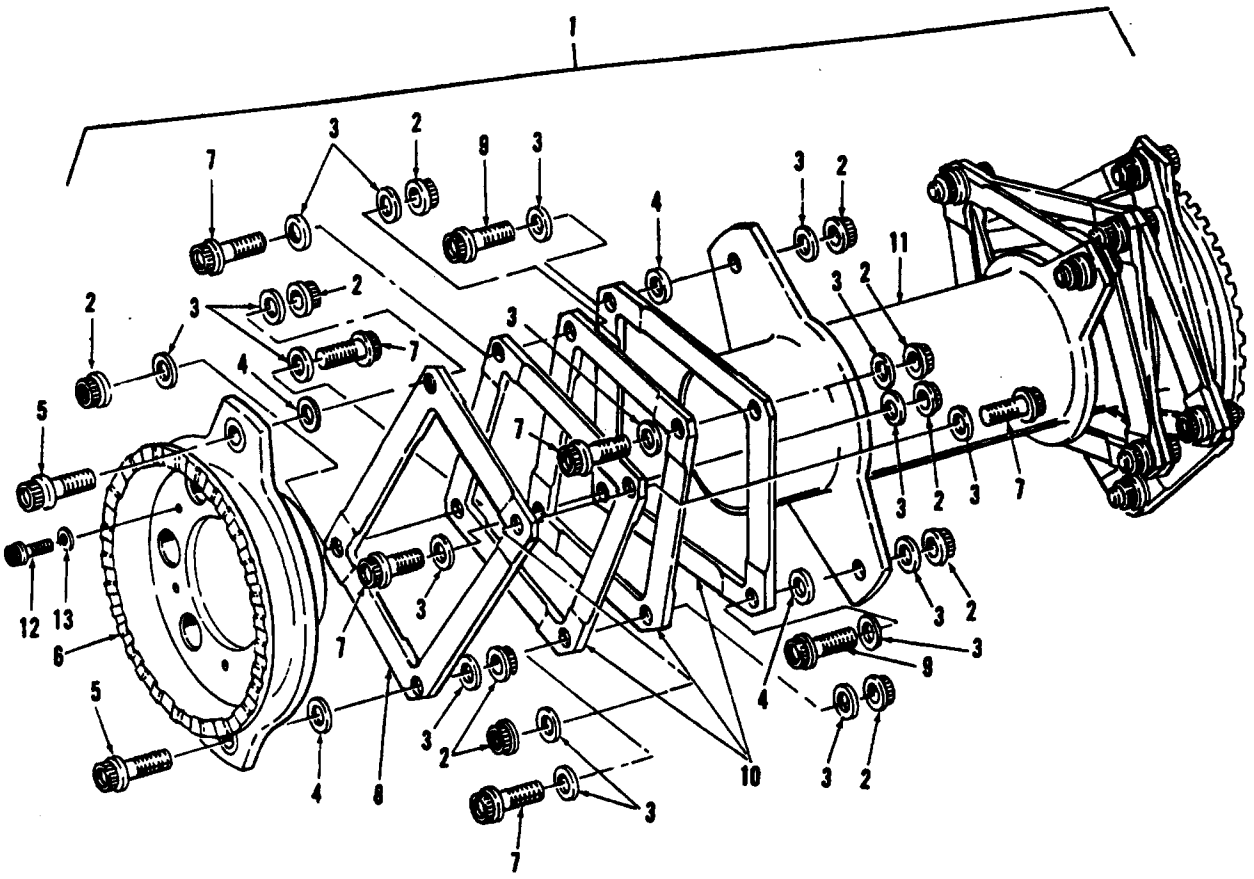
NOTE

Used components and refinished parts recovered as products of disassembly will be examined 100% to determine serviceability.

3-9. General.

a. Coating damage which exposes bare metal to a width of 0.10 inch or less will not require recoating. Touch-up in accordance with paragraph 3-14, step d.

b. Inspect failsafe surfaces (see figure 3-5) for indications of rubbing in operation. Any such indication is cause for rejection of all flex plates (8 and 10, figure 3-1) on that end of the shaf where rubbing had occurred.



Index Number	Part Number	Description	Units Per Assy.
1	SKCP2281-103	DRIVE SHAFT ASSEMBLY	1
2	SKCP2187-11	NUT, SELF-LOCKING	20
3	SKCP2161-11	WASHER, RECESSED	36
4	SKCP2315-11	WASHER, FLAT	8
5	SKCP2314-13	BOLT, MACHINE	4
6	SKCP2177-11	FITTING, SHAFT	2
7	SKCP2314-11	BOLT, MACHINE	12
8	SKCP2175-11	PLATE, OUTER	2
9	SKCP2314-15	BOLT, MACHINE	4
10	SKCP2176-11	PLATE, INNER	6
11	SKCP2178-11	FITTING, INTERCONNECT	1
12	NAS603-11	SCREW, MACHINE	AR
	NAS603-13	SCREW, MACHINE	AR
	NAS603-15	SCREW, MACHINE	AR
13	AN960-10	WASHER, FLAT	AR
	AN970-3	WASHER, FLAT	AR

*Use to be determined by balance requirements.

Figure 3-1. Exploded View - Drive Shaft Assembly

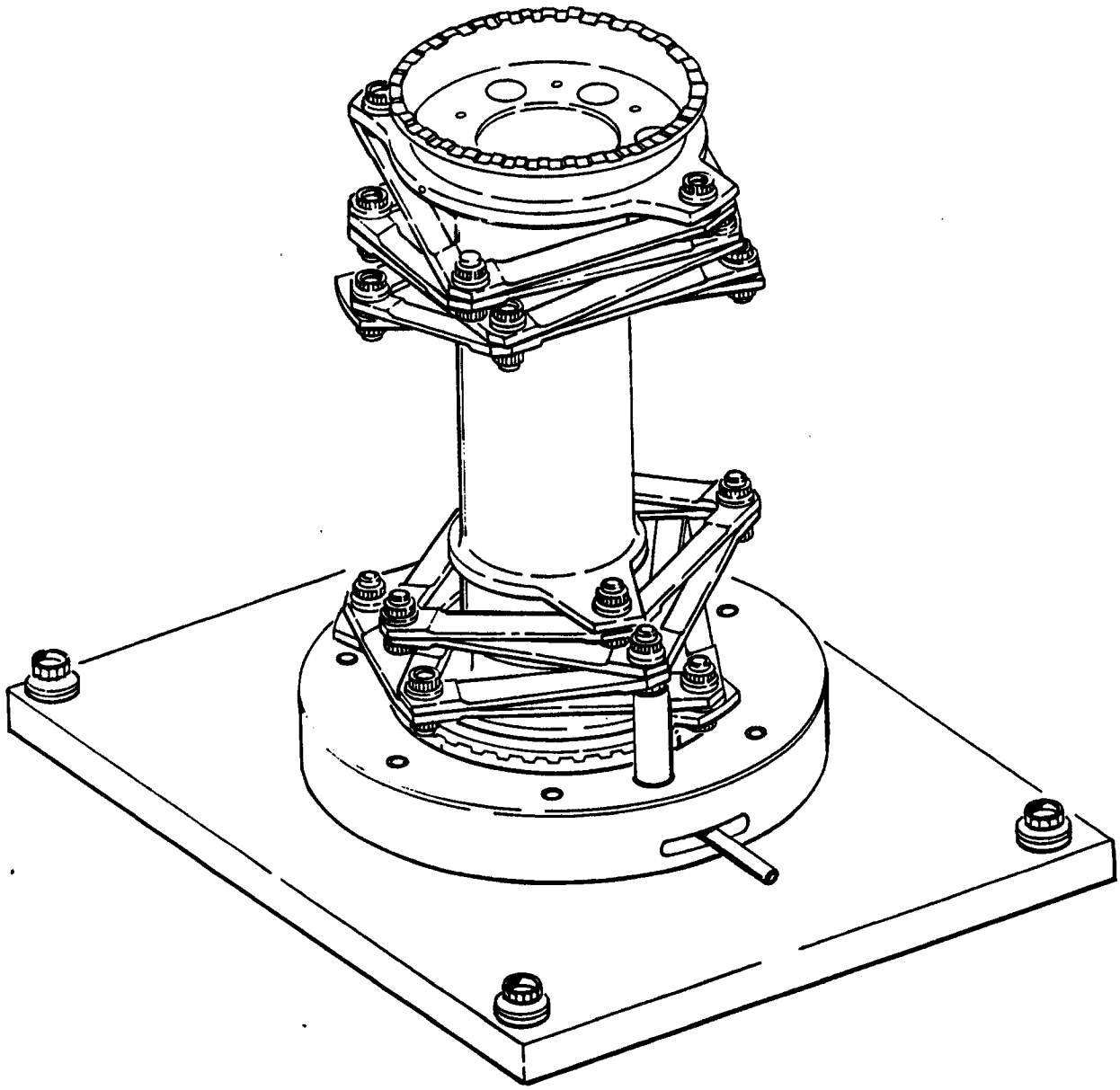
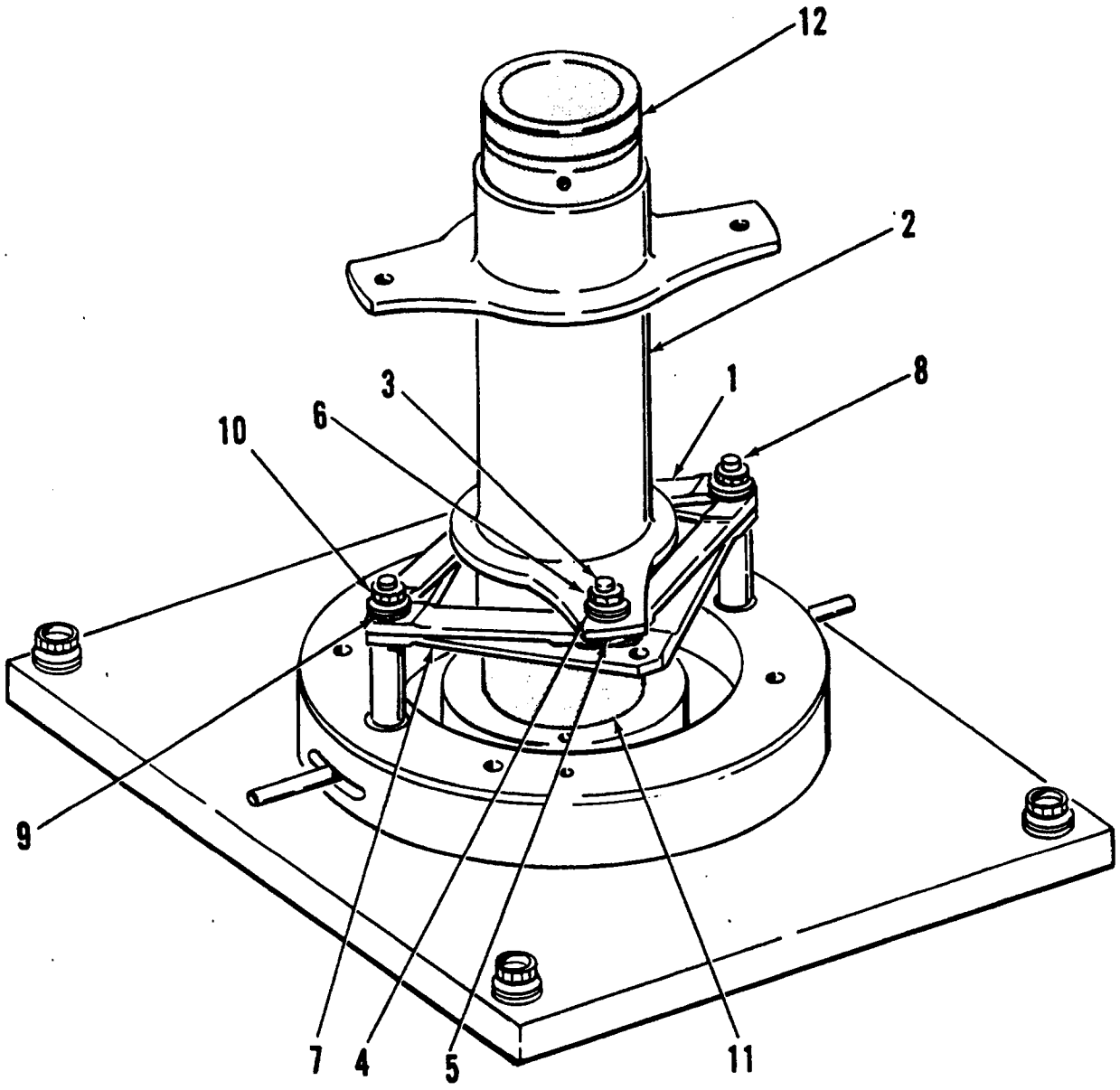


Figure 3-2. Drive Shaft on Assembly/Disassembly Fixture



1. Thin flex plate (0.216-0.130 in.)
2. Interconnect
3. 1.21 inch long bolt
4. Countersunk washer
5. Flat washer (special)
6. Nut
7. Thin flex plate (0.126-0.130 in.)
8. 1.02 inch long bolt
9. Countersunk washer
10. Nut
11. 2.50 inch long phenolic guide
12. 3.00 inch long phenolic guide

Figure 3-3. Interconnect Subassembly on Assembly Fixture

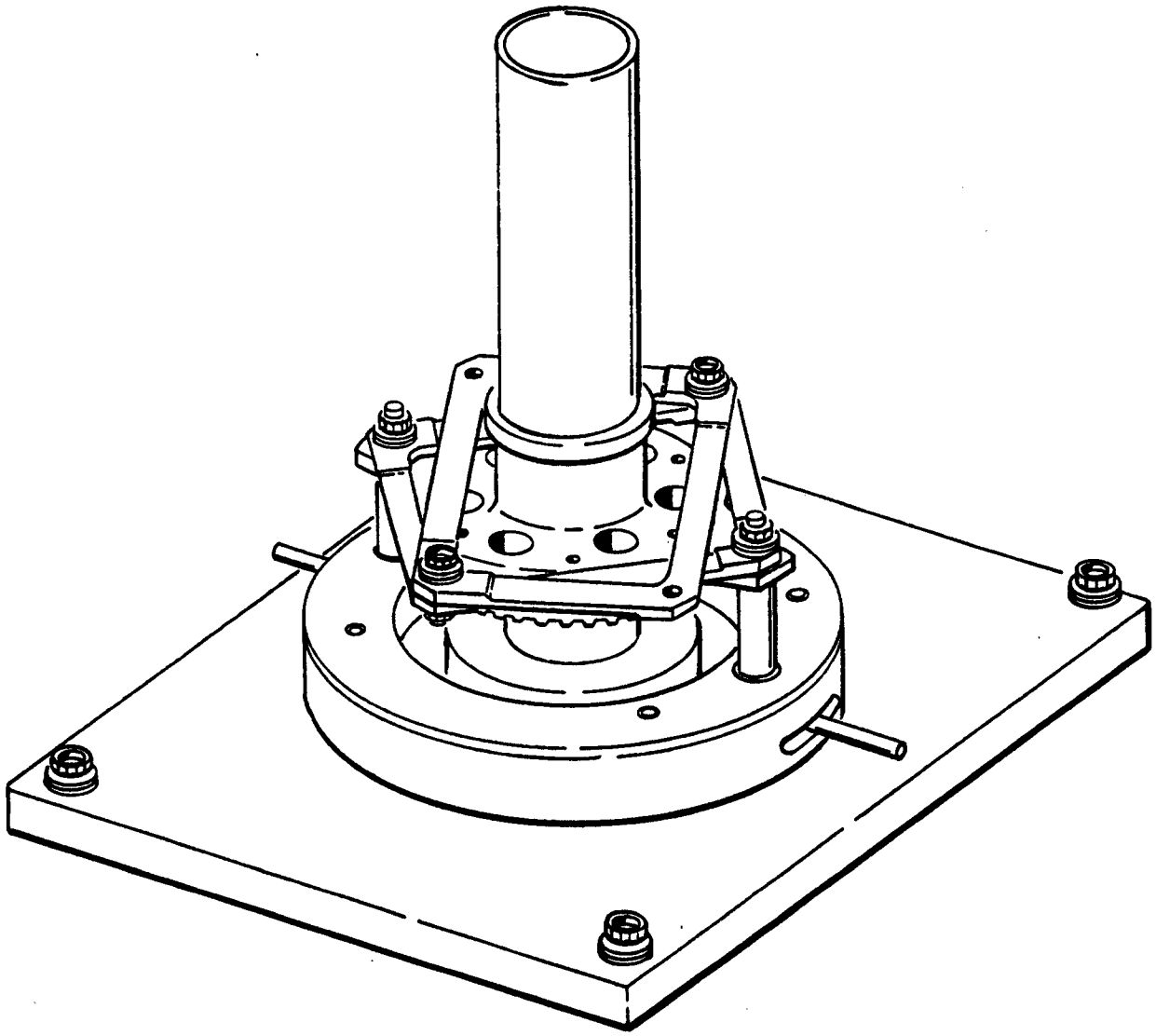


Figure 3-4. End Fitting Subassembly on Assembly Fixture

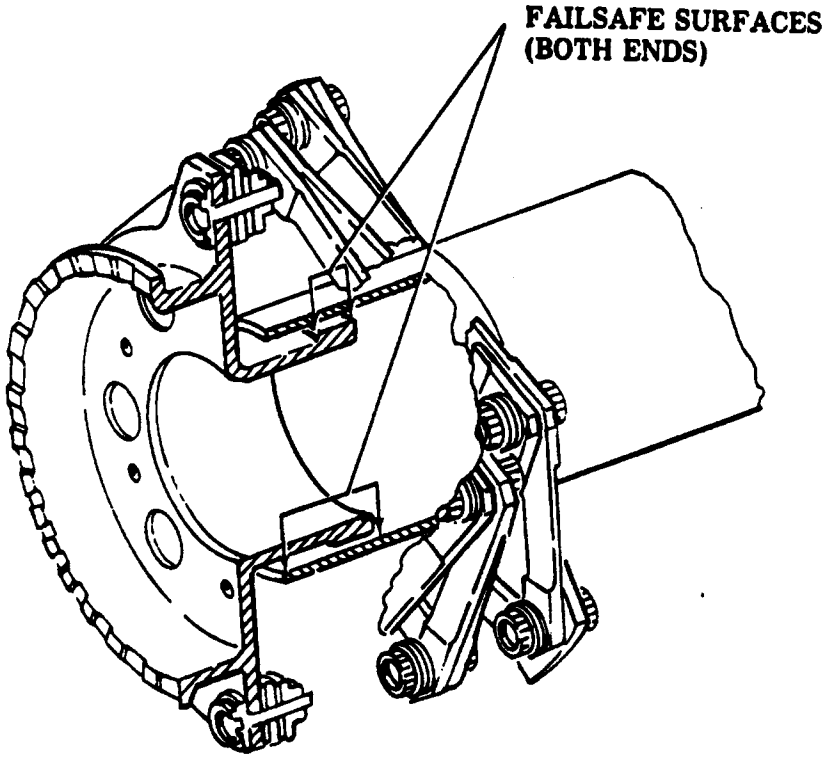


Figure 3-5. Failsafe Surfaces

c. Strip metallic-ceramic coating from all flex plates (8 and 10, figure 3-1) and from those other parts exhibiting coating damage beyond the limits of step a.

d. Indications of severe service such as contact marks from flex plates to end fittings or interconnect, bolts to flex plates, or on failsafe surfaces is cause for stripping end fittings and interconnect and subjecting them to magnetic particle inspection in accordance with specification MIL-STD-1949 and paragraph 3-13.

3-10. Flex Plate. (See figure 3-6.)

a. Strip coating from all flex plates (refer to paragraph 3-7). Check for nicks, dents, scratches, wear, and corrosion.

b. Magnetic-particle inspection in accordance with specification MIL-STD-1949 and paragraph 3-13.

3-11. Shaft End Fitting. (See figure 3-7.)

a. Check for nicks, dents, scratches, wear, and corrosion.

b. Strip metallic-ceramic coating (refer to paragraph 3-7) if damaged beyond the limits of paragraph 3-9.

3-12. Interconnecting Fitting. (See figure 3-8.)

a. Check for nicks, dents, scratches, wear, and corrosion.

b. Strip metallic-ceramic coating (refer to paragraph 3-7) if damaged beyond the limits of paragraph 3-9.

3-13. Magnetic-Particle Inspection Detail

WARNING

FLIGHT SAFETY PART

Magnetic particle inspection per MIL-STD-1949 is the critical characteristic.

a. Flex plate:

1. Between heads, contact on outside edges of rectangle, 3 shots at 250 amperes. Rotate 90° for 3 more shots at 250 amperes.

2. On central conductor through rectangular opening, 3 shots at 3500 amperes.

3. Demagnetize.

FLIGHT SAFETY PART

WARNING

Magnetic particle inspection per MIL-STD-1949 is the critical characteristic.

b. End Fitting:

1. Between heads, contact on 0.312 rim, 3 shots at 1000 amperes. Rotate 90° for 3 more shots at 1000 amperes.

2. On central conductor through 2.550 diameter hole, 3 shots at 2000 amperes.

3. In coil, put axis parallel to coil axis, 3 shots at 8000 amperes turns.

4. Demagnetize.

WARNING

FLIGHT SAFETY PART

Magnetic particle inspection per MIL-STD-1949 is the critical characteristic.

c. Interconnect:

1. On conductor through 3.190 diameter hole, 3 shots at 3250 amperes.

2. In coil, part axis parallel to coil axis for 3 shots at 15000 ampere turns.

3. Demagnetize.

3-14. Repair.

a. Remove nicks, scratches, dents, and corrosion. Repairs must be accomplished within the limits specified in figures 3-6 through 3-8 using standard shop practices. Use of grinders and impact tools is prohibited. Surface finish of repaired area to be 63 micro inch minimum.

b. Replace all parts that cannot be repaired within the limits specified in figure 3-6 through 3-8.

c. Following rework, reapply metallic-ceramic coating (Item 3, Table 2-3) in accordance with Kamatics Specification KCS51. Coating thicknesses on all faying surfaces including curvic teeth, shall be 0.0003 - 0.0007 inch. All other surfaces shall be 0.0003 - 0.002 inch.

d. Parts with minor coating damage not requiring recoating (reference paragraph 3-9) shall be retouched by brush application of the coating, (Item 3, Table 2-3).

STRIP METALLIC-CERAMIC COATING (REFER TO PARAGRAPH 3-7) AND SUBJECT FLEX PLATE TO MAGNETIC PARTICLE INSPECTION MIL-STD-1949 AND PARAGRAPH 3-13). ANY INDICATION OF A CRACK OR DAMAGE BEYOND THE FOLLOWING LIMITS IS CAUSE FOR REJECTION.

PERMISSIBLE DAMAGE.

ZONE 1 - SUPERFICIAL CORROSION WHICH CAN BE READILY REMOVED WITH SCOTCH-BRITE OR FINE EMERY, SCRATCHES, NICKS, AND DENTS NOT DEEPER THAN 0.001 INCH NOR LONGER THAN 0.25 INCH MAY BE SMOOTH BLENDED TO REMOVE SHARP EDGES AND INDENTATIONS (0.25 INCH MIN. RADIUS). LIMIT 2 REPAIRS PER LEG, NO CLOSER THAN ONE INCH.

ZONE 2 - FRETTING NOT EXCEEDING 0.001 INCH DEEP X 0.05 SQUARE INCH IS ACCEPTABLE. NICKS, DENTS, AND SCRATCHES NOT EXCEEDING 0.002 INCH DEEP MAY BE SMOOTH BLENDED TO REMOVE SHARP EDGES AND INDENTATIONS (0.25 INCH MIN. RADIUS). REPAIRED AREA SHALL NOT EXCEED 0.05 SQUARE INCH.

HOLES- SUPERFICIAL CORROSION AFFECTING NO MORE THAN 13% OF HOLE AREA IS ACCEPTABLE. MAXIMUM DIMENSION NOT TO EXCEED 0.379 INCH. WIRE BRUSH INSIDE DIA. OF HOLES TO REMOVE LOOSE DEBRIS, FLUSH WITH HOT WATER, DRY, AND APPLY ZINC CHROMATE PRIMER PER TT-P-1757 0.0002 TO 0.0005 INCH THICK. CURE AT 150° ±10°F FOR 15 MINUTES.

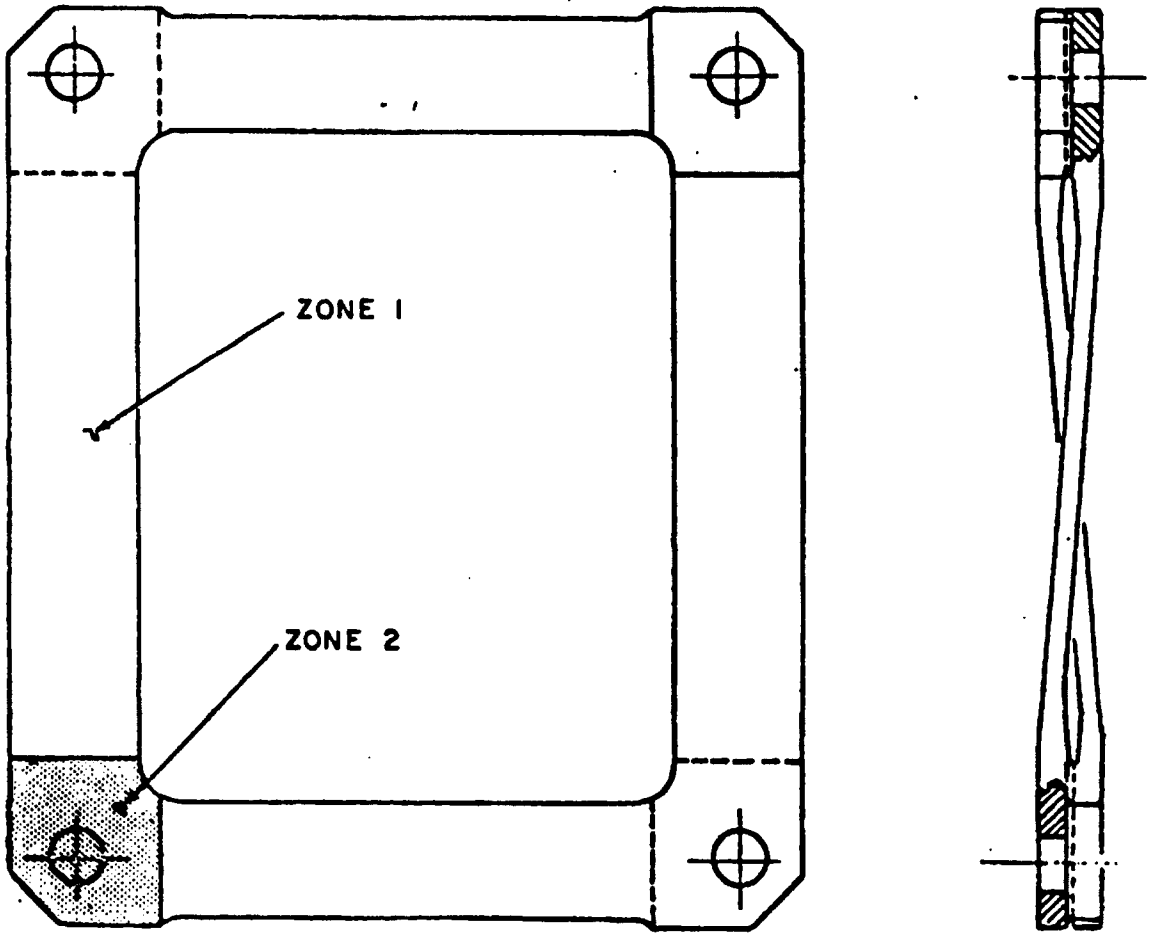


Figure 3-6. Flex Plate Inspection Criteria

PERMISSIBLE DAMAGE:

CHECK METALLIC-CERAMIC COATING IN ACCORDANCE WITH PARAGRAPH 3-9.

ZONE 1 - FRETTING, CORROSION, SCRATCHES, NICKS, AND DENTS NOT DEEPER THAN 0.005 INCH ON FLAT SURFACE OR 0.015 INCH ON EDGES OR CORNERS MAY BE SMOOTH BLENDED TO REMOVE RAISED AND SHARP EDGES AND SHARP INDENTS (0.125 MIN. RADIUS). REPAIRED AREA NOT TO EXCEED 5% OF EACH CONTACT SURFACE OR 15% OF REMAINING ZONE 1 SURFACES.

ZONE 2 - NICKS, DENTS, SCRATCHES, AND CORROSION NOT DEEPER THAN 0.030 INCH MAY BE SMOOTH BLENDED TO REMOVE RAISED BURRS, SHARP EDGES AND SHARP INDENTS (0.060 MIN. RADIUS). REPAIRED AREA NOT TO EXCEED 20% OF SURFACE. DAMAGE BEYOND THESE LIMITS IS CAUSE FOR REJECTION.

BOLT HOLES - MAY BE REPAIRED BY MACHINING HOLDING A TRUE HOLE DIAMETER NOT TO EXCEED 0.379 INCH. WIRE BRUSH INSIDE DIA. OF BOLT HOLES TO REMOVE LOOSE DEBRIS, FLUSH WITH HOT WATER, DRY, AND APPLY ZINC CHROMATE PRIMER PER TT-P-1757, 0.0002 TO 0.0005 IN. THICK. CURE AT 150° ±10°F FOR 15 MINUTES.

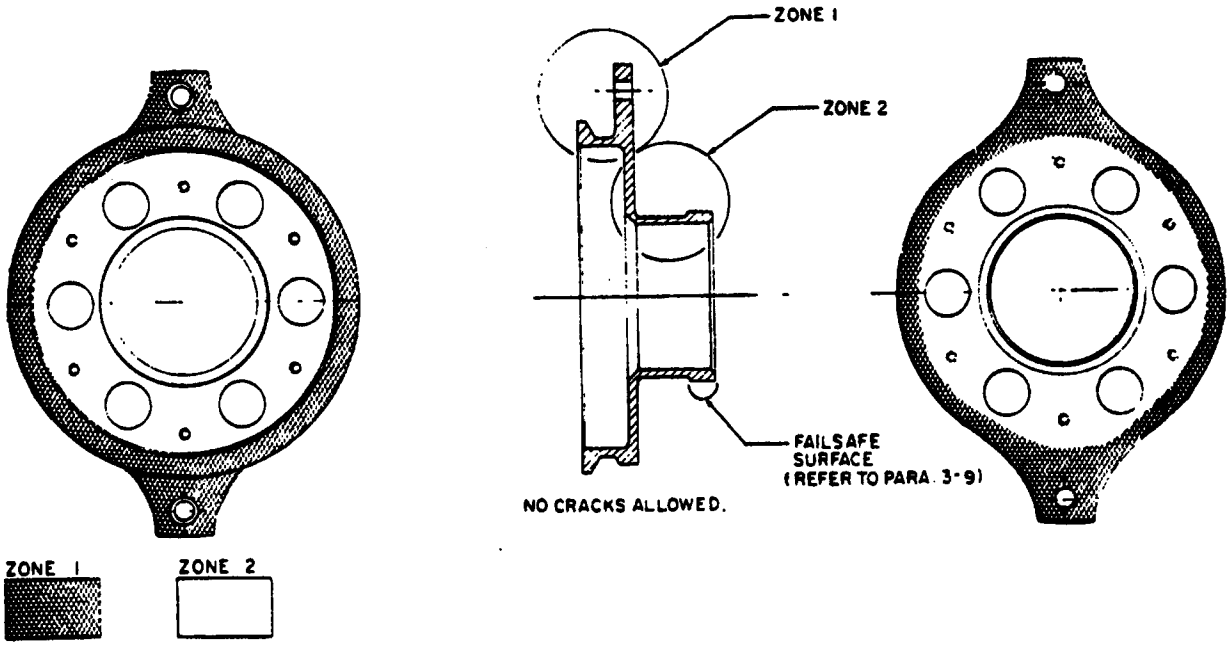


Figure 3-7. Shaft End Fitting Inspection Criteria

PERMISSIBLE DAMAGE:

CHECK METALLIC-CERAMIC COATING IN ACCORDANCE WITH PARAGRAPH 3-9.

ZONE 1 - NICKS, DENTS, SCRATCHES, AND CORROSION NOT DEEPER THAN 0.005 INCH MAY BE SMOOTH BLENDED TO REMOVE RAISED BURRS, SHARP EDGES, AND SHARP INDENTS (0.125 INCH MIN. RADIUS). REPAIRED AREA NOT TO EXCEED 0.5 SQUARE INCH. ADJACENT REPAIRS TO BE NO CLOSER THAN ONE INCH.

ZONE 2 - FRETTING, CORROSION, SCRATCHES, NICKS, AND DENTS NOT DEEPER THAN 0.005 INCH ON FLAT SURFACE OR 0.015 INCH ON EDGES OR CORNERS MAY BE SMOOTH BLENDED TO REMOVE RAISED BURRS, SHARP EDGES, AND SHARP INDENTS (0.125 INCH MIN. RADIUS). REPAIRED AREA NOT TO EXCEED 5% OF EACH CONTACT SURFACE OR 15% OF REMAINING ZONE 2 SURFACES. DAMAGE BEYOND THESE LIMITS IS CAUSE FOR REJECTION.

BOLT HOLES - MAY BE REPAIRED BY MACHINING HOLDING A TRUE HOLE DIAMETER NOT TO EXCEED 0.379 INCH. WIRE BRUSH BOLT HOLES TO REMOVE LOOSE DEBRIS, FLUSH WITH HOT WATER, DRY, AND APPLY ZINC CHROMATE PRIMER PER TT-P-1757, 0.0002 TO 0.0005 IN. THICK. CURE AT 150° ±10°F FOR 15 MINUTES.

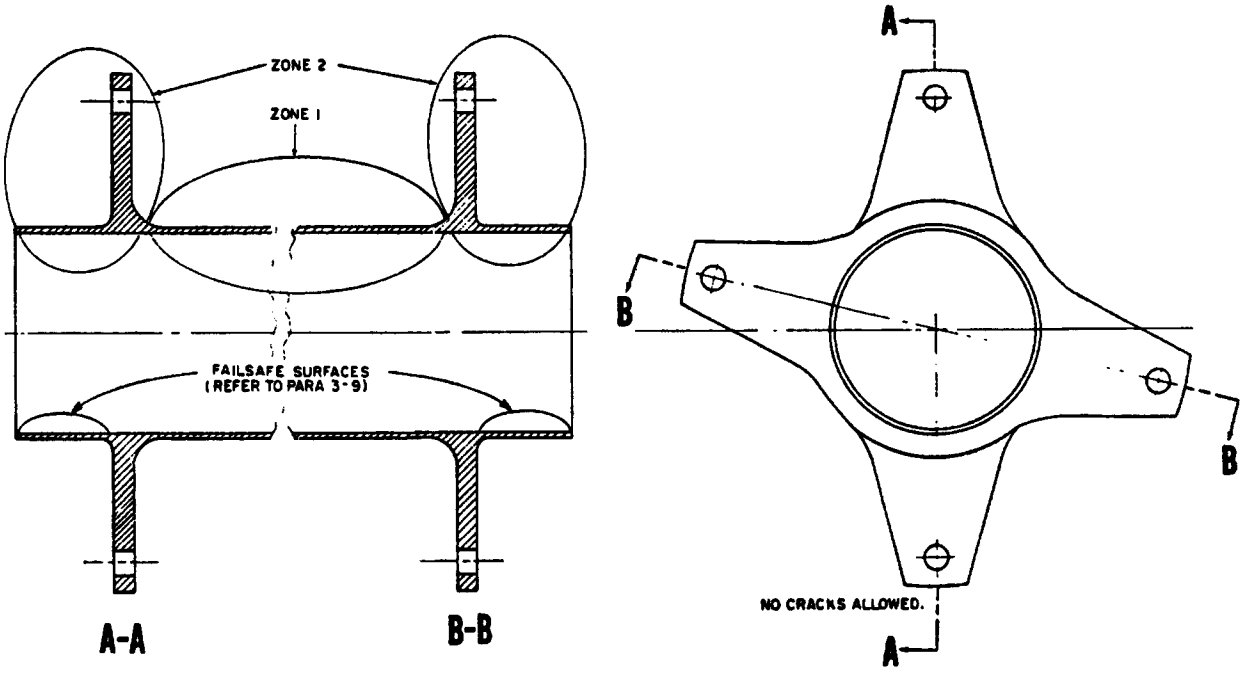


Figure 3-8. Interconnecting Fitting Inspection Criteria

CHAPTER 4

FINAL ASSEMBLY AND BALANCING

Section I

Assembly

4-1. General. (See figure 3-1.)

CAUTION

Proper assembly can be assured only by following the sequence specified in the following procedures. Note carefully that there are two different thickness flex plates (8 and 10), three different length bolts (5, 7 and 9), washers which are countersunk on one side (3) and flat washers (4). Note also that it is possible to assemble flex plates incorrectly. Make certain that flex plate corners lie flat and flush to the end fitting, the interconnect, or the adjoining flex plate, as applicable.

a. Prepare twelve of the 1.02 inch long bolts (7), four of the 1.12 inch long bolts (5), and four of the 1.21 inch long bolts (9) by applying accelerator (Item 1, Table 2-3) to the threaded area of bolts that are clean and free of oil, grease, or other foreign material.

b. Prepare twenty nuts, (2) clean and free of oil, grease, or other foreign material, by applying a drop or more of thread lock adhesive (Item 2, Table 2-3), using a cotton swab (Item 8, Table 2-3) or other suitable means, to the threaded area. Wipe face of nut and arrange nuts small end down to allow excess adhesive to drain towards that end. Nuts so prepared are satisfactory for use anytime within two hours.

4-2. Assembly.

NOTE

Bolts must assemble freely. If excessive coating interferes with free assembly, remove coating as necessary. Do not remove base metal.

a. (See figure 4-1.) Assemble one thick flex plate (1; 0.145 - 0.149 inch) to an end fitting (2) with two special flat washers (5) between flex plate and end fitting. Make certain that the flex plate corners lie flat and flush on the end fitting. Use two 1.12 inch long bolts, (3) two countersink washers (4) (under nut with countersink towards the nut), and two nuts (6). Note direction of bolt insertions - bolt head on end fitting side.

b. Assemble a thin flex plate (7; 0.126 - 0.130 inch) to the thick flex plate (1). Make certain that the flex plate corners lie flat and flush to each other. Use two 1.02 inch long bolts (8), four countersink washers (4) (one under each head with countersink towards head and one under each nut with countersink towards nut), and two nuts (6). Note direction of bolt insertion - bolt head on thin plate side.

WARNING

Flight Safety Part

The proper torque on the nut is the critical characteristic.

c. Install this subassembly on assembly fixture post (see figure 3-4) to that two bolt beads fit into assembly fixture sockets. Tighten nuts to 460-500 inch pounds torque.

NOTE

Inadvertent overtightening not exceeding 600 inch pounds torque is cause for immediate loosening and retightening to proper torque. This procedure is allowed for a maximum of three times per nut/bolt set. Overtightening more than three times, or a single tightening exceeding 600 inch pounds torque requires replacement of the affected nut/bolt set. The operator responsible for tightening the plate corner fasteners shall record the final torque value and sign on a form similar to figure 4-2. These procedures shall be followed for all torque applications.

WARNING

FLIGHT SAFETY PART

The proper torque on the nuts is the critical characteristic.

d. Turn the subassembly over and tighten the other two nuts to 460-500 inch pounds torque.

e. Repeat steps a through d to create a second subassembly. These subassemblies will be referred to as subassemblies "A".

f. (See figure 3-3.) Assemble a thin flex plate (1; 0.126-0.130 inch) to the interconnect (2), placing two special flat washers (5) between flex plate and interconnect. Make certain that flex plate corners lie flat and flush on the interconnect. Use two 1.21 inch long bolts (3), four countersink washers (4) (one under each head with countersink towards head and one under each nut, with countersink towards nut), and two nuts (6). Note direction of bolt insertions - bolt heads away from interconnect.

g. Assemble a second thin flex plate (7; 0.126 - 0.130 inch) to the first plate. Make certain flex plate corners lie flat and flush to each other. Use two 1.02 inch long bolts (8), four countersunk washers (9) (one under each head, with countersink towards head and one under each nut with countersink towards nut), and two nuts (10). Note direction of bolt insertions - bolt heads away from interconnect.

h. Repeat steps f and g for the other end of the interconnect.

WARNING

FLIGHT SAFETY PART

The proper torque on the nuts is the critical characteristic.

i. Install the 2.50 inch long phenolic guide (11) on the post of the assembly fixture.

j. Slide the interconnect onto the assembly fixture post so that two bolt heads fit into the assembly fixture sockets. Install 3.00 inch long phenolic guide (12) onto top of post. Tighten nuts to 460-500 inch pounds torque. Rotate interconnect and repeat for the other two nuts.

k. Turn interconnect over and repeat step j procedure. This subassembly will be referred to as subassembly "B".

m. (See figure 4-3.) Remove interconnect and phenolic guides from assembly fixture.

n. Install the two subassemblies "A" to subassemblies "B" using four 1.02 inch long bolts (1), eight countersunk washers (2) (one under each head with countersink towards head and one under each nut with countersink towards nut), and four nuts (3). Note direction of bolt insertion - heads away from interconnect.

WARNING

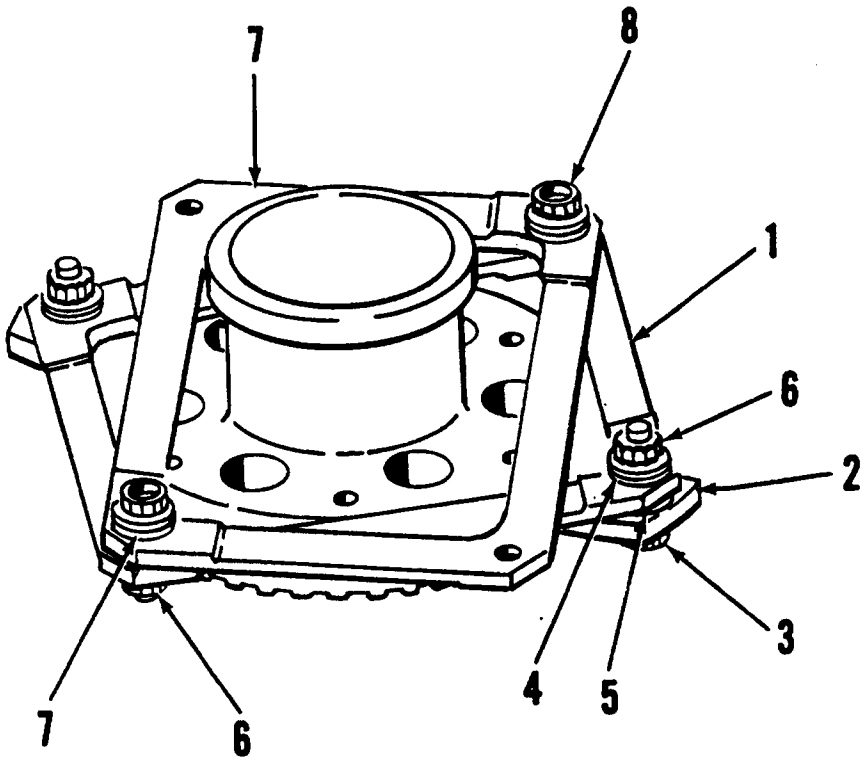
FLIGHT SAFETY PART

The proper torque on the nuts is the critical characteristic.

p. Install the assembly on the assembly fixture (phenolic guides not required) so that the two bolt heads installed in step n fit into the assembly fixture sockets. Tighten nuts to 460-500 inch pounds torque.

q. Turn assembly over and repeat step p procedure.

4-3. Final Inspection. Four quick checks for proper assembly can be readily made: (1) all but two of the bolts on each end are inserted towards the shaft center; (2) all bolt ends should extend 2 1/2 threads beyond the nut; (3) special flat washers are located against the end fittings and interconnect lugs; (4) the thick flex plates (0.145-0.149 inch) are located adjacent to each end fitting.



1. Thick flex plate (0.145-0.149 inch)
2. End fitting
3. 1.12 inch long bolt
4. Countersunk washer
5. Flat washer (special)
6. Nut
7. Thin flex plate (0.126-0.130 inch)
8. 1.02 inch long bolt

Figure 4-1. Assembly - Flex Plates to End Fitting

Date _____ Coupling Ser. No. _____

Assembly and balance sequence.
Torque values must be recorded for each individual fastener.

Torque Record

	BOLT 1	BOLT 2
1. Thick plate to end fitting		
2. Thick plate to thin plate		
3. Thick plate to end fitting		
4. Thick plate to thin plate		
5. Interconnect to thin plate		
6. Thin plate to thin plate		
7. Interconnect to thin plate		
8. Thin plate to thin plate		
9. Sub Ass'y A-1 to Sub Ass'y B-1		
10. Sub Ass'y A-2 to Sub Ass'y B-2		

_____
Signature, Ass'y Technician

_____
Inspector

Balance Record

Final balance - Right End _____ Wt. Added _____

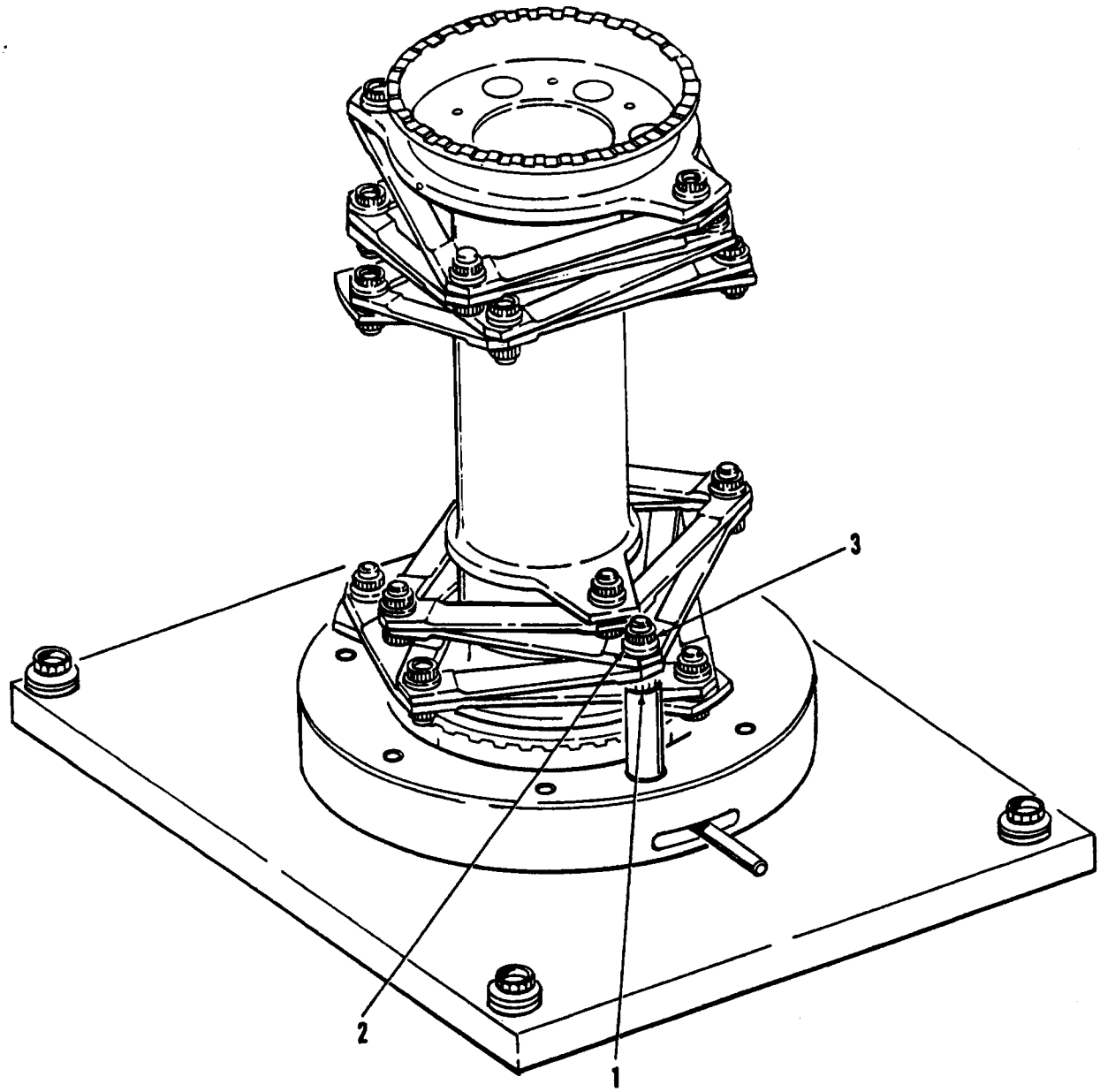
Final balance - Left End _____ Wt. Added _____

_____
Signature, Balance Technician

_____
Inspector

Final Inspection OK: _____

Figure 4-2. Quality Control Form



1. 1.02 inch long bolt
2. Countersunk washer
3. Nut

Figure 4-3. Final Assembly

Section II

Balancing

4-4. Balancing . (See figure 4-4.)

a. Install drive shaft on balancing arbor, part number SKCP2180-1T74.

b. Using a ¼ (0.250) inch internal socket head wrench, tighten arbor expanding screw until drive shaft is held tightly in place on the arbor.

c. Place arbor on a Stewart Warner Series 2000 balancing machine, or equivalent, and following the balancing machine instructions, dynamically balance the shaft at each of the balance planes to within 0.25 ounce inches of unbalance.

d. Correct excessive unbalance by installing applicable screws, which are available in three lengths (12, figure 3-1), and washers, available in two diameters (13, figure 3-1), in applicable tapped holes in end fittings.

CAUTION

As a maximum length balance screw threaded end must extend no closer than 1/8 inch of the flex plate and conversely as a minimum length screw threads must at least be flush with fitting surface.

e. When correct final balance is achieved, remove the drive shaft and arbor from the balancing machine. Withdraw the balance screws one at a time and apply sealing, locking, and retaining compound (Item 6, Table 2-3) to the threads. Reinstall each screw before removing the next one for sealing, locking, and retaining compound application.

f. Final balance results are to be recorded and signed on a form similar to figure 4-2.

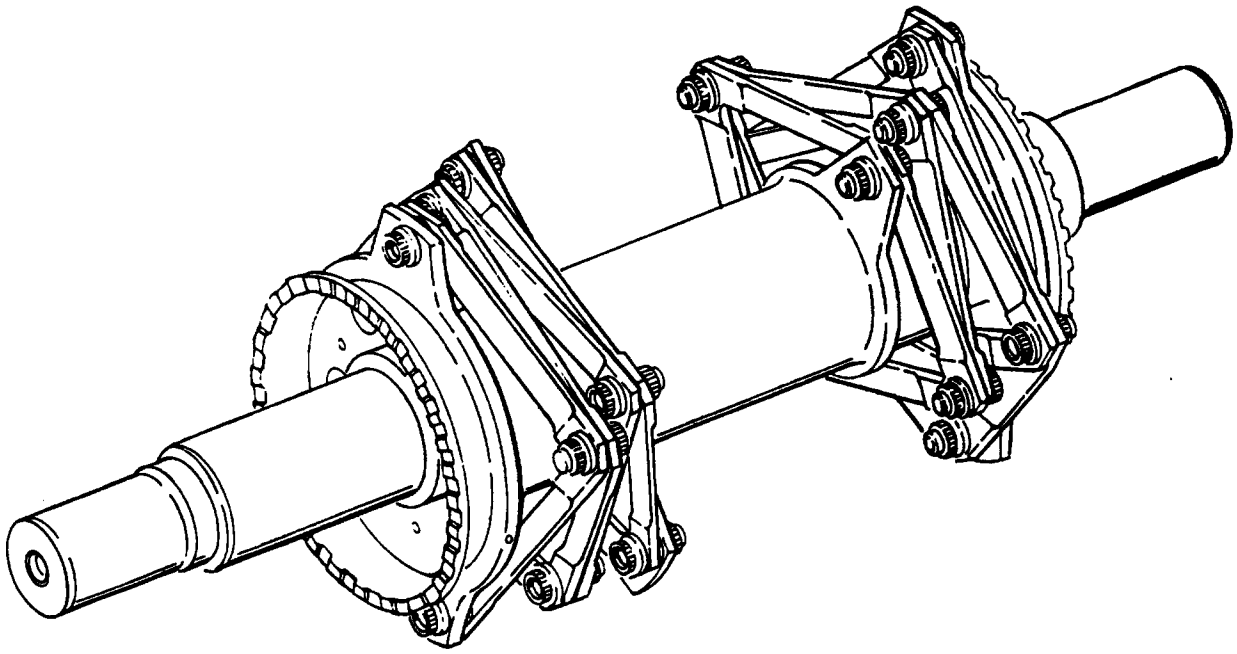


Figure 4-4. Drive Shaft on Balancing Arbor

CHAPTER 5

QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

Section I. GENERAL

5-1. Responsibility. The contractor/depot quality assurance activity is responsible for the performance of the inspections specified in the DMWR. The contractor/depot may utilize their own facilities or any commercial laboratory acceptable to the procuring activity/commodity manager (PA/CM). The PA/CM reserves the right to perform any of the inspections specified in the DMWR, when such inspections are necessary to assure that supplies or services conform to the prescribed requirements.

5-2. Quality Assurance Terms and Definitions. For quality assurance terms and definitions refer to MIL-STD-109 and the glossary in the DMWR.

5-3. Inspection and Test Equipment. The overhaul facility is responsible for acquisitions, maintenance, calibration, and disposition of all inspection and test equipment. Test equipment to be used by AMC (Army) elements will be acquired in accordance with AR 750-43 and AMC Supplement 1 to AR 750-43. All instrumentation and inspection equipment used in compliance with this DMWR shall be calibrated and controlled in accordance with MIL-I-45607B and MIL-STD-45662 (Commercial facility) or DESCOM-R 702-1, Depot Quality Systems (Army facility), with all standards traceable to the National Bureau of Standards. Descriptions of inspecting and measuring equipment are left to the discretion of the overhauling facility to be considered as good shop practice.

5-4. Certification of Personnel, Materials, and Processes. The contractor/depot QA activity shall be responsible for ascertaining and certifying personnel skills, equipment, and material meet the requirements of the work to be accomplished. Unless otherwise specified in the contract or by PA/CM representative, the contractor/depot QA activity shall provide the PA/CM with statements or other evidence that specifications for such special processes as welding, nondestructive testing, plating. and the like, have been complied with. Personnel performing magnetic particle and penetrant tests shall be certified in accordance with MIL-STD-410.

Section II. INSPECTION REQUIREMENTS

5-5. General.

a. Quality Inspectors (QI) are required to witness all tests and those inspections which are marked "QI" or otherwise designated by the PA/CM.

b. The Maintenance Technicians shall inspect, check, and determine the conditions of all other areas to insure compliance with the DMWR.

5-6. Product Verification Audit. A product verification audit may be performed in accordance with AVSCOM-R 702-1 on one of the first five items produced to verify compliance with the DMWR and contractual terms.

5-7. In-Process and Acceptance Inspections.

a. Used components and refinished parts recovered as products of disassembly shall be examined 100% by the contractor/depot. to determine serviceability. A copy of this log shall be submitted to the PA/CM as part of the overhaul contract. The log shall contain the Maintenance Technician's comments for all parts, removed; such as, parts inspected, replaced, inspected by QI, tested by NDI, modified by MWO, or other notes or actions.

b. Diagnostic and nondestructive tests such as magnetic particle, penetrant, radiographic , and ultrasonic inspections as required by this DMWR shall be in accordance with referenced military specifications, and AVSCOM AA-STD-1 and AA-STD-2 where not otherwise specified. A qualified QI shall either perform or witness these tests.

c. A list of inspection definitions. Table 5-1, are included at the end of this chapter. Accept and reject criteria for these inspections and unique repair methods are found in applicable areas of this DMWR.

5-8. Test Check List. A check list indicating each required test shall be included as part of this DMWR. The list shall show name of test and test set-up (per figure if applicable). List the input readings, such as position of valves, switches, etc. List the required readings, such as time, meter readings, etc. List the accept/reject criteria for each test as applicable.

Table 5-1. Inspection Definitions

TERM	DEFINITION	PROBABLE CAUSE
Abrasion	Roughened surface, varying from light to severe	Foreign material present between moving parts
Bend	Any change in the intended configuration	Application of severe or excessive force
Break	Separation of part	Severe force, pressure or overload
Burn	Loss of metal	Excessive heat
Burnishing	The smoothing of a metal surface by mechanical action, but without loss of material. Generally found on plain bearing surfaces. Surface discoloration is sometimes present around outer edges of burnished area NOTE Normal burnishing from operational service is not detrimental if coverage approximates the carrying load and if there is no evidence of burns.	Excessive heat
Burr	A rough edge or sharp projection	Impact from foreign object, or poor machining
Chipping	Breaking away of small metallic particles	Heavy impact of foreign object
Corrosion	Surface chemical action that results in surface discoloration, a layer of oxide, rust, and removal of surface metal	Improper corrosion preventive procedures and excessive moisture
Crack	A break in material	Severe stress from overloading or shock; possible extension of a scratch

Table 5-1. Inspection Definitions (continued)

TERM	DEFINITION	PROBABLE CAUSE
Dent	A small smoothly rounded depression	A sharp blow or excessive pressure
Distortion	A change from original shape	Application of severe heat or irregular forces
Erosion	Wearing away of metal	Hot gases, corrosive liquids, or grit
Fatigue failure	Sharp indentions, cracks toolmarks, and inclusions that result in progressive yielding of one or more local areas	Cyclic stress. As stress is repeated, cracks develop, then spread, usually from surfaces (or near surface) of the particular section. Finally, so little sound material remains that normal stress on part exceeds strength of the remaining material. This type of failure is not caused by metal crystalization. This condition can easily be determined by visual inspection of part. Striations will be evidence by several lines, more or less concentric. The center (or focus) of lines indicates origin of the failure
Flaking	Loose particles of metal or evidence of surface covering removal	Imperfect bond or severe load
Fracture	See break	
Gouging	Removal of surface metal. Typified by rough and deep depressions	Protruding objects, misalignment
Heat oxidizing	Characterized by a discoloring film Color varies from yellow to brown and blue to purple	High temperature operation
Indenting	Cavities with smooth bottoms and sides. Occurs on rolling contact surfaces of bearing components	Loose or foreign particles rolling between rotating elements of a bearing
Nick	A sharp-bottomed depression that may have rough outer edges	Dropping, banging
Off-square or mis-alignment of Anti-Friction Bearing	Indicated by retainer deterioration, retainer bore erosion, and gouged retainer rolling element pockets of the inner and outer race. Two distinct rolling element paths may be seen on the race where off-square conditions exist	Caused by rolling element speed variation, which jams rolling elements into separator pockets

Table 5-1. Inspection Definitions (continued)

TERM	DEFINITION	PROBABLE CAUSE
Pitting	Small indentions in a surface	Chemical pitting: Oxidation of surface or electrolytic action. Mechanical pitting: Chipping of loaded surfaces caused by improper clearances and overloading, and by pressure of foreign material
Scoring	Deep scratch following path of part travel	Result of localized lubrication breakdown between sliding surfaces
Scraping	A furrow	Rubbing with any hard, or rough pointed object
Scratch	A very shallow furrow or irregularity, usually longer than wide	Movement of a sharp object across the surface
Seizure	Fusion or binding of two adjacent surfaces preventing continued movement	Improper lubrication or wear
Stripped thread	Thread of a nut, stud, bolt, or screw damaged by tearing away part of thread	Improper installation or thread pitch or size
Tear	Parting of parent material	Excess tension, caused by an external force
Wear	Slow removal of parent material. Frequently, wear is not visible to the naked eye	Result of abrasive substances contacting rolling surfaces, and acting as a lapping compound

Chapter 6

PACKAGING

6-1. Components will be preserved, packed, and marked in accordance with the Delivery Order/Contract, Depot Maintenance Interservice Support Agreement (DMISA), Statement of Work (SOW), Memorandum of Agreement or other authorized document, and the accompanying AMSAV Form 6525(J).

6-2. Organic Depots shall contact ATCOM Packaging and Transportability Branch, HQ ATCOM, AMSAT-I-SDP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798 for preservation and packaging requirements.

6-3. For further information, contact ATCOM Packaging and Transportability Branch, HQ ATCOM, AMSAT-I-SDP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. All contracts or inquiries shall be through the Contracting Officer (KO).

Figure 6-1 has been deleted.

APPENDIX A

REFERENCES

A-1.	MILITARY STANDARDS MIL-STD -1949	Inspection Process, Magnetic Particle
A-2.	FEDERAL SPECIFICATIONS TT-P-1757	Primer, Zinc Chromate
A-3.	TECHNICAL MANUALS TM55-1520-210-23P TM 38-750	Aviation Unit and Intermediate Maintenance Repair Parts and Special Tools List
A-4.	DA PAMPHLET DA PAM 738-751 KAMATICS SPECI FICATIONS KC S51	Functional Users Manual for the Army Maintenance Management System- Aviation (TAMMS-A)
A-5.	ARMY REGULATIONS DESCOM - R 702-1	Depot Quality System
A-6.	MISCELLANEOUS KCS51	Schematics Specifications KCS51 Coating Metallic - Ceramic

APPENDIX B

DEPOT MOBILIZATION REQUIREMENTS

The purpose of this appendix is to streamline production procedures during depot mobilization. The following list if action will be in effect during depot mobilization: This DMWR pertains to an "on condition" item and is used as a guide during depot maintenance to perform only those corrective maintenance tasks essential to achieving serviceability. The exception is when mandatory convenience maintenance tasks, necessary to assure the inherent reliability and/or longevity of the item, are stipulated in the Preshop Analysis Sect-ion of the DMWR. All of the above are essential, even under a state of mobilization.

For the Commander:

EUGENE J. DAVIS
Colonel, GS
Chief of Staff

Official:

JOANNE M. MEYER
DA Publications Manager

REQUEST FOR DEPOT ENGINEERING SUPPORT

CONTRACT NO	PRIORITY OF REQUEST	DATE OF REQUEST
	☐ URGENT ☐ ROUTINE	

TO

THRU

COPIES

FROM.

POINT-OF-CONTACT

PUBLICATION NO	CHANGE NO	PUBLICATION DATE

PUBLICATION TITLE

STATEMENT OF THE PROBLEM ☐ PUBLICATIONS PROCEDURES ☐ OTHER

(Use Continuation Sheet if Necessary)

REASONS FOR URGENCY

AREA OF PUBLICATION WHERE PROBLEM EXISTS *(Optional)*

BE EXACT — PIN POINT WHERE IT IS

PAGE NO	PARA GRAPH	FIGURE NO	TABLE NO

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT.

(Use Continuation Sheet if Necessary)

TITLE	SIGNATURE	DATE

AMSAT-I M Form 1379
1 Jun 93

Edition of 1 Oct 87 is obsolete

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)
PFC JOHN DOE
COA, 3d ENGINEER BN
FT. LEONARDWOOD, MO 63108

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
DMWR 55-1615-278	15 October 93	MAIN DRIVE SHAFT

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
6	2-1 a			In line 6 of paragraph 2-1a the manual states the engine has 6 Cylenders. The engine on my set only has 4 Cylenders. Change the manual to show 4 Cylenders.
B1		4-3		Callout 16 on figure 4-3 is pointing at a bolt. In key to figure 4-3, item 16 is called a shim - Please Correct one or the Other.
125	line 20			I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered, so the NSN is wrong. Please give me a good NSN

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER	SIGN HERE
JOHN DOE, PFC (268) 317-7111	JOHN DOE

TEAR ALONG PERFORATED LINE

DA FORM 1 JUL 79 2028-2 PREVIOUS EDITIONS ARE OBSOLETE. DRSTS-M Overprint 1, 1 Nov 80

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS

REVERSE OF DA FORM 2028-2 Reverse of DRSTS-M Overprint 2, 1 Nov 80

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COMMANDER
U.S. ARMY AVIATION AND TROOP COMMAND
ATTN: AMSAT-I-MP
4300 GOODFELLOW BOULEVARD
ST. LOUIS, MO 63120-1798

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DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
DMWR 55-1615-278	15 October 93	MAIN DRIVE SHAFT

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER

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ST. LOUIS, MO 63120-1798

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1 094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10 764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2 471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35 315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2 113
gallons	liters	3.785	liters	quarts	1 057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2 205
pound-feet	newton-meters	1.356	metric tons	short tons	1 102
pound-inches	newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C