

# ALERT SERVICE BULLETIN



A Textron Company

NO. 412-07-127

DATE Nov 27, 2007

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DATE
REV

**MODEL AFFECTED:** 412, 412EP

**SUBJECT:** CYCLIC FLIGHT CONTROL BEARING, P/N MS27643-4 ONE TIME INSPECTION AND REPLACEMENT OF.

**HELICOPTERS AFFECTED:** Model 412 / 412EP helicopters serial number 33001 through 33213, 36001 through 36439, 36441 and 36449.

[Model 412EP helicopters, serial numbers 36440, 36442 through 36448, 36450 and subsequent will have the intent of this bulletin accomplished prior to delivery.]

- COMPLIANCE:**
- Part I** Immediately after receipt this bulletin.
  - Part II** Within the next 300 hours of flight following receipt of this bulletin.
  - Part III** Within the next 600 hours of flight following the receipt of this bulletin but no later than October 30, 2008.

**DESCRIPTION:**

Bearings P/N MS27643 are designed to be internally self-aligning for a minimum of 10 degrees in any direction. Bell Helicopter has determined that Bearings P/N MS27643 manufactured prior to September 2007 by Schatz Bearing Corporation allow only an 8.5 degree angular rotation.

If the Bearing MS27643 installation requires angular rotation greater than the bearing capability, the bearing shoulder will bottom out on the grease seal resulting in an increase of control force. Also, the grease seal may be damaged or dislodged causing potential loss of lubrication and/or increased friction in the affected controls.

BHT has identified those specific bearing installations where a 10 degree angular rotation is required for proper control operation. These installations are limited to several specific P/N MS27643-4 Bearings in the cyclic flight control system.

Although Schatz Bearing has subsequently redesigned their MS27643 Bearing product to meet the 10 degree minimum specification, a one time inspection is required to determine if an old design Schatz bearing is installed in one of the critical locations in the cyclic controls. If an old design Schatz bearing is found, it must be replaced in accordance with the Compliance and Accomplishment Instructions sections of this bulletin. Bearings P/N MS27643 manufactured by Schatz in installations other than those specifically noted in this ASB are acceptable for continued operation subject to normal serviceability requirements.

Bearings P/N MS27643 manufactured by BHT suppliers other than Schatz meet the 10 degree minimum requirement and do not require inspection. All spare Schatz manufactured Bearings P/N MS27643 delivered by BHT, either as detail parts or in assembled components, after October 2, 2007, will be new design bearings which meet the 10 degree minimum requirement.

**APPROVAL:**

The engineering design aspects of this bulletin are FAA/DER approved.

**MANPOWER:**

Approximately 0.5 additional man-hours are required to complete Part II of this bulletin, if done in conjunction with a scheduled inspection. Time to accomplish Part III, if required, will vary upon the quantity of Schatz bearings installed. Man-hours are based on hands-on time, and may vary with personnel and facilities available.

**WARRANTY:**

Owners / Operators of Bell Helicopters who comply with the instructions in Part I, and Part II of this Bulletin will be eligible to receive replacement bearings at no cost. Warranty credit will only be provided for those bearings identified being made by Schatz as detailed in the instructions of this Bulletin that are found in stock, on next higher assemblies, or installed on aircraft.

In order to receive this special warranty credit purchase replacement bearing through a Bell approved source and file a VISTA Warranty claim. Only those bearings, and or next higher assemblies that have been previously purchased from a Bell approved

source and are traceable back to a Bell Helicopter invoice will be covered under this warranty statement.

Customers who fail to comply with the instructions in this Bulletin after the 30<sup>th</sup> October 2008 are not eligible for the special warranty exceptions listed above. No other labor cost will be covered under this Bulletin.

#### **MATERIAL:**

##### **Required Material:**

The following material is required for the accomplishment of this bulletin and may be obtained through your Bell Helicopter Textron Supply Center.

<u>Part Number</u>	<u>Nomenclature</u>	<u>Quantity</u>
MS27643-4	BEARING	A/R
120-013-4A	SLEEVE	A/R

##### **Consumable Material:**

The following material is required to accomplish this bulletin, but may not require ordering, depending on the operator's consumable material stock levels. This material may be obtained through your Bell Helicopter Textron Supply Center.

<u>Part Number</u>	<u>Nomenclature</u>	<u>Quantity</u>	<u>Reference</u>
MIL-PRF-23377TI,CLC	PRIMER KIT	A/R	C-204*
299-947-107 TY3 CL7	ADHESIVE 50 G.	A/R	C-308
PD680	SOLVENT DRYCLEANING	A/R	C-304

\*See Accomplishment Instruction Part III C for note on primer

#### **WEIGHT AND BALANCE:**

Not required

#### **SPECIAL TOOLS:**

See Accomplishment Instructions Part III C for locally fabricated work-aid.

**ELECTRICAL LOAD DATA:**

Not affected

**REFERENCES:**

BHT-412-IPB Illustrated Parts Breakdown  
BHT-412-MM Maintenance Manual  
BHT-412-CR&O Component Repair and Overhaul Manual  
BHT-ALL-SPM Standard Practices Manual

**PUBLICATIONS AFFECTED:**

None affected

**ACCOMPLISHMENT INSTRUCTIONS:**

**Component and Bearing Identification:**

1. On the Bell 412 / 412EP, BHT has identified 4 applications where a 10 degree angular rotation is required from the bearings MS27643 for proper control operation.
  - a. Controls Installation, Cyclic Assembly.  
The Arm Assembly P/N 204-001-356-001 has 2 Bearings P/N MS27643-4 installed.
  - b. Controls Installation, Cyclic Assembly.  
The Arm Assembly P/N 204-001-332-005 has 1 Bearing P/N MS27643-4 installed.
  - c. Stick Assembly, Pilot Cyclic.  
The Lever Assembly P/N 204-001-357-005 has 2 Bearings P/N MS27643-4 installed.
  - d. Dual Control Kit. Copilot Cyclic.  
The Lever Assembly P/N 204-001-357-001 has 2 Bearings P/N MS27643-4 installed.
2. Bearings manufactured by Schatz Bearing Corporation will have the word **SCHATZ** imprinted on the bearing seal retainer on at least one side of the bearing as shown in Figure 1.

- a. Bearings previously manufactured by Schatz which do not meet the 10 degree minimum angular rotation requirement can be identified by the **straight shoulder inner race** design as illustrated in Figure 2 (**old design**).
- b. Redesigned bearings manufactured by Schatz which do meet the 10 degree minimum angular rotation requirement can be identified by the **under cut shoulder inner race** design as illustrated in Figure 2 (**new design**).

## Part I:

### Inspection of Arm and Lever Assemblies in spares stock.

1. Inspect all bearings installed in the assemblies identified in Component and Bearing Identification section. Any **old design** Schatz bearings found must be removed and replaced in accordance with the Compliance section and Accomplishment Instructions, Part III C, of this bulletin.

#### NOTE

Installed bearings with manufacturer identification other than Schatz Bearing Corporation and **new design** Schatz bearings are acceptable for continued operation subject to normal serviceability requirements.

2. If the Arm or Lever Assemblies do not have the **old design** Schatz bearings installed, attach a serviceable tag to the assembly and indicate compliance with this Alert Service Bulletin.

## Part II:

### Inspection of Arm and Lever Assemblies installed on Helicopter.

(Refer to Figure 3 and 4).

1. Prepare helicopter for maintenance (disconnect battery).
2. Access Arm Assembly P/N 204-001-356-001 and P/N 204-001-332-005.
  - a. Remove pilot and copilot seats
  - b. Remove doors P/N 212-030-250-001.

**NOTE**

A clean cloth dampened (DO NO SOAK) with MEK or aliphatic naphtha may be used to clean the grease and dirt from the bearing seal retainer if required.

- c. Inspect bearing in all 3 lug locations per Figure 2 for **old design** Schatz bearings as described in Component and Bearing Identification section.
  - 1) If **old design** Schatz bearings are found in any of the lugs they must be removed and replaced in accordance with the Compliance section and Accomplishment Instructions, Part III C, of this bulletin.
  - 2) If an **old design** Schatz bearing is installed but is not to be replaced at this time, ensure that the seals and seal retainers are correctly seated in the bearing and have not been dislodged. If the seals or seal retainers have been dislodged or are damaged, the bearing must be replaced before next flight.
  - 3) Installed bearings with manufacturer identification other than Schatz Bearing Corporation and **new design** Schatz bearings are acceptable for continued operation subject to normal serviceability requirements.
- 3. Access Levers Assemblies P/N 204-001-357-005 and P/N 204-001-357-001. (Refer to BHT-412-IPB and BHT-412-MM, Chapter 67).
  - a. Remove door P/N 205-032-104-085 located under forward cabin right hand side.
  - b. Remove door P/N 205-032-105-163 (33001 through 33100) or 205-032-105-131 (33101 through subsequent) located under forward cabin left hand side.

**NOTE**

A clean cloth dampened (DO NO SOAK) with MEK or aliphatic naphtha may be used to clean the grease and dirt from the bearing seal retainer if required.

- c. Inspect bearings installed in the fore and aft and lateral lugs in both Levers Assemblies for **old design** Schatz bearings as described in Component and Bearing Identification section.
  - 1) If **old design** Schatz bearings are found in any of the lugs they must be removed and replaced in accordance with the Compliance section and Accomplishment Instructions, Part III C, of this bulletin.

- 2) If an **old design** Schatz bearing is installed but is not to be replaced at this time, ensure that the seals and seal retainers are correctly seated in the bearing and have not been dislodged. If the seals or seal retainers have been dislodged or are damaged, the bearing must be replaced before next flight.
- 3) Installed bearings with manufacturer identification other than Schatz Bearing Corporation and **new design** Schatz bearings are acceptable for continued operation subject to normal serviceability requirements.
4. If the Arm Assemblies or Cyclic Assemblies do not have **old design** Schatz bearings installed, make an entry in helicopter historical records indicating compliance with this Alert Service Bulletin.

### Part III A:

#### **Removal and Installation of Arm Assembly P/N 204-001-356-001 and P/N 204-001-332-005.** (Refer to Figure 3 and 4).

1. Prepare helicopter for maintenance (disconnect battery).
2. Access Arm Assembly P/N 204-001-356-001 and P/N 204-001-332-005.
  - a. Remove pilot and copilot seats
  - b. Remove doors P/N 212-030-250-001.
3. Refer to BHT-412-MM, Chapter 67 for the removal of the component attaching the arm assembly P/N 204-001-356-001 and P/N 204-001-332-005.

#### -NOTE-

Mark bolt and bushing installations prior to removal to ensure installation in same location.

#### -NOTE-

Tube and lever assembly is a matched assembly after drilling and taper reaming to fit parts. Do not intermix used parts from another assembly. Replace damaged part with new part.

- a. Remove bolts (27, figure 3), nuts (30), washers (29) and tapered bushings (28) attaching components of tube and lever assembly (1).

- b. Remove lever assembly (33) from tube (1).
  - c. Remove bolts (25, figure 4), nuts (28), washers (27) and tapered bushings (26) attaching components of tube (11) and lever assembly (24).
  - d. Remove lever assembly (24) from tube (11).
4. If wear or damage of component is suspected, refer to BELL-412-CR&O, Chapter 67, for inspection criteria.
  5. Refer to Part III C for Bearing and Sleeve replacement.
  6. Assemble lever as follow:
    - a. Insert lever assembly (33, figure 3) in tube (1) and align bolt holes.

**-NOTE-**

Tube and lever are matched assembly after drilling and taper reaming. It shall be place in original position when reinstalled.

- b. Apply primer (C-204) on bolts (27), taper bushings (28) and mounting surfaces of tube (1).
- c. Install bolts (27), tapered bushings (28), washers (29) and nuts (30). Torque bolts 50 to 70 inch-pounds (5.65 to 7.91 N-m). Washer must clear tube 0.030 to 0.060 inch (0.762 to 1.524 mm).
- d. Insert lever assembly (24, figure 4) in tube (11) and align bolt holes.

**-NOTE-**

Tube and lever are matched assembly after drilling and taper reaming. It shall be place in original position when reinstalled.

- e. Apply primer (C-204) on bolts (25), taper bushings (26) and mounting surfaces of tube (11).
- f. Install bolts (25), tapered bushings (26), washers (27) and nuts (28). Torque bolts 50 to 70 inch-pounds (5.65 to 7.91 N-m). Washer must clear tube 0.030 to 0.060 inch (0.762 to 1.524 mm)
- g. Apply sealant (C-308) to seal bolt heads and nuts.

- h. Apply small bead of sealant (C-308) to mating surfaces of lever assembly and tube.
7. Assemble previously removed components to the levers per BHT-412-MM, Chapter 67.
8. Connect hydraulic power cart to helicopter.
9. Move cyclic and collective controls through full travel and check for obstruction and binding.
10. Install access doors and seats.
11. Make an entry in helicopter historical records indicating compliance with this Alert Service Bulletin.

**Part III B:**

**Removal and Installation of Arm Lever Assembly P/N 204-001-357-005 and P/N 204-001-357-001.** (Refer to BHT-412-IPB and BHT-412-MM, Chapter 67).

1. Remove pilot cyclic control stick assembly.
2. If wear or damage of component is suspected, refer to BELL-412-CR&O, Chapter 67, for inspection criteria.
3. Refer to Part III C for Bearing and Sleeve replacement.
4. Install pilot cyclic control stick. Refer BHT-412-MM.
5. Same procedure applies to the copilot cyclic stick.
6. Connect hydraulic power cart to helicopter.
7. Move cyclic and collective controls through full travel and check for obstruction and binding.
8. Install removed access panel.
9. Make an entry in helicopter historical records indicating compliance with this Alert Service Bulletin.

**Part III C:**

**Bearing and Sleeve Replacement**

1. Press out discrepant bearing/s and sleeve/s ensuring lugs containing the bearings are adequately supported during the pressing operation.
2. Refer to BHT-ALL-SPM, Chapter 9 for bearings and sleeves replacement.
3. Inspect bores for damage and repair as necessary. Refer to BHT-412-CR&O, Chapter 67.

**CAUTION**

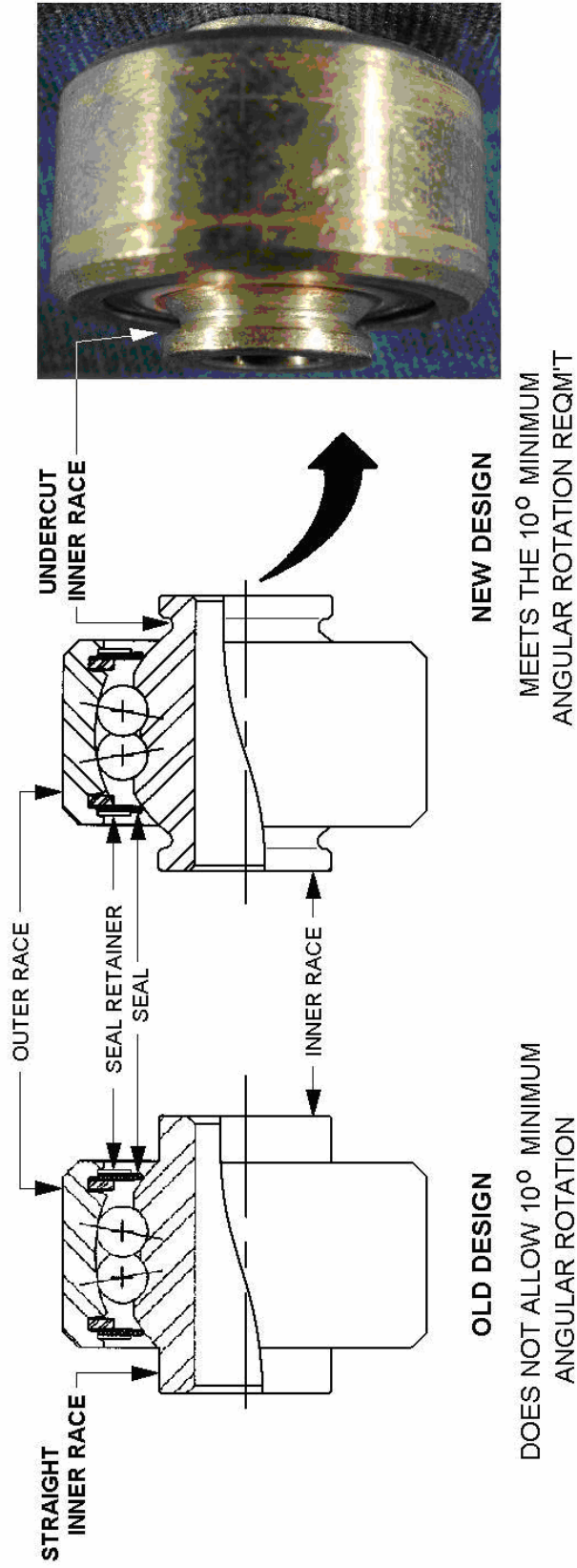
**Ensure lugs containing the bearings are adequately supported during the pressing and staking operations required to replace sleeves and bearings.**

4. Install and ring stake new sleeve/s and bearing/s per BHT-ALL-SPM except as follows:
  - a. Do not use zinc chromate or water borne (Mil-P-85582) primer, use Mil-P-23377 primer only when installing the sleeve and bearing.
  - b. Heat may be applied to the component lug to aid sleeve installation. Do not exceed 200 degrees F. Allow primer to cure before installing the bearing.
  - c. The new bearing may be chilled in a freezer or with dry ice to aid installation into the sleeve. Do not exceed 2 hours chill time and do not use liquid nitrogen or alcohol.
  - d. Due to access limitations, P/N T101873-13 Ring Staking Tool noted in BHT-ALL-SPM can not be used to replace the bearing in the lateral lug of the P/N 204-001-357 Lever and is only marginally acceptable for the bearings in the P/N 204-001-356 Arm. A locally fabricated work aid (Figures 5 and 6) may be used to ring stake bearings in these areas.



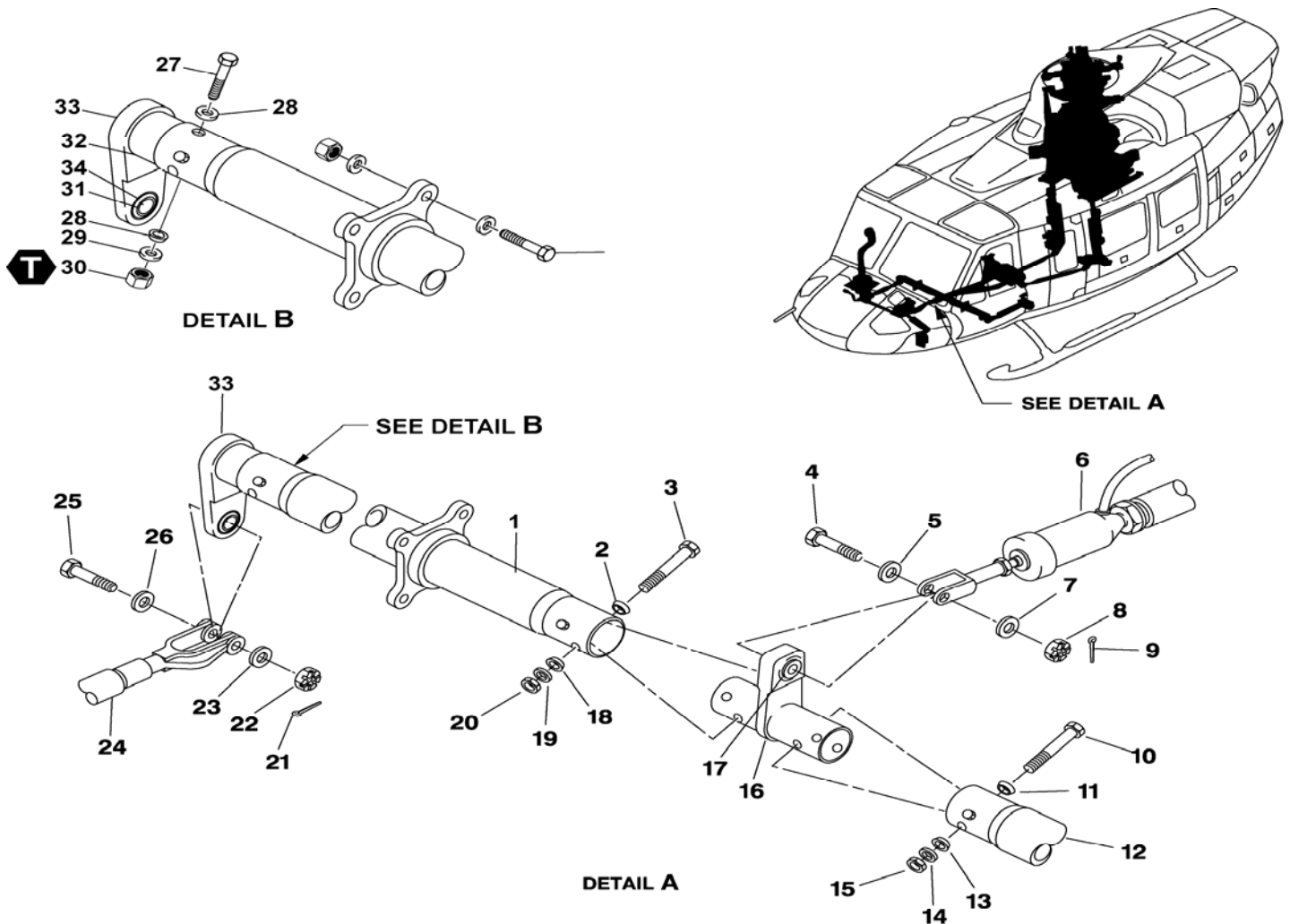
BEARING MS27643-4

FIGURE 1



SCHATZ MS27643 BEARING OLD DESIGN - NEW DESIGN IDENTIFICATION

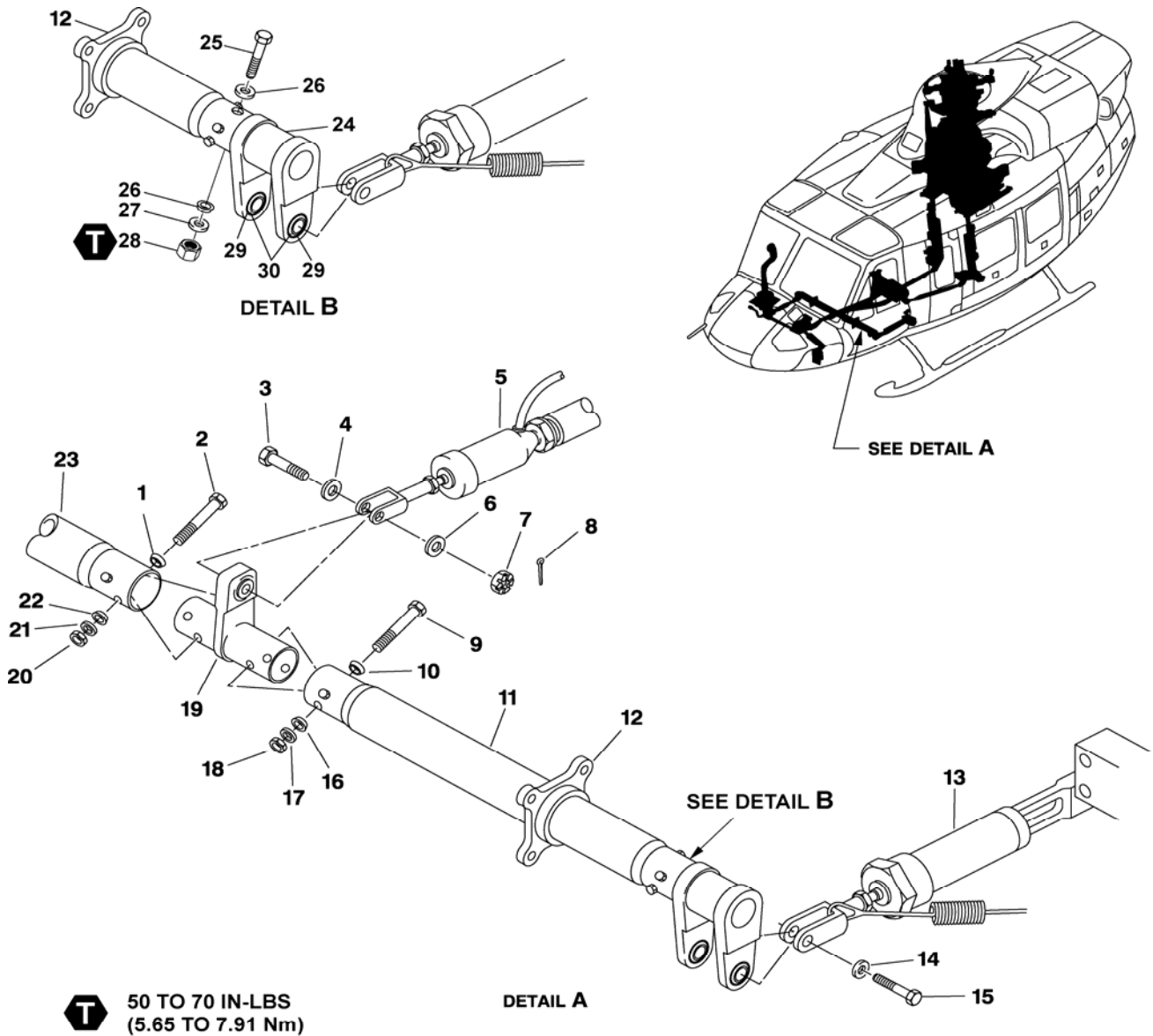
FIGURE 2



- |                             |                         |
|-----------------------------|-------------------------|
| 1. Tube and lever assembly  | 18. Tapered bushing     |
| 2. Tapered bushing          | 19. Washer              |
| 3. Bolt                     | 20. Nut                 |
| 4. Bolt                     | 21. Cotter pin          |
| 5. Aluminum washer          | 22. Nut                 |
| 6. Series actuator          | 23. Aluminum washer     |
| 7. Aluminum washer          | 24. Flight control tube |
| 8. Nut                      | 25. Bolt                |
| 9. Cotter pin               | 26. Aluminum washer     |
| 10. Bolt                    | 27. Bolt                |
| 11. Tapered bushing         | 28. Bushing             |
| 12. Tube and lever assembly | 29. Washer              |
| 13. Tapered bushing         | 30. Nut                 |
| 14. Washer                  | 31. Bearing             |
| 15. Nut                     | 32. Insert              |
| 16. Arm assembly            | 33. Lever assembly      |
| 17. Washer                  | 34. Sleeve              |

**T** 50 TO 70 IN-LBS  
(5.65 TO 7.91 Nm)

LEVER ASSEMBLY 204-001-332-005  
FIGURE 3



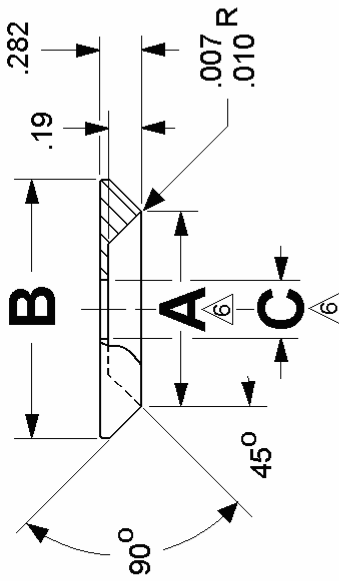
50 TO 70 IN-LBS  
(5.65 TO 7.91 Nm)

- |                     |                                    |                                     |
|---------------------|------------------------------------|-------------------------------------|
| 1. Tapered bushing  | 11. Tube and lever assembly (left) | 21. Washer                          |
| 2. Bolt             | 12. Housing                        | 22. Tapered bushing                 |
| 3. Bolt             | 13. Force gradient                 | 23. Tube and lever assembly (right) |
| 4. Aluminum washer  | 14. Aluminum washer                | 24. Arm assembly                    |
| 5. Series actuator  | 15. Bolt                           | 25. Bolt                            |
| 6. Aluminum washer  | 16. Tapered bushing                | 26. Bushing                         |
| 7. Nut              | 17. Washer                         | 27. Washer                          |
| 8. Cotter pin       | 18. Nut                            | 28. Nut                             |
| 9. Bolt             | 19. Arm                            | 29. Sleeve                          |
| 10. Tapered bushing | 20. Nut                            | 30. Bearing                         |

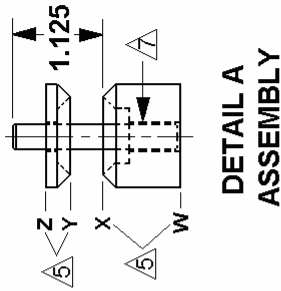
LEVER ASSEMBLY 204-001-356-001  
FIGURE 4

NOTES:

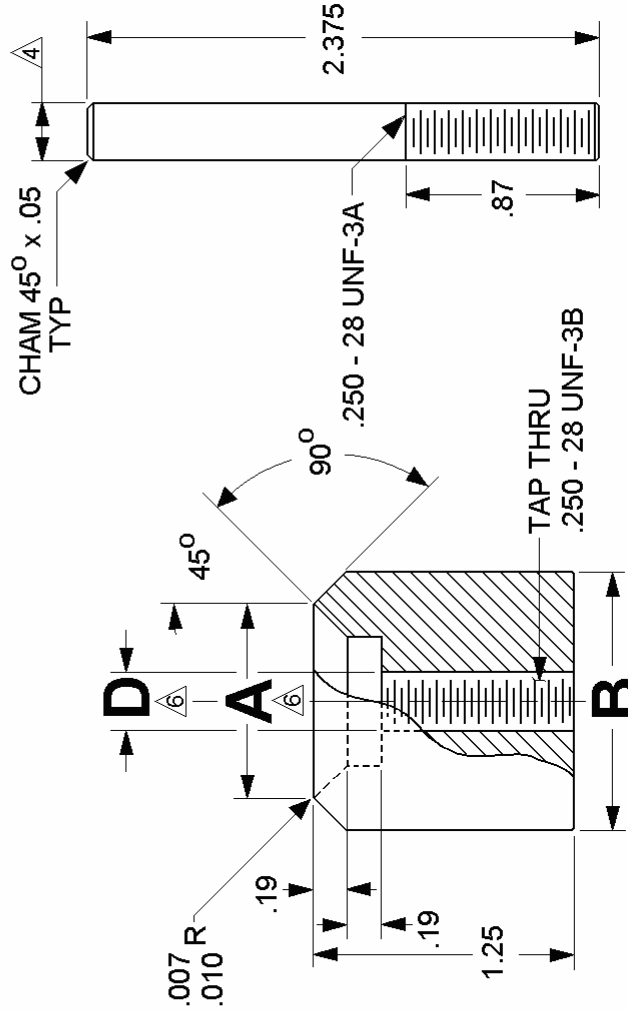
1. DRAWING NOT TO SCALE.
2. ALL DIMENSIONS IN INCHES.
3. FABRICATE -1 AND -2 DETAILS FROM 4130 OR 4340 ALLOY STEEL, H.T. 140-160 KSI.
4. FABRICATE -3 DETAIL FROM .250 DIAMETER ALLOY STEEL BOLT
5. SURFACES W, X, Y, & Z TO BE PARELLEL WITHIN .005 T.I.R.
6. DIAMETERS A & C AND A & D TO BE CONCENTRIC WITHIN .005 T.I.R.
7. AS NECESSARY, ASSEMBLE -3 DETAIL TO -1 DETAIL WITH LOCTITE.



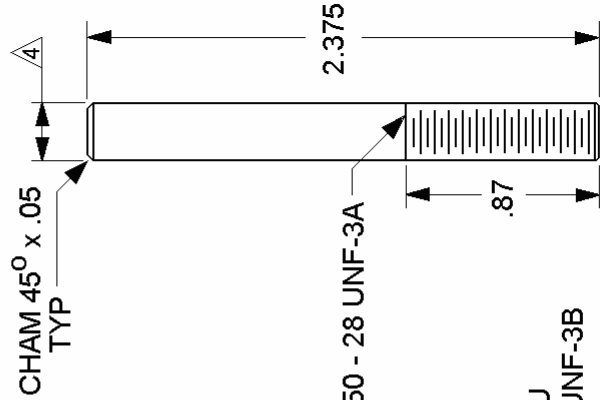
DETAIL 2 - PRESS



DETAIL A ASSEMBLY



DETAIL 1 - BASE



DETAIL 3 - GUIDE

TOLERANCES:  
(UNLESS OTHERWISE SPECIFIED)

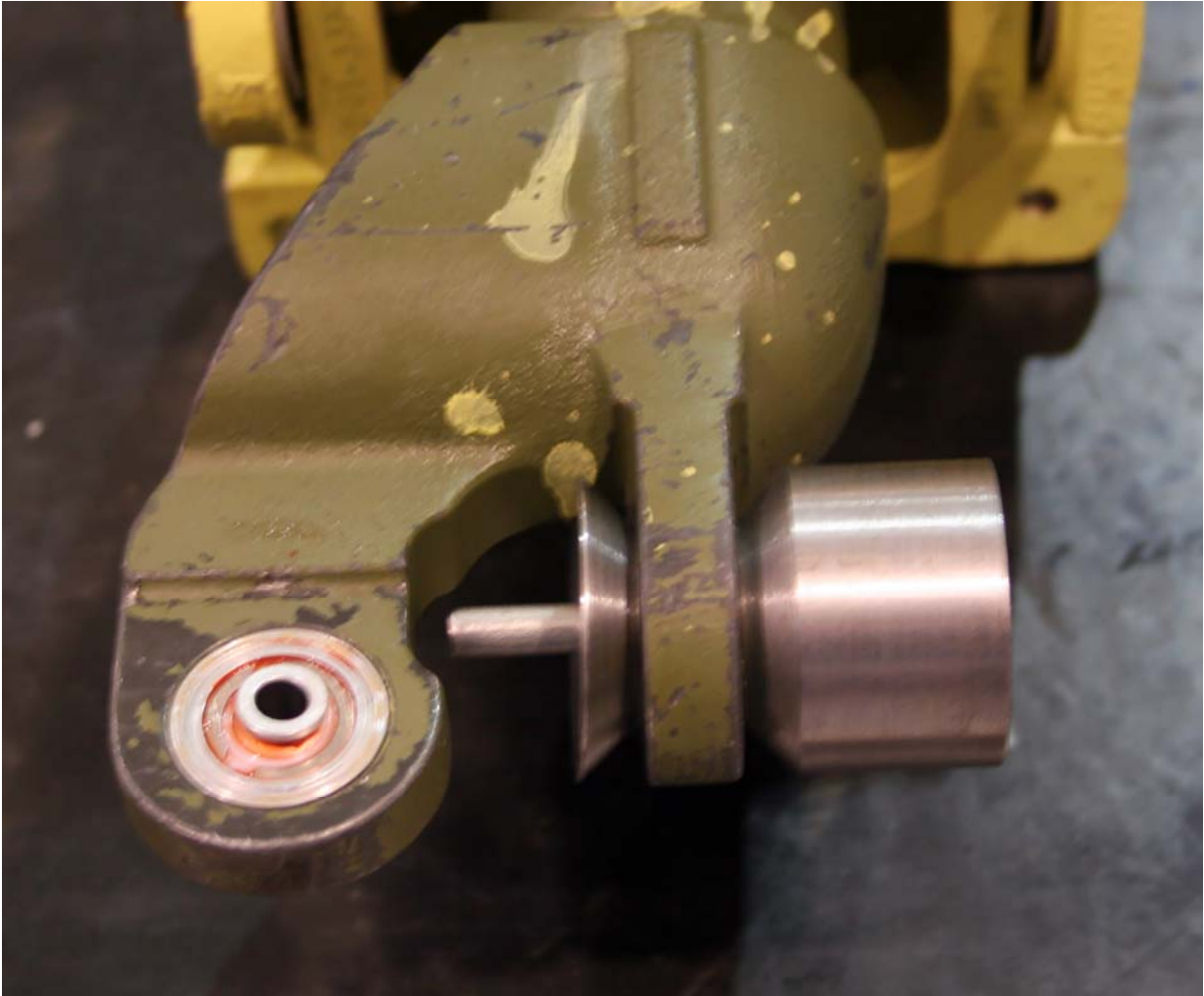
- .XXX ± .010
- .XX ± .03
- .X ± .1

ANGLES ± 1/4°

DIAMETER CHART

A	B	C	D
+ .005	+ .03	+ .002 - .000	+ .002 - .000
.965	1.50	.250	.248

RING STAKE WORK-AID  
FIGURE 5



RING STAKE WORK-AID SHOWN INSTALLED ON  
LATERAL INPUT LUG OF THE P/N 204-001-357  
SUPPORT ASSEMBLY

ENSURE ALL LUGS ARE ADEQUATELY SUPPORTED  
DURING ALL PRESSING, REAMING, AND STAKING  
OPERATIONS.

**LEVER ASSEMBLY 204-001-357  
FIGURE 6**