

 **BOEING**  
COMPONENT  
MAINTENANCE MANUAL

TO: ALL HOLDERS OF TAIL SKID SHOCK ABSORBER ASSEMBLY COMPONENT MAINTENANCE  
MANUAL 32-71-13.

REVISION NO. 2 DATED MAR 01/04

HIGHLIGHTS

Pages which have been added or revised are outlined below together with the highlights of the revision. Remove and insert the affected pages as listed and enter Revision No. and date to the Record of Revision Sheet.

CHAPTER/SECTION

AND PAGE NO.

DESCRIPTION OF CHANGE

TITLE PAGE

Added clarifications and updated callouts.

1

CONTENTS

1

DESCRIPTION & OPERATION

1

301-302

501-502

REPAIR-GEN

601

REPAIR 1-1

601-602

REPAIR 2-1

601-602

REPAIR 3-1

601-603,605-606

REPAIR 4-1

601-602

701

801

1002-1003,1007

REPAIR 3-1

Changed dimensions and details on the end fitting.

604-606

**32-71-13**

HIGHLIGHTS

01.1

Page 1

Mar 01/04



# TAIL SKID SHOCK ABSORBER ASSEMBLY

## PART NUMBER 163T1020-1

COMPONENT MAINTENANCE MANUAL  
WITH  
ILLUSTRATED PARTS LIST

### 32-71-13

TITLE PAGE

Page 1

Mar 01/04

01.1

K09706



REVISION RECORD

- Retain this record in front of manual. On receipt of revision, insert revised pages in the manual, and enter revision number, date inserted and initial.

REVISION NUMBER	REVISION DATE	DATE FILED	BY	REVISION NUMBER	REVISION DATE	DATE FILED	BY

**32-71-13**

REVISION RECORD

01

Page 1

Jul 01/99



TEMPORARY REVISION AND SERVICE BULLETIN RECORD

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVE	DATE OF INCORPORATION INTO MANUAL

**32-71-13**

TR & SB RECORD

01

Page 1

Jul 01/99


**BOEING**  
 COMPONENT  
 MAINTENANCE MANUAL

PAGE	DATE	CODE	PAGE	DATE	CODE
32-71-13			REPAIR-GENERAL		
			*601	MAR 01/04	01.1
			*602	BLANK	
TITLE PAGE			REPAIR 1-1		
*1	MAR 01/04	01.1	*601	MAR 01/04	01.1
2	BLANK		*602	MAR 01/04	01.1
REVISION RECORD			REPAIR 2-1		
1	JUL 01/99	01	*601	MAR 01/04	01.1
2	BLANK		*602	MAR 01/04	01.1
TR & SB RECORD			REPAIR 3-1		
1	JUL 01/99	01	*601	MAR 01/04	01.1
2	BLANK		*602	MAR 01/04	01.1
LIST OF EFFECTIVE PAGES			*603	MAR 01/04	01.1
*1	MAR 01/04	01	*604	MAR 01/04	01.1
THRU LAST PAGE			*605	MAR 01/04	01.1
CONTENTS			*606	MAR 01/04	01.1
*1	MAR 01/04	01.1	REPAIR 4-1		
2	BLANK		*601	MAR 01/04	01.1
INTRODUCTION			*602	MAR 01/04	01.1
1	JUL 01/99	01	ASSEMBLY		
2	BLANK		*701	MAR 01/04	01.1
DESCRIPTION & OPERATION			702	BLANK	
*1	MAR 01/04	01.1	FITS AND CLEARANCES		
2	JUL 01/99	01	*801	MAR 01/04	01.1
DISASSEMBLY			802	BLANK	
*301	MAR 01/04	01.1	ILLUSTRATED PARTS LIST		
*302	MAR 01/04	01.1	1001	JUL 01/99	01
303	MAR 01/00	01.1	*1002	MAR 01/04	01.1
304	BLANK		*1003	MAR 01/04	01.1
CHECK			*1004	MAR 01/04	01.1
*501	MAR 01/04	01.1	*1005	MAR 01/04	01.1
*502	MAR 01/04	01.1	*1006	MAR 01/04	01.1
			*1007	MAR 01/04	01.1
			1008	BLANK	

\* = REVISED, ADDED OR DELETED

32-71-13

EFFECTIVE PAGES  
LAST PAGE Page 1  
01 Mar 01/04



TABLE OF CONTENTS

<u>Paragraph Title</u>	<u>Page</u>
Description and Operation . . . . .	1
Testing and Fault Isolation . . . . .*[1]	
Disassembly . . . . .	301
Cleaning. . . . .*[2]	
Check . . . . .	501
Repair. . . . .	601
Assembly. . . . .	701
Fits and Clearances . . . . .	801
Special Tools . . . . .*[1]	
Illustrated Parts List. . . . .	1001

\*[1] Not Applicable.

\*[2] Special instructions are not necessary. Use standard industry practices and the instructions in SOPM 20-30-03.

**32-71-13**

CONTENTS

Page 1

Mar 01/04

01.1



## INTRODUCTION

The instructions in this manual provide the information necessary to perform maintenance functions ranging from simple checks and replacement to complete shop-type repair.

This manual is divided into separate sections:

- |  |                              |
|--|------------------------------|
| 1. Title Page                                      | 4. List of Effective Pages   |
| 2. Record of Revisions                             | 5. Table of Contents         |
| 3. Temporary Revision &<br>Service Bulletin Record | 6. Introduction              |
|  | 7. Procedures & IPL Sections |

Refer to the Table of Contents for the page location of applicable sections.

The beginning of the REPAIR section includes a list of the separate repairs, a list of applicable standard Boeing practices, and an explanation of the True Position Dimensioning symbols used.

An explanation of the use of the Illustrated Parts List is provided in the Introduction to that section.

All weights and measurements used in the manual are in English units, unless otherwise stated. When metric equivalents are given they will be in parentheses following the English units.

Design changes, optional parts, configuration differences and Service Bulletin modifications create alternate part numbers. These are identified in the Illustrated Parts List (IPL) by adding an alphabetical character to the basic item number. The resulting item number is called an alpha-variant. Throughout the manual, IPL basic item number references also apply to alpha-variants unless otherwise indicated.

Verification:

# 32-71-13

INTRODUCTION

01

Page 1

Jul 01/99

TAIL SKID SHOCK ABSORBER ASSEMBLYDESCRIPTION AND OPERATION1. Description

A. The tail skid shock absorber assembly is the energy absorbing element of the tail skid assembly. The tail skid assembly has a two-piece housing that holds a replaceable crush cartridge.

2. Operation

A. The tail skid shock absorber assembly helps to prevent damage to the airplane if over rotation occurs at takeoff and landing. When the rotation limit is exceeded, the honeycomb core cartridge is compressed and crushed. Indicator rods extend from the housing when the cartridge is crushed to indicate that the cartridge must be replaced.

3. Leading Particulars (Approximate)

- A. Length -- 36 inches
- B. Diameter -- 6 inches
- C. Weight -- 31 pounds

**32-71-13**

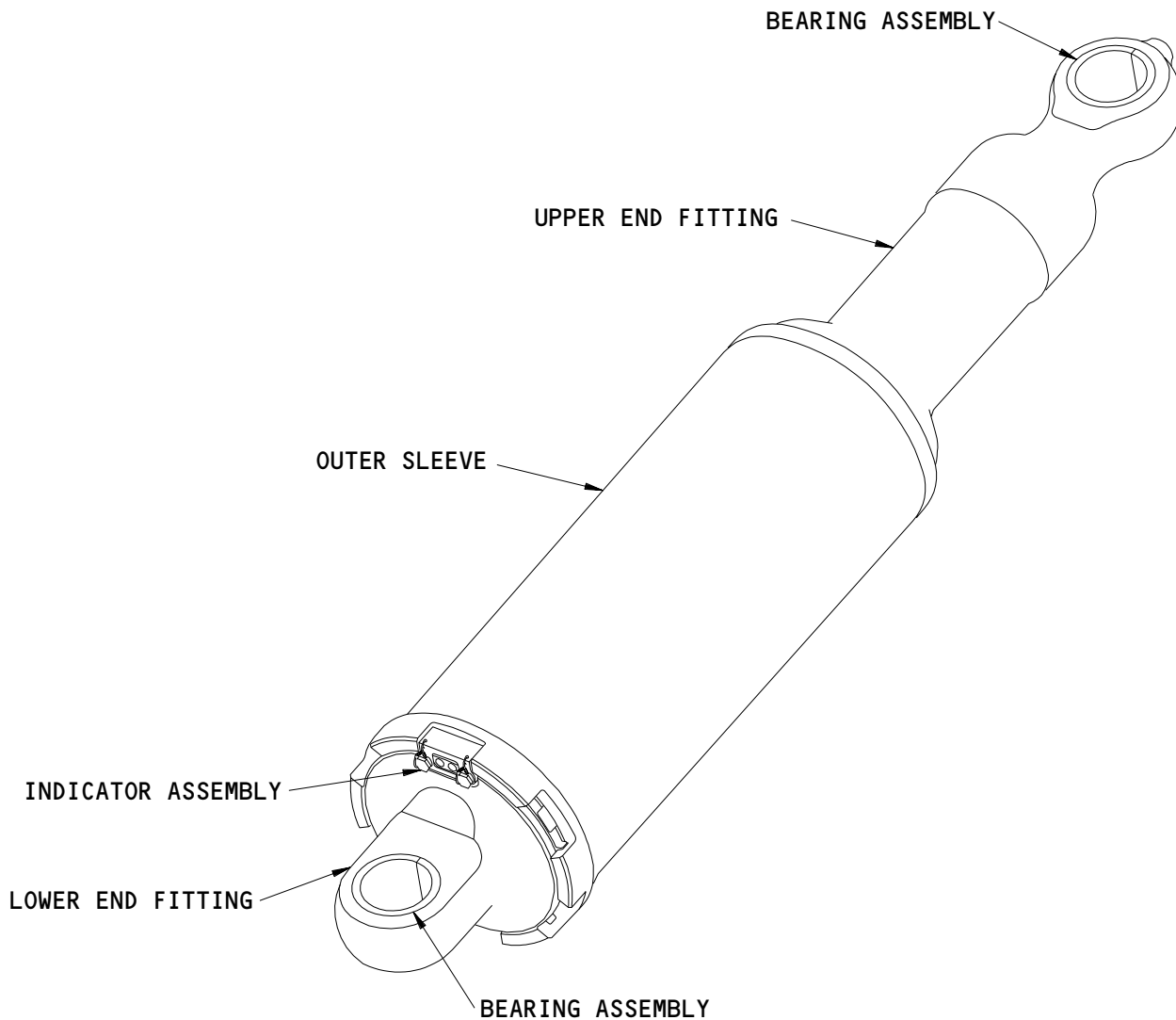
DESCRIPTION &amp; OPERATION

01.1

Page 1

Mar 01/04





Shock Absorber Assembly  
Figure 1

**32-71-13**

DESCRIPTION & OPERATION

01

Page 2

Jul 01/99

DISASSEMBLY1. General

- A. This procedure has the data to disassemble the shock absorber assembly.
- B. Disassemble this component sufficiently to isolate the defects, do the necessary repairs, and put the component back to a serviceable condition.
- C. Refer to IPL Fig. 1 for item numbers.

2. Disassembly

## A. Procedure

- (1) Use standard industry procedures and these steps.
- (2) To replace the energy absorber cartridge (65).
  - (a) Remove the bolts (5), the washers (10), the lockplate (15), and the indicator assembly (40).
  - (b) Turn the lower end fitting (20) until its tabs are free of the outer sleeve (85). Pull the lower end fitting off the outer sleeve.
  - (c) If the unit absorbed a tail strike, then one or both of the indicator rods (50, 55) will be pushed out of the indicator assembly. Then the energy absorber cartridge (65) and the indicator assembly (40) must be replaced.
  - (d) Hold the outer sleeve (85) and push the upper end fitting assembly (70) toward the open end of the outer sleeve. Then the energy absorber cartridge (65) will come out of the outer sleeve.

**32-71-13**

DISASSEMBLY

01.1

Page 301

Mar 01/04

(e) Turn the absorber cartridge (65) to disengage the locking tabs from the bulkhead (75) and remove the cartridge.

(3) Ball assembly (25)

CAUTION: THE BALL HALVES ARE A MATCHED SET AND MUST BE REPLACED AS A SET.

(a) The ball halves (30, 35) are not installed with any special equipment. They are installed by hand. Turn one half 90 degrees so that the halves disengage. This will let you remove them. See Fig. 301.

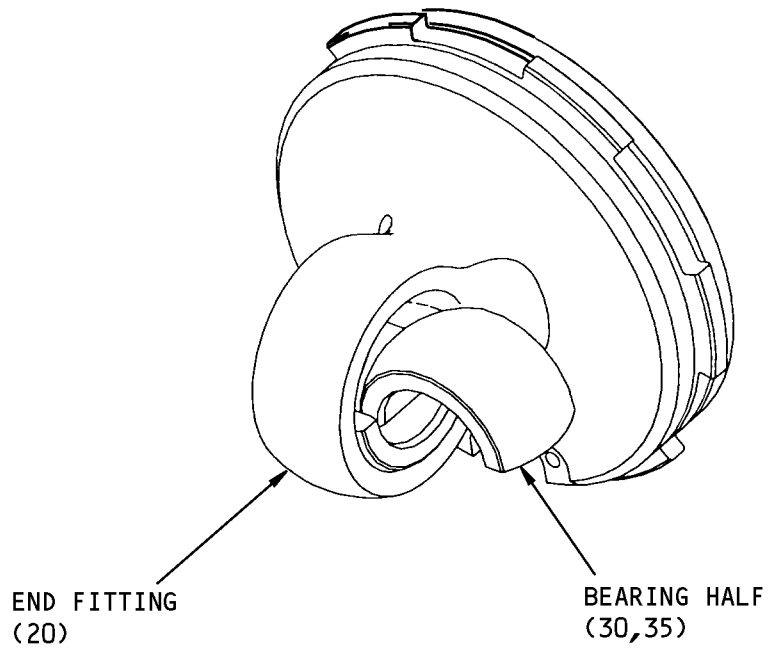
**32-71-13**

DISASSEMBLY

01.1

Page 302

Mar 01/04



Shock Absorber Disassembly - Tail Skid  
Figure 301

**32-71-13**

DISASSEMBLY

01.1

Page 303

Mar 01/00



CHECK1. General

- A. This procedure has the data to find defects in the specified parts.
- B. Refer to FITS AND CLEARANCES for design dimensions and wear limits.
- C. Refer to the Standard Overhaul Practices Manual (SOPM) for details of the SOPM subjects identified in this procedure.
- D. Refer to IPL Fig. 1 for item numbers.

2. Check

## A. References

- (1) SOPM 20-20-01, Magnetic Particle Inspection
- (2) SOPM 20-20-02, Penetrant Methods of Inspection

## B. Procedure

- (1) Use standard industry procedures to do a visual check of all the parts for defects. Do the penetrant or magnetic particle check if the visual check shows possible damage or if you think there are defects on the parts listed below:
- (2) Do a magnetic penetrant check (SOPM 20-20-01) of these parts:
  - (a) Lower End Fitting (20)
  - (b) Outer Sleeve (85)
- (3) Do a penetrant check (SOPM 20-20-02) of these parts:
  - (a) Lock Plate (15)
  - (b) End Fitting (80)

**32-71-13**

CHECK

01.1

Page 501

Mar 01/04

- (4) Indicator assembly (40) check.
- (a) If the shock absorber assembly has absorbed a tail strike, then the indicator rods (50, 55) will be extended out of the indicator housing (60). If this occurs, the energy absorber cartridge (65) and the indicator assembly (40) must be replaced.
- (5) The ball assembly has two Karon coated ball halves (30, 35). If the Karon coating is worn down to the bare base material (15-5PH), then the ball halves must be replaced with new ones. The ball halves are a matched set. The ball halves must be replaced as a set.

**32-71-13**CHECK  
01.1 Page 502  
Mar 01/04

REPAIR – GENERAL1. General

- A. Instructions for repair, refinish, and replacement of the specified subassembly parts are included in each REPAIR when applicable:

<u>PART NUMBER</u>	<u>NAME</u>	<u>REPAIR</u>
---	REFINISH OF OTHER PARTS	1-1
163T1021	LOWER END FITTING	2-1
163T1022	UPPER END FITTING ASSEMBLY	3-1
163T1023	OUTER SELEEVE	4-1

2. Dimensioning Symbols

- A. Standard True Position Dimensioning Symbols used in the applicable repair procedures are shown in SOPM 20-00-00.

32-71-13

REPAIR-GENERAL

01.1

Page 601

Mar 01/04





REFINISH OF OTHER PARTS – REPAIR 1-1

1. General

- A. This repair gives the data to refinish the parts which are not given in the other repairs.
- B. Refer to the Standard Overhaul Practices Manual (SOPM) for details of the SOPM subjects identified in this procedure.
- C. Refer to IPL Fig. 1 for item numbers.

2. Refinish of Other Parts

A. General

- (1) Instructions for the repair of the parts listed in Table 601 are for replacement of the original finish.

B. References

- (1) SOPM 20-30-02, Stripping of Protective Finishes
- (2) SOPM 20-30-03, General Cleaning Procedures
- (3) SOPM 20-41-01, Decoding Table for Boeing Finish Codes

C. Procedure

**32-71-13**

REPAIR 1-1

01.1

Page 601

Mar 01/04

IPL FIG. & ITEM	MATERIAL	FINISH
<u>IPL Fig. 1</u> Plate (15)	304 CRES	Passivate (F-17.25) all surfaces.

Refinish Details  
 Table 601

**32-71-13**

REPAIR 1-1

01.1

Page 602

Mar 01/04

LOWER END FITTING - REPAIR 2-1

163T1021-1

1. General

- A. This repair gives the data to refinish the lower end fitting (20).
- B. Refer to the Standard Overhaul Practices Manual (SOPM) for the standard practices shown in the repair.
- C. Refer to IPL Fig. 1 for item numbers.
- D. General repair details:
  - (1) Material: 15-5PH CRES  
180-200 ksi

2. End Fitting Refinish

## A. Consumable Materials

- (1) C00307 Coating -- BMS 10-20 (SOPM 20-60-02)
- (2) D00113 Solid Film Lubricant -- BMS 3-8 (SOPM 20-50-08)

## B. References

- (1) SOPM 20-30-02, Stripping of Protective Finishes
- (2) SOPM 20-30-03, General Cleaning Procedures
- (3) SOPM 20-41-01, Decoding Table for Boeing Finish Codes
- (4) SOPM 20-50-08, Application of Bonded Solid Film Lubricants
- (5) SOPM 20-60-02, Finishing Materials

## C. Procedure (Fig. 601)

- (1) Passivate (F-17.25) all surfaces.
- (2) Apply BMS 3-8 solid film lubricant (F-19.10) as shown.

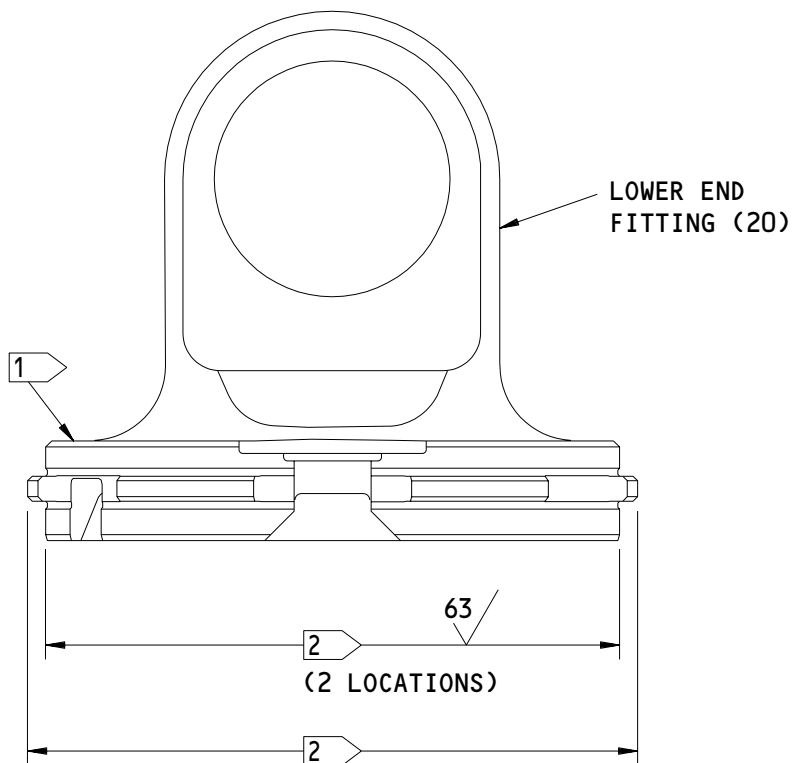
**32-71-13**

REPAIR 2-1

01.1

Page 601

Mar 01/04



1 PART NUMBER IS LOCATED HERE

ITEM NUMBER REFER TO IPL FIG. 1

2 APPLY DRY FILM LUBRICANT (F-19.10)  
TO THESE SURFACES. THIS DRY FILM  
LUBE IS NOT NECESSARY ON ADJACENT  
SLOTS OR CHAMFERS

163T1021-1  
End Fitting Refinish  
Figure 601

**32-71-13**

REPAIR 2-1

01.1

Page 602

Mar 01/04

UPPER END FITTING ASSEMBLY – REPAIR 3-1

163T1022-1

1. General

- A. This repair gives the data to repair and refinish the upper end fitting assembly (70).
- B. Refer to the Standard Overhaul Practices Manual (SOPM) for details of the SOPM subjects identified in the repair.
- C. Refer to IPL Fig. 1 for item numbers.
- D. General repair details:
  - (1) Material: Aluminum alloy
  - (2) Shot peen: Intensity 0.007A2

2. Repair

## A. Consumable Materials

- (1) A00247 Sealant -- BMS 5-95 (SOPM 20-60-04)
- (2) D00015 Grease -- BMS 3-24 (SOPM 20-60-03)

## B. References

- (1) SOPM 20-10-03, Shot Peening
- (2) SOPM 20-20-02, Penetrant Methods of Inspection
- (3) SOPM 20-43-03, Chemical Conversion Coatings for Aluminum
- (4) SOPM 20-50-03, Bearing and Bushing Replacement
- (5) SOPM 20-60-03, Lubricants
- (6) SOPM 20-60-04, Miscellaneous Materials

**32-71-13**

REPAIR 3-1

01.1

Page 601

Mar 01/04

C. Procedure

- (1) Remove the bulkhead (75) from the upper end fitting (80). If the Karon coating is worn off end fitting (80), new Karon coating can be applied. But Karon coating is a vendor proprietary process. Only the vendor, Kamatics Corp. (V50632) can apply it. See Refinish for more details.
- (2) Do a penetrant check of the end fitting (80) (SOPM 20-20-02).
- (3) Install the bulkhead (75) into the end fitting (80) by the shrink-fit method (SOPM 20-50-03), with BMS 5-95 sealant on mating surfaces.
- (4) The ball assembly (25) has two ball halves (30, 35). When the Karon coating is worn to the base material (15-5PH), replace the ball assembly as a set.

**NOTE:** The ball halves are a matched set. The ball halves must be replaced as a set.

3. Refinish

A. Consumable Materials

- (1) C00032 Enamel -- BMS 10-60 (SOPM 20-60-02)
- (2) C00130 Primer -- BMS 10-79 (SOPM 20-60-02)

B. References

- (1) SOPM 20-30-02, Stripping of Protective Finishes
- (2) SOPM 20-30-03, General Cleaning Procedures
- (3) SOPM 20-41-01, Decoding Table For Boeing Finish Codes
- (4) SOPM 20-43-01, Chromic Acid Anodizing

**32-71-13**

REPAIR 3-1

01.1

Page 602

Mar 01/04

- (5) SOPM 20-43-03, Chemical Conversion Coatings For Aluminum
- (6) SOPM 20-44-04, Application of Urethane Compatible Primer
- (7) SOPM 20-60-02, Finishing Materials

C. Procedure (Fig. 601)

- (1) For the upper end fitting (80).
  - (a) Boric acid-sulfuric acid anodize (F-17.31).
  - (b) Hard anodize the inner diameter of the bearing hole.
  - (c) Send the fitting to Kamatics (V50632) to apply the Karon coating.
  - (d) Apply BMS 10-79, Type 3 primer (F-19.47), unless shown differently.
- (2) For the upper end fitting assembly (70).
  - (a) Apply BMS 10-60 enamel (F-14.9813) to the exterior surfaces only, unless shown differently.

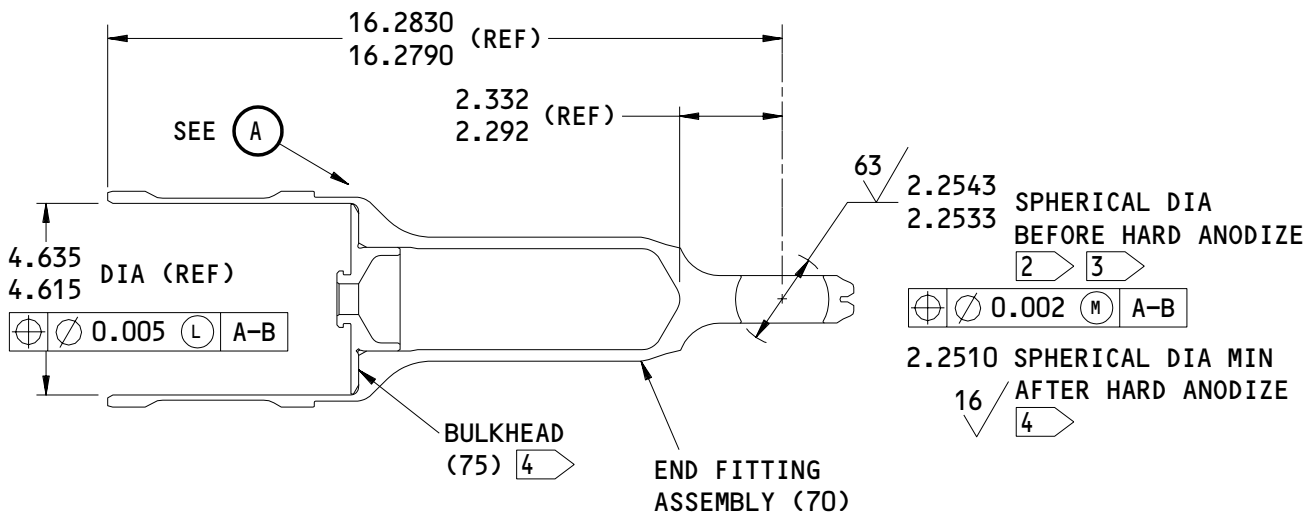
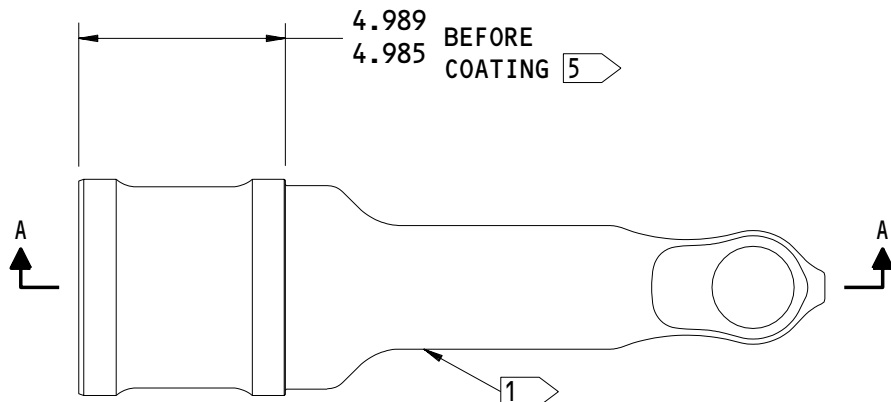
**32-71-13**

REPAIR 3-1

01.1

Page 603

Mar 01/04



A-A

163T1022-1  
 Upper End Fitting Assembly Repair  
 Figure 601 (Sheet 1)

**32-71-13**

REPAIR 3-1

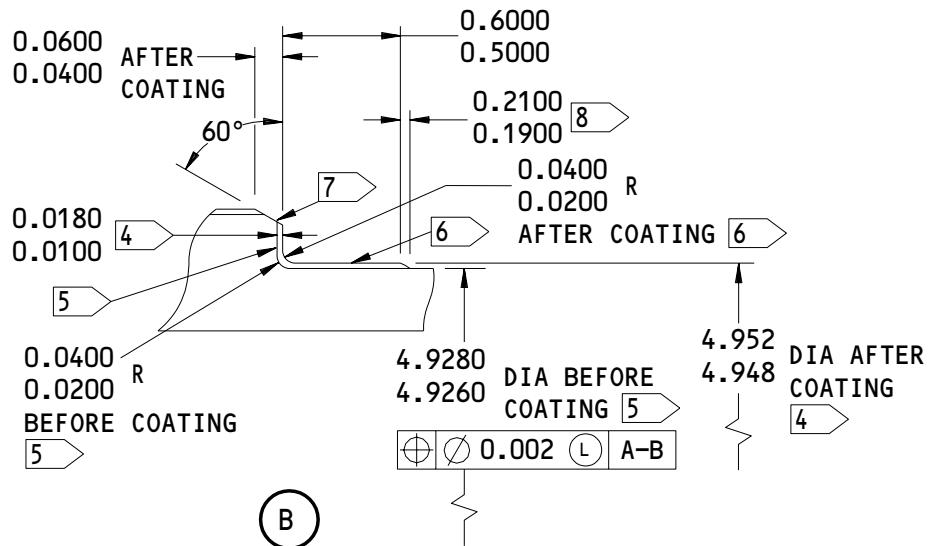
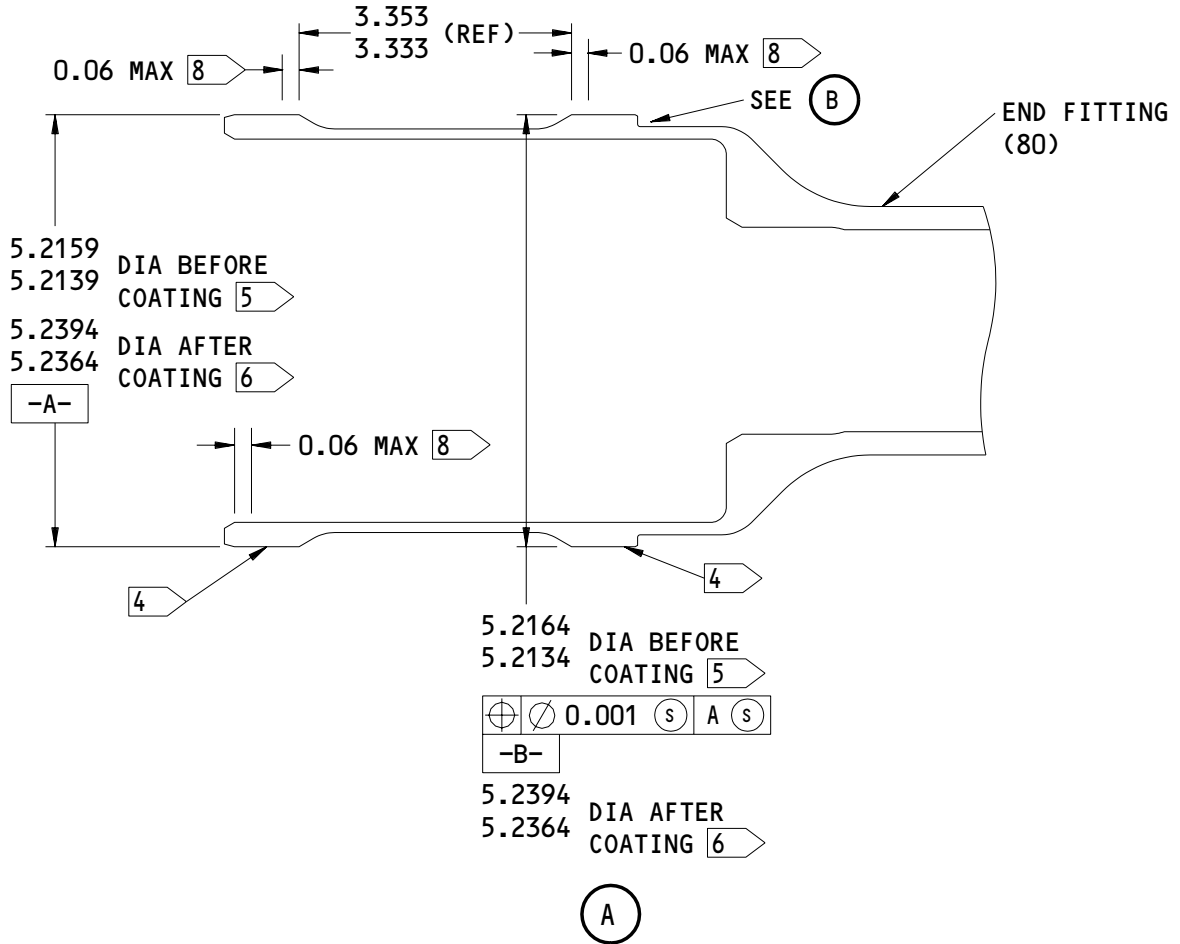
01.1

Page 604

Mar 01/04



**BOEING**  
 COMPONENT  
 MAINTENANCE MANUAL



163T1022-1  
 Upper End Fitting Assembly Repair  
 Figure 601 (Sheet 2)

**32-71-13**

REPAIR 3-1

Page 605

Mar 01/04

01.1

- 1 ▷ PART NUMBER LOCATION
- 2 ▷ DO NOT SHOT PEEN
- 3 ▷ HARD ANODIZE (F-17.06)  
0.0017-0.0023 THICK
- 4 ▷ NO PAINT ON THIS SURFACE
- 5 ▷ ANODIZE (F-17.31) THIS SURFACE  
BEFORE KARON COATING
- 6 ▷ KARON COATING, TO BE APPLIED BY  
KAMATICS CORP. (V50632)
- 7 ▷ ANODIZE (F-17.31) AND APPLY  
BMS 10-79 TYPE 3 PRIMER  
(F-19.47) OR CHEMICAL TREAT  
(F-17.10) AND APPLY BMS 10-79  
TYPE 3 PRIMER (F-19.47)
- 8 ▷ BLEND OUT KARON COATING SMOOTHLY  
IN THIS AREA

125 ✓ ALL MACHINED SURFACES UNLESS  
SHOWN DIFFERENTLY  
BREAK ALL SHARP EDGES  
ITEM NUMBERS REFER TO IPL FIG. 1  
ALL DIMENSIONS ARE IN INCHES

163T1022-1  
Upper End Fitting Assembly Repair  
Figure 601 (Sheet 3)

**32-71-13**  
REPAIR 3-1  
Page 606  
Mar 01/04

01.1

OUTER SLEEVE – REPAIR 4-1

163T1023-1

1. General

- A. This repair gives the data to refinish the outer end sleeve (85).
- B. Refer to the Standard Overhaul Practices Manual (SOPM) for the standard subjects shown in the repair.
- C. Refer to IPL Fig. 1 for item numbers.
- D. General repair details:
  - (1) Material: 15-5PH CRES  
180-200 ksi

2. End Fitting Refinish

## A. References

- (1) SOPM 20-30-02, Stripping of Protective Finishes
- (2) SOPM 20-30-03, General Cleaning Procedures
- (3) SOPM 20-41-01, Decoding Table for Boeing Finish Codes

## B. Procedure (Fig. 601)

- (1) Passivate (F-17.25).
- (2) Cadmium plate (F-15.36) as shown.

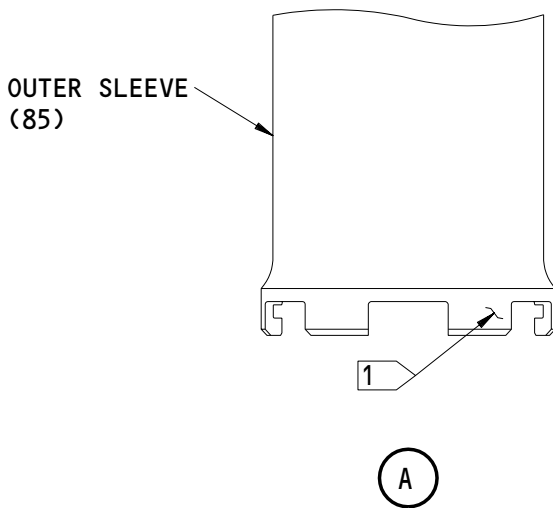
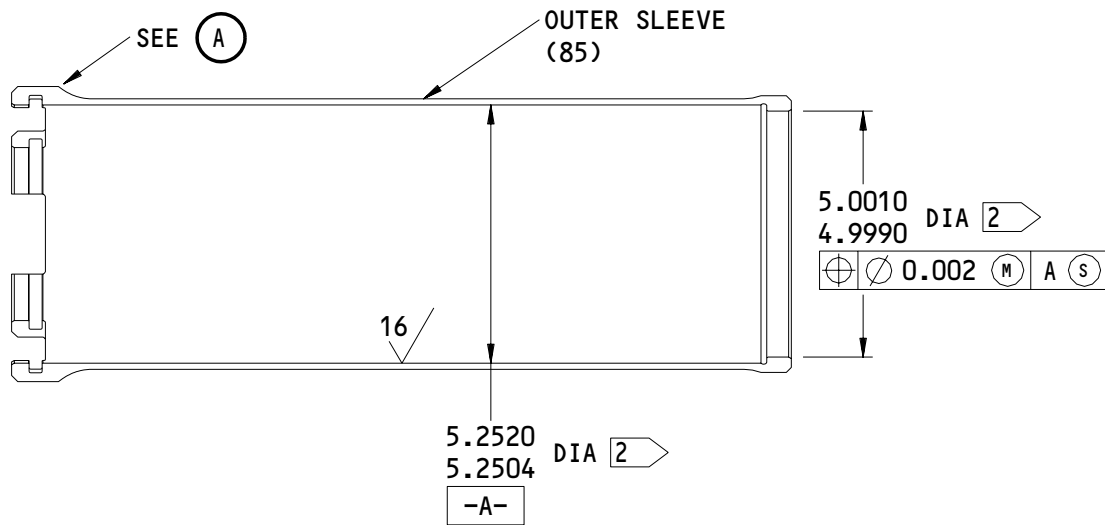
**32-71-13**

REPAIR 4-1

01.1

Page 601

Mar 01/04



1 PART NUMBER AND SERIAL NUMBER  
 LOCATED HERE

2 CADMIUM PLATE (F-15.36)

ITEM NUMBERS REFER TO IPL FIG. 1  
 ALL DIMENSIONS ARE IN INCHES

163T1023-1  
 Shock Absorber Outer Sleeve Refinish  
 Figure 601

**32-71-13**

REPAIR 4-1

Page 602

Mar 01/04

01.1

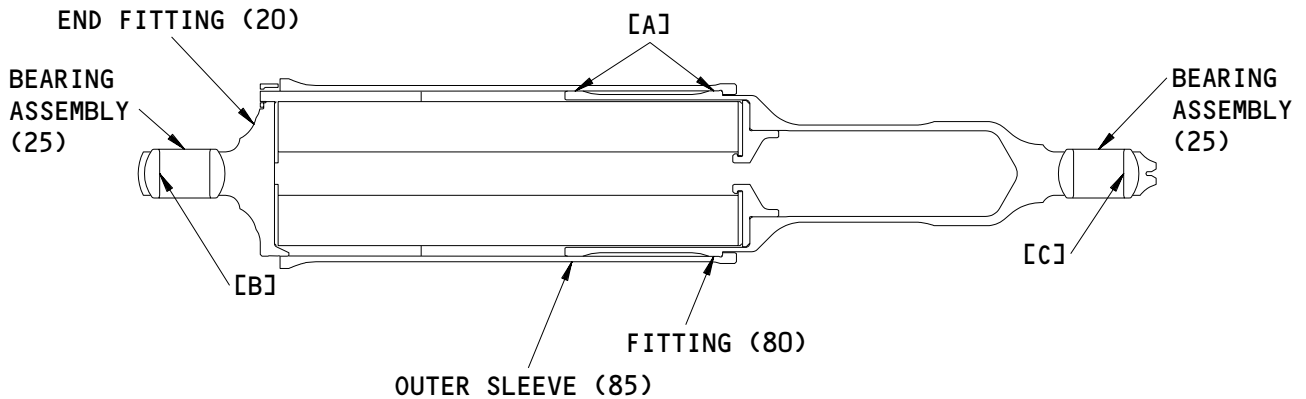
ASSEMBLY1. General

- A. This procedure contains the data necessary to assemble the tail skid shock absorber assembly.
- B. Refer to the Standard Overhaul Practices Manual (SOPM) for details of the SOPM subjects identified in this procedure.
- C. Refer to IPL Fig. 1 for item numbers.
- D. Procedure
  - (1) Install the two ball assemblies (25) into the upper end fitting (80) and the lower end fitting (20).
  - (2) Install the upper end fitting assembly (70) through the outer sleeve (85) until the upper end fitting comes to a stop within the outer sleeve.
  - (3) Install the energy absorber cartridge (65) into the outer sleeve (85). Turn the absorber cartridge (65) 45 degrees to engage the tabs of the bulkhead (75).
  - (4) Install the lower end fitting (20) onto the outer sleeve (85). Push the lower end fitting into the slot end of the outer sleeve and turn the lower end fitting 30 degrees, until the lock lugs are in position.
  - (5) Install the indicator assembly (40).
  - (6) Install the lockplate (15), the washers (10) and bolts (5).

**32-71-13**ASSEMBLY  
Page 701  
Mar 01/04

01.1

FITS AND CLEARANCES



REF LETTER	REF IPL		DESIGN DIMENSION*				SERVICE WEAR LIMIT**		
	FIG. 1, MATING ITEM NO.		DIMENSION		ASSEMBLY CLEARANCE		DIMENSION		MAXIMUM CLEARANCE
			MIN	MAX	MIN	MAX	MIN	MAX	
[A]	ID	85	5.2504	5.2520	0.0110	0.0156	—	5.2596	0.0202 1
	OD	80	5.2364	5.2394			5.2318	—	
[B]	ID	20	2.2510	2.2520	0.0010	0.0040	—	2.2570	0.0070 2
	OD	25	2.2480	2.2500			2.2450	—	
[C]	ID	80	2.2510	2.2526	0.0010	0.0046	—	2.2570	0.0070 2
	OD	25	2.2480	2.2500			2.2450	—	

\* ALL DIMENSIONS ARE IN INCHES

\*\* MAXIMUM AND MINIMUM SERVICE WEAR LIMIT CANNOT OCCUR AT THE SAME TIME

1 IF KARON COATING ON THE END FITTING IS WORN THROUGH TO THE BASE MATERIAL OR MORE THAN THE WEAR LIMITS THEN THE KARON COATING MUST BE REAPPLIED BY THE KAMATICS CORP. (V50632)

2 THIS BEARING ASSEMBLY 163N2526-1 IS A MATCHED SET OF BALL HALVES. IF KARON COATING ON EITHER BALL HALF IS WORN THROUGH TO THE BASE MATERIAL OR MORE THAN THE WEAR LIMITS, REPLACE THE BEARING ASSEMBLY AS A UNIT

Fits and Clearances  
 Figure 801

**32-71-13**

ILLUSTRATED PARTS LIST

1. This section lists and illustrates replaceable or repairable component parts. The Illustrated Parts Catalog contains a complete explanation of the Boeing part numbering system.

2. Indentures show parts relationships as follows:

Assembly

Detail Parts for Assembly

Subassembly

Attaching Parts for Subassembly

Detail Parts for Subassembly

Detail Installation Parts (Included only if installation parts may be returned to shop as part of assembly)

3. One use code letter (A, B, C, etc.) is assigned in the EFF CODE column for each variation of top assembly. All listed parts are used on all top assemblies except when limitations are shown by use code letter opposite individual part entries.

4. Letter suffixes (alpha-variants) are added to item numbers for optional parts, Service Bulletin modification parts, configuration differences (Except left- and right-hand parts), product improvement parts, and parts added between two sequential item numbers. The alpha-variant is not shown on illustrations when appearance and location of all variants of the part is the same.

5. Service Bulletin modifications are shown by the notations PRE SB XXXX and POST SB XXXX.

A. When a new top assembly part number is assigned by Service Bulletin, the notations appear at the top assembly level only. The configuration differences at detail part level are then shown by use code letter.

B. When the top assembly part number is not changed by the Service Bulletin, the notations appear at the detail part level.

6. Parts Interchangeability

Optional  
(OPT)

The parts are optional to and interchangeable with other parts having the same item number.

Supersedes, Superseded By  
(SUPSDS, SUPSD BY)

The part supersedes and is not interchangeable with the original part.

Replaces, Replaced By  
(REPLS, REPLD BY)

The part replaces and is interchangeable with, or is an alternate to, the original part.

**32-71-13**

ILLUSTRATED PARTS LIST

01

Page 1001

Jul 01/99

VENDORS

6D159      HEXCEL CORP  
             1214 W HWY 84  
             CASA GRANDE, ARIZONA 85230-5006

**32-71-13**

ILLUSTRATED PARTS LIST  
01.1      Page 1002  
             Mar 01/04




**BOEING**  
 COMPONENT  
 MAINTENANCE MANUAL

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
BACP18BC00A04P		1	45	2
BACW10BP3APU		1	10	2
CU9130		1	65A	1
NAS6703HU3		1	5	2
163N2526-1		1	25	2
163N2526-2		1	30	2
163N2526-3		1	35	2
163T1020-1		1	1A	RF
163T1021-1		1	20	1
163T1022-1		1	70	1
163T1022-2		1	80	1
163T1023-1		1	85	1
163T1024-1		1	75	1
163T1030-1		1	50	1
163T1030-2		1	55	1
163T1031-1		1	60	1
163T1033-1		1	40	1
163W1034-1		1	15	1

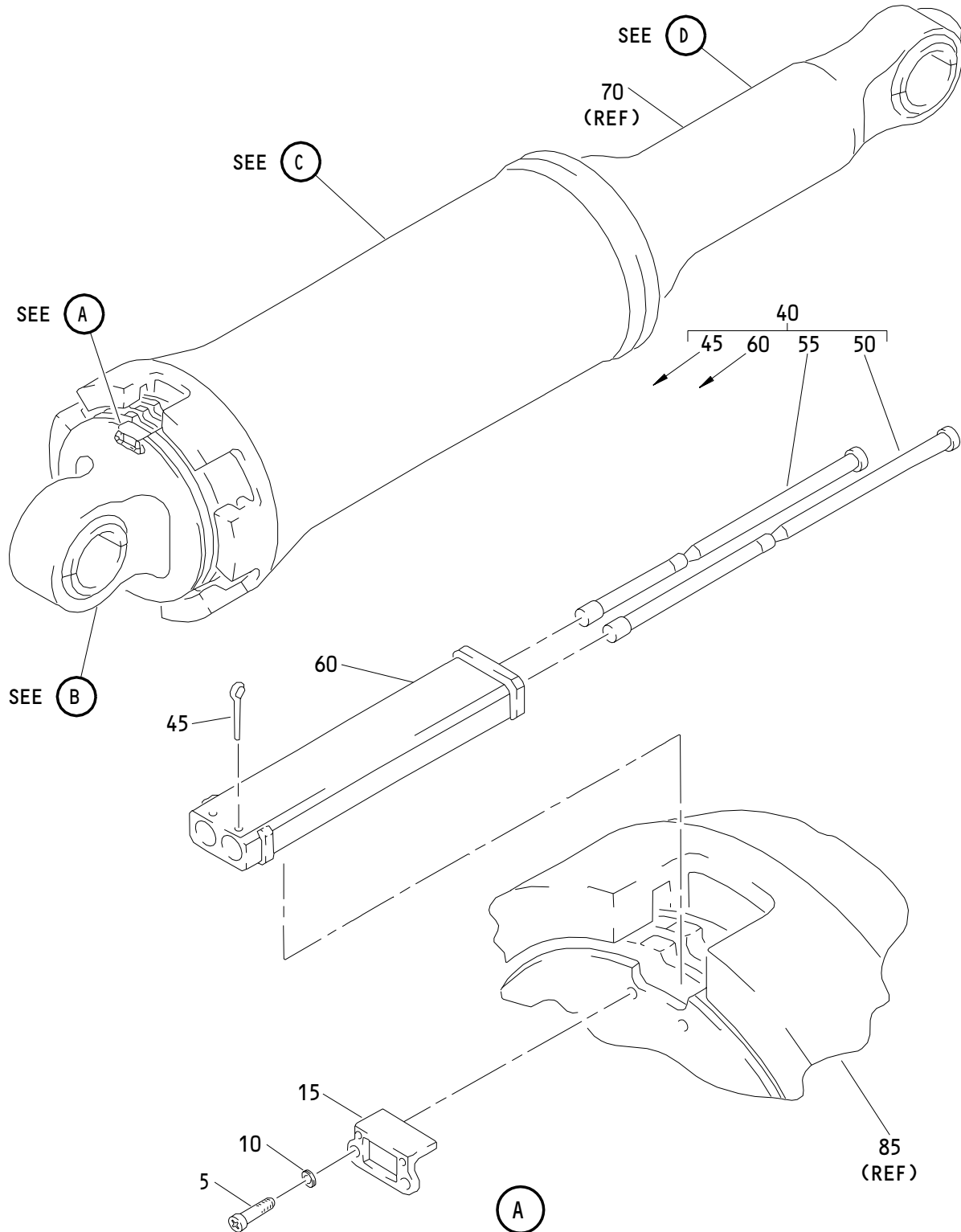
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ILLUSTRATED PARTS LIST

01.1

Page 1003

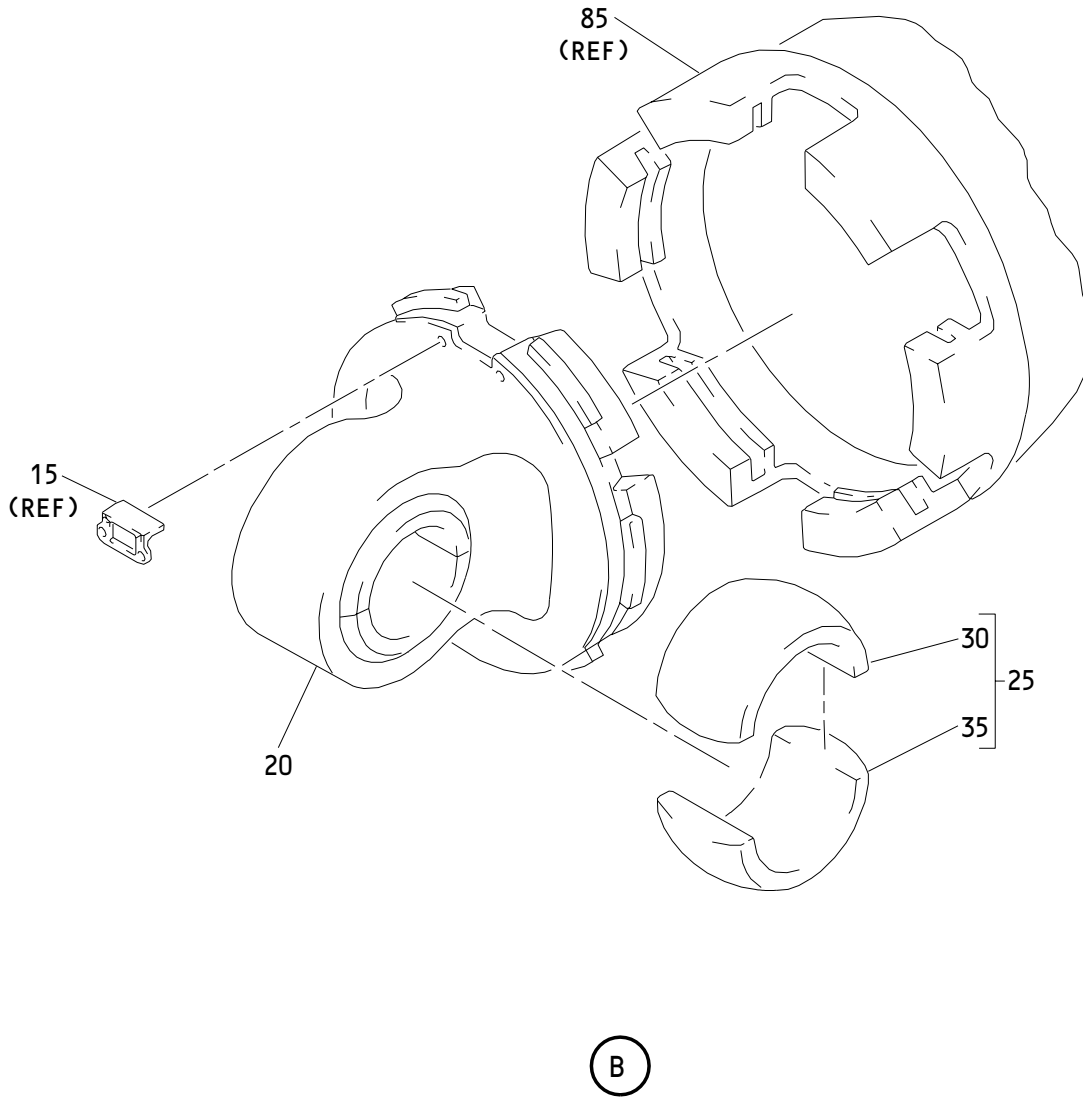
Mar 01/04



Tail Skid Shock Absorber Assembly  
Figure 1 (Sheet 1)

**32-71-13**

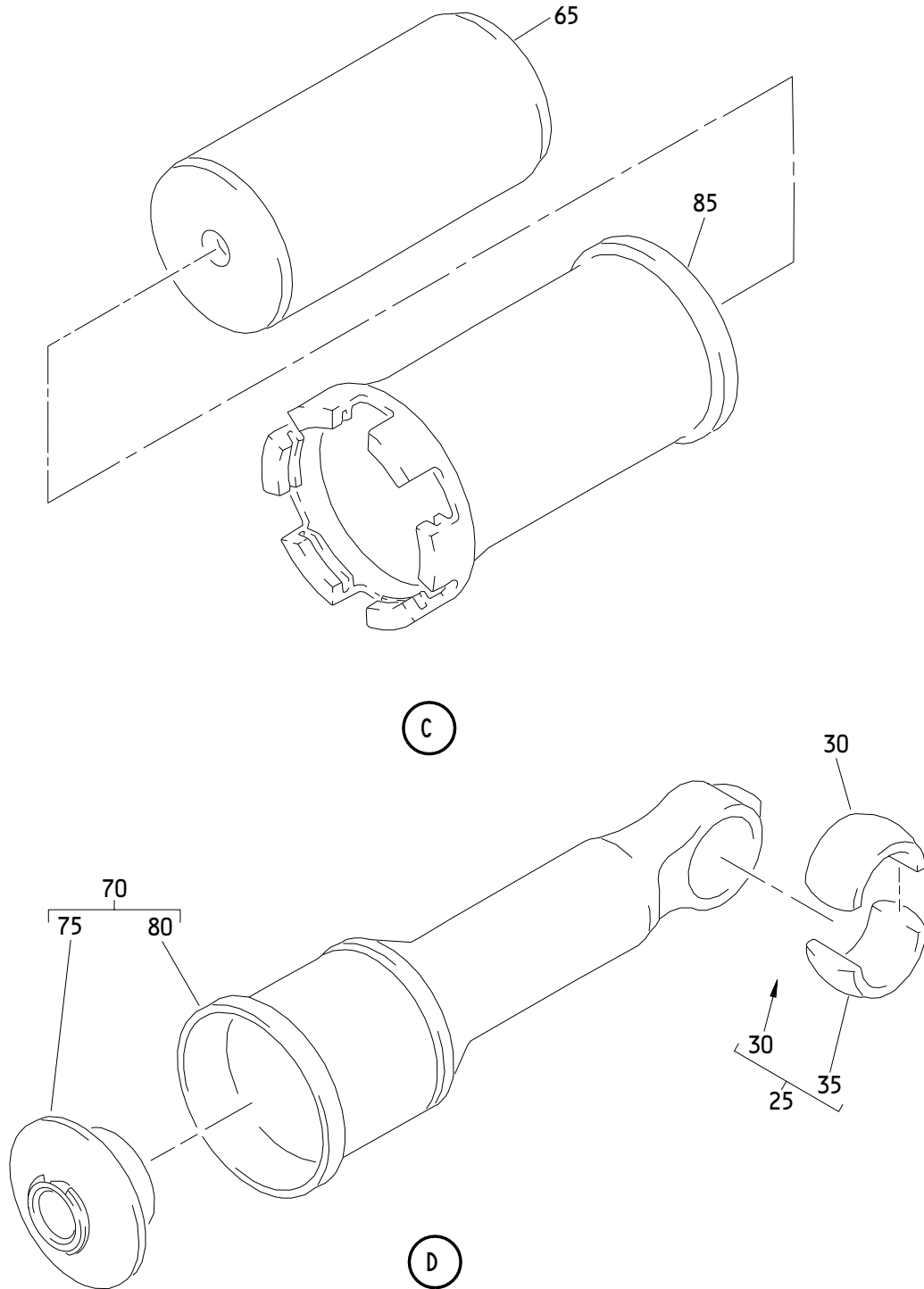
ILLUSTRATED PARTS LIST  
01.1 Page 1004  
Mar 01/04



Tail Skid Shock Absorber Assembly  
Figure 1 (Sheet 2)

**32-71-13**

ILLUSTRATED PARTS LIST  
01.1 Page 1005  
Mar 01/04



Tail Skid Shock Absorber Assembly  
Figure 1 (Sheet 3)

**32-71-13**

ILLUSTRATED PARTS LIST  
01.1 Page 1006  
Mar 01/04


**BOEING**  
 COMPONENT  
 MAINTENANCE MANUAL

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01- -1A	163T1020-1		SHOCK ABSORBER ASSY- TAIL SKID		RF
5	NAS6703HU3		.BOLT		2
10	BACW10BP3APU		.WASHER		2
15	163W1034-1		.PLATE-LOCK		1
20	163T1021-1		.FITTING-END		1
25	163N2526-1		.BEARING ASSY		2
30	163N2526-2		..HALF-BRG		1
35	163N2526-3		..HALF-BRG		1
40	163T1033-1		.INDICATOR ASSY		1
45	BACP18BC00A04P		..PIN-COTTER		2
50	163T1030-1		..ROD-INDICATOR		1
55	163T1030-2		..ROD-INDICATOR		1
60	163T1031-1		..GUIDE		1
65	S163T103-1		DELETED		
R 65A	CU9130		.CORE-CRUSH (V6D159)		1
70	163T1022-1		.FITTING ASSY-END		1
75	163T1024-1		..BULKHEAD		1
80	163T1022-2		..FITTING		1
85	163T1023-1		.SLEEVE		1

- Item Not Illustrated

# 32-71-13

ILLUSTRATED PARTS LIST

01.1

Page 1007

Mar 01/04