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# SERVICE LETTER

FLEET SUPPORT ENGINEERING • BOEING COMMERCIAL AIRPLANES • P.O. BOX 3707 • SEATTLE • WASHINGTON 98124-2207

**737-SL-29-095-A**

ATA: 2900-00

22 December 2010

SUBJECT: HYDRAULIC FLUID EXTERNAL LEAKAGE - RELIABILITY  
IMPROVEMENTS

MODEL: 737-600/-700/-800/-900/BBJ SERIES

APPLICABILITY: ALL

- REFERENCES:
- a) AMM 29-00-00, Table 601/29-00-00 Hydraulic Fluid Leakage Limits
  - b) Boeing Service Letter 737-SL-20-048-D, NAS1611-xxxA Code O-ring Static Seals - Hydraulic Fluid External Leakage at Low Temperatures, dated 9 April 2008.
  - c) Maintenance Tip 737-MT-29-010, Troubleshooting Hydraulic Fluid External Leakage in the Wing Leading Edge and Trailing Edge, dated 6 March 2006
  - d) Maintenance Tip 737-MT-29-011, Troubleshooting Hydraulic Fluid External Leakage in Main Landing Gear Wheel Well, dated 6 March 2006
  - e) Maintenance Tip 737-MT-29-012, Troubleshooting Hydraulic Fluid External Leakage in Rudder/Tail Area, dated 1 September 2006.
  - f) Boeing Fleet Team Digest 737NG-FTD-57-06005, Wing Leading Edge Cavity Paint Peeling

## SUMMARY:

This revision to the service letter provides update to the items in the attachments. The original release of the service letter provided operators with a summary of actions Boeing and component suppliers have taken to address hydraulic fluid external leakage in multiple ATA hydraulic components and in general plumbing in 737NG airplanes. The attachments to this letter provide operators with a quick reference to pertinent information for each affected component and plumbing application.

## BACKGROUND:

Since the introduction of model 737NG airplanes into service, hydraulic fluid external leakage

has been a significant in-service issue reported by operators. The source for the leakage has varied but includes hydraulic line replaceable unit (LRU) components and general plumbing (tubes, hoses and fittings).

#### DISCUSSION:

Boeing and our component suppliers have investigated and determined the cause for leakage in most cases. Corrective actions have been initiated and improvements introduced into production airplanes. Related retrofit has also been released. A few applications are still under investigation for root cause and possible design improvements. The updated attachments to this service letter provide operators with a list of the affected components, a brief statement about the leakage, and information related to corrective action.

#### BOEING ACTION:

Boeing has closely monitored and investigated reports of hydraulic fluid leakage in the 737NG fleet for the past several years. This work has included testing of individual components received from in-service airplanes, coordinating results with our suppliers, and initiating design changes where needed. The communications listed in the attachment to this service letter reflect this work. In most cases, operators have already been informed of corrective actions by Fleet Team Digest articles, Service Letters, and/or Service Bulletins already released. [Since original release of this service letter, problems with most of the components have been resolved by improvements as noted. Some components remain](#) under investigation and this work is noted and will continue until the issue is resolved. Operators will be kept informed on these items via individual Fleet Team Digest articles.

The reference /b/ service letter discusses cold temperature static seal leakage of NAS1611-xxxA code O-rings installed in multiple ATA hydraulic components. It discusses actions Boeing has taken to address this type of leakage and includes as an attachment the latest Boeing Qualified Products List (QPL) supplement to NAS1611, which lists currently approved seals. These seals have been specially tested and shown to provide satisfactory sealing at cold temperatures. The attachment to this service letter notes the actions suppliers have taken to address NAS1611 cold temperature leakage in components reported to have this type of leakage.

Boeing has also monitored reports of problems identified in general plumbing (tubes, hoses, and fittings) on both production and in-service airplanes. The attachment to this SL also lists the various individual improvements that have been released for these items.

Additionally, Boeing has released the reference b/, c/, and d/ Maintenance Tips to guide operators when troubleshooting hydraulic leakage in the wings, main landing gear wheel well, and tail areas of the airplane.

**SUPPLIER ACTION:**

The updated attachments to this service letter list the latest pertinent actions and communications each supplier has completed to address leakage in their individual component.

**SUGGESTED OPERATOR ACTION:**

We suggest that operators review the information in the attachment to this service letter and incorporate improvements as needed. If an operator has a recurrent leakage problem that cannot be addressed by the corrective actions listed therein, we would like to receive a detailed report so we can investigate the matter further.

**WARRANTY INFORMATION:**

No warranty remedies are available for this service letter.

**RELATED INFORMATION:**

Although not listed in the attachment to this service letter, Boeing released Revision N to BPS-F-125 in October 2006. BPS-F-125 is the Boeing parts specification for flareless tube fittings, hydraulic tube end fittings, and individual shape (unions/tee/cross) fittings. This specification revision calls for the use of single point tools (prohibits blanking tools) during the machining of these parts and eliminates surface grit blasting during the finishing process. These changes should provide for improved roundness and metal-to-metal contact sealing at plumbing joints. These improvements have been phased into [production starting in 2007](#) as new detailed parts are procured and used. These are no specific line number incorporation points for these improvements.

Boeing also released Fleet Team Digest article 737NG-FTD-57-06005 which discusses leading edge cavity paint peeling that, in part, has resulted from hydraulic fluid leakage. Much of this paint peeling in this area does not need to be restored. It is overspray that occurs when the front spar cavity area is painted during production. There is no drawing or functional requirement to apply a primer or paint over the aluminum foil on the composite leading edge panel surfaces and these surfaces are not prepared for paint application. The over-spray is permitted on these panels per drawing, and masking of this area during production is not required since the over-spray does not adversely affect the structure. The peeling of the over-spray is not considered a loss of essential protective finish and therefore is structurally acceptable. When found, we suggest the loose paint be removed as much as possible so it does not trap debris or moisture. No refinishing needs to be done. See 737NG-FTD-57-06005 for detailed discussion and photograph.

DJW:cmm

Original: Dated: 18 April 2007.  
Revision Updated reference b) to show latest revision level and updated data in Attachments I and II based on developments since original release of this service letter.

Attachment I: 737NG Improvements for Reduction of Hydraulic Leakage - Components  
Attachment II: 737NG Improvements for Reduction of Hydraulic Leakage – Plumbing (Tubes, Hoses, Fittings)

### ***737NG Improvements for Reduction of Hydraulic Leakage - Components***

| Subject                     | ATA | Affected Parts                | Reference Information   |                       |  |
|-----------------------------|-----|-------------------------------|---|-----------------------|--|
|                             |     |                               | Number  | Affected Hydr. System | Comments   |
| NAS1611 O-Ring Static Seals | 20  | Several                       | 737-SL-20-048-D (multi-model);<br>737NG-FTD-29-04003                                  | A, B, Standby         | SL discusses actions taken to address cold temperature hydraulic fluid external leakage past NAS1611-xxxA code O-ring static seals installed in multiple ATA components. Also, see FTD article and additional comments below where applicable.   |
| Standby Rudder PCU          | 27  | Parker P/N 381200-1001, -1003 | a/ Parker SB 381200-27-260 and<br>737NG-FTD-27-04002,<br>b/ 737-SL-20-048-D           | Standby               | Two Items:<br>a/ Piston rod corrosion. Improved rod incorporated at unit S/N 2000, on airplane L/N 1354 (del. Jul 2003). Retrofit per Parker SB.<br>b/ Cold temperature leakage past NAS1611 static seals. Parker returned to using NAS1611-xxx (no code) O-rings made from E0515-80 compound in production at unit S/N 2761. Ref: CMM 27-20-70, IPL Figure 1, Items 80, 120, 150, 195, 375, 425, 525 and 560.                                 |
| Elevator Tab Lock Actuator  | 27  | Boeing P/N 65-44751-2         | 737NG-FTD-27-09002;<br>737NG-FTE-27-X2673;<br>737-SL-27-215;<br>Triumph SL TASV-10109 | A,B                   | Reports of external leakage due to leakage past NAS1611 dynamic piston rod seal and BACS34A2 scraper seal; also reports of scratches and wear on piston. Ref: OHM 27-30-01 Items 2, 7 and 9; See FTD article for summary of the subject. The Boeing SL advises operators about Triumph SL regarding a manufacturing problem within a certain lot of parts. Leaking parts from the suspect lot of 242 parts are returned to Triumph for rework. |

**737NG Improvements for Reduction of Hydraulic Leakage - Components**

| Subject                         | ATA | Affected Parts        | Reference Information  |                       |   |
|---------------------------------|-----|-----------------------|--|-----------------------|---|
|                                 |     |                       | Number   | Affected Hydr. System | Comments  |
| TE Flap Power Drive Unit        | 27  | Boeing P/N 256A3515-1 | a/ 737NG-FTD-27-00010 and 737-SL-27-178-C<br>b/ 737NG-FTD-27-04003 | B                     | Two Items:<br>a/ Input seal degradation from hydraulic fluid. New Shamban P/N 737-135-7279-19 retainer/excluder seal assembly incorporated at airplane L/N 1590 (del. Nov 2004). Ref. CMM 27-55-87, Fig 1, Item 115.<br>b/ Output seal degradation resulting from increased exposure to hydraulic fluid from input seal damage. Input seal change will address this condition. Ref: CMM 27-55-87, Item 70.                  |
| Flight Spoiler Actuator         | 27  | Boeing P/N 251A1270-4 | a/ 737NG-FTD-27-03005<br>b/ 737-SL-27-180                          | A,B                   | Three Items:<br>a/ Hold-down check valve cap seal leakage. Defective O-rings installed in limited number of valves delivered before 4th qtr 2002. Ref: CMM 27-60-42, Item 265.<br>b/ Incorrect piston rod seal on some units delivered 2nd half 2003. Ref: CMM 27-60-42, Item 410.<br>c/ Smiths introduced improved NAS1611-xxxA static seals into production at unit S/N A0020793. Ref: CMM 27-60-42, Items 140, 265, 425. |
| Inboard Ground Spoiler Actuator | 27  | EFS P/N 30490         | 737-SL-20-048-D  | A                     | Cold temperature leakage past NAS1611-xxxA code O-rings static seals in some units. EFS returned to using NAS1611-xxx (no code)(E0515-80) O-rings again in production at unit S/N 8527 and on. Ref: CMM 27-90-01, Items 90, 95, 100, 105, 110, 115.   |

### ***737NG Improvements for Reduction of Hydraulic Leakage - Components***

| Subject                          | ATA | Affected Parts                           | Reference Information   |                       |  |
|----------------------------------|-----|--|---|-----------------------|--|
|                                  |     |  | Number  | Affected Hydr. System | Comments   |
| Outboard Ground Spoiler Actuator | 27  | Boeing P/N 251A1510-3                    | 737-SL-20-048-D   | A                     | Cold temperature leakage past NAS1611-xxx A coded seals. EFS began using NAS1611-xxx (no code - E-515-80 compound) static seals in production units at S/N 7818 and/on. Ref: CMM 27-62-71, Items 40, 50, 70, 95, 115, 120.   |
| Ground Spoiler Interlock Valve   | 27  | Crane P/N 38-805 (Boeing Spec. S251A101) | 737NG-FTE-27-X3864;<br>737NG-SRP-27-0196;<br>737NG-FTD-27-07003;<br>737-SL-27-223;<br>Crane CSB 38-805-27-2 | A                     | Leakage past slide/sleeve seal assembly due to in-service wear and/or damage incurred during production assembly. Improved valve P/N 38-805-2 introduced into production at airplane L/N 3386 (del. Aug 2010). Crane has released Component SB 38-805-27-2 to rework P/N 38-805 to the upgraded P/N 38-805-2; Valve P/N 38-805-2 supersedes (1 way forward) valve P/N 38-805. Ref: CMM 32-43-68, Items 230 and 235.  |
| LE Flap Actuator                 | 27  | Parker P/N 382000-1001                   | a/ 737NG-FTD-27-00017 and SB 382000-27-212<br>b/ 737-SL-20-048-D  | B                     | Two Items:<br>a/ Leakage past piston rod gland seal due to adverse tolerance conditions with rod gland. May impact unit S/Ns 1 through 2335. Parker SB provides retrofit. Ref: CMM 27-80-05, IPL Figure Item 160.<br>b/ Cold temperature leakage past the NAS1611 static seals, possibly from the gland and blocking valve. Parker has returned to using NAS1611-xxx (no code) O-rings procured from E0515-80 compound in production at unit S/N 8439. Ref: CMM 27-80-05, IPL Figure 1, Item 175 and IPL; Figure 2, Items 30 and 90. |

**737NG Improvements for Reduction of Hydraulic Leakage - Components**

| Subject               | ATA | Affected Parts   | Reference Information   |                       |  |
|-----------------------|-----|--|---|-----------------------|--|
|                       |     |  | Number  | Affected Hydr. System | Comments   |
| LE Slat Actuator      | 27  | Parker P/N 381800-1001/-1003/-1005                                       | 737-SL-20-048-D   | B                     | Cold temperature leakage past the NAS1611 static seals, possibly from gland and blocking valve. Parker has returned to using NAS1611-xxx (no code) O-rings procured from E-0515-80 compound in production at unit S/N 19746. Ref: CMM 27-80-06, IPL Figure 1, Item 185 and IPL, Figure 2, Items 30 and 90.   |
| LE Flap/Slat Actuator | 27  | Flap - Parker P/N 382000-1001; Slat - Parker P/N 381800-1001/-1003/-1005 | 737NG-FTD-27-08007  | A, B                  | Operators have experienced hydraulic leakage after airplane painting due to paint over-spray contaminating the piston rods. The over-spray is detrimental to the actuator seals during actuation and can result in the actuator continuing to leak even when flight controls have not been actuated for an extended period. See FTD article for details. |
| LE/TE Swivels         | 27  | Boeing P/N 69-69882-5 (LE) and 69-69882-6 (TE)                           | 737NG-FTE-29-X4399;<br>737-MT-29-010;<br>737NG-FTD-27-08006;<br>737-SL-29-095;<br>737-SL-20-048-D | A, B                  | Leakage past NAS1611 O-ring and S30661-1 cap strip assembly. Hirschler Mfg using improved NAS1611-xxxA code seals (E454 or equivalent) in production since Aug 2005. Worn cap strips also found. Ref: OHM 29-09-21, Items 40 and 45. See FTD article for latest status of action.  |



| <b>737NG Improvements for Reduction of Hydraulic Leakage - Components</b> |     |  |   |                       |  |
|---|-----|--|---|-----------------------|--|
| Subject   | ATA | Affected Parts   | Reference Information                             |                       |  |
|   |     |  | Number  | Affected Hydr. System | Comments   |
| Electric Motor Driven Hydraulic Pump (EMDP)                               | 29  | Boeing P/N 10-60556-30, Abex P/N 57186-10                                | 737-SL-29-084-A                                   | A, B                  | Some P/N 10-60556-30 EMDPs have a thin-wall condition which could cause leakage; Parker Abex has released SB 5718610-29-308 with inspection instructions; applicable to pump S/Ns K2336 through K2463 (except S/Ns K2337, K2345, and K2346), manufactured between May and Aug 2001.  |
| Electric Motor Driven Hydraulic Pump (EMDP)                               | 29  | Boeing P/N 10-60556-32, -33 and -35. Eaton P/N 887477, 887479 and 887480 | 737NG-FTD-29-07001                                | A, B                  | Eaton Vickers has released SB 887477-29-05 for P/N 887477 (Boeing P/N 10-60556-32) electric motor-driven pumps (EMDPs) which improves shaft seal to prevent leakage. Other product improvements are also made. Eaton has also released similar SBs to cover two similar pumps: SB 887479-29-05, which covers pump P/N 10-60556-33 (Eaton P/N 887479); and SB 887480-29-05, which covers pump P/N 10-60556-35 (Eaton P/N 887480). |
| Electric Motor-driven Pump (EMDP) Acoustic Filter                         | 29  | Pulsco P/N 840002-074  | 737NG-FTD-29-05003 and Pulsco SB 840002-074-29-01 | A, B                  | Leakage past NAS1611-220A seal at filter housing joint. Discrepant seals possibly installed in unit S/Ns 8510 through 8845. Pulsco SB 840002-074-29-01 addresses this manufacturing problem.   |

**737NG Improvements for Reduction of Hydraulic Leakage - Components**

| Subject               | ATA | Affected Parts               | Reference Information   |                       |  |
|-----------------------|-----|------------------------------|---|-----------------------|--|
|                       |     |                              | Number  | Affected Hydr. System | Comments   |
| Fuses                 | 29  | Smiths P/N 2-8041-1          | 737NG-FTE-29-X2231;<br>737NG-FTD-29-06001;<br>737-SL-20-048-D   | A, B                  | Leakage occurred past NAS1611-121A static seal which had undersized cross section. Scratches also in fuse housing surface adjacent to the seal. Smiths are using NAS1611-xxx (no code) seals made from E0515-80 compound in all fuses. No explanation for undersized NAS1611-121A seal being installed; considered isolated condition. Ref: CMM 32-40-18, Item 50. |
| Reservoir Drain Valve | 29  | Parker P/N 3-111794          | 737-SL-29-105;<br>Parker SB 3-111794-29-070   | A, B                  | Leakage past ball valve due to production tool damage. Possible suspect lot of valves with S/N 27091 through S/N 27865. Parker SB 3-111794-29-070 complete. Release of retrofit fix for airplane L/Ns 1658 thru 2593 complete - see Boeing SL for details, reference Parker SB. Ref: CMM 29-10-34, Item 55.  |
| MLG Shimmy Damper     | 32  | Boeing P/N 273A3610-1 and -2 | 737NG-FTD-32-02016,<br>737NG-FTD-32-03006,<br>SB 737-32-1368;<br>737NG-FTE-32-X1617;<br>737-SL-20-048-D | A                     | Cold temperature leakage past NAS1611-236A code seals. Wear conditions also found in units. NAS1611-236 (no code) seal and hardware improvements incorporated into P/N 273A3610-4 at airplane L/N 1467 (del. Mar 2004). See FTDs and SB for retrofit options. Ref: CMM 32-30-62, Item 240.   |

| <b>737NG Improvements for Reduction of Hydraulic Leakage - Components</b> |     |                                  |  |                       |   |
|---|-----|----------------------------------|--|-----------------------|---|
| Subject   | ATA | Affected Parts                   | Reference Information  |                       |   |
|   |     |                                  | Number   | Affected Hydr. System | Comments  |
| MLG Retract Actuator  | 32  | Boeing P/N 273A2101-2, -3 and -5 | a/ 737NG-FTD-32-04004;<br>b/ 737NG-FTD-32-04007;<br>SB 737-32-1369;<br>SB-737-32-1418;<br>737-SL-32-119;<br>737-SL-20-048-D;<br>737NG-FTD-32-09011 | A                     | Two Issues:<br>a/ Cold temperature leakage past NAS1611-233A and -347A static seals. Oversized seals and backup rings incorporated at airplane L/N 1865. See FTDs and SBs for retrofit instructions.<br>b/ Leakage through cracks in actuator barrel. New barrel incorporated into production at airplane L/N 1865 (del. Feb 2006). Retrofit with new or modification per SB 737-32-1369, Rev 1 or later. Ref: CMM 32-32-37, Items 150 and 350; for -5 actuators, see 737NG-FTD-32-09011 for optional solution incorporated in production per PRR 38777 at airplane L/N 3015 (del. Sep 2009). 737-SB-32-1418 converts all previous actuator versions to latest P/N 273A2101-101 or equivalent/terminates inspections - see 737-SL-32-119. |
| NLG Steering Metering Valve   | 32  | Parker P/N 383900-1005 and -1007 | 737-SL-32-124;<br>737NG-FTD-32-01041;<br>Parker SB 383900-32-104 R1  | A                     | Leakage at valve swivels due to rough surface finish at lap assembly and wear of dynamic seals. New preferred valve assembly Parker P/N 383900-1011 introduced in production at airplane L/N 1538 (del. July 2004. See SL and SSB for retrofit details. Ref: CMM 32-50-17, Items 162 and 167.   |

**737NG Improvements for Reduction of Hydraulic Leakage - Components**

| Subject               | ATA | Affected Parts        | Reference Information  |                       |   |
|-----------------------|-----|-----------------------|--|-----------------------|---|
|                       |     |                       | Number   | Affected Hydr. System | Comments  |
| NLG Retract Actuator  | 32  | Boeing P/N 273A1101-1 | 737NG-FTD-32-06010;<br>737NG-FTE-32-X3704;<br>737-SL-20-048-D;<br>Retrofit SB-737-32-1440 to be issued Aug 2011. | A                     | Investigation complete. Improvements, incorporated at airplane L/N 3469 (del. Nov 2010), include replacement of static seals at head end and at rod end, replacement of existing scraper with improved version. See FTD article for details; ref: CMM 32-33-12, Item 285; Added cleaning of chrome to "Inspect Task Card, Task 32-120-00-01.                      |
| NLG Steering Actuator | 32  | Boeing P/N 275A1101   | 737NG-FTD-32-10005;<br>737NG-FTD-29-04003;<br>737-SL-20-048-D  | A                     | Investigation complete. Leakage attributed to NAS1611-XXXXA static seal shrinkage - see 737-SL-20-048-D. See FTD article for details, see SL for recommended action on seals. Ref: CMM 32-51-52; Revised AMM 32-21-00/601 to address inspection of chrome on actuator; added cleaning of chrome to Inspection Task Card No. 32-120-00-01 (Task 32-21-00-200-801). |

**737NG Improvements for Reduction of Hydraulic Leakage - Components**

| Subject               | ATA | Affected Parts              | Reference Information   |                       |  |
|-----------------------|-----|-----------------------------|---|-----------------------|--|
|                       |     |                             | Number  | Affected Hydr. System | Comments   |
| Brake Metering Valves | 32  | Eaton P/N 71404 and 71404-1 | 737NG-SRP-32-0154;<br>737NG-FTD-32-04002;<br>Eaton SB 71404-32-02;<br>Eaton SB 71404-32-03;<br>737-SL-32-140;<br>737-SL-32-157;<br>737NG-FTE-32-X1929 | A, B                  | Action Completed for: a/ Static Seal leakage. Cold temperature leakage past input shaft end closure seals NAS1611-119 and -226. Oversized seals incorporated into production at unit SN 7456, delivered on airplane L/N 1983 (del. Jul 2006). Retrofit per Eaton SB 71404-32-2. 737-SL-32-140 advises operators about the Eaton SB 71404-32-02; b/ Dynamic seal leakage due to input shaft wear. SRP 737NG- 32-0154 initiated to investigate and address this condition. PRR 38275-134 introduces production design change to correct dynamic seal leakage. Change incorporated into production at airplane L/N 2788 (del. Feb 2008). 737-SL-32-157 (5 Feb 2009) - see 737NG-FTD-32-04002 and Eaton SB 71404-32-03; Ref: CMM 32-41-04 Items 246 and 296. |

**737NG Improvements for Reduction of Hydraulic Leakage - Components**

| Subject | ATA | Affected Parts                           | Reference Information   |                       |   |
|---------|-----|--|---|-----------------------|---|
|         |     |  | Number  | Affected Hydr. System | Comments  |
| Brakes  | 32  | Honeywell P/N 2612302-1 and PN 2612312-1 | 737NG-FTD-32-03013, SSILs 715,783,794, 796 and 737NG-FTE-32-X2750 | B                     | Leakage from adjuster pins due to scoring, corrosion pits in nitride surface and seal wear from hard nitride surface. See SSILs for field repairs and new parts. Improved adjuster pins introduced into production at airplane L/N 1621 (unit S/N 3099) for 2612302-1 brakes and airplane L/N 1649 (unit S/N 4069) for 2612312-1 brakes. Airplane L/N 6121 was delivered in Dec 2004 and airplane L/N 1649 was delivered in Feb 2005; Final Action: SIL-853 introduces flash chrome pin P/Ns for brake P/N 2612302-1, S/N B4090, at airplane L/N 2246 (del. May 2007). Since then, Honeywell has issued SBs 2612312-32-008 and 2612302-32-004 which change piston to allow installation of an alignment bushing to prevent adjuster pin from contacting the piston during brake applications - introduced for brakes P/N 2612312-1, S/N B5949, at airplane L/N 2864 (del. Mar 2009) and P/N 2612302-1, S/N B4665, at airplane L/N 3037 (del. Sep 2009); Ref: CMMs 32-40-13 (P/N 2612302-1), Item 330; CMM 32-40-15 (P/N 2612312-1), Item 350. |

**737NG Improvements for Reduction of Hydraulic Leakage - Components**

| Subject                              | ATA | Affected Parts           | Reference Information  |                       |  |
|--------------------------------------|-----|--------------------------|--|-----------------------|--|
|                                      |     |                          | Number   | Affected Hydr. System | Comments   |
| Thrust Reverser Non-Locking Actuator | 78  | Boeing P/N 315A2800-1/-2 | 737NG-FTD-78-05002;<br>737NG-FTD-78-08001;<br>USG SB 737-78-1083 | A, B                  | Leakage due to piston rod wear adjacent to where the foot seal rests against the piston with the thrust reverser stowed. Ref. CMM 78-31-18, Item 360; A new fitting with a Rulon-J spacer between rod end and fitting has been developed. The new fitting was incorporated into production at airplane L/N 2648 (del. Jun 2008). USG SB 737-78-1083, released in June, 2010, provides retrofit instructions for airplane L/Ns 1 through 2647. See 737NG-FTD-78-08001 for latest details. |

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**737NG Improvements for Reduction of Hydraulic Leakage - Plumbing (Tubes, Hoses, Fittings)**

| Affected Parts | ATA | Affected Parts                         | Reference Information |                     |   |
|----------------|-----|--|-----------------------|---------------------|---|
|                |     |  | Number                | Affected Hydr. Sys. | Comments  |
| Tubing         | 29  | Tube P/Ns 272A4451-87 and 272A4451-200 | 737NG-FTD-29-07007    | B                   | Possible cracking to titanium ground spoiler hydraulic tube P/N 272A4451-87, which runs between the ground spoiler control valve and the ground spoiler interlock valve - on 737NG airplanes prior to L/N 2345. The crack occurs in the heat affected zone of the welded end sleeve. One crack to a tube in service contributed to a dual hydraulic system loss. The tube has been replaced by dimensionally identical tube P/N 272A4451-200, made from 21-6-9 corrosion resistant steel (CRES) material. Tube P/N 272A4451-200 was incorporated to airplanes in production beginning at airplane L/N 2346 (L/N 2346 del. Aug 2007) and is one way forward interchangeable with tube earlier tube P/N 272A4451-87. See FTD article for details. |
| Tubing         | 29  | Tube P/Ns 272A4351-12 and 272A4351-9   | 737NG-FTD-29-02004    | B                   | Possible chafing of tube P/Ns 272A4351-12 and 272A4351-9 on P/N 214A3108-2 air recirculation filter in the aft end of the forward cargo compartment. New tubes, P/Ns 272A4351-33 and 272A4351-34, are available. Applicable to 737-800 and -900 airplane L/Ns through 1250 (L/N 1250 del. Dec 2002). Ref: IPC 29-11-51-3 Items 90 and 125.  |

**737NG Improvements for Reduction of Hydraulic Leakage - Plumbing (Tubes, Hoses, Fittings)**

| Affected Parts | ATA | Affected Parts              | Reference Information                     |                     |  |
|----------------|-----|-----------------------------|---|---------------------|--|
|                |     |                             | Number                                    | Affected Hydr. Sys. | Comments   |
| Tubing         | 29  | Tube<br>P/N<br>312A2110-2   | 737NG-FTD-29-03003 and<br>737-SL-29-091   | B                   | Fractures of pressure tube P/N 312A2110-2 located in the engine strut. Caused by preload. Adjustment procedure given in 737-SL-29-091. Applicable to all 737NG airplanes. Ref: IPC 54-51-51-02, Item 515.  |
| Tubing         | 29  | Multiple Tube<br>P/Ns       | 737NG-FTD-29-04002 and<br>737-SL-29-092-B | A, B                | Describes extensive corrosion of tubes when operating in areas using potassium-based runway deicing fluids. Recommends tube inspections, possible tube replacement, application of CICs. Applicable to all 737NG airplanes.  |
| Tubing         | 29  | Tube<br>P/N<br>272A4451-148 | 737NG-FTD-29-05004                        | A                   | Possible chafing between tube P/N 272A4451-148 and system A EMDP support bracket. New tube P/N 272A4451-196 available, or FTD allows trimming of bracket to provide clearance. Applicable to airplanes L/Ns 1741 (L/N 1741 del. Jul 2005) and earlier. Ref: IPC 29-11-52-10, Item 480JA. |
| Tubing         | 29  | Tube<br>P/N<br>272A4151-16  | 737NG-FTD-29-05005                        | A                   | Two tubes P/N 272A4151-16 and -18 in the nose wheelwell may be misrouted (positions in a clamp block switched), causing the -16 to chafe against a third tube. Applicable to airplanes L/Ns 1741 (L/N 1741 del. Jul 2005) and earlier. Ref: IPC 32-22-51-01, Item 160J.                  |

**ATTACHMENT II To: 737-SL-29-095-A**

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| <b>737NG Improvements for Reduction of Hydraulic Leakage - Plumbing (Tubes, Hoses, Fittings)</b> |     |   |                       |                     |  |
|--|-----|---|-----------------------|---------------------|--|
| Affected Parts   | ATA | Affected Parts                                  | Reference Information |                     |  |
|  |     |   | Number                | Affected Hydr. Sys. | Comments   |
| Tubing   | 29  | Tube P/Ns<br>272A1552-65<br>and<br>272A1553-65, | 737NG-FTD-29-05007    | A, B                | Tubes 272A1552-65 and 272A1553-65, spoiler return tubes on wing trailing edges, found damaged by tool during installation. New two-piece replacement tubes provided for ease of replacement. Affects <a href="#">airplanes L/Ns 1749</a> (July 2005) and earlier. Ref: IPC 29-11-52-02 item 532J and IPC 29-11-52-03 Item 478. |
| Hose   | 29  | Hose<br>P/N<br>AS116-08-0260                    | 737-SL-29-076-A       | A                   | System A EMDP pressure hose rubbing on return filter module; clamps added to secure hose to nearby tube on <a href="#">airplane L/N 180</a> (L/N 180 del. Feb 99) and on. Ref: IPC 29-11-21-10, Item 5.  |
| Hose   | 29  | Hose<br>P/N<br>AS115-06F0324                    | ISAR 98-19-2904-30    | A                   | MLG retract actuator hose chafing on actuator transfer tube; new hose guide loop P/N 273A2702-3 replaces -1. Ref: IPC 32-32-52-01, Item 55.  |
| Hose   | 29  | Multiple<br>Hose<br>P/Ns                        | SB 737-29-1077 Rev 1  | B                   | Revise clamping of System B EMDP wire bundle to prevent contact with System B EMDP hoses; applicable to <a href="#">airplane L/Ns through 347</a> (L/N 347 del. Aug 99).   |
| Hose   | 29  | Multiple<br>Hose<br>P/Ns                        | 737-SL-29-087         | A, B,<br>Standby    | Titeflex hoses with improperly heat-treated B-nuts. Inspect and replace. Applicable to <a href="#">airplane L/Ns 406 through 769</a> (L/N 769 del. Feb 2001). See SL attachment for list of affected hoses and applications.   |

**737NG Improvements for Reduction of Hydraulic Leakage - Plumbing (Tubes, Hoses, Fittings)**

| Affected Parts       | ATA | Affected Parts                  | Reference Information |                     |  |
|----------------------|-----|---------------------------------|-----------------------|---------------------|--|
|                      |     |                                 | Number                | Affected Hydr. Sys. | Comments   |
| Hose                 | 29  | Hose P/N<br>AS154A04EN0280<br>K | 737NG-FTD-32-01034    | A                   | Brake hose P/N AS154A04EN0280K chafed and ruptured. The operator had previously installed the main landing gear shimmy dampers per service bulletin 737-32-1312, Revision 1. Supplemental kit P/N 270A5003-35 was created to alleviate the chafing; the kit was introduced at Revision 3 to S/B 737-32-1312. Applicable to 737NG airplanes delivered prior to airplane L/N 494 (L/N 494 del. Apr 2000). Ref: IPC 32-41-52-07, Item 97.   |
| Shape Fitting Cracks | 29  | Several Fitting P/Ns            | 737NG-FTD-29-05006    | A, B, Standby       | Leakage due to overtorqued/stress corrosion cracks in 7075-aluminum fittings. Incorrect heat treat found in some fittings. Mostly random locations. Steel fittings are optional. Boeing has taken action to replace six aluminum fittings in the wheel wells of production airplanes - changes for five of the six fittings have been implemented. The changes are being included as part of design improvements to hydraulic tubing in the wheel wells (ref. 737NG-SL-29-109 for description of wheel well tubing improvements). See FTD article for latest status of changes to the aluminum fittings. |

| <b>737NG Improvements for Reduction of Hydraulic Leakage - Plumbing (Tubes, Hoses, Fittings)</b> |     |                       |                       |                     |  |
|--|-----|-----------------------|-----------------------|---------------------|--|
| Affected Parts   | ATA | Affected Parts        | Reference Information |                     |  |
|  |     |                       | Number                | Affected Hydr. Sys. | Comments   |
| Frangible Fittings   | 32  | Boeing P/N 273A2801-3 | 737NG-FTD-32-00014    | A                   | Leakage due to loose fittings. FTD provides method for testing and revised torque requirement. Retightening fittings corrects problem. Ref: IPC 32-12-51-01, Items 20, 140 and -150. |