

*Ford Motor Company*

James P. Vondale, Director  
Automotive Safety Office  
Environmental & Safety Engineering

May 3, 2004

Ms. Kathleen C. DeMeter, Director  
Office of Defects Investigation Safety Assurance  
National Highway Traffic Safety Administration  
400 Seventh Street, S.W.  
Washington, DC 20590

Dear Ms. DeMeter:

Subject: EA02-025:NVS-213bby

The Ford Motor Company response to a request made by Mr. Jeffrey Quandt in a meeting with the agency on February 26, 2004 relating to the collection and analysis of speed control deactivation switches from the EA02-025 subject vehicle population is provided on the enclosed CD.

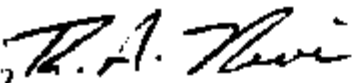
Forty-two switches were removed from vehicles located in eight states and operated under various driving conditions. Vehicle mileages ranged from 35,629 to 379,891 miles. Only one switch exhibited any sign of brake fluid leaking through the Kapton seals into the switch cavity. The vehicle equipped with this switch had accrued 107,669 miles and had experienced a loss of speed control function. The switch from this vehicle did not exhibit any signs of a thermal event.

Twelve switches came from vehicles that had accumulated greater mileage than the vehicle discussed above, ranging from 108,001 to 379,891 miles. These switches did not exhibit signs of brake fluid leaking through the Kapton seals and into the switch cavity.

Of the 42 switches analyzed, no pattern of failure could be found similar to those switches included in Safety Recall 99S15.

If you have any further questions, please contact me.

Sincerely,



James P. Vondale

Attachment





April 30, 2004

**To:** M. Kwiatkowski (313) 32-24519 (313) 32-24519 FAX  
**From:** S. LaRouche (313) 84-54876  
**Subject:** Speed Control Deactivation Switch  
 Part Number: Not Provided  
 Specification: Not Provided  
 Supplier: Not Provided

**Received:** Forty-two speed deactivation control switches (see attached spreadsheet for identification) were received on April 13, 2004. A spreadsheet containing switch identification and vehicle information was also received.

**Object:** Disassemble the switches and check for evidence of brake fluid leakage from the hydraulic to the electrical side of the switches.

**Conclusion:** One of the switches (from vehicle 2MELM74W0S [redacted]) shows leakage of brake fluid from the hydraulic side to the electrical side of the switch. Tears and delamination in the Teflon overlays and cracks in the Kapton substrates of all of the seals appear to have formed the leak path. One switch (2MELM75W4S [redacted]) shows evidence of water intrusion, but no evidence of brake fluid leakage through the seals.

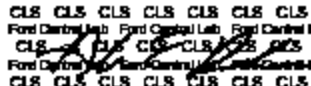
**Data and Analysis:**

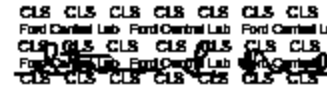
Visual Examination

(Bench Microscope ~7 – 42X Magnification)

Disassembly was started by removing the aluminum crimp rings from the switches. The switch housings were then separated from the cups. The interiors of the switch housings, faces of the cups, and transfer pin holes were examined under a bench microscope for evidence of brake fluid or other foreign material. Thirty-nine of the switches showed no visual evidence of brake fluid leakage. Three of the switches (2MELM74W0SX [redacted], 2MELM74W6S [redacted], and 2MELM75W4SX [redacted]) appeared suspect and were further disassembled by turning the crimp rings off the cups and removing the Kapton seals. The seals were then inspected for features such as tears and delamination in the Teflon overlays or cracks in the Kapton substrates that could form leak paths for brake fluid. The results are reported in the attached spreadsheet. The suspect switches were photographed (Figures 1 through 27).

**Contributors:** R. Van Stratton-Kirk

**Concur:**   
CLB CLB CLB CLB CLB CLB CLB CLB CLB CLB  
 Ford Central Lab Ford Central Lab Ford Central Lab Ford Central Lab  
 CLB CLB CLB CLB CLB CLB CLB CLB CLB CLB  
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**By:**   
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A. Radke, Supervisor  
 Metallurgy and Mechanical Testing Section

Steven LaRouche (SLAROUCH)

**Enclosures:** Spreadsheet (94\_95\_Panther\_Switches\_4\_13\_04\_Lab.xls)  
 Figures 1 through 27

SL/el

ASSIGNMENT 04-18

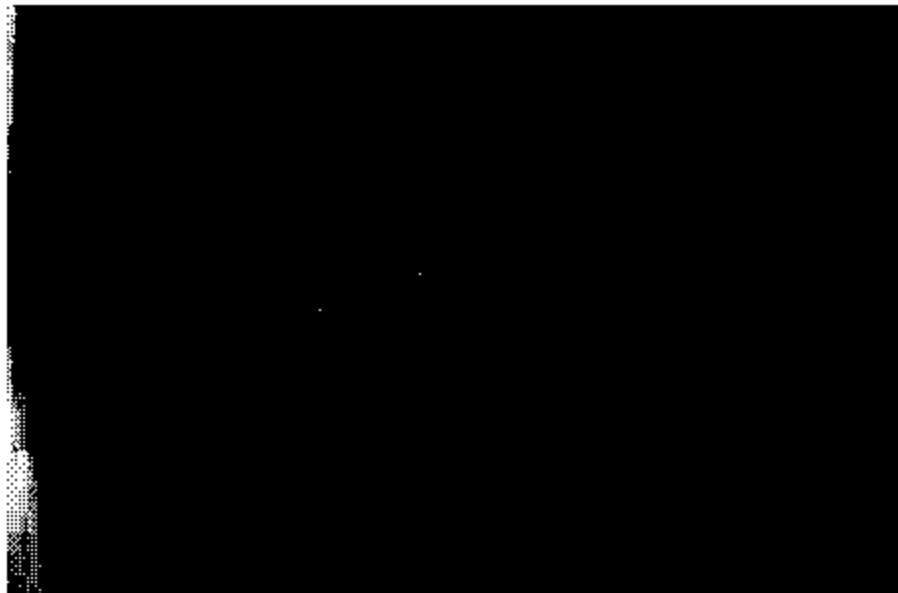
MY	Vehicle Line	VIN	Mileage	Location	Comments	Switch Code	Switch Mfg Date	9F924-Switch P/N
1995	Town Car	1LNLM81W0	150,214	Atlanta		4277	8/15/94	F2AC-AA
1994	Town Car	1LNLM81W3	84,089	Pittsburgh, PA.		4116A	4/26/94	F2VC-AB
1995	Town Car	1LNLM81W3	93,073	Roseville, CA		4285	10/12/94	F2AC-AA
1995	Town Car	1LNLM81W3	95,362	Peachtree City, GA		5129	5/9/95	F2AC-AA
1994	Town Car	1LNLM81W8	175,297	Merced, CA		4014	1/14/94	F2VC-AB
1995	Town Car	1LNLM82W1	89,283	Atlanta		4315	11/11/94	F2AC-AA
1995	Town Car	1LNLM82W1	92,877	Atlanta		5025	1/25/95	F2AC-AA
1994	Town Car	1LNLM82W2	119,709	Atlanta		4007	1/7/94	F2VC-AB
1995	Town Car	1LNLM82W2	82,300	Sexton Ford		5025A	1/25/95	F2AC-AA
1994	Town Car	1LNLM82W3	78,030	Pittsburgh, PA.		3222A	8/10/93	F2VC-AB
1994	Town Car	1LNLM82W8	295,864	Peachtree City, GA		4025	1/25/94	F2VC-AB
1994	Town Car	1LNLM82W9	118,115	Landmark L-M Lakewood, Co (Denver Area)		3222A	8/10/93	F2VC-AB
1994	Town Car	1LNLM83W4	65,366	Pittsburgh, PA.		4129	5/9/94	F2VC-AB
1994	Town Car	1LNLM83W8	81,187	Pittsburgh, PA.		3235	8/23/93	F2VC-AB
1995	Crown Victoria	2FALP71W3	88,823	Pittsburgh, PA.		5038A	2/7/95	F2AC-AA
1995	Crown Victoria	2FALP72W1	79,449	SW FLORIDA		4321	11/17/94	F2AC-AA
1994	Crown Victoria	2FALP73W3	66,500	Pittsburgh, PA.		2288A	10/15/92	F2AC-AA
1995	Crown Victoria	2FALP74W0	35,629	Packey Webb		4223A	8/11/94	F2AC-AA
1994	Crown Victoria	2FALP74W1	56,901	Pittsburgh, PA.		3187	7/8/93	F2VC-AB
1994	Crown Victoria	2FALP74W2	130,644	Merced, CA	bad vin	3320	11/16/93	F2AC-AA
1994	Crown Victoria	2FALP74W3	99,000	Terry's L/M		4073	3/14/94	F2VC-AB
1994	Crown Victoria	2FALP74W5	147,380	Lancaster, CA		3193	7/12/93	F2VC-AB
1994	Crown Victoria	2FALP74W8	36,355	SW FLORIDA		3308	11/4/93	F2VC-AB
1995	Crown Victoria	2FALP74W7	90,919	Pittsburgh, PA.		4222	8/10/94	F2AC-AA
1994	Crown Victoria	2FALP74WX	UNK	Pittsburgh, PA.		4137	5/17/94	F2VC-AB
1995	Grand Marquis	2MELM74W	UNK	Peachtree City, GA		4145	5/25/94	F2AC-AA
1995	Grand Marquis	2MELM74W	101,888	Las Vegas, NV		5130	5/10/95	F2AC-AA
1994	Grand Marquis	2MELM74W	131,013	Atlanta		3308	11/4/93	F2VC-AB
1995	Grand Marquis	2MELM74W	55,190	Pittsburgh, PA.		4223	8/11/94	F2AC-AA

1995	Grand Marquis	2MELM74W6		96,280	Atlanta		4313	11/8/94	F2AC-AA
1995	Grand Marquis	2MELM74W8		163,110	Pittsburgh, PA.		4321	11/17/94	F2AC-AA
1995	Grand Marquis	2MELM75W0		58,988	Pittsburgh, PA.		4226	8/14/94	F2AC-AA
1995	Grand Marquis	2MELM75W0		108,001	Terry's LM		4321A	11/17/94	F2AC-AA
1995	Grand Marquis	2MELM75W7		74,770	SW FLORIDA		4315	11/11/94	F2AC-AA
1995	Grand Marquis	2MELM75W1		97,755	Michigan		5033A	2/2/95	F2AC-AA
1995	Grand Marquis	2MELM75W2		78,292	Landmark L-M Lakewood, Co (Denver Area)		4303	10/30/94	F2AC-AA
1995	Grand Marquis	2MELM75W3		69,085	SW FLORIDA		5048	2/17/95	F2AC-AA
1995	Grand Marquis	2MELM75W4		379,891	Orlando, FL-Mears Transport	bad vin	4223	8/11/94	F2AC-AA
1994	Grand Marquis	2MELM75W8		118,210	Anderson Ford	not OE	4054	2/23/94	F2AC-AA
1995	Grand Marquis	2MELM75W7		73,723	Peachtree City, GA		5011	1/11/95	F2AC-AA
1994	Grand Marquis	2MELM75WX		55,761	Rhode Island		3231	8/19/93	F2VC-AB
1995	Grand Marquis	2MELM75WX		79,437	Las Vegas, NV		4202A	7/21/94	F2AC-AA

**Leakage of Brake  
Fluid Into Electrical  
Side of Switch**

<b>Usage</b>	
City	none visible
	none visible
City	none visible
	none visible
Hwy	none visible
City	none visible
City	none visible
City	none visible
	none visible
Metro-Highway	none visible
	none visible
City	none visible
	none visible
	none visible
	none visible
Rural	none visible
	none visible
	none visible
	none visible
City	none visible
	none visible
City/Highway	none visible
City	none visible
	none visible
	none visible
	Brake fluid and sludge in switch cavity and on face of cup (Figures 1 through 3). Movable contact arm corroded and fractured off. Tears and delamination in Teflon on both sides of all three Kapton seals, along with cracks in substrates (Figures 4 through 9), formed leak path for brake fluid to enter electrical portion of switch.
City	none visible
City	none visible
	none visible

	<p>No fluid visible on face of cup, in transfer pin hole, or on movable or stationary contacts. Small amount of fluid visible at bases of contacts (Figures 10 and 11), as well as in terminal cavity. Fluid also visible on exterior of cavity. Face of cup clean and dry (Figure 12). Tears and delamination visible in Teflon on side of Kapton seal facing hexport (Figure 13). No tears or delamination visible on other side of seal, or on either side of other two seals (Figures 14 through 18). No cracks in Kapton substrates of seals. Appears that brake fluid may have drained out of hexport fitting and seeped into switch cavity through gaps around terminals. There is no apparent leakage path through Kapton seals.</p>
City	none visible
	none visible
	none visible
City	none visible
	none visible
City	none visible
City	none visible
	<p>Exterior moist with brake fluid. Lip around switch cavity exhibits white deposits and movable contact arm is tarnished, suggesting water intrusion (Figures 19 and 20). Bases of contacts exhibit traces of what appears to be brake fluid. Face of cup is covered with white deposits suggesting water intrusion (Figure 21). Teflon on both sides of Kapton seal adjacent hexport exhibits tears and delamination (Figures 22 and 23). Side of middle Kapton seal facing hexport seal exhibits tears in Teflon (Figure 24). No tears or delamination visible in Teflon on other side of seal (Figure 25), or on either side of seal adjacent washer (Figures 26 and 27). No cracks are visible in the Kapton substrates of any of the seals. There is no apparent path for leakage of brake fluid through the Kapton seals. It appears that water intrusion may have occurred through gaps around terminals or through environmental seal. Seepage of brake fluid from exterior through gaps around terminals may have also occurred.</p>
	none visible
	none visible
	none visible
City	none visible



<b>FIGURE 1)</b>	<b>Switch:</b>	<b>603722</b>
	<b>Component:</b>	<b>Switch Housing</b>
	<b>Comment:</b>	<b>Brake fluid and sludge in interior of switch housing.</b>



<b>FIGURE 2)</b>	<b>Switch:</b>	<b>603722</b>
	<b>Component:</b>	<b>Switch Housing</b>
	<b>Comment:</b>	<b>Close-up of Figure 1</b>



FIGURE 3)

Switch:	603722
Component:	Cup
Comment:	Sludge and brake fluid on face of cup.

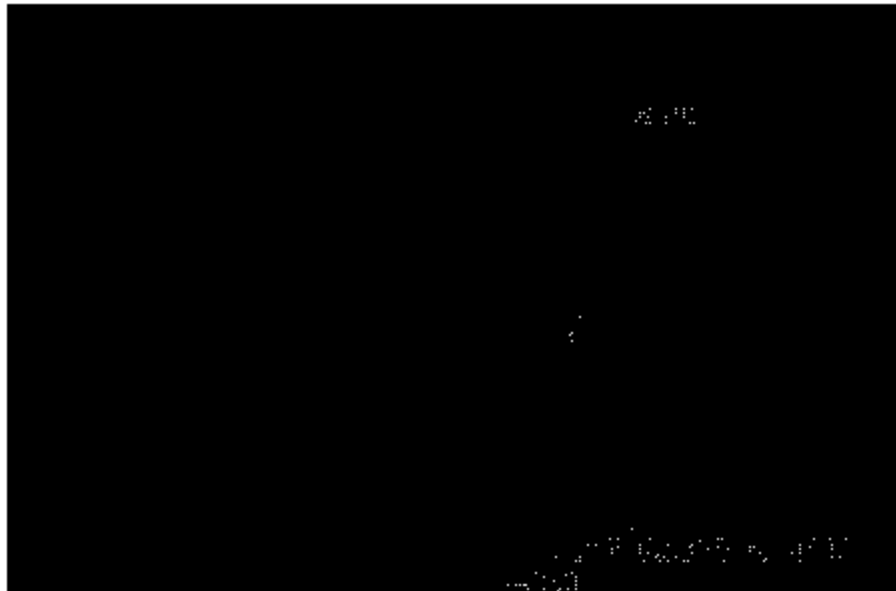


FIGURE 4)

Switch:	603722
Component:	Kapton Seal Adjacent Hexport
Comment:	Delamination and tears in Teflon on side facing hexport. Crack in Kapton visible.



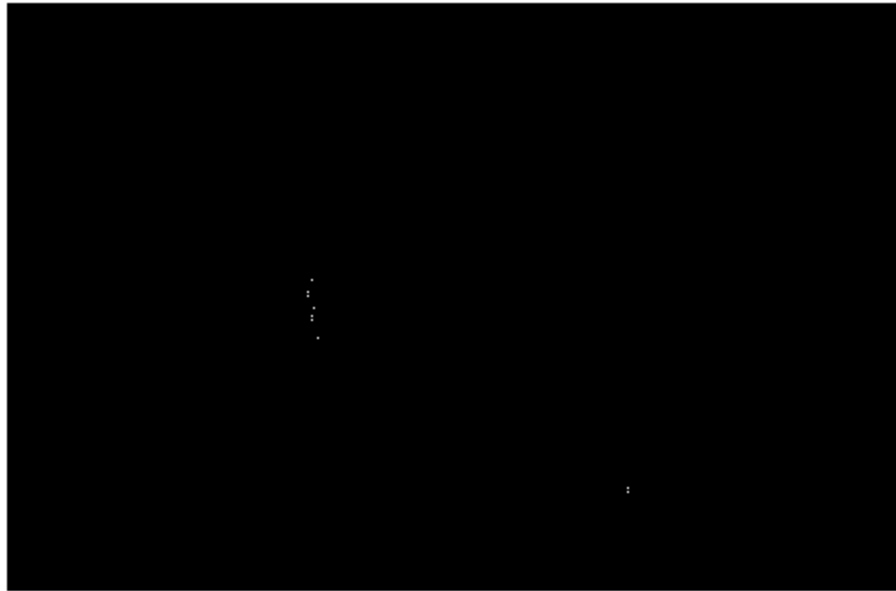


FIGURE 5)	<i>Switch:</i>	<i>603722</i>
	<i>Component:</i>	<i>Kapton Seal Adjacent Hexport</i>
	<i>Comment:</i>	<i>Delamination and tear in side facing middle seal.</i>

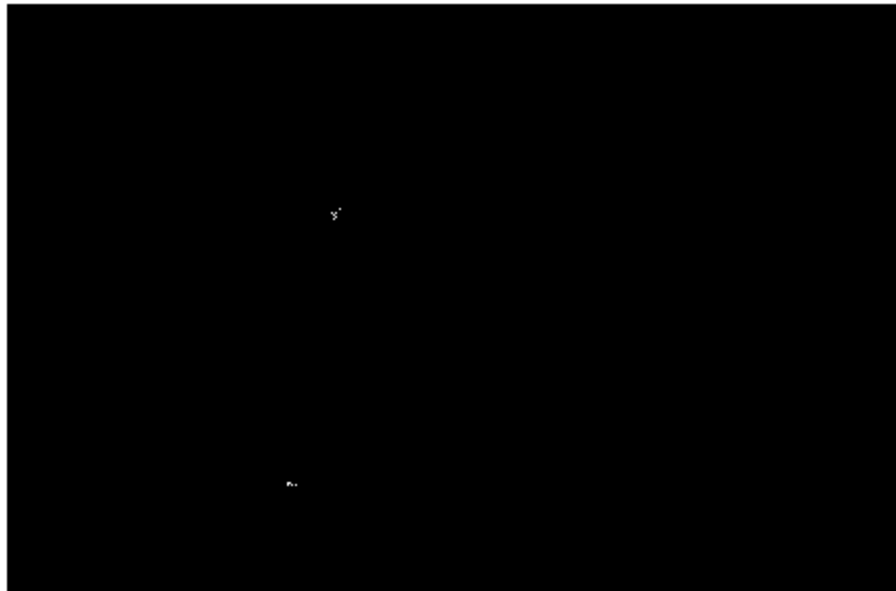
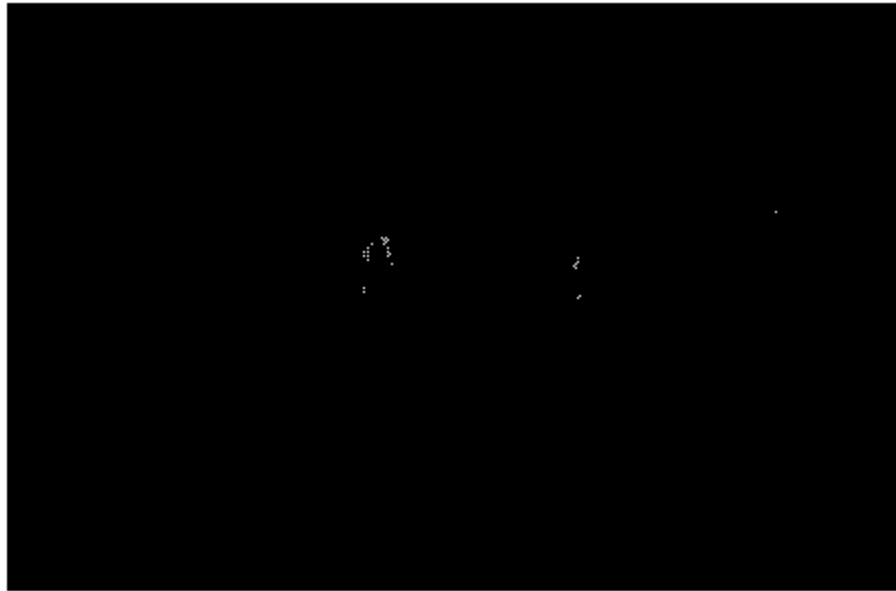


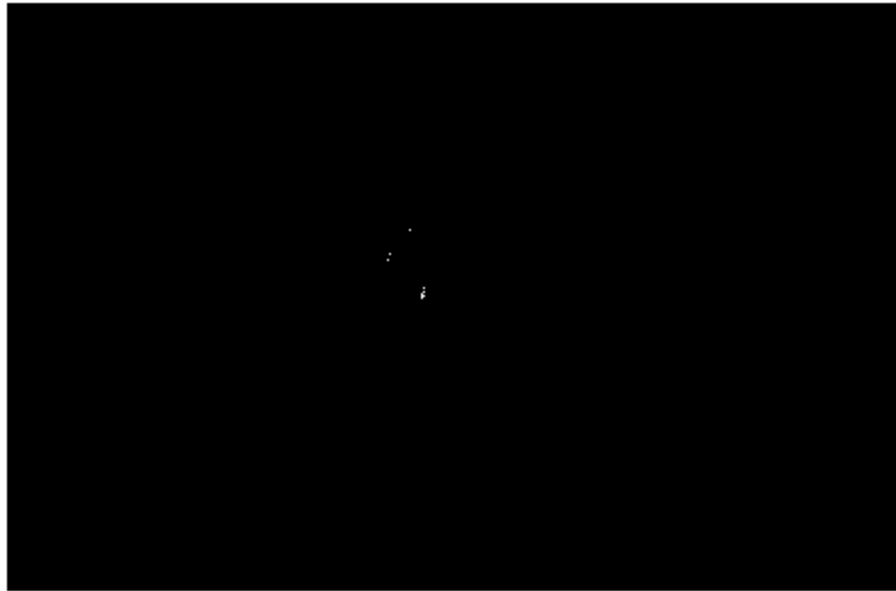
FIGURE 6)	<i>Switch:</i>	<i>603722</i>
	<i>Component:</i>	<i>Middle Kapton Seal</i>
	<i>Comment:</i>	<i>Delamination and tears in Teflon on side facing hexport seal. Crack in Kapton visible.</i>



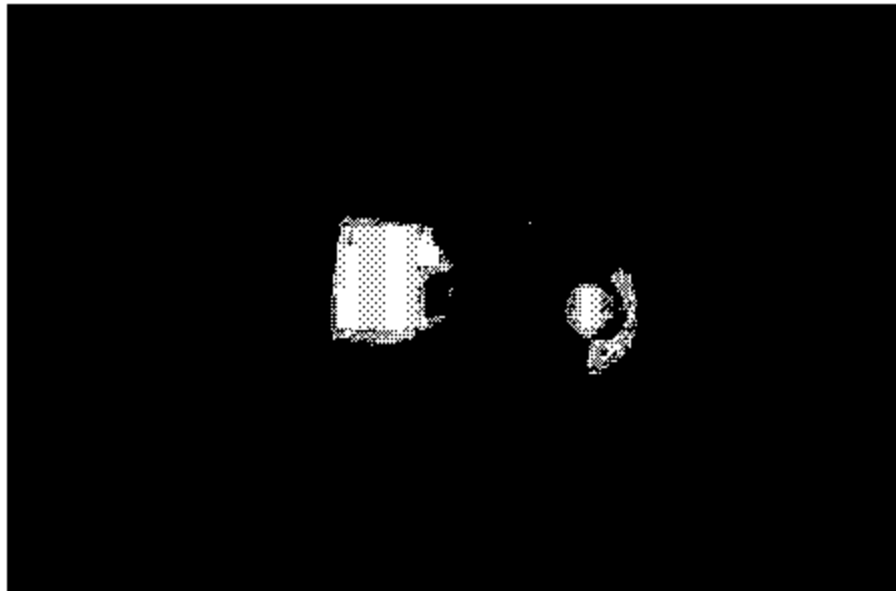
<b>FIGURE 7)</b>	<b>Switch:</b>	<b>603722</b>
	<b>Component:</b>	<b>Middle Kapton Seal</b>
	<b>Comment:</b>	<b>Delamination and tears in Teflon on side facing washer seal.</b>



<b>FIGURE 8)</b>	<b>Switch:</b>	<b>603722</b>
	<b>Component:</b>	<b>Kapton Seal Adjacent Washer</b>
	<b>Comment:</b>	<b>Delamination and tears in Teflon on side facing middle seal. Crack in Kapton visible.</b>



<b>FIGURE 9)</b>	<b>Switch:</b>	<b>603722</b>
	<b>Component:</b>	<b>Kapton Seal Adjacent Washer</b>
	<b>View:</b>	<b>Delamination and tears in Teflon on side facing washer.</b>



<b>FIGURE 10)</b>	<b>Switch:</b>	<b>669949</b>
	<b>Component:</b>	<b>Switch Housing</b>
	<b>Comment:</b>	<b>Interior mostly clean and dry.</b>

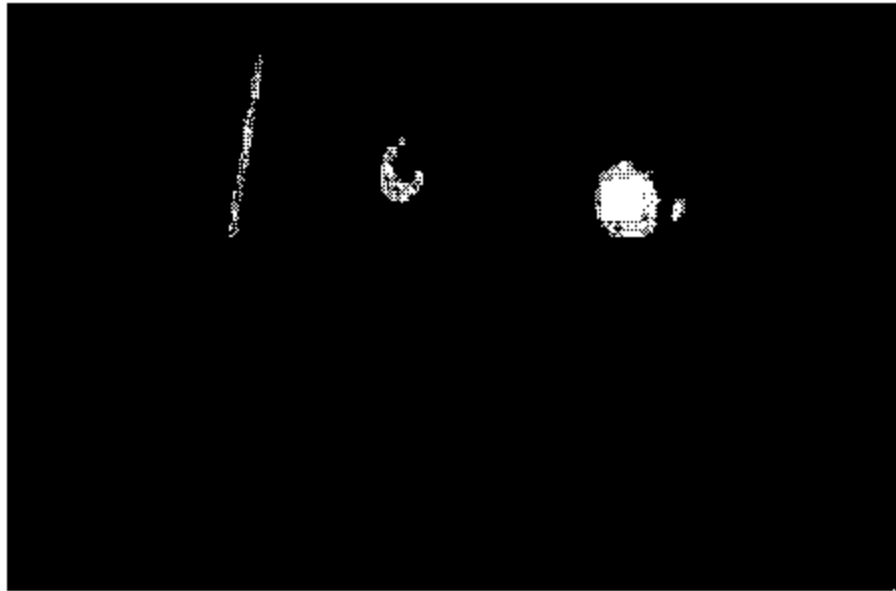


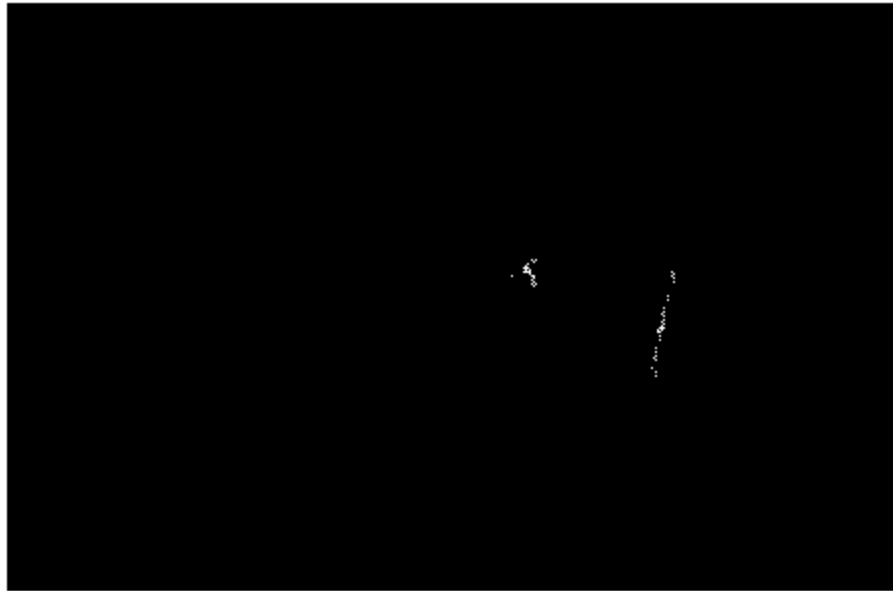
FIGURE 11)

<i>Switch:</i>	<i>669949</i>
<i>Component:</i>	<i>Switch Housing</i>
<i>Comment:</i>	<i>Close-up of interior showing traces of what appears to be brake fluid at base of contact.</i>



FIGURE 12)

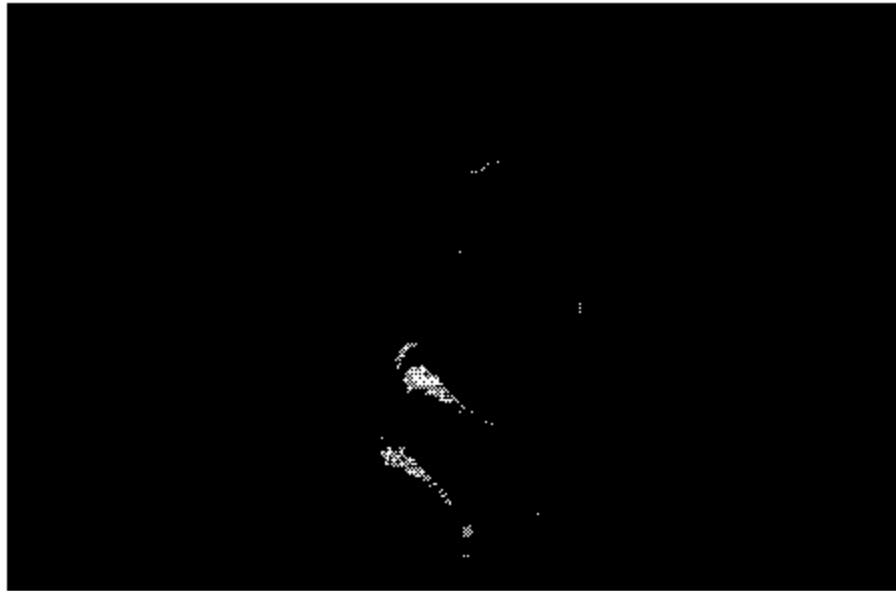
<i>Switch:</i>	<i>669949</i>
<i>Component:</i>	<i>Cup</i>
<i>Comment:</i>	<i>Face of cup clean and dry.</i>



<b>FIGURE 13)</b>	<b>Switch:</b>	<b>669949</b>
	<b>Component:</b>	<b>Kaptan Seal Adjacent Hexport</b>
	<b>Comment:</b>	<b>Tears and delamination in side facing hexport. No apparent cracks in Kaptan.</b>



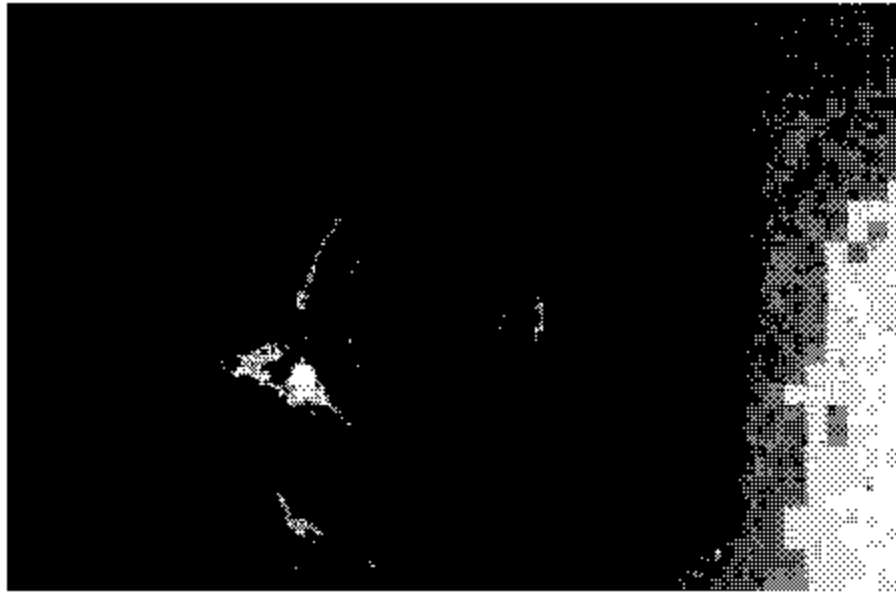
<b>FIGURE 14)</b>	<b>Switch:</b>	<b>669949</b>
	<b>Component:</b>	<b>Kaptan Seal Adjacent Hexport</b>
	<b>Comment:</b>	<b>No apparent tears or delamination in side facing middle seal.</b>



<b>FIGURE 15)</b>	<b>Switch:</b>	<b>669949</b>
	<b>Component:</b>	<b>Middle Kapton Seal</b>
	<b>Comment:</b>	<b>No apparent tears or delamination in side facing hexport seal. No apparent cracks in Kapton.</b>



<b>FIGURE 16)</b>	<b>Switch:</b>	<b>669949</b>
	<b>Component:</b>	<b>Middle Kapton Seal</b>
	<b>Comment:</b>	<b>No apparent tears or delamination in side facing washer seal.</b>



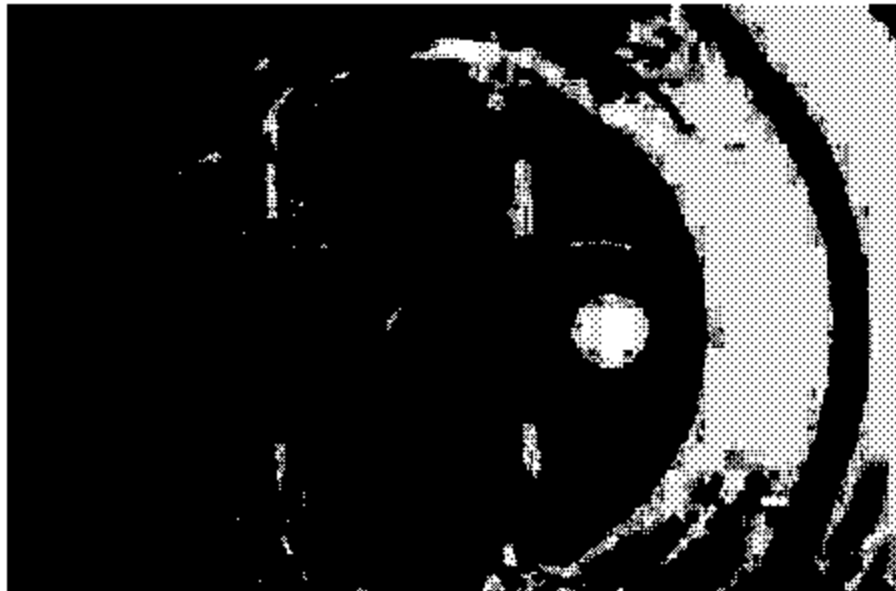
<b>FIGURE 17)</b>	<b>Switch:</b>	<b>669949</b>
	<b>Component:</b>	<b>Kapton Seal Adjacent Washer</b>
	<b>Comment:</b>	<b>No apparent tears or delamination in side facing washer seal. No apparent cracks in Kapton.</b>



<b>FIGURE 18)</b>	<b>Switch:</b>	<b>669949</b>
	<b>Component:</b>	<b>Kapton Seal Adjacent Washer</b>
	<b>Comment:</b>	<b>No apparent tears or delamination in side facing washer.</b>



<i>FIGURE 19)</i>	<i>Switch:</i>	<i>631977</i>
	<i>Component:</i>	<i>Switch Housing</i>
	<i>Comment:</i>	<i>White deposits around lip of housing suggest water intrusion.</i>



<i>FIGURE 20)</i>	<i>Switch:</i>	<i>631977</i>
	<i>Component:</i>	<i>Switch Housing</i>
	<i>Comment:</i>	<i>Close-up of Figure 19.</i>



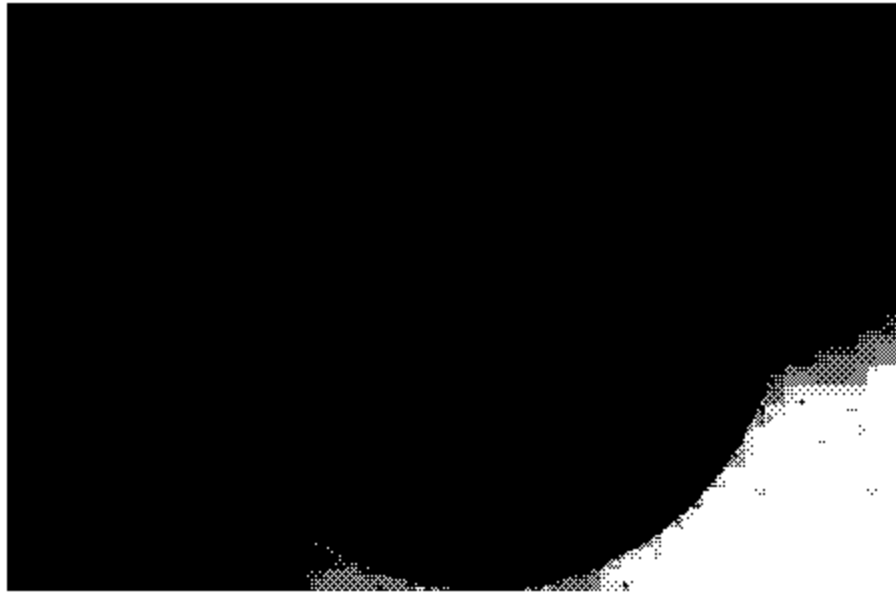


FIGURE 21)	Switch:	631977
	Component:	Cup
	Comment:	White deposits on face of cup suggest water intrusion.

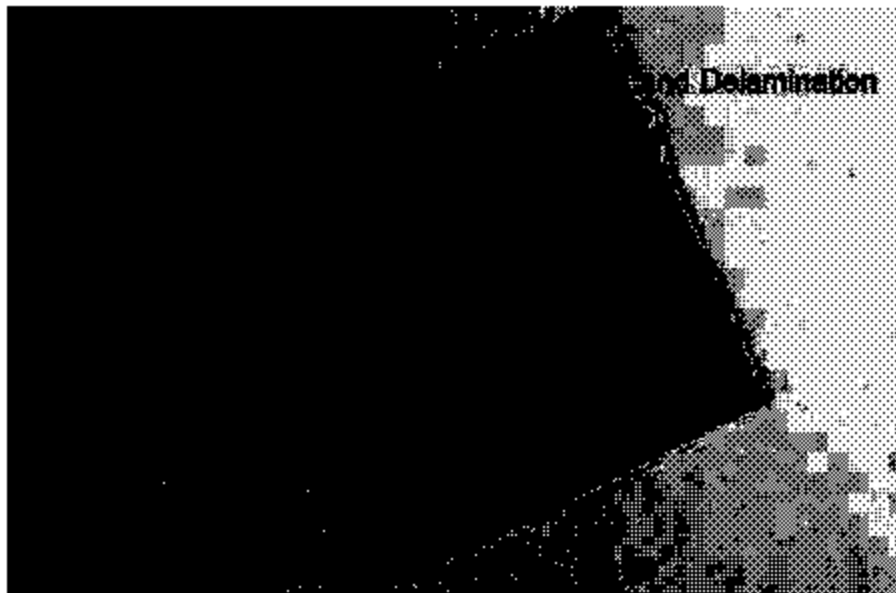


FIGURE 22)	Switch:	631977
	Component:	Kapton Seal Adjacent Hexport
	Comment:	Tears and delamination in side facing hexport. No apparent cracks in Kapton.

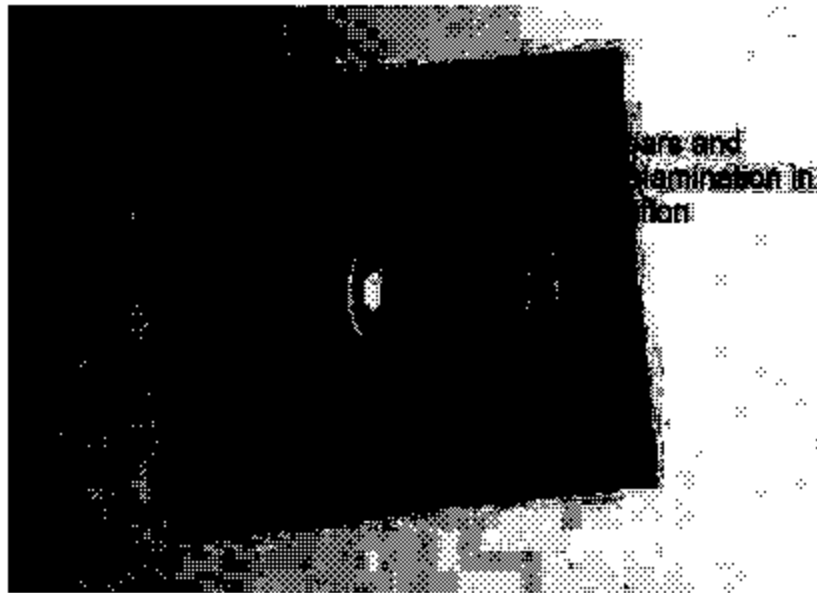


FIGURE 23)

Switch:	631977
Component:	Kapton Seal Adjacent Hexport
Comment:	Tears and delamination in side facing middle seal.



FIGURE 24)

Switch:	631977
Component:	Middle Kapton Seal
Comment:	Tears in side facing hexport seal. No apparent cracks in Kapton.



FIGURE 25)	Switch:	6319??
	Component:	Middle Kapton Seal
	Comment:	No apparent tears or delamination side facing washer seal.

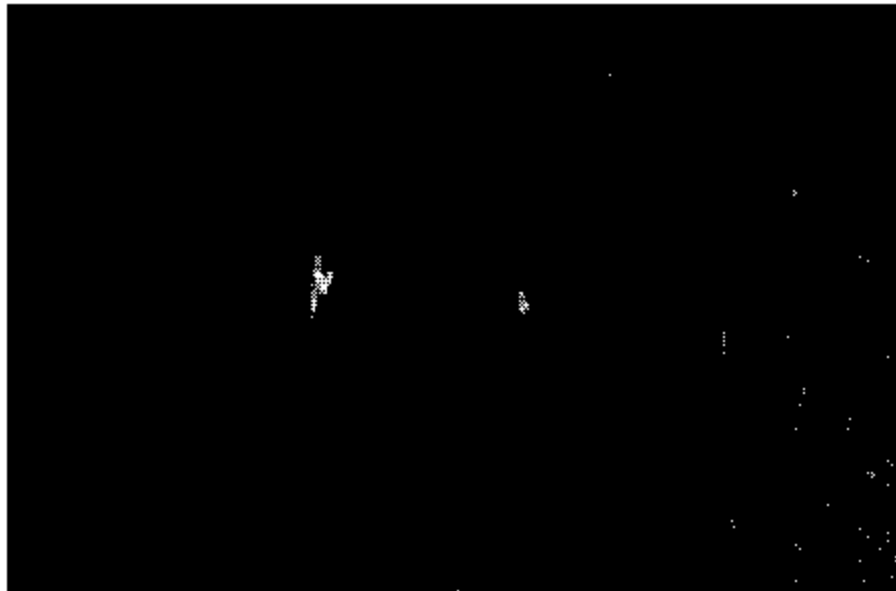


FIGURE 26)	Switch:	6319??
	Component:	Kapton Seal Adjacent Washer
	Comment:	No apparent tears or delamination side facing middle seal. No apparent cracks in Kapton.



FIGURE 27)	Switch:	631977
	Component:	Kaptan Seal Adjacent Washer
	Comment:	No apparent tears or delamination side facing washer.