PRODUCT ADVISORY NOTICE

KEEPING YOU INFORMED OF PRODUCT CHANGES

To: **All 90 Series DIP Switch Customers, Sales Representatives and Distributors**

Date: **March 1, 2010**

Subject: **Base and Cover Plastic Material Change**

This Product Advisory Notice is to alert you that there is a coming change to a series of Grayhill DIP switches and our records show your company has purchased one or more of the affected part numbers in the past. Please forward this notification to the appropriate person(s) in your organization.

Description of the Change
The thermoplastic material that is used in the base and cover piece parts are changing from 33% glass filled polyphthalamide (PPA) to 30% glass filled polyamide (PA46).

Reason for Change
Solvay Polymers, the manufacturer of PPA, has obsoleted the material. The PA46 material is also rated for higher temperature processing.

Effective Date
All two through eight position 90 Series DIP switches manufactured after March 29, 2010 (date code 1013 or later) may be built with either PPA or PA46. The 10 position 90 Series family will be converted in the next 60 days.

Part Numbers Affected
The table below lists the Grayhill part numbers included in the change notice:

2s	3s	6s	8s	Custom	Custom
90B02SLT	90B03ST	90B06ST	90B08SLT	90YY2882R	90YY3142SGWR
90B02ST	90HBJ03PT	90B06T	90B08ST	90YY2901S	90YY3143SGWR
90HBJ02PRT	90HBW03PRT	90CR06SGWRT	90GB08ST	90YY2923SGWR	90YY3145SGWR
90HBJ02PT	90HBW03PT	90HBJ06PRT	90HBJ08PRT	90YY2928SGWR	90YY3148SGWR
90HBW02PRT		90HBJ06PT	90HBJ08PT	90YY3048S	90YY3203SGWR
90HBW02PT	**5s**	90HBW06PRT	90HBW08PRT	90YY3048SR	90YY3205SGWR
90HBW02RT	90B05SLT	90HBW06PT	90HBW08PT	90YY3062SR	90YY3326PR
90HBW02T	90B05ST		90HBW08RT	90YY3111SR	90YY3370PR
90HBW02T	90HBJ05PRT	**7s**			90YY3371PR
	90HBJ05PT	90B07ST			90YY3372SGWR
	90HBW05PRT	90HBW07PRT			
	90HBW05PT	90HBW07PT			
	90HBW05T				
	90HGBW05PRT				

Note: 4 position switches were converted on an earlier Product Advisory Notice (Bulletin #1137).

The test report is available on http://www.grayhill.com/about/PAN.aspx

Samples of most 2 through 8 position 90 series DIP switches with PA46 are available upon request.

Please contact your Grayhill, Inc. sales associate for further information.

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MATERIAL CHANGE TEST REPORT
90 Series DIP Switches
1/18/10
Rev. A

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1. Introduction:
The purpose of this report is to provide information along with test data with respect to a change to be made in the plastic materials used in the construction of the Grayhill 90 Series DIP low profile switches. The change if from the PPA resin that is currently used to a PA 4/6 GF30 resin (UL94 V-0 rated). This change is being made due to obsolescence of the current material. The report details the extensive product testing that was performed to ensure that customers of the 90 series product can be assured of continued use of the switches with no negative impact to their current production processes and as components in their products. The material change affects the high temperature plastic material that is used for the main body of the switch (base assembly) and the cover that is ultrasonically welded to the base assembly during the switch assembly process. All other switch materials and finishes will not be changing from the current materials used at the time of this report. For the purpose of this product testing, two five hundred piece orders of the 90B08ST were built in the same production cell using the current and the proposed material to ensure that no differences could be attributed to variation in equipment, assembly methods, or personnel. The switches were then tested side by side to ensure that a control group was subjected to identical testing throughout the process.
The test switches were divided into nine subgroups and tested as described under the individual headings. All test switches were measured for Contact Resistance, Insulation Resistance, and Dielectric Withstanding prior to any testing. The switches described in the following pages are all from the five hundred sample of switches built using the new material. If there were any differences noted in performance between the new material switches and the control group that information is included under the respective subgroup heading.

2.0 Subgroup 1:

2.1. Thermal Shock- Fifty switches were tested for thermal shock as specified in MIL-STD-202, Method 107G (test condition B1) that specifies 25 thermal cycles between –65°C and +125 C.

2.2. Mechanical Life: After Thermal Shock, the fifty switches were tested for mechanical life per MIL-STD-83504/12. The test conditions were for a minimum of 2,000 cycles at a rate not greater than 10 cycles per minute. The test load used was 10mA resistive with an open circuit voltage of 5 VDC.

2.3. Dielectric Withstanding Voltage- Following mechanical life testing, the fifty switches were tested per MIL-202, Method 301 at a test voltage of 500 VAC RMS in the open position. The requirement is that there shall be no arcing, flashover, or breakdown of insulation or damage, and that leakage current shall be no greater than 100 microamperes.

2.4. Contact Resistance. - The switches were then measured for contact resistance per MIL-STD-202, Method 307 using a test current of 10mA maximum at 1 VDC. The contact resistance is not to exceed 100 milliohms on any switch position after mechanical life as described in 2.2.

2.5 Operating Force-The actuation force of each switch was measured to ensure that each switch position meets a 1.0-ounce minimum force after mechanical life.

All fifty switches in subgroup 1 met the criteria as specified above.

3.0 Subgroup 2:

3.1. Moisture Resistance- Fifty switches were tested for moisture resistance as specified in MIL- 202, Method 106, test condition B-1 (air).

3.2. Insulation Resistance. - After the moisture resistance test, the switches were tested for insulation resistance per MIL-202, Method 302 with a requirement that the IR be no less than 10 MegOhms.

3.3.Contact Resistance- Contact resistance measurements were taken after moisture resistance and IR.

All fifty switches that were tested in this subgroup met the requirements as specified.

4.0 Subgroup 3:

4.1. Resistance to IR Reflow Processing. -Fifty switches were run through three cycles of a typical lead free reflow process using a thermal profile as shown. The test criteria specify that there should be no evidence of physical or electrical damage to the switches.

4.2 Contact Resistance- Contact resistance measurements taken after the reflow processing must be less than 50 milliohms on all switch positions (10 mA @ 50mV DC).

All fifty switches that were tested met the requirements as specified.

5.0 Subgroup 4:

5.1. Resistance to IR Reflow Processing. - Twenty-five switches that were processed in subgroup 3 for resistance to IR Reflow were used for the subgroup 4 testing.

5.2. Mechanical Shock- Twenty-five switches were tested as specified in MIL-202, Method 213 using test condition “E” (1,000 G’s, 0.5mS, half sine) for the test. Each switch was preset with half of the switches in the open position and half in the closed position. With all switch positions monitored in accordance with Method 310 of MIL-202, no opening or closing of contacts in excess of 10 microseconds is allowed during the test period.

5.3. Resistance to Vibration- After mechanical shock, the twenty five switches were tested as specified in MIL-202, Method 204 to test condition “B” (10-2000 Hz at 15G or 0.06” double amplitude). Each switch was preset with half of the switches in the open position and half in the closed position. No contact openings or closings in excess of 10 microseconds are allowed during the test. The switches were then inspected for any mechanical or physical damage.

5.4. Contact Resistance- Contact resistance measurements were taken after the Shock and Vibration testing were completed. Contact resistance must be less than 50 milliohms at all switch positions after testing.

All twenty-five switches tested met the requirements as specified.

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6.0 Subgroup 5:

6.1. Resistance to Flammability- When switches are tested as specified in IEC Standard 69522, there shall be less than 3 seconds of continuous burning after removal of burner, and falling burning drops or parts shall not ignite the cheesecloth underneath. The following test conditions apply:

A. Test bottom of switch per position.
B. Use 30 seconds of flame exposure.

Five switches were tested to the specification as described in 6.1.and all of the switches passed the specification.

7.0 Subgroup 6:

7.1. Solderability Testing. - Ten switches were tested to meet the requirements of MIL-202, Method 208, condition#1 that specifies exposure to 16 hours of steam aging. Following the steam aging, the switches were solder dipped and inspected per the requirement that 95% of the soldered area on the terminals shall be free of pinholes and voids.

All ten switches met the requirements as specified above.

8.0. Subgroup 7:

8.1. Thermal Aging. - Twenty five switches were tested as specified in MIL-202, Method 108A using condition “D” (1000 hours at 125 C.). The specification requires that the switches shall be mechanically and electrically operative after the testing with no greater than a 50% change in contact resistance over the initial readings.

8.2. Contact Resistance. - Contact resistance readings were taken at five hundred and one thousand hours during the testing.

All twenty-five switches met the contact resistance and operational requirements after testing.

9.0. Subgroup 8:

9.1. Resistance to IR Reflow Processing. -An additional hot air reflow test was conducted to determine the ability of the switches built using the new material to withstand temperature extremes by using a reflow profile at a higher temperature for longer duration. The reflow profile used had peak temperatures above 270 C for a duration of approximately 43 seconds. This profile is above the Grayhill recommended temperature for processing the 90 series product but is intended to demonstrate a safety factor above the typical lead-free reflow processing temperatures. Five switches were processed for three cycles through the reflow profile described above and tested afterward for contact resistance and mechanical operation. Although it was noted that the plastic switch materials showed notable discoloration, the switches performed electrically and mechanically as specified with no apparent defects.

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10. Conclusion: Throughout the testing described on the preceding pages, the selected replacement material for use in the Grayhill 90 Series DIP switch products has been proven to be a suitable material for use in place of the current material that is being discontinued. The new material is currently used in the Grayhill 94 series rotary DIP switches and has performed well in that product.