BOMBARDIER
Toronto (de Havilland)
PROPRIETARY INFORMATION

PPS 9.37

PRODUCTION PROCESS STANDARD

Use of Stabilant Contact Enhancement

Issue 3
- This standard supersedes PPS 9.37, Issue 2.
- Vertical lines in the left hand margin indicate changes over the previous issue.
- Direct PPS related questions to PPS.Group@aero.bombardier.com or (416) 375-4365.
- This PPS is effective as of the distribution date.

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Signed original on file. Validation of paper prints is the responsibility of the user.

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1 Scope

1.1 This PPS (Production Process Standard) specifies the procedure and requirements for the use of Stabilant contact enhancement.

1.1.1 This PPS complements the engineering drawings that specify its use as an authorized instruction and the procedure specified must be followed to ensure compliance with all applicable specifications. In general, if this PPS conflicts with the engineering drawing, follow the engineering drawing. The requirements specified in this PPS are necessary to fulfil the engineering design and reliability objectives.

1.1.2 Refer to PPS 13.26 for the subcontractor provisions applicable to this PPS.

1.1.3 Procedure or requirements specified in a Bombardier BAPS, MPS, LES or P. Spec. **do not** supersede the procedure or requirements specified in this PPS. Similarly, the procedure and requirements specified in this PPS are not applicable when use of a BAPS, MPS, LES or P. Spec. is specified.

2 Hazardous Materials

2.1 Before receipt at Bombardier Toronto (de Havilland), all materials must be approved and assigned Material Safety Data Sheet (MSDS) numbers by the Bombardier Toronto (de Havilland) Environment, Health and Safety Department. Refer to the manufacturer's MSDS for specific safety data on any of the materials specified in this PPS. If the MSDS is not available, contact the Bombardier Toronto (de Havilland) Environment, Health and Safety Department.

3 References

3.1 PPS 13.26 - General Subcontractor Provisions.

3.2 PPS 31.17 - Solvent Usage.

4 Materials and Equipment

4.1 Materials

4.1.1 Stabilant 22, modified polyoxypropylene-polyoxyethylene block polymer, D.W. Electrochemicals Ltd.

4.1.2 Stabilant 22a, an isopropyl alcohol diluted form of Stabilant 22, D.W. Electrochemicals Ltd.

4.1.3 Stabilant 22p, an isopropanol diluted (7% by volume) form of Stabilant 22, D.W. Electrochemicals Ltd.

4.2 Equipment

4.2.1 Stabilant application tools (e.g., 15 ml dropper bottles and industrial syrettes).

5 Procedure

5.1 General

5.1.1 Contact failure is rarely caused by a single factor. Thus, treatments that solve only one problem don't necessarily offer a reliable long term solution. For example, cleaners do not prevent the re-entry of contaminants or the reformation of contaminant films; nor do they offer any lubrication. They must be used each time a connector gets dirty. Lubricants in themselves are rarely cleaners. Corrosion inhibitors are neither cleaners nor lubricants and are often specific to one type of metal or plating. Unsaturated oils used as contact treatments can cross-link under the influence of elastomer or thermoset plastic curing agents and accelerants.

5.1.2 While resident in the connector, Stabilant 22 performs several concurrent functions. Its very presence in the contact gap will prevent the entry of outside contaminants. It has sufficient surfactant action to lift surface contaminants and hold them in suspension. In cases where corrosion products are present Stabilant 22 will penetrate them and prevent rectification effects. Due to its high dielectric constant it will act to form a capacitative layer which is in parallel with whatever residual resistance exists in the contact increasing the passage of AC signals. Given sufficient DC bias within the gaps of the contact the thin film of Stabilant 22 will "switch", conducting by quantum tunneling and thus limit the resistance of the contact to a serviceable level.

5.1.3 Stabilant 22 is an initially non-conductive block polymer which when used in a thin film between metal contacts becomes conductive under the effect of an electrical field. This occurs at an electrical field gradient such that the material will remain non-conductive between adjacent contacts in a multiple pin environment. In addition, Stabilant 22 exhibits surfactant action as well as lubrication ability providing a single component resident solution to virtually all contact problems. When applied to electro-mechanical contacts, Stabilant 22 can provide the connection reliability of a soldered joint without bonding the contact surfaces.

5.1.4 When using Stabilant contact enhancement, one general precaution is not to use too much material. This is not a case of "if a little is good then a lot is better". While some applications involving heavy existing corrosion may justify the use of thicker films in order to hold removed corrosion in suspension, this should be considered a temporary measure. The thick film of Stabilant should be scheduled for removal (along with the corrosion by-products) at an early moment, to be replaced by a thinner film of Stabilant.

5.1.5 Apply Stabilant from 15 ml bottles fitted with dropper caps, industrial syrettes or equivalent means.

5.2 Use of Stabilant on Relays and Switches

5.2.1 The most common cause of relay and switch contact failure or intermittence is caused by contaminant materials which either increase contact resistance or cause corrosion of the contact.

5.2.2 In this application a final film thickness of 0.00025" - 0.002" is all that is normally necessary (i.e., apply just enough to fill up the interstices between the contact faces). If using Stabilant 22a, apply enough to leave a final film thickness of 0.00025" - 0.002" after the isopropyl alcohol evaporates. If too much Stabilant is used on a contact there is a potential for the stabilant to so completely fill the gap around the point of contact that it may overly cushion the closing contact.

5.3 Stabilant on Aircraft Connectors with Fluorosilicone Inserts

5.3.1 In many aircraft connectors a fluorosilicone washer is used at the base of the male pins to form a barrier which, when compressed by screwing the connector closed, acts to form a water barrier between the pins thus reducing signal leakage and increasing flashover voltages. Most solvents cause swelling of the washer, and if the connector is closed with the washer in the swelled condition the connector might leak. The amount of solvent in Stabilant 22a could cause the washer to swell enough to cause a connector leak.

5.3.2 In connectors with fluorosilicone washers use Stabilant 22p as it does not use enough solvent in to cause the washer to swell enough to cause a connector leak. If Stabilant 22p is not available, it is acceptable to use Stabilant 22 diluted 7% by volume with isopropanol (i.e., 7 parts of isopropanol to 100 parts of Stabilant 22) on connectors with fluorosilicone washers.

5.4 Solving Sensor Problems using Stabilant

5.4.1 With the increase in microprocessor controlled signal processing the signal levels in the wiring harnesses have generally dropped to TTL/MOS levels, that is, voltages under 5 volts with correspondingly low currents. Connector reliability at these voltage and power levels has lagged behind the demands placed on them resulting in “sensor failures” caused by malfunctioning connectors. Stabilant improves the reliability of connectors in general and can therefore be useful in solving sensor problems.

5.4.2 Apply a drop or two of Stabilant 22a on the sensor connectors and any other in-signal-path connectors in the wiring harness.

5.5 Using Stabilant as an Aid to IC Insertion

5.5.1 When Stabilant 22 is used on IC pins, its lubricating qualities reduce the insertion forces on the individual pins making it much less likely that a pin will be bent under. While hand insertion of IC's without the use of a tool is made easier when Stabilant 22 is used as a lubricant, it is recommended that a tool be used whenever possible. The use of Stabilant 22 is not a substitute for having the pins of the IC properly lined up or aligned in properly spaced parallel rows For this application, the use of diluted Stabilant 22 or Stabilant 22a is not recommended as the lubricating properties will be reduced with dilution.

5.6 Use of Stabilant 22 in Avionics and Navigational Equipment

5.6.1 By providing a lubricating film that won't cross-link, Stabilant can substantially improve the reliability of multiple independent package installations as well as improve the reliability of single package units.

5.6.2 In this application a final film thickness of 0.001" - 0.002" is all that is normally necessary (i.e., apply just enough to fill up the interstices between the contact faces). If using Stabilant 22a, apply enough to leave a final film thickness of 0.001" - 0.002" after the isopropyl alcohol evaporates. Use Stabilant 22 in its concentrated form if the connectors are out in the open, such as exposed RF connectors. If the connectors are not easy to get at or if the Stabilant is to be applied to something such as a socketed IC (without removing the IC from its socket) use Stabilant 22a.

5.7 Use of Stabilant on Microphone Connectors

5.7.1 By applying a thin coating of either Stabilant 22 or Stabilant 22a to the contacts in an XLR or equivalent connector, thin film distortion effects can be eliminated along with most cases of connector microphonics and signal to noise degradation.

5.7.2 Do not treat condenser microphone cartridges with Stabilant in such a way that any of the material gets on the insulator between the back and diaphragm electrode connections. The resistance between the back electrode and diaphragm electrode must be maintained at extremely high levels; Stabilant across the insulator would lower this.

5.8 Using Stabilant in Severe Outdoor Environments

5.8.1 The presence of Stabilant will help exclude oxygen and corrosive materials from the contacts and its surfactant action will keep existing contaminants in suspension.

6 Requirements

6.1 When using Stabilant, do not use too much material. This is not a case of "if a little is good then a lot is better". While some applications involving heavy existing corrosion may justify the use of thicker films in order to hold removed corrosion in suspension, this should be considered a temporary measure. The thick film of Stabilant should be scheduled for removal (along with the corrosion by-products) at an early moment, to be replaced by a thinner film of Stabilant.

7 Safety Precautions

7.1 Avoid eye contact and prolonged skin contact with Stabilant. If eye contact does occur, flush immediately with flowing water for a period of at least 10 minutes and seek medical attention. if skin contact occurs, wash thoroughly with soap and water.

7.2 Refer to PPS 31.17 for the safety precautions regarding the handling of solvents.

8 Personnel Requirements

8.1 Personnel responsible for application of Stabilant contact enhancement must have a good working knowledge of the procedure and requirements as specified herein and must have exhibited their competency to their supervisor.