TO: ALL HOLDERS OF APPLICATION AND REPAIR OF BMS 10-102 INSULATIVE COATING SYSTEM COMPONENT MAINTENANCE MANUAL 71-00-01

REVISION NO. 14 DATED NOV 01/01

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 on the Record of Revision Sheet.

CHAPTER/SECTION AND PAGE NO.	DESCRIPTION OF CHANGE
REPAIR-GEN 601-602	Changed vendor address for Kevlar 29.

APPLICATION AND REPAIR OF BMS 10-102 INSULATIVE COATING SYSTEMS

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COMPONENT MAINTENANCE MANUAL
WITH
ILLUSTRATED PARTS LIST

BOEING
COMPONENT
MAINTENANCE MANUAL

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.

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TEMPORARY REVISION AND SERVICE BULLETIN RECORD

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INTRODUCTION

This manual is divided into separate sections:

1. Title Page
2. Record of Revisions
3. Temporary Revision & Service Bulletin Record
4. List of Effective Pages
5. Table of Contents
6. Introduction
7. Procedures

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

APPLICATION AND REPAIR OF BMS 10-102

INSULATIVE COATING SYSTEM

1. Description

A. This manual covers Boeing recommended procedures for application and repair of insulative coating systems. These coatings are a synthetic rubber cured at room temperature. These systems are employed in areas where the structure must be insulated from high temperature.

B. The insulative coating systems consist of the following application types:

(1) Type I - Application of insulative coating by spraying or troweling.

(2) Type II - Application of insulative coating by bonding of premolded components (precured patches).

C. Topcoat application grades

(1) Grade A - Application of topcoat without reinforcement.

(2) Grade B - Application of topcoat with reinforcement.

NOTE: Application of Grade B topcoat is required with both types of insulative coating. When no grade is specified on the drawing, use Grade A.

2. Materials

NOTE: Only the specified materials may be used.

A. Insulative Coatings

(1) Raw Materials

(a) BMS 10-102, Type 1, Class 1 (sprayable) (Ref 20-60-04)

(b) BMS 10-102, Type 1, Class 2 (trowelable) (Ref 20-60-04)

(2) Precured Patches

(a) Precured MA-25 (BMS 10-102, Type I, Class 1) repair patch (Lockheed Martin MA-25, Type III panel) (Ref 20-60-04, Lockheed Martin)

(b) Precured MA-25 (BMS 10-102, Type I, Class 1) repair patch with precured topcoat (Lockheed Martin MA-25, Type IV panel) (Ref 20-60-04, Lockheed Martin)

(3) Kits

(a) Uncured Material Kits

1) MA-25, type II Trowelable (BMS 10-102, Type I, Class 2) with topcoat repair kit (Martin part number MA2RK) (Ref 20-60-04, Lockheed Martin)

(b) Precured Material Kits

1) Precured MA-25 (BMS 10-102, Type I, Class 1) with precured topcoat repair patch kit (Martin part number MA4RK) (Ref 20-60-04, Lockheed Martin)

B. Topcoats

(1) BMS 10-102, Type II (Ref 20-60-04)

(2) RTV 106, GE Silicones (repair material only)(Ref 20-60-04)

C. Topcoat Catalysts

(1) Dibutyl tin dilaurate (recommended source GE Silicones, Waterford, New York)(Ref 20-60-04)

(2) Tin octoate (recommended source GE Silicones, Waterford, New York) (Ref 20-60-04)

(3) Catalyst S, Dow Corning Corporation, Midland, MI

D. Topcoat Reinforcements

(1) Kevlar 29 nonwoven mat, 0.4 ounces per square yard, polyester binder with high solvent resistance, Hollingsworth and Vose Company, East Walpole, Massachusetts 02032-1008 (Ref 20-60-04)

(2) Silica Fibers, Hitco F100-A25 (Ref 20-60-04)

E. Thinner

(1) Aliphatic naphtha, TT-N-95, Type II (Ref 20-60-01)

F. Primer

(1) DC-1200, Dow Corning Corporation, Midland, Michigan (Ref 20-60-02)

G. Cleaning Solvents

(1) Aliphatic naphtha, TT-N-95, Type I (Ref 20-60-01)

(2) BMS 11-7, Cleaning Solvent, Pre-Sealing (Ref 20-60-01)

(3) Methyl Ethyl Ketone, ASTM D 740 (Ref 20-60-01)

(4) Methyl Isobutyl Ketone, ASTM D 1153 (Ref 20-60-01)

(5) Solvent mixtures, 42 percent Methyl Ethyl Ketone, ASTM D 740, and 58 percent sec-butyl alcohol, ASTM D 1007 (Ref 20-60-01)

(6) Toluene ASTM D 362 (Ref 20-60-01)

H. Masking Materials

(1) Sheet maskants

(a) Mask-Off 939A, Mask-Off Company, Monrovia, California

(b) Paper, MIL-B-121, Grade A, Type II, Class 1 (Ref 20-60-04)

(2) Tapes

(a) Aluminum 3M No. 425, 3M Company, St. Paul, Minnesota

(b) Mylar, Permacel P-280, Permacel, Buena Park, California

(c) Mylar, 3M No. 850, 3M Company, St. Paul, Minnesota

(d) Polypropylene, 3M No. 218, 3M Company, St. Paul, Minnesota

(e) Polyethylene, 3M No. 226, 3M Company, St. Paul, Minnesota

(f) Teflon, TFE, HM350, Furon CHR Division, New Haven, CT

(g) Teflon, TFE HM 650, Furon CHR Division, New Haven, CT

I. Release Agents

(1) Ceara Mold Release Wax (100 percent yellow carnuba base wax-no silicones), Ceara Products, Inc., P.O. Box 5724, Denver, Colorado

(2) Frekote 33 aerosol spray, Frekote, Inc., Boca Raton, Florida

(3) KRAXO 1711 aerosol spray, Contour Chemical Company, North Reading, Massachusetts

(4) MS-122 aerosol spray, Miller-Stephenson Chemical Company, Danbury, Connecticut

(5) Release-All No. 30 aerosol spray (blue color preferred), Airtech International, Carson, California

J. Miscellaneous Materials

(1) Abrasive pads, Scotch-Brite medium, fine or very fine grade, 3M Company, St. Paul, Minnesota

(2) Abrasive paper, aluminum oxide, 180, 240, and 320 grit, Norton Company, Troy, New York

(3) BMS 15-5 Wiper, Absorbent, Process Cleaning (Class A)(Ref 20-60-04)

(4) Paint brushes (nylon, polyethylene or natural bristle), high quality, commercial grade

(5) BMS 5-63, Firewall Sealant, Hydraulic Fluid Resistant (Ref 20-60-04)

(6) BMS 5-63 Primer, Firewall Sealant (Ref 20-60-04)

(7) Dapcocast 18-4 Detackifying Solution for BMS 5-63, D'Aircraft Company, Anaheim, California (Ref 20-60-04)

3. Material Storage Life

CAUTION: DO NOT USE MATERIALS WHICH ARE BEYOND THEIR ORIGINAL EXPIRATION DATE UNLESS THEY HAVE BEEN RETESTED AS SHOWN IN TABLE I IN FIG. 601.

DO NOT USE RETESTED MATERIALS BEYOND THE 3 MONTH STORAGE LIFE EXTENSION.

A. Storage life and retest requirements are shown in Table 1 in Fig. 601.

MATERIAL	STORAGE TEMPERATURE (°F)	STORAGE LIFE 1	STORAGE LIFE EXTENSION 2
BMS 10-102, TYPES I AND II	35 TO 80	6 MONTHS	3 MONTHS 3
DC-1200 PRIMER	35 TO 80	12 MONTHS	3 MONTHS 4
BMS 5-63 SEALANT	40 TO 80	6 MONTHS	3 MONTHS 5
BMS 5-63 PRIMER	40 TO 80	6 MONTHS	3 MONTHS 6
DAPOCAST 18-4	40 TO 80	6 MONTHS	NONE
RTV 106	35 TO 90	12 MONTHS	3 MONTHS 7

TABLE I

1 BASED ON DATE OF RECEIVAL.

2 THERE SHALL BE NO MORE THAN ONE STORAGE LIFE EXTENSION

3 CONTINGENT ON RETEST VERIFYING COMPLIANCE WITH THE APPLICABLE TEST REQUIREMENTS OF BMS 10-102.

4 THREE MONTH STORAGE LIFE EXTENSION IS ALLOWED IF PRIMER REMAINS CLEAR AND NO PRECIPITATE HAS FORMED. IF CLOUDINESS DEVELOPS OR A PRECIPITATE FORMS AT ANY TIME DURING STORAGE, DISCARD THE PRIMER.

5 CONTINGENT ON RETEST VERIFYING COMPLIANCE WITH THE APPLICABLE ACCEPTANCE TEST REQUIREMENTS OF BMS 5-63

6 DISCARD IF CLOUDY OR IF PRECIPITATE HAS FORMED. REVALIDATE IN ACCORDANCE WITH ACCEPTANCE TEST OF BMS 5-63.

7 MATERIAL SHALL EXTRUDE FREELY AND CONTAIN NO LUMPS. A SMALL AMOUNT OF CURED SEALANT UNDER THE CAP SHALL NOT BE CAUSE FOR REJECTION.

Storage Life and Retest Requirements
Figure 601

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4. Facilities

A. Control

(1) The spray area shall be maintained at room temperature (70 to 85 F) and a minimum of 40 percent relative humidity.

(2) The spray booth for Type 1 processing shall conform to the following requirements:

(a) The application area shall be physically isolated from all other painting operations and from other production areas. The area shall be totally dedicated to the processes of this specification.

(b) Equipment used in the application area which requires oil or other lubricants shall be equipped with shielding to prevent contamination of coatings or part surfaces to which coatings will be applied.

(c) All spray equipment shall be grounded to prevent the build-up of static charges.

(3) The area used for Type II processing and for rework shall conform to the following requirements:

(a) The area shall be isolated to prevent cure inhibition of silicones by chemical vapors and to prevent silicone contamination of other surfaces.

(4) The area shall be maintained so as to prevent the accumulation of visible dust or other debris. Tooling shall be maintained in a dust free and uncontaminated condition.

(5) Facilities used for freezing or for frozen storage of mixed insulative coatings and topcoats shall not make use of dry ice or carbon dioxide in any form.

B. Maintenance

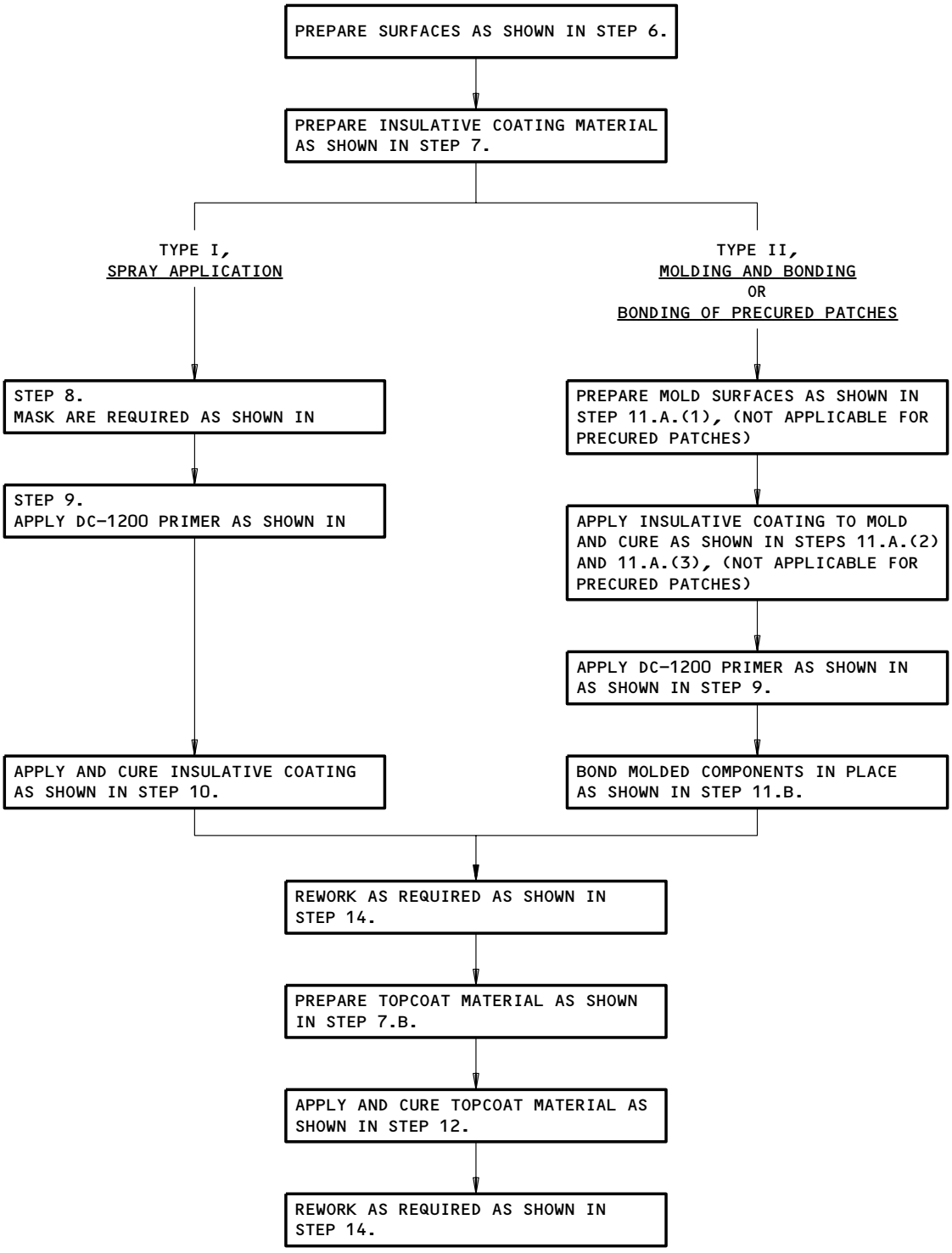
(1) Clean equipment, fixtures and floor daily or immediately prior to application of coating if coating is not applied daily.

(2) Clean walls, ceiling and overhead construction at least once a month during normal usage schedules. Clean with high pressure water or, if necessary, by vacuuming using stiff-bristle brushes to facilitate removal of overspray and other solid contaminants.

(3) To avoid silicone contaimination in other shop areas, part holding fixtures which are not permanently assigned to the paint application area shall be cleaned after coating application/cure, before they are returned to their permanent location.

5. Flow Chart

A. See application of insulative coating systems flow chart, Fig. 602.



Application of Insulative Coating Systems Flowchart
Figure 602

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6. Surface Preparation

WARNING: SOME OF THE MATERIALS EMPLOYED HEREIN ARE TOXIC AND/OR FLAMMABLE. PERSONNEL SHOULD REFER TO MANUFACTURER'S MATERIAL SAFETY DATA SHEETS, OR CONTACT THE MANUFACTURER FOR SAFETY AND HEALTH INFORMATION PERTAINING TO A HAZARDOUS MATERIAL.

A. General

(1) Masking prior to cleaning is required only if cleaning solvents will adversely affect adjacent materials. If required, mask as shown in step 8.

(2) Solvent clean surfaces to be coated using clean BMS 15-5, Class A wipers and one of the solvents as shown in step 2.G. Wipe surfaces dry before the solvent evaporates. Take extra care to assure adequate cleaning of difficult areas such as seams and joints.

B. Primed or Painted Surfaces

(1) This procedure applies to surfaces which have previously been coated with primer or enamel.

CAUTION: UNCURES PRIMER OR ENAMEL WILL INHIBIT THE CURE OF THE BMS 10-102, TYPE I INSULATIVE COATING.

(2) Confirm that the primer or enamel is fully cured before proceeding with surface preparation. Full cure consists of 7 days (minimum) at a temperature 65 F or higher.

(3) Solvent clean as shown in step 6.A.(2).

(4) Reactive the finish surface by lightly abrading with Scotch-Brite pads (step 2.J.(1)) or 240 grit or finer abrasive paper (step 2.J.(2)). Remove all sanding residues by wiping with clean, dry BMS 15-5, Class A wipers.

(5) Repeat solvent cleaning as shown in step 6.A.(2).

(6) Apply DC-1200 primer within 12 hours after final solvent cleaning. If the primer is not applied within 12 hours, reclean as shown in step 6.A.(2) prior to primer application.

C. Compatible filler Material

NOTE: BMS 5-63 is compatible silicone sealant that shall be used in accordance with BAC5000, to fillet seal structure, gaps, and fasteners to be coated with BMS 10-102, Type 1 insulative coating. Use of Dapocast 18-4 Detackifying solution for BMS 5-63 in accordance with BAC5000 is permitted to accelerate cure.

(1) Sealant should be applied following the cure of all primers.

(2) Cure sealant to a firm, resilient surface prior to application of BMS 10-102, Type I coatings.

7. Coating Materials Preparation

CAUTION: THE INSULATIVE COATINGS AND TOPCOATS ARE SILICONE BASE MATERIALS AND SHALL NOT BE MIXED OR USED IN ANY AREA WHERE THEY COULD CAUSE SILICONE CONTAMINATION OF OTHER MATERIALS, PARTS, ASSEMBLIES OR FACILITIES.

CAUTION: USE ONLY CLEAN METAL CONTAINERS AND INERT FLUID HOSES FOR THE BMS 10-102 MATERIALS. DO NOT SPRAY NONSILICONE MATERIALS IN THE ISOLATED AREA, AND AVOID ALL CONTAMINATION FROM BUTYL AND CHLORINATED RUBBERS, AMINES, OILS, PLASTICIZERS, SULFUR CONTAINING COMPOUNDS, TIN COMPOUNDS AND OTHER MATERIALS.

A. BMS 10-102, Type I, Class 1 and Class 2 Insulative Coatings

CAUTION: BMS 10-102 TYPE I INSULATIVE COATINGS ARE EASILY POISONED BY EXPOSURE TO MOST OTHER MATERIALS WHICH MAY BE LOCATED IN THE AREA. SUCH EXPOSURE WILL RETARD OR DESTROY THE CURING REACTION. DIRECT CONTACT IS NOT NECESSARY FOR CURE POISONING TO OCCUR.

(1) General

(a) The material is supplied in kits which consist of the base (Part A) and a curing agent (Part B). A thinner (Part C), which may or may not be included with the kit, is also required.

(b) Kit components are supplies in the correct, premeasured quantities. No measuring is required.

CAUTION: INTERMIXING OF KITS CAN DEGRADE THE PERFORMANCE PROPERTIES OF THE COATING.

(c) Do not use the base or curing agent of one kit with the base or curing agent of another kit.

(d) Kits as received from the supplier may be broken up into smaller kits (rekitted) for rework or small jobs provided that the base or curing agent of one original kit is not combined in a smaller kit with the base or curing agent of another original kit. (See step 7.A.(1)(c)).

1) Mix the smaller kits as shown in the procedures of step 7.A.(2) size kits, making minor adjustments as necessary for the smaller material quantities.

2) Use the ratios provided by the supplier in weighing the components for rekitting.

(2) Mixing Procedures

CAUTION: DO NOT USE WOODEN TOOLS, AND DO NOT ALLOW LATEX OR WOOD PRODUCTS OF ANY SORT TO CONTACT THE BMS 10-102, TYPE I COATINGS.

CAUTION: CURING AGENTS MAY BE VISCOUS. IF THIS IS THE CASE, EXERCISE SPECIAL CARE TO ASSURE THAT A HOMOGENEOUS MIXTURE IS OBTAINED. THE PART B PLUS PART C MIXTURE SHALL BE ADDED TO PART A WITHIN 4 HOURS OF THE TIME OF MIXING.

(a) Combine all of the curing agent (Part B) with the thinner (Part C). The thinner and quantity of thinner shall be as recommended by the supplier.

(b) Shake or stir the base (Part A) as follows until it is homogeneous.

1) Shake the Class 1 base on a paint shaker for 15 to 30 minutes. If additional dispersal is required, stir with a stiff, non-wooden blade or paddle until the material is uniform. To expedite dispersal, the container may be inverted for approximately 24 hours prior to shaking.

2) Prepare the Class 2 base by stirring manually with a stiff non-wooden blade or spatula. Stir until all constituents are dispersed and the material is uniform in appearance.

(c) Slowly pour the Part B plus Part C mixture into Part A while stirring continuously. Stir until a uniform blend is obtained. After stirring Class 1, close the container, place on a paint shaker, and agitate for 3 to 5 minutes.

(d) The work life (the period of time throughout which the material will remain suitable for application) of the BMS 10-102, Type I, Class 1 coating is approximately 2 hours at temperatures of 50 to 90°F. Normally, the mixed coating does not need to be thinned. However, thinning may be required at times to improve sprayability. If this is the case, add thinner in accordance with the supplier's recommendations. Use only the thinner recommended by the supplier.

(e) For BMS 10-102, Type 1, Class 2 coatings, the work life at temperatures of 50 to 90°F is approximately 2 hours for Grade 24 and approximately 45 minutes for Grade 28. Always apply Grade 28 materials immediately after mixing. Do not thin Class 2 coatings.

B. BMS 10-102, Type II Topcoat

(1) Mixing and Thinning of Topcoat

CAUTION: USE OF EXCESSIVE CATALYST CAN COMPROMISE THE FIRE RESISTANCE PROPERTIES OF THE TOPCOAT.

(a) Table I in Fig. 603 shows the different catalyst concentrations which may be used for curing the topcoat and the effects of these concentrations on handling properties. Do not use any catalyst concentrations other than those indicated. Do not, under any circumstance, exceed the maximum catalyst concentration of 0.50 parts per hundred for Catalyst A or B.

(b) Stir the base as required to assure that pigments are uniformly dispersed and the material is homogeneous.

(c) Add the required amount of catalyst in accordance with Table I in Fig. 603 and mix thoroughly. Use Catalyst B for rework only.

(d) Add silica fibers (step 2.D.(2)) to the mixed topcoat. The quantity of fibers added shall be 2.0 to 3.0 percent by weight. Mechanically mix the fibers into the topcoat until they are uniformly dispersed. Omit the fibers if the material is to be used as an adhesive as shown in step 11.B.

(e) Thin the mixed topcoat with aliphatic naphtha (step 2.E.) to a level of 10 percent (maximum) by volume for brush application or 40 percent (maximum) by volume for spray application. Do not thin topcoat which has been mixed with Catalyst B.

CATALYST	PARTS PER 100 PARTS OF BASE (BY WEIGHT)	DROPS PER 100 GRAMS OF BASE 3	DROPS PER POUND OF BASE 3	WORK LIFE, HOURS 4	TACK-FREE TIME, HOURS 8 4	FULL CURE, HOURS 4
A 1	0.10	5	23	4 TO 6	10 TO 12	36 TO 40 6
	0.30	15	69	2 TO 3.5	5 TO 7	26 TO 30 6
	0.50	25	115	1 TO 1.5	1.5 TO 2.5	16 TO 24 6
B 2	0.10	4	21	0.5	5	4 TO 5
	0.30	12	62	0.25		2 TO 3
	0.50	20	105	0.1		0.5 TO 1
C 7	1.0	40	210	0.5 TO 1	6 TO 8	5 TO 12

TABLE I

1 CATALYST A – DIBUTYL TIN DILAURATE – USE ONLY WITH RTV 60 OR RTV 560.

2 CATALYST B – TIN OCTOATE – USE ONLY WITH RTV 60 OR RTV 560. DO NOT USE FOR GRADE B TOPCOATS.

3 FROM CONVENTIONAL TYPE MEDICINE DROPPER

4 AT 70° TO 85° F

5 TACK-FREE TIME IS NOT APPLICABLE TO TIN OCTOATE CATALYZED MATERIAL.

6 CURE TIME MAY BE ACCELERATED BY APPLYING HEAT UP TO A MAXIMUM OF 200° F. (FOR EXAMPLE, AT THE 0.5 PARTS PER 100 CATALYST CONCENTRATION, CURE TIME AT 150° F IS APPROXIMATELY 2 HOURS.)

7 CATALYST C – DIBUTYL TIN DILAURATE IN SILICONE OIL (CATALYST S) – USE ONLY WITH DC 3120.

8 THE TIME AT WHICH THE TOPCOAT MATERIAL WILL NO LONGER TRANSFER TO POLYETHYLENE FILM.

Effects of Catalyst Concentration on Topcoat Usage Properties
Figure 603

G18794

(2) Frozen Storage of Mixed Topcoat

NOTE: Topcoat mixed with Catalyst A (dibutyl tin dilaurate) may be frozen and held in frozen storage for future use.

(a) Immediately after mixing, dispense the material into a polyethylene tube or other suitable container. After it has been filled the container shall be closed at both ends.

(b) Immerse immediately in a liquid bath at -60°F or colder with the upper end above the liquid level by no more than 1 inch. Hold each container in the liquid bath for a minimum of 10 minutes.

(c) Immediately after removal from the liquid bath, place the containers in a freezer at -20°F or colder. For maximum storage life, maintain the freezer temperature at -40°F or colder.

(d) Each container is premixed and frozen form shall be legibly and durably marked with the following:

1) Vendor's designation

2) BMS 10-102, Type and Class if applicable

3) Supplier batch number

4) Date of mix and expiration date of usage

5) Mixer's identification

6) Hazard warnings to comply with Hazard Communication Requirements

(e) If desired, the mixed topcoat may be placed directly into a freezer without quick freezing (step 7.B.(2)(b)). This option does not apply to topcoat mixed at the 100 to 0.5 base to catalyst weight ratio.

(f) Frozen storage times shall not exceed 14 days at -40°F or colder or 7 days at -20° to -39°F.

CAUTION: EXPOSURE TO CARBON DIOXIDE WILL CAUSE SPONGING OF THE TOPCOAT.

(g) Do not use dry ice or carbon dioxide in any form for quick freezing or frozen stoage.

8. Masking

CAUTION: USE ONLY THOSE MASKING MATERIALS AS SHOWN IN STEP 2.H. DO NOT USE PAPER, VINYL OR CLOTH TAPE OR UNCOATED MASKING PAPER.

A. Prior to Type I processing, apply masking materials as required to ensure that the insulative coating is applied only to the part surfaces specified on the drawing.

(1) Masking shall be done after cleaning unless the cleaning solvents will have an adverse effect on adjacent materials. If this is the case, mask prior to cleaning, and inspect the masking after cleaning to confirm its integrity. If solvents have penetrated under the masking, dry the affected area completely and remask.

(2) If a tooling fixture is used to hold parts during coating application and the fixture is not permanently assigned to the coating area, it shall be completely masked prior to coating application. The masking shall be removed before the fixture leaves the work area. Any visible coating residues shall be removed before the fixture is transported out of the work area.

9. Application of DC-1200 Primer

A. Apply DC-1200 primer to all surfaces which will be covered by insulative coating. Apply after cleaning and masking but no later than 12 hours after cleaning.

B. Apply a light, uniform coating of primer by spraying or by using a clean brush (step 2.J.) or BMS 15-5, Class A wiper. Application of wiper is preferred. A proper application will deposit just enough primer to wet the surface resulting in a light pink color after drying and a thickness in the range of 0.0001 to 0.0003 inch (0.1 to 0.3.mil.). Exercise care to minimuze primer thickness. Remove excess primer from the brush or wiper, and apply in one pass. Thicker primer is permissible in overlap areas. If runs occur during application, remove the excess primer with clean wipers.

C. Allow the primer to cure for a minimum of 30 minutes prior to application of the insulative coating.

D. Primer shall not be allowed to cure for more than 12 hours prior to application of the insulative coating system.

CAUTION: IF PRIMER IS NOT ALLOWED TO CURE FOR THE MINIMUM TIME INDICATED IN STEP 9.C., OR IF THE MAXIMUM CURE TIME OF 12 HOURS IS EXCEEDED, SUBSEQUENTLY APPLIED INSULATIVE COATINGS MAY NOT EXHIBIT SATISFACTORY ADHESION.

E. Do not allow the primed surface to be touched or to come into contact with any foreign material. If the surface becomes contaminated or if the 12 hour maximum cure time is exceeded without the insulative coating having been applied, completely remove the primer with wipers and one of the solvents as shown in step 2.G. and reprime.

10. Application and Cure of Insulative Coatings - Type I

A. Application by Spraying

(1) General Spray Application Procedure

(a) Clean surfaces to be coated as shown in step 6. and apply DC-1200 primer as shown in step 9.

(b) Prepare BMS 10-102, Type I, Class 1 coating as shown in step 7.A.

(c) Use pressure pot type spray equipment to apply the coating. Since the coating contains hollow microspheres which tend to float, continuous mechanical stirring of the material in the pressure pot is required. Do not exceed 120 rpm.

(d) Apply the coating in a continuous wet spray. Each pass shall be performed as a single, continuous operation without interruption. Use a spray pattern overlap of approximately 60 percent between adjacent passes.

(e) Multiple coats will generally be required to obtain the thickness specified on the drawing. To assure proper cure, each coat shall be adequately dried before the next coat is applied. At a temperature of 70 ±5°F, a single coat will normally require a drying time of three to eight minutes depending on the product being used. Dry times will vary with changes in the ambient temperature and will also be affected by factors such as air flow and coating thickness. A properly dried coat will exhibit a dull satin finish and, when lightly touched with a clean, dry probe will exhibit no lasting depression and will not adhere to the probe. To assure optimum properties, minimize the drying time between coats. (See step 10.A.(1)(i)4).)

(f) Measure accumulative thickness after each coat, just prior to applying the next coat, using a micrometer or thickness gauge.

(g) When it is necessary to apply a number of successive coats to achieve the final thickness, apply the first few coats thinner than normal to ensure satisfactory cure of the completed coating.

(h) Apply coatings at ambient temperatures within the range of 70 to 85°F and a minimum of 40 percent relative humidity. Application at temperatures outside of this range will change drying times and may have an adverse effect on coating quality.

(i) Proper spray techniques are required to obtain satisfactory results. The following is a list of improper techniques along with some of the defects which can be expected to occur.

1) Coating applied too wet: Increases shrinkage of the cured coating, sags on vertical surfaces and extends cure time.

2) Coating applied too dry: Surface roughness, poor intercoat adhesion, and reduced cohesive strength

3) Stop and go application: Poor intercoat adhesion with distinct layering of the cure coating, low cohesive strength, and increased roughness at the surface and overlap areas.

4) Excessive drying time between coats: Possible layering to the cured coating, intercoat blistering, and poor cohesive strength.

5) Insufficient drying time between coats: Increases shrinkage of the cured coating and extends cure time. (Lower coats are especially slow curing).

(2) Tapered Coating Application

(a) When required by the drawing, the insulative coating shall be applied in a tapered thickness configuration in which the coating thickness increases in a specified manner from one end of the part to the other.

(b) Spray a uniform coating over the entire surface of the part until the thickness corresponds to the minimum specified on the drawing.

(c) Apply successive coats so that the cumulative amount of material deposited is progressively greater as the coating operation moves toward the surface requiring the maximum thckness. This is a staggered stepwise operation in which the area of the part which receives new coating is steadily reduced until the last coat is applied only to the area which is to have the maximum thickness.

(d) This process will result in a rough surface because of dry overspray which is deposited on surfaces which have been coated but do not receive fresh coating during subsequent spray operations. After cure of the coating as shown in step 10.C., sand the surface smooth with abrasive paper. Sanding may be performed either manually or with a power sander. The final sanding shall be performed with 240 grit or finer abrasive paper. Remove sanding residues by directing a stream of clean, dry compressed air over the surface and then by wiping the surface with clean, dry wipers. Do not use solvents.

B. Application by Troweling

(1) This procedure is suitable for application of BMS 10-102, Type I, Class 2 coating to small contoured detail parts

(a) Clean and prime the substrate as shown in steps 6. and 9. respectively.

(b) Prepare the coating material as shown in step 7.

(c) Apply the coating to the part surface with a trowel, spatula or other suitable non-wooden tool.

CAUTION: ENTRAPMENT OF AIR WILL RESULT IN VOIDS IN THE CURED COATING.

(d) Carefully smooth the coating to the required thickness as uniformly as possible. Exercise care to avoid entrapment of air. Work out all evident air pockets.

C. Cure of BMS 10-102, Type I Insulative Coatings

(1) General

(a) Uncured topcoat materials will inhibit the cure of the insulative coatings. Therefore, the insulative coatings shall be completely cured prior to topcoating.

CAUTION: THE COATINGS MAY NOT CURE PROPERLY AT TEMPERATURES BELOW 70°F. PHYSICAL PROPERTIES AS WELL AS CURE RATE MAY BE AFFECTED.

(b) Do not cure coatings at temperatures below 70°F.

(c) After curing, if the coating is excessively rough, sand smooth as shown in the procedure in step 10.A.(2)(d).

(d) Special care shall be exercised to avoid contamination of cured insulative coatings with organic solvents. If such contact does occur, immediately blot the surface dry with wipers (step 2.J.(3)), and allow the coating to air dry for a minimum of 24 hours before topcoating or bonding.

(2) Cure Condition

(a) Cure condition for BMS 10-102, Type I coatings are shown in Table I in Fig. 604.

COATING THICKNESS, INCH	CURE TIME 1		
	ACCELERATED CURE 2 3		ROOM TEMPERATURE (70° TO 85°F) CURE
	70° TO 85°F	120° TO 150°F	
0.08 TO 0.16	30 MINUTES	1 HOUR	24 HOURS
>0.16	1 HOUR	6 HOURS	24 HOURS

TABLE I

1 TIMES SHOWN ARE MINIMUMS
2 CURE AT 70° TO 85°F IS IMMEDIATELY FOLLOWED BY CURE AT 120° TO 150°F
3 ACCELERATED CURE IS PREFERRED

BMS 10-102, Type I Cure Conditions
Figure 604

G18803

11. Application and Cure of Insulative Coatings - Type II

A. Preparation of Molded Components (Precured Patches)

(1) Tooling

(a) Prepare tooling molds from master models or other Engineering approved models.

(b) If residual release agent is present from prior use, lightly abrade the mold surfaces with very fine Scotch-Brite to remove it. Remove all sanding residues by cleaning the mold with solvent wetted wipers. Wipe the surfaces dry before the solvent evaporates.

(c) Apply a thin film of release agent (step 2.I.) to the applicable mold surfaces, and cure in accordance with the supplier's recommendations. Protect the surfaces from contamination prior to coating application.

(2) Application of Coating

(a) Molded components may be prepared either from BMS 10-102, Type I, Class 1 sprayable coating or BMS 10-102, Type I, Class 2 trowelable coating.

(b) Prepare coating as shown in step 7.A.

(c) If Class 1 coating is used, apply to the mold by spraying as shown in step 10.A.(1) to the thickness specified on the drawing.

(d) If Class 2 coating is used, apply in accordance with the following procedure:

1) Transfer the coating to the mold surface, and smooth into place using a trowel spatula or other suitable (non-wooden) tool.

CAUTION: ENTRAPMENT OF AIR WILL RESULT IN VOIDS IN THE CURED COATING.

2) Carefully work the coating into place so as to fill the mold to the required thickness as uniformly as possible. Use care to avoid entrapment of air. Work out all evident air pockets.

3) When the drawing specifies a tapered coating configuration (see step 10.A.(2)) work the coating so as to achieve the required thicknesses and to produce a smooth transition along the length of the part.

(3) Cure, Rework and Storage

(a) Cure the coating as shown in step 10.C.

(b) As an option, topcoat may be applied to the cured coating as shown in step 12. prior to removal of the part. If this is the case, before topcoat is applied, rework as required as shown in step 14.

(c) Remove the part from the mold. Rework as required as shown in step 14.

(d) Protect all parts to be stored from damage and contamination, particularly from solvents and other fluids.

B. Bonding of Molded Components (Precured Patches)

CAUTION: THE COATING WILL BE SEVERELY DAMAGED BY CONTACT WITH SOLVENTS.

(1) Clean substrate surfaces to be bonded as shown in step 6. Prepare premolded coating surfaces by abrading lightly with fine Scotch-Brite or 240 grit or finer abrasive paper. Remove sanding residue with clean, dry wipers and clean, dry compressed air, Do not use solvents.

(2) Apply DC-1200 primer to subtrate surfaces as shown in step 9.

(3) Prepare topcoat as shown in step 7.B. using Catalyst A. Do not add silica fibers. Thin as required as shown in step 7.B.(1)(e) for brush or spray application.

NOTE: The topcoat is used as an adhesive in this procedure.

(4) Brush or spray the topcoat onto the bonding surfaces of both the premolded part and the substrate as shown in step 12. Apply to an approximate thickness of 0.003 inch.

(5) Within five minutes, place premolded parts onto substrate surfaces. Work out entrapped air by pressing from the center outward. Using vacuum, weights or other suitable means, apply a uniform pressure of approximately 12 psi on the bonded surfaces for a minimum of 8 hours.

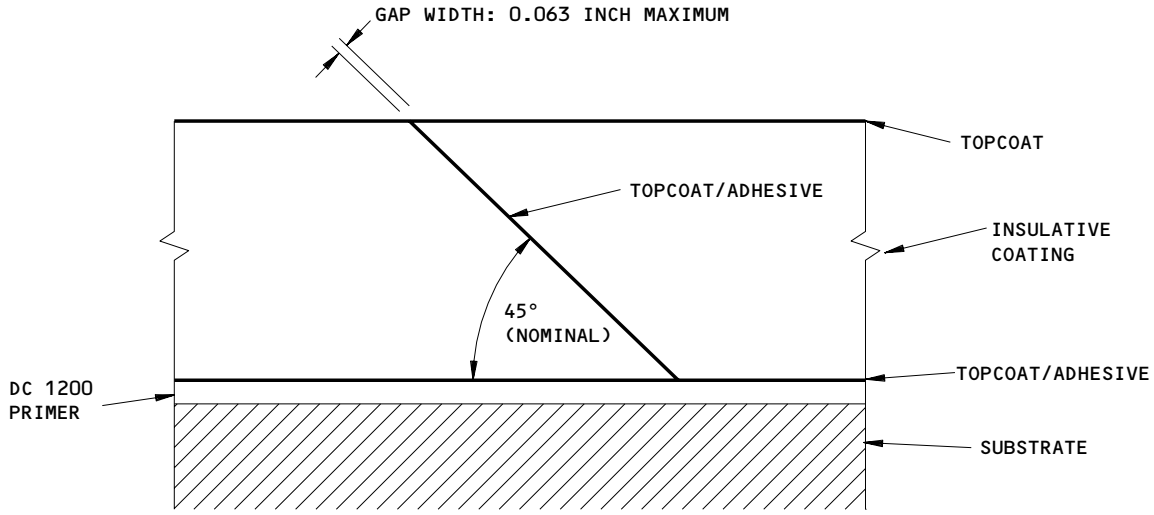
(6) If topcoat was previously applied to parts while in the mold, apply additional topcoat as shown in step 12. as required to seal all exposed edges.

(7) Rework damaged coating as required as shown in step 14.

C. Optional Splicing of Molded Components

(1) Lightly abrade edges of parts to be spliced as shown in Fig. 605 using fine Scotch-Brite or 240 grit or finer abrasive paper so as to produce a 45-degree chamfer. Remove sanding residue with clean wipers and clean, dry compressed air. Do not use solvents

(2) Bond the aprts to the substrate as shown in step 11.B. Parts being mated at splice joints shall be no more than 0.063 inch apart. Figure 605 illustrates a typical bonded joint.



Splicing of Components
Figure 605

G18787

12. Application and Cure of Topcoat

A. General

(1) Topcoat shall be applied to all exposed insulative coating surfaces.

CAUTION: CURE OF THE INSULATIVE COATING IS INHIBITED BY THE TOPCOAT.

(2) Before applying the topcoat, verify that the insulative coating to which it is to be applied is fully cured as shown in step 10.C.

B. Grade A Application of Topcoat

(1) Mix and thin the topcoat with silica fibers material as shown in step 7.B.(1), selecting the catalyst A concentration which will give the desired pot life and cure time.

(2) If the topcoat has been frozen as shown in step 7.B.(2), allow it to stabilize at room temperature prior to use.

(3) Apply the topcoat by brush or spray to a thickness of 0.003 to 0.005 inch (3 to 5 mils).

(a) Brush application is preferred since one coat will normally provide the required thickness. Apply as uniformly as possible.

(b) If the topcoat is applied by spraying, one to two coats will be required to achieve the required thickness. Allow a dry time of 30 to 40 minutes between coats.

C. Grade B to Topcoat Application

(1) Mix and apply topcoat as shown in steps 12.B.(1) through 12.B.(3). Apply a wet continuous film over the entire surface.

CAUTION: THE TOPCOAT NEEDS TO BE WET FOR THE MAT TO BE PROPERLY IMPREGNATED.

(2) Apply nonwoven Kevlar mat (step 2.D.) to the coated surface. Work the mat into the wet topcoat material with rubber gloves, rollers, plastic spreaders or brushes using light pressure until the mat is smoothly and uniformly impregnated with topcoat.

(3) The nonwoven may be cut into strips or pieces of various shapes as required to conform to part contours. When applied as shown in step 12.C.(2), adjacent pieces shall overlap by 0.25 to 1.0 inch. Use additional topcoat as required to impregnate mat plies in overlap areas.

(4) Overcoat the entire surface with topcoat to a thickness of 0.010 to 0.020 inch.

(5) In locations where the nonwoven mat is not required (fasteners, etc.), apply the topcoat to a thickness of 0.020 to 0.030 inch.

D. Cure of Topcoat

(1) Room Temperature Cure

(a) Keep topcoated parts in the application area until the topcoat is tack-free.

CAUTION: UNTIL THE TOPCOAT BECOMES TACK-FREE, THE SURFACE IS HIGHLY SUSCEPTIBLE TO PARTICULATE CONTAMINATION.

(b) When thinned and applied over insulated coating, topcoat tack-free time may exceed that indicated in Table II.

(2) Accelerated Cure

(a) After a minimum of 1 hour at room temperature, heat cure the topcoat until it is tack-free. The cure temperature shall not exceed 200°F.

(b) The time at temperature required to obtain a tack-free condition will vary with the catalyst ratio used and the ambient conditions during application.

13. Removal of Masking

A. Masking shall be removed in the application and curing area so as to avoid contamination of other shop areas.

B. Masking may be removed at any time after application of the insulative coating, either before or after cure.

C. If masking is to be removed after cure of the insulative coating, it is necessary to protect the coating edge from damage which can occur where excess coating has overlapped onto the masking. To accomplish this, cut just through the coating with a knife along the line of contact between maskant and coating. A template, straight edge or other aid may be used as a cutting guide. Any other method of maskant removal may be used provided that damage to the coating edge is avoided.

D. Masking may be removed after application of topcoat provided that the topcoat is tack-free and precautions against damage to the insulative coating are observed. Apply additional topcoat as requried to cover any areas of insulative coating which may have been exposed as a result of maskant removal.

14. Rework

NOTE: The following rework shall be documented as required by the applicable quality assurance provisions.

A. Rework of Uncured BMS 10-102, Type I

(1) If blisters appear during application of the insulative coating, remove the coating immediately using a plastic scraper. Reclean and reprime the surface as shown in steps 6. and 9. respectively. Continue application of coating after the condition causing the problem has been corrected.

(2) If the surface is excessively rough after application or if the specified thickness has been exceeded, allow the coating to cure as shown in step 10.C.(2). Abrade the surface to remove rought coating or to reduce thickness using Scotch-Brite pads or abrasive paper. Final sanding shall be with 240 grit or finer abrasive paper. Remove sanding residue with clean wipers and clean, dry compressed air. Do not use solvent.

B. Rework of Cured Coatings

NOTE: When damage occurs during handling or rework is otherwise required, the coating shall be reworked in accordance with one of the following methods.

(1) Bonded Plug Rework Method

NOTE: The bonded plug method is the most rapid and is preferred where practical. However, this method shall be limited to rework areas of 1 square foot or less.

CAUTION: DO NOT USE SOLVENTS TO CLEAN REPAIR AREA. FIRE INSULATION IS EASILY CONTAMINATED.

DO NOT SCRATCH BASE METAL.

(a) Remove the coating from the area to be reworked by cutting through to the substrate with a sharp knife, taking extreme care not to damage the substrate. Remove the coating with a nonmetallic scraper. Remove loose material with a soft brush or clean wiper. Apply DC-1200 primer to the exposed substrate surface as shown in step 9. and cure for a minimum of 30 minutes.

(b) Prepare the plug material by applying BMS 10-102, Type I, Class 1 or Class 2 to a 24 by 24 inch Teflon sheet or any smooth metal substrate to which a release agent has been applied. Apply the coating as shown in step 10.A. or 10.B. as applicable to a thickness greater than the thickness required for the rework. Cure as shown in step 10.C.

(c) After removal of the cured sheet from the substrate, cut a plug conforming to the exact size of the trimmed rework area.

(d) Coat both the trimmed area and the bonding surfaces of the plug (including edges) with topcoat which has been mixed with Catalyst B. Do not add fibers to the topcoat.

(e) Press the plug into place, and apply approximately 12 psi pressure by vacuum or weights. Maintain pressure while allowing the topcoat to cure for a minimum of 1 hour.

(f) Sand the area flush using 240 grit or finer abrasive paper, and apply topcoat as applicable as shown in step 12.B. or 12.C. Blend the topcoat into the aurrouding area. Cure as shown in step 12.D.

(2) Spray Rework Method

NOTE: The spray rework method shall be used to rework areas which exceed 1 square foot or where the bonded plug method of step 14.B.(1) is impractical, such as on highly contoured parts.

(a) Remove the damaged coating from the are to be reworked, and remove loose material with clean wipers and clean, dry compressed air. Do not taper the edges or use solvents on the remaining acceptable coating. Mask adjacent coating areas as shown in step 8.

(b) Apply and cure DC-1200 primer as shown in step 9.

(c) Spray apply BMS 10-102, Type I, Class 1 coating to the rework area as shown in step 10. Apply to a thickness greater than that of the adjacent undamaged coating.

(d) Remove masking prior to cure of the freshly applied coating.

(e) Cure the coating as shown in step 10.C., and sand flush using 240 grit or finer abrasive paper.

(f) Apply topcoat as applicable to the rework area as shown in steps 12.B. and 12.C. Blend the topcoat into the surrouding area, and cure as shown in step 12.D.

(3) Trowel Rework Method for Minor Discrepancies

(a) The following procedure applies to slight abrasions and similar minor damage. This method shall be limited to areas of no more than 4 square inches and damage which does not penetrate the coating by more than 20 percent of its thickness.

CAUTION: DO NOT USE SOLVENTS TO CLEAN AREA.

1) Smooth edges by sanding lightly with 240 grit or finer abrasive paper. Remove sanding residues with clean wipers and clean, dry compressed air.

2) Use one of the following materials for the repair:

a) BMS 10-102, Type I, Class 2 insulative coating

b) BMS 10-102, Type II topcoat using Catalyst B

c) RTV 106 (step 2.B.(2))

3) Prepare insulative coating as shown in step 7.A. or topcoat as shown in step 7.B. Use Catalyst B for the topcoat. RTV 106 is a one-part silicone adhesive/sealant which is ready to use as supplied.

4) Fill the rework area with the selected material, and smooth with a spatula, trowel or putty knife.

5) If insulative coating is used, cure as shown in step 10.C., and sand flush as shown in step 14.B.(3)(a)1)). Apply topcoat (with Catalyst B) as applicable as shown in step 12.B, and cure as shown in step 12.D.

(b) The following procedure applies to scratches, cuts, and other damage which expose the substrate. This method shall be limited to damage which extends to the substrate and is no more than 1/2 inch in width.

1) Completely remove damaged coating down to the substrate as shown in step 14.B.(1)(a).

2) Apply and cure DC-1200 as shown in step 9.

3) Complete the rework as shown in steps 14.B.(3)(a)2) thru 14.B.(3)(a)4).

a) If insulative coating is used, cure for 30 minutes at 70 to 85°F plus 1 hour at 120 to 150°F. Sand flush as shown in step 14.B.(3)(a)1).

b) Apply topcoat (with Catalyst B) as applicable as shown in step 12.B., and cure as shown in step 12.D.

c) Repair may be made using BMS 10-102, Type II topcoat or RT 106 alone for field rework only. Do not use RTB 106 under any circumstances where the depth of the rework exceeds 0.25 inch.

(c) The following procedure applies to small areas which fail to meet coating thickness requirements after cure. This method is limited to areas of no more than 4 square inches.

1) Lightly abrade the area to be reworked with 240-grit or finer abrasive paper. Remove sanding residues with clean wipers and clean dry compressed air.

2) Apply BMS 10-102, Type I, Class 2 insulative coating to the area as shown in steps 10.B.(1)(b) through 10.B.(1)(d). Apply an excess so that the level of rework coating is above the level of the coating in adjacent areas.

3) Sand the coating flush to the level of the surrounding coating using abrasive materials as specified in step 2.J. Final sanding shall be with 240 grit or finer abrasive paper. Remove sanding residues with clean wipers and clean, dry compressed air. Do not use solvent.

C. Stripping and Recoating Entire Assemblies

(1) When rework of coating assemblies is impractical because of extensive damage or unacceptable coating, the entire assembly shall be stripped and recoated.

(2) Remove the coating with nonmetallic scrapers.

(3) Remove residual coating by sanding with 240 grit or finer abrasive paper. Remove sanding residues with clean, dry compressed air.

(4) Solvent clean as shown in step 6.A.(2) using a 50-50 mixture of methyl ethyl ketone (step 2.G.(3)) and toluene (step 2.G.(6)).

(5) Apply and cure DC-1200 primer as shown in step 9., insulative coating as shown in step 10., and topcoat as shown in step 12.