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SUBJECT: VOLATILE ORGANIC CONTENT (VOC) COMPLIANT COATING SYSTEMS FOR CARBON STEEL EXPOSED TO THE STS LAUNCH ENVIRONMENT - APPLICATION, LABORATORY AND 18 MONTH EXPOSURE RESULTS.

RELATED DOCUMENTATION: KSC-STD-C-0001

1.0 SUMMARY

This report is to document the 18 month performance of Volatile Organic Content (VOC) compliant coating systems for carbon steel exposed to the Space Transportation System (STS) launch environment. This test program was initiated in 1990 to identify corrosion resistant coating materials for use at KSC that would comply with proposed Clean Air legislation. In addition to the exposure results, the application reports and the laboratory testing of the coating materials are also included. The laboratory testing included heat testing, scrape adhesion testing, and Elcometer adhesion testing. The exposure testing also include topcoat gloss testing at 6, 12, and 18 months. As a part of this study, testing was conducted to evaluate inorganic zinc primer cure time before topcoating and scribe performance. This report provides information for the revision of approved coating systems in KSC-STD-C-0001.

2.0 FOREWORD

2.1 The process of coatings testing at the Kennedy Space Center (KSC) continues to identify materials for the long term protection of carbon steel structures exposed to a severe seacoast environment. Over the years, many different types of protective coatings have been evaluated for this purpose at the KSC Beach Corrosion Test Site. This same site has been used for corrosion and coatings testing for over 25 years. Due to the unique hazards involved with space launch industry at KSC, materials had to be resistant to marine atmospheres, high heat from rocket exhaust, and now with the Space Shuttle, acidic residues from the combustion products from the Solid Rocket Boosters (SRB's). As a result of previous tests, inorganic zinc rich primers were found to be the best choice to provide for the long term protection of launch structures and ground support equipment. In fact, as of this writing, several of the single coat, untopcoated inorganic zinc materials originally exposed for testing in 1969 are still providing complete protection to the carbon steel test panels at the KSC Beach Corrosion Test Site.

2.2 With the arrival of the Space Shuttle in 1981, a new hazard was introduced to the KSC environment that required additional coatings to protect the inorganic zinc primers. The SRB combustion products included hydrochloric acid (HCl) absorbed on alumina (Al_2O_3) particles. These materials settle on the unprotected zinc coatings and severely degrade the long term protective qualities.

2.3 In response to this problem, testing was conducted to identify topcoat materials to contribute to the chemical resistance of the coating systems at KSC. Tests were conducted in 1982 and 1986 to evaluate topcoat materials for the inorganic zinc primers. The initial study results showed that none of the topcoat materials tested successfully passed the simulated SRB effluent testing. The 1986 study focused on higher build topcoat products to improve chemical resistance. As a result of that study, 10 topcoat systems were approved for use in the STS launch environment.

2.4 Based on the results of these studies, the coating systems in use at KSC are all solvent borne materials. The coating systems were based on solvent thinned inorganic zinc primers further coated with various topcoat systems. In general, the topcoat systems that were successful in the 1986 study were epoxy mid-coats followed by polyurethane topcoats. All of these topcoat systems were solvent thinned. The results of these programs have provided valuable data in selecting appropriate coatings for protection of KSC structures in our unique, very severe marine and chemical environment. However, in recent years, Clean Air legislation and environmental regulations have sought to restrict the use of these highly solvated paints and coatings.

2.5 The current study focuses on coatings for use at KSC that will be compliant with proposed regulations. All of the solvent-based inorganic zinc primers tested and approved in the 1986 study could become unacceptable at KSC in the near future due to their Volatile Organic Content (VOC) levels. All but two of the recently tested and approved materials have VOC levels above 500 grams/liter (4.2 lbs/gallon) whereas the maximum levels allowed in some areas such as California, several Florida counties, and many other urban areas of the U.S. are 420 grams/liter (3.5 lbs/gallon). According to manufacturers literature, only two of the products tested and approved in 1986 comply with the 420 grams/liter VOC level. Reportedly, current legislation is dictating that this level be further reduced to 340 grams/liter (2.8 lbs/gallon) by 1993. The possibility of the inorganic zinc primers and topcoat systems presently approved for use in KSC-STD-C-0001 becoming unacceptable and unavailable for use would not be an acceptable occurrence.

2.6 To address this problem, the current study focuses on the evaluation of inorganic zinc primers and topcoat systems that will provide superior protection to KSC launch structures and ground support equipment that will fully comply with environmental regulations. At the initiation of this study, the protective coating manufacturing industry were producing compliant coatings and were developing new systems to conform to the anticipated strengthening of environmental air quality standards. In fact, many of the coating systems tested started with water-based inorganic zinc primers followed by water-based acrylic topcoat that could generate coating systems with zero VOC. This would not only allow conformance to the air quality regulations, but would significantly reduce the use of flammable solvents and the associated hazardous waste. In addition, several powder coating materials were evaluated for corrosion protection performance. This report documents the different coating systems included in the study, the application of the materials, the laboratory testing, and the 18 month exposure results.

3.0 <u>MATERIALS AND EQUIPMENT</u>

3.1 In preparation for the material application, manufacturers were contacted to participate in the program. Each manufacturer was given specific criteria for the coatings to be submitted for testing. These criteria included that the inorganic zinc primers be VOC compliant, two-component types that were water-based or less than 340 grams/liter (2.8 lbs/gallon) if solvent-based. The primers submitted must allow topcoating and that they contain no asbestos or added lead. The VOC levels of the chemical resistant topcoats were also limited to 340 grams/liter and that the final topcoat color be white. Finally, as part of the written documentation package, the exact mix ratio of the zinc primer was to be submitted, all product data sheets, all Materials Safety Data Sheets (MSDS), and a letter with all materials and coating systems recommended thicknesses listed. Further, all coatings were to be current production materials and experimental or developmental products were discouraged.

3.2 In preparation for the beach exposure testing, test panels were prepared in the Materials Science Laboratory (MSL) coatings facility except the powder coated panels. For the beach exposure, 4-inch x 6-inch composite AISI M1020 copper free carbon steel test panels (Tator panels) manufactured by KTA, Inc., were used. These panels were chosen so the results would remain consistent with all other past studies that have employed these test panels. Panels to be used for laboratory testing were flat, 4-inch x 6-inch x 1/8-inch carbon steel test panels. All panels were abrasive blasted to white metal (SSPC-SP-5) to remove any mill scale and weld slag. After the preparation of the test panels with the prescribed materials in the coatings laboratory, the panels were installed in the test racks and placed at the KSC Beach Corrosion Test Site (Figure 1) on May 21, 1991. The acronyms used for the materials are identified as follows.

<u>KEY TO TEST MATERIALS</u>

Carbon Steel Coatings:

IZ-SB	Two-component non-VOC compliant solvent-based inorganic zinc
IZVOC-SB	Two-component VOC compliant solvent-based inorganic zinc
IZVOC-WB	Two-component VOC compliant water-based inorganic zinc
VOC-SB	Vendor's inorganic zinc + same vendor's VOC compliant solvent-based topcoats

VOC-WB Vendor's inorganic zinc + same vendor's water-based topcoats

VOC-PC Vendor's specified powder coating system

3.3 The list of coating materials included in this study is shown in Table I.

3.4 The single non-VOC compliant solvent based inorganic zinc coating (IZ-SB) was included in this study as a control material due to the performance displayed in MTB-268-86. This material performed well in both the untopcoated and topcoated condition in that previous study. It will be used to judge the relative performance of the VOC compliant inorganic zincs in both the untopcoated and topcoated conditions.

3.5 The Materials Science Laboratory coatings application laboratory is a temperature controlled facility with a water wash spray booth. The laboratory is equipped with several Binks Model 18 spray guns with graphite packings, various combinations of fluid needles, fluid nozzles, and air caps suited to spray materials of varying viscosities. One spray gun is connected to a 1-quart DeVilbiss pressure cup and is used for the materials not requiring agitation during spraying. Another spray gun is connected to a 2-quart Stewart-Warner agitated pressure cup with approximately six feet of standard fluid hose. This agitated cup is used exclusively for the application of the inorganic zinc primers. During the application of the inorganic zinc materials, the pressure cup is kept at the same level as the spray gun.

3.6 The powder coated panels were prepared by Z-Coat Group, Inc., 3915 U.S. Highway 98 South, Lakeland, Florida. The panels used were the same KTA-Tator panels used in this study. The panels were sandblasted to white metal (SSPC-SP-5), coated with the various materials, and baked at the prescribed temperature to complete the coating process. The different types of powder coatings evaluated were epoxy primers, polyvinylidene flouride (Kynar 500), and TGIC polyesters. All materials were applied at the manufacturers recommended dry film thicknesses.

3.7 Coating Dry Film Thickness (DFT) was measured in mils (0.001") with a calibrated Mikrotest IV magnetic pull-off gauge and a Positector 2000

TABLE I

1 NON-VOC COMPLIANT INORGANIC ZINC COATING (IZ-SB)

MANUFACTURER	ZINC COATING	TYPE
PORTER	ZINC LOCK 311	SB

7 VOC COMPLIANT INORGANIC ZINC COATINGS (IZVOC-SB)

MANUFACTURER	ZINC COATING	TYPE
AMERON	D-21-9	SB
CARBOLINE	CZ-11HS	SB
DEVOE	CATHA-COAT 302H	SB
PLAS-CHEM	ZINC-ITE 9030	SB
PORTER	ZINC LOCK 99	SB
SHERWIN WILLIAMS	ZINC CLAD II	SB
VALSPAR	V13-F-12	SB

20 VOC COMPLIANT INORGANIC ZINC COATINGS (IZVOC-WB)

MANUFACTURER	ZINC COATING	TYPE
AMERON	D-4	WB
AMERON	D-21-5	WB
AMERON	D-21-7	WB
BRINER	V-65	WB
CARBOLINE	CZ-D7	WB
CON-LUX	ZINC PLEX 6	WB
DEVOE	CATHA-COAT 305	WB
DuPONT	GANICIN 347WB	WB
ELITE	4610	WB
HEMPEL	GALVOSIL 1562	WB
INORGANIC COATINGS	IC-531	WB
M. A. BRUDER	24-A-190	WB
BLP MOBILE	MO-ZINC 2	WB
PLAS-CHEM	ZINC-ITE W-9108	WB
PORTER	IZ-91N	WB
PORTER	TQ-4374H	WB
SHERWIN WILLIAMS	ZINC CLAD 10	WB
SIGMA	TORNUSIL 7550	WB
SOUTHERN COATINGS	CHEMTEC 600	WB
VALSPAR	13-F-6	WB

NOTE: SB - Solvent-Based
WB - Water-Based

TABLE I (Cont)

19 VOC COMPLIANT SOLVENT-BASED TOPCOAT SYSTEMS (VOC-SB)

MANUFACTURER	ZINC PRIMER	TIE COAT	TOPCOAT
AMERON	D-4	400	450HS
AMERON	D-21-5	----	3238
AMERON	D-21-9	400	450HS
AMERON	D-21-9	----	3239
CARBOLINE	CZ-11HS	893	134HS
DEVOE	302H	224HS	379
DuPONT	347WB	25P	333
ELITE	4610	8915	4045HS
M. A. BRUDER	24-A-190	101	880HS
BLP MOBILE	MO-ZINC 2	----	MOTHANE HB
PLAS-CHEM	9030	2316	2885
PLAS-CHEM	W-9108	2316	2885
PORTER	311	FR-51	8910
PORTER	99	FR-51	8910
PORTER	IZ-91N	FR-51	8910
PORTER	TQ-4374H	FR-51	8910
SHERWIN WILLIAMS	ZC-II	B67H5	B65W300
SHERWIN WILLIAMS	ZC-10	B67H5	B65W300
SIGMA	7550	5483	5529
VALSPAR	V13-F-12	76	54
VALSPAR	13-F-6	76	54

TABLE I (Cont)

11 VOC COMPLIANT WATER BASED SYSTEMS (VOC-WB)

MANUFACTURER	ZINC PRIMER	TIE COAT	TOPCOAT
AMERON	D-21-5	3207	3204
AMERON	D-21-7	149	3204
BRINER	V-65	5282	5353
CARBOLINE	CZ-D7	3358	3359
CON-LUX	ZP-6	1788-90	1788-90
DEVOE	305	648	669
ELITE	4610	154	154
HEMPEL	1562	4813	4813
INORGANIC CTGS	IC-531	IC-46P	IC-46
M. A. BRUDER	24-A-190	078	078
SOUTHERN CTGS	600	601	601

3 VOC COMPLIANT POWDER COATING SYSTEMS (VOC-PC)

MANUFACTURER	PRIMER	TOPCOAT
MORTON INTERNATIONAL	EP-10	90-7003 (Kynar 500)
MORTON INTERNATIONAL	-----	30-7008
RELIABLE COATINGS	RSX3-1-A	RSX1-64I

digital magnetic gauge calibrated with plastic shims. Thickness measurements were first conducted on the bare abrasive blasted surface and this result subtracted from further coating DFT measurements.

3.8 Scrape adhesion testing was conducted in accordance with ASTM D2197-68 using a Gardner Laboratory balanced-beam scrape adhesion tester. Pull-off adhesion testing was accomplished in accordance with ASTM D4541-85 using an Elcometer 106-1 adhesion tester.

3.9 Gloss testing of the topcoat materials was conducted at the Beach Corrosion Test Site using a portable, multi-angle gloss meter manufactured by BYK Chemie GmbH. All gloss measurements were performed at the 60° angle.

4.0 <u>TEST PROCEDURES</u>

4.1 <u>Application</u>

4.1.1 The coating materials under consideration were supplied to KSC as wet samples by the manufacturers. The coatings were applied in the MSL Coatings Laboratory by Mr. Edwin V. Tier, a journeyman painter under contract to NASA. Mr. Tier has applied coating materials for the coating studies conducted by NASA for over 20 years and is an expert on the application characteristics of inorganic zinc-rich coatings. During the course of this study, over 85 materials from 19 different manufacturers were applied to approximately 450 test panels. Application data for all the coatings applied by Mr. Tier as a part of this study are presented in Appendix B.

4.1.2 The carbon steel panels, both the KTA (Tator) Panels for the exposure testing and the flat panels for the laboratory testing were abrasive blasted with 20 to 30 mesh silica sand at 90 pounds per square inch (psi) at the nozzle. This produced the white metal condition described as National Association of Corrosion Engineers (NACE) No. 1 in NACE TM-01-70 or as SSPC-SP5 by the Steel Structures Painting Council (SSPC). The panels were blasted within several hours prior to the application of the primer coat to assure a clean, non-contaminated surface for painting. The anchor profile created by the abrasive blasting was approximately 2.0 mils as measured by the replica tape method.

4.1.3 The inorganic zinc primers were mixed per the manufacturers specific instructions supplied as part of the documentation package. Since most products were supplied in 1 gallon kits, partial kits were mixed for the small applications. The exact mix ratios by weight of liquid to zinc powder were used to mix the coatings. The portions were weighed on a Sartorius digital balance within a one gram accuracy.

4.1.4 The inorganic zinc primers were generally applied to a DFT of 3-5 mils for most of the materials; however, several of the VOC compliant solvent-based products could not be applied at these thicknesses due to their high solids and high build characteristics. These materials would have required the addition of thinner to reduce the DFT and this would have caused them to exceed the 340 grams/liter VOC limit for this study. After initial thorough mixing of the zinc primers, they were kept constantly agitated in the 2-quart Stewart-Warner pressure cup during application to prevent settling of the zinc powder.

4.1.5 The tie coats and finish coats were applied at varying DFT according to the manufacturers recommendations. Insofar as the directions were complete, manufacturers instructions were followed in mixing, thinning, and applying the coatings. For the majority of the topcoated panels, the inorganic zinc primer was allowed to cure overnight inside the Coatings Laboratory.

4.1.6 During the course of the application of the inorganic zinc primers, extra panels of several different manufacturers materials were produced for further study. This was done to prepare additional topcoated panels with the inorganic zinc primer having various primer coating cure times. The optimum time allowed between primer application and topcoat application to improve overall system performance has been the subject of much discussion and debate. For this procedure, the panels were coated with the inorganic zinc primer and allowed to remain untopcoated for various time periods in both indoor and outdoor conditions. The panels were then coated with topcoats after the prescribed time and conditioning.

4.1.7 Protective coatings are most often applied outdoors at KSC. During this study, all coatings were applied in the relatively controlled environment of the MSL Coatings Laboratory. By coating the test panels indoors, the variations in temperature, humidity, and wind conditions encountered outdoors were eliminated. Further, this allowed all the coatings to be applied under the same environmental conditions by the same painter. Only panels designated for additional primer curing were placed outdoors.

4.2 Laboratory Tests

4.2.1 Adhesion testing of the inorganic zinc-rich primers was conducted to determine the adhesion characteristics of the various formulations included in this study. Two different methods were used to judge adhesion of these materials. The first was performed in accordance with ASTM D2197-68 using a Gardner Laboratory balanced-beam scrape adhesion tester. This test is conducted by pushing a rounded loop stylus over the paint film. This stylus is mounted on a pivoted beam which is loaded incrementally until the film is stripped from its base or resists 10 kg, which is the maximum load. This test is better suited for organic coatings than for the inorganic zinc primers, but it was performed to allow comparisons with historical data from other coating studies conducted at KSC. The second adhesion test was done in accordance with ASTM D4541-85 using an Elcometer 106-1 or 106-3 pull-off tester designed to measure the bond strength of the applied coatings to the substrate in pounds per square inch (psi). In this test, a metal dolly is glued to the coating surface, the adhesive is allowed to cure, the coating is cut around the perimeter of the dolly using a special cutter, and then the instrument claw is engaged to the dolly. The lift force required to pull the dolly from the surface is recorded by means of an indicator on an engraved scale on the device. The tests were performed in triplicate and the values reported were a rounded average of the three pulls.

4.2.2 The Kennedy Space Center coating standard, KSC-STD-C-0001, requires that inorganic zinc coatings must have a temperature resistance of 400°C (750°F) for use on launch structures and ground support equipment subject to the elevated temperatures associated with rocket exhausts. This requirement is satisfied by exposing the inorganic zinc coated panels in a high temperature oven to a temperature of 400°C for 24 hours. Any visual deterioration, such as destruction or burning of the coating, would establish failure of the product. Loss of adhesion after heating also would constitute a failure due to temperature effects on the film. Each of the zinc coatings were first tested for adhesion as described in 4.2.1 and then exposed to the heat cycle. The coating film is then re-tested for adhesion to check for adhesion loss or film deterioration caused by heating. If a coating is determined to display a heat related failure, it is not allowed on the approved products list in KSC-STD-C-0001.

4.3 Field Exposure

4.3.1 The field exposure testing of the test panels was conducted at the KSC Beach Corrosion Test Site. This site is located approximately 1.5 miles south of Launch Complex 39A directly on the Atlantic Ocean. The coated test panels were installed on a stainless steel rack that uses porcelain insulators as standoffs. Each rack can hold up to 25 panels; however, not all the racks were completely filled. The racks were installed on galvanized pipe test stands at a 30° angle facing the ocean. Each test stand held three test racks. The distance of the test stands from the mean high-tide line was approximately 30 meters (100 feet). An overall view of the test site and racks is shown in Figures 1 and 2.

4.3.2 Four different conditions were used in the field exposure testing: (1) untopcoated inorganic zinc panels exposed to normal conditions, (2) untopcoated inorganic zinc

FIGURE 1

AERIAL VIEW OF KSC BEACH CORROSION TEST SITE

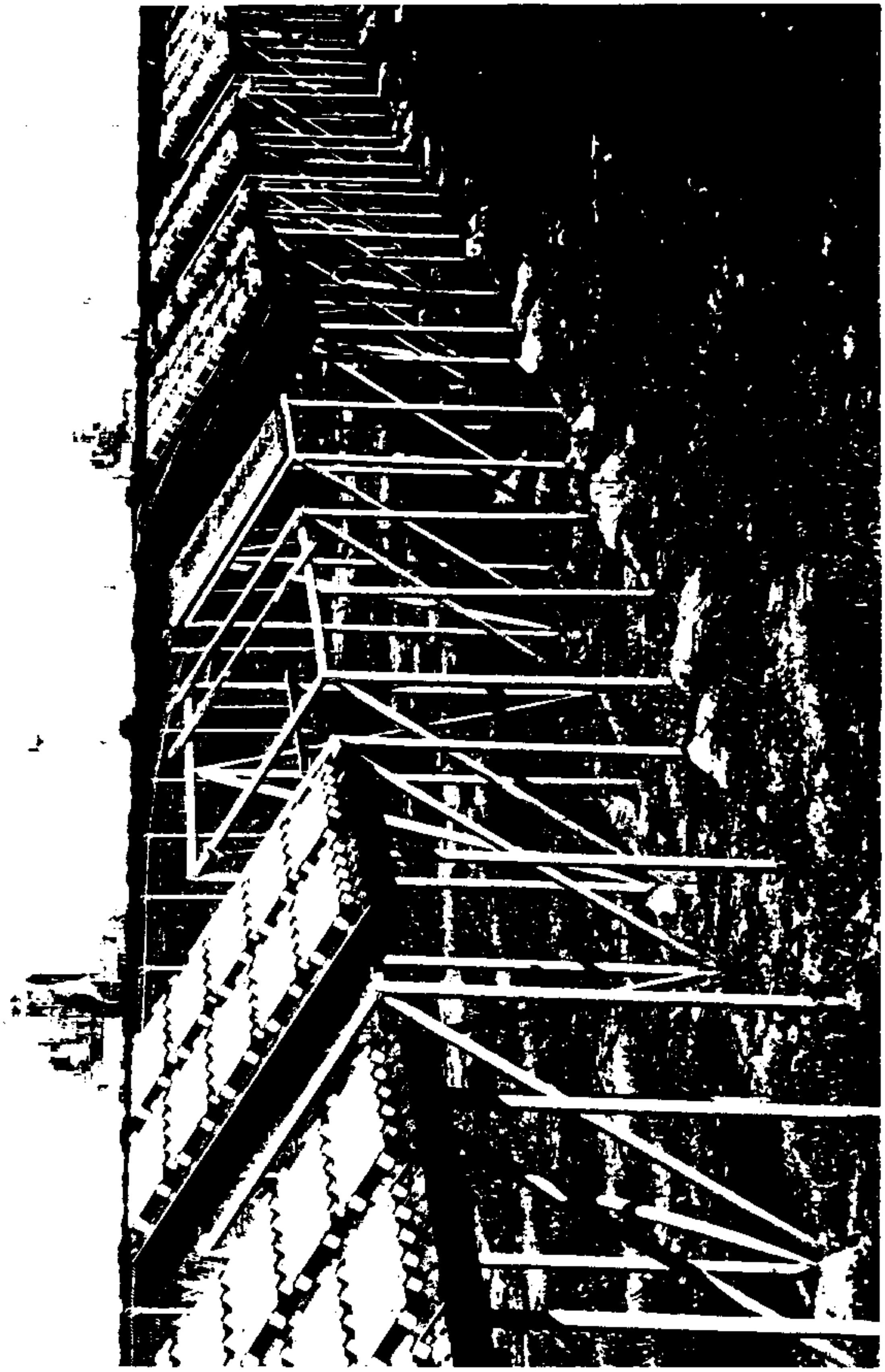

FIGURE 2

PROXIMITY OF TEST SITE TO LAUNCH COMPLEX test panels with 0.32 cm (1/8") scribe exposed to normal conditions, (3) VOC compliant topcoats over zinc exposed to normal conditions, and (4) VOC compliant topcoats over zinc exposed to normal conditions plus Al_2O_3 slurry applications. The slurry was produced by combining 0.3 micron Al_2O_3 particles in a 10% (by volume) HCl solution. This slurry was periodically applied to the lower 2/3 of the panels using a polyethylene squeeze bottle. Twelve such applications were made to the designated panels during the 18 months of beach exposure.

4.3.3 One set of flat panels was used for scribe testing of the inorganic zinc primers. After the panels were sprayed and allowed to dry, they were scribed by a vertical milling machine at the Development Testing Laboratory Prototype Facility (DM-MED-2). This was accomplished by milling a 0.32 cm (1/8") wide by 10 cm (4") X-shape on the center of the face of the panel. The depth of cut during the milling process was inspected to make sure that the metallic substrate was exposed for testing. Scribe ratings were conducted in accordance with ASTM D1654-79a Procedure A.

4.3.4 Topcoat gloss performance has been a concern at KSC for many years. Due to the variations in performance of polyurethane topcoats in several studies, topcoat gloss testing was conducted to determine the gloss retention of the materials included in this study. Since many types of generic topcoats were involved in this study (e.g. acrylics, polyurethanes, epoxies, polysiloxanes, etc.), comparative data was produced for the different type coatings. Panels were designated at random for gloss testing during the initial installation in the test racks. Typically, the designated panels were located near the edges of the racks to allow easier removal and replacement during subsequent gloss measurements at the KSC Beach Corrosion Test Site. The panels were measured for initial gloss prior to exposure at the Beach Site. The gloss readings were conducted on the topcoats in the final coating system configuration and not on panels specifically used for gloss measurements. The gloss readings were determined using a properly calibrated, portable, BYK Tri-gloss multi-angle gloss meter at the 60° angle. Every 6 months, the designated panels were removed from the exposure rack at the Beach Site, rinsed with deionized water to remove surface residues, allowed to dry, measured for gloss, and replaced in the exposure rack. The data was collected for all the coatings and brought back to the laboratory for further analysis.

5.0 TEST RESULTS

5.1 Laboratory Test Results

5.1.1 The results of the scrape adhesion testing before and after heat testing are shown in Table II. As can be seen from the data, very few materials maintained or increased adhesion values after heat exposure. One material, Devoe Catha-coat 302H, was completely destroyed during the heat cycle. This product must have a significant organic content for the film to completely lose adhesion. At the end of the test the coating displayed a burned or charred appearance and failed the heat requirements. Several materials such as the Ameron D-4, Hempel 1562, Sigma 7550, and the Valspar MZ-6 showed excellent resistance to heat with values of 10 kg or more before and after scrape adhesion testing.

5.1.2 The results of the Elcometer adhesion testing before and after heating are presented in Table III. The values were the result of three readings taken on the same panel and the findings averaged together. The data shows all the materials except the Devoe Catha-coat 302H performed well. Some of the materials such as the Ameron D-21-7, Ameron D-21-9, DuPont 347WB, Inorganic Coatings IC-531, Porter TQ-4374H, Sherwin Williams ZC-10, Southern 600, and the Valspar MZ-6 displayed significant increases in Elcometer adhesion after the heat cycle. This could indicate enhanced curing or strengthening of the coating film by heating. The only material that displayed poor adhesion during this test was the Plaschem 9030 and this was probably due to the high DFT produced by this product. This high DFT caused the film to fail cohesively and could account for the low values.

TABLE II
ADHESION TEST RESULTS (SCRAPE ADHESION)

MATERIAL NAME	ADHESION BEFORE (KG)	ADHESION AFTER* (KG)
AMERON D-21-5	7	1
AMERON D-21-7	2	1
AMERON D-21-9	3	7
AMERON D-4	9	>10
BLP MOBILE MZ-2	1	1
BRINER V-65	1	7
CARBOLINE CZ-D7	1	2
CARBOLINE CZ11-HS	5	8
CON LUX ZP-6	1	4
DEVOE 302H	10	DESTROYED
DEVOE 305	1	3
DuPONT 347WB	6	4
ELITE 4610	1	2
HEMPEL 1562	>10	>10
INORGANIC COATINGS IC-531	6	4
M A BRUDER 24-A-190	2	1
PLASCHEM 9030	1	1
PLASCHEM W-9108	1	2
PORTER IZ-91N	1	3
PORTER TQ-4374H	>10	5
PORTER ZL-311	7	3
PORTER ZL-99	8	8
SHERWIN WILLIAMS ZC-10	>10	5
SHERWIN WILLIAMS ZC-II	>10	3
SIGMA 7550	10	>10
SOUTHERN 600	>10	2
VALSPAR MZ-6	>10	10
VALSPAR V13-F-12	>10	7

* - ADHESION AFTER 24 HOURS AT 400 DEGREES CENTIGRADE

TABLE III
ELCOMETER ADHESION TEST RESULTS

MATERIAL NAME	ADHESION BEFORE (PSI)	ADHESION AFTER* (PSI)
AMERON D-21-5	775	500
AMERON D-21-7	315	630
AMERON D-21-9	480	725
AMERON D-4	395	480
BLP MOBILE MZ-2	1000	900
BRINER V-65	1200	1050
CARBOLINE CZ-D7	750	800
CARBOLINE CZ11-HS	850	700
CON LUX ZP-6	1100	775
DEVOE 302H	950	DESTROYED
DEVOE 305	1000	1025
DuPONT 347WB	340	1025
ELITE 4610	950	1025
HEMPEL 1562	850	740
INORGANIC COATINGS IC-531	270	1100
M A BRUDER 24-A-190	1050	1125
PLASCHEM 9030	110	150
PLASCHEM W-9108	1150	950
PORTER IZ-91N	1000	1125
PORTER TQ-4374H	575	900
PORTER ZL-311	825	475
PORTER ZL-99	475	375
SHERWIN WILLIAMS ZC-10	550	850
ERWIN WILLIAMS ZC-II	575	675
.GMA 7550	1000	750
SOUTHERN 600	300	825
VALSPAR MZ-6	350	950
VALSPAR V13-F-12	575	650

* - ADHESION AFTER 24 HOURS AT 400 DEGREES CENTIGRADE

5.1.3 The reasons for the variations in results from the two different adhesion tests are probably due to the dissimilar nature of the procedures. The scrape adhesion test described by ASTM D2197-68 is a test mainly related to organic type coating films. Applying this procedure to inorganic zinc coatings may produce results that are misleading. This test appears to be sensitive to coating hardness or brittleness and may not be suitable for evaluating coating films rich in metallic zinc. The Elcometer pull-off adhesion test as described by ASTM D4541-85 is much better suited to test the adhesion characteristics of any type of applied thin film coating. From the results shown in Table III, most of the coatings maintained or increased their adhesion levels after the heat cycle. These inorganic zinc coatings may be curing further thus enhancing adhesion characteristics. This increased tensile strength could indicate increased film brittleness that could cause reduction in the results of the scrape adhesion procedure. Both tests identified the complete failure of the Devoe 302H material and the Plaschem 9030 also rated low in each test. However, many materials that ranked low in the scrape adhesion test such as Ameron D-21-7, BLP Mobile MZ-2, Carboline CZ-D7, Con Lux ZP-6, Devoe 305, Elite 4610, M.A. Bruder 24-A-190, Plas-Chem W-9108, Porter IZ-91N, Sherwin Williams ZC-10 and ZC-II, and the Southern 600 showed excellent adhesion in the Elcometer testing. Based on the findings of the adhesion testing, the Elcometer results will be used to determine the heat test acceptability of the coating products evaluated in this study. The coating that failed the scrape adhesion test also failed the Elcometer testing indicating deterioration in the film due to exposure to high temperature. This result suggests that this material has significant organic content and is not a true inorganic zinc rich coating. Since this material fails to comply with the temperature requirements in KSC-STD-C-0001, it should not be considered for use on KSC launch structures and ground support equipment.

5.2 Field Exposure Results

5.2.1 The test panels exposed at the KSC Beach Corrosion Test Site were examined on November 30, 1992, making the exposure duration just over 18 months. During this 18-month period, 12 applications of the acid slurry were made to the designated panels. Photographs of the panels after the 18 month exposure with the product identification key can be found in Appendix A.

5.2.2 The information on coating type and values for the initial gloss of the topcoat materials included in this study are presented in Table IV. The results of the gloss retention testing can be found in Tables V, VI, and VII for 6, 12, and 18 month exposure respectively. The data are presented in the format of percent loss of gloss and percent gloss retention. The time of year corresponding to the various exposure times were 5/91 - 11/91 for the first 6 months, 11/91 - 5/92 for the second 6 months, and 5/92 - 11/92 for the final 6 months.

5.2.3 As can be seen from the gloss data, the various topcoat formulations from different manufacturers can vary considerably with respect to gloss retention. Also, gloss readings taken from time to time may vary due to the exact location of gloss measurement causing the gloss measurement to have a typical accuracy of ±5%. When comparing the data, it is important to use materials of similar composition (polyurethanes, acrylics, etc.) for direct association. However; it is interesting to note the differences in performance between the various compositions. It is also important to study the original versus final percent gloss for use in comparisons. Many materials started at a much lower percent gloss and at the 18 month point may not have enough remaining gloss to satisfy specific requirements. Although polyurethanes have been used for years for equipment or structures requiring superior gloss retention, many of the water-based acrylic formulations actually performed better than some polyurethane products in this gloss retention study.

TABLE IV
INITIAL GLOSS DATA

MATERIAL NAME	GENERIC TYPE	INITIAL GLOSS
AMERON 3204	WB EPOXY	69.5%
AMERON 3238	POLYSILOXANE	60.8%
AMERON 3239	POLYSILOXANE	24.9%
AMERON 450HS	URETHANE	73.4%
BLP MOBILE MOTHANE 72AW024	URETHANE	70.1%
BRINER 5353	ACRYLIC	59.5%
CARBOLINE 134HS	URETHANE	79.8%
CARBOLINE 3359	ACRYLIC	62.8%
CONLUX 1788-90	ACRYLIC	60.5%
DEVOE 379	URETHANE	90.3%
DEVOE 669	WB EPOXY	35.9%
DUPONT 333	URETHANE	71.0%
ELITE 154	ACRYLIC	43.6%
ELITE 4045HS	URETHANE	68.2%
HEMPEL 4813	ACRYLIC	26.4%
INORGANIC COATINGS IC-46	ACRYLIC	65.0%
M.A. BRUDER 078	ACRYLIC	48.7%
M.A. BRUDER 880HS	URETHANE	64.8%
MORTON INT. 30-7008 BLACK	POWDER	42.9%
MORTON INT. 90-7003 MIST	POWDER	27.4%
PLASCHEM 2885	URETHANE	32.7%
PORTER 8910	URETHANE	87.2%
RELIABLE RSX1-64I	POWDER	66.0%
SHERWIN WILLIAMS B65W300	URETHANE	70.4%
SIGMA 5529	URETHANE	87.6%
SOUTHERN COATINGS 601	ACRYLIC	52.7%
VALSPAR 54 SERIES	URETHANE	86.4%

TABLE V
6-MONTH GLOSS DATA

MATERIAL NAME	6 MO. GLOSS	% LOSS	% GLOSS RETENTION
AMERON 3204	56	20	80
AMERON 3238	56	8	92
AMERON 3239	24	4	96
AMERON 450HS	71	3	97
BLP MOBILE MOTHANE 72AW024	54	23	78
BRINER 5353	45	25	75
CARBOLINE 134HS	69	13	87
CARBOLINE 3359	56	11	89
CONLUX 1788-90	6	90	10
DEVOE 379	84	7	93
DEVOE 669	32	11	89
DUPONT 333	69	2	98
ELITE 154	43	1	99
ELITE 4045HS	58	15	85
HEMPEL 4813	21	21	79
INORGANIC COATINGS IC-46	64	2	98
M.A. BRUDER 078	42	14	86
M.A. BRUDER 880HS	51	21	79
MORTON INT. 30-7008 BLACK	33	24	77
MORTON INT. 90-7003 MIST	27	2	99
PLASCHEM 2885	22	32	68
PORTER 8910	71	19	81
RELIABLE RSX1-64I	58	13	87
SHERWIN WILLIAMS B65W300	52	26	74
SIGMA 5529	63	28	72
SOUTHERN COATINGS 601	48	8	92
VALSPAR 54 SERIES	74	15	85

TABLE VI
12-MONTH GLOSS DATA

MATERIAL NAME	12 MO. GLOSS	% LOSS	% GLOSS RETENTION
AMERON 3204	45	36	65
AMERON 3238	55	10	91
AMERON 3239	23	8	92
AMERON 450HS	71	3	97
BLP MOBILE MOTHANE 72AW024	39	44	56
BRINER 5353	39	34	66
CARBOLINE 134HS	61	24	76
CARBOLINE 3359	44	30	70
CONLUX 1788-90	1	98	2
DEVOE 379	78	14	86
DEVOE 669	28	22	78
DUPONT 333	68	4	96
ELITE 154	28	36	64
ELITE 4045HS	41	41	59
HEMPEL 4813	20	23	77
INORGANIC COATINGS IC-46	63	3	97
M.A. BRUDER 078	26	47	53
M.A. BRUDER 880HS	43	33	67
MORTON INT. 30-7008 BLACK	31	28	72
MORTON INT. 90-7003 MIST	26	6	94
PLASCHEM 2885	22	34	66
PORTER 8910	61	30	70
RELIABLE RSX1-64I	52	21	79
SHERWIN WILLIAMS B65W300	29	59	42
SIGMA 5529	63	28	72
SOUTHERN COATINGS 601	43	19	81
VALSPAR 54 SERIES	60	30	70

TABLE VII
18-MONTH GLOSS DATA

MATERIAL NAME	18 MO. GLOSS	% LOSS	% GLOSS RETENTION
AMERON 3204	34	51	49
AMERON 3238	59	4	96
AMERON 3239	23	8	92
AMERON 450HS	47	36	64
BLP MOBILE MOTHANE 72AW024	5	93	7
BRINER 5353	26	57	44
CARBOLINE 134HS	13	83	17
CARBOLINE 3359	22	66	34
CONLUX 1788-90	1	98	2
DEVOE 379	41	54	46
DEVOE 669	9	75	25
DUPONT 333	66	8	92
ELITE 154	23	48	52
ELITE 4045HS	16	76	24
HEMPEL 4813	10	62	38
INORGANIC COATINGS IC-46	35	47	53
M.A. BRUDER 078	16	68	32
M.A. BRUDER 880HS	10	84	16
MORTON INT. 30-7008 BLACK	30	30	70
MORTON INT. 90-7003 MIST	24	14	86
PLASCHEM 2885	9	74	26
PORTER 8910	13	85	15
RELIABLE RSX1-64I	23	65	35
SHERWIN WILLIAMS B65W300	7	90	10
SIGMA 5529	31	65	36
SOUTHERN COATINGS 601	37	31	69
VALSPAR 54 SERIES	30	65	35

5.2.4 The relative gloss retention was high for the first 6 months (Florida summer) except for the Con Lux 1788-90 material that retained only 10% of its original gloss. The gloss retention during the second 6 months (Florida winter) was also relatively good. However, after the first 12 months of exposure, the final 6 months of Florida summer produced the most significant deterioration. The superior performers became apparent during this period with several materials displaying excellent gloss retention. Materials such as the Ameron 3238 (polysiloxane) and the DuPont 333 (aliphatic polyurethane) retained over 90 percent of original gloss with a final gloss over 55 percent after 18 months of exposure at the KSC Beach Corrosion Test Site. On the other hand, many aliphatic polyurethane products such as the BLP Mobile Mothane, Carboline 134HS, M.A. Bruder 880HS, Porter 8910, and the Sherwin Williams B65W300 retained less than 20 percent of original gloss with a final gloss of less than 15 percent after 18 months of weathering. Several of the water reducible acrylic formulations performed well for gloss retention, but typically these materials started at much lower initial gloss.

5.3.5 Based on the overall performance of the aliphatic polyurethanes in the high intensity ultraviolet (UV) environment at KSC, specific material selection of these products is important to the long term gloss retention performance of the applied system. Generic specification of aliphatic polyurethanes may produce undesirable gloss retention results on exterior exposed systems in the Florida or other high intensity UV environment. Due to the level of deterioration of most of the test panels, further gloss testing will not be conducted on these products.

5.3.6 The results of the seacoast exposure of the coated composite test panels are presented in Tables VIII, IX, X, and XI. The degree of corrosion is judged on a scale of 0 to 10, with 10 being the highest rating. This rating system is described in ASTM D610 as follows:

TABLE VIII

RUST GRADE EVALUATIONS AFTER 18-MONTH SEACOAST EXPOSURE

ASTM D-610-68(74) RUST GRADES*

1 IZ-SB COATING SYSTEM	PANEL RATING
PORTER ZINC LOCK 311	9.94
7 IZVOC-SB COATING SYSTEMS	**PANEL RATING**
AMERON D-21-9	10.00
CARBOLINE CZ-11HS	10.00
DEVOE CATHA-COAT 302H	6.32
PLAS-CHEM ZINC-ITE 9030	9.91
PORTER ZINC LOCK 99	9.85
SHERWIN WILLIAMS ZINC CLAD II	10.00
VALSPAR V13-F-12	9.91
20 IZVOC-WB COATING SYSTEMS	**PANEL RATING**
AMERON D-4	9.41
AMERON D-21-5	6.38
AMERON D-21-7	9.40
BRINER V-65	10.00
CARBOLINE CZ-D7	9.94
CON-LUX ZINC PLEX 6	9.91
DEVOE CATHA-COAT 305	10.00
DuPONT GANICIN 347WB	10.00
ELITE 4610	9.28
HEMPEL GALVOSIL 1562	9.85
INORGANIC COATINGS IC-531	9.79
M. A. BRUDER 24-A-190	10.00
BLP MOBILE MO-ZINC 2	10.00
PLAS-CHEM ZINC-ITE W-9108	10.00
PORTER IZ-91N	9.75
PORTER TQ-4374H	9.10
SHERWIN WILLIAMS ZINC CLAD 10	9.72
SIGMA TORNUSIL 7550	9.66
SOUTHERN COATINGS CHEMTEC 600	9.10
VALSPAR 13-F-6	9.94

*AVERAGE VALUE FOR SIXTEEN RATINGS OF EACH COATING SYSTEM

TABLE IX

RUST GRADE EVALUATIONS AFTER 18-MONTH SEACOAST EXPOSURE

VOC-SB COATING SYSTEM	ASTM D-610-68(74) RUST GRADES* NORMAL EXPOSURE	ACID TREATED
D-4/400/450HS	9.79	9.19
D-21-9/3239	9.88	8.88
D-21-9/400/450HS	9.31	9.30
D-21-5/3238	5.35	6.93
CZ-11HS/893/134HS	8.11	8.88
302H/224HS/379	6.03	8.75
347WB/25P/333	9.02	9.08
4610/8915/4045HS	7.31	8.00
24-A-190/101/880HS	8.32	9.48
MO-ZINC 2/MOTHANE HB	7.90	8.25
9030/2316/2885	7.79	8.98
W-9108/2316/2885	8.38	9.44
ZL-311/FR-51/8910	7.89	8.78
ZL-99/FR-51/8910	9.25	8.97
IZ-91N/FR-51/8910	7.82	8.38
TQ-4374H/FR-51/8910	7.66	8.49/BLIST.
ZC-II/B67H5/B65W300	7.58	8.28
ZC-10/B67H5/B65W300	5.13	7.53
7550/5483/5529	4.97/BLIST.	5.06/BLIST.
V13-F-12/76/54	7.97	8.72
13-F-6/76/54	8.58	9.54

NOTE: BLIST. - Blistered

*AVERAGE VALUE FOR SIXTEEN RATINGS OF EACH COATING SYSTEM

TABLE X

RUST GRADE EVALUATIONS AFTER 18-MONTH SEACOAST EXPOSURE

ASTM D-610-68(74) RUST GRADES*

VOC-WB COATING SYSTEM	NORMAL EXPOSURE	ACID TREATED
D-21-5/3207/3204	7.45	8.80
D-21-7/149/3204	7.72	8.59
V-65/5282/5353	8.22	8.31
CZ-11HS/CM-15/3359	8.93	9.44
CZ-D7/3358/3359	8.38	9.49
ZP-6/1788-90/1788-90	8.97	8.06
305/648/669	8.55	9.58
4610/154/154	7.14	7.43
1562/4813/4813	6.00	6.28
IC-531/IC-46P/IC-46	8.26	8.90
24-A-190/078/078	7.11	8.31
600/601/601	7.57	8.25

VOC-PC COATING SYSTEM	NORMAL EXPOSURE	ACID TREATED
EP-10/90-7003	3.25	2.88
30-7008	3.25	1.88
RSX3-1-A/RSX1-64I	7.63	7.63

*AVERAGE VALUE FOR SIXTEEN RATINGS OF EACH COATING SYSTEM

RATING	DESCRIPTION
10	No rusting or less than 0.01% of surface rusted.
9	Minute rusting, less than 0.03% of surface rusted.
8	Few isolated rust spots, less than 0.1% of surface rusted.
7	Less than 0.3% of surface rusted.
6	Extensive rust spots, but less than 1% of surface rusted.
5	Rusting to the extent of 3% of surface rusted.
4	Rusting to the extent of 10% of surface rusted.
3	Approximately 1/6 of the surface rusted.
2	Approximately 1/3 of the surface rusted.
1	Approximately 1/2 of the surface rusted.
0	Approximately 100% of the surface rusted.

The KTA panels used for coating testing have approximately 32 square inches of exposed area. This calculates to 0.0096 square inches for a rating of "9", 0.032 square inches for a rating of "8", 0.096 square inches for a rating of "7", and so on for the other area amounts.

5.3.7 Typically, all rating values presented are an average of four panels prepared and exposed at the same time. Four different individuals were used for the rating process; therefore, the final rating value of each coating system is an average of sixteen numbers. Several systems were exposed with less than four panels each due to the extra panels prepared for the coating cure time evaluation. Where the panel ratings differed from panel to panel, a simple arithmetic mean is reported. In case one panel's or individual's rating was substantially below the other three, its rating was not included in the average due to the possibility of application or preparation defects.

5.3.8 The simple arithmetic averaging system can be misleading. It should be noted that an evaluation of, for example, "8.25" merely means that the performance lies somewhere closer to 8 than 9. The numerical rating does not have arithmetic significance of a weight change or thickness change corrosion rating that could be used for kinetic or mechanistic study.

5.3.9 According to the regulations stated in KSC-STD-C-0001, an inorganic zinc coating must receive a corrosion rating of 9 or better after 18 months of exposure at the KSC Beach Corrosion Test Site. This is the requirement a coating must meet to be approved for use and subsequently added to the approved products list at KSC. Further, the coating must continue to perform to this level for a period of 5 years to remain on the approved list. If during this 5-year period the coating drops below the corrosion rating of 9, it is immediately removed from the approved products list.

5.3.10 Similarly, the requirement for topcoated inorganic zinc primer is to receive a corrosion rating of 8 or better after 18 months of normal beach exposure to be initially approved. These systems must continue to perform at this level for 5 years (60 months) to remain on the approved topcoat list in KSC-STD-C-0001.

5.3.11 Most of the inorganic zinc coating systems are performing well at the "18-month" evaluation. With the exception of Ameron D-21-5 and Devoe Catha-Coat 302H, all of the inorganic zinc coatings exposed to normal conditions at the beach site have met the 18-month requirements of KSC-STD-C-0001. Two materials, Porter TQ-4374H and Southern Coatings 600 are only marginally above the requirements and will be watched closely for continued performance.

5.3.12 Of the 28 inorganic zinc coatings included in this study, only 9 have remained perfect with a rating of 10, Ameron D-21-9, Briner

V-65, Carboline CZ-11HS, Devoe Catha-Coat 305, DuPont 347WB, M. A. Bruder 24-A-190, BLP Mobile Mo-Zinc 2, Plas-Chem W-9108, and Sherwin Williams Zinc Clad II.

5.3.13 The panels with the solvent-based topcoat systems (VOC-SB) exposed to both the normal and acid treatment conditions exhibited considerable variations in performance. Most of these systems were epoxy mid-coats followed by polyurethane topcoats. In many cases, the acid treated panels performed better than those normally exposed. A possible cause for this occurrence was that panels to be exposed to the acid conditions had higher film thicknesses than the panels chosen for normal exposure. Panels chosen for normal exposure for a given system were panels coated at or near the manufacturer's recommended film thickness while panels for acid exposure were all slightly higher than the recommended film thickness. In general, the topcoats did provide significant chemical resistance to the inorganic zinc primers in the acid exposure condition.

5.3.14 The panels with the water-based topcoat systems (VOC-WB) exposed to both the normal and acid treatment conditions had similar variations in performance. Most of these systems were water-based acrylic mid-coats and topcoats, but several systems were water-based epoxy mid-coats and topcoats. One system, Carboline CZ-11HS/CM-15/3359, was a mixture of solvent-based epoxy mid-coat with a water-based acrylic topcoat. Overall, these water-based systems performed as well as the solvent-based counterparts as seen by the average of all panels at the end of Table XI. However, acceptable performance was still product or system specific.

5.3.15 The performance of the powder coated panels showed the same variation. The two systems manufactured by Morton International performed poorly in the beach exposure and acid exposure conditions. The system manufactured by Reliable Coatings performed much better and would be a better choice if a powder coating system were used on items to be exposed at KSC. However, none of the powder coating systems performed as well as the better inorganic zinc/topcoat systems.

5.3.16 The findings of many previous coating studies at KSC were confirmed again by this investigation. Topcoating of inorganic zinc-rich primers in normal atmospheres deteriorates its long term protection potential. As can be seen from the total panel averages of the different systems in Table XI, the untopcoated inorganic zinc panels exposed to normal conditions had an average rating of 9.43 for the IZVOC-SB and 9.56 for the IZVOC-WB. The average ratings for the topcoated panels were 7.81 for the VOC-SB and 7.86 for the VOC-WB. The typical failure mode for the topcoated panels was rusting of the area under the channel of the KTA panel. This rusting then spreads under the edge of the painted area causing failure of the adjacent coating. This demonstrates the reduction of the galvanic "throwing power" of the inorganic zinc to protect damaged or uncoated areas. The topcoats negatively affect this ability of inorganic zinc and leads to increased localized failure of the coating system. However, certain conditions require the use of topcoats over inorganic zinc such as chemical exposure outside the accepted range of inorganic zinc primers (< pH 4 or > pH 10), immersion conditions in aqueous electrolytes, surfaces of machinery or equipment that must be kept clean for various reasons, color coding, safety concerns, etc. In summary, topcoating of inorganic zinc primers in neutral atmospheres for aesthetic reasons is unjustified and should be avoided. The untopcoated inorganic zinc coating system provides superior protection, is lower in cost, and is easier and cheaper to maintain.

5.3.17 The results of the coating system cure time evaluation is shown in Table XI. For the Carboline CZ-11HS/893/134HS system, increased primer cure times provided improved results from the standard overnight cure. The standard cure time in the normal exposure produced a rust grade rating of 8.11 (Table IX) whereas the 7 day outside cure produced a 9.08 rating (Table XI). This one point increase in rating translates to a threefold increase in corrosion protection per the ASTM rating scale. In fact, after 90 days outside, the Carboline system ratings increased to 9.85, which is

TABLE XI

RUST GRADE EVALUATIONS AFTER 18-MONTH SEACOAST EXPOSURE

COATING SYSTEM CURE TIMES	ASTM D-610-68(74) RUST GRADES NORMAL EXPOSURE	ACID TREATED
CZ-11HS/893/134HS - 24 hrs. outside	8.24	8.81
CZ-11HS/893/134HS - 3 days outside	8.50	9.38
CZ-11HS/893/134HS - 7 days outside	9.08	8.84
CZ-11HS/893/134HS - 14 days outside	8.82	9.34
CZ-11HS/893/134HS - 30 days outside	8.60	9.16
CZ-11HS/893/134HS - 90 days outside	9.85	9.5
V13-F-12/76/54 - 24 hrs. outside	8.51	8.60
V13-F-12/76/54 - 9 days outside	8.75	9.26
V13-F-12/76/54 - 20 days outside	8.13	8.73
13-F-6/76/54 - 24 hrs. outside	8.19	8.38
13-F-6/76/54 - 9 days outside	8.08	9.26
13-F-6/76/54 - 21 days outside	8.96	9.34
MZ-2/MOTHANE - 24 hrs outside	7.50	8.58
MZ-2/MOTHANE - 12 days outside	8.13	7.92

AVERAGE OF ALL PANELS (IZVOC-SB)	9.43	----
AVERAGE OF ALL PANELS (IZVOC-WB)	9.56	----
AVERAGE OF ALL PANELS (VOC-SB)	7.81	8.52
AVERAGE OF ALL PANELS (VOC-WB)	7.86	8.45

nearly equivalent to the untopcoated ratings. The Valspar V13-F-12/76/54 displayed similar results between the standard overnight cure and the 9 day outside cure cycle. However, the Valspar 13-F-6/76/54 and the BLP Mobile MZ-2/MOTHANE systems did not display the same trend. The differences could be related to the fact that both the Carboline CZ-11HS and the Valspar V13-F-12 are solvent-based formulations whereas the Valspar 13-F-6 and the BLP Mobile MZ-2 are water-based formulations. The exact reasons for this result are unclear and are open for much speculation. This situation will be closely monitored as these results may become more or less dramatic with continued exposure.

5.3.18 The result of the scribe testing is presented in Table XII. The scribe ratings were conducted in accordance with ASTM D1654-79a Procedure A and are described as follows:

Representative Mean Creepage from Scribe

Millimeters	Rating Number
Over 0	10
Over 0 to 0.5	9
Over 0.5 to 1.0	8
Over 1.0 to 2.0	7
Over 2.0 to 3.0	6
Over 3.0 to 5.0	5
Over 5.0 to 7.0	4
Over 7.0 to 10.0	3
Over 10.0 to 13.0	2
Over 13.0 to 16.0	1
Over 16.0 to more	0

Many of the low VOC inorganic zinc coating materials provide excellent scribe protection. This scribe would simulate a damaged area in the coating and yields information on the ability of the surrounding material to continue to provide corrosion protection.

5.3.19 The purpose of this study was to identify the performance of coating materials that have less than 350 grams/liter VOC. The performance of these could be judged against coating materials with successful histories of use at KSC. From the exposure results to

TABLE XII

SCRIBE EVALUATIONS PER ASTM D1654 AFTER 18-MONTH SEACOAST EXPOSURE

1 IZ-SB COATING SYSTEM	SCRIBE RATING
PORTER ZINC LOCK 311	8

7 IZVOC-SB COATING SYSTEMS	SCRIBE RATING
AMERON D-21-9	10
CARBOLINE CZ-11HS	10
DEVOE CATHA-COAT 302H	4
PLAS-CHEM ZINC-ITE 9030	7
PORTER ZINC LOCK 99	10
SHERWIN WILLIAMS ZINC CLAD II	10
VALSPAR V13-F-12	10

20 IZVOC-WB COATING SYSTEMS	SCRIBE RATING
AMERON D-4	10
AMERON D-21-5	7
AMERON D-21-7	8
BRINER V-65	10
CARBOLINE CZ-D7	10
CON-LUX ZINC PLEX 6	10
DEVOE CATHA-COAT 305	7
DuPONT GANICIN 347WB	10
ELITE 4610	9
HEMPEL GALVOSIL 1562	7
INORGANIC COATINGS IC-531	9
M. A. BRUDER 24-A-190	10
BLP MOBILE MO-ZINC 2	10
PLAS-CHEM ZINC-ITE W-9108	8
PORTER IZ-91N	10
PORTER TQ-4374H	9
SHERWIN WILLIAMS ZINC CLAD 10	9
SIGMA TORNUSIL 7550	8
SOUTHERN COATINGS CHEMTEC 600	9
VALSPAR 13-F-6	8

date, many of the candidate low VOC products display excellent corrosion protection of carbon steel in the STS environment. The Approved Products List in KSC-STD-C-0001 will be amended to include the low VOC products that have met KSC protection requirements. This will allow conformance to air quality regulations in areas or regions where this is a requirement when protective coatings are applied.

6.0 CONCLUSIONS

6.1 The laboratory testing of the inorganic zinc primers showed that most of the materials performed well during adhesion testing. The differences in the test procedures indicate that the scrape adhesion test method may not be suitable for the evaluation of inorganic zinc-rich coatings. Elcometer adhesion testing is a much better method to evaluate the adhesion of these materials. Tables II and III should be consulted for the adhesion test results of specific products.

6.2 Heat test results indicate that the Devoe Catha-Coat 302H is not suitable for use at KSC due to complete failure during the heat cycle.

6.3 Field test results indicate considerable variation in the gloss retention performance of the different topcoat products tested in this study. Overall, the water-based acrylic formulations performed as well as the solvent-based polyurethane products in gloss retention percentages. However, several individual products performed well with good gloss retention after 18 months in the high intensity UV of the Florida sun. Tables IV, V, VI, and VII should be consulted for the gloss retention results of specific products.

6.4 At the 18-month evaluation period, the VOC compliant inorganic zinc coatings have performed well in the KSC marine environment with the exception of the Ameron D-21-5 and the Devoe Catha-Coat 302H. Several of the other coatings are nearing failure and will be closely watched for possible removal from the Approved Products List. Table VIII should be consulted for the exposure results of specific products.

6.5 The topcoat systems used for acid resistance have been beneficial in protecting the inorganic zinc primers. The differences between the solvent-based (VOC-SB) and the water-based (VOC-WB) materials provided good resistance to the simulated SRB effluent testing. Continued exposure and applications of the acid slurry should provide more definitive data. Tables IX and X should be consulted for the field exposure results of specific coating products.

6.6 The powder coating systems displayed extreme variations in performance in the STS environment. Two of the systems performed poorly but one system showed good corrosion resistance. This technology may need more investigation to identify more systems that would provide acceptable corrosion protection on items to be exposed at KSC. Table X should be consulted for the field exposure results of the specific coating systems.

6.7 The limited study of primer cure times indicates that solvent-based inorganic zinc materials tested during this investigation were sensitive to extended curing. These materials provided increased protection with increasing outdoor curing prior to topcoating. The water-based products did not display this increase in performance with the longer curing cycle. Table XI should be consulted for the field test results of specific cure times and coating products.

6.8 The scribe testing of the inorganic zinc coatings showed many of the materials provided excellent protection to areas of the coating that were damaged. The galvanic protection of these damaged areas is one of the unique qualities of untopcoated inorganic zinc primers.

6.9 The field exposure data continues to confirm that topcoating inorganic zinc primers in neutral atmospheres is detrimental to the long term protection potential of these type coatings. Topcoating promotes the localized failure of the zinc primer and this leads to the premature failure of the adjacent coating system.

6.10 Future studies will continue to focus on improving the topcoated performance of the inorganic zinc primer. Other types of VOC compliant topcoat products will be investigated for the improvement of gloss retention and chemical resistance. Further studies will examine coatings for aluminum and stainless steel that are VOC compliant and free of hazardous compounds such as lead and chromium.

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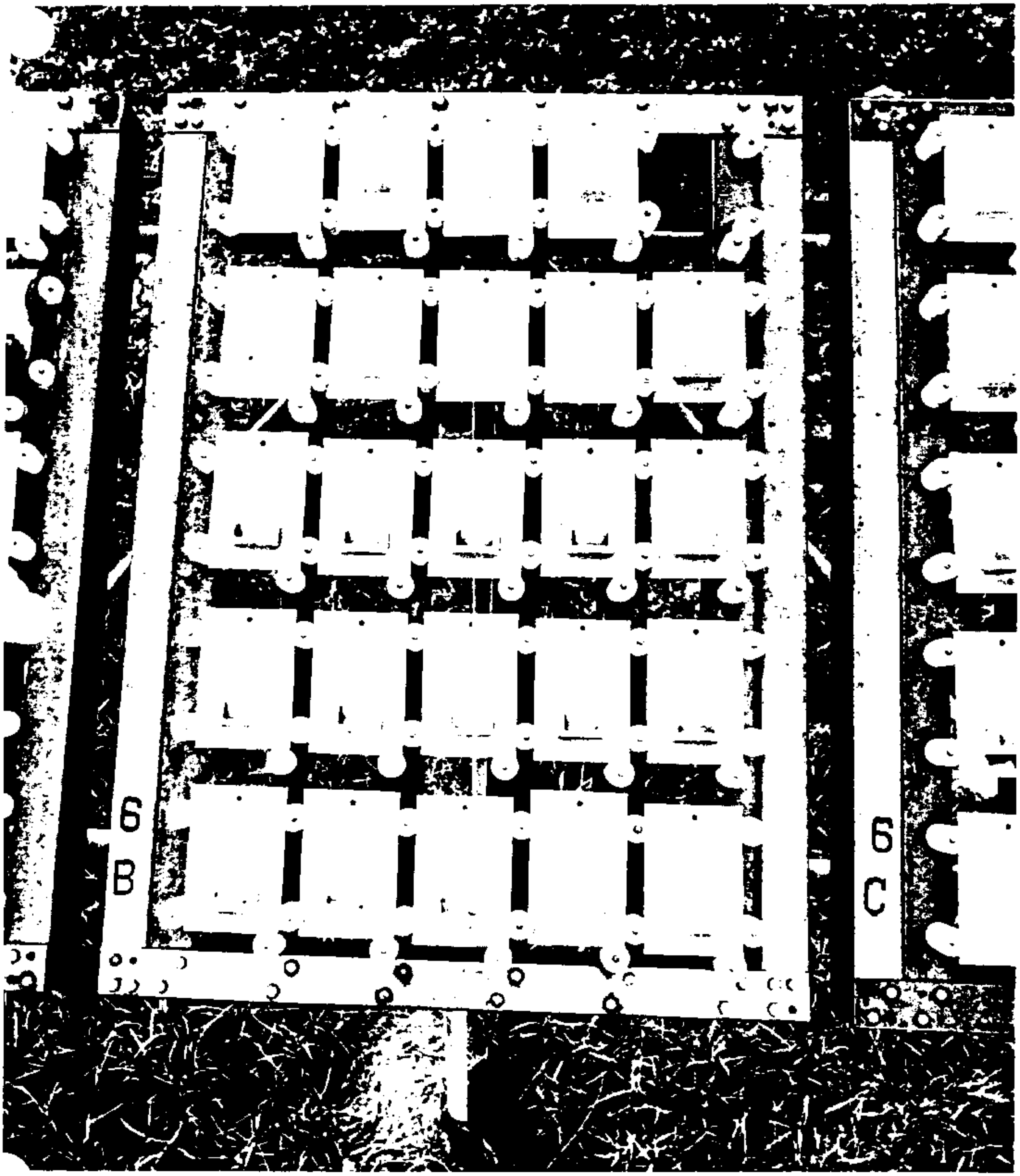
APPENDIX A

93-2004

STUDY NO.: 93-2004 RACK NO.: 6B DATE : 11/92 EXPOSURE: NORMAL

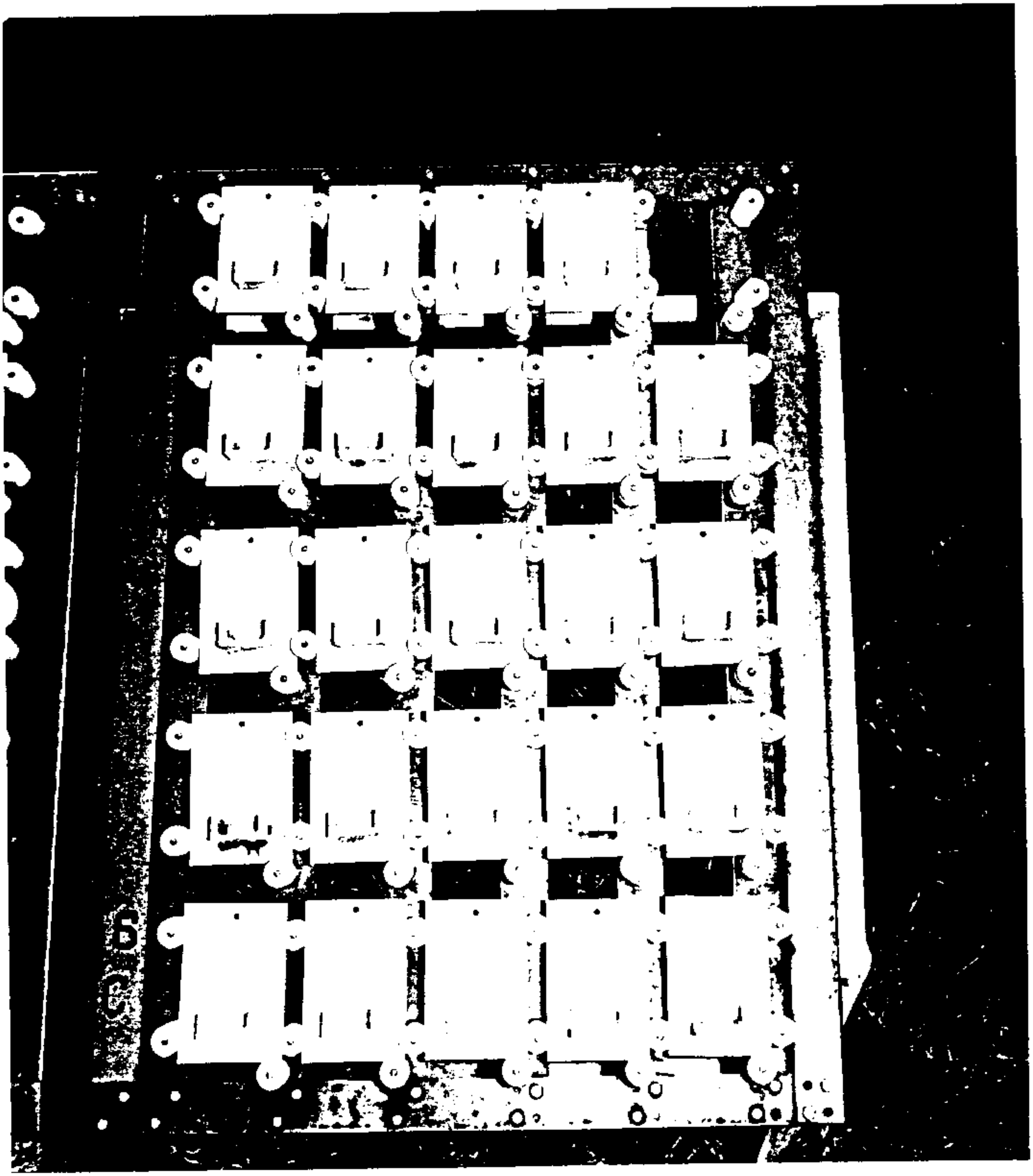
	A	B	C	D	E
5	AMERON D-4	AMERON D-4	AMERON D-4	AMERON D-4	
4	AMERON D-21-9	AMERON D-21-9	AMERON D-21-9	AMERON D-21-9	CON-LUX ZP-6
3	AMERON D-21-5	AMERON D-21-5	AMERON D-21-5	AMERON D-21-5	CON-LUX ZP-6
2	AMERON D-21-7	AMERON D-21-7	AMERON D-21-7	AMERON D-21-7	CON-LUX ZP-6
1	BRINER V-65	BRINER V-65	BRINER V-65	BRINER V-65	CON-LUX ZP-6



RACK NUMBER: 6B

STUDY NO.: 93-2004 RACK NO.: 6C DATE : 11/92 EXPOSURE: NORMAL

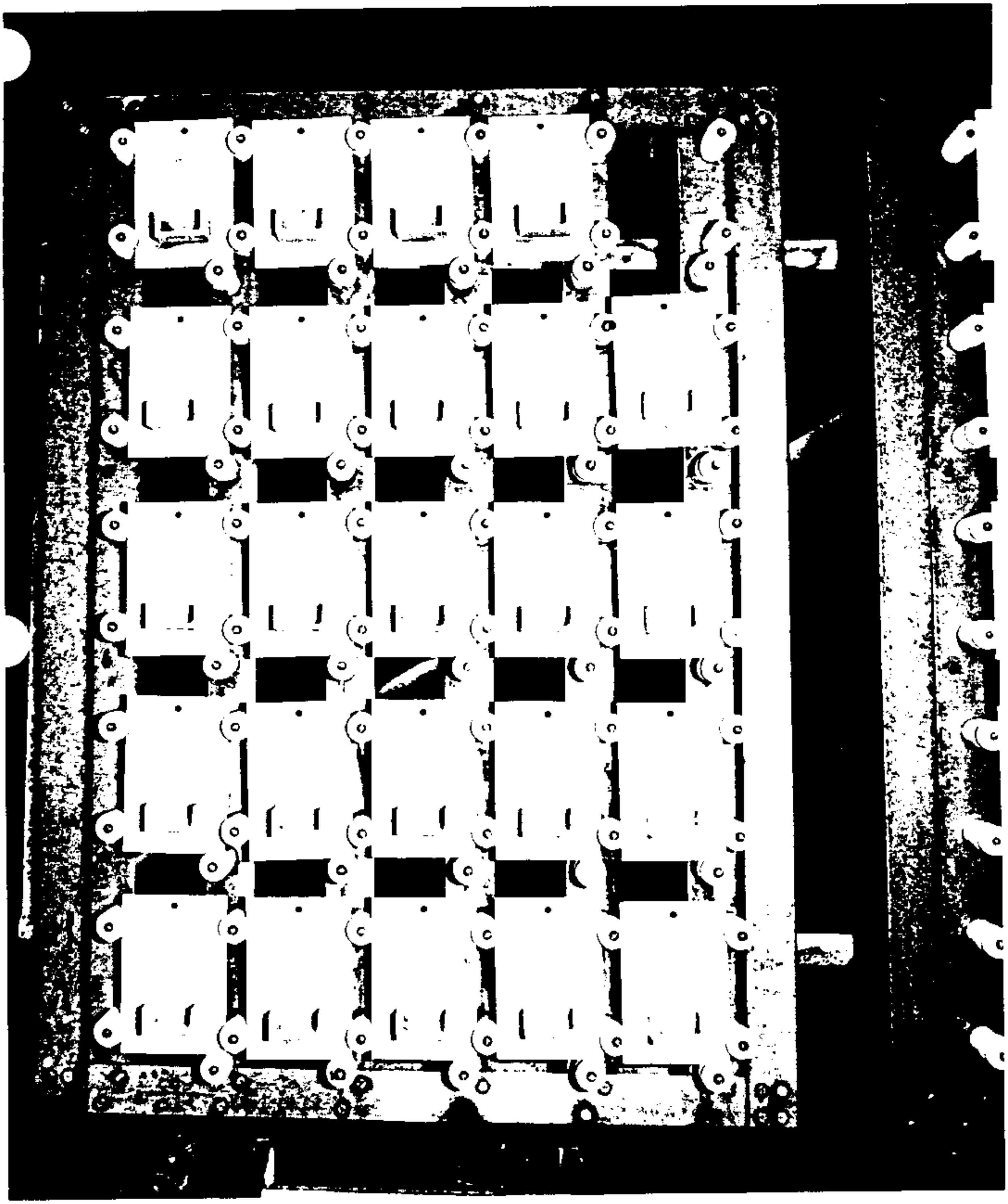
A	B	C	D	E
CARBO CZ-11HS	CARBO CZ-11HS	CARBO CZ-11HS	CARBO CZ-11HS	
CARBO CZ-D7	CARBO CZ-D7	CARBO CZ-D7	CARBO CZ-D7	ELITE 4610
DEVOE 305	DEVOE 305	DEVOE 305	DEVOE 305	ELITE 4610
DEVOE 302-H	DEVOE 302-H	DEVOE 302-H	DEVOE 302-H	ELITE 4610
DUPONT 347WB	DUPONT 347WB	DUPONT 347WB	DUPONT 347WB	ELITE 4610



RACK NUMBER: 6C

STUDY NO.: 93-2004 RACK NO.: 8A DATE : 11/92 EXPOSURE: NORMAL

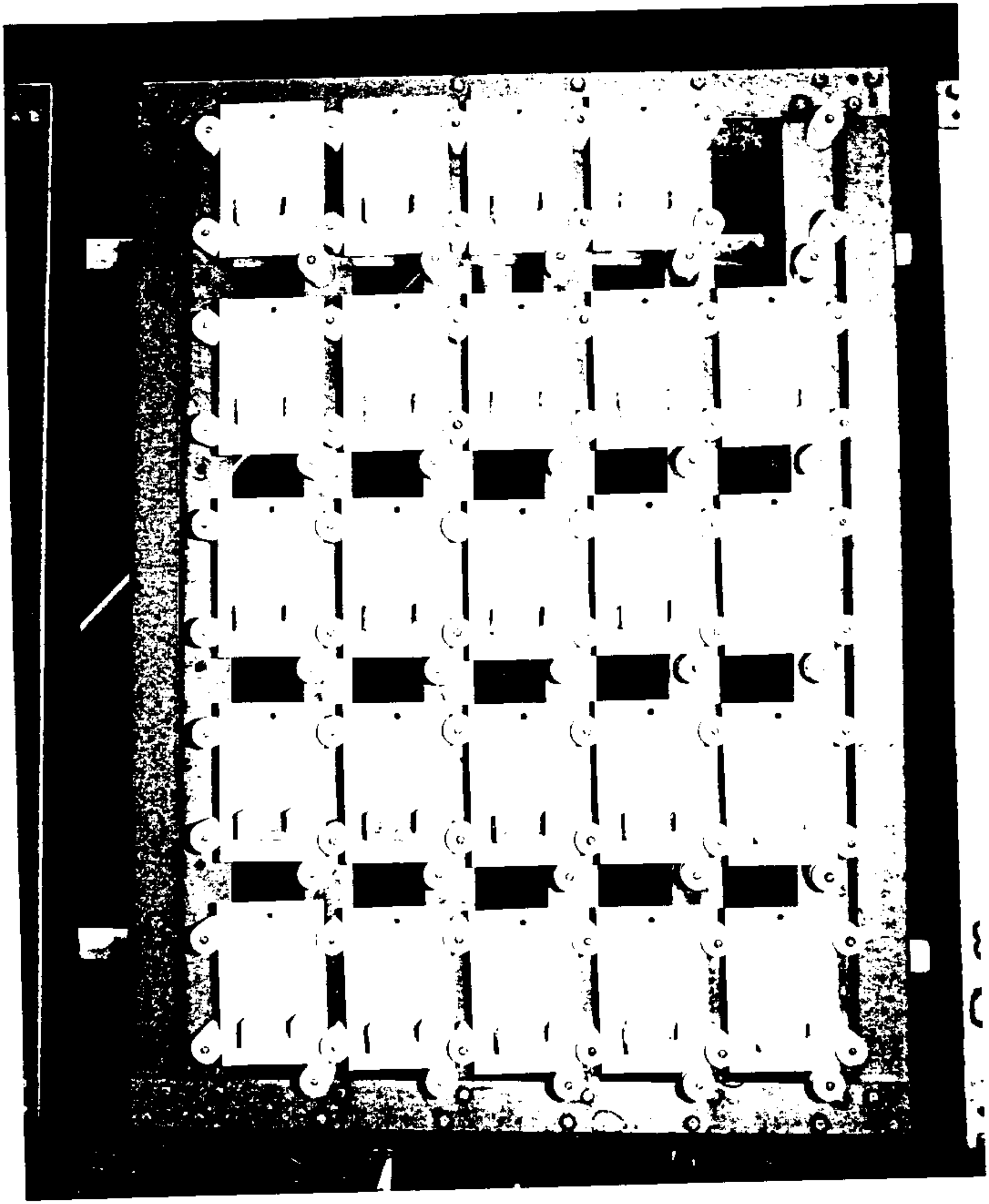
A	B	C	D	E
HEMPEL 1562	HEMPEL 1562	HEMPEL 1562	HEMPEL 1562	
IC-531	IC-531	IC-531	IC-531	SOUTHERN COATINGS CHEMTEC 600
M.A. BRUDER 24-A-190	M.A. BRUDER 24-A-190	M.A. BRUDER 24-A-190	M.A. BRUDER 24-A-190	SOUTHERN COATINGS CHEMTEC 600
BLP MOBILE MZ-2	BLP MOBILE MZ-2	BLP MOBILE MZ-2	BLP MOBILE MZ-2	SOUTHERN COATINGS CHEMTEC 600
SIGMA 7550	SIGMA 7550	SIGMA 7550	SIGMA 7550	SOUTHERN COATINGS CHEMTEC 600



RACK NUMBER: 8A

STUDY NO.: 93-2004 RACK NO.: 8B DATE : 11/92 EXPOSURE: NORMAL

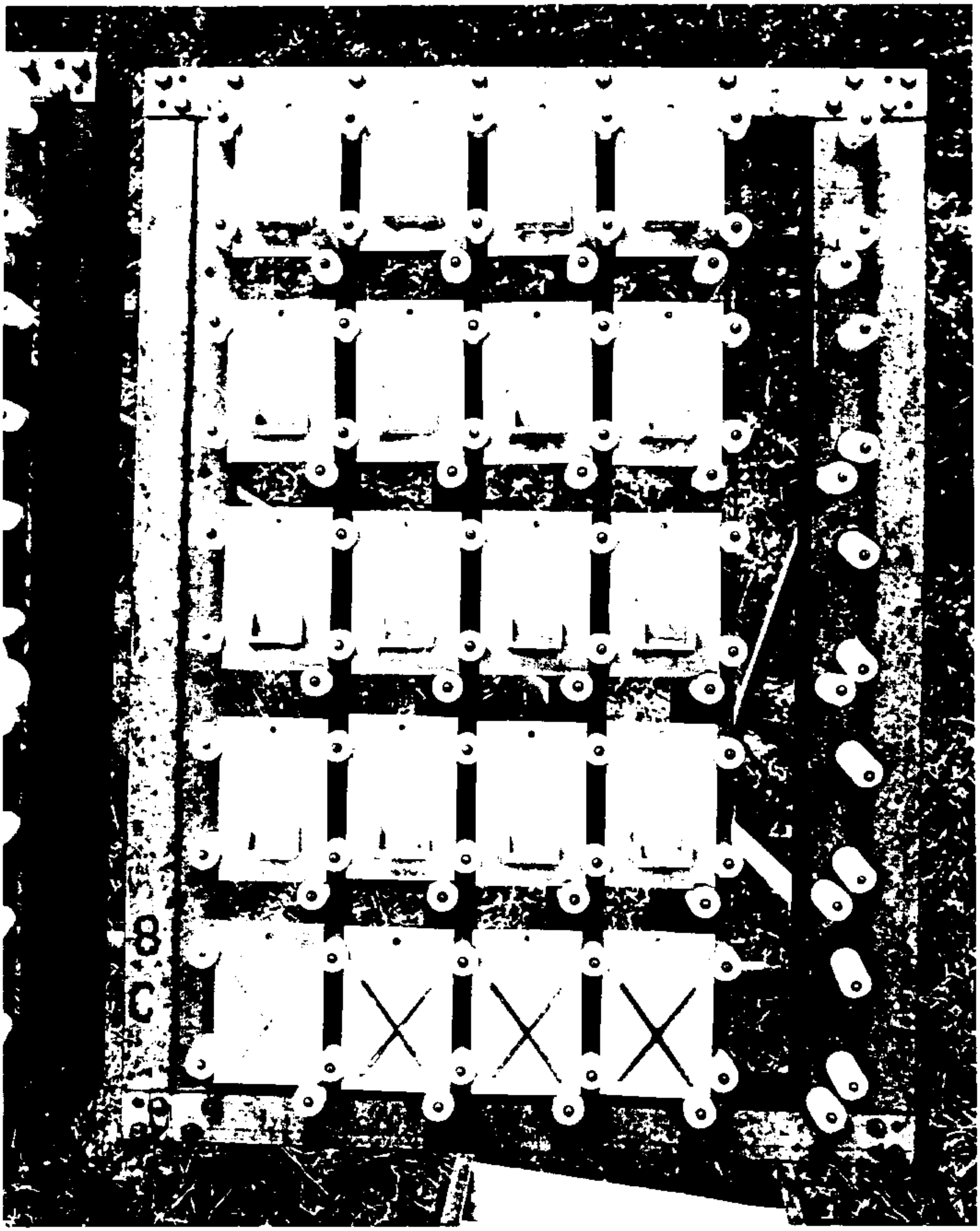
	A	B	C	D	E
5	PORTER ZL-311	PORTER ZL-311	PORTER ZL-311	PORTER ZL-311	
4	PORTER ZL-99	PORTER ZL-99	PORTER ZL-99	PORTER ZL-99	SHERWIN WILLIAMS ZC-10
3	PORTER IZ-91N	PORTER IZ-91N	PORTER IZ-91N	PORTER IZ-91N	SHERWIN WILLIAMS ZC-10
2	PORTER TQ-4374H	PORTER TQ-4374H	PORTER TQ-4374H	PORTER TQ-4374H	SHERWIN WILLIAMS ZC-10
1	SHERWIN WILLIAMS ZC-II	SHERWIN WILLIAMS ZC-II	SHERWIN WILLIAMS ZC-II	SHERWIN WILLIAMS ZC-II	SHERWIN WILLIAMS ZC-10



RACK NUMBER: 8B

STUDY NO.: 93-2004 RACK NO.: 8C DATE : 11/92 EXPOSURE: NORMAL

A	B	C	D	E
VALSPAR V13-F-12 MZ-7HS	VALSPAR V13-F-12 MZ-7HS	VALSPAR V13-F-12 MZ-7HS	VALSPAR V13-F-12 MZ-7HS	
VALSPAR 13-F-6 MZ-6	VALSPAR 13-F-6 MZ-6	VALSPAR 13-F-6 MZ-6	VALSPAR 13-F-6 MZ-6	
PLASCHEM W-9108	PLASCHEM W-9108	PLASCHEM W-9108	PLASCHEM W-9108	
PLASCHEM 9030	PLASCHEM 9030	PLASCHEM 9030	PLASCHEM 9030	
VALSPAR V13-F-12 SCRIBE	VALSPAR 13-F-6 SCRIBE	PLASCHEM W-9108 SCRIBE	PLASCHEM 9030 SCRIBE	

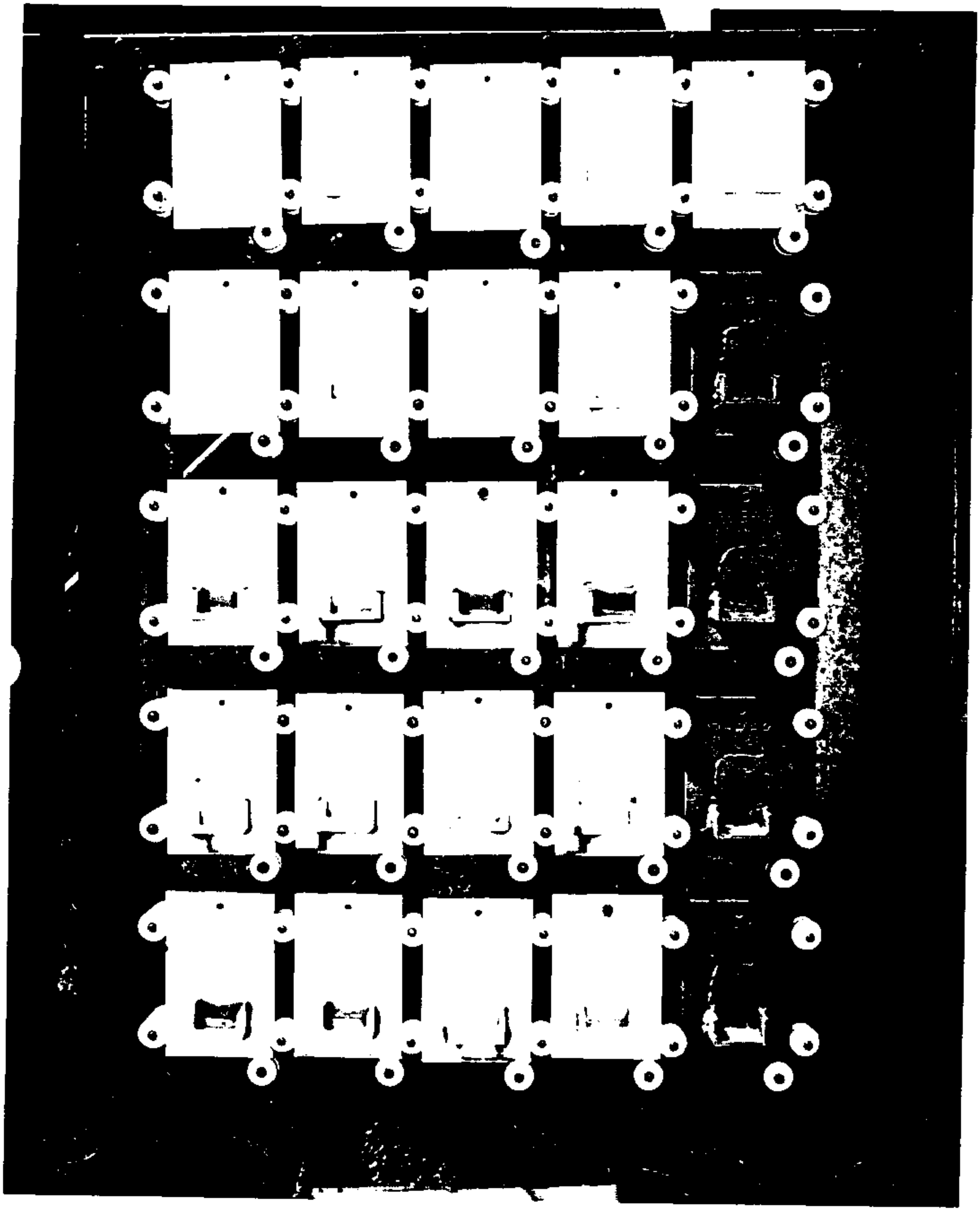


RACK NUMBER: 8C

STUDY NO.: 93-2004 RACK NO.: 9B DATE : 11/92 EXPOSURE: NORMAL

	A	B	C	D	E
5	AMERON D-4 400 450HS **	AMERON D-4 400 450HS	AMERON D-4 400 450HS	AMERON D-4 400 450HS	AMERON D-21-9 3239 **
4	AMERON D-21-9 400 450HS	AMERON D-21-9 400 450HS	AMERON D-21-9 400 450HS	AMERON D-21-9 400 450HS	CONLUX ZP-6 1788-90
3	AMERON D-21-5 3207 3204 **	AMERON D-21-5 3207 3204	AMERON D-21-5 3207 3204	AMERON D-21-5 3207 3204	CONLUX ZP-6 1788-90 **
2	AMERON D-21-7 149 3204	AMERON D-21-7 149 3204	AMERON D-21-7 149 3204	AMERON D-21-7 149 3204	CONLUX ZP-6 1788-90
1	BRINER V-65 5282 5353 **	BRINER V-65 5282 5353	BRINER V-65 5282 5353	BRINER V-65 5282 5353	CONLUX ZP-6 1788-90

** - DENOTES PANEL FOR GLOSS TESTING



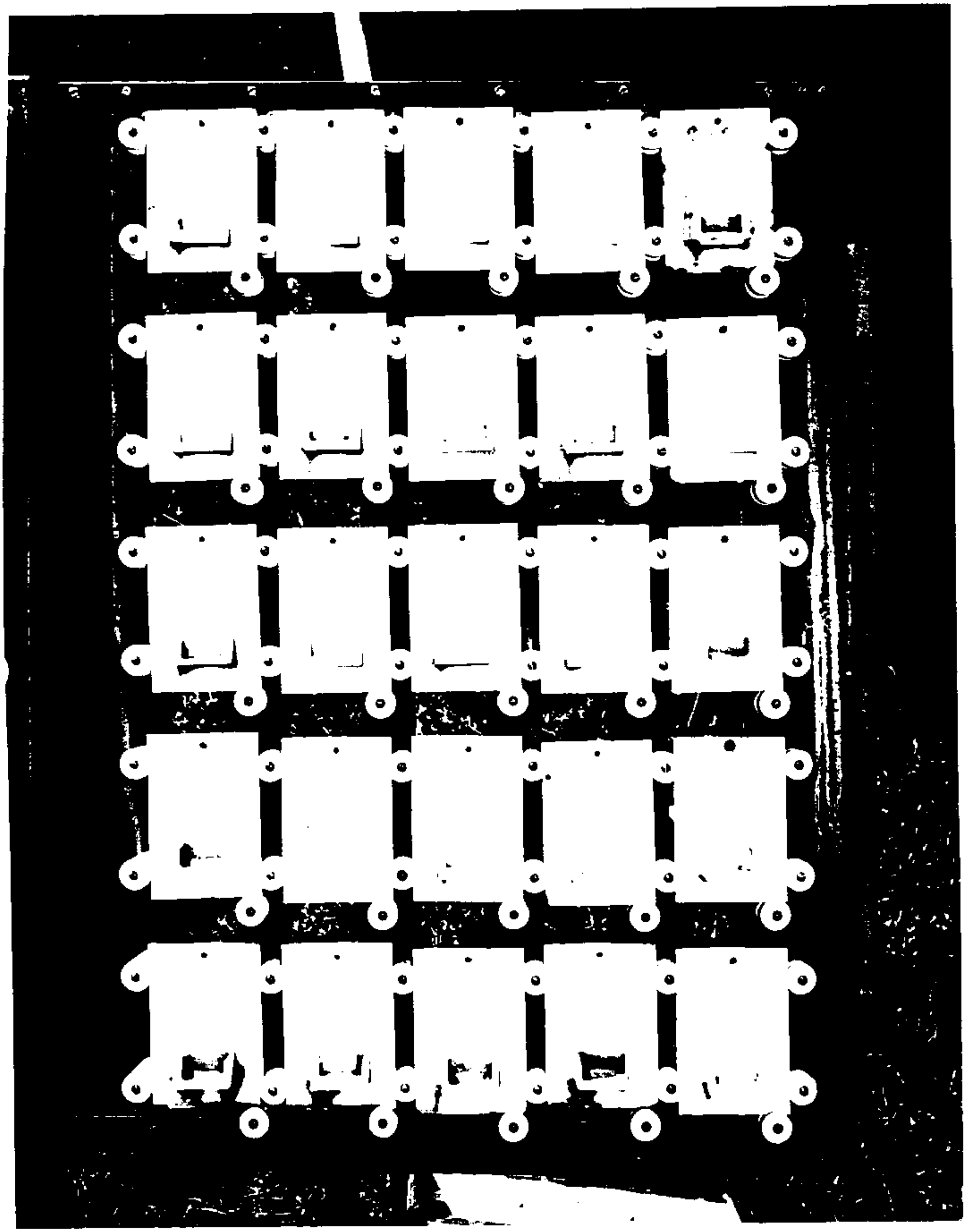
RACK NUMBER: 9B

93-2004 A-13

STUDY NO.: 93-2004 RACK NO.: 9C DATE : 11/92 EXPOSURE: NORMAL

	A	B	C	D	E
5	CARBO CZ-11HS CM-15 3359 **	CARBO CZ-11HS CM-15 3359	CARBO CZ-11HS CM-15 3359	CARBO CZ-11HS CM-15 3359	AMERON D-21-5 3238 **
4	CARBO CZ-11HS 893 134-HS ** O/N-IN	CARBO CZ-11HS 893 134-HS O/N-IN	CARBO CZ-11HS 893 134-HS 24HR-OUT	CARBO CZ-11HS 893 134-HS 24HR-OUT	DUPONT 347WB 25P 333 **
3	CARBO CZ-D7 3358 3359	CARBO CZ-D7 3358 3359	CARBO CZ-D7 3358 3359	CARBO CZ-D7 3358 3359	DUPONT 347WB 25P 333
2	DEVOE 305 648 669 **	DEVOE 305 648 669	DEVOE 305 648 669	DEVOE 305 648 669	DUPONT 347WB 25P 333
1	DEVOE 302-H 224HS 379 **	DEVOE 302-H 224HS 379	DEVOE 302-H 224HS 379	DEVOE 302-H 224HS 379	DUPONT 347WB 25P 333

** - DENOTES PANEL FOR GLOSS TESTING



RACK NUMBER: 9C

STUDY NO.: 93-2004 RACK NO.: 11A DATE : 11/92 EXPOSURE: NORMAL

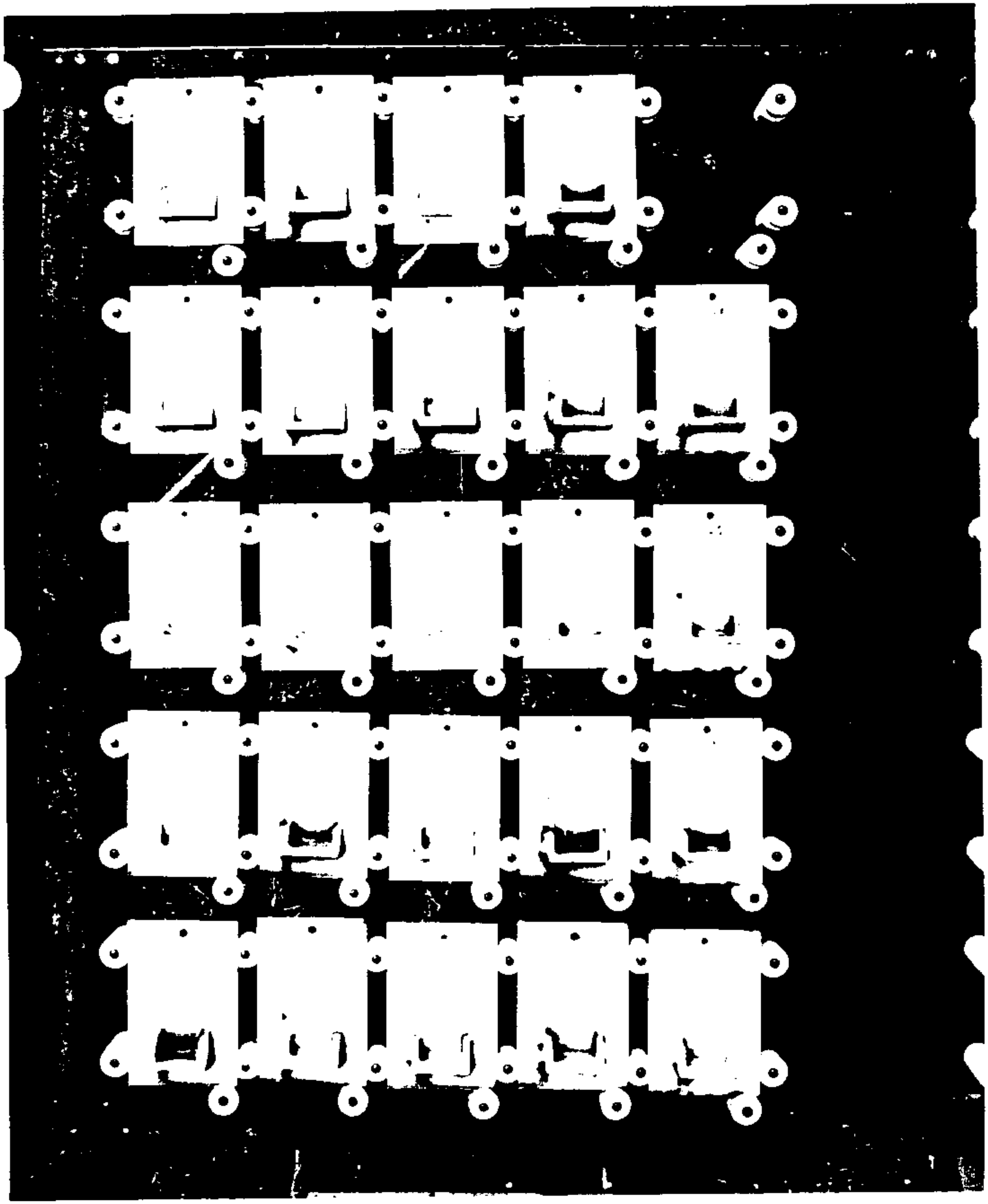
	A	B	C	D	E
5	ELITE 4610 154 **	ELITE 4610 154	ELITE 4610 154	ELITE 4610 154	
4	ELITE 4610 8915 4045HS **	ELITE 4610 8915 4045HS	ELITE 4610 8915 4045HS	ELITE 4610 8915 4045HS	M.A. BRUDER 24-A-190 078
3	HEMPEL 1562 4813 **	HEMPEL 1562 4813	HEMPEL 1562 4813	HEMPEL 1562 4813	M.A. BRUDER 24-A-190 078
2	IC-531 IC-46P IC-46 **	IC-531 IC-46P IC-46	IC-531 IC-46P IC-46	IC-531 IC-46P IC-46	M.A. BRUDER 24-A-190 078
1	M.A. BRUDER 24-A-190 101 880HS **	M.A. BRUDER 24-A-190 101 880HS	M.A. BRUDER 24-A-190 101 880HS	M.A. BRUDER 24-A-190 101 880HS	M.A. BRUDER 24-A-190 078 **

** - DENOTES PANEL FOR GLOSS TESTING

STUDY NO.: 93-2004 RACK NO.: 11B DATE : 11/92 EXPOSURE: NORMAL

A	B	C	D	E
BLP ** MOBILE MZ-2 MOTHANE HB 72AW024	BLP MOBILE MZ-2 MOTHANE HB 72AW024	BLP MOBILE MZ-2 MOTHANE HB 72AW024	BLP MOBILE MZ-2 MOTHANE HB 72AW024	
PORTER ZL-311 FR-51 8910	PORTER ZL-311 FR-51 8910	PORTER ZL-311 FR-51 8910	PORTER ZL-311 FR-51 8910	SIGMA 7550 5483 5529
PORTER ZL-99 FR-51 8910	PORTER ZL-99 FR-51 8910	PORTER ZL-99 FR-51 8910	PORTER ZL-99 FR-51 8910	SIGMA 7550 5483 5529
PORTER IZ-91N FR-51 8910	PORTER IZ-91N FR-51 8910	PORTER IZ-91N FR-51 8910	PORTER IZ-91N FR-51 8910	SIGMA 7550 5483 5529
PORTER TQ-4374H FR-51 8910 **	PORTER TQ-4374H FR-51 8910	PORTER TQ-4374H FR-51 8910	PORTER TQ-4374H FR-51 8910	SIGMA 7550 5483 5529 **

** - DENOTES PANEL FOR GLOSS TESTING

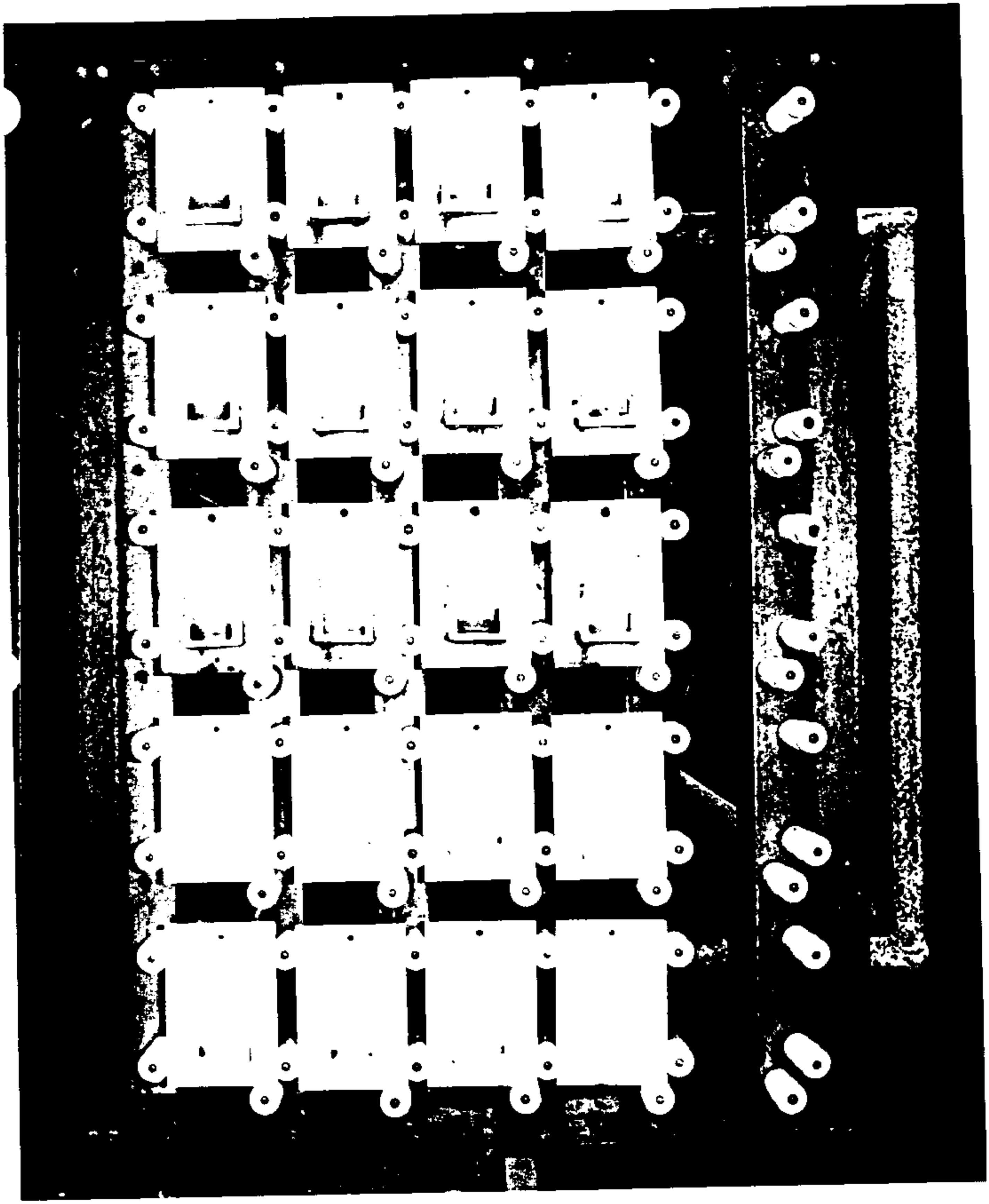


RACK NUMBER: 11B

STUDY NO.: 93-2004 RACK NO.: 11C DATE : 11/92 EXPOSURE: NORMAL

A	B	C	D	E
SOUTHERN COATINGS 600 601 **	SOUTHERN COATINGS 600 601	SOUTHERN COATINGS 600 601	SOUTHERN COATINGS 600 601	
SHERWIN WILLIAMS ZC-II B67H5 B65W300	SHERWIN WILLIAMS ZC-II B67H5 B65W300	SHERWIN WILLIAMS ZC-II B67H5 B65W300	SHERWIN WILLIAMS ZC-II B67H5 B65W300	
SHERWIN WILLIAMS ZC-10 B67H5 B65W300 **	SHERWIN WILLIAMS ZC-10 B67H5 B65W300	SHERWIN WILLIAMS ZC-10 B67H5 B65W300	SHERWIN WILLIAMS ZC-10 B67H5 B65W300	
VALSPAR V13-F-12 76 54	VALSPAR V13-F-12 76 54	VALSPAR V13-F-12 76 54	VALSPAR V13-F-12 76 54	
VALSPAR 13-F-6 76 54 **	VALSPAR 13-F-6 76 54	VALSPAR 13-F-6 76 54	VALSPAR 13-F-6 76 54	

** - DENOTES PANEL FOR GLOSS TESTING

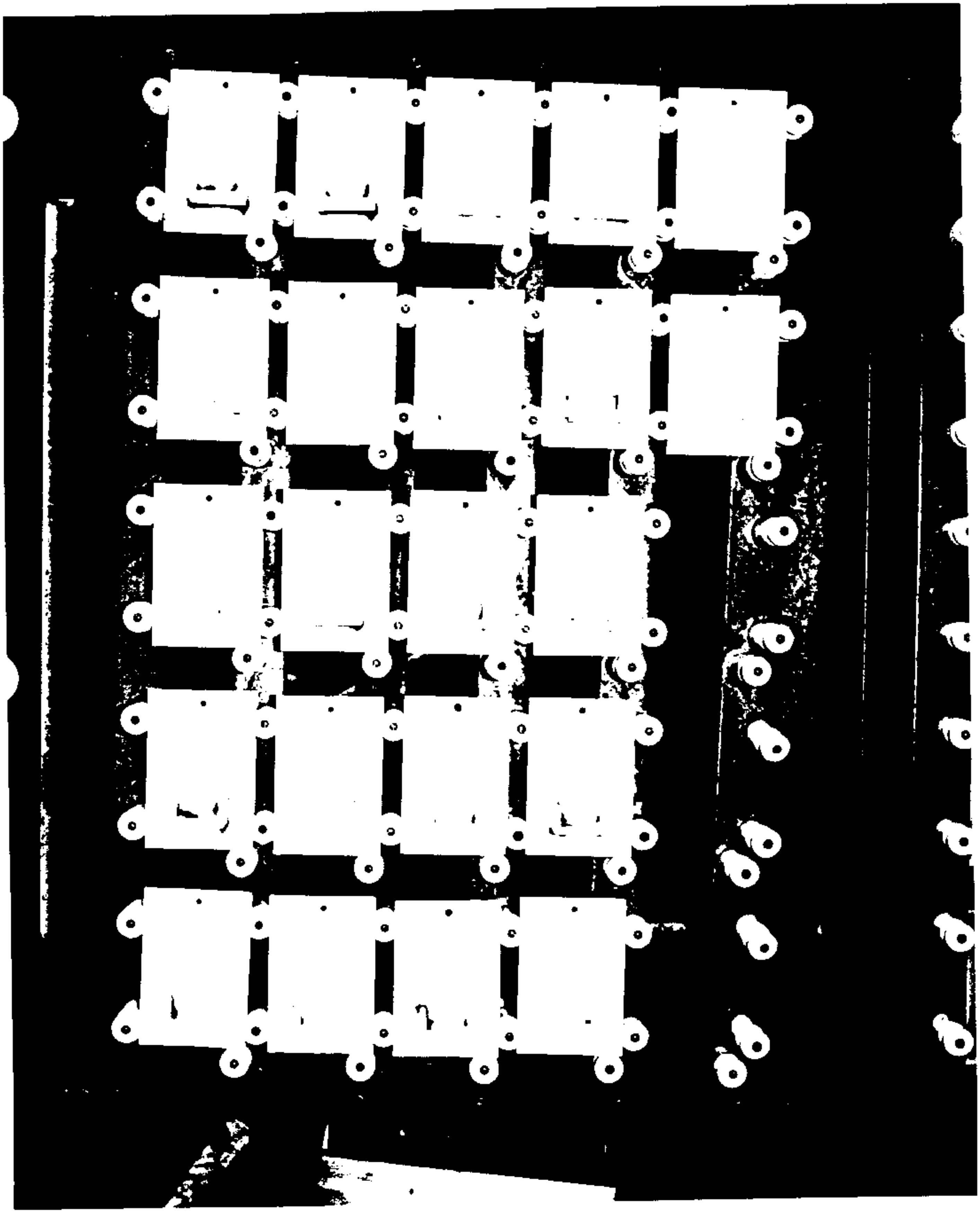


RACK NUMBER: 11C

93-2004

STUDY NO.: 93-2004 RACK NO.: 12A DATE : 11/92 EXPOSURE: NORMAL

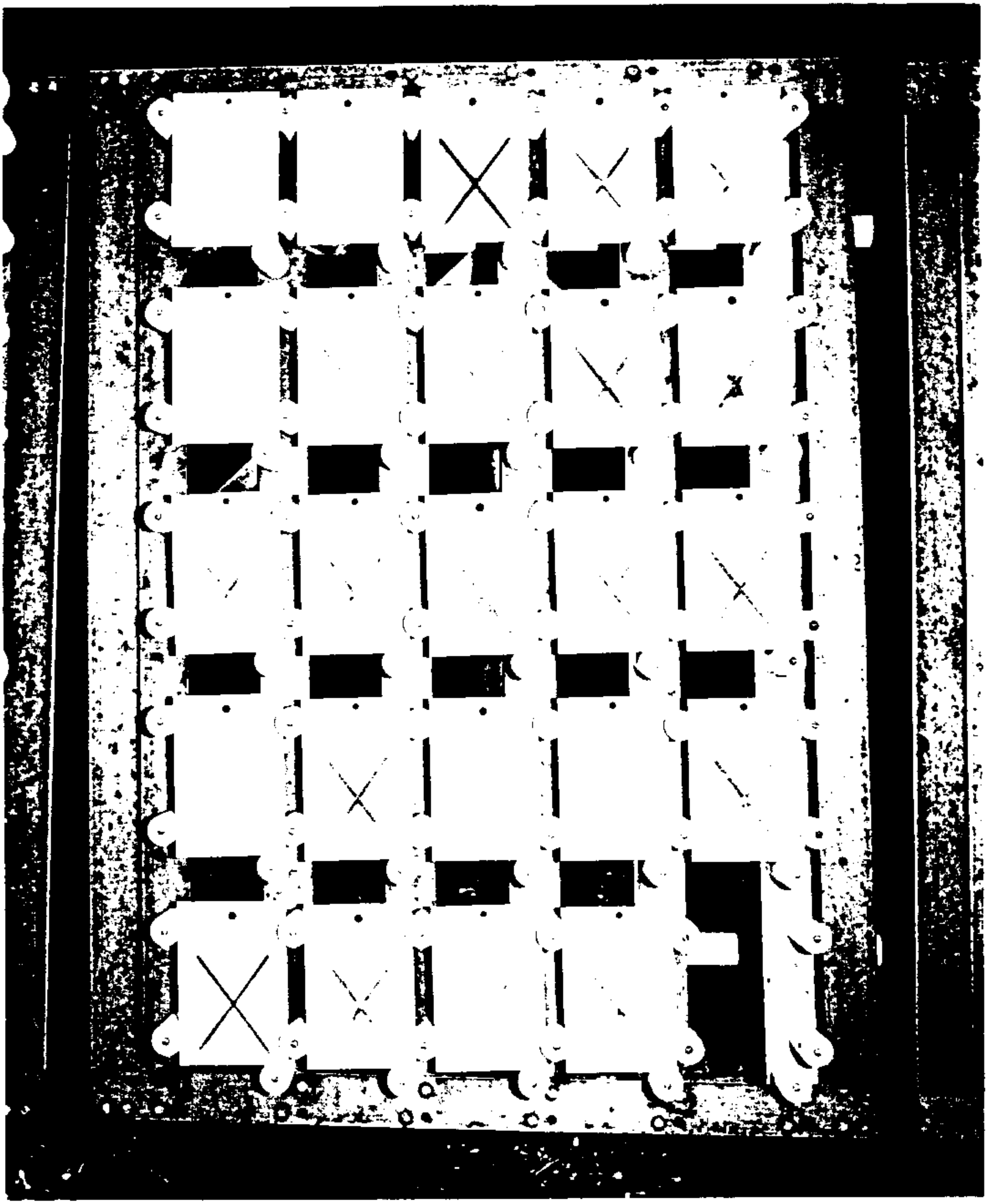
	A	B	C	D	E
5	CARBO CZ-11HS 893 134HS 3 DAYS	CARBO CZ-11HS 893 134HS 3 DAYS	CARBO CZ-11HS 893 134HS 7 DAYS	CARBO CZ-11HS 893 134HS 7 DAYS	CARBO CZ-11HS 893 134HS 90 DAYS
4	CARBO CZ-11HS 893 134HS 14 DAYS	CARBO CZ-11HS 893 134HS 14 DAYS	CARBO CZ-11HS 893 134HS 30 DAYS	CARBO CZ-11HS 893 134HS 30 DAYS	CARBO CZ-11HS 893 134HS 90 DAYS
3	VALSPAR V13-F-12 76 54 1DAY-OUT	VALSPAR V13-F-12 76 54 1DAY-OUT	VALSPAR V13-F-12 76 54 9 DAYS	VALSPAR V13-F-12 76 54 9 DAYS	
2	VALSPAR V13-F-12 76 54 20 DAYS	VALSPAR V13-F-12 76 54 20 DAYS	VALSPAR 13-F-6 76 54 1DAY-OUT	VALSPAR 13-F-6 76 54 1DAY-OUT	
1	VALSPAR 13-F-6 76 54 9 DAYS	VALSPAR 13-F-6 76 54 9 DAYS	VALSPAR 13-F-6 76 54 21 DAYS	VALSPAR 13-F-6 76 54 21 DAYS	



RACK NUMBER: 12A

STUDY NO.: 93-2004 RACK NO.: 12B DATE : 11/92 EXPOSURE: NORMAL

	A	B	C	D	E
5	AMERON D-4 SCRIBE	AMERON D-21-9 SCRIBE	AMERON D-21-5 SCRIBE	AMERON D-21-7 SCRIBE	BRINER V-65 SCRIBE
4	CARBO CZ-11HS SCRIBE	CARBO CZ-D7 SCRIBE	CONLUX ZP-6 SCRIBE	DEVOE 305 SCRIBE	DEVOE 302H SCRIBE
3	DUPONT 347WB SCRIBE	ELITE 4610 SCRIBE	HEMPEL 1562 SCRIBE	IC-531 SCRIBE	M.A. BRUDER 24-A-190 SCRIBE
2	BLP MOBILE MZ-2 SCRIBE	PORTER ZL-311 SCRIBE	PORTER ZL-99 SCRIBE	PORTER IZ-91N SCRIBE	PORTER TQ-4374H SCRIBE
1	SIGMA 7550 SCRIBE	SOUTHERN COATINGS 600 SCRIBE	SHERWIN WILLIAMS ZC-II SCRIBE	SHERWIN WILLIAMS ZC-10 SCRIBE	

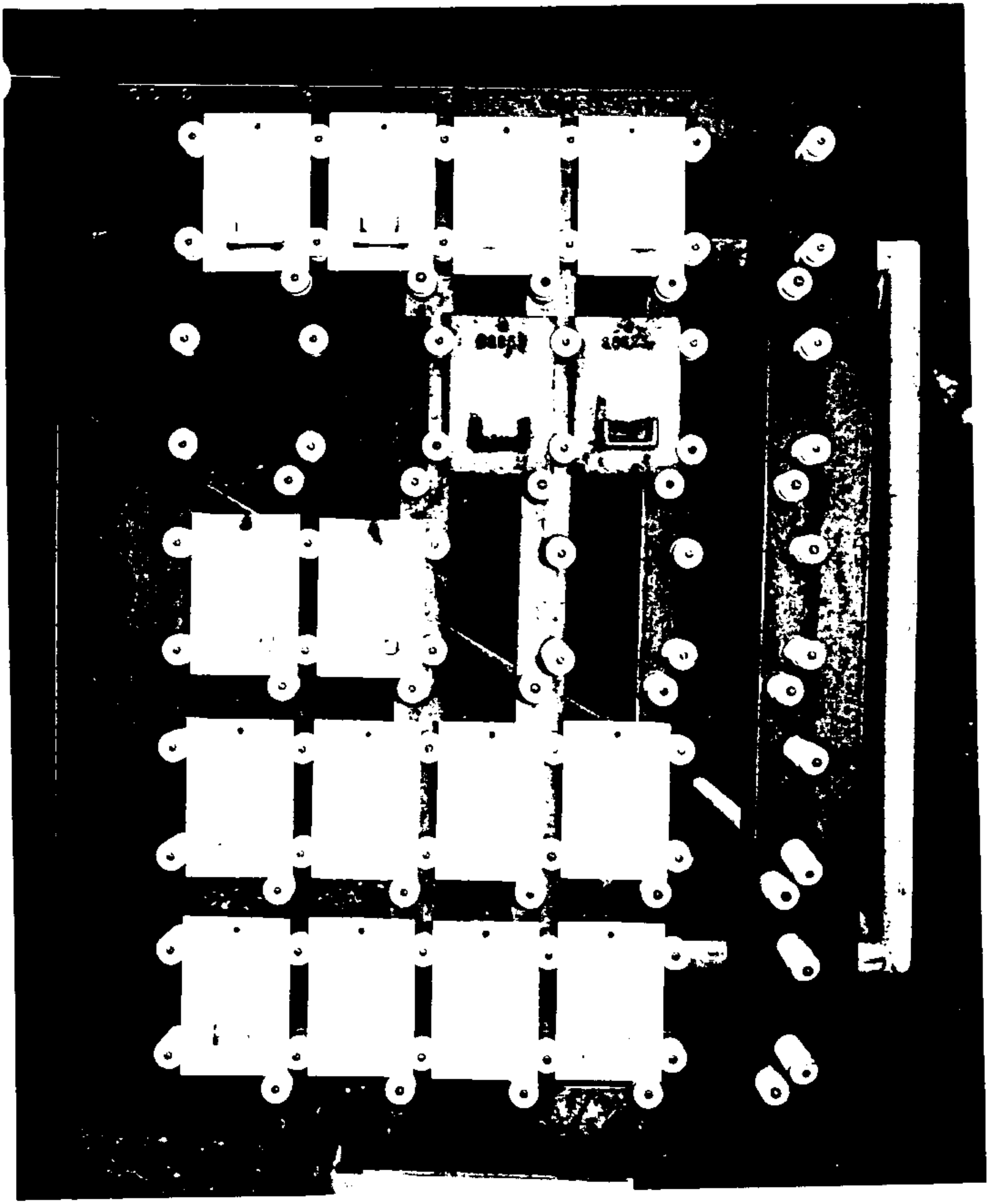


RACK NUMBER: 12B

STUDY NO.: 93-2004 RACK NO.: 12C DATE : 11/92 EXPOSURE: NORMAL

	A	B	C	D	E
5	BLP MOBILE MZ-2 MOTHANE HB 1DAY-OUT	BLP MOBILE MZ-2 MOTHANE HB 1DAY-OUT	BLP MOBILE MZ-2 MOTHANE HB 12 DAYS	BLP MOBILE MZ-2 MOTHANE HB 12 DAYS	
4	MORTON INT. 30-7008 BLACK **	MORTON INT. 30-7008 BLACK	MORTON INT. 90-7003 MIST	MORTON INT. 90-7003 MIST **	
3	RELIABLE COATINGS RSX1-64I **	RELIABLE COATINGS RSX1-64I			
2	PLASCHEM W-9108 2885 **	PLASCHEM W-9108 2885	PLASCHEM W-9108 2885	PLASCHEM W-9108 2885	
1	PLASCHEM 9030 2885	PLASCHEM 9030 2885	PLASCHEM 9030 2885	PLASCHEM 9030 2885	

** - DENOTES PANEL FOR GLOSS TESTING

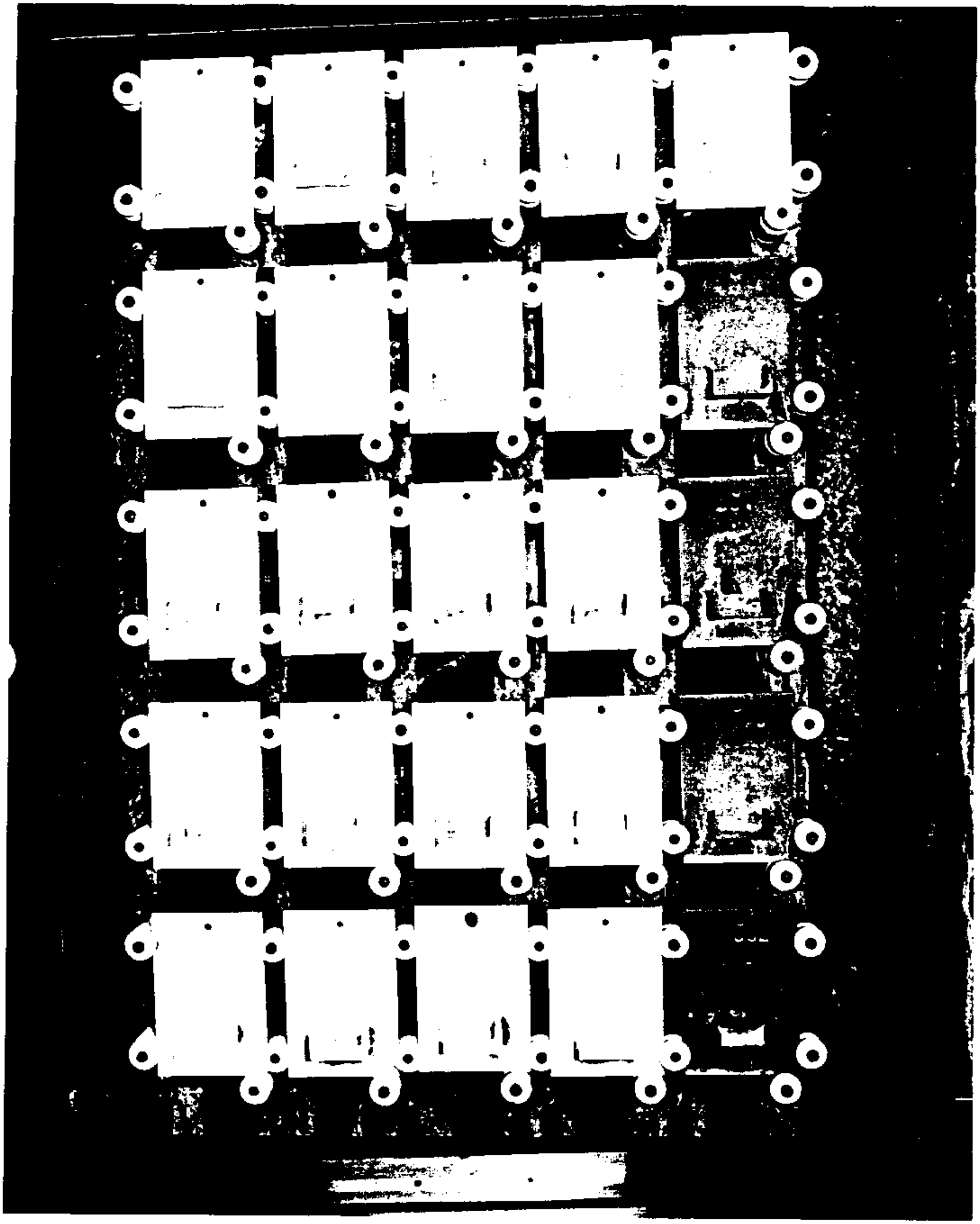


RACK NUMBER: 12C

93-2004

STUDY NO.: 93-2004 RACK NO.: 13A DATE : 11/92 EXPOSURE: ACID

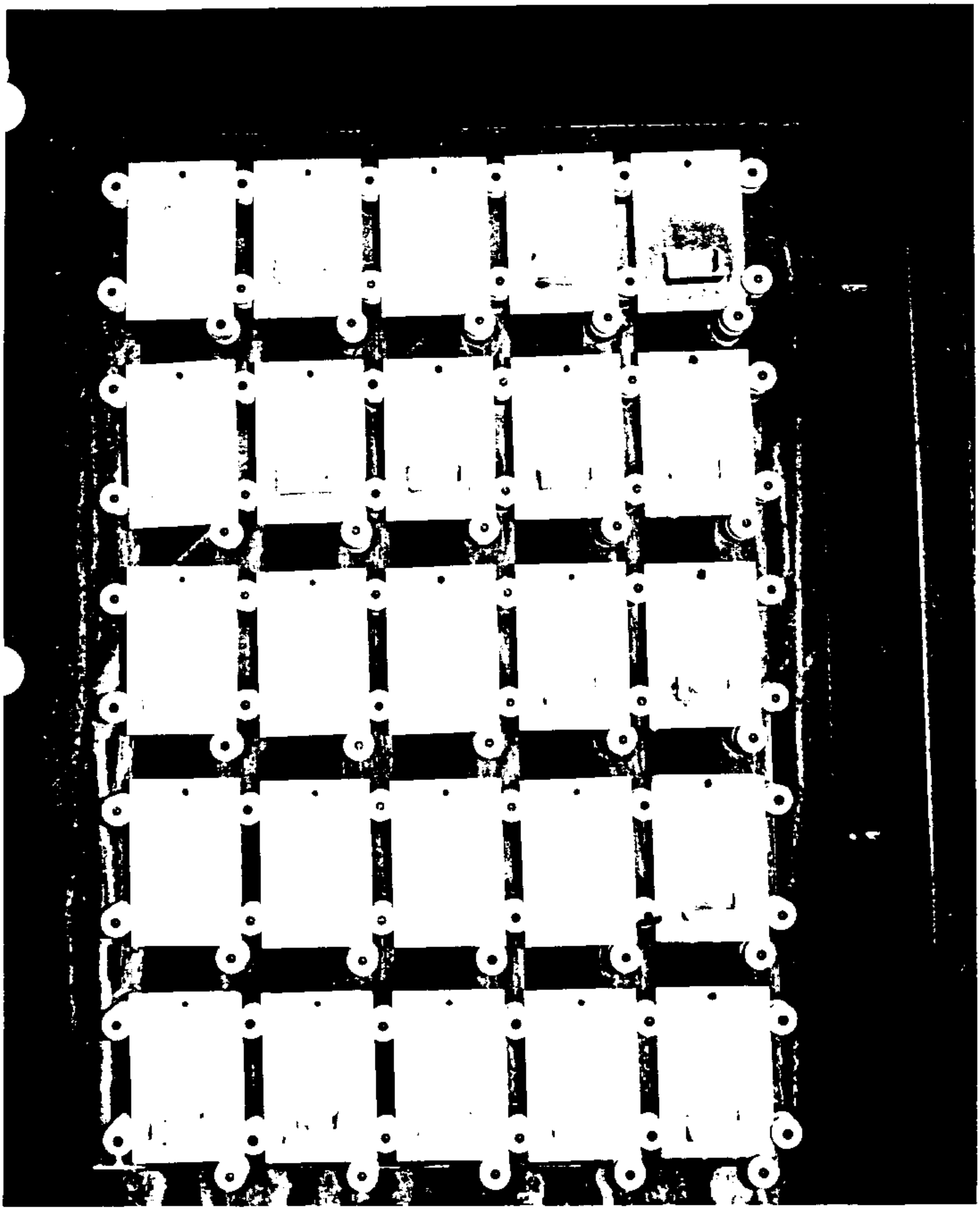
	A	B	C	D	E
5	AMERON D-4 400 450HS	AMERON D-4 400 450HS	AMERON D-4 400 450HS	AMERON D-4 400 450HS	AMERON D-21-9 3239
4	AMERON D-21-9 400 450HS	AMERON D-21-9 400 450HS	AMERON D-21-9 400 450HS	AMERON D-21-9 400 450HS	CONLUX ZP-6 1788-90
3	AMERON D-21-5 3207 3204	AMERON D-21-5 3207 3204	AMERON D-21-5 3207 3204	AMERON D-21-5 3207 3204	CONLUX ZP-6 1788-90
2	AMERON D-21-7 149 3204	AMERON D-21-7 149 3204	AMERON D-21-7 149 3204	AMERON D-21-7 149 3204	CONLUX ZP-6 1788-90
1	BRINER V-65 5282 5353	BRINER V-65 5282 5353	BRINER V-65 5282 5353	BRINER V-65 5282 5353	CONLUX ZP-6 1788-90



RACK NUMBER: 13A

STUDY NO.: 93-2004 RACK NO.: 13B DATE : 11/92 EXPOSURE: ACID

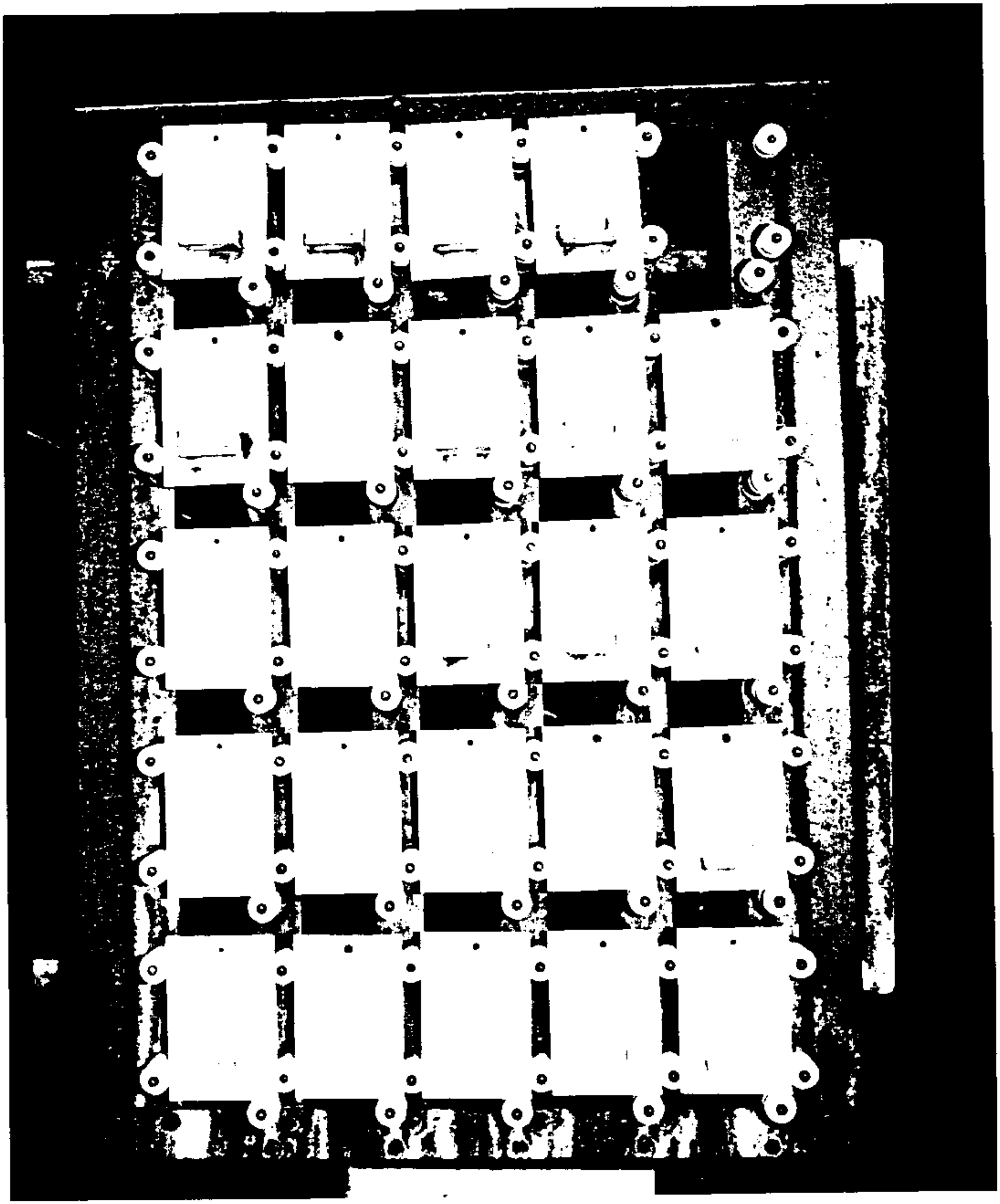
	A	B	C	D	E
5	CARBO CZ-11HS CM-15 3359	CARBO CZ-11HS CM-15 3359	CARBO CZ-11HS CM-15 3359	CARBO CZ-11HS CM-15 3359	AMERON D-21-5 3238
[illegible]	CARBO CZ-11HS 893 134-HS O/N-IN	CARBO CZ-11HS 893 134-HS O/N-IN	CARBO CZ-11HS 893 134-HS 24HR-OUT	CARBO CZ-11HS 893 134-HS 24HR-OUT	DUPONT 347WB 25P 333
3	CARBO CZ-D7 3358 3359	CARBO CZ-D7 3358 3359	CARBO CZ-D7 3358 3359	CARBO CZ-D7 3358 3359	DUPONT 347WB 25P 333
2	DEVOE 305 648 669	DEVOE 305 648 669	DEVOE 305 648 669	DEVOE 305 648 669	DUPONT 347WB 25P 333
[illegible]	DEVOE 302-H 224HS 379	DEVOE 302-H 224HS 379	DEVOE 302-H 224HS 379	DEVOE 302-H 224HS 379	DUPONT 347WB 25P 333



RACK NUMBER: 13B

STUDY NO.: 93-2004 RACK NO.: 13C DATE : 11/92 EXPOSURE: ACID

	A	B	C	D	E
5	ELITE 4610 154	ELITE 4610 154	ELITE 4610 154	ELITE 4610 154	
4	ELITE 4610 8915 4045HS	ELITE 4610 8915 4045HS	ELITE 4610 8915 4045HS	ELITE 4610 8915 4045HS	M.A. BRUDER 24-A-190 078
3	HEMPEL 1562 4813	HEMPEL 1562 4813	HEMPEL 1562 4813	HEMPEL 1562 4813	M.A. BRUDER 24-A-190 078
2	IC-531 IC-46P IC-46	IC-531 IC-46P IC-46	IC-531 IC-46P IC-46	IC-531 IC-46P IC-46	M.A. BRUDER 24-A-190 078
1	M.A. BRUDER 24-A-190 101 880HS	M.A. BRUDER 24-A-190 101 880HS	M.A. BRUDER 24-A-190 101 880HS	M.A. BRUDER 24-A-190 101 880HS	M.A. BRUDER 24-A-190 078

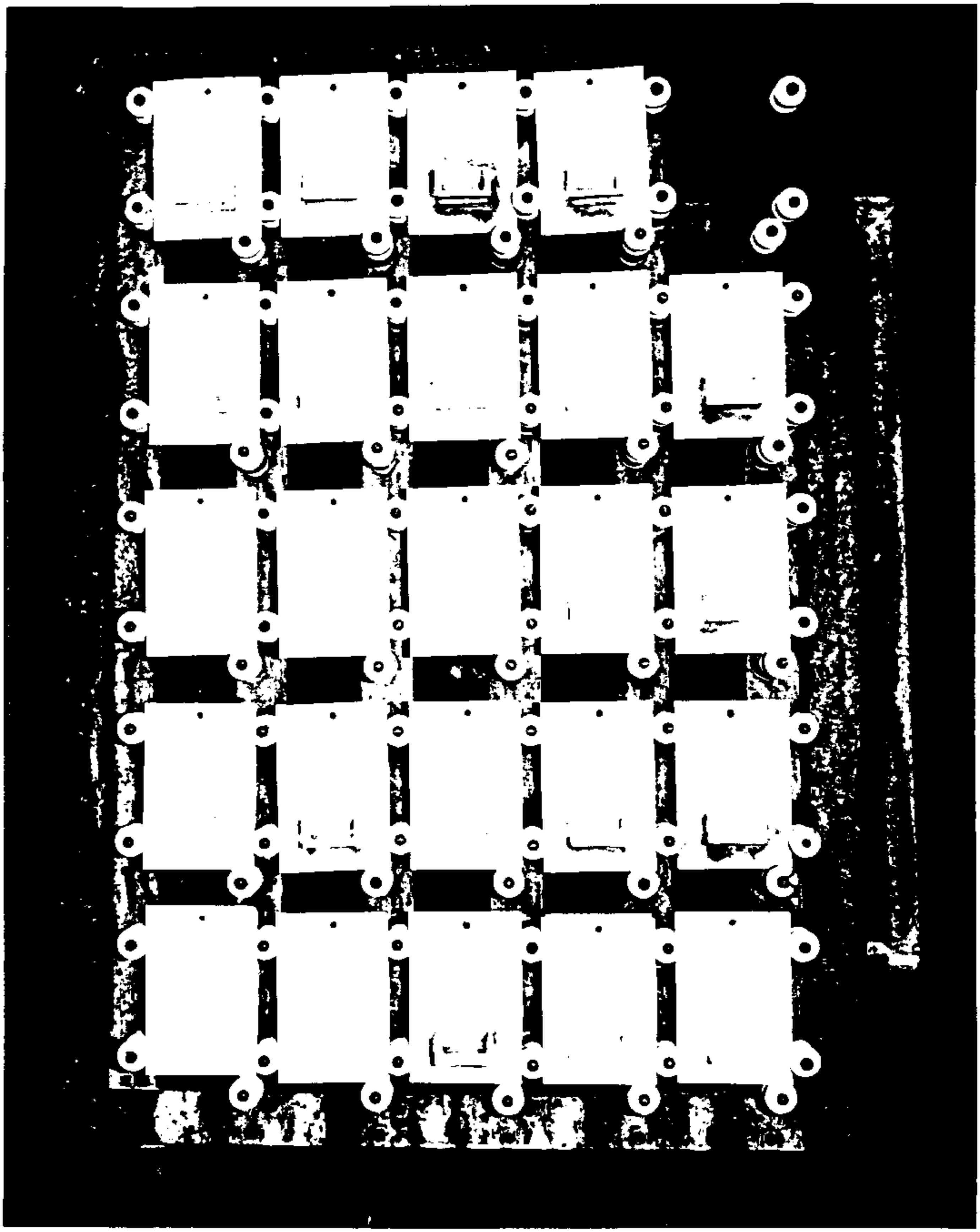


RACK NUMBER: 13C

93-2004

STUDY NO.: 93-2004 RACK NO.: 14C DATE : 11/92 EXPOSURE: ACID

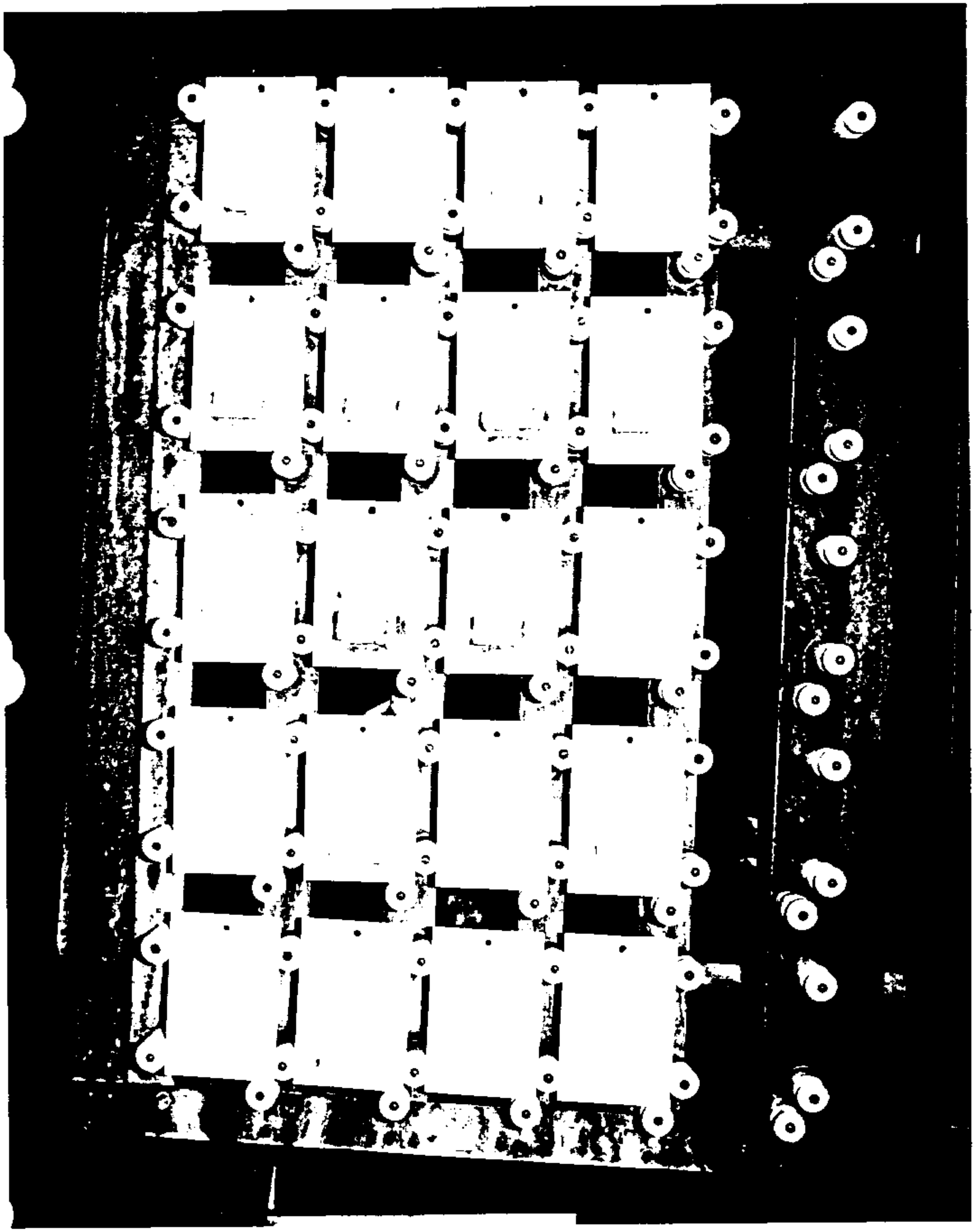
	A	B	C	D	E
5	BLP MOBILE MZ-2 MOTHANE HB 72AW024	BLP MOBILE MZ-2 MOTHANE HB 72AW024	BLP MOBILE MZ-2 MOTHANE HB 72AW024	BLP MOBILE MZ-2 MOTHANE HB 72AW024	
4	PORTER ZL-311 FR-51 8910	PORTER ZL-311 FR-51 8910	PORTER ZL-311 FR-51 8910	PORTER ZL-311 FR-51 8910	SIGMA 7550 5483 5529
3	PORTER ZL-99 FR-51 8910	PORTER ZL-99 FR-51 8910	PORTER ZL-99 FR-51 8910	PORTER ZL-99 FR-51 8910	SIGMA 7550 5483 5529
2	PORTER IZ-91N FR-51 8910	PORTER IZ-91N FR-51 8910	PORTER IZ-91N FR-51 8910	PORTER IZ-91N FR-51 8910	SIGMA 7550 5483 5529
1	PORTER TQ-4374H FR-51 8910	PORTER TQ-4374H FR-51 8910	PORTER TQ-4374H FR-51 8910	PORTER TQ-4374H FR-51 8910	SIGMA 7550 5483 5529



RACK NUMBER: 14C

STUDY NO.: 93-2004 RACK NO.: 15A DATE : 11/92 EXPOSURE: ACID

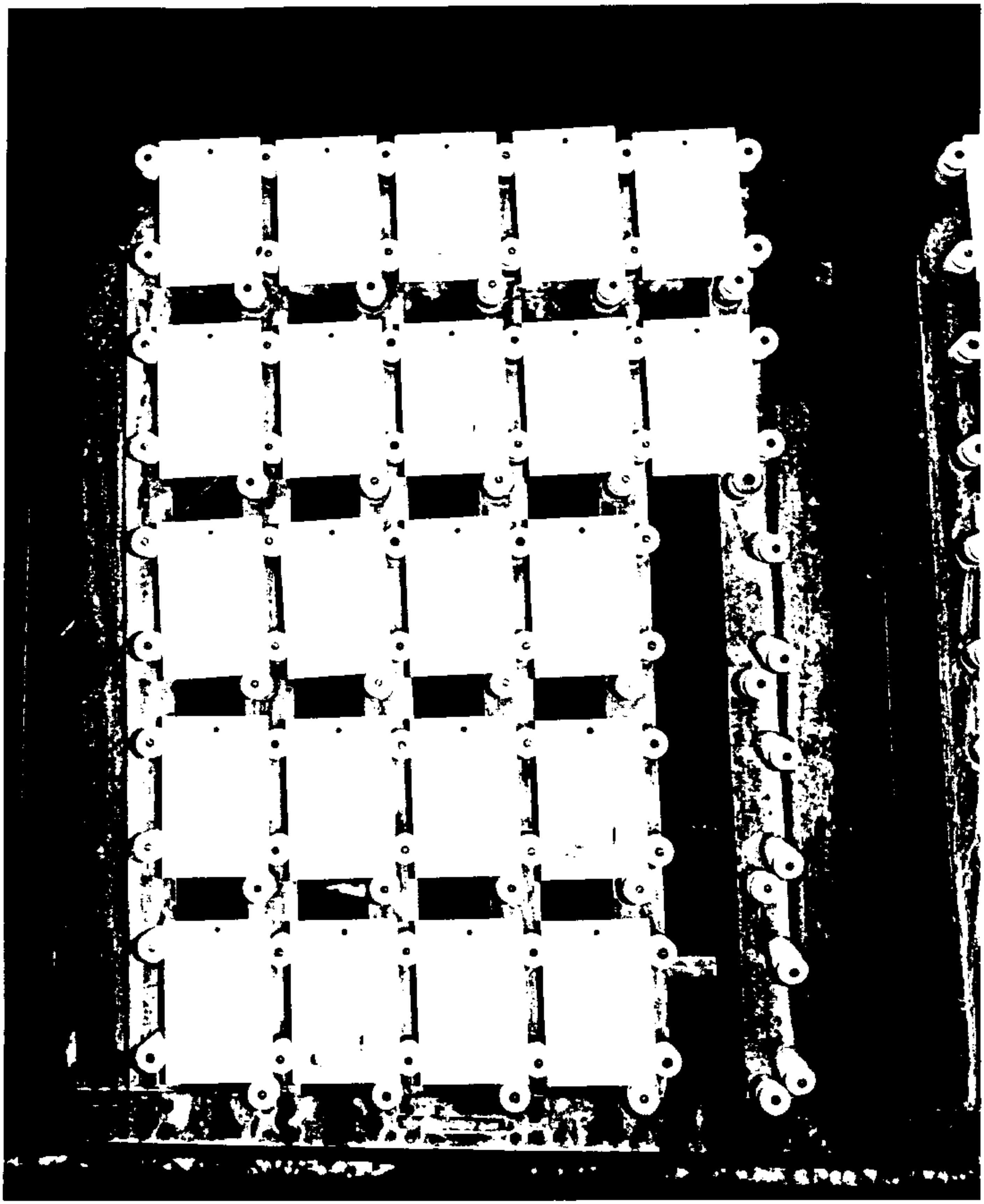
A	B	C	D	E
SOUTHERN COATINGS 600 601	SOUTHERN COATINGS 600 601	SOUTHERN COATINGS 600 601	SOUTHERN COATINGS 600 601	
SHERWIN WILLIAMS ZC-II B67H5 B65W300	SHERWIN WILLIAMS ZC-II B67H5 B65W300	SHERWIN WILLIAMS ZC-II B67H5 B65W300	SHERWIN WILLIAMS ZC-II B67H5 B65W300	
SHERWIN WILLIAMS ZC-10 B67H5 B65W300	SHERWIN WILLIAMS ZC-10 B67H5 B65W300	SHERWIN WILLIAMS ZC-10 B67H5 B65W300	SHERWIN WILLIAMS ZC-10 B67H5 B65W300	
VALSPAR V13-F-12 76 54	VALSPAR V13-F-12 76 54	VALSPAR V13-F-12 76 54	VALSPAR V13-F-12 76 54	
VALSPAR 13-F-6 76 54	VALSPAR 13-F-6 76 54	VALSPAR 13-F-6 76 54	VALSPAR 13-F-6 76 54	



RACK NUMBER: 15A

TUDY NO.: 93-2004 RACK NO.: 15B DATE : 11/92 EXPOSURE: ACID

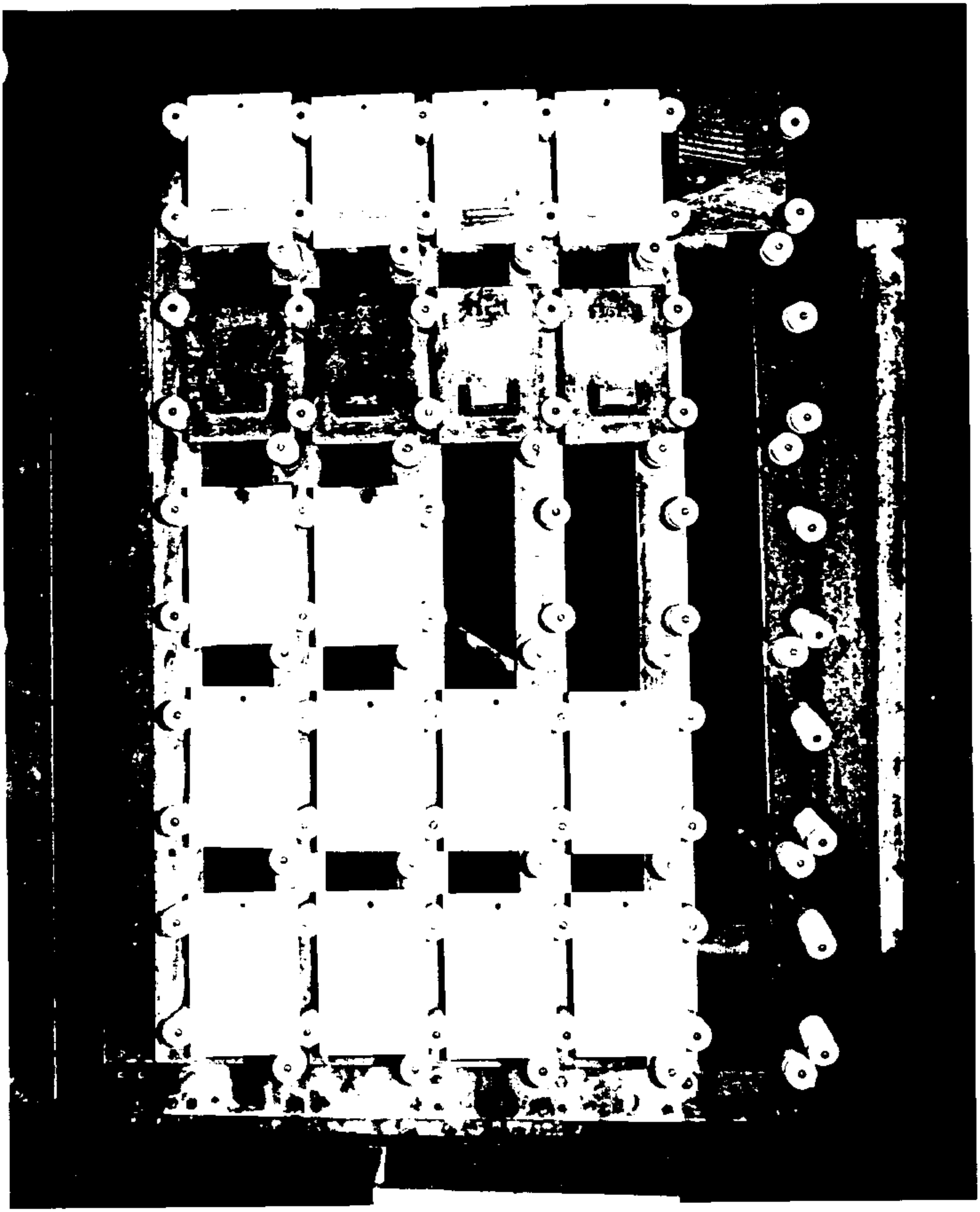
A	B	C	D	E
CARBO CZ-11HS 893 134HS 3 DAYS	CARBO CZ-11HS 893 134HS 3 DAYS	CARBO CZ-11HS 893 134HS 7 DAYS	CARBO CZ-11HS 893 134HS 7 DAYS	CARBO CZ-11HS 893 134HS 90 DAYS
CARBO CZ-11HS 893 134HS 14 DAYS	CARBO CZ-11HS 893 134HS 14 DAYS	CARBO CZ-11HS 893 134HS 30 DAYS	CARBO CZ-11HS 893 134HS 30 DAYS	CARBO CZ-11HS 893 134HS 90 DAYS
VALSPAR V13-F-12 76 54 1DAY-OUT	VALSPAR V13-F-12 76 54 1DAY-OUT	VALSPAR V13-F-12 76 54 9 DAYS	VALSPAR V13-F-12 76 54 9 DAYS	
VALSPAR V13-F-12 76 54 20 DAYS	VALSPAR V13-F-12 76 54 20 DAYS	VALSPAR 13-F-6 76 54 1DAY-OUT	VALSPAR 13-F-6 76 54 1DAY-OUT	
VALSPAR 13-F-6 76 54 9 DAYS	VALSPAR 13-F-6 76 54 9 DAYS	VALSPAR 13-F-6 76 54 21 DAYS	VALSPAR 13-F-6 76 54 21 DAYS	



RACK NUMBER: 15B

STUDY NO.: 93-2004 RACK NO.: 15C DATE : 11/92 EXPOSURE: ACID

	A	B	C	D	E
5	BLP MOBILE MZ-2 MOTHANE HB 1DAY-OUT	BLP MOBILE MZ-2 MOTHANE HB 1DAY-OUT	BLP MOBILE MZ-2 MOTHANE HB 12 DAYS	BLP MOBILE MZ-2 MOTHANE HB 12 DAYS	
4	MORTON INT. 30-7008 BLACK	MORTON INT. 30-7008 BLACK	MORTON INT. 90-7003 MIST	MORTON INT. 90-7003 MIST	
3	RELIABLE COATINGS RSX1-64I	RELIABLE COATINGS RSX1-64I			
2	PLASCHEM W-9108 2316 2885	PLASCHEM W-9108 2316 2885	PLASCHEM W-9108 2316 2885	PLASCHEM W-9108 2316 2885	
1	PLASCHEM 9030 2316 2885	PLASCHEM 9030 2316 2885	PLASCHEM 9030 2316 2885	PLASCHEM 9030 2316 2885	



RACK NUMBER: 15C

APPENDIX B

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Project: AMERON D-4 Batch No.: Date: 11/20/90
Color: BROWN - RED Location: KSC Item Coated: 18 TATORS
SURFACE PREPARATION SSPC: SP-5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 50

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 20 Air Pressure(PSI): 50

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:			
Varying Color:	X	X	X
Other (Describe):			

D. THICKNESS Wet Film (Average): 7 MILS Dry Film (Average): 5.4 MILS
Maximum Dry Film Thickness Without Sagging: 20 MILS
Maximum Dry Film Thickness Without Cracking: 15 MILS

E. DRYING TIME

Dry to Touch: 45 MIN Dry Through: 1 HR
Metallic Polish: 2 HR

F. Comments: MIXES AND SPRAYS WELL - APPLIES WELL - SALTS OVERNIGHT

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr...ct: AMERON D-21-9 Batch No.: Date: 11/14/90
C...: GRAY Location: KSC Item Coated: 18 TATORS
S...\CE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER
A. Settling - Yes: X No: Soft: X Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: Difficult:
Thinning Required Yes: X No: Type: 930 Quantity: 5%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 60

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 50

C. HANDLING PROPERTIES

1. Atomization Good: Fair: X Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): Dry Film (Average): 9.4 MILS
Maximum Dry Film Thickness Without Sagging: 25 MILS
Maximum Dry Film Thickness Without Cracking: 10 MILS

E. DRYING TIME

Dry to Touch: 20 MIN Dry Through: 1 HR
Metallic Polish: 2 HR

F. Comments: MIXES WELL - TOO HEAVY - CAN'T SPRAY A WET COAT UNDER 8 MILS - HARD TO USE ON HOT STEEL IN WINDY WEATHER

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr... ct: AMERON D-21-5 Batch No.: Date: 11/3/90
Co... : GRAY Location: KSC Item Coated: 18 TATORS
SU... CE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 50

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 50

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 7 MILS Dry Film (Average): 4.4 MILS
Maximum Dry Film Thickness Without Sagging: 18 MILS
Maximum Dry Film Thickness Without Cracking: 18 MILS

E. DRYING TIME

Dry to Touch: 20 MIN Dry Through: 1 HR
Metallic Polish: 3 HR

F. Comments: MIXES AND SPRAYS WELL - CLOGS HOSE - BUILDS UP ON AIR CAP - DRIES TOO FAST - USE BINKS N65 NEEDLE

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr…ct: AMERON D-21-7 Batch No.: Date: 2/13/91
C…: GRAY Location: KSC Item Coated: 18 TATORS
S… CE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: Difficult:
Thinning Required Yes: No: Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 74 Surface Temp: 74 %RH: 80

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66N
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 6 MILS Dry Film (Average): 3.1 MILS
Maximum Dry Film Thickness Without Sagging: 8 MILS
Maximum Dry Film Thickness Without Cracking: 8 MILS

E. DRYING TIME

Dry to Touch: 20 MIN Dry Through: 45 MIN
Metallic Polish: 1 HR

F. Comments: MIXES AND SPRAYS WELL - LOOKS GOOD

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr[illegible]ct: AMERLOCK 400 Batch No.: Date: 11/27/90
C[illegible]: WHITE Location: KSC Item Coated: D-4 PRIMER
S[illegible]\CE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: X No: Type: 65 Quantity: 10%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 50

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 7 MILS Dry Film (Average): 5.5 MILS
Maximum Dry Film Thickness Without Sagging:
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 2 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - DRIES HARD

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr[illegible]ct: AMERON 450 HS Batch No.: Date: 11/28/90
C[illegible]: WHITE Location: KSC Item Coated: EPOXY
S[illegible]ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: X No: Type: 65 Quantity: 5%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 50

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 5 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 5 MILS Dry Film (Average): 2.4 MILS
Maximum Dry Film Thickness Without Sagging:
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 2 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - LOOKS GOOD

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Project: AMERON 3207 Batch No.: Date: 11/15/90
Color: TAN Location: KSC Item Coated: D-21-5 PRIMER
SURFACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: X No: Soft: Hard: X Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult: X
Type Mixer Blade: SHAKER
Hand Mixing Properties Easy: Difficult: X
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 50

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 40

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:	X	X	X
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): Dry Film (Average): 4.6 MILS
Maximum Dry Film Thickness Without Sagging: 12 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 30 MIN Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES FAIR - SPRAYS WELL - BUBBLES OVER ZINC - NEEDS MIST COAT

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr[illegible]ct: AMERON 3204 Batch No.: Date: 11/16/90
C[illegible]: WHITE Location: KSC Item Coated: EPOXY
S[illegible] CE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 50

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 5 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): Dry Film (Average): 4.3 MILS
Maximum Dry Film Thickness Without Sagging: 8 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 2 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - LOOKS GOOD - STILL SOFT AFTER 2 DAYS

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P[illegible]ct: AMERON AMERGUARD 149 Batch No.: Date: 2/14/91
C[illegible]: WHITE Location: KSC Item Coated: D-21-7 PRIMER
S[illegible]\CE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult: X
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: Difficult: X
Thinning Required Yes: X No: Type: WATER Quantity: 15%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 70 Surface Temp: 70 %RH: 80

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 20 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:	X	X	X
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 8 MILS Dry Film (Average): 5.9 MILS
Maximum Dry Film Thickness Without Sagging:
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 4 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: VERY DIFFICULT TO MIX - BASE VERY THICK - HARD TO ADD CATALYST NEEDS THINNING TO BREAK UP - POT LIFE VERY SHORT

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr ct: AMERON 3238 Batch No.: Date: 11/15/90
C : WHITE Location: KSC Item Coated: D-21-5 PRIMER
S ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: X Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 50

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): Dry Film (Average): 5 MILS
Maximum Dry Film Thickness Without Sagging:
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: Dry Through:
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - LOOKS GOOD

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr... ct: AMERON 3239 Batch No.: Date: 11/15/90
C... : WHITE Location: KSC Item Coated: D-21-9 PRIMER
S... CE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER

A. Settling - Yes: X No: Soft: X Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 60

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 15 Air Pressure(PSI): 50

C. HANDLING PROPERTIES

1. Atomization Good: Fair: X Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): Dry Film (Average): 6 MILS
Maximum Dry Film Thickness Without Sagging:
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 30 MIN Dry Through:
Metallic Polish:

F. Comments: MIXES FAIR - SPRAY LOOKS DRY - BUILDS WELL

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr...ct: BRINER V-65 Batch No.: Date: 9/20/90
Co...: GRAY Location: KSC Item Coated: 18 TATORS
S...ACE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 60

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:	X	X	X
Cracking:	X	X	X
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 5 MILS Dry Film (Average): 3.4 MILS
Maximum Dry Film Thickness Without Sagging: 4 MILS
Maximum Dry Film Thickness Without Cracking: 6 MILS

E. DRYING TIME

Dry to Touch: 1 HR Dry Through: 2 HR
Metallic Polish: 2 HR

F. Comments: MIXES AND SPRAYS WELL - DOESN'T BUILD WELL - VERY THIN - RUNS AND CRACKS

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr[illegible]ct: BRINER 5282 Batch No.: Date: 9/21/90
C[illegible]: TAN Location: KSC Item Coated: V-65 PRIMER
S[illegible]ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 70

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 8 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:	X	X	X
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 6 MILS Dry Film (Average): 3 MILS
Maximum Dry Film Thickness Without Sagging: 4 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 2 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - BUBBLES OVER PRIMER - MUST MIST COAT

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P... ct: BRINER 5353 Batch No.: Date: 9/24/90
C... : WHITE Location: KSC Item Coated: 5282 TIE COAT
S... ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 70

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 5 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 5 MILS Dry Film (Average): 2.1 MILS
Maximum Dry Film Thickness Without Sagging: 3 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 2 HR Dry Through: 3 HR
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - LOOKS GOOD - VERY THIN - CAN'T BUILD MORE THAN 3 MILS PER COAT - SOFTENS UNDERCOAT

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr...ct: CARBOLINE CZ-11HS Batch No.: Date: 10/22/90
C...: GRAY Location: KSC Item Coated: 18 TATORS
S...CE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER

A. Settling - Yes: X No: Soft: X Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: Difficult:
Thinning Required Yes: X No: Type: 26 Quantity: 5%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 65

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 8 Air Pressure(PSI): 60

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 7 MILS Dry Film (Average): 5.7 MILS
Maximum Dry Film Thickness Without Sagging: 12 MILS
Maximum Dry Film Thickness Without Cracking: 10 MILS

E. DRYING TIME

Dry to Touch: 45 MIN Dry Through: 2 HR
Metallic Polish: 4 HR

F. Comments: MIXES WELL - SPRAYS FAIR - BUILDS FAST AND ROUGH - DRY SPRAY AT LESS THAN 4 MILS DFT

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr[illegible]ct: CARBOLINE CZ-D7 Batch No.: Date: 10/10/90
C[illegible]: RED Location: KSC Item Coated: 18 TATORS
S[illegible] CE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER

A. Settling - Yes: X No: Soft: X Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 80

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X		X
Varying Color:		X	
Other (Describe):			

D. THICKNESS Wet Film (Average): 6 MILS Dry Film (Average): 3.7 MILS
Maximum Dry Film Thickness Without Sagging: 18 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 45 MIN Dry Through: 2 HR
Metallic Polish: 2 HR

F. Comments: MIXES AND SPRAYS WELL - CAN BUILD HIGH MILLAGE - DOES NOT RUN DRIES SMOOTH - LOOKS GOOD - HAS SMALL HOLES IN HEAVY MILLAGE

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr[illegible]ct: CARBOLINE 893 Batch No.: Date: 10/24/90
C[illegible] : RED Location: KSC Item Coated: CZ-11HS PRIMER
S[illegible]ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: X No: Soft: X Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: X No: Type: 2 Quantity: 5%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 75

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 8 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:	X	X	X
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 7 MILS Dry Film (Average): 4.7 MILS
Maximum Dry Film Thickness Without Sagging:
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 2 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - HIGH BUILD - PINHOLES AFTER MIST COAT

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P: ct: CARBOLINE D-134HS Batch No.: Date: 11/1/90
C : WHITE Location: KSC Item Coated: EPOXY
S \CE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 75 Surface Temp: 75 %RH: 65

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 8 MILS Dry Film (Average): 4.2 MILS
Maximum Dry Film Thickness Without Sagging:
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 1.5 HR Dry Through: 3 HR
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - LOOKS GOOD

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Product: CARBOLINE CARBOMASTIC 15 L.O. Batch No.: Date: 10/23
Color: ALUMINUM Location: KSC Item Coated: CZ-11HS PRIMER
SURFACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: X No: Type: 76 Quantity: 15%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 75

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 10 MILS Dry Film (Average): 8.5 MILS
Maximum Dry Film Thickness Without Sagging: 20 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 12 HRS Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - NEEDS THINNING - STAYS SOFT - VERY HIGH BUILD

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr[illegible]ct: CARBOLINE D-3358 Batch No.: Date: 10/11/90
C[illegible]: TAN Location: KSC Item Coated: CZ-D7 PRIMER
S[illegible]\CE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 70

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 8 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:	X		
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 7 MILS Dry Film (Average): 4.1 MILS
Maximum Dry Film Thickness Without Sagging: 6 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 1 HR Dry Through: 2 HR
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - MUST MIST COAT TO STOP BUBBLING

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr ct: CARBOLINE D-3359 Batch No.: Date: 10/12/90
C : WHITE Location: KSC Item Coated: D-3358 TIE COAT
S ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 70

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 6 MILS Dry Film (Average): 2.6 MILS
Maximum Dry Film Thickness Without Sagging:
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 1 HR Dry Through: 2 HR
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - LOOKS GOOD - HARD TO BUILD MILLAGE

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr...ct: CON-LUX ZP-6 Batch No.: Date: 12/13/90
Co...: BROWN-GRAY Location: KSC Item Coated: 18 TATORS
S... CE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER

A. Settling - Yes: X No: Soft: X Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 76 Surface Temp: 76 %RH: 50

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66N
Air Cap: 63PB Fluid Pressure(PSI): 4 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:	X	X	X
Cracking:		X	X
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 6 MILS Dry Film (Average): 4.4 MILS
Maximum Dry Film Thickness Without Sagging: 3 MILS
Maximum Dry Film Thickness Without Cracking: 12 MILS

E. DRYING TIME

Dry to Touch: 20 MIN Dry Through: 45 MIN
Metallic Polish: 45 MIN

F. Comments: MIXES AND SPRAYS WELL - BUILDS FAST - RUNS PUDDLE IN CHANNEL AND CRACK

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Product: CON-LUX 1788-90 Batch No.: Date: 1/11/91
Color: BLUE Location: KSC Item Coated: ZP-6 PRIMER
SURFACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 70 Surface Temp: 70 %RH: 60

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 15 Air Pressure(PSI): 30

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:	X	X	X
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 7 MILS Dry Film (Average): 1.5 MILS
Maximum Dry Film Thickness Without Sagging: 2 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 1 HR Dry Through: 4 HR
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - TENDS TO RUN - COVERS WELL - DRIES FAST

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr…ct: DEVOE CATHA-COAT 305 Batch No.: Date: 12/19/90
C…: GRAY Location: KSC Item Coated: 18 TATORS
S… CE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 60

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66N
Air Cap: 63PB Fluid Pressure(PSI): 4 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:		X	X
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 7 MILS Dry Film (Average): 4.5 MILS
Maximum Dry Film Thickness Without Sagging: 17 MILS
Maximum Dry Film Thickness Without Cracking: 6 MILS

E. DRYING TIME

Dry to Touch: 30 MIN Dry Through: 1.5 HR
Metallic Polish: 1.5 HR

F. Comments: MIXES AND SPRAYS WELL - LARGE GRAINS IN MIX WILL NOT STRAIN OUT

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr...ct: DEVOE CATHA-COAT 302H Batch No.: Date: 1/10/91
C...: GREEN Location: KSC Item Coated: 18 TATORS
S... ACE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER

A. Settling - Yes: X No: Soft: X Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: SHAKER
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 70

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66N
Air Cap: 63PB Fluid Pressure(PSI): 15 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: Fair: X Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:	X		
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 6 MILS Dry Film (Average): 4.7
Maximum Dry Film Thickness Without Sagging: 5 MILS
Maximum Dry Film Thickness Without Cracking: 7 MILS

E. DRYING TIME

Dry to Touch: 2 HR Dry Through: OVERNIGHT
Metallic Polish: N/A

F. Comments: MIXES WELL - SPRAY DOES NOT BREAK UP WELL - NEEDS THINNING SKINS OVER - DRIES FROM OUTSIDE TO SUBSTRATE - SOFT - DOES NOT POLISH

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr...ct: DEVOE 648 Batch No.: Date: 1/31/91
C...: LT. GRAY Location: KSC Item Coated: 305 PRIMER
S...ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: X No: Type: WATER Quantity: 15%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 76 Surface Temp: 76 %RH: 70

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 15 Air Pressure(PSI): 60

C. HANDLING PROPERTIES

1. Atomization Good: Fair: X Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:	X	X	X
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 8 MILS Dry Film (Average): 5.6 MILS
Maximum Dry Film Thickness Without Sagging: 10 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 1 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES WELL - SPRAYS HEAVY - NEEDS THINNING - CLEANS UP WELL

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P[illegible]ct: DEVOE 669 Batch No.: Date: 2/1/91
C[illegible]: WHITE Location: KSC Item Coated: EPOXY TIE COAT
S[illegible]CE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: Difficult: X
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 74 Surface Temp: 74 %RH: 50

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 15 Air Pressure(PSI): 60

C. HANDLING PROPERTIES

1. Atomization Good: Fair: X Poor:

2. COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 6 MILS Dry Film (Average): 3.3 MILS
Maximum Dry Film Thickness Without Sagging: 8 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 1.5 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - CATALYST IS VERY DIFFICULT TO MIX INTO THE BASE - VERY THICK

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P…ct: DEVOE 224HS Batch No.: Date: 2/4/91
C…: GRAY Location: KSC Item Coated: 302H PRIMER
S…ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: X No: Type: EPOXY Quantity: 5%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 76 Surface Temp: 76 %RH: 50

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 60

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 8 MILS Dry Film (Average): 3.5 MILS
Maximum Dry Film Thickness Without Sagging: 10 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 4 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - LOOKS GOOD - NO BUBBLES

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr ct: DEVOE 379 Batch No.: Date: 2/5/91
C : WHITE Location: KSC Item Coated: EPOXY TIE COAT
S ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 76 Surface Temp: 76 %RH: 50

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: Fair: X Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 6 MILS Dry Film (Average): 3.2 MILS
Maximum Dry Film Thickness Without Sagging: 4 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 4 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES WELL - NEEDS THINNING TO SPRAY - DOES NOT BREAK UP WELL
PULLS AWAY FROM EDGES WHILE CURING

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Product: DuPONT GANICIN 347WB   Batch No.:   Date: 12/5/90
Color: GRAY   Location: KSC   Item Coated: 18 TATORS
SURFACE PREPARATION   SSPC: SP 5   Abrasive: S. SAND   Profile: 2.0   Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X   Soft: Hard: Other:
Separation - Yes: No: X   Description:

B. MIXING - Mechanical   Easy: X   Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties   Easy: Difficult:
Thinning Required   Yes: No: X   Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS   Inside Shop: X   Outside: Shade: X   Sun:
Air Temp(F): 76   Surface Temp: 76   %RH: 60

B. EQUIPMENT USED   Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X   Type Gun: BINKS 18   Fluid Tip: 66N
Air Cap: 63PB   Fluid Pressure(PSI): 4   Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization   Good: X   Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS   Wet Film (Average): 6 MILS   Dry Film (Average): 3.5 MILS
Maximum Dry Film Thickness Without Sagging: 9 MILS
Maximum Dry Film Thickness Without Cracking: 9 MILS

E. DRYING TIME

Dry to Touch: 20 MIN   Dry Through: 1.5 HR
Metallic Polish: 1.5 HR

F. Comments: MIXES AND SPRAYS WELL - NYLON NEEDLE BINDS UP IN GRAPHITE PACKING - NEEDS NYLON PACKINGS - USE NYLON NEEDLE

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P... ct: DuPONT 25P Batch No.: Date: 12/6/90
C... : GRAY Location: KSC Item Coated: 347WB PRIMER
S... ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: X No: Soft: X Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: X No: Type: EPOXY Quantity: 10%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 76 Surface Temp: 76 %RH: 60

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 67 Fluid Pressure(PSI): 4 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: Fair: X Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:	X		
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 9 MILS Dry Film (Average): 6.4 MILS
Maximum Dry Film Thickness Without Sagging: 9 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 4 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES WELL - SPRAYS FAIR - DOES NOT BREAK UP OR FLOW WELL
HIGH BUILD

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr ct: DuPONT IMRON 333 Batch No.: Date: 12/7/90
C : WHITE Location: KSC Item Coated: 25P EPOXY TIE COAT
S ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: X No: Soft: Hard: X Other:
Separation - Yes: X No: Description: MATERIAL ON CAN BOTTOM

B. MIXING - Mechanical Easy: Difficult: X
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 76 Surface Temp: 76 %RH: 60

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 4 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:	X		
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 5 MILS Dry Film (Average): 2.9 MILS
Maximum Dry Film Thickness Without Sagging: 4 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 4 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES FAIR - SPRAYS WELL - SEEMS THIN - RUNS AND DOES NOT COVER SHARP EDGES

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Product: ELITE 4610 Batch No.: Date: 12/10/90
Color: GRAY Location: KSC Item Coated: 26 TATORS
SURFACE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER
A. Settling - Yes: X No: Soft: X Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: X No: Type: WATER Quantity: 10%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 75 Surface Temp: 75 %RH: 60

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66N
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 8 MILS Dry Film (Average): 5.1 MILS
Maximum Dry Film Thickness Without Sagging: 16 MILS
Maximum Dry Film Thickness Without Cracking: 15 MILS

E. DRYING TIME

Dry to Touch: 30 MIN Dry Through: 1 HR
Metallic Polish: 1 HR

F. Comments: MIXES WELL - QUITE HEAVY - NEEDS THINNING TO GET REQUIRED THICKNESS

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Product: ELITE 8915 Batch No.: Date:
Color: BUFF Location: KSC Item Coated: 4610 PRIMER
SURFACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 75 Surface Temp: 75 %RH: 60

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:	X	X	X
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 12 MILS Dry Film (Average): 7 MILS
Maximum Dry Film Thickness Without Sagging:
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 4 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - BUBBLES AFTER MIST COATING - SLOW DRY

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P[illegible]ct: ELITE 4045HS Batch No.: Date: 12/12/90
C[illegible]: WHITE Location: KSC Item Coated: 8915 TIE COAT
S[illegible]ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: X No: Type: T-40 Quantity: 5%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 75 Surface Temp: 75 %RH: 60

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): Dry Film (Average): 2.7 MILS
Maximum Dry Film Thickness Without Sagging:
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 30 MIN Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - LOOKS GOOD - NEEDS THINNING TO GET MILLAGE

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr[illegible]ct: ELITE 154 Batch No.: Date: 12/11/90
C[illegible]: WHITE Location: KSC Item Coated: 4610 PRIMER
S[illegible]ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: X No: Type: WATER Quantity: 5%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 75 Surface Temp: 75 %RH: 60

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 8 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): Dry Film (Average): 2.4 MILS
Maximum Dry Film Thickness Without Sagging:
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 1 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - BUILDS WELL - HARD TO CLEAN UP

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Product: HEMPEL 1562 Batch No.: Date: 2/20/91
Color: GRAY Location: KSC Item Coated: 18 TATORS
SURFACE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 78 Surface Temp: 78 %RH: 50

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66N
Air Cap: 63PB Fluid Pressure(PSI): 4 Air Pressure(PSI): 35

C. HANDLING PROPERTIES

1. Atomization Good: Fair: Poor: X

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:	X	X	X
Uniform Color:	X	X	X
Varying Color:			

Other (Describe): FILM WAS NOT SMOOTH, VERY LUMPY AND ROUGH

D. THICKNESS Wet Film (Average): 6 MILS Dry Film (Average): 3.8 MILS
Maximum Dry Film Thickness Without Sagging: 15 MILS
Maximum Dry Film Thickness Without Cracking: 5 MILS

E. DRYING TIME

Dry to Touch: 1 HR Dry Through: 2 HR
Metallic Polish: 2 HR

F. Comments: FOAM ON TOP OF LIQUID WHEN CAN WAS OPENED - LIQUID FOAMED WHEN MIXING - MIXED MATERIAL WOULD NOT GO THROUGH SCREEN - VERY LUMPY - HAD TO KEEP GUN IN BUCKET OF WATER WHEN NOT ACTUALLY SPRAYING - DIFFICULT TO CLEAN UP

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr... ct: HEMPEL 4813 Batch No.: Date: 2/22/91
C... : WHITE Location: KSC Item Coated: 1562 PRIMER
S... ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 78 Surface Temp: 78 %RH: 60

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 4 Air Pressure(PSI): 15

C. HANDLING PROPERTIES

1. Atomization Good: Fair: X Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:	X	X	X
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 11 MILS Dry Film (Average): 5.1 MILS
Maximum Dry Film Thickness Without Sagging: 12 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 2 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES WELL - SPRAYS WELL AT LOW PRESSURE - DOES NOT FLOW OUT - MAY WORK BETTER WITH AIRLESS - VERY ROUGH - PIN HOLES ON SURFACE

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr...ct: INORGANIC COATINGS IC-531 Batch No.: Date: 11/30/90
C...: GRAY Location: KSC Item Coated: 18 TATORS
... ACE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 74 Surface Temp: 74 %RH: 60

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66N
Air Cap: 63PB Fluid Pressure(PSI): 2 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:	X	X	X
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 6 MILS Dry Film (Average): 3.5 MILS
Maximum Dry Film Thickness Without Sagging: 6 MILS
Maximum Dry Film Thickness Without Cracking: 12 MILS

E. DRYING TIME

Dry to Touch: 30 MIN Dry Through: 1 HR
Metallic Polish: 2 HR

F. Comments: MIXES AND SPRAYS WELL - SEEMS TO RUN QUITE A BIT - VERY SMALL MARGIN BETWEEN A WET SURFACE AND A RUN - USE N65 NYLON NEEDLE

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P... ct: INORGANIC COATINGS IC-46P   Batch No.:   Date: 12/3/90
C... :   Location: KSC   Item Coated: IC-531 PRIMER
S... CE PREPARATION   SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical   Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties   Easy: X   Difficult:
Thinning Required   Yes: X No: Type: WATER   Quantity: 10%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS   Inside Shop: X   Outside: Shade: X   Sun:
Air Temp(F): 80   Surface Temp: 80   %RH: 70

B. EQUIPMENT USED   Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X   Type Gun: BINKS 18 P. CUP   Fluid Tip: 66
Air Cap: 63PB   Fluid Pressure(PSI): 10   Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization   Good: X   Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS   Wet Film (Average): 7 MILS   Dry Film (Average): 2.8 MILS
Maximum Dry Film Thickness Without Sagging: 5 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 1 HR   Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - LOOKS GOOD - HIGHER THICKNESS AREAS STILL STICKY AFTER 24 HOURS

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P... ct: INORGANIC COATINGS IC-46 Batch No.: Date: 12/4/90
C... : WHITE Location: KSC Item Coated: IC-46P TIE COAT
... ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 60

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:	X	X	X
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 8 MILS Dry Film (Average): 3.8 MILS
Maximum Dry Film Thickness Without Sagging: 4 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 1 HR Dry Through: 3 HR
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - LOOKS GOOD

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr[illegible]ct: M. A. BRUDER 24-A-190 Batch No.: Date: 9/17/90
C[illegible]: GRAY Location: KSC Item Coated: 18 TATORS
S[illegible]ACE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER

A. Settling - Yes: X No: Soft: X Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 80

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 8 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 7 MILS Dry Film (Average): 5.3
Maximum Dry Film Thickness Without Sagging: 12 MILS
Maximum Dry Film Thickness Without Cracking: 30 MILS

E. DRYING TIME

Dry to Touch: 20 MIN Dry Through: 1 HR
Metallic Polish: 1 HR

F. Comments: MIXES AND SPRAYS WELL - DOES NOT CLOG GUN - LOOKS GOOD - FLOWS WELL - TAKES PRACTICE TO GET EVEN COVERAGE

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr...ct: M. A. BRUDER 101 Batch No.: Date: 9/18/90
C...: OFF WHITE Location: KSC Item Coated: 24-A-190 PRIMER
S...ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: X No: Type: ZYLOL Quantity: 10%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 80

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 20 Air Pressure(PSI): 60

C. HANDLING PROPERTIES

1. Atomization Good: Fair: X Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:	X		
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): Dry Film (Average): 9.3 MILS
Maximum Dry Film Thickness Without Sagging: 40 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES WELL - SPRAYS FAIR - VERY HEAVY - WOULD BE BETTER WITH AIRLESS - BUBBLES OVER 8 MILS WET FILM THICKNESS

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr   ct: M. A. BRUDER 880HS   Batch No.:   Date: 9/19/90
C : WHITE   Location: KSC   Item Coated: 101 TIE COAT
F ACE PREPARATION   SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: X No: Type: 58 Quantity: 5%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 70

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: Fair: X Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 10 MILS Dry Film (Average): 7 MILS
Maximum Dry Film Thickness Without Sagging:
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 2 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - WOULD SPRAY BETTER WITH AIRLESS

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P: ct: M. A. BRUDER 078 Batch No.: Date: 9/20/90
C : WHITE Location: KSC Item Coated: 24-A-190 PRIMER
S' ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 60

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: Fair: X Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:	X		
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 8 MILS Dry Film (Average): 5.2 MILS
Maximum Dry Film Thickness Without Sagging: 12 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 1 HR Dry Through: 3 HR
Metallic Polish:

F. Comments: MIXES WELL - SPRAYS FAIR - DOES NOT FLOW OUT - BUBBLES BADLY

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Project: BLP MOBILE MO-ZINC 2 Batch No.: Date: 2/6/91
Color: GRAY Location: KSC Item Coated: 26 TATORS
SURFACE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 76 Surface Temp: 76 %RH: 70

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66N
Air Cap: 63PB Fluid Pressure(PSI): 8 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:		X	X
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 7 MILS Dry Film (Average): 4.6 MILS
Maximum Dry Film Thickness Without Sagging: 14 MILS
Maximum Dry Film Thickness Without Cracking: 10 MILS

E. DRYING TIME

Dry to Touch: 45 MIN Dry Through: 1 HR
Metallic Polish: 1 HR

F. Comments: MIXES AND SPRAYS WELL - CRACKS IN CORNERS

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr...ct: BLP MOBILE MOTHANE Batch No.: Date: 2/8/91
C... : WHITE Location: KSC Item Coated: MO-ZINC 2 PRIMER
...ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: X No: Type: 43EF091 Quantity: 10%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 70 Surface Temp: 70 %RH: 50

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 18 Air Pressure(PSI): 60

C. HANDLING PROPERTIES

1. Atomization Good: Fair: X Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:	X		
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 6 MILS Dry Film (Average): 4.3 MILS
Maximum Dry Film Thickness Without Sagging: 8 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 4 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES WELL - SPRAY DOES NOT ATOMIZE WELL - DOES NOT FLOW OUT - SLOW DRY

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P··· ct: PLAS-CHEM 9030 Batch No.: Date: 5/2/91
C··· : GRAY Location: KSC Item Coated: 18 TATORS
S··· ACE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER
A. Settling - Yes: X No: Soft: X Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: SHAKER & PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 70

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 67SS
Air Cap: INT. Fluid Pressure(PSI): 28 Air Pressure(PSI): 38

C. HANDLING PROPERTIES

1. Atomization Good: Fair: Poor: X

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:			
Orange Peel:	X		
Overspray:	X	X	X
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:			
Varying Color:	X	X	X

Other (Describe): DRY SPRAYS BADLY

D. THICKNESS Wet Film (Average): Dry Film (Average): 7 MILS
Maximum Dry Film Thickness Without Sagging: 40 MILS
Maximum Dry Film Thickness Without Cracking: 10 MILS

E. DRYING TIME

Dry to Touch: 1 HR Dry Through: OVERNIGHT
Metallic Polish: OVERNIGHT

F. Comments: MIXES FAIR - TOO HEAVY - VERY HARD TO SPRAY - VERY ROUGH FILM DOES NOT ATOMIZE WELL

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Product: PLAS-CHEM W-9108 Batch No.: Date: 5/1/91
Color: GRAY Location: KSC Item Coated: 18 TATORS
SURFACE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 60

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66N
Air Cap: 63PB Fluid Pressure(PSI): 4 Air Pressure(PSI): 35

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:	X		
Cracking:			X
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 7 MILS Dry Film (Average): 5.5 MILS
Maximum Dry Film Thickness Without Sagging: 6 MILS
Maximum Dry Film Thickness Without Cracking: 4 MILS

E. DRYING TIME

Dry to Touch: 15 MIN Dry Through: 2 HR
Metallic Polish: 2 HR

F. Comments: MIXES AND SPRAYS WELL - RUNS AT OVER 6 MILS DFT

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr[illegible]ct: PLAS-CHEM 2316 Batch No.: Date: 5/3/91
C[illegible]: Location: KSC Item Coated: 9030 PRIMER
S[illegible]ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: Difficult: X
Thinning Required Yes: X No: Type: ZYLENE Quantity: 10%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 70

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 20 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: Fair: Poor: X

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:			
Orange Peel:	X	X	X
Overspray:			
Bubbles and Pinholes:	X		
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): Dry Film (Average): 12 MILS
Maximum Dry Film Thickness Without Sagging: 20 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 3 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES FAIR - MATERIAL VERY THICK - DOES NOT SPRAY WELL - DOES NOT FLOW OUT

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr[illegible]ct: PLAS-CHEM 2885 Batch No.: Date: 5/6/91
C[illegible]: WHITE Location: KSC Item Coated: 2316 TIE COAT
SU[illegible]ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 70

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 4 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 4 MILS Dry Film (Average): 2.8 MILS
Maximum Dry Film Thickness Without Sagging: 6 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 4 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - LOOKS GOOD - SURFACE STILL STICKY NEXT DAY

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P[illegible]ct: PORTER 311 Batch No.: Date: 11/5/90
C[illegible]: GRAY Location: KSC Item Coated: 18 TATORS
S[illegible]ACE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER

A. Settling - Yes: X No: Soft: X Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 70

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 4 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:	X	X	X
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 7 MILS Dry Film (Average): 5.6 MILS
Maximum Dry Film Thickness Without Sagging: 20 MILS
Maximum Dry Film Thickness Without Cracking: 15 MILS

E. DRYING TIME

Dry to Touch: 30 MIN Dry Through: 1 HR
Metallic Polish: 1 HR

F. Comments: MIXES WELL - SPRAYS FAIR - VERY THIN - FLASHES TOO FAST - DRY SPRAY PROBLEMS

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P··ct: PORTER ZL-99   Batch No.:   Date: 11/7/90
C··: GRAY   Location: KSC   Item Coated: 18 TATORS
S ACE PREPARATION   SSPC: SP 5   Abrasive: S. SAND   Profile: 2.0   Other:

CONDITION IN CONTAINER
A. Settling - Yes: X No: Soft: X Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS   Inside Shop: X   Outside: Shade: X   Sun:
Air Temp(F): 80   Surface Temp: 80   %RH: 70

B. EQUIPMENT USED   Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X   Type Gun: BINKS 18   Fluid Tip: 66
Air Cap: 63PB   Fluid Pressure(PSI): 5   Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization   Good: X   Fair: Poor:

2. COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS   Wet Film (Average):   Dry Film (Average): 4.2 MILS
Maximum Dry Film Thickness Without Sagging: 8 MILS
Maximum Dry Film Thickness Without Cracking: 10 MILS

E. DRYING TIME

Dry to Touch: 15 MIN   Dry Through: 1 HR
Metallic Polish: 2 HR

F. Comments: MIXES FAIR - CLOGS STRAINING SCREEN - SPRAYS WELL - DRIES FAST
DOES NOT CAUSE GUN PROBLEMS

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P[illegible]ct: PORTER IZ91N Batch No.: Date: 11/21/90
C[illegible]: GRAY Location: KSC Item Coated: 18 TATORS
S[illegible]ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 60

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 3 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:	X		
Cracking:	X	X	X
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): Dry Film (Average): 5.8 MILS
Maximum Dry Film Thickness Without Sagging: 6 MILS
Maximum Dry Film Thickness Without Cracking: 6 MILS

E. DRYING TIME

Dry to Touch: 30 MIN Dry Through: 2 HR
Metallic Polish: 2 HR

F. Comments: MIXES WELL - DOES NOT SPRAY WELL - CLOGS GUN - BUILDS UP ON AIR CAP - KEPT GUN IN WATER BUCKET WHEN NOT SPRAYING

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P[...]uct: PORTER TQ-4374H Batch No.: Date: 11/6/90
C[...]: DARK GRAY Location: KSC Item Coated: 18 TATORS
S[...]ACE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER

A. Settling - Yes: X No: Soft: X Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 70

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 4 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:			
Varying Color:	X	X	X
Other (Describe):			

D. THICKNESS Wet Film (Average): 6 MILS Dry Film (Average): 3.9 MILS
Maximum Dry Film Thickness Without Sagging: 13 MILS
Maximum Dry Film Thickness Without Cracking: 15 MILS

E. DRYING TIME

Dry to Touch: 20 MIN Dry Through: 1 HR
Metallic Polish: 2 HR

F. Comments: MIXES AND SPRAYS WELL - VERY THIN - HARD FILM - LOOKS GOOD

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr ct: PORTER FR-51 Batch No.: Date: 11/7/90
C : WHITE Location: KSC Item Coated: PORTER ZINC PRIMERS
S ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 70

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 8 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: Fair: X Poor:

2. COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:	X	X	X
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): Dry Film (Average): 7.7 MILS
Maximum Dry Film Thickness Without Sagging: 12 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 20 MIN Dry Through: 1 HR
Metallic Polish:

F. Comments: MIXES AND WELL - COULD USE A LITTLE THINNING - DRIES FAST

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Product: PORTER 8910 Batch No.: Date: 11/9/90
Color: WHITE Location: KSC Item Coated: FR-51 TIE COAT
SURFACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 60

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 3 Air Pressure(PSI): 50

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 4 MILS Dry Film (Average): 2.5 MILS
Maximum Dry Film Thickness Without Sagging: 6 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 2 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - LOOKS GOOD

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P[illegible]uct: SHERWIN WILLIAMS ZINC CLAD II Batch No.: Date: 9/10/90
C[illegible]: GRAY Location: KSC Item Coated: 18 TATORS
S[illegible]ACE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER
A. Settling - Yes: X No: Soft: Hard: X Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 75

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 8 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:	X	X	X
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 7 MILS Dry Film (Average): 3.9 MILS
Maximum Dry Film Thickness Without Sagging: 10 MILS
Maximum Dry Film Thickness Without Cracking: 11 MILS

E. DRYING TIME

Dry to Touch: 30 MIN Dry Through: 2 HR
Metallic Polish: 3 HR

F. Comments: MIXES AND SPRAYS WELL - DRIES TOO FAST - TENDS TO DRY OVER-SPRAY - MUST SPRAY WET COAT TO GET SMOOTH FINISH

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P... ct: SHERWIN WILLIAMS ZINC CLAD 10 Batch No.: Date: 9/5/90
C... : GRAY Location: KSC Item Coated: 18 TATORS
S... ACE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 75

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:	X		
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 6 MILS Dry Film (Average): 4 MILS
Maximum Dry Film Thickness Without Sagging: 8 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 30 MIN Dry Through: 2 HR
Metallic Polish: 2 HR

F. Comments: MIXES WELL - SPRAYS FAIR - TENDS TO CLOG NEEDLE AND TIP AFTER SPRAYING 5 MINUTES - RUNS IF APPLIED OVER 8 MILS WET

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P[illegible]ct: SHERWIN WILLIAMS B67H5 Batch No.: Date: 9/13/90
C[illegible]: TAN Location: KSC Item Coated: S/W ZINC PRIMERS
S[illegible]ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: X No: Type: 58 Quantity: 5%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 70

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:	X	X	X
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 6 MILS Dry Film (Average): 5 MILS
Maximum Dry Film Thickness Without Sagging: 15 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 1 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - MUST MIST COAT TO REDUCE BUBBLING

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P...ct: SHERWIN WILLIAMS B65W300 Batch No.: Date: 9/14/90
C...: WHITE Location: KSC Item Coated: B67H5 TIE COAT
S...ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: X No: Type: 58 Quantity: 5%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 80 Surface Temp: 80 %RH: 70

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 5 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): Dry Film (Average): 2.9 MILS
Maximum Dry Film Thickness Without Sagging:
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 2 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - LOOKS GOOD

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Product: SIGMA 7550 Batch No.: Date: 1/7/91
Color: RED-GRAY Location: KSC Item Coated: 18 TATORS
SURFACE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 76 Surface Temp: 76 %RH: 50

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66N
Air Cap: 63PB Fluid Pressure(PSI): 2 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:		X	
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 7 MILS Dry Film (Average): 4 MILS
Maximum Dry Film Thickness Without Sagging: 5 MILS
Maximum Dry Film Thickness Without Cracking: 12 MILS

E. DRYING TIME

Dry to Touch: 45 MIN Dry Through: 1 HR
Metallic Polish: 1 HR

F. Comments: MIXES AND SPRAYS WELL - VERY THIN - RUNS AROUND CHANNEL

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

P··ct: SIGMA 5483 Batch No.: Date: 1/8/91
C··: TAN Location: KSC Item Coated: 7550 PRIMER
S· ACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: X No: Soft: X Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: SHAKER
Hand Mixing Properties Easy: Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 76 Surface Temp: 76 %RH: 50

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 6 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 6 MILS Dry Film (Average): 3.7 MILS
Maximum Dry Film Thickness Without Sagging: 9 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 3 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - BUILDS FAST - DOES NOT BUBBLE - SLOW DRY

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Product: SIGMA 5529 Batch No.: Date: 1/9/91
Color: WHITE Location: KSC Item Coated: 5483 TIE COAT
SURFACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 76 Surface Temp: 76 %RH: 50

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 8 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: Fair: X Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 5 MILS Dry Film (Average): 2.2 MILS
Maximum Dry Film Thickness Without Sagging: 4 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 4 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES WELL - SPRAYS FAIR - NEEDS THINNING - RUNS OVER 4 MILS DRY

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Product: SOUTHERN CHEMTEC 600   Batch No.:   Date: 1/16/91
Color: GRAY   Location: KSC   Item Coated: 18 TATORS
SURFACE PREPARATION   SSPC: SP 5   Abrasive: S. SAND   Profile: 2.0   Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical   Easy: X   Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties   Easy: Difficult:
Thinning Required   Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS   Inside Shop: X   Outside: Shade: X   Sun:
Air Temp(F): 74   Surface Temp: 74   %RH: 60

B. EQUIPMENT USED   Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X   Type Gun: BINKS 18   Fluid Tip: 66N
Air Cap: 63PB   Fluid Pressure(PSI): 8   Air Pressure(PSI): 30

C. HANDLING PROPERTIES

1. Atomization   Good: X   Fair: Poor:

2. COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:	X		
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS   Wet Film (Average): 6 MILS   Dry Film (Average): 3.9 MILS
Maximum Dry Film Thickness Without Sagging: 8 MILS
Maximum Dry Film Thickness Without Cracking: 8 MILS

E. DRYING TIME

Dry to Touch: 45 MIN   Dry Through: 2 HR
Metallic Polish: 2 HR

F. Comments: MIXES WELL - SPRAYS FAIR - TIP PLUGS UP AFTER SPRAYING FOR 5 MINUTES - MANY PATICLES IN FINISH THAT DID NOT STRAIN OUT

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr...ct: SOUTHERN 601 Batch No.: Date: 1/17/91
C...: WHITE Location: KSC Item Coated: CHEMTEC 601 PRIMER
SU...CE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: X No: Type: WATER Quantity: 5%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 75 Surface Temp: 75 %RH: 60

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: Fair: X Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:	X		
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 9 MILS Dry Film (Average): 6.3 MILS
Maximum Dry Film Thickness Without Sagging: 15 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 1 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES WELL - SPRAYS FAIR - NEEDS AIRLESS - DOES NOT FLOW - STILL STICKY AFTER 6 DAYS

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr...ct: VALSPAR V13-F-12 Batch No.: Date: 1/29/91
C...: GREEN Location: KSC Item Coated: 30 TATORS
S... CE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER

A. Settling - Yes: X No: Soft: X Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: SHAKER & PNEUMATIC
Hand Mixing Properties Easy: Difficult: X
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS
Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 76 Surface Temp: 76 %RH: 50

B. EQUIPMENT USED
Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66N
Air Cap: 63PB Fluid Pressure(PSI): 15 Air Pressure(PSI): 45

C. HANDLING PROPERTIES

1. Atomization Good: Fair: X Poor:

2. COATING APPEARANCE

COATING APPEARANCE	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS
Wet Film (Average): 6 MILS Dry Film (Average): 4.1 MILS
Maximum Dry Film Thickness Without Sagging: 8 MILS
Maximum Dry Film Thickness Without Cracking: 6 MILS

E. DRYING TIME

Dry to Touch: 1 HR Dry Through: 3 HR
Metallic Polish: 3 HR

F. Comments: MIXES AND SPRAYS WELL - NEEDS SOME THINNING

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr[illegible]ct: VALSPAR 13-F-6 Batch No.: Date: 1/28/91
C[illegible]: GRAY Location: KSC Item Coated: 30 TATORS
S[illegible]CE PREPARATION SSPC: SP 5 Abrasive: S. SAND Profile: 2.0 Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: X Difficult:
Type Mixer Blade: PNEUMATIC
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 74 Surface Temp: 74 %RH: 60

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 Fluid Tip: 66N
Air Cap: 63PB Fluid Pressure(PSI): 5 Air Pressure(PSI): 35

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:	X		
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 6 MILS Dry Film (Average): 2.6 MILS
Maximum Dry Film Thickness Without Sagging: 5 MILS
Maximum Dry Film Thickness Without Cracking: 20 MILS

E. DRYING TIME

Dry to Touch: 45 MIN Dry Through: 1.5 HR
Metallic Polish: 1.5 HR

F. Comments: MIXES FAIR - POWDER HAS LUMPS - SPRAYED WELL BUT HAD SOME LUMPS THAT WOULD NOT STRAIN OUT - RUNS OVER 8 MILS WET

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Pr...ct: VALSPAR 76 Batch No.: Date: 1/30/91
C...: WHITE Location: KSC Item Coated: VALSPAR ZINC PRIMERS
SU...CE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER
A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: No: X Type: Quantity:

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 76 Surface Temp: 76 %RH: 70

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 60

C. HANDLING PROPERTIES

1. Atomization Good: Fair: X Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:			
Fairly Smooth:	X	X	X
Orange Peel:			
Overspray:			
Bubbles and Pinholes:	X		
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 6 MILS Dry Film (Average): 4.1 MILS
Maximum Dry Film Thickness Without Sagging: 5+ MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 4 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES WELL - SPRAYS FAIR - NEEDS THINNING - DRIES SLOW

VOC COMPLIANT STUDY
MATERIAL APPLICATION REPORT

Product: VALSPAR 54 Batch No.: Date: 2/14/91
Color: WHITE Location: KSC Item Coated: 76 TIE COAT
SURFACE PREPARATION SSPC: Abrasive: Profile: Other:

CONDITION IN CONTAINER

A. Settling - Yes: No: X Soft: Hard: Other:
Separation - Yes: No: X Description:

B. MIXING - Mechanical Easy: Difficult:
Type Mixer Blade:
Hand Mixing Properties Easy: X Difficult:
Thinning Required Yes: X No: Type: 7-T-59 Quantity: 5%

APPLICATION CONDITIONS AND COATING PROPERTIES (REPORT ON EACH PRODUCT APPLIED)

A. ENVIRONMENTAL CONDITIONS Inside Shop: X Outside: Shade: X Sun:
Air Temp(F): 76 Surface Temp: 76 %RH: 60

B. EQUIPMENT USED Airless: Type:
Ratio: Tip: Airmotor Pressure:
Conventional: X Type Gun: BINKS 18 P. CUP Fluid Tip: 66
Air Cap: 63PB Fluid Pressure(PSI): 10 Air Pressure(PSI): 60

C. HANDLING PROPERTIES

1. Atomization Good: X Fair: Poor:

2. COATING APPEARANCE

	FLAT AREAS	ANGLES & CORNERS	WELD SEAM
Smooth w/ Fair Flow:	X	X	X
Fairly Smooth:			
Orange Peel:			
Overspray:			
Bubbles and Pinholes:			
Sags and Runs:			
Cracking:			
Uniform Color:	X	X	X
Varying Color:			
Other (Describe):			

D. THICKNESS Wet Film (Average): 6 MILS Dry Film (Average): 2.8 MILS
Maximum Dry Film Thickness Without Sagging: 4 MILS
Maximum Dry Film Thickness Without Cracking:

E. DRYING TIME

Dry to Touch: 4 HR Dry Through: OVERNIGHT
Metallic Polish:

F. Comments: MIXES AND SPRAYS WELL - NEEDS A LITTLE THINNER - SHORT POT LIFE