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FINAL REPORT

TESTING AND EVALUATION OF SPECIALTY ARCHITECTURAL COATINGS

CONTRACT #A4-166-48

CALCOAST ANALYTICAL LABS

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PREPARED FOR CALIFORNIA AIR RESOURCES BOARD

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DISCLAIMER

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1. ABSTRACT

This study deals with the evaluation of currently available water borne and/or low solvent content products within fourteen ARB cited categories of specialty air drying architectural coatings for compliance with acceptable commercial use standards.

The compositional properties evaluated included calculated volatile organic compound (VOC) content. The fourteen (14) categories examined were selected from a group of twenty four (24) categories for which coating manufacturers have been unable to develop coatings to comply with low solvent regulations.

A testing format was chosen to provide performance and compositional information allowing comparison of low solvent or water borne coatings with currently accepted industry standards.

Samples for the study were obtained by a third party and coded to provide a double blind test method.

The coatings were evaluated for volatile organic content compliance with the existing Technical Review Group approved architectural coatings rule and evaluated within each use category for market acceptability.

The "State of the Technology" of polymer and additive development and formulation of high solids and water borne coatings is explored.

2. SUMMARY AND CONCLUSIONS

Although some portion of thirty seven criteria were tested for each sample (see Test Protocol pg. 42), some criteria are more specific to rating a coating for its efficacy within a category. For the purpose of this evaluation, certain test results are assigned weighting factors to highlight their usefulness as prime criteria in arriving at a numerical rating for each of the samples tested. In our experience the prime criteria chosen are the most useful within the framework of the California Air Resources Board definitions (pg. 47). The ratings are tabulated in the Review of Performance Properties (pg. 33).

Category 1: Concrete Curing Compounds

Five of the samples out of a total of ten were V.O.C. compliant with V.O.C. limit of 350 gms/litre. The overall performance and specifically moisture retention and alkali resistance properties were superior for non-compliant coatings (samples 1,5,6,7). A two component high solids system (sample 3) showed similar performance properties to the noncompliant coatings but historically a two component system is labor intensive and generally more expensive than single component coatings. The prime criteria in this category are moisture retention, alkali resistance, adhesion, application properties and stability of the product. These account for 85% of the rating assigned to each of ten samples. Water based V.O.C. compliant coatings tested were unacceptable substitutes for existing concrete curing compounds.

Category 2: General Sealers-Concrete

The product information supplied with coatings in this category specified concrete and masonry as substrate and therefore the heading is more appropriately "Concrete Sealers."

All four coatings evaluated were V.O.C. compliant with the limit of 350 gms/litre. Only two of the total four samples were recoatable and since recoatability is, by definition of this category, a primary function, two coatings (samples 3, JFN-12) are eliminated as useful or acceptable. The remaining coatings are low solids (25%), low viscosity polymer emulsion concrete sealers. Both coatings showed fair to poor humidity resistance, no resistance to ferrous metal bleeding and marginal adhesion to concrete. We conclude that this category was under-sampled and that the samples submitted do not meet with the current market demands for concrete sealers. Eight prime criteria, notably adhesion and recoatability (30% of total), were used to assign ratings to the four samples tested. Evaluation criteria also included stability, dry time, enamel holdout, application properties, humidity resistance and stain resistance.

Category 3: Industrial Maintenance Primers

All seven samples submitted were V.O.C. compliant with the limit of 420 gms/litre. Two coatings, one pigmented polymer emulsion (sample 16-1) and one high solids solvent based formulation (sample JFN-1), showed overall best performance and provide reasonable and acceptable levels for current use requirements. The high solids coating was slower drying and required reduction with 1.1.1 Trichloroethane to allow satisfactory spraying but was easily brush and roller applied directly from the container. The superior moisture resistance characteristics of sample 16-1 over other polymer emulsion coatings in this category indicates that proper selection of polymer and formulation are requisite for acceptable performance of waterborne coatings. Eight primer criteria including salt spray corrosion resistance, enamel holdout and intercoat adhesion account for 90% of the rating assigned each of seven samples.

The duration of salt spray testing was 200 hours ASTM B117, 5% salt solution. The C.A.R.B. definition for this category is vague and implies that in severe corrosion environments ferrous metal can be adequately protected by samples represented in this category. There is no comparison between the efficacy of samples tested in terms of corrosion resistance with, for example, either organic or inorganic zinc rich primers.

The best performance of the water based submittals is comparable to lower cost alkyd primers such as Federal Specification TTP636.

Differentiation must be made between short term maintenance cycle coatings and those which are required to provide long term service under more severely corrosive conditions.

Category 4: Industrial Maintenance Topcoats

All nine samples submitted were V.O.C. compliant with the limit of 420 gms/litre. By definition chemical, abrasion, ultra violet and water resistance comprise the major evaluation criteria for this category. In general, salt spray resistance is poor for all water based coatings. One high solids formulation (JFN2) showed best overall performance. Typically, the dry time was longer than for waterborne coatings, and a reduction in viscosity by a 10% by volume dilution with 1.1.1 Trichloroethane was necessary to allow satisfactory spraying properties. None of the water based products provides satisfactory performance properties. The V.O.C. level of the high solids coating (159 gms/litre) is substantially lower than the projected 420 gms/litre limit. The high solids coatings are much more difficult to apply than conventional solvent borne systems.

Category 5: Lacquers

Two samples out of a total of five were compliant with the limit of 680 gms/litre. Three samples were conventional solvent based lacquers (samples 1,2,3). Two conventional products had V.O.C. levels extremely close to the projected 680 gms/litre. Of the two compliant coatings evaluated, one waterborne (solution) resin performed practically equally to the conventional coatings. Two major areas of failure of both water based coatings were grain raising on wood, and corrosion resistance on ferrous metal.

Other physical properties of the solution water based lacquer are equal to the conventional lacquer coatings including adhesion, flexibility, impact resistance, hardness and drytime. The V.O.C. of the water based lacquer is essentially zero. Of the eight prime criteria used to provide 80% of the rating for the five samples in this category, dry time, adhesion, hardness and application properties provided the best methods for differentiation between the samples tested.

We conclude that the existing grain raising problem limits the water based laquer usefulness on wood; the poor corrosion resistance properties limit use to well primed steel.

This category was not adequately represented by waterborne coatings.

Category 6: Opaque Stains

A total of eleven samples were submitted for evaluation. Seven samples were V.O.C. compliant with the limit of 350 gms/litre. One coating was solvent based and was very close to V.O.C. compliance. Ten samples were waterborne. Water based opaque stains showed performance properties equal to or exceeding conventional solvent based stains. We assumed the purpose of this category was for exterior application and thus grain raising was given a lower weighting. Water repellancy and bleed resistance appeared to be a formulation dependant parameter since efficacy varied greatly between coatings of similar generic composition. The prime criteria for this category which were given a total of 70% weighting were accelerated weathering resistance, hiding power (contrast ratio) and to a lesser extent, water repellancy, dry time, and package stability. We conclude that V.O.C. compliant waterborne coatings meet the standards of current market demands.

Category 7: Opaque Wood Preservatives

Four samples were evaluated in this category and only one was V.O.C. compliant with the limit of 350 gms/litre. The compliant coating gave overall fair performance but does not equal the efficacy of the non-compliant coatings. This category was under-sampled. The two primary weighting criteria were fungus resistance and water repellancy comprising 60% weighting. No conclusions can be made with respect to the usefulness of V.O.C. compliant coatings due to under sampling.

Category 8: Quick Dry Enamels

None of the six samples evaluated were V.O.C. compliant with the limit of 400 gms/litre. One water based enamel with a V.O.C. of 505 gms/litre showed excellent performance properties within the category definition. Three of the solvent based coatings had V.O.C. levels of approximately 450 gms/litre which is close to the current requirement. The water based coatings failed salt spray exposure but only minor weighting was given to corrosion resistance. Of the eight prime criteria weighted, one or more of block resistance, gloss and adhesion tests were failed by five of the six samples. We conclude that water based quick dry enamels can be formulated to perform to industry requirements but not within the proposed V.O.C. limits using V.O.C. minus water calculations.

Category 9: Roof Coatings

Six samples were evaluated. All were V.O.C. compliant with the limit of 300 gms/litre. The sampling in this category was not representative of the spectrum of currently marketed types of fluid applied roof coatings. Of six samples, three were asphalt or modified asphalt coatings. One sample (#4) was clearly a patching material with an extremely high viscosity and should more correctly be evaluated with category 13. A high weighting factor was assigned to tensile/elongation properties which improved the rating performance of the three water based samples. The water based samples are more properly represented in category 13 as elastomers.

Although the weighted performance criteria assigned apparently superior properties to the water based materials, by definition Roof Coatings should be more heavily evaluated for ponding water and moisture vapor transmission data. The water based coatings all showed inferior ponding water resistance. The asphaltics gave poor ultra violet resistance results and are therefore unacceptable as a roof coating without some type of U.V. resistant surface coating. We believe that roof systems should be evaluated, not simply roof coatings.

We conclude that the waterborne submittals are not useful as primary roof coating membranes but as secondary surface coatings on well drained (non ponding) roof surfaces.

The high solids compliant coatings have limited usefulness as roof coatings due to poor ultra violet resistance.

Category 10,11,12: Specialty Primers, Sealers and Undercoaters

Six total samples were evaluated; five were V.O.C. compliant with the limit of 350 gms/litre. The criteria used for evaluation of the performance properties of the six samples were application properties, adhesion, humidity resistance and alkali resistance. All of the V.O.C. compliant coatings achieved similar ratings and performed slightly better than the V.O.C. non-compliant coating.

Grain raising was included as an evaluation criteria for specialty undercoaters since traditionally undercoaters are used on wood. The information supplied with the samples in most cases did not delineate specific specialty function and therefore only general tests were performed within categories 10,11 and 12.

Specialty functions include:

a. adhesion to deteriorated or chalky masonry
b. resistance to ferrous metal bleed
c. resistance to asphalt bleed
d. sealing smoke damaged substrata, etc.

The evaluation indicates that the performance for compliant vs. non-compliant coatings is generally equal but in the absence of the critical use weighting factor, no real conclusions with respect to efficacy can be made.

Category 13: Waterproofing Mastics-Elastomers

Five samples of six total were V.O.C. compliant with the limit of 300 gms/litre. The samples consisted primarily of asphaltic (cut backs) solutions and generally ranged around 250 gms/litre V.O.C. These coating types are generally used as roof patching materials or for below grade vertical waterproofing. By definition only one sample was correctly allocated as a high build elastomer.

Alkali resistance was added to this category as an important evaluation factor.
All of the asphaltic materials exhibited equal alkali resistance to JFN-11. The ponding water resistance in this category is more appropriately replaced by moisture vapor transmission tests. Tensile/elongation values were heavily weighted and generally failed by the asphaltic coatings.

We conclude that high solids asphaltic coatings meet both the V.O.C. limits and current market demands for waterproofing mastics. None of the asphaltics function as elastomers.

Category 14: Waterproofing Sealers

A total of nine samples were evaluated of which two samples were V.O.C. compliant with the limit of 400 gms/litre. The best rating was achieved by V.O.C. non-compliant coatings.

Alkali resistance and water repellancy were generally better for non-compliant coatings, but sample 1 and JFN-10, both V.O.C. compliant coatings gave excellent alkali resistance and reasonable water repellancy values. Both tests were used as prime evaluation criteria.

We conclude that in general, non compliant coatings are superior in this cateogry. High solids solvent based coatings perform adequately and are comparable to conventional V.O.C. non compliant coatings but require reduction with exempt solvents for spray application.

General Comments

In all categories of coatings tested which require low water permeance such as #1 Concrete Curatives, #3 and #4 Industrial Maintanance Primers and Topcoats, #9 Roof Coatings, #13 and 14 Waterproofing Mastics and Sealers, the waterborne coatings as emulsions, solutions or dispersions performed unsatisfactorily.

In categories #5 Lacquers, #8 Guick Dry Enamels, or #6 Opaque Stains where corrosion resistance or moisture is of limited concern, water based coatings perform satisfactorily in the majority of physical properties and High Solids Coatings provide equal corrosion control properties to conventional systems but in general are slower curing and more difficult to apply, requiring reduction with exempt solvents to maintain V.O.C. compliance levels.

In our gas chromatographic analysis of solvent borne coatings in this study with high and low solids, no exempt chlorinated solvents were detected.

It appears that the manufacturers of Architectural Coatings are avoiding the use of chlorinated solvents despite the exempt status. We believe the avoidance of chlorinated solvents is due to possible harmful health effects.

Two component systems such as epoxy-polyamide, epoxy acrylates, polyurethanes, urethane acrylics and the like offer a solution to corrosion control and moisture permeability but are in general difficult to use and expensive when compared to conventional non compliant coatings.

The future of waterborne coatings as adequate replacements for conventional low solids coatings will depend on providing an improved mechanism of curing or cross linking of the dispersion resins and a reduction of persistent hydrophylic functionality.

In macromulecular emulsions, polymer research is currently being undertaken to reduce the effect of residual surfactants, optimize the structure, particle size distribution, and functionality of the polymers to reduce both resolvation potential and interstitial voids.

The coatings industry does not have available at this time broad spectrum polymer systems which will function with equivelant efficiency when compared to traditional low solids coatings in economy or performance.

3. RECOMMENDATIONS

Category 1: Concrete Curing Compounds

The non-compliant coatings are superior in performance to V.O.C. compliant coatings. The closest value, 470 gms/litre, exceeds the recommended limit of 350 gms/litre. The only exception to non compliant coating superiority is a two component epoxy system with a V.O.C. of 303 gms/litre. This type of coating is probably more expensive and more difficult to use than present non V.O.C. compliant systems. We recommend that the proposed V.O.C. limit be increased to 470 gms/litre.

Category 2: General Sealers

No recommendations are made for this category based on undersampling. Only four samples were provided for testing and only two of the samples passed recoatability tests. All of the coatings evaluated were designed for concrete.

Category 3: Industrial Maintenance Primers

The current proposed V.O.C. limit is 420 gms/litre. We recommend that this category be redefined to exclude certain industrial environments where severe corrosion conditions prevail.

None of the samples submitted has corrosion resistance properties approaching other single component zinc rich organic or inorganic primers.

The 420 gms/litre limit should apply to use requirements similar to currently marketed shop primers such as TTP636.

Category 4: Industrial Maintenance Topcoats

We recommend that the proposed limit be maintained at 420 gms/litre. The performance properties of one high solids coating indicate that potentially a lower V.O.C. limit can be proposed.

All of the water based samples failed corrosion resistance tests. The definition of industrial maintenance topcoats is vaque in that no differentiation of levels of corrosion inhibition is cited. The performance level of the tested V.O.C. compliant coatings is equal to that of Federal Specification TTE489, Alkyd Gloss Enamel.

Category 5: Lacquers

The proposed limit of 680 gms/litre has been effected by the industry. Further evaluation of waterborne systems is recommended.

Performance evaluation of water based lacquers shows promise for eventual reduction of the current V.O.C. limit.

Category 6: Opaque Stains

We recommend that the proposed V.O.C. limit be maintained a 350 gms/litre. V.O.C. compliant stains performed equal to non compliant stains. This category provides protential for further V.O.C. reductions.

Category 7: Opaque Wood Preservatives

We recommend further sampling and evaluation in this category since only four samples were tested and only one sample was V.O.C. compliant. The compliant coating was ranked 3rd out of four and failed water repellancy tests.

Category 8: Quick Dry Enamels

We recommend that the proposed V.O.C. limit of 400 gms/litre be increased to 450 gms/litre. None of the coatings evaluated in this category complied with the 400 gms/litre limit.

Category 9: Roof Coatings

No recommendations are made for this category based on inadequate sampling. The samples submitted were not representative of the broad range of currently marketed roof coatings.

Category 10,11 and 12: Specialty Primers, Sealers, Undercoaters

These categories require more evaluation based on the specialty use of individual coatings. Inadequate information was provided with sampling to allow specific use capabilities of the coatings.

Category 13: Waterproofing Mastics- Elastomers

We recommend the current proposed V.O.C. limit of 300 gms/litre be maintained. The high solids coatings evaluated performed satisfactorily for current market demands.

Category 14: Waterproofing Sealers

We recommend that the proposed V.O.C. limit of 400 gms/litre be maintained. The recommendation is based on one pigmented high solids coating which performed equal to non compliant coatings.

4. CONTRACT HISTORY

Air pollution created by organic solvent emissions during the manufacturing and curing process of applied coatings creates serious health and environmental problems. Photochemically reactive solvents such as branched ketones, the various aromatics normally associated with other low molecular weight hydrocarbon emissions, and nitrogen oxides undergo ultra-violet catalysis creating ozone and other oxidants. Low level organic solvent systems for coatings provides a means of significantly reducing current organic pollutant levels.

The substitution for solvent dispersable resin systems by low molecular weight hydrophylic dispersion resins, colloidal dispersions and macromolecular emulsion polymers or low molecular weight solution resins in coatings creates physical and performance problems intrinsic to the chemical and physical properties of the molecular system. These problems must be overcome by formulation to comply with product use requirements.

The contract for Testing and Evaluation of Specialty Architectural Coatings #A4-166-48 was awarded to Calcoast Labs in July, 1985 by the California Air Resources Board (C.A.R.B.) to investigate progress by the coatings manufacturing industry in the reduction of volatile organic compounds in certain Architectural Coating categories. The purpose of the work was to evaluate volatile organic level in unit volumes of coating manufactured and assess the performance and application properties of low level organic solvent coatings compared with conventional solvent based coatings.

Problems were encountered in instrumenting and awarding a separate contract for a sample collection program with a third party not associated with Calcoast Labs. The sampling contract was awarded to Athey Technologies.

The first samples were received by the laboratory on March 13, 1986. Between March 13 and March 25, fifty five samples were received. Between March 26 and April 30, thirty three further samples were received, for a total of eighty eight (88).

Testing was initiated immediately upon sample acquisition and it became apparent within one (1) week of testing that duplicate samples had been provided to the laboratory. C.A.R.B. was notified of these redundant test results and a total of seven (7) duplicates were identified. Testing of duplicate samples was terminated under C.A.R.B. direction. The total number of testable samples was therefore reduced to eighty one (81).

A total projected sampling for the contract included six (6) samples in each of fourteen (14) categories with the exception of category 3 Industrial Maintenance Primers and category 4 Industrial Maintenance Topcoats. It was assumed that four (4) resin types could be sampled in each of categories 3 and 4 and therefore the total samples would be one hundred and twenty (120).

Categories		Total Samples
12	x 6 =	72
2	x 24=	48
14		120

Difficulty was encountered by the sample acquisition contractor in finding the six samples in each of four differing resin types for categories three, Industrial Maintenance Primers, and four, Industrial Maintenance Primers which complied with projected VOC limts.

The cost of testing duplicates which were abandoned after discovery used up a significant amount of the category 3 and category 4 budgets.

The unit contract price for testing the projected twenty four samples in categories 3 and 4 were substantially lower than unit costs in the twelve other categories due primarily to reduced laboratory costs.

The total sample budget was therefore reduced to ninety five (95) samples.

With the aforementioned eighty one (81) testable samples we were concerned with distribution. Assuming an even distribution of six samples per category, the following discrepancies occurred:

Category	Total Samples
2	3
5	4
7	3
13	5

(ie) 9 total samples deficient in four categories

C.A.R.B. was apprised of this fact and accordingly, the laboratory received eight (8) samples labelled JFN on July 11, 1986.

Initial tests were run to determine V.O.C. in order to select the most valuable samples based on:

a. V.O.C. compliance
b. Distribution into deficient categories

Only one sample, JFN 5 (category 5) fit into a sample deficient category. All JFN samples proved to be V.O.C. compliant and were thus incorporated into the test program. Total samples 89.

Additional samples received:

JFN 11 (category 13) and JFN 12 (category 2) were received on Sept 10, 1986

JFN 13 (category 7) was received on October 15, 1986

All samples relieved deficiencies in categories and were included in our testing. Total samples 92.

We increased total samples to 95 by including three samples from our reserve of over-sampled categories which tested as VOC compliant.

As it was important to complete testing of all of the later submittals, a final or interim report was delayed.

Calcoast Labs, as a fully equipped Coatings Testing Laboratory, provided a revised testing protocol for each of the fourteen coating categories based on the original request for proposals from C.A.R.B.

The test procedures used were from either American Society for Testing Materials (ASTM) or U.S. Federal Test Method Standard 141.

5. CATEGORY, NUMERICAL DESIGNATION

The following numerical designation for the tested categories is used in the text.

Category	Total Samples Tested
1. Concrete Curing Compounds	10
2. General Sealers	4
3. Industrial Maintenance Primers	7
4. Industrial Maintenance Topcoats	9
5. Lacquers	5
6. Opaque Stains	11
7. Opaque Wood Preservatives	4
8. Quick Dry Enamels	6
9. Roof Coatings	6
10. Specialty Primers	6
11. Specialty Sealers	6
12. Specialty Undercoaters	6
13. Waterproofing Mastics- Elastomers	6
14. Waterproofing Sealers	9

6. DISCUSSION OF TEST RESULTS

CATEGORY 1: Concrete Curing Compounds

A weighting factor of 30 was allocated to moisture retention, ASTM C156. The uncoated control in these tests averaged 1.3 Kg/M^2.24 hrs. and therefore an arbitrary efficacy number of 0.25 $Kg.M^2$.24 hrs. was assigned and the rating scaled accordingly.

With the exception of sample 3, the compliant water based coatings gave the highest moisture losses. Further, the compliant coatings, with the exception of the two component epoxy (#3) exhibited no alkali resistance.
The highest ratings were allocated to the non compliant coatings which ranged in VOC from 470-698 gms/litre.
The only compliant coating showing equal performance within the assigned weighting is a two component, low solvent system.

CATEGORY 2: General Sealers-Concrete

This category was changed from "General Undercoaters" to "General Sealers" by C.A.R.B. The test protocol originally submitted was therefore revised to include Recoatability with:

a). Flat Exterior Acrylic Coating (waterbased), meeting Federal Specification TTP19C
b). Alkyd Gloss Enamel, meeting Federal Specification TTE489

and tested for intercoat adhesion using ASTM D3359.

A second revision in test protocol changed the "Bleed Resistance" test normally used for wood sealers and undercoaters to "Rust Stain Resistance" since the product information provided indicated that all samples were to be applied to concrete and masonry surfaces.
All samples were clear polymer emulsion types and all had compliant V.O.C.
Sample 3 and JFN-12 appear to be silicone based emulsions. Both samples exhibit poor recoatability.
Sample 3 also exhibits an objectionably strong amine/ammonia odor.
Sample 3 has an initial viscosity of 37,000 cps and requires a 60% reduction with water in order to spray satisfactorily.

Category 3: Industrial Maintenance Primers

All samples are compliant and with the exception of JFN-1 are all waterborne. The high solids sample JFN-1 exhibited longer curing times than the waterbased coatings and was slower to develop adhesion. Salt spray resistance was heavily weighted in our evaluation since maintenance primers are often left uncoated for various time periods. Samples 2 and 3 are water dispersible alkyds; the balance of the water based submittals are polymer emulsion types.
The highest ratings overall were given to sample 1, a pigmented emulsion coating and JFN-1, a high solids solvent based coating.
The initial viscosity of the high solids coating is slightly high for conventional spray and required 10% reduction with 1.1.1 Trichloroethane.

Category 4: Industrial Maintenance Topcoats

Salt spray resistance was given highest weighting in our evaluation, with accelerated weathering (U.V. Resistance) and application properties equal secondary factors.
All samples are polymer emulsion types with the exception of JFN-2 which is solvent based high solids, and JFN-7 which is a water dispersible alkyd.
The highest rating was given to the high solids, solvent based sample JFN-2 due primarily to superior humidity and salt spray resistance.
Typically, the high solids sample JFN-2 exhibited slow cure time as opposed to the water based coatings.

Category 5: Lacquers

Samples 1, 2 and 3 are conventional nitrocellulose type lacquers. Both sample 1 and 3 are extremely close to the 680 gms/litre VOC limit but our testing indicates minor non-conformity. Samples 4 and 5 are water based, sample 4 is a solution resin, sample 5 is a polymer emulsion.
We assumed, due to lack of product information, that the major substrate in this category was wood.
Only minor value was placed on accelerated exposure and salt spray resistance since we assumed interior use for this category.
Adhesion tests were, however, performed on both wood and steel.
The conventional lacquers (1,2,3) were rated highest, primarily due to a grain raising factor evaluated as "other" properties.

Category 6: Opaque Stains

A total of eleven (11) samples were tested. The samples were water based with the exception of sample 8. Of the water based submissions, sample 4 is a water soluble resin type, the balance are polymer emulsions with varying degrees of emulsified alkyds/oils modification. Sample 8 was very close to compliance due to a high solids level, all other samples are VOC compliant (< 350 gms/litre).
The highest performance rankings were achieved by samples in each of the water soluble, water based polymer emulsion and solvent based high solids coatings sub-categories.
Dry time of the oil based sample 8 was typically longer than the water based samples. Grain raising was not given high weighting value since we assumed primarily exterior use for this category.

Category 7: Opaque Wood Preservatives

Of four samples submitted, only one (JFN-13) is VOC compliant and appears to be an oil emulsion.
Water repellancy and fungus resistance were heavily weighted in our evaluation.
The standard industry treatment which was represented by sample 1, Creosote Oil, showed the poorest fungus resistance.
Samples 1, 2 and 3 are non compliant and VOC's range from 498-643, which are extremely high when compared to the 350 gms/litre limit.

Category 8: Quick Dry Enamels

A total of six samples were evaluated. Samples 2 and 4 are water based. The balance are non compliant solvent based enamels.
Salt spray resistance was weighted lightly since the category definition excludes corrosion resistance properties. Both water based products dried much more rapidly than the solvent based samples, but all samples fall within the stated maximums (set to touch less than two hours, dry hard less than eight hours).
Unfortunately, only one water based compliant coating had a 60° gloss greater than 70, a stated requirement for inclusion in this category.
Block resistance, while not by definition an evaluation parameter was given a W.F. of 10 which has skewed the totals in favor of sample 2, a water based enamel.

Category 9: Roof Coatings

Samples 1, 2 and 3 are water based; samples 4, 5 and 6 are solvent based asphaltic mastics. Samples 1 and 3 are white and are useful primarily as high reflectance coatings. Sample 2 is a black water based elastomer.
Confusion exists in the allocation of samples to category 9 and category 13, Waterproofing Mastics and Elastomers.
The evaluation criteria used for both categories was practically identical.
The asphaltic mastics are typical roof repair materials and not generally used as total area roof coatings.
The asphaltics react poorly to ultra violet exposure and typically exhibit low moisture transmission and good ponding water resistance.
Tensile strength and elongation weighting gave advantage to the water based coatings in overall rating.

Category 10, 11 and 12: Specialty Primers, Sealers and Undercoaters

The definition provided by C.A.R.B. grouped the coatings into one functional category.
The information accompanying the samples differentiated substrata in some cases but not precise function: (ie) was the coating used primarily for sealing smoke or water damaged walls, etc.
As a result specific test conditions were not employed, but general tests such as bleed resistance on wood, alkali resistance and humidity resistance were used for all three categories.
The evaluation was necessarily common for categories 10, 11 and 12 and may not represent efficacy of specific use products.
Category 12 included a weighting factor for grain raising of wood.
In category 10 and 11 compliant coatings generally showed superior overall performance.

Category 12: Specialty Undercoaters

Undercoaters are generally accepted as pigmented coatings as opposed to sealers.
Samples 2 and 4 are clear coatings for concrete and should be evaluated within category 11.
Samples 1, 3, 5 and 6 are pigmented undercoaters.

Category 13: Waterproofing Mastics- Elastomers

Samples 2 thru 7 are asphaltic mastics. Sample JFN 11 is completely dissimilar and appears to be a silicone based elastomeric wall coating. The asphaltic coatings are more correctly placed in category 9, Roof Coatings. Roof coatings were more heavily weighted on ponding water resistance, and the waterproofing mastics, since they ultimately are used on concrete and masonry surfaces require better tensile/elongation characteristics.

Category 14: Waterproofing Sealers

Sample 1 is an asphalt emulsion and should have been included in Category 9, Roof Coatings.
Sample 2, 3, 4, 6 and 9 are clear, low viscosity, low solids concrete water repellant/sealers. Sample 10 is a low viscosity, pigmented sealer.
Water repellancy was a major evaluation factor and it was generally noted that the non compliant coatings exhibited better water repellancy after accelerated U.V. exposure.
Only two compliant coatings out of a total of eleven were tested. Of compliant coatings sample 1 is incorrectly categorized, sample JFN 10 is unstable.
Low solids waterborne coatings are subject to the trauma of the currently adopted "V.O.C. minus water" calculation which converts innocuous 40 gms/litre of organic volatile coatings to non compliant levels.

7. VOC COMPLIANCE

Category	VOC[2] Samples Comply	VOC[2] Samples Non-comply	Total Samples
1	5	5	10
2	4	0	4
3	7	0	7
4	9	0	9
5	2	3	5
6	7	4	11
7	1	3	4
8	0	6	6
9	6	0	6
10	5	1	6
11	3	3	6
12	0	6	6
13	5	1	6
14	2	7	9
Totals	55	40	95

Calculations for Volatile Organic Content (VOC), were made for solvent based and water reducible coatings using the following formula from ASTM D3960:

$$A = (V_2 - W)(Dm) \times 10$$

where A = Volatile organic content (VOC-1)
V_2 = Weight % total volatile including water
W^2 = Weight % water
Dm = Density of coating gms/ml

For compliance evaluation purposes, the VOC content minus water (or exempt solvent) for coatings containing water or exempt solvents was calculated from VOC-1 using the following formula from ASTM D3960:

$$VOC_2 = \frac{VOC\text{-}1 \times 100}{100 - Dm\ (W)}$$

We assumed D_w = 1.0 (25°C) since the factor 0.997 has a trivial effect compared to errors in density measurement.

The following table shows the Technical Review Group (TRG) approved Architectural Coatings VOC limits. The limit units are in grams of volatile organic compounds per litre of total paint using the VOC-2 calculation.

TABLE 1

TRG APPROVED ARCHITECTURAL VOC LIMITS

CATEGORIES	1989 VOC LIMIT (g/l)
9, 13	300
1, 2, 6, 7, 10, 11, 12	350
8, 14	400
3, 4	420
5	680

VOC Compliance Review

Category 1	Sample #	VOC[1]	VOC Limit 350	VOC[2]	Comply
	2-13-1	698.02		698.02	
	2-13-3A,B	303.49		303.49	X
	2-13-4	25.50		178.19	X
	2-13-5	551.22		551.22	
	2-13-6	627.51		627.51	
	2-13-7	469.56		469.56	
	2-13-8	1.40		0.80	X
	2-13-9	0.10		0.45	X
	2-13-10	4.27		15.34	X
	JFN #3	247.13		573.38	
				Total Compliance:	5

Category 2	Sample #	VOC[1]	VOC Limit 350	VOC[2]	Comply
	2-14-1	16.81		61.10	X
	2-14-2	12.71		50.19	X
	2-14-3	14.12		30.78	X
	JFN #12	48.47		97.95	X
				Total Compliance:	4

Category 3	Sample #	VOC[1]	VOC Limit 420	VOC[2]	Comply
	2-16-1	42.55		90.28	X
	2-16-9	111.71		220.98	X
	2-16-10	68.97		138.38	X
	2-17-1	35.82		70.08	X
	2-17-2	73.57		151.56	X
	2-17-3	53.29		128.59	X
	JFN #1	256.02		256.02	X
				Total Compliance:	7

Category 4	Sample #	VOC[1]	VOC Limit 420	VOC[2]	Comply
	2-19-1	89.43		185.34	X
	2-19-2	72.31		152.10	X
	2-19-3	52.83		117.34	X
	2-19-4	18.16		40.73	X
	2-19-5	72.23		170.59	X
	2-19-6	54.72		125.01	X
	2-20-1	105.31		294.98	X
	JFN #2	158.98		158.98	X
	JFN #7	218.85		295.82	X
				Total Compliance:	9

Category 5	Sample #	VOC[1]	VOC Limit 680	VOC[2]	Comply
	2-21-1	683.00		683.00	
	2-21-2	742.00		742.00	
	2-21-3	687.00		687.00	
	2-21-4	46.22		168.13	X
	JFN #5	184.40		439.67	X
				Total Compliance:	2

Category 6	Sample #	VOC[1]	VOC Limit 350	VOC[2]	Comply
	2-22-1	148.33		622.71	
	2-22-2	252.80		410.99	
	2-22-3	114.44		251.24	X
	2-22-4	193.33		411.51	
	2-22-5	17.43		62.31	X
	2-22-6	0		0	X
	2-22-7	0.98		2.28	X
	2-22-8	351.17		358.30	
	2-22-9	97.83		185.28	X
	JFN #6	16.39		70.34	X
	JFN #8	108.76		284.26	X
				Total Compliance:	7

Category 7	Sample #	VOC[1]	VOC Limit 350	VOC[2]	Comply
	2-23-1	554.59		554.59	
	2-23-2	498.13		503.46	
	2-23-3	643.41		668.40	
	JFN #13	44.32		137.46	X
				Total Compliance:	1

Category 8	Sample #	VOC[1]	VOC Limit 400	VOC[2]	Comply
	2-24-2	354.50		505.27	
	2-24-4	268.91		426.23	
	2-24-6	452.00		452.00	
	2-24-7	451.00		451.00	
	2-24-8	465.00		465.00	
	2-24-9	497.11		497.11	
				Total Compliance:	0

Category 9	Sample #	VOC[1]	VOC Limit 300	VOC[2]	Comply
	2-25-1	30.63		54.82	X
	2-25-2	58.00		96.13	X
	2-25-3	14.94		27.85	X
	2-25-4	236.68		236.68	X
	2-25-5	244.03		244.03	X
	2-25-6	292.63		292.63	X
				Total Compliance:	6

Category 10	Sample #	VOC[1]	VOC Limit 350	VOC[2]	Comply
	2-26-1	46.64		161.32	X
	2-26-2	37.49		157.19	X
	2-26-3	35.55		145.93	X
	2-26-4	79.54		192.82	X
	2-26-5	389.24		389.24	
	2-26-6	0		3.09	X
				Total Compliance:	5

Category 11	Sample #	VOC[1]	VOC Limit 350	VOC[2]	Comply
	2-27-2	146.86		280.58	X
	2-27-3	126.00		731.35	
	2-27-4	652.30		652.30	
	2-27-5A/B	283.25		283.25	X
	2-27-6	2.91		6.33	X
	2-27-7	725.56		725.56	
				Total Compliance:	3

Category 12	Sample #	VOC[1]	VOC Limit 350	VOC[2]	Comply
	2-28-1	547.49		547.49	
	2-28-2	137.38		743.80	
	2-28-3	397.58		397.58	
	2-28-4	708.87		708.87	
	2-28-5	483.52		483.52	
	2-28-6	569.00		569.00	
				Total Compliance:	0

Category 13	Sample #	VOC[1]	VOC Limit 300	VOC[2]	Comply
	2-29-2	261.92		261.92	X
	2-29-3	239.30		239.30	X
	2-29-4	253.15		253.15	X
	2-29-6	220.13		220.13	X
	2-29-7	390.13		390.13	
	JFN #11	98.20		192.62	X
			Total Compliance:		5

Category 14	Sample #	VOC[1]	VOC Limit 400	VOC[2]	Comply
	2-30-1	7.36		16.24	X
	2-30-2	40.26		563.86	
	2-30-3	116.65		652.40	
	2-30-4	84.40		636.98	
	2-30-6	751.08		751.08	
	2-30-7	406.56		406.56	
	2-30-9	712.62		712.62	
	2-30-10	438.50		728.28	
	JFN #10	219.62		264.02	X
			Total Compliance:		2

8. REVIEW OF PERFORMANCE PROPERTIES/RANKING

In order to rank the coating samples within a specific category for performance, a weighting factor (W.F.) was assigned to each test or test group. The weighting factor was derived from the C.A.R.B. category definition and from the ultimate use of the coating within the category.

The weighting factor value assigns relative importance of each of the criteria tested within a category and has been adjusted to provide a rating out of 100 for each sample submitted. The criteria designated "other" is a statistical average of the results of all the testing per Test Protocol (p. 12) not already assigned a weighting factor.

The ranking gives both information on relative performance of the specific samples tested and the viability of the coating compared to external standards such as federal specification coatings, when applicable, or currently accepted industrial standards.

CATEGORY 1- CONCRETE CURING COMPOUND

	W.F.	1	3	4	5	6	7	8	9	10	JFN3
1. Moisture Ret. *	30	25	30	5	20	20	30	5	5	5	5
2. Alkali Res.	15	15	15	0	15	15	15	0	0	0	0
3. Appl. Prop.	15	15	15	10	15	15	10	10	15	10	15
4. Stability	10	10	10	5	10	10	10	10	10	10	10
5. Adhesion	15	15	15	10	10	10	15	15	15	15	15
VOC		N/C	C	C	N/C	N/C	N/C	C	C	C	N/C
Other	15	15	8	10	8	12	15	15	15	15	15
TOTAL	100	95	93	40	78	82	95	55	60	55	60

* Any number greater than 0.25 Kg/M^2.24 Hrs. fails

CATEGORY 2- GENERAL SEALERS- CONCRETE AND MASONRY

	W.F.	1	2	3	JFN12
1. Stability	10	10	10	10	10
2. Dry Time	10	10	10	10	10
3. Adhesion	15	7	7	5	15
4. En. Holdout	10	10	10	10	10
5. Appl. Prop.	10	10	10	5	10
6 Humidity Res.	10	6	6	9	10
7. Stain Res.	10	0	0	8	8
8. Recoatability	15	15	15	3	0
VOC		C	C	C	C
Other	10	5	8	10	10
TOTAL	100	73	76	70	83

CATEGORY 3- INDUSTRIAL MAINTENANCE PRIMERS

	W.F.	16-1	9	10	17-1	2	3	JFN1
1. Appl. Prop.	10	8	10	10	5	0	10	10
2. Stability	10	10	10	10	10	10	0	10
3. Dry Time	10	10	10	10	8	6	10	5
4. Adhesion	10	10	8	10	8	8	8	8
5. En. Holdout	10	8	8	8	8	8	10	8
6. Salt Spray	20	16	8	3	8	5	3	18
7. Humidity Res.	10	10	10	10	10	0	10	10
8. Int. Adhesion	10	10	9	10	8	9	10	8
VOC		C	C	C	C	C	C	C
Other	10	9	9	9	7	9	7	9
TOTAL	100	91	82	80	72	55	68	86

CATEGORY 4- INDUSTRIAL MAINTENANCE TOPCOATS

	W.F.	19-1	2	3	4	5	6	20-1	JFN2	JFN7
1. Stability	6	4	4	6	6	6	6	10	5	0
2. Appearance	10	10	7	10	7	10	10	7	10	10
3. Appl. Prop.	15	15	15	15	15	15	8	15	10	15
4. Cont. Ratio	7	7	7	7	7	7	7	7	7	7
5. Acc. Weath.	15	10	8	15	8	10	10	12	8	10
6. Humidity Res.	7	2	3	3	2	0	7	3	7	0
7. Adhesion	10	5	5	10	7	7	10	10	10	10
8. Salt Spray	20	0	0	0	5	5	10	0	20	5
VOC		C	C	C	C	C	C	C	C	C
Other	10	9	9	9	9	9	5	5	7	5
TOTAL	100	62	58	75	66	69	73	59	84	62

CATEGORY 5-LACQUERS

	W.F.	1	2	3	4	JFN5
1. Dry Time	10	10	10	10	10	0
2. Adhesion	10	8	5	8	8	10
3. Hardness	10	10	8	7	7	7
4. Block Res.	10	10	10	10	10	10
5. Stability	10	10	10	10	10	8
6. Appearance	10	10	10	10	10	10
7. Appl. Prop.	10	10	8	10	7	10
8. Abrasion Res.	10	10	10	10	10	5
VOC		N/C	N/C	N/C	C	C
Other	20	17	15	15	8	10
TOTAL	100	95	86	90	80	70

CATEGORY 6- OPAQUE STAINS

	W.F.	1	2	3	4	5	6	7	8	9	JFN6	JFN8
1. Stability	10	7	7	10	10	9	10	8	10	10	10	10
2. Dry Time	10	10	10	10	10	9	6	7	5	8	8	10
3. Appearance	10	10	10	10	10	10	10	10	10	10	10	10
4. Appl. Prop.	10	10	10	10	10	10	10	10	10	10	10	10
5. Cont. Ratio	15	15	15	15	15	15	15	15	15	15	15	10
6. Acc. Weath.*	15	15	15	5	15	10	0	15	15	15	15	5
7. H_2O Rep.	10	2	2	2	10	2	2	2	10	2	10	10
8. Grain Raising	10	5	5	0	8	0	5	5	10	5	5	5
VOC		N/C	N/C	C	N/C	C	C	C	N/C	C	C	C
Other(Bleed,Adhesion)	10	8	5	7	5	5	8	8	7	8	10	10
TOTAL	100	82	79	69	93	70	66	80	92	83	93	80

*$\Delta E > 3.0$ Fail

CATEGORY 7- OPAQUE WOOD PRESERVATIVES

	W.F.	1	2	3	JFN13
1. Fungus Res.	30	10	25	30	20
2. Water Rep.	30	20	30	20	15
3. Stability	10	10	10	8	10
4. Appl. Prop.	10	5	10	10	10
5. Humidity Res.	10	10	8	5	8
VOC		N/C	N/C	N/C	C
Other	10	5	10	10	10
TOTAL	100	60	93	83	73

CATEGORY 8- QUICK DRYING ENAMELS

	W.F.	2	4	6	7	8	9
1. Dry Time	20	20	20	20	20	20	20
2. Block Res.	10	8	10	0	0	0	0
3. Gloss	10	10	0	10	0	10	10
4. Appl. Prop.	15	15	8	15	15	15	15
5. Stability	10	10	10	5	9	10	10
6. Adhesion	10	10	0	10	10	10	10
7. Appearance	10	10	5	10	10	10	10
Salt Spray and W/O	5	0	0	4	5	3	5
VOC		N/C	N/C	N/C	N/C	N/C	N/C
Other	10	10	5	10	7	7	10
TOTAL	100	93	58	84	76	85	90

CATEGORY 9- ROOF COATINGS

	W.F.	1	2	3	4	5	6
1. Stability	10	0	10	10	10	10	10
2. Ponding Water*	20	10	10	0	20	18	18
3. Humidity	10	5	5	10	10	10	10
4. Adhesion	10	9	10	10	8	8	8
5. Application	10	10	10	10	10	10	10
6. Acc. Weath.	10	10	10	5	0	0	0
7. Tensile/ Elongation	10	10	10	7.5	2.5	5	5
VOC		C	C	C	C	C	C
OTHER	20	18	18	20	10	5	5
TOTAL	100	72	83	72.5	70.5	66	66

*192 hrs.

Elongation 200%
Tens. Strength 200 psi

CATEGORY 10- SPECIALTY PRIMERS

	W.F.	1	2	3	4	5	6
1. Appl. Prop.	10	10	5	5	8	10	8
2. Stability	10	5	10	10	10	10	10
3. Dry Time	10	10	10	10	10	6	10
4. Adhesion	15	15	10	10	15	12	15
5. En. Holdout	10	10	10	10	10	10	10
6. Bleed Res.	5	5	5	5	1	3	1
7. Humidity	10	10	10	10	5	5	2
8. Alkali Res.	10	0	10	10	5	0	5
VOC		C	C	C	C	N/C	C
Other	20	10	10	10	15	15	15
TOTAL	100	75	80	80	79	71	76

CATEGORY 11- SPECIALTY SEALERS

	W.F.	2	3	4	5A/B	6	7
1. Stability	10	8	4	10	8	10	10
2. Dry Time	10	10	8	10	8	10	0
3. Adhesion	15	15	15	10	10	10	5
4. En. Holdout	10	10	8	8	10	8	10
5. Appl. Prop.	10	10	10	8	10	10	10
6. Alkali Res.	10	10	0	0	10	0	0
7. Bleed Res.	5	2	4	4	5	2	2
8. Humidity Res.	10	5	0	4	10	10	8
VOC		C	N/C	N/C	C	C	N/C
Other	20	20	10	18	18	20	18
TOTAL	100	90	59	72	89	80	63

CATEGORY 12- SPECIALTY UNDERCOATERS

	W.F.	1	2	3	4	5	6
1. Stability	10	10	10	10	10	10	10
2. Dry Time	10	10	10	8	10	10	10
3. Sanding Prop.	10	10	-	10	-	10	8
4. Adhesion	10	8	10	10	10	10	8
5. En. Holdout	10	10	10	10	10	10	10
6. Appl. Prop.	10	5	5	10	10	8	8
7. Bleed Res.	10	5	0	10	5	0	5
8. Alkali Res.	10	0	0	0	10	0	10
9. Grain Raising	10	10	5	10	5	10	10
VOC		N/C	N/C	N/C	N/C	N/C	N/C
Other	10	10	8	10	10	9	9
TOTAL	100	78	58	88	80	77	88

CATEGORY 13- WATERPROOFING MASTICS-ELASTOMERS

	W.F.	2	3	4	6	7	JFN11
1. Stability	10	10	10	10	10	10	5
2. Ponding Water	10	10	10	10	10	10	5
3. Humidity	10	10	10	10	10	6	10
4. Adhesion	10	10	8	8	8	8	10
5. Acc. Weath.	10	5	5	5	5	5	10
6. Elongation	10	0	0	0	0	10	10
7. Tens. Strength	10	5	2	0	0	0	5
8. Alkali Res.	10	10	10	10	10	10	10
VOC		C	C	C	C	N/C	C
Other	20	15	15	10	15	15	15
TOTAL	100	75	70	63	68	74	80

Elongation 200%
Tens. Strength 200 psi

CATEGORY 14- WATERPROOFING SEALERS

	W.F.	1	2	3	4	6	7	9	10	JFN10
1. Stability	10	8	10	10	10	10	10	9	5	0
2. Humidity	15	8	10	10	10	10	10	10	10	10
3. Adhesion	10	10	10	10	10	10	8	10	10	10
4. Application	10	10	10	10	10	10	5	10	10	10
5. Acc. Weath.	15	15	15	15	15	15	15	15	15	15
6. H_2O Rep.	15	5	5	10	5	15	15	15	10	10
7. Alkali Res.	10	10	0	0	0	0	10	10	8	10
VOC		C	N/C	N/C	N/C	N/C	N/C	N/C	N/C	C
Other	15	10	15	15	15	10	15	10	15	10
TOTAL	100	76	75	80	75	80	88	89	83	75

9. TEST PROCEDURES

ASTM D2369	1. Total Non-Volatile (% Wt.)
ASTM D1475	2. Specific Gravity (Lbs/Gallon)
ASTM D2196	3. Viscosity, Cps, Brookfield
ASTM D1729	4. Color
ASTM D1364 and ASTM D3792	5. % Water (Wt.)
ASTM D1849	6. Stability 77°F
ASTM D1849	7. Stability 120 °F
ASTM D2243	8. Freeze-Thaw Resistance
ASTM D1640	9. Drytime
ASTM D3363	10. Hardness
STD 141B FTM 6216	11. Block Resistance
STD 141B FTM 6321	12. Sanding Properties
ASTM D523	13. 60° Gloss
	14. Ponding H_2O Resistance (a)
STD 141B 6131	15. Yellowness Index
ASTM D2247	16. Humidity Resistance
ASTM D3359	17. Adhesion
	18. Enamel Holdout (b)
	19. H_2O Cleanup
ASTM D4060	20. Abrasion Resistance
ASTM D1737	21. Flexibility
ASTM D2794	22. Impact Resistance
	23. Appearance (c)
	24. Application Properties (d)
STD 141 FTM 4494	25. Sag Resistance
ASTM D2801	26. Levelling
ASTM D2805	27. Contrast Ratio
ASTM G23, D822	28. Accelerated Weathering
ASTM B117	29. Salt Spray Resistance
ASTM D2370	30. Elongation
ASTM D2370	31. Tensile Strength
	32. Bleed Resistance (e)
ASTM D2921	33. H_2O Repellancy
STD 141B FTM TTC555	34. Alkali Resistance
ASTM D3273 and ASTM D3274	35. Fungus Resistance
ASTM D3960, 10.2.3	36. Volatile Organic Content (VOC)

Note: Items 19, 23, 24, 32 are qualitative tests. Item 14 and 18 run as described.

a). Ponding water resistance: cured 25 mil D.F.T. sealed freefilm to metal cylinder 25 cm^2 surface area, 100 gms H_2O, Wt. loss monitored each 24 hrs.
b). Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest Chart.
c). Subjective aesthetic evaluation
d). Application properties: includes brush, roller, spray (airless, conventional) as applicable.
e). Bleed Resistance: redwood panel, 3 mil wet film, humidity cabinet, 100°F, 100% RH 72 Hrs, visual rating.

ASTM D3792 was performed using whole sample headspace gas/liquid chromatography

10. TEST PROTOCOL

The following table represents the specific tests performed on each sample within the fourteen (14) categories.

TABLE 2

TESTS	CATEGORY 1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Total NV % Wt.	x	x	x	x	x	x	x	x	x	x	x	x	x	x
2. Spec. Gravity	x	x	x	x	x	x	x	x	x	x	x	x	x	x
3. Viscosity Cps	x	x	x	x	x	x	x	x	x	x	x	x	x	x
4. Color	x				x									x
5. % Water	x	x	x	x	x	x	x	x	x	x	x	x	x	x
6. Stability 77°F	x	x	x	x	x	x	x	x	x	x	x	x	x	x
7. Stability 120°F	x	x	x	x	x	x	x	x	x	x	x	x	x	x
8. Freeze-Thaw Res.			All		H_2O		Based			Products				
9. Dry Time	x	x	x	x	x	x	x	x	x	x	x	x	x	x
10. Hardness		x	x	x	x			x		x		x		
11. Block Res.					x			x				x		
12. Sanding Prop.					x					x		x		
13. 60° Gloss				x	x			x						
14. Ponding H_2O Res.									x				x	
15. Yellowness Index				x	x			x						
16. Humidity Res.		x	x	x	x	x	x	x	x	x	x	x	x	x
17. Adhesion	x	x	x	x	x	x	x	x	x	x	x	x	x	x
18. En. Holdout (S.S.)		x	x							x	x	x		
19. H_2O Cleanup			All		H_2O		Based			Products				
20. Abrasion Res.				x	x			x						
21. Flexibility		x	x	x	x	x	x	x	x	x	x	x	x	
22. Impact Res.		x	x	x	x			x	x				x	
23. Appearance	x	x	x	x	x	x	x	x	x	x	x	x	x	x
24. App. Properties	x	x	x	x	x	x	x	x	x	x	x	x	x	x
25. Sag Res.		x	x	x	x			x		x	x	x	x	
26. Levelling		x	x	x	x			x		x	x	x	x	
27. Contrast Ratio				x	x	x	x	x					x	
28. Acc. Weathering	x			x	x	x	x	x	x				x	x
29. Salt Spray Res.			x	x	x			x		x				
30. Elongation									x				x	
31. Tensile Strength									x				x	
32. Bleed Res.		x				x				x	x	x		
33. H_2O Repellancy						x	x							x
34. Alkali Res.	x									x	x	x	x	x
35. Fungus Res.							x							
36. Moisture Retention	x													
37. Grain Raising		x			x	x	x					x		
38. VOC	x	x	x	x	x	x	x	x	x	x	x	x	x	x

A. V.O.C.

In order to calclate V.O.C., certain tests must be performed including:

1. Total Non Volatile
2. Specific Gravity
5. % Water
38. G.C. Analysis for Exempt Solvents (Chlorinated Hydrocarbons)

B. Stability

Tests such as:

3. Viscosity - initial
6. Stability 77°F
7. Stability 120°F

monitor viscosity changes with aging of the coating in the container and provide information with respect to application properties and modes of application.

C. Waterbased Only

Waterbased products only are tested for:

8. Freeze Thaw Resistance
19. Water-Cleanup of Application Tools

D. All Coatings

Tests applicable to all coatings include:

9. Drytime
17. Adhesion- to specific use substrate
23. Appearance
24. Application Properties

E. Water Resistance

Water resistance properties of the cured film include:

14. Ponding Water resistance- Roof Coatings
16. Humidity Resistance
17. Salt Spray Resistance
33. Water Repellancy

F. Dried Film Properties

Physical property tests of the dried film include:

4. Color
10. Hardness
13. 60° Gloss
20. Abrasion Resistance
21. Flexibility
22. Impact Resistance
27. Contrast Ratio- Hiding Power
30. Elongation
31. Tensile Strength

G. Wet Film Properties

25. Sag Resistance
26. Levelling

H. Other specialty tests required for specific end use include:

11. Block Resistance (adhesion of coatings when stacked)
12. Sanding Properties
18. Enamel Holdout (primers and undercoats)
28. Accelerated U.V. Resistance
32. Bleed Resistance (to substrata components or contaminants)
34. Alkali Resistance
35. Fungus Resistance
36. Moisture Retention (concrete curatives)
37. Grain Raising (for wood coatings)

11. TEST CONDITIONS

The following conditions relate to tests cited in the Test Protocol.

1.	Total NV % Wt.	100°C, 2 Hrs
2.	Spec. Gravity	Weight/gallon cup, 77°F
3.	Viscosity Cps	Brookfield RVT (spindle, speed)
4.	Color	
5.	% Water	Karl Fischer
6.	Stability 77°F	5 months, 3/4 full pint
7.	Stability 120°F	30 days, 3/4 full pint
8.	Freeze-Thaw Res.	3 cycles, 16 hrs, 20°F, 8 Hrs 77°F
9.	Drytime	Gardner Circular Drytime Recorder
10.	Hardness	Pencil, 7 day cure, 77°F
11.	Block Res.	
12.	Sanding Prop.	24 Hrs dry, 120 grit, ponderosa pine
13.	60° Gloss	48 Hrs dry
14.	Ponding H_2O Res.	7 day cure, 25 mil D.F.T.
15.	Yellowness Index	
16.	Humidity Res.	48 Hrs cure, 48 Hrs exposure, 100°F, 100% R.H.
17.	Adhesion	Crosshatch, Tape
18.	En. Holdout (S.S.)	48 Hr cure, 3 mil wet (a)
19.	H_2O Cleanup	
20.	Abrasion Res.	48 Hrs cure, 1000 gms, CS10, 1000 rev.
21.	Flexibility	Cylindrical mandrel
22.	Impact Res.	Forward
23.	Appearance	
24.	Appl. Properties	Brush, roller, spray (b)
25.	Sag Res.	
26.	Levelling	
27.	Contrast Ratio	3 mil wet film
28.	Acc. Weathering	ASTM G23 Type D, Twin Carbon Arc, 300 Hrs
29.	Salt Spray Res.	200 Hrs, 5% NaCl, Bonderite 1000 Panels
30.	Elongation	1 week cure + 4 hrs. 120°F, 25 mils DFT (c)
31.	Tensile Strength	1 week cure + 4 hrs. 120°F, 25 mils DFT (c)
32.	Bleed Res.	72 Hrs humidity cabinet 100°F, 100% RH
33.	H_2O Repellancy	7 day cure (d)
34.	Alkali Res.	5% NaOH, 48 Hrs
35.	Fungus Res.	16 day exposure
36.	Moisture Retention	ASTM C156, surface area 48 sq. in.
37.	Grain Raising	Ponderosa pine panels
38.	VOC	G.C. Headspace Analysis

a). Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b). Application properties: includes brush, roller, spray (airless, conventional) as applicable.

c). Tensile/Elongation: 1" x 3" specimen, C.H. speed 1"/minute

d). H_2O Repellancy Evaluation

Rating	Explanation
Excellent	Beads water longer than 2 1/2 hrs.
Good	Beads water between 2 and 2 1/2 hrs.
Fair	Beads water between 30 minutes and 2 hrs.
Poor	Beads water less than 30 minutes.

12. APPENDICES

I. Definitions

The following definitions of categories are those of the California Air Resources Board:

(A). Architectural Coating- Any coating applied to stationary structures and their appurtenances, to mobile homes, to pavements, curbs, etc.

(B). Concrete Curing Compounds- Coatings with the sole purpose of retarding the evaporation of water from the surface of freshly cast concrete, thereby strengthening the concrete.

(C). General Undercoaters- Coatings which are designed to provide a smooth surface for subsequent coats.

(D). Industrial Maintenance Primers- Coatings which are intended to be applied to a surface prior to the application of an industrial maintenance topcoat to provide a firm bond between the substrate and subsequent coats.

(E). Industrial Maintenance Topcoats- High performance coatings which are formulated for the purpose of heavy abrasion, water immersion, chemical, corrosion, temperature, electrical, or solvent resistance.

(F). Lacquer- Clear or pigmented coatings formulated with nitrocellulose or synthetic resins to dry by evaporation without chemical reaction and to provide a quick drying, solid, protective film.

(G). Opaque Stains- Any stain that is not classified as a semi-transparent stain.

(H). Opaque Wood Preservatives- All wood preservatives not classified as semi-transparent wood preservatives.

(I). Photochemically Reactive Organic Compound (PROC)- Any compound containing at least one atom of carbon that is a gas or liquid at 70^{o}F and 760 mm Hg, except methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, dichloromethane, trichlorofluoromethane (CFC-11), dichlorodifluoromethane (CFC-12), chlorodifluoromethane (CFC-22), trifluoromethane (FC-23), 1,1,1-trichloroethane, tetrachloroethene (perchloroethylene), trichlorotrifluoroethane (CFC-113), dichlorotetrafluoroethane (CFC-114), and chloropentafluoroethane (CFC-115). Most organic solvents used in architectural coatings are comprised entirely of PROCs.

(J). Quick Dry Enamels - Non-flat coatings which:

1. Are capable of being applied directly from the container by brush or roller under normal conditions, normal conditions, ie: ambient temperatures between 60°F and 80°F and

2. When tested in accordance with ASTM D 1640, set to touch in two hours or less, dry hard in eight hours or less, and are tack free in four hours or less by the mechanical method test; and

3. Have a 60° dried film gloss of no less than 70.

(K). Roof Coatings- Coatings that are formulated for the sole purpose of preventing penetration of a roof substrate by water.

(L). Specialty Primers, Sealers, and Undercoaters- Primers, sealers, and undercoaters used only to perform one of the following functions; repair fire, smoke, or water damage; neutralize odor; block stains, block effloresence; condition chalky surfaces; or coat acoustical materials without affecting their acoustical abilities.

(M). Waterproofing Mastic Coatings- Weatherproof and waterproof coatings which are formulated to cover holes and minor cracks and to conceal surface irregularities, and which are to be applied in thicknesses of at least 15 mils.

(N). Waterproofing Sealers- Coatings which are formulated for the sole purpose of protecting porous substrates by preventing the penetration of water.

II. Product Information Supplied With Sample

Category #	Sample #	Substrate	Spreading Rate sq. ft./gal.
1	13-1	Uncured Concrete	200 to 300
1	13-3A/B	Uncured Concrete	250 to 400
1	13-4	Uncured Concrete	200 to 300
1	13-5	Uncured Concrete	200 to 300
1	13-6	Uncured Concrete	200 to 300
1	13-7	Uncured Concrete	200
1	13-8	Uncured Concrete	100
1	13-9	Uncured Concrete	200 to 300
1	13-10	Uncured Concrete	200 to 300
1	JFN #3	Uncured Concrete	~200
2	14-1	Concrete	
2	14-2	Concrete	
2	14-3	Concrete	
2	JFN #12	Masonry	Floodcoat
3A	JFN #1	Steel	300 to 400
3B	16-9	Steel	
3B	16-10	Steel	
3B	16-1	Steel	
3C	17-1	Steel	55 to 60
3C	17-2	Steel	55 to 60
3C	17-3	Steel	55 to 60
4	JFN #2	Wood, Al.,Steel	~800 to 1000
4	JFN #7	Brick	
4	19-1	Primed Steel	
4	19-2	Primed Steel	
4	19-3	Primed Steel	
4	19-4	Primed Steel	
4	19-5	Primed Steel	
4	19-6	Primed Steel	
4	20-1	Primed Steel	
5	21-1		
5	21-2		500
5	21-3	Wood	500
5	21-4		
5	JFN #5	Wood	300 to 400

Category #	Sample #	Substrate	Spreading Rate sq. ft./gal.
6	22-1	Wood	200 to 300
6	22-2	Wood	
6	22-3	Wood	350 to 400
6	22-4	Wood	300 to 400
6	22-5	Wood	100 to 500
6	22-6	Wood	200 to 500
6	22-7	Wood	200 to 500
6	22-8	Wood	150 to 250
6	22-9	Wood	
6	JFN #6	Wood	
6	JFN #8	Cement, Asphalt	
7	23-1	Wood	
7	23-2	Wood	
7	23-3	Rough Wood	100 to 300
7	JFN #13	Wood	150 to 300
8	24-2		250 to 400
8	24-4		
8	24-6		400 to 500
8	24-7		600
8	24-8		500 to 600
8	24-10	Metal	250 to 400
9	25-1		
9	25-2		
9	25-3		
9	25-4		
9	25-5		
9	25-6		100
10	26-1		
10	26-2	Stucco, Concrete	
10	26-3	Chalky Surfaces	
10	26-4		
10	26-5		
10	26-6		
11	27-2		
11	27-3	Concrete	150 to 300
11	27-4	Wood	200 to 400
11	27-5		
11	27-6	Asphalt	350 to 400
11	27-7	Wood	200

Category #	Sample #	Substrate	Spreading Rate sq. ft./gal
12	28-1		
12	28-2	Rough Concrete	200 to 300
12	28-3	Dry Wall or Plaster	400
12	28-4	Rough Concrete	200
12	28-5	Wood	200
12	28-6	Masonry	
13	29-2	Concrete and Steel	12.5
13	29-3	Concrete and Steel	
13	29-4	Concrete and Steel	
13	20-6	Concrete and Steel	12.5
13	29-7	Concrete and Steel	10
13	JFN #11	Masonry	33
14	30-1		
14	30-2	Rough Concrete	200
14	30-3	Rough Concrete	75 to 150
14	30-4	Rough Concrete	150 to 300
14	30-6		100 to 200
14	30-7		75 to 150
14	30-9	Rough Concrete	50 to 100
14	30-10	Rough Concrete	50 to 100
14	JFN #10	Concrete Block	~75

III. Laboratory Data Sheets

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-13-1
Contract No. A5 097 48
Date received: 3/13/86
Log No.: 313-1A-1C
Lab code: CC1
Quantity: 1 Pt./2 Qts.
Test initiated: 3/14/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 1. Concrete Curing Compound

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	12.36%
2.	Wt. per Gallon	ASTM D1475	6.72
3.	Viscosity Cps (Brookfield)	ASTM D2196	24 cp #1 (50,100)
4.	Color	ASTM D1729	#1
5.	% Water	ASTM D1364	1.01%
6.	Stability 77°F 5 months	ASTM D1849	20.3 cp#1 (50,100)
7.	Stability 120°F	ASTM D1849	19.5 cp#1 (50,100)
8.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	N/A
9.	Dry Time	ASTM D1640	STT: 5 min. DH: 19 min. (on metal)
10.	Adhesion	ASTM D3359	5 (concr.)
11.	H_2O Cleanup	---	Oil based
12.	Appearance	---	Smooth on concrete
13.	Application Properties	---	* Sprays satisf.
14.	Acc. Weathering	ASTM G23, D822	Pass
15.	Alkali Res.	TD 141B FTM TTC555	Pass
16.	VOC		698.02
17.	Moisture Retention	ASTM C156	0.216 kg/m^2 24hrs.

*Airless and conventional

Note: Items 11, 12, 13 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-13-3A, 3B
Contract No. A5 097 48
Date received: 3/28/86
Log No.: 328 1A-1C
Lab code: CC3
Quantity: 1 Pt./2 Qts.
Test initiated: 4/4/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 1. Concrete Curing Compound

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	73.55
2.	Wt. per Gallon	ASTM D1475	9.57
3.	Viscosity Cps (Brookfield)	ASTM D2196	404 cp #2 (20,50) Mixed 10 min. after prep
4.	Color	ASTM D1729	#18-ASTM D 1544
5.	% Water	ASTM D1364	0.17%
6.	Stability 77°F	ASTM D1849	618 cp#2 (20,50)
7.	Stability 120°F	ASTM D1849	734 cp #2(20,50)
8.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	N/A oil base
9.	Dry Time	ASTM D1640	STT: 22 min. DH: 70 min. (on metal)
10.	Adhesion	ASTM D3359	5
11.	H_2O Cleanup	---	N/A oil base
12.	Appearance	---	Smooth
13.	Application Properties	---	* Spray/brush-good
14.	Acc. Weathering	ASTM G23, D822	Failed
15.	Alkali Res.	TD 141B FTM TTC555	Pass (48 hrs)
16.	VOC		303.49
17.	Moisture Retention	ASTM C156	0.123 kg/m^2 24 hrs.
18.	Pot Life		105 min.

*Airless and conventional

Note: Items 11, 12, 13 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-13-4
Contract No. A5 097 48
Date received: 4/10/86
Log No.: 410 1A-1C
Lab code: CC4
Quantity: 1 Pt./2 Qts.
Test initiated: 4/11/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 1. Concrete Curing Compound

	Tests	Procedure		Results
1.	Total NV % Wt.	ASTM D2369		11.77
2.	Wt. per Gallon	ASTM D1475		8.37
3.	Viscosity Cps (Brookfield)	ASTM D2196		12.1 cp #1 (50,100)
4.	Color	ASTM D1729		N/A
5.	% Water	ASTM D1364		85.69
6.	Stability 77°F	ASTM D1849		13.3 cp #1(50,100)
7.	Stability 120°F	ASTM D1849	*	11.1 cp #1 (50,100)
8.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243		12.8 cp #1 (50,100)
9.	Dry Time	ASTM D1640		STT: 3 min. DH: 11 min. (cured concrete)
10.	Adhesion	ASTM D3359		4 (concrete)
11.	H_2O Cleanup	---		Easy
12.	Appearance	---		Smooth
13.	Application Properties	---		Spray satisf
14.	Acc. Weathering	ASTM G23, D822		Pass
15.	Alkali Res.	TD 141B FTM TTC555		Failed-48 hrs
16.	VOC			1. 25.50 2. 178.19
17.	Moisture Retention	ASTM C156		0.742 kg/m^2 24 hrs.

*Resin Kickout and settling

Note: Items 11, 12, 13 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-13-5
Contract No. A5 097 48
Date received: 4/10/86
Log No.: 410 2A-2C
Lab code: CC5
Quantity: 1 Pt./2 Qts.
Test initiated: 4/11/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 1. Concrete Curing Compound

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	42.96
2.	Wt. per Gallon	ASTM D1475	8.06
3.	Viscosity Cps (Brookfield)	ASTM D2196	125 cp #2 (50,100)
4.	Color	ASTM D1729	N/A (white pigmented)
5.	% Water	ASTM D1364	0.31%
6.	Stability 77°F	ASTM D1849	50.8 cp #2 (50,100)
7.	Stability 120°F	ASTM D1849	62 cp #2 (50,100)
8.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Solvent base
9.	Dry Time	ASTM D1640	STT: 65 min. DH: >48 hrs
10.	Adhesion	ASTM D3359	3
11.	H_2O Cleanup	---	N/A
12.	Appearance	---	Smooth
13.	Application Properties	---	Brush, spray-good
14.	Acc. Weathering	ASTM G23, D822	Pass
15.	Alkali Res.	TD 141B FTM TTC555	Pass-48hrs.
16.	VOC		551.22
17.	Moisture Retention	ASTM C156	0.247 kg/m^2 24hrs.

Note: Items 11, 12, 13 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-13-6
Contract No. A5 097 48
Date received: 4/25/86
Log No.: 425 1A-1C
Lab code: CC6
Quantity: 1 Pt./2 Qts.
Test initiated: 4/28/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 1. Concrete Curing Compound

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	23.93%
2.	Wt. per Gallon	ASTM D1475	6.88
3.	Viscosity Cps (Brookfield)	ASTM D2196	76.9 cp#1 (50,100)
4.	Color	ASTM D1729	>18 ASTM D 1544
5.	% Water	ASTM D1364	<0.1%
6.	Stability 77°F	ASTM D1849	34.9 cp#1 (50,100)
7.	Stability 120°F	ASTM D1849	36 cp#1 (50,100)
8.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	N/A solvent based
9.	Dry Time	ASTM D1640	STT: 105 min. DH:>6 hrs.
10.	Adhesion	ASTM D3359	3
11.	H_2O Cleanup	---	Oil based
12.	Appearance	---	Smooth
13.	Application Properties	---	Spray,brushing-good
14.	Acc. Weathering	ASTM G23, D822	Pass
15.	Alkali Res.	TD 141B FTM TTC555	Pass
16.	VOC		627.51
17.	Moisture Retention	ASTM C156	0.247 kg/m^2 24hrs.

Note: Items 11, 12, 13 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-13-7
Contract No. A5 097 48
Date received: 4/30/86
Log No.: 430 1A-1C
Lab code: CC7
Quantity: 1 Pt./2 Qts.
Test initiated: 4/30/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 1. Concrete Curing Compound

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	51.35%
2.	Wt. per Gallon	ASTM D1475	8.05
3.	Viscosity Cps (Brookfield)	ASTM D2196	71.3 cp #1 (50,100)
4.	Color	ASTM D1729	N/A (pigmented)
5.	% Water	ASTM D1364	< 0.1%
6.	Stability 77°F	ASTM D1849	84.5 cp #1 (50,100)
7.	Stability 120°F	ASTM D1849	76.8 cp #1 (50,100)
8.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Oil based
9.	Dry Time	ASTM D1640	STT: 148 min. DH: > 5 hrs.
10.	Adhesion	ASTM D3359	5
11.	H_2O Cleanup	---	N/A Solvent based
12.	Appearance	---	Smooth on concrete
13.	Application Properties	---	Spray, brush-satisf
14.	Acc. Weathering	ASTM G23, D822	Pass
15.	Alkali Res.	TD 141B FTM TTC555	Pass
16.	VOC		469.56
17.	Moisture Retention	ASTM C156	0.185 kg/m^2 24hrs.

Note: Items 11, 12, 13 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-13-8
Contract No. A5 097 48
Date received: 4/30/86
Log No.: 430 2A-2C
Lab code: CC8
Quantity: 1 pt./2 qts.
Test initiated: 8/11/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 1. Concrete Curing Compound

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	10.84%
2.	Wt. per Gallon	ASTM D1475	9.78
3.	Viscosity Cps (Brookfield)	ASTM D2196	16.8 cp #1 (50/100)
4.	Color	ASTM D1729	#10
5.	% Water	ASTM D1364	89.04
6.	Stability 77°F	ASTM D1849	13.7 cp #1 (50.100)
7.	Stability 120°F	ASTM D1849	12.2 cp #1 (50,100)
8.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	12.6 cp #1 (50,100)
9.	Dry Time	ASTM D1640	STT: 4 min. DH: 9 min.
10.	Adhesion	ASTM D3359	5
11.	H_2O Cleanup	---	Easy
12.	Appearance	---	Smooth-on concrete
13.	Application Properties	---	Brush,spray-satisf.
14.	Acc. Weathering	ASTM G23, D822	Pass
15.	Alkali Res.	TD 141B FTM TTC555	Failed-48hrs
16.	VOC		1. 1.40 2. 0.80
17.	Moisture Retention	ASTM C156	0.99 kg/m^2 24hrs.

Note: Items 11, 12, 13 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-13-9
Contract No. A5 097 48
Date received: 4/30/86
Log No.: 430 3A-3C
Lab code: CC9
Quantity: 1 pt./2 qts.
Test initiated: 8/11/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 1. Concrete Curing Compound

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	20.59%
2.	Wt. per Gallon	ASTM D1475	8.18
3.	Viscosity Cps (Brookfield)	ASTM D2196	25.2 cp #1 (50/100)
4.	Color	ASTM D1729	Tan-off white
5.	% Water	ASTM D1364	79.40%
6.	Stability 77°F	ASTM D1849	42.2 cp #1(50/100)
7.	Stability 120°F	ASTM D1849	26 cp #1 (50,100)
8.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	55.0 cp #1 (50/100)
9.	Dry Time	ASTM D1640	STT: 12 min. DH: >3 hrs.
10.	Adhesion	ASTM D3359	5
11.	H_2O Cleanup	---	Easy
12.	Appearance	---	Smooth (concrete)
13.	Application Properties	---	Brush, spray-good
14.	Acc. Weathering	ASTM G23, D822	Pass
15.	Alkali Res.	TD 141B FTM TTC555	Failed-48hrs
16.	VOC		1. 0.10 2. 0.45
17.	Moisture Retention	ASTM C156	0.773 kg/m^2 24hrs

Note: Items 11, 12, 13 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-13-10
Contract No. A5 097 48
Date received: 4/30/86
Log No.: 430 4A-4C
Lab code: CC10
Quantity: 1pt./2 qts.
Test initiated: 8/11/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 1. Concrete Curing Compound

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	26.67%
2.	Wt. per Gallon	ASTM D1475	8.27
3.	Viscosity Cps (Brookfield)	ASTM D2196	17.4 cp #1 (100/50)
4.	Color	ASTM D1729	Off white
5.	% Water	ASTM D1364	72.9%
6.	Stability 77°F	ASTM D1849	16.2 cp #1 (50,100)
7.	Stability 120°F	ASTM D1849	17.5 cp #1 (50,100)
8.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	*28.2 cp #1 (50,100)
9.	Dry Time	ASTM D1640	STT: 7 min. DH: 35 min.
10.	Adhesion	ASTM D3359	5
11.	H_2O Cleanup	---	Difficult
12.	Appearance	---	Smooth
13.	Application Properties	---	Brush,spray-good
14.	Acc. Weathering	ASTM G23, D822	Pass
15.	Alkali Res.	TD 141B FTM TTC555	Failed-48 hrs
16.	VOC		1. 4.27 2. 15.34
17.	Moisture Retention	ASTM C156	0.804 kg/m^2 24hrs

*Thick skin

Note: Items 11, 12, 13 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. JFN #3
Contract No. A5 097 48
Date received: 7/11/86
Log No.: 711 3A-3B
Lab code: CC11
Quantity: 2 qts.
Test initiated: 7/15/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 1. Concrete Curing Compound

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	20.16
2.	Wt. per Gallon	ASTM D1475	8.57
3.	Viscosity Cps (Brookfield)	ASTM D2196	16.4 (#1;50/100)
4.	Color	ASTM D1729	White-translucent
5.	% Water	ASTM D1364	55.79
6.	Stability 77°F	ASTM D1849	15.4 cp #1 (50,100)
7.	Stability 120°F	ASTM D1849	16.2 cp #1 (50,100)
8.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Visc. n/a-gelled
9.	Dry Time	ASTM D1640	STT: 2 min. DH: 20 min.
10.	Adhesion	ASTM D3359	5
11.	H_2O Cleanup	---	Easy
12.	Appearance	---	Smooth
13.	Application Properties	---	Brush,spray-good
14.	Acc. Weathering	ASTM G23, D822	Pass no change
15.	Alkali Res.	TD 141B FTM TTC555	Failed-48 hrs
16.	VOC		1. 247.13 2. 573.38
17.	Moisture Retention	ASTM C156	0.680 kg/m^2 24hrs

Note: Items 11, 12, 13 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-14-1
Contract No. A5 097 48
Date received: 4/10/86
Log No.: 410 4A-4C
Lab code: GS2
Quantity: 1 Pt./2 Qts.
Test initiated: 4/10/86
Test completed: 12/86

Chemist: R. Haffner

Product Category: 2. General Sealers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	25.98
2.	Wt. per Gallon	ASTM D1475	8.365
3.	Viscosity Cps (Brookfield)	ASTM D2196	32.0 (1,100)
4.	% Water	ASTM D1364	72.49
5.	Stability 77°F	ASTM D1849	32.0 (1,100)
6.	Stability 120°F	ASTM D1849	28.0
7.	Freeze - Thaw Res. (1,100) (All H_2O Based Products)	ASTM D2243	33 Pass (1,100)
8.	Dry Time Concrete	ASTM D1640	STT: 20 min. DH: 1 hr. 30 min.
9.	Hardness Q-panel	ASTM D3363	< HB
10.	Humidity Res. Concrete	ASTM D2247	*See below
11.	Adhesion	ASTM D3359	3
12.	En. Holdout (self sealing)	---	0.83
13.	H_2O Cleanup (All H_2O Based Products)	---	** Fair-see below
14.	Flexibility Q panel	ASTM D1737	Passed 1" mandrel only
15.	Impact Res. Q panel	ASTM D2794	10 in. lbs.
16.	Appearance	---	Fair;appears smooth Translucent
17.	Application Properties	---	***Good;brushing exc.
18.	Sag Res.	ASTM D2801	0 mils
19.	Levelling	ASTM D2801	10
20.	Rust Stain Res.	---	Poor
21.	VOC		1. 16.81 2. 61.10
22.	Grain Raising		Poor; left surface rough on ponderosa pin
23.	Recoatability		A. 5 B. 5

*Medium blisters-size 6- general
**Leaves tacky residue if not cleaned immediately after use
***Produces a bronze discoloration on Q-panel after application within 15 minutes.

Note: Items 13, 16, 17 are qualitative tests. Item 12 run as described.
a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.
b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.
c. Recoatability: A. TTP19 B. TTE489

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-14-2
Contract No. A5 097 48
Date received: 4/10/86
Log No.: 410 3A-3C
Lab code: GS2
Quantity: 1 Pt./2 Qts.
Test initiated: 4/11/86
Test completed: 12/86

Chemist: R. Haffner

Product Category: 2. General Sealers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	24.92
2.	Wt. per Gallon	ASTM D1475	8.464
3.	Viscosity Cps (Brookfield)	ASTM D2196	30.5(1,100)
4.	% Water	ASTM D1364	73.94
5.	Stability 77°F(brown skins)	ASTM D1849	30.5 (1,100)
6.	Stability 120°F	ASTM D1849	27.0 (1,100)
7.	Freeze - Thaw Res.(1,100) (All H_2O Based Products)	ASTM D2243	29 (1,100)
8.	Dry Time Concrete	ASTM D1640	STT: 20 min. DH: 1 hr. 30 min.
9.	Hardness Concrete	ASTM D3363	<HB
10.	Humidity Res. Concrete	ASTM D2247	* see below
11.	Adhesion Q panel	ASTM D3359	1
12.	En. Holdout (self sealing)	---	1.0
13.	H_2O Cleanup (All H_2O Based Products)	---	** Fair
14.	Flexibility Q panel	ASTM D1737	Pass>1/8" mandrel
15.	Impact Res. Q panel	ASTM D2794	10.50 in/lbs
16.	Appearance	---	***Fair;smooth,transluscent
17.	Application Properties (conv. spray)	---	Brushing-concrete exc.
18.	Sag Res.	ASTM D2801	0 mils
19.	Levelling	ASTM D2801	Flow 10
20.	Rust Stain Res.	---	Poor
21.	VOC		1. 12.71 2. 50.19
22.	Grain Raising		Poor;left surface rough on ponderosa pine
23.	Recoatability		A. 5 B. 5

*Blisters medium-size 6- uniform over field
**Leaves tacky residue if not cleaned immediately after use
***Produces a bronze discoloration after application on Q-panel, within 10 minutes.

Note: Items 13, 16, 17 are qualitative tests. Item 12 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

c. Recoatability: A. TTP19 B. TTE489

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-14-3
Contract No. A5 097 48
Date received: 4/28/86
Log No.: 428 1A-1C
Lab code: GS2
Quantity: 1 Pt./2 Qts.
Test initiated: 4/28/86
Test completed: 12/86

Chemist: R. Haffner

Product Category: 2. General Sealers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	43.99
2.	Wt. per Gallon	ASTM D1475	8.279
3.	Viscosity Cps (Brookfield)	ASTM D2196	37,600 cp (4,2.5)
4.	% Water	ASTM D1364	54.68
5.	Stability 77°F(some brn. skins)	ASTM D1849	37,600 (4,2.5)
6.	Stability 120°F(some brn skins)	ASTM D1849	32,400 (4,2.5)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	38,400 (4,2.5)
8.	Dry Time	ASTM D1640	STT: 17 min. DH: 45 min.
9.	Hardness Q-panel	ASTM D3363	<HB
10.	Humidity Res. Concrete brick	ASTM D2247	Whitens;no blistering
11.	Adhesion Concrete brick	ASTM D3359	3
12.	En. Holdout (self sealing)	---	1.13
13.	H_2O Cleanup (All H_2O Based Products)	---	*good, cleans easily
14.	Flexibility Q-panel	ASTM D1737	1" mandrel
15.	Impact Res. Q-panel	ASTM D2794	84 inch Lbs
16.	Appearance	---	** Waxy
17.	Application Properties(brushed)	---	Fair
18.	Sag Res.	ASTM D2801	12; flow 0
19.	Levelling	ASTM D2801	4
20.	Rust Stain Res.	---	Fair
21.	VOC		1. 14.12 2. 30.78
22.	Grain Raising (on ponderosa pine)		Poor, left surface roug
23.	Recoatability		A. 0 B. 2

*But needs to be cleaned immediately after use
**Has very waxy feel when applied to wood. Has waxy feel and local stains Q-panels. Mild ammonia odor

Note: Items 13, 16, 17 are qualitative tests. Item 12 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

c. Recoatability: A. TTP19 B. TTE489

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. JFN #12
Contract No. A5 097 48
Date received: 9/10/86
Log No.: 910-1B
Lab code: GS2
Quantity: 1 gal
Test initiated: 9/10/86
Test completed: 12/86

Chemist: R. Haffner

Product Category: 2. General Sealers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	45.19
2.	Wt. per Gallon	ASTM D1475	8.44
3.	Viscosity Cps (Brookfield)	ASTM D2196	98 (1,50)
4.	% Water	ASTM D1364	50.02
5.	Stability 77°F	ASTM D1849	52 (1,50) 3 months
6.	Stability 120°F	ASTM D1849	51.6 (1,50)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	60.0 (1,50)
8.	Dry Time	ASTM D1640	STT: 30 min. DH: 1 hr. 35 min.
9.	Hardness	ASTM D3363	<HB
10.	Humidity Res. (concrete)	ASTM D2247	*see below
11.	Adhesion (concrete)	ASTM D3359	5
12.	En. Holdout (self sealing)	---	1.0
13.	H_2O Cleanup (All H_2O Based Products)	---	**Excellent
14.	Flexibility	ASTM D1737	>1/8" mandrel
15.	Impact Res.	ASTM D2794	> 80.5 in. lbs.
16.	Appearance	---	*** Waxy, dries clear
17.	Application Properties	---	Good
18.	Sag Res.	ASTM D2801	0 mils
19.	Levelling	ASTM D2801	10
20.	Rust Stain Res.	---	Fair
21.	VOC		1. 48.47 2. 97.95
22.	Grain Raising		Poor
23.	Recoatability		A. 0 B. 0

*Slight Whitening-no blisters
**Cleans very easily
***Strong ammonia odor

Note: Items 13, 16, 17 are qualitative tests. Item 12 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

c. Recoatability: A. TTP19 B. TTE489

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-16-1
Contract No. A5 097 48
Date received: 4/11/86
Log No.: 411 1A-1C
Lab code: 047-3B
Quantity: 1 Pt./2 Qts.
Test initiated: 4/14/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 3. Industrial Maintenance Primers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	57.7
2.	Wt. per Gallon	ASTM D1475	11.34
3.	Viscosity Cps (Brookfield)	ASTM D2196	8800 (3,5)
4.	% Water	ASTM D1364	39.17%
5.	Stability 77°F	ASTM D1849	8800 (3,5)
6.	Stability 120°F	ASTM D1849	* 8800 (3,5)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	* 8800 (3,5)
8.	Dry Time	ASTM D1640	STT: 28 min. DH: 38 min.
9.	Hardness	ASTM D3363	HB
10.	Humidity Res.	ASTM D2247	No blisters; very slight rust
11.	Adhesion	ASTM D3359	5
12.	En. Holdout (self sealing)	---	1.20
13.	H_2O Cleanup (All H_2O Based Products)	---	Satisfactory
14.	Flexibility	ASTM D1737	Passes 1/8" mandrel
15.	Impact Res.	ASTM D2794	Passes 80 in. lbs.
16.	Appearance	---	Smooth
17.	Application Properties	---	**see not below
18.	Sag Res.	ASTM D2801	> 12
19.	Levelling	ASTM D2801	0
20.	Salt Spray Res.	ASTM B117	Fair-see attach
21.	VOC		1. 42.55 2. 90.28
22.	Pot Life		N/A
23.	Intercoat Adhesion		A. 5 B. 5

Note: Items 13, 16, 17 are qualitative tests. Item 12 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

c. Intercoat Adhesion: A. TTP19 B. TTE489

*No skin or sediment, mixes to smooth paste

**Sprayable upon 22-24% reduction,reduced with water

20. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	6	Medium	Uniform over field and at both scribes	--
2. Corrosion	--	--	Uniform at both scribes	1/4" from each scribe some isolated field corrosion

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-16-9
Contract No. A5 097 48
Date received: 3/18/86
Log No.: 318 2A-2C
Lab code: 016-3B-00
Quantity: 1 Pt./2 Qts.
Test initiated: 3/21/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 3. Industrial Maintenance Primers

	Tests	Procedure		Results
1.	Total NV % Wt.	ASTM D2369		52.30
2.	Wt. per Gallon	ASTM D1475		10.60
3.	Viscosity Cps (Brookfield)	ASTM D2196		1750.00 (3,20)
4.	% Water	ASTM D1364		38.91
5.	Stability 77°F	ASTM D1849		1713 (3,20)
6.	Stability 120°F	ASTM D1849	*	1725 (3,20)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	**	1975 (3,20)
8.	Dry Time	ASTM D1640		STT: 23 min. DH: 45 min.
9.	Hardness	ASTM D3363		HB
10.	Humidity Res.	ASTM D2247		No blisters or rust
11.	Adhesion	ASTM D3359		4
12.	En. Holdout (self sealing)	---		1.13
13.	H_2O Cleanup (All H_2O Based Products)	---		Good
14.	Flexibility	ASTM D1737		Passed 1/8"
15.	Impact Res.	ASTM D2794		Passed 80 in. lbs.
16.	Appearance	---		Smooth finish
17.	Application Properties	---		Sprayable at 20% reduct.
18.	Sag Res.	ASTM D2801		12
19.	Levelling	ASTM D2801		0
20.	Salt Spray Res.	ASTM B117		Very Poor-see attached
21.	VOC			1. 111.71 2. 220.98
22.	Pot Life			N/A
23.	Intercoat Adhesion			A. 4 B. 5

Note: Items 13, 16, 17 are qualitative tests. Item 12 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

c. Intercoat Adhesion: A. TTP19 B. TTE489

* Slight settling of pigment
** Pigment settled but mixes to smooth paste

20. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	6	Med. dense	Uniform over field and at both scribes	--
2. Corrosion	--	--	Uniform at both scribes, uniform over field	1/2" from vertical scribe, 1/4" from cross-hatch

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-16-10
Contract No. A5 097 48
Date received: 3/18/86
Log No.: 318 1A-1C
Lab code: 017-3B-00
Quantity: 1 Pt./2 Qts.
Test initiated: 3/21/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 3. Industrial Maintenance Primers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	56.78
2.	Wt. per Gallon	ASTM D1475	11.02
3.	Viscosity Cps (Brookfield)	ASTM D2196	1775 (3,20)
4.	% Water	ASTM D1364	38.0
5.	Stability 77°F	ASTM D1849	1760 (3,20)
6.	Stability 120°F	ASTM D1849	* 1825 (3,20)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	1950 (3,20)
8.	Dry Time	ASTM D1640	STT: 18 min. DH: 30 min.
9.	Hardness	ASTM D3363	HB
10.	Humidity Res.	ASTM D2247	No blisters or rust
11.	Adhesion	ASTM D3359	5
12.	En. Holdout (self sealing)	---	0.94
13.	H_2O Cleanup (All H_2O Based Products)	---	Good
14.	Flexibility	ASTM D1737	Passed 1/8"
15.	Impact Res.	ASTM D2794	Passed 80 in. lbs.
16.	Appearance	---	Smooth finish
17.	Application Properties	---	Sprayable at 25% reduction
18.	Sag Res.	ASTM D2801	12
19.	Levelling	ASTM D2801	0
20.	Salt Spray Res.	ASTM B117	Poor- see attached
21.	VOC		1. 68.97 2. 138.38
22.	Pot Life		N/A
23.	Intercoat Adhesion		A. 5 B. 5

*Settled but mixable

Note: Items 13, 16, 17 are qualitative tests. Item 12 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

c. Intercoat Adhesion: A. TTP19 B. TTE489

20. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	4	Med.	Uniform at both scribes	--
	8	Med. dense	Uniform over field	--
2. Corrosion	--	--	Uniform at both scribes, some isolated field corrosion	1/8" from both scribes
			General fileform corrosion	

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-17-1
Contract No. A5 097 48
Date received: 4/2/86
Log No.: 42 1A-1C
Lab code: 043-3C
Quantity: 1 Pt./2 Qts.
Test initiated: 4/3/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 3. Industrial Maintenance Primers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	58.7
2.	Wt. per Gallon	ASTM D1475	10.67
3.	Viscosity Cps (Brookfield) (5 spindel,1 speed)	ASTM D2196	1.2×10^4 (5,20)
4.	% Water	ASTM D1364	38.50
5.	Stability 77°F	ASTM D1849	1.2×10^4 (5,20)
6.	Stability 120°F	ASTM D1849	1.2×10^4 (5,20)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Reduction viscosity 9×10^3 (5,20) STT: 25 min.
8.	Dry Time	ASTM D1640	DH: 35 min.
9.	Hardness	ASTM D3363	HB
10.	Humidity Res.	ASTM D2247	No rust or blister
11.	Adhesion	ASTM D3359	1-2
12.	En. Holdout (self sealing)	---	0.97
13.	H_2O Cleanup (All H_2O Based Products)	---	Good
14.	Flexibility	ASTM D1737	Passed 1/8" mandrel
15.	Impact Res.	ASTM D2794	Passed 60 in. lbs.
16.	Appearance	---	Smooth
17.	Application Properties	---	*see below
18.	Sag Res.	ASTM D2801	12
19.	Levelling	ASTM D2801	0
20.	Salt Spray Res.	ASTM B117	Very Poor-see attached
21.	VOC		1. 35.82 2. 70.08
22.	Pot Life		N/A
23.	Intercoat Adhesion		A. 3 B. 5

*Sprayable at 3-40% reduction H_2O

Note: Items 13, 16, 17 are qualitative tests. Item 12 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

c. Intercoat Adhesion: A. TTP19 B. TTE489

20. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	6	Med.	Uniform at both scribe, some random isolated blisters on field	--
2. Corrosion	--	--	Uniform at both scribe, some random isolated field corrosion	1/4" from vertical scribe, 3/4" from cross-hatch
			General filiform corrosion	

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-17-2
Contract No. A5 097 48
Date received: 4/16/86
Log No.: 416 1A-1C
Lab code: 049-3C
Quantity: 1 Pt./2 Qts.
Test initiated: 4/21/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 3. Industrial Maintenance Primers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	52.6
2.	Wt. per Gallon	ASTM D1475	10.4
3.	Viscosity Cps (Brookfield)	ASTM D2196	6500 (5,20)
4.	% Water	ASTM D1364	41.50%
5.	Stability 77°F	ASTM D1849	6500 (5,20)
6.	Stability 120°F	ASTM D1849	* 7000 (5,20)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	* 5800 (5,20)
8.	Dry Time	ASTM D1640	STT: 30 min. DH: 65 min.
9.	Hardness	ASTM D3363	HB
10.	Humidity Res.	ASTM D2247	99% blisters on field, no rust
11.	Adhesion	ASTM D3359	2
12.	En. Holdout (self sealing)	---	0.98
13.	H_2O Cleanup (All H_2O Based Products)	---	Satisfactory
14.	Flexibility	ASTM D1737	Passed 1/8" mandrel
15.	Impact Res. (80 in lb)	ASTM D2794	Passed
16.	Appearance	---	Smooth
17.	Application Properties	---	Sprayable at 67% reduction
18.	Sag Res.	ASTM D2801	12
19.	Levelling	ASTM D2801	0
20.	Salt Spray Res.	ASTM B117	Poor-see attached
21.	VOC		1. 73.57 2. 151.56
22.	Pot Life		N/A
23.	Intercoat Adhesion		A. 4 B. 5

*Smooth paste, no skin

Note: Items 13, 16, 17 are qualitative tests. Item 12 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

c. Intercoat Adhesion: A. TTP19 B. TTE489

20. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	6	Med. dense	Uniform at both scribes	--
	8	Med.	Random over field	--
2. Corrosion	--	--	Unifomr at both scribes, some random isolated field corrosion	1/8" from each scribe

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-17-3
Contract No. A5 097 48
Date received: 4/16/86
Log No.: 416 2A-2C
Lab code: 050-3C
Quantity: 1 Pt./2 Qts.
Test initiated: 4/21/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 3. Industrial Maintenance Primers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	47.2
2.	Wt. per Gallon	ASTM D1475	10.1
3.	Viscosity Cps (Brookfield)	ASTM D2196	3300 (5,20)
4.	% Water	ASTM D1364	48.40
5.	Stability 77°F	ASTM D1849	3550 (5,20)
6.	Stability 120°F	ASTM D1849	* see note
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	** 3400 (5,20)
8.	Dry Time	ASTM D1640	STT: 24 min. DH: 38 min.
9.	Hardness	ASTM D3363	HB
10.	Humidity Res.	ASTM D2247	No blisters or rust
11.	Adhesion	ASTM D3359	4
12.	En. Holdout (self sealing)	---	1.06
13.	H_2O Cleanup (All H_2O Based Products)	---	Fair
14.	Flexibility	ASTM D1737	Passes 1/8" mandrel
15.	Impact Res. (80 in lb)	ASTM D2794	Passed
16.	Appearance	---	Smooth; slight grit
17.	Application Properties	---	Sprayable 30% H_2O red.
18.	Sag Res.	ASTM D2801	12
19.	Levelling	ASTM D2801	0
20.	Salt Spray Res.	ASTM B117	Poor -see attached
21.	VOC		1. 53.29 2. 128.59
22.	Pot Life		N/A
23.	Intercoat Adhesion		A. 5 B. 5

*Jelled, formed very thick paste, settled
**No skin, smooth

Note: Items 13, 16, 17 are qualitative tests. Item 12 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

c. Intercoat Adhesion: A. TTP19 B. TTE489

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	6	Med.	Unifom at both scribe	--
	8	Med. dense	Isolated on field near vertical scribe	
2. Corrosion	--	--	Uniform at both scribes, some random isolated field corrosion	1/8" from each scribe

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. JFN #1
Contract No. A5 097 48
Date received: 7/11/86
Log No.: 711 1A-1B
Lab code: IMP3
Quantity: 2 qts.
Test initiated: 7/11/86
Test completed: 12/86

Chemist: R. Haffner

Product Category: 3. Industrial Maintenance Primers

	Tests	Procedure		Results
1.	Total NV % Wt.	ASTM D2369		80.46
2.	Wt. per Gallon	ASTM D1475		11.28
3.	Viscosity Cps (Brookfield)	ASTM D2196		1780 (4,50)
4.	% Water	ASTM D1364		0.61
5.	Stability 77°F	ASTM D1849		1800 (4,50) no skins, sed.
6.	Stability 120°F	ASTM D1849		1530 (4,50) settles
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243		N/A
8.	Dry Time	ASTM D1640		STT: 5 hrs. DH: 12 hrs.
9.	Hardness (Q panel)	ASTM D3363		HB
10.	Humidity Res. (Q panel)	ASTM D2247		see attached
11.	Adhesion (Q panel)	ASTM D3359		2
12.	En. Holdout (self sealing)	---		0.95
13.	H_2O Cleanup (All H_2O Based Products)	---		N/A solvent base
14.	Flexibility (Q panel)	ASTM D1737		1/8" mandrel
15.	Impact Res. (Q panel)	ASTM D2794		80.5 in. lbs
16.	Appearance (semi glossy, smooth)	---		Good
17.	Application Properties	---	*	See below
18.	Sag Res.	ASTM D2801		12
19.	Levelling	ASTM D2801		1
20.	Salt Spray Res.	ASTM B117		Exc.-see attached
21.	VOC			256.02
22.	Pot Life			8 hrs. 30 min.
23.	Intercoat Adhesion			A. 3 B. 5

* Conventional spraying-must be reduced with 1,1,1 Trichloroethane. 10% by vol., brushability-good

Note: Items 13, 16, 17 are qualitative tests. Item 12 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

c. Intercoat Adhesion: A. TTP19 B. TTE489

10. Humidity Resistance

	Size	Freq.	Pattern	Extent of Corrosion
1. Blistering	None	--	--	--
2. Corrosion	None	--	--	--

20. Salt Spray Resistance

	Size	Freq.	Pattern	Extend of Corrosion
1. Blistering	8	med.	Uniform along both scribes	--
2. Corrosion	--	--	Uniform at both scribes	3/8" from each scribe

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-19-1
Contract No. A5 097 48
Date received: 3/18/86
Log No.: 318-3A-3C
Lab code: 018-4A-00
Quantity: 1 Pt./2 Qts.
Test initiated: 3/21/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 4. Industrial Maintenance Topcoats

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	51.49
2.	Wt. per Gallon	ASTM D1475	10.49
3.	Viscosity Cps (Brookfield)	ASTM D2196	2925 (3,20)
4.	% Water	ASTM D1364	41.4
5.	Stability 77°F	ASTM D1849	2938 (3,20)
6.	Stability 120°F (=cps)	ASTM D1849	* 4675 (3,20)
7.	Freeze - Thaw Res.(=cps) (All H_2O Based Products)	ASTM D2243	** 3100 (3,20) STT: 20 min.
8.	Dry Time	ASTM D1640	DH: 30 min.
9.	Hardness	ASTM D3363	HB
10.	60° Gloss	ASTM D523	22
11.	Yellowness Index	STD 141B 6131	N/A (green)
12.	Humidity Res.	ASTM D2247	No blisters or rust
13.	Adhesion	ASTM D3359	3
14.	H_2O Cleanup (All H_2O Based Products)	---	Good
15.	Abrasion Res.	ASTM D4060	0.063 gms
16.	Flexibility	ASTM D1737	Passed 1/8" mandrel
17.	Impact Res.	ASTM D2794	Passed 80 in. lbs.
18.	Appearance	---	Smooth finish
19.	Application Properties	--- ***	See below
20.	Sag Res.	ASTM D2801	11
21.	Levelling	ASTM D2801	2.5
22.	Contrast Ratio	ASTM D2805	1.0
23.	Acc. Weathering	ASTM G23, D822****	14 See below
24.	Salt Spray Res.	ASTM B117	Poor- see attached
25.	VOC		1. 89.43 2. 185.34
26.	Pot Life		N/A

Note: Items 14, 18, 19 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

*Thickened slightly, but pasty
**Smooth paste
***Water reduced, sprayable at 25% reduction
****Some uniform edge corrosion, some isolated. #6 blisters on edges

24. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	6	Dense	Uniform at both scribes and over field	--
2. Corrosion	--	--	Uniform at both scribes, uniform over field, some isolated edge corrosion	1" from each scribe

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-19-2
Contract No. A5 097 48
Date received: 3/18/86
Log No.: 318-4A-4C
Lab code: 019-4A-00
Quantity: 1 Pt/2 Qts.
Test initiated: 3/21/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 4. Industrial Maintenance Topcoats

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	51.11
2.	Wt. per Gallon	ASTM D1475	10.24
3.	Viscosity Cps (Brookfield)	ASTM D2196	2375 (3,20)
4.	% Water	ASTM D1364	43.0
5.	Stability 77°F	ASTM D1849	2375 (3,20)
6.	Stability 120°F	ASTM D1849	9700 cps (3,10)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	2400 cps (3,20) STT: 21 min.
8.	Dry Time	ASTM D1640	DH: 31 min.
9.	Hardness	ASTM D3363	HB
10.	60° Gloss	ASTM D523	14
11.	Yellowness Index	STD 141B 6131	N/A (green)
12.	Humidity Res.	ASTM D2247	* see note below
13.	Adhesion	ASTM D3359	3
14.	H_2O Cleanup (All H_2O Based Products)	---	Washable when wet
15.	Abrasion Res.	ASTM D4060	0.076 gms
16.	Flexibility	ASTM D1737	Passed 1/8" mandrel
17.	Impact Res.	ASTM D2794	Passed 80 in. lbs.
18.	Appearance	---	Slightly gritty
19.	Application Properties	---	Sprayable at 25% Reducti
20.	Sag Res.	ASTM D2801	10
21.	Levelling	ASTM D2801	2-3
22.	Contrast Ratio	ASTM D2805	1.0
23.	Acc. Weathering	ASTM G23, D822	** 9 see below
24.	Salt Spray Res.	ASTM B117	Poor- see attached
25.	VOC		1. 72.31 2. 152.10
26.	Pot Life		N/A

*Small blisters and pinhole corrosion
**Uniform #8 blisters over field

Note: Items 14, 18, 19 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

24. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	8	Dense	Uniform at both scribes and over entire field	--
2. Corrosion	--	--	Uniform at both scribes, and over entire field	1" from each scribe

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-19-3
Contract No. A5 097 48
Date received: 4/11/86
Log No.: 411 2A
Lab code: 048-4A
Quantity: 3/4 Qt.
Test initiated: 4/14/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 4. Industrial Maintenance Topcoats

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	49.8
2.	Wt. per Gallon	ASTM D1475	10.06
3.	Viscosity Cps (Brookfield)	ASTM D2196	4400 (3,5)
4.	% Water	ASTM D1364	45.82
5.	Stability 77°F	ASTM D1849	4450 (3,5)
6.	Stability 120°F	ASTM D1849	4400 (3,5)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	4400 cps (3,5)
8.	Dry Time	ASTM D1640	STT: 18 min. DH: 28 min.
9.	Hardness	ASTM D3363	HB
10.	60° Gloss	ASTM D523	19
11.	Yellowness Index	STD 141B 6131	N/A (orange)
12.	Humidity Res. (48 hrs)	ASTM D2247	No blisters or rust
13.	Adhesion	ASTM D3359	5
14.	H_2O Cleanup (All H_2O Based Products)	---	Satisfactory
15.	Abrasion Res.	ASTM D4060	0.077 gms
16.	Flexibility	ASTM D1737	Passes 1/8" mandrel
17.	Impact Res.	ASTM D2794	Passed 80 in. lbs.
18.	Appearance	---	Smooth
19.	Application Properties	---	Sprayable upon 15% reduction
20.	Sag Res.	ASTM D2801	12
21.	Levelling	ASTM D2801	0
22.	Contrast Ratio	ASTM D2805	0.99
23.	Acc. Weathering	ASTM G23, D822	* 15 see below
24.	Salt Spray Res.	ASTM B117	Poor-see attached
25.	VOC		1. 52.83 2. 117.34
26.	Pot Life		N/A

*Some uniform edge corrosion

Note: Items 14, 18, 19 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

24. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	4	Dense	Uniform at both scribes and on field surrounding crosshatch	--
	8	Med.	Random over field	--
2. Corrosion	--	--	Uniform at both scribes	1/16" from each scribe

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-19-4
Contract No. A5 097 48
Date received: 4/17/86
Log No.: 416 3A-3C
Lab code: 051-4A
Quantity: 1 Pt./2 Qts.
Test initiated: 4/21/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 4. Industrial Maintenance Topcoats

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	51.5
2.	Wt. per Gallon	ASTM D1475	9.9
3.	Viscosity Cps (Brookfield)	ASTM D2196	2960 (5,50)
4.	% Water	ASTM D1364	46.97
5.	Stability 77°F	ASTM D1849	2640 (5,50)
6.	Stability 120°F	ASTM D1849	2240 cps (5,50)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	2560 cps (5,50)
8.	Dry Time	ASTM D1640	STT: 20 min. DH: 35 min.
9.	Hardness	ASTM D3363	HB
10.	60° Gloss	ASTM D523	41
11.	Yellowness Index	STD 141B 6131	N/A (grey)
12.	Humidity Res.	ASTM D2247	35% blisters; slight rust
13.	Adhesion	ASTM D3359	Between primer=4; substrate =2
14.	H_2O Cleanup (All H_2O Based Products)	---	Satisfactory
15.	Abrasion Res.	ASTM D4060	0.094 gms
16.	Flexibility	ASTM D1737	Passed 1/8" mandrel
17.	Impact Res.	ASTM D2794	Passed 80 in. lbs.
18.	Appearance	---	Smooth; slight grit
19.	Application Properties	---	*see below
20.	Sag Res.	ASTM D2801	12
21.	Levelling	ASTM D2801	0
22.	Contrast Ratio	ASTM D2805	0.994
23.	Acc. Weathering	ASTM G23, D822	** 30 -see below
24.	Salt Spray Res.	ASTM B117	Fair-see attached
25.	VOC		1. 18.16 2. 40.73
26.	Pot Life		N/A

*Sprayable upon 20% reduction H_2O
**Some isolated edge corrosion uniform #8 blisters over field

Note: Items 14, 18, 19 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

24. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	6	Med.	Uniform at both scribes,	--
	8	Few	Random isolated field blisters	--
2. Corrosion	--	--	Uniform at both scribes	1/16" from each scribe

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-19-5
Contract No. A5 097 48
Date received: 4/16/86
Log No.: 416-4A-4C
Lab code: 052-4A
Quantity: 1 Pt./2 Qts.
Test initiated: 4/21/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 4. Industrial Maintenance Topcoats

	Tests	Procedure		Results
1.	Total NV % Wt.	ASTM D2369		46.8
2.	Wt. per Gallon	ASTM D1475		10.12
3.	Viscosity Cps (Brookfield)	ASTM D2196		3480 (5,50)
4.	% Water	ASTM D1364		47.66
5.	Stability 77°F	ASTM D1849		3400 (5,50)
6.	Stability 120°F	ASTM D1849		2720 cps (5,50)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243		3040 cps (5,50)
8.	Dry Time	ASTM D1640		STT: 20 min. DH: 30 min.
9.	Hardness	ASTM D3363		HB
10.	60° Gloss	ASTM D523		63.5
11.	Yellowness Index	STD 141B 6131		n= .0018
12.	Humidity Res.	ASTM D2247		99% field blisters; no rust
13.	Adhesion	ASTM D3359		4
14.	H_2O Cleanup (All H_2O Based Products)	---		Satisfactory
15.	Abrasion Res.	ASTM D4060		0.071 gms
16.	Flexibility	ASTM D1737		Passed 1/8" mandrel
17.	Impact Res. (80 in lb)	ASTM D2794		Passed 80 in. lbs.
18.	Appearance	---		Smooth
19.	Application Properties	---		Sprayable upon 50% reduction
20.	Sag Res.	ASTM D2801		12
21.	Levelling	ASTM D2801		0
22.	Contrast Ratio	ASTM D2805		0.968
23.	Acc. Weathering	ASTM G23, D822	*	41- see below
24.	Salt Spray Res.	ASTM B117		Fair- see attached
25.	VOC			1. 72.23 2. 170.59
26.	Pot Life			N/A

*Uniform edge corrosion, uniform #8 blisters on edges

Note: Items 14, 18, 19 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

24. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	4	Med.	Uniform at both scribes	--
2. Corrosion	--	--	Uniform at both scribes, some isolated random field	1/8" from each scribe

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-19-6
Contract No. A5 097 48
Date received: 4/23/86
Log No.: 423 1A-1C
Lab code: 054-4A
Quantity: 1 Pt./2 Qts.
Test initiated: 4/25/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 4. Industrial Maintenance Topcoats

	Tests	Procedure		Results
1.	Total NV % Wt.	ASTM D2369		52.2
2.	Wt. per Gallon	ASTM D1475		10.84
3.	Viscosity Cps (Brookfield)	ASTM D2196		3200 cps (4,20)
4.	% Water	ASTM D1364		43.59%
5.	Stability 77°F	ASTM D1849		3240 (4,20)
6.	Stability 120°F	ASTM D1849		4100 cps (4,20)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243		3100 cps (4,20)
8.	Dry Time	ASTM D1640		STT: 24 min. DH: 39 min.
9.	Hardness	ASTM D3363		HB
10.	60° Gloss	ASTM D523		6.0 flat
11.	Yellowness Index	STD 141B 6131		N/A (green)
12.	Humidity Res.	ASTM D2247		No blisters or rust
13.	Adhesion	ASTM D3359		5
14.	H_2O Cleanup (All H_2O Based Products)	---		Washable when wet (satisfactory)
15.	Abrasion Res.	ASTM D4060		0.097 gms
16.	Flexibility	ASTM D1737		Passed 1/8" mandrel
17.	Impact Res.	ASTM D2794		Passed 80 in lbs.
18.	Appearance	---		Smooth
19.	Application Properties	---		Sprayable upon 63% reduction
20.	Sag Res.	ASTM D2801		12
21.	Levelling	ASTM D2801		0
22.	Contrast Ratio	ASTM D2805		1.0
23.	Acc. Weathering	ASTM G23, D822	*	4- see below
24.	Salt Spray Res.	ASTM B117		Fair-see attached
25.	VOC			1. 54.72 2. 125.01
26.	Pot Life			N/A

*Slight uniform edge corrosion; random #8 blisters on edges

Note: Items 14, 18, 19 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

24. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	8	Med.	Uniform at both scribes	
2. Corrosion	--	--	Uniform at both scribes	1/8" from each scribe

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-20-1
Contract No. A5 097 48
Date received: 3/18/86
Log No.: 318-6A-6C
Lab code: 020-4B-00
Quantity: 1 Pt./2 Qts.
Test initiated: 3/21/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 4. Industrial Maintenance Topcoats

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	30.23
2.	Wt. per Gallon	ASTM D1475	8.99
3.	Viscosity Cps (Brookfield)	ASTM D2196	4200(3,20)
4.	% Water	ASTM D1364	60.10
5.	Stability 77°F	ASTM D1849	4060 (3,20)exploded
6.	Stability 120°F	ASTM D1849	1200 cps (5,20)slight ga
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	8500 cps (3,10)slight ga STT: 37 min.
8.	Dry Time	ASTM D1640	DH: 73 min.
9.	Hardness	ASTM D3363	HB
10.	60° Gloss	ASTM D523	20
11.	Yellowness Index	STD 141B 6131	N/A (silver)
12.	Humidity Res.	ASTM D2247	* see note
13.	Adhesion	ASTM D3359	5
14.	H_2O Cleanup (All H_2O Based Products)	---	Washable when wet
15.	Abrasion Res.	ASTM D4060	0.107 gms
16.	Flexibility	ASTM D1737	Passed 1/8" mandrel
17.	Impact Res.	ASTM D2794	Passed 80 in. lbs.
18.	Appearance	---	Slight grit
19.	Application Properties	---	** Brushable
20.	Sag Res.	ASTM D2801	12
21.	Levelling	ASTM D2801	0
22.	Contrast Ratio	ASTM D2805	0.98
23.	Acc. Weathering	ASTM G23, D822	*** 18- see below
24.	Salt Spray Res.	ASTM B117	Very Poor-see attached
25.	VOC		1. 105.31 2. 294.98
26.	Pot Life		N/A

*No blisters, very slight pinhole rust
**Sprayable at 30% Reduction
***(slight) random edge corrosion uniform #8 blisters over field

Note: Items 14, 18, 19 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

24. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	4	Dense	Uniform at both scribes, uniform over field	--
2. Corrosion	--	--	Uniform at both scribes, and over entire field	Excessive 1 1/2" from each scribe

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. JFN #2
Contract No. A5 097 48
Date received: 7/11/86 — Chemist: R. Haffner
Log No.: 711 2A-2B
Lab code: IMT4
Quantity: 2 qts.
Test initiated: 7/11/86
Test completed: 12/86

Product Category: 4. Industrial Maintenance Topcoats

	Tests	Procedure		Results
1.	Total NV % Wt.	ASTM D2369		90.98
2.	Wt. per Gallon	ASTM D1475		14.96 lbs.gal
3.	Viscosity Cps (Brookfield)	ASTM D2196		5850 (4,20)
4.	% Water	ASTM D1364		0.16
5.	Stability 77°F (no skins,sed)	ASTM D1849		4500 (4,20) 3 months
6.	Stability 120°F	ASTM D1849		2650 (4,20)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243		N/A
8.	Dry Time	ASTM D1640		STT: 3 hrs. DH: 26 hrs.
9.	Hardness Q panel	ASTM D3363		HB
10.	60° Gloss Q panel	ASTM D523		96
11.	Yellowness Index 96 hrs	STD 141B 6131		n= .0018
12.	Humidity Res.Q panel 48 hrs	ASTM D2247		see attached
13.	Adhesion Q panel	ASTM D3359		3
14.	H_2O Cleanup (All H_2O Based Products)	---		N/A Solvent base
15.	Abrasion Res.	ASTM D4060		0.059 gms
16.	Flexibility Q panel	ASTM D1737		1/8" mandrel
17.	Impact Res. Q panel	ASTM D2794		80.5 in. lb.
18.	Appearance	---		Exc.;high gloss
19.	Application Properties	---	*	See below
20.	Sag Res.	ASTM D2801		11
21.	Levelling	ASTM D2801		4
22.	Contrast Ratio	ASTM D2805		0.99
23.	Acc. Weathering 300 hrs	ASTM G23, D822	**	51 see below
24.	Salt Spray Res.	ASTM B117		Excellent-see attached
25.	VOC			158.98

*Conventional spraying-must be reduced with 1,1,1 Trichloroethane, 10% by vol. Brushability-good

**Some wrinkling of coating; slight edge corrosion (random)
mil thickness: 2.2

Note: Items 14, 18, 19 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

Paint cures very slowly at ambient temperature

12. Humidity Resistance

	Size	Freq.	Pattern	Extent of Corrosion
1. Blistering	None	--	--	--
2. Corrosion	None	--	--	--

24. Salt Spray Resistance

	Size	Freq.	Pattern	Extent of Corrosion
1. Blistering	8	V. Few	Random over field	--
2. Corrosion	--	--	Random at both scribes, no field corrosion	1/8" from scribes

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. JFN #7
Contract No. A5 097 48
Date received: 7/11/86
Log No.: 711 7A-7B
Lab code: 4IMT
Quantity: 2 qts.
Test initiated: 7/11/86
Test completed: 12/86

Chemist: R. Haffner

Product Category: 4. Industrial Maintenance Topcoats

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	68.14
2.	Wt. per Gallon	ASTM D1475	12.58 lbs/gal
3.	Viscosity Cps (Brookfield)	ASTM D2196	5750 (4,20)
4.	% Water	ASTM D1364	17.35
5.	Stability 77°F	ASTM D1849	Gelled
6.	Stability 120°F	ASTM D1849	27,600 (4,20)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	5700 passed (4,20)
8.	Dry Time	ASTM D1640	STT: 35 min. DH: 3hrs. 30 min
9.	Hardness Q panel	ASTM D3363	HB
10.	60° Gloss Q panel	ASTM D523	4
11.	Yellowness Index	STD 141B 6131	N/A (blue)
12.	Humidity Res. Q panel	ASTM D2247	see attached
13.	Adhesion Q panel	ASTM D3359	5
14.	H_2O Cleanup (All H_2O Based Products)	---	Good
15.	Abrasion Res.	ASTM D4060	0.232 gms
16.	Flexibility Q panel	ASTM D1737	1/8" mandrel
17.	Impact Res. Q panel	ASTM D2794	80.5 in. lbs.
18.	Appearance Flat, Q panel	---	Good
19.	Application Properties	--- *	See below
20.	Sag Res.	ASTM D2801	12
21.	Levelling	ASTM D2801	1
22.	Contrast Ratio	ASTM D2805	0.97
23.	Acc. Weathering 300 hrs	ASTM G23, D822	** 3 see below
24.	Salt Spray Res.	ASTM B117	Poor-see attached
25.	VOC		1. 218.85 2. 295.82
26.	Pot Life		N/A (1 component)

* Brushablility-good
**Small pits, uniform field corrosion. D.F.T. 1.7

Conventional spraying-must be reduced with water (5% by vol.)

Note: Items 14, 18, 19 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

12. Humidity Resistance

	Size	Freq.	Pattern	Extent of Corrosion
1. Blistering	8	med.	Uniform over field	--
2. Corrosion	--	--	Uniform field corrosion	Upper 1/2 of panel
			Uniform edge corrosion	

24. Salt Spray Resistance

	Size	Freq.	Pattern	Extent of Corrosion
1. Blistering	6	med. dense	Uniform at both scribes	--
2. Corrosion	--	--	Uniform at both scribes	1" from each scribe

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-21-1
Contract No. A5 097 48
Date received: 3/19/86
Log No.: 319 4A-4C
Lab code: L5
Quantity: 1 Pt./2 Qts.
Test initiated: 3/20/86
Test completed: 12/86

Chemist: B. Haffner

Product Category: 5. Lacquers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	22.21
2.	Wt. per Gallon	ASTM D1475	7.32
3.	Viscosity Cps (Brookfield)	ASTM D2196	150 (2,100)
4.	Color	ASTM D1729	1
5.	% Water	ASTM D1364	0.04
6.	Stability 77°F	ASTM D1849	* 148 (2,100)
7.	Stability 120°F(no skins,sed.)	ASTM D1849	* 132 (2,100)
8.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	N/A
9.	Dry Time Q panel	ASTM D1640	STT: 8 min. DH: 25 min.
10.	Hardness	ASTM D3363	HB
11.	Block Res.	STD 141B FTM 6216	45 min.
12.	Sanding Prop	STD 141B FTM 6321	Good; no gumming
13.	60° Gloss (sands to smooth)	ASTM D523	100 Q panel
14.	Yellowness Index	STD 141B 6131	N/A
15.	Humidity Res.	ASTM D2247	See attached chart
16.	Adhesion	ASTM D3359	3 (metal) 4 (wood)
17.	H_2O Cleanup (All H_2O Based Products)	---	Oil based (N/A)
18.	Abrasion Res.	ASTM D4060	0.080 gms
19.	Flexibility	ASTM D1737	1" mandrel
20.	Impact Res.	ASTM D2794	8.75 in. lbs.
21.	Appearance	---	good-clear,smooth finish
22.	Application Properties (conv spray)	---	sprays good,brushes exc
23.	Sag Res.	ASTM D2801	7
24.	Levelling	ASTM D2801	5
25.	Contrast Ratio	ASTM D2805	N/A Clear
26.	Acc. Weathering (300 hrs) 60° specular gloss	ASTM G23, D822	96
27.	Salt Spray Res. (200 hours)	ASTM B117	See attached
28.	VOC		683.00
29.	Grain Raising		Good; slight on ponderosa pine

* No skins, sediment

Note: Items 17, 21, 22 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

15. Humidity Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	None	--	--	--
2. Corrosion	--	--		Minor field corrosion

27. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	4	Medium	Uniform at both scribes	
2. Corrosion	--	--	Uniform at both scribes	3/8" inch from both scribes; upper half of panel extensive corrosion

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-21-2
Contract No. A5 097 48
Date received: 3/20/86
Log No.: 320 6A-6C
Lab code: L5
Quantity: 1 Pt./2 Qts.
Test initiated: 3/21/86
Test completed: 12/86

Chemist: R. Haffner

Product Category: 5. Lacquers

	Tests	Procedure		Results
1.	Total NV % Wt.	ASTM D2369		15.62
2.	Wt. Per Gallon	ASTM D1475		7.342
3.	Viscosity Cps (Brookfield)	ASTM D2196		144 (2,100)
4.	Color	ASTM D1729		3
5.	% Water	ASTM D1364		0.02
6.	Stability 77°F	ASTM D1849	*	134 (2,100)
7.	Stability 120°F	ASTM D1849	*	128 (2,100)
8.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243		N/A
9.	Dry Time Q panel	ASTM D1640		STT: 6 min. DH: 30 min.
10.	Hardness	ASTM D3363		HB
11.	Block Res.	STD 141B FTM 6216		35 min.
12.	Sanding Prop	STD 141B FTM 6321	**	Fair
13.	60° Gloss	ASTM D523		44 Q-panel
14.	Yellowness Index	STD 141B 6131		N/A
15.	Humidity Res.	ASTM D2247		see attached
16.	Adhesion	ASTM D3359	***	0 (metal) 5 (wood)
17.	H_2O Cleanup (All H_2O Based Products)	---		Solvent based
18.	Abrasion Res.	ASTM D4060		0.070 gms
19.	Flexibility	ASTM D1737		1" mandrel
20.	Impact Res.	ASTM D2794		6.12 in. lbs.
21.	Appearance	---		Good-clear
22.	Application Properties (conventional spraying)	---		Spraying fair Brushing good
23.	Sag Res.	ASTM D2801		4
24.	Levelling	ASTM D2801		7
25.	Contrast Ratio	ASTM D2805		N/A
26.	Acc. Weathering (300 hrs)	ASTM G23, D822		38
27.	Salt Spray Res. (200 hrs)	ASTM B117		see attached
28.	VOC			742.00
29.	Grain Raising (some on Ponderosa Pine)			Fair-good

*No skins, sediment
**Sands fairly smooth, slight gumming occurred
***Came off completely
Note: Items 17, 21, 22 are qualitative tests.
Application properties: includes brush, roller, spray (airless, conventional) as applicable.

15. Humidity Resistance

		Size	Freq.	Pattern	Extent of Corrosion
1.	Blistering	None	--	--	--
2.	Corrosion	--	--	Random	Some isolated field corrosion

27. Salt Spray Resitance

		Size	Freq.	Patterm	Extent of Corrosion
1.	Blistering	2	Medium	Uniform at both scribes	--
2.	Corrosion	--	--	Uniform at both scribes Some random isolated field corrosion	3/8" from both scribes

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-21-3
Contract No. A5 097 48
Date received: 3/24/86
Log No.: 324 1A-1C
Lab code: L5
Quantity: 1 Pt./2 Qts.
Test initiated: 3/24/86
Test completed: 12/86

Chemist: B. Haffner

Product Category: 5. Lacquers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	21.63
2.	Wt. per Gallon	ASTM D1475	7.319
3.	Viscosity Cps (Brookfield)	ASTM D2196	144 (2,100)
4.	Color	ASTM D1729	N/A (clear)
5.	% Water	ASTM D1364	0.05
6.	Stability 77°F	ASTM D1849	* 146 (2,100)
7.	Stability 120°F	ASTM D1849	** 130 (2,100)
8.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	N/A
9.	Dry Time (wood-ponderosa pine)	ASTM D1640	STT: 9 min. DH: 35 min.
10.	Hardness	ASTM D3363	HB
11.	Block Res.	STD 141B FTM 6216	45 min.
12.	Sanding Prop	STD 141B FTM 6321	Poor; gums easily
13.	60° Gloss	ASTM D523	73 Q panel
14.	Yellowness Index	STD 141B 6131	N/A
15.	Humidity Res.	ASTM D2247	See attached chart
16.	Adhesion	ASTM D3359	3 (metal) 5 (wood)
17.	H_2O Cleanup (All H_2O Based Products)	---	Solvent based
18.	Abrasion Res.	ASTM D4060	0.067 gms
19.	Flexibility	ASTM D1737	1/8" mandrel
20.	Impact Res.	ASTM D2794	14 in.lbs.
21.	Appearance	---	excellent-clear smooth finish
22.	Application Properties(conv.)	---	sprays good brushes goo
23.	Sag Res.	ASTM D2801	3
24.	Levelling	ASTM D2801	8
25.	Contrast Ratio	ASTM D2805	N/A (clear)
26.	Acc. Weathering (300 hrs) 60° specular gloss	ASTM G23, D822	53
27.	Salt Spray Res. (200 hours)	ASTM B117	See attached chart
28.	VOC		687.00
29.	Grain Raising		Poor; left surface roug on ponderosa pine

*No skins, sediment
**Some discoloration. Changed from white to light brown

Note: Items 17, 21, 22 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

15. Humidity Resistance

	Size	Frequency	Patern	Extent of Corrosion
1. Blistering	None	--	--	--
2. Corrosion	--	--	Some random isolated field corrosion	--

27. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	6	Few	Uniform at both scribes	
2. Corrosion	--	--	Very little random isolated field corrosion uniform at both scribes	1/8" from both scribes

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-21-4
Contract No. A5 097 48
Date received: 4/11/86
Log No.: 411 3A-3C
Lab code: L5
Quantity: 1 Pt./2 Qts.
Test initiated: 4/14/86
Test completed: 12/86

Chemist: R. Haffner

Product Category: 5. Lacquers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	24.05
2.	Wt. per Gallon	ASTM D1475	8.457
3.	Viscosity Cps (Brookfield)	ASTM D2196	400 (2,50)
4.	Color	ASTM D1729	10
5.	% Water	ASTM D1364	71.79
6.	Stability 77°F	ASTM D1849	492 (2,50) orange sediment
7.	Stability 120°F	ASTM D1849	1485 (2,50)
8.	Freeze - Thaw Res. (2,20) (All H_2O Based Products)	ASTM D2243	660 (2,20)
9.	Dry Time (Q panel)	ASTM D1640	STT: 15 min. DH: 40 min.
10.	Hardness	ASTM D3363	HB
11.	Block Res.	STD 141B FTM 6216	50 min.
12.	Sanding Prop (120 grit)	STD 141B FTM 6321	* Fair
13.	60° Gloss	ASTM D523	75
14.	Yellowness Index	STD 141B 6131	N/A
15.	Humidity Res.	ASTM D2247	see attached
16.	Adhesion	ASTM D3359	3 (metal) 5 (wood)
17.	H_2O Cleanup (All H_2O Based Products)	---	** Fair,rapid dry
18.	Abrasion Res.	ASTM D4060	0.038 gms
19.	Flexibility	ASTM D1737	1" mandrel
20.	Impact Res.	ASTM D2794	6.13 in/lbs
21.	Appearance	---	*** Good
22.	Application Properties (conv)	---	Fair brushes- Fair on wood
23.	Sag Res.	ASTM D2801	2
24.	Levelling	ASTM D2801	7
25.	Contrast Ratio	ASTM D2805	N/A
26.	Acc. Weathering (300 hrs)	ASTM G23, D822	52
27.	Salt Spray Res.	ASTM B117	see attached
28.	VOC		1. 46.22 2. 168.13
29.	Grain Raising		**** Poor

*Difficult to sand to smooth; some gumming
**Leaves tacky residue if not cleaned immediately after use
***Smooth; transluscent
Produces a bronze discoloration when applied to Q-panels (within 10 min.
****Left surface very rough on ponderosa pine

Note: Items 17, 21, 22 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

15. Humidity Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	6	Medium Dense	Uniform over field	-
2. Corrosion	-	-	Uniform over field	Fairly extensive

27. Salt Spray Resistance after 20 hours

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	6	Dense	Uniform at both scribes	-
2. Corrosion	-	-	Uniform at both scribes; random field corrosion	1/4" from intersecting 1/2" from vertical scribe

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. JFN #5
Contract No. A5 097 48
Date received: 7/11/86
Log No.: 711 5A
Lab code: 5L
Quantity: 2 Qts.
Test initiated: 7/11/86
Test completed: 12/86

Chemist: R. Haffner

Product Category: 5. Lacquers

	Tests	Procedure		Results
1.	Total NV % Wt.	ASTM D2369		33.49
2.	Wt. per Gallon	ASTM D1475		9.60
3.	Viscosity Cps (Brookfield)	ASTM D2196		60 (1,100)
4.	Color (clear dries)	ASTM D1729		N/A
5.	% Water	ASTM D1364		50.49
6.	Stability 77°F (no skins, sed.)	ASTM D1849		60 (1,100) 3 months
7.	Stability 120°F	ASTM D1849		46.5 (1,100)
8.	Freeze - Thaw Res. 5,5 (All H_2O Based Products)	ASTM D2243		2800 (failed)
9.	Dry Time	ASTM D1640		STT: 25 min. DH: 3 hrs 15 min
10.	Hardness Q panel	ASTM D3363		HB
11.	Block Res.	STD 141B FTM 6216		2 hrs
12.	Sanding Prop	STD 141B FTM 6321	*	Excellent
13.	60° Gloss	ASTM D523		100
14.	Yellowness Index	STD 141B 6131		N/A (Dries, clear)
15.	Humidity Res. Q panel 48 hrs	ASTM D2247		see attached
16.	Adhesion Q panel	ASTM D3359		4 (metal) 5 (wood)
17.	H_2O Cleanup (All H_2O Based Products)	---		Excellent
18.	Abrasion Res.	ASTM D4060		0.11 gms
19.	Flexibility Q panel	ASTM D1737		1/8" mandrel
20.	Impact Res. Q panel	ASTM D2794		17.5 in/lbs
21.	Appearance Clear, smooth	---		Good
22.	Application Properties	---	**	see below
23.	Sag Res.	ASTM D2801		3
24.	Levelling	ASTM D2801		7
25.	Contrast Ratio	ASTM D2805		N/A (clear)
26.	Acc. Weathering 300 hrs	ASTM G23, D822	***	80-see below
27.	Salt Spray Res.	ASTM B117		see attached
28.	VOC			1. 184.40 2. 439.67
29.	Grain Raising (excessive on ponderosa pine)			Poor

* Ponderosa pine: sands smooth, slightly gummy
** Conventional spraying-good brushability-good
***Some isolated edge corrosion mil thickness 1.5
Note: Items 17, 21, 22 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

15. Humidity Resistance

	Size	Freq.	Pattern	Extent of Corrosion
1. Blistering	None	--	--	--
2. Corrosion	--	--	Some isolated field corrosion and random edge corrosion	3/8" from edge

27. Salt Spray Resistance

	Size	Freq.	Pattern	Extent of Corrosion
1. Blistering	9	Med. dense	Uniform over field	--
2. Corrosion	--	--	Uniform at both scribes; some isolated field corrosion	1/2" from each scribe

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-22-1
Contract No. A5 097 48
Date received: 3/14/86
Log No.: 314-4A-4C
Lab code: OS1
Quantity: 1 Pt./2 Qts.
Test initiated: 3/17/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 6. Opaque Stains

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	15.76%
2.	Wt. per Gallon	ASTM D1475	9.03
3.	Viscosity Cps (Brookfield)	ASTM D2196	1250 cp #5 (20,50)
4.	% Water	ASTM D1364	70.54%
5.	Stability 77°F	ASTM D1849	2360 #5 (20,50)
6.	Stability 120°F	ASTM D1849	1950 cp #5 (20,50)
7.	Freeze - Thaw Res. (All H_2O Based Products	ASTM D2243	1308 cp #5(20,50)
8.	Dry Time	ASTM D1640	STT: 11 min. DH: 30 min.
9.	Humidity Res.	ASTM D2247	passed (48 hrs)
10.	Adhesion	ASTM D3359	5 (wood)
11.	H_2O Cleanup (All H_2O Based Products)	---	Very easy
12.	Flexibility	ASTM D1737	Pass 3/4"
13.	Appearance	---	Smooth
14.	Application Properties	---	Brush,spray-good
15.	Contrast Ratio	ASTM D2805	1.0
16.	Acc. Weathering	ASTM G23, D822	Color change ΔE=1.49
17.	Bleed Res.	---	Good
18.	H_2O Repellancy	ASTM D2921	Poor
19.	VOC		1. 148.33 2. 622.71
20.	Grain Raising (ponderosa pine)		Slight

Note: Items 11, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-22-2
Contract No. A5 097 48
Date received: 3/14/86
Log No.: 314-2A-2C
Lab code: OS2
Quantity: 1 Pt./2 Qts.
Test initiated: 3/17/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 6. Opaque Stains

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	49.49
2.	Wt. per Gallon	ASTM D1475	10.56
3.	Viscosity Cps (Brookfield)	ASTM D2196	1810 cp #5 (20/50)
4.	% Water	ASTM D1364	30.55%
5.	Stability 77°F	ASTM D1849	2750 cp #5 (20,50)
6.	Stability 120°F	ASTM D1849	2900 cp #5 (20,50)
7.	Freeze - Thaw Res. (H_2O Based Products)	ASTM D2243	2114 cp #5(20-50)
8.	Dry Time	ASTM D1640	STT: 14 min. DH: 34 min.
9.	Humidity Res.	ASTM D2247	Pass (48 hrs) in HC
10.	Adhesion	ASTM D3359	4 on wood
11.	H_2O Cleanup (H_2O Based Products)	---	Very easy
12.	Flexibility	ASTM D1737	Pass 1/8"
13.	Appearance	---	Smooth
14.	Application Properties	---	Brush, spray-good
15.	Contrast Ratio	ASTM D2805	1.0
16.	Acc. Weathering	ASTM G23, D822	Color change E=0.71
17.	Bleed Res.	---	Fair
18.	H_2O Repellancy	ASTM D2921	Poor
19.	VOC		1. 252.80 2. 410.99
20.	Grain Raising		Slight

Note: Items 11, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-22-3
Contract No. A5 097 48
Date received: 3/14/86
Log No.: 314-1A-1C
Lab code: OS3
Quantity: 1 Pt./2 Qts.
Test initiated: 3/17/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 6. Opaque Stains

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	50.48
2.	Wt. per Gallon	ASTM D1475	11.12
3.	Viscosity Cps (Brookfield)	ASTM D2196	2765 cp #5 (20/50)
4.	% Water	ASTM D1364	40.94%
5.	Stability 77°F	ASTM D1849	3342 cp #5 (20,50)
6.	Stability 120°F	ASTM D1849	3220 cp #5 (20,50)
7.	Freeze - Thaw Res. (All H_2O Based Products	ASTM D2243	3054 #5(20,50)
8.	Dry Time	ASTM D1640	STT: 13 min. DH: 40 min.
9.	Humidity Res.	ASTM D2247	Pass (48 hrs in HC)
10.	Adhesion	ASTM D3359	5 (wood)
11.	H_2O Cleanup (All H_2O Based Products)	---	Very easy
12.	Flexibility	ASTM D1737	Pass 1/8"
13.	Appearance	---	Smooth
14.	Application Properties	---	Brush,spray-good
15.	Contrast Ratio	ASTM D2805	0.99
16.	Acc. Weathering	ASTM G23, D822	Color change- E=3.31
17.	Bleed Res.	---	Fair
18.	H_2O Repellancy	ASTM D2921	Poor
19.	VOC		1. 114.44 2. 251.24
20.	Grain Raising		Excessive

Note: Items 11, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-22-4
Contract No. A5 097 48
Date received: 3/14/86
Log No.: 314-6A-6C
Lab code: OS4
Quantity: 1 Pt./2 Qts.
Test initiated: 3/17/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 6. Opaque Stains

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	45.63%
2.	Wt. per Gallon	ASTM D1475	11.12
3.	Viscosity Cps (Brookfield)	ASTM D2196	3390 cp #5 (20,50)
4.	% Water	ASTM D1364	39.87
5.	Stability 77°F	ASTM D1849	3490 cp #5 (20,50)
6.	Stability 120°F	ASTM D1849	3390 cp #5 (20,50)
7.	Freeze - Thaw Res. (All H_2O Based Products	ASTM D2243	3456 cp #5 (20,50)
8.	Dry Time	ASTM D1640	STT: 22 min. DH: 46 min.
9.	Humidity Res.	ASTM D2247	Pass (48 hrs) in HC
10.	Adhesion	ASTM D3359	5 (wood)
11.	H_2O Cleanup (All H_2O Based Products)	---	Very easy
12.	Flexibility	ASTM D1737	Pass 1/8"
13.	Appearance	---	Smooth
14.	Application Properties	---	Brush, spray-good
15.	Contrast Ratio	ASTM D2805	0.99
16.	Acc. Weathering	ASTM G23, D822	Color change Δ E=1.26
17.	Bleed Res.		Fair
18.	H_2O Repellancy	ASTM D2921	Good
19.	VOC		1. 193.33 2. 411.51
20.	Grain Raising		Slight

Note: Items 11, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-22-5
Contract No. A5 097 48
Date received: 3/17/86
Log No.: 317-5A-5C
Lab code: OS5
Quantity: 1 Pt./ 2 Qts.
Test initiated: 3/18/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 6. Opaque Stains

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	36.95
2.	Wt. per Gallon	ASTM D1475	9.82
3.	Viscosity Cps (Brookfield)	ASTM D2196	1344 cp #5 (50,100)
4.	% Water	ASTM D1364	61.57%
5.	Stability 77°F	ASTM D1849	1486 cp #5 (50,100)
6.	Stability 120°F	ASTM D1849	1454 cp #5 (50,100)
7.	Freeze - Thaw Res. (All H_2O Based Products	ASTM D2243	1446 cp #5(50,100)
8.	Dry Time	ASTM D1640	STT: 19 min. DH: 54 min.
9.	Humidity Res.	ASTM D2247	Pass (48 hrs)in HC
10.	Adhesion	ASTM D3359	4 (wood)
11.	H_2O Cleanup (All H_2O Based Products)	---	Very easy
12.	Flexibility	ASTM D1737	Pass 1/8"
13.	Appearance	---	Smooth
14.	Application Properties	---	Brush,spray-good
15.	Contrast Ratio	ASTM D2805	1.0
16.	Acc. Weathering	ASTM G23, D822	Color change ΔE=2.52
17.	Bleed Res.	---	Poor
18.	H_2O Repellancy	ASTM D2921	Poor
19.	VOC		1. 17.43 2. 62.31
20.	Grain Raising		Excessive

Note: Items 11, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-22-6
Contract No. A5 097 48
Date received: 3/25/86
Log No.: 325 1A-1C
Lab code: OS7
Quantity: 1 Pt./2 Qts.
Test initiated: 3/25/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 6. Opaque Stains

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	28.74%
2.	Wt. per Gallon	ASTM D1475	8.96
3.	Viscosity Cps (Brookfield)	ASTM D2196	725 cp #4(50,100)
4.	% Water	ASTM D1364	71.26
5.	Stability 77°F	ASTM D1849	685 cp #4 (50,100)
6.	Stability 120°F	ASTM D1849	720 cp #4 (50,100)
7.	Freeze - Thaw Res. (All H_2O Based Products	ASTM D2243	652 cp #4 (50,100)
8.	Dry Time	ASTM D1640	STT: 56 min. DH: 150 min.
9.	Humidity Res.	ASTM D2247	Pass (48 hrs)
10.	Adhesion	ASTM D3359	5 (Wood)
11.	H_2O Cleanup (All H_2O Based Products)	---	Easy
12.	Flexibility	ASTM D1737	Pass 1/8"
13.	Appearance	---	Smooth
14.	Application Properties	---	Brush, spray-good
15.	Contrast Ratio	ASTM D2805	1.0
16.	Acc. Weathering	ASTM G23, D822	Color change ΔE-10.5
17.	Bleed Res.	---	Poor
18.	H_2O Repellancy	ASTM D2921	Poor
19.	VOC		0
20.	Grain Raising		Slight

Note: Items 11, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-22-7
Contract No. A5 097 48
Date received: 3/25/86
Log No.: 325 2A-2C
Lab code: OS8
Quantity: 1 Pt./2 Qts.
Test initiated: 3/25/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 6. Opaque Stains

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	58.81%
2.	Wt. per Gallon	ASTM D1475	11.62 lbs/gal
3.	Viscosity Cps (Brookfield)	ASTM D2196	3575 cp #4 (20,50)
4.	% Water	ASTM D1364	41.12
5.	Stability 77°F	ASTM D1849	4081 cp #4 (20,50)
6.	Stability 120°F	ASTM D1849	3414 cp #4 (20,50)
7.	Freeze - Thaw Res. (All H_2O Based Products	ASTM D2243	3679 cp #4 (20,50)
8.	Dry Time	ASTM D1640	STT: 46 min. DH: 103 min.
9.	Humidity Res.	ASTM D2247	Pass (48 hrs)
10.	Adhesion	ASTM D3359	5 wood
11.	H_2O Cleanup (All H_2O Based Products)	---	Easy
12.	Flexibility	ASTM D1737	Pass 1/8"
13.	Appearance	---	Smooth
14.	Application Properties	---	Brush, spray-good
15.	Contrast Ratio	ASTM D2805	1.0
16.	Acc. Weathering	ASTM G23, D822	Color change- ΔE= 1.6
17.	Bleed Res.	---	Good
18.	H_2O Repellancy	ASTM D2921	Poor
19.	VOC		1. 0.98 2. 2.28
20.	Grain Raising		Slight

Note: Items 11, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-22-8
Contract No. A5 097 48
Date received: 3/20/86
Log No.: 320-3A-3C
Lab code: OS6
Quantity: 1 Pt./2 Qts.
Test initiated: 3/21/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 6. Opaque Stains

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	69.46
2.	Wt. per Gallon	ASTM D1475	10.15 lb/gal
3.	Viscosity Cps (Brookfield)	ASTM D2196	110 cp #1 (20,50)
4.	% Water	ASTM D1364	1.65
5.	Stability 77°F	ASTM D1849	65.8 cp #1 (20,50)
6.	Stability 120°F	ASTM D1849	58.2 cp #1 (20,50)
7.	Freeze - Thaw Res. (All H_2O Based Products	ASTM D2243	N/A
8.	Dry Time	ASTM D1640	STT: 48 min. DH: 54 hrs.
9.	Humidity Res.	ASTM D2247	Pass (48 hrs)
10.	Adhesion	ASTM D3359	5 (wood)
11.	H_2O Cleanup (All H_2O Based Products)	---	Solvent based
12.	Flexibility	ASTM D1737	Pass 1/8"
13.	Appearance	---	Smooth
14.	Application Properties	---	Brush, spray-good
15.	Contrast Ratio	ASTM D2805	1.0
16.	Acc. Weathering	ASTM G23, D822	Color change-Δ E=2.05
17.	Bleed Res.	---	Poor
18.	H_2O Repellancy	ASTM D2921	Good
19.	VOC		1. 351.17 2. 358.30
20.	Grain Raising		None

Note: Items 11, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-22-9
Contract No. A5 097 48
Date received: 4/10/86
Log No.: 410 5A-5C
Lab code: OS9
Quantity: 1 pt./2 qts.
Test initiated: 8/15/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 6. Opaque Stains

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	58.03%
2.	Wt. per Gallon	ASTM D1475	11.38 lbs/gal
3.	Viscosity Cps (Brookfield)	ASTM D2196	1812.5 cp #3 (20,50)
4.	% Water	ASTM D1364	34.71%
5.	Stability 77°F	ASTM D1849	897 cp #3 (20,50)
6.	Stability 120°F	ASTM D1849	1640.51 cp #3 (20,50)
7.	Freeze - Thaw Res. (All H_2O Based Products	ASTM D2243	1696 cp #3 (20,50)
8.	Dry Time	ASTM D1640	STT: 30 min. DH: 65 min.
9.	Humidity Res.	ASTM D2247	Pass 48 hrs.
10.	Adhesion	ASTM D3359	5 wood
11.	H_2O Cleanup (All H_2O Based Products)	---	Easy
12.	Flexibility	ASTM D1737	Pass 1/8"
13.	Appearance	---	Smooth
14.	Application Properties	---	Brush, spray-good
15.	Contrast Ratio	ASTM D2805	1.00
16.	Acc. Weathering	ASTM G23, D822	Color change ΔE= 1.72
17.	Bleed Res.	---	Good
18.	H_2O Repellancy	ASTM D2921	Poor
19.	VOC		1. 97.83 2. 185.28
20.	Grain Raising		Slight

Note: Items 11, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. JFN #6
Contract No. A5 097 48
Date received: 7/11/86
Log No.: 711 6A-6B
Lab code: OS10
Quantity: 2 qts.
Test initiated: 7/15/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 6. Opaque Stains

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	32.37%
2.	Wt. per Gallon	ASTM D1475	9.30
3.	Viscosity Cps (Brookfield)	ASTM D2196	326 cp #3 (50,100)
4.	% Water	ASTM D1364	69.10
5.	Stability 77°F	ASTM D1849	258 cp #3 (50,100)
6.	Stability 120°F	ASTM D1849	191.5 cp #3 (50,100)
7.	Freeze - Thaw Res.	ASTM D2243	521 cp #3 (50,100)
	(All H_2O Based Products		
8.	Dry Time	ASTM D1640	STT: 25 min. DH: 56 min.
9.	Humidity Res.	ASTM D2247	Pass 48 hrs.
10.	Adhesion	ASTM D3359	5 wood
11.	H_2O Cleanup	---	Easy
	(All H_2O Based Products)		
12.	Flexibility	ASTM D1737	Pass 1/8"
13.	Appearance	---	Smooth
14.	Application Properties	---	Brush,spray-Good
15.	Contrast Ratio	ASTM D2805	0.975
16.	Acc. Weathering	ASTM G23, D822	Color change ΔE= 1.12
17.	Bleed Res.	---	Good
18.	H_2O Repellancy	ASTM D2921	Good
19.	VOC		1. 16.39 2. 70.34
20.	Grain Raising		None

Note: Items 11, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. JFN #8
Contract No. A5 097 48
Date received: 7/11/86
Log No.: 711 8A-8B
Lab code: OS11
Quantity: 2 qts.
Test initiated: 7/15/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 6. Opaque Stains

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	34.01
2.	Wt. per Gallon	ASTM D1475	9.20
3.	Viscosity Cps (Brookfield)	ASTM D2196	237.6 cp #2 (50/100)
4.	% Water	ASTM D1364	56.13
5.	Stability 77°F	ASTM D1849	237.0 cp #2 (50,100)
6.	Stability 120°F	ASTM D1849	* 313.0 cp #2 (50,100)
7.	Freeze - Thaw Res. (All H_2O Based Products	ASTM D2243	236 cp #2 (50,100)
8.	Dry Time	ASTM D1640	STT: 17 min. DH: 40 min.
9.	Humidity Res.	ASTM D2247	Pass
10.	Adhesion	ASTM D3359	5 wood
11.	H_2O Cleanup (All H_2O Based Products)	---	Easy
12.	Flexibility	ASTM D1737	Pass 1/8"
13.	Appearance	---	Smooth
14.	Application Properties	---	Spray,brush-Good
15.	Contrast Ratio	ASTM D2805	0.904
16.	Acc. Weathering	ASTM G23, D822	Color change ΔE= 4.02
17.	Bleed Res.	---	Fair
18.	H_2O Repellancy	ASTM D2921	Good
19.	VOC		1. 108.76 2. 284.26
20.	Grain Raising		Slight

*Gummy settle

Note: Items 11, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-23-1
Contract No. A5 097 48
Date received: 3/20/86
Log No.: 320 4A-4C
Lab code: 029-7-00
Quantity: 1 Pt./2 Qts.
Test initiated: 3/21/86
Test completed: 12/86

Chemist: E. Khan
R. Haffner

Product Category: 7. Opaque Wood Preservatives

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	47.6%
2.	Wt. per Gallon	ASTM D1475	9.02
3.	Viscosity Cps (Brookfield)	ASTM D2196	44 cp (2,100)
4.	% Water	ASTM D1364	1.12%
5.	Stability 77°F	ASTM D1849	44 (2,100)
6.	Stability 120°F	ASTM D1849	42 cps (2,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	N/A
8.	Dry Time	ASTM D1640	*Remains tacky
9.	Humidity Res.	ASTM D2247	No blisters, slight change in color
10.	Adhesion	ASTM D3359	Wood- 5.0
11.	H_2O Cleanup (All H_2O Based Products)	---	Solvent based
12.	Flexibility	ASTM D1737	Passes 1/8" mandrel
13.	Appearance	---	Smooth
14.	Application Properties	---	**Brushable
15.	Contrast Ratio	ASTM D2805	0.225
16.	Acc. Weathering	ASTM G23, D822	*** see below
17.	H_2O Repellancy	ASTM D2921	Fair
18.	VOC		554.59
19.	Grain Raising		Slight
20.	Fungus Res.	STD 141B FTM 6271	Poor

*After 48 hours
**Clogs spray gun
***Stain is bleaching out, some warpage of ponderosa pine
Note: material contains lumps and grit, rendering uneven distribution
Strong creosote odor
Note: Items 11, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-23-2
Contract No. A5 097 48
Date received: 4/23/86
Log No.: 423 2A-2C
Lab code: 055-7
Quantity: 1 Pt./2 Qts.
Test initiated: 4/25/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 7. Opaque Wood Preservatives

	Tests	Procedure		Results
1.	Total NV % Wt.	ASTM D2369		49.9
2.	Wt. per Gallon	ASTM D1475		8.47
3.	Viscosity Cps (Brookfield)	ASTM D2196		132 (2,100)
4.	% Water	ASTM D1364		1.05%
5.	Stability 77°F	ASTM D1849	*	130 (2,100)
6.	Stability 120°F	ASTM D1849		126 cps (2,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243		N/A
8.	Dry Time	ASTM D1640		STT: 1hr. 50min. DH: 2 hrs 15min.
9.	Humidity Res.	ASTM D2247		No blisters but discolored
10.	Adhesion	ASTM D3359		5 (on wood)
11.	H_2O Cleanup (All H_2O Based Products)	---		N/A
12.	Flexibility	ASTM D1737		Passed 1/8" mandrel
13.	Appearance	---		Slightly rough
14.	Application Properties	---		Brushable, spray good
15.	Contrast Ratio	ASTM D2805		0.063-clear
16.	Acc. Weathering	ASTM G23, D822	**	see below
17.	H_2O Repellancy	ASTM D2921		Excellent
18.	VOC			1. 498.13 2. 503.46
19.	Grain Raising			Very slight
20.	Fungust Res.	STD 141B FTM 6271		Fair

*Soft settle, easy disp.
**Stain is whitening, a great deal of warpage occurs with ponderosa pine

Note: Items 11, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-23-3
Contract No. A5 097 48
Date received: 5/9/86
Log No.: 59 1A-1C
Lab code: 058-7
Quantity: 1 Pt./2 Qts.
Test initiated: 5/12/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 7. Opaque Wood Preservatives

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	28.56
2.	Wt. per Gallon	ASTM D1475	7.95
3.	Viscosity Cps (Brookfield)	ASTM D2196	74.0 (2,100)
4.	% Water	ASTM D1364	3.94
5.	Stability 77°F	ASTM D1849	76 (2,100)
6.	Stability 120°F	ASTM D1849	35 (2,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Solvent based
8.	Dry Time	ASTM D1640	STT: 8 hrs. DH: 18 hrs.
9.	Humidity Res.	ASTM D2247	* Blisters;see below
10.	Adhesion	ASTM D3359	5
11.	H_2O Cleanup (All H_2O Based Products)	---	Oil based
12.	Flexibility	ASTM D1737	Passes 1/8" mandrel
13.	Appearance	---	Flat
14.	Application Properties	---	Brushable;sprays good
15.	Contrast Ratio	ASTM D2805	0.82
16.	Acc. Weathering	ASTM G23, D822	**see below
17.	H_2O Repellancy	ASTM D2921	Good
18.	VOC		1. 643.41 2. 668.40
19.	Grain Raising		Very slight
20.	Fungus Res.	STD 141B FTM 6271	Excellent

*Size 8, medium dense, uniform
**Left white residue on ponderosa pine, no warpage of wood.

Note: Items 11, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. JFN #13
Contract No. A5 097 48
Date received: 10/15/86
Log No.: 1015-1A
Lab code: PWP7
Quantity: 1 gal.
Test initiated: 10/15/86
Test completed: 12/86

Chemist: R. Haffner

Product Category: 7. Opaque Wood Preservatives

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	37.89
2.	Wt. per Gallon	ASTM D1475	9.79
3.	Viscosity Cps (Brookfield)	ASTM D2196	1176 (2,20)
4.	% Water	ASTM D1364	57.92
5.	Stability 77°F	ASTM D1849	-
6.	Stability 120°F	ASTM D1849	1115 (2,20) Pass
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	870 (2,20)
8.	Dry Time	ASTM D1640	STT: 1 hr. 5 min. DH: 2 hrs. 45 min.
9.	Humidity Res.	ASTM D2247	* see below
10.	Adhesion	ASTM D3359	5
11.	H_2O Cleanup (All H_2O Based Products)	---	Good
12.	Flexibility	ASTM D1737	80.5 in. lbs.
13.	Appearance	---	Smooth
14.	Application Properties	---	** see below
15.	Contrast Ratio	ASTM D2805	1.0
16.	Acc. Weathering	ASTM G23, D822	***see below
17.	H_2O Repellancy	ASTM D2921	Fair
18.	VOC		1. 44.32 2. 137.46
19.	Grain Raising (ponderosa pine)		****see below
20.	Fungus Res.	STD 141B FTM 6271	Fair

*Whitish exudation on ponderosa pine.
**Brush excellent, spray 10% reduction H_2O
***Slight whitish residue on ponderosa pine, cracking and warpage Fair-leaves surface slightly rough on ponderosa pine
****Fair; leaves surface slightly rough on ponderosa pine

Note: Items 11, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-24-2
Contract No. A5 097 48
Date received: 3/17/86
Log No.: 317 4A-4C
Lab code: QDE8
Quantity: 1 Pt./2 Qts.
Test initiated: 3/20/86
Test completed: 12/86

Chemist: B. Haffner

Product Category: 8. Q. D. Enamels

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	45.30
2.	Wt. per Gallon	ASTM D1475	9.978
3.	Viscosity Cps (Brookfield)	ASTM D2196	1370 (3,20)
4.	% Water	ASTM D1364	25.08
5.	Stability 77°F	ASTM D1849	* 1575 (3,20)
6.	Stability 120°F	ASTM D1849	1575 (3,20)
7.	Freeze - Thaw Res.visc. (All H_2O Based Products)	ASTM D2243	1150 (3,50)
8.	Dry Time Q panels	ASTM D1640	STT: 25 min. DH: 2 hrs.
9.	Hardness	ASTM D3363	HB
10.	Block Res.	STD 141B FTM 6216	2 Hrs. 40 min.
11.	60° Gloss	ASTM D523	77
12.	Yellowness Index	STD 141B 6131(96hrs)	n= .0085
13.	Humidity Res.	ASTM D2247	See attached chart
14.	Adhesion	ASTM D3359	3
15.	H_2O Cleanup (All H_2O Based Products)	---	Good-excellent
16.	Abrasion Res.	ASTM D4060	0.066 gms
17.	Flexibility	ASTM D1737	1/8" mandrel
18.	Impact Res.	ASTM D2794	84.0 in. lbs.
19.	Appearance	---	Excellent,very glossy
20.	Application Properties (Conv.)	---	Brushes exc. Spraying good
21.	Sag Res.	ASTM D2801	6 mils
22.	Levelling	ASTM D2801	6
23.	Contrast Ratio	ASTM D2805	0.96
24.	Acc. Weathering (300 hrs) 60° specular gloss	ASTM G23, D822	42
25.	Salt Spray Res. (200 hrs)	ASTM B117	See attached
26.	VOC		1. 354.50 2. 505.27

*No skins, sed.

Note: Items 15, 19, 20 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

13. Humidity Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	--	None	--	--
2. Corrosion	--	--	Very little random isolated field corrosion	

25. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	6	Medium dense	Uniform at both scribes and over field	
2. Corrosion	--	--	Uniform at both scribes and over	1" inch from both scribes; very extensive field corrosion

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-24-4
Contract No. A5 097 48
Date received: 3/18/86
Log No.: 318 5A-5C
Lab code: QDE8
Quantity: 1 Pt./2 Qts.
Test initiated: 3/20/86
Test completed: 12/86

Chemist: B. Haffner

Product Category: 8. Q. D. Enamels

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	50.68
2.	Wt. per Gallon	ASTM D1475	10.84
3.	Viscosity Cps (Brookfield)	ASTM D2196	2600 (3,20)
4.	% Water	ASTM D1364	28.62
5.	Stability 77°F lumps,gritty	ASTM D1849	* 2250 (3,20)
6.	Stability 120°F	ASTM D1849	2550 (3,20)
7.	Freeze - Thaw Res. (H_2O Based Products)	ASTM D2243	2463 Pass (3,20)
8.	Dry Time Q panel	ASTM D1640	STT: 15 min. DH: 1 hr
9.	Hardness	ASTM D3363	HB
10.	Block Res.	STD 141B FTM 6216	2 hrs.
11.	60° Gloss	ASTM D523	7 Q panel
12.	Yellowness Index(difference)	STD 141B 6131(96hrs)	n= .0023
13.	Humidity Res.	ASTM D2247	See attached
14.	Adhesion	ASTM D3359	0
15.	H_2O Cleanup (H_2O Based Products)	---	Good-excellent
16.	Abrasion Res.	ASTM D4060	0.183 gms
17.	Flexibility	ASTM D1737	1/8" mandrel
18.	Impact Res.	ASTM D2794	38.5 in. lbs.
19.	Appearance	---	Little gloss-fair
20.	Application Properties (conv)	---	Brushes good, spraying fair
21.	Sag Res.	ASTM D2801	8 mils
22.	Levelling	ASTM D2801	4
23.	Contrast Ratio	ASTM D2805	0.97
24.	Acc. Weathering (300 hrs) 60° specular gloss	ASTM G23, D822	7
25.	Salt Spray Res. (200 hours)	ASTM B117	See attached
26.	VOC		1. 268.91 2. 426.23

*No skins, some sediment, gritty

Note: Items 15, 19, 20 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

13. Humidity Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering		None		
2. Corrosion	--	--	Random isolated field corrosion	Some edge corrosion

25. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	4	Medium	Uniform at both scribes; random over field	
2. Corrosion	--	--	Uniform along both scribes; random over field	3/8" from both scribes very extensive field corrosion

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-24-6
Contract No. A5 097 48
Date received: 3/20/86
Log No.: 320 5A-5C
Lab code: QDE8
Quantity: 1 Pt./2 Qts.
Test initiated: 3/21/86
Test completed: 12/86

Chemist: B. Haffner

Product Category: 8. Q. D. Enamels

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	59.55
2.	Wt. per Gallon	ASTM D1475	9.32
3.	Viscosity Cps (Brookfield)	ASTM D2196	1725 (3,50)
4.	% Water	ASTM D1364	0.06
5.	Stability 77°F	ASTM D1849	* 2125 (3,50)
6.	Stability 120°F	ASTM D1849	* 5100 (3,10)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	N/A
8.	Dry Time Q panel	ASTM D1640	STT: 1 hr. 45 min. DH: 7 hrs. 30 min.
9.	Hardness	ASTM D3363	HB
10.	Block Res.	STD 141B FTM 6216	16 hrs.
11.	60° Gloss	ASTM D523	84 Q panel
12.	Yellowness Index (difference)	STD 141B 6131	n= .0019 (96 hrs)
13.	Humidity Res.	ASTM D2247	See attached chart
14.	Adhesion	ASTM D3359	4
15.	H_2O Cleanup (All H_2O Based Products)	---	Oil based (N/A)
16.	Abrasion Res.	ASTM D4060	0.096 gms
17.	Flexibility	ASTM D1737	1/8" mandrel
18.	Impact Res.	ASTM D2794	84 in. lbs
19.	Appearance	---	Exc-smooth finish Very glossy
20.	Application Properties	(Conv.) ---	** See below
21.	Sag Res.	ASTM D2801	5 mils
22.	Levelling	ASTM D2801	7
23.	Contrast Ratio	ASTM D2805	0.97
24.	Acc. Weathering (300 hrs) 60° specular gloss	ASTM G23, D822	61
25.	Salt Spray Res. (140 hrs)	ASTM B117	See attached
26.	VOC		452.00

*No skins, sed.
**Reduced with 5% by volume, 1,1,1 Trichloroethane
Brushing exc., spraying good

Note: Items 15, 19, 20 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

13. Humidity Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	6	Medium dense	Uniform over field	--
2. Corrosion	--	Few	Random	

25. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	8	Medium	Uniform at both scribes uniform over field	
2. Corrosion	--	--	Uniform at both scribes; uniform over field	1/8" inch from both scribes, slight isolated field corrosion

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-24-7
Contract No. A5 097 48
Date received: 3/20/86
Log No.: 320 2A-2C
Lab code: QDE8
Quantity: 1 Pt./2 Qts.
Test initiated: 3/21/86
Test completed: 12/86

Chemist: B. Haffner

Product Category: 8. Q. D. Enamels

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	59.29
2.	Wt. per Gallon	ASTM D1475	9.29
3.	Viscosity Cps (Brookfield)	ASTM D2196	2500 (3,20)
4.	% Water	ASTM D1364	0.25
5.	Stability 77°F	ASTM D1849	* 2475 (3,20)
6.	Stability 120°F	ASTM D1849	* 3100 (3,20)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	N/A
8.	Dry Time Q panel	ASTM D1640	STT: 1 hr. 10 min. DH: 6 hrs.20 min.
9.	Hardness	ASTM D3363	HB
10.	Block Res.	STD 141B FTM 6216	11 hrs.
11.	60° Gloss	ASTM D523	16 Q panel
12.	Yellowness Index	STD 141B 6131	N/A (black)
13.	Humidity Res.	ASTM D2247	See attached chart
14.	Adhesion	ASTM D3359	5
15.	H_2O Cleanup (All H_2O Based Products)	---	Oil based (N/A)
16.	Abrasion Res.	ASTM D4060	0.120 gms
17.	Flexibility	ASTM D1737	1/8" mandrel
18.	Impact Res.	ASTM D2794	84 in. lbs.
19.	Appearance	---	Good,semi-gloss
20.	Application Properties	(Conv.)---	** Brushes exc.,sprays good
21.	Sag Res.	ASTM D2801	9 mils
22.	Levelling	ASTM D2801	4
23.	Contrast Ratio	ASTM D2805	1.0
24.	Acc. Weathering (300 hrs) 60° specular gloss	ASTM G23, D822	6
25.	Salt Spray Res. (140 hrs)	ASTM B117	See attached
26.	VOC		451.00

* No skins, sed.
** Reduced with 5% by volume, 1,1,1 Trichlorethane

Note: Items 15, 19, 20 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

13. Humidity Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	6	Medium dense	Random over field	--
2. Corrosion	--	--	Random over field; some edge corrosion	--

25. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	6	Few	Random along both scribes; random over field	--
2. Corrosion	--	--	Uniform along both scribes; random isolated field corrosion	1/4" from both scribes; very little isolated field corrosion

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-24-8
Contract No. A5 097 48
Date received: 3/21/86
Log No.: 321 2A-2C
Lab code: QDE8
Quantity: 1 Pt./2 Qts.
Test initiated: 3/24/86
Test completed: 12/86

Chemist: B. Haffner

Product Category: 8. Q. D. Enamels

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	55.75
2.	Wt. per Gallon	ASTM D1475	8.758
3.	Viscosity Cps (Brookfield)	ASTM D2196	990 (3,50)
4.	% Water	ASTM D1364	0.60
5.	Stability 77°F	ASTM D1849	* 1000 (3,50)
6.	Stability 120°F(no skins,sed)	ASTM D1849	1320 (3,50)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	N/A
8.	Dry Time Q panel	ASTM D1640	STT: 1 hr. 30 min. DH: 7 hrs.
9.	Hardness	ASTM D3363	HB
10.	Block Res.	STD 141B FTM 6216	15 hrs.
11.	60° Gloss	ASTM D523	86 Q panel
12.	Yellowness Index(difference)	STD 141B 6131(96hrs)	n= .0013 (96 hrs)
13.	Humidity Res.	ASTM D2247	See attached
14.	Adhesion	ASTM D3359	4
15.	H_2O Cleanup (All H_2O Based Products)	---	Oil based (N/A)
16.	Abrasion Res.	ASTM D4060	0.130 gms
17.	Flexibility	ASTM D1737	1/8" mandrel
18.	Impact Res.	ASTM D2794	> 84 inch-lbs.
19.	Appearance	---	Exc. very smooth, glossy
20.	Application Properties	(Conv.)--- **	Brush exc.,sprays good
21.	Sag Res.	ASTM D2801	6 mils
22.	Levelling	ASTM D2801	6
23.	Contrast Ratio	ASTM D2805	0.98
24.	Acc. Weathering (300 hrs) 60° specular gloss	ASTM G23, D822	67
25.	Salt Spray Res. (140 hrs)	ASTM B117	See attached
26.	VOC		465.00

*No skins, sed.
** reduced with 5% by volume, 1,1,1 Trichloroethane prior to spraying

Note: Items 15, 19, 20 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

13. Humidity Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	8	Medium	Random over field	--
2. Corrosion	--	--	Random isolated field corrosion; some edge corrosion	--

25. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	2	Medium	Uniform along scribe	--
	8	Few	Uniform over field	--
2. Corrosion	--	--	Uniform along scribes; random isolated field corrosion	1/8" from both scribes; very little isolated field corrosion

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-24-9
Contract No. A5 097 48
Date received: 3/25/86
Log No.: 325 4A-4C
Lab code: QDE8
Quantity: 1 Pt./2 Qts.
Test initiated: 3/25/86
Test completed: 12/86

Chemist: B. Haffner

Product Category: 8. Q. D. Enamels

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	50.12
2.	Wt. per Gallon	ASTM D1475	8.312 lbs/gal
3.	Viscosity Cps (Brookfield)	ASTM D2196	910 (3,50)
4.	% Water	ASTM D1364	0.40
5.	Stability 77°F	ASTM D1849	1000 (3,50)
6.	Stability 120°F(no skins,sed)	ASTM D1849	1000 (3,50)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	N/A
8.	Dry Time Q panel	ASTM D1640	STT: 1 hr. 15 min. DH: 7 hrs.
9.	Hardness	ASTM D3363	HB
10.	Block Res.	STD 141B FTM 6216	11 hrs.
11.	60° Gloss	ASTM D523	79 Q panel
12.	Yellowness Index	STD 141B 6131	N/A (grey)
13.	Humidity Res.	ASTM D2247	See attached
14.	Adhesion	ASTM D3359	5
15.	H_2O Cleanup (All H_2O Based Products)	---	(Oil based) N/A
16.	Abrasion Res.	ASTM D4060	0.077 gms
17.	Flexibility	ASTM D1737	1/8" mandrel
18.	Impact Res.	ASTM D2794	84 inch lbs.
19.	Appearance	---	Exc. very glossy
20.	Application Properties	(Conv.)---	* Brushes exc.sprays good
21.	Sag Res.	ASTM D2801	5 mils
22.	Levelling	ASTM D2801	7
23.	Contrast Ratio	ASTM D2805	1.0
24.	Acc. Weathering (300 hrs) 60° specular gloss	ASTM G23, D822	49
25.	Salt Spray Res. (140 hrs)	ASTM B117	See attached
26.	VOC		497.11

* reduced with 5% by volume, 1,1,1 Trichlorethane prior to spraying

Note: Items 15, 19, 20 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

13. Humidity Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	8	Few	Random over field	--
2. Corrosion	--	--	Some random isolated field corrosion	--

25. Salt Spray Resistance

	Size	Frequency	Pattern	Extent of Corrosion
1. Blistering	2	Few	Random along both scribes	
	8	Few	Random over field	
2. Corrosion	--	--	Uniform along scribes; random over field	1/8" from both scribes some field corrosion

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-25-1
Contract #A5 097 48
Date received: 3/13/86
Log No.: 313 2A-2C
Lab code: RC-9
Quantity: 1 Pt., 2 Qts.
Test initiated: 3/14/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 9. Roof Coatings

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	60.34%
2.	Wt. per Gallon	ASTM D1475	9.94
3.	Viscosity Cps (Brookfield)	ASTM D2196	1.7×10^3 (5,20)
4.	% Water	ASTM D1364	37.09
5.	Stability 77°F	ASTM D1849	1.75×10^3 (5,20)
6.	Stability 120°F	ASTM D1849	Material solidified
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Solidified
8.	Dry Time	ASTM D1640	STT: 50 min. DH: 70 min.
9.	Ponding-H_2O Res.	---	* 30.0
10.	Humidity Res. (48 Hrs.)	ASTM D2247	**No blisters
11.	Adhesion	ASTM D3359	4
12.	H_2O Cleanup (All H_2O Based Products)	---	Satisfactory
13.	Flexibility 1/8" mandrel	ASTM D1737	Passed
14.	Impact Res.(60 in. lbs.)	ASTM D2794	Passed
15.	Appearance	---	Smooth
16.	Application Properties	---	Satisfactory brushing
17.	Acc. Weathering	ASTM G23, D822	*** see below
18.	Elongation	ASTM D2370	240%
19.	Tensile Strength	ASTM D2370	360 psi
20.	VOC		1. 30.63 2. 54.82

*gms/day.M^2
**Some rust bleeding
***Slight yellowing, slight loss in 60° gloss, uniform #8 blisters over field

Note: Items 12, 15, 16 are qualitative tests.
Item 9 run as described.

a. Ponding water res: preformed urethane form dish filled with water wt % increase monitored per 24 hours.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-25-2
Contract #A5 097 48
Date received: 3/14/86
Log No.: 314 3A-3C
Lab code: 009-09-00
Quantity: 1 Pt./2 Qts.
Test initiated: 3/18/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 9. Roof Coatings

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	56.7%
2.	Wt. per Gallon	ASTM D1475	8.78
3.	Viscosity Cps (Brookfield)	ASTM D2196	2800 cp
4.	% Water	ASTM D1364	37.79
5.	Stability 77°F	ASTM D1849	2200 (4,20)
6.	Stability 120°F	ASTM D1849	3400 cps (4,20)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Smooth Paste =2400 cps
8.	Dry Time	ASTM D1640	STT: 1.5 hrs. DH: 4 hrs.
9.	Ponding-H_2O Res.	---	* 29.10
10.	Humidity Res. (48 Hrs.)	ASTM D2247	** see below
11.	Adhesion	ASTM D3359	5
12.	H_2O Cleanup (All H_2O Based Products)	---	Satisfactory
13.	Flexibility	ASTM D1737	Passed
14.	Impact Res.	ASTM D2794	Passed
15.	Appearance	---	Smooth
16.	Application Properties	---	Brushable
17.	Acc. Weathering	ASTM G23, D822	*** see below
18.	Elongation	ASTM D2370	1800
19.	Tensile Strength	ASTM D2370	250
20.	VOC		1. 58.00 2. 96.13

*gms/day.M^2
**Slight blistering, no rust penetration
***Slight loss in 60° gloss; overall appearance good, some surface

Note: Items 12, 15, 16 are qualitative tests.
Item 9 run as described.

a. Ponding water res: preformed urethane form dish filled with water wt % increase monitored per 24 hours.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-25-3
Contract #A5 097 48
Date received: 3/14/86
Log No.: 314 5A-5C
Lab code: 011-09-00
Quantity: 1 Pt./2 Qts.
Test initiated: 3/17/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 9. Roof Coatings

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	67.22%
2.	Wt. per Gallon	ASTM D1475	12.22 Lbs/Gal
3.	Viscosity Cps (Brookfield)	ASTM D2196	11,600 cp(4,5)
4.	% Water	ASTM D1364	31.76
5.	Stability 77°F	ASTM D1849	5000 (5,20)
6.	Stability 120°F	ASTM D1849	5100 (5,20)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	* Pass 5500 (5,20)
8.	Dry Time	ASTM D1640	STT: 1.1 Hr. DH: 3 Hrs.
9.	Ponding-H_2O Res.	---	** 82.08
10.	Humidity Res.	ASTM D2247	Pass
11.	Adhesion	ASTM D3359	5 (felt)
12.	H_2O Cleanup (All H_2O Based Products)	---	Satisfactory
13.	Flexibility	ASTM D1737	Passed
14.	Impact Res.	ASTM D2794	Passed
15.	Appearance	---	Smooth finish
16.	Application Properties	---	Good brushing
17.	Acc. Weathering	ASTM G23, D822	*** see below
18.	Elongation	ASTM D2370	138%
19.	Tensile Strength	ASTM D2370	243 psi
20.	VOC		1. 14.94 2. 27.85

*Smooth paste
**gms/day.M^2
***some yellowing

Note: Items 12, 15, 16 are qualitative tests.
Item 9 run as described.

a. Ponding water res: preformed urethane form dish filled with water wt % increase monitored per 24 hours.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-25-4
Contract #A5 097 48
Date received: 3/25/86
Log No.: 325 5A-5C
Lab code: 037-09-00
Quantity: 1 Pt./2 Qts.
Test initiated: 3/26/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 9. Roof Coatings

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	76.5
2.	Wt. per Gallon	ASTM D1475	8.4
3.	Viscosity Cps (Brookfield)	ASTM D2196	7.3×10^4 (6,5)
4.	% Water	ASTM D1364	0.52
5.	Stability 77°F	ASTM D1849	5.9×10^4 (6,5)
6.	Stability 120°F	ASTM D1849	5.4×10^4 (6,5)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	N/A
8.	Dry Time	ASTM D1640	STT: 18 hrs. DH: 2 days
9.	Ponding-H_2O Res.	---	* 6.24
10.	Humidity Res.	ASTM D2247	Pass
11.	Adhesion	ASTM D3359	4
12.	H_2O Cleanup (All H_2O Based Products)	---	N/A (solvent based)
13.	Flexibility	ASTM D1737	Passed
14.	Impact Res.	ASTM D2794	Passed 60 in. lbs.
15.	Appearance	---	** see below
16.	Application Properties	---	Spreadable,brushable
17.	Acc. Weathering	ASTM G23, D822	*** see below
18.	Elongation	ASTM D2370	100%
19.	Tensile Strength	ASTM D2370	26 psi
20.	VOC		236.68

*gms/day.M^2
**Glossy paste, slightly gritty
***Large loss in 60° gloss, large cracks, pits developing down to felt substrate (uniform over field)

Note: Material remained soft

Note: Items 12, 15, 16 are qualitative tests.
Item 9 run as described.

a. Ponding water res: preformed urethane form dish filled with water wt % increase monitored per 24 hours.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-25-5
Contract #A5 097 48
Date received: 3/21/86
Log No.: 321 3A-3C
Lab code: 034-09-00
Quantity: 1 Pt./2 Qts.
Test initiated: 3/25/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 9. Roof Coatings

	Tests	Procedure		Results
1.	Total NV % Wt.	ASTM D2369		73.24
2.	Wt. per Gallon	ASTM D1475		7.91
3.	Viscosity Cps (Brookfield)	ASTM D2196		7600 (5,20)
4.	% Water	ASTM D1364		1.03
5.	Stability 77°F	ASTM D1849		8900 (5,20)
6.	Stability 120°F	ASTM D1849		7400 (5,20)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243		N/A
8.	Dry Time	ASTM D1640		STT: 18 hrs. DH: 4 days (slight soft)
9.	Ponding-H_2O Res.	---	*	39.12
10.	Humidity Res.	ASTM D2247		Pass
11.	Adhesion	ASTM D3359		4
12.	H_2O Cleanup (All H_2O Based Products)	---		N/A (solvent based)
13.	Flexibility	ASTM D1737		Passed 1/8" mandrel
14.	Impact Res.	ASTM D2794		Passed 60 in. lbs.
15.	Appearance	---		Glossy-smooth
16.	Application Properties	---		Spreadable,brushable
17.	Acc. Weathering	ASTM G23, D822	**	see below
18.	Elongation	ASTM D2370		324
19.	Tensile Strength	ASTM D2370		8.5 psi
20.	VOC			244.03

*gms/day.M^2
**Large loss in 60° gloss, cracks, pits developing down to substrate (uniform over field)

Note: Items 12, 15, 16 are qualitative tests.
Item 9 run as described.

a. Ponding water res: preformed urethane form dish filled with water wt % increase monitored per 24 hours.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-25-6
Contract #A5 097 48
Date received: 3/24/86
Log No.: 324 2A-2C
Lab code: 031-09-00
Quantity: 1 Pt./2 Qts.
Test initiated: 3/25/86
Test completed: 12/86

Chemist: A. Khan
R. Haffner

Product Category: 9. Roof Coatings

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	69.3
2.	Wt. per Gallon	ASTM D1475	7.95
3.	Viscosity Cps (Brookfield)	ASTM D2196	3680 (5,50)
4.	% Water	ASTM D1364	0.06
5.	Stability 77°F	ASTM D1849	3680 (5,50)
6.	Stability 120°F	ASTM D1849	3700 (5,50)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	N/A
8.	Dry Time	ASTM D1640	STT: 24 hrs. DH: 3 days
9.	Ponding-H_2O Res.	---	* 31.2
10.	Humidity Res.	ASTM D2247	Slight blistering No rust
11.	Adhesion	ASTM D3359	4
12.	H_2O Cleanup (All H_2O Based Products)	---	N/A (solvent based)
13.	Flexibility	ASTM D1737	Passed 1/8" mandrel
14.	Impact Res.	ASTM D2794	Passed 60 in.-Lb.
15.	Appearance	---	Smooth glossy,slight grit
16.	Application Properties	---	**Spreadable
17.	Acc. Weathering	ASTM G23, D822	*** see below
18.	Elongation	ASTM D2370	290%
19.	Tensile Strength	ASTM D2370	7.6 psi
20.	VOC		292.63

*gms/day.M^2
**Roller,brush,spatula
***Large loss in 60° gloss, large cracks, pits developing down to substrate (uniform over field)

Note: Items 12, 15, 16 are qualitative tests.
Item 9 run as described.

a. Ponding water res: preformed urethane form dish filled with water wt % increase monitored per 24 hours.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-26-1
Contract No. A5 097 48
Date received: 3/24/86
Log No.: 324 3A-3C
Lab code: 032-10-00
Quantity: 1 Pt./2 Qts.
Test initiated: 3/25/86
Test completed: 12/86

Chemist: A. Khan
L. Kudela

Product Category: 10. Specialty Primers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	37.4
2.	Wt. per Gallon	ASTM D1475	10.13
3.	Viscosity Cps (Brookfield)	ASTM D2196	710 (3,50)
4.	% Water	ASTM D1364	58.76
5.	Stability 77°F	ASTM D1849	880 cp (#3,50)
6.	Stability 120°F	ASTM D1849	796 cp (#3,50)
7.	Freeze - Thaw Res.	ASTM D2243	Increase in viscosity (η = 8600 cps)
	(All H_2O Based Products)		STT: 1hr. 30 min.
8.	Dry Time	ASTM D1640	DH: 2 hrs.
9.	Hardness	ASTM D3363	<HB
10.	Sanding Prop.	STD 141B FTM 6321	Sandable
11.	Humidity Res.	ASTM D2247	*See below
12.	Adhesion (concrete)	ASTM D3359	4
13.	En. Holdout (self sealing)	---	0.987
14.	H_2O Cleanup (All H_2O Based Products)	---	Washable when wet
15.	Flexibility	ASTM D1737	Failed
16.	Appearance	---	Smooth, flat
17.	Application Properties	---	Brush, spray satisf.
18.	Sag Res.	ASTM D2801	5 mils
19.	Levelling	ASTM D2801	2
20.	Salt Spray Res.	ASTM B117	Rust through upon app.
21.	Bleed Res.	---	Good
22.	Alkali Res.	STD 141B FTM TTC555	Dissolves
23.	VOC		1. 46.64 2. 161.32

*No blisters, no surface changes

Note: Rusts thru upon drying

Note: Items 14, 16, 17 are qualitative tests. Item 13 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-26-2
Contract No. A5 097 48
Date received: 4/2/86
Log No.: 42 3A-3C
Lab code: 045-10
Quantity: 1 Pt./2 Qts.
Test initiated: 4/3/86
Test completed: 12/86

Chemist: A. Khan
L. Kudela

Product Category: 10. Specialty Primers- Concrete

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	20.9
2.	Wt. per Gallon	ASTM D1475	8.45
3.	Viscosity Cps (Brookfield)	ASTM D2196	17 (1,100)
4.	% Water	ASTM D1364	75.4
5.	Stability 77°F	ASTM D1849	20.0 cp (#1,100)
6.	Stability 120°F	ASTM D1849	17.4 cp (#1,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	20 cp (#1,100)
8.	Dry Time	ASTM D1640	STT: 25 min. DH: 35 min.
9.	Hardness	ASTM D3363	<HB
10.	Sanding Prop.	STD 141B FTM 6321	Not sandable
11.	Humidity Res.	ASTM D2247	*See below
12.	Adhesion (concrete)	ASTM D3359	5
13.	En. Holdout (self sealing)	---	Crawling on Morest chart
14.	H_2O Cleanup (All H_2O Based Products)	---	Washable when wet
15.	Flexibility	ASTM D1737	Passes 1/8" mandrel
16.	Appearance	---	** see below
17.	Application Properties	---	***Brush and spray good
18.	Sag Res.	ASTM D2801	0
19.	Levelling	ASTM D2801	>10
20.	Salt Spray Res.	ASTM B117 ****	See below
21.	Bleed Res.	---	Good
22.	Alkali Res.	STD 141B FTM TTC555	Passed
23.	VOC		1. 37.49 2. 157.19

*No blisters, no surface changes
**Smooth, transparant when dried on concrete
***Extremely foamy, drips-very low viscosity
****Note: 1/4 to 1/2 inch corrosion along scribes, isolated field corrosion= 50%

Note: Items 14, 16, 17 are qualitative tests. Item 13 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-26-3
Contract No. A5 097 48
Date received: 4/2/86
Log No.: 42 4A-4C
Lab code: 046-10
Quantity: 1 Pt./2 Qts.
Test initiated: 4/3/86
Test completed: 12/86

Chemist: A. Khan
L. Kudela

Product Category: 10. Specialty Primers- Concrete

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	21.6
2.	Wt. per Gallon	ASTM D1475	8.47
3.	Viscosity Cps (Brookfield)	ASTM D2196	20.5 (1,100)
4.	% Water	ASTM D1364	74.9
5.	Stability 77°F	ASTM D1849	19.5 cp (#1,100)
6.	Stability 120°F	ASTM D1849	19.3 cp (#1,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	No change 20 cp (1,100)
8.	Dry Time	ASTM D1640	STT: 35 min. DH: 45 min.
9.	Hardness	ASTM D3363	HB
10.	Sanding Prop.	STD 141B FTM 6321	Not sandable
11.	Humidity Res.	ASTM D2247	No blisters
12.	Adhesion (concrete)	ASTM D3359	5
13.	En. Holdout (self sealing)	---	Crawling on Morest Chart
14.	H_2O Cleanup (All H_2O Based Products)	---	Washable when wet
15.	Flexibility	ASTM D1737	Passes 1/8" mandrel
16.	Appearance	---	* see below
17.	Application Properties	---	Spray,brush satif.
18.	Sag Res.	ASTM D2801	0
19.	Levelling	ASTM D2801	10
20.	Salt Spray Res.	ASTM B117	**See below
21.	Bleed Res.	---	Good
22.	Alkali Res.	STD 141B FTM TTC555	Passed
23.	VOC		1. 35.55 2. 145.93

*Smooth, transparent when dried on concrete
**Note: 1/8 to 1/2 inch rusts from scribes;= 1% isolated spot corrosion. Rusts stains 70% on substrate. Slight wrinkling of films.

Note: Items 14, 16, 17 are qualitative tests. Item 13 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-26-4
Contract No. A5 097 48
Date received: 4/16/86
Log No.: 416 5A-5C
Lab code: 053-10
Quantity: 1 Pt./2 Qts.
Test initiated: 4/22/86
Test completed: 12/86

Chemist: A. Khan
L. Kudela

Product Category: 10. Specialty Primers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	47.9
2.	Wt. per Gallon	ASTM D1475	10.7
3.	Viscosity Cps (Brookfield)	ASTM D2196	5300 (5,20)
4.	% Water	ASTM D1364	45.90%
5.	Stability 77°F	ASTM D1849	4900 cp (#5,20)
6.	Stability 120°F	ASTM D1849	3100 cp (#5,20)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	4200 cp (#5,20)
8.	Dry Time	ASTM D1640	STT: 18 min. DH: 28 min.
9.	Hardness	ASTM D3363	HB
10.	Sanding Prop.	STD 141B FTM 6321	Poor
11.	Humidity Res.	ASTM D2247	*See below
12.	Adhesion (concrete)	ASTM D3359	5
13.	En. Holdout (self sealing)	---	1.00
14.	H_2O Cleanup (All H_2O Based Products)	---	Satisfactory
15.	Flexibility	ASTM D1737	Passed 1/8 in mandrel
16.	Appearance	---	Smooth
17.	Application Properties	---	Sprayable upon red.-15%
18.	Sag Res.	ASTM D2801	11
19.	Levelling	ASTM D2801	1-2
20.	Salt Spray Res.	ASTM B117	** see below
21.	Bleed Res.	---	Poor
22.	Alkali Res.	STD 141B FTM TTC555	Film weakens, detaches from substrates
23.	VOC		1. 79.54 2. 192.82

*Blisters no. 4 medium in the field; few pinholes

** Small to medium size blisters on either side of scribe. Few clusters of small field blisters. Corrosion along and extends 1/16 to 1/8" from scribes. Few corrosions at burst blisters.

Note: Items 14, 16, 17 are qualitative tests. Item 13 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-26-5
Contract No. A5 097 48
Date received: 4/23/86
Log No.: 423 3A-3C
Lab code: 056-10
Quantity: 1 Pt./2 Qts.
Test initiated: 4/25/86
Test completed: 12/86

Chemist: A. Khan
L. Kudela

Product Category: 10. Specialty Primers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	70.7
2.	Wt. per Gallon	ASTM D1475	11.08
3.	Viscosity Cps (Brookfield)	ASTM D2196	2050 (3,20)
4.	% Water	ASTM D1364	0.86
5.	Stability 77°F	ASTM D1849	1630 cp (#3,20)
6.	Stability 120°F	ASTM D1849	1750 cps (3,20)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	N/A
8.	Dry Time	ASTM D1640	STT: 2hrs. 50 min. DH: 5hrs. 45 min.
9.	Hardness	ASTM D3363	HB (flaky)
10.	Sanding Prop.	STD 141B FTM 6321	Sandable
11.	Humidity Res.	ASTM D2247	* See below
12.	Adhesion (wood)	ASTM D3359	4
13.	En. Holdout (self sealing)	---	0.987
14.	H_2O Cleanup (All H_2O Based Products)	---	N/A
15.	Flexibility	ASTM D1737	Passed 1/8 mandrel
16.	Appearance	---	Smooth
17.	Application Properties	---	Good brush and spray
18.	Sag Res.	ASTM D2801	6
19.	Levelling	ASTM D2801	5-6
20.	Salt Spray Res.	ASTM B117	** See below
21.	Bleed Res.	---	Fair
22.	Alkali Res.	STD 141B FTM TTC555	Dissolves
23.	VOC		389.24

Note: Items 14, 16, 17 are qualitative tests. Item 13 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

*No blistering, stain bleeding

**No blisters. Corrosion along scribes only, and occasionally extends to 1/16" on either side of scribe. Rust stain field paint.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-26-6
Contract No. A5 097 48
Date received: 4/23/86
Log No.: 423 4A-4C
Lab code: 057-10
Quantity: 1 Pt./2 Qts.
Test initiated: 4/25/86
Test completed: 12/86

Chemist: A. Khan
L. Kudela

Product Category: 10. Specialty Primers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	51.4
2.	Wt. per Gallon	ASTM D1475	11.42
3.	Viscosity Cps (Brookfield)	ASTM D2196	4225 (3,20)
4.	% Water	ASTM D1364	49.76
5.	Stability 77°F	ASTM D1849	4370 cp (#3,20)
6.	Stability 120°F	ASTM D1849	4050 cp (#3,20)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	3950 cp (#3,20)
8.	Dry Time	ASTM D1640	STT: 32 mins. DH: 43 mins.
9.	Hardness	ASTM D3363	<HB
10.	Sanding Prop.	STD 141B FTM 6321	Sandable
11.	Humidity Res.	ASTM D2247	*See below
12.	Adhesion (wood)	ASTM D3359	4
13.	En. Holdout (self sealing)	---	1.00
14.	H_2O Cleanup (All H_2O Based Products)	---	Satisfactory
15.	Flexibility	ASTM D1737	Passes 1/8" mandrel
16.	Appearance	---	Smooth (flat)
17.	Application Properties	---	**Sprayable upon red.20%
18.	Sag Res.	ASTM D2801	>12
19.	Levelling	ASTM D2801	0
20.	Salt Spray Res.	ASTM B117	*** See note
21.	Bleed Res.	---	Poor
22.	Alkali Res.	STD 141B FTM TTC555	Detaches from substrate
23.	VOC		1. 0 2. 3.09

*Blistering and stain bleeding
**Strong ammonia odor
***Small to medium size blisters along either side of scribes and a few in field. Corrosion along either side of end extends 1/8 to 1/2" from scribes. Occasional field corrosion at bust blisters.

Note: Items 14, 16, 17 are qualitative tests. Item 13 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-27-2
Contract No. A5 097 48
Date received: 3/17/86
Log No.: 317 2A-2C
Lab code: SS2
Quantity: 1 Pt./2 Qts.
Test initiated: 3/21/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 11. Specialty Sealers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	50.98
2.	Wt. per Gallon	ASTM D1475	10.66
3.	Viscosity Cps (Brookfield)	ASTM D2196	9846 cp #5(20,50)
4.	% Water	ASTM D1364	37.53
5.	Stability 77°F	ASTM D1849	11772 cp #5 (20,50)
6.	Stability 120°F	ASTM D1849	9400 cp #5 (20,50)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	9440 cp #5(20,50)
8.	Dry Time	ASTM D1640	STT:2min/DH:21min concrete STT:21min/DH:36min metal
9.	Humidity Res.	ASTM D2247	No blisters,no corros.
10.	Adhesion	ASTM D3359	5
11.	En. Holdout (self sealing)	---	0.91
12.	H_2O Cleanup (All H_2O Based Products)	---	Excellent
13.	Flexibility	ASTM D1737	1/8" Pass
14.	Appearance	---	Smooth
15.	Application Properties	---	Spray,brush,roller very good
16.	Sag Res.	ASTM D2801	12 mils
17.	Levelling	ASTM D2801	-0-
18.	Bleed Res.	---	Fair
19.	Alkali Res.	STD 141B FTM TTC555	Pass 48 hrs.
20.	VOC		1. 146.86 2. 280.58

Note: Items 12, 14, 15 are qualitative tests. Item 11 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-27-3
Contract No. A5 097 48
Date received: 3/19/86 Chemist: L. Kudela
Log No.: 319 1A-1C
Lab code: SS3
Quantity: 1 Pt./2 Qts.
Test initiated: 3/21/86
Test completed: 12/86

Product Category: 11. Specialty Sealers- Concrete

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	12.52%
2.	Wt. per Gallon	ASTM D1475	9.11 lbs/gal
3.	Viscosity Cps (Brookfield)	ASTM D2196	12.7 cp #1 (50.100)
4.	% Water	ASTM D1364	75.95
5.	Stability 77°F	ASTM D1849	18.2 cp #1 (50,100)
6.	Stability 120°F	ASTM D1849	24.0 cp #1 (50,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	13.6 cp #1 (50,100)
8.	Dry Time	ASTM D1640	STT:2min/DH:53min conc. STT:16 min/DH:70min metal
9.	Humidity Res.	ASTM D2247	Failed
10.	Adhesion	ASTM D3359	5
11.	En. Holdout (self sealing)	---	0.89
12.	H_2O Cleanup (All H_2O Based Products)	---	Good-easy
13.	Flexibility	ASTM D1737	Pass 1/8"
14.	Appearance	---	Smooth
15.	Application Properties	---	*Spray,brush-good
16.	Sag Res.	ASTM D2801	0
17.	Levelling	ASTM D2801	N/A
18.	Bleed Res.	---	Good
19.	Alkali Res. STD 141B FTM TTC555		Failed (48hrs)
20.	VOC		1. 125.94 2. 731.35

*Extremely low viscosity

Note: Items 12, 14, 15 are qualitative tests. Item 11 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-27-4
Contract No. A5 097 48
Date received: 3/24/86
Log No.: 324 4A-4C
Lab code: SS4
Quantity: 1 Pt./2 Qts.
Test initiated: 3/25/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 11. Specialty Sealers- Wood

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	19.52
2.	Wt. Per Gallon	ASTM D1475	6.76 lbs/gal
3.	Viscosity Cps (Brookfield)	ASTM D2196	16.2 cp #1 (50,100)
4.	% Water	ASTM D1364	<0.1%
5.	Stability 77°F	ASTM D1849	19.5 cp #1 (50,100)
6.	Stability 120°F	ASTM D1849	16.1 cp #1 (50,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Oil Based
8.	Dry Time	ASTM D1640	STT:2min/DH:42min conc. STT:28min/DH:36min metal
9.	Humidity Res.	ASTM D2247	No blister,no corros.
10.	Adhesion	ASTM D3359	5 (wood)
11.	En. Holdout (self sealing)	---	0.805
12.	H_2O Cleanup (All H_2O Based Products)	---	Good
13.	Flexibility	ASTM D1737	Pass 1/8"
14.	Appearance	---	Smooth
15.	Application Properties	---	Brush,spray-satisf.
16.	Sag Res.	ASTM D2801	0
17.	Levelling	ASTM D2801	10
18.	Bleed Res.	---	Good
19.	Alkali Res.	STD 141B FTM TTC555	Failed (48 hrs)
20.	VOC		652.30

Note: Items 12, 14, 15 are qualitative tests. Item 11 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-27-5A,5B
Contract No. A5 097 48
Date received: 3/28/86
Log No.: 328 7A-7C,8A-8C
Lab code: SS5
Quantity: 1 Pt./2 Qts.
Test initiated: 4/3/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 11. Specialty Sealers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	80.84%
2.	Wt. per Gallon	ASTM D1475	12.33
3.	Viscosity Cps (Brookfield)	ASTM D2196	3135 cp #4 (20,50) 10 after prep.
4.	% Water	ASTM D1364	$<$0.1%
5.	Stability 77°F	ASTM D1849	3660 cp #4 (20,50)
6.	Stability 120°F	ASTM D1849	4735 cp #4 (20,50)
7.	Freeze - Thaw Res. (H_2O Based Products)	ASTM D2243	Oil based
8.	Dry Time	ASTM D1640	STT: 3.2 hrs DH: 10.5 hrs
9.	Humidity Res.	ASTM D2247	No blisters,no corros.
10.	Adhesion	ASTM D3359	5
11.	En. Holdout (self sealing)	---	1.00
12.	H_2O Cleanup (H_2O Based Products)	---	N/A
13.	Flexibility	ASTM D1737	Pass 1/8"
14.	Appearance	---	Smooth
15.	Application Properties	---	* Brush,spray good
16.	Sag Res.	ASTM D2801	3
17.	Levelling	ASTM D2801	#2
18.	Bleed Res.		Excellent
19.	Alkali Res.	STD 141B FTM TTC555	Pass (48 hrs)
20.	VOC		283.25
21.	Pot Life		8 hrs.

* Dilution 15% TCE

Note: Items 12, 14, 15 are qualitative tests. Item 11 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-27-6
Contract No. A5 097 48
Date received: 4/2/86
Log No.: 42 5A-5C
Lab code: SS6
Quantity: 1 Pt./2 Qts.
Test initiated: 4/4/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 11. Specialty Sealers- Asphalt

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	49.72%
2.	Wt. per Gallon	ASTM D1475	9.06 lbs/gal
3.	Viscosity Cps (Brookfield)	ASTM D2196	128.8 cp #2 (50,100)
4.	% Water	ASTM D1364	50.03
5.	Stability 77°F	ASTM D1849	153.3 cp #2 (50,100)
6.	Stability 120°F	ASTM D1849	137.5 cp #2 (50,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	366 cp #2 (50,100)
8.	Dry Time	ASTM D1640	STT: 42 min. DH: 90 min.
9.	Humidity Res.	ASTM D2247	No blisters (asphalt)
10.	Adhesion	ASTM D3359	5
11.	En. Holdout (self sealing)	---	0.83
12.	H_2O Cleanup (All H_2O Based Products)	---	Easy
13.	Flexibility	ASTM D1737	Pass 1/8"
14.	Appearance	---	Smooth,white turns in clear
15.	Application Properties	---	Brush,spray-good
16.	Sag Res.	ASTM D2801	0
17.	Levelling	ASTM D2801	N/A
18.	Bleed Res.	---	Fair
19.	Alkali Res.	STD 141B FTM TTC555	Failed (48 hrs)
20.	VOC		1. 2.91 2. 6.33

Note: Items 12, 14, 15 are qualitative tests. Item 11 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-27-7
Contract No. A5 097 48
Date received: 4/11/86
Log No.: 411 4A-4C
Lab code: SS7
Quantity: 1 Pt./2 Qts.
Test initiated: 4/14/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 11. Specialty Sealers- Wood

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	9.41%
2.	Wt. per Gallon	ASTM D1475	6.68
3.	Viscosity Cps (Brookfield)	ASTM D2196	11.0 cp, #1 (50,100)
4.	% Water	ASTM D1364	<0.1%
5.	Stability 77°F	ASTM D1849	12.1 cp #1 (50,100)
6.	Stability 120°F	ASTM D1849	14.5 cp #1 (50,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Solvent based
8.	Dry Time	ASTM D1640	STT: 82 min. DH: →48 hrs.
9.	Humidity Res.	ASTM D2247	No blisters,no field cor.
10.	Adhesion	ASTM D3359	3
11.	En. Holdout (self sealing)	---	1.0
12.	H_2O Cleanup (All H_2O Based Products)	---	Good
13.	Flexibility	ASTM D1737	Pass 1/8"
14.	Appearance	---	Smooth
15.	Application Properties	---	Brush,spray-good
16.	Sag Res.	ASTM D2801	0
17.	Levelling	ASTM D2801	N/A
18.	Bleed Res.	---	Fair
19.	Alkali Res. STD 141B	FTM TTC555	Failed (48 hrs)
20.	VOC		725.56

Note: Items 12, 14, 15 are qualitative tests. Item 11 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-28-1
Contract No. A5 097 48
Date received: 3/21/86
Log No.: 321 4A-4C
Lab code: SU1
Quantity: 1 Pt./2 Qts.
Test initiated: 3/21/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 12. Specialty Undercoaters-Wood

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	49.32%
2.	Wt. per Gallon	ASTM D1475	9.01%
3.	Viscosity Cps (Brookfield)	ASTM D2196	539 cp #3(50,100)
4.	% Water	ASTM D1364	0.68%
5.	Stability 77°F	ASTM D1849	250 cp #3 (50,100)
6.	Stability 120°F	ASTM D1849	216 cp #3 (50,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Oil based
8.	Dry Time	ASTM D1640	STT:2 min DH: 9min
9.	Hardness	ASTM D3363	H
10.	Block Res.	STD 141B FTM 6216	Slight adhesion
11.	Sanding Prop.	STD 141B FTM 6321	* Good
12.	Humidity Res.	ASTM D2247	Passed-no corrosion
13.	Adhesion	ASTM D3359	4
14.	En. Holdout (self sealing)	---	0.91
15.	H_2O Cleanup (All H_2O Based Products)	---	N/A
16.	Flexibility	ASTM D1737	Pass 1/8"
17.	Appearance	---	Some mottling on steel
18.	Application Properties	---	Spray,brush 50% After dilution
19.	Sag Res.	ASTM D2801	7
20.	Levelling	ASTM D2801	5
21.	Bleed Res.	---	Fair
22.	Alkali Res.	STD 141B FTM TTC555	Failed
23.	VOC		547.49
24.	Grain Raising		None -pass

*Surface smooth; no gumming of sand-paper

Note: Items 15, 17, 18 are qualitative tests. Item 14 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-28-2
Contract No. A5 097 48
Date received: 4/10/86
Log No.: 410 6A-6C
Lab code: SU2
Quantity: 1 Pt./2 Qts.
Test initiated: 4/11/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 12. Specialty Undercoaters- Concrete

	Tests	Procedure		Results
1.	Total NV % Wt.	ASTM D2369		12.61%
2.	Wt. per Gallon	ASTM D1475		9.13 lbs/gal
3.	Viscosity Cps (Brookfield)	ASTM D2196		12.5 cp #1 (50,100)
4.	% Water	ASTM D1364		74.8%
5.	Stability 77°F	ASTM D1849		14.5 cp #1 (50,100)
6.	Stability 120°F	ASTM D1849		12.6 cp #1 (50,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243		11.9 cp #1 (50,100)
8.	Dry Time	ASTM D1640		STT: 11 min. DH: 20 min.
9.	Hardness	ASTM D3363		<HB
10.	Block Res.	STD 141B FTM 6216		N/A
11.	Sanding Prop.	STD 141B FTM 6321		Good
12.	Humidity Res.	ASTM D2247		Strong corrosion on the whole panel
13.	Adhesion	ASTM D3359		5
14.	En. Holdout (self sealing)	---		0.94
15.	H_2O Cleanup (All H_2O Based Products)	---		Good
16.	Flexibility	ASTM D1737		Pass 1/8"
17.	Appearance	---		Smooth,waxy film
18.	Application Properties	---	*	Excellent
19.	Sag Res.	ASTM D2801		3
20.	Levelling	ASTM D2801		10
21.	Bleed Res.	---		Poor
22.	Alkali Res.	STD 141B FTM TTC555		Failed 48 hrs
23.	VOC			1. 137.38 2. 743.80
24.	Grain Raising			Slight

*Brushing on concrete good. Water thin viscosity

Note: Items 15, 17, 18 are qualitative tests. Item 14 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-28-3
Contract No. A5 097 48
Date received: 4/11/86
Log No.: 411 5A-5C
Lab code: SU3
Quantity: 1 Pt./2 Qts.
Test initiated: 4/14/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 12. Specialty Undercoaters-Dry Wall

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	71.29%
2.	Wt. per Gallon	ASTM D1475	11.55 lbs/gal
3.	Viscosity Cps (Brookfield)	ASTM D2196	2168 cp #5 (50,100)
4.	% Water	ASTM D1364	$<$0.1%
5.	Stability 77°F	ASTM D1849	1564 cp #5 (50,100)
6.	Stability 120°F	ASTM D1849	2092 cp #5 (50,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Solvent based
8.	Dry Time	ASTM D1640	STT: 37 min. DH: 102 min.
9.	Hardness	ASTM D3363	F
10.	Block Res.	STD 141B FTM 6216	Pass 10 psi
11.	Sanding Prop.	STD 141B FTM 6321	Good
12.	Humidity Res.	ASTM D2247	No blisters,no corros.
13.	Adhesion	ASTM D3359	5
14.	En. Holdout (self sealing)	---	0.93
15.	H_2O Cleanup (All H_2O Based Products)	---	Impossible
16.	Flexibility	ASTM D1737	Pass 1/2"
17.	Appearance	---	Smooth
18.	Application Properties	---	Brush,spray-good 20% reduction
19.	Sag Res.	ASTM D2801	12
20.	Levelling	ASTM D2801	3
21.	Bleed Res.	---	Fair
22.	Alkali Res.	STD 141B FTM TTC555	Failed (48 hrs)
23.	VOC		397.58
24.	Grain Raising		None

Note: Items 15, 17, 18 are qualitative tests. Item 14 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-28-4
Contract No. A5 097 48
Date received: 4/16/86 Chemist: L. Kudela
Log No.: 416 6A-6C
Lab code: SU4
Quantity: 1 Pt./2 Qts.
Test initiated: 4/18/86
Test completed: 12/86

Product Category: 12. Specialty Undercoaters- Concrete

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	13.31%
2.	Wt. per Gallon	ASTM D1475	6.82 lbs/gal
3.	Viscosity Cps (Brookfield)	ASTM D2196	11.3 cp #1(50,100)
4.	% Water	ASTM D1364	<0.1%
5.	Stability 77°F	ASTM D1849	13.4 cp #1 (50,100)
6.	Stability 120°F	ASTM D1849	13.2 cp #1 (50,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Solvent based
8.	Dry Time	ASTM D1640	STT: 3 min. DH: 18 min.
9.	Hardness	ASTM D3363	F
10.	Block Res.	STD 141B FTM 6216	No adhesion
11.	Sanding Prop.	STD 141B FTM 6321	Good-no gumming
12.	Humidity Res.	ASTM D2247	Pass
13.	Adhesion	ASTM D3359	5
14.	En. Holdout (self sealing)	---	1.00
15.	H_2O Cleanup (All H_2O Based Products)	---	N/A
16.	Flexibility	ASTM D1737	Pass 1/8"
17.	Appearance	---	Smooth
18.	Application Properties	---	Spray,brush- good
19.	Sag Res.	ASTM D2801	3
20.	Levelling	ASTM D2801	8
21.	Bleed Res.	---	Good
22.	Alkali Res.	STD 141B FTM TTC555	Pass 48 hrs.
23.	VOC		708.87
24.	Grain Raising		Slight

Note: Items 15, 17, 18 are qualitative tests. Item 14 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-28-5
Contract No. A5 097 48
Date received: 4/23/86
Log No.: 423 5A-5C
Lab code: SU5
Quantity: 1 pt./2 qts.
Test initiated: 7/15/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 12. Specialty Undercoaters-Wood

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	63.07
2.	Wt. per Gallon	ASTM D1475	10.92
3.	Viscosity Cps (Brookfield)	ASTM D2196	662 cp #3 (50,100)
4.	% Water	ASTM D1364	$<0.1\%$
5.	Stability 77°F	ASTM D1849	404 cp #3 (50,100)
6.	Stability 120°F	ASTM D1849	663 cp #3 (50,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Solvent based
8.	Dry Time	ASTM D1640	STT: 4 min. DH: 85 mins.
9.	Hardness	ASTM D3363	H
10.	Block Res.	STD 141B FTM 6216	Slight adhesion
11.	Sanding Prop.	STD 141B FTM 6321	Good
12.	Humidity Res.	ASTM D2247	Pass
13.	Adhesion	ASTM D3359	5
14.	En. Holdout (self sealing)	---	0.96
15.	H_2O Cleanup (All H_2O Based Products)	---	N/A
16.	Flexibility	ASTM D1737	Pass 1/8"
17.	Appearance	---	Smooth
18.	Application Properties	---	Spraying-Satisf.
19.	Sag Res.	ASTM D2801	8
20.	Levelling	ASTM D2801	5
21.	Bleed Res.	---	Poor
22.	Alkali Res.	STD 141B FTM TTC555	Failed 48 hrs.
23.	VOC		483.52
24.	Grain Raising		None

Note: Items 15, 17, 18 are qualitative tests. Item 14 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-28-6
Contract No. A5 097 48
Date received: 4/23/86
Log No.: 423 6A-6C
Lab code: SU6
Quantity: 1 pt./2 qts.
Test initiated: 7/15/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 12. Specialty Undercoaters-Concrete

	Tests	Procedure		Results
1.	Total NV % Wt.	ASTM D2369		49.3
2.	Wt. per Gallon	ASTM D1475		9.36
3.	Viscosity Cps (Brookfield)	ASTM D2196		2264 cps #5 (50,100)
4.	% Water	ASTM D1364		<0.1%
5.	Stability 77°F	ASTM D1849		2030 cps #5 (50,100)
6.	Stability 120°F	ASTM D1849		2376 cps #5 (50,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243		Solvent based
8.	Dry Time	ASTM D1640		STT: 32 min. DH: 69 min.
9.	Hardness	ASTM D3363		H
10.	Block Res.	STD 141B FTM 6216		Slight adhesion
11.	Sanding Prop.	STD 141B FTM 6321	*	See below
12.	Humidity Res.	ASTM D2247		Pass
13.	Adhesion	ASTM D3359		4
14.	En. Holdout (self sealing)	---		0.98
15.	H_2O Cleanup (All H_2O Based Products)	---		N/A
16.	Flexibility	ASTM D1737		Pass 1/8"
17.	Appearance	---		Smooth
18.	Application Properties	---	**	(20% red.)
19.	Sag Res.	ASTM D2801		12 mils
20.	Levelling	ASTM D2801		0
21.	Bleed Res.	---		Good
22.	Alkali Res.	STD 141B FTM TTC555		Pass
23.	VOC			568.99
24.	Grain Raising			None

*Slight gumming of sand paper
**Spraying satisfactory with TCE reduction

Note: Items 15, 17, 18 are qualitative tests. Item 14 run as described.

a. Enamel Holdout: ratio of 60° gloss of TT489 enamel over paint vs sealed Morest chart.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-29-2
Contract # A5 097 48
Date received: 3/17/86
Log No.: 317-1A-1C
Lab code: 015-13-00
Quantity: 1 Pt./ 2 Qts.
Test initiated: 3/19/86
Test completed: 12/86

Chemist: A. Khan
L. Kudela

Product Category: 13. Waterproofing Mastics - Elastomers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	77.15%
2.	Wt. per Gallon	ASTM D1475	9.56%
3.	Viscosity Cps (Brookfield) spindle 7, speed= 5	ASTM D2196	4×10^5 cps (7,5)
4.	% Water	ASTM D1364	<0.01
5.	Stability 77°F	ASTM D1849	4.3×10^5 cps (7,3)
6.	Stability 120°F	ASTM D1849	3.56×10^5 cps (7,5)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Not water based (N/A)
8.	Dry Time	ASTM D1640	STT: 3 hrs. DH: 20 hrs.
9.	Ponding-H_2O Res.	---	5.50
10.	Humidity Res. 120 hrs.	ASTM D2247	No rust or blistering
11.	Adhesion	ASTM D3359	4
12.	H_2O Cleanup (All H_2O Based Products)	---	N/A (oil based)
13.	Flexibility	ASTM D1737	Passed
14.	Impact Res.	ASTM D2794	Passed
15.	Appearance	---	Smooth
16.	Application Properties	---	Satisfactory with spatul
17.	Sag Res.	ASTM D2801	12
18.	Levelling	ASTM D2801	0
19.	Contrast Ratio	ASTM D2805	0.93
20.	Acc. Weathering	ASTM G23, D822	Pass
21.	Elongation	ASTM D2370	47%
22.	Tensile Strength	ASTM D2370	137 Psi
23.	Alkali Res.(120 hrs)	STD 141B FTM TTC555	Passed-No blisters
24.	VOC		261.92

Note: Items 12, 15, 16 are qualitative tests. Item 9 run as described.

a. Ponding water res: dried film 15 mils, 32 cm^2 surface sealed to vertical container, 100 gms H_2O monitored each 24 hrs. gms/M^2.24 hrs.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-29-6
Contract # A5 097 48
Date received: 3/21/86
Log No.: 321 6A-6C
Lab code: 036-13-00
Quantity: 1 Pt./2 Qts.
Test initiated: 3/25/86
Test completed: 12/86

Chemist: A. Khan
L. Kudela

Product Category: 13. Waterproofing Mastics - Elastomers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	82.15
2.	Wt. per Gallon	ASTM D1475	10.22
3.	Viscosity Cps (Brookfield)	ASTM D2196	8.96×10^5 (7,2.5)
4.	% Water	ASTM D1364	<0.01
5.	Stability 77°F	ASTM D1849	1.152×10^6 (7,2.5)
6.	Stability 120°F	ASTM D1849	1.248×10^6 (7,2.5)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	N/A
8.	Dry Time	ASTM D1640	STT: 1hr. DH: 20 hrs.
9.	Ponding-H_2O Res.	---	3.82
10.	Humidity Res.	ASTM D2247	No rust or blisters
11.	Adhesion	ASTM D3359	4
12.	H_2O Cleanup (All H_2O Based Products)	---	N/A (solvent based)
13.	Flexibility	ASTM D1737	Passed
14.	Impact Res.	ASTM D2794	Passed 60 in.-Lbs
15.	Appearance	---	Flat paste
16.	Application Properties	---	Spreadable with spatula
17.	Sag Res.	ASTM D2801	>12
18.	Levelling	ASTM D2801	0
19.	Contrast Ratio	ASTM D2805	0.98
20.	Acc. Weathering	ASTM G23, D822	Pass
21.	Elongation	ASTM D2370	30%
22.	Tensile Strength	ASTM D2370	44 psi
23.	Alkali Res.	STD 141B FTM TTC555	Pass
24.	VOC		220.13

Note: Items 12, 15, 16 are qualitative tests. Item 9 run as described.

a. Ponding water res: dried film 15 mils, 32 cm^2 surface sealed to vertical container, 100 gms H_2O monitored each 24 hrs. gms/M^2.24 hrs.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-29-7
Contract # A5 097 48
Date received: 3/24/86
Log No.: 324 5A-5C
Lab code: 033-13-00
Quantity: 1 Pt./2 Qts.
Test initiated: 3/25/86
Test completed: 12/86

Chemist: A. Khan
L. Kudela

Product Category: 13. Waterproofing Mastics - Elastomers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	66.5
2.	Wt. per Gallon	ASTM D1475	10.20
3.	Viscosity Cps (Brookfield)	ASTM D2196	1.248×10^6 (7,2.5)
4.	% Water	ASTM D1364	1.6
5.	Stability 77°F	ASTM D1849	1.344×10^6 (7,2.5)
6.	Stability 120°F	ASTM D1849	1.536×10^6 (7,2.5)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	N/A
8.	Dry Time	ASTM D1640	STT: 32 min. DH: 50 min.
9.	Ponding-H_2O Res.	---	3.6
10.	Humidity Res.	ASTM D2247	Slight blistering No rust
11.	Adhesion	ASTM D3359	4
12.	H_2O Cleanup (All H_2O Based Products)	---	N/A
13.	Flexibility	ASTM D1737	Passed
14.	Impact Res.	ASTM D2794	Passed
15.	Appearance	---	Smooth,slight-grit
16.	Application Properties	---	Spreadable with spatula
17.	Sag Res.	ASTM D2801	> 12
18.	Levelling	ASTM D2801	0
19.	Contrast Ratio	ASTM D2805	0.96
20.	Acc. Weathering	ASTM G23, D822	Pass
21.	Elongation	ASTM D2370	240%
22.	Tensile Strength	ASTM D2370	99 psi
23.	Alkali Res.	STD 141B FTM TTC555	No change Slight red. in gloss
24.	VOC		390.13

Note: Items 12, 15, 16 are qualitative tests. Item 9 run as described.

a. Ponding water res: dried film 15 mils, 32 cm^2 surface sealed to vertical container, 100 gms H_2O monitored each 24 hrs. gms/M^2.24 hrs.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA - JFN #11
Contract # A5 097 48
Date received: 9/10/86 Chemist: L. Kudela
Log No.: 910-1A
Lab code: WM6
Quantity: 1 gal
Test initiated: 9/30/86
Test completed: 12/86

Product Category: 13. Waterproofing Mastics - Elastomers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	45.53%
2.	Wt. per Gallon	ASTM D1475	9.02
3.	Viscosity Cps (Brookfield)	ASTM D2196	5595 cp #6 (50,100)
4.	% Water	ASTM D1364	45.39%
5.	Stability 77°F	ASTM D1849	7325 cp #6 (50,100)
6.	Stability 120°F	ASTM D1849	Solidified
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	7835 cp #6 (50,100)
8.	Dry Time	ASTM D1640	STT: 67 min. DH: 160 min.
9.	Ponding-H_2O Res.	---	17.2
10.	Humidity Res.	ASTM D2247	Excellent
11.	Adhesion	ASTM D3359	5
12.	H_2O Cleanup (All H_2O Based Products)	---	Easy
13.	Flexibility	ASTM D1737	Pass 1/8"
14.	Impact Res.	ASTM D2794	Pass 60 in. lb.
15.	Appearance	---	Smooth
16.	Application Properties	---	Brush, spray-good
17.	Sag Res.	ASTM D2801	#3
18.	Levelling	ASTM D2801	0
19.	Contrast Ratio	ASTM D2805	0.90
20.	Acc. Weathering	ASTM G23, D822	Pass
21.	Elongation	ASTM D2370	1326%
22.	Tensile Strength	ASTM D2370	105.9 psi
23.	Alkali Res.	STD 141B FTM TTC555	Failed
24.	VOC		1. 98.20 2. 192.62

Note: Items 12, 15, 16 are qualitative tests. Item 9 run as described.

a. Ponding water res: dried film 15 mils, 32 cm^2 surface sealed to vertical container, 100 gms H_2O monitored each 24 hrs. gms/M^2.24 hrs.

b. Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-30-1
Contract # A5 097 48
Date received: 3/13/86
Log No.: 313 6A-6C
Lab code: WS-4
Quantity: 1 Pt./2 Qts.
Test initiated: 3/14/86
Test completed: 12/86

Chemist: A. Khan
L. Kudela

Product Category: 14. Waterproofing Sealers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	46.19
2.	Wt. per Gallon	ASTM D1475	8.64
3.	Viscosity Cps (Brookfield)	ASTM D2196	9350 (#6,50)
4.	% Water	ASTM D1364	53.10%
5.	Stability 77°F	ASTM D1849	9400 (6,50)
6.	Stability 120°F	ASTM D1849	9640 (6,50)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Solidified
8.	Dry Time	ASTM D1640	STT: 55 mins. DH: 80 mins.
9.	Color	STD 141B 4249	Black
10.	Humidity Res. (48 Hrs.)	ASTM D2247	No blistering,slight rus
11.	Adhesion	ASTM D3359	4
12.	H_2O Cleanup	---	Pass
13.	Appearance	---	Smooth
14.	Application Properties	---	Satisfactory;brush,rolle
15.	Acc. Weathering	ASTM G23, D822	Pass
16.	H_2O Repellancy	ASTM D2921	Poor
17.	Alkali Res.	STD 141B FTM TTC555	Pass
18.	VOC		1. 7.36 2. 16.24

Note: Items 12, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-30-4
Contract # A5 097 48
Date received: 3/19/86
Log No.: 319 2A-2C
Lab code: WS3
Quantity: 1 Pt./2 Qts.
Test initiated: 3/21/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 14. Waterproofing Sealers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	11.09%
2.	Wt. per Gallon	ASTM D1475	8.99 lbs/gal
3.	Viscosity Cps (Brookfield)	ASTM D2196	12.3 cp #1 (50,100)
4.	% Water	ASTM D1364	81.08%
5.	Stability 77°F	ASTM D1849	17.2 cp #1 (50,100)
6.	Stability 120°F	ASTM D1849	11.3 cp #1 (50,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	13.2 cp #1 (50,100)
8.	Dry Time	ASTM D1640	STT: 21 min. DH: 75 min.
9.	Color	ASTM D1544	Color #1
10.	Humidity Res.	ASTM D2247	Pass 48 hrs
11.	Adhesion	ASTM D3359	#5 (on concrete)
12.	H_2O Cleanup	---	Easy
13.	Appearance	---	Smooth on concrete
14.	Application Properties	---	Brush,spray-good (concr)
15.	Acc. Weathering	ASTM G23, D822	Pass
16.	H_2O Repellancy	ASTM D2921	Poor
17.	Alkali Res.	STD 141B FTM TTC555	Failed
18.	VOC		1. 84.40 2. 636.98

Note: Items 12, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-30-6
Contract # A5 097 48
Date received: 3/19/86
Log No.: 319 6A-6C
Lab code: WS5
Quantity: 1 Pt./2 Qts.
Test initiated: 3/21/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 14. Waterproofing Sealers-Concrete

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	5.23%
2.	Wt. per Gallon	ASTM D1475	6.61 lbs/gal
3.	Viscosity Cps (Brookfield)	ASTM D2196	8.4 cp #1 (50,100)
4.	% Water	ASTM D1364	0.08%
5.	Stability 77°F	ASTM D1849	12.5 cp #1 (50,100)
6.	Stability 120°F	ASTM D1849	10.1 cp #1 (50,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Oil based
8.	Dry Time	ASTM D1640	STT: 20 min. DH: 105 min.
9.	Color	ASTM D1544	Color #1
10.	Humidity Res.	ASTM D2247	Pass (48 hrs in HC)
11.	Adhesion	ASTM D3359	5 (on concrete)
12.	H_2O Cleanup	---	N/A
13.	Appearance	---	Smooth on concrete
14.	Application Properties	---	Brush good on concr Spray good
15.	Acc. Weathering	ASTM G23, D822	Pass
16.	H_2O Repellancy	ASTM D2921	Very good
17.	Alkali Res.	STD 141B FTM TTC555	Failed
18.	VOC		751.08

Note: Items 12, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-30-7
Contract # A5 097 48
Date received: 3/24/86
Log No.: 324 6A-6C
Lab code: WS6
Quantity: 1 Pt./2 Qts.
Test initiated: 3/25/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 14. Waterproofing Sealers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	74.37%
2.	Wt. per Gallon	ASTM D1475	13.23 lbs/gal
3.	Viscosity Cps (Brookfield)	ASTM D2196	3600 cp #6 (50,100)
4.	% Water	ASTM D1364	0.40%
5.	Stability 77°F	ASTM D1849	5840 cp #6 (50,100)
6.	Stability 120°F	ASTM D1849	5695 cp #6 (50,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Oil based
8.	Dry Time	ASTM D1640	STT: 57 min. DH: 106 min.
9.	Color	STD 141B 4249	White
10.	Humidity Res.	ASTM D2247	Pass (48 hrs)
11.	Adhesion	ASTM D3359	4 (on concrete)
12.	H_2O Cleanup	---	Oil based
13.	Appearance	---	Rough
14.	Application Properties	---	Brush or roller only
15.	Acc. Weathering	ASTM G23, D822	Pass- no change
16.	H_2O Repellancy	ASTM D2921	Very good
17.	Alkali Res.	STD 141B FTM TTC555	Pass 48 hrs
18.	VOC		406.56

Note: Items 12, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-30-9
Contract # A5 097 48
Date received: 3/13/86
Log No.: 313-5A-5C
Lab code: WS1
Quantity: 1 Pt./2 Qts.
Test initiated: 3/14/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 14. Waterproofing Sealers-Concrete

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	9.81%
2.	Wt. per Gallon	ASTM D1475	6.59
3.	Viscosity Cps (Brookfield)	ASTM D2196	16.2 cp #1 (50,100)
4.	% Water	ASTM D1364	0.19%
5.	Stability 77°F	ASTM D1849	18.0 cp #1 (50,100)
6.	Stability 120°F	ASTM D1849	18.8 cp #1 (50,100)
7.	Freeze - Thaw Res. (H_2O Based Products)	ASTM D2243	Oil Based
8.	Dry Time	ASTM D1640	STT: 18 min. DH: 17.5 hrs.(concrete)
9.	Color	ASTM D1544	Color #1
10.	Humidity Res.	ASTM D2247	Pass (48 hrs)
11.	Adhesion	ASTM D3359	5 (concrete)
12.	H_2O Cleanup	---	N/A
13.	Appearance	---	Smooth on concrete
14.	Application Properties	---	*See below
15.	Acc. Weathering	ASTM G23, D822	No change
16.	H_2O Repellancy	ASTM D2921	Very good
17.	Alkali Res.	STD 141B FTM TTC555	Pass 96 Hrs.
18.	VOC		712.62

*Brush, spray-good

Note: Items 12, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. RDA -II-30-10
Contract # A5 097 48
Date received: 4/11/86
Log No.: 411 6A-6C
Lab code: WS8
Quantity: 1 pt./2 qts.
Test initiated: 8/11/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 14. Waterproofing Sealers-Concrete

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	13.19%
2.	Wt. per Gallon	ASTM D1475	7.87 lbs/gal
3.	Viscosity Cps (Brookfield)	ASTM D2196	274.5 cp #3 (50,100)
4.	% Water	ASTM D1364	42.34%
5.	Stability 77°F	ASTM D1849	69 cp #3 (50,100)
6.	Stability 120°F	ASTM D1849	87 cp #3 (50,100)
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	111.5 cp #3 (50,100)
8.	Dry Time	ASTM D1640	STT: 18 min. DH: 145 min. (concrete)
9.	Color	STD 141B 4249	N/A pigmented
10.	Humidity Res.	ASTM D2247	Good
11.	Adhesion	ASTM D3359	5
12.	H_2O Cleanup	---	Difficult
13.	Appearance	---	Smooth
14.	Application Properties	---	Spray, brush-good
15.	Acc. Weathering	ASTM G23, D822	Pass
16.	H_2O Repellancy	ASTM D2921	Good
17.	Alkali Res.	STD 141B FTM TTC555	Failed
18.	VOC		1. 438.50 2. 728.28

Note: Items 12, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

LABORATORY REPORT FORM

Contract # A4 166 48

Sample No. JFN #10
Contract # A5 097 48
Date received: 7/11/86
Log No.: 711 9A-9B
Lab code: WS9
Quantity: 2 qts.
Test initiated: 7/14/86
Test completed: 12/86

Chemist: L. Kudela

Product Category: 14. Waterproofing Sealers

	Tests	Procedure	Results
1.	Total NV % Wt.	ASTM D2369	70.80%
2.	Wt. per Gallon	ASTM D1475	12.36
3.	Viscosity Cps (Brookfield)	ASTM D2196	7345 cp #6 (50,100)
4.	% Water	ASTM D1364	14.38
5.	Stability 77°F	ASTM D1849	Solidified
6.	Stability 120°F	ASTM D1849	Solidified
7.	Freeze - Thaw Res. (All H_2O Based Products)	ASTM D2243	Solidified
8.	Dry Time	ASTM D1640	STT: 15 min. DH: 110 min.
9.	Color	STD 141B 4249	N/A pigmented
10.	Humidity Res.	ASTM D2247	Pass
11.	Adhesion	ASTM D3359	5
12.	H_2O Cleanup	---	Easy
13.	Appearance	---	Smooth
14.	Application Properties	---	Brush, spray-good
15.	Acc. Weathering	ASTM G23, D822	Pass
16.	H_2O Repellancy	ASTM D2921	Good
17.	Alkali Res.	STD 141B FTM TTC555	Pass
18.	VOC		1. 219.62 2. 264.02

Note: Items 12, 13, 14 are qualitative tests.

Application properties: includes brush, roller, spray (airless, conventional) as applicable.

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