J-71

1951

1951 PAINT INDUSTRIES SHOW

Progress Report on . . .

VINYLITE

TRADE-MARK

Resins

FOR COATINGS

Featuring Latest Exposure Data On . . .

- ★ *A NEW one-package wash primer*
- ★ *Wash primer WP-1 for improved adhesion of paint films*
- ★ *Simplified maintenance systems with VINYLITE resin VAGH topcoats*
- ★ *Tough organosol metal finishes*
- ★ *High-gloss baking-type coatings based on VINYLITE resin VAGH*
- ★ *Steam-resistant systems based on VINYLITE resin VYDR for shipboard storage-tank service*

OUT DATED

BAKELITE COMPANY

A Division of

UNION CARBIDE AND CARBON CORPORATION

UCC

30 East 42nd Street, New York 17, N. Y.

The terms "BAKELITE," "FLEXOL," "VINYLITE" are registered trade-marks of Union Carbide and Carbon Corporation

Progress Report on . . .

VINYLITE

TRADE-MARK

Resins

FOR COATINGS

As Displayed at the

1951 Paint Industries Show

Atlantic City, New Jersey

October 31st to November 3rd, 1951

BAKELITE COMPANY

A Division of

UNION CARBIDE AND CARBON CORPORATION

UCC

30 East 42nd Street, New York 17, New York

PANEL DIAGRAMS*

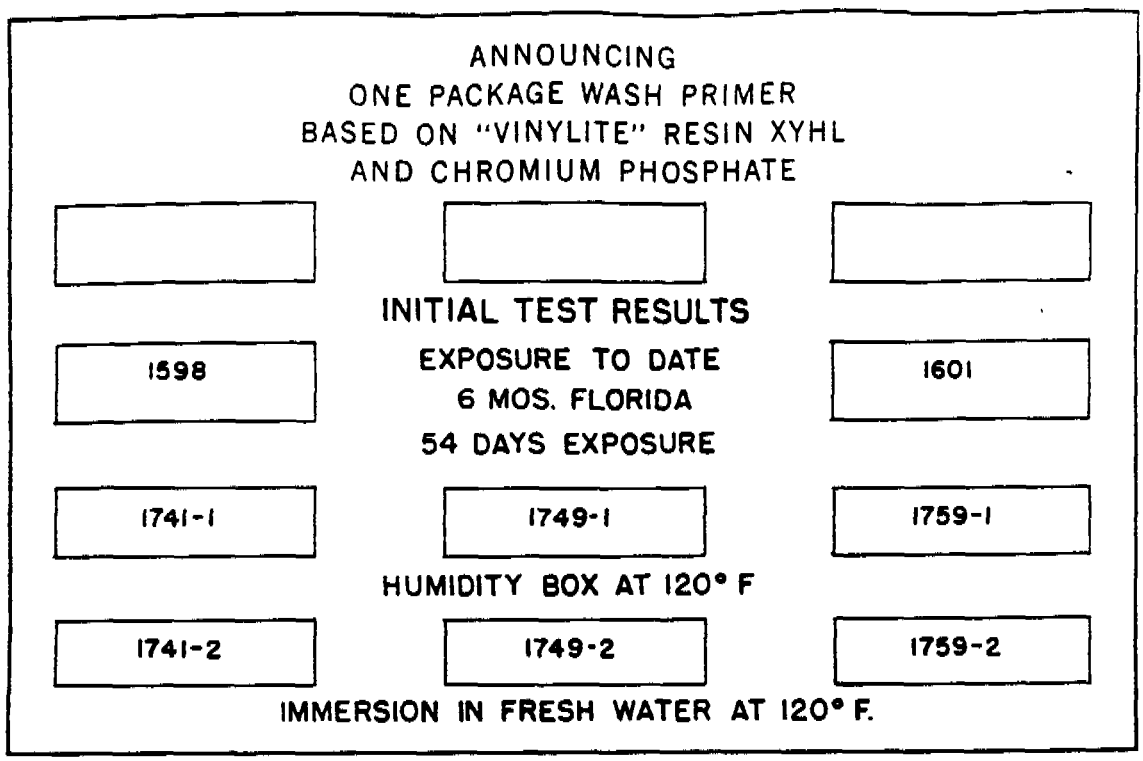


DIAGRAM A

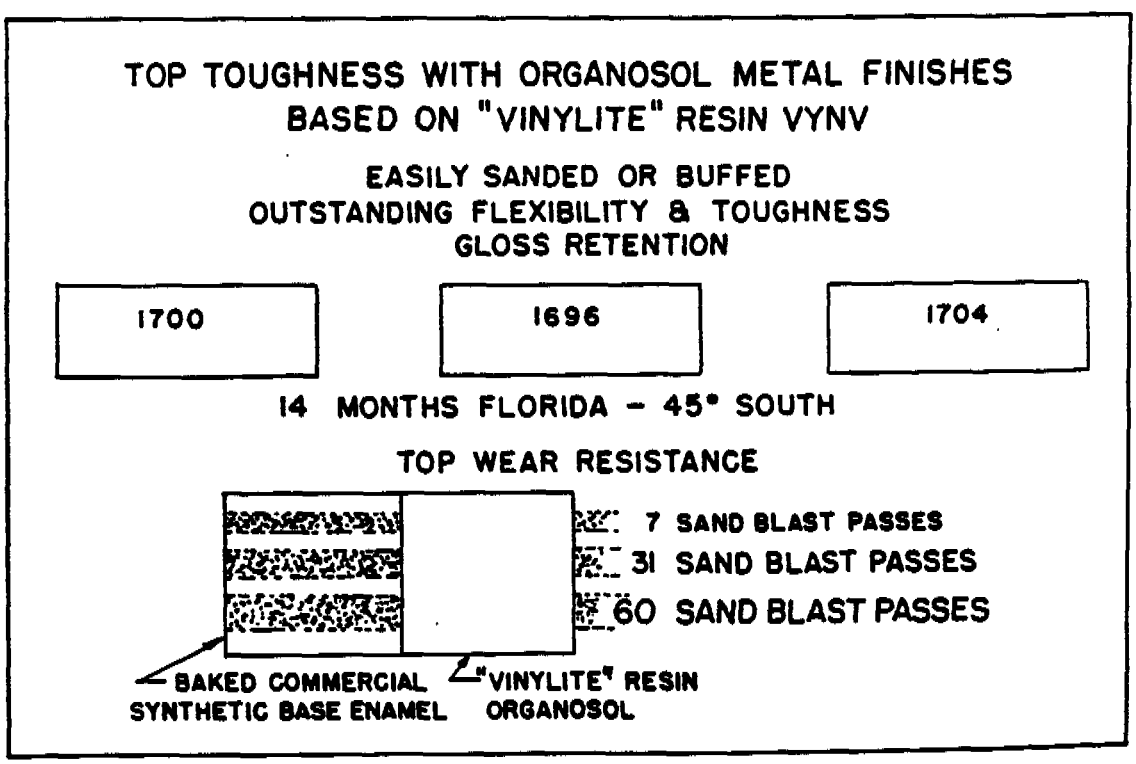


DIAGRAM C

*For data on these diagrams, please refer to: Diagram A, Page 6—Diagram B, Page 7—Diagram C, Page 9—Diagram D, Page 11

UCC
058049

1951 PAINT INDUSTRIES SHOW

SAVE THE METAL WITH WASH PRIMER WP-1
BASED ON "VINYLITE" RESIN XYHL

HALT UNDERFILM CORROSION - IMPROVE ADHESION

1644	1646	1658

EXPOSURE TO DATE - 20 MOS - FLORIDA

INSURE PROTECTION WITH
SIMPLIFIED MAINTENANCE SYSTEMS BASED ON
"VINYLITE" RESIN VAGH TOPCOAT

M-1339	PHOTO	M-1466
15 MOS. FLORIDA	PHOTO	18 MOS. FLORIDA

DIAGRAM B

MAINTAIN GLOSS WITH BAKING TYPE COATINGS
BASED ON "VINYLITE" RESIN VAGH

TOP GLOSS RETENTION

M-1717	BLUE XE 5342	WHITE XE 5344

GAIN LONG TERM SERVICE WITH COATINGS BASED ON
"VINYLITE" RESIN VYDR

MAXIMUM CHEMICAL RESISTANCE

PRIMER XE 5338 TOPCOAT XE5339	RESISTS ACIDS ALKALIES ALCOHOL GASOLINE WATER	PHOTO

DIAGRAM D

UCC
058050

WASH PRIMERS

Since its introduction a few years ago, wash primer based on VINYLITE resin XYHL has amassed an enviable series of top performance service records. The value of this system for upgrading all types of coatings has been proven, not only on laboratory exposure panels, but in large scale practical applications as well. Known generally in the trade as WP-1, this type of conditioner, based on resin XYHL and basic zinc chromate and phosphoric acid, is now being manufactured by many paint concerns and is becoming a standard coatings item where top quality and performance are needed for specific applications.

INTRODUCING – ONE-PACKAGE WASH PRIMER

(Diagram A)

Initial test results have been obtained with another wash primer formulation based on VINYLITE resin XYHL and chromium phosphate. This latest development in wash primers offers the advantage of a one-package system with excellent packaging stability, in addition to the outstanding performance of WP-1. Chromium phosphate, as used in this formulation, is being produced in experimental quantities by the National Lead Company and E. I. DuPont de Nemours.

In the exhibit, a number of display panels show the use of chromium phosphate wash primers: On three panels, the top one-inch is bare, the next 1¼-inch shows the primer, and the following ten inches show the finish. A steel and a galvanized iron panel have a gray finish (XE-5307) over this chromium phosphate wash primer. An aluminum panel has an aluminum finish (XE-5221) over the new wash primer. Steel and galvanized iron exposure panels, Nos. 1598 and 1601, show the performance of the chromium phosphate wash primer after six months Florida exposure. They are divided into three sections to test three chromium phosphate wash primers, differing in acid content only. The panels were scribed prior to exposure to increase the severity of the test. There is no evidence of corrosion or under-film creepage on these panels. The topcoat is a red lead VINYLITE resin VYHH-VAGH coating (XE-5194).

Two other sets of panels show the performance of the chromium phosphate wash primer after 54 days humidity box exposure at 120 deg. F., and 54 days fresh water immersion at 120 deg. F. These 54-day exposure panels consist of steel, No. 1741, galvanized, No. 1749, and aluminum, No. 1739, and are coated with a VINYLITE resin-aluminum topcoat (XE-5221-A).

IMPROVING ADHESION WITH WASH PRIMER WP-1

(Diagram B)

Long-term exposure of VINYLITE resin-base wash primer WP-1 is exhibited in three display panels which were tested twenty months in Florida. Here, this material serves a two-fold function, as a metal pre-treatment or conditioner acting as an excellent adhesive bond for subsequent paint films, and, in addition, provides an anti-corrosive film. As it is applied in an extremely thin film of approximately 0.1 to 0.3 mils, it supplements, but does not entirely replace, the anti-corrosive primer or intermediate coats which are used under severe corrosive conditions, and is most aptly described as a metal conditioner.

Two panels in the exhibit are compared to show the effect of WP-1 in improving the adhesion of a phenolic dispersion resin primer to aluminum. One panel, No. 1644, has no pre-treatment, while the other, No. 1646, is pre-treated with WP-1. The topcoat is a commercial alkyd. A third panel of steel, No. 1658, also exposed for 20 months, shows the improvement in adhesion and prevention of underfilm corrosion obtainable through the use of WP-1 as a metal pre-treatment.

DOUBLE PROTECTION WITH "VINYLITE" RESIN VAGH TOPCOAT

(Diagram B)

Double protection is assured with simplified maintenance systems which use wash primer in conjunction with VINYLITE resin VAGH topcoat. One panel on exhibit, No. M-1339, shows the performance of wash primer after fifteen months exposure in Florida. The topcoat has excellent freedom from chalking and discoloration in a red lead topcoat which is attributed to the use of "Flexol" plasticizer TWS. Another panel, No. M-1466 shows the wash primer with a VINYLITE resin VMCH and VAGH topcoat after 18 months exposure. The formulation data for these panels is as follows:

Panel No. M-1339
15 Months—Florida Exposure Panel:

Resin VAGH	10.7
Resin VYHH	4.3
Red Lead	22.5
FLEXOL Plasticizer TWS	3.0
Methyl Isobutyl Ketone	30.0
Toluene	29.5
Total parts by weight	**100.0**

Panel No. M-1466
18 Months—Florida Exposure Panel:

Resin VAGH	17.7
Aluminum Powder	7.1
Methyl Isobutyl Ketone	35.4
Toluene	35.4
Tricresyl Phosphate	4.4
Total parts by weight	**100.0**

The data for the formulations mentioned here are as follows:

	XE-5221-A	XE-5307	XE-5194
Red Lead	...	...	22.5
Sublimed blue lead	...	22.0	...
Standard lining aluminum powder	6.7	...	...
Resin VAGH	7.5	15.0	10.7
Resin VYHH	...	...	4.3
Resin VMCH	7.5	...	...
Tricresyl phosphate	1.5	1.5	3.0
FLEXOL Plasticizer TWS	...	1.5	...
Toluene	38.4	30.0	22.6
Methyl Isobutyl Ketone	38.4	30.0	36.9
Total parts by weight	100.0	100.0	100.0

TOPS IN TOUGHNESS WITH ORGANOSOL METAL FINISHES

(Diagram C)

Toughness, high solids, low thinner coats, fast solvent release, and surface effects are widely recognized attributes of organosol finishes based on VINYLITE Resin VYNV. These finishes are also known for their good gloss retention, and are easily sanded or buffed.

Panels on display show organosol metal finishes exposed fourteen months at 45 degrees south in Florida. These panels, Nos. 1700, 1696, and 1704, show the extreme toughness of these finishes and their high gloss retention. The finishes were pigmented with carbon black, cadmium red and titanium dioxide-antimony oxide.

The adhesion of organosols to metals is developed by modification with resin VAGH and application over wash primer WP-1.

The VAGH resin content was kept at 25 per cent of the VYNV. 1 resin weight, as was the plasticizer content, with one exception where the plasticizer content was increased to 43 per cent. All finishes were applied

over WP-1 wash primer and buffed with a lamb's wool wheel after partial fusion. The buffed finishes were fused 30 minutes at 350 deg. F.

On solids content the systems were:

	No. 1696	No. 1700	No. 1704
R-610 Timonox	...	...	40.5
Cadmium Red	16.2	...	...
Cadmium Yellow	...	...	...
Monastral Blue	...	...	...
Monastral Green	...	...	...
Carbon Black	...	5.0	...
Aluminum Flake	...	...	...
Resin VYNV. 1	100.0	100.0	100.0
Resin VAGH	25.0	25.0	25.0
FLEXOL Plasticizer DOP	25.0	25.0	43.7
Stabilizer A-5	2.0	2.0	2.0

After 14 months' exposure the red, black and white finishes show good weathering properties.

Furthermore, these panels show the unusual freedom from dirt collection and ease of cleaning characteristic with VINYLITE resin coatings. These panels have not been cleaned since exposure except for a small strip on the right side of the panel which was wiped each month for rating. In the case of the red panel, it is impossible to discern any difference between the wiped and unwiped areas.

TOPS IN WEAR RESISTANCE WITH ORGANOSOL METAL FINISHES

(Diagram C)

The exceptional abrasion resistance of VINYLITE resin coatings has come to be one of the familiar hallmarks of these materials. The actual comparative abrasion resistance is shown very strikingly by a panel which has been sandblasted, using a conventional sandblasting apparatus. This panel in the exhibit compares a baked VINYLITE resin organosol metal finish with a baked com-

mercial synthetic base enamel. The organosol finish was applied over metal conditioner WP-1 while the synthetic enamel was applied over a conventional primer-surfacer. Total film thickness in each case was 5 mils and each system was baked under the recommended optimum conditions. The effect of the sandblasting is shown by the paths made across the panel by multiple passes of the sandblasting nozzle. It is noted that 31 passes completely remove the synthetic enamel whereas 60 passes have not penetrated the VINYLITE resin coating.

HIGH-GLOSS BAKING—TYPE COATINGS WITH "VINYLITE" RESIN VAGH

(Diagram D)

Baking type coatings based on VINYLITE resin VAGH have high initial gloss, exceptional gloss retention, and freedom from chalking. The panels shown in the display have been modified with epoxy and urea formaldehyde resins, and show the good natural gloss and smoothness obtained with this system over conventional primer surfaces. One panel, No. M-1717 exposed fourteen months in Florida at 45 degrees south shows excellent gloss retention, relatively little bronzing in a phthalocyanine blue composition, and freedom from chalking.

Compositions of the top coatings are:

	M-1717	XE-5342	XE-5344
Phthalocyanine blue	1.4	1.4	...
Titanium dioxide	1.2	...	13.9
Resin VAGH	15.1	14.0	12.6
BAKELITE Resin RR-18774	4.5	4.2	3.8
FLEXOL Plasticizer DOP	2.2	2.1	1.9
Urea formaldehyde resin	4.5	4.2	3.8
Nondrying alkyd resin	2.2	2.1	1.9
Thinner	68.4	71.0	62.1
Primer	Baked Commercial Automotive Type		
Topcoat Bake	30 Minutes at 300°F.		

"VINYLITE" RESIN VYDR
FOR MAXIMUM CHEMICAL RESISTANCE

(Diagram D)

Long-term service coatings, based on VINYLITE resin VYDR, have excellent chemical resistance and adhesion and are especially useful in shipboard liquid storage-tank applications where frequent cleaning with either steam or hot water is required. A panel on display shows a type of air-dry finish, based on VINYLITE resin VYDR, which has withstood steam cleaning. The system is as follows:

Primer XE-5338

Resin VYHH	1.10
Resin VMCH	6.72
Resin VYDR	5.30
Lead Chromate	5.72
FLEXOL plasticizer DOP	0.51
Tricresyl phosphate	2.40
Methyl Isobutyl Ketone	17.11
Toluene	13.44
Cyclohexanone	23.85
Methyl Ethyl Ketone	23.85
Total parts by weight	**100.00**

Topcoat XE-5339

Resin VYDR	10
Standard Lining Aluminum Powder	4
Methyl Ethyl Ketone	43
Cyclohexanone	43
Total parts by weight	**100**

In the preparation of Primer XE-5338, the lead chromate pigment, was

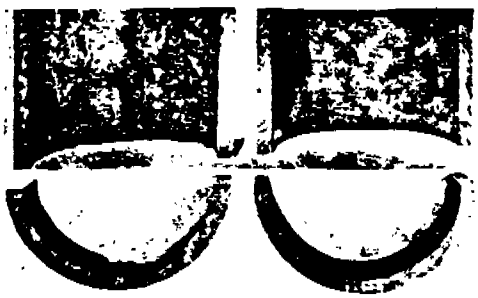
dispersed in VINYLITE resin VYHH on a two-roll mill in the following proportions:

Resin VYHH	15
Lead Chromate	78
FLEXOL plasticizer DOP	7
Total parts by weight	**100**

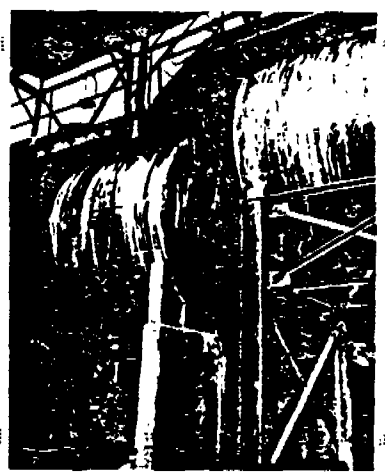
with 70 parts of the resulting chip being dissolved in 30 parts of methyl isobutyl ketone.

The pigment paste was dispersed in a solution of 10 parts of VINYLITE resin VYDR in equal parts of cyclohexanone and methyl ethyl ketone. VINYLITE resin VMCH is introduced from a 20% solution in equal parts of methyl isobutyl ketone and toluene which is added to the VYDR-VYHH mixture just prior to application to forestall gelation. If a spray application is desired, it is thinned with equal parts of cyclohexanone and methyl ethyl ketone. The same mixture is used to thin the topcoat if application by spray is required.

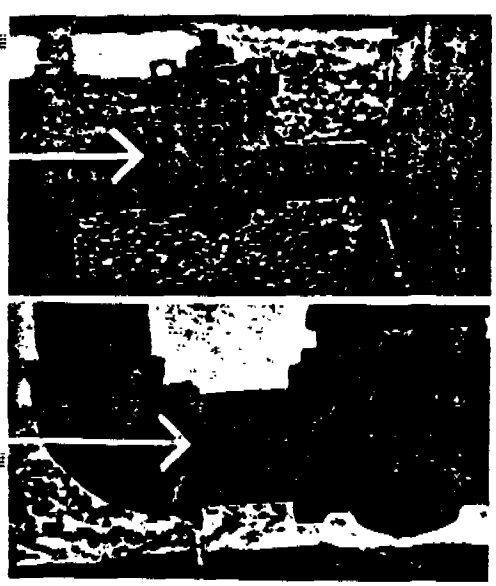
SERVICE RECORDS SHOW DEP E
C atings based on



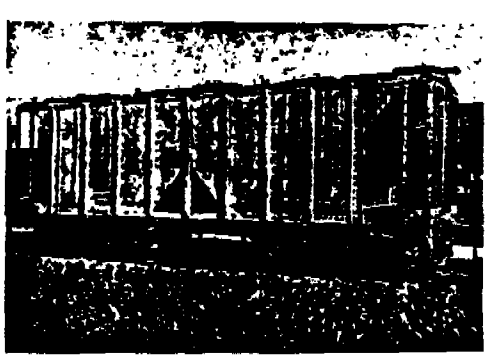
These pipe sections were removed from an oil well after five months service, during which they were exposed every 24 hours to a flow of 100 barrels of oil and 5,000 barrels of salt water. The pipe at right, coated with a VINYLITE resin-based system, shows no corrosion or wear despite these severe service conditions. The uncoated pipe at left was corroded as deeply as one-quarter inch by salt water.



This sulfuric acid tank is maintained at a temperature of 90 to 100 deg. F. After a year's service, considerable spillage is shown, but the coating based on VINYLITE resins and the undersurface are unharmed.



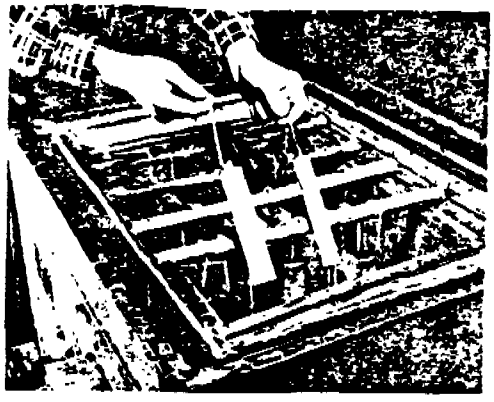
These plug valves and connectors (marked by arrows) in Texas oil field flow lines were installed to carry salt water and basic sediment from storage tanks. The uncoated metal sprang leaks in two months. The coated metal shows no appreciable corrosion after more than two years.

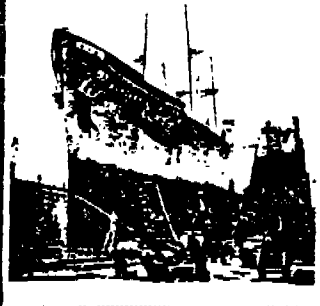


This hopper car, finished with a coating based on VINYLITE resins, remained free from corrosion after more than three years of hauling cement and soda ash which quickly destroys ordinary car coatings. It also remained unharmed despite frequent pounding with sledge hammers to loosen up cargoes.

NDABLE PERFORMANCE OF /INYLITE Resins . . .

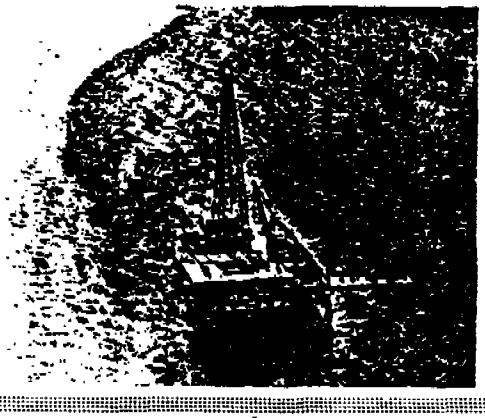
This photo shows the results of tests run on right wall steel tubing used for outdoor structures such as television antenna masts which require tough, all-weather resistance coating. The tubing at right is electro-galvanized tubing subjected to ASTM salt spray test for 175 hours. The tube at left, protected by a VINYLITE resin base coating is unaffected after 801 hours under the same test conditions. Such VINYLITE resin-coated tubes have withstood 2,000 hours of salt spray tests, and accelerated weather tests equal to five years in the open without failure.

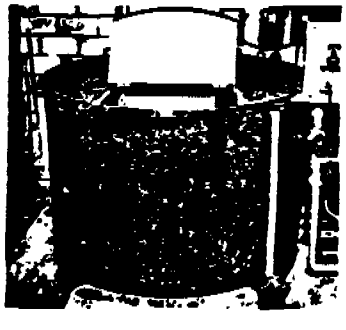




The ship's rudder shown here [illegible]ed on the left with a common paint system and, on the right with a system based on VINYLITE resins. After two years, the ordinary system requires full refinishing; the VINYLITE resin system is virtually intact. Such vinyl systems protect large seagoing vessels from both corrosion and fouling.

VINYLITE resin-base coatings which protect off-shore drilling rigs in the Gulf of Mexico remain intact after years of exposure, to corrosive attacks by sea water, crude oil, air, sunlight, buffeting of debris in pounding seas, and repeated scraping contact with small boats.





Oil field water treating tank for solution containing 7 per cent caustic soda and 2.3 per cent Calgon. After 12 months of 24-hour-a-day service, coating based on VINYLITE resins shows no failure.

Technical Assistance

Representatives of Bakelite Company are at your service to discuss all aspects of this exhibit and assist you with your particular coating problems.

BAKELITE COMPANY

A DIVISION OF

UNION CARBIDE AND CARBON CORPORATION

UCC

30 East 42nd Street, New York 17, N. Y.

Coating and Adhesive Materials Division

DISTRICT SALES OFFICES

California
1709 West 8th Street, Los Angeles 14
22 Battery Street, San Francisco

Connecticut
410 Asylum Street, Hartford 3

Illinois
230 North Michigan Avenue, Chicago 1

Massachusetts
734 Statler Office Building
20 Providence Street, Boston 16

Michigan
807 Stephenson Building, Detroit 2

New York
30 East 42nd Street, New York 17

Pennsylvania
1649 No. Broad Street, Philadelphia
311 Ross Street, Pittsburgh 19

Printed in U.S.