White Lead Adds Durability To Today's House Paints

The painted surface of this house exhibits a charm and beauty that no other surface treatment can achieve. White lead in the paint provides durability.

THE function of a house paint is two-fold, first to provide an exterior surface that will add charm and beauty to the home. Secondly, and more important, to provide a protective barrier that will isolate the construction surface from the ravages of weather through many seasons.

Almost any paint will meet the first requirement initially but only the best paints will remain beautiful for long periods of time and meet the second requirement, too. Generally speaking, those paints with excellent weathering properties will have a high proportion of white lead in the formulation.

The accompanying photographs of the home of William R. Bradley, of Tenafly, N. J., which was painted recently with a white lead-titanium dioxide paint (the complete formulation appears elsewhere in this article), certainly exhibits a charm and beauty that no other surface treatment can achieve. Unseen of course is the durability that has been built into the paint, durability that will withstand the seasonal extremes of heat and cold that prevail in that particular section of the country.

One of the major advantages of white lead in paint is the fact that it imparts high water resistance to the paint film. It is undoubtedly this property that prompted the following statement made by the Forest Products Laboratory, Madison, Wis., "Paints of the titanium-lead type are non-sensitive to moisture and therefore blister resistant." This quotation was taken from their 1956 publication entitled "Wood Siding, How to Install It, Paint It, Care for It."

WHITE LEAD-TITANIUM DIOXIDE HOUSE PAINT

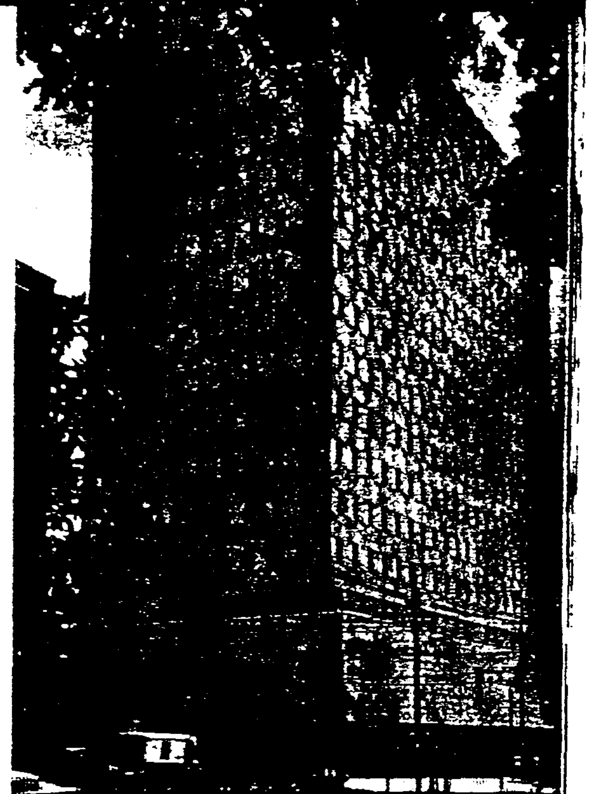
		In Per Cent By Weight
Pigment:		
Basic Carbonate White Lead		85.0
Titanium Dioxide		15.0
		100.0
Vehicle:		
Linseed Oil		80.0
Thinner and Dryer		20.0
		100.0
Pigment	65%	
Vehicle	35%	

In addition to water resistance, white lead imparts many other just as desirable characteristics to an exterior house paint, far more than any other pigment. White lead, being an active pigment, reacts with the oil in the vehicle to form lead soaps that reinforce the paint film and increases its flexibility and elastic strength. These lead soaps also serve as plasticizers in that they prevent embrittlement of the paint film, an occurrence that will generally lead to early breakdown.

These advantages of white lead result in long-term protection and good appearance throughout the life of the paint. An evenly weathered unbroken surface ideally suited for repainting is another result that can be expected when white lead or a high white lead content paint is used.

The ready-mixed lead-titanium paint being applied here has high hiding power with long, dependable, weather resisting wear.

Flexible Lead Plumbing Connections Are Used Widely



The Wachovia Bank & Trust Building in Charlotte, N. C. has flexible lead stubs connecting the wall-hung water closets to the rigid drain lines. Harrison and Abramovitz of New York and A. G. O'Dell of Charlotte, are the architects.

THE plumbing specifications in two entirely different types of commercial buildings, the Wachovia Bank & Trust Co. Building in Charlotte, N. C., and the Fairview Shopping Center in Decatur, Ill., include the use of flexible lead connections between the rigid piping system and the water closets.

In the first instance, wall-hung fixtures are being used and in the second, the more conventional floor type is being installed. In either case, lead is the one material above all others that is almost universally accepted for such connections by architects, builders and plumbing contractors.

There are of course many good reasons why this is so and among these is lead's flexibility. A property of lead that permits it to absorb any strains or stresses that may be set up by uneven building settlement, vibration or differential expansion and contraction without damage to itself, the fixture or the rigid drain.

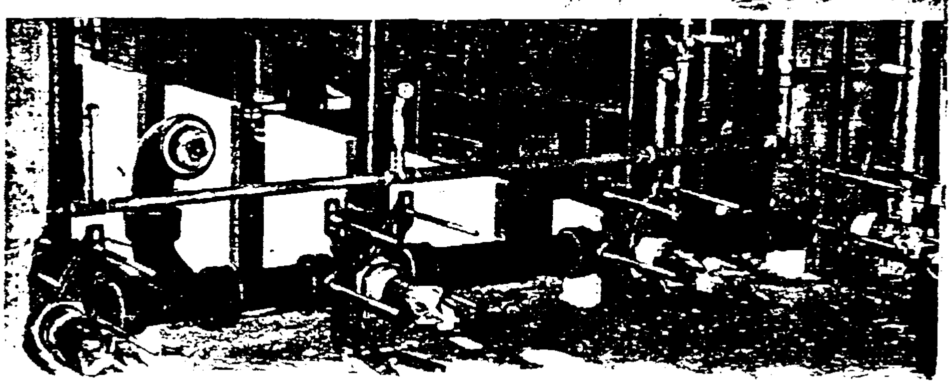
The Wachovia Bank & Trust Building, designed by Harrison & Abramovitz, New York, and A. G. O'Dell of Charlotte, N. C., is 15 stories high of concrete slab construction. The plumbing system includes wall-hung water closets in all toilet rooms with flexible lead stubs connecting the fixtures to the cast-iron drains. Jaros, Baum & Bolles of New York are the consulting engineers and A. Z. Price & Associates are the plumbing contractors.

In the Fairview Shopping Center, Decatur, Ill., the plumbing system is quite extensive and spread over a considerable area in this one- and two-story type structure. Geo. S. Walker, Inc. of Decatur, Ill., is installing flexible lead stubs under the water closets. Because of the type of construction, 40 plumbing vent stacks protrude through the roofs and to assure water-tightness at these vulnerable points, lead flashings are being installed. These vent stack flashings are being prefabricated from 4-lb. sheet lead in the shop on the construction site.

Similar lead vent stack flashings are also being installed on the Wachovia Bank & Trust Building.

As exemplified by these two jobs, the widespread acceptance of lead for specific and generally critical areas is due to the inherent qualities of lead. For flashing purposes, lead is flexible and non-staining, water running over the lead onto brick or painted surfaces will not stain these surfaces with its own corrosion products. Also, the insoluble gray patina formed on the lead upon exposure to the atmosphere will blend pleasingly with any color scheme.

Journeyman Obum completes the wiping of the lead stubs for the water closet connections in the Fairfield Shopping Center, Decatur, Ill. A lead vent stack flashing is shown in the foreground.



The roughing-in for one of the toilet rooms in the Wachovia Bank building, Charlotte, N. C., and a close-up of the lead stub and chair at right.

New Rechargeable Lead Dry Cell Battery Developed

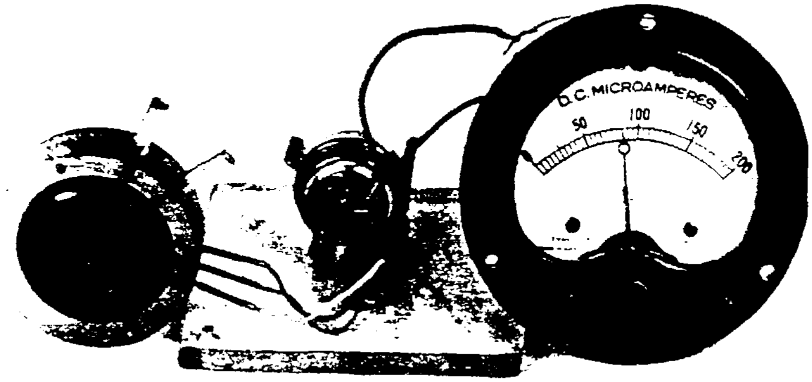
A "LEAD dry cell" battery having a completely reversible electrochemical system which does not gas on charging and is therefore practically indestructible, has been developed by scientists Monroe B. Goldberg and Herbert B. Reed at the Naval Ordnance Laboratory at Silver Spring, Md., to power miniature electronic circuits of the jet and missile age.

Simple in construction and readily adapted to mass production, a fact attested to by a 4-hr. 3500-unit experimental production run at a leading manufacturer's establishment, the new battery (XA-10B) was built primarily to power recently developed electrochemical control units (Solions) used in the "brains" of underwater mines. However it is just as readily adaptable for use in transistor circuits of hearing aids, walkie-talkie transceivers, air navigation systems and portable radios.

The "mighty midget" delivers 9/10 of a volt of power as compared to the 1½-volt output of the commonplace type of dry cell. But its many advantages more than offset this voltage difference. Cell capacity is rated at 1½-ampere hours and banks of them can be hooked up in series or parallel circuits with the aid of simple plastic plates containing electrical contacts that slide over the faces of the battery under slight pressure. Circuits of considerable voltage and amperage are built up in this manner. Charging is accomplished with a battery charger having a voltage regulator capable of limiting a charge current to the requirements of the battery. Such a battery charger can be readily plugged into regular commercial house wiring.

The battery's anode is composed of consolidated Grenox or lead-lead oxide. The cathode is composed of consolidated silver powder. When the cell is charged at 1.12 ± 0.03 volts the silver cathode is converted to silver oxide, Ag_2O, and the lead-lead monoxide anode is converted to metallic lead. A Synpor barrier separates the potassium hydroxide electrolyte from the cathode. The electrolyte itself is contained in 5 thin Dynel absorber pads placed in a pile between the Synpor barrier and the anode. The assembly is pressure sealed with a Neoprene grommet which also serves as external insulation between the cathode and anode.

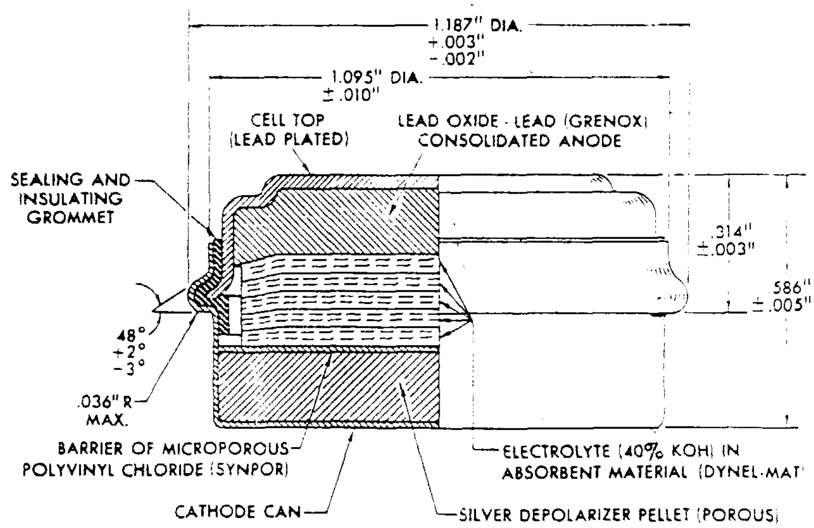
One of the principal advantages the



A puff of air on the Solion at the left powered by a new rechargeable "lead dry cell," center, could push iodine ions against delicate electrodes to cause a surge of electricity detectable by the meter on the right. In combination both the Solion and "lead dry cell" can be used for various military hardware items, among them inertial guidance systems for missiles where changes in direction cause changes in acceleration or pressure in the Solion fluids.

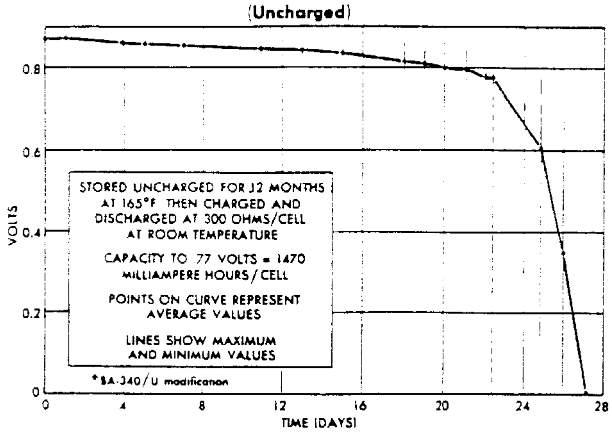
The new dry cell shown below with the vastly larger conventional type weighs 40 grams as compared with 95 grams for the flashlight battery. Producing 9/10 of a volt at 1½ amperes, gram for gram, the new battery equals its predecessor in electrical capacity.

XA-10B DRY BATTERY

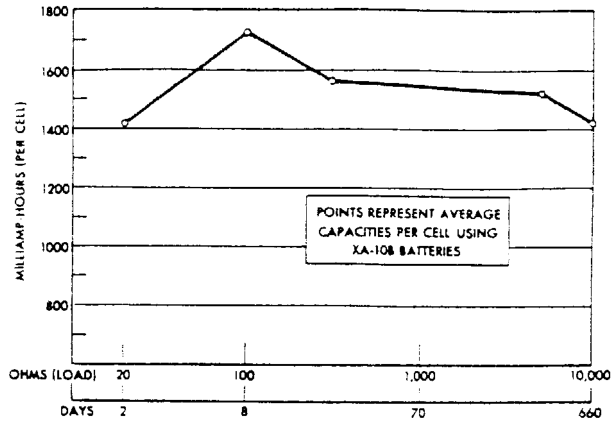


LIA26118

X-10B BATTERY*
DISCHARGE AFTER 12 MONTHS STORAGE AT 165°F
(Uncharged)



XA-10B BATTERY
VARIATION OF CAPACITY WITH RATE OF DISCHARGE



new battery possesses is its long-term storageability as evidenced by its indefinite shelf life in the uncharged state. Even after years of use its capacity is not greatly affected by repeated recharging over long periods of time. It is found particularly high in shock and vibration resistance and its temperature resistance is believed noteworthy, particularly in temperatures as low as −65° F. On the plus side of the temperature scale the battery has shown the same capacity after 12 months' storage at 165° F.

The above characteristics and advantages far outweigh weight (1½ oz.) and cost considerations. No actual cost figures have been developed but it is believed that costs would be about 50 per cent higher than a Mercury battery (the competitor in its field) when mass produced. Amperage - voltage - temperature considerations, however, give the new battery a decided advantage over the Mercury type.

The dry battery released for use to the general public under federally-owned patent number 2,697,736 is a noteworthy addition to the "lead in the battery" family which up to now had as its conspicuous member, the wet lead-acid cell.

Editor's Note — There was a presentation of a pertinent paper titled "A Unique Dry Battery" by H. B. Reed, Jr., and M. B. Goldberg at the Buffalo Meeting of The Electrochemical Society as part of the Unconventional Electrochemical Systems For Batteries session on Tuesday, Oct. 8, 1957.

Lead—Impervious Interliner For Chemical Plant Floors

HOW to contain corrosive spillage on the upper floor of a chemical process building or to convey it in deliberate, safe and efficient manner to drainage without damage to the concrete floor slab or building was a problem solved and implemented by lead-acid brick floor construction.

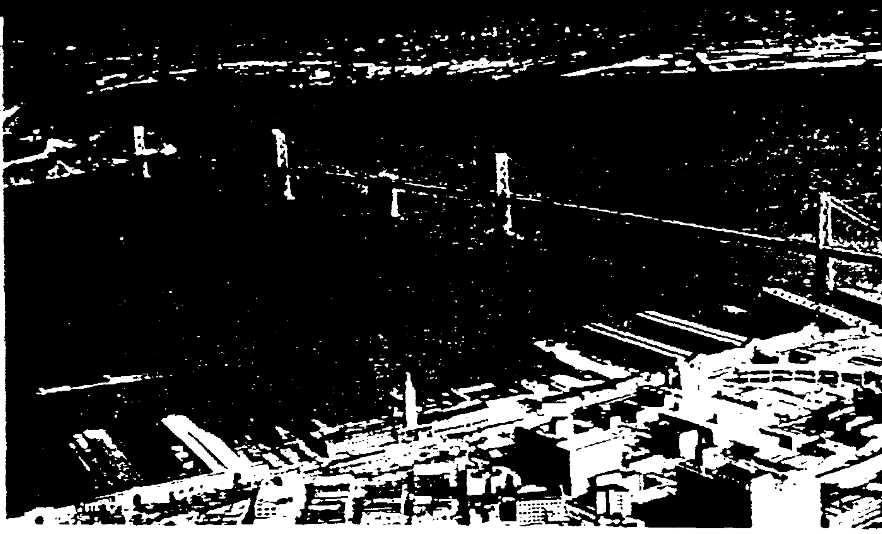
The floor in question, the cell room of the peroxide plant of Pennsalt Chemicals Corp. at Wyandotte, Mich., was subject to corrosive spillage of sulphurous and sulphuric acids, a combination representing a more severe oxidizing condition than is normally encountered with sulphurous or sulphuric acid alone. The answer to this corrosion problem was obviously in terms of lead.

How to protect lead from mechanical or physical damage attendant with any floor material, where its imperviousness is to be maintained, was answered by acid-resisting brick installed over sheet lead using compatible Pennsalt Asplit Cement on the bottom of the brick, next to the lead, and on the sides of the brick.

How to prepare the concrete floor for the above construction was answered in terms of lead-based paint used for chemical and physical compatability. The paint coat presented a clean, noncorrosive surface to sheet lead burned to cover a floor area sloping more than ¼ in. per ft. and connected to drains.

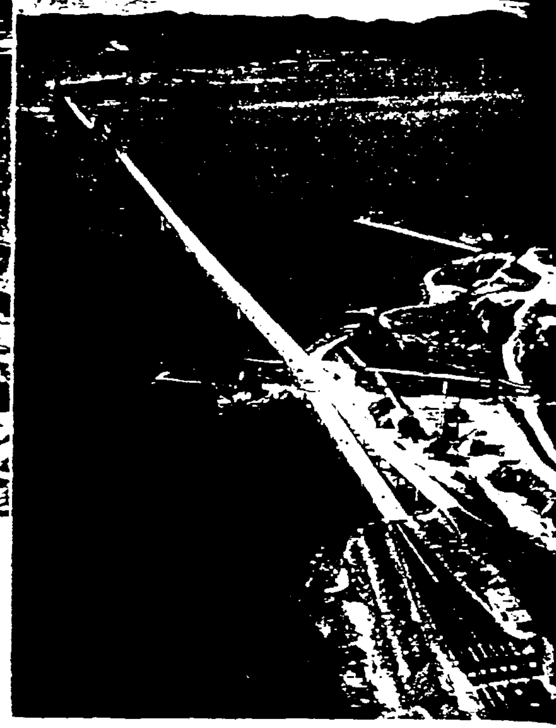
The result — the concrete floors which would have completely disintegrated under existing conditions in a few months were at last report, recently, giving continued, trouble-free service for a period of over ten years.

A view of the 10-year-old floor in the cell room of the peroxide plant of Pennsalt Chemicals Corp. at Wyandotte, Mich., where lead-acid brick floor construction has been used to good advantage.



Photos by: Calif. Dept of Public Works, Division of Highways

The cantilever span of the San Francisco-Oakland Bay Bridge, shown in the background, is the longest of its type in the United States. Maintenance painting practice on this bridge relies heavily on red lead.



The newest of the San Francisco Bay bridges, the Richmond-San Rafael Bridge, has two coats of red lead paint to protect the steel work against corrosion.

San Francisco Bay Bridges Rely On Red Lead Paint

THE San Francisco Bay area, one of the world's major deep sea ports, is crisscrossed by a variety of beautifully designed highway bridges, two of which hold the record as the longest of their type.

The Golden Gate Bridge, opened in 1937, has the world's longest single suspension span, 4,200 ft., exceeding that of the new Straits of Mackinac Bridge by 400 ft. and New York's George Washington Bridge by 700 ft.

The second of these record holders is the San Francisco - Oakland Bay Bridge, opened in 1936, with a cantilever span of 1,400 ft., longest in the United States. In addition, this bridge has six suspension spans, two 2,310 ft. long, about the fifth longest in the country, and four other suspension spans of 1,160 ft.

The newest of the San Francisco area bridges, opened to traffic in September, 1956, is the Richmond - San Rafael Bridge, connecting these two important communities in the area. This bridge has two cantilever spans and with the approaches is 21,343 ft. long.

The Golden Gate Bridge is operated by the Golden Gate Bridge and Highway District. The San Francisco-Oakland Bay and the Richmond-San Rafael bridges are under the supervision of the California State Department of Public Works, Division of Highways, Howard C. Wood, principal bridge engineer and C. S. Hamilton, assistant bridge engineer.

CALIFORNIA DIVISION OF HIGHWAYS — PAINT SPECIFICATIONS

52-G-53. RED LEAD, SEMI-QUICK DRYING PRIMER

Pigment:	*Lb./100 Gal.*
Red Lead	1,566
Aluminum Stearate	6
Vehicle:	
Raw Linseed Oil	160
Alkyd Solution*	307
Drier, Lead	16
Drier, Cobalt	6
Thinner	92
Pigment (per cent by weight)	73 min.
Vehicle (per cent by weight)	27 max.
Weight per gallon (pounds)	21.5 min.
Drying time: Set to touch	4 hr.
For recoating	18 hr.

* Federal Specification TT-R-266, Type III, except that the oil content shall be linseed oil fatty acids.

52-G-60. RED LEAD-LINSEED OIL PRIMER

Pigment:	*Lb./100 Gal.*
Red Lead	2,260
Vehicle:	
Raw Linseed Oil	445
Drier, Lead	14
Drier, Manganese	5
Drier, Cobalt	2
Thinner	62
Pigment (per cent by weight)	81
Vehicle (per cent by weight)	19
Weight per gallon (pounds)	27.8
Drying time (hours)	24 max.

52-G-61. SECOND COAT, RED LEAD-LINSEED OIL

Pigment:	*Lb./100 Gal.*
Red Lead	1,883
Carbon Black	4
Vehicle:	
Raw Linseed Oil	490
Drier, Lead	13
Drier, Manganese	3
Drier, Cobalt	1
Thinner	55
Pigment (per cent by weight)	77 min.
Vehicle (per cent by weight)	23 max.
Weight per gallon (pounds)	24.4
Drying time (hours)	24 max.

Despite the varying types of construction of these San Francisco area bridges, they have one thing in common and that is their reliance on red lead paint to protect the exposed steel work against corrosion.

The red lead primer paint formulation used on the Golden Gate Bridge accompanies the text. The topcoat is International Orange, the pigment of which is composed of molybdate orange, toluidine red, titanium dioxide, carbon black and barium sulphate. The molybdate orange used in this paint is a complex lead molybdate and lead chromate pigment, a brilliant orange-red pigment of good color permanency with high hiding power and excellent durability.

On the San Francisco-Oakland Bay Bridge, the engineers have developed through experience a paint maintenance program for the care and preservation of the bridge structure that has provided the protection required on over 16,000,000 sq. ft. of steel surface area. Red lead paint is an important part of this maintenance program and their experience has also indicated that preparation of the surface is of great importance.

GOLDEN GATE BRIDGE
GG-1-56, PRIMER PAINT SPECIFICATION

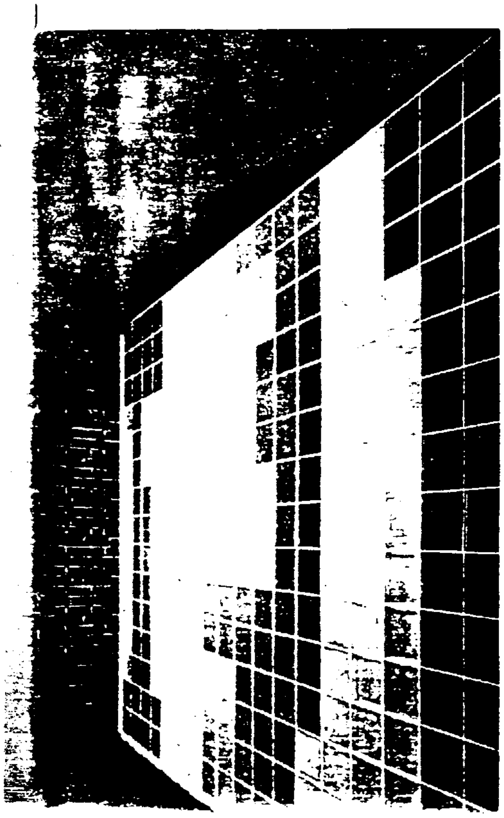
	Per Cent By Weight ($\pm$ 2.5)
Pigment:	
Red Lead (95% grade Min.)	75.0
Iron Oxide (75% Fe_2O_3 Min.)	25.0
	100.0
Vehicle:	
Linseed Oil and Synthetic Resin	80.6
Drier and Thinner	19.4
	100.0
Pigment (per cent by weight)	80.0 $\pm$ 2.5
Vehicle (per cent by weight)	20.0 $\pm$ 2.5
Weight per gallon (pounds)	23.5
Drying time (ready for recoating)	18 hours

The first step in their repainting program is the removal by steam cleaning to which a detergent has been added, all dirt, grease, loose chalky paint, salt spray, fume deposits and other foreign material which has accumulated on the previously painted surface. The next step is the removal of all loose rust and paint by spot sandblasting. However, if over 50 per cent of the surface is badly deteriorated or is breaking down generally, then sandblasting of the entire area is performed. In this connection the engineers have found that for optimum paint life, only that much area be treated as can be sandblasted and primed with red lead the same day. Four coats of paint are then applied to the surfaces thus prepared.

The first or priming coat is a red lead-linseed oil paint, California Specification 52-G-60, or a faster drying red lead-oil, alkyd paint, 52-G-53, followed by a second spot coat of red lead-linseed oil paint, 52-G-61. The third coat is a half-and-half mixture of the first and second coat materials and is applied solidly over all areas previously painted. The top or finish coat is an aluminum paint.

The painting of the newest of the San Francisco area bridges, the Richmond-San Rafael Bridge also followed the practice of the California State Department of Public Works, Division of Highways. A three-coat system was used with a red lead-linseed oil paint, California State Specification 52-G-60, used as a primer, followed by a red lead field coat, 52-G-61. The top coat was aluminum.

Color Now Added To Glass Building Blocks



A PRACTICAL and unique application of ceramic decorating colors to glass construction blocks has just been announced by the Pittsburgh Corning Corp. This new application of color on what has been up to now a utilitarian product should enhance its value and usefulness to the building industry. These new color glass blocks will permit the entry of diffused light supplemented by the effect of glowing color and provide the architect and builder with a colorful new design tool for either exterior curtain walls or interior partitions.

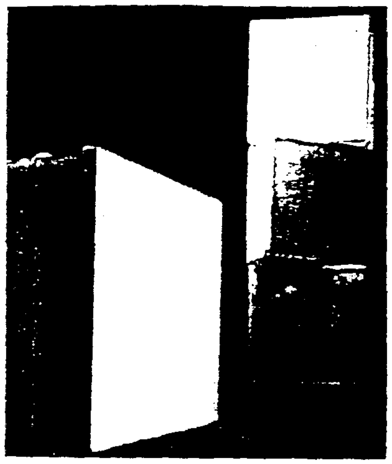
The colors, blue, green, yellow and coral, are applied to one face of the glass blocks which, with the color ap-

Exterior view, at left, and interior view of same wall built of the new colorful ceramic decorated glass blocks. The color finish is translucent and permanent.

plied, are translucent with a median light transmission range of about 25 per cent. The average thickness of the leaded ceramic color is 0.005 in. and the finish has a semigloss or "satin" appearance. They are currently available in the 8-in. square size.

The color finish is permanent, with no significant fading after long-term exposure to sunlight, and is as scratch and abrasive resistant as the basic glass. Also, the finish has the same thermal expansion characteristics as the glass block face, thus eliminating the possibility of any "crazing" or spontaneous chipping through temperature differentials. Further the glass enamel finish, which contains a substantial amount of lead oxide, is resistant to sulphurous atmospheres, water, chemical detergents, mild acids, and the mildly alkaline wash resulting from mortar joints leaching when exposed to the weather.

The glass color blocks in blue, green, yellow and coral are available in the 8-in square size.



To produce the permanent finish, which in effect becomes a part of the glass itself, the block is sprayed with a high lead content glass decorating enamel and sent through a continuous furnace, where they are preheated and then fired for 10 minutes at 1,040 deg. F., at which point the enamel melts and fuses to the base glass. It is then annealed for about 1½ hours.

Other uses for these leaded glass enamels include returnable beverage bottles, cosmetic containers, tumblers, lighting goods and gift glassware.

The following articles and reprints contain information, drawings and specifications on the use of lead products helpful to architects, engineers and others interested. They are available free of charge except where otherwise indicated, upon request to the LEAD INDUSTRIES ASSOCIATION, 60 EAST 42nd STREET, NEW YORK 17, N. Y.

MATERIALS OF CHEMICAL CONSTRUCTION ANNUAL REVIEWS — LEAD AND LEAD ALLOYS

Lead and lead alloys in chemical construction including research progress, engineering applications, and technological advancements. With bibliography. 1956 and 1955 reviews (editions are not cumulative) available. Reprinted from "Industrial and Engineering Chemistry," September, 1956 and September, 1955.

LEAD REFERENCE SHEET (Parts 1 & 2)

A short outline of the types, grades, and chemical and physical properties of lead in chemical construction, with a summary of the corrosion characteristics of lead in use with a large number of common chemicals and solutions used in various industries. Reprinted from "Chemical Engineering Progress," January and February, 1955.

INSPECTING LEAD LININGS

Latest methods of testing and inspecting sheet lead and bonded lead linings used in the chemical process industries are described. Reprinted from "Chemical Engineering," November, 1956.

BEST DESIGNS FOR LEAD INSTALLATIONS

A special report on the applications of lead and lead alloys in the chemical and metallurgical industries. Recommended practice for joining lead sheets, and the construction of wood stave tanks, launders, towers and flues where lead is involved are included. Reprinted from "Chemical Engineering," March, April and May, 1956.

PORTABLE RADIATION SHIELDING MATERIALS

A special report on commercially available shielding forms that can be used to build readily assembled, hand stacked shielding walls. Prepared by the editors of "Nucleonics," May, 1955.

LEAD IN MODERN INDUSTRY

$1.50 Postpaid

A fully illustrated, 230 page, cloth bound book describing all phases of the production and use of lead, lead alloys and lead compounds.

LEAD WORK FOR MODERN PLUMBING

$1.50 Postpaid, $1.00 per copy in quantities of 10 or more

Profusely illustrated with over 140 photographs and drawings, this textbook presents clearly to the plumbing student the necessary tools, procedures and the methods required for lead work.

LEAD BUILDING CONSTRUCTION BULLETINS

A series of specifications for the use of lead in building construction. (Available separately.)

BULLETIN NO. 1

Specification for Lead Waste Connections for Plumbing Fixtures with Integral Traps (Water Closets—Pedestal Urinals—Service Sinks).

BULLETIN NO. 2

Specifications for Lead Shower and Safe Pans

SUGGESTED SPECIFICATIONS FOR CHEMICAL LABORATORY DRAINAGE SYSTEM

A complete guide to the selection and installation of drainage systems in chemical laboratories. Includes laboratory waste and vent piping, traps, sinks, acid trays, troughs, safe pans, neutralizing basins and other topics.

LEAD IN MODERN PLUMBING— WHY, WHERE, HOW IT IS USED

A 24 page booklet containing descriptive information as well as four pages of detailed drawings for plumbing installations in various type houses.

LEAD WELDING

An informative as well as practical guide to lead welding. Reprinted from the "Welding Handbook, Third Edition" published by the American Welding Society.

LEAD FLASHINGS IN MODERN CONSTRUCTION

Lead flashings as used in an ultramodern house in Randolph, Vt. Reprinted from "National Roofer," October, 1954.

SHEET LEAD WORK FOR THE SMALL HOME

A specification for the use of the new 2½ lb. hard sheet lead on small homes.

THE STORY OF LEAD — MATERIALS THE RAILROADS BUY (Parts 1 and 2)

Lead from mine to finished product with special reference to its uses by the railroads. Reprinted from "Railway Purchases and Stores," December, 1954 and February, 1955.

RADIATION PROTECTION

The place of lead in shielding against radiation in X-ray and atomic energy applications. Principles of lead shielding construction. Reprinted from "Lead in Modern Industry."

RED LEAD TECHNICAL LETTERS

A series of technical letters containing red lead paint formulations. (Available separately.)

- **Technical Letter No. 9—Red Lead Paints for Galvanized Steel, Rusted, Weathered or Treated New.**
- **Technical Letter No. 10—L.I.A. Formula 3-7, A Red Lead-Alkyd Vehicle Primer for Industrial and Marine Environments.**
- **Technical Letter No. 11 — Recommended Surface Preparation of Steel for Red Lead Paints.**
- **Technical Letter No. 12—Painting Highway Strutural Steel.**

PAINT GALVANIZED SURFACES?

Why galvanized surface should be painted, the kind of pretreatment that should be given, and the correct painting systems are discussed. Reprinted from "Factory Management and Maintenance," April, 1956.

FEDERAL SPECIFICATION FOR PAINT: RED-LEAD-BASE, READY-MIXED TT-P-86a

Covers four types of red-lead-base paints including two fast drying formulations. Many intended applications listed.

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