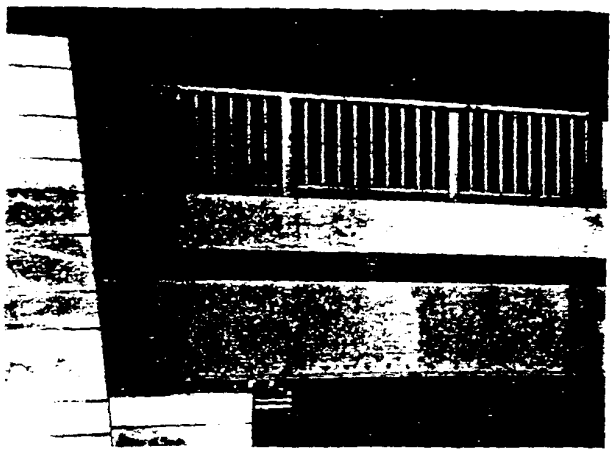
Lead Paints Used On New York Highway Bridges

THE excellent rust-inhibiting properties of red lead paint pigment has made it the standard metal protective paint primer wherever steel is left exposed to the weather. This is particularly true of State Highway Departments, by far the majority of whom specify red lead for the important shop coat of all exposed steel highway structures.

As a result of this widespread use of red lead primer paints, its bright orange color is and will continue to be the motorist's signpost of future highways that will speed him along non-stop, from coast to coast.

New York's Department of Public Works, which has jurisdiction over that state's highway construction, specifies shop coats of red lead overall shop-fabricated steel work. In addition, a field touch-up with the same red lead paint is given after construction on all unpainted surfaces or where the original primer coat has been worn off or has otherwise become defective.

The primer paint specified by New York State is composed of red lead (95 percent grade), 78 to 81 percent and the vehicle, 19 to 22 percent, the vehicle to consist of a mixture of raw and boiled linseed oil in the proportion of one-third to one-half boiled oil, the balance being raw oil.



A priming coat of red lead protects the steel on the Baychester Ave. bridge over the New England Thruway in Bronx County, N. Y. Top coats are white lead base paints.

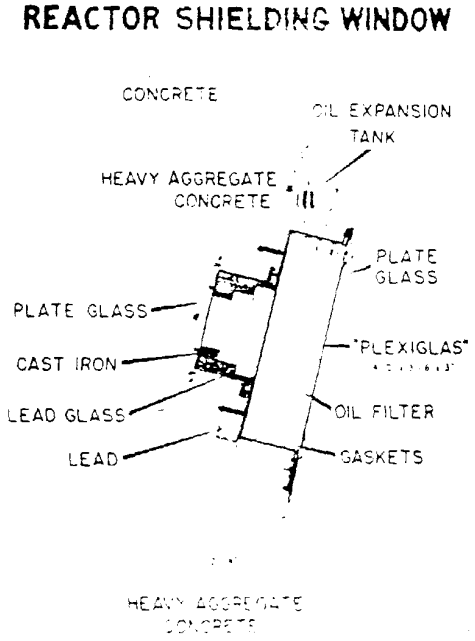
One of the many bridges now nearing completion in New York State's highway program is shown in the accompanying photograph. This 110 ft. single-span bridge over the section of the New England Thruway in Bronx County, N. Y. at Baychester Ave. is one of several such bridges being constructed by the Central Iron Works, Inc. New York City.

The first and second field coats of paint on this bridge and similar structures is a mixed pigment paint containing a minimum of 50 and a maximum of 70 percent white lead.

Atomic Reactor Shielding Windows

THE problem of viewing radioactive areas that require operational and maintenance work and at the same time maintaining the necessary shielding against gamma rays and neutron bombardment has been uniquely solved by the engineers at General Electric Co., Richland, Washington, operators of the Hanford Atomic Products Operation.

Because shielding and viewing requirements are usually not compatible and even the requirements for gamma and neutron shielding differ greatly, a combination of materials, which had to be light transparent, was necessary. One material had to be of sufficient den-



Details of construction of the leaded glass window recently installed at the Hanford Atomic Products Operation, Richland, Wash.

sity to protect against gamma rays and the other containing sufficient hydrogen to absorb neutrons. How this was accomplished in the minimal space is shown in the accompanying drawing of a window recently installed to view the radioactive rear face of a Hanford reactor. The window is two feet thick and gives the same protection as five feet of concrete.

Construction of the window involved three layers of 4 in. thick lead silicate glass which has good light transmission for all colors except blue and with a density of 6.2 is approximately half as effective as the metal lead in the absorption of gamma rays. The light loss at the surfaces of the glass was reduced by applying a low reflective coating. Neutron protection was afforded by four sheets of 3 in. thick, the largest commercially available, "Plexiglas" which also has good light transmission as well as 8 per cent hydrogen. To eliminate reflection at the surfaces of the "Plexiglas" a clear mineral oil with the same index of refraction was placed between the layers and confined with a gasket. The two outer surfaces were extensively polished.

In the installation of the windows in the concrete shield, extra sheets of lead were placed around the perimeter of the leaded glass to provide shielding in those areas where the concrete was of insufficient thickness.

By the use of two of these windows, engineers and physicists at the Hanford reactor can view an area approximately 80 ft. square and from a central station operate by remote control many slave devices accurately and with comparative ease and safety.

Alternate to this type of window is one filled with distilled water which has good light transmission and good resolution with monochromatic light. However, this type of window is not feasible where space limitations are a factor. Because of the limited shielding afforded by water, the size of the window becomes objectionable at high radiation levels, ten feet of water being equal to approximately five feet of concrete or eight inches of lead.

Leaded Porcelain Enameled Steel Panels

THE availability of porcelain enameled metal panels for architectural applications has generated almost an entirely new concept in modern construction.

Architects now find it economically feasible to design buildings having interior and exterior enameled surfaces of varying color hues and shades that blend harmoniously with the surrounding terrain; to design with colors that are pleasing to the eye or to serve as company or product identification. The mechanical advantages, such as easy and fast erection and the easily maintained and colorfast surfaces, are also a decisive factor in their selection and use.

Porcelain enameled steel and aluminum sheets are both used for this purpose. The enamels applied to aluminum of necessity have a high lead content to provide a firing temperature below the melting point of aluminum and at the same time result, in a smooth, glossy, tenacious and weather-resistant coating.

Now enamelers are finding the properties of somewhat similar leaded enamels on steel advantageous. By the use of lead in these enamels, the firing temperatures are being reduced from the 1500-1600°F. range to 1000-1100°F. This not only reduces the costs of firing but at the same time results in enamels of superior resistance to chipping and weathering and good elasticity.

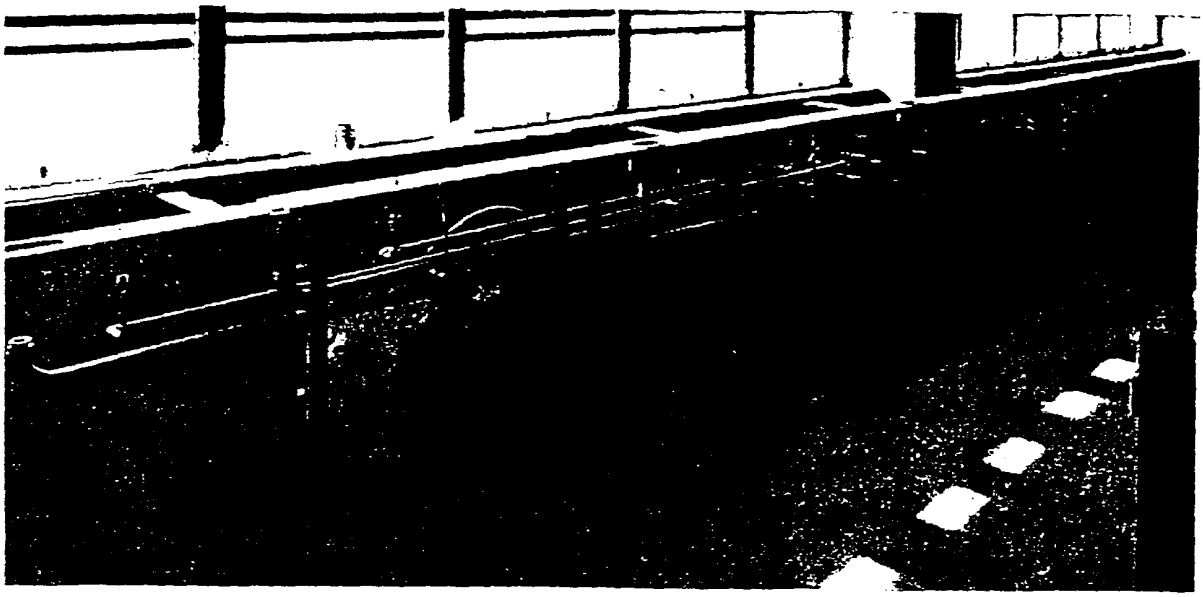
THE O. HOMMEL CO.

Note the remarkable flatness and lack of distortion of these steel panels enameled with low temperature leaded porcelain enamels fired as low as 1,000 to 1,100° F.

Enamels fired in this lower temperature range mature below the transformation temperature (strain point) of the steel, making possible the use of lower cost cold rolled steel as the base metal. Such problems as warping, sagging, boiling and reboiling, common with higher firing temperatures, are eliminated or materially reduced, and thinner sheets can often be enameled successfully.

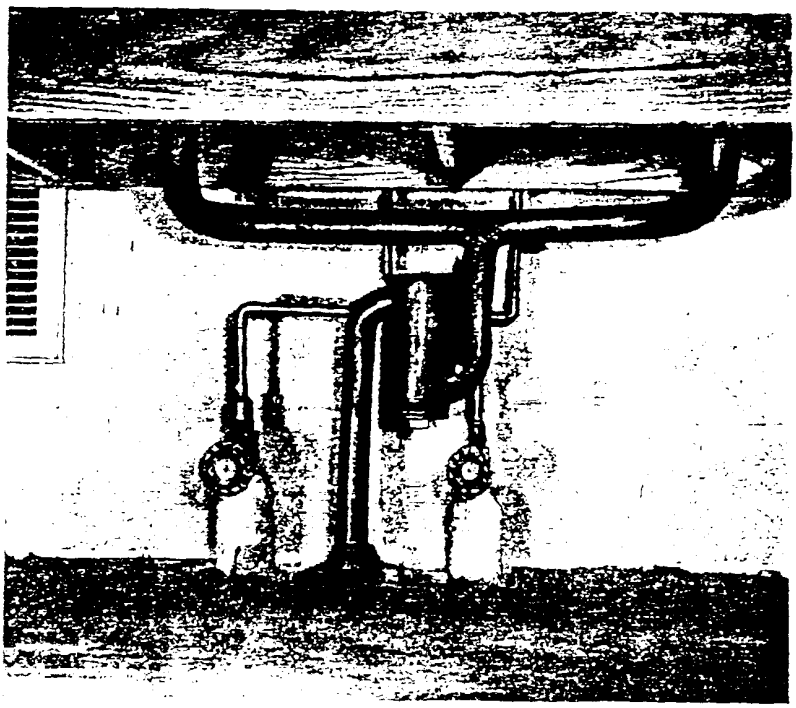
The use of lead compounds in porcelain enamel compositions is primarily as a flux. They have an advantage over most fluxing compounds in that they can be added in relatively large amounts without causing a dull finish. Lead-bearing porcelain enamels are opening new vistas for the porcelain enameler, the architect and the product designer.

The leaded porcelain enamels used on the steel panels shown in the accompanying photograph were produced by The O. Hommel Co., Pittsburgh, Pa.



Lead waste lines and lead cup sinks for two of the chemical laboratory tables in the new Education Wing of the University of Arkansas' Medical School in Little Rock, Ark. Lead's corrosion resistance and ease of fabrication make its use ideal for such installations.

Lead's Corrosion Resistance Properties Used To Advantage In Chemical Laboratories



These lead waste lines from two chemical laboratory sinks entering a single lead drum trap require no special fittings for the sharp bends.

LEAD has greater corrosion resistance to more acids or combinations of acids than probably any other common metal. As a result, it is ideally suited for use in chemical laboratories where a variety of corrosive media is constantly being used. In such surroundings, lead's use has been widespread for such things as hood linings, table tops, trough linings and for the chemical plumbing drainage system.

Many of the common corrosive chemicals used in laboratory experiments, such as ammonium and sodium hydroxide, chromic, hydrochloric, hydrofluoric, phosphoric and of course, sulphuric acid, are all safely handled by lead or lead-lined equipment.

In the new Education Wing of the University of Arkansas' Medical School in Little Rock, Ark., a number of chemical laboratories are being installed and lead is used extensively.

In the chemical plumbing system, 1½ and 2-in. lead waste pipe, class "C" weight, (WW-P-325 — Federal

When chemical corrosives are to be conveyed in lead, all joints, shown here, should be lead welded.

Lining the troughs in the laboratory tables with 4-lb. sheet lead.

Specification for Pipe, Bends and Traps; Lead (For) Plumbing and Water-Distribution) will carry the chemical wastes from 300 laboratory fixtures to acid resisting cast-iron drainage lines. Lead drum traps as well as lead cup sinks are also being installed.

All joints in the lead pipe and between the lead pipe and fittings are being made by lead welding, the method of joining lead that should always be used when chemical corrosives are apt to come in contact with the jointing material.

Troughs to carry the chemical wastes from each of the work positions at the laboratory tables are being lined with 4-lb. sheet lead and the joints are also lead welded.

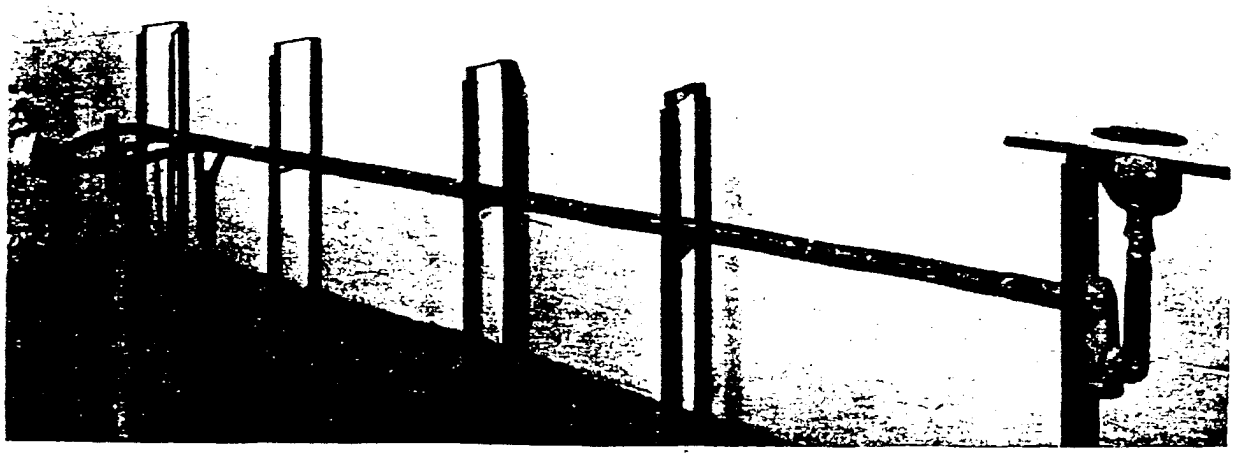
In jobs of this kind, the advantages of lead, other than its corrosion resistance, are its ease of fabrication, need for very few special fittings, and the absence of joints over long lengths and in the sharp bends and turns, advantages that are indicated in the accompanying photographs.

Joints are always a potential source of trouble particularly in corrosive atmospheres and the fact that lead requires a minimum number of joints can add immeasurably to the life of the installation.

The Kewaunee Co. supplied the lead cup sinks and other laboratory equipment and the chemical plumbing system was installed by the Arkansas Mechanical Contractors, Inc., North Little Rock, Ark.

Copies of the Federal Specification WW-P-325 previously mentioned and a suggested specification for the use of lead in chemical laboratories entitled "Suggested Specifications for Chemical Laboratory Drainage System" may be had from the Association free, upon request.

Another of the many lead waste lines from the lead cup sinks in chemical laboratory tables installed in the new wing of the University of Arkansas' Medical School.

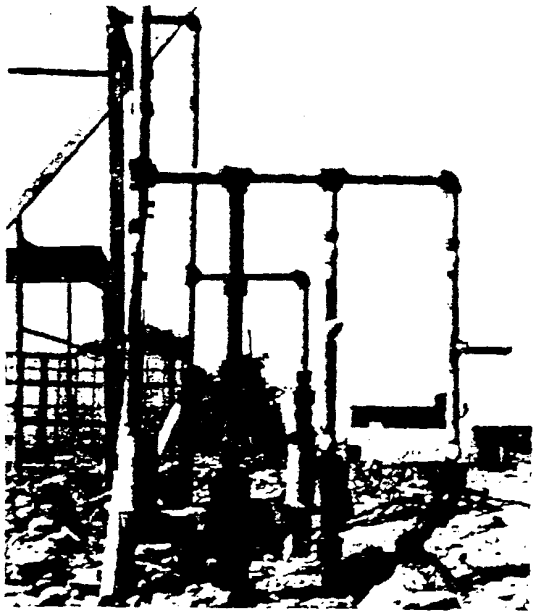


Plumbing In Place Before Building Is Erected

THE concept of small home and building construction wherein the orderly procession of building tradesmen on the construction site would be foundation worker, bricklayer or carpenter, roofer and then the plumber, is undergoing a radical change in many sections of the country. The plumber now finds himself on the job simultaneously with the foundation worker, thus speeding construction and lowering cost.

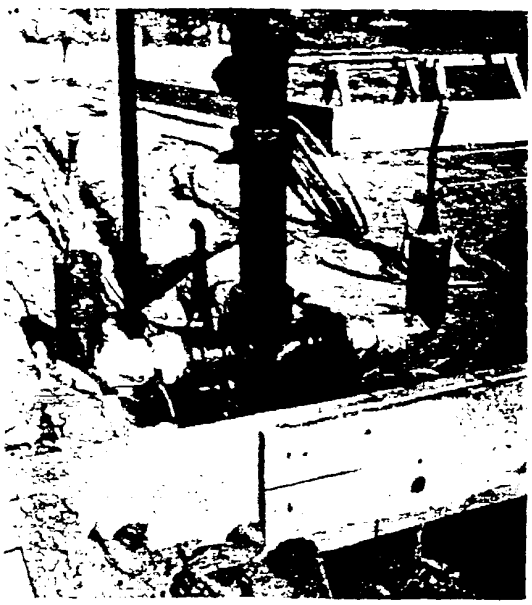
As the accompanying photographs of recent construction jobs in Tulsa, Okla. and Shreveport, La., would indicate, it has become a common sight to see the plumbing roughing-in completed before any other part of the prospective building is visible.

One of the problems connected with the installation of the plumbing before the house is built is the question of accuracy in placing the plumbing roughing-in. When construction is well enough along to set the fixtures, any slight errors made in the placement of the roughing-in can create a serious and costly problem with rigid pipe connections. However, with lead connections, such inaccuracies are not a serious problem. The flexibility of lead permits bending the connection by hand, if necessary, to compensate for whatever small errors in measurement that may exist.



The roughing-in for a first floor toilet room in the building to be erected around it, in Tulsa, Okla., has lead wastes and vents for the the lavatories and lead water closet connections.

Small ranch-type homes now under construction in Cherokee Park, just outside Shreveport, La., are having the plumbing roughing-in set in place before the concrete slab is poured and lead is being used for fixture connections.



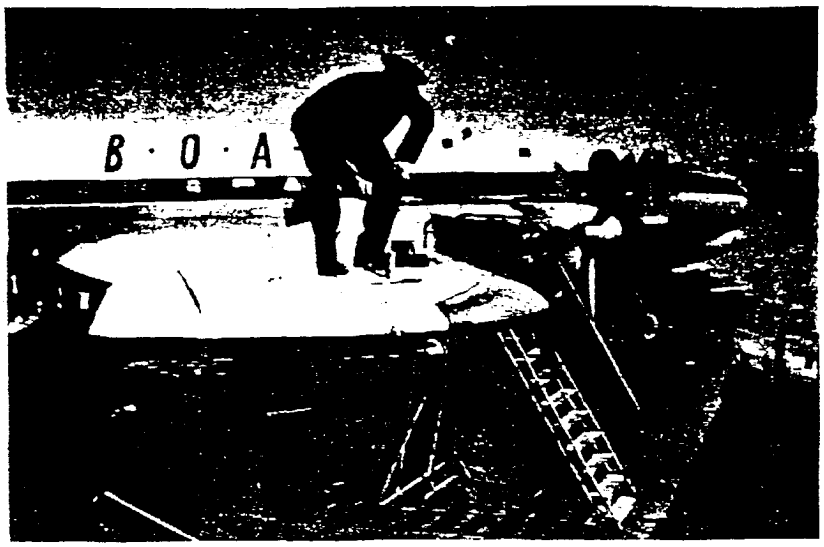
Prior to the pouring of the concrete slab for this small home near Shreveport, La., the plumbing roughing-in, including lead bends, is set in place.

The Elton J. Wolfe Plumbing Co., of Shreveport, La., is installing 4-in. lead bends for the water closets along with lead stubs for the bathtub wastes in each of the homes' 1½ baths. The flashings for the plumbing vent stack passing through the roof are to be 3-lb. sheet lead.

The same construction procedure is also being used in the new Home Building and Loan Association building in Tulsa, Okla. The plumbing contractor, W. F. Glenn Co., Tulsa, Okla., has completed the installation of the plumbing roughing-in for the first-floor toilet room prior to erection of the building. Lead waste and vent connections for the lavatories and lead bends for the water closets will provide the necessary flexibility to the plumbing system.

The contractor has wisely placed paper packing tubes around the lead bends, see accompanying photograph, to protect them during the pouring of the concrete floor and upon their removal will leave sufficient working space for setting the water closets.

Shipping Radioactive Isotopes By Air



An overseas shipment of radioactive isotopes is removed from its lead box and placed in the tip of airliner's wing to begin its long journey.

RADIOACTIVE isotypes for physical therapy and medical research are being used in increasing numbers in hospitals throughout the world. Because the half-life of many of these radioactive isotopes is limited. rapid delivery schedules must be maintained and this is accomplished by the use of regular commercial airline flights.

One of the airline companies engaged in this operation is B.O.A.C., British Overseas Airline Corp., which handles several thousand such shipments originating in Great Britain every year. Special regulations laid down by the International Air Transport Association for the handling of radioactive materials assure that there is no risk of contamination to either the crew or passengers.

The consignments for overseas destinations arrive at London Airport in lead containers. carried in a wooden box. The containers are immediately transferred to a safe made of 2 in. thick lead where they await shipment. Shortly before the aircraft is due to leave, the head loader takes the consignment out to the tarmac and transfers the radioactive material in its casing from the lead container to a small compartment in the tips of the airliner's wings. Here it is completely safe being well away from the passengers and crew. Both B.O.A.C. Argonaut and Constellation airliners are equipped to carry consignments in this fashion.

The shipments handled by B.O.A.C. are distributed chiefly by the Radio Chemical Center at Amersham. Bucks. and the Atomic Energy Research Establishment. Harwell. Berkshire. both in England.

The consignments of radioactive isotopes arrive at London airport in lead containers carried in a wooden box.

The head loader on the tarmac at London airport demonstrates the use of a three foot long pole in handling the radioactive materials.

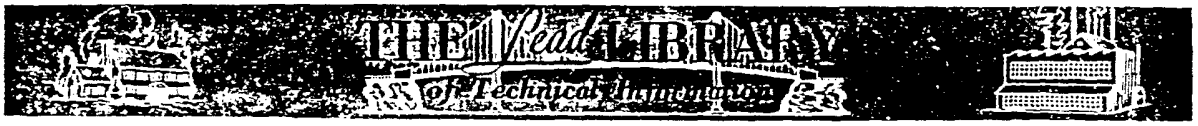
RADIOISOTOPE CONTAINERS USED BY OAK RIDGE NATIONAL LABORATORY

Reprint of a report with the above title, containing descriptions and detailed drawings of shipping containers, prepared by the Oak Ridge National Laboratory, is available, free of charge, upon request to the Lead Industries Association, 60 East 42nd St., New York 17, N.Y.

MEMBERS OF THE LEAD INDUSTRIES ASSOCIATION

ALLIED SMELTING CORP.—5116 W. Lincoln Ave., Milwaukee 14, Wis.
ALPHA METALS, INC.—Box 34, Bergen Station, Jersey City 4, N. J.
THE AMERICAN METAL CO., LTD.—61 Broadway, New York 6, N. Y.
AMERICAN SMELTING & REFINING CO.—120 Broadway, New York 5, N. Y.
AMERICAN ZINC, LEAD & SMELTING CO.—Paul Brown Bldg., St. Louis 1, Mo.
THE ANACONDA CO.—25 Broadway, New York 4, N. Y.
THE G. A. AVRIL CO., LEAD PRODUCTS DIVISION
Langdon Farm Rd. & Seymour Ave., Cincinnati 12, Ohio
BERS & COMPANY, INC.—Ashland & Lewis Sts., Philadelphia 24, Pa.
*BROKEN HILL ASSOCIATED SMELTERS PROPRIETARY LTD.
Collins House, Melbourne C1, Australia
*BROKEN HILL SOUTH, LTD.—Box 194-C, G.P.O., Melbourne, Australia
THE BUNKER HILL CO.—660 Market St., San Francisco 4, Calif.
CAMBRIDGE SMELTING CO.—100 Pacific St., Cambridge, Mass.
*CERRO DE PASCO SALES CORP.—300 Park Ave., New York 22, N. Y.
*THE CONSOLIDATED MINING AND SMELTING CO. OF CANADA LIMITED
P.O. Box 1030, Place D'Armes, Montreal 1, Canada
DAY MINES, INC.—Wallace, Idaho
DICKSON WEATHERPROOF NAIL CO.—Box 590, Evanston 4, Ill.
DIXIE LEAD CO.—P.O. Box 8625, Dallas, Tex.
E. I. DUPONT DE NEMOURS & CO., INC.—Wilmington 98, Del.
THE EAGLE-PICHER CO.—American Building, Cincinnati 1, Ohio
THE EDLOW LEAD CO.—P.O. Box 1936, 729 Bank St., Columbus 16, Ohio
THE ELECTRIC STORAGE BATTERY CO.—Box 8109, Philadelphia 1, Pa.
ETHYL CORP.—100 Park Ave., New York 17, N. Y.
EUSTON LEAD CO. (The Glidden Co.)—500 Penn Ave., Scranton 3, Pa.
EVANS LEAD DIVISION (National Lead Co.)—Box 1467, Charleston 25, W. Va.
FEDERATED METALS DIVISION OF AMERICAN SMELTING & REFINING CO.
120 Broadway, New York 5, N. Y.
AARON FERER AND SONS CO.—101-19 S. 8 St., Omaha 8, Nebr.
*THE FIRESTONE TIRE & RUBBER CO.—Box F, Firestone Park, Akron 17, Ohio
THE FLEMM LEAD CO., INC.—52-01 31 Place, Long Island City 1, N. Y.
W. P. FULLER & CO.—301 Mission St., San Francisco 19, Cal.
GARDINER METAL CO.—4820 S. Campbell Ave., Chicago 32, Ill.
GLASER LEAD CO., INC.—31 Wyckoff Ave., Brooklyn 27, N. Y.
GOLDSMITH BROS. SMELTING & REFINING CO.
111 North Wabash Ave., Chicago 2, Ill.
HAMMOND LEAD PRODUCTS, INC.—5231 Hohman Ave., Hammond, Ind.
HECLA MINING CO.—Wallace, Idaho
HUDSON SMELTING & REFINING CO.—85-95 Hyatt Ave., Newark 5, N. J.
IMPERIAL TYPE METAL CO.—3400 Aramingo Ave., Philadelphia 34, Pa.
INTERNATIONAL SMELTING & REFINING CO. (Anaconda Sales Co., Agents)
25 Broadway, New York 4, N. Y.
KNAPP MILLS, INC.—23-15 Borden Ave., Long Island City 1, N. Y.
LEAD PRODUCTS CO., INC.—P.O. Box 1341, Houston 1, Texas
LUCKY FRIDAY SILVER-LEAD MINES CO.—Wallace, Idaho
JOHN R. MacGREGOR LEAD CO.—4520 W. 15 St., Chicago 23, Ill.
MIKE HORSE MINING & MILLING CO.—620 Power Bldg., Helena, Mont.
THE MURDOCK LEAD PRODUCTS CO.—P.O. Box 5298, Dallas 2, Texas
NATIONAL LEAD CO.—111 Broadway, New York 6, N. Y.
NEW PARK MINING CO.—Keetley, Utah
*NORTH BROKEN HILL, LTD.—Box 1903-R, G.P.O., Melbourne, Australia
THE OKONITE CO.—Passaic, N. J.
OLIN MATHIESON CHEMICAL CORP.—East Alton, Ill.
PEND OREILLE MINES & METALS CO.—Old Natl. Bk. Bldg., Spokane 8, Wash.
PENNSYLVANIA SMELTING & REFINING CO.
3100 E. Ontario St., Philadelphia 34, Pa.
PHELPS DODGE COPPER PRODUCTS CO.—300 Park Ave., New York 22, N. Y.
REVERE COPPER AND BRASS, INC., FOIL DIVISION
196 Diamond St., Brooklyn 22, N. Y.
RIVER SMELTING & REFINING CO.—4195 Bradley Road, Cleveland 1, Ohio
ROCHESTER LEAD WORKS, INC.—380 Exchange St., Rochester 8, N. Y.
ST. JOSEPH LEAD CO.—250 Park Ave., New York 17, N. Y.
SHATTUCK DENN MINING CORP.—120 Broadway, New York 5, N. Y.
SIPI METALS CORP.—1708-1720 Elston Ave., Chicago 22, Ill.
*SOCIETE MINIERE ET METALLURGIQUE DE PENARROYA
12 Place Vendome, Paris 1, France
SUNSHINE MINING CO.—115 N. Second St., Yakima, Wash.
UNITED PARK CITY MINES CO.—Continental Bank Bldg., Salt Lake City 1, Utah
UNITED STATES SMELTING REFINING AND MINING CO.
57 William St., New York 5, N. Y.
THE VICTORY WHITE METAL CO.—6100 Roland Ave., Cleveland 27, Ohio
HYMAN VIENER & SONS—5300 Hatcher St., Richmond 5, Va.
VULCAN LEAD PRODUCTS CO.—1545 W. Pierce St., Milwaukee 4, Wis.
WESTERN ELECTRIC CO., INC.—195 Broadway, New York 7, N. Y.
WESTERN LEAD PRODUCTS CO.—4530 E. Pacific Way, Los Angeles 22, Cal.
WHITE METAL ROLLING & STAMPING CORP.—80 Moultrie St., Brklyn 22, N. Y.
*THE ZINC CORP. LTD.—Box 384-D, G.P.O., Melbourne, Australia

* Associate Member



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

Up-to-date reports on new developments in the uses of lead and lead alloys in chemical construction including research progress, engineering applications, and technological advancements. With bibliography. 1956, 1955 and 1954 reviews (editions are not cumulative) available. Reprinted from "Industrial and Engineering Chemistry," September, 1956, October, 1955, and October, 1954.

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

Postpaid

Illustrated, 230 page, cloth bound book all phases of the production and use of 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

Specification 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.

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.

RED LEAD TECHNICAL LETTERS

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

Technical Letter No. 3—Red Lead Primers for Atmospheric Exposures

Technical Letter No. 6 — Red Lead Paint Formulations

Technical Letter No. 7—Paint Systems for Hydraulic Structures

Technical Letter No. 8—Primers for Railroad Structures and Rolling Stock

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.

FEDERAL SPECIFICATION TT-P-86a Paint: Red-Lead-Base, Ready-Mixed

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

PAINT GALVANIZED SURFACES?

Why galvanized surfaces 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.

UPON REQUEST, THE LEAD INDUSTRIES ASSOCIATION WILL BE GLAD TO MAIL "LEAD" REGULARLY, FREE OF CHARGE, TO THOSE INTERESTED, AND WILL COOPERATE WITHOUT OBLIGATION IN THE SOLUTION OF YOUR LEAD PROBLEMS.

PRINTED IN U. S. A.
BY ISAAC GOLDMANN COMPANY INC.
NEW YORK CITY