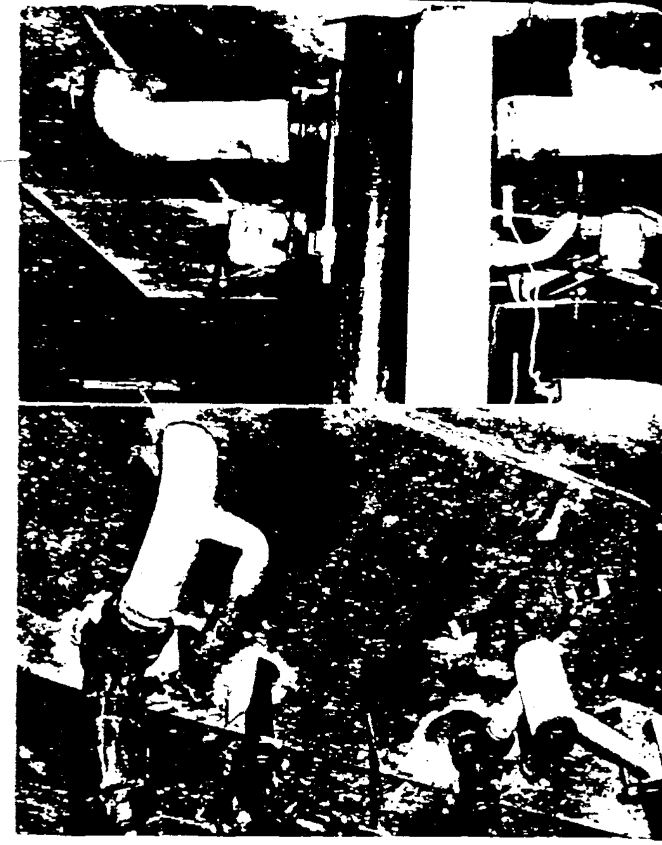
Large Or Small Projects: Lead Offers Trouble-Free, Economical Plumbing



Flexible lead plumbing connections for the water closets and baths are being installed in all of the 126 units of the now-under-construction Town House Apartments in Springfield, Ill. Shown at right are the top and lower floor method of installation.

ONE of the great advantages of lead plumbing is its adaptability to all types of structures and all kinds of construction conditions. It is equally at ease in large buildings or small bungalows and offers the same trouble-free, economical plumbing with flexibility which avoids joints and speeds installation. Shown here are two examples of entirely different types of buildings in widely separated parts of the country, both utilizing the advantages of lead plumbing.

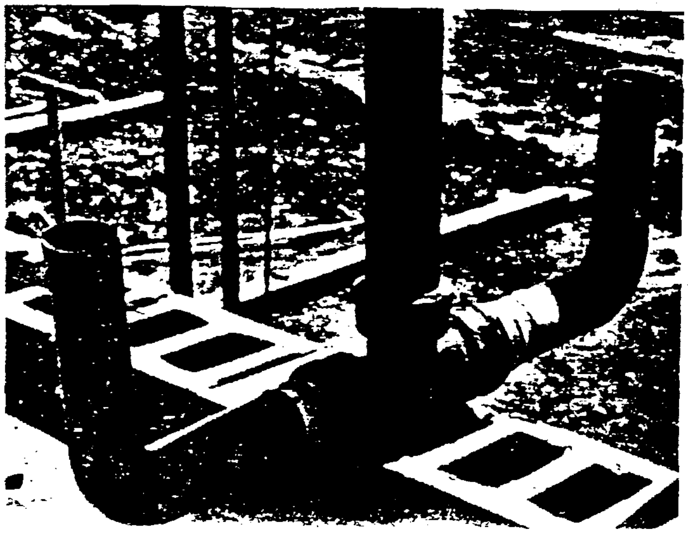
One is the 10-story Town House Apartments in Springfield, Ill., containing 126 apartments, each with bathroom and kitchen. The kitchen plumbing is particularly noteworthy as each is equipped with dishwasher and garbage disposal unit. Waste connections and vents for each of these units are 1½-in. XL (D) lead pipe.

In the bathrooms all 126 water closet connections were made with 4-in. 8-lb. lead bends or stubs and for the baths lead drum traps with 1½-in. lead inlets and outlets. Most of the bathrooms and kitchens are back-to-back, although a few are single units. All vent stack flashings at the roof are 4-lb. sheet lead.

Shaw, Metz and Dolio were architects for the Town House Apartments, owned by Franklin Life Insurance Co. Evans Construction Co. were general contractors, and Edwards Plumbing and Heating Co. did the plumbing.

The other example is a large single-story motor court at Charlotte, N. C. In this instance again all water closet connections were made with 4-in. 8-lb. lead bends, installed back-to-back. Bath connections, however, were 1½-in. lead P-traps. The contractor was the R. & L. Plumbing Co.

The plumbing roughing-in for this motor court now under construction in Charlotte, N. C. includes the use of economical lead fixture connections. The flexibility of lead assures more rapid setting of the fixtures when construction is completed.

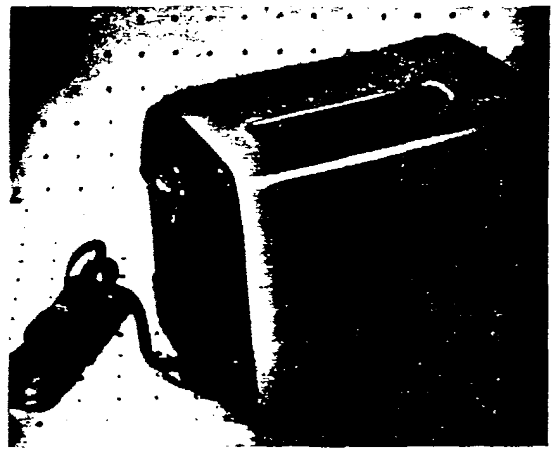


New Leaded Porcelain Enamels For Steel Make Possible Fresh Fields Of Application

PORCELAIN enameled coatings on steel products that could not heretofore be coated with this highly desirable and permanent vitreous finish are now possible with the use of lead-containing enamels.

These new leaded porcelain enamels have a low firing temperature maturing in the range of 1,000 to 1,100 deg. F. (Compared to 1,300 up to 1,600 deg. F.) and fire down to produce very thin, glassy coatings that are simple to clean and maintain and with far more durability than organic coatings. As a matter of fact, these enamels can be used on products basically designed for organic finishes, with little or no change.

This colorful black and aquamarine automatic toaster is coated with the new low temperature leaded porcelain enamels designed for application on steel.



Photos by
THE O. HOMMEL CO.

The finish is uniform and is ideal for architectural paneling, signs and small appliances for home and industry. With a few exceptions, a wide range of colors, both full strength and semi-pastel, are available.

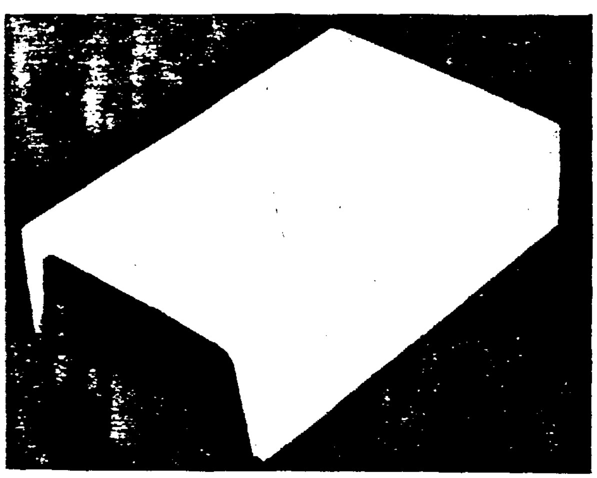
The physical properties of these low temperature vitreous finishes compare favorably with those that mature at the much higher temperatures. The finish has good resistance to acids and because they can be applied extremely thin, they offer obvious mechanical advantages over the more conventional porcelain enamels. The fired thickness of ground and cover coat combined usually falls in the range of 3 to 5 mils.

One of the outstanding advantages of these low temperature leaded porcelain enamels is their ability to cover sharp edges and radii uniformly, as can be seen in the accompanying photographs.

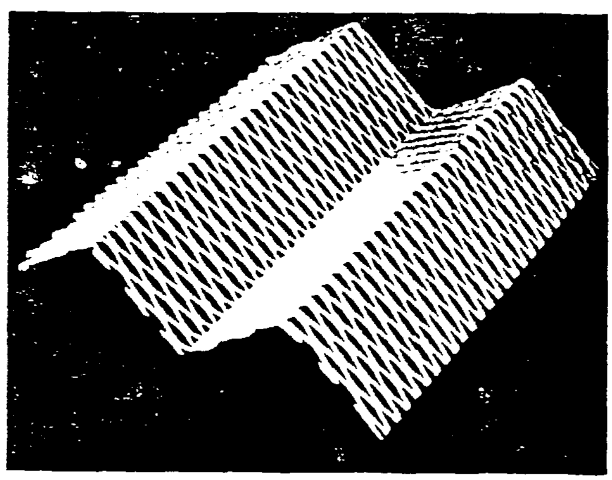
In the application and firing of the leaded enamels, there is less warpage and thereby fewer rejects, as a result of the low temperature required. Also they have a coefficient of expansion value more nearly equal to that of the base metal. These two factors contribute materially to the resulting lower costs and make possible the enameling of lighter gage metal, more complicated shapes, and in many cases non-premium grades of steel.

Furnaces with uniform heat distribution and accurate instrumentation are usually necessary and because there is relatively little radiation, forced convection is desirable. However, operating costs are remarkably low when compared to furnaces operating at much higher temperature levels. Tooling costs are also lower inasmuch as less costly alloys may be used as well as lighter weight bars and hangers.

A piece of structural steel coated with one of the new low temperature leaded porcelain enamels. Note excellent coverage of the end which was cut through with a hack saw.



One of the new low temperature leaded porcelain enamels was applied to this piece of expanded metal. Note the excellent coverage of the sharp radii and edges.



LIA26109

Lead Gamma Shields In Educational And Industrial Research

IN the educational field as well as in industry, training and research programs with the use of radioactive materials is becoming commonplace. In all such programs, there is widespread acceptance of the use of lead shields to protect personnel against gamma radiation and in extremely sensitive work, to shield the equipment against pick-up from minute radioactive sources outside the equipment.

IN EDUCATION LEAD GAMMA SHIELDS PROTECT PERSONNEL

One of the greatest stumbling blocks at the colleges and universities, which delays the use of radioactive educational aids in the development of competent students for the nuclear power fields, is the fear for safety. Manhattan College, located in the suburban Riverdale section of New York City, recognizing its role in nuclear science education, has adopted a whole network of safety precautions permitting it to employ radioactive isotopes as a teaching tool.

Such safety measures range from shielding, safe storage of radioactive sources, special gloves for students and faculty, installation of devices for monitoring and scaling experiments, inculcation of responsible habits of mind in the student scientist, to the rigid enforcement of Atomic Energy Commission's stringent safety regulations.

Prof. Titone of Manhattan College and a student removing a radioactive sample from a lead-lined storage chest.

The Physics Department, headed by Brother Conrad Gabriel, employs shielding equipment against the harmful effects of gamma rays. Lead figures in this safety method at a cost saving without sacrificing safety. The department utilizes the usual variety of shielding, as well as one which can be considered novel. For example, it uses separate portable lead containers for each radioactive source, so students can safely transport the radioactive material.

Prof. Titone of Manhattan's Physics Department is monitoring the removal of C^{14} from a lead safe.

A Manhattan College student explains the construction and use of a rolled lead container for a 10 microcurie Co^{60} source.

Lead, too, plays an important role in the college safety program in respect to providing a solution to the problem of storing radioactive material for an extended period of time. The hottest source at the college, a 5 millicurie C^{14} slug which required special licensing by the AEC, is kept in a lead safe, AEC Cat. No. AL13A. Series 172, having approximately 4 cm. of effective lead shielding. The safe is versatile and suited to the job; it serves as a combination shipping container and as a means of storage. Low weight, low volume, durability and over-all portability make lead an essential item here.

For gamma ray sources of less intensity (10 microcuries), lead was chosen as the most practical material for lining a chest containing a variety of radioactive substances such as Ca^{45}, Zn^{60}, and C^{14}, and other radioactive chemicals used in experiments in various stages of completion.

Another improvisation at little expense was devised by the department by fashioning a lead storage container from a ¼-in. sheet lead rolled to an OD and ID of 5 and 1 in. respectively, giving a sufficiently adequate shield of 2 in. of lead. Suitable lead plugs were used on both ends to facilitate placement and removal of a 10 microcuries of Co^{60} source.

To give personnel working with radioactive materials a greater measure of protection. both students and instructors are required to wear lead-impregnated rubber gloves when directly handling micro and millicurie sources.

Various up-to-date electronic devices are used for scaling and monitoring experiments, such as Geiger-Muller Counters. Beta and Gamma Ray ionization chambers. pocket dosimeters for measuring gamma and exradiation dosage. and electrometers for the detection of alpha particles.

Equally important is the emphasis the Manhattan College Physics Department places on the development in students of sound habits of mind. Although hot materials used by the laboratory are low level, approximating a maximum of 5 millicuries, the staff at Manhattan College stresses the habit-forming attitude of exacting safety regulations.

Professor Luke Titone. who is the person directly responsible for Manhattan College's program in this field, pointed out, "This training gives the future scientist a built-in mental attitude involving safety, which properly helps to prepare him for work with high energy isotopic sources or even with reactors themselves."

It is quite apparent that lead is the material for gamma shielding where flexibility in use, minimum weight and space requirements. portability, and the ability to lend itself to uses where its function as a shield material must blend with other materials. Lead is the answer to the safe and economic use of a new educational tool, the radioactive isotope.

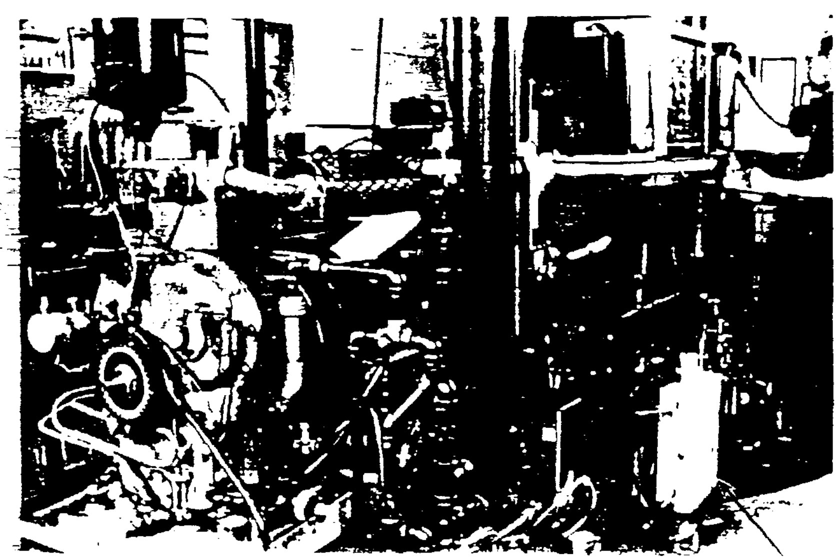
IN INDUSTRY LEAD GAMMA SHIELDS ISOLATE EQUIPMENT

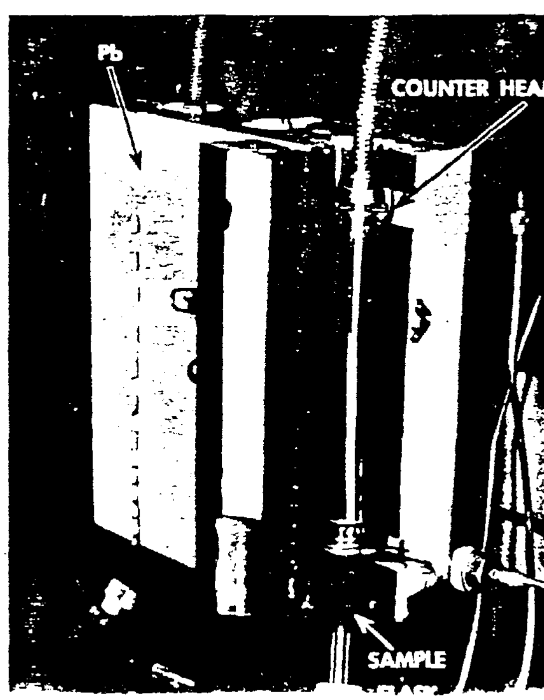
In industry, more and more companies are finding the use of radioactive materials helpful in their research and testing activities. Most of these turn to lead in one form or another to confine gamma radiation and protect personnel and equipment from it. Many forms of lead protective equipment are readily available commercially for handling, storage and use of these radioactive materials, but lead is also adaptable.

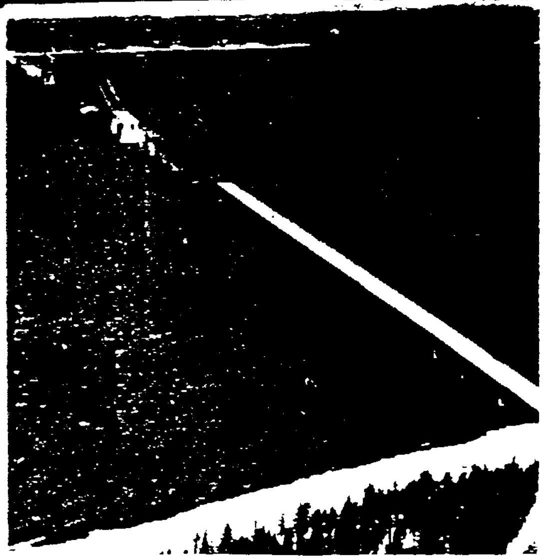
An example will be found in the Detroit research laboratories of Ethyl Corp. In piston ring studies conducted there engine oil containing radioactive wear debris is pumped from the engine through tubing to a sampling flask attached to a scintillation counter head. Since the scintillation counter is extremely sensitive, it must be shielded to prevent pickup from the radio-active piston ring in the engine several feet-away. Accordingly both flask and head are mounted in a lead block measuring about 4 x 8 x 11 in. Four of these blocks are in use in the Ethyl laboratory.

Lead was chosen for this application not only for its high shield efficiency against gamma radiation. Its ready machinability is an added advantage both for shielding devices commercially on the market and particularly for those special devices constructed to meet special conditions.

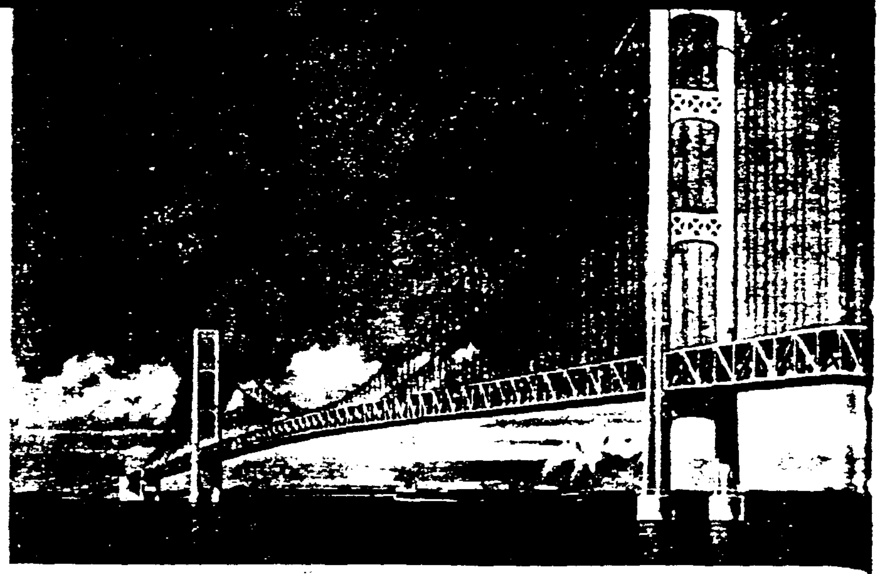
Below, the testing apparatus is shielded from outside radioactive sources by a lead block, arrow, which is a small but integral part of the test apparatus. At right, details of the lead block assembly.







The south approach spans of the new Mackinac Bridge.



The completed Mackinac Bridge as envisioned by D. B. Steinman, consulting engineer. Opening of the bridge is scheduled for November 1, 1957.

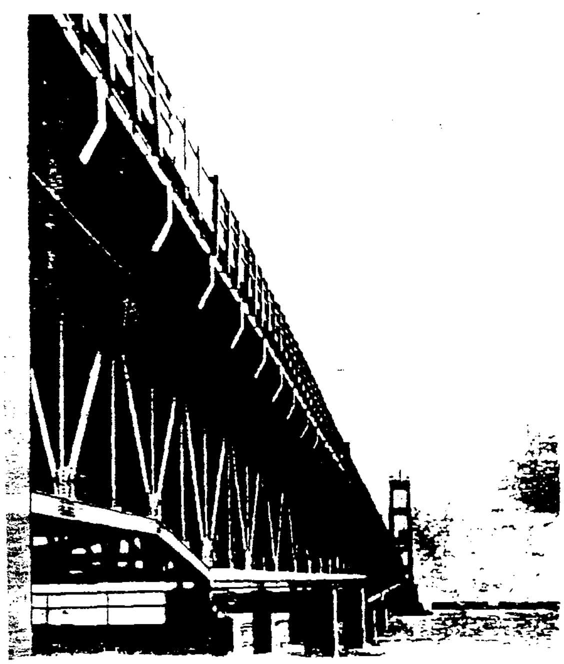
Mackinac Bridge Superstructure Primed With Red Lead Paint

STRETCHING gracefully across the Straits of Mackinac from St. Ignace on the north to Mackinaw City on the south, a great new bridge will soon link Michigan's Northern and Southern Peninsulas and form another link in our ever-expanding modern highway system. Like so many other bridges, large and small, the steel of the Mackinac Bridge, five miles in length, including approaches, will be protected by a red lead base primer paint.

The superstructure of this bridge is approximately three and one-half miles long and contains 66,500 tons of steel. Between anchorages it will be the longest suspension bridge in the world and the 3,800-ft. center suspension span is second in length only to the Golden Gate Bridge, another lead-paint protected "wonder of the world." The entire project will cost in the neighborhood of $100,000,000.

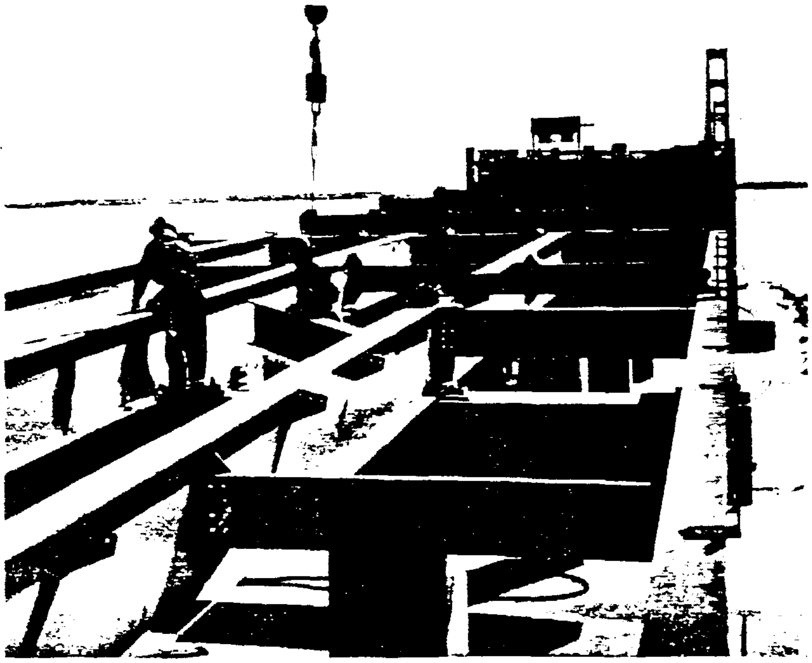
The bridge will carry a 48-ft. roadway with two lanes in each direction and a center mall 2 ft. wide. Minimum clearance at the center will be 148 ft., allowing the largest of the greatest fleet of ships that ply the Great Lakes to pass comfortably beneath. It will provide passage for pleasure and commercial traffic across the Straits in about 10 minutes in place of the old slow and inadequate ferry service and should be a boon to the development of the area and particularly the Northern Peninsula of Michigan.

This great bridge was designed by Dr. D. B. Steinman, consulting engineer of New York, for the Mackinac



At left, the west side of the north approach spans of the Mackinac Bridge from end of causeway. All steel has been shop primed with a red lead base paint.

At right, a view along the 24¼-in. diameter west cable from pier 22 of the Mackinac Bridge.



American Bridge Division personnel erecting the red lead painted steel on the causeway viaduct piers.

Bridge Authority, and the superstructure was the work of American Bridge Division of United States Steel Corp. The specifications for the primer coat of paint on the bridge steel are given in the table.

SHOP PRIMER PAINT SPECIFICATION FOR THE MACKINAC BRIDGE

Pigment:	*Per Cent by Wt.*
Red Lead (95% grade)	75.0 min.
Red Iron Oxide (80% Fe_2O_3 Min.)	25.0 max.
	100.0
Vehicle:	
Fractionated Linseed Oil	95.2 min.
Driers and Turpentine	4.8 max.
	100.0
Pigment (per cent by weight)	73.5-75.5
Vehicle (per cent by weight)	24.5-26.5
Weight per gallon (pounds)	22.0
Drying Time (hours to dry through)	24 (max.)

Red Lead Technical Letter No. 12 — Painting Highway Structural Steel — designed to assist highway engineers in the selection of complete painting systems, has just been published by Lead Industries Association, 60 East 42nd St., New York 17, N. Y. Copies available upon request.

Acid-Resistant Lead Pipe In Laboratory Drainage System Of New Phillips Petroleum Research Center

EXPERIMENTING and testing in modern industrial laboratories often involve a number of different and highly corrosive liquids. Conveying these corrosives to the waste disposal system after they have served their purpose at the experimental or testing bench can become a serious problem unless proper attention is given to the selection of the materials used in the piping system.

Lead because of its excellent corrosion resistance to many of these liquid corrosives and the ease with which it can be fabricated make it ideally suited for such piping.

The accompanying illustrations are an example of how lead pipe has been used for the laboratory drainage and vent system in the new chemical laboratory building at the Phillips Research Center, Bartlesville, Okla. Giffels and Vallet, Inc. of Detroit, Mich. are the architects and engineers. The Phillips Petroleum Company's engineering department supervised construction.

Long lengths of lead pipe, supported on angle-irons, connect the

Long lengths of acid-resistant lead pipe, supported on angle-irons, connect the chemical laboratory tables to the drainage lines in the new Phillips Petroleum Research Center.

laboratory tables to the acid-resistant cast-iron drainage lines. The traps were made in the lead pipe itself, thus the job was installed with a minimum number of special fittings and more important, fewer joints, always a potential source of trouble, were necessary. Where joints in the lead pipe were necessary, they were made by lead burning. Carl Moore Co. of Tulsa, Okla. was responsible for the installation of the chemical plumbing system.

As can be seen at the left, bends made in the lead pipe itself, minimize the number of joints required, and just as the lead burner is doing at the right, all joints should be lead burned.

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, 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

$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

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.

LEAD SUPPLY AND DEMAND IN THE UNITED STATES

A short resume of lead supply and demand in the United States in 1956 and the outlook for 1957. Reprinted from "Engineering and Mining Journal", February, 1957.

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. 6 — Red Lead Paint Formulations

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.

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.

NEW LITERATURE

RED LEAD TECHNICAL LETTER NO. 12 — PAINTING HIGHWAY STRUCTURAL STEEL

The latest in this series is designed to assist the highway engineer in the selection of complete painting systems for highway structural steel.

SHEET LEAD WORK FOR THE SMALL HOME

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

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