

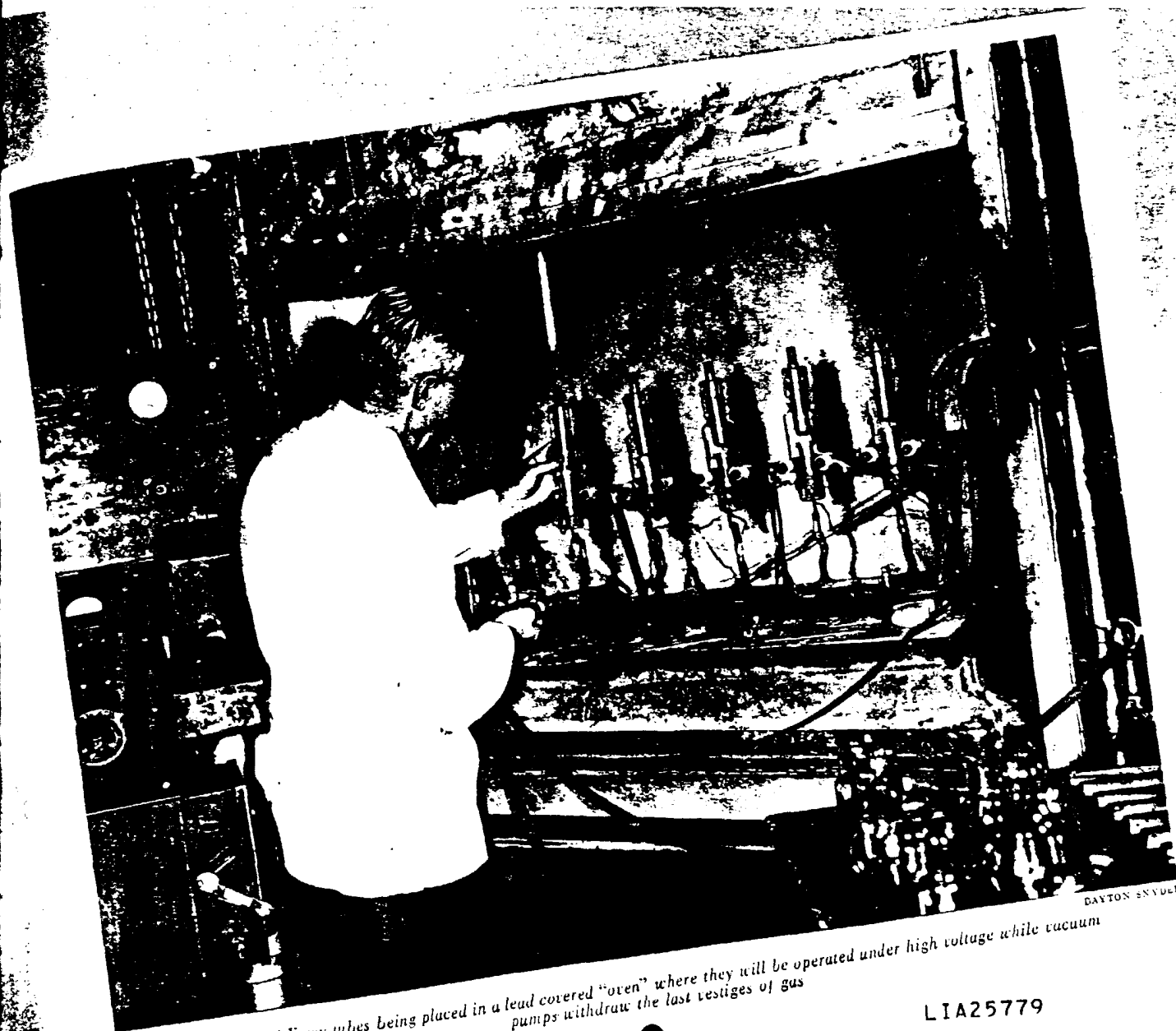
LEAD

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DAYTON SNYDER

Assembled X-ray tubes being placed in a lead covered "oven" where they will be operated under high voltage while vacuum pumps withdraw the last vestiges of gas

LIA25779

Lead Industries Association New York 17, N. Y.

Makers of X-ray Tubes Protect Employees with Lead-Sheathed Equipment

It is a commonly known fact that X-ray equipment which is of great value to the medical profession and to industry can be a source of serious danger to its operators unless much care is taken to protect them from excessive exposure to the X-rays.

Lead, by reason of its high density, provides greater and more positive protection in less space than does any other material economically feasible to use. It shields operators from exposures which might cause serious harm. Nearly all X-ray installations of reasonably high power or which are likely to be used for extended periods of time are enclosed in lead-sheathed rooms with even the doors and windows covered with thick sheets of lead. As a result of the care exercised by the manufacturers and operators of X-ray equipment in the use of complete lead shielding, X-ray injuries are today practically unknown.

Protection of workers from X-ray radiation is also necessary during the process of manufacture of X-ray tubes. If the tubes are to be durable and are to continue to operate with a suitable degree of electrical stability it is necessary that the elements operate in a very high vacuum. With proper equipment it is not difficult to produce a high initial vacuum but since, in operation, an X-ray tube generates considerable heat and since the elements in the tube comprise a fairly large volume which may contain certain amounts of various gases, the tubes during the manufacturing process are operated with high voltage while they are connected to the vacuum pump. Thus any gases which may be driven out of the construction materials or generated by decomposition of minute amounts of impurities which may have been occluded in the tube parts in spite of the meticulous care exercised in preliminary processing and assembling, are drawn out before the tube is finally sealed off.

During this process X-ray radiation is given off by the tubes which, al-



In this oil-filled tank, covered with a 1/4-in. thick sheath of lead, X-ray tubes undergo vigorous tests before being sealed in oil-filled lead-lined shells

though of low intensity, can be dangerous to persons exposed for long periods of time. Therefore the tubes undergoing the final exhausting process are placed in lead-covered "ovens" or large cabinets with all sides and sliding doors sheathed with lead.

The final testing under full current and voltage load is done in tanks cov-

ered with thick heavy sheets of lead.

Certain types of X-ray tubes have protective lead jackets or sleeves in their construction. In some cases a lead jacket with a small circular window to permit the passage of the rays is fitted around the glass of the tube. In other types the entire X-ray tube is enclosed in an oil-filled steel or aluminum shell which is lined with sheet lead. Lead shielded tubes are used in the many field type X-ray units being supplied to the armed forces which are proving to be of incalculable value in the quick and accurate location and identification of battle injuries.

The photographs shown on this page were taken in the plant of the Machlett Laboratories, Springdale, Connecticut, which is currently making large numbers of X-ray tubes of many types including the "shock-proof" or shielded types used in field units.

All employees working in the vicinity of X-ray tubes which may be emitting radiation are required to carry on their persons tightly wrapped photographic films which are developed at stated intervals and examined for indications of excessive exposure. However, this is merely a checking procedure to make sure that protection is adequate and it is upon the shielding power of lead that reliance is placed to minimize the hazards of this vitally important work.



PHOTOS BY DAYTON SNYDER

Final test room in the Machlett Laboratories where finished X-ray tubes are operated under working voltages in the massive lead-covered cabinets shown

Simple Lead Ring Seals Machine Gun Package to Exclude Moisture and Dust

EVERY man who received an issue rifle in World War I will well remember the thick coating of heavy grease which he was obliged to remove before the gun could even be handled. He will also remember that hours of painstaking work were required to put the rifle into such condition that it could be operated—to say nothing of stand inspection.

In the present war which demands great numbers of machine guns which are of necessity more complicated than rifles, the work of removing "cosmoline" is far too tedious a chore to be tolerated in the field where time lost may mean lives sacrificed. For this reason packing procedure has been developed by means of which machine guns in condition to be immediately loaded and fired are adequately protected from the salt air of a sea voyage, the humidity of jungle air or the dust of the desert during delivery to the fighting fronts.

An important part of this package is a simple lead ring which, when crimped over the ends of a moisture proof transparent envelope, effectively provides an air and vapor tight seal.

Press crimping lead ring on plastic envelope to make air-tight seal on package containing .50 caliber machine gun



DAYTON SNYDER
Lead rings used for sealing plastic bag enclosing machine gun. Approximately actual size

The finished and tested guns are dipped in lubricant, drained, inserted with a dessicant carton into a knitted bag and then placed in a tubular section of transparent plastic material. The ends of the tube are gathered and slipped through a small lead ring which is crimped tightly by a small hand press thus sealing the envelope against the infiltrations of moisture



FRIGIDAIRE
Draining excess lubricant from machine guns before inserting them in lead sealed plastic envelopes

and dust. A second knitted bag and a specially designed wooden box complete the package.

This type of seal is quickly applied with the simplest of equipment and it has the additional advantage that, should it be desirable to reseal the package after it is once opened the ring can be opened up with a screw driver or punch, replaced on the plastic and recrimped with a blow from a hammer.

This package developed by one of the largest manufacturers of caliber .50 machine guns with the cooperation and assistance of the Army Ordnance Department, has been in use for approximately one year. Several other manufacturers have, within the past few months, been directed by the Ordnance Department to convert their entire production to this method of packing. The lead ring, inexpensive and easily handled, helps materially in speeding up the safe delivery of these important arms to the military forces.

Other government agencies are investigating the possibility of using lead seals for similar applications in other fields. This simple, economical sealing process could also be applied to many items for civilian as well as military use. It is adaptable to packages of widely varying sizes and articles from watches to machine tools and parts can easily be so protected from damage by air and moisture.

Lead Saves Many a Headache in Water Works Extensions

ALONG with all of the many new uses to which lead has been applied in solving problems set up by war conditions this versatile metal continues to perform long established prosaic functions in the water works industry. Large quantities of lead have been and are being used in the tremendous extension activities that have been made necessary by the many war housing projects in industry centers. Lead-calked water mains and lead service pipe are vital details in the great job of providing comfortable and sanitary living conditions for war workers.

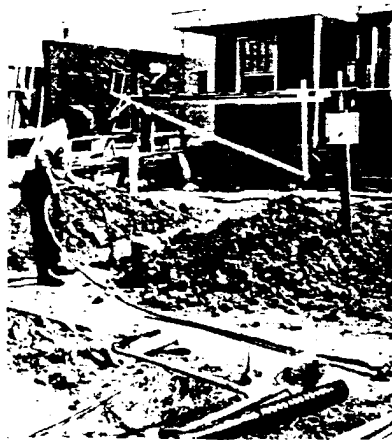
Illustrated on this page are examples of these uses which, while they are being installed in these times of emergency, will none the less be permanent, durable investments of lasting value to the cities and to the owners of the properties involved.

In Schenectady, New York, a new pumping station and the necessary mains and connections have recently been installed. This job included the laying of nearly 2,000 ft. of cast-iron pipe in 8-in., 14-in., 18-in., 24-in. and 30-in. sizes. Over 14,000 lbs. of calking lead was used. The work was done by the Stock Construction Company of New York City. These lead-

calked mains, water-tight and flexible, will be serving the city of Schenectady through many years of future peacetime growth.

In Detroit, Michigan, lead is the standard required material for water service pipe. Lead is used both for the connection from main to curb stop, which is installed by the city water department, and for the line from curb stop to the house which is installed by the plumber. Lead service

Installing shop-prepared lead service pipe on Detroit housing project



MC GREGOR

Wiping curb stop to lead water service in shop speeds up work of installation crew

lines provide the necessary flexibility to compensate for any possible ground settlement as well as the durability and corrosion resistance which will ensure to the property owner long, trouble-free service and full flow to take care of his maximum demands.

Though water department officials like other industry operators have plenty of troubles and obstacles to overcome they have been spared the necessity of using untried makeshifts for jointing and service pipe materials by the continued availability of lead for these uses.

All-Lead Waste-Vent Frames are Economical

IN cities where the use of lead pipe for waste and vent lines is required or generally used builders and owners of new or remodelled buildings are realizing both present and future benefits. At the present, in addition to the usual advantages of ease of installation and economy, lead is easily obtainable because of the ample supply of this durable metal. In the future the owners of buildings in which lead wastes and vents are used will be free from the annoyances and expense which result from rusted out pipes and from stoppages due to accumulations of waste at joints and sharp angle fittings.

Two recent jobs in midwestern cities serve to illustrate these points

clearly. In expanding the comfort and recreation facilities of the W. C. Norris Mfg. Co. of Tulsa, Oklahoma, certain former offices are being converted to toilet rooms. The waste and vent frame shown in the illustration is entirely of lead with all joints and connections wiped. It can be noted that, disregarding the connections to the cast iron waste fittings, there are 11 joints in this frame which would have required 33 joints if it had been built up of rigid pipe and fittings. It is also to be noted that a wiped joint joins the parts together in a union which is as strong or stronger than the pipe itself and is also smooth and freely open in the direction of flow. Each joint in a rigid pipe and fitting

Pouring a lead joint in water main on Schenectady, N. Y. pumping plant extension



WHITE STUDIOS



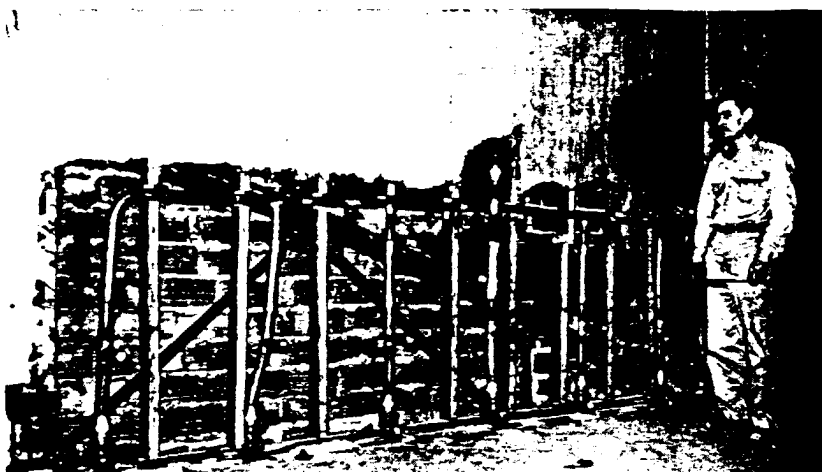
All-lead waste-vent frames in residence under construction in East St. Louis, Illinois

frame can be a source of weakness and a potential lodging place for waste and soil if it is not made with unusual care and perfection.

Similar economies in installation and advantages in operation are evident in the photograph showing the roughing in for one of 35 houses now under construction in East St. Louis, Ill. Here again can be seen the economy of joints required and the easy gradual changes of direction accomplished by the use of bends in place of angular fittings.

In both of these installations it can be noted that the vents are installed with the same careful regard for free opening in the direction of flow as are the wastes. This is of special significance since the carrying away of dangerous gases is a function of the plumbing system equal in importance to the disposal of waste matter. The smooth gradually curved bore of lead pipe is therefore an important advantage in vent lines as well as in waste pipes.

In the many cities throughout the country where lead pipe is required for wastes, vents, and closet bends, little if any change has had to be allowed in plumbing code requirements as a result of wartime emergencies. Their required materials have remained available and the quality of their plumbing installations has not had to be reduced. War emergency has not forced the sacrifice of safety.



Fine example of economy and serviceability of all-lead waste-vent frame in western defense plant

Lead Coated Corrugated Steel Sheets Stand Up Well in Service

LEAD coated steel sheets which are now showing promise of a wide range of usefulness have been in use for building construction for a number of years. An excellent example is furnished by the buildings of the Paxton Mitchell Company of Omaha, Nebraska.

This company operating foundries, machine shops, pattern shops and other manufacturing units occupies a building, part of which was constructed in 1928. At that time lead

coated corrugated sheets were applied to the exterior walls of the building and to the ends and parts of the side walls of the monitor. These sheets stood up well and when the company built an addition to the building in 1937, lead coated corrugated sheets were again used in the same manner.

The lead coated sheets on the original building have now been in service 15 years and according to an official of the Company they "have shown no signs of deterioration except in one

Lead coated corrugated steel sheets on this foundry building in Omaha, Nebraska, have proved to be highly resistant to corrosion



small place where cinders accumulated behind them, and at this point only a small hole rusted through."

This is an example of excellent performance under especially severe conditions. The lead coated sheets are on a building which houses a foundry melting iron and brass and they are therefore subject to the fumes from both cupola and furnace. They have sustained no damage as a result of

continuous exposure to those fumes.

During the past spring the company had its buildings repainted and, for the sake of uniformity of appearance, the lead sheets were painted along with the other metal work of the buildings. It is a characteristic of lead coated sheets that they are easily paintable. In this case, of course, ample time for weathering had elapsed but such weathering is not

necessary for successful painting. Lead coated sheets may be painted immediately upon erection with assurance that the paint will stick to the lead surface.

As can be seen from the photographs, the lead coated sheets present a neat, clean cut appearance. They are easily erected and they lie together well when drawn into place with lead coated bolts or screws.

Lead Coated Sheet Metal Easy to Paint

THE general use of hot dip lead-alloy coating as a protection of iron and steel is so new that many of the advantages are not yet generally known. Improved methods of applying lead coatings have only recently been developed, largely as a result of the almost complete diversion of zinc and tin supplies to war industries. The term lead coated as used here is intended to mean coated with lead or an alloy containing 95 per cent or more of lead and small amounts of other metals.

Lead alloy coatings on iron and steel sheets possess so many points of superiority over other types of surface protection that increasing amounts of lead coated sheets may be expected to appear in many uses. While lead coatings may be expected to possess great durability when exposed to the weather in their natural state there are many places where sheet metal parts are customarily painted. Gutters, leaders, roofs, spandrels, flashings, corrugated siding and other structural and functional details are commonly included in the parts of buildings which are decorated with color. For these parts lead coated sheets in addition to being highly durable will eliminate much disagreeable work for the

painter as well as the hazard of insecure anchorage which usually threatens painted sheet metal.

All of the metal protective coatings which have been commonly used on iron and steel in the past have required special preparation either to remove greasy accumulations or to roughen the surface so that the paint could anchor itself. Some commonly used metallic coatings must be allowed to weather for months or must be treated with copper sulfate, acid or some other solution to create a "tooth" on the surface to which the paint can cling. Also, paints applied over the oxidized surface of certain coating metals seem to have a tendency to take up metallic compounds which cause them to become hard and inelastic. A hard brittle paint tends to crack and scale off as the metal moves as a result of thermal expansion.

Lead alloy coated sheets are free of all of these troubles. The process of their manufacture entails the use of no scum forming material which must be removed before painting. The surface of the hot dip lead coat requires no roughening to provide a secure anchorage for the paint. If any oxides or carbonates of lead have formed before painting they will not have any

detrimental effect on the paint after it is applied. Thus it can be seen that lead coated sheets are not only less work to paint but once painted they can be expected to hold the paint better than other types of metallic coated sheets.

Any of the standard lead pigments are suitable as priming coats for lead coated sheets. The old standby metal primer, red lead, is excellent. Blue lead or blue basic lead sulfate, another favorite metal primer, will give excellent results but when a white lead paint is being used throughout a painting job no special primer is required. White lead paint will adhere to lead coated sheets with the same tenacity it exhibits when applied to wood or other materials. Thus the number of materials required on a painting job is reduced and the painter's investment in materials is less.

A priming coat for lead coated sheets made from white lead requires no additional materials beyond those that the painter always has on the job for painting wood, stucco or masonry. White lead, linseed oil and thinner, always on hand, are sufficient to formulate a thoroughly satisfactory primer. The same is true of red lead and blue lead if preference calls for either of these pigments. The following formulas are for priming coats suitable for use on all lead coated sheets.

Formulas for Lead Pigment Primers Suitable for Use on Lead Coated Sheets

Red Lead

Red lead in oil.....100 lbs.
Raw linseed oil..... 2 gals.
Gum turpentine..... 1½ pints
Liquid drier..... 1½ pints

Blue Lead

Blue basic lead sulfate
in oil.....100 lbs.
*Boiled linseed oil..... 2¾ gals.
Gum turpentine..... 1 qt.
Liquid drier..... 1 pint

White Lead

Soft paste white lead...100 lbs.
Raw linseed oil..... 2 gals.
Gum turpentine..... 2 gals.
Liquid drier..... 1 pint

* If raw linseed oil is used, double the amount of drier.



No. 23

Landmarks of the War for Independence

CENTRAL New Jersey is rich in historical landmarks. The state was settled early and was dotted with prosperous farms before the time of the War for Independence. Many of the farmhouses were used by leaders of the Continental Armies as lodging places or official headquarters for varying periods of time as the training of soldiers and the movement of troops required their presence in dif-



Wallace House, Somerville, New Jersey. Here during the winters of 1778 and 1779, General and Mrs. Washington had a home for a longer period of time than in any other New Jersey house. This beautiful old farmhouse, still in excellent condition has only recently received its latest coating of pure white lead paint

Artillery Hill Farmhouse, Bedminster, New Jersey. Built about 1765 by Elias van der Veer, a sympathizer of the American Revolution. Pure white lead paint keeps this sturdy old house snow white against the deep green of its surrounding cedars



PHOTOS BY DAYTON SNYDER

ferent areas. Thus there are many houses in New Jersey with records of having served as shelters for the brave men who led the American forces.

Upon the present owners of these houses falls the responsibility of safeguarding and preserving them so that they may continue to remind us of the patriotism and devotion of the founders of our nation. Only the best of maintenance materials is good enough for such important service. Many of these historic landmarks have for many years been painted with pure white lead paint at regular intervals. They stand protected today in sound and unweathered condition.

The house in Somerville where General and Mrs. Washington lived during the winters of 1778 and 1779 was their home for a longer period than was any other New Jersey house. Artillery Hill Farm is so called because General Knox quartered his artillery on the property for a time. Until 1905 the ownership remained in the family of Elias van der Veer.

THIS IS NO. 23 OF A SERIES REPRESENTATIVE OF THE MANY AMERICAN LANDMARKS IN VARIOUS SECTIONS OF THE COUNTRY THAT ARE PRESERVED FOR THE FUTURE WITH PURE WHITE LEAD AND OIL PAINT. MANY OF THEM HAVE ALWAYS BEEN PROTECTED WITH THIS RELIABLE MATERIAL ACCORDING TO AVAILABLE RECORDS.

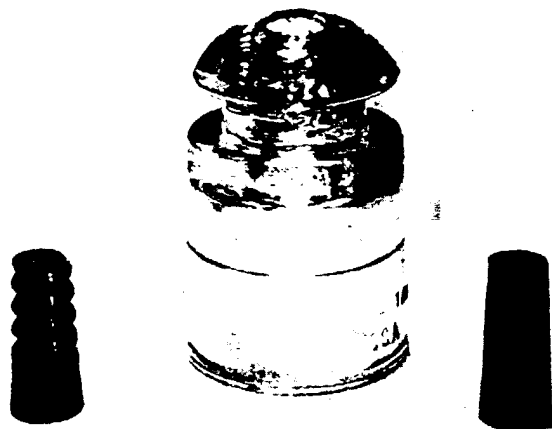
Lead Used to Cushion Glass Insulators

FEW metals are used for so many different reasons as is lead. It has uses based on its high resistance to corrosion by chemicals as well as in atmosphere. Other uses are based on its ductility, its ease of casting, its high density and weight, its unresponsiveness to vibration and even on the softness which is one of leads most noticeable characteristics.

The use shown in the accompanying photograph is based on softness and malleability of lead. In the picture are a glass telephone line insulator and two lead sleeves of a kind that are used to form a cushion between the glass and the threaded steel pin which supports it. One of the sleeves has been in place and bears the form of the threads impressed upon it by the glass. The other sleeve

is as it comes from the manufacturer. These sleeves are accurately made to close tolerances especially as to diameter, taper and wall thickness. In place between the steel pin and the glass the lead forms a soft protective jacket on which the glass can be screwed down tight without breaking. The lead will also serve to retard the

transmission of vibrations from the wires to the cross arms and poles.



Used (left) and unused (right) lead sleeves which provide cushioning surface between glass telephone line insulator (center) and steel supporting pin



The following articles and reprints contain information, drawings and specifications on the use of lead products helpful to architects, engineers and others in the construction industry. They are available, free of charge, upon request to the Lead Industries Association, 420 Lexington Avenue, New York 17, N. Y.

PROPERTY PROTECTION WITH WHITE LEAD PAINT

A 28 page booklet on the protective value, durability and beauty of pure white lead paint with quantity estimating tables, formulas and mixing and tinting instructions for exterior and interior use.

SOME PAINTING PROBLEMS AND THE ANSWERS

By Dr. F. L. Browne, Senior Chemist, Forests Products Laboratory, Madison, Wise.

Reprinted from the National Real Estate Journal, Sept., 1939.

STAMFORD'S DOUBLE LIFETIME HOME

A complete analysis of hard lead flashing, white lead paint, lead plumbing, plywood and red cedar Corrigrade shingle details and installation methods. Reprinted from the American Builder, July, 1939.

STOP DEMON RUST

Leaflet giving concise, simple instructions in the use of the rust preventing qualities of Red Lead Paint in protecting farm machinery.

SUMMARY OF NOTES ON LEAD ROOFING

A brief description of the uses of lead for roofing and flashing purposes and the proper practices of its application. Reprinted from "Sheet Metal Worker".

LEAD EQUIPMENT USED IN INDUSTRY

By F. E. Wormser, Secretary of Lead Industries Association

A summary of the uses of lead in the production and handling of corrosive chemicals. Reprinted from "Metal Progress" to be included in the next edition of "American Society of Metals Handbook."

WHITE LEAD PAINT FOR DEFENSE HOUSING

Reprint from Bulletin of the Producers' Council including specifications and graphic mixing instructions for exterior and interior White Lead Paint.

COMMERCIAL STANDARDS:

Calking Lead, CS94-41

Lead Pipe, CS95-41

Lead Traps and Bends, CS96-41

Official publications by the Government Printing Office of the above Commercial Standards as promulgated by the U. S. Department of Commerce through the National Bureau of Standards, effective June 25, 1941.

LEAD PLUMBING FOR DEFENSE HOUSING

Reprint from Bulletin of the Producers' Council including information on the Emergency Plumbing Standards and the Defense Housing Critical List.

NEW LEAD COATING PROCESS ELIMINATES USE OF ZINC ALLOYS

By W. Yonkman, Engineer, Western Electric Co.

A description of a successful hot dip lead coating process with complete instructions for changing over from hot dip galvanizing using the same equipment. Reprinted from Products Engineering, May, 1943.

PARTIAL LIST OF USES OF LEAD NOT RESTRICTED BY CONSERVATION ORDER M-38

Anodes
Anti-knock treatment for motor fuels
Bearing metals
Calking lead, lead wool
Ceramics (Except as on ingredient of ornamental glass)
Chemical equipment—tanks, linings, piping, pumps, valves, filters, evaporators
Coatings on iron, steel and other metals
Collapsible tubes
Counterweights (except sashweights)
Die casting for process work
Fittings—traps, bends, floor flanges, ferrules
Flooring in chemical and explosives plants
Gaskets and packings
Insecticides and chemicals
Manufacturing equipment for synthetic fibres
Metal pickling tanks, spray nozzles and piping
Mould material for casting plastics
Name and instruction plates
Paint pigments—white lead, red lead, blue lead, litharge
Pipe—soil, waste, water service and chemical
Plating tank linings
Roofing, flashing, gravel stops, damp proofing
Safety tread
Scientific and experimental apparatus
Sheathing for electric cables
Shot—ammunition
Shower pans, floor safes, waterproofing
Solder
Storage batteries
Substitution for more critical metals
Varnish making—driers
Vulcanizing moulds
Window cames—glaziers lead
X-ray and radium protection

USE PERMITTED WITH CERTAIN RESTRICTIONS

Automobile body solder
Casket hardware—casket linings
Foil

**Buy that
EXTRA War Bond
Today**

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