SENT TO PIN 1
Engineering and Purchasing Personnel

LEAD INDUSTRIES ASSOCIATION, INC.
292 MADISON AVENUE
NEW YORK 17, N. Y.

November 20, 1963

SUBJECT: 1964 SWEET'S CATALOG REPRINTS

To Member of the Lead Industries Association, Inc.:

We are enclosing the following four reprints:

Sheet Lead for Moisture Protection
Lead Plumbing
Lead to Control Sound and Vibration
Lead for Modern Design

which will appear in the 1964 Sweet's Catalogs as detailed below:

SWEET'S ARCHITECTURAL CATALOG - estimated distribution to 20,000 architects
Sheet Lead for Moisture Protection
Lead Plumbing
Lead to Control Sound and Vibration

SWEET'S INDUSTRIAL CONSTRUCTION CATALOG - estimated distribution to 14,000 individuals and companies in the industrial construction field.
Sheet Lead for Moisture Protection
Lead to Control Sound and Vibration

SWEET'S LIGHT CONSTRUCTION CATALOG - estimated distribution to 29,000 individuals and companies who are builders of homes and other light construction.
Lead Plumbing

SWEET'S DESIGN ENGINEERING CATALOG - estimated distribution to 19,000 design engineers in all industries.
Lead for Modern Design

We are sending the first three reprints to our "Lead" mailing list of approximately 13,000 architects, building superintendents, building contractors, and members of the Building Research Institute, in addition to the distribution through Sweet's Catalogs.

Twenty five copies of each of these reprints will be supplied to members without charge. Additional copies are available at 6¢ each for the first three leaflets, and 22¢ for the last one.

Sincerely yours,

David M. Borcina
Secretary

DMB:HMN
Look Ahead with Lead

SHEET LEAD

SHEET LEAD

Today, whether your roof is on a small home, a large office building, a monument or an industrial installation, it faces a more difficult life than its predecessors from as much as a thousand years ago. Yet, for all its historical success, the new lead is one of the most modern of roofing materials. An alloy of lead with antimony resulting in increased stiffness and strength, it enables the architect to specify thinner gauges with less weight and cost and without lessening the advantages lead has traditionally held in the roofing and flashing field. Today, in addition to snow and ice, intense heat and cold, we have the corrosive elements of modern industrial atmospheres to combat. Lead has answered Architects' and Builders' needs from far back in antiquity—and the new lead still does today. Following are briefly but a few of the outstanding advantages of lead as a roofing and flashing material.—

DESIGN VERSATILITY
Use of battens or standing seams, as illustrated, gives character to visible roof areas.

COLOR COMPATIBILITY
Acquires a soft, silvery grey patina with age which results in color harmony with any masonry and, for exposed roof areas, can be painted to become a part of the total design concept.

ECONOMICAL
Pound for pound one of the cheapest of the common metals, lead in the new alloy with antimony is competitive in the metal roofing market. Economical too from the standpoint of maintenance a properly installed lead roof is virtually free from repairs and replacements. Universally recognized as a quality material, the new lead again proves that quality does not cost, it pays.

EASILY INSTALLED
Can be installed by any qualified roofing or sheet metal contractor, lead is easily worked, cut, formed, or molded.

PERMANENT PROTECTION
The most durable of common metals, lead has the greatest resistance to corrosion in whatever atmosphere Industrial, Urban, Rural or Seacoast.

NON-STAINING
Corrosion products of lead approach the composition of the surface minerals and are insolvule. They remain on the lead and no staining of adjacent materials is possible.

NO SOLDERING OR WELDING
Every seam acts as an expansion joint.

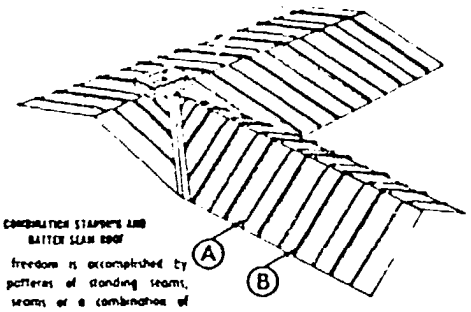
FULL THICKNESS
Lead is an homogeneous material, full thick, not a coating to protect a more vulnerable material.

SALVAGE VALUE
Often overlooked, a lead roof today has frequently more worth, as scrap, than its total cost in labor and materials represented when built.

POOLS AND PLANTERS BROCHURE
Describes installation procedures of seven lead lined pools and planters, including a suggested specification. Send for your copy.

for roofing

Sheets should not exceed 8'-0" in length and, if more than 12" wide without longitudinal bends reinforcing them, should not be over 6'-0" in length. Weights should be as indicated on these typical details or as called for in the specification on page 4.



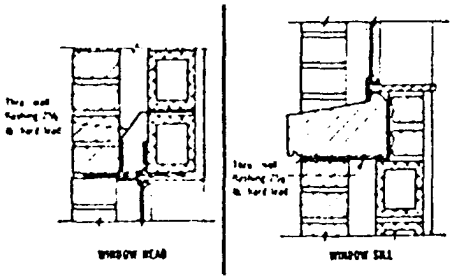
COMBINATION STANDING AND BATTEN SEAM ROOF

Design freedom is accomplished by using patterns of standing seams, batten seams or a combination of both.

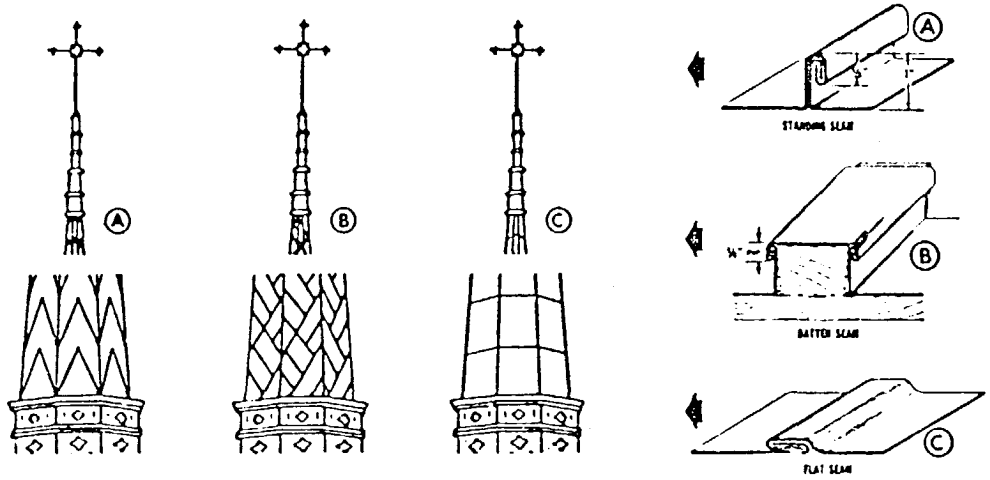
for flashing

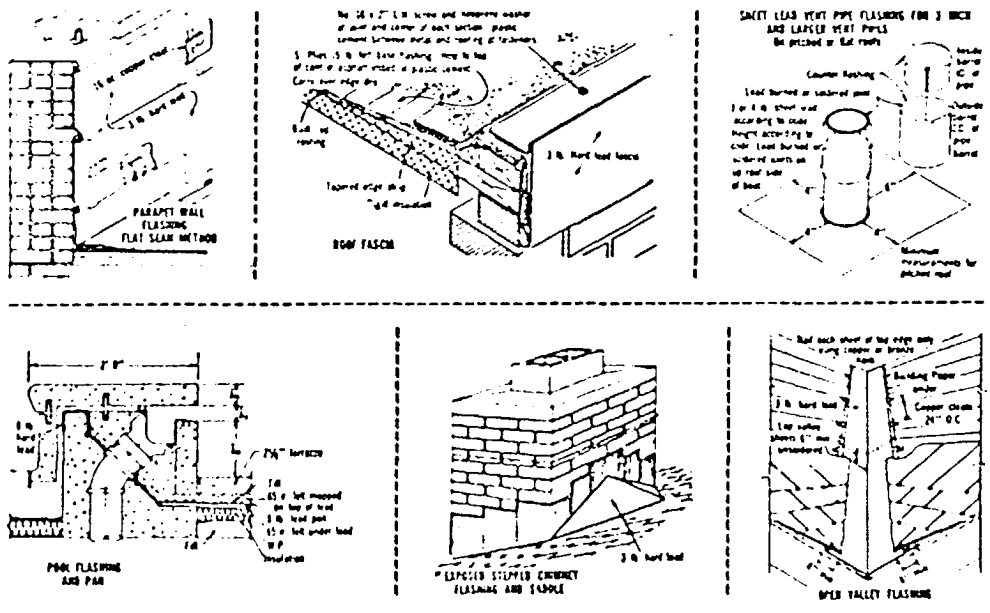
Roofing for country homes may be 2½ lb. hard lead. For larger buildings or larger areas to be covered, 3 lb. hard lead should be specified. For pool linings, slop sinks or shower stalls, 4, 6, or 8 lb. soft lead is required.

Battens or standing seams may be spaced 15" to 18" o.c. or to accommodate a 24" wide sheet by 48" long. Flat, horizontal loose locks join sheets together at the 48" interval, are formed in the direction of flow and staggered in adjoining bays.



WINDOW HEAD WINDOW SILL


A
B
C
STANDING SEAM
BATTEN SEAM
FLAT SEAM


PARAPET WALL FLASHING FLAT SEAM METHOD
EAVE FASCIA
SHEET LEAD VENT PIPE FLASHING FOR 3 INCH AND LARGER VENT PIPES
PAN FLASHING AND PAN
EXPOSED STEPPED CHIMNEY FLASHING AND STEPPLE
OPEN VALLEY FLASHING

SPECIFICATIONS

SHORT SPECIFICATION

Unless otherwise particularly specified, all sheet metal work shall be 2½ lb hard sheet lead, and all material and labor in connection therewith shall be executed in strict conformity with the recommended practice and Standard Specification of the Lead Industries Association, which specification is hereby declared and made a part of this specification, with the same force and effect as if written herein in full.

STANDARD SPECIFICATION

MATERIALS

Unless noted otherwise, all lead shall be hard lead, containing not less than 6% or more than 7.5% of antimony, and the remainder shall be lead.

Sheet lead shall be free from pits, dents, buckles, waves, scratches, grit, foreign matter, porosity, and other injurious defects. All lead shall be 3 lb hard lead except where herein specified otherwise, and except as follows:

1—Where flashings may be 2½ lb hard lead. Step flashing concealed hip flashing closed valley flashing cap flashing, window and door head and sill flashing chimney cap flashing gutter lining where gutters are not over 6" wide, gable end flashing, column cap and base flashing (where no heavy weight rests on same).

2—Where roofing may be 2½ lb hard lead. Small standing seam roofs, where seams are not greater than 15" o.c. Batten roofing where battens are spaced not over 18" o.c.

No sheet shall exceed 2'-0" x 4'-0". Occasional larger sheets may be permitted. Flashing sheets shall be not over 8'-0" long. Sheets with flat surfaces more than 12" wide without longitudinal bends reinforcing them shall be not over 6'-0" in length.

COATING FOR CONTACTS WITH CEMENT OR CONCRETE

a. Black asphaltum brush coating as made by .....
b. Layer of 15 lb asphalt impregnated rag felt.

ROOFING FELT:

a. Under all lead roofs lay 30 lbs. per square building felt, as made by .....

CLEATS & NAILS

a. Cleats shall be—16 oz. copper (or) 3 lb. hard lead.
b. Hard copper wire nails.

SOLDER

a. 50-50 solder for hard lead—Standard Specification of the A.S.T.M., B32-40aT.

JOINT & SEAM COMPOUND

a. Vulcatex #7200 or Keuhl non-hardening compound.

LAYING & WORKMANSHIP

EXAMINATION OF SURFACES

(a) All defects found in surfaces prepared by other trades to receive lead roofing shall be reported to the Architect in writing. The Architect will cause all defects to be remedied. The commencing of work by the Contractor indicates his acceptance of the surfaces.

TYPES OF ROOFS:

(a) Roofs shall be: standing seam (or) batten (ribbed)—spaced ....." o.c. (preferably 18").

(b. Battens, as set by others, shall be ..." wide at top, tapered to ..." wide at the bottom, and ..." high at center, with the top edges slightly rounded.

(c) Finished standing seams shall be ..." high when completed (not less than 1").

● See Sweet's file index for catalog on lead plumbing

LEAD PROTECTION

a. Use care in handling this material so as to prevent scoring, bruising, or sharp bends.

(b) Paint all lead work which is to come in contact with new or green cement, or concrete, work with one heavy coat of asphaltum or felt on side which is to make the contact.

SEAMS & JOINTS

(a) Sheets shall be joined by loose locks or overlaps made in the direction of flow, which shall be filled with non-hardening compound where there is possibility of water, snow, or ice standing or driving into the joints. Where bends in sheets cross the seams, the sheets shall not be notched to facilitate seaming.

1—Flat lock seams shall finish at least 1" wide.

2—Lap seams shall lap at least 3" on vertical surfaces or with in flashings, or 4" elsewhere.

3—Standing seams shall finish at least 1" high unless otherwise specified. Soldered seams shall only be used for inserting gusset pieces, making special caps, and for other special conditions, and in no case shall be used to join roofing or flashing sheets to make continuous runs of roofing or flashing greater than 4'-0", and 8'-0", respectively.

CLEATS

(a) Cleats shall be 16 oz. copper, except that if any part is exposed, 3 lb. hard lead shall be used. Cleats, except where otherwise specified, shall be at least 2" wide and 4" long, secured by two nails. Continuous cleats will be in lengths not exceeding 8'-0" and a space at least ½" wide shall be left between sections. They shall be nailed at least every 8". All cleats shall have sufficient metal on the nailed end to turn back over the nail heads to protect the lead lying over the nails.

FASTENING

a. Cleats shall be used to secure sheet lead to supporting surfaces in such manner as to permit free expansion and contraction of the lead. Nails or screws shall never be driven through sheet lead unless particularly specified, except that pieces of lead not larger than 18" square may be nailed along one edge only if nail heads are covered.

BENDS

a. All bends shall be made with an easy radius. Where metal turns up on a wall curve or batten, or other surface, provide a clearance between bend in metal and such surface of at least ½" for expansion.

VERTICAL SURFACES:

a. Sheathing for vertical surfaces shall be installed by the standing seam method (or) flat seam method. At the bottom it shall be loose locked to base flashing and at the top to through wall flashing or lead coping.

1. Standing seams shall run vertically. Sheets shall be not more than 2'-0" wide, with this dimension horizontal. They shall not exceed 4'-0" in height and, if the wall is higher than this, the sheathing shall be installed in more than one sheet vertically, with loose locks between sheets. Continuous cleats broken only at standing seams shall support the sheathing at these horizontal joints. Cleats 2" wide shall be folded into the standing seams at 12" intervals.

2. Flat seam sheathing shall be installed in sheets not exceeding 4'-0" long and 18" high, with long dimension horizontal. It shall be supported by continuous cleats, broken only at vertical seams, in all horizontal seams. One 2" wide cleat shall also be folded into the lock at the end of each sheet.

FLASHING.

a) Where flashing is built into a wall and emerges more than 3" into the open, it shall be loose locked where it emerges to a separate piece.

b) Flashing caulked into a reglet shall have separate flashing piece loose locked to the caulked piece.

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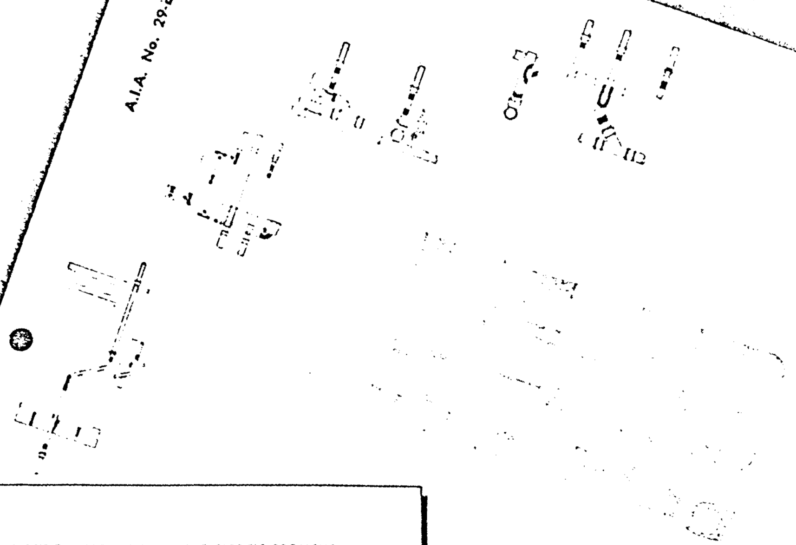
A.I.A. No. 29-d



SPECIFIC INFORMATION ABOUT SPECIFIC PROBLEMS

More detailed information and specifications are available from Lead Industries Association, Inc. on

- Pools and Planters (lead waterproof membranes)
- Lead Shower and Safe Pans
- Chemical Laboratory Drainage Systems

They are yours for the asking . . . write to the Architectural Department at the address below.

LEAD INDUSTRIES ASSOCIATION, INC.
292 Madison Avenue, New York 17, N. Y.

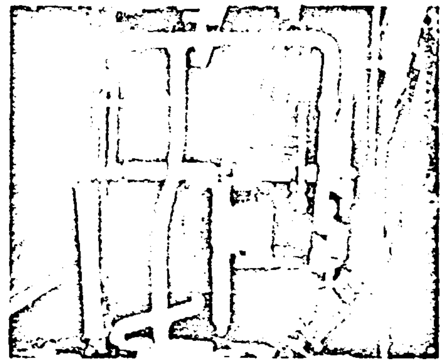
A.I.A. No. 29-B

Look Ahead with Lead

LEAD for MODERN PLUMBING

One of the major advantages of lead plumbing is its adaptability to all types of structures and all kinds of construction. Lead helps to provide a trouble-free and economical installation. Economies are effected primarily because lead is flexible, joints are minimized and installation speeded.

As a result, lead is widely used in the most modern plumbing installations. Lead is virtually essential for certain applications.



[illegible]

ADVANTAGES OF LEAD

DURABLE—*Long considered one of the most durable of the common metals.*

FLEXIBLE—Provides a flexible connection that can take up uneven building settlement, without damage to itself, the fixture or the rigid drain.

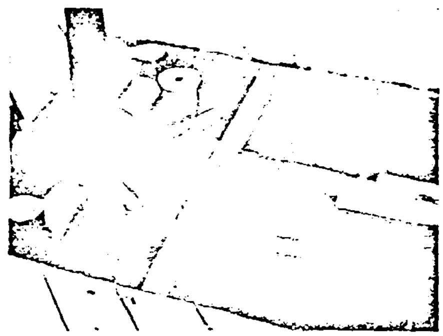
FREE FLOWING—Smooth inner bore and wiped joints offer no obstructions to which solids can cling and cause clogging.

BONDED JOINTS—The wiped joint provides an integral bond that cannot come loose and leak.

LOW COST—The cost of lead connections is generally as low or lower than other types of connections. No expensive fittings are required when changes of direction are made as the pipe itself is easily bent to conform.

PLUMBING CODE ACCEPTANCE—Lead connections are accepted by practically all plumbing ordinances and required by many.

VENTS—Lead pipe is ideally suited for the individual venting of waste fixtures for the same reasons its use is desirable for connecting the fixtures to the drainage system. Very often overlooked is the fact that vents are more subject to corrosion than waste lines, particularly that area of the vent below the rim of the fixture where moisture may collect.



[illegible]

NEW

Lead waste and vent pipe, lead bends or stubs and lead traps are now available already prepared and wiped to brass fittings. Such ready to install lead fixture connections and lead wastes and vents have the advantage of predetermined costs and quality.

*FEDERAL SPECIFICATION WW-P-325 *(Excerpts)*

DIMENSIONS AND WEIGHTS OF CLASS "B" OR "XL" LEAD SOIL AND WASTE PIPE

The wall thickness of lead pipe shall be not more than 0.008 in. under, nor more than 0.012 in. over, the specified wall thickness.

Size (nominal inside diameter)	Wall Thickness	Outside Diameter	Minimum outside circumference	Nominal weight per foot
Inches	*Inch*	*Inches*	*Inches*	*Pounds*
1½	.138	1.776	5½	2.50
2	.142	2.284	7⅛	4.75
2½	.125	2.75	8⅝	5.00
3	.125	3.25	10¼	6.00
4	.125	4.25	13⅜	8.00
5	.125	5.25	16½	10.00
6	.125	6.25	19⅝	11.75

DIMENSIONS AND WEIGHTS OF LEAD BENDS

Lead bends shall be of 0.125 in. nominal wall thickness. The wall thickness at no point shall be less than 0.118 in.

2½ inch nominal inside diameter			3 inch nominal inside diameter			4 inch nominal inside diameter		
Dimensions	Total Weight		Dimensions	Total Weight		Dimensions	Total Weight	
Inches	lb.	oz.	*Inches*	lb.	oz.	*Inches*	lb.	oz.
4 x 7	2	12	5½ x 10	7	2	5½ x 10	9	6
4 x 12	4	1	5½ x 12	8	1	5½ x 12	10	10
4 x 15	4	15	5½ x 15	9	12	5½ x 15	12	10
4 x 18	5	10	5½ x 18	11	4	5½ x 18	14	10
4 x 20	6	2	5½ x 20	12	4	5½ x 20	15	8
7 x 7	3	8	10 x 10	9	5	10 x 10	12	6
7 x 12	4	13	10 x 12	10	6	10 x 12	13	10
7 x 15	5	10	10 x 15	12	0	10 x 15	15	10
7 x 18	6	6	10 x 18	13	8	10 x 18	17	10
7 x 20	6	15	10 x 20	14	8	10 x 20	18	15

INSTALLATION

Requirements for plumbing systems vary widely depending upon state or local plumbing codes or ordinances. However, lead is the one material in today's plumbing system whose use is permitted by practically all codes and is in fact required by many.

Lead finds its widest use for the waste lines of the plumbing system, also for individual vents where sanitary practices recommend that the lead be extended above the fixture level. Thus two important properties of lead, its flexibility and high resistance to corrosion, are used to advantage in this always wet area of the plumbing system.

Lead waste and vent pipe should conform to the requirement for "D" weight lead pipe as given in Federal Specification WW-P-325. In conformance with the same specification, lead traps and bends should have a wall thickness of ⅛ in. The following are the recommended methods of joining lead to lead and lead to other materials:

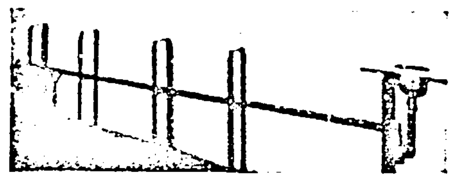
LEAD TO LEAD—Joints made with a wiped joint, or a cup joint made with a soldering iron.

LEAD TO CAST IRON—Made by a brass ferrule wiped to the lead and lead calked into the hub of the soil pipe.

LEAD TO GALVANIZED PIPE (DURHAM)—Made by a brass solder bushing or nipple wiped to the lead and screwed to the galvanized piping.

LEAD TO COPPER TUBE—Made by wiping the lead to a 6 in. section of copper tubing which is then sweat soldered into the drainage fitting or wiped directly to the drainage fitting.

At the U. S. Army Medical Depot, St. Louis, Mo., these back to back lead connected wall hung water closets required only 26 in. of horizontal space.



One of the [illegible] lead waste lines from the lead cup sinks in chemical laboratory tables installed in the new wing of the University of Arkansas Medical School.

CHEMICAL LABORATORY DRAINAGE SYSTEMS

In chemical processing plants, the piping, storage and other equipment may be designed with specific references to the corrosion resistance of materials and the particular chemicals to be handled. In school, college, hospital, plant and other laboratories, however, materials must be selected which have good corrosion resistance against the widest possible variety of chemicals. Since lead is probably more resistant to corrosion by a greater variety of chemicals than any other common metal, it is therefore one of the most useful materials for laboratory piping, fittings, sinks, troughs and the like.

Lead waste and vent piping for chemical laboratories shall be Class "D" or "XL" weight. Where such piping is inaccessible or where corrosive conditions may be particularly severe, Class "B" or "M" weight may be used, class designations in accordance with Federal Specification WW-P-325.

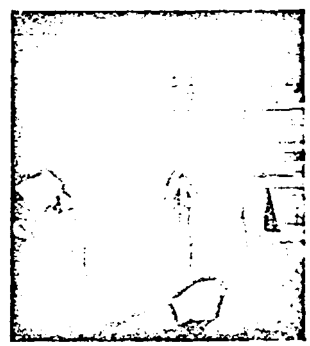
Lead traps should have a wall thickness comparable to the lead pipe to which it is connected and have at least a 2-in. trap seal.

Lead cup sinks or waste bowls should have a wall thickness of at least 5/32 in. equivalent to 10-lb. sheet lead.

At least 4 lb. sheet lead should be used for covering tables and lining table troughs or acid trays.

All joints in lead pipe or sheet lead used for chemical laboratory drainage systems should be lead burned or lead-to-lead flange type. Soldered joints should not be used.

Further details and complete specification is contained in Lead Building Construction Bulletin No. 3—Specification for Lead Chemical Laboratory Drainage Systems, available upon request.



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

LEAD VENT STACK FLASHINGS

Lead vent stack flashings are easily made from not less than 3-lb. sheet lead with soldered or burned joints. Lead vent stack flashings cast in one piece are also available.

Lead when exposed to the atmosphere develops the pleasing gray patina that blends well with any color scheme. This patina is a strongly adherent film that is insoluble and therefore non-staining. This is particularly important where any resulting stains can mar the roof and side walls.

LEAD PANS FOR INTERIOR WATERPROOFING

Lead pans provide an impermeable moisture barrier between shower baths and slop sinks, and adjoining walls and floors. A barrier that will prevent, at small cost, moisture from seeping through the former to the eventual destruction of adjoining beams, studs or decorated surfaces.

Sheet lead pans are also excellent for larger areas such as required for shower rooms, soda fountains and restaurant kitchens.

The accompanying drawings detail the correct method of installing sheet lead pans. For shower stalls, the sheet lead used should weigh not less than 4 lb. per sq. ft., approximately 1/16 in. thick, and for slop sinks either 4 lb. or 6 lb. per sq. ft. Further details are outlined in "Lead Building Construction Bulletin No. 2—Specification for Lead Shower and Safe Pans" available upon request.

A note of precaution: Green cement, containing free lime may be excessive to lead as it is to many other common metals. It is *therefore necessary* to coat the lead with asphaltum to protect it during the curing stage of the cement. After the curing, the asphaltum coating is no longer important.

CALKING LEAD

Lead has several advantages when used for calking, wherever cast-iron bell and spigot pipe is employed. It is soft and allows the joint to become deformed due to settling, vibration, or expansion and contraction, without leaking. It does not deteriorate with age.

Lead can be used in the molten state or in the form of lead wool. Poured joints using molten lead are the most common but lead wool is ideal where the molten form cannot be used, as in wet ground, under water, or for repairs in gas lines where heat might create a dangerous condition.

Calking lead is obtainable in pigs weighing 90 to 100 lb. or in ingots or cakes weighing 1 to 5 lb. calking lead meeting the following requirements should be specified. This is identical with the American Water Works Association Specification C-titer, Tentative Standard Specification for Installation of Cast Iron Water Mains.

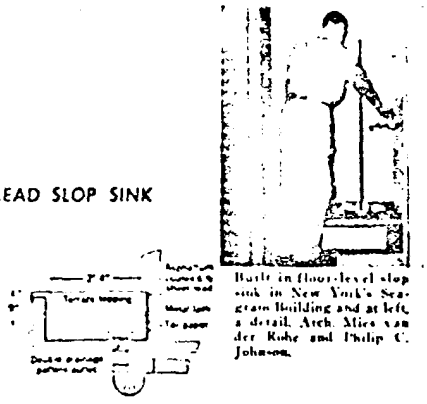
Chemical requirement for calking lead

	PER CENT
Lead, not less than	99.91
Arsenic, antimony and tin together	0.05
Copper	0.08
Zinc	0.02
Iron	0.02
Bismuth	0.25
Silver	0.02

TECHNICAL ASSISTANCE—The Lead Industries Association, Inc. is prepared to assist with technical information and specifications applicable to your specific problem.

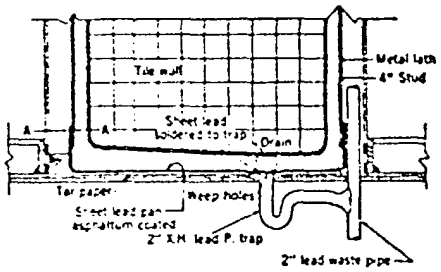
For information on other lead products see our catalogue on:
Lead for Modern Design—Sweet's 1964 Product Design file
Roofing and Flashing—Sweet's 1964 Industrial Construction and Architectural files
Sound and Vibration Controls—Sweet's 1964 Industrial Construction and Architectural files

LEAD SLOP SINK



Built-in floor-level slop sink in New York's Seagram Building and at left, a detail. Arch. Mies van der Rohe and Philip C. Johnson.

LEAD SHOWER PAN



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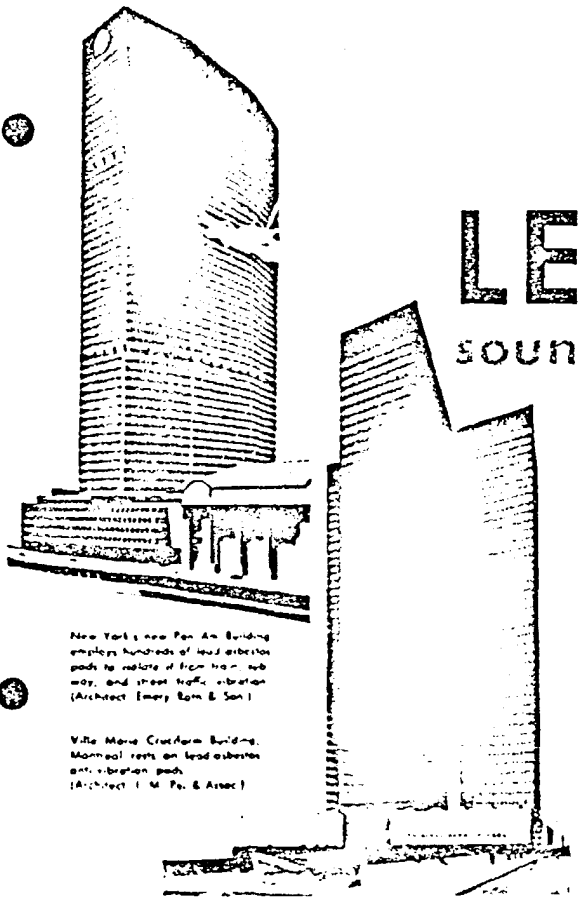
ARCHITECTURAL DEPARTMENT

292 Madison Avenue • New York 17, N.Y.

A.I.A. File No. 39



New York's new Pan Am Building employs hundreds of lead asbestos pads to isolate it from train, sub way, and street traffic vibration. (Architect Emery Roth & Son.)

Villa Maria Cruciform Building, Montreal rests on lead-asbestos anti-vibration pads. (Architect I. M. Pei & Assoc.)

LEAD *to control* sound and vibration

Lead in a number of forms is being increasingly used to control annoying noise and vibration in all sorts of buildings and industrial situations. The areas where lead products are now widely employed are:

anti-vibration pads

Emplaced in building foundation footings to dissipate earth-borne vibration caused by railroad and subway lines, heavy street traffic. They are also being used to stop transmission of vibration from heavy equipment such as roof top cooling towers and printing presses.

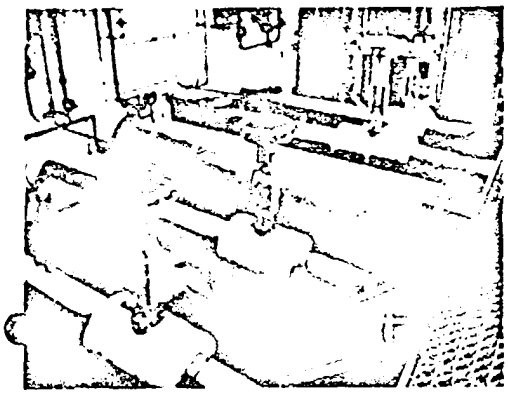
sound barriers

Sheet lead has the highest rating of all common building materials in terms of reduction of sound transmission. It is used in critical areas such as broadcast studios as well as in isolating troublesome noise sources such as boiler rooms.

Inclusion of lead in textile fabric or flexible plastic sheeting leads to novel materials flexible enough to be used as drapery or folding walls, yet having the sound-stopping power of conventional fixed walls. These are being used in schools and meeting rooms and in industrial problem cases.

sound damping

Where the acoustics problem hinges on damping a noise source rather than preventing the transmission of noise, a family of leaded plastic coatings and mastics are employed. These can be supplied directly to such noise sources as vibrating ducts or pipes, rattling metal panels. These materials have been widely used by the Navy in quieting ships engaged in Sonar and antisubmarine activity.



Pressure reduction house of a gasworks—leaded vinyl pipe covering cuts the roar by 30 db.

LEAD INDUSTRIES ASSOCIATION, INC.
292 Madison Avenue • New York 17, N.Y.

Lead Ahead with Lead

A.I.A. File No. 39

N 1945.03

anti-vibration pads

For 45 years lead and asbestos pads have been used in building foundations to reduce transmission of vibration from the ground into the building structure. This practice is followed where railroad tracks, subways, or heavy street traffic might be a source of troublesome vibration. More recently smaller pads of the same construction have been successfully used to isolate rooftop cooling towers from the steelwork of their buildings. Lead—alone, with asbestos, or in combination with other materials—is used for the same purpose under printing presses, commercial laundry machines, rubber mills, big fans and other vibration sources.

In contrast to other materials used for the same purpose lead asbestos pads have two outstanding advantages:

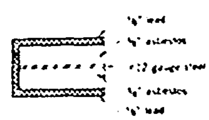
—they are extremely durable. When ground was cleared for the erection of New York's new Union Carbide Building (it rests on lead-asbestos pads), one of the buildings demolished was the old Marguery Hotel, built around the time of World War I. It had rested on lead-asbestos pads which were found to be in excellent condition.

—they will function at a much higher loading than other vibration pads or mountings. Loads of 600 or 800 psi have been used and there is a trend to still higher loadings.

Among the more recent buildings resting on lead asbestos pads are the Pan Am Building adjacent to Grand Central Terminal in New York, the El Paso National Bank in Texas, the Dorchester Building in Montreal. In each of these cases the pads will stop heavy vibration from adjacent railroads from entering the structure.

Where vibrations emanate from a source in or on the building, the pads are equally effective. The rooftop cooling tower of the Grolier Building, recently erected on New York's Lexington Avenue, rests on ten small pads which were installed with the steelwork of the building.

In this way erection of the cooling tower could be carried out with the regular steelwork of the building without the usual loss of time involved in completing the roof, spudding in new footings, and making a separate project of the tower. This "built-in" isolation is possible because of the extreme life of lead-asbestos pads compared with conventional isolating materials.



Sample Specifications* for

ANTI-VIBRATION PADS OR ISOLATION PADS

Except as otherwise shown on detail plans, special insulation pads shall be provided and placed between all column bases or grillages and the tops of concrete foundations. These pads shall be made of five layers of material, as follows:

1. top layer of 1/8-inch sheet lead
2. upper layer of 1/8 inch asbestos roll fire felt
3. middle layer 12 gauge galvanized sheet steel
4. lower layer of 1/8 inch asbestos roll fire felt
5. bottom layer of 1/8 inch sheet lead

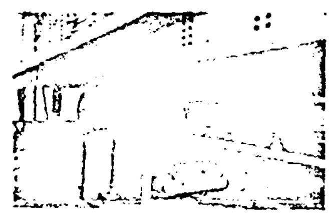
The top and bottom layers of sheet lead shall be lead burned together while the pad is recompressed at 200 psi to form a watertight envelope around the inside layers. Before setting in place pads shall be given one coat of approved asphalt paint.

* Based on material specifications for the Union Carbide Bldg. VIBRATION PAD DATA — for more detailed information see "The Lead Circle" on page 4.

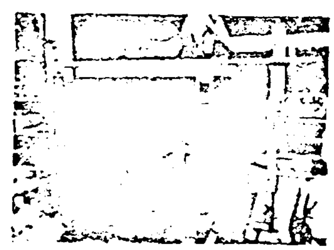
a word about vibration

Most vibration occurring in building structures is unpredictable and complex. It is almost impossible to say beforehand what frequencies and intensities will be encountered. A typical vibration curve caused by a railroad line is shown. Note that the most intense vibration is in the 75 to 600 cycles per second frequency range. For standard lead asbestos pads 1" thick loaded to 800 psi tests indicated about 85 percent isolation.

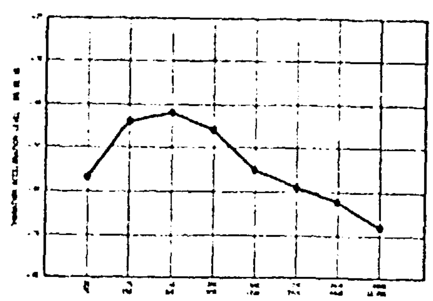
It would appear to be a simpler case when the annoying vibration is caused by a large fan, for example, of known shaft speed. It has been suggested that such a shaft speed can be divided by 60 (seconds per minute) to arrive at the fundamental vibration frequency. Tests of such equipment have invariably shown this to be false. A better approximation is to divide by 60 and multiply by the number of blades in the fan (or vanes in the pump, cylinders in the compressor x 2, etc.). This will provide an indication of the lowest frequency of disturbance for the source. Integral multiples of this (x 2, x 3, etc.) will also be important. In addition, there will always be high frequency noise. So long as there is no important low frequency resonance in the supporting structure, lead asbestos pads have tested 75 to 95 per cent effective in isolating such vibration.



Small lead asbestos anti-vibration pads speeded erection of this rooftop cooling tower, promise indefinitely long service life.



Pads are used under many large newspaper presses, too, to keep vibration out of the building structure.



sound barriers

Any wall acts as a barrier to sound, but some walls are better than others. Acoustics experts, in seeking to generalize their findings, have come to the conclusion that the key factors in effectiveness of a sound barrier are:

weight—The greater the weight (per square foot) the greater the isolation, or transmission loss, given by the partition material.

limpness—The acoustical efficiency of any material as a sound isolator depends not only on its weight but on its "bending stiffness." If a partition is stiff enough it can actually lose much of the advantage it gains by being heavy. This happens because the stiffness of a partition increases much more rapidly than its weight as its thickness is increased.

a general rule is: high weight + low rigidity = good sound isolation

Lead is an obvious choice in the search for a heavy, limp material for construction of partitions. Having a density two or three times that of common building materials (and 10 to 15 times that of wood) it is also a "limp" material in the acoustical barriers, leads to the surprising conclusion that if two equally effective sound barrier partitions are built, one of lead and one of any other common construction, the lead barrier will almost inevitably be the lighter.

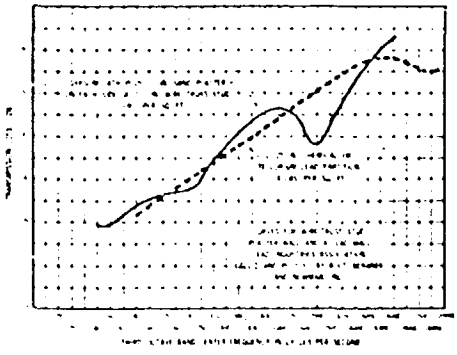
Table I compares thickness and cost for lead alone versus common partition materials.

TABLE I

Type of Partition	Weight of Partition		Material Cost Ratio	Thickness	
	equiv. lead	other to lead		equiv. lead	other to lead
	lb. sq. ft.	lb. sq. ft.		inches	inches
Plywood	2.5	0.67	2.2	3/4	1 1/2[3]
Sheet Steel[1]	3.0	1.8	3.1	1/16	1/32
Solid Plaster	1.6	3.75	0.44	2	1 1/8
Cinderblock	2.2	5.5	0.32		3 1/32
Plaster on studs	1.2	7.5	0.29	4 6	1 8
Plaster on double studs	1.6	11.0	0.25	5 8	3 16
Brick	10.4	15.0	0.33	8	1 4

NOTES: 1) As employed in a movable partition, for example.
2) Estimated by dividing total erected cost by two to get material costs.
3) Approximate. Will vary depending on relative material prices.

The effectiveness of sheet lead as a sound barrier is quickly seen in this comparison of a standard wall construction of gypsum lath plus ½" of sand plaster on either side of a 2½" wire lath stud to sheet lead. Only ⅛" of lead is required for comparable sound isolation.

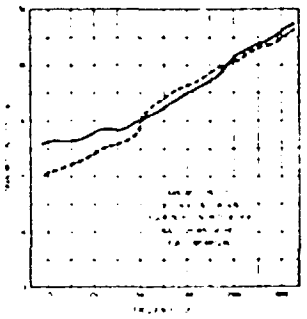


movable sound barriers

Contemporary architectural requirements have spurred the development of flexible "room dividers that provide acoustical privacy. One of the newest developments, called the Torjesen curtain, uses a lead vinyl sheet that rolls up and down like a window shade. A ten foot high curtain, for example, can be raised by its motor in half a minute, regardless of length.

Using a sheet of loaded vinyl weighing 3 lb. per sq. ft. (about ⅛ in. thick) enables the manufacturer to attain a transmission class of 34 according to Riverbank Laboratories tests. Other materials take up to 30 times this thickness to provide the same degree of quieting.

Sound leaks around the wall edges are blocked by vinyl and foam pressure seals in the jams. The curtain's weighted hem maintains a tight seal along the floor.



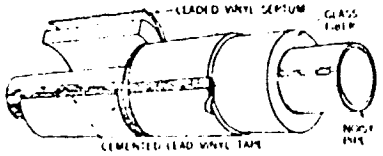
Acoustical tests made at Riverbank Laboratories show the Torjesen curtain to attain a sound transmission class of 34 in the 125 to 4000 cycles per second ranges.

flexible plastic sheet

More recently, flexible vinyl sheet loaded with metallic lead powder has been used to make similar sound curtains. This material is vinyl coated or fabric covered (laminate) and is available in a complete variety of colors, surface textures and decorative designs. It can be used in much the same way as the woven material; similar fittings systems are available.

Flexible plastic sheet, however, is often put to use in other ways. The cabin of the Navy's HSS-2 anti-submarine helicopter, for example, is quieted by using loaded vinyl sheet in conjunction with glass wool. The material is also used by manufacturers of better quality folding doors and office equipment, etc.

One industrial use clearly demonstrates how loaded vinyl can be put to work on noise sources. The cutaway drawing below shows a glass wool and leaded vinyl cover which reduced the intense noise of a gas pressure reduction station by about 30 decibels.

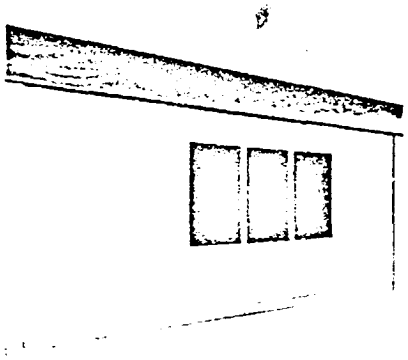


LEAD INDUSTRIES ASSOCIATION, INC.

sound damping

leaded mastics

Still another tool of the architect and designer in the family of leaded plastics and mastics available for painting or trowelling directly onto rattling or ringing metal noise sources. Relatively inexpensive, these materials are quick and easy to apply and are dramatically effective in stopping harsh metallic buzzes and "bonngggs."

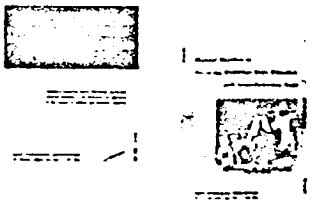


Leaded vinyl Tarpaulin curtain that rolls up and down like a window shade. Its sound transmission class of 24 db provides adequate privacy between rooms.

For information on other lead products see our catalogs on
Lead for Modern Design – Sweet's 1964 Product Design file
Roofing and Flashing – Sweet's 1964 Industrial Construction and Architectural files
Plumbing – Sweet's 1964 Architectural and Light Construction files

technical assistance

Although a wide variety of products such as those described are already on the market, new developments are occurring at a rapid pace. Lead Industries Association serves as a clearing house for technical and application data concerning these. On request, the LIA will furnish names and addresses of manufacturers of these and other products—such as lead-wood and other laminates, soundproof doors, etc. In addition the Association maintains a library of technical publications and methods and is adding to this by publishing new data as it becomes available.



publications available

IMPROVED SOUND BARRIERS EMPLOYING LEAD

—six twelve page engineering report gives detailed information and calculation methods.

CURRENT PRACTICES IN ISOLATING BUILDINGS FROM VIBRATION

—illustrations of several current construction jobs where lead pads were used, detailed drawings of footings, sample specifications.

LEAD ASBESTOS PADS ISOLATED COOLING TOWER VIBRATIONS

—two page reprint gives construction details and case history of lead pads for a rooftop installation.

WAYS TO REDUCE PRESS VIBRATION

—reprint from "Publication Management" describing the preferred method for using lead asbestos anti-vibration pads.

TRANSFORMER NOISE REDUCTION

—design, construction details of close-fitting mass-law enclosure for electrical transformers.

VIBRATION ISOLATION FOR PHILHARMONIC HALL

—report of a study and performance measurements of lead asbestos anti-vibration pads at New York's Philharmonic Hall and Montreal's Place Ville Marie.

LEAD INDUSTRIES ASSOCIATION, INC.
[illegible]

Lead Ahead with Lead

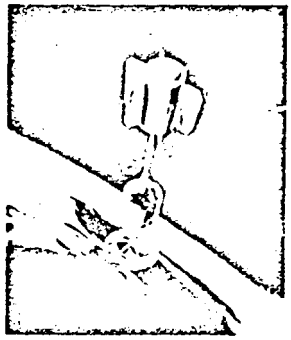
Printed in U.S.A.—1964

LIA23914

This 59-story New York skyscraper rests on lead-asbestos antivibration pads

Nearly 700 lbs. of leaded plastic sound insulation quests cabin space in modern jet liners

Lead shielding safely confines gamma rays on naval and merchant ships



Lead telluride thermo-electric generators power advanced satellites

As new as tomorrow, lead provides the solution to the problems of modern design . . . it serves the needs of advancing technology in thousands of ways

Look Ahead with Lead

LEAD FOR MODERN DESIGN

N 1945.04

LEAD as a design material

Lead is more readily and inexpensively fabricated into a greater variety of useful forms than almost any other common metal. These readily available forms, combined with lead's interesting variety of properties — high density, low melting point, corrosion resistance, malleability, lubricity, unusual electrical properties, and ability to form useful alloys and chemical compounds — provide a unique material for the solution of a wide range of design problems.

look ahead with LEAD

... a material for modern design

LEAD

LEAD

LEAD

design factors favoring LEAD

corrosion resistance

Lead is a permanent metal under varying conditions of weather, exposure to most types of soil, marine and industrial environments, and action of corrosive chemicals.

radiation resistance

The most impervious of all common metals to X ray and gamma radiation, lead is the accepted standards of reference. It occupies minimum space and adds the least weight.

vibration control

Massive without being stiff, lead is a poor conductor of vibration. Its ability to effectively block vibration makes it a popular material for use in mountings and heavy footings.

sound control

In products ranging from home appliances to submarines, lead and leaded materials act to deaden ringing vibrations and isolate sound.

lubricity

No other single metal matches the inherent slickness of lead and lead alloys under sliding loads. This feature is used to advantage in clay bearings as well as under the massive supporting slabs of the Niagara Power Project conduits.

solid state properties

In the field of solid state physics, lead shows outstanding promise as a superconductor. Lead telluride is one of the few semi-metals used commercially in a thermoelectric power generator; lead zirconate-titanate is highly efficient in ceramic piezoelectric elements.

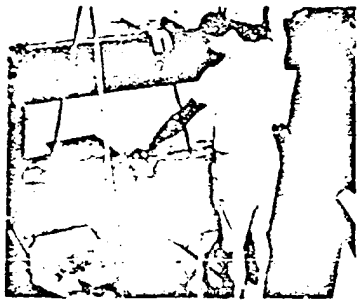
other unique properties

- The most dense common metal
- Low melting point
- Easily fabricated
- Wide range of forms available
- Easily alloyed

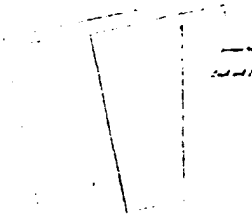
LEAD

for corrosion resistance

Expected to give years of service without paint, without attention, this automobile gas tank is made of terne plate—lead coated steel. No corrosion will take place inside, either, to clog fuel lines. Beyond corrosion protection, the lead coating makes drawing and forming of the tank easier by lubricating the dies, and leaves leak proof seams because it is easy to solder.



This power station in Georgia relies on lead anodes to prevent corrosion in the sea water piping providing cooling at the condensers



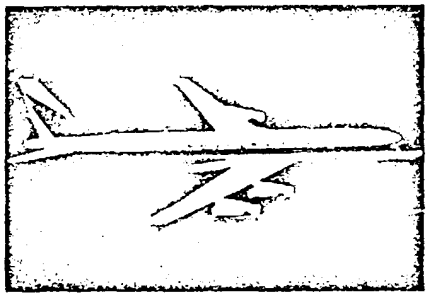
CORROSION DATA FOR LEAD AND ITS ALLOYS—Six page tabulation of the temperature-concentration-corrosion rate of lead and its alloys for 188 chemical materials. Reprinted from *Chemical Engineering*, February 1933. Available from L.I.A.

LEAD

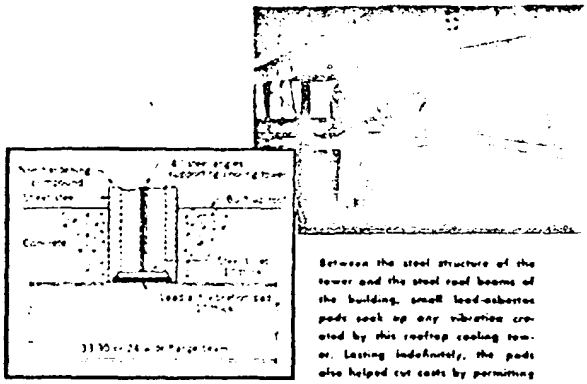
look ahead with LEAD

... a material for modern design

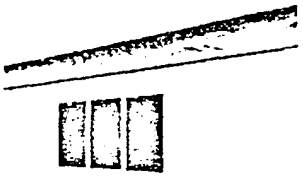
for sound and vibration control



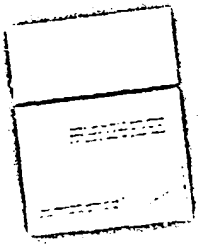
Modern airliners depend on leaded plastics—nearly 700 pounds plane—to still the cabin from the roar of the jets



Between the steel structure of the tower and the steel roof beams of the building, small lead-asbestos pads soak up any vibration created by this rooftop cooling tower. Lasting indefinitely, the pads also helped cut costs by permitting the construction to go ahead on one job of steelwork. Conventional pads require completion of the building and roof, then erection of the tower separately.



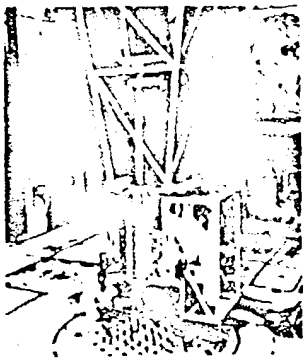
Leaded vinyl Trojasun curtains that roll up and down like a window shade. Its sound transmission class of 24 db provides adequate privacy between rooms.



D INDUSTRIES ASSOCIATION, INC. 5

LEAD

for radiation shielding

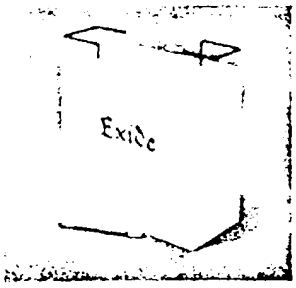


A huge, lead-shielded chamber for loading and unloading Southern California Edison's sodium reactor hovers over the core sunk deep beneath the ground

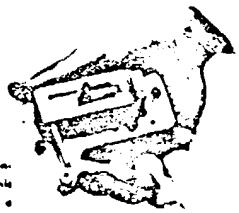
Brookhaven technicians moving a three-ton lead shipping container carrying six cobalt-60 sources

Light rays but not gamma rays will pass through this 42-inch thick lead glass window. This is the view technicians have as they remove a cobalt-60 source from its container

for electrical energy sources



Completely maintenance-free is this new sealed-cell lead-acid battery for powering telephone, microwave, emergency lighting, switchgear and similar electrical equipment in floating or standby service

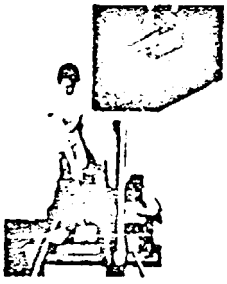


Squeezing the lead zirconate titanate ceramic in this "Spark Pump" generates a 20,000 volt spark. The pump is used as the starter on small engines for lawn mowers and similar machines

LEAD in other roles

soldering and joining

Lead-tin solder is the standard method of attaching handles to stainless steel cans

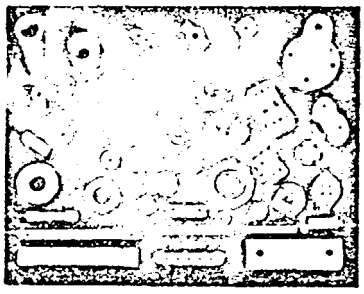


Pumping a jet of molten solder up above the bath (arrow, left, and close up), this automatic soldering machine can complete all the connections in a circuit board in a second or so

Although solder is generally thought of as an alloy of lead and tin, there are many other solders in which lead is allowed with one or more metals such as silver, bismuth, antimony, indium, etc. The composite melting point range embraced by all of these alloys extends from 117 to 588°. Such solders are widely used, of course, in joining copper for seams in tin cans, automobile radiators and other products. It is also practical to solder aluminum, copper, nickel, monel, nickel, stainless steel and zinc as well as most of the other common metals.

Solder is used to fill dents and repair damage to sheet metal and to join lead pipes and cable sheathing by wiping. Wide or narrow melting range alloys meet the special demands of each situation—for wide or narrow temperature ranges of plasticity. Recently, the soldering of electronic circuits has become automatic with the advent of soldering machines which will solder dozens or hundreds of connections in a circuit in a matter of seconds.

ceramics



Lead glazes for insulator bodies meet tough military specs

A powerful flux, lead oxide has been lowering firing temperatures and promoting smooth, lustrous surfaces in ceramics for centuries. Despite this long recognition, ceramists are still making discoveries about lead's usefulness. In the past few years, for example, they have learned to produce economical fired-on coatings for thin-gage aluminum. Thin and tough, this porcelain enamel coating can actually be sawed without serious spalling. The same development has made it possible to enamel cast aluminum and even magnesium. The familiar blackboard of the schoolroom is giving way to greenboards and blueboards, consisting of an extra-low temperature porcelain enamel on steel. These same frits now, for the first time, make possible a porcelain finish on complicated shapes formerly finished only with paints. Glazed brick containing lead is a colorful material for contemporary buildings along New York's Fifth Avenue and the suburbs. Soon to be seen is a cousin of this material—lightweight building block, glazed on both sides to permit colorful and durable inner and outer walls with one block.

pearlescent pigments

Incorporated in the plastic of these combs and hair brushes, pearlescent lead pigments produce a rich, sleek appearance. They can be used with a wide range of hues

The "pearliness" of a pearl is due to a combination of lenticular crystal structure and double refraction. Until recently, commercial pearl pigments were natural products. Today, there are two simple lead compounds which, in addition to being laboratory-controlled for reproducible "pearliness", are available in abundant and predictable supply at stable prices. Suitably tinted, these have been much in evidence in plastic and leather finish for shoes and accessories. They are being used for hard plastic tiles and moldings as a custom finish for luxury automobiles, and for adding distinction to many products molded of plastic or given a protective paint coating.

lubricants

Long an ingredient of heavy duty greases, lead and its compounds are finding still wider use as lubricants today. In greases, the finely powdered lead helps retain the "body" of the grease at high temperatures and pressures. On pitted or worted bearing surfaces, lead particles smear out to fill surface irregularities and present a smooth, slick surface. For the same reason, babbitt and other lead alloy bearing metals have long been used in electric motors, as railroad bearings, and for other heavy duty service. The world's largest bearings are each four miles long. They are sheet lead strips under the conduit walls of the Niagara Power Project and serve to seal water in the conduit as well as to lubricate the joint, permitting it to slide with earth movements. Bearings designed never to see oil in Rolls Royce engines and in space satellites also make use of lead. The anti-seize type embosses lead powder in a Teflon coating and operates from −425 to 545 F. without any further lubrication. NASA's development of a "space bearing" made use of a coating of cuprous lead monoxide, good for temperatures up to 1250 F.

the LEAD library

These publications contain data, drawings and specifications on the use of lead and lead products. They are free of charge to qualified design engineers. Please address your requests to LEAD INDUSTRIES ASSOCIATION, INC., 292 MADISON AVE., NEW YORK 17, N. Y.

general

Materials of Construction Review

Lead and lead alloys in design and construction. Four separate reviews for the years 1958 through 1961 are available. With bibliography. Reprinted from "Industrial and Engineering Chemistry."

Lead in Modern Industry

(Please send request on company letterhead.)
Fully illustrated 250 page hard bound book, describing all phases of lead production and uses. Comprehensive data section is included.

corrosion

Corrosion Data for Lead and its Alloys

Chart form presentation of corrosion resistance of lead and its alloys to 188 chemical materials at the temperature at which they are normally handled. Reprinted from "Chemical Engineering," February, 1955.

Lead Dome's Silver Anniversary

A review of 25 years of service and maintenance records of the lead dome of New Jersey State Penitentiary at Rahway, N. J. Construction method is also illustrated. Reprinted from "Heating and Air Conditioning Contractor."

Anodes for Ship Protection

Results of a detailed examination of lead-silver anodes for corrosion protection of ships. Operating efficiency and behavior are given and lead is compared with other anode materials. Reprinted from "Corrosion", November, 1959.

Seamless Terne for Roofing

Shows architectural use and specifications, but also contains descriptive and engineering data on terne plate.

Summary Specifications for Red Lead Paints

A summary of all foregoing LIA recommendations and specifications for red lead anti-corrosive paints.

lead to control sound and vibration

Lead Asbestos Pads

Current practice in the use of anti-vibration pads for building footings is detailed in this four page bulletin. Drawings and specifications included.

Lead Sound Barriers

Twelve-page engineering report on basic design of sound barriers, cost considerations, and calculation methods for simple barriers.

Isolating Cooling Tower Vibration

Reprint shows how lead-asbestos pads were used to isolate a roof-top cooling tower from the steel structure of a modern office building. Drawing and loading data are given.

ceramics

Lead in the Ceramic Industries

Loose leaf binder, supplements issued periodically, of all of the principal uses of lead in ceramics together with basic data, performance studies and typical formulations.

Ultra Low Loss Ceramics

Technical discussion of new formulations for ultra low loss ceramics together with possible mechanisms of behavior.

electrical and power

Truck Cost Calculator

Twelve page nomographic calculator for industrial trucks. Rapid estimation methods show capital expense, operating and maintenance costs separately. In addition, the bulletin contains basic information on the cost of power from lead-acid batteries and internal combustion engines.