Lead Paints Protect Steel-Faced Colorado Dam

RED LEAD and white lead paint have been used to paint the new steel-faced dam of the South Catamount Creek reservoir supplying the City of Colorado Springs, Colo. This city lies at the foot of Pike's Peak, at an elevation of 6000 feet above sea level, and its only source of water supply is from the high mountain streams originating on the slopes of the Peak. The run-off from these streams occurs only during a few months of the year, making necessary storage reservoirs to carry over the supply for the water system during the months when the stream flow is low or has ceased completely. There are now nine such reservoirs on the various streams, the last of which being on South Catamount Creek at an elevation of 9200 feet.

Full view of the steel-faced South Catamount Creek Dam, Colorado Springs, Colo., the exposed face primed with red lead and finished with pure white lead and oil paint

This dam is constructed with a disintegrated granite fill and has a reinforced concrete toe wall on the upstream face extending into the solid rock with a reinforced concrete face extending from the toe wall to a line one foot above the flow line of the outlet pipe. The remainder of the face is made of steel sheets, 100 in. wide and 25 ft. long, welded to V-shaped expansion joints every 25 ft. The sheets were placed on steel angle horses, in order to provide anchors to the granite fill and to permit the painting of the steel sheets on the under side after welding the joints. After painting the under side, the disintegrated granite was filled in.

Due to the uneven flow from the mountain stream, the exposed face of this dam will be subjected to a very serious test. Because of the high elevation, it will be very cold in winter and fairly warm in summer, presenting a wide temperature change. Furthermore, the steel face will be under water part of the time and exposed to air at other times. It will also be subjected to the wear of ice on the surface, the elevation of which will vary as water is drawn from storage.

The steel face has a surface area of approximately 126,000 sq. ft. Both sides were given one coat of red lead paint and the exposed face was then finished with white lead paint. This finish coat of white lead, with the characteristic heat reflection of light-colored paint, was used to cut down on the expansion of the steel face.

Both red lead and white lead have a long record of durable and efficient service on a wide variety of surface materials and under many varied and unusual conditions. Consequently, it is no wonder that these materials were selected for painting work on this dam.

We are indebted to Mr. Frank O. Ray, City Engineer of Colorado Springs, for photographs and information on the construction of this dam, which was designed by Mr. M. C. Hinderlider, State Engineer, in Denver, Colorado.

At left, a section of the dam showing the steel face and steel horses to support the sheets. Right, the steel dam with the parapet in place prior to painting the exposed face

Flexible Lead Plumbing for New York Apartment Remodeling

At right, one of the old bathrooms in a large New York apartment building, and center, the lead roughing-in after remodeling the plumbing. Note the limited space available

WURTS BROS.

BY specifying lead for plumbing, architects may avail themselves not only of the efficiency and durability of this material, but also of the ease with which lead may be employed to surmount difficulties in installation. This faculty is especially advantageous in remodeling jobs, in which there is greatly increased interest under the provisions of the F.H.A., and is clearly demonstrated in the case of a New York City apartment building recently modernized. The building was erected 54 years ago and extends for an entire city block on one front. A total of 54 apartments are included in the building with stores occupying the ground floor. The owners of this building, however, fully realized the value of more modern plumbing and decided to remodel all bathroom and kitchen plumbing. That this decision was wise is exemplified by the apartment shown in the accompanying photographs. Although the same tenant has occupied this apartment for a number of years, he has agreed to increased rental after the completion of the modernization.

From an installation standpoint, however, the remodeling was difficult in these apartments as the old fashioned bathrooms are small and fixtures are crowded together. Indeed, the available space for installing concealed piping was so limited that it was only due to lead, with its flexibility and space saving features, that the remodeling installations were made possible. By using lead, pipes may be bent around obstacles without the use of joints and elbows. This elimination of extra joints is an additional feature of lead installations, since joints are a great source of failure or weakness in most pipes, retard the flow of water and are potential causes of clogging.

The original piping in this building was largely lead and the fine service it furnished also justified the selection of this material for all waste and vent pipes, bends and concealed traps in the remodeling. Lewis F. Seath, the plumbing contractor, is a strong advocate of lead and uses it almost exclusively in his work. His confidence is borne out by the complete satisfaction lead installations give his customers. Such satisfaction, too, is a splendid recommendation for the architect specifying this material and means the increased good will and confidence of his clients.

This is brought out by the fact that the contractor has done the work for the Ferris Estate, owners of the building, over a number of years.

Below, view showing the remodeled bathroom before decorating. Lead was of great advantage in overcoming the limitations of space for the concealed piping

WURTS BROS.

SPECIFY SEAL OF LEAD INDUSTRIES' APPROVAL MATERIAL

KIRK MEARS

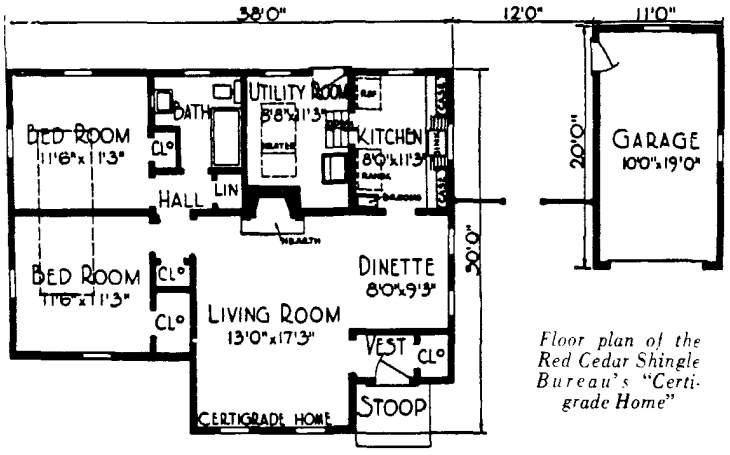
Finished exterior of the "Certigrade Home," painted inside and out with pure white lead and oil

CAREFUL thought and attention were given the interior painting and decorating of the "Certigrade Home". This home, whose outside painting and sheet metal work were described in LEAD, May, 1938, was erected in Lacy Forest, Arlington County, Va., by the Red Cedar Shingle Bureau. It is an outstanding example of low-cost building, using only the highest quality materials, and yet is designed to be built for from $3000 to $4000, depending on location.

For the interiors, each room's purpose and exposure were important factors in selecting new and popular colors and their placement according to latest trends in modern paint styling. Three coats of pure white lead and oil were given all interiors, the desired colors obtained by tinting with pure colors in oil.

With the exception of the kitchen, ceilings and trim were painted light putty gray, an agreeable change from the conventional cream, ivory and white so commonly used. Walls of various colors and shades complete the decorative scheme.

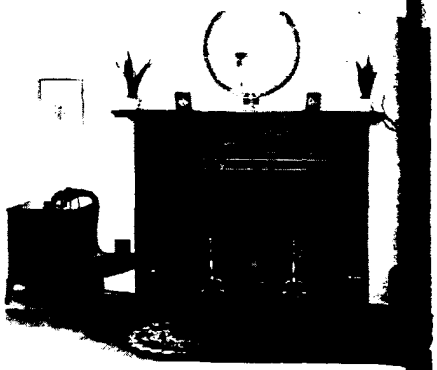
Vestibule walls were painted dark putty blue in contrast with the light gray ceiling and trim. Soft lemon yellow was used to decorate the walls of the living room, dinette and hall. Passing through the hall, one enters the master bedroom, which embodies in its decoration one of the latest paint styling developments. Three of the walls are painted warm gray, but the fourth, the north wall, is finished a delicate shade of peach. Trim throughout is warm gray. Light blue walls feature the guest room, and the utility room is finished in French gray.



Floor plan of the Red Cedar Shingle Bureau's "Certigrade Home"

Pure White Lead a "Certigr

The model kitchen is completely modern in every respect, with a suction fan in one wall to remove unpleasant cooking odors. Equipment, consisting of gas range, refrigerator, and sink, is finished in ivory enamel. Three coats of lead and oil and two finishing coats of ivory enamel were given the wood



Two views, showing the fire

Powdered Lead

RECENT experiments with powdered lead in bearing greases have brought out another important use of this metal to augment the already varied and extensive purposes for which it is employed, and indicate the superior value of leaded greases.

These experiments were conducted under actual operating conditions, the relative merits of regular and leaded lower tumbler greases being compared after use in an 8 cu. ft. gold dredge.

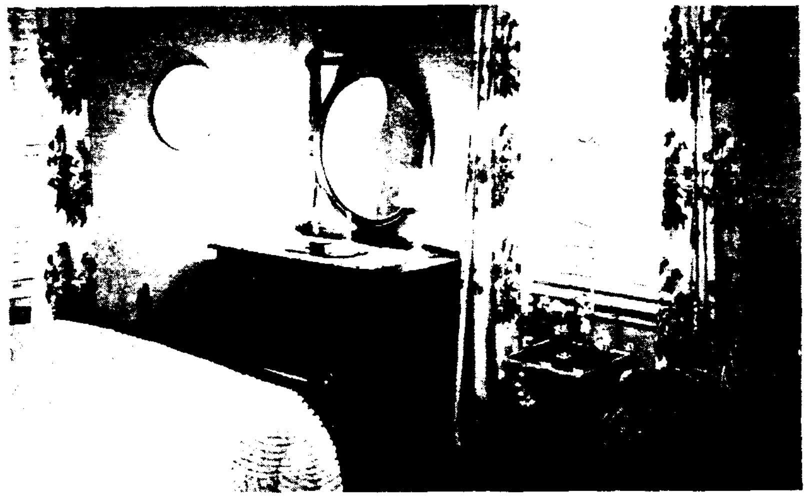
The procedure followed was to caliper the port and starboard bearings carefully and operate the dredge for 53 days with regular grease in the port bearings and leaded grease in the starboard. After this time, the bearings were removed and re-calipered. The reading showed that the wear on the port side was 13 32 in. and on the

l and Paint Used for Modern
grade Home" Interiors

cabinets. Walls, ceiling and trim are white with red moldings and back bands on door frames and windows. This touch of color, combined with the blue marbleized linoleum flooring, provides a room both freshly cheerful and agreeable in which to work.

The tremendous increase in interest

fireplace living room and the modern kitchen of the Home"



Master bedroom of the "Certigrade Home," interiors made of plywood with invisible flush joints and painted in new and attracitve colors

in houses such as the "Certigrade Home" offers a wide field for the development of architects' skill and ingenuity. The decorative treatments afforded by painting are practically limitless and offer the home owner the possibility of changing the colors and styling at any time. Furthermore, this feature is augmented greatly by the use of white lead paint, since an infinite variety of colors and shades are obtainable by tinting with pure colors in oil rather than a few standard colors with which to work out the decorative scheme. Some appropriate color combinations are listed in the accompanying table: the formulas for tinting are based on the quantity of 100 lb. white lead, mixing as described in LEAD, March, 1938.

VESTIBULE

	Scheme 1	Scheme 2	Scheme 3
Ceiling	Lemon Yellow	Lemon Yellow	White
Walls	Grayed Blue	Grayed Blue	Lemon Yellow
Wood Trim	White	White	White

LIVING ROOM

	Scheme 1	Scheme 2	Scheme 3
Ceiling	Off White	White	Pale Tan
Walls	Warm Gray	{1 Wall—Grayed Blue} {3 Walls—Off White}	Lemon Yellow
Wood Trim	Warm Gray	Off White	Medium Tan

DINETTE

	Scheme 1	Scheme 2	Scheme 3
Ceiling	White	White	Lemon Yellow
Walls	Lemon Yellow	Lemon Yellow	Grayed Blue
Wood Trim	White	White	White

NOTE—It should be understood that if Scheme 1 is used for one of the rooms, the corresponding scheme should be used for the other two rooms.

BEDROOM

	Scheme 1	Scheme 2	Scheme 3
Ceiling	White	Peach	Pale Yellow
Walls	{1 Wall—Peach} {3 Walls—White}	Light Blue	Pale Green
Wood Trim	White	White	White

KITCHEN

	Scheme 1	Scheme 2
Ceiling	White	Blue Green
Walls	White	Blue Green
Wood Trim	White	White
Cabinets	Yellow	White
Strips and Molds	Light Blue	Peach
Linoleum	Dark Blue with Black Border	Marbleized Gray and Black

FORMULAS FOR MIXING COLORS

WHITE:	Pure white lead and oil.
OFF WHITE:	1/16 pt. Raw Turkey Umber.
LEMON YELLOW:	1/8 pt. C. P. Chrome Yel. Lemon.
PEACH:	1/4 pt. C. P. Chrome Yel. Orange.
PALE YELLOW:	1/16 pt. C. P. Chrome Yellow Medium.
YELLOW:	1/4 pt. C. P. Chrome Yellow Medium.
WARM GRAY:	1/2 pt. Raw Turkey Umber.
PALE TAN:	1/8 pt. Burnt Turkey Umber.
MEDIUM TAN:	1/4 pt. Burnt Turkey Umber.
GRAYED BLUE:	1 pt. Cobalt Blue; 1/4 pt. Lampblack.
LIGHT BLUE:	1/2 pt. Cobalt Blue.
PALE GREEN:	1/8 pt. C. P. Chrome Green Dark.
BLUE GREEN:	1 liq. oz. C. P. Chrome Green Dark.

ad E...e in Bearing Grease

T... cold dre... like this grease con...ered with ...

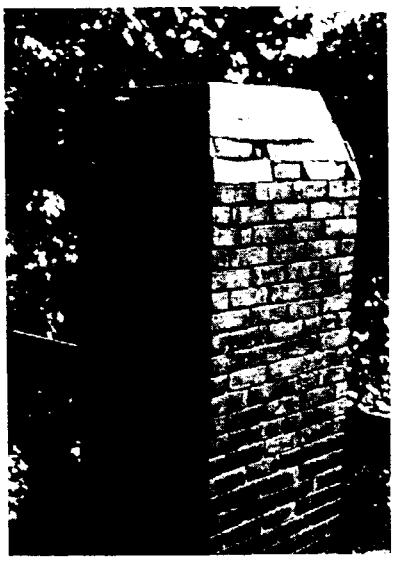
starboard side 6/32 in. Careful examination of both bearings and shafts showed the usual scoring and the presence of sand on the port side, whereas the starboard showed no scoring and the presence of only a small amount of fine slime. Furthermore, during the period of operation, the port side consumed 1-1/3 drums of regular grease as against 7/12 drums, about 1/3, using leaded grease.

From these figures, it was estimated by the field manager of the dredging company that the life of the bearings was increased from 60 to 150 days by using leaded grease. This factor, in conjunction with the saving in grease used and other benefits, fully justified a change to leaded tumbler grease.

This information was reported by the Metalead Products Corporation of San Francisco, Cal.

Hard Lead Chimney Caps

Chimneys without Lead Caps Liable to Deterioration



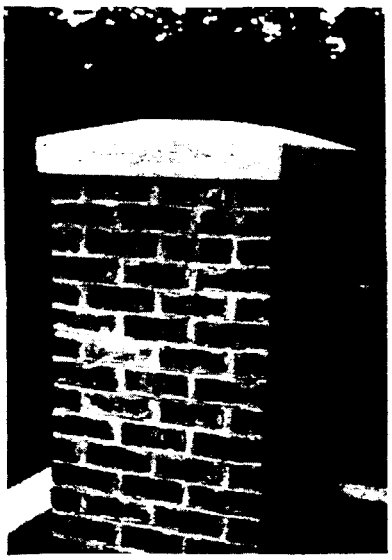
Two views showing the deterioration of the chimneys due to attacks by the weather

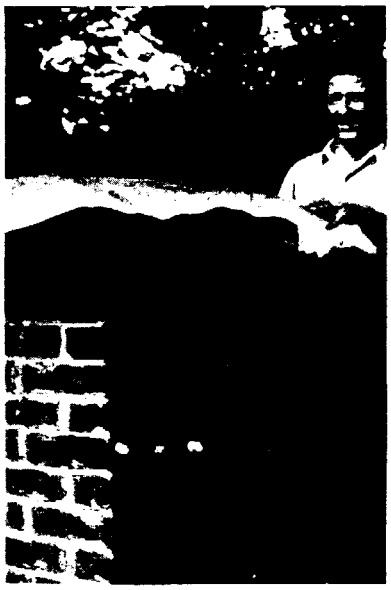
LEAD flashing, properly installed, is a protective measure of great value in safeguarding homes against attacks of weather conditions. Rain, sleet and snow, driving against the roof or sides of houses, are an ever-present danger when buildings are not flashed adequately, for resultant leaks ruin ceilings and wall finishes, damage timbers and may readily be the cause of electrical short circuits. Chimneys, also, are vulnerable parts of the home and the accompanying photographs show forcibly the damage that may occur from weathering. Inspection of the chimneys of a Greenwich, Conn. home prior to re-shingling, showed the great deterioration that may occur. Moisture had permeated the cement tops and joints and when this moisture froze, the cement tops cracked badly, and the mortar was crumbling from the joints. This is clearly delineated in the photographs. Base flashing on the chimneys was found inadequate and here, also, the weather had done considerable damage, both to the chimneys and roof. The destruction wrought on both chimneys was so great that it was necessary to re-build them before proceeding with re-shingling.

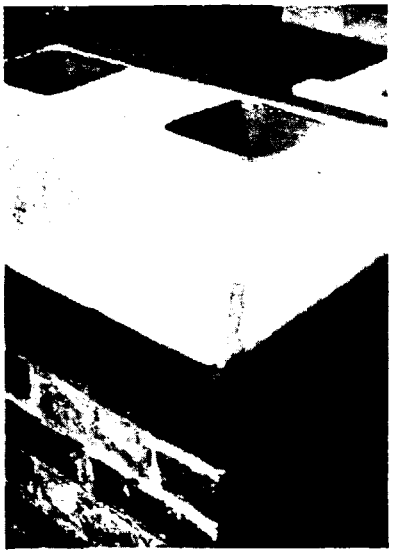
In order to safeguard the new chimneys and roofing from future damage of this sort, the contractor decided to install new base flashings and chimney caps as well. Recognizing the superior durability of lead, together with its ease of installation and the fact that lead does not produce unsightly stains on adjacent building materials, 3 lb. hard lead was selected for flashing these parts and also the open valleys on the reshingled part of the roof.

Chimney cap flashings were installed as shown in LEAD, May, 1938, outside corners being folded and dressed under the 1 in. overhang. Gusset pieces were soldered in the inside corners of the flues, making a completely water-tight top, from which rain will drip without running into cracks in the masonry work and causing damage.

The apron flashing at the front of the chimney was first calked into place and small soakers of lead run under each shingle course, overlapping one another 3 in. and flashed 3 in. up the





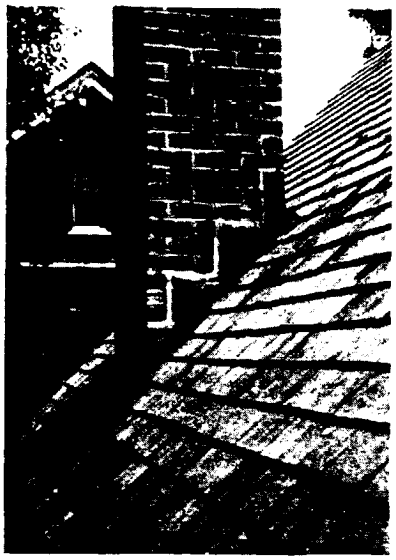


Views showing rebuilt chimney, without lead cap, dressing the lead over the chimney cap, and the finished lead chimney cap in place, adequate protection against deterioration

Lead Flashing for Open Valleys

Lead Assures Water-Tight Roof Intersections

Two views of the completed flashing for the restored chimneys



side of the chimney. Flashing on the cricket was made with two sheets, loose-locked 2 in. to one side of the cricket ridge and extending 14 in. up the roof slope under the shingles. Step flashing was calked into the reglets in the chimney and dressed down over the soakers, loose-locked to the cricket flashing and the apron. Gusset pieces of lead were soldered at all corners to insure complete waterproofing.

Flashing for the open valleys was run in 5 ft. lengths, 20 in. wide, with the edges turned back 1 in. and secured by lead cleats every 12 in. locked into the edge and nailed to the roof battens. The top of each sheet was also locked to cleats, one in each slope, the bottom of the upper length fitted under the edge folds, lapping the bottom sheet 4 in. and dressed down securely. In this way, adequate provision has been made for expansion and contraction, at the same time providing a water-tight joint. Open valley sheets may be lapped in this way when the slope is steep, or loose-locked as shown in the drawing. Where the slope is slight, loose-locking should be done in all instances.

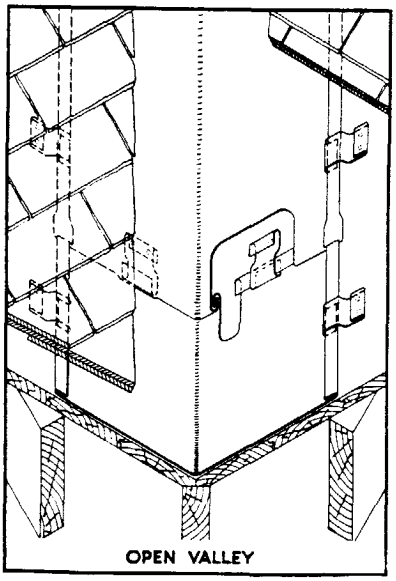
The excellent durability of lead is strong recommendation for its use on

all types of flashings. This factor is augmented, where flashing is exposed, by the attractive gray-color of lead work which blends pleasingly with any building materials. For flashings, such as have just been described, 3 lb. hard lead or 5 lb. soft lead is recommended for open valleys and base flashings on chimneys, 3 lb. hard lead or 4 lb. soft lead for chimney caps.

Alex R. Abramson, of Greenwich, was the general contractor for the repairing and reshingling; John F. Ingham, of the same town, was the sheet metal contractor.

Lead is an excellent material for sheet metal work, whether for valley and chimney flashing, or for use on many other parts of buildings, such as flashing for door and window heads, gutters, leaders, metal roofs, and other applications.

The Lead Industries Association will be glad to assist architects and sheet metal contractors planning to use lead with information on installation methods and other pertinent factors.



Drawing of correct installation of open valley flashing and two views showing one sheet being installed with supporting cleats and the finished valleys after re-shingling

Selecting Correct Sizes and Weights of Lead Services A Factor of Great Importance

OF PRIME importance in getting the greatest satisfaction from lead water services is the selection of pipes having correct wall thickness. Each diameter of lead pipe has three standard wall thicknesses. These are classified in the East as A, AA and AAA, and in the west as strong (S), extra-strong (XS), and double extra-strong (XXS). A and S are identical, as are AA and XS, and AAA and XXS. All lead pipe classified as A or S is designed to withstand 50 lb. per sq. in. constant water pressure, all AA or XS, 75 lb. per sq. in., and all AAA or XXS, 100 lb. per sq. in., regardless of size.

In the old days things were not so simple, for formerly large diameter pipe of any classification was not so strong as small diameter pipe of the same classification. Consequently, it was an easy thing to make errors in selection of the correct weight pipe by choosing pipe with too thin walls in the larger sizes on the assumption that it would withstand the same pressure as smaller pipe of the same classification. To obviate this difficulty, lead pipe sizes were recalculated and resulted in the new Lead Industries Association Standard discussed above.

SPECIFY SEAL OF LEAD INDUSTRIES' APPROVAL MATERIAL

In buying lead pipe, purchasers should insist on pipe meeting these new standards. It is identified by the Lead Industries' Seal of Approval stamped on it. In this way, the purchaser's selection of the correct weight for a certain pressure is simplified and he can be sure, by looking for the Seal of Approval on the pipe, that he is getting exactly what he orders.

As an example, if a city has water pressures in its services of 65 lb. per sq. in., all that is necessary to get the correct lead pipe for the job is to order AA (XS) lead pipe bearing the Lead Industries' Seal of Approval. If the pressure is 90 lb. per sq. in., the specification should call for AAA (XXS) lead pipe bearing the Seal of Approval. The accompanying table lists the Lead Industries Association Standard service pipe sizes and weights, and the pressure for which each is designed.

Pressures listed are constant water pressures. Sometimes water hammer increases pressures materially but momentarily. On a quick test lead is considerably stronger than on a slow test. In other words, pipe of a certain weight will successfully resist momentary high pressures much greater than the constant pressures for which it is designed. For instance, in calculating the standard weights, the allowable fiber stress used was 200 lb. per sq. in. for lead, whereas the ultimate tensile strength of lead on a quick test is about 2000 lb. per sq. in., the exact figure depending to some extent upon the grade of lead used and other factors. Obviously then, the new Lead Industries Association Standards provide a large factor of safety to take care of quick surges of pressure. The question of water hammer and how to protect against it will be discussed in a subsequent issue since it is injurious to all piping systems.

Having selected pipe of proper weight for the water pressures involved, sufficient wall thickness is assured, not only to resist pressure, but also to resist the various types of corrosion to which pipes buried in the ground are subjected. Wall thickness of pipe is of tremendous importance from this angle too, just as the number of plies of an automobile tire affect its resistance to wear. Even the lighter weights of lead service pipe have thick walls to withstand corrosion which add proportionately to its life when compared with thinner walled pipes of other materials, particularly when it is remembered that lead itself is the most durable common metal under most conditions.

Lead Industries Association Standard Service Pipe

Classification		For Pressures up to	Inside Diameter	Weight per Foot	
East	West	lb. per sq. in.	in.	lb.	oz.
A	S	50	¾	3	—
			1	4	—
			1¼	4	12
			1½	6	8
			2	8	12
AA	XS	75	¾	3	8
			1	4	12
			1¼	6	—
			1½	8	—
			2	13	12
AAA	XXS	100	¾	4	12
			1	6	—
			1¼	7	12
			1½	11	4
			2	19	8

Correct sizes and weights of service pipe for various pressures in accordance with the Standards of the Lead Industries Association

SPECIFY SEAL OF LEAD INDUSTRIES' APPROVAL MATERIAL

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

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