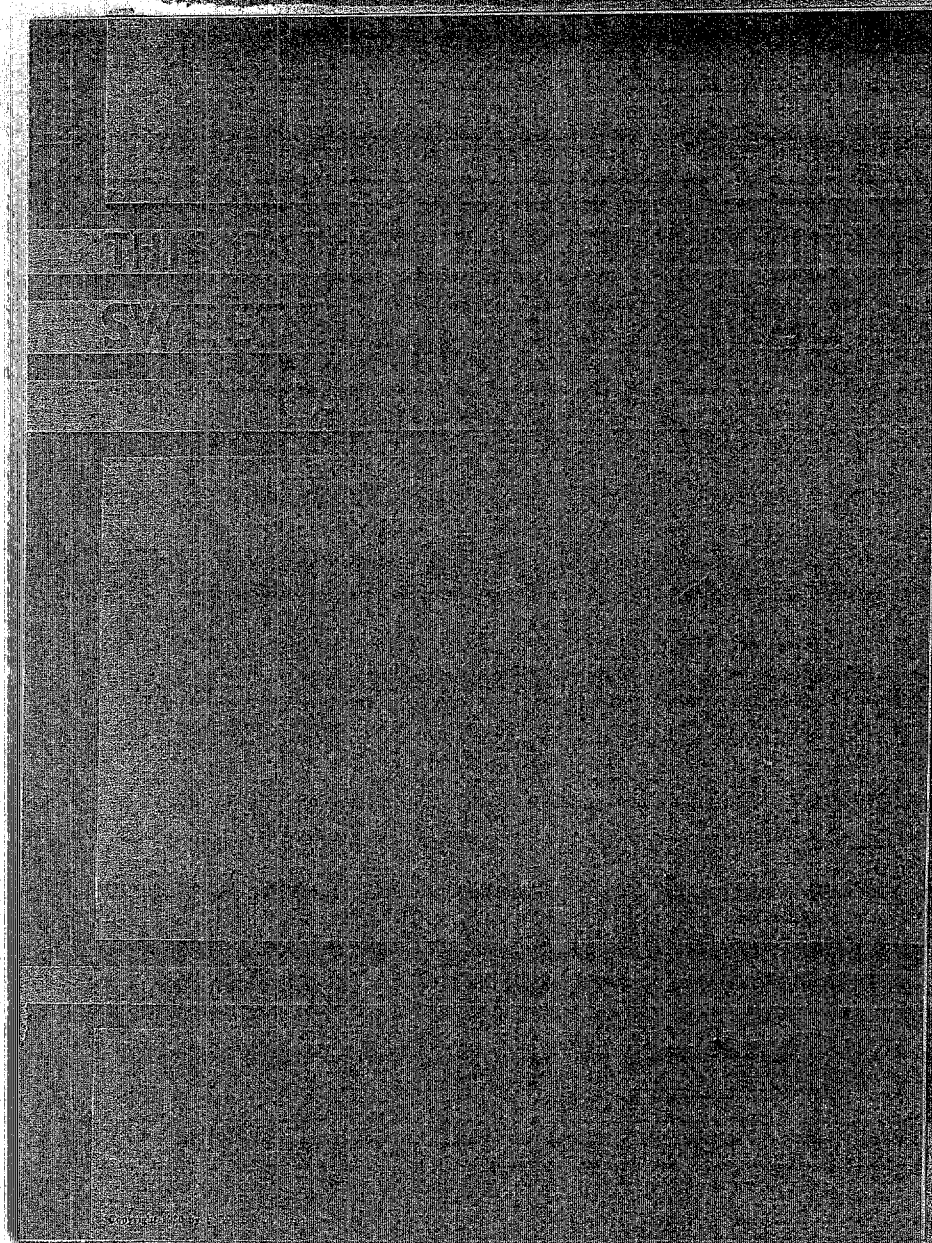




N 28042

NATIONAL LEAD COMPANY

Old Style Lead Cames, Templeads and Steelhearts

ATLANTIC BRANCH
NEW YORK, N. Y.

NORTHWESTERN WORKS
ST. PAUL, MINN.

For Hardlead Sheets, Gutters, etc., and Paint, see Manufacturers' Index

Old Style Lead Cames

Old Style Lead Cames, by their irregularity of outline and surface, bring an appearance of hand-wrought leading to windows or even the most simple design. In addition these comes make it possible to have a lead in harmony with the particular type of architecture employed. There are five designs from which to choose—Rustic, Rough Cast, Antique, Hammered and Frosted—as well as smooth finish comes with irregular edges.



Rustic



Rough Cast
(Patent No. 71132)



Antique



Hammered



Frosted



Smooth Surface—Irregular Edges

Furnished in following dimensions:

	Width of face, in.	Width of glass channel, in.
Rustic	$\frac{3}{4}$ to 1	$\frac{1}{2}$ and $\frac{3}{4}$
Rough Cast	$\frac{3}{4}$ to $\frac{1}{2}$	$\frac{1}{2}$ to $\frac{3}{4}$
Antique	$\frac{3}{4}$ to 1	$\frac{1}{2}$ and $\frac{3}{4}$
Hammered	$\frac{3}{4}$ to 1	$\frac{1}{2}$ to $\frac{3}{4}$
Frosted	$\frac{3}{4}$ to 1	$\frac{1}{2}$ to $\frac{3}{4}$
Smooth (irregular edges)	$\frac{3}{4}$ to 1	$\frac{1}{2}$ to $\frac{3}{4}$

Templeads

These are Old Style Lead Cames made of tempered lead. Especially recommended for small windows where greater rigidity is required than soft lead gives and where steel reinforcement is either difficult or unnecessary. Supplied in all five designs illustrated above.

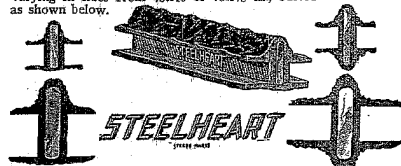
Reinforced Cames—All Old Style Cames, in face widths of $\frac{3}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, $\frac{1}{2}$ and 1 in., can be furnished reinforced with a tempered steel bar of such width as to give the greatest possible reinforcing strength.



Reinforced Cames

Steelheart Old Style Lead Cames

For very large windows, doors and skylights, where the ordinary steel reinforcement is not sufficient, our Steelhearts are available. These are something entirely new in leaded glass reinforcement and come not only in the Rough Cast, Hammered and Frosted designs, but also in smooth finish comes with irregular edges and in a smooth finish, straightedged came. Supplied in four widths: $\frac{1}{2}$, $\frac{3}{4}$, $\frac{1}{2}$ and 1 in. with glass channels ranging from $\frac{1}{4}$ to $\frac{3}{4}$ in. and with tempered steel bars varying in sizes from $\frac{3}{8}$ x $\frac{1}{2}$ in. to $\frac{1}{2}$ x $\frac{1}{2}$ in., buried in the came as shown below.



Standard
Steelheart
Section

Colonial Steelheart
Section

Steelhearts may be used throughout, or the Steelhearts may be used for all or any part of the cross members, and lead of the same design, without reinforcement but with the same channel, may be used for the remainder of the work. In either case, saddle bars are eliminated while strength and rigidity are assured.

When Specifying

When specifying our Old Style designs, please mention the design by name, whether soft comes or templeads are desired, width of face, width of channel and whether reinforcement should be used.

When specifying our Steelhearts, please mention whether they should have Rough Cast, Hammered, Frosted design or smooth face, width of face and width of glass channel.

Suggested Specifications

Old Style Lead Cames shall be of the surface design [Rustic] [Rough Cast] [Antique] [Hammered] [Frosted] and width of face specified by the architect, and of NATIONAL LEAD COMPANY manufacture.

Where Old Style Smooth Cames are specified, they shall have the irregular edges, as in the comes manufactured by NATIONAL LEAD COMPANY.

Where it is necessary to reinforce the lead comes, the reinforcement shall consist of a tempered steel bar not less than $\frac{1}{4}$ in. thick, and of suitable width for each channel width, buried in the came by the manufacturer of the lead in the process of manufacture. Where steel reinforcement of $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$ or wider is specified, the Steelhearts manufactured by NATIONAL LEAD COMPANY shall be used. All Steelhearts and other reinforced comes, where shown or indicated, shall run through under both stops to the bottom of the rabbet, the other comes being fitted into the reinforced member.

The channel of the comes shall be sufficiently wide to receive the glass and to allow, in addition, ample room for enough putty to insure a perfectly watertight job.

The cement shall be made of high grade materials and be of such composition as will preclude the possibility of its becoming brittle with age. All cement shall be thoroughly worked into the channel, and the edges of the lead came pressed down firmly upon it.

Lead comes shall be soldered with high grade solder on both sides of the glass in such a way as to make a firm, rigid and workmanlike job.

All soldered joints shall be so finished as to meet the approval of the architect.

Catalogue and Samples

Catalogue and samples sent to architects on request.

If you do not find exactly what you want mentioned on this page or in our catalogue, please write us, as we are continually making something new and different.

C4102

NATIONAL LEAD COMPANY

Paint Materials for the Protection and Decoration of Wood, Plaster, Masonry and Metal

NEW YORK, N. Y., 111 Broadway
BOSTON, MASS., NATIONAL-BOSTON LEAD Co.,
800 Albany Street
BUFFALO, N. Y., 116 Oak Street
CHICAGO, ILL., 900 West 18th Street
CINCINNATI, OHIO, 659 Freeman Avenue
CLEVELAND, OHIO, 820 West Superior Avenue

ST. LOUIS, MO., 722 Chestnut Street
SAN FRANCISCO, CAL., 2240 24th Street
PITTSBURGH, PA., NATIONAL LEAD & OIL Co.,
316 Fourth Avenue
PHILADELPHIA, PA., JOHN T. LEWIS & BROS. Co.,
Widener Building

Products

WHITE LEAD (Dry and in Oil); RED LEAD (Dry, in Oil, Liquid); WALL PRIMER; LINSEED OIL (Raw and Boiled); FLATTING OIL.

White Lead for General Painting

Gloss paint made of pure white lead and pure linseed oil has long been the standard protective and decorative coating for exterior wood, brick, stone, concrete and stucco. It forms a tough, tenacious film that does not crack and scale but wears down smooth and even, leaving the surface ready for repainting without expensive preparation. Being mixed to order, lead-and-oil paint can be adapted to meet all exposure, surface and weather conditions. It can also be varied in color from white to any desired shade or tint by the addition of the proper colors-in-oil.

Our Dutch Boy White Lead is guaranteed to be pure white lead ground in pure linseed oil. It is obtainable in the regular or heavy paste form and also in soft paste form. (The soft paste, known as Dutch Boy soft paste White Lead, contains three-quarters of a gallon more oil to the 100 lbs. of paste than does the heavy paste. This makes it softer or easier to thin, saving the user time and labor in mixing.)

Both the heavy paste and soft paste are sold in 100-lb. steel kegs and 50, 25 and 12½-lb. steel pails.

Dutch Boy Linseed Oil is pure, clear, carefully filtered and well settled. Sold in 1 and 5-gal. sealed cans bearing the Dutch Boy trade-mark. Our linseed oil is also obtainable in half barrels and barrels.

Flat Finishes for Interiors

Most inside painting nowadays is done in either flat or eggshell gloss finishes, such as are obtainable by reducing heavy paste white lead to brushing consistency with Dutch Boy Flattening Oil.

When white lead is thinned with flattening oil an interior paint results which possesses many points of excellence. It has good working and hiding qualities. It is easy to apply. It levels itself nicely, leaving no brush marks. It sets slowly, so that large areas can be worked without risk of laps or joints.

Some of the finest interior decorating jobs in the country have been done with white lead and flattening oil paint. The beauty and charm of the finish it gives, the all-around economy of this paint and its thorough washability recommend it for all types of interior work—plain wall finishes, mottled, figured and textured effects, the tiffany, etc.

The washability of a white lead and flattening oil finish is a point that should not be overlooked. This paint can be washed without injury not only a few months after it is applied but throughout its long life.



TRADE-MARK

Its pigment, white lead, is insoluble in water and remains so, not changing chemically under normal exposure indoors. Thus there is no unsightly streaking due to washing off of some of the pigment.

Dutch Boy Flattening Oil is sold in quart, gallon and 5-gal. cans sealed at the spout.

Wall Primer

There is a demand in interior painting with white lead for a primer that serves as both a sealer and a coat of paint. Dutch Boy Wall Primer meets these requirements.

Dutch Boy Wall Primer is a paint made with a special long oil vehicle of varnish type. It stops suction, seals fire cracks, and, at the same time, gives good hiding. It has the elasticity, adhesion and other qualities of an oil primer, combined with the recognized sealing property of a varnish primer, producing an ideal foundation for succeeding coats.

Dutch Boy Wall Primer brushes easily as it comes from the can and has a normal spreading rate of 800 square feet per gallon on smooth plaster surfaces. The ease in brushing and extremely high spreading rate of Dutch Boy Wall Primer effect a real economy on every job. Furthermore, the primer, because of its fine flowing and leveling qualities, leaves no laps, brush marks or other mechanical blemishes.

In full containers, Dutch Boy Wall Primer does not skin over or settle in the can. The pigment portion is always in suspension and the primer is ready for immediate use, requiring only the addition of tinting materials to form a ground of desired color.

Sold in 5, 1 and ½-gal. cans.

White Lead and Oil Plastic Paint

The trend is away from excessively rough surfaces as wall finishes but modified textures are gaining in popularity. This latter type of textural effect can be produced readily with a white lead and oil plastic paint. Such a paint is made with materials that the painter always has in his shop, is relatively low in cost and gives a finish that is durable and can be kept clean by washing.

The formula for white lead and oil plastic paint is 100 lb. Dutch Boy White Lead (heavy paste), 22 lb. dry whiting, 1½ gal. Dutch Boy Flattening Oil and ¼ pt. drier. This formula, making about 5¼ gal. of paint, will cover from 100 to 200 sq. ft. of wall surface when spread to a thickness about equal to two ordinary paint coats.

If soft paste white lead is used, mix the plastic paint as follows: 100 lb. Dutch Boy White Lead (soft paste), 44 lb. dry whiting, 1¾ to 2 gal. Dutch Boy Flattening Oil and ¼ pt. pure drier. This formula makes about 7¼ gal. of paint.

SWEET'S

Continued on next page

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The resulting paint in both cases, although heavy, will brush out with comparative ease, after which it may be manipulated with a paint brush, whiskbroom, sponge, or any other means to give the texture desired.

The plastic paint prepared as described may be tinted prior to application, or may have colors-in-oil worked into it while it is still wet. The finish sets up overnight and can easily be glazed to lend additional color interest. No size coat is necessary to permit glazing.

When white lead and oil plastic paint is to be applied to new plaster walls, it is recommended that the walls first receive the customary priming coat. If the walls have been previously painted, and are in satisfactory condition for repainting, the plastic finish may be applied direct.

A booklet giving full information about white lead and oil plastic paint, and showing various textures in color, will be sent to any architect upon request.

Red Lead for Metal

Pure white lead, properly thinned to suit the special conditions under which the paint is to be used, gives the best protection for wood and other building materials except metal. When it comes to the painting of metal, white lead (though good for the purpose) must yield first place to pure red lead.

The chief requirements of a protective coating for metal are that it should have the ability to stick firmly to metal and that it should keep moisture which combined with air forms rust, from getting through. The paint must also be able to resist the destructive action of atmospheric gases, acid from the surface oil, and salt spray near the seacoast.

Paint made of pure red lead meets these requirements. It is insoluble in water, unaffected by ordinary atmospheric gases, adheres closely to metal, and is a true rust preventive.

A great advance in the quality of red lead was made when Dutch Boy Red Lead was perfected. It is a more highly oxidized product than old style dry red lead and is sold in paste form, ready for use after the addition of more linseed oil. Its exceptionally high true red lead content and the fineness of its pigment particles insure a paint of excellent brushing qualities, good coverage and extreme durability. Sold in 100-lb. steel kegs and 50, 25 and 12½-lb. steel pails.

The same highly oxidized red lead can also be had in liquid form. The liquid product is called Dutch Boy Liquid Red Lead and is ready for use. It comes in natural red lead color, light and dark brown, light and dark green, and black. Sold in 1-gal. cans and 2½-gal. kegs.

We also make dry red lead of the highest grade.

General Painting Specifications

Following are general specifications for the painting of interior and exterior surfaces:

Preparation of Surface—(1) Woodwork—New woodwork shall be smoothed off with sandpaper where required and dusted clean before priming. From old woodwork which has been painted before, all loose paint, scale, dirt and dust shall be removed. Wash off with benzine or turpentine all parts where liquid paint remover has been used.

Before priming new woodwork, all knots and sap streaks shall receive one coat of pure alcohol shellac, brushed out thin. After the priming coat is thoroughly dry, putty up all knot holes, dents, cracks and other defects with putty composed of white lead and whiting.

(2) Plaster—Before applying any paint to plaster, either new or old, see that it is clean and smooth. Fill all cracks with approved patching plaster. Where new plaster to be painted is not properly aged, it shall be treated before priming with a solution made by dissolving 2 lbs. of zinc sulphate in 1 gal. of water.

(3) Brick and Stone—New brickwork shall not be primed

until dry. At least 2 or 3 days of dry weather should precede painting. If any mortar has become loose or washed out, repoint all such damaged places with mortar or portland cement before applying paint. After priming, correct small defects in the surface with putty.

(4) Stucco and Concrete—Stucco or concrete should be allowed to stand and dry a year before paint is applied. If painted within a year, it shall be aged artificially by washing with a solution made by dissolving 2 lbs. of zinc sulphate in 1 gal. of water, or with carbonic acid water.

(5) Metal Work—Iron, steel and other metal work shall be cleaned thoroughly of all loose paint, dirt, oil, grease, rust, scale and other foreign matter before paint is applied.

The Paint and Its Application—(6) Designation of Paint to Be Used—All woodwork, plaster, brick, stone, concrete and stucco which are to be painted, shall be painted with NATIONAL LEAD COMPANY'S Dutch Boy White Lead, Dutch Boy Flatting Oil, pure linseed oil, pure turpentine and pure drier mixed according to the formulas hereinafter designated for each kind of work. All metal shall be painted with NATIONAL LEAD COMPANY'S Dutch Boy Red Lead-in-oil, Dutch Boy Liquid Red Lead, or pure dry red lead and pure linseed oil mixed according to formulas hereafter given for each specific purpose.

(7) Tinting Materials—In producing tints and shades, John T. Lewis & Bros. Co. colors-in-oil or those of equally high grade shall be used. If colors-in-oil are used in quantities large enough to affect the consistency of the paint, the quantities of thinners named in the formulas shall be increased in amount equal to one-half the weight of the tinting material.

(8) Applying the Paint—No exterior painting shall be done when rain or snow is falling, during fog, or until after dew or moisture which may be on the surface has completely disappeared. Painting done in winter weather shall only be done when the temperature is above 50° F. and when all surfaces are dry. All exterior work shall be allowed to dry from 2 to 4 days before the next coat is applied and at least 24 hours shall be allowed between coats on interior work.

Formulas—The following white lead formulas take no account of tinting materials. See Paragraph No. 7 when adding colors to the formulas.

It will be noted that the formulas for painting exterior wood are on the basis of Dutch Boy soft paste White Lead as well as heavy paste white lead. For flat effects inside, the heavy paste is to be preferred as the higher oil content of the soft paste will give more of a sheen to surfaces painted with it.

(9) New Woodwork Outside—Three coats of paint, mixed as follows, shall be applied to new unpainted woodwork outside:

	(a) Priming coat		(b) Second coat	
	Heavy Paste	Soft Paste	Heavy Paste	Soft Paste
Dutch Boy White Lead	100 lb.	100 lb.	100 lb.	100 lb.
Pure raw linseed oil	4 gal.	3½ gal.	1½ gal.	¾ gal.
Pure turpentine	2 gal.	2 gal.	1½ gal.	1½ gal.
Pure drier	1 pt.	1 pt.	1 pt.	1 pt.

	(c) Third coat	
	Heavy Paste	Soft Paste
Dutch Boy White Lead	100 lb.	100 lb.
Pure raw linseed oil	3 to 4 gal.	2½ to 3½ gal.
Pure turpentine	1 pt.	1 pt.
Pure drier	1 pt.	1 pt.

Note: The painter may exercise his discretion in using a larger or smaller quantity of oil according to whether the wood is oil absorbing, such as redwood, white fir, sugar pine, western red cedar and hemlock, or less absorbent, such as southern yellow pine, white spruce, Alaska cedar and cypress. The painter may, in rare cases, find it advisable to increase the quantity of turpentine for extremely sappy or resinous woods. Where this is done, a corresponding decrease should be made in the specified amount of linseed oil.

(10) Old Woodwork Outside—Two coats of paint as follows shall be applied in repainting old woodwork outside:

	(a) First coat		(b) Second coat	
	Heavy Paste	Soft Paste	Heavy Paste	Soft Paste
Dutch Boy White Lead	100 lb.	100 lb.	100 lb.	100 lb.
Pure raw linseed oil	2 gal.	1½ gal.	3 to 4 gal.	2½ to 3½ gal.
Pure turpentine	2 gal.	2 gal.	1 pt.	1 pt.
Pure drier	1 pt.	1 pt.	1 pt.	1 pt.

Continued on next page

SWERT

(11) *New Woodwork Inside*—Three coats of paint, mixed as follows, shall be applied to new unpainted woodwork inside:

		(a) Priming Coat	(b) Second coat
Dutch Boy white lead (heavy paste)	100 lb.	100 lb.	
Dutch Boy flattening oil	3 gal.	2 to 2½ gal.	
Pure raw linseed oil	3 gal.	None	
Pure drier	1 pt.	None	
		(c) Third coat (Flat finish)	(d) Third coat (Eggshell gloss finish)
Dutch Boy white lead (heavy paste)	100 lb.	100 lb.	
Dutch Boy flattening oil	2 to 2½ gal.	1½ to 2 gal.	
Floor varnish	None	¾ gal.	

Note: As on outside wood, the painter may exercise his discretion in the use of the thinner prescribed—thus on white pine, poplar and basswood, which more readily absorb oil, increase the quantity of linseed oil for the priming coat. On yellow pine, cypress, spruce and hemlock, use less linseed oil and more flattening oil.

(12) *Old Woodwork Inside*—Two coats of paint shall be used in repainting woodwork inside. For a flat finish, mix the paint for the first and second coats according to formula B in paragraph 11. For an eggshell gloss finish, mix the paint for the first coat according to formula B in paragraph 11 and according to formula D for the finishing coat.

(13) *Plaster Walls*—Three coats of paint shall be applied to plaster which has never before been painted. The priming coat shall be Dutch Boy Wall Primer or the following:

Dutch Boy white lead (heavy paste)	100 lb.
Pure kettled-boiled linseed oil	7 gal.
Pure turpentine	1 gal.

Note: If kettled-boiled linseed oil can not be obtained, 7 gal. raw linseed oil with 1 pt. drier may be used instead, and will in most cases give satisfactory results. Boiled oil is much superior, however, and will prevent cracking when conditions are difficult. It seals pores in the plaster and prevents suction.

Mix the paint for the second coat according to formula B in paragraph 11 and according to formula C for the finishing coat. If a flat finish is desired. If an eggshell finish is wanted, mix the paint for the finishing coat according to formula D.

In repainting plaster walls, follow the practice recommended for new plaster, except that the priming coat may be omitted.

(14) *Brick and Stucco*—Three coats of paint, mixed as follows, shall be applied to brick or stucco which has never before been painted:

		(a) Priming coat	(b) Second coat
Dutch Boy white lead	100 lb.	100 lb.	100 lb.
Pure linseed oil	7 gal.*	6½ gal.*	4 gal.*
Pure turpentine	1 gal.	1 gal.	1 gal.
Pure drier	None	½ pt.	None
		(c) Third coat (gloss finish)	(d) Third coat (flat finish)
Dutch Boy white lead	100 lb.	100 lb.	100 lb.
Pure linseed oil	3½ gal.*	2½ gal.*	None
Dutch Boy flattening oil	None	None	2 gal.
Pure turpentine	1 pt.	1 pt.	None
Pure drier	None	½ pt.	None

*Boiled linseed oil is recommended but if it is not available use raw linseed oil and add pure drier not to exceed 1½ pints. (Use ¾ boiled and ½ raw linseed oil, or all raw oil. In latter case, add drier not to exceed 1½ pints.)

Two coats of paint shall be applied in repainting brick and stucco. For the first coat, mix the paint according to formula B in paragraph 14 and for the finishing coat according to formula C or D.

(15) *Concrete and Stone*—Three coats of paint, mixed as follows, shall be applied to concrete and stone which have never before been painted:

		(a) Priming coat	(b) Second coat
Dutch Boy white lead	100 lb.	100 lb.	100 lb.
Pure linseed oil	5 gal.*	4½ gal.*	3 gal.*
Pure turpentine	1 gal.	1 gal.	½ gal.
Pure drier	None	½ pt.	None

		(c) Third coat (gloss finish)	(d) Third coat (flat finish)
Dutch Boy white lead	100 lb.	100 lb.	100 lb.
Pure linseed oil	3½ gal.*	2½ gal.*	None
Dutch Boy flattening oil	None	None	2 gal.
Pure turpentine	1 pt.	1 pt.	None
Pure drier	None	½ pt.	None

*Boiled oil is recommended but if it is not available use pure raw linseed oil and add pure drier not to exceed 1½ pints. (Use ¾ boiled and ½ raw linseed oil, or all raw oil. In latter case, add drier not to exceed 1½ pints.)

In repainting concrete and stone, apply two coats. Mix the paint for the first coat according to formula B in paragraph 15 and according to formula C or D for the second coat.

A semi-flat finish on brick, stone, concrete and stucco can be secured by applying over the second coat one or two coats of paint made with 100 lb. heavy paste white lead, 1½ to 2 gal. flattening oil and ¾ gal. spar varnish. For brick red finish on outside brick, thin the color with Dutch Boy flattening oil.

(16) *Metal Work, Exterior and Interior*—Three coats of paint, mixed as follows, shall be applied to exterior and interior metal work:

		(a) First coat	(b) Second coat
Dutch Boy red lead-in-oil	100 lb.	100 lb.	100 lb.
Raw linseed oil	2½ gal.	2½ gal.	2½ gal.
Lampblack-in-oil	None	None	12 oz.
Pure turpentine	1 pt.	1 pt.	1 pt.
Pure drier	1 pt.	1 pt.	1 pt.
		or	
Pure dry red lead	100 lb.	100 lb.	100 lb.
Raw linseed oil	2½ gal.	2½ gal.	2½ gal.
Lampblack-in-oil	None	None	13 oz.
Pure turpentine	1 pt.	1 pt.	1 pt.
Pure drier	1 pt.	1 pt.	1 pt.

		(c) Third coat (dark brown)
Dutch Boy red lead-in-oil	100 lb.	100 lb.
Raw linseed oil	2½ gal.	2½ gal.
Lampblack-in-oil	None	1 pt.
Pure turpentine	1 pt.	1 pt.
Pure drier	1 pt.	1 pt.

or
Pure dry red lead 100 lb.
Raw linseed oil 2½ gal.
Lampblack-in-oil 6½ lb.
Pure turpentine 1 pt.
Pure drier 1 pt.

Note: If genuine boiled linseed oil is available, use one-third boiled and two-thirds raw oil, omitting drier.

If liquid red lead is to be used, specify Dutch Boy liquid red lead No. 1 (natural red lead color) for first coat, Dutch Boy liquid red lead No. 6 (light brown) for second coat and Dutch Boy liquid red lead No. 7 (dark brown) for third coat.

Where a dark color other than brown is desired for the finishing coat, one of the following formulas shall be used according to the color desired:

		Light green	Dark green
Dutch Boy red lead-in-oil	100 lb.	100 lb.	100 lb.
Raw linseed oil	5½ gal.	5½ gal.	4 gal.
Medium chrome yellow	30 lb.	12½ lb.	12½ lb.
Chinese or prussian blue	12 lb.	7½ lb.	2 pt.
Pure turpentine	1 pt.	1 pt.	2 pt.
Pure drier	1 pt.	1 pt.	2 pt.

		Black
Dutch Boy red lead-in-oil	100 lb.	100 lb.
Raw linseed oil	14 gal.	14 gal.
Chinese or prussian blue	16 lb.	16 lb.
Lampblack-in-oil	32 lb.	32 lb.
Pure turpentine	½ gal.	½ gal.
Pure drier	½ gal.	½ gal.

If liquid red lead is to be used, specify Dutch Boy liquid red lead according to the finishing color desired, that is: No. 8—light green; No. 9—dark green or No. 5—black.

Printed Specifications Furnished

To any architect who desires, we will supply printed specifications in booklet form containing full and complete directions for the proper use of white lead in the painting of woodwork, plaster, brick, stone, concrete and stucco, and of red lead in the painting of metal.

Write our nearest branch office for "Standard Specification for the use of White Lead" or "Standard Specification for use of Red Lead."

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Paint Materials for the Protection and Decoration of Wood, Plaster, Masonry and Metal

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BOSTON, MASS., NATIONAL-BOSTON LEAD Co.,
330 Albany Street
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Products

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Both the heavy paste and soft paste are sold in 100-lb. steel kegs and 50, 25 and 12½-lb. steel pails.

Dutch Boy Linseed Oil is pure, clear, carefully filtered and well settled. Sold in 1 and 5-gal. sealed cans bearing the Dutch Boy trade-mark. Our linseed oil is also obtainable in half barrels and barrels.

Red Lead for Metal

Pure white lead, properly thinned to suit the special conditions under which the paint is to be used, gives the best protection for wood and other building materials except metal. When it comes to the painting of metal, white lead (though good for the purpose) must yield first place to pure red lead.

The chief requirements of a protective coating for metal are that it should have the ability to stick firmly to metal and that it should keep moisture, which combined with air forms rust, from getting through. The paint must also be able to resist the destructive action of atmospheric gases, acid from the surface oil, and salt spray near the seacoast.

Paint made of pure red lead meets these requirements. It is insoluble in water, unaffected by ordinary atmospheric gases, adheres closely to metal, and is a true rust preventive.

A great advance in the quality of red lead was made when Dutch Boy Red Lead was perfected. It is a more highly oxidized product than old style dry red



TRADE-MARK

lead and is sold in paste form, ready for use after the addition of more linseed oil. Its exceptionally high true red lead content and the fineness of its pigment particles insure a paint of excellent brushing qualities, good coverage and extreme durability. Sold in 100-lb. steel kegs and 50, 25 and 12½-lb. steel pails.

The same highly oxidized red lead can also be had in liquid form. The liquid product is called Dutch Boy Liquid Red Lead and is ready for use. It comes in natural red lead color, light and dark brown, light and dark green, and black. Sold in 1-gal. cans and 2½-gal. kegs.

We also make dry red lead of the highest grade.

Flat Finishes for Interiors

Most inside painting nowadays is done in either flat or eggshell gloss finishes, such as are obtainable by reducing heavy paste white lead to brushing consistency with Dutch Boy Flating Oil.

When white lead is thinned with flattening oil an interior paint results which possesses many points of excellence. It has good working and hiding qualities. It is easy to apply. It levels itself nicely, leaving no brush marks. It sets slowly, so that large areas can be worked without risk of laps or joints.

Some of the finest interior decorating jobs in the country have been done with white lead and flattening oil paint. The beauty and charm of the finish it gives, the all-around economy of this paint and its thorough washability recommended it for all types of interior work—plain wall finishes, mottled, figured and textured effects, the tiffany, etc.

The washability of a white lead and flattening oil finish is a point that should not be overlooked. This paint can be washed without injury not only a few months after it is applied but throughout its long life. Its pigment, white lead, is insoluble in water and remains so, not changing chemically under normal exposure indoors. Thus there is no unsightly streaking due to washing off of some of the pigment.

Dutch Boy Flating Oil is sold in quart, gallon and 5-gal. cans sealed at the spout.

Wall Primer

Present-day plaster conditions, as well as the demand for two-coat work, have necessitated the development of a new primer for use on white lead jobs. What is needed today is a primer that not only seals fire cracks and stops suction more effectively than the old-time white lead and boiled oil primer, but that makes possible, when wanted, a satisfactory two-coat job of wall painting with white lead. These requirements are met by the new Dutch Boy Wall Primer, which is a sealer and paint coat combined.

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0000-NLI-000014332

Dutch Boy Wall Primer is made with a special long oil vehicle of varnish type. It stops suction, seals fire cracks and, at the same time, gives good hiding. It has the elasticity, adhesion and other qualities of an oil primer, combined with the recognized sealing property of a varnish primer, producing an ideal foundation for succeeding coats.

Dutch Boy Wall Primer brushes easily and has a normal spreading rate of 800 sq. ft. per gallon on smooth plaster surfaces. The ease in brushing and extremely high spreading rate of Dutch Boy Wall Primer effect a real economy on every job. Furthermore, the primer, because of its fine flowing and leveling qualities, leaves no laps, brush marks or other mechanical blemishes.

In full containers, Dutch Boy Wall Primer does not skin over or settle in the can. The pigment portion is always in suspension and the primer is ready for immediate use, requiring only the addition of tinting materials to form a ground of desired color.

Sold in 5, 1 and 1/2 gal. cans.

General Painting Specifications

Following are general specifications for the painting of interior and exterior surfaces:

Preparation of Surface—(1) Woodwork—New woodwork shall be smoothed off with sandpaper where required and dusted clean before priming. From old woodwork which has been painted before, all loose paint, scale, dirt and dust shall be removed.

Wash off with benzine or turpentine all parts where liquid paint remover has been used.

Before priming new woodwork, all knots and sappy streaks shall receive one coat of pure alcohol shellac, brushed out thin. After the priming coat is thoroughly dry, putty up all knot holes, dents, cracks and other defects with putty composed of white lead and whiting.

(2) Plaster—Before applying any paint to plaster, either new or old, test that it is clean and smooth. Fill all cracks with approved patching plaster. Where new plaster to be painted is not properly aged, it shall be treated before priming with a solution made by dissolving 2 lbs. of zinc sulphate in 1 gal. of water.

(3) Brick and Stone—New brickwork shall not be primed until dry. At least 2 or 3 days of dry weather should precede painting.

If any mortar has become loose or washed out, repoint all such damaged places with mortar or portland cement before applying paint. After priming, correct small defects in the surface with putty.

(4) Stucco and Concrete—Stucco or concrete should be allowed to stand and dry a year before paint is applied. If painted within a year, it shall be aged artificially by washing with a solution made by dissolving 2 lbs. of zinc sulphate in 1 gal. of water, or with carbonic acid water.

(5) Metal Work—Iron, steel and other metal work shall be cleaned thoroughly of all loose paint, dirt, oil, grease, rust, scale and other foreign matter before paint is applied.

The Paint and Its Application—(6) Designation of Paint to Be Used—All woodwork, plaster, brick, stone, concrete and stucco which are to be painted, shall be painted with NATIONAL LEAD COMPANY'S Dutch Boy White Lead, Dutch Boy Flatting Oil, pure linseed oil, pure turpentine and pure drier mixed according to the formulas hereinafter designated for each kind of work.

All metal shall be painted with NATIONAL LEAD COMPANY'S Dutch Boy Red Lead-in-oil, Dutch Boy Liquid Red Lead, or pure dry red lead and pure linseed oil mixed according to formulas hereafter given for each specific purpose.

(7) Tinting Material—In producing tints and shades, John T. Lewis & Sons Co. colors-in-oil or those of equally high grade shall be used.

If colors-in-oil are used in quantities large enough to affect the consistency of the paint, the quantities of thinners

named in the formulas shall be increased in amount equal to one-half the weight of the tinting material.

(8) Applying the Paint—No exterior painting shall be done when rain or snow is falling, during fog, or until after dew or moisture which may be on the surface has completely disappeared. Painting done in winter weather shall only be done when the temperature is above 30° F. and when all surfaces are dry. All exterior work shall be allowed to dry from 2 to 4 days before the next coat is applied and at least 24 hours shall be allowed between coats on interior work.

Formulas—The following white lead formulas take no account of tinting materials. See Paragraph No. 7 when adding colors to the formulas.

It will be noted that the formulas for painting exterior wood are on the basis of Dutch Boy soft paste White Lead as well as heavy paste white lead. For flat effects inside, the heavy paste is to be preferred as the higher oil content of the soft paste will give more of a sheen to surfaces painted with it.

(9) New Woodwork Outside—Three coats of paint, mixed as follows, shall be applied to new unpainted woodwork outside:

	(a) Priming coat	(b) Second coat
	Heavy Paste	Soft Paste
Dutch Boy White Lead	100 lb.	100 lb.
Pure linseed oil	4 gal.	3 1/2 gal.
Pure turpentine	2 gal.	1 1/2 gal.
Pure drier	1 pt.	1 pt.

	(c) Third coat
	Heavy Paste
Dutch Boy White Lead	100 lb.
Pure linseed oil	3 1/2 gal.
Pure turpentine	1 pt.
Pure drier	1 pt.

*If boiled oil is used, reduce drier to 1/2 pt.
Note: Under conditions of relatively high humidity better results will be obtained by reducing the linseed oil content of the finishing coat by 1/2 gal. and increasing the turpentine by 1 pt.

(10) Old Woodwork Outside—Two coats of paint as follows shall be applied in repainting old woodwork outside:

	(a) First coat	(b) Second coat
	Heavy Paste	Soft Paste
Dutch Boy White Lead	100 lb.	100 lb.
Pure linseed oil	2 gal.	1 1/2 gal.
Pure turpentine	2 gal.	1 pt.
Pure drier	1 pt.	1 pt.

*If boiled oil is used, reduce drier to 1/2 pt.
Note: Under conditions of relatively high humidity better results will be obtained by reducing the linseed oil content of the finishing coat by 1/2 gal. and increasing the turpentine by 1 pt.

(11) New Woodwork Inside—Three coats of paint, mixed as follows, shall be applied to new unpainted woodwork inside:

	(a) Priming coat	(b) Second coat
	Heavy Paste	Soft Paste
Dutch Boy White Lead	100 lb.	100 lb.
Dutch Boy Flatting Oil	3 gal.	2 gal.
Pure linseed oil	3 gal.	None
Pure drier	1 pt.	None

	(c) Third coat (flat finish)	(d) Third coat (eggshell gloss finish)
Dutch Boy White Lead	100 lb.	100 lb.
Dutch Boy Flatting Oil	2 gal.	1 1/2 gal.
Floor varnish	None	1/2 gal.

(12) Old Woodwork Inside—Two coats of paint shall be used in repainting woodwork inside. For a flat finish, mix the paint for the first and second coats according to formula (b) in paragraph 11. For an eggshell gloss finish, mix the paint for the first coat according to formula (b) in paragraph 11 and according to formula (d) for the finishing coat.

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0000-NLI-000014333

(13) **Plaster Walls.** Three coats of paint shall be applied to plaster which has never before been painted. The priming coat shall be Dutch Boy Wall Primer or the following:

Dutch Boy White Lead (heavy paste) 100 lb.
Pure kettled-boiled linseed oil 7 gal.
Pure turpentine 1 gal.
Pure drier 1 pt.

Note: If kettled-boiled oil cannot be obtained, 7 gal. raw linseed oil with 1 pt. drier may be used instead.

Mix the paint for the second coat according to formula (b) in paragraph 14 (adding 1 1/2 gal. of Dutch Boy Wall Primer to this formula will improve the paint for use on plaster) and according to formula (c) for the finishing coat if a flat finish is desired. If an eggshell finish is wanted, mix the paint for the finishing coat according to formula (d).

In repainting plaster walls, follow the practice recommended for new plaster, except that the priming coat may be omitted. Where fire cracks are extremely bad, it is recommended that straight Dutch Boy Wall Primer be applied as the first coat in repainting.

(14) **Brick and Stucco.** Three coats of paint, mixed as follows, shall be applied to brick or stucco which has never before been painted:

(a) Priming coat	(b) Second coat
Heavy Paste	Soft Paste
Dutch Boy White Lead 100 lb.	100 lb.
Pure linseed oil 3 1/2 gal.	2 1/2 gal.
Pure turpentine 1 pt.	1 pt.
Pure drier 1 pt.	1 pt.

(c) Third coat (gloss finish)	(d) Third coat (flat finish)
Heavy Paste	Soft Paste
Dutch Boy White Lead 100 lb.	100 lb.
Pure linseed oil 3 1/2 gal.	2 1/2 gal.
Pure turpentine 1 pt.	1 pt.
Pure drier 1 pt.	1 pt.

Note: Boiled linseed oil is recommended but if it is not available use pure raw linseed oil and add pure drier not to exceed 1 1/2 pt.

If boiled oil is used, reduce drier to 1/2 pt.

Two coats of paint shall be applied in repainting brick and stucco. For the first coat, mix the paint according to formula (b) in paragraph 14 and for the finishing coat according to formula (c) or (d).

(15) **Concrete and Stone.** Three coats of paint, mixed as follows, shall be applied to concrete and stone which have never before been painted:

(a) Priming coat	(b) Second coat
Heavy Paste	Soft Paste
Dutch Boy White Lead 100 lb.	100 lb.
Pure linseed oil 3 1/2 gal.	2 1/2 gal.
Pure turpentine 1 pt.	1 pt.
Pure drier 1 pt.	1 pt.

(c) Third coat (gloss finish)	(d) Third coat (flat finish)
Heavy Paste	Soft Paste
Dutch Boy White Lead 100 lb.	100 lb.
Pure linseed oil 3 1/2 gal.	2 1/2 gal.
Pure turpentine 1 pt.	1 pt.
Pure drier 1 pt.	1 pt.

Note: Boiled oil is recommended but if it is not available use pure raw linseed oil and add pure drier not to exceed 1 1/2 pt.

If boiled oil is used, reduce drier to 1/2 pt.

In repainting concrete and stone, apply two coats. Mix the paint for the first coat according to formula (b) in paragraph 15 and according to formula (c) or (d) for the second coat.

A semi-flat finish on brick, stone, concrete and stucco can be secured by applying over the second coat one or two coats of paint made with 100 lb. heavy paste and 1 1/2 gal. of 2 gal. flatting oil and 1/2 gal. spar varnish. For brick red finish on outside and 1/2 gal. spar varnish. For brick red finish on outside and 1/2 gal. spar varnish.

(16) **Metal Work, Exterior and Interior.** Three coats of paint, mixed as follows, shall be applied to exterior and interior metal work:

(a) Priming coat	(b) Second coat
Dutch Boy Red Lead-in-oil 100 lb.	100 lb.
Raw linseed oil 3 1/2 gal.	2 1/2 gal.
Lampblack-in-oil 1 pt.	1 pt.
Pure turpentine 1 pt.	1 pt.
Pure drier 1 pt.	1 pt.

(c) Third coat (dark brown)
Dutch Boy Red Lead-in-oil 100 lb.
Raw linseed oil 3 1/2 gal.
Lampblack-in-oil 1 pt.
Pure turpentine 1 pt.
Pure drier 1 pt.

Note: If genuine kettled-boiled oil is available, use one-third kettled and two-thirds raw oil, omitting drier.

If liquid red lead is to be used, specify Dutch Boy Liquid Red Lead No. 1 (natural red lead color) for first coat, Dutch Boy Liquid Red Lead No. 6 (light brown) for second coat and Dutch Boy Liquid Red Lead No. 7 (dark brown) for third coat.

Where a dark color other than brown is desired for the finishing coat, one of the following formulas shall be used according to the color desired:

	Light green	Dark green
Dutch Boy Red Lead-in-oil	100 lb.	100 lb.
Raw linseed oil	3 1/2 gal.	4 gal.
Medium chrome yellow	30 lb.	12 1/2 lb.
Chinese or prussian blue	12 lb.	7 1/2 lb.
Pure turpentine	1 pt.	2 pt.
Pure drier	1 pt.	2 pt.

	Black
Dutch Boy Red Lead-in-oil	100 lb.
Raw linseed oil	14 gal.
Chinese or prussian blue	16 lb.
Lampblack-in-oil	52 lb.
Pure turpentine	1/2 gal.
Pure drier	1/2 gal.

If liquid red lead is to be used, specify Dutch Boy Liquid Red Lead according to the finishing color desired, that is: No. 8—light green; No. 9—dark green or No. 5—black.

Specifications in Pamphlet Form
Specifications for the use of white lead and red lead in painting are available in pamphlet form and will be sent to any engineer interested.

Write for "Specifications for the use of White Lead" or "Standard Specification for the use of Red Lead."

Other Publications
A practical book, of unusual value to those interested in the subjects of paint and painting, is our "Handbook on Painting." This book gives formulas and directions for exterior and interior work of all kinds. It covers, in complete detail, the painting of wood, plaster, brick, stone, concrete, stucco and metal.

We also publish a booklet "Structural Metal Painting," which discusses the causes of corrosion and remedies for it, besides giving formulas and going into detail on the subject of painting structural metal of all kinds.

This catalogue is filed in 4-0000 Copies of Swedish Engineering Catalogues, 1931 Edition.

0000-NLI-000014334

NATIONAL LEAD COMPANY

Atlantic Branch

Lined Products Division

111 BROADWAY, NEW YORK, N. Y.

PRODUCTS

"United" Chemical Lead Lined:
Pipe, Fittings, Valves, Coils, Tank Connections.
"United" Hard Lead:
Acid Pumps, Fittings, Valves, Plug Cocks, Bibbs.
"United" Tin Lined:
All the above products furnished in Pure Tin Lined.

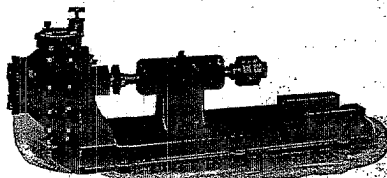
SERVICE

Actual service records are on file testifying to the satisfactory results secured from installations of "United" Lined Products.

Our Engineering Department is prepared to offer its services to anyone having acid contact problems to solve. If blueprints or sketches are submitted we will be pleased to offer suggestions in detail as to the most economical and satisfactory use of "United" Lined Products.

"UNITED" HARD LEAD CENTRIFUGAL ACID PUMPS

"United" Acid Pumps, after careful consideration by competent engineers, have been frequently selected for use in places where high efficiency was required and repairs were almost impossible.

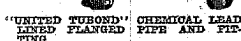


"UNITED" HARD LEAD CENTRIFUGAL ACID PUMP

Self-lubricating with large internal grease glands supplied by compression grease cup. Outside bearings self-oiling and equipped with self-aligning thrust bearing with thrusts running in oil and properly housed. The case is of solid hard lead with the impeller of the same alloy cast around a reinforcing bronze spider. The shaft is of Monel.

"UNITED TUBOND" CHEMICAL LEAD LINED STEEL PIPE AND FLANGED FITTINGS

"United Tubond" Chemical Lead Lined Pipe is lined with a seamless chemical lead tube inseparably bonded to the outer casing. This "United" Method gives an absolutely uniform lining and a smooth interior surface with friction reduced to a minimum; also a lining free from porous or defective spots.



"UNITED TUBOND" CHEMICAL LEAD LINED PIPE AND FLANGED FITTING

Flanged pipe is made up with the bonded chemical lead lining made on to the lead face of the recessed flange, which gives a positive lead-to-lead joint at each flange.

"UNITED" HARD LEAD OR TIN LINED ACID VALVES



"UNITED" CHEMICAL HARD LEAD LINED WEDGE TYPE FLANGED ACID VALVE

"United" Acid Valves are heavily lined throughout with hard lead or pure block tin, and being constructed of iron, offer the strength of the cast iron valve with full acid resisting qualities.

"United" Acid Valves are made in all required sizes and styles: globe, gate, angle, check, diaphragm and free flow "Y" type; also special valves according to specifications.

"United" Acid Valves are always tight when closed, and by seating at the top when opened, pressure is taken from the stuffing box.

The "United" Hard Lead Lined Wedge Type Gate Pattern Flanged Acid Valve is a most efficient gate pattern of acid valve. It was especially designed for work where a drip-proof valve is necessary. You can be sure that this valve is positively tight when closed. The wedge is recessed to take a bakelite or rubber disc on the wet side. The use of either disc eliminates any rubbing or abrasive action. A perfect seat is assured at all times.

"UNITED" HARD LEAD "CHEM-RAYON" FLANGED ACID VALVES

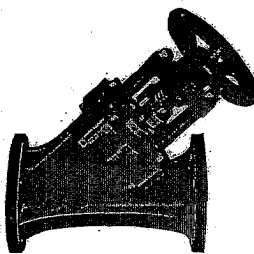
"United" Hard Lead Chem-Rayon Y or Angle Plug and Seat or Disc Type Flanged Acid Valve has a bonnet of steel and brass which is completely covered with hard lead with the exception of the hand wheel and bushing support.

The stuffing box is deeper than is customarily found in acid valves, while the gland is of hard lead, eliminating the use of the usual steel studs on the bonnet flange. The bonnet, therefore, is completely corrosion resistant which does away with the necessity of frequent costly replacements.

The body is of solid hard lead with reinforcing fins cast in the side, affording the maximum strength, while reducing the weight to a minimum.

In place of the usual lead plug or disc, rubber can be supplied.

"United" Hard Lead Acid Valves can be furnished in the same pattern as "United" Lined Valves; i. e., Globe, Y, Angle, Gate, etc., as well as special sizes and types according to specifications.



"UNITED" HARD LEAD CHEM-RAYON Y PLUG AND SEAT FLANGED VALVE

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NATIONAL LEAD COMPANY

Atlantic Branch

Lined Products Division

SELLING AGENTS FOR THE CREADWELL CONSTRUCTION CO., MIDLAND, PA.

111 BROADWAY, NEW YORK, N. Y.

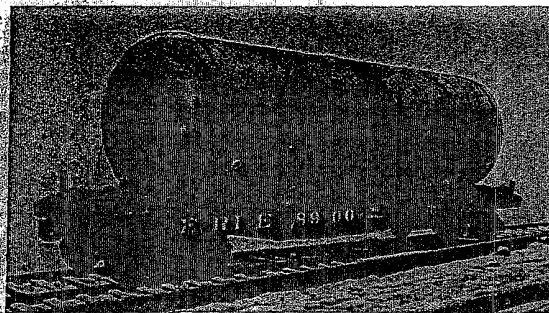
PRODUCTS

Homogeneous Lead Lined Vacuum Apparatus, Evaporators, Tanks, Steam Jacketed Kettles, Acid Eggs, Digesters, Autoclaves, Agitators, Pressure Still's, Treater Drums and Tank Cars. Homogeneous Lead Covered Heating or Cooling Coils; also Agitating Apparatus of any design.

ADVANTAGES OF PROCESS

The chemical lead lining or covering is of uniform thickness and inseparably bonded to the base metal which may be steel, iron, copper or brass, forming a flawless and impervious protective surface.

A strip of steel covered with chemical lead by this process can be mechanically twisted to destruction



ONE OF FOUR TREATER DRUMS EACH 10 FEET IN DIAMETER BY 30 FEET LONG FABRICATED OF ONE- $\frac{1}{2}$ INCH STEEL SHELL $\frac{1}{4}$ INCH HEADS OF WELDED CONSTRUCTION FOR 125 POUNDS WORKING PRESSURE WITH $\frac{1}{4}$ INCH HOMOGENEOUS CHEMICAL LEAD LINING FABRICATED FOR RETINENT USE

without the slightest shearing action between the lead and the steel.

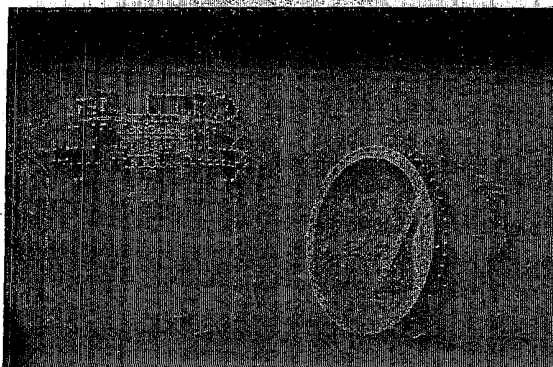
Continuous unbroken surface of lining or covering gives strength and durability under pressure, vacuum or high temperature.

Our improved method of application assures a bond that will not come loose under conditions of shock, vibration or pressure.

The chemical lead bonding is not affected up to temperatures within a few degrees of the melting point of the lead.

All homogeneously lined equipment is fabricated to your individual specifications. In this connection, the services of our engineering staff are at your disposal either for consultation or for submitting definite quotations based on your specifications.

Continued on Next Page



STEAM JACKETED VACUUM AGITATOR TANK 5 FEET IN DIAMETER AND 8 FEET HIGH WITH $\frac{1}{4}$ INCH HOMOGENEOUS CHEMICAL LEAD LINING

INTERIOR VIEW, STEAM JACKETED TANK 5 $\frac{1}{2}$ FEET IN DIAMETER AND 7 FEET HIGH SHOWING REBARRED WITH $\frac{1}{4}$ INCH HOMOGENEOUS CHEMICAL LEAD LINING AND COVERING

NATIONAL LEAD COMPANY

and Lead Pipe

NEW YORK, 116 BROADWAY

BALTIMORE, 214 W. HENRIETTA ST.

BUFFALO, 116 OAK ST.

CHICAGO, 900 WEST 18th ST.

CINCINNATI, 639 FREEMAN AVE.

CLEVELAND, 820 W. SUPERIOR AVE.

ST. LOUIS, 722 CHESTNUT ST.

NATIONAL-BOSTON LEAD CO., 800 ALBANY ST.

BOSTON

GEORGIA LEAD WORKS, EAST & BISHOPS STS.

ATLANTA

GIBSON & PRICE, SWETLAND BUILDING, CLEVELAND

NATIONAL LEAD & OIL CO. OF PA., 316 FOURTH

AVE., PITTSBURGH

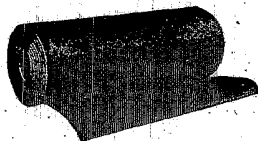
JOHN T. LEWIS & BROS. CO., WIDENER BUILDING, PHILADELPHIA



PRODUCTS

Antimonial Sheet Lead
Chemical Sheet Lead
Crawlproof (Reinforced) Sheet Lead
Antimonial Lead Pipe
Chemical Lead Pipe

Other products of National Lead Company include: solder, babbitt metal, burning lead, traps and bends, ingot lead, block tin pipe, tin-lined lead pipe, lead wool, lead wire, lead washers, expansion bolts, red-lead, white-lead, litharge, linseed oil, flattening oil.



SHEET LEAD

Sheet lead of our manufacture is in use in many plants throughout the country and may be depended upon to render satisfactory service in withstanding the action of ammonia gas, phosphoric acid, sulphuric acid, electrolytic solutions, etc. As noted above, we are in a position to supply three kinds of sheet lead—antimonial, chemical and crawlproof or reinforced. Which particular type will best meet requirements in a given case can be determined only when all conditions surrounding the proposed installation are known. In this connection, the advice of our technical staff is always available. Simply get in touch with our nearest office.

ANTIMONIAL SHEET

Antimonial sheet lead is lead alloyed with various percentages of antimony to impart hardness and other desired properties. It possesses a high degree of acid resistance and under certain conditions has advantages over chemical sheet because of greater rigidity and strength. Its elastic limit is five times that of chemical lead, its tensile strength double, and it also has a lower specific gravity.

We can supply antimonial sheet in any gauge or thickness desired down to $\frac{1}{64}$ " and can furnish sheets, in some weights, as large as 8' wide by 25' long.

CHEMICAL SHEET

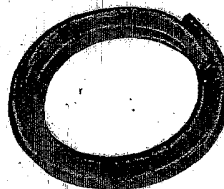
Our chemical sheet lead is made from the best grades of Missouri chemical lead, which insures a product of the proper composition to give the maximum in acid-resisting qualities. Uniform in thickness and free from irregularities, it is furnished in any gauge from $\frac{1}{64}$ " up and in some weights in sheets as large as 12' x 40'.

CRAWLPROOF SHEET

This is the newest development in sheet lead—a chemical lead sheet reinforced inside with antimonial lead supporting bars.

Crawlproof sheet is designed especially to prevent buckling, stretching and wrinkling.

Supplied in any thickness from $\frac{1}{64}$ " up and in any size sheet not exceeding 8' in width by 25' in length.



LEAD PIPE

We make both antimonial lead pipe and chemical lead pipe. Only high quality materials are used and our pipe will be found to be of proper wall thickness, thus insuring correct weight per foot.

Antimonial lead pipe, as well as chemical lead pipe, is supplied by us in sizes up to 12" inside diameter and in various wall thicknesses. Catalog listing pipe sizes furnished on request.

GENERAL

We are always glad to advise on sheet lead installations and to submit estimates based on blue prints or specifications.

In ordering sheet lead please state, in case plain rectangle sheets are desired, thickness or weight per foot, width and length. If irregular sheets are required, please send sketch giving dimensions or provide a sketch, including dimensions, of the tank to be lined.

NATIONAL VACUUM COMPANY

Acid Recovery Process
111 BROADWAY NEW YORK, N.Y.

PRODUCTS

- Concentrating Plants for
 - Sludge Acid
 - Spent Acid
 - Chamber Acid
- Separating Plants for
 - Sludge Acid
- Evaporators for
 - Weak Solutions of Sulphuric and Phosphoric Acid

PROCESS

The Simonson-Mantius Vacuum Process, patented in the United States and foreign countries, has been adopted by a large number of oil refineries for the concentration of separated sludge acid, by chemical plants for the recovery of spent acids, and by chamber acid plants for the concentration of weak chamber acid.

The salient feature of this process is that the work is carried on under high vacuum with indirect application of heat. The use of vacuum has very decided advantages, as it eliminates all fumes and leakage, materially decreases acid losses and reduces fuel consumption by lowering the boiling point of the acid and radiation losses.

Recent developments have brought about the perfection of the SUPER VACUUM Concentrator, which is operated under a vacuum of 29.7". Because of this very high vacuum it is now possible to concentrate acid to any desired density up to 66° Be. in one apparatus, using only 100 lbs. steam pressure as heating medium.

APPLICATION OF PROCESS

Oil Refineries—The weak acid coming from the separators at a density of from 25 to 45° Be. is concentrated by our process to 56°, 61° or 66° Be. Where necessary the partially concentrated acid of 56° Be. is allowed to settle so as to remove tarry matter which has been separated by the decomposition of sulphonic acids, and then further concentrated to 66° Be.

The 61° Be. acid can be used without further concentration for the treating of light oils and pressure distillates, or it can be reinforced with oleum to an acid of higher density and then used for treating kerosenes and lubricating oils.

In refineries requiring 98% acid for the treatment of their oils, the 61° acid is used for the absorption of SO₂ produced in a contact plant.

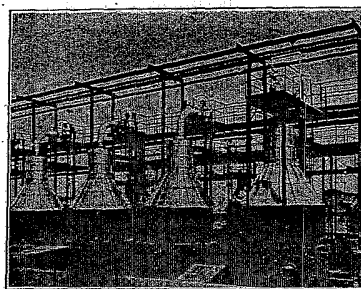
Under normal conditions the total cost of concentrating from 30 to 36° Be. will vary from \$4 to \$8 per ton of finished acid, and the concentration to 61° Be. only will cost from \$1.50 to \$4 per ton.

Operating costs depend on the size of the plant and the figures given are exclusive of overhead and depreciation.

Chemical Plants—Many chemical factories use large quantities of sulphuric acid in the manufacture of their products, and this acid can be recovered and concentrated economically by the Simonson-Mantius Vacuum Process to any desired density up to 66° Be.



SEPARATING AND CONCENTRATING PLANT



CONCENTRATOR AT EXTREME RIGHT IS A TYPE B SUPER VACUUM; OTHERS ARE REGULAR TYPE B CONCENTRATORS

Continued on Next Page

However, spent acids should be practically free from nitric acid to prevent excessive corrosion of the lead vapor lines and condenser.

Chamber Acid Plants—Sulphuric acid manufactured by the standard lead chamber process has a density of from 56 to 58° Be. and therefore requires further concentration to 66° Be. This work can be done economically under vacuum, as the fuel consumption is low and the loss of acid very small compared with losses usually encountered in the old-fashioned pan and bench or tower system.

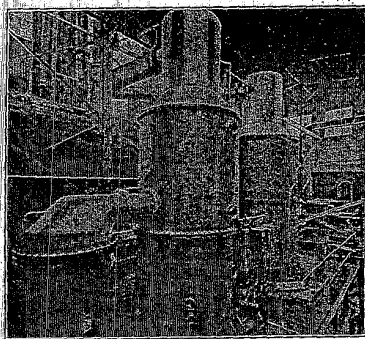
Under normal conditions the 56° acid can be concentrated to 66° Be. at a total cost of from \$1.70 to \$2 per ton of 66° acid.

SEPARATING PLANTS FOR SLUDGE ACID

We are prepared to design and furnish complete plants for the separation of sludge acid; where necessary, we also build special equipment for the complete absorption of all fumes and odors coming from separating plants.

EVAPORATORS

We are building single and double effect evaporators for the recovery of dilute solutions of sulphuric and phosphoric acid; also for sulphuric acid solutions containing sodium, nickel, copper, or iron sulphate.



TYPES A AND D CONCENTRATORS

INSTALLATIONS

We have in operation or under construction the following plants:

Sludge Acid Concentrators	Units
Atlantic Refining Company.....	4
Bethlehem Steel Company.....	1
Empire Refineries.....	3
Gulf Refining Company.....	19
Houston Oil & Refining Co.....	1
Indian Refining Company.....	2
Lincoln Oil Refining Co.....	1
Marland Refining Company.....	3
Pure Oil Company.....	4
Roxana Petroleum Corp.....	2
Sharples Solvents Corp.....	1
Simon Carves, Ltd.....	1
Sinclair Refining Co.....	1
Standard Oil Co. of Indiana.....	2
Standard Oil Co. of N. J.....	4
Standard Oil Co. of Ohio.....	2
The Texas Company.....	2
Union Oil Company of Cal.....	2
Utah Oil Refining Co.....	1
Vacuum Oil Company.....	10
Spent Acid Concentrators	
Carbide & Carbon Chemicals Corp.....	2
E. I. DuPont de Nemours Co.....	11
Grasseff Powder Company.....	1
Nichols Copper Company.....	1
Tubize Artificial Silk Co. of America.....	5
Westvaco Chlorine Products, Inc.....	1
Chamber Acid Concentrator	
Hard Chemical Works.....	1
Sludge Acid Separating Plants	
Cities Service Refining Co.....	1
Lincoln Oil Refining Co.....	1
Shell Company of Cal.....	2

The above installations represent a combined daily capacity of over 2370 tons of finished acid and 900 barrels of sludge.

INQUIRIES

The National Lead Company has the exclusive rights to build and sell concentrating plants and give licenses for the Simonson-Mantius Vacuum Process. Inquiries should be directed to the National Lead Company, Acid Recovery Department, 111 Broadway, New York.

THE NATIONAL PIPE BENDING COMPANY

101 RIVER STREET NEW HEAVEN, CONN.

Boston, Mass.
New York, N. Y.
Philadelphia, Pa.

Pittsburgh, Pa.
Baltimore, Md.
Atlantic City, N. J.

Cleveland, Ohio
Cincinnati, Ohio
Memphis, Tenn.

Chicago, Ill.
St. Paul, Minn.
San Francisco, Calif.

Minneapolis, Minn.
Butte, Mont.
Los Angeles, Calif.

PRODUCTS

Instantaneous Water Heaters (Bulletin No. 55)
Process Water Storage Heaters (Bulletin No. 65)
Feed Water Heaters (Bulletins Nos. 51A and 53)
Coils, Pipe and Tube (Bulletin No. 60)
Welded Headers (Bulletin No. 60)
Caustic Liquor Heaters (Designed to suit service)
Fuel Oil Heaters (Designed to suit service)

SERVICE AND COOPERATION

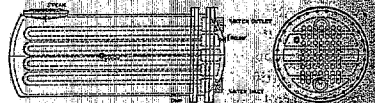
Detail information, estimates on drawings and specifications for any piece of apparatus will be gladly furnished to those who are considering the above equipment.

General information on Heaters and Coils can be obtained by writing for our condensed bulletins. They give weights and physical properties of our products and contain much valuable engineering data.

NATIONAL HOT WATER HEATERS

We make hot water heating units of two types, instantaneous and storage. Both types have their advantages and the installation depends upon the hot water demand. For either exhaust or live steam.

Instantaneous Type—Heats water as it flows either continuously or intermittently. Built for steam pressures up to 75 lbs. per sq. in. U-bend copper tubes through which the water passes are heated by a cast iron or steel shell through which the steam for heating is passed. Made in sizes from 210 to 12,000 gallons of hot water per hour at temperatures from 60° F. to 180° F.

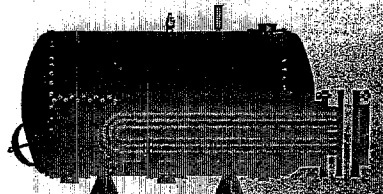


INSTANTANEOUS PROCESS WATER HEATER

One of Our Three Sizes of Tube Elements

INSTANTANEOUS PROCESS WATER HEATER PUMP AND STORAGE TANK

Storage Type—A combination of a closed pressure vessel and a steam tube heating element. For use under conditions where the instantaneous demand for hot water exceeds the immediate steam supply. A properly proportioned hot water storage heater will insure ample hot water without increased boiler capacity in many instances. Made in horizontal and vertical type to supply from 100 to 15,000 gallons of hot water per hour, heated through standard temperature range 60 to 180° F., with steam under pressure from 0 to 100 lb. gauge.



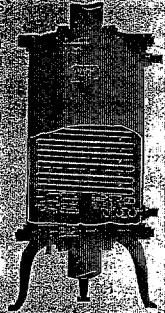
SINGLE ELEMENT STEEL SHELL HORIZONTAL STORAGE HEATER

Note the ease with which elements can be supplied separately for tanks, vats and flowing liquids in pipes.

FEED WATER HEATERS

National Feed Water Heaters are made up of a cast iron shell with one or two coils containing one or more helical coils of seamless copper tubing. The water is pumped through the coils absorbing heat from the exhaust steam in the shell.

These heaters are made in sizes to provide for heating the feed water for a wide range of boiler sizes and invariably show large savings of fuel.

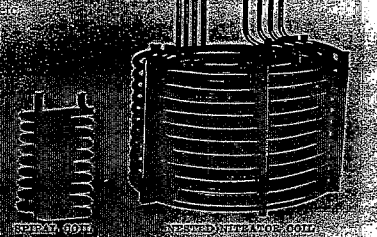


ORIGINAL COIL TYPE FEED WATER HEATER

FACILITIES FOR COILS AND BENDS

All National Coils are continuous without couplings or seams unless specified. Iron and Steel coils have a specially welded joints and all brass and copper coils have brazed joints. The National Pipe Bending Co. is prepared to submit designs, specifications and estimates covering coils and bends for the particular requirements of the customer.

Round flat coils of plain and will quote promptly on receipt of sketches and specifications. National fabricates any type of coil in Nickel, Monel, Chrome Nickel, Chrome-Iron, Aluminum, Admiralty, Brass, Copper, Stainless Iron, 18-8 S. S. and Wrought Iron etc.



ROUND FLAT COIL

WELDED TITANIUM COIL

0000-NLI-000014340