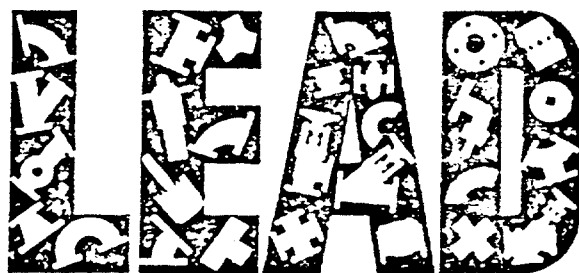


142

NATIONAL



PRODUCTS

FOR THE

CHEMICAL INDUSTRY



rely on LEAD to resist corrosion

-1-71-52

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NLI 115271

142

NATIONAL LEAD COMPANY PRODUCTS

For Handling Corrosive Materials in
CHEMICAL PROCESSING

Lead Sheet

Lead, Lead Lined and Lead Covered Pipe and Coils

Hard Lead and Lead Lined Valves and Fittings

Hard Lead Pumps

Homogeneous Lead Lined Tanks and Vessels

Extruded, Cast, and Machined Lead Products

Acid Recovery Equipment



NATIONAL LEAD COMPANY

General Office: 111 BROADWAY, NEW YORK 6, N. Y.

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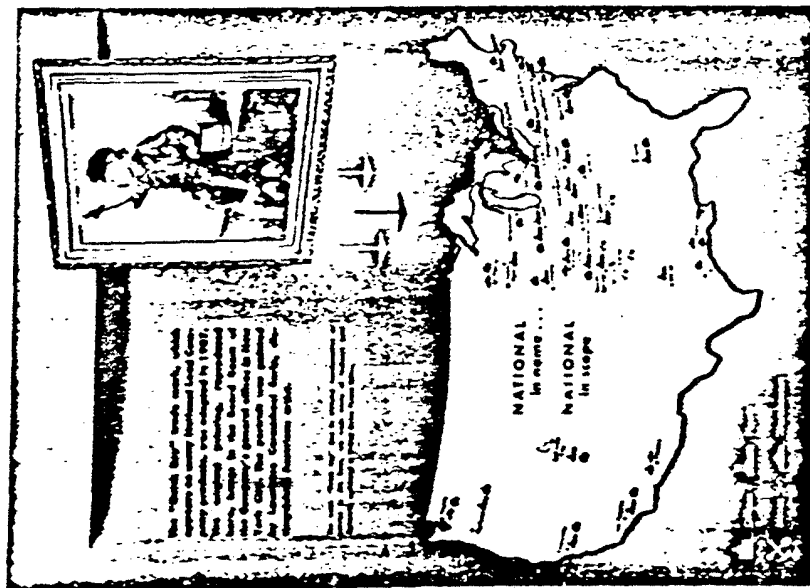
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NLI 115274



LOOK TO THE LEADER FOR LEAD

The formula for leadership in any industry comes down to about this: Deliver the right goods at the right price, at the right place at the right time. The percent of this policy has earned for National Lead Company leadership in the field of lead products.

As may be seen by a glance at the map on the facing page, the Company maintains a network of plants across the nation, making it possible to meet the demand of time and place. These plants are geared to produce high grade lead goods in the volumes necessary to keep costs down. This makes it possible to meet the demand for top quality at a fair price.

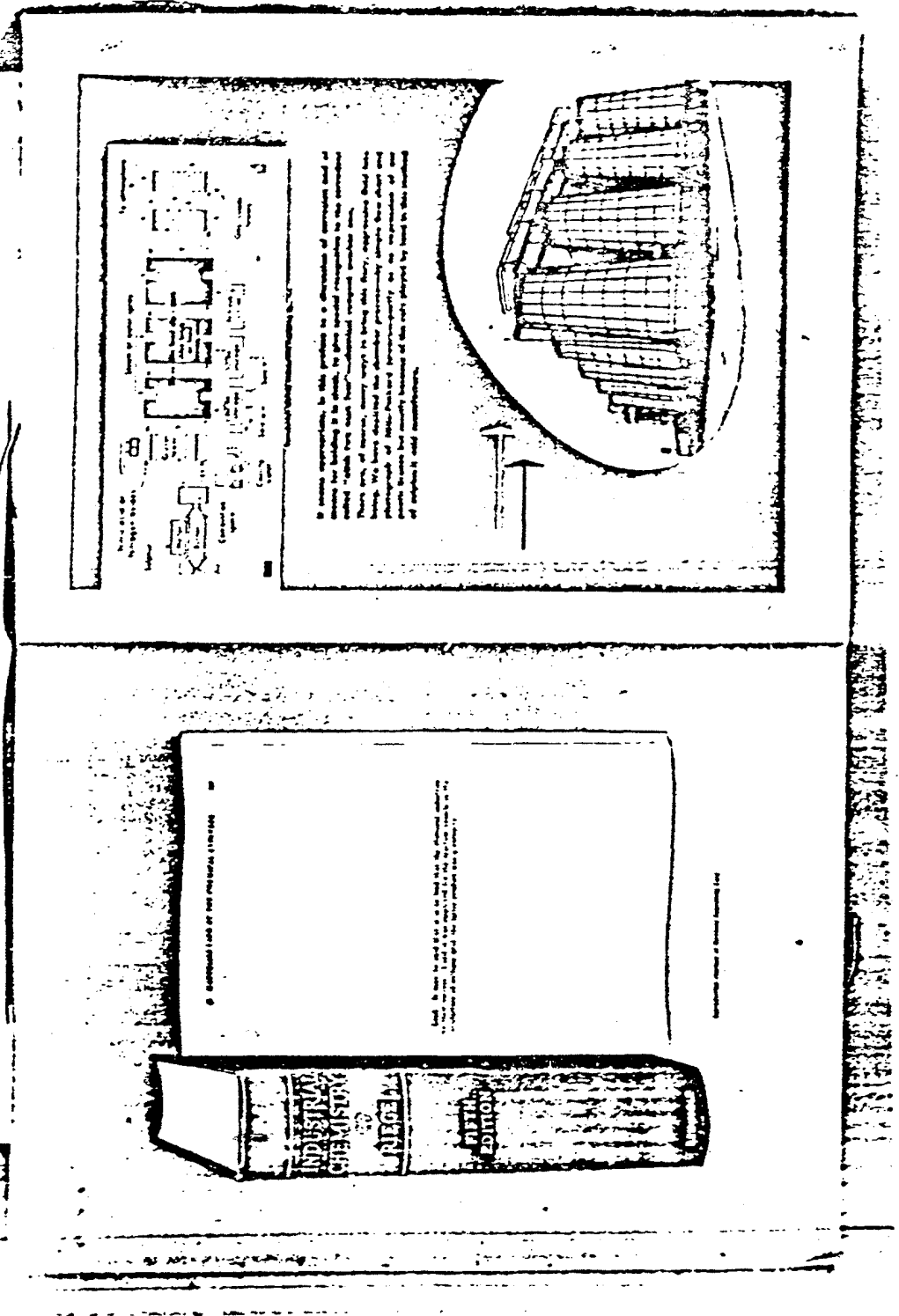
Because of these established facilities and policies National Lead Company is backed upon as lead headquarters by the chemical processing industry, from the base of a single lead sheet to the purchase of a complete acid handling system.

NATIONAL LEAD COMPANY

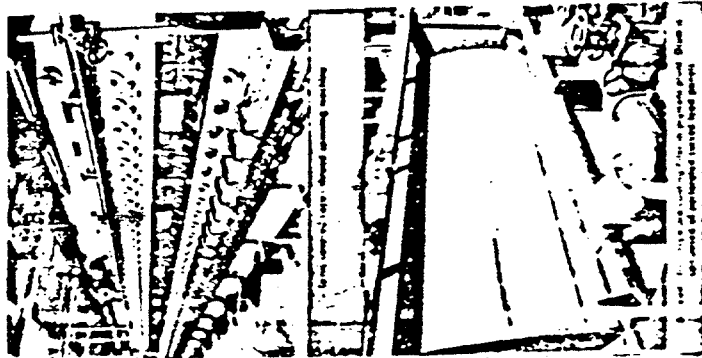
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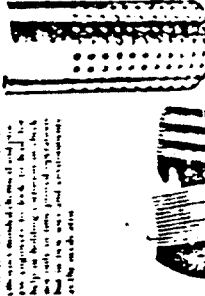
LEAD KEEPS PACE WITH Chemical Progress



The original point in the entire field of lead is a process. The lead industry has made a great deal of progress in making sulphur, and the trend of active chemical, concentrated on the right side.

Lead is a metal which is highly resistant to corrosion, and it is this property which makes it so valuable in many applications. It is also a metal which is highly resistant to corrosion, and it is this property which makes it so valuable in many applications.

Lead is a metal which is highly resistant to corrosion, and it is this property which makes it so valuable in many applications. It is also a metal which is highly resistant to corrosion, and it is this property which makes it so valuable in many applications.



Lead pipe and lead container. The lead pipe is shown in cross-section, and the lead container is shown in cross-section.

Choosing a Corrosion Resistant Material of Construction

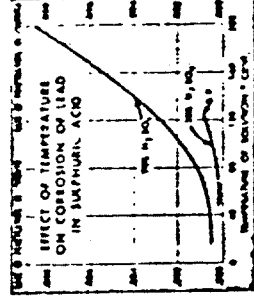
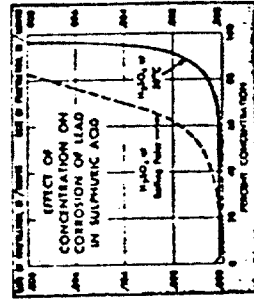
The first step in choosing a corrosion resistant material of construction is to determine the nature of the corrosive medium.

A number of factors must be considered in making the choice of a material of construction for the corrosive medium. These factors are: the nature of the corrosive medium, the temperature of the medium, the concentration of the medium, and the type of material of construction.

1-CORROSION RESISTANCE

The first step in choosing a corrosion resistant material of construction is to determine the nature of the corrosive medium. A number of factors must be considered in making the choice of a material of construction for the corrosive medium.

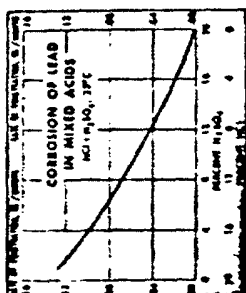
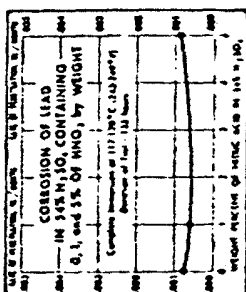
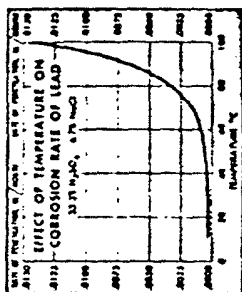
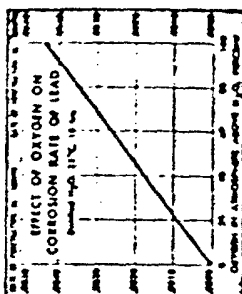
The first step in choosing a corrosion resistant material of construction is to determine the nature of the corrosive medium. A number of factors must be considered in making the choice of a material of construction for the corrosive medium.



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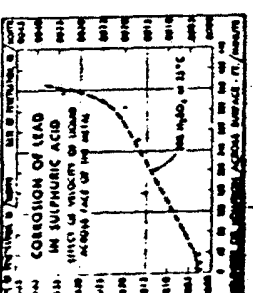
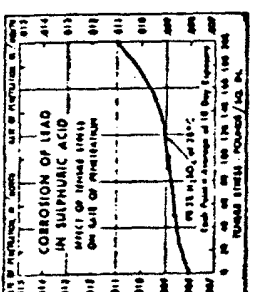
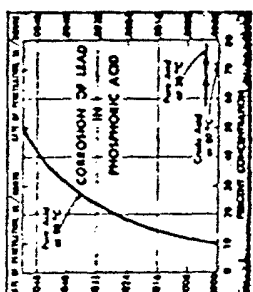
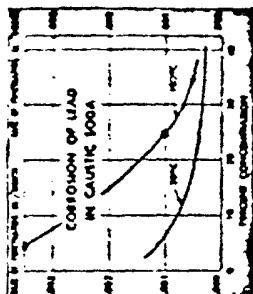


The rate of corrosion of lead in sulfuric acid is a function of the concentration of the acid, the temperature, and the presence of oxygen. The rate of corrosion increases with increasing concentration of the acid, increasing temperature, and increasing oxygen concentration. The rate of corrosion is also affected by the surface area of the lead and the time of exposure.

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The grades of lead described in this document are based on the chemical composition of the lead, and not on the physical form of the lead. The grades of lead are based on the chemical composition of the lead, and not on the physical form of the lead. The grades of lead are based on the chemical composition of the lead, and not on the physical form of the lead.

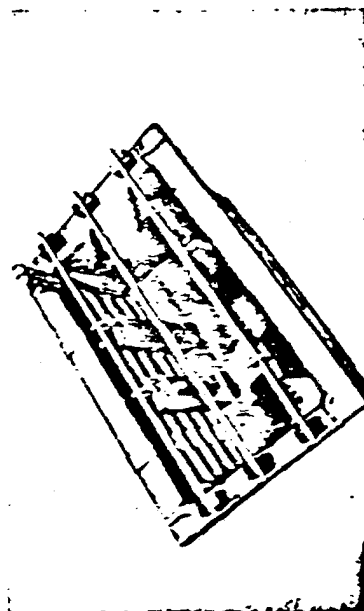
TABLE 1. GRADES OF LEAD USED BY NATIONAL LEAD CO.

Grade	Chemical Composition	Physical Form
Grade 1	99.99% Lead, 0.01% Antimony	Cast and rolled
Grade 2	99.98% Lead, 0.02% Antimony	Cast and rolled
Grade 3	99.97% Lead, 0.03% Antimony	Cast and rolled
Grade 4	99.96% Lead, 0.04% Antimony	Cast and rolled
Grade 5	99.95% Lead, 0.05% Antimony	Cast and rolled
Grade 6	99.94% Lead, 0.06% Antimony	Cast and rolled
Grade 7	99.93% Lead, 0.07% Antimony	Cast and rolled
Grade 8	99.92% Lead, 0.08% Antimony	Cast and rolled
Grade 9	99.91% Lead, 0.09% Antimony	Cast and rolled
Grade 10	99.90% Lead, 0.10% Antimony	Cast and rolled

For more information on the grades of lead used by National Lead Co., contact the National Lead Co. Sales Office, 1000 Broadway, New York, N.Y. 10001.

Grades of Lead

When it comes to the grades of lead, there are many different types of lead available. The grades of lead are based on the chemical composition of the lead, and not on the physical form of the lead. The grades of lead are based on the chemical composition of the lead, and not on the physical form of the lead.



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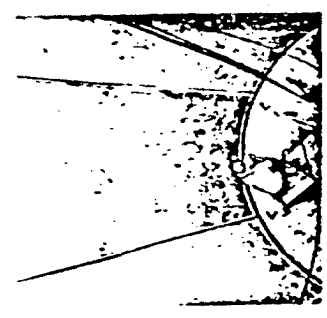
NLI 115281

SHEET LEAD SIZES AND WEIGHTS

The weights given in this table are approximate and should not be used for exact calculations. Lead is sold in sheets of 100 lb. each.

Sheet Size (inches)	Weight (lb.)	Thickness (inches)
100 x 100	100	0.001
100 x 100	100	0.002
100 x 100	100	0.003
100 x 100	100	0.004
100 x 100	100	0.005
100 x 100	100	0.006
100 x 100	100	0.007
100 x 100	100	0.008
100 x 100	100	0.009
100 x 100	100	0.010
100 x 100	100	0.011
100 x 100	100	0.012
100 x 100	100	0.013
100 x 100	100	0.014
100 x 100	100	0.015
100 x 100	100	0.016
100 x 100	100	0.017
100 x 100	100	0.018
100 x 100	100	0.019
100 x 100	100	0.020
100 x 100	100	0.021
100 x 100	100	0.022
100 x 100	100	0.023
100 x 100	100	0.024
100 x 100	100	0.025
100 x 100	100	0.026
100 x 100	100	0.027
100 x 100	100	0.028
100 x 100	100	0.029
100 x 100	100	0.030
100 x 100	100	0.031
100 x 100	100	0.032
100 x 100	100	0.033
100 x 100	100	0.034
100 x 100	100	0.035
100 x 100	100	0.036
100 x 100	100	0.037
100 x 100	100	0.038
100 x 100	100	0.039
100 x 100	100	0.040
100 x 100	100	0.041
100 x 100	100	0.042
100 x 100	100	0.043
100 x 100	100	0.044
100 x 100	100	0.045
100 x 100	100	0.046
100 x 100	100	0.047
100 x 100	100	0.048
100 x 100	100	0.049
100 x 100	100	0.050
100 x 100	100	0.051
100 x 100	100	0.052
100 x 100	100	0.053
100 x 100	100	0.054
100 x 100	100	0.055
100 x 100	100	0.056
100 x 100	100	0.057
100 x 100	100	0.058
100 x 100	100	0.059
100 x 100	100	0.060
100 x 100	100	0.061
100 x 100	100	0.062
100 x 100	100	0.063
100 x 100	100	0.064
100 x 100	100	0.065
100 x 100	100	0.066
100 x 100	100	0.067
100 x 100	100	0.068
100 x 100	100	0.069
100 x 100	100	0.070
100 x 100	100	0.071
100 x 100	100	0.072
100 x 100	100	0.073
100 x 100	100	0.074
100 x 100	100	0.075
100 x 100	100	0.076
100 x 100	100	0.077
100 x 100	100	0.078
100 x 100	100	0.079
100 x 100	100	0.080
100 x 100	100	0.081
100 x 100	100	0.082
100 x 100	100	0.083
100 x 100	100	0.084
100 x 100	100	0.085
100 x 100	100	0.086
100 x 100	100	0.087
100 x 100	100	0.088
100 x 100	100	0.089
100 x 100	100	0.090
100 x 100	100	0.091
100 x 100	100	0.092
100 x 100	100	0.093
100 x 100	100	0.094
100 x 100	100	0.095
100 x 100	100	0.096
100 x 100	100	0.097
100 x 100	100	0.098
100 x 100	100	0.099
100 x 100	100	0.100

Lead is sold in sheets of 100 lb. each. The weights given in this table are approximate and should not be used for exact calculations. Lead is sold in sheets of 100 lb. each.



Lead is sold in sheets of 100 lb. each. The weights given in this table are approximate and should not be used for exact calculations. Lead is sold in sheets of 100 lb. each.

Lead Sheet

The large sheet of lead is the standard size for most applications. It is sold in sheets of 100 lb. each. The weights given in this table are approximate and should not be used for exact calculations. Lead is sold in sheets of 100 lb. each.



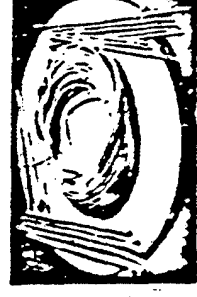
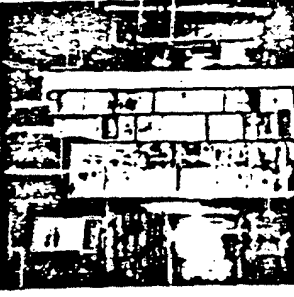
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NLI 115282

APPLICATION OF SHEET LEAD LININGS

Lead is a heavy metal which is used in many applications. It is a soft metal and is easily deformed. It is used in many applications, including as a lining for radiation shielding. Lead is used in many applications, including as a lining for radiation shielding. Lead is used in many applications, including as a lining for radiation shielding.



LOOSE LEAD LININGS

Loose lead linings are used in many applications. They are made of lead and are used to provide shielding. They are used in many applications, including as a lining for radiation shielding. Loose lead linings are used in many applications, including as a lining for radiation shielding.

Loose lead linings are used in many applications. They are made of lead and are used to provide shielding. They are used in many applications, including as a lining for radiation shielding. Loose lead linings are used in many applications, including as a lining for radiation shielding.

LEAD WELDING OR CURING

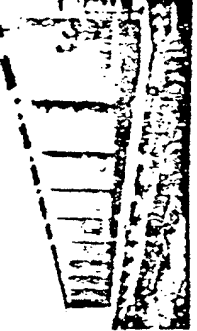
Lead welding or curing is a process used to join lead pieces. It is used in many applications, including as a lining for radiation shielding. Lead welding or curing is used in many applications, including as a lining for radiation shielding.

BONDED OR HOMOGENEOUS LININGS

Bonded or homogeneous linings are used in many applications. They are made of lead and are used to provide shielding. They are used in many applications, including as a lining for radiation shielding. Bonded or homogeneous linings are used in many applications, including as a lining for radiation shielding.

TYPICAL INSTALLATIONS OF HOMOGENEOUS EQUIPMENT

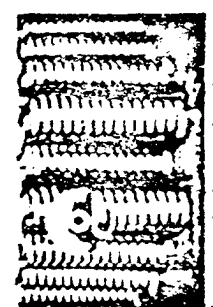
Equipment	Installation
Lead Welding	Lead Welding
Lead Curing	Lead Curing
Lead Linings	Lead Linings
Lead Welding	Lead Welding
Lead Curing	Lead Curing
Lead Linings	Lead Linings



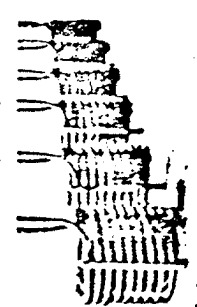
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NLI 115284

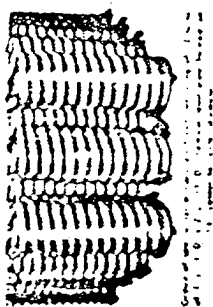
Lead Pipe Coils



Having a history of more than a century, the lead pipe industry has developed a reputation for producing high quality lead pipe. The lead pipe is made from a special alloy of lead and antimony, which gives it the strength and durability required for use in water supply systems. The lead pipe is coiled into large coils for easy handling and transport.



We manufacture a full line of lead pipe and traps. Our traps are made from a special alloy of lead and antimony, which gives them the strength and durability required for use in water supply systems. The traps are designed to prevent the backflow of water and to keep the system clean and free from debris.



Lead pipe packing is a special type of lead pipe that is designed to be used in water supply systems. It is made from a special alloy of lead and antimony, which gives it the strength and durability required for use in water supply systems. The packing is coiled into large coils for easy handling and transport.



The lead pipe industry has a long history of producing high quality lead pipe. The lead pipe is made from a special alloy of lead and antimony, which gives it the strength and durability required for use in water supply systems. The lead pipe is coiled into large coils for easy handling and transport.

Fig. 1. Manufactured by an automatic process. The length of the pipe is 10 ft. longer than the length of the coil.

ECONOMIC COMPARISON OF PIPING FOR HANDLING 60" x 10" x 100' F

Material	Weight (lb.)	Volume (cu. ft.)	Cost (\$)
Lead	1000	1.0	100.00
Steel	1000	1.0	100.00
Concrete	1000	1.0	100.00
Cast Iron	1000	1.0	100.00
Brass	1000	1.0	100.00
Copper	1000	1.0	100.00
Aluminum	1000	1.0	100.00
Galvanized Steel	1000	1.0	100.00
Stainless Steel	1000	1.0	100.00
Plastic	1000	1.0	100.00
Asbestos	1000	1.0	100.00
Lead	1000	1.0	100.00

Fig. 2. Lead pipe coils are made by an automatic process. The length of the pipe is 10 ft. longer than the length of the coil.

The lead pipe industry has a long history of producing high quality lead pipe. The lead pipe is made from a special alloy of lead and antimony, which gives it the strength and durability required for use in water supply systems. The lead pipe is coiled into large coils for easy handling and transport.

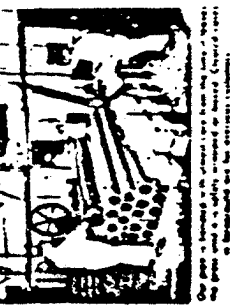
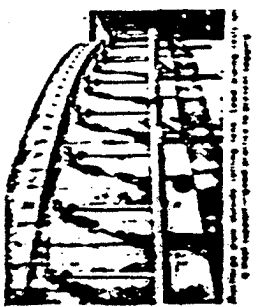


Fig. 3. Lead pipe traps and bends are made by an automatic process. The length of the pipe is 10 ft. longer than the length of the coil.

Fig. 4. Lead pipe packing is made by an automatic process. The length of the pipe is 10 ft. longer than the length of the coil.

SPECIFIC GRAVITY DEGREES BAUME TABLE FOR THREE COMMON ACID SOLUTIONS

PHOSPHORIC ACID			ZINC CHLORIDE			SULPHURIC ACID		
%H ₃ PO ₄	Specific Gravity	°Baumé	%ZnCl ₂	Specific Gravity	°Baumé	%H ₂ SO ₄	Specific Gravity	°Baumé
1	1.0038	0.6	2	1.0167	2.4	1	1.0051	0.7
10	1.0532	7.3	10	1.0819	11.0	10	1.0661	9.0
20	1.1134	14.8	20	1.1866	22.8	20	1.1394	17.7
30	1.1805	22.2	30	1.2928	32.8	30	1.2185	26.0
40	1.254	29.4	40	1.4173	42.7	40	1.3028	33.7
50	1.335	36.4	50	1.5681	52.5	50	1.3951	41.1
60	1.426	43.3	60	1.749	62.1	60	1.4983	48.2
70	1.526	50.0	70	1.962	71.1	70	1.6105	55.0
80	1.633	56.2				80	1.7272	61.1
90	1.746	62.0				90	1.8144	65.1
100	1.870	67.5				97	1.8364	66.0
						100	1.8305	65.8

Approximate Boiling Points of H₂SO₄ at Atmospheric Pressure

50 °Bé—295 F	63 °Bé—432 F
60 °Bé—386 F	64 °Bé—451 F
61 °Bé—400 F	65 °Bé—485 F
62 °Bé—415 F	66 °Bé—538 F

COMPARISON OF BAUME SCALE AND SPECIFIC GRAVITY LIQUIDS HEAVIER THAN WATER¹

Degrees Baumé	Specific Gravity	Pounds Per Gallon
0	1.000	8.328
5	1.036	8.625
10	1.074	8.945
15	1.115	9.289
20	1.160	9.660
25	1.208	10.063
30	1.261	10.501
35	1.318	10.978
40	1.381	11.501
45	1.450	12.076
50	1.526	12.711
55	1.611	13.417
60	1.706	14.207
65	1.813	15.094
66	1.835	15.285

¹Degrees Baumé = $145 - \frac{145}{\text{sp. gr.}}$

TEMPERATURE CONVERSION

To convert from	To	Substitute in Formula
Degrees Centigrade	Degrees Fahrenheit	(°C. × 9/5) + 32
Degrees Centigrade	Degrees Absolute	(°C. + 273.18)
Degrees Centigrade	Degrees Reaumur	(°C. × 4/5)
Degrees Fahrenheit	Degrees Centigrade	(°F. - 32) × 5/9
Degrees Fahrenheit	Degrees Reaumur	(°F. - 32) × 4/9
Degrees Reaumur	Degrees Centigrade	(°Reaumur × 5/4)
Degrees Reaumur	Degrees Fahrenheit	(°Reaumur × 9/4) + 32

ENGINEERING DATA

LEAD PIPE FOR HEATING COILS

Inside Diameter of Pipe in Inches	Wall Thickness in Inches	Outside Diameter in Inches	Weight per Ft. lbs.	Sq. Ft. Outside Surface Area per 100 Ft. Length	Maximum Steam Pressure Lbs. per Sq. In.	Corresponding Temperature in °F
3/4	1/8	1	1.69	26.18	30	274
3/4	3/16	1 1/8	2.72	29.48	40	287
3/4	1/4	1 1/4	3.87	32.73	50	298
1	3/16	1 3/8	3.44	36.01	30	274
1	1/4	1 1/2	4.83	39.28	40	287
1	5/16	1 5/8	6.34	42.81	50	298
1 1/4	3/16	1 5/8	4.17	42.81	30	274
1 1/4	5/16	1 7/8	7.54	49.12	40	287
1 1/4	3/8	2	9.42	52.36	50	298

HEATING COIL FORMULA

For Calculating Length of Lead Pipe Needed for Heating Solutions—Time 1 Hour

$$\text{Mean temperature difference } ^\circ\text{F.} = \frac{(T-T_1)-(T-T_2)}{2.3 \log_{10} \frac{(T-T_1)}{(T-T_2)}}$$

where T = Temperature of steam or heating medium in $^\circ\text{F}$.

T_1 = Initial temperature of solution in $^\circ\text{F}$.

T_2 = Final temperature of solution in $^\circ\text{F}$.

Length of pipe required =

$$\frac{V \times W \times (T_2 - T_1) \times Sp \times 12}{H \times M \times D \times 3.1416}$$

where V = Volume of solution in gallons

W = Weight of solution in lbs. per gal.

T_2 = Temperature to which solution is to be heated in $^\circ\text{F}$.

T_1 = Initial temperature of solution in $^\circ\text{F}$.

Sp = Specific heat of solution.

H = Heat transfer in B.t.u./sq. ft./ $^\circ\text{F}$ /hr.
Varies from 50 to 150. See note below.

M = Mean temperature difference $^\circ\text{F}$.

D = Outside diameter of lead pipe in inches

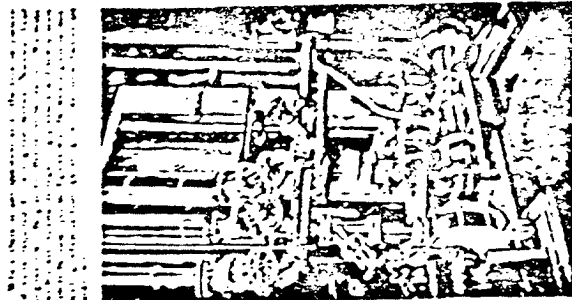
NOTE: H varies with the outside film conductivity of solution, the inside film conductivity of heating medium, the lead pipe wall thickness, the agitation outside the coil, and the speed of flow inside the coil. For a thorough consideration of heat transfer problems, consult engineering books on the subject.

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NLI 115287

ACID HANDLING Valves • Fittings • Pumps • Lined Pipe

Under the trade name, T-lined, National Lead Company manufactures and distributes an advanced process for the manufacture of acid handling valves, fittings, pumps and lined pipe.



When they are subjected to acid, the T-lined valves, fittings, pumps and lined pipe are not damaged. The T-lined process is a unique method of lining the interior of valves, fittings, pumps and pipe with a special acid-resistant material. This lining is applied in a continuous process, resulting in a uniform, seamless lining that is resistant to all acids. The T-lined process is a unique method of lining the interior of valves, fittings, pumps and pipe with a special acid-resistant material. This lining is applied in a continuous process, resulting in a uniform, seamless lining that is resistant to all acids.

T-lined valves, fittings, pumps and lined pipe are available in a wide range of sizes and materials. They are designed to handle all acids, including sulfuric, hydrochloric, nitric, phosphoric, and acetic. The T-lined process is a unique method of lining the interior of valves, fittings, pumps and pipe with a special acid-resistant material. This lining is applied in a continuous process, resulting in a uniform, seamless lining that is resistant to all acids.

ENGINEERING DATA SAFE WORKING PRESSURES

For Lined Pipe, See Working Pressure of Pipe at Various Temperatures

Temperature	Working Pressure (lb./sq. in.)	Working Pressure (lb./sq. in.)	Working Pressure (lb./sq. in.)
0	100	100	100
100	100	100	100
200	100	100	100
300	100	100	100
400	100	100	100
500	100	100	100
600	100	100	100
700	100	100	100
800	100	100	100
900	100	100	100

The T-lined process is a unique method of lining the interior of valves, fittings, pumps and pipe with a special acid-resistant material. This lining is applied in a continuous process, resulting in a uniform, seamless lining that is resistant to all acids.

FEET OF PIPE REQUIRED TO HEAT AQUEOUS SOLUTIONS

Temperature	Feet of Pipe Required	Feet of Pipe Required	Feet of Pipe Required
0	100	100	100
100	100	100	100
200	100	100	100
300	100	100	100
400	100	100	100
500	100	100	100
600	100	100	100
700	100	100	100
800	100	100	100
900	100	100	100

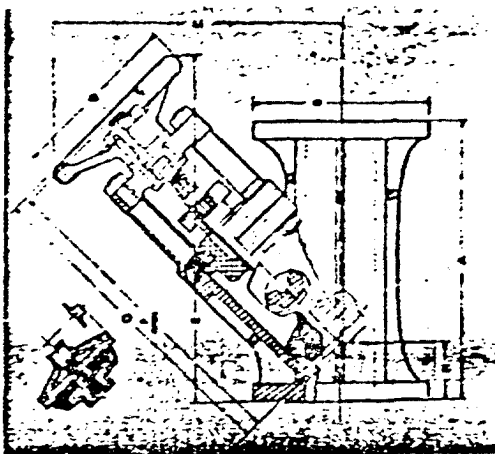
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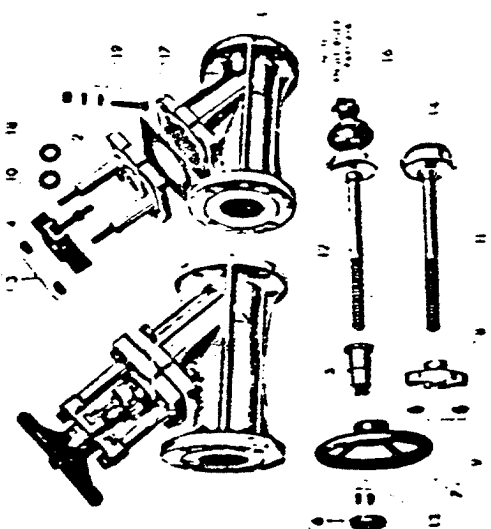
NLI 115288

CHEM-RAYON VALVE - HARD LEAD - V PATTERN

PART NO.	PART NAME
1	Valve Body
2	Valve Head
3	Valve Stem
4	Valve Seat
5	Valve Spring
6	Valve Spring Retainer
7	Valve Spring Washer
8	Valve Spring Nut
9	Valve Spring Lock Washer
10	Valve Spring Lock Nut
11	Valve Spring Lock Washer
12	Valve Spring Lock Nut
13	Valve Spring Lock Washer
14	Valve Spring Lock Nut
15	Valve Spring Lock Washer
16	Valve Spring Lock Nut
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38	Valve Spring Lock Nut
39	Valve Spring Lock Washer
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41	Valve Spring Lock Washer
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45	Valve Spring Lock Washer
46	Valve Spring Lock Nut
47	Valve Spring Lock Washer
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94	Valve Spring Lock Nut
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97	Valve Spring Lock Washer
98	Valve Spring Lock Nut
99	Valve Spring Lock Washer
100	Valve Spring Lock Nut



ITEM NO.	ITEM NAME
1	Valve Body
2	Valve Head
3	Valve Stem
4	Valve Seat
5	Valve Spring
6	Valve Spring Retainer
7	Valve Spring Washer
8	Valve Spring Nut
9	Valve Spring Lock Washer
10	Valve Spring Lock Nut
11	Valve Spring Lock Washer
12	Valve Spring Lock Nut
13	Valve Spring Lock Washer
14	Valve Spring Lock Nut
15	Valve Spring Lock Washer
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99	Valve Spring Lock Washer
100	Valve Spring Lock Nut



"United" CHEM-RAYON VALVE - HARD LEAD

V PATTERN

With perforated and variable lead, this Chem-Rayon Valve is made in both "V" and "Angle" patterns. The lead is cast hard lead, mentioned in the head and stem to greatly increase the strength of both and flanges. The flanges are of hard lead, reinforced with a steel insert. The valve contains no steel parts which are subject to the hammer and completely covered with hard lead. The stem, which is also hard lead, is fitted and the joint is made of bronze composition. The working box is deep, permitting the use of a generous quantity of special anti-rusting packing. Packing can be replaced when the valve is under pressure. The valve is equipped with hard lead plug integral with the stem, or with tamperable plug one of anti-rusting alloy.

ITEM NO.	ITEM NAME
1	Valve Body
2	Valve Head
3	Valve Stem
4	Valve Seat
5	Valve Spring
6	Valve Spring Retainer
7	Valve Spring Washer
8	Valve Spring Nut
9	Valve Spring Lock Washer
10	Valve Spring Lock Nut
11	Valve Spring Lock Washer
12	Valve Spring Lock Nut
13	Valve Spring Lock Washer
14	Valve Spring Lock Nut
15	Valve Spring Lock Washer
16	Valve Spring Lock Nut
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99	Valve Spring Lock Washer
100	Valve Spring Lock Nut

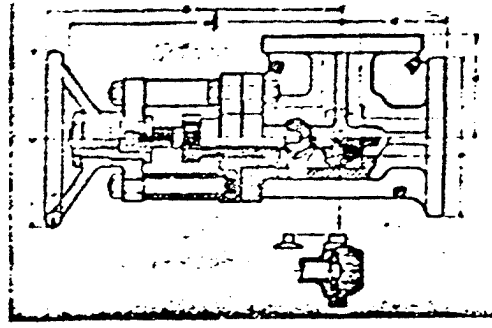
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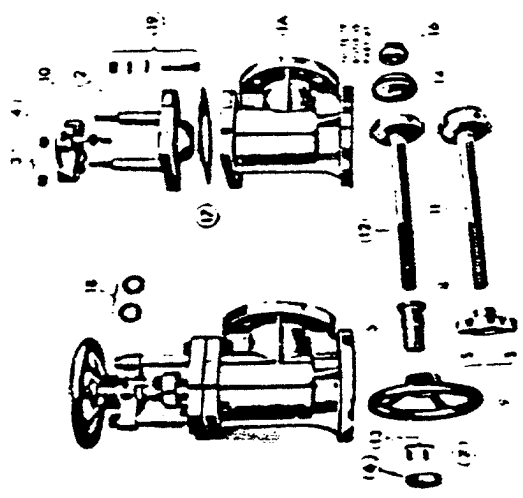
NLI 115289

CHEM-RAYON VALVE-HARD HEAD-ANGLE PATTERN

Part No.	Part Name	Part Material
1	Angle Plug	Steel
2	Bracket	Steel
3	Bracket Top Nut (1)	Steel
4	Bracket Top	Steel
5	Bracket Nut	Steel
6	Bracket Plug	Steel
7	Bracket Plug	Steel
8	Bracket Plug	Steel
9	Bracket Plug	Steel
10	Bracket Plug	Steel
11	Bracket Plug	Steel
12	Bracket Plug	Steel
13	Bracket Plug	Steel
14	Bracket Plug	Steel
15	Bracket Plug	Steel
16	Bracket Plug	Steel
17	Bracket Plug	Steel
18	Bracket Plug	Steel
19	Bracket Plug	Steel



Part No.	Part Name	Part Material
1	Angle Plug	Steel
2	Bracket	Steel
3	Bracket Top Nut (1)	Steel
4	Bracket Top	Steel
5	Bracket Nut	Steel
6	Bracket Plug	Steel
7	Bracket Plug	Steel
8	Bracket Plug	Steel
9	Bracket Plug	Steel
10	Bracket Plug	Steel
11	Bracket Plug	Steel
12	Bracket Plug	Steel
13	Bracket Plug	Steel
14	Bracket Plug	Steel
15	Bracket Plug	Steel
16	Bracket Plug	Steel
17	Bracket Plug	Steel
18	Bracket Plug	Steel
19	Bracket Plug	Steel



"United" CHEM-RAYON VALVE-HARD LEAD

ANGLE PATTERN

Sample for the difference in pattern, this Chem-Rayon Valve has the same features as the "United" valve in that it has a hard head with reinforcing hard lead. The Chem-Rayon Valve has a hard head with reinforcing hard lead, which are integral with the bracket, are heavily coated with hard lead and valve bushing are of bronze composition. The valve is coated with hard lead. The valve bushing has a large quantity of packing which when necessary, may be replaced while valve is under pressure. The valve is furnished with a hard lead plug integral with the stem or with removable plug due to wall reinforcing rubber.

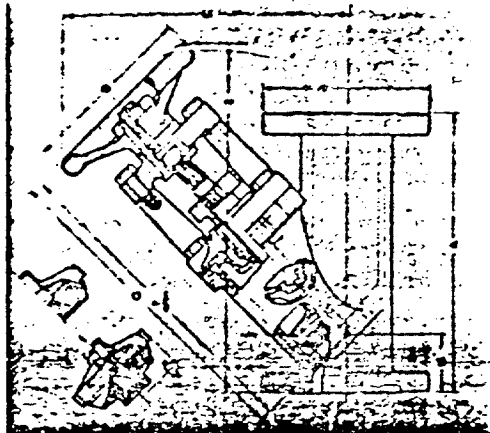
1	Angle Plug	Steel
2	Bracket	Steel
3	Bracket Top Nut (1)	Steel
4	Bracket Top	Steel
5	Bracket Nut	Steel
6	Bracket Plug	Steel
7	Bracket Plug	Steel
8	Bracket Plug	Steel
9	Bracket Plug	Steel
10	Bracket Plug	Steel
11	Bracket Plug	Steel
12	Bracket Plug	Steel
13	Bracket Plug	Steel
14	Bracket Plug	Steel
15	Bracket Plug	Steel
16	Bracket Plug	Steel
17	Bracket Plug	Steel
18	Bracket Plug	Steel
19	Bracket Plug	Steel

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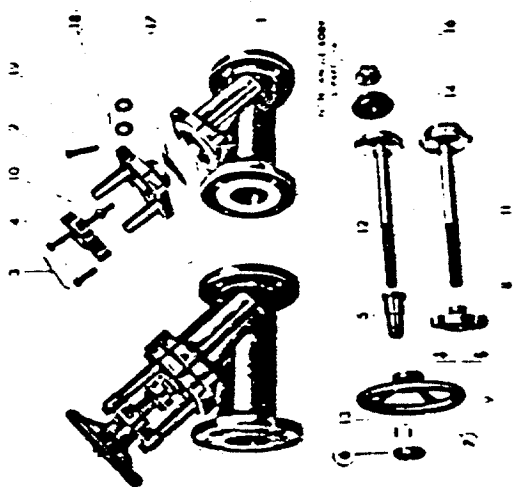
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NLI 115290

TYPE C VALVE - LEAD LINED - A PATTERN	
Part No.	Part Name
1	Valve Body
2	Valve Seat
3	Valve Stem
4	Valve Wobble Plug
5	Valve Wobble Plug
6	Valve Wobble Plug
7	Valve Wobble Plug
8	Valve Wobble Plug
9	Valve Wobble Plug
10	Valve Wobble Plug
11	Valve Wobble Plug
12	Valve Wobble Plug
13	Valve Wobble Plug
14	Valve Wobble Plug
15	Valve Wobble Plug
16	Valve Wobble Plug
17	Valve Wobble Plug
18	Valve Wobble Plug
19	Valve Wobble Plug
20	Valve Wobble Plug



Part No.	Part Name
1	Valve Body
2	Valve Seat
3	Valve Stem
4	Valve Wobble Plug
5	Valve Wobble Plug
6	Valve Wobble Plug
7	Valve Wobble Plug
8	Valve Wobble Plug
9	Valve Wobble Plug
10	Valve Wobble Plug
11	Valve Wobble Plug
12	Valve Wobble Plug
13	Valve Wobble Plug
14	Valve Wobble Plug
15	Valve Wobble Plug
16	Valve Wobble Plug
17	Valve Wobble Plug
18	Valve Wobble Plug
19	Valve Wobble Plug
20	Valve Wobble Plug



"United" TYPE C VALVE - LEAD LINED

"A" PATTERN

In general construction and operating characteristics the Type C Valve is similar to the Type B Valve. The important difference is in its construction. This valve has both body and bonnet of cast iron or cast steel for greater overall strength. Both chambers are heavily lined with lead and having lead head. All other parts that come in contact with acid are heavily covered with lead head. Full flow area is assured since the stem and seat body is one piece.

Part No.	Part Name
1	Valve Body
2	Valve Seat
3	Valve Stem
4	Valve Wobble Plug
5	Valve Wobble Plug
6	Valve Wobble Plug
7	Valve Wobble Plug
8	Valve Wobble Plug
9	Valve Wobble Plug
10	Valve Wobble Plug
11	Valve Wobble Plug
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14	Valve Wobble Plug
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19	Valve Wobble Plug
20	Valve Wobble Plug

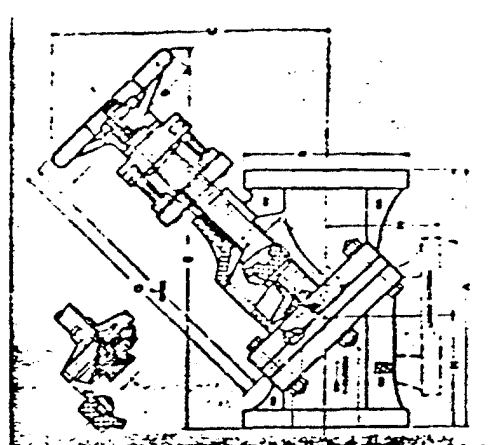
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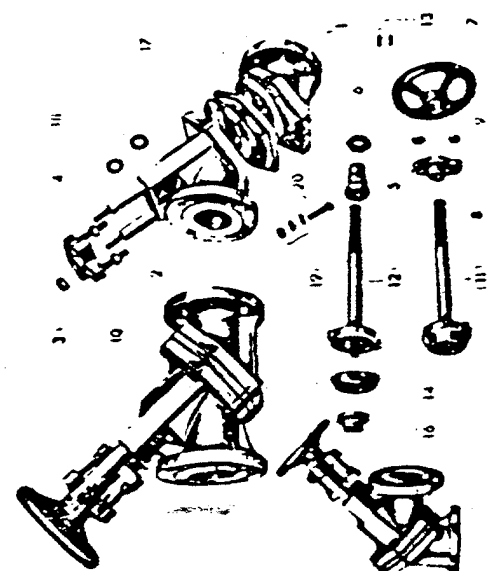
NLI 115292

TYPE K VALVE • HARVEY • ANGEL and PATRICKS

POST NAME	POST ADDRESS
1	Post Office
2	Post Office
3	Post Office
4	Post Office
5	Post Office
6	Post Office
7	Post Office
8	Post Office
9	Post Office
10	Post Office
11	Post Office
12	Post Office
13	Post Office
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...COLUMBIA TYPE R VALVE—HARD LEAD

APR 11 1964

This variable valve is manufactured of the same sturdy materials and to the same exacting standards as the popular Ram-Ration engine. It is a variable valve, however, always gives an adjustable amount of the "double punch" body consists the tip. It has an "Angle position to a" and can give this special construction for any position of the arm and play of any other, making the engine to meet special conditions. These valves are made of hardened steel and are subject to play and to wear. They play and wear, however, are adjustable.

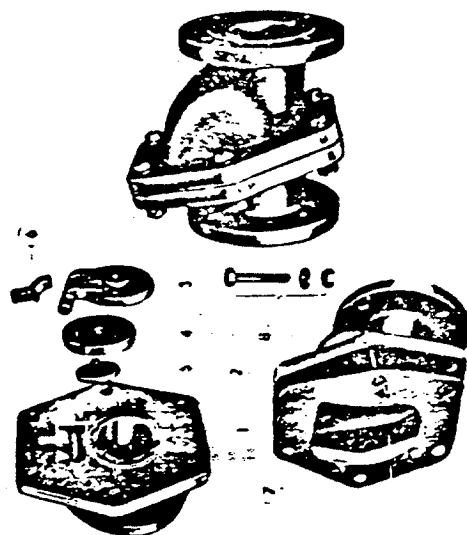
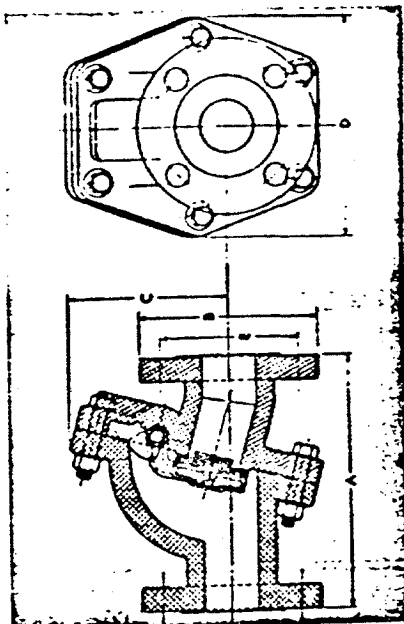
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NLI 115296

Part No.	Part Name	Part Material
1	Body (left)	Aluminum
2	Body (right)	Aluminum
3	Flange	Steel
4	Pin	Steel
5	Pin (right)	Steel
6	Flange (right)	Steel
7	Pin (left)	Steel
8	Pin (right)	Steel
9	Pin (left)	Steel
10	Pin (right)	Steel

Part No.	Part Name	Part Material
1	Body (left)	Aluminum
2	Body (right)	Aluminum
3	Flange	Steel
4	Pin	Steel
5	Pin (right)	Steel
6	Flange (right)	Steel
7	Pin (left)	Steel
8	Pin (right)	Steel
9	Pin (left)	Steel
10	Pin (right)	Steel



TYPE D CHECK VALVE—HEAVY LEAD

Part No.	Part Name	Part Material
1	Body (left)	Aluminum
2	Body (right)	Aluminum
3	Flange	Steel
4	Pin	Steel
5	Pin (right)	Steel
6	Flange (right)	Steel
7	Pin (left)	Steel
8	Pin (right)	Steel
9	Pin (left)	Steel
10	Pin (right)	Steel

This check valve is used in heavy duty applications where a heavy lead is required. The valve is made of aluminum and steel. The handle is made of steel and the pin is made of steel. The flange is made of steel and the body is made of aluminum. The valve is used in heavy duty applications where a heavy lead is required.

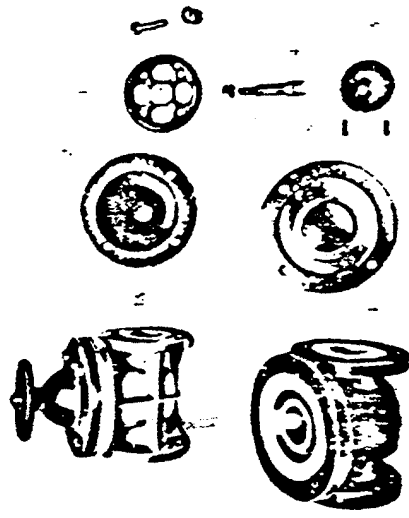
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NLI 115298

**DIAPHRAGM VALVE
LEAD LINED or HARD LEAD**

PART NO.	PART NAME	PART MATERIAL
1	Body	Cast Iron
2	Head	Cast Iron
3	Diaphragm	Cast Iron
4	Diaphragm Gasket	Cast Iron
5	Diaphragm Nut	Cast Iron
6	Diaphragm Washer	Cast Iron
7	Diaphragm Bolt	Cast Iron
8	Diaphragm Nut	Cast Iron
9	Diaphragm Washer	Cast Iron
10	Diaphragm Bolt	Cast Iron
11	Diaphragm Nut	Cast Iron
12	Diaphragm Washer	Cast Iron
13	Diaphragm Bolt	Cast Iron
14	Diaphragm Nut	Cast Iron
15	Diaphragm Washer	Cast Iron
16	Diaphragm Bolt	Cast Iron
17	Diaphragm Nut	Cast Iron
18	Diaphragm Washer	Cast Iron
19	Diaphragm Bolt	Cast Iron
20	Diaphragm Nut	Cast Iron
21	Diaphragm Washer	Cast Iron
22	Diaphragm Bolt	Cast Iron
23	Diaphragm Nut	Cast Iron
24	Diaphragm Washer	Cast Iron
25	Diaphragm Bolt	Cast Iron
26	Diaphragm Nut	Cast Iron
27	Diaphragm Washer	Cast Iron
28	Diaphragm Bolt	Cast Iron
29	Diaphragm Nut	Cast Iron
30	Diaphragm Washer	Cast Iron
31	Diaphragm Bolt	Cast Iron
32	Diaphragm Nut	Cast Iron
33	Diaphragm Washer	Cast Iron
34	Diaphragm Bolt	Cast Iron
35	Diaphragm Nut	Cast Iron
36	Diaphragm Washer	Cast Iron
37	Diaphragm Bolt	Cast Iron
38	Diaphragm Nut	Cast Iron
39	Diaphragm Washer	Cast Iron
40	Diaphragm Bolt	Cast Iron
41	Diaphragm Nut	Cast Iron
42	Diaphragm Washer	Cast Iron
43	Diaphragm Bolt	Cast Iron
44	Diaphragm Nut	Cast Iron
45	Diaphragm Washer	Cast Iron
46	Diaphragm Bolt	Cast Iron
47	Diaphragm Nut	Cast Iron
48	Diaphragm Washer	Cast Iron
49	Diaphragm Bolt	Cast Iron
50	Diaphragm Nut	Cast Iron
51	Diaphragm Washer	Cast Iron
52	Diaphragm Bolt	Cast Iron
53	Diaphragm Nut	Cast Iron
54	Diaphragm Washer	Cast Iron
55	Diaphragm Bolt	Cast Iron
56	Diaphragm Nut	Cast Iron
57	Diaphragm Washer	Cast Iron
58	Diaphragm Bolt	Cast Iron
59	Diaphragm Nut	Cast Iron
60	Diaphragm Washer	Cast Iron
61	Diaphragm Bolt	Cast Iron
62	Diaphragm Nut	Cast Iron
63	Diaphragm Washer	Cast Iron
64	Diaphragm Bolt	Cast Iron
65	Diaphragm Nut	Cast Iron
66	Diaphragm Washer	Cast Iron
67	Diaphragm Bolt	Cast Iron
68	Diaphragm Nut	Cast Iron
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70	Diaphragm Bolt	Cast Iron
71	Diaphragm Nut	Cast Iron
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73	Diaphragm Bolt	Cast Iron
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76	Diaphragm Bolt	Cast Iron
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79	Diaphragm Bolt	Cast Iron
80	Diaphragm Nut	Cast Iron
81	Diaphragm Washer	Cast Iron
82	Diaphragm Bolt	Cast Iron
83	Diaphragm Nut	Cast Iron
84	Diaphragm Washer	Cast Iron
85	Diaphragm Bolt	Cast Iron
86	Diaphragm Nut	Cast Iron
87	Diaphragm Washer	Cast Iron
88	Diaphragm Bolt	Cast Iron
89	Diaphragm Nut	Cast Iron
90	Diaphragm Washer	Cast Iron
91	Diaphragm Bolt	Cast Iron
92	Diaphragm Nut	Cast Iron
93	Diaphragm Washer	Cast Iron
94	Diaphragm Bolt	Cast Iron
95	Diaphragm Nut	Cast Iron
96	Diaphragm Washer	Cast Iron
97	Diaphragm Bolt	Cast Iron
98	Diaphragm Nut	Cast Iron
99	Diaphragm Washer	Cast Iron
100	Diaphragm Bolt	Cast Iron

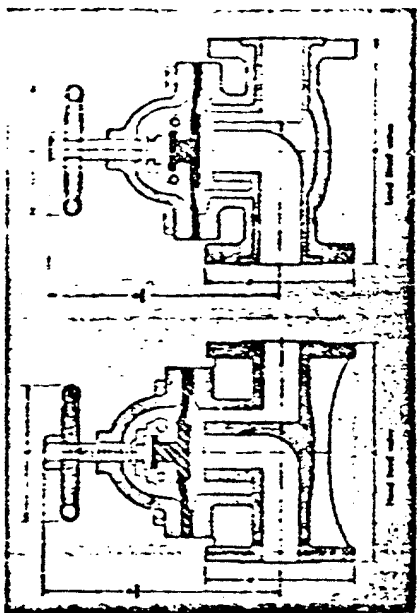


**United DIAPHRAGM VALVE
LEAD LINED or HARD LEAD**

For this type of valve the flow of the medium is controlled by a gas tight diaphragm. The working box is aluminum. Valves are available in lead lined or in cast iron with hard lead linings.

As this feature for its construction, it offers type of valve to select from. It is also available in lead lined or in cast iron with hard lead linings.

Size	Weight	Lead Lined	Hard Lead
1/2"	1.5	1.5	1.5
3/4"	2.5	2.5	2.5
1"	3.5	3.5	3.5
1 1/2"	5.5	5.5	5.5
2"	7.5	7.5	7.5
2 1/2"	10.5	10.5	10.5
3"	13.5	13.5	13.5
3 1/2"	16.5	16.5	16.5
4"	19.5	19.5	19.5
4 1/2"	22.5	22.5	22.5
5"	25.5	25.5	25.5
5 1/2"	28.5	28.5	28.5
6"	31.5	31.5	31.5
6 1/2"	34.5	34.5	34.5
7"	37.5	37.5	37.5
7 1/2"	40.5	40.5	40.5
8"	43.5	43.5	43.5
8 1/2"	46.5	46.5	46.5
9"	49.5	49.5	49.5
9 1/2"	52.5	52.5	52.5
10"	55.5	55.5	55.5



Size	Weight	Lead Lined	Hard Lead
1/2"	1.5	1.5	1.5
3/4"	2.5	2.5	2.5
1"	3.5	3.5	3.5
1 1/2"	5.5	5.5	5.5
2"	7.5	7.5	7.5
2 1/2"	10.5	10.5	10.5
3"	13.5	13.5	13.5
3 1/2"	16.5	16.5	16.5
4"	19.5	19.5	19.5
4 1/2"	22.5	22.5	22.5
5"	25.5	25.5	25.5
5 1/2"	28.5	28.5	28.5
6"	31.5	31.5	31.5
6 1/2"	34.5	34.5	34.5
7"	37.5	37.5	37.5
7 1/2"	40.5	40.5	40.5
8"	43.5	43.5	43.5
8 1/2"	46.5	46.5	46.5
9"	49.5	49.5	49.5
9 1/2"	52.5	52.5	52.5
10"	55.5	55.5	55.5

00057

NLI 115299

"United" Lead Lined Pipe



"United" ACID PROOF-LEAD LEAD IMBIBITION TYPE

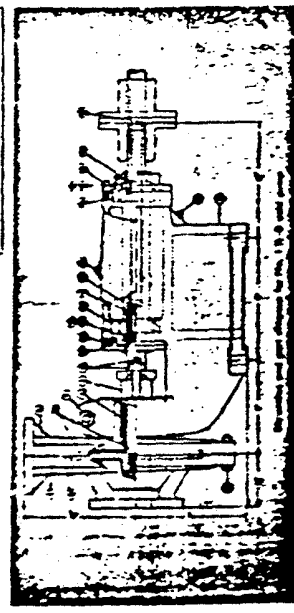
This lead lined pipe is of the open impeller type. It is designed for the particular service in which it is used and is made in a heavy and light weight for the different sizes.

Heavy - Lead lined with rubberizing for the maximum strength.

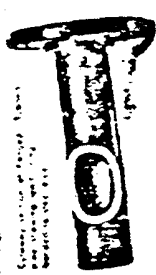
Light - In some instances the pipe containing the impeller is made of sheet metal through which is a rubber sheet (as in ball bearings) and is connected to the other section of the pipe by a flange and nut. This completely eliminates the danger of leakage and is a desirable feature in many applications.

Impeller - Impellers designed to pump various grades of acids and other liquids. They are made in various sizes and are available in different materials to suit the service.

Size	Weight	Length	Capacity
12"	100	10	100
14"	150	12	150
16"	200	14	200
18"	250	16	250
20"	300	18	300
22"	350	20	350
24"	400	22	400
26"	450	24	450
28"	500	26	500
30"	550	28	550



When regular lead piping is used with the acid and other liquids, it is necessary to use lead lined pipe and fittings. With the "United" lead lined pipe and fittings, the entire system is made of lead lined pipe and fittings, and the entire system is made of lead lined pipe and fittings. This is the only way to get the maximum life out of the system and to get the maximum strength out of the system. The "United" lead lined pipe and fittings are made of lead lined pipe and fittings, and the entire system is made of lead lined pipe and fittings. This is the only way to get the maximum life out of the system and to get the maximum strength out of the system.



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NLI 115300

Corrosion Resistant Die Castings

The use of magnesium die castings in corrosive environments is becoming increasingly important. Magnesium alloys are known for their excellent strength-to-weight ratio and their ability to be cast into complex shapes. However, they are also susceptible to corrosion, particularly in the presence of moisture and certain salts. This document discusses the various factors that influence the corrosion resistance of magnesium die castings and provides guidelines for selecting the appropriate alloy and finish for a given application.

In many cases, the use of magnesium die castings is justified by the weight savings and the ability to produce complex shapes. However, the corrosion resistance of these alloys must be carefully considered. Factors such as the environment, the presence of stress, and the quality of the casting process can all affect the corrosion resistance of the final part. Proper selection of alloy and finish, along with appropriate protective measures, can ensure the long-term performance of magnesium die castings in corrosive environments.



"United"

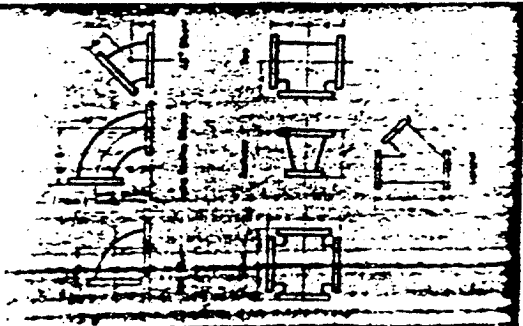
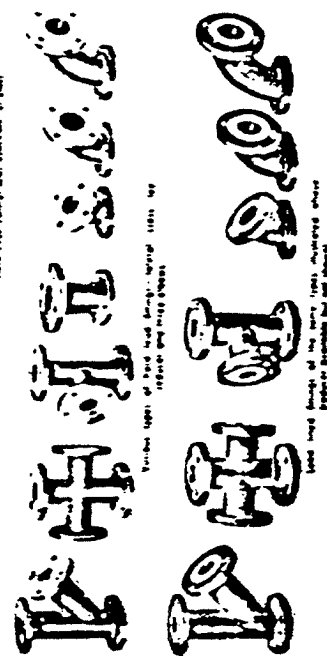
FLANGED FITTINGS HARD LEAD and LEAD FINISH

United Flanged fittings are made of hard lead or lead with a hard lead finish. The use of hard lead fittings is recommended for applications where the fittings will be subjected to high temperatures and/or high pressures. The hard lead finish provides a smooth, corrosion-resistant surface that is easy to clean and maintain. The fittings are available in a variety of sizes and configurations to meet the needs of a wide range of industrial applications.

UNITED DIMENSIONS SAME STANDARD
FOR THE STANDARD HARD LEAD FITTING

Size	1/2"	3/4"	1"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"	42"	48"	60"	72"	84"	96"	108"	120"
Weight	0.15	0.25	0.40	0.75	1.25	1.75	2.50	3.50	4.50	6.00	8.00	11.00	15.00	20.00	25.00	35.00	45.00	60.00	80.00	100.00	120.00	150.00	200.00	250.00	350.00	450.00	600.00	800.00	1000.00

These Flanged fittings are made of hard lead or lead with a hard lead finish.



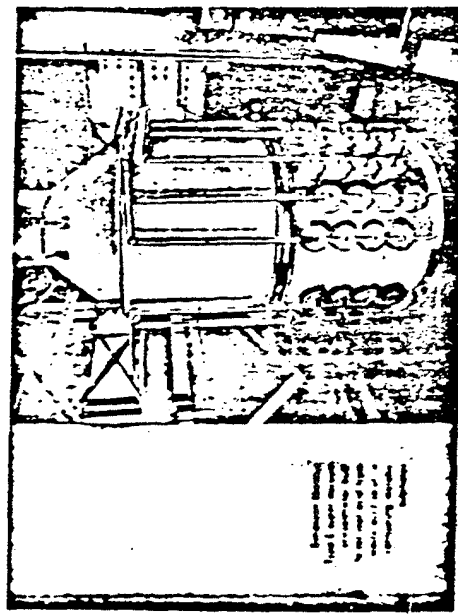
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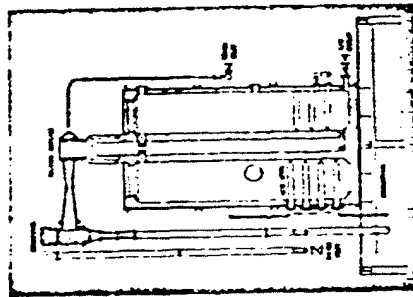
NLI 115301

Acid Recovery SIMONSON-MANTUUS VACUUM PROCESS

The most efficient way to recover acid from spent acid is by the Simonson-Mantius Vacuum Process. This process is designed to recover acid from spent acid in a highly efficient and economical manner. The process is designed to recover acid from spent acid in a highly efficient and economical manner. The process is designed to recover acid from spent acid in a highly efficient and economical manner.



Consistent for 100% recovery, chamber and stage design for the purification of impure acid. The process is designed to recover acid from spent acid in a highly efficient and economical manner. The process is designed to recover acid from spent acid in a highly efficient and economical manner.



When the acid is recovered, it is then used in the same process. The process is designed to recover acid from spent acid in a highly efficient and economical manner. The process is designed to recover acid from spent acid in a highly efficient and economical manner.

