

THE NATIONAL PIPE BENDING COMPANY

Incorporated 1883

101 RIVER STREET, NEW HAVEN, CONN.

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

Pittsburgh, Pa.
Baltimore, Md.
Atlanta, Ga.

BRANCH OFFICES

Cleveland, Ohio
Cincinnati, Ohio
Memphis, Tenn.

Chicago, Ill.
Duluth, Minn.
Denver, Colo.

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

Canadian Representative: Albert G. Hill, Toronto, Ont.

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).
Preheaters.

Brass and Copper Spun Products.

SERVICE AND COOPERATION

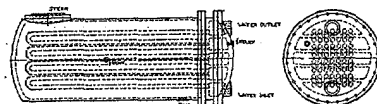
Detail information, estimates on drawings and specifications for any piece of apparatus will be gladly furnished to those who are considering the above equipment.

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

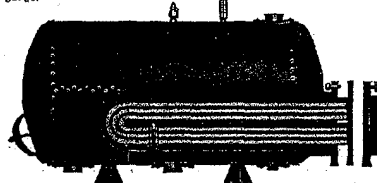
We make hot water heating units of two types, instantaneous and storage. Both types have their advantages and the installation depends upon the hot water demand. For either exhaust or live steam.

Instantaneous Type—Heats water as it flows either continuously or intermittently. Built for steam pressures up to 75 lbs. per sq. in. Bent copper tubes through which the water passes are fitted into 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 40° F. to 180° F.



INSTANTANEOUS PROCESS WATER HEATER
One of Our Three Styles of Tube Elements

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 types to supply from 100 to 15,000 gallons of hot water per hour, heated through standard temperature range 50 to 180° F., with steam under pressure from 0 to 100 lb. gauge.



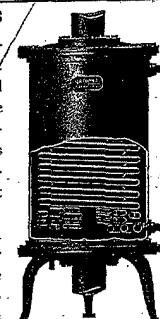
SINGLE ELEMENT STEEL SHELL HORIZONTAL STORAGE HEATER

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

FEED WATER HEATERS

National Feed Water Heaters are made up of a cast iron, wrought iron or steel shell 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.

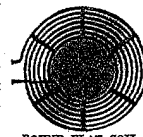
These heaters are made in sizes to provide for heating the feed water for a wide range of boiler sizes and invariably show large savings of fuel.



ORIGINAL COIL TYPE HEATER
Inside manifold. A type that has given efficient use for many years.

FACILITIES FOR COILS AND BENDS

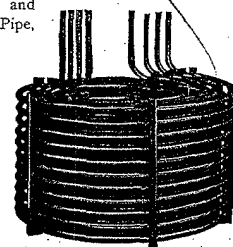
All "National" Coils are continuous, without couplings or screwed fittings, unless specified. Iron and Steel Coils have electrically welded joints and all Brass and Copper Tubes have brazed joints. The National Pipe Bending Co. is prepared to submit designs, specifications and estimates covering coils and bends for the particular requirements of plant 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, Iron, Steel, and Wrought Iron Pipe, etc.



ROUND FLAT COIL



SPIRAL COIL



NESTED NITRATOR COIL

N 28356

0000-NLI-000014755

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 can be furnished Block Tin Lined.

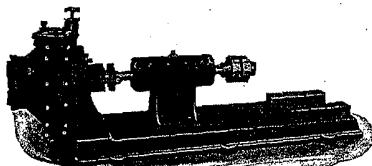
SERVICE

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"

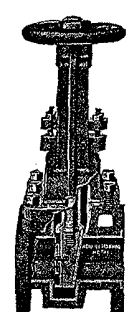
Method gives an absolutely uniform lining and a smooth interior surface with friction reduced to a minimum; also a lining free from porous or defective spots.

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 TUBOND" CHEMICAL LEAD LINED FLANGED PIPE AND FITTINGS

"UNITED" HARD LEAD OR TIN LINED ACID VALVES



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

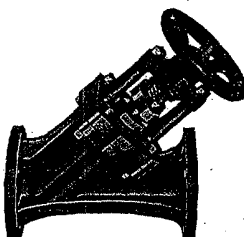
"United" Hard Lead Chem-Rayon Y or Angle Plug and Seat or Disc Type Flanged Acid Valve has a bonnet of steel and brass which is completely covered with hard lead with the exception of the hand wheel and bushing support.

The stuffing box is deeper than is customarily found in acid valves, while the gland is of hard lead. The bonnet 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. 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

NATIONAL LEAD COMPANY

Atlantic Branch

Lined Products Division

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

111 BROADWAY, NEW YORK, N. Y.

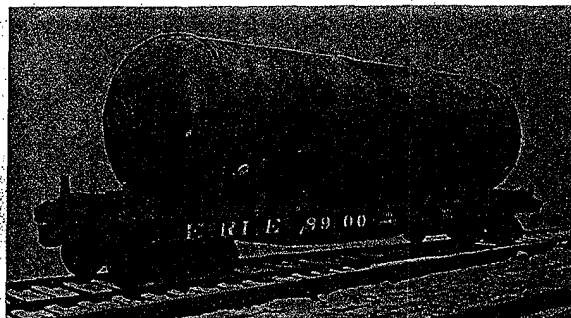
PRODUCTS

Homogeneous Lead Lined Vacuum Apparatus, Evaporators, Tanks, Steam Jacketed Kettles, Acid Eggs, Digesters, Autoclaves, Agitators, Pressure Still, 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 INCH STEEL SHELL. 1/4 INCH HEADS OF WELDED CONSTRUCTION FOR 125 POUNDS WORKING PRESSURE WITH 1/4 INCH HOMOGENEOUS CHEMICAL LEAD LINING PURCHASED FOR REFINERY USE

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

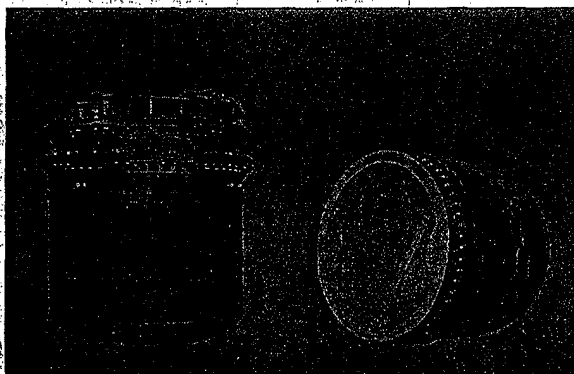
Continuous unbroken surface of lining or covering gives strength and durability under pressure, vacuum or high temperature.

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, 13 FEET IN DIAMETER AND 3 FEET HIGH WITH 1/4 INCH HOMOGENEOUS CHEMICAL LEAD LINING

INTERIOR VIEW, STEAM JACKETED TANK, 13 FEET IN DIAMETER AND 3 FEET HIGH SHOWING BREAKERS WITH 1/4 INCH HOMOGENEOUS CHEMICAL LEAD LINING AND COVERING

NATIONAL LEAD COMPANY

Atlantic Branch

Acid Recovery Department

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.

By this process sulphuric acid can be concentrated to 66° Be. in a SUPER VACUUM Concentrator using a steam pressure of from 100 to 150 lbs. and a vacuum of 29.7". The application of such high vacuum practically eliminates all losses due to foaming. The concentration to a lower strength of 61 or 62° Be. does not require the installation of a special vacuum booster, and the work can be accomplished with a steam pressure of 45 lbs.

Concentrators can be equipped with our electric level indicator which insures perfect control of operation at all times.

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.

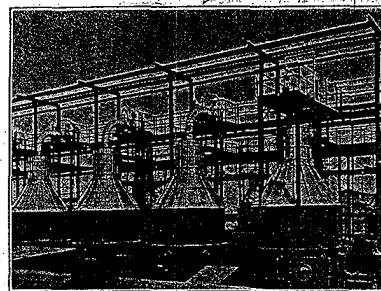
Under normal conditions the total cost of concentrating from 30 to 66° Be. will vary from \$3 to \$6 per ton of finished acid, and the concentration to 61° Be. only will cost from \$1.50 to \$3 per ton.

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

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 to \$1.50 per ton of 66° acid.

High Concentration—Chamber acid and clean spent acid can be concentrated in our Super Vacuum Type Concentrators to an acidity of 95% or 96% H_2SO_4 at very reasonable cost and with extremely low loss.

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 acids, also for sulphuric acid solutions containing sodium, nickel, copper, or iron sulphate.



TYPES A AND D CONCENTRATORS

INSTALLATIONS

have in operation and are constructing 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.....	3
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.....	5
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	
Canadian Copper Refiners, Ltd.....	1
Canadian Industries, Ltd.....	1
Carbide & Carbon Chemicals Corp.....	2
Davison Chemical Co.....	1
E. I. DuPont de Nemours Co.....	13
Grasselli Powder Company.....	1
Hercules Powder Company.....	1
Nichols Copper Company.....	1
Titanium Pigment Co.....	4
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 3000 tons of finished acid and 900 barrels of sludge. Eleven of these installations are of the SUPER VACUUM type.

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.