

SEPARATING PLANTS FOR SLUDGE ACID

Pure Oil Company, Smiths Bluff, Texas.

Lined Products Division

Subsidiary of

NATIONAL LEAD COMPANY

111 BROADWAY, NEW YORK, N. Y.

PRODUCTS

"United" Chemical Lead Lined:
Pipe, Fittings, Valves, Coils, Drums, Autoclaves,
Tank Connections, Agitator Tanks, Apparatus.

"United" Chemical Lead Covered:
Pipe, Tubes, Agitators, Sheets, Heating Coils, Cool-
ing Coils.

"United" Hardlead:
Acid Pumps, Fittings, Valves, Plug Cocks, Bibbs.

"United" Block Tin Lined:
All the above products furnished in Pure Block Tin

Lined or Covered.

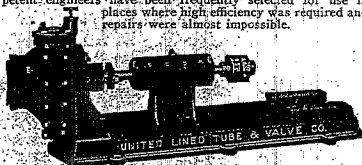
SERVICE

Actual service records are on file testifying of the
satisfactory results secured from installations of
"United" Lined Products. Your corrosion problems
can be eliminated.

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 com-
petent engineers have been frequently selected for use in
places where high efficiency was required and
repairs were almost impossible.



"UNITED" CHEMICAL HARD LEAD CENTRIFUGAL ACID PUMP
Furnished for Direct or Belt Drive

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 run-
ning in oil and properly housed.

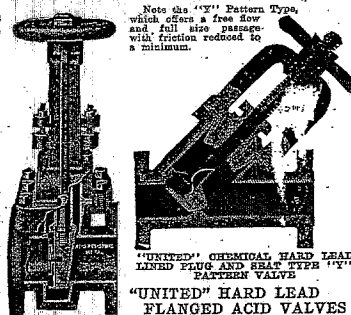
"UNITED" CHEMICAL LEAD OR BLOCK TIN LINED ACID VALVES

"United" 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 qual-
ities.

"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, and this is one feature that you can
be sure of. This valve is positively tight when closed. The
wedge consists of a hard lead disc recessed on the wet side
to take a bakelite or rubber disc. The rubber disc has yield-
ing properties and in the case of bakelite—which is harder
than lead—the elimination of any rubbing or abrasive action
results, thereby assuring a perfect seat.



Note the "Y" Pattern Type,
which offers a free flow
and full size passage
with friction reduced to
a minimum.

"UNITED" CHEMICAL HARD LEAD
LINED PLUG AND BALL TYPE "Y"
PATTERN VALVE

"UNITED" HARD LEAD FLANGED ACID VALVES

"United" Hard Lead Flanged Acid
Valves are furnished in the same pat-
terns as "United" Lined Valves, i.e.,

globe, Y, angle and gate patterns, etc.

The difference between the hard lead and lead lined valves
is in the body only. The body is manufactured entirely of
hard lead and the remaining parts are of cast iron or bronze.

Hard lead valves are recommended where acid fumes may
prevail or there is a likelihood of drippage on the outside of
the valve body. Such valves should also be used wherever
installation is to operate under vacuum.

"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 ab-
solute uniform lining
and a smooth interior
surface with friction
reduced to a mini-
mum, and free from
porous or defective
spots.

"UNITED" CHEMICAL LEAD LINED STORAGE, VACUUM AND MIXING TANKS

"United" Linings, by our methods, are inseparably bonded,
which on jacketed tanks assures maximum heat transmission.
"United" apparatus has been installed for service with vac-
uums as high as 29 ins., and economical results are being se-
cured. This is a severe test for the inseparability of "United"
linings, but "United" apparatus is successfully meeting the
required service.

"UNITED" HEATING OR COOLING COILS

"United" Chemical Lead or Block Tin Lined or Covered
Coils are particularly adapted for installations where high
steam pressure is necessary for heating or ammonia for
cooling; the covering or lining being a protection against
the action of the acid and the outer or inner casing doubles
the bursting strength of the coil.

N 27906

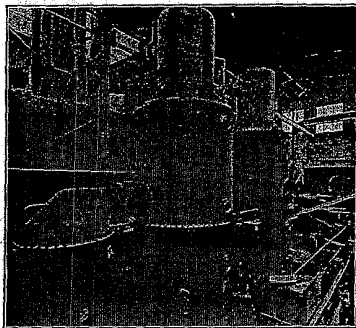
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SEPARATING PLANTS FOR SLUDGE ACID

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, copper, or iron sulphate.



TYPES A AND D CONCENTRATORS

INSTALLATIONS

We have in operation or under construction the following plants:

Sludge Acid Concentrators

- Vacuum Oil Company, Paulsboro, N. J. (4 units)
- Vacuum Oil Company, Olean, N. Y.
- Indian Refining Company, Lawrenceville, Ill.
- Mariand Refining Company, Ponca City, Okla. (2 units)
- Gulf Refining Company, Fort Worth, Texas
- Gulf Refining Company, Port Arthur, Texas (5 units)
- Gulf Refining Company, Bayonne, N. J.
- Gulf Refining Company, Girard Point, Pa.
- Empire Refineries, Okmulgee, Okla.
- Sinclair Refining Company, Coffeyville, Kans.

Pure Oil Company, Smiths Bluff, Texas.

- Pure Oil Company, Martins Hook, Pa.
- Houston Oil & Refining Co., Camden, Ark.
- Bethlehem Steel Company, Buenos Ayres, S. A.
- Lincoln Oil Refining Co., Robinson, Ill.
- Standard Oil Co. of Indiana, Wood River, Ill.
- Roxana Petroleum Corp., East Chicago, Ind.
- Standard Oil Co. of N. J., Fawley, England.
- Standard Oil Co. of N. J., Bahia Blanca, S. A.
- Standard Oil Co. of Ohio, Cleveland, Ohio.
- Union Oil Co. of California, Wilmington, Cal.
- Sharples Solvents Corp., Belle, W. Va.

Spent Acid Concentrators

- Tubize Artificial Silk Co. of America, Hopewell, Va. (5 units)
- Grasselli Powder Company, Seneca, Ill.

Chamber Acid Concentrator

- Hard Chemical Works, Mexico City, Mexico.

Sludge Acid Separating Plants

- Cities Service Refining Co., E. Braintree, Mass.
- Lincoln Oil Refining Co., Robinson, Ill.
- Shell Company of California, Dominguez, Cal.
- Shell Company of California, Wilmington, Cal.

Evaporators

- Du Pont Rayon Company, Old Hickory, Tenn. (2 units)
- Du Pont Rayon Company, Black Rock, N. Y. (2 units)
- E. I. Du Pont de Nemours Co., Old Hickory, Tenn.
- Carbide & Carbon Chemicals Corp., So. Charleston, W. Va.

The above installations represent a combined daily capacity of over 1200 tons of finished acid and 900 barrels of sludge.

INQUIRIES

The United Lead Company, a subsidiary of 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 Division, 111 Broadway, New York.

Continued on Next Page

Maryland

Baltimore, 19 E. Lombard Street
Cumberland, 120 Bedford Street
Salisbury, Mill and High Streets

Massachusetts

Cambridge, 539 Concord Avenue
Indian Orchard, State Street
Worcester, 342 Canterbury Street

Michigan

Detroit, 6785 Hamilton Avenue
Grand Rapids, 436-59 Tonia Avenue, S.W.
Iron Mountain, 618 Hutchinson Avenue
Iron River, (P. O. Box 257), 102 Fourth Avenue
Lapeer, 622 W. Myer Street
Lansing, 611 E. Vine Street
Jackson, 118 2nd Water Street
Kalamazoo, 175 N. Water Street
Lansing, 617 E. Shawnee Street
Muskegon, 410-20 Morris Avenue
Saginaw, 1280-40 N. Michigan Avenue
Sault Ste. Marie, 1000 Main Street

Minnesota

Mankato, 402-404 Pike Street
Minneapolis, 324 No. First Street
St. Cloud, 200 Sixth Avenue, No. Virginia
Virginia, 408 Chastnut Street

Mississippi

Vicksburg (P. O. Box 322), 1701-08 Levee Street

Missouri

Chillicothe, 3 E. Jackson Street
Kansas City, 147 W. Ninth Street
Mexico, 601 Johnson Street
St. Joseph, 320 So. Sixth Street
St. Louis, (See East St. Louis, Ill.)
Sedalia, 620 E. Fifth Street

Montana

Great Falls (P. O. Box 1138), 420 2nd Street, So.

Nebraska

Grand Island, 371 W. Fourth Street
Omaha, 1007-11 Jones Street

New Jersey

Camden, Front and Division Streets
Newark, 281-55 Ridgewood Avenue

New York

Albany, Mill and Third Streets
Binghamton, 100 Roundhouse Road
Brooklyn, 1088 Grand Street
Buffalo, 12501 Genesee Street
Canton, 251 Exchange Street
Hempstead, 610 W. 8th Street
Kingston, O'Neil Street near Broadway
Madison, (P. O. Box 520), 68-69 W. Main Street
Niagara Falls, Smith Street & C. N. E. R. R.
Syracuse, 278 W. Water Street
Utica, 235 State Street
Watertown, 488 Court Street
Whitehall, 35 Main Street

North Carolina

Asheville, 44 Valley Street
Charlotte, 124-126 W. Morehead Street
Greensboro, (P. O. Box 632), 231 1/2 So. Elm Street
Henderson, 201 Garnett Street
Kinston, 128-35 So. Queen Street
Mills, (P. O. Box 287), So. Main Street
Salisbury, (P. O. Box 140), 115 W. Lemon Street
Spartanburg, 263 No. Main Street
Savannah, (P. O. Box 185), 420 No. Long Street
Wilmington, 312 Surr Street (between Castle and Queen Streets)
Wilson, (P. O. Box 515), 700 So. Goldsboro Street

North Dakota

Bismarck (P. O. Box 372), 209 Fifth Street
Fargo, 416 N. E. Avenue

Ohio

Akron, 97 E. South Street
Athens, Taylor and Moore Streets
Canton, 618 Mulberry Road, S.E.
Cincinnati, 67 First Street
Cleveland, 1342 Euclid Building
Columbus, 420 Dublin Avenue
Dayton, 204-436 So. Wayne Avenue
Gallopia, (P. O. Box 277), 651 Second Avenue
Lima, 338 Third Street
Massillon, 231 E. Fifth Street
Mansfield, 405 W. Fremont Street
Newark, 224 No. Seventh Street
Toledo, 1201 Backlary Street
Youngstown, Jones and Britton Streets
Zanesville, Main and 2nd Streets

Oklahoma

Clinton, 1st and Rays Streets
Edmond, 416 W. Chastnut Street
McAlester, 11-17 East Clooney Street
Oklahoma City, 121 E. Washington St.
West Tulsa, 1202 W. 17th Street

Oregon

Klamath Falls, 206 Main Street
Portland, 15th and Hoyt Streets

Pennsylvania

Allentown, 711 Gordon Street
Beaver Falls, 2512 8th Avenue
Dufort, Weber Avenue and Franklin Street
Erie, 1022 Main Street
Greensburg, Clark Avenue and George Street
Harrisburg, 25 So. Tenth Street
Hartsville, 230 E. Main Street
Johnstown, Monongahela Street and B. & O. R. R.
Philadelphia, Delaware Avenue and Brown Street
Pittsburgh, (P. O. Box 148), No. Front Street
Pittsburgh, Lincoln and Taylor Streets
Pottsville, Railroad and Sanderson Street
Scranton, Penn Avenue and Vine Street
Shamokin, Fifth and Walnut Streets
Strom, Bond Street and So. Irvine Avenue
Swarthout, Bigler Avenue
Tulsa, 150-68 N. Northampton Street
Williamsport, Canal and Court Streets
York, 204 No. George Street

Rhode Island

Providence, Allen Avenue foot of Oxford Street

South Carolina

Charleston, 44 John Street
Columbia, (P. O. Box 715), 800 Palakid Street
Florence, (P. O. Box 487), 133 1/2 W. Dartington Street
Greenville, 18 E. McKeen Avenue

South Dakota

Spear Falls, 204-06 E. Tenth Street
Watertown, 124 First Avenue, N.W.

Tennessee

Chattanooga, 800 E. 10th Street
Jolice, (P. O. Box 374)
Knoxville, (P. O. Box 1431), 201-11 Randolph Street
Memphis, 371 So. Main Street
Nashville, 194-204 Hermitage Avenue

Texas

Amarillo, (P. O. Box 697), 101-05 Pierce Street
Beaumont, (P. O. Box 894), 368 Liberty Street
Brownwood, 1400 Main Avenue
Corpus Christi, 1917-19 Tiger Street
Dallas, 112-23 Jackson Street
El Paso, 217 No. Oregon Street
Fort Worth, 1111 Lamar Street
Houston, 519 Love Oak Street
San Antonio, 500 Dolores Street
Sweetwater, 117 E. N. First Street
Waco, 312-10 Jackson Street
Wichita Falls, (P. O. Box 1092), 1507 Lamar St.

Utah

Salt Lake City, 108 W. Second South Street

Virginia

Emporia, Halifax Street opposite A. C. L. Depot
Fredericksburg, 602 Main Street
Lynchburg, 1224 Commerce Street
Norfolk, E. Main and E. Water Streets
Richmond, (P. O. Box 487), 1709 E. Cary Street

Washington

Seattle, 304 Railroad Avenue, So.
Spokane, 162 So. Post Street

West Virginia

Bethesda, 250 Roanoke Street
Charleston, corner Bullitt Street and N. Y. C. Dr.
Clarksburg, 608 No. Third Street
Elkins, Railroad Avenue and First Street
Fairmont, Auburn Street and B. & O. R. R.
Huntington, 207-11 Eleventh Street
Martinsburg, 610 No. University Avenue
Mount Hope, (P. O. Box 472)
Mullins, (P. O. Box 37)
Wassila, 4rd and McCulloch Streets
Williamson, (P. O. Box 305), foot of W. 2nd Street

Wisconsin

Appleton, 209 No. Laws Street
La Crosse, Front and King Streets
Madison, 513-15 Williamson Street
Marshfield, First and Maple Streets
Milwaukee, 519 Trowbridge Avenue

Wyoming

Casper, 218-34 Industrial Avenue

3. Go over entire seam with burning bar in regular way, except slow up and await the setting of each drop.

Die Castings for any purpose manufactured of
Fray Metal, Zinc, Tin or Lead Base Metals
Stick Bronze

UNITED LEAD COMPANY

Acid Recovery Division

Subsidiary of

NATIONAL LEAD COMPANY

111 BROADWAY, NEW YORK, N. Y.

PRODUCTS

Concentrating Plants for

Sludge Acid

Spent Acid

Chamber Acid

Separating Plants for

Sludge Acid

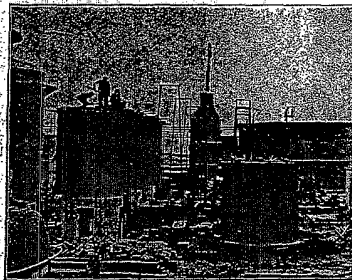
Evaporators for

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. Operating costs are moderate, varying with the size of plant, cost of labor, etc.



SEPARATING AND CONCENTRATING PLANT

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 \$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 of course depend on the size of the plant and the figures are given 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. 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.

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they thoroughly melt and unite. Fill in every few inches with burning bar of soft lead.

3. Go over entire seam with burning bar in regular way, except slow up and await the setting of each drop.

Bronze Back Sprocket Chain Bearings and Pins
Die Castings for any purpose manufactured of
Fraser Metal, Zinc, Tin or Lead Base Metals
Stick Bronze

SEPARATING PLANTS FOR SLUDGE ACID

Pure Oil Company, Smiths Bluff, Texas.

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HOYT METAL COMPANY

GENERAL OFFICE: ST. LOUIS, MO.

Cable Address: "HOYTMETAL", St. Louis
PLANT: Granite City, Ill.

PRODUCTS

Antimonial Sheet and Pipe.
Chemical Sheet Lead and Pipe.
Crawlproof Sheet Lead.
Block Tin Pipe and Sheet.
Lead Wool.
Babbitt Metal.
Solder.

CRAWLPROOF (REINFORCED) SHEET LEAD

Designed especially for prevention of buckling, stretching and wrinkling in hot acids or under agitation, or severe strain.

Crawlproof (Reinforced) sheet lead can be readily burned by any practical lead burner.

The reinforcing bars are so spaced as to give great resistance to agitation, or heat, and extend the life of the lining far beyond soft sheet lead before repairs are necessary.

For use especially in hot acid tanks, boiling solutions, blow-cases, acid eggs, agitators, cooking kettles, or any other installation where soft sheet lead is now used but causing trouble.

In writing us give dimensions of your tank and conditions under which lead lining will be used.

Stock Sizes of Crawlproof (Reinforced) Sheet

Any size and weight not to exceed 7' 6" in width. Any length desired.

A large slab of chemical sheet lead is reinforced in the center with hard lead (antimonial) bars, placed exactly like steel rods in reinforced concrete. The hard lead rods are so secured that no separation between the hard lead and the chemical lead can take place. The slab is rolled to any gauge desired; furnished in standard widths not to exceed 7' 6" wide by 40' long. The reinforcing bars elongate when the slab is rolled to gauge.

Crawlproof when rolled to $\frac{1}{8}$ " thickness shows the reinforcing bars to be $2\frac{1}{4}$ " wide and spaced $\frac{1}{2}$ " apart.

The sheet when hung in a tank is practically supported by the hard lead bars.

INSTRUCTIONS FOR LEAD BURNERS ON HOYT'S CRAWLPROOF SHEET LEAD

1. Flat seams and scumpright seams should be joined by the butt seam process.
2. Fasten both sheets together by burning edges so they thoroughly melt and unite. Fill in every few inches with burning bar of soft lead.
3. Go over entire seam with burning bar in regular way, except slow up and await the setting of each drop.

4. When you have burned over surface of reinforcing bar, a little sink spot will be noted in the setting of the drop. After it sets, go over the drop again with the flame; remelt and proceed with the seam. This prevents blowholes or weak spots in the seam.

5. Upright seams can be burned by the usual lap joint method, letting each drop set properly before going ahead.

6. Always use soft lead burning bar.

7. Always use a soft flame—never a sharp one. A soft flame melts slowly.

8. Finished flat seams will be about $1\frac{1}{4}$ inches wide.

9. Crawlproof Sheet Lead is chemical sheet lead, reinforced in the center with antimonial bars. The principle is the same as reinforced concrete.

CRAWLPROOF SHEET LEAD

For temperatures exceeding 150° F. we recommend Hoyt's Crawlproof Sheet Lead. This is chemical lead, reinforced with antimonial bars and is the newest invention in sheet lead. It is designed especially for places where, ordinarily, sheet lead cannot be used because the high temperature tends to buckle and tear out soft lead. It is especially suitable for blow cases, and other tanks where the temperature exceeds the boiling point of water.

SPACERS

For lead pipe heating coils. Great labor savers. Write us for information.

HOYT METAL COMPANY PRODUCTS

Rolling Mill and Pipe Departments

Hoyt Metal Sheet	Sheet Block Tin
Hoyt Metal Pipe	Block Tin Pipe
Chemical Sheet Lead	Lead Wool
Chemical Lead Pipe	Tape Lead
Burning Bar	Lead Wire
Crawlproof Sheet Lead	

Mixed Metal Departments

Babbitt Metals	Type Metals
Solder-Bar—Triangular	Casting Metals
Solder-Wire	
Special Alloys—Lead, Tin or Zinc Base	
Boy Scout Air Rifle Shot—Bag Shot	

Bronze Back and Die Casting Departments

Bronze Back Babbitt Lined Bearings and Bushings
Die Castings for any purpose manufactured of Fray Metal, Zinc, Tin or Lead Base Metals
Stick Bronze