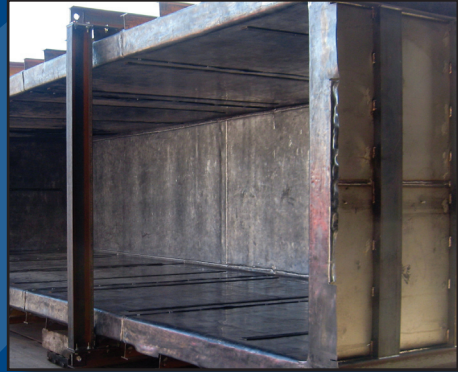


EL DORADO

El Dorado Metals of Arkansas



Industrial Products



"I would personally like to welcome you to **EL DORADO**. It is with great pride and satisfaction to see how our company has grown. This milestone would not have been possible without the strong business relationships and partnerships we have established as well as the commitment and professionalism of our staff and employees.

This brochure has been designed to showcase our abilities and give an in depth understanding of some of the products and services we offer. On your next project, I invite you to experience the distinction of **EL DORADO**.

We look forward to hearing from you."

William R. McNabb / CEO

Gas Cleaning



Precipitators

Acid-Mist precipitators are essential for superior performance in today's sulfuric acid production facilities. Precipitators remove acid mists, metals, particulate, and dusts that are present in process gas streams. These cleaning systems vary in design, size, and production capabilities. **EL DORADO** specializes in the maintenance and erection of these cleaning systems. Construction and repair can include structural support, vessels, interior support frames (upper and lower), conductive lead wire, rigid electrodes, lead suspension weights, or any part thereof. **EL DORADO** has experience fabricating and installing the following designs: Joy, Western, Lurgi, Belco, Hugo Peterson, Cottrell and more.



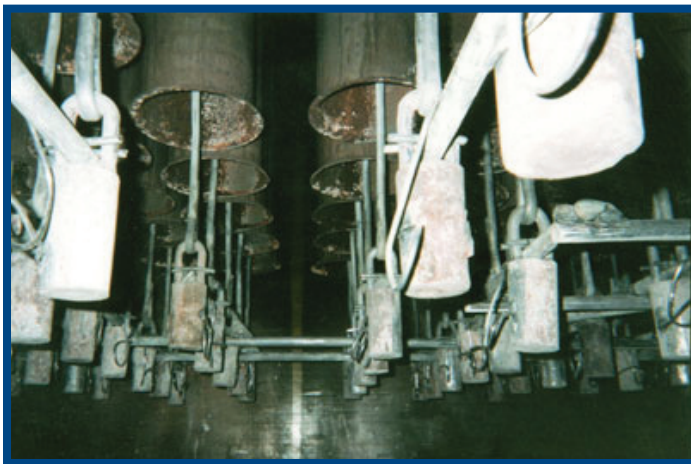


Benefits of WESP'S:

- Minimal Pressure Drop
- Proven Technology
- Low Operating Costs
- High Removal Efficiency of Sub Micron Particulate
- Even Distribution of Electrical Charge

Services

- On-Site Maintenance
- Equipment Rebuilds
- Emergency Shutdowns
- Design Staff for Alterations



Gas Cleaning

Quench Systems

Quench towers, Scrubbers, and Humidifying Towers primary functions are to saturate the incoming gas, clean the gas, and offer a residence for the condensation of metallic vapors to facilitate their subsequent removal in downstream equipment. Traditional designs consisted of an open vessel in which liquid is sprayed to contact the gas. The system is subject to hot gas, weak acid and regions where the conditions vary from wet to dry and hot to cold. Typically, the gas enters through the bottom of the tower, through a side nozzle and flows upwards, counter-current to liquid that has been sprayed from the top of the tower. By the time the gas has reached the top gas outlet, it has been cooled to its adiabatic saturation temperature. Variations in design have the gas entering the top of the tower and contacting the liquid co-currently as it travels down through the tower.

EL DORADO is a leader in the market for supplying new and retrofitting existing plants with these types of systems.



EL DORADO offers three design choices for the lead lining:

- **EL DORADO** Sheet Lead Lining – Traditional sheet lead lining with a proven history of long life.
- **EL DORADO** Panel Bond System – This insures that each sheet lead panel is isolated from the others, allowing for ease of maintenance in life of lining. The most popular lining available.
- **EL DORADO** Homogeneously Bonded Liner – The premier lead lining for all gas cleaning equipment including lead bonding of the duct system.



Star Coolers

Star Coolers are found in metallurgical acid plants designed by Lurgi Engineering, and are used for gas cleaning and cooling. There are approximately 60+ sulfuric acid plants worldwide that utilize this technology. **EL DORADO** has successfully repaired, and fabricated new Star Coolers in accordance with original design specifications. Star Coolers derive their name from the Lead Pipe that compromise the tube bundles. These tubes vary in size, coming in three distinct profiles. Each Profile differs in OD and Length, with varying radius degrees on the fins and star configuration. The fins on the tubes are essential for performance, their names deriving from the star configurations on the tubes. Each star cooler tube bundle, depending on the capacity of the Sulfuric Acid Plant, can weigh from 30 to 50 MT's.



Linings and Coatings

Homogeneous Bonding

A homogeneously bonded lead lining is a metallurgically joined laminate of lead and another metal, usually steel. Combining the strength of steel with the excellent corrosion resistance of lead, this type of vessel will withstand rapidly fluctuating temperatures, high pressures, thermal shock, vibration and physical shock, and will perform well in vacuum service. It will resist de-lamination so strongly that only by melting the lead or the solder bonding layer, or chipping it off with a pneumatic hammer can it be separated from the steel. In addition, as lateral movement of the lining is severely restricted, the only response to thermal cycling is an occasional increase in lining thickness. The thermal and electrical conductivities of bonded lead vessel walls are high, due to the gapless nature of the metallurgical bond. The three steps necessary to make Bonded Lead materials are careful surface preparation, pre-coating with a lead alloy and metallurgically bonding the lead to the pre-coat. Surface preparation involves cleaning and degreasing the steel or other underlying metal. The lead alloys generally used as pre-coats, contain either tin or antimony. Bonding the lead to the pre-coat is accomplished by using a hydrogen/oxygen fuel type welding procedure. Approximately 450°F. is the highest operating temperature at which use of Bonded Lead is practical. This upper temperature limit varies with the pre-coat used in the bonding process. Usually, the lower the amount of tin or antimony there is in the pre-coat, the higher is the temperature that can be tolerated. Tanks with this type of lining have been in continuous operation in the bromine, mining, and paper industries for 25 years without extensive repairs.

Brick / Lead

Brick/Lead vessels have an outer shell of steel or concrete, a lead lining, and courses of chemical-resistant masonry set with a suitable cement. The masonry in Brick/Lead vessels protects the lead lining from high temperatures, rapid temperature fluctuations, erosion and mechanical abuse. It also eliminates a large portion of heat losses and provides enough support for the lining to allow good performance in vacuum service. The lead acts as an impermeable, corrosion-resistant membrane to contain the chemicals that seep through the porous masonry. The mechanical and thermal protection provided by the masonry allows lead to indirectly handle process temperatures as high as 1800°F. and above, and abrasive solutions. Good performance has been obtained with vacuums as low as 0.25 inches of mercury at 260°F. The use of masonry greatly increases the types of corrosive environments that can be handled by Brick/Lead vessels. The masonry used is usually 3% to 4% porous brick. It is resistant to the spalling caused by thermal shock, sustained high temperatures and absorption of solutions that crystallize on cooling. The total thickness of the brickwork should be high enough to keep the temperature at the brick lead interface at 165°F. or below. The temperature gradient through the brickwork of a Brick/Lead vessel with a steel shell is about 15°F per inch of thickness for fire clay or shale type brick and 10°F per inch for carbon brick. These figures are valid for process temperatures up to 400°F. The temperature gradient through the brickwork of a concrete Brick/Lead vessel is somewhat less. This is due to the insulating effect of the concrete shell. Another factor to be considered when setting the thickness of the layer of brick in a steel Brick/Lead vessel is thermal expansion. The brickwork must elongate more than the steel shell expands. This ensures that the lead lining receives continued support. Tanks with this type of lining have been in continuous operation in the sulfuric acid, aluminum sulfate, and related industries for 25 years without extensive repairs.





Panel Bond System

The **EL DORADO** Panel Bond System was developed at the request of customers looking for a better lining, with maintenance and the corrosive resistant properties of lead in mind. A primary concern was towards the end of a traditional sheet lead lining, failures in the lead lining were difficult to pinpoint due to the nature of the installation. Also, retrofitting existing tanks and vessels were to be taken into consideration.

EL DORADO Panel Bonded Lead liner is installed in such a fashion so that at least one vertical edge is homogeneously bonded to steel shell, the first panel bonded on both edges, the following ones bonded on one side, the other lead burnt to previously bonded panel. This insures that each panel is isolated from the others, allowing for ease of maintenance in life of lining. Each panel has "weep holes" drilled in bottom of tank, at bottom of each panel section, to help determine locations of future problem areas. Panel size and lead thickness is determined per customer process requirements. All linings are installed per **EL DORADO** Quality Control Manual. Testing requirements include: Acid Wash, Dye Penetrant, and Hydro Testing. All results are documented and included in data package per customers request.



Benefits:

- Ease of Maintenance
- Available in thickness from 1/8" to 5/16" sheet lead
- Adaptable to Existing Tanks / Vessels
- Economical over homogeneous lining
- Proven design and performance
- Applicable in Aluminum Sulfate Industry

Bromine Shipping Containers

EL DORADO thru a joint agreement with SMI Companies, is the only manufacturer of Bromine ISO Shipping Containers in North America. **EL DORADO** manufactures Bromine ISO's, ranging from 6250 Liter to 8000 Liter Capacity. These containers are built per all regulatory bodies including:

- ABS/CSC, IMO Type I (IMDG Code)
- RID/ADR, U.S. DOT 51 (Consultative)
- Customs/TIR
- AAR600
- UIC
- ASME Section VIII, Div. 1
- National Board Certified



All containers have minimum 6mm homogeneous chemical lead lining installed, per **EL DORADO** Quality Control Standards. Lead lining testing includes: Visual, Acid Wash, and Dye Penetrant Tests. **EL DORADO** currently holds AAR Class L lining certificate for all repairs on lead linings in Bromine Railcars. Railcars are inspected and repaired as needed per AAR regulations and requirements. For smaller quantities, Bromine is shipped in small lead lined tanks. These tanks, referred to as "pigs" or "eggs", have been fabricated to ship quantities from 125 Liters to 1250 Liter capacities. **EL DORADO** currently has annual maintenance agreements with two of the four largest bromine producers in the world. Also, we have fabricated tanks and shipping containers for three of the four largest producers of bromine in the world.



Metal Finishing

Plating Tanks

Hard chromium plating is applied as a heavy coating, for wear resistance, lubricity, oil retention, and other 'wear' purposes. It is called hard chromium because it is thick enough that when a hardness measurement is performed the chrome hardness can actually be measured. It is almost always applied to items that are made of steel. However, some companies have used it on plastic parts. **EL DORADO** fabricates tanks for both types of anodizing and for plating. Tanks can be fabricated from carbon and stainless steels with applicable lead liners. Preferred lead lining thickness is either 3/16" or 1/4" lead sheet. Supported strapping can be employed depending on tank size. Tanks have been fabricated as large as 8' W x 12' H x 110' L. **EL DORADO** offers on-site maintenance for annual outages and emergency service for repairs on lead-lined tanks and lead heating/cooling coils.



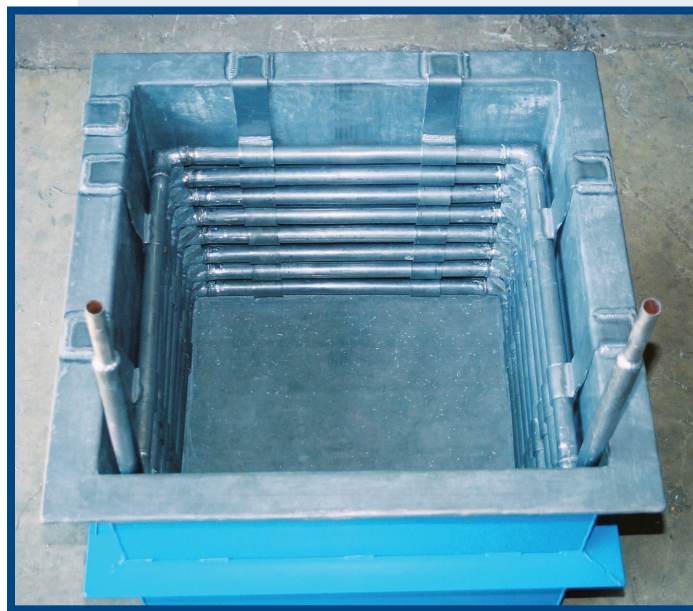
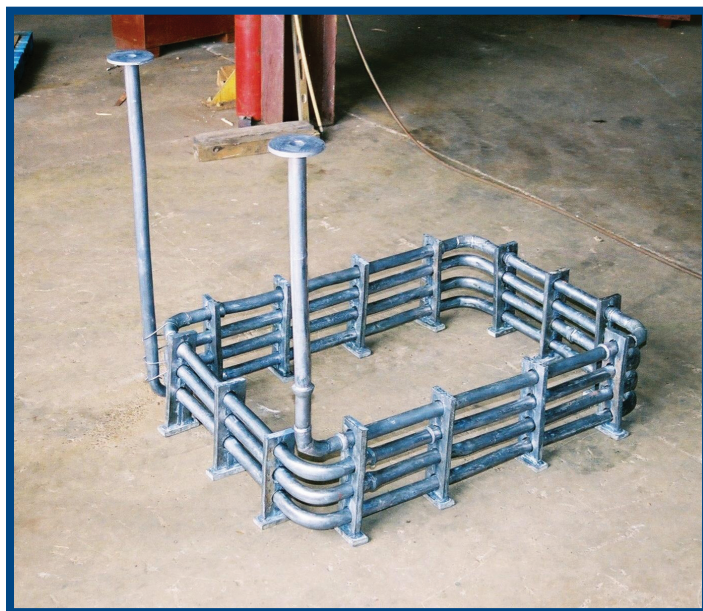
Anodizing Tanks

Anodizing is an electrochemical process that forms a non-conductive oxide coating on the surface of the anodized piece. There are basically two classifications of anodizing. Type II - Sulfuric Acid Anodize – This type of anodizing is favored for applications where hardness & resistance to erosion is required. Its permeable nature prior to sealing is used in the production of color surface finishes on aluminum and it's alloys. Type III - Hard Anodizing - Hard Anodizing also uses a sulfuric acid electrolyte, except that the baths have higher sulfuric acid concentration, lower temperatures, and higher current density. Coatings have heightened surface roughness and are softer on the top surface than down in the core of the coating.



Heating and Cooling Coils

Heating and Cooling Coils are made from extruded lead pipes with solid lead or homogeneously bonded lead supports for electroplating, anodizing, dyes, chemicals, and the fertilizer industries. There are numerous configurations and designs to consider, each factor dependent upon the application or processes.



Specialty Anodes

EL DORADO is a manufacturer of specialty anodes, anodes for Tin Mills in the Steel Industry, and anode plates for the SX/EW operations throughout North America. Cast anodes of various types of alloys can be manufactured. Anodes are fabricated in cast and rolled versions for electrowinning of zinc and copper. They are comprised of Pb-Ag alloys for Zinc electrolysis and Pb-Sn-Ca Alloys for copper electrolysis. Our quality assurance program verifies fabrication is always performed to meet specific customer requirements. An **EL DORADO** representative works with cell-house managers to schedule the replacement of the anodes for routine maintenance.



EL DORADO

El Dorado Metals of Arkansas

Industrial Products



EL DORADO

El Dorado Metals of Arkansas

PO Box 571 • 122 Pellizzari Place • El Dorado, AR 71730 | phone (870) 863-5757 • fax (870) 863-4230 | www.eldomet.com • info@eldomet.com