



**Corrosion-resistant materials and services protecting and enhancing the life of both concrete and steel**

***Value Service Integrity***

# CORE VALUES

# Mission

# VISION

CONNECTING YOUR BUSINESS TO THE TECHNOLOGY RESOURCES YOU NEED

## Core Values

Virtual Scientific Industries Inc. (VSI) was born with the idea to provide engineered solutions efficiently, responsibly and profitably. Focusing on the core industrial challenges, VSI carefully cemented its strategic partnerships with only top manufacturers in the fields of coatings and linings.

Our business is driven by our core values through continual improvement in our process, delivering the highest standard of service to benefit our customers, employees, business partners, community and our environment.

## Mission

To become the first and dynamic choice in corrosion coatings and lining solutions. To be a reliable partner by offering integrated products that are best in quality, safety and are eco-friendly, ensuring our coating applications provide long lasting protection to our clients' assets.

## Vision

To create and deliver added value by providing innovative long-term solutions. To grow beyond a horizon of business goals and promote trust, goodwill and satisfaction.

VSI offers a comprehensive selection of corrosion-resistant materials that protect and enhance the life of both concrete and steel in new construction or restoration applications. We don't offer cookie cutter solutions. Our systems are engineered to create the best solutions while keeping in mind environmental considerations and cost efficiencies. VSI is an easily accessible Middle-East-wide representative of leading brands of coatings and linings: Sauereisen® and Advanced Polymer Coatings (Chemline®).

VSI offers state-of-art testing products, field analysis and root-cause failure analysis to evaluate failures in both products and processes. Understanding the complexity of failures allows us to engineer customized solutions that are implemented by our highly qualified staff with proven results. Our goal is to provide coating applications with zero defects to increase return on investment for our clients.

- **Chemical and Petrochemical**
- **Mining**
- **Power Plants**
- **Rail Transportation**
- **Oil and Gas**
- **Wastewater and Desalination**
- **Tank storage and Terminals**
- **Construction**

## APPLICATIONS



## Our Products and Brands

WORLD'S LEADING BRANDS OF CORROSION COATINGS AND LININGS



Choosing the right lining or coating is critical for any operator or lessor of rail cars, cargo ships, OTR's, or regular tank farms. A high performance coating must be versatile to protect assets against corrosion and degradation from the widest range of chemicals, including aggressive acids, alkalis, solvents, CPPs and edible oils. We provide the ability to switch between cargoes and the ease of decontamination from concentrated 98-percent sulfuric acid to hot crude/crude water mixtures, sodium compounds or food grade cargoes. Additionally, Chemline coatings meet criterion with resistance to more than 5,000 chemicals and thermal shock resistance from -40°F to 350°F. Its formulation is based on a chemical matrix that cross-links an organic polymer and an inorganic polymer with high multi-functional capability creating a three-dimensional ladder-like structure to create the strongest linkage bonds in chemistry. Chemline is a high-volume-solids content (98%) with low VOCs.

Sauereisen offers engineered systems for each job offering environmental friendly products for optimal results. Sauereisen cements and coatings are proven chemical-resistant products to protect both concrete and steel both in new construction and rehabilitation projects. For over a century Sauereisen has been offering a progressive selection of organic linings and materials that provide corrosion resistance and low permeability to a wide variety of chemicals. It's technology of inorganics offers resistance to high acid concentration and temperatures through 2,000°F. Among its offerings are potassium silicate polymer acid-proof concrete, epoxy polymer concrete, vinyl ester polymer concrete, motars, high temperature membranes, elastomeric joint compounds, linings, self leveling epoxy, refractories and coatings.

# Products

## Products

- High Performance Industrial Coatings
- Chemline 784/32, 2,400/32, Primer, Caulk
- Vinyl Ester Coatings
- Epoxy Novolak Coatings
- Phenolics
- Water-Based Coatings
- High Temperature Coatings



### Processing and Equipment

Tanks, vessels, secondary containment, floors, pipes, waste water areas, clarifiers, flocculation basins and neutralization chambers

## Specialized Products

- Epoxy Pipe Supports
- Galvanized Base Plates
- Pipe Straps
- Pipeline Protective Covers
- Control Valves (All Types)
- Pumps (All Types)
- Flowmeters (All Types)
- Instrumentation (All Types)
- Composite Support Structures



### Refinery Services

High performance corrosion protection services and solutions

## Linings

- Fiber-Reinforced Epoxy Linings
- Polymer Linings for Wastewater
- Filler Compounds

## Polymer Concretes

- Acid-proof Concrete (Structural Grade)
- Vinyl Ester Polymer Concrete
- Epoxy Novolak Polymer Concrete



### Power Gen Equipment

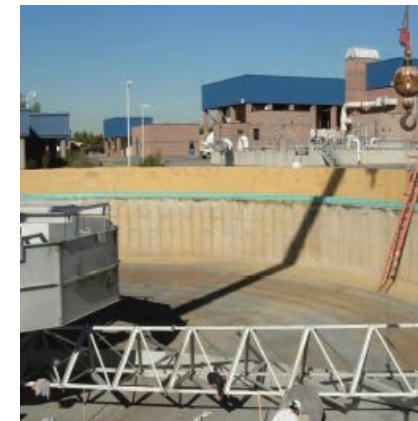
Flue gas desulfurization (FGD) systems, ducts, stacks, chimneys, scrubbers, spray towers, fans, piping and containment areas

## Industrial Cleaning

- Sand and Abrasive Blasting
- Water Blasting and Power Washing
- Chemical Cleaning

## Industrial Coatings

- Onshore and Offshore Coatings
- Coating Removal and Repairs
- Composite Repairs

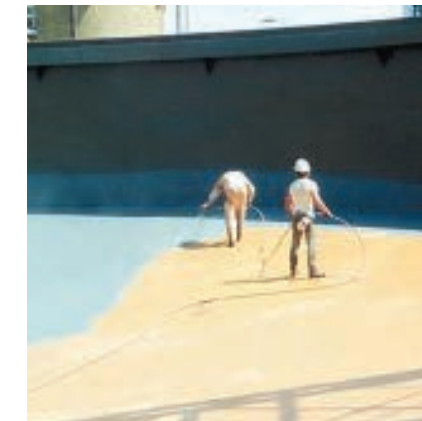


### Wastewater Infrastructure and Rehabilitation and Protection Solutions

Engineered solutions for the restoration and corrosion protection of water structures

## Specialized Inspections

- Structural Evaluation and Inspections
- Atmospheric Corrosion Evaluation
- Coating Inspections
- Scaffolding Inspections
- Infrastructure GRP (Ground Penetrating Radar)
- Thermography
- Ultrasonic Inspection



## Other Services

- Heat Curing Services 24/7
- Shot Peening 24/7 (Downhole Equipment)
- Ultrasonic Peening (Enhances Weld Strength)
- Manganese and Zinc Phosphate
- PVC Coatings
- Laser Welding
- Chrome and ENP (Electroless Nickel Plating)



### Food and Beverage Corrosion Protection Solutions

Impermeable systems, corrosion resistant floors and walls



### Tank Container Transport

Linings of tank containers (ISO containers) to virtually ensure cargo product purity



### OTR Transport

Linings of over-the-road tank trailers carrying a wide range of aggressive chemicals



### Railcar Transport

Linings of rail tank cars and hopper cars to withstand corrosive effects of various cargoes carried



### Chemical and Petrochemical Processing

Engineered systems for immersion, flue gas, flooring and secondary containment



### Tank Storage and Terminals

For all types of storage tanks, including specialty coatings for food additives



# Sulfur Pits

## Operating Conditions

- Interior: 285°F - 315°F
- Exterior: 120°F - 130°F

## Concrete Problems

### Defects

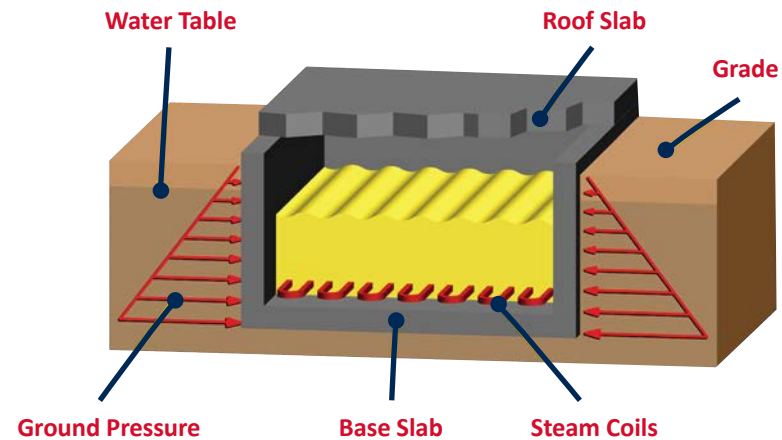
- Design
- Materials

### Damage

- Overload
- Fire
- Impact
- Chemical Spill

### Deterioration

- Metal Corrosion
- Erosion
- Freeze/Thaw
- Sulfate Attack



## High Operating Temperatures

Typically, the sulfur pit concrete is exposed to operating temperatures of molten sulfur ranging between 285°F to 315°F. The temperature gradient exists within the wall mass extending from the pit's interior earth contact of 57°F. Actual exterior soil temperature stabilized during operation reach elevated temperatures ranging between 120°F to 130°F.

## Chemical Attack

Desiccation of the concrete mass (removal of excess moisture by high surface temperatures) causes cracks.

## Sulfurous Acid Attack

Acid generated by water leakage into the pit from cracks combined with failed penetration seals or jacketed pipe/coil leakage creates corrosion of the reinforcing steel bars.



Concrete roof soffit showing severe steel reinforcement corrosion and concrete spalling. Sulfur is also infiltrated within the concrete.

# Solution

## PER ARAMCO STANDARD SAER 6601

We start with a visual inspection. If leaking or cracks appear, we begin with the chinking of cementitious grouting, corroding rebars then follow Aramco standards for repairs. Once repairs are completed, we use Sauereisen/Chemline protection for the longevity of the sulfur pit.

Sauereisen offers chemical-resistant refractors applied by gunniting that can provide dual protection of high acid concentrations and temperatures to 2,100°F. We use anchor reinforcement with an added layer of mastic

membrane to make the surface water proof. Two or three inches of potassium silicate is applied through gunniting. Potassium silicate cures within 24 hours, forming a monolithic structure that is strong, flexible, acid resistant and can absorb thermal shocks.

Expansion joints are sealed with viton caulks. Vapor zones, such as columns and soffit areas, are protected with the super-acid-resistant coating Chemline 784/32. Roof tops are coated with 2,400/32 to ensure complete protection.



## SOME OF OUR ESTEEMED CUSTOMERS





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