

PLANT SYSTEMS ENGINEERING

Primary Metals Project Case Studies

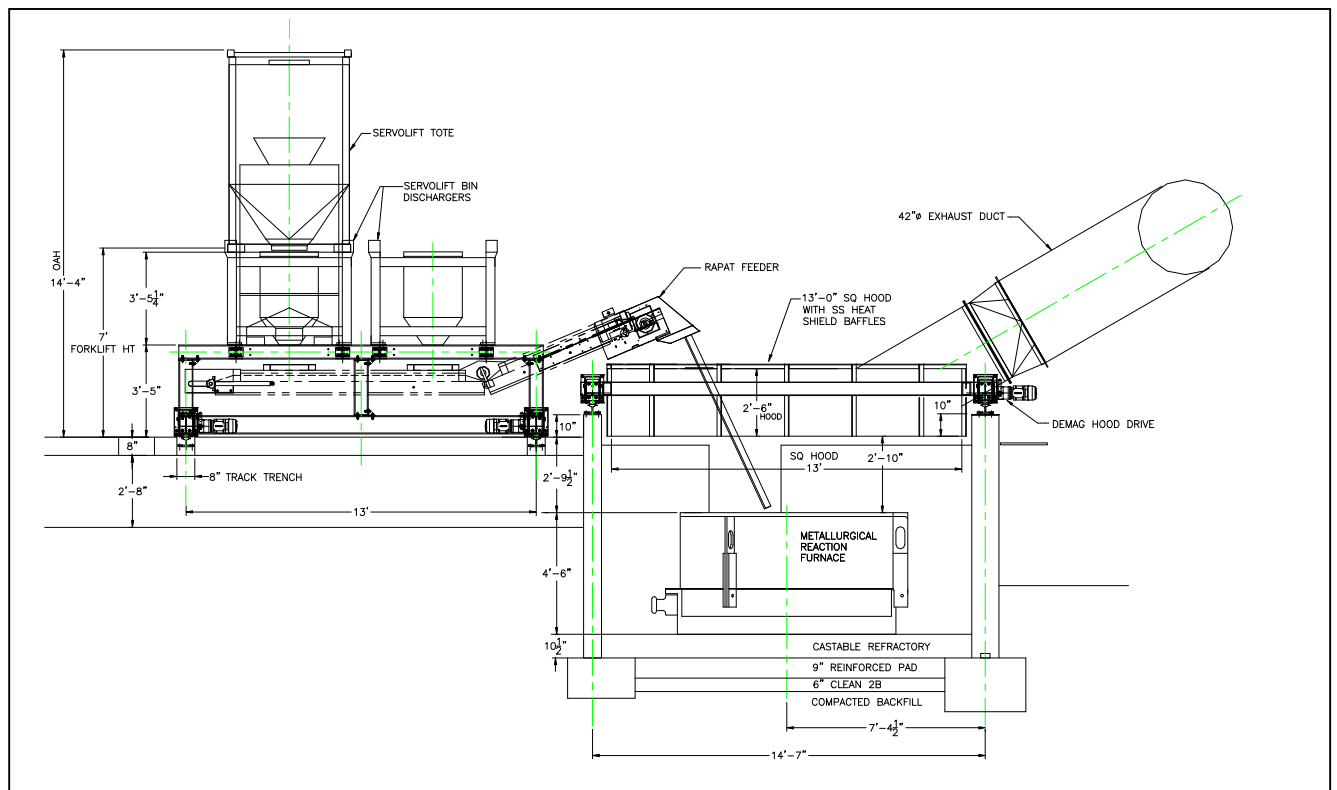
Project: Material Transfer and Hood
Client: Bear Metallurgical
Project Location: Butler, PA
Material: Vanadium, Aluminum, CAO, Steel Shot
Services: Engineering and Design
Constructed Value: \$1M



Complete integration of civil, mechanical, pollution control and electrical systems for a material handling system feeding a metallurgical furnace at the facility.

Bulk materials were provided in Servolift Totes and were docked over bin dischargers for transfer to a vibratory feeder. The feeder discharged the material to a Rapat conveyor which in turn fed the furnace located in a reinforced sub-grade pit. Over the furnace, a custom hood with stainless steel baffles was designed to keep the furnace heat away from the hood / dust collection system.

Since there were two furnaces, the material storage / transfer system and hood were designed with DeMag wheel drives to shuttle the systems back and forth on ASCE rails.



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Project: De-lacquering Tests
Client: Alcoa Technical Center
Project Location: Alcoa Center, PA
Material: Aluminum – UBS's
Services: Research / Design / Testing
Constructed Value: Research only

PSE was contacted by Alcoa to develop an experimental system to de-lacquered used beverage cans (UBC's). We utilized a stainless steel mixing vessel provided by Alcoa and designed a gentle mixing system to agitate the crushed UBS's in a heated, aqueous solution.

A battery of tests were conducted using different solutions, temperatures, mixing speeds and mixing blade designs to determine the best combination to remove the coatings on the cans. Test data was formalized, reviewed and expanded to a pilot plant level to determine infrastructure needs for larger scale testing and development.



Project: Explosion Investigation
Client: Confidential
Project Location: PA
Material: Vanadium-aluminum to make titanium alloys
Services: Investigation
Constructed Value: \$1M

A manufacturer of high purity specialty metal products for the aerospace, defense and super alloy industries suffered an explosion in a bunker where vanadium-aluminum is mixed with aluminum niobium.



PSE was called upon to review applicable codes (NFPA 484) and standards to determine the design deficiencies that resulted in the explosion and to determine the cost of repairing the facility utilizing the applicable codes. Other codes reviewed included NFPA 70 and NFPA 497.

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Project: Aluminum Spray Metalizing
Client: Confidential
Project Location: PA
Material: Thermal sprayed aluminum
Services: Engineering and Design
Constructed Value: \$500K



A manufacturer of agricultural silo accessories coated carbon steel rods with aluminum generated from a thermal spray system. The over spray of super-fine aluminum particles were captured in a dust collector. An explosion occurred in the dust collector, and PSE was called to re-design the system to be current with the latest codes.

Applying NFPA 33 – Standard for Spray Application Using Flammable and Combustible Materials. The resulting design included isolating the spray operations from the general plant space with barrier walls, locating the dust collector outside in a secure area and providing explosion vents on the interconnecting duct work and dust collector.

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