



brands you trust.



Solutions for Mining and Mineral Processing



Crane ChemPharma & Energy

www.cranecpe.com



Introduction to Crane • Crane Co.

FOUNDED IN 1855

- 1 FLUID HANDLING
- 2 AEROSPACE & ELECTRONICS
- 3 MERCHANDISING SYSTEMS AND PAYMENT TECHNOLOGIES
- 4 ENGINEERED MATERIALS

Crane Co.

Crane Co. is a diversified global manufacturer of engineered industrial products traded on the New York Stock Exchange (NYSE: CR). One of its segments, Crane Fluid Handling, provides highly engineered products for fluid handling applications worldwide.

The Fluid Handling Segment

Crane Fluid Handling provides highly-engineered products including **valves, pumps, controls and water treatment equipment for fluid handling applications worldwide**. Its operating units include Crane ChemPharma & Energy, Crane Nuclear, Crane Building Services, Crane Pumps & Systems, Crane Supply, Barksdale Control Products.

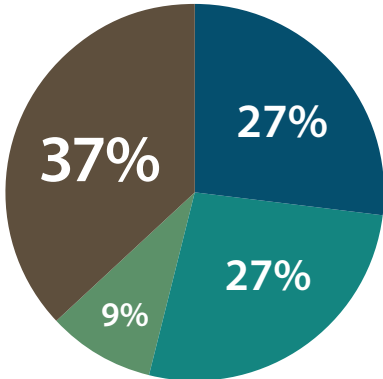
Crane ChemPharma & Energy (CPE)

Crane CP&E designs and manufactures a variety of high-performance products including: highly-engineered **check valves, sleeved plug valves, lined valves, process ball valves, high performance butterfly valves**, bellows sealed globe valves, aseptic and industrial diaphragm valves, multi/quarter-turn valves, actuation, sight glasses, lined pipe, **fitting and hoses, and air-operated diaphragm and peristaltic pumps**. Its trusted brands are in use worldwide in many industries, including **Oil & Gas, Oil Refining, Petrochemical, Power Generation, Chemical Processing, Biotechnology, and Pharmaceutical**.

Crane (CPE) Brands

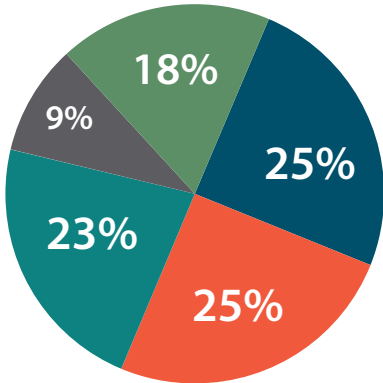
ALOYCO · CENTER LINE · COMPAC-NOZ · CRANE · DEPA
DUO-CHEK · ELRO · FLOWSEAL · JENKINS · KROMBACH
NOZ-CHEK · PACIFIC · RESISTOFLEX · REVO · SAUNDERS
STOCKHAM · TRIANGLE · UNI-CHEK · WTA · XOMOX

Crane Co.



- Fluid Handling
- Aerospace & Electronics
- Merchandising and Payment Technologies
- Engineered Materials

Key Markets

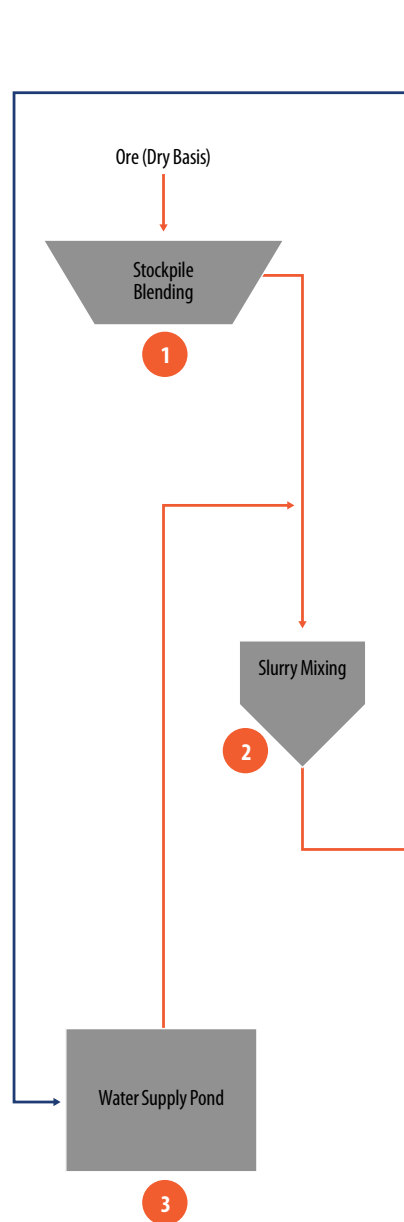


- Chemical/Petrochemical
- Energy
- Building Services
- Municipal
- General Industry

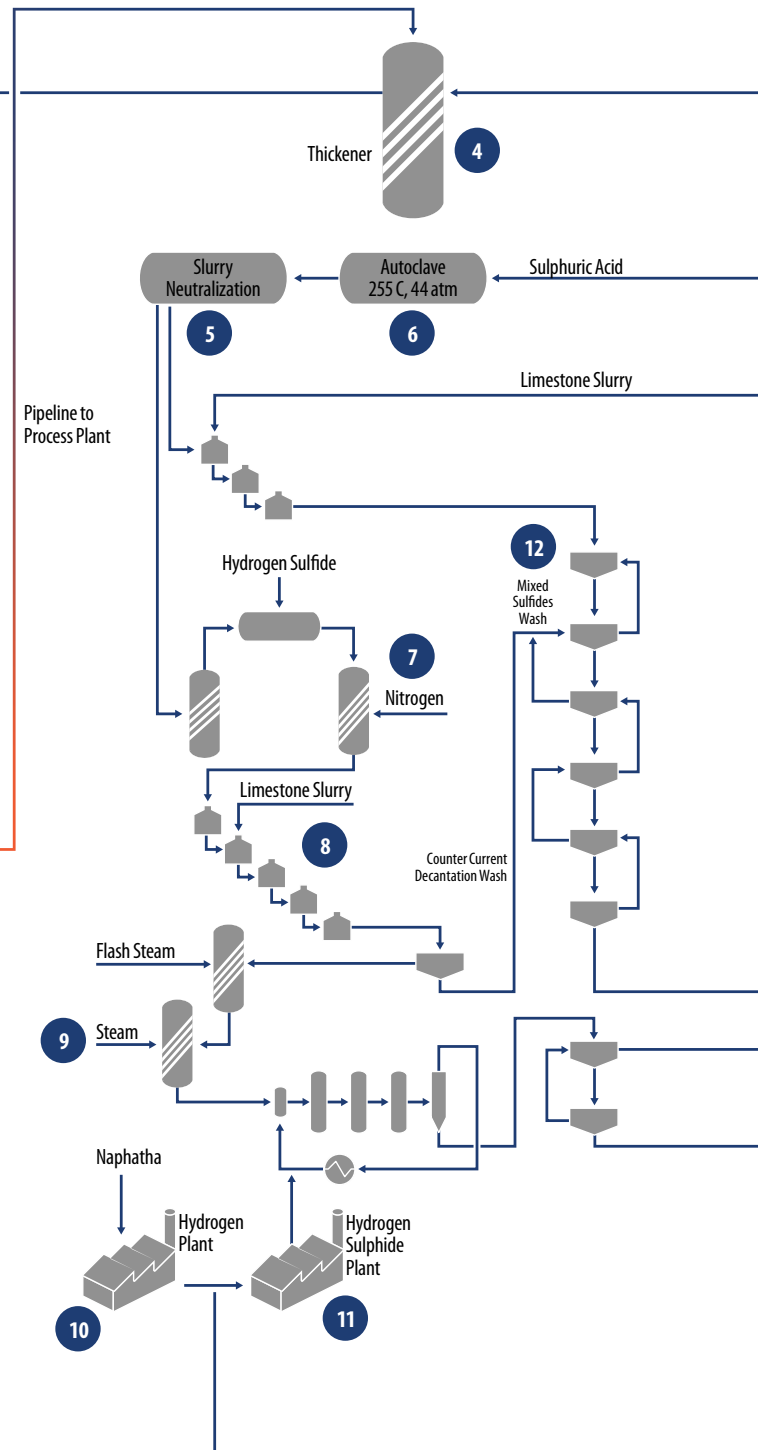
Nickel Process Diagram

1. **Stockpile Blending**
Industrial Diaphragm
2. **Slurry Mixing**
Gate, Globe, Check
Metal Seated Ball
Process Ball
Sleeved Plug
3. **Water Supply Pond**
Gate, Globe, Check
High Performance Butterfly
Industrial Diaphragm
Process Ball
Resilient Seated Butterfly
4. **Thickener**
Metal Seated Ball
Process Ball
Sleeved Plug
5. **Slurry Neutralization**
Metal Seated Ball
Sleeved Plug
6. **Autoclave 255 C, 44atm**
Metal Seated Ball
Sleeved Plug
7. **Nitrogen**
Gate, Globe, Check
Process Ball
Sleeved Plug
8. **Limestone Slurry**
Sleeved Plug
- Steam**
Gate, Globe, Check
Industrial Diaphragm
Metal Seated Ball
Pressure Seal
9. **Hydrogen Plant**
Gate, Globe, Check
High Performance Butterfly
Process Ball
Triple Offset
10. **Hydrogen Sulphide Plant**
Metal Seated Ball
Process Ball
Sleeved Plug
11. **Mixed Sulphides Wash**
Gate, Globe, Check
Metal Seated Ball
Sleeved Plug
12. **Steam & Electricity Plant**
Gate, Globe, Check
Industrial Diaphragm
Pressure Seal
Process Ball

CRUSHING & GRINDING

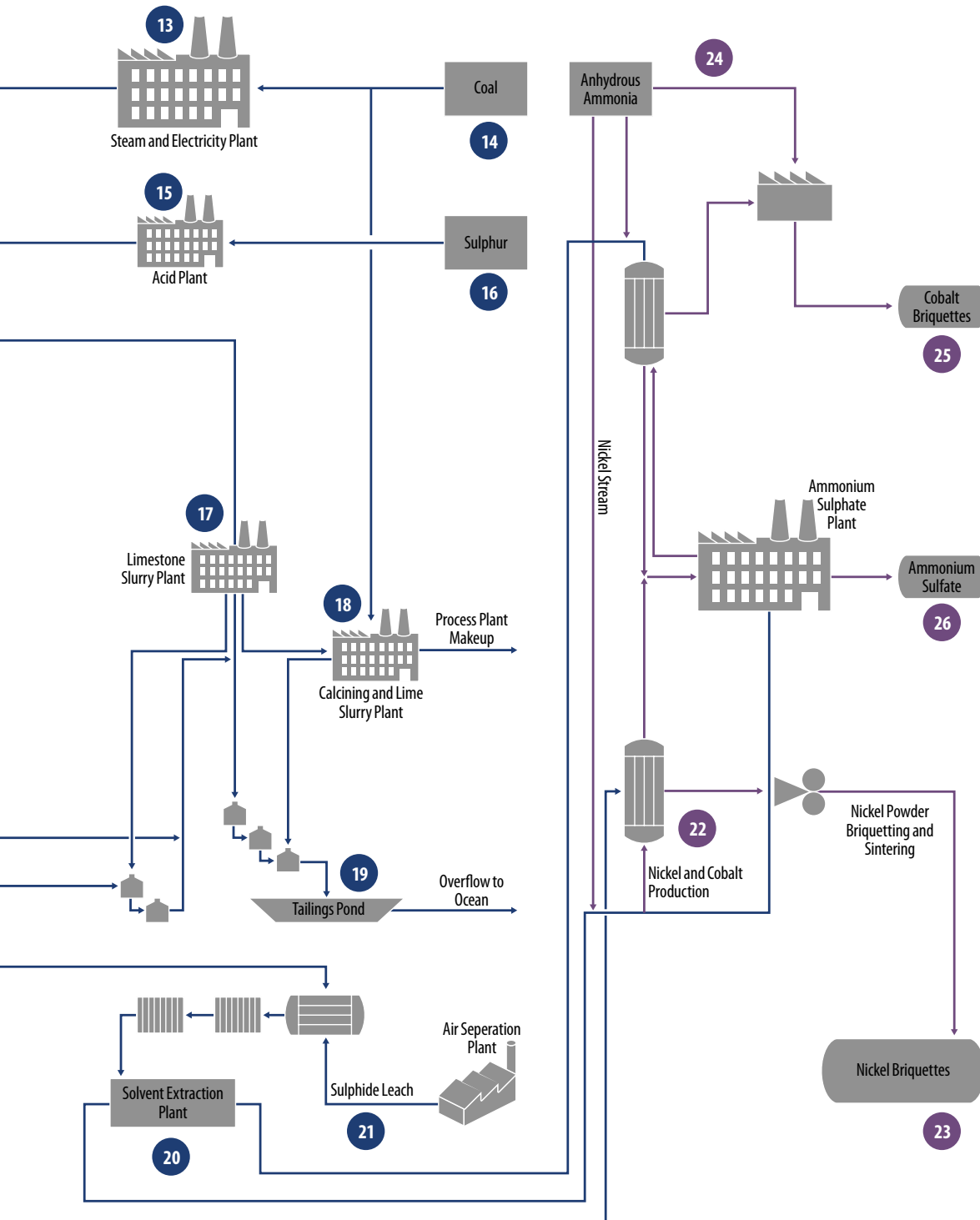


UTILITIES



Nickel Process Diagram

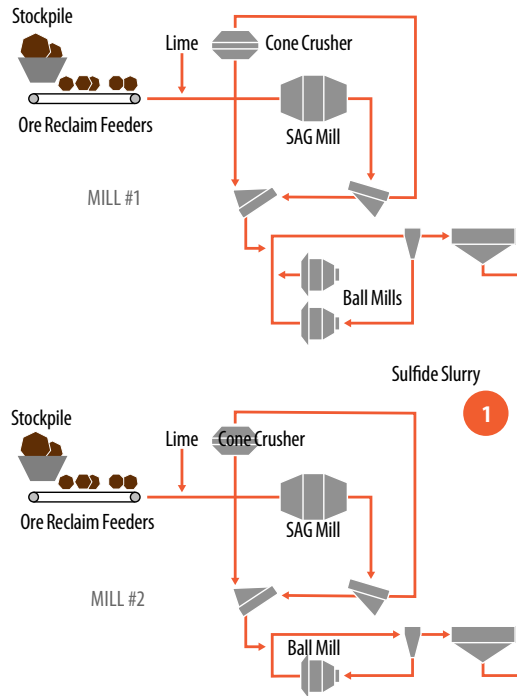
FINAL PROCESS



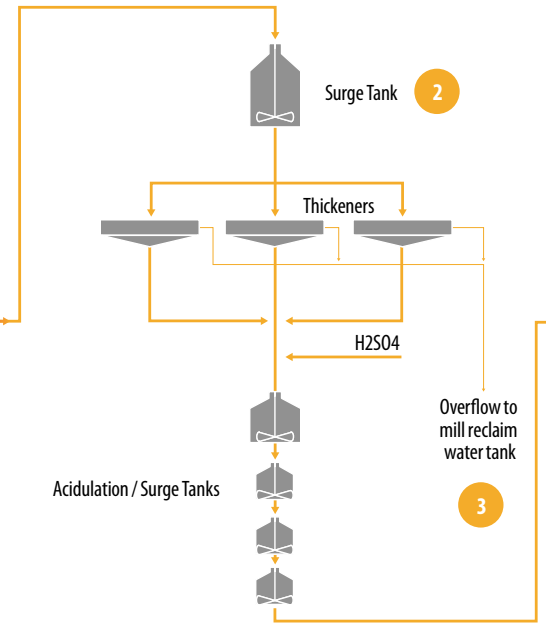
- 13. **Coal**
Industrial Diaphragm
Sleeved Plug
Triple Offset
- 14. **Acid Plant**
Industrial Diaphragm
Process Ball
Lined Pipes and Fittings
Sleeved Plug
- 15. **Sulphur**
Sleeved Plug
Lined Products
- 16. **Limestone Slurry Plant**
Gate, Globe, Check
Metal Seated Ball
Sleeved Plug
Triple Offset
- 17. **Calcining & Lime Slurry Plant**
Gate, Globe, Check
Industrial Diaphragm
Resilient Seated Butterfly
- 18. **Tailings Pond**
Gate, Globe, Check
Industrial Diaphragm
Sleeved Plug
Triple Offset
- 19. **Solvent Extraction Plant**
High Performance Butterfly
Process Ball
Sleeved Plug
Triple Offset
- 20. **Sulphide Leach**
Process Ball
Sleeved Plug
- 21. **Nickel & Cobalt Production**
Metal Seated Ball
Process Ball
Sleeved Plug
- 22. **Nickel Briquettes**
NO
- 23. **Anhydrous Ammonia**
Process Ball
Sleeved Plug
- 24. **Cobalt Briquettes**
NO
- 25. **Ammonium Sulfate**
Gate, Globe, Check
Process Ball
Sleeved Plug

Gold Process Diagram

CRUSHING & GRINDING

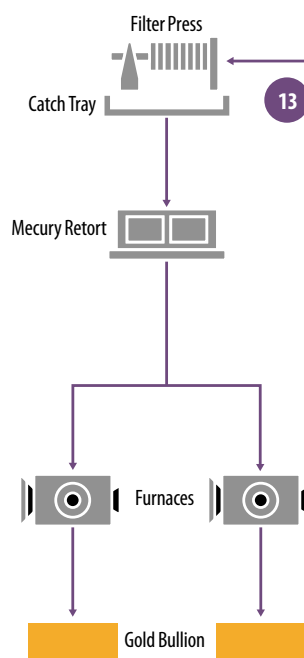


ACIDULATION (SULPHIDE PRE-TREATMENT)

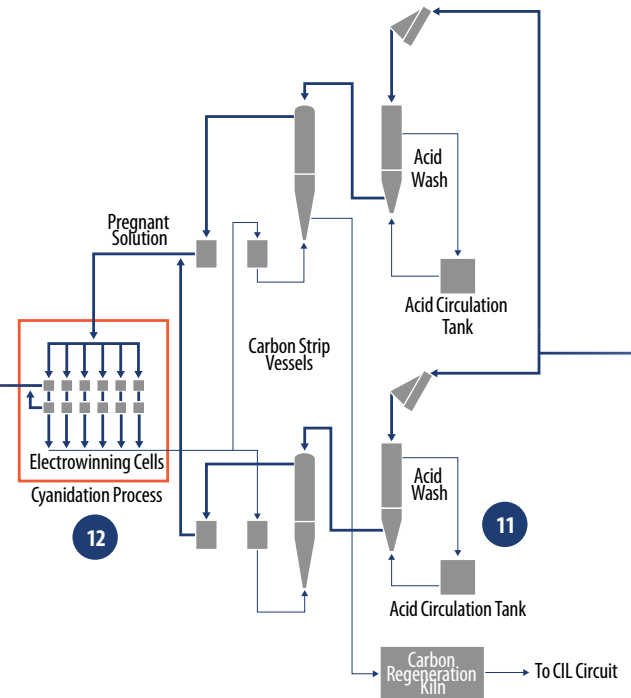


1. **Sulfide Slurry**
Process Ball
Sleeved Plug
2. **Surge Tank**
Gate, Globe, Check
Industrial Diaphragm
Lined Pipes and Fittings
Lined Products
Sleeved Plug
3. **Overflow to Mill Reclaim to Water Tank**
High Performance Butterfly
Resilient Seated Butterfly

11. **Acid Circulation Tank**
Gate, Globe, Check
Industrial Diaphragm
Lined Pipes and Fittings
Lined Products
Sleeved Plug
12. **Cyanidation Process**
Industrial Diaphragm
13. **Filter Press**
High Performance Butterfly
Process Ball
Triple Offset



GOLD BULLION

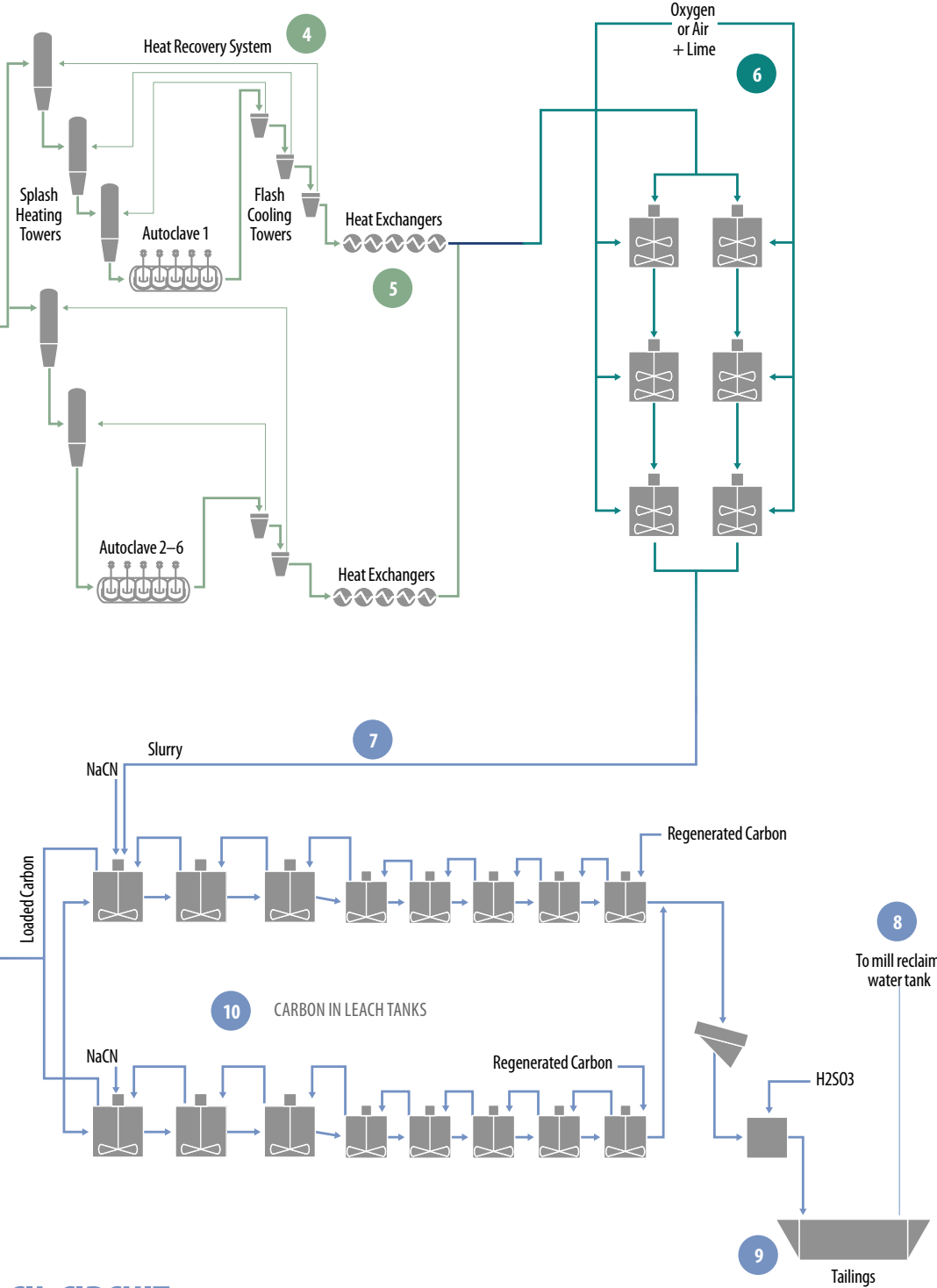


CARBON STRIP CIRCUIT

Gold Process Diagram

AUTOCLAVING CIRCUIT

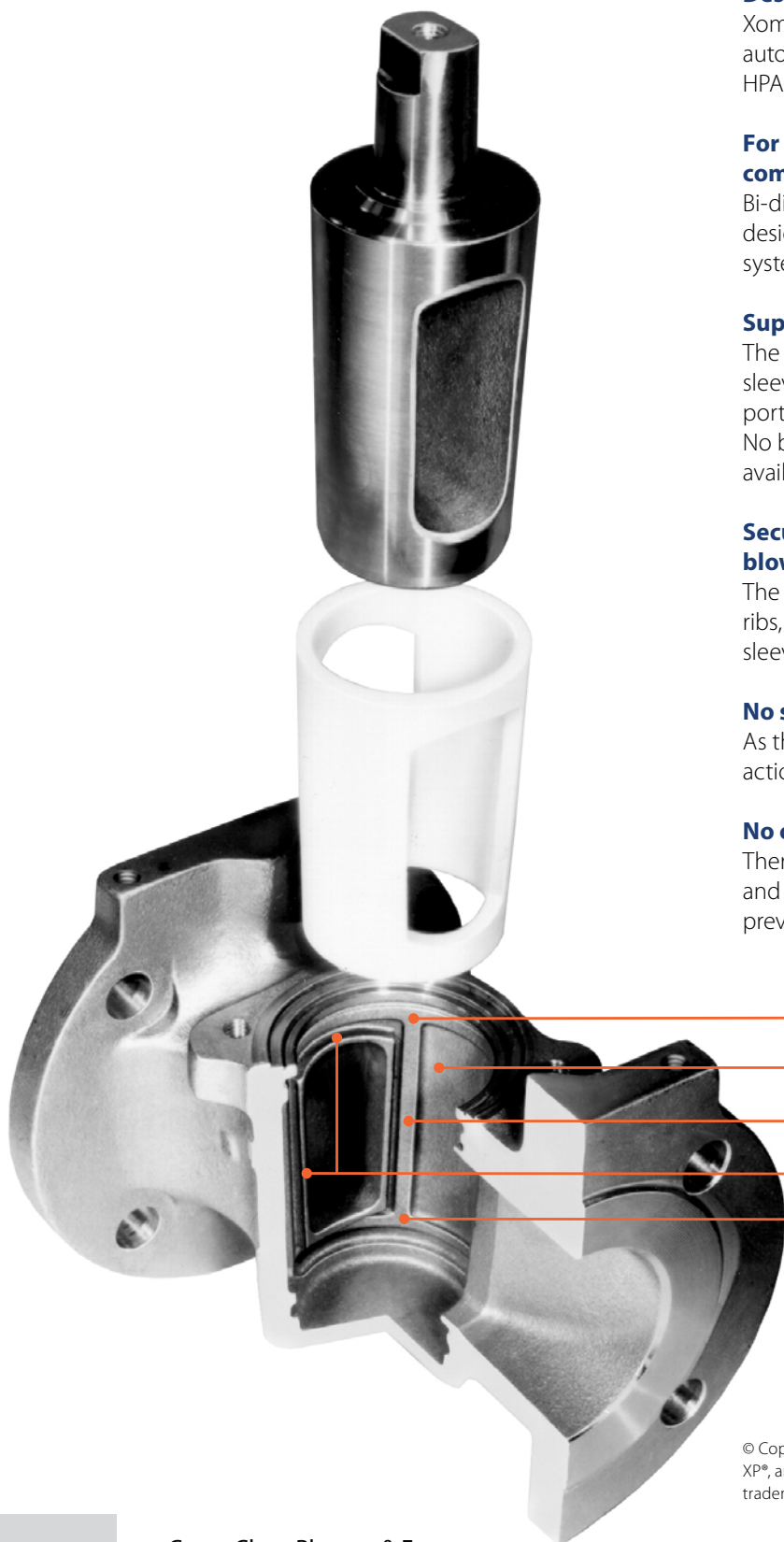
NEUTRALIZATION CIRCUIT



- 4. **Heat Recovery System**
Metal Seated Ball
Process Ball
Sleeved Plug
- 5. **Heat Exchangers**
High Performance
Butterfly
Triple Offset
- 6. **Oxygen or Air + Lime**
High Performance
Butterfly
Process Ball
Sleeved Plug
Triple Offset
- 7. **Slurry**
Sleeved Plug
Triple Offset
- 8. **To Mill Reclaim Water Tank**
High Performance
Butterfly
Resilient Seated Butterfly
- 9. **Tailings**
Industrial Diaphragm
Lined Pipes and Fittings
Lined Products
- 10. **Carbon in Leach Tanks**
Gate, Globe, Check
Process Ball
Sleeved Plug
Triple Offset

CIL CIRCUIT

Metal Mining & Processing: XOMOX® SPV



Designed with mining in mind.

Xomox Tuflin Sleeved Plug Valves are designed for handling autoflame vent, abrasive slurries, and caustic solutions in many HPAL and other mining processes.

For the most economical, flexible, and compact fluid handling systems.

Bi-directional flow, simple actuation, lightweight, compact design, and multiport configurations all facilitate improved system design.

Superior, long-lasting in-line sealing.

The inert PTFE sleeve completely surrounds the plug. The sleeve provides a large, circumferential sealing surface from port to port. Open, closed, or rotating, the seal is assured. No ball or gate valve can match this sealing power. Sleeve is available in higher temperature and abrasive resistant material.

Secure sealing with no cold-flow, deformation, blow-out, or rotation of the sleeve.

The sleeve is securely nestled in the valve body. High pressure ribs, top and bottom retention, and 360° port lips all assure sleeve containment.

No seizing. No sticking.

As the plug rotates, the 360° port lips provide a self-cleaning action to remove scaling and adhering media.

No cavities. No contamination.

There are no body cavities where flow media can accumulate and contaminate future processing. This cavity-free design also prevents sticking.

Top retention of sleeve

Sleeve relief area

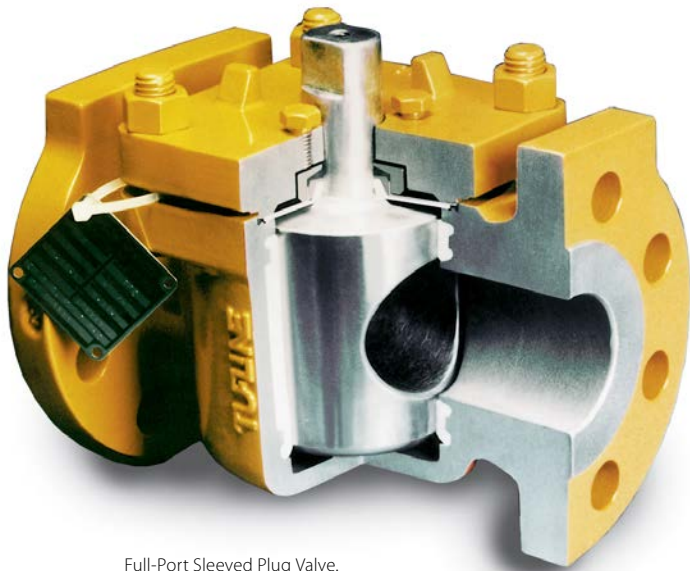
Pressure seal ribs

360° lips

Bottom retention of the sleeve

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Metal Mining & Processing: XOMOX® SPV



Full-Port Sleeved Plug Valve.

High flow rate without body cavities.

Full port SPVs are fully pluggable with five times the CV as a standard SPV.

Scaling problems are easily overcome.

Scale build-up deteriorates gate valves and causes seat scoring in ball valves.

Scale build-up is prevented in Tufline Sleeved Plug Valves by metal lips. These lips completely surround the port areas of the valve.

Any scale that collects on the plug while in the closed position is broken up by the lips when the valve is opened. The plug is wiped clean with each rotation of the plug.

Since scale is not a problem, Tufline Sleeved Plug Valves perform well in lime mud applications.

360° lips assure superior steam purge service.

Most other sleeved plug valves have only partial lips at the port edges. These partial lips allow the PTFE sleeve to extrude into the flow path. Media flow is blocked and sleeve edges are eroded.

The exposed sealing area of ball valves is also vulnerable to extrusion and erosion.

Handling higher pressures and temperatures.

In applications such as autoclave, acid leaching, and flush vessels, the Tufline locked-in sleeve easily withstands higher pressures and temperatures. XOMOX® Sleeved Plug Valves are available up to ANSI class 600. For applications with service temperatures up to 600°F, Tufline Xenith valves utilizing Tufline-600 sleeves and seals are the proven choice.

Versatile and adaptable.

Tufline Multiport Sleeved Plug Valves facilitate more efficient, economical, and flexible system design.

Tufline Sleeved Plug Valves are available in 3-way, 4-way, and 5-way configurations. These are especially useful in bypass, coating, diverter, and weak-wash systems.

Optional sleeve materials include glass filled PTFE, Tufline-475, and Tufline-600 which can be used in steam purge lines.

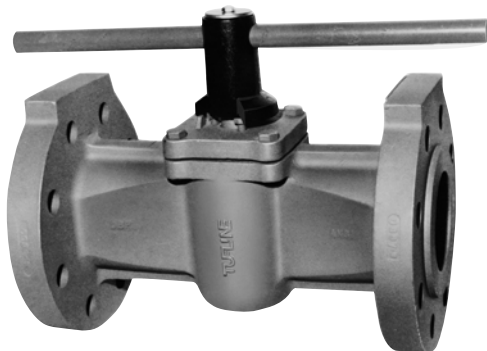
Optional plug designs meet a broad range of control valve requirements. Valves are available in ANSI Classes 150, 300, and 600.

Select from a wide variety of materials ranging from ductile iron to titanium.

In Sulfur applications, or other services requiring temperature control, XOMOX Fully Jacketed SPV's provide a high rate of heat transfer to keep media flowing. Also available in partial jacketed and 3-way options.



Full-port 3-way valve



Class 600 SPV



Jacketed valve

Industrial Diaphragm Valve

Industrial Diaphragm Valve

Brands: Saunders

Sizes: ½" - 20"

Class: ASME 125-150

DN: 15-500

Materials: Cast Iron, Ductile Iron, Cast Steel, Stainless Steel, Gunmetal

Linings: Glass, Rubber, Plastic

Diaphragm: Rubber, PTFE

Operation: Manual, Pneumatic, Electric, Hydraulic

Connections: Flanged, Threaded

Body Style: Weir or straight through types

Features & Benefits:

- The Science Inside®: Proprietary diaphragm technology provides unique sealing solution and complete emissions control.
- Unmatched Expertise & Innovation: Comprehensive selection of polymers delivers superior corrosion and abrasion resistance for a wide range of demanding applications, since 1928.
- Efficient Operation: Top entry design enables in-line maintenance capability to reduce plant down-time.



High Performance Butterfly Valve



High Performance Butterfly

Brands: Flowseal, Xomox

ASME Class: 150 - 600

Sizes: 2" - 48"

DN: 50 - 1200

Materials: Carbon Steel, Stainless Steel & Alloy

Body Styles: Wafer, Lugged (Double Dead End)

Features & Benefits:

- Soft seat design provides bubble tight shut-off
- Metal seated; ASME Class IV Leakage
- Wafer and lug body styles
- Firesafe, Meets API 607, Rev. 4
- MSS-SP-68
- Unparalleled service in vacuum-to-low pressure

XOMOX® Lined Products

Lined Ball, Butterfly, and Plug Valves

Brand: XOMOX®

Sizes: Ball: 1/2" - 12", Butterfly: 2" - 24", Plug: 1/2" - 12"

ASME Class: Ball and Butterfly: 150, Plug 300

DN: Ball: DN15 - DN150

Materials: PFA Lined Ductile Iron, other materials available

Linings: PFA, Antistatic, PVDF for ball valves

Connections: ANSI Class 150 Flanged

Features & Benefits:

- XOMOX® lined ball, butterfly and check valves offer unparalleled corrosion resistance to virtually all chemicals at temperatures up to 400°F
- The XLD, XOMOX® Lined Butterfly valve is the space saving, robust solution to highly corrosive applications
- The XLB, XOMOX® Lined Ball valve with its patented SX seal provides excellent fugitive emissions protection in a full port low torque package
- The XOMOX® lined plug valve contributes a tight in-line seal with a class 300 option



Lined Check Valves and Accessories

Brand: XOMOX®

Sizes: 1/2" - 12" (varies by product)

ASME Class: 150

DN: DN 15 - 300

Materials: PFA Lined Ductile iron, other materials available

Linings: PFA, Antistatic, PVDF (varies by product)

Connections: ANSI Class 150 Flanged

Features & Benefits:

- Protect equipment meet process needs with the full range of XOMOX® lined check valves and accessories
- XOMOX® offers the XLC, the first lined ball check valve with a Class A leak rate in addition to lined Y-ball and wafer swing check valves
- The portfolio of XOMOX® lined accessories includes basket strainers, filters, sight flow indicators, and sample valves



Check Valves

Triple Offset

Brands: CRANE®FKX 9000

ASME Class: 150, 300

PN: 10 - 100

Sizes: 3" - 96"

DN: 80-600

Materials: Carbon Steel, Stainless Steel, Special Materials

Body Styles: Lug, Double Flanged Short or Long

Features & Benefits:

- Optimized seat angle design and Stellite® hard-faced valve body seat deliver a longer seal life and improved abrasion resistance
- Metal-to-metal sealing to deliver reliable and bidirectional shutoff in high-temperature, high-pressure, severe service applications, etc.
- Innovative stem seal design
- Fugitive emissions tested: ISO 15848
- Torque-seating self-adjusts to evenly distribute seal compression
- A "floating" seal ring and wide seal ring supporting gasket eliminate binding and enhance performance

Note: special configuration Turbine Trip & Throttle Valve with customized quick-closing actuation package.

Turbine Trip & Throttle Valve



Dual Plate Check

Brands: Duo-Chek

ASME Class: 125 - 4500

Sizes: 2" - 84"

DN: 50 - 2100

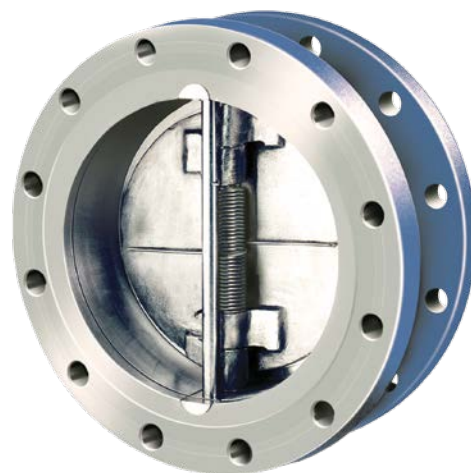
Materials: Cast Iron, Bronze, Carbon Steel, Stainless Steel, Alloy

Connections: Wafer, Lugged, Flanged

Standards: ASME, DIN, JIS, AS

Features & Benefits:

- Lightweight & compact compared to the traditional swing check valve
- Spring assisted closure (independent spring design), plates are more responsive to changes in flow conditions
- Faster response time improved by the use of independent springs and support sleeves, minimizes water hammer risks for non slam applications
- Retainerless design available (no fugitive emission to atmosphere, valve is inherently fire-safe)
- Choice of spring torques to suit critical velocity systems and improve valve response time



Polypropylene-Lined Pipe and Fittings



Brand: Resistoflex
ASME Class: 150, 300
Sizes: 1" – 12"
DN: 25 – 300
Materials: Carbon Steel, Stainless Steel
Connections: Flanged

Features and Benefits:

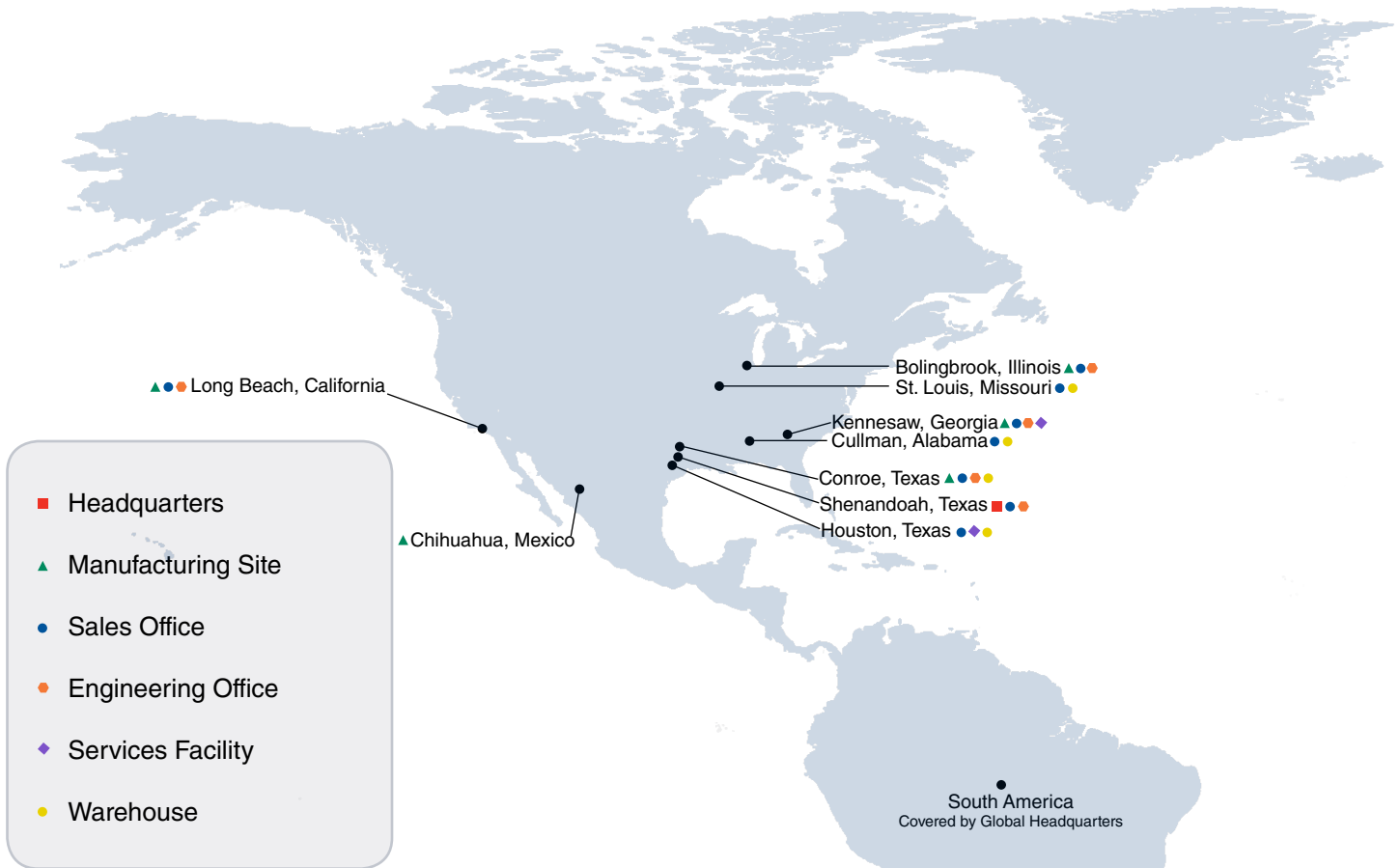
- Pipe and fittings liners have a heavy wall thickness and are made from raw resin at our North Carolina manufacturing facility.
- Pipe and fittings are rated for continuous full vacuum service up to 225°F
- The Resistoflex Thermalok™ process locks the plastic liner in the metal housing, resulting in the liner and metal housing acting as one monolithic unit, even during frequent thermal cycling. Inherently stiff liner remains tight against the housing interior throughout its lifespan.
- Polypropylene has shown good abrasion resistance on fine slurries, such as fly ash. Third party testing indicates that Resistoflex Polypropylene liners will outperform rubber liners by a factor of four, giving enhanced service life.
- Resistoflex Polypropylene lined pipe and fittings are delivered to site ready to bolt-up, with no expensive, time-consuming, or equipment-dependent fabrication procedures.
- Polypropylene has excellent chemical resistance to a broad spectrum of acids and caustics.
- Good release properties to fight scale buildup
- Weld free construction reduces NDE costs.
- Straight lengths available up to 20 ft.
- Resistoflex pipe and fittings comply with the requirements of ASME B31.3 and ASTM F1545-15a



Special Configurations Available with
 ETFE or PVDF Liner



Global Coverage



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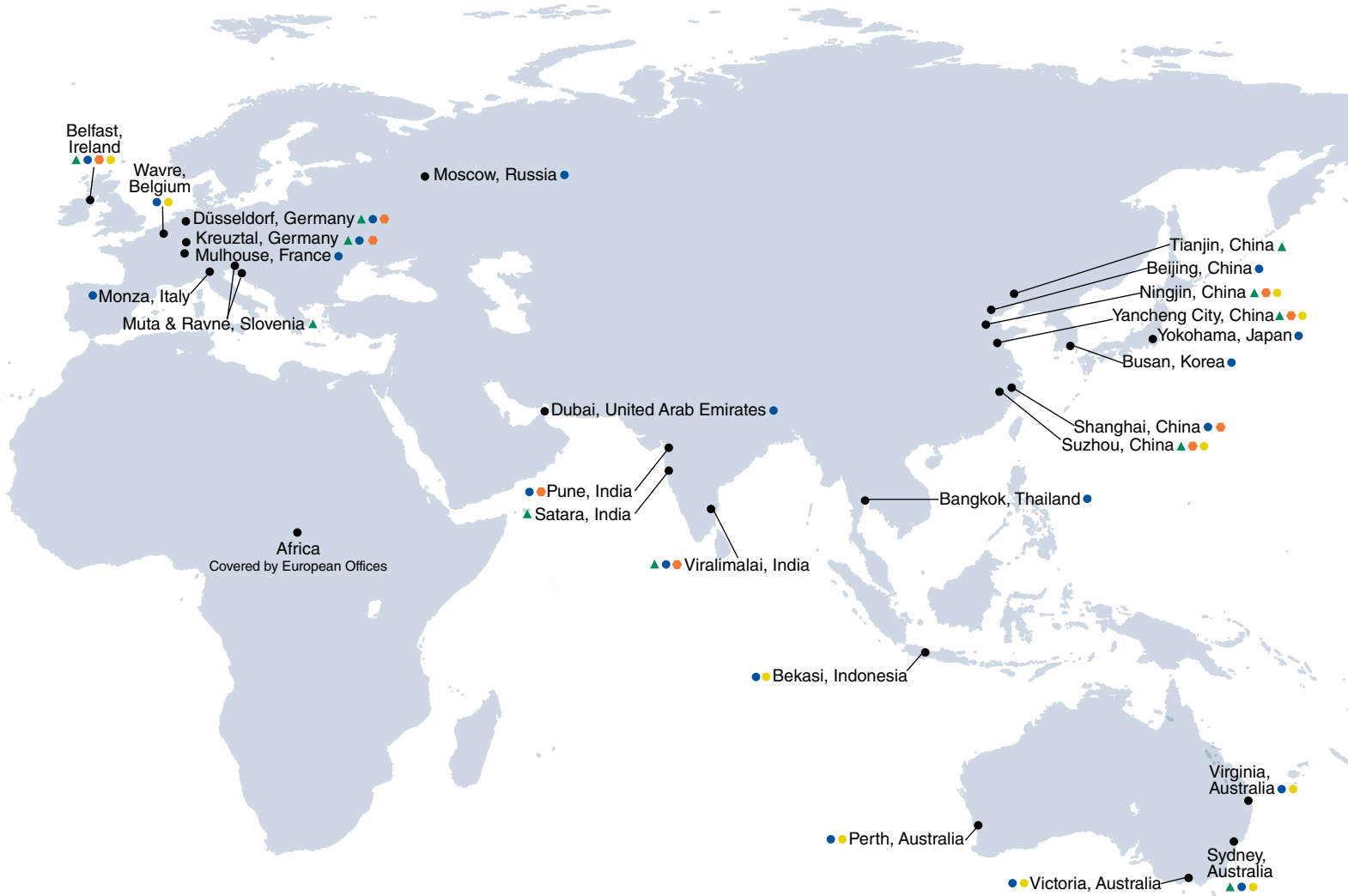
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Regional Service & Support

Crane is determined to become faster, better and easier to do business with tomorrow, next month, and next year (and in perpetuity). Its business is an extension of its customer's business as Crane is an enabler and a partner working toward the common goal of managing and optimizing its customers' fluid handling needs. Crane ChemPharma & Energy has a global network of Service & Distribution Centers that offer the following capabilities:

Factory-trained Technicians

Service Center personnel receive the same rigorous training and evaluation as the factory personnel who manufacture our valves. In addition, they are specially trained in valve automation and repair. Our experienced personnel can provide design and engineering assistance upon request.

On-site Inventories - Fast Response

We maintain inventories of valves, repair parts, and control accessories on-site to ensure fast response.

Field Repair Service Option

Our technicians are available for field repair and emergency service at your site.

Genuine Quality Parts

All parts used in automation, modification, and repair are factory authorized and fully conform to our manufacturing specifications. Don't accept any third-party parts to maintain your warranty.

Other Services

Other services offered include product specification, engineering support, system design, MRO, spare parts, training, and testing.



Flow Expertise

Crane has remained committed to application expertise since its early days. One such example was demonstrated in early 1940s by its introduction of the Crane Technical Handbook TP410 - long since and still today recognized as the leading guide to principles aiding in the design of fluid-handling systems. This guide has recently been updated and the company has developed a companion website www.TP410.com that offers real-time online calculation capabilities to solve necessary fluid handling equations. By developing specialized expertise over many years, Crane is better positioned to understand the unique needs of each of its focus industries, and devise more effective application solutions.

Quality Assurance & Certifications

At Crane, quality is assured at each stage of our manufacturing process, where safety, reliability and performance cannot be compromised. Our procedures and manufacturing facilities are regularly audited by the industry recognized authorities, resulting in the following certifications, among others:

- ASME 16.34, 16.10, 16.5, 16.25, 16.42
- API 607, 609
- MSS SP – 67, 68, 72
- ISO 9001: 2000 (DET NORSKE VERITAS, TÜV)
- ISO 14001:2005 (TÜV NORD)
- ZERTIFIKAT DGRL CERTIFICATE PED (TÜV NORD)
- DIRECTIVE 97/56/EG
- API 6D
- QS - CERTIFICATE OF ASSESSMENT PED (DET NORSKE VERITAS)
- TECHNICAL STANDARDS & SAFETY AUTHORITY
- LABORATORIO DE PRUEBAS DE EQUIPOS Y MATERIALES
- WELDING PROCEDURE APPROVAL (DET NORSKE VERITAS)
- RUSSIAN TR
- WATER REGULATION ADVISORY SCHEME
- DESIGN ASSESSEMENT (AMERICAN BUREAU OF SHIPPING)
- KONFORMITÄTSEKTLÄRUNG ATEX - DECLARATION OF CONFORMITY ATEX
- DVGW - BAUMUSTER-PRÜFZERTIFIKAT GASVERSORGUNG (DVGW ZERTIFIZIERUNGSSTELLE)
- CERTIFICATE OF RECOGNITION (BUREAU VERITAS)
- AD 2000-MERKBLATT HP 0/TRD 201/GGVE/ GGVS
- AD 2000-MERKBLATT A4
- SHIPBUILDING APPROVAL ACCORDING TO MODE IBV/MODE II
- EN 729-2
- KTA 1401
- TA LUFT 2000
- API 622 EMISSIONS TESTING
- EPA METHOD 21 EMISSIONS TESTING
- CE
- 10CFR50 APPENDIX B
- ASME N45.2
- ASME N-STAMP N-2 899
- ASME NPT STAMP N-2900
- ASME NCA-4000
- ASME NB REGISTRATION
- REPAIR AND TESTING OF VALVES AND ACTUATORS IN COMPLIANCE WITH 10CFR.50 APPENDIX B AND ASME NQA-1
- "NR"- FIELD REPAIR OR REPLACEMENT OF CLASS 1, 2, & 3 LINE VALVES AND SECTION III CLASS 1, 2 AND 3 PRESSURE RELIEF DEVICES
- "VR"- FIELD REPAIR OF ASME SECTION I, III AND VIII PRV
- UL LISTED

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