



OIL & GAS APPLICATIONS: PIPING AND NICKEL ALLOY SOLUTIONS





INTRODUCTION

The Oil and Gas industry continues, as it has over the last century, to meet the challenges of well complexity, safety and environmental regulations and harsher E&P conditions. Production chemistry, increased water depths, uncharted geographic locations and demanding production rates test the industry. These are the challenges and opportunities for the PCC Energy Group's advanced materials and product portfolio.

CAPABILITIES

The supply of OCTG products is a mainstay to the Oil and Gas industry. The downstream processing and gas transmission industries use pipe, fittings, flanges and equipment produced from plate, sheet and bar.

The PCC Energy companies; Wyman Gordon, Hackney Ladish, Special Metals, PCC KLAD, PCC Rollmet and RathGibson manufacture a variety of alloy steel and nickel alloy seamless and welded pipe, tube, fittings, plate, sheet and bar. These products are made into equipment to be used in the most demanding environments, from the bottom of the well through the distribution of refined products. In fact, the combination of Wyman Gordon, Special Metals, PCC Rollmet and RathGibson now provides the industry with the largest, most corrosion-resistant casing, mechanical tube, coiled and straight length seamless and welded tubular products available.

PCC KLAD provides more specialized corrosion-resistant surfaces through its weld overlay and co-extrusion processes and Hackney Ladish's 1% max ovality, fully-segmentable fittings provide the most flexibility in field fabrications.

PCC Energy Group companies also provide solutions for the construction of offshore production platforms, riser components, pull-tubes, flex riser components, tensioning pistons, subsea pipeline architecture, pipeline end terminals, valve bodies connectors, processing equipment separators, heat exchangers and test loops.

The PCC Energy Group is engaged in the extrusion and cold working of nickel alloy OCTG products with an unrivaled ability to produce large OD and long lengths, such as 9-5/8" and larger OD nickel alloy production casing.

The PCC Energy Group stands ready to work with you on safe, cost effective and highly efficient solutions.



Manufacturing seamless, heavy-wall pipe in a range of materials, including carbon steel, stainless, nickel alloy and titanium grades.



A world leader in the invention, production and supply of high-nickel, high-performance alloys.



With products ranging from commodity to high-end, heavy-wall fittings and components.



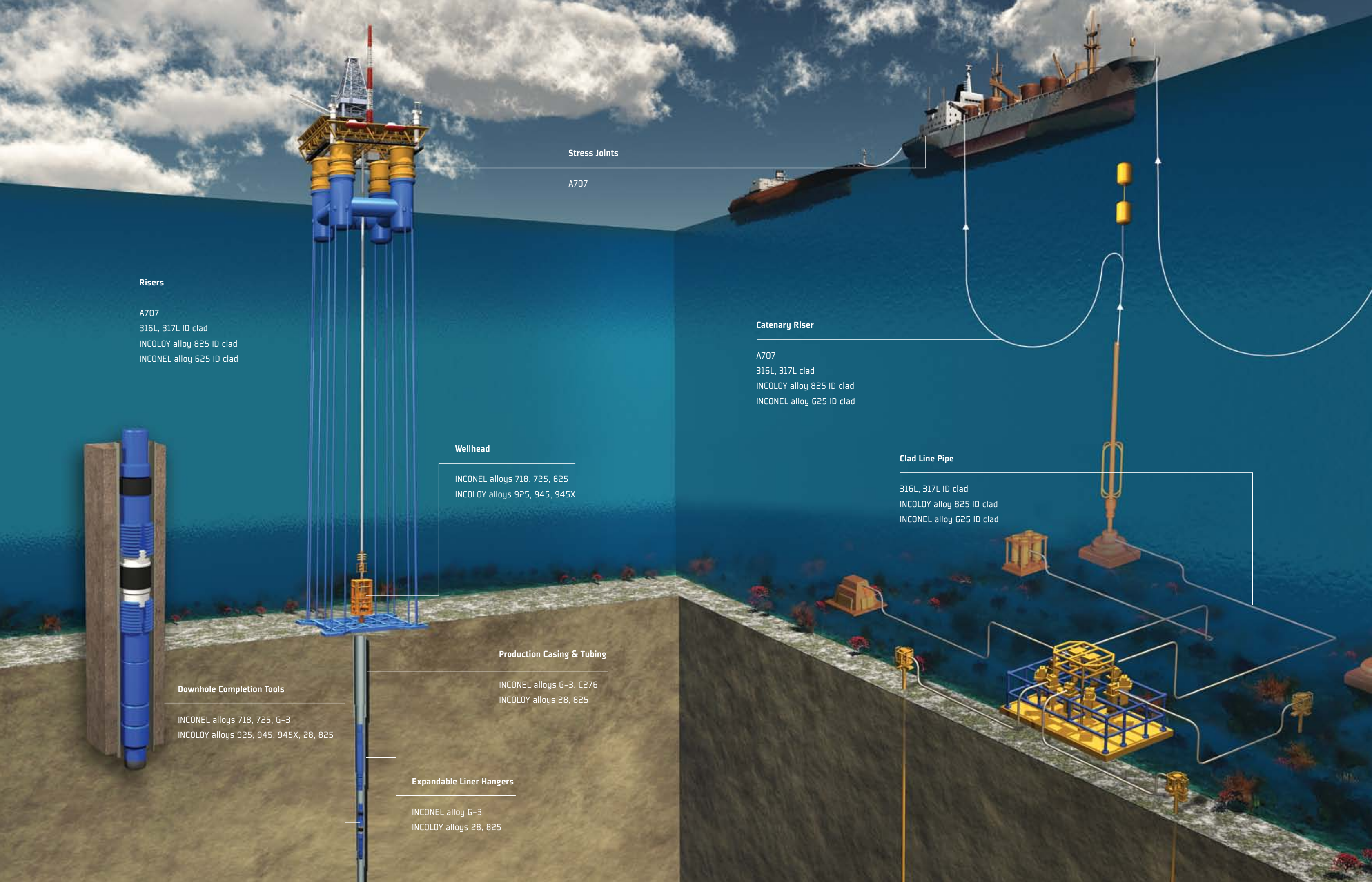
Producer of large-diameter, seamless pipe and tube, in nickel alloys, stainless steels and ferritic alloys.



Producer of weld overlay pipe systems, metallurgically bonded, co-extruded clad pipe.



A manufacturer of welded, welded and drawn, and seamless stainless steel, nickel and alloy tubing.



Stress Joints

A707

Risers

A707

316L, 317L ID clad

INCOLOY alloy 825 ID clad

INCONEL alloy 625 ID clad

Wellhead

INCONEL alloys 718, 725, 625

INCOLOY alloys 925, 945, 945X

Production Casing & Tubing

INCONEL alloys G-3, C276

INCOLOY alloys 28, 825

Downhole Completion Tools

INCONEL alloys 718, 725, G-3

INCOLOY alloys 925, 945, 945X, 28, 825

Expandable Liner Hangers

INCONEL alloy G-3

INCOLOY alloys 28, 825

Catenary Riser

A707

316L, 317L clad

INCOLOY alloy 825 ID clad

INCONEL alloy 625 ID clad

Clad Line Pipe

316L, 317L ID clad

INCOLOY alloy 825 ID clad

INCONEL alloy 625 ID clad

OIL AND GAS PRODUCTS AND SERVICES

The PCC Energy Group is capable of providing seamless and welded pipe, tube and forgings in several different materials, including alloy steels, stainless steels, duplex stainless steel and nickel alloys. All basic mill forms – pipe, tube, bar, plate, sheet, strip and wire rod – are available in nickel alloys. Additionally, the PCC Energy Group manufactures nickel alloy welding products for joining, overlaying and clad processes, as well as providing clad pipe, tube and equipment.

Oilfield equipment manufacturers have historically relied on precipitation-hardened nickel alloy bar, such as INCONEL® alloy 718 and INCOLOY® alloy 925, as source material required for down hole tools, wellhead components and subsurface flow control equipment in sour environments. Special Metals continues to develop higher strength and corrosion resistant alloys, such as INCONEL alloys 945™ and 945X™, to keep pace with increasing engineering demands. In addition, PCC Rollmet specializes in cold work of large diameter tubing in specialty alloy materials such as INCONEL alloys G-3 and C276 and INCOLOY alloys 28 and 825. By developing these alternative processes to deliver NACE approved, high strength, cold worked tube in a near-finished condition, OEM's can realize savings by reducing cycle time for component manufacturing, raw material waste and machining time.

Sour subsea well production has utilized nickel alloy materials to combat the corrosive mediums being handled. Synergies within the PCC Energy Group now allow the Wyman Gordon large OD extrusion capabilities to be combined with nickel alloy materials from Special Metals, resulting in an innovative process to manufacture co-extruded seamless clad pipe with a full metallurgical bond between the cladding and the substrate.

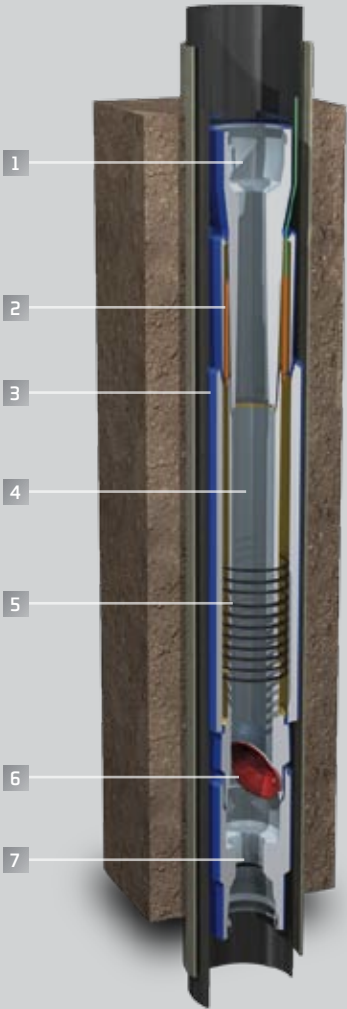
The PCC Energy Group of companies provide an unrivaled tube size and alloy potential, providing the world's largest OD premium corrosion-resistant alloy and clad pipe products in the longest lengths commercially available.

Oil Country Tubular Goods

INCONEL alloy G-3	Grades 110 & 125
INCOLOY alloy 825	Grades 110 & 125
INCOLOY alloy 28	Grades 110 & 125
Duplex Stainless 2205	Grades 85 & up
Super Duplex Stainless 2507	Grades 85 & up
• Seamless, cold worked nickel alloy and stainless pipe	• Non-standard sizes and grades available upon request
• 2-3/8" to 10-3/4" OD (60.3 – 273.1mm), plus coupling stock	• OCTG products certified to ISO 13680, API 5CRA, NACE MR0175
• Range 3 lengths	

Mechanical Tubing

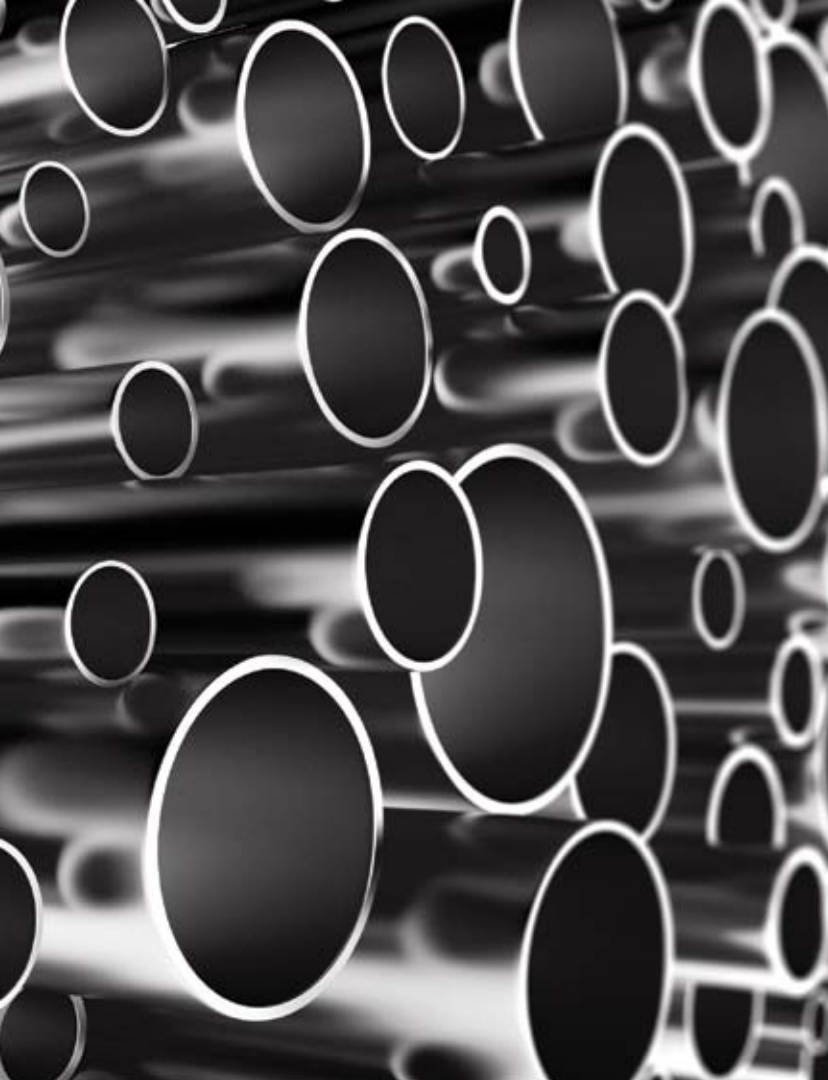
From precipitation hardened bar:	• Hot forged, annealed and aged bar
INCONEL alloy 718	• 4" – 14" diameter (101.6 – 355.6mm)
INCONEL alloy 725	• Up to 24 feet long (longer available upon request)
INCOLOY alloy 925	• Certified to appropriate internal or industry specifications, NACE MR0175
INCOLOY alloy 945	
INCOLOY alloy 945X	
From cold worked tubing:	• Seamless, cold worked nickel alloy and stainless tubing
INCONEL alloy G-3	• From 6" – 16" OD (152.4 – 406.4mm)
INCOLOY alloy 825	• Up to 28 feet long (longer available upon request)
INCOLOY alloy 28	• In conformance with ISO 13680, API 5CRA, NACE MR0175

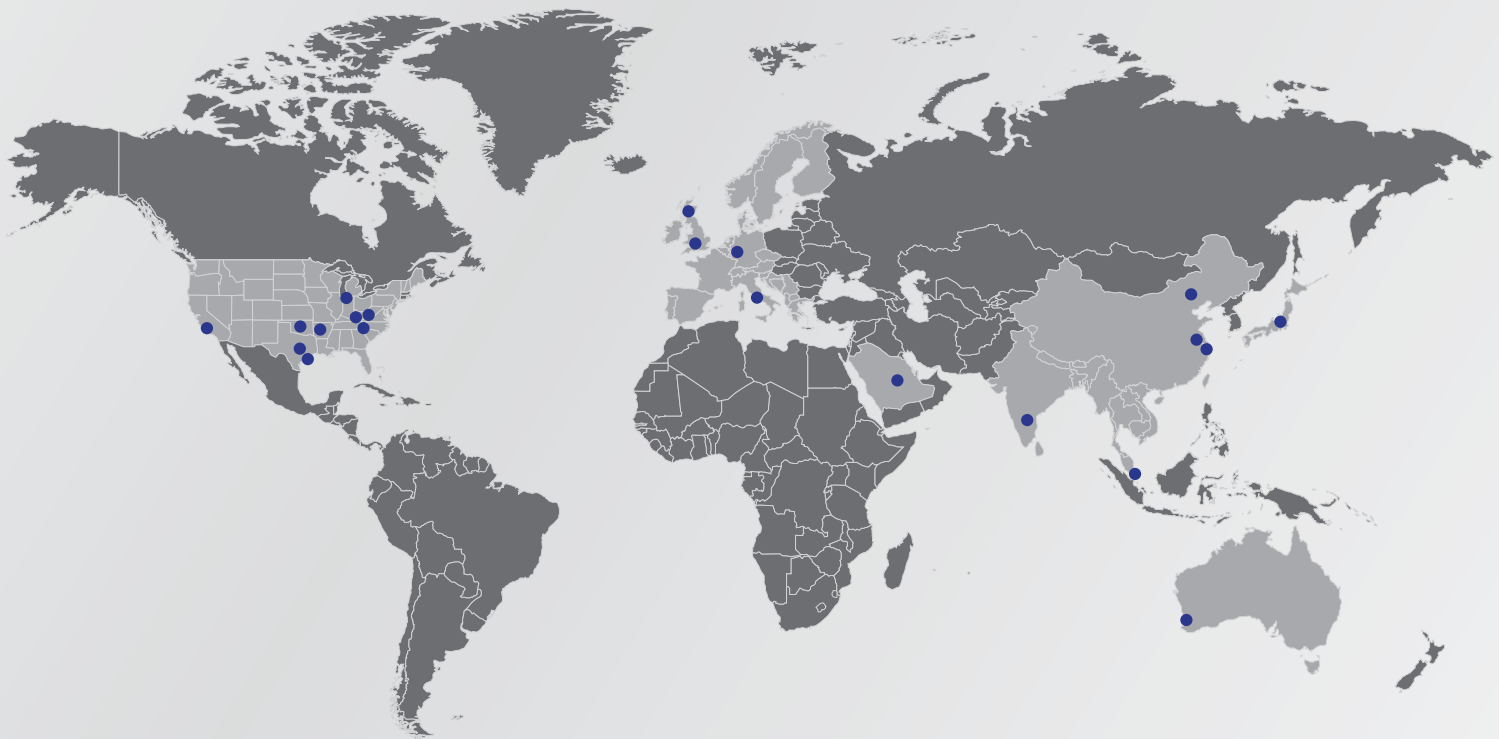


Safety Valve Components

- 1 Upper Nipple
- 2 Pistons
- 3 Outer Housing
- 4 Flow Tube
- 5 Springs
- 6 Flapper
- 7 Lower Nipple

INCONEL alloys 718, 725, X750
INCOLOY alloys 925, 945, 945X





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Enid, Oklahoma
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Irvine, California

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Huntington, West Virginia
Newton, North Carolina

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Hereford, United Kingdom
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