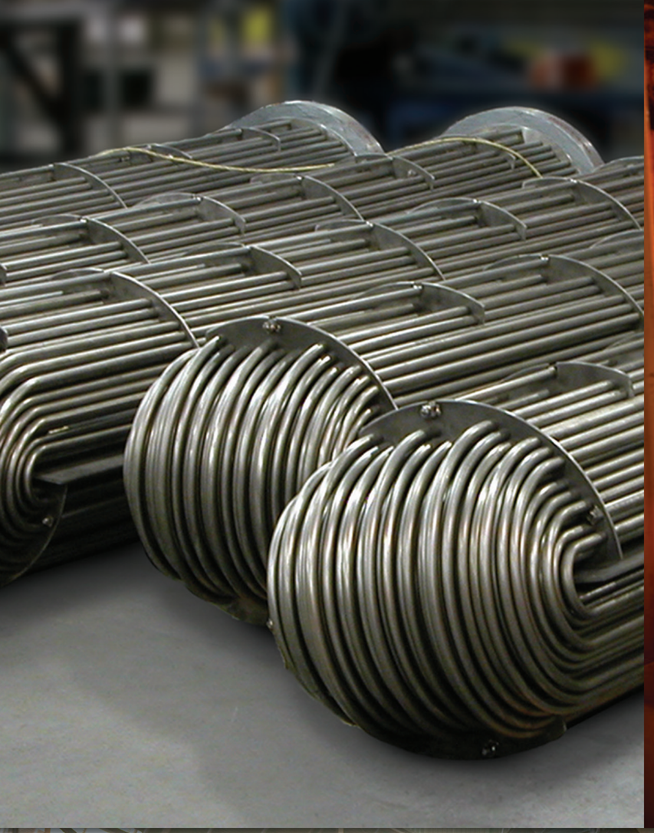
PCC ENERGYGROUP

POWER APPLICATIONS: PIPE, FORGINGS, AND ALLOY SOLUTIONS



PCC ENERGYGROUP

OVERVIEW

The PCC Energy Group provides total material solutions to the power generation, oil and gas, refining, chemical processing and general industrial markets. We are the foremost supplier of nickel-based alloys, titanium, stainless steel, and carbon and alloy steel products ranging from ingot to complex, value-added solutions. We produce pipe, fittings, forgings, tubing, cladding, sheet, plate, wire, rod and solid bar products in a wide array of sizes.

Headquartered in Houston, Texas, the PCC Energy Group has a worldwide presence with 30 locations across the globe. Our manufacturing network includes 12 facilities with melting and forging capabilities, including closed die and extrusion presses in capacities ranging up to 35,000 tons. We produce:

- Hot worked, seamless, extruded pipe
- Cold-drawn, seamless pipe
- Extreme, thin-wall, cold-drawn, seamless pipe and tube
- Welded and welded-and-drawn pipe and tube
- High-quality, rolled, drawn and forged rod and bar
- Hot-rolled wire rod
- Welding products and consumables
- Weld overlay and co-extruded seamless clad products
- Hot- and cold-rolled sheet and plate

The PCC Energy Group offers years of experience in solving the energy industry's toughest material challenges. Having developed more than 85% of the nickel alloys in the market, we bring world class R&D facilities and high quality forging capabilities to solve your most demanding needs.

The PCC Energy Group is a division of Precision Castparts Corp., a worldwide leader in structural investment castings, forged components, and airfoil castings for critical airframe, engine, power generation, and general industrial components.
NYSE: PCP

WYMAN GORDON

Wyman Gordon uses the largest vertical extrusion presses in the world to manufacture seamless, heavy-wall pipe in a range of materials, including Chrome Moly, nickel alloy, stainless and carbon steel grades.

HACKNEY LADISH

One of the largest and most versatile fittings manufacturers in the world, with products ranging from commodity to high-end, heavy wall fittings and components.

SPECIAL METALS

One hundred years of industry-leading invention and production of high-performance nickel and cobalt alloys for use in severe environments. INCONEL®, INCOLOY®, MONEL®, NILO®, NIMONIC®, UDIMET®.

PCC Rollmet

PCC Rollmet developed a unique cold-roll extrusion process to manufacture precision thin-wall pipe across a range of materials, including nickel alloys, stainless steel, aluminum and carbon steel, which are utilized in a variety of applications.

KLAD

Principal supplier of metallurgically-bonded clad co-extruded pipes and weld overlay products. KLAD supports the power, petro-chemical, refining and subsea industries with effective corrosion-resistant alloy (CRA) solutions.

RathGibson

Precision engineered tubing and pipe for industry. RathGibson is a world-class manufacturer of precision-welded straight lengths and coil, welded and welded-drawn tubing and pipe.

CAPABILITIES

The PCC Energy Group has the ability to produce a diverse range of critical products, unique within the power industry. We provide solutions for coal, gas, nuclear and renewable (geothermal, solar and hydro) power projects.

Quality assurance is integral to all operations within the PCC Energy Group. Each facility maintains the highest industrial and international standards and certifications.

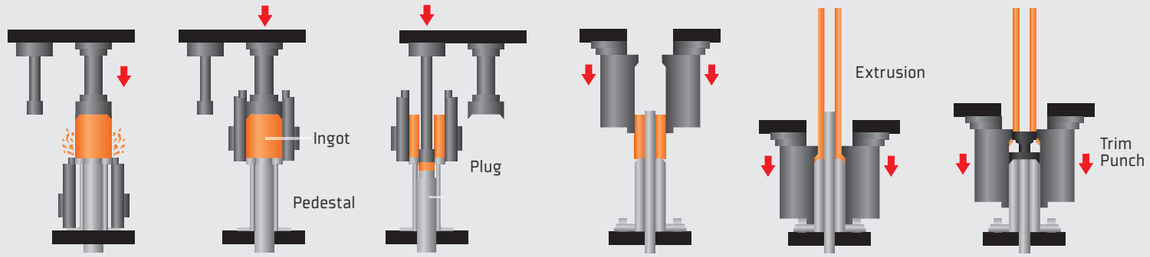
Our Special Metals superalloys are the ideal solution for a broad array of nickel alloy requirements, including land-based gas turbines, feedwater and superheated tubing for coal- and oil-fired utilities, FGD systems, and nuclear applications. As the inventor of alloy brands including INCONEL®, INCOLOY®, NIMONIC®, MONEL®, UDIMET®, INCO-WELD®, NI-ROD® and others, Special Metals sets the world standard for corrosion resistance, high-pressure and high-temperature strength. Power generation finished products that are produced from these alloys include: pipe, plate, sheet, strip, bar, rod, tube, wire, forgings, and welding products.

POWER GENERATION PIPE AND TUBE PRODUCTS

With presses ranging from 5,000 tons to 35,000 tons, the PCC Energy Group has the most comprehensive pipe extrusion capability in the world. The streamlined capabilities of Special Metals, Wyman Gordon, RathGibson, PCC Rollmet and PCC KLAD provide the ability to make the largest diameter pipe, the longest lengths in the industry, thick-wall pipe, extreme thin-wall and cold-drawn extrusion in a unique variety of alloys.

The PCC Energy Group provides interconnect, boiler, piping, sheet and welding consumables used to make boiler vessels from various proprietary nickel alloys, including INCONEL® alloy 740H® for advanced ultra-super critical (A-USC) applications.

VERTICAL EXTRUSION PROCESS



Upsetting Position to Remove Scale | Potting Operation | Piercing Position | Upper Bolster Begins to Move Down | Extrusion Fully Extended | Upper Bolster Moves Down to Trim Tang

The PCC Energy Group offers a unique combination of metalworking capability, technology, and outstanding metallurgical know-how for the most demanding applications. For more than 40 years we have manufactured a variety of components for nuclear power plants and spent-fuel shortage. We can melt, extrude, draw, forge, roll and weld overlay from a range of materials, including carbon and alloy steels, austenitic stainless steels and exotic nickel alloys, with restricted or special chemistry capability.

The current demand for improved power generation efficiency requires the development of advanced materials that can withstand higher temperatures and higher pressures. Creep-strength enhanced ferritic (CSEF) steels such as P91 were developed to withstand the extreme operating conditions of ultra-super critical (USC) power plants. Subsequently, P92 was developed to achieve comparable or better mechanical properties within wall thickness reduction.

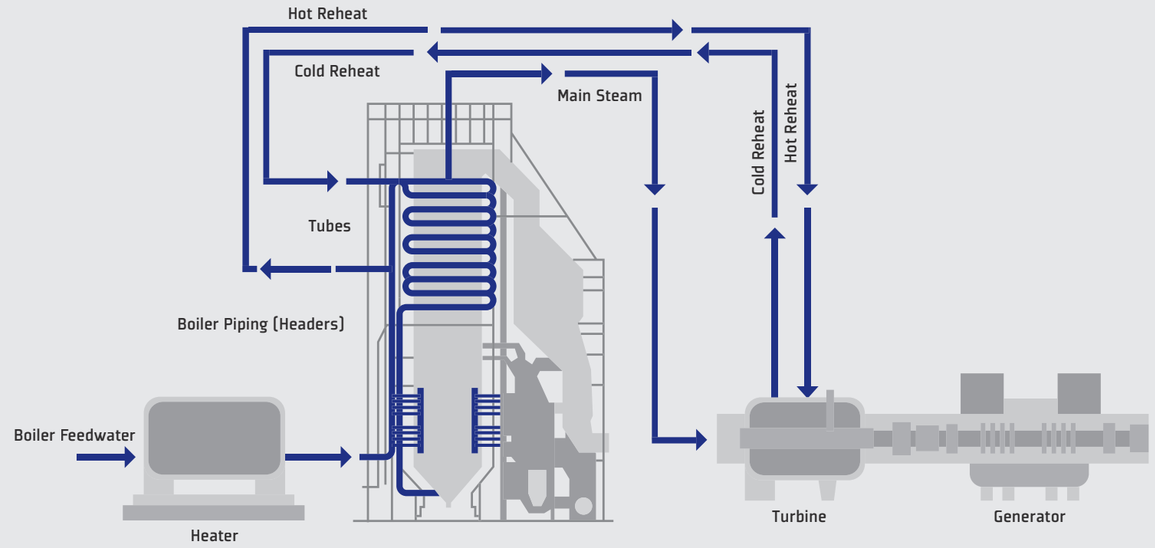
Advanced ultra-super-critical (A-USC) applications will be required for even higher-efficiency power plants, therefore, INCONEL® alloy 740H® was developed by Special Metals research and technology to meet the requirements. INCONEL® alloy 740H® successfully achieved ASME boiler and pressure vessel code (B&PVC) approval for use in power boilers. This material tolerates steam temperatures up to 760° C (1400° F), and is qualified for fabrication of steam loops, tube bends and is weldable.

Wyman Gordon routinely supplies pipe in these grades of materials globally, to meet ASTM/ASME, Engineers India Limited (EIL) and "Well Known Pipe Maker", India Boiler Regulations, 1950, GOST and/or EN10216-2. Using the 35K extrusion press, the range of size capability is unmatched.

PCC Rollmet is an industry leading supplier of precision, seamless, cylindrical shapes and assemblies, including close-tolerance, thin-walled cylinders in materials such as; aluminum alloys, stainless steels, high-strength steels and nickel-based alloys. For the power generation market, PCC Rollmet produces ASTM A335 Grades, P11, P22, P91 and P92 ferritic alloy for seamless power plant piping, for both fossil and nuclear piping applications.

RathGibson is an industry leading supplier of precision engineerd tubing for heat exchangers, steam condensers, and U-Bend feedwater heaters. Producing over 40 different alloys, RathGibson manufactures Duplex, Super Austenitic, Nickel, Super Ferritic and Stainless grades.

SUPERCRITICAL BOILER PROCESS



TYPE	ASTM/ASME SPECIFICATION	EN 10216-2 SPECIFICATION
Carbon Steel	A/SA 106 B	St 45.8
	A/SA 106 C	St 45.8
Chrome Moly	A/SA P1	16Mo3
	A/SA P2	14MoV6-3
	A/SA 335 P11	15CrMoV5-10
	A/SA 335 P12	13CrMo4-5
	A/SA 335 P22	10CrMo9 10
	A/SA 335 P23	
	A/SA 335 P36	15 NiCuMoNb5-6-4
	A/SA 335 P91	X10CrMoVNb9-1
	A/SA 335 P92	X10CrWMoVNb9-2
	A/SA 335 P122	
		X20CrMoV11-1

WYMAN GORDON AND PCC ROLLMET

TYPE	SIZE RANGE
OD	8" NPS (219.1mm) - 48" (1219.2mm)
ID	8" (203.2mm) - 38" (965.20mm)
WT	0.165" (4.19mm) - 7.0" (177.8mm)

RATH GIBSON AND SPECIAL METALS CORP.

TYPE	SIZE RANGE
OD	1/4" NPS (13.71mm) - 6" (168.27mm)
WT	0.020" (0.508mm) - 0.864" (21.95mm)

*RathGibson's partial list of power generation alloys include: 316L, Duplex 2205, Lean Duplex 2101, Ferritic alloys 29-4C and 439.

A list of Special Metals power generation alloys listed on page 7.

POWER GENERATION SHEET AND PLATE PRODUCTS

The PCC Energy Group produces a range of high-performance, heat and corrosion resistant alloys available as flat products – sheet, plate and strip. We have the ability to combine forms, properties and quality with exceptional availability and service.

The PCC Energy Group offers hot-rolled plate and cold-rolled sheet in a variety of alloys and sizes. The alloys include commercial and high purity nickel grades, MONEL®, INCONEL®, INCOLOY®, NIMONIC®, NILO®, and specialty grades such as INCOLOY® alloys 25-6HN, 27-7MO, and 02 and INCONEL® alloys HX, 22, C-276 and 686.

The PCC Energy Group also manufactures electroformed nickel-foil products using a proprietary, continuous electrode position process. High-purity nickel foil is used to produce battery mesh, heating elements, gaskets and more.

INCONEL® ALLOY 740H®

As the world's demand for electrical power increases, governments also demand that emissions be strictly controlled to minimize the greenhouse effects of society's carbon footprint. Thus, there is a strong incentive for development of cleaner, more efficient power generation systems. Advanced ultra-supercritical (A-USC) boiler technology offers generation efficiency over 50% with operation such that carbon-base emissions can be readily collected and sequestered.

Since A-USC facilities will operate at higher temperatures (700 to 760°C) and pressures (up to 35 MPa) than conventional power plants, nickel-base superalloys are required to meet the rigors of strength and corrosion resistance. INCONEL® alloy 740H® is a superalloy that was specifically developed to operate under the demanding service conditions of A-USC power generation. The nickel-chromium-cobalt alloy is precipitation-strengthened by the formation of gamma prime due to its contents of niobium, aluminum and titanium. It offers a unique combination of high strength and creep resistance at elevated temperatures along with resistance to coal ash corrosion, oxidation, carburization and sulfidation. INCONEL® alloy 740H® is also readily welded.

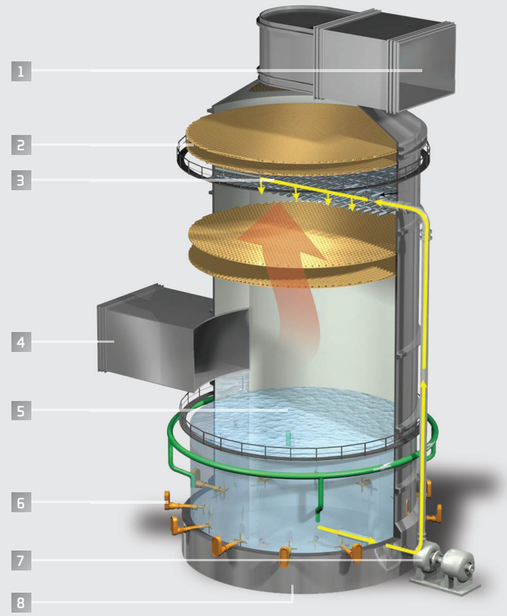
PCC Energy Group companies, Special Metals and Wyman Gordon teamed up to manufacture one of the largest superalloy tubes ever produced. Melted and refined at Special Metals / Huntington, West Virginia and forged and extruded at Wyman Gordon / Houston, TX, the tube is over 15 inches (381 mm) in diameter, has a wall over 3 inches (76.2 mm) in thickness, is 22 feet (6.7 m) long and weighs over 10,000 pounds (4,535 kg). This prototype demonstrates the ability of the PCC Energy Group to manufacturer tubes large enough for A-USC steam header pipes. In addition, standard superheater-size tubes have been manufactured from INCONEL® alloy 740H® at Special Metals mills in the U.K. and U.S.A.

INCONEL® alloy 740H® is approved by the ASME Boiler and Pressure Vessel Code Case 2702 for Section I construction for power applications to 800°C (1500°F).

POWER GENERATION ALLOYS

Nickel Alloy Wrought Products		UNS Number	Werkstoff Number
	INCONEL® alloy 617	N06617	2.4663
	INCONEL® alloy 686	N06686	2.4606
	INCONEL® alloy 690	N06690	2.4642
	INCONEL® alloy 740H®	N07740	N/A
	INCONEL® alloy 22	N06022	2.4602
	INCONEL® alloy C-276	N10276	2.4819
	INCONEL® alloy HX	N06002	2.4665
	INCOLOY® alloy 25-6MO	N08926	1.4529
	INCOLOY® alloy 25-6HN	N08367	N/A
	INCOLOY® alloy 27-7MO	S31277	N/A
	NIMONIC® alloy 263	N07263	2.4650
Nickel Alloy Welding Products	**Filler Metals**	**UNS Number**	**Werkstoff Number**
	INCONEL® Filler Metal 82	N06082	2.4806
	INCONEL® Filler Metal 52	N06052	N/A
	INCONEL® Filler Metal 52M	N06054	N/A
	INCONEL® Filler Metal 52MSS	N06695	N/A
	INCONEL® Filler Metal 72	N06072	N/A
	INCONEL® Filler Metal 72M	N06073	N/A
	INCONEL® Filler Metal 617	N06617	2.4627
	INCONEL® Filler Metal 622	N06022	N/A
	INCONEL® Filler Metal 625	N06625	2.4831
	INCONEL® Filler Metal 740H®	N07740	N/A
	INCO-WELD® C-276 Filler Metal	N10276	2.4886
	INCO-WELD® 686CPT Filler Metal	N06686	N/A
Welding Electrodes		**UNS Number**	**Werkstoff Number**
	INCONEL® Welding Electrode 112	W86112	2.4621
	INCONEL® Welding Electrode 117	W86117	2.4628
	INCONEL® Welding Electrode 122	W86022	N/A
	INCONEL® Welding Electrode 152	W86152	N/A
	INCONEL® Welding Electrode 152M	W86152	N/A
	INCONEL® Welding Electrode 152MSS	W86155	N/A
	INCONEL® Welding Electrode 182	W86182	2.4807
	INCO-WELD® C-276 Welding Electrode	W80276	2.4887
	INCO-WELD® 686CPT Welding Electrode	W86686	N/A
Welding Fluxes			
	INCOFLUX® ES51		
	INCOFLUX® ES52		
	INCOFLUX® ES53		
	INCOFLUX® ES54		
	INCOFLUX® SA51		
	INCOFLUX® SA52		

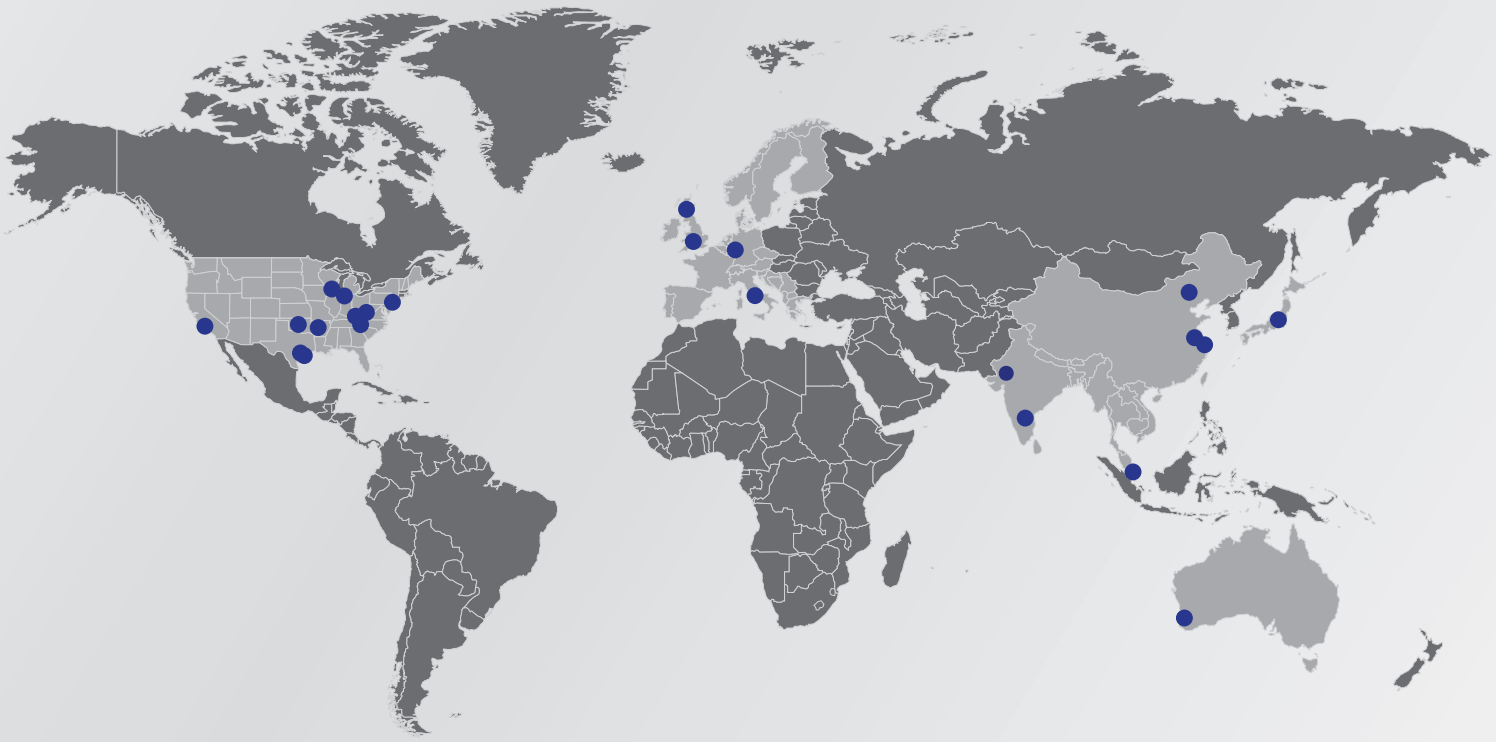
FGD Applications



Corrosion-resistant alloys (CRA) commonly used in FGD construction include INCOLOY® alloys 25-6HN and 27-7MO and INCONEL® alloys 625, 22, C-276 and 686.

1. **Outlet Ducting** – fabricated from solid or clad steel CRA plate or lined with CRA sheet
2. **Mist Eliminators with Trays** – fabricated from CRA plate
3. **Spray Headers** – utilizing CRA piping
4. **Inlet Ducts** – fabricated from CRA plate
5. **Absorber Vessel Walls** – fabricated from solid or clad steel CRA plate or lined with CRA sheet
6. **Slurry Agitators** – fabricated from CRA bar and plate
7. **Recirculation Pumps** – using CRA components
8. **Absorber Vessel Floor** – fabricated from solid CRA plate

PCC ENERGY GROUP



Houston, Texas
Enid, Oklahoma
Russellville, Arkansas
Clarksville, Arkansas

Elkhart, Indiana
Burnaugh, Kentucky
Huntington, West Virginia
Newton, North Carolina

Janesville, Wisconsin
Irvine, California
North Branch, New Jersey
Milan, Italy

Hereford, England
Düsseldorf, Germany
Livingston, Scotland
Mumbai, India

Bangalore, India
Shanghai, China
Yangzhou, China
Beijing, China

Singapore
Tokyo, Japan
Perth, Australia

UNITED STATES . EUROPE . ASIA . AUSTRALIA

Corporate Office | 10825 Telge Rd. | Houston, TX 77095 | 1.877.858.0433 | www.pccenergygroup.com