

FORGING AHEAD

OFFSHORE OIL AND GAS

PUSHING THE POSSIBILITIES OF OFFSHORE OIL AND GAS

Offshore conditions are like nothing else in the world. With high temperature, high pressure and extreme corrosion to contend with, operators must manage unforgiving conditions at every level. But the minds behind PCC Energy Group have invented alloys and products to combat these demanding conditions and give you an edge. In fact, PCC Energy Group companies have invented over 80 percent of the nickel and titanium alloys in use in the industry today. It's how we're pushing to develop the future of offshore oil and gas metals, so you can reach your goals.

ENGINEERING NEW ADVANTAGES

At PCC Energy Group, we're constantly expanding metallurgical capabilities for oil and gas operations. With access to extensive computer modeling and a collection of the world's largest, most capable forging and extrusion presses, our unrivaled staff of engineers, metallurgists and manufacturing specialists address challenging conditions through precision engineering and material innovation. And it's all backed by a global network of presses to deliver the industry's best turnkey production capabilities. If you're ready to break new ground, we have the mission-critical metals to get you there.

SPECIALTY OIL AND GAS ALLOYS

- INCONEL® Alloy G-3
- INCOLOY® Alloy 825
- INCOLOY® Alloy 28
- INCONEL® Alloy C276
- INCOLOY® Alloy 945/ 945X
- INCOLOY® Alloy 925
- INCONEL® Alloy 718
- INCONEL® Alloy 725
- TIMETAL® 50A
- TIMETAL® 50A 05Pd
- TIMETAL® CODE 12
- TIMETAL® 3-2.5 Ru
- TIMETAL® 6-4/ELI/Ru
- TIMETAL® 6246

POPULAR APPLICATIONS

- Risers
- Stress Joints
- Tree Components
- Wellhead Components
- Production Casing and Tubing
- Downhole Completion Tools
- Downhole Control Lines
- Catenary Risers
- Clad Line Pipe
- Weld Wire
- Umbilical Tubing
- Mechanical Tubing
- BOP Components
- Process Piping
- Logging Tools

ALLOY SOLUTIONS ENGINEERED TO HANDLE THE TOUGHEST CONDITIONS

Designed with oil and gas operations in mind, our INCOLOY® Alloy 945X is forging ahead into the harshest HPHT, corrosive downhole environments.

The latest drilling methods and techniques are taking offshore oil and gas to new depths that require new kinds of materials—like the high-strength, corrosion-resistant INCOLOY® Alloy 945X developed by PCC Group metallurgists. This metal was specifically designed to take on aggressive, sour wells containing high levels of hydrogen sulfide, chlorides and elevated HPHT conditions. Forged using advanced methods and over a half-dozen carefully selected metals, this alloy is an ideal candidate for tough downhole conditions.

BUILT TO COMBAT CORROSION

The unique metal composition of INCOLOY® Alloy 945X provides extreme anti-corrosive properties. Nickel, chromium, molybdenum and copper make INCOLOY® Alloy 945X resistant against corrosion from sulfides and chlorides, including stress corrosion cracking that often occurs in hydrogen sulfide conditions. And to stop small problems from becoming big issues, the chromium and molybdenum in INCOLOY® Alloy 945X offers resistance to the localized pit and crevice corrosion common in acid-halide conditions.

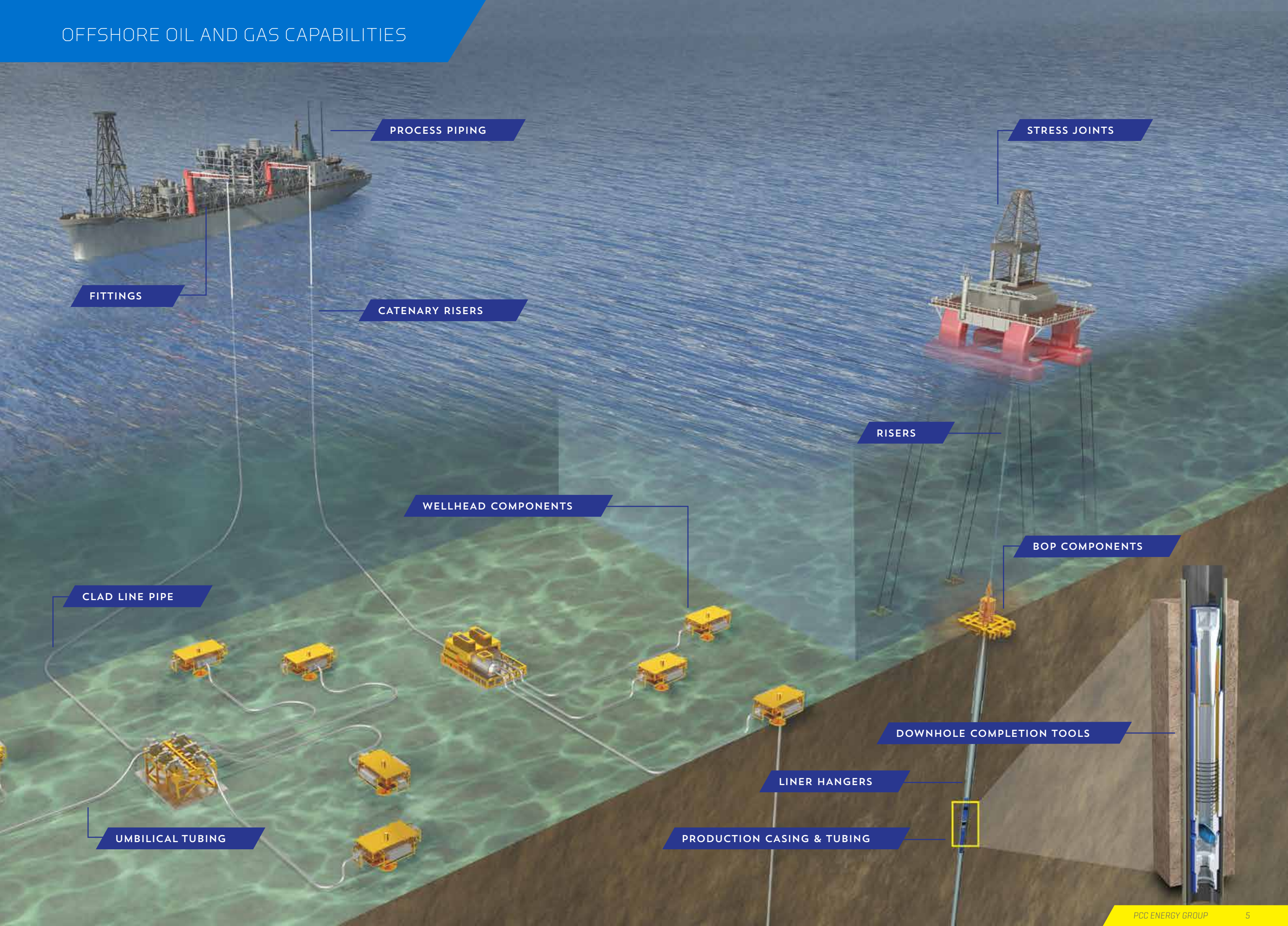
STRENGTH FOR THE HARSHTEST HPHT CONDITIONS

Even with corrosion under control, the extreme heat and pressure of offshore wells can often wreak havoc on inferior metals. That's why the engineers and metallurgists behind INCOLOY® Alloy 945X use an age-hardening process that forms gamma prime and gamma double prime precipitates to strengthen the alloy—so you can forge ahead with confidence.

MACHINABILITY LENDS FLEXIBILITY OF USE

Not only is INCOLOY® Alloy 945X strong, but its excellent machinability makes it the smart choice for a wide range of offshore oil and gas uses, including the fabrication of complex gas well components.

**PCC Energy Group companies have
invented over 80 percent of the
nickel and titanium alloys in use
in the industry today.**



PROCESS PIPING

STRESS JOINTS

FITTINGS

CATENARY RISERS

RISERS

WELLHEAD COMPONENTS

BOP COMPONENTS

CLAD LINE PIPE

DOWNHOLE COMPLETION TOOLS

UMBILICAL TUBING

LINER HANGERS

PRODUCTION CASING & TUBING

SPECIALTY ALLOY SOLUTIONS FOR OFFSHORE OIL AND GAS

PCC Energy Group is shaping the future of critical alloys through innovative product capabilities—designed for even the toughest offshore applications.

NICKEL AND TITANIUM ALLOYS



The demanding conditions of offshore oil and gas operations require tough metals to get the job done. That's why our engineers are working hard every day to invent, optimize and produce alloys for the industry's most extreme applications.

PCC Energy Group companies have invented over 80 percent of the nickel and titanium alloys in the market, offering more specialty alloy products than any other company in the world.

PCC Energy Group's unparalleled nickel alloy offerings include sheet, plate, bar, billet, ingot, seamless pipe and welding wire. We can also form titanium into everything from bars, billets and plates to welded pipe, fittings, pressure vessels and more.

Whether you need heat resistance, strength under pressure, corrosion resistance or all three, you can depend on the unmatched quality of PCC Energy Group's alloys and the products created from them.

CO-EXTRUDED PIPE



Offshore oil and gas environments are places where pressure and corrosion come together like nowhere else. It's an environment that demands clad pipe to get the advantages of corrosion resistant alloys (CRAs), plus the cost effectiveness and pressure-handling capabilities of steel.

In addition to the cost advantages of clad pipe over solid CRA, PCC Energy Group companies have developed a co-extrusion method that produces the largest, longest, heaviest walled seamless pipe—in diameters of up to 30 inches.

Our co-extrusion process delivers superior metallurgical bonding that's stronger than conventional welding and allows for significantly increased production speed. Combined with advanced alloys from PCC Energy Group company Special Metals, it's the fastest, most economical way to get the corrosion-resistant pipe you need at a price that will keep your financial performance strong.

UMBILICAL TUBING



With hundreds of thousands of feet of umbilicals needed on any given offshore project, using the wrong material can get expensive quickly. PCC Energy Group company RathGibson has developed production methods to deliver continuous umbilical tubing with all of the strength you need at a fraction of the cost.

Originally developed for use by an oil and gas supermajor, our umbilical tubing is proven for deepwater and ultra-deepwater pressures and provides considerable cost savings compared to conventional umbilical tubing.

Our production methods yield tubing rated for up to 10,000 psi for our Lean Duplex ATI 19D™ and up to 15,000 psi for our Super Duplex 2507.

Available in static and dynamic applications, our unique continuous laser weld method allows us to create umbilical tubing up to 80,000 feet long—25 percent longer than the industry average—and offers accelerated production capabilities.

OCTG



Not just any OCTG product can stand up to the demanding downhole conditions of offshore wells. But at PCC Energy Group, we don't make just any OCTG products. We invent alloys and processes to overcome the greatest challenges of offshore oil and gas.

We start with the advanced alloys of PCC Energy Group company Special Metals, like INCOLOY® Alloy 28, INCOLOY® Alloy 825, INCONEL® Alloy G-3 and our latest introduction, INCOLOY® Alloy 945X—the industry's first precipitation-hardened alloy for production tubing applications.

Then we leverage the unmatched forging capabilities of PCC Energy Group companies to extrude those metals into production tubing, production casing, mechanical tubing and manufactured cold worked products.

With these capabilities combined, we can create the longest, range-3 capable and largest seamless CRA pipe—up to 20 inches in diameter—ready to take on the harshest offshore downhole conditions.

FOR A DETAILED LISTING OF ALL PCC ENERGY GROUP PRODUCTS AND SERVICES, VISIT PCCENERGY.COM



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FIVE LEADING BRANDS. ONE POWERFUL GOAL.

The names that comprise PCC Energy Group have been on the forefront of the oil and gas industry's alloy needs for decades. Over the years, PCC Energy Group has brought all of these leaders together to help better tackle the toughest applications. Our engineers and metallurgists work closely with the world's most innovative operators in every part of the energy sector to identify high-performance alloy applications that could have a huge impact on operational performance.

