



FIELD-JOINT COATING SERVICES



PROTECTIVE COATINGS FOR LONGER PIPELINE LIFE

RAE Energy is a leader in the application of protective coatings of offshore pipelines. We focus on leading innovation and technology to provide advanced service capabilities and field execution to the industry. We offer a variety of field-joint coating solutions aimed to provide protection from corrosion, cathodic disbondment, mechanical damage, extreme temperatures, as well as weight stabilization. Additionally, we provide custom coatings at our facility or at our customers' worksite, no matter the location.

OFFSHORE CAPABILITIES

COATING FOR THE ENERGY & INDUSTRIAL SECTORS

RAE Energy has a global presence with major offshore operational hubs in North America and South East Asia which are leveraged in serving our global customer base in an optimal manner. For the offshore oil and gas industry, our global offerings are full-scope, inclusive of field-joint coating solutions, project management, personnel talent and mobilization, equipment management, logistics coordinating, storage, and supplier management. We operate at key spoolbases around the world and have extensive experience with offshore pipelay work onboard a vessel.

OFFSHORE PRODUCTS WE SERVE:

- Subsea Flowlines & Risers
- Tie-In Spools & Jumpers
- Export Lines & Buckle Arrestors
- Manifolds & PLET Systems

COATING MATERIALS

COATINGS FOR OFFSHORE PRODUCTS

We offer a variety of field-joint coating solutions aimed to provide protection from corrosion, cathodic disbondment, mechanical damage, extreme temperatures, as well as weight stabilization. RAE also provides custom coatings at our facility or at our customers' worksite, no matter the location.

FIELD-JOINT COATINGS WE OFFER:

POWDER COATINGS

- Fusion Bonded Epoxy (FBE)
- Chemically Modified Polypropylene (CMPP)
- Abrasion Resistant Overcoat (ARO)

THERMOPLASTIC FIELD-JOINT COATINGS

- Injection Molded Polypropylene (IMPP), 3LPP-5LPP
- Rapid 3LPP Wehocoat (3LPP FJC)
- Rapid 3LPE Wehocoat (3LPE FJC)

THERMOSET FIELD-JOINT COATINGS

- Injection Molded Polyurethane (IMPU)
- Calor (3-Component High-Temperature Infill)

MANUALLY APPLIED FIELD-JOINT COATINGS

- Liquid Epoxy (LE)
- Multi-Component Liquid (MCL) PU, LE
- Polypropylene Flame Spray (PPFS)
- Polyethylene Flame Spray (PEFS)

WEIGHT STABILIZATION

- High-Density Polyurethane Foam Infill (HDPF)

HEAT SHRINK SLEEVES

- Wraparound or Tubular Heat Shrink Sleeves (HSS) PP, PE, Hybrid

CUSTOM FIELD-JOINT COATINGS

- Subsea Paint Systems



RAE EDGE is a system that utilizes smart technology to capture and transmit data in real time with a cloud-based, customized data acquisition and analytics software. RAE EDGE seamlessly provides real-time data in the following primary areas: Operations, Maintenance and Logistics, Production, and Quality.



COATING EQUIPMENT



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SURFACE PREPARATION: BLASTING

RAE's Blasting machines for surface preparation deliver automated, closed-cycle blasting utilizing dual opposing nozzles and 180° rotation for complete coverage, creating a rough surface for protective coating layers.

PRE-HEAT TREATMENT: INDUCTION OR INFRARED

RAE offers two types of Pre-Heat Treatment methods: Induction Coil Heating for anti-corrosion coatings or Infrared Heating of the parent coating for thermoplastics or thermoset coatings. Each system supplies uniform, reliable heating to the steel pipe or parent coating for improved bonding with the next protective coating application.



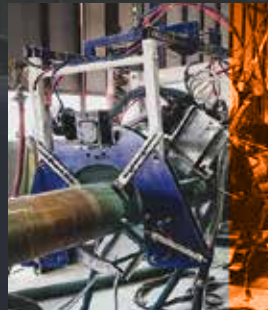
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POWDER COATINGS: FBE, CMPP, ARO

RAE's Powder Coating machines automate the entire FBE, CMPP, & ARO coating processes by accurately aligning the field-joint within the target coating area, then evenly apply the FBE and subsequent CMPP or ARO coating via electrostatic spray guns that spray side-to-side and rotationally around the pipe.

THERMOPLASTIC COATINGS: IMPP, 3LPP-5LPP

RAE's Thermoplastics Coating machines serve as a single platform for IMPP featuring laser guided pipe alignment, automated infrared heating, and modular changeout between 3LPP - 5LPP in less than one shift.



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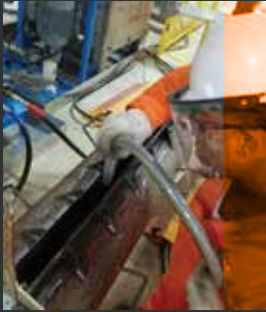
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RAPID THERMOPLASTIC COATINGS: RAPID 3LPP OR 3LPE WEHOCOAT

RAE's Rapid Wehocoat system is an advanced 3-layer FJC system that offers a directly extruded film of material, applied to a hot FBE and adhesive coated cutback region and fused to the parent coating. It utilizes automation, faster application time (e.g., 2-3 min cycle time for a 10-in pipe), and quick change over time from IMPP to Wehocoat.



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THERMOSET COATINGS: IMPU, CALOR

RAE's Thermoset Coatings system applies IMPU to welded joints utilizing an automated PLC controlled infrared heater, and PLC controlled SPU pump system. The system is also used to apply Calor coatings - a three component resin - which offers increased durability, higher operating temperatures, and faster cycle times than SPU coatings.

MANUAL APPLICATION: LE, MCL, FSPP, FSPE

RAE's Manual Coating services are used for coatings such as LE, MCL, FSPP, and FSPE. Whether applied by brush, sponge, a paint spray kit, or flame sprayer or handheld extruder, RAE has extensive experience with these manual coating processes at a spoolbase or aboard a pipelay vessel. MCL coatings can also be applied via automated system for higher productivity.



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QUENCHING

RAE's Quenching booth can be moved side-to-side along the pipe, as well as up and down. Within the booth there is a water pump with many nozzles for full pipe coverage. The booth is automatically positioned utilizing a laser-guided pipe alignment system.

WEIGHT STABILIZATION: HDPF

RAE's HDPF Coating services provides mechanical protection and weight stabilization for Concrete Weight Coated (CWC) subsea pipelines installed in shallow waters. HDPF coatings can be applied in a wide range of weights, thicknesses, and diameters. It is common to apply the HDPF coating over anti-corrosion and/or mechanical protection coating materials such as HSS.



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HEAT SHRINK SLEEVES: HSS PP, PE, OR HYBRID

RAE's Heat Shrink Sleeve (HSS) Coating service offers an easy, cost-effective solution to provide protection from corrosion, mechanical damage, and works well in high heat environments. The shrinkable materials (PP, PE, or Hybrid in combination with LE primer) provides a strong bond, and provides protection during pipeline installation activities.



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RAE ENERGY USA

+1 (281) 578-6523
info@rae.com

rae.com

RAE ENERGY, INC.

USA • CANADA • UK • SINGAPORE • INDONESIA • THAILAND