

## Corrosion Resistant Steels and Alloys in the Oil &amp; Gas Industry



Quest Offshore Resources, Inc.



## List of Applications Covered in the Report

Category	Sub-Category1	Sub-Category2	Steel Type			
			Alloy Steel	Stainless Steel	Nickel Alloy	
Drill String	Kelly		✓			
	Drill Pipe					
	Heavy Weight Drill Pipe	Integral Heavy Weight Drill Pipe		✓	✓	
		Welded Heavy Weight Drill Pipe - Body		✓		
		Welded Heavy Weight Drill Pipe - Joint		✓		
	Bottom Hole Assembly	Drill Collar		✓		
		Non-Magnetic Drill Collar			✓	✓
		MWD & LWD			✓	✓
		Connections and Subs		✓	✓	
		Stabilizer & Rotary Reamer		✓	✓	✓
Mud Motor/Downhole Motor - Stator			✓	✓		
Mud Motor/Downhole Motor - Rotor			✓	✓	✓	
Drill Bit		✓				
Blowout Preventers	Ram Type BOP	Body	✓			
		Flange & Bonnet	✓			
		Ram	✓			
		Operating Cylinder	✓			
		Piston	✓			
	Weld Overlay				✓	
	Annular Type BOP	Body	✓			
		Weld Overlay				✓
	Wellheads	Conventional Surface Wellhead	Tubing Head Adapter	✓	✓	
			Tubing Hanger	✓	✓	✓
Tubing Head			✓	✓		
Casing Hanger			✓	✓	✓	
Casing Spool			✓	✓		
Casing Head			✓	✓		
Seal/Pack-Off			✓	✓		
Base Plate			✓			
Weld Overlay					✓	
Subsea Wellheads		Conductor Housing	✓			
		High Pressure Housing	✓			
		Casing Hanger	✓	✓	✓	
		Annulus Seal Assembly	✓	✓		
		Wear Bushing	✓	✓		
		Weld Overlay				✓
					✓	
Casing & Tubing			✓	✓		
Downhole Tools	Flow Control	Sliding Sleeve	✓	✓	✓	
		Landing Nipple	✓	✓	✓	
		Polished Bore Receptacle	✓	✓	✓	
		Others	✓	✓	✓	
	Safety Systems		✓	✓	✓	
	Packers		✓	✓	✓	
	Liner Hangers		✓	✓	✓	
	Sand Control	Screen	✓	✓	✓	
Gravel Pack		✓	✓	✓		
Subsea Equipment	Subsea Tree	Tubing Hanger	✓	✓	✓	
		Master Valve	✓		✓	
		Wing Valve	✓	✓		
		Other Tree Valves	✓	✓		
		Production Choke	✓	✓		
		Tree Cap	✓	✓		
		Tree Piping & Tubing		✓	✓	
	Weld Overlay				✓	
	Subsea Manifold	Manifold Block	✓	✓		
		Piping System		✓	✓	
		Pigging Loop		✓	✓	
		Weld Overlay				✓
	Jumper	Flexible Jumper		✓	✓	
		Rigid Jumper		✓	✓	
	Flowlines & Pipelines	Flowlines		✓	✓	
Pipelines			✓	✓		
Risers	Drilling Riser	High Pressure Drilling Riser	✓			
		Standard Drilling Riser		✓		
	Production Riser	Flexible Risers/Flexible Jumper		✓	✓	
		Steel Catenary Riser	✓		✓	
		Top-Tensioned Riser				
		Free Standing Hybrid Riser				
	Riser Joints	Flex Joints	✓			
		Stress Joints	✓		✓	

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Subsea Connectors	Bolted Flange	Flange	✓	✓	✓
		Seal Ring	✓	✓	✓
	Clamp Connector	Hub	✓	✓	✓
		Clamp	✓	✓	
		Lead Screw			✓
		Seal Ring	✓	✓	✓
	Collet Connector	Body	✓		
		Seal Ring			✓
	Dog & Window Connector	Body	✓		
		Gasket		✓	✓
	Bend Stiffener Connector	Body	✓		
	Tubular Connector	Tubular Connector			
	Stab Connector	Body		✓	✓
		Seal			✓
Stab Plates	Body		✓		
	Tubing		✓	✓	
Hydraulic Couplings	Body		✓	✓	
Weld Overlay				✓	
Umbilicals & Flying Leads	Steel Tube Umbilicals			✓	
	Flying Leads			✓	
Subsea Control Units	Tubing		✓	✓	
	Fittings		✓	✓	
	Valves & manifolds		✓	✓	
	Housing		✓		
	Subsea Sensors		✓	✓	
	Control Lines		✓	✓	
	Injection Lines		✓	✓	
	Tube Bundles		✓		
	Slickline & Wireline		✓	✓	
Topside Processing	Heat Exchangers	Shell & Tube Heat Exchanger		✓	✓
		Plate Heat Exchanger			✓
		Shell & Plate Heat Exchanger		✓	✓
		Electric Heater		✓	✓
		Air Cooler		✓	✓
	Separators	Internals		✓	✓
		Vessel / Housing		✓	✓
	Vessels			✓	✓
			✓	✓	
Piping & Tubing	Piping & Tubing		✓	✓	
	Flanges & Fittings		✓	✓	
Non-Process-Related Applications			✓		
FPSO	Swivel Stack	Turret Svivel Core	✓	✓	✓
		Swivel Rings		✓	
	Tube & Pipe			✓	✓
LNG	Cryogenic Transfer Line	Cryogenic Flexible Tube		✓	
		Cryogenic Pipe	✓		✓
	LNG Pipe			✓	
	LNG Tanker			✓	✓
FLNG			✓	✓	
Pumps	Horizontal Split Case Pump	Casing		✓	
		Impeller			
		Shaft	✓	✓	✓
	Deepwell Vertical Lineshaft Pump	Volute Casing			
		Impeller			
		Shaft	✓	✓	
	Electric Submersible Pump	Pipe Stack		✓	
		Housing	✓	✓	
		Shaft		✓	✓
	Helico-Axial Pump	Stage			
		Housing			
		Motor Rotor	✓		✓
	Progressive Cavity Pump	Shaft		✓	
		Stage			
		Drive Train		✓	✓
	Twin Screw Pump	Housing / Stator	✓	✓	✓
Rotor		✓	✓	✓	
Reciprocating Pump	Housing				
	Twin Screws	✓	✓		
Fracking Pump	Housing				
	Plunger		✓	✓	
	Housing				
	Crankshaft	✓			
Fluid End	✓	✓			
Plunger	✓				

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Compressors	Screw Compressor	Body			
		Twin Screws		✓	✓
	Reciprocating Compressor	Housing			
		Crankshaft	✓		
		Cylinder	✓	✓	✓
Rod	✓				
Valves	Gate Valve	Body	✓	✓	✓
		Bonnet	✓	✓	
		Gate/Wedge	✓	✓	✓
		Seat Ring	✓	✓	✓
		Stem	✓	✓	✓
	Globe Valve	Body	✓	✓	
		Bonnet	✓	✓	
		Plug/Disc	✓	✓	
		Seat		✓	
	Ball Valve	Stem	✓	✓	
		Body	✓	✓	✓
		Ball	✓	✓	✓
		Seat Ring		✓	
		Stem	✓	✓	✓
	Check Valve	Trunnion	✓	✓	
		Body	✓	✓	✓
		Bonnet	✓	✓	✓
		Disk	✓	✓	✓
	Butterfly Valve	Seat	✓	✓	✓
		Body	✓	✓	
		Disc	✓	✓	✓
		Shaft		✓	✓
	Choke Valve	Seat		✓	✓
		Body	✓	✓	✓
		Bonnet	✓	✓	✓
		Flow Bean		✓	
		Seat		✓	✓
	Actuator	Stem		✓	
		Case/Cylinder			
		Piston		✓	
Spring		✓			
Stem	✓	✓			

Components with no markings are either made of carbon steel or castings. They are mentioned in the report but the volumes are not counted.