



RETLOCK[®] CLAMP CONNECTORS

Field-Proven Connections from the Seafloor to the Surface



Reliable, Robust Connections for the Widest Range of Subsea Applications

For more than 20 years, AFGlobal has provided advanced deepwater diverless connection solutions for a broad range of field requirements. The source of our success is the field-proven *Retlock*® connector, a first-of-its-kind twin-bolt clamp and the central core of each diverless connection solution we offer. Compared to traditional offerings, the twin-bolt design provides the best combination of features and benefits available.

The *Retlock* clamp's unique design affords a versatility of bore configurations, which allows delivery of monobore, multi-bore, and controls (H/E) deployment systems. It can reliably make secure and safe connections for vertical and horizontal applications, or for any angle off the vertical/horizontal as required.

As part of our commitment to quality control and seamless subsea system delivery, AFGlobal designs, engineers, and builds each *Retlock* connector in-house. Our current size portfolio extends from 2 inches to 48 inches NPS.

Retlock clamp connectors are manufactured with a strict adherence to international best practices and materials. Each clamp incorporates several mechanical features that help ensure trouble-free installation and operation:

- An even distribution of hub preload assures high pressure and load capability.
- A gasket with broad-faced, robust metal-to-metal sealing surface prevents sand gouges from forming leak paths.

- Functional clamp components can be retrieved by an ROV without recovering the jumper, spool, or host structure.
- A continual leak monitoring system and annulus port allow for pressure testing and external seal tests.
- The compact, lightweight clamp and accompanying porch design enables smaller associated structures.
- Secondary release feature ensures the connection can always be separated if needed.
- Clamp contingency operations enable clamp mounting on the host structure/inboard side, which allows for the use of simple cost effective full pressure blinds to serve as long term/short term pressure caps.
- Clamps qualified in accordance with API 6A and 17D.

These features, coupled with our commitment to expert project execution and in-field installation, have helped the *Retlock* technology amass a successful track record of more than 1,600 subsea connections around the world.

The Heart of Each Connection System

Thanks to the *Retlock* technology's peerless performance and inherent design flexibility, AFGlobal can provide customized connection solutions for any subsea production application. The wide range of diverless connection systems that incorporate the *Retlock* includes:

- Virtus™ Riser Type Connectors (RTCs), field proven delivery systems capable of making riser connections at any angle.
- Virtus™ Diverless Maintained Clusters (DMaC), designed for horizontal connections, DMaC technology enables long-term wet-parking, as needed.

- Virtus™ Flowline Type Connectors (FTCs) are engineered for horizontal connection of rigid or flexible pipe.
- Virtus™ Vertical Type Connectors (VTCs) the industry's first vertical connection system with wet parking that does not require a crane vessel during final connection.
- Virtus™ Multi-purpose Connectors (MPC), perfect connection systems for flying leads instruments.

The same *Retlock* clamp connector can be used in any of the *Virtus* connection systems across the entire field and with common ROV tooling.



Diversified Clamping Capabilities

	RETLOCK® CLAMP	COLLET CONNECTOR	SINGLE BOLT CLAMP
COMPACT FOOTPRINT	✓	x	✓
LIGHTER WEIGHT	✓	x	✓
EFFICIENT/DIRECT-ACTING DESIGN	✓	x	✓
INTERCHANGEABLE COMPONENTS	✓	x	x
EVEN HUB PRELOAD	✓	✓	x
HIGHER BENDING/TORSION LOAD CAPABILITY	✓	x	✓
HIGHER FATIGUE/VIBRATION RESISTANCE	✓	x	x
ROV MOUNTED INSTALLATION TOOLING	✓	x	✓
LOW MAKE-UP TORQUE	✓	n/a	x
SHORTER INSTALLATION TIMES	✓	x	x
CONTINGENCY RELEASE MECHANISM	✓	x	x
SUBSEA REPLACEABLE CONNECTOR COMPONENTS	✓	x	x
PROTECTED THREADS/MOVING PARTS	✓	✓	x
FULL PRESSURE BLIND HUB	✓	x	x

Expanding Our Offering to Keep Pace with Field Demands

As offshore production continues to move into deeper waters and higher temperature/pressure reservoirs, subsea connections will be held to higher performance standards. AFGlobal is committed to exceeding expectations in safety and reliability with several clamp innovations built on the original *Retlock* design.



Retlock 2.0 connector – An optimized version of the original, the *Retlock* 2.0 is available in two different clamp size options, for nominal pipe size of 6 inches to 12 inches. It was developed to provide an optimized connection

solution for standard piping systems in offshore West Africa, the US Gulf of Mexico, and South America.

Retlock LB connector – With different clamp size options for nominal pipe sizes ranging from 24 inches to 48 inches and pressures up to 5000 psi, the *Retlock* LB is used exclusively for connecting export flowlines.

Retlock 20K connector – The *Retlock* 20K is designed to provide a secure and safe connection for high-pressure systems up to 20,000 psi. The connector comes in two different hub size options for use on pipe sizes ranging from 6 inches to 12 inches.

Retlock SB connector – The single-bolt *Retlock* SB stands apart from the other twin-bolt designs in the *Retlock* family. Ranges below NPS 6 inches are best served with a single bolt due to lower separation loads requiring a low torque input. Optimally designed to provide a compact and lightweight solution to service NPS 4 inches and below and up to 20,000 psi, the SB is ideally suited for making connections in gas lift and other small bore applications.

