

X-11

Modular offshore CT unit

APPLICATIONS

- Designed for all offshore applications

FEATURES

- Adaptable for platforms, barges, spars, floaters, and tension-leg platforms
- Operates with fly-by-wire controls from the control cabin to all the major skids
- Provides finite control of injector speed and applied forces
- Uses computer-controlled systems that eliminate overpull and oversnub scenarios
- Incorporates automatic hydraulic power pump management system
- Can be configured to run up to Category III well-control working pressures
- Offers automatic reel-brake fail-safe system
- Reduces the need for personnel to climb on top of the injector through use of semiautomated tubing stabbing process
- Monitors the condition of all the electronic, hydraulic, and pneumatic systems
- Works with CT sizes from 1¼ to 2⅞ in
- Offers fail-safe systems that incorporate complete manual backup
- Enables detailed, accurate entry into the wellbore through real-time geometry inputs
- Provides constant monitoring of BOP system pressures and valve positions
- Reduces the number of hydraulic and mechanical connections required to set up
- Offers zoned, ATmosphere EXplosibles (ATEX), and CE-marked certified control cabin, hydraulic power pack, reel, and injector

BENEFITS

- Incorporates fail-safe systems to improve safety
- Improves efficiency and safety of the wellsite delivery process
- Reduces footprint through modular design concept that allows stacking

Flexible, fit-for-purpose design

The X-11* modular offshore CT unit with active process control and automated safety systems was developed as a flexible, fit-for-purpose system that is easily adaptable for many offshore structures including platforms, barges, spars, floaters, and tension-leg platforms.

The unit works with CT sizes ranging from 1¼ to 2⅞ in, and changing from one CT size to another is safer, easier, and more efficient.

More automation, less complexity

The X-11 unit comprises five main skids:

- a hydraulic power pack
- a control cabin
- a drop-in drum reel
- two transport baskets that contain well-control equipment and the injector.

Modular in design, the hydraulic power pack, the control cabin, and the transport baskets are built in standard shipping containers, and the control cabin can stack on top of the hydraulic power pack. This design reduces the total weight and footprint of the entire CT system.

The unit's automated control system monitors well parameters and the entire electric hydraulic system. This control system detects and provides timely notification to the supervisor when changes occur. In addition to providing real-time data acquisition and data transfer to offsite locations, the X-11 unit provides one central control point for the entire CT operation.

The modular package combines major CT components are easy to connect, optimize space utilization, and provide maximum versatility.

Improved safety and efficiency

The X-11 unit improves the efficiency and safety of the wellsite delivery process, while reducing the cost of the total system. Automating several key processes also reduces the number of operating personnel that is normally required. Improved crew ergonomics, a smaller footprint, and the automated monitoring and control systems allow the CT supervisor to focus on downhole job requirements rather than equipment coordination.



Interior of the X-11 unit.

X-11

General Specifications

Operating temperatures -4 degF [-20 degC] to 118 degF [48 degC]

Hydraulic Power Pack

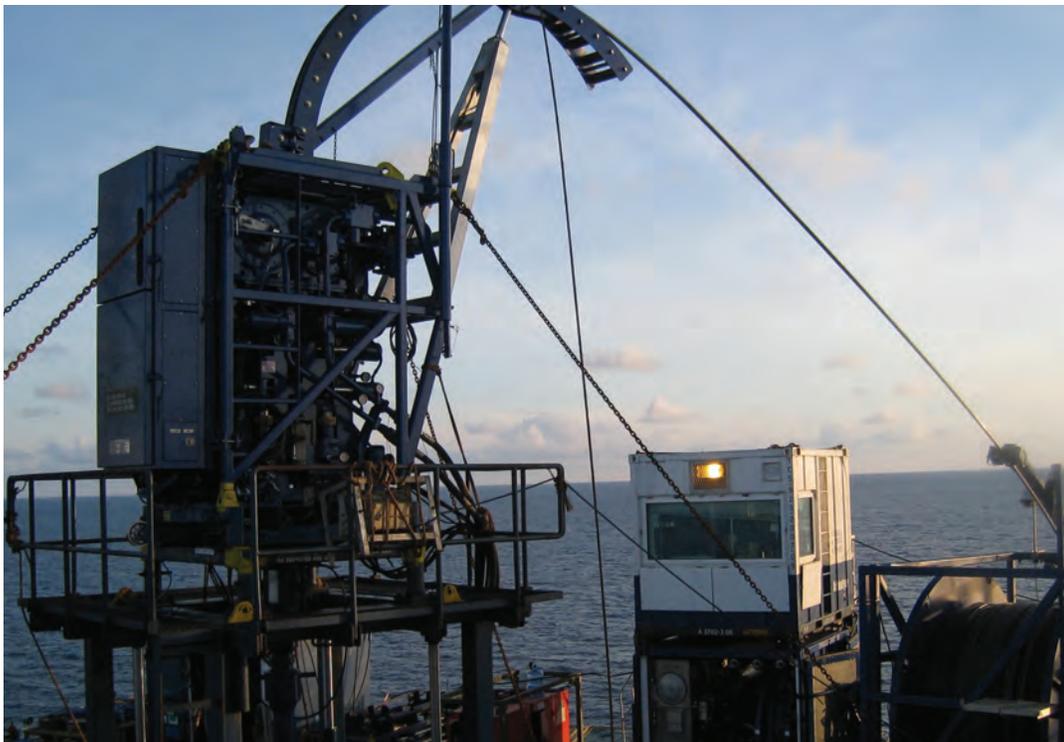
Engine	340-hp Caterpillar® C9 Tier III engine
Engine emergency shutdown system	Emergency air intake shutdown, automatic engine overspeed shutdown, gas detector sensors
Hydraulic pump	250-hp triple-stack gear pump
Hydraulic circuits	Semiclosed loop, with 3,000-psi [20.68-MPa] and 5,000-psi [34.48-MPa] circuits
Accumulators	Three 15 galUS [0.057 m ³]
Diesel tank	150 galUS [0.57 m ³]
Hydraulic tank	150 galUS [0.57 m ³]
Length × width × height	10 ft × 8 ft × 8.5 ft [3.05 m × 2.44 m × 2.59 m]
Weight	25,000 lbm [11,339.8 kg]
Lifting certification	DNV [†] 2.7.1
Certification	ATEX [‡] , CE marked, Zone II compliant

Control Cabin

Cabin	Pressure purged
Controls	Process-controlled system
Data acquisition	CoilCAT* coiled tubing computer-aided treatment
External monitoring (video camera system)	Remote spooling, stripper, two others as required
Climate control	30,000-Btu cooling system
External view	270° view
Length × width × height	10 ft × 8 ft × 8.5 ft [3.05 m × 2.44 m × 2.59 m]
Weight	15,000 lbm [6,803.9 kg]
Lifting certification	DNV 2.7.1
Certification	ATEX, CE marked, Zone II compliant

[†] Det Norske Veritas

[‡] ATmosphere EXplosibles



X-11 in offshore Malaysia.

Drop-In Drum Reel System

Loading	From top and front of power stand
Levelwind	Floating arm type suitable for all tubing sizes, automated electronic overhydraulic spooling control
Drive system	Chain drive
Reel swivel	15,000-psi [103.42-MPa] rated
Circulating pressure transducer	Integral type with double isolation valve manifold
Pig launcher	Yes
Ball-dropping ability	Yes
Tubing monitoring	CT inspection device for wall thickness and ovality
Tubing lubrication (external)	Automatic lubrication with applicator on levelwind, 5-galUS tank capacity
Tubing lubrication (internal for corrosion mitigation)	Self-contained system
Safety equipment	Fall arrester, work platforms as required for levelwind access

Tubing Spool Specifications

Flange outside diameter	Core diameter	Width	Tubing capacity	With 95% spooling efficiency
142 in [3.61 m]	80 in [2.03 m]	68.5 in [1.74 m]	1¼ in	37,800 ft [11,521.4 m]
			1½ in	26,700 ft [8,138.2 m]
			1¾ in	19,800 ft [6,035.1 m]
			2 in	14,600 ft [4,450.1 m]
Flange outside diameter	Core diameter	Width	Tubing capacity	With 95% spooling efficiency
142 in [3.61 m]	70 in [1.78 m]	68.5 in [1.74 m]	1¼ in	41,300 ft [12,588.2 m]
			1½ in	28,500 ft [8,686.8 m]
			1¾ in	21,800 ft [6,644.6 m]
			2 in	na [†]
Length × width × height	13.83 ft × 8.5 ft × 12.25 ft [4.22 m × 2.59 m × 3.73 m]			
Weight with empty spool	19,500 lbm [8,845.1 kg]			
Weight of empty spool	5,700 lbm [2,585.5 kg]			
Skid, max. gross weight with tubing full of fluid	100,000 lbm [45,359.3 kg]			
Lifting certification	DNV 2.7.1			
Certification	ATEX, CE marked, Zone II compliant			

Injector Specifications

HR 560 configuration	60,000 lbf pull, 26,000 lbf snub [266,893 N pull, 115,654 N snub]
HR 580 configuration	80,000 lbf pull, 40,000 lbf snub [355,858 N pull, 177,929 N snub]
HR 5100 configuration	100,000 lbf pull, 50,000 lbf snub [444,822 N pull, 222,411 N snub]
Hydraulics	5,000-psi [34.48-MPa] circuit with condition monitoring systems
Depth system	Universal tubing length monitor mounted below the injector chains
Gooseneck	72-in [1.83-m] gooseneck with overload protection system, set up for 1¼-in [3.175-cm] to 2⅞-in [7.303-cm] CT
	100-in [2.54-m] gooseneck with overload protection system, set up for 1¼-in [3.175-cm] to 2⅞-in [7.303-cm] CT
Condition monitoring	Metallic chip detection and temperature sensors
Safety system	Fall arrester system
Lifting certification	DNV 2.7.1
Certification	ATEX, CE marked, Zone I compliant

BOP Control Station

Operation	Can operate two strippers, two dual combi or one quad BOP system, and kill and flow valves
Mode of operation	From control cabin or from control station, with automatic ram position detection and feedback to the control system
Certification	ATEX, CE marked, Zone II compliant

Well Control Equipment

BOP	10,000-psi [68.95-MPa] dual combi 4.06-in [10.31-cm] bore slidelock BOP
Stripper	4.06 in [10.31 cm], 10,000 psi [68.95 MPa]
2-ft riser	4.06 in [10.31 cm], 10,000 psi [68.95 MPa]
4-ft riser	4.06 in [10.31 cm], 10,000 psi [68.95 MPa]
8-ft riser	4.06 in [10.31 cm], 10,000 psi [68.95 MPa]

Injector Transport Basket

	Injector, stripper, injector legs
Length × width × height	10 ft × 8 ft × 9.5 ft [3.05 m × 2.44 m × 2.89 m]
Weight	6,000 lbm [2,721.6 kg]
Gross weight, fully loaded	28,000 lbm [12,700.6 kg]
Lifting certification	DNV 2.7.1
Certification	CE marked

Well Control Transport Basket

	BOP, gooseneck, BOP control cart, risers, stairs
Length × width × height	10 ft × 8 ft × 9.5 ft [3.05 m × 2.44 m × 2.89 m]
Weight	6,000 lbm [2,721.6 kg]
Gross weight, fully loaded	28,000 lbm [12,700.6 kg]
Lifting certification	DNV 2.7.1
Certification	CE marked

Options

Soundproofed power pack	
Max. average sound pressure level	80 dB
Operating temperatures	−4 degF [−20 degC] to 108 degF [42 degC]
Certification	ATEX, CE marked, Zone II compliant
Reel conversion skid	
	Adapts to conventional CT reels and provides all the reel control features
Certification	ATEX, CE marked, Zone II compliant

[†] Not available