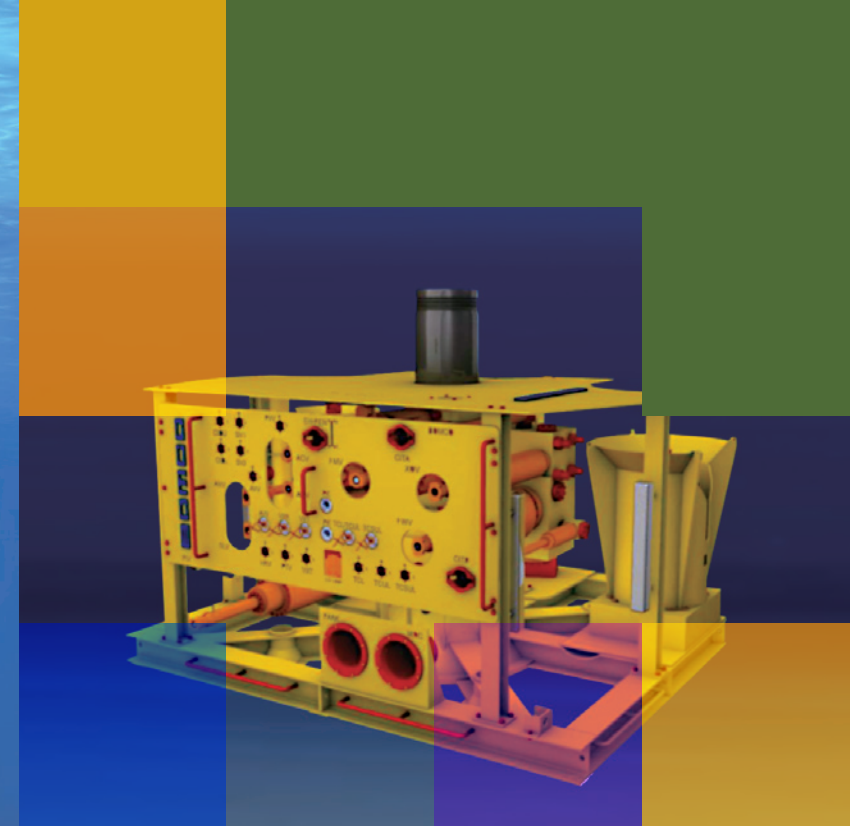
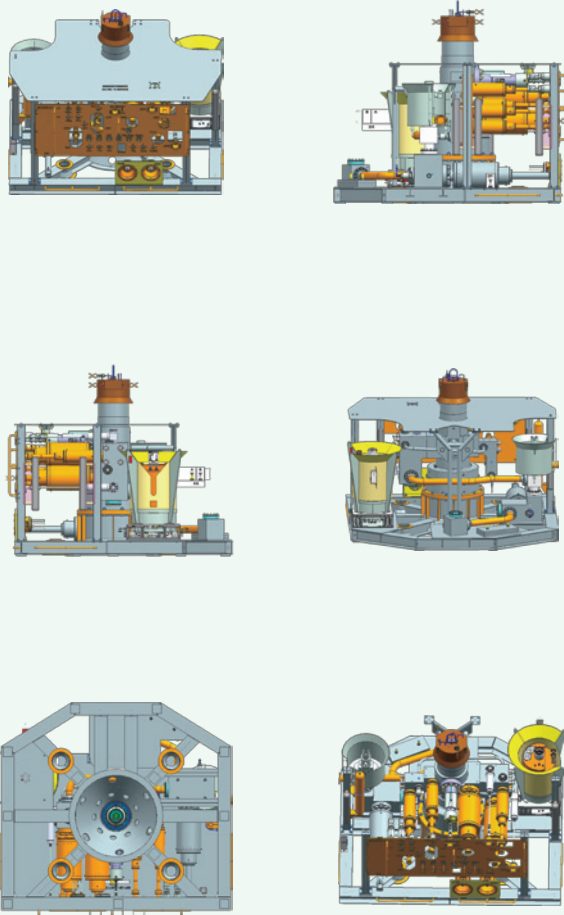


BOMCO's horizontal subsea Xmas tree, equipped with combined electrohydraulic control and ROV control, has the functions of automatic alignment for installation, valve activation, unlocking and retrieval. It is applicable to deep water operation and can help achieve safe and controllable subsea oil & gas production.



## Horizontal Subsea Xmas Tree



Subsea Xmas tree is the core equipment in offshore oil & gas production system. Installed on subsea wellhead, the tree is used to connect and support tubing string, seal off casing pipes and casing-tubing annulus, isolate borehole fluids from external sea water, control wellhead production pressure, and adjust borehole flow rates. Also, the tree can be used for acid fracturing, water injection, and testing.

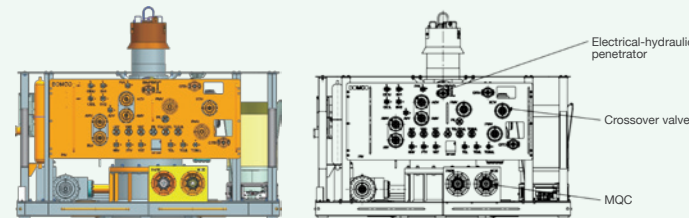
With proper integration of mechanical, hydraulic and electronic techniques, BOMCO Horizontal Subsea Xmas Tree features high automation and reliable performance. Meeting requirements specified in API 6A, API 17D, API 17H, NACE MR 0175 and other relevant standards, the tree can operate at water depth up to 1,500m, working pressures up to 69MPa and with designed service life of 20 years.

#### Specification

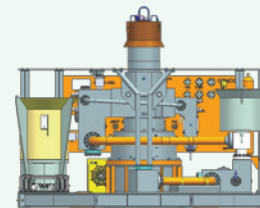
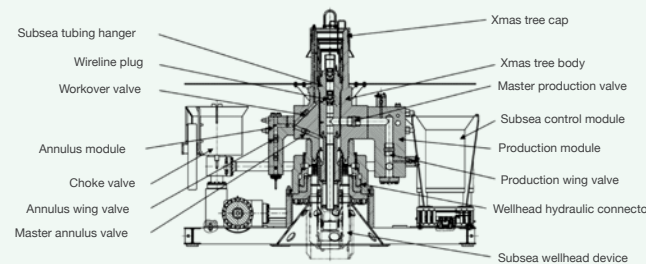
Structure	Horizontal (EHXT)
Applicable standards	ISO 13628-4 / API 17D
API product specification level	PSL3 (tubing hanger PSL 3G)
Material class	HH (production), EE (annulus)
Temperature rating	Upstream production choke: 0°F-250°F (U) Downstream production choke: -200°F-250°F (P-U)
Pressure rating	69 MPa (10,000 psi)
Water depth rating	1,500 m (5,000 ft)
Control line pressure	LP: 21 MPa (3,000 psi) HP: 69MPa (1,0000 psi)
Control fluid and cleanliness	Water-based fluid, NAS 1638, Level 6
Hybrid penetrator	Eight hydraulic lines and one 4-pin electrical line
Production nominal bore	5-1/8"
Annulus nominal bore	2-1/16"
Subsea choke	With subsea retrievable/re-installable choke insert
Subsea control module	Electrohydraulic control, retrievable
Wellhead connector	Hydraulic control
Installation	Without guide rope
Designed service life	20 years
Dimensions (W*L*H)	(5438×5068×4357) mm
Weight	50 Tonnes

### Structure and Operation Mechanisms

With EHXT (Enhanced Horizontal Xmas Tree) structure, BOMCO subsea tree is mainly composed of tree body, production module, annulus module, choke module, subsea control module, hydraulic connector, tubing hanger, etc. The tree cap does not bear any pressure and is used only for secondary locking of the hanger and for isolation of seawater. The tubing hanger, which is installed within the Xmas Tree, has metal-to-metal sealing with electrohydraulic penetrator. With two wireline plugs installed, the tubing hanger may have double sealing over production channels. Workover operation can be conducted by tripping in tools through tubing hanger as long as the Xmas Tree cap and wireline plugs are retrieved.



Front view of the subsea tree



Section view of the subsea tree

### Technical Features

- Framework module design is adopted for the structure of the subsea tree, to enable individual module optimization and fast customization.
- The penetrator uses an integrated electrical-hydraulic connector to enable underwater ROV control, with up to 8 hydraulic/chemical injection ports and one cable channel. The hydraulic connector is of self-sealing plug type and the electrical connector is of wet type, which is adaptable to offshore use. In addition, the penetrator is equipped with secondary unlocking mechanism to ensure proper retrieval in case of emergency.
- Major production and annulus valves are designed with built-in structures to be embedded within the tree body or each module. Compared with stand-alone valves, such valves are characterized by compact structure and reliable sealing, with no bolt connection required.
- All valves on the subsea tree are ROV mechanically controlled, or hydraulically controlled through connection of ROV with Hot Stab. To facilitate ROV control over all valves, all the valve switches or Hot Stab hydraulic injection ports are properly integrated on the ROV control panel of the subsea tree. Key valves are fault free type with re-set spring.
- All sealing elements in flow channels of the subsea tree are full metallic sulfur-resistant type with auxiliary non-metallic sealing, so as to achieve redundant design for sealing of flow channels, and ensure reliability and longer service life of sealing elements within corrosive environment.
- The subsea tubing hanger can be installed after proper seating of the horizontal Xmas tree, and can be locked inside the tree. To avoid accidental unlocking due to vibration, pressure fluctuation and other causes during oil & gas production, the tubing hanger is equipped with secondary locking mechanism to ensure proper locking of the hanger with the subsea tree.
- The hydraulic connector adopts hydraulic locking and unlocking devices, with secondary unlocking mechanism also available.