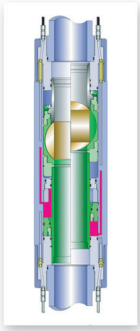
ELSA-HD (High Debris, Deep Water)

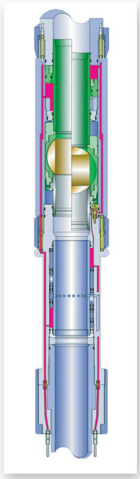
The ELSA-HD, Expro Landing String Assembly has been engineered to extend the operating capabilities of Expro's ELSA-DH (Direct Hydraulic) design. ELSA-HD was specifically developed to operate in applications with highly aggressive erosive solids and deep water environments, offering exceptional reliability for all Horizontal Subsea Xmas Tree well completion and intervention operations.

The ELSA-HD comprises of a full suite of redesigned valve assemblies. The Lubricator Valve, Retainer Valve and Subsea Test Tree provides the full range of well intervention, pressure control functions and disconnection capabilities for harsh completion installation, workover or intervention operations.

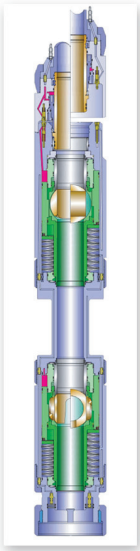
Expro's high integrity ball valve system is at the heart of the system, and features a unique seat-reacted and trunion mounted valve mechanism. The advanced design and construction techniques used in the development of ELSA-HD extends their operating cycle, allowing an increased number of installations between maintenance periods, even in challenging applications where aggressive media such as produced sand and proppant are present.



Lubricator Valve



Retainer Valve



Subsea Tree

Applications:

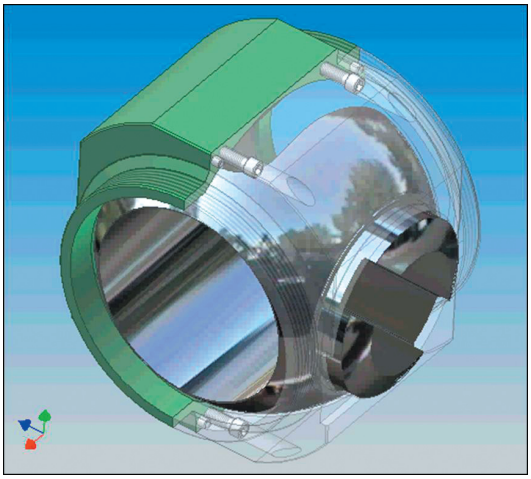
- Completion installation, workover and intervention operations on Horizontal Subsea Xmas Trees from Mobile Offshore Drilling Units in water depths up to 10,000 ft (3048m)
- Drill stem testing, well clean up and extended appraisal operations requiring a large flow bore
- Specifically designed to suit environments where high levels of entrained solids and aggressive media are present in the completion fluids e.g. reservoir fracturing applications
- Specifically designed to operate in batch completion campaigns where minimal redress operations between runs are critical

Benefits:

- Provides a dual primary subsea barrier between the well and surface during subsea operations
- Allows subsea well operations to be conducted under controlled conditions without having to function BOP
- Disconnect function allows MODU to unlatch and relatch safely should environmental conditions dictate
- Mechanical features permit hydraulic fracturing and back flow erosive solids through the string without compromising safety
- Independent ball closure allows a single cutting device to be selected
- System reliability and maintenance requirements virtually eliminating rig down time
- High integrity ball valve construction protects seal surface from debris damage
- Electrical feed through and wet connectors to facilitate surface read out
- Can be run with either EXPRESS Subsea Control Systems or direct hydraulic systems

ELSA-HD (High Debris, Deep Water)

Technical Specifications:		
Service	H_2S NACE MR 0175 (+CO_2)	
Working Pressure	10,000psig (690 Bar)	
Working Temperature	0°F to 250°F (-18°C to 121°C)	
Tensile Load Capacity (@ WP)	400,000 lbs (1,779 kN)	
Tensile Load Capacity (@ 0psi)	1,000,000 lbs (4,448 kN)	
Maximum Torque	30,000 lbf ft (40,675 Nm)	
Minimum Internal Diameter	6.74" (171.2 mm) minimum throughbore	
Maximum External Diameter	Subsea Test Tree	18.60" (472.4 mm)
	Lubricator Valve	15.18" (385.6 mm)
	Retainer Valve	16.50" (419.1 mm)
Pump Through Capability	Valve opens with differential from above	
Coil Tubing Cutting Capability	2.375" x 0.204", 80 ksi with 0.438" conductor cable	
	2.375" x 0.190", 95 ksi	
Differential Pressure Support from Above	10,000 psig (690 Bar)	
Differential Pressure Support from Below	10,000 psig (690 Bar)	
Electrical Cable Capability	Permits installation of two electrical cables	
Overall Weight	Subsea Test Tree	6742 lbs (3058 kg)
	Lubricator Valve	1985 lbs (900 kg)
	Retainer Valve	2977 lbs (1350 kg)



Certification:

Certified bt Bureau Veritas to API 14A, S.I. 289
Design Codes API 6A, SI289, API14A.

ELSAHD 290707_v1