
oiltechpipe
UMBILICAL WELL OPERATIONS

UMBILICALS

CONTENTS

1. ADVANTAGES

What are the advantages of umbilical cable over regular tubing string?

· Checking the tightness of the column is carried out at the factory.

· The time of work is sharply reduced, due to the exclusion of operations on twisting of NKT.

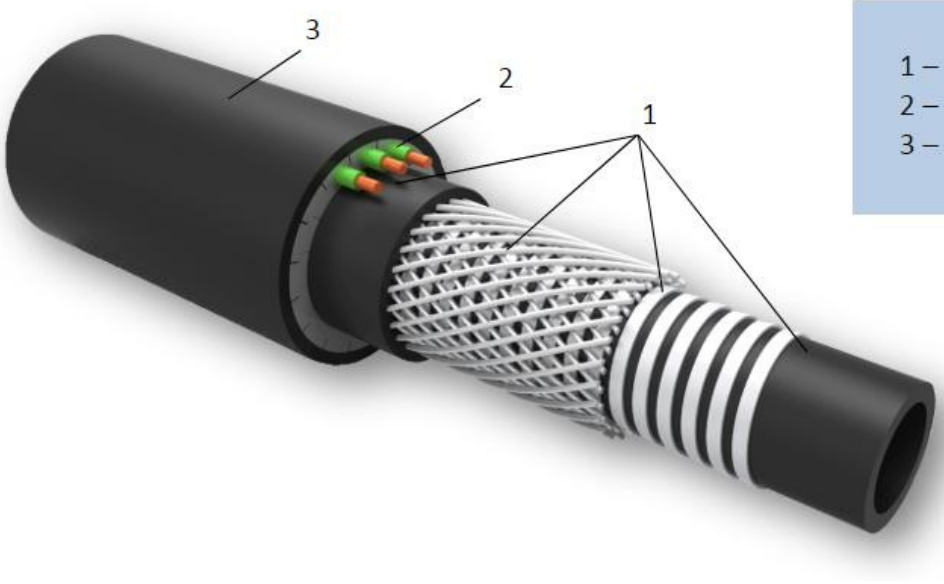
· The safety of the work is increased, since when the umbilical is launched, the personnel are not nearby, but only supervising the lowering process.
· Since the umbilical is made in one piece, there is no chance of leaks at the junction of two pipes.

·The probability of damage to the power cores is reduced, since they are located under a reinforcing sheath, which has excellent damping and protective properties.

·The environmental safety of the work increases since the wellhead is hermetically sealed during tripping, which eliminates the likelihood of a blowout or spill.

· On the inner surface of the pipe, the process of deposition of ARPD occurs much less intensively.

2. UMBILICAL CONSTRUCTION

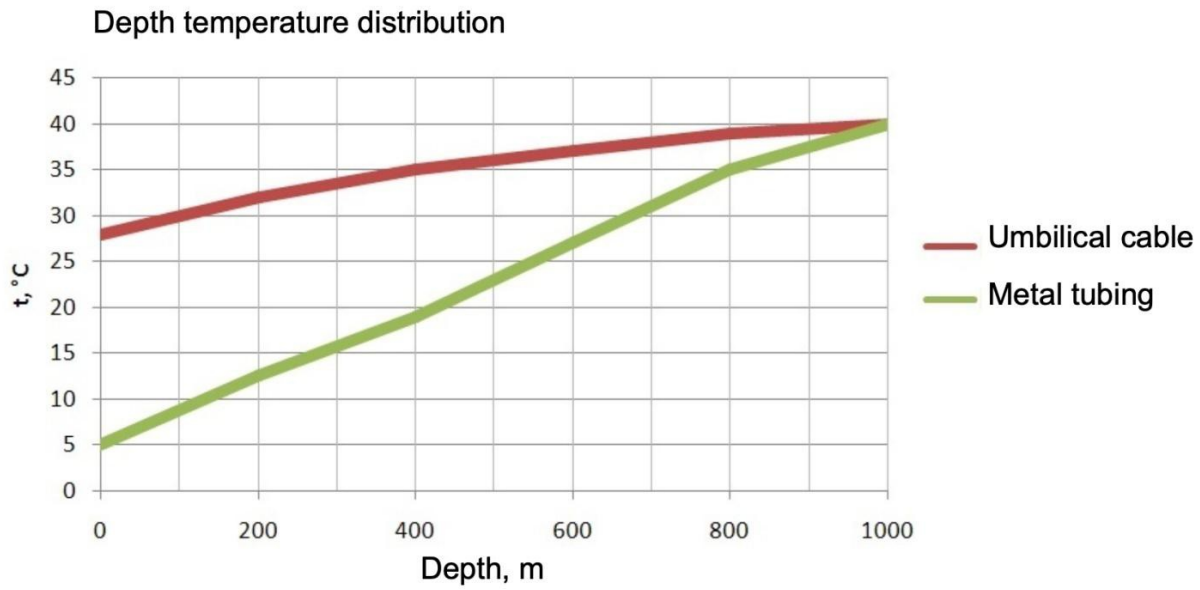


1 – steel polymer pipe
2 – conductive conductors
3 – outer shell

Mark	Diameter, in/outr	Breaking strength	Min. bending radius	Weight in air	Max. pressure, in/out	Number of conductors	Section of conductors
	mm	kN	mm	kg/km	MPa	ea.	mm^2
TG 30/75-250-120 (X×YY)	30 / 75	120	1300	4200	25/25	3-15	3,0-16,0
TG 40/85-250-150 (X×YY)	40 / 85	150	1300	5600	25/25	3-15	3,0-16,0
TG 50/98-250-180 (X×YY)	50 / 98	180	1300	6400	25/25	3-15	3,0-16,0

2.1. THERMAL-INSULATING PROPERTIES OF UMBILICAL

Umbilical have lower heat emission coefficient in comparison with metal tubing. Besides this fact the diameter of inner pipe is taken as 40mm that is lower than tubing 73, in the result of which the speed of fluid stream in umbilical is 3 times higher. Due to these reasons the fluid does not have time to cool down. Thus, if well rate is 100-150 m3/24 hours, temperature decreases no more than 10-15 degrees, that is significantly less than in tubing.



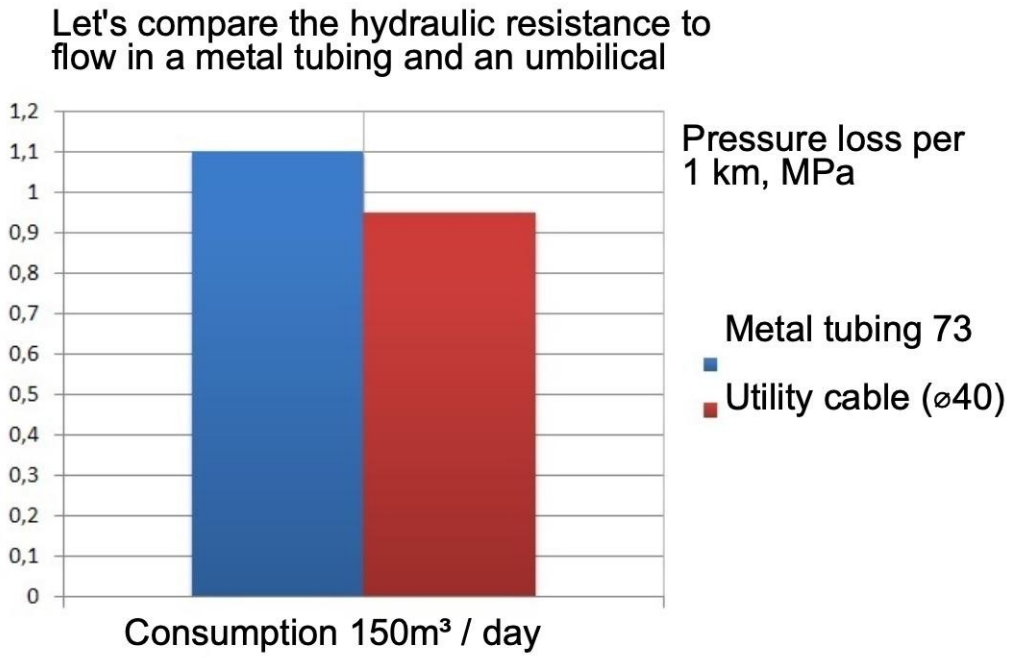
2.2. UMBILICAL HYDRAULIC PROPERTIES

Hydraulic resistance to flow is one of the components of total losses. Compared with metal pipes, steel-polymer pipes have significantly lower flow resistance losses, for the following reasons:

- During operation, deposits of salts, paraffins, rust with an increased coefficient of hydraulic resistance are formed on the inner surface of metal pipes. In addition, corrosion processes take place. All this leads to a decrease in the flow area of the pipes, and an increase in hydraulic resistance.

- The transported liquid has a high temperature, which reduces its viscosity.

- The joints between the tubing pipes are zones of turbulence and increased resistance to flow, in a continuous steel-polymer pipe, these losses are absent.

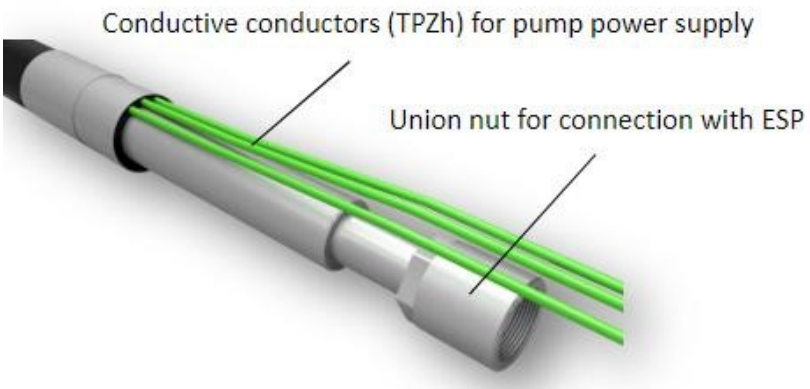


As a result, hydraulic fluid resistance in umbilical with inner diameter 40mm is in practice equal to the resistance of tubing string NKT 73.

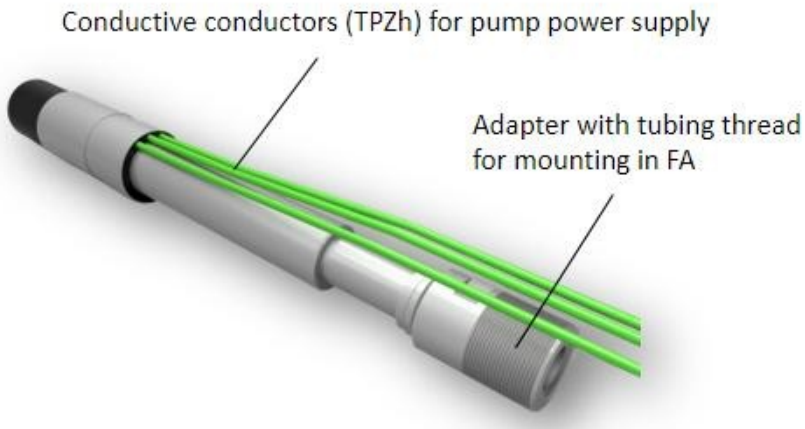
2.3. PIPE CORROSION RESISTANCE

Steel-polymer pipes have higher corrosion resistance. Polyethylene is a main material, which is used in the production of our pipe, has operational life of 50 years that is significantly more in comparison with standard structural steel which is used for tubing production. Besides, polyethylene is more resistant to the influence of aggressive environments such as hydrogen sulfide and carbon dioxide which can be present in a well.

2.4. UMBILICAL ENDS

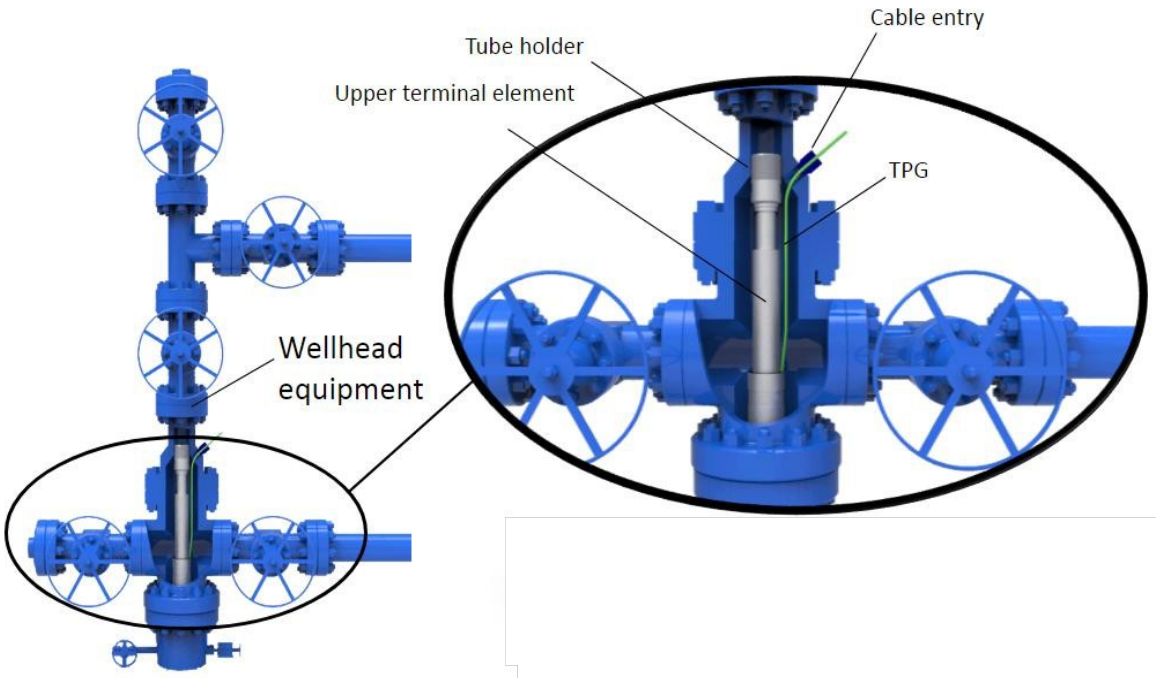


UPPER TERMINAL ELEMENT



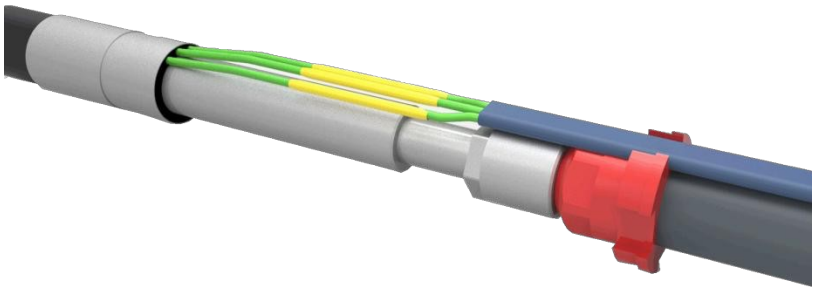
LOWER TERMINAL ELEMENT

2.5. CONNECTION DIAGRAM OF UMBILICAL WITH PIPE HANGER AT WELLHEAD EQUIPMENT

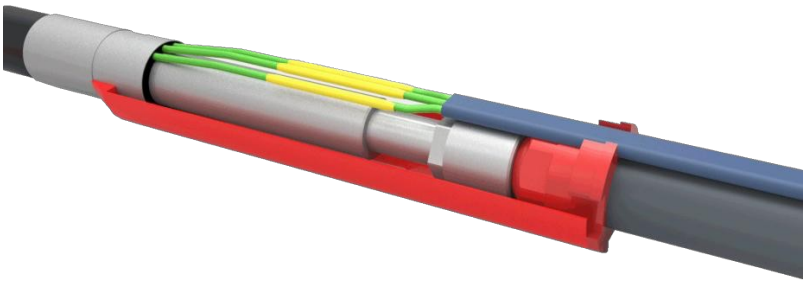


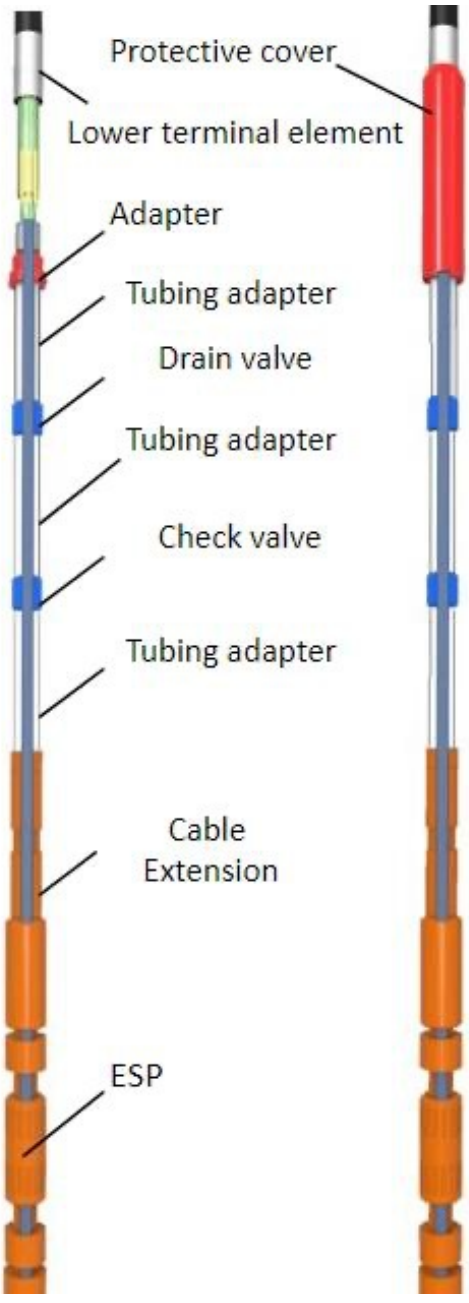
2.6. CONNECTION DIAGRAM OF UMBILICAL WITH ELECTRIC SUBMERSIBLE PUMP

Step 1: Connect the bottom lug to the layout.
Splice of conductive cores with an extension cable.



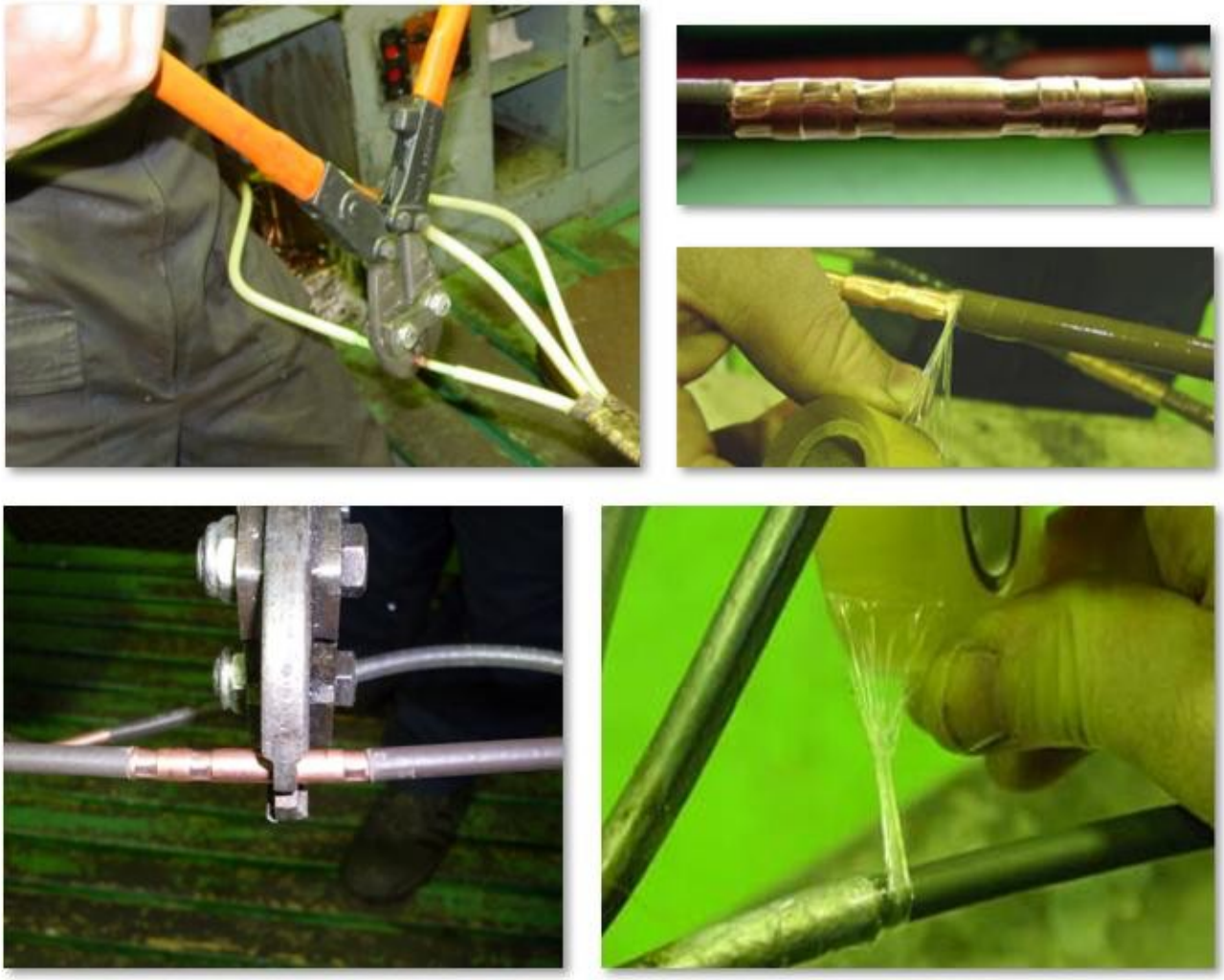
Step 2: Mounting protective cover.





2.7. SPLICE OF CONDUCTIVE CONDUCTORS

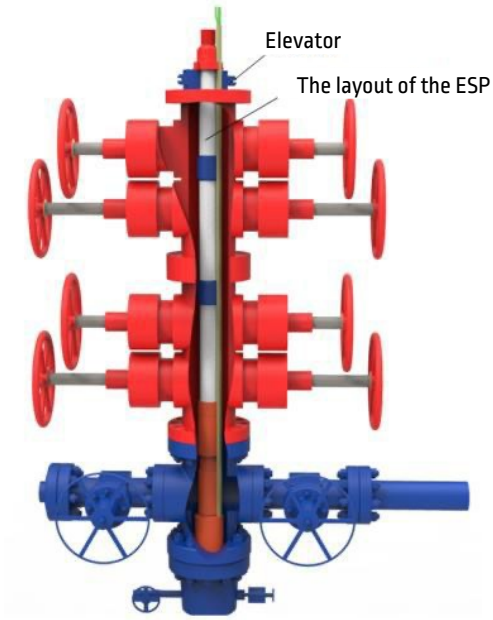
The splicing of conductive conductors is carried out as with standard methods of connecting oil-submersible cables, i.e. using a crimp sleeve and insulating tapes.



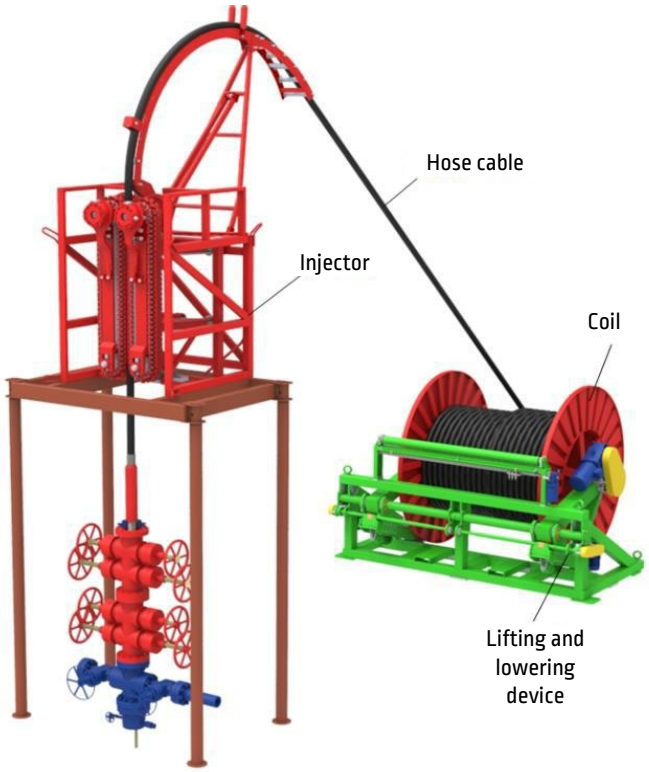
2.8. SHORT DESCRIPTION OF SEQUENCE OF UMBILICAL LOWERING

1. Install blowout equipment

2. To produce ESP installation

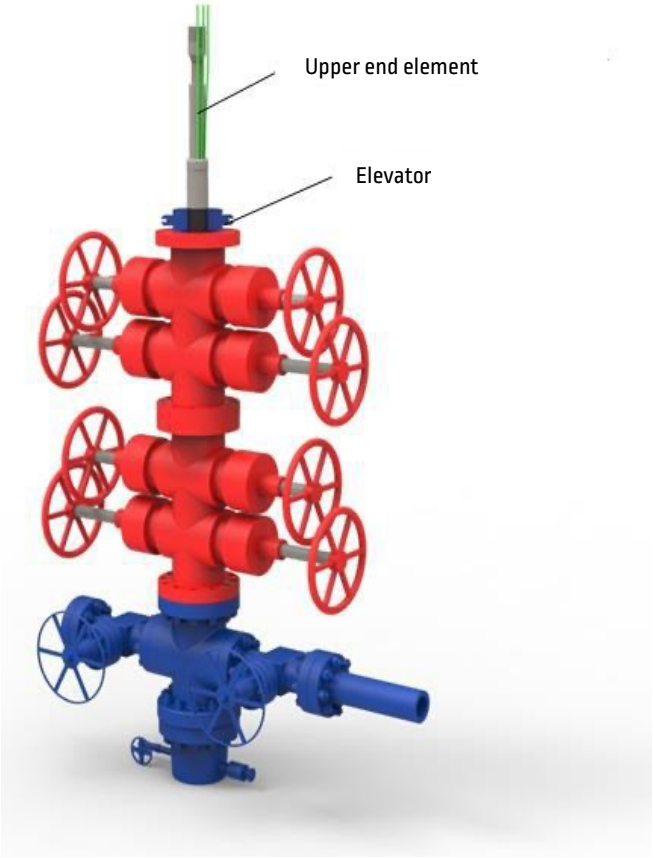


3. Install injector, lifting equipment. Install the reel with umbilical into launching equipment and to put the umbilical into injector. Connect umbilical with components of ESP and splice conductors of umbilical. Descent the unit.



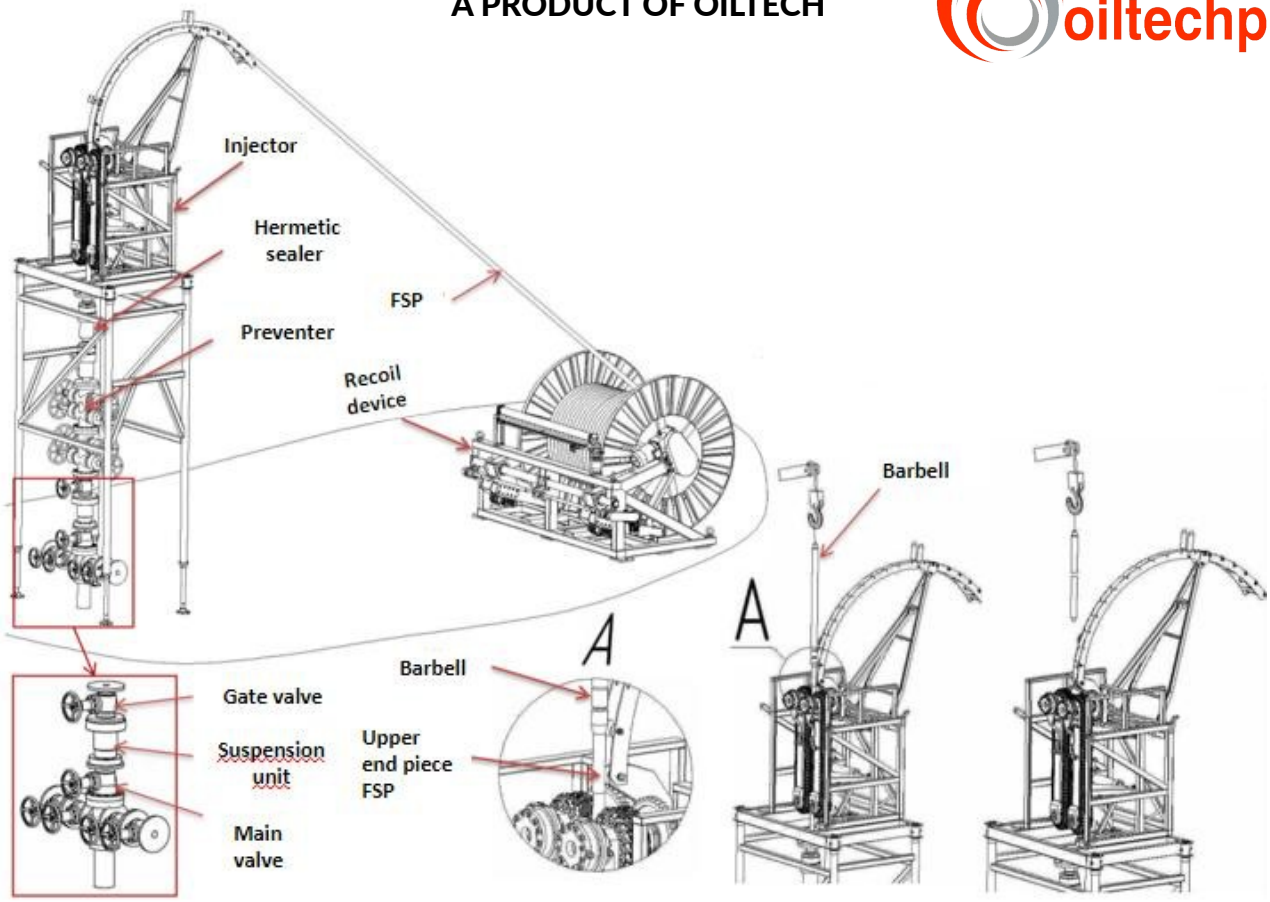
4. With the top end piece off the umbilical reel into the trigger and thread the reel, thread the process tube and umbilical into the injector. Connect the umbilical cable to the layout and fix it to the 2-sling elevator. ESP and an overgrowth of conductive conductors of the umbilical cable. Descend the unit.

5. To descent upper terminal element lower the injector and fix it on the elevator.



6. To dismantle injector, preventer.

7. To mount wellhead equipment, to connect and to test the system



3. PHOTOS

In 2015 in Australia 2 wells with the depth of 500m each were equipped with umbilical

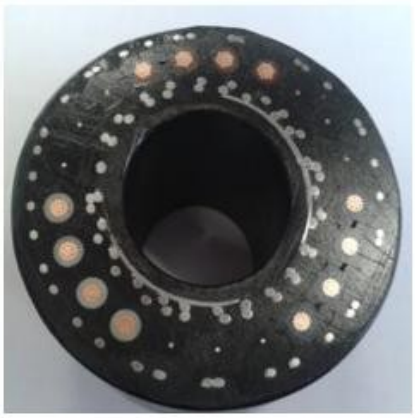
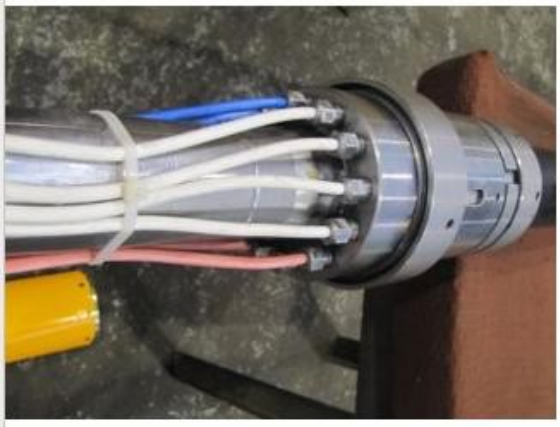






In 2016, 2 more umbilicals with a length of 1200 meters were delivered to Australia.
The launch was scheduled for April 2017



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