مشخصات فنی تجهیزات یک نمونه تجهیز CT

1.1.2 LGT360 Coiled Tubing Unit

This unit is trailer mounted and it consists of the power pack, trailer, control cabin, hydraulic system, tubing reel, injector motor power hose reel, injector control and BOP control hose reel and injector.

The engine of the power pack is the power source of the whole unit. The pump drive takes power from the engine and then drives three sets of hydraulic systems: one set of the hydraulic systems is the injector power system which adopts a closed-loop hydraulic system. A variable displacement piston pump drives two variable displacement piston motors on the injector. The second system is a tubing reel driving system which adopts an open loop hydraulic system. A vane pump drives the tubing reel motor. The third one is an auxiliary hydraulic system (open-loop system) which drives the hydraulic hose reel, tubing levelwind control, control cabin raise and lower and BOP control. The control cabin has rigid structure and is equipped with air conditioner. It can be raised and lowered freely with 35" allowance. Most of the operational valves are installed on the internal control panel which makes the unit operation easier. This unit has two separate lubrication systems and adopts pressurized oil supply system to lubricate the coiled tubing and injector chains respectively. The tubing reel has functions of automatic tubing winding and forced tubing winding which help to reduce labor intensity. It is also equipped with mechanical counter and electronic counter to help monitor the depth and speed of the coiled tubing. This unit is applicable for onshore operation. All supplied parts are suitable for humid, storm and sand ambient environments with working temperature at -30~+60°C. The reel can hold 5,760m coiled tubing at 2" and can meet operation requirements of the oilfields. The unit can be used for well service, gas lift, fishing, acidulation and sand removal.

Figure-LGT360 Coiled Tubing Units

1.1.2.1 Specification of LGT360 Coiled Tubing Unit

Table-Specification of LGT360

Item	Equipment	Unit	Company's Request
1	**Coiled Tubing Unit**		**Required**
1.1	Make & type		Jerry/Trailer-mounted
1.2	Years of construction		December, 2012
1.3	Years on service		June, 2013
1.4	Date last certification/inspection		December, 2012
1.5	Nominal Working Pressure	psi	10,000
1.6	CT unit driven by		Diesel power pack
1.7	Input power	HP	540
1.8	Suited for hazardous area		Yes, Zone II
1.9	Max. rated depth with 2" & 1-1/2" CT	ft	20,951(2")

Item	Equipment	Unit	Company's Request
2	**Coiled tubing reel**		**Required**
2.1	Make & Type		Jerry/150-78-78
2.2	Available capacity with 1-3/4″ C.T	ft	26,033
2.3	Available capacity with 1 1/2″ C.T	ft	37,247
2.4	Available capacity with 2″ C.T	ft	20,951
2.5	Available capacity with 2-3/8″ C.T	ft	14,279
3	**Coiled tubing**		**Required**
3.1	Make & type		Jason/TS-90*1.5*(0.175-0.134)
3.2	Dare of manufacture		June, 2017
3.3	Period in service	month	2
3.4	size	in	1-1/2
3.5	Wall thickness	in	Tapped, 0.175"-0.134"
3.6	Available length	ft	19,022
3.7	Working pressure	psi	12,400
3.8	Collapse pressure	psi	12,060
3.9	Steel (grade, yield)		TS-90
3.10	Max Pull	t	25.6
4	**Injector Head**		**Required**
4.1	Make & type		Jerry/ZRT-80
4.2	For CT size	in	1-1/2″ & 1-3/4″ & 2”
4.3	Minimum Pulling capacity	lb	47,000
4.4	Maximum pulling capacity	lb	80,000
4.5	At speed	Ft/min	100
4.6	Max speed	Ft/min	190

Item	Equipment	Unit	Company's Request
5	**Coiled Tubing Unit BOP**		**Required**
5.1	Make & type		Vanoil /4-1/16"10k
5.2	Nominal size	in	1-3/4"
5.3	W.P.	psi	10,000
5.4	Min.ID.	in	4-1/16
5.5	Equipped with rams:		blind, shear, slip &pipe rams
5.6	Lower connection		4-1/16" 10k flange
5.7	Remotely operable from control cabin		Yes
6	**BOP Adapter**		**Required**
6.1	Quantity and type available		Custom according to requirement
6.2	Bottom flange		Company to define
6.3	Working pressure	psi	10.000
6.4	Mini.ID.	in	According to bottom flange
7	**Lubricator / riser**		**Required**
7.1	Make & type		Jerry/4-1/16"*10k
7.2	Size O.D.	in	6
7.3	Size I.D.	in	4-1/16
7.4	Working pressure		10,000 psi
7.5	Element length	ft	3, 6, 10
7.6	No. of elements	No.	2, 2, 3
7.7	Total length	ft	48
8	**Striper**		
8.1	Make & type		Vanoil /4-1/16"*10k, side door

Item	Equipment	Unit	Company's Request
8.2	Nominal size	in	4-1/16
8.3	W.P.	psi	10,000
9	**Power pack**		
9.1	Suited for hazardous area		Zone II
9.2	Emergency shutdown		yes
9.3	Make & type		Jerry/CAT 15
9.4	Rated output power	Hp	540
10	**Control cabin**		**Required**
10.3	Suitable to remotely control the CT unit		yes
10.4	Remote control for BOP		yes
10.5	Inter-communication system		yes
10.6	Data acquisition		yes
11	**Standard Tools & Accessories**		**Required**
11.1	Tools & accessories for C.T. OP.s		yes

1.1.2.2 Reel

This coiled tubing reel mainly consists of the reel weldment assembly, driving system assembly, level wind system assembly, high pressure manifold assembly, reel hanging bracket and ladder.

1) Main specification

(1) 150-78-78 Reel, flange diameter 150", core diameter 78", width 78"

(2) Coiled tubing：1.75″× 5000m（16405ft）×Wall thickness：0.145″

(3) Working pressure: 10000psi

(4) HS80 (Tenaris USA)

(5) Maximum capacity 1.75″*26033ft

2) Driving System

The reel motor drives the gear box to drive the coiled tubing reel and the levelwind system through the double row chains. The whole driving system mainly consists of the reel driving system and the automatic levelwind system. The reel driving system mainly consists of the hydraulic motor, gear box, double row chains and gear to rotate the coiled tubing reel. The automatic levelwind system mainly consists of primary levelwind sprockets, secondary levelwind sprockets, levelwind arm, lead screw components, levelwind head and the override levelwind sprocket to drive the automatic levelwind system. The specification and form of the reel driving system chains are 20 A and double row.

3) Levelwind Assembly

The levelwind device assembly mainly consists of the secondary levelwind sprocket wheels, levelwind arm assembly, torque limiter, lead screw components, tubing lubricator, levelwind head assembly, override levelwind sprocket wheels, orbital motor and guide pulley. The levelwind arm allows the tubing level angle to be adjusted between the smallest 10° to the maximum 85° and it is adjusted by the hydraulic cylinder. The automatic levelwind device fulfills its function through the secondary levelwind sprocket wheels. Mechanical counter and electronic counter are installed on the levelwind head. The mechanical counter is used to observe the depth of the coiled tubing directly; and the electronic counter is used to record both the depth and the speed of the coiled tubing and it can also collect the data to the data acquisition system. A tubing lubricator used to lubricate the coiled tubing is designed beside the levelwind head. The levelwind head can be adjusted according to different diameters of the coiled

tubing and its adjustable range is 1″ ~ 2-7/8″.

4) Reel Lubrication

There is a remote controlled pneumatic reel lubricator installed at the rear of the reel counter and the remote control switch is mounted on the instrument panel inside the control cabin. The lube oil inside the lube oil bottle will enter the tubing lubricator by pressurized air, then the lubricator will spray the lube oil to the tubing. The lube oil bottle with capacity of 100 L (26.5 gal) is installed under the levelwind on the trailer. There is a pressure gauge on the oil bottle to display the pressure of the lube oil bottle, and the normal pressure range is 25~45 psi.

5) High Pressure Manifold Assembly

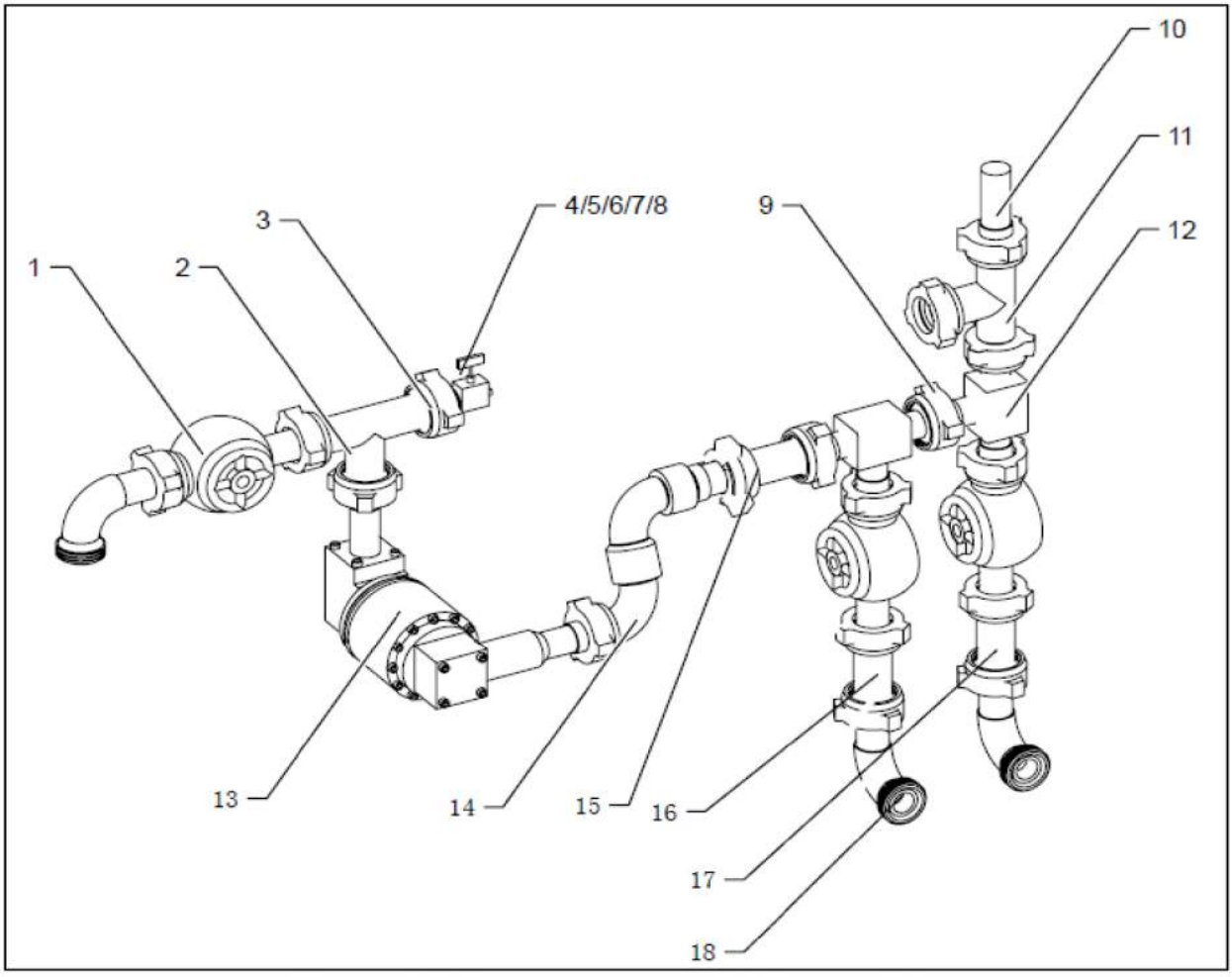


Figure- High pressure manifold assembly

Figure-Reel

1.1.2.3 Control Cabin

This module consists of the control cabin, base skid, cabin lifting cylinder, operation and control system and data acquisition system. During operation, the cabin shall be raised to monitor the working condition of the unit conveniently.

The control cabin module is welded on the gooseneck of the trailer through the base skid. The lifting stroke of the cabin is 1,000 mm, which provides enough view for the operators. There are two ladders designed for the cabin, namely lower ladder and upper ladder. The upper ladder is built in the guiderail of the cabin bottom; while the lower ladder, ladder handrail and ladder platform guardrail are located on the auxiliary girder at the rear of the unit. Install before application (first unfold the upper ladder, then install the platform guardrail at the upper ladder side).

1) Main specification

(1) A work desk is provided in the cabin for the digital computer which is provided with the data acquisition system. An air conditioning is also equipped to make sure our operators have a comfortable environment.;

(2) working temperature range:-30～+60 ℃;

(3) Four foot lift by hydraulic control;

(4) Equip a manual pump and a pneumatic emergency pump, MWP：35MPa;

2) Control Cabin

The control cabin features good seal, rain proof, sand proof and shock proof functions. This cabin is designed with one front window and two side windows. The front window is designed with protective screening and two electric windscreen wipers. Defroster fan, hydraulic air conditioner and chairs are designed inside the cabin.

There are two indoor lights at the top of the cabin and three lights in the external front of the cabin. The voltage of all electric parts is 24 VDC.

The control handle of the hand pump is designed beside the foldable seat on the side wall and it will be used to operate the hand pump under emergency.

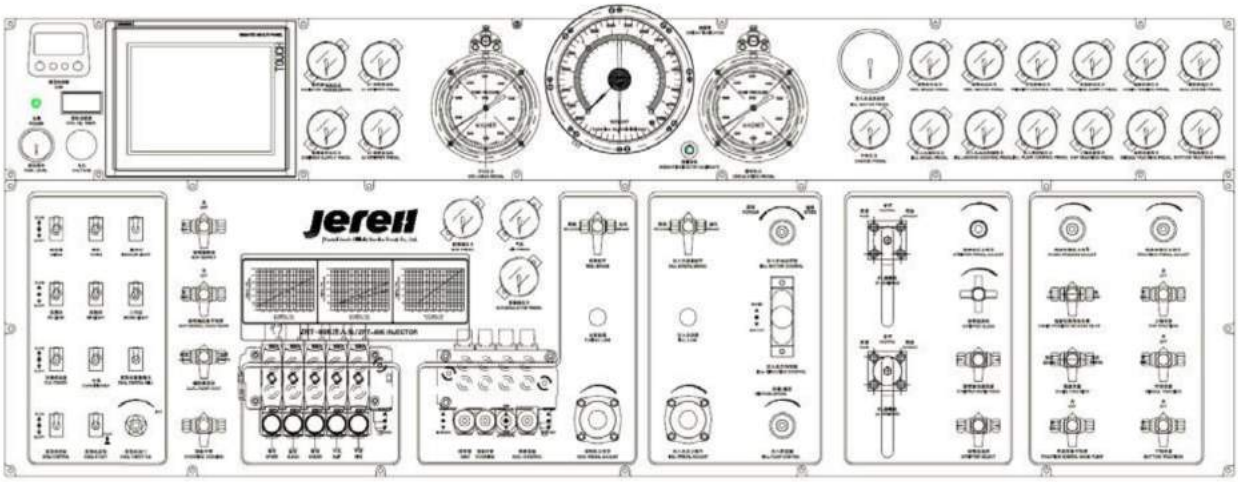
3) Cabin Lifting Device

The raise and lower of the control cabin is achieved through four hydraulic rotary actuators. The reasonable design of the hydraulic system ensures there is enough lifting capacity for cabin lifting and also ensures the synchronization of the raise and lower operation. There are four guiderails welded on the base skid of control cabin to control the direction of the cabin raise and lower. Spacer pin holes are designed on the guiderail. Insert the spacer pin to the hole after the control cabin is raised. Grease the guiderail to ensure the stability of the application after long term of use.

4) Control Panel

The control cabin is reinforced to provide a safe operation environment for the operators and the clients. The control panel is located inside the control cabin, and the operators can control most valves, buttons and monitor most pressure gauges and instruments safely and conveniently. The instrument panel includes upper panel and lower panel. The upper panel is used for monitoring and displaying while the lower panel is used for operating. The panel can be divided into different sections by different functions.

5) Main Instrument Panel



The following items are controlled by the system,

(1) Unit operation pressure display section

(2) Instrument display section

(3) Electric switches section

(4) Injector control valve operation section

(5) Reel control valve operation section

(6) Stripper control valve control section

(7) BOP control valve operation section

(8) Power unit control panel

(9) Fluid-charging indicating panel

(10) Operation valves outside the cabin and bulkhead panel nameplate

Figure-Control Cabin

1.1.2.4 Injector head

The main function of injector head is to provide power for running coiled tubing. Injector head include frame, driven system, clamp system, chain tensioners, gooseneck, weight indicator, hydraulic system, air brake system etc.

1) Type: ZRT-80K
2) Max pulling capability: 80,000 lbs
3) Max pushing capability: 40,000 lbs
4) Dimension: 1652*1435*2666mm
5) Weight: 4850kg
6) Suitable tubing size: 1.25-3.5"
7) Radius of gooseneck: 72"
8) Max running speed: 190 ft/min

Figure- Injector

1.1.2.5 Power pack

The power system and the control cabin form an independent power module which is skid mounted and fixed on the gooseneck of the trailer through hinge pin. The power pack is the power source of the unit and it provides power for the working parts of the unit, mainly includes the engine, pump drive, hydraulic pump, fuel tank, hydraulic oil tank, battery, hydraulic oil radiator, fuel heater and hydraulic valves.

1) Engine：CAT C15,
2) Cooling method: Fan
3) Rated power: 540hp，
4) Rated rotary speed: 2100 rpm
5) Throttle control: electrical control
6) Shutdown method: electrical control
7) Emission standard：Euro IV
8) Fuel tank: 680L（180Gal）
9) MWP: 32MPa;
10) Hydraulic oil tank: 650L(170Gal);
11) Electrical starting in 24V with 24V generator.

Figure-Power pack

1.1.2.6 BOP Assembly

Vanoil's 4 1/16"-10Ksi Quad BOP is designed to give positive protection against blowouts when operating with tubing applications up to 10,000 psi working pressure in an H_2S environment. It is hydraulically actuated with manually operated auxiliary ram stems to lock the rams in a closed position or to close the actuators in the event of a hydraulic power source failure. This style of BOP comes with hydraulic disassembly of the actuators from the body, providing easy ram monitoring and redress.

1) Main Specification

(1) Four rams: Blind/Shear/Pipe/Slip
(2) Working pressure: 10,000 psi
(3) Testing pressure: 15,000psi
(4) ID: 4-1/16"
(5) Operating temperature: -20~250F
(6) Top connection: 10kpsi BX-155 studded flange
(7) Bottom connection: 10kpsi BX-155 flange
(8) Hydraulic operating pressure: 2800-3000psi
(9) Control way: remotely and manually
(10) Standard: API 16A, NACE MR-0175

2) Ram Configuration

The standard ram assemblies in the 4 1/16"-10Ksi Quad BOP consist of four sets of mating rams:

Blind Seal Rams - contained in the top set of ram assemblies, these rams serve the purpose of sealing off the well pressure when no tubing is present.

Shear Rams - contained in the second set of ram assemblies, these rams are used to shear tubing.

Pipe Slip Rams - contained in the third set of ram assemblies, these rams grip the tubing while shearing or are used for any other application where the tubing is required to be held in place.

Pipe Seal Rams - contained in the bottom set of ram assemblies, these rams serve the purpose of sealing around the tubing isolating the wellbore pressure below.

3) Pressure Equalization

Each 4 1/16"-10Ksi Quad BOP comes with a single point equalizing system at each sealing ram assembly. This system enables the well bore pressure to be equalized from the bottom to the top of the sealing ram assemblies. The equalizer ports at the

shear and slip ram assemblies are blanked off. The purpose of these ports is to allow for the versatility of interchanging the ram assemblies to different configurations than mentioned above.

When servicing equipment above the BOP, a pressure differential is often created by bleeding off the pressure above the BOP. When the equipment is ready to go back on-line, the pressure equalizing system must be used to prevent a pressure surge which would be created by simply opening the sealing rams. Failure to do so may cause damage to ram or hydraulic assemblies.

4) Injection Port

On the side of each 4 1/16"-10Ksi Quad BOP is a BX-152 flanged type connection which is used for downhole injection. A common adapter for this port is a 2.0" figure 1502 female union by BX-152 flange. Vanoil can supply this adapter or others upon request.

Figure-Four Rams BOP

1.1.2.7 Stripper Packer

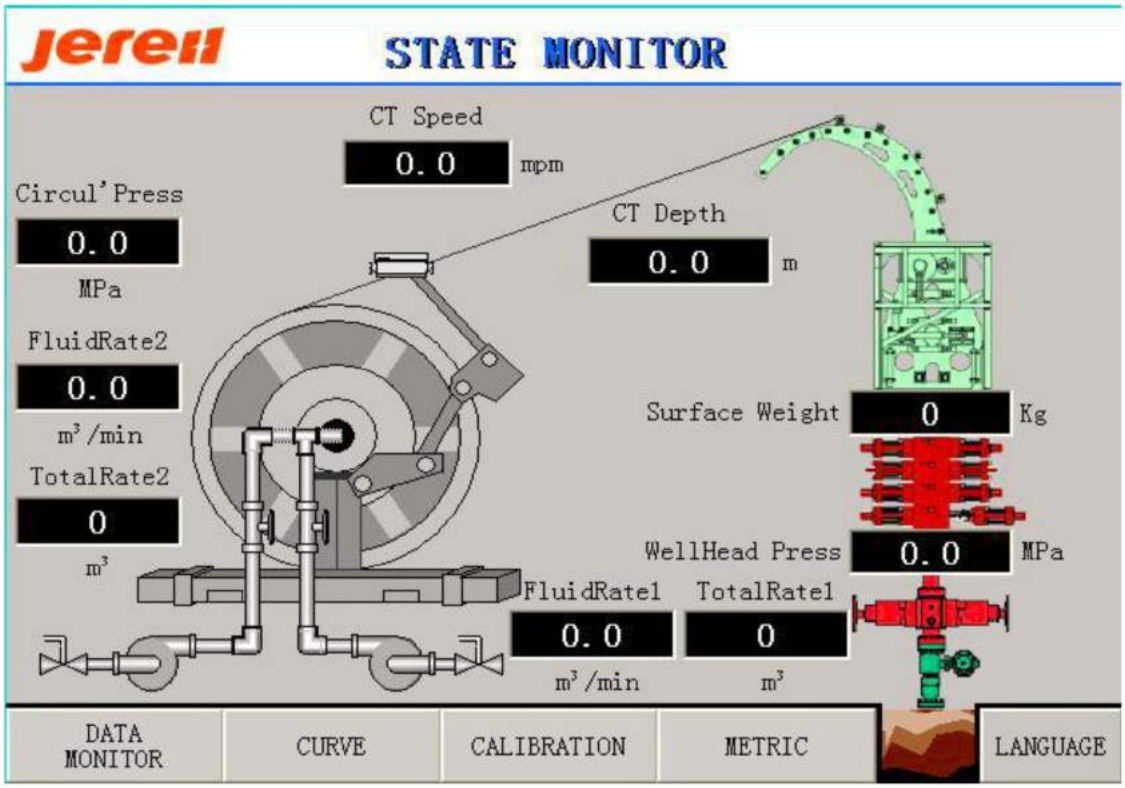
Vanoil's 4 1/16-10K side door stripper/packer assembly is designed to pack off on coil tubing as it is being stripped in or out of the well, at working pressures up to 10,000 psi. It also allows the replacement of packing elements, non-extrusion rings, and primary seal while the tubing is still in the well.

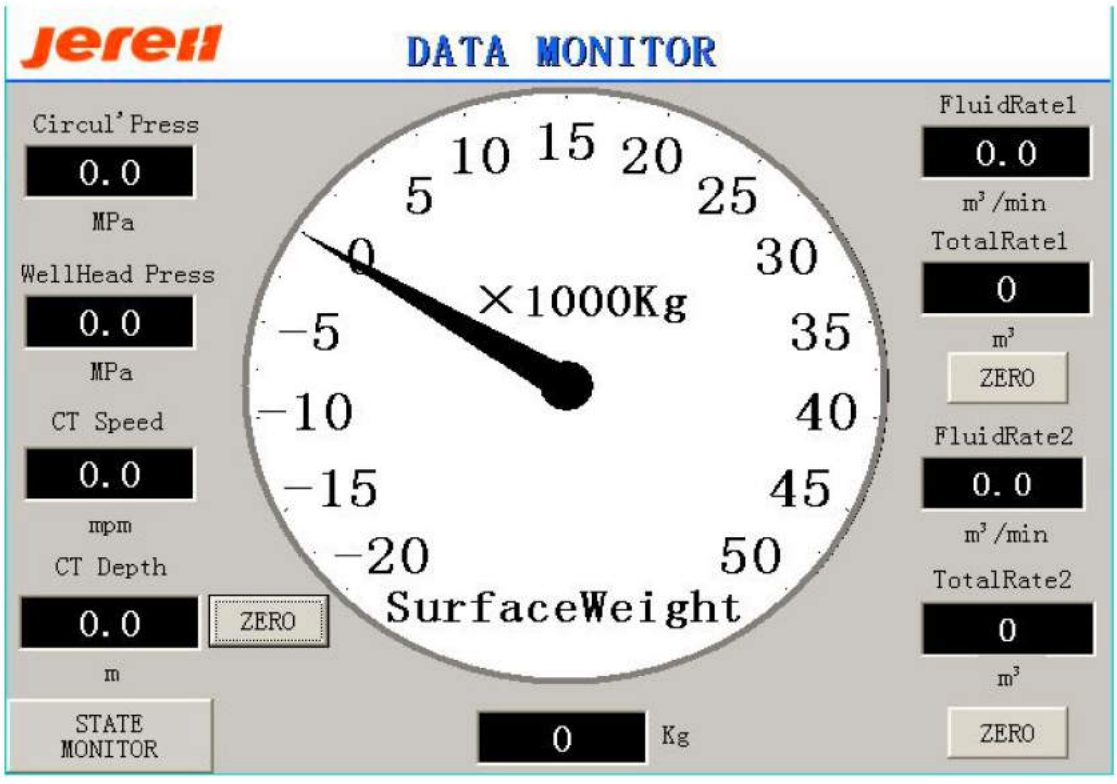
1) Working pressure: 10,000psi
2) ID: 4-1/16"
3) Type: side door
4) Operating temperature: -20~250F
5) Service: H2S
6) Tubing sizes: 1-1/4~2-7/8"
7) Standard: API 16A, NACE MR-0175
8) Double acting hydraulic pressure activated.
9) Removable split retainer for packer change
10) Vented to prevent well fluid from contaminating the hydraulic fluids

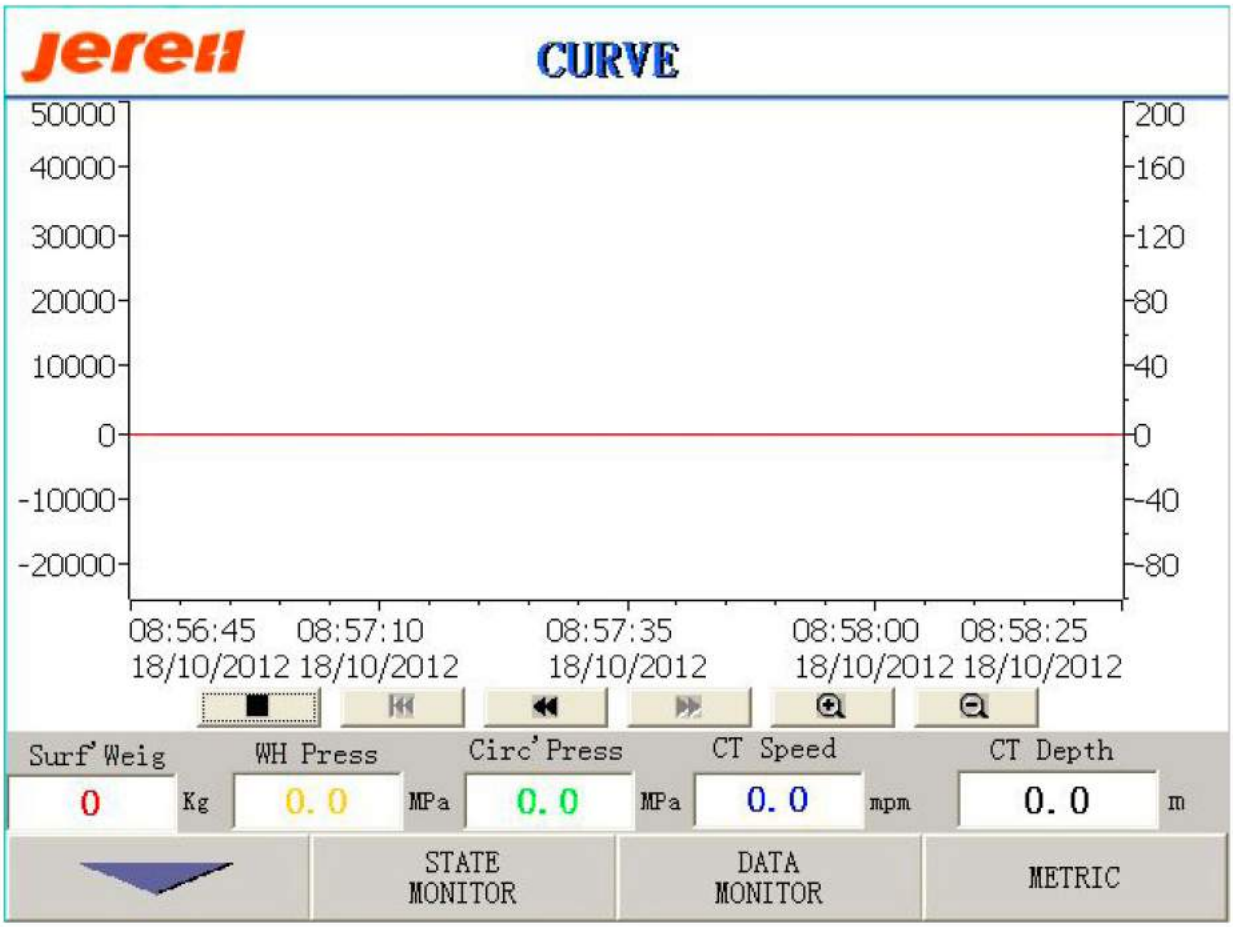
Figure- Stripper packer

1.1.2.8 Data Acquisition System

The following job data and flow rate etc. can be sample, displayed, recorded and copied, as well as printed in graphs: Tubing depth\ Running speed\(pipe heavy\ Circulating pressure\ Wellhead pressure\ liquid pumped rate\ total fluid volume pumped down CT.



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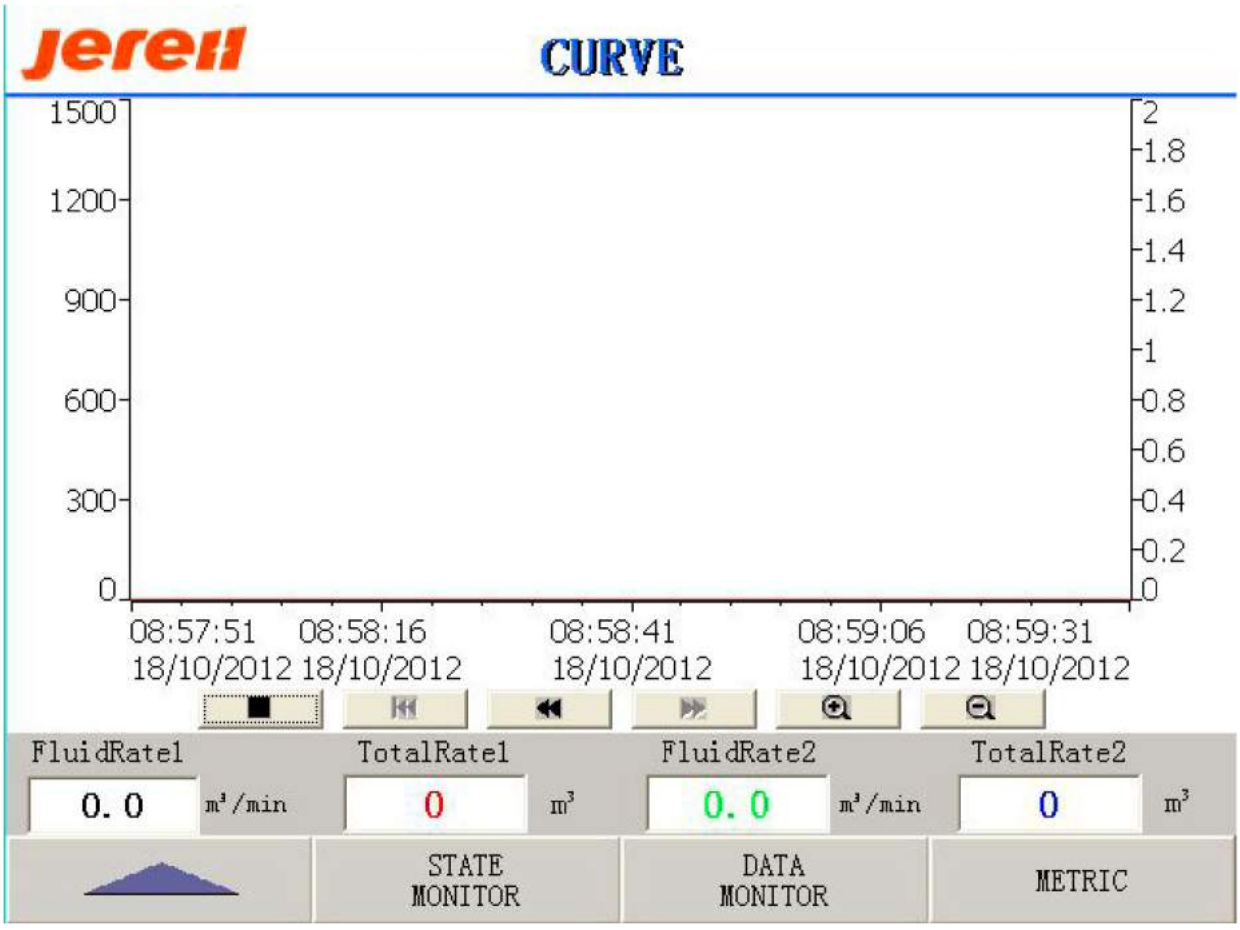
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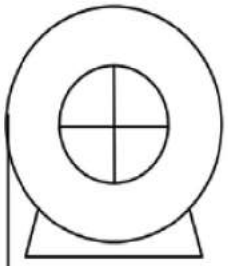
2) Coiled tubing certificate

Jason

CERTIFICATION OF CONFORMANCE

www.jasonoandg.com

Customer	Yantai Jereh Petroleum Equipment & Technologies Co., Ltd.	Certificate No.	JGC17020601
Order No.	JOG20170104001	Coiled Tube No.	TS-SEA01M0117A
Product Name	Coiled Tubing	Size	1.500"×TAP
Manufacturer	Jason Energy Technologies Co.,Ltd.	Grade	TS-90
Spool Size	Metal /135×82×70(in)	Length	19022 ft
Date Completed	02/06/2017	EST Tubing WT	40962 Lbs.
		EST Total WT	47752 Lbs.



Strip No.	Wall (in)	Length (ft)	Weld Loc (ft)	Weld Type	Coil No.	Heat No.	Mechanical Property							Chemical Analysis,Wt %									
							Yield Strength (psi)0.2%	Tensile Strength (psi)	Elongation (%)	Rockwell Mat'l	Hardness Weld	Flaring	Flattening	C	Mn	P	S	Si	Cr	Mo	Ni	Cu	Nb	Ti
2722144361212	0.134	1680	1680	BIAS	27221443612	27273383	99500	109000	24	97.0HRB	96.0HRB	OK	OK	0.15	0.74	0.012	0.001	0.34	0.58	0.15	0.14	0.28	0.012	0.016
2722144361213	0.134	1975	3655	BIAS	27221443612	27273383								0.15	0.74	0.012	0.001	0.34	0.58	0.15	0.14	0.28	0.012	0.016
2722144361214	0.134	1972	5627	BIAS	27221443612	27273383								0.15	0.74	0.012	0.001	0.34	0.58	0.15	0.14	0.28	0.012	0.016
2722144361215	0.134	1975	7602	BIAS	27221443612	27273383								0.15	0.74	0.012	0.001	0.34	0.58	0.15	0.14	0.28	0.012	0.016
2722144361216	0.134	1302	8904	BIAS	27221443612	27273383								0.15	0.74	0.012	0.001	0.34	0.58	0.15	0.14	0.28	0.012	0.016
2722127422552	0.145	2165	11069	BIAS	26218947413	26268265								0.14	0.76	0.008	0.000	0.35	0.59	0.12	0.16	0.29	0.016	0.016
2722094231219	0.156	2106	13175	BIAS	27220942312	27275531								0.14	0.74	0.007	0.001	0.34	0.58	0.11	0.15	0.26	0.014	0.016
2722094231210	0.156	2103	15278	BIAS	27220942312	27215531								0.14	0.74	0.007	0.001	0.34	0.58	0.11	0.15	0.26	0.014	0.016
2722343971212	0.175	1765	17043	BIAS	27223439712	27275475								0.14	0.77	0.010	0.000	0.34	0.57	0.11	0.16	0.28	0.015	0.015
2722343971213	0.175	1768	18811	BIAS	27223439712	27275475								0.14	0.77	0.010	0.000	0.34	0.57	0.11	0.16	0.28	0.015	0.015
2722343971214	0.175	211	19022	END	27223439712	27275475	99500	107000	25	97.0HRB	98.0HRB	OK	OK	0.14	0.77	0.010	0.000	0.34	0.57	0.11	0.16	0.28	0.015	0.015

UNION END

NDE Tests Results				Hydrostatic Test					
X-Ray	Strip ET	MFL	Mill ET	Flash-in Cut	Hydrotest	Water PH Level	Gauge Ball Size	Nitrogen Purge & Wiped	Freeze Proof
Acceptable	Acceptable	Acceptable	Acceptable	N/A	13600 Psi 30 Minute	Acceptable	1.000 in	Acceptable	N/A

Product Specification	API 5ST	NDE Specification	ASTM E309 E570
Material Specification	ASTM A606	Mechanical Test Specification	ASTM A370

I certify the above tests,inspections and reports are ture and accurate.

Quality Control /Date 02/06/2017