

# CenerTech

## Downhole Services

### 1. Overview

The Company is located at Tianjin - Tanggu Bohai Petroleum Base, covers an area of about 24000m<sup>2</sup> (including material area, plants & workshops, tool warehouse, office area and other international best facilities) and sets up subsidiaries in Zhanjiang, Shenzheng, Shanghai and other cities. The company is engaged in R&D, sales, lease, maintenance and test of new tools regarding drilling, completion, fishing, abandonment, acceleration & efficiency; and establishes one-stop comprehensive service system for the onsite service of operation preparation engineers and tool engineers.



### 2. Casing Window Sidetracking And Coring

With the rich experience and technology accumulation in casing window sidetracking, we are capable of conducting one-trip casing window sidetracking and two-trip casing window sidetracking, and sidetracking of drilling riser with large size. So far, our company has completed 40 times of window sidetracking operation including two for 20' ' casing; and reaches a 100% success ratio of one-time sidetracking.



Multi-functional bypass circulating valve

Running tool

Three-section window milling bit

Packer whip stock

Recyclable anchor

Permanent packer

## Downhole Services

With the technology accumulation in numerous years, the company now has the capacity of conventional conformal coring, sealed coring, coring in soft formation, coring in directional well, coring in special core diameter, wireline coring, etc. Up till now, the company has completed coring of about 110 wells in the east of South China Sea, Bohai, East China Sea, North Yellow Sea, including Shanxi coalbed methane fields, Anhui shale gas fields and overseas oilfields, with an accumulated coring footage of 4107.36m, an average recovery percentage of 97.83% and an average sealing rate of sealed coring of 95.52%. The company devotes itself to creating CNOOC unique coring brand and world brand; by now, the coring service has obtained API certification, which wholly improves the level of technology and quality.



## 3. Well Completion

### Sand Control Process And Capacity

#### 1. Casing Well

9-5/8"	One-trip Muti-zone standalone screen
9-5/8"	One-trip Muti-zone gravel packing
9-5/8"	Stack-pack
7"	One-trip Muti-zone standalone screen

#### 2. Open-hole Well

7"	One-trip Muti-zone gravel packing
7"	Stack-pack
8-1/2" & 6"	Open hole gravel packing
8-1/2" & 6"	Open hole standalone screen

#### 1. One - Trip Muti-Zone Standalone Screen

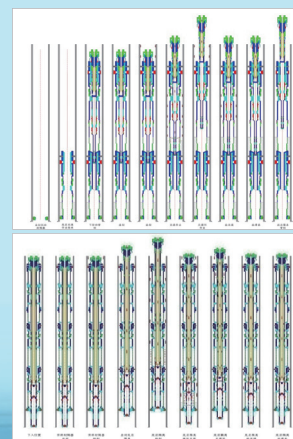
- Features: One trip to complete running sand control string, setting top packer and setting isolation packer zone by zone;  
 One trip to complete muti-zone perforation and one trip to run sand control string, save operation time, reduce leakoff, benefit for protecting reservoir;  
 Applied for separated production string, adjust and control payzone;

#### 2. Stack-Pack

- Simple operation, reliability, widely application, especially applied to the severe depleted formation or gravel packing of casing well recompletion with large amount of leakoff;
- Able to confirm the sealing property of sliding sleeve after gravel packing;

#### 3. One-Trip Muti-Zone Gravel Packing

- Applied to one-trip for muti-zone perforation and packing;
- One trip for running sand control string, setting packer and muti-zone gravel packing, so save operation time greatly;
- Setting top packer directly without dropping a ball;
- Weight indicates by weight down indicator when pick up string, and packing with a less weight to keep string without movement;



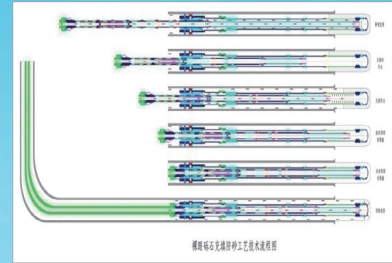


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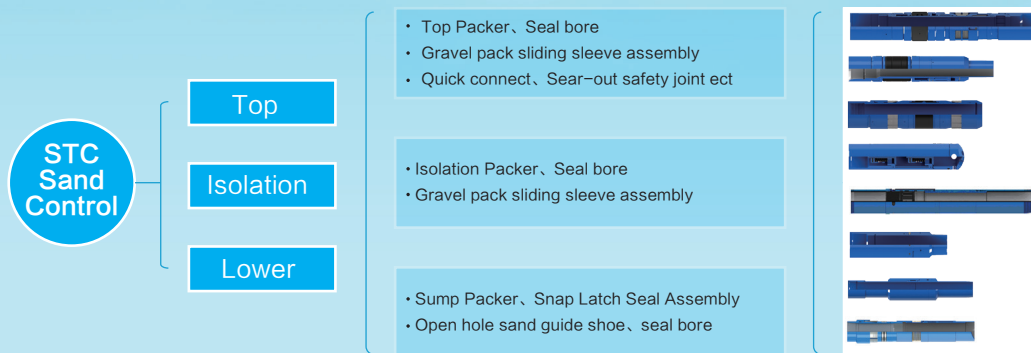
## Downhole Services

### 4. Open Hole Gravel Packing

- Open hole gravel packing require sidewall stable seriously and long time for packing;
- Allow Slow right rotation when running down with stuck;
- Preventing top packer setted early by a special structure;
- Hydraulic Release mechanism by Applied Tubing Pressure, and right rotation for emergency;



### Open-Hole Gravel Pack Sand Control Process Flow

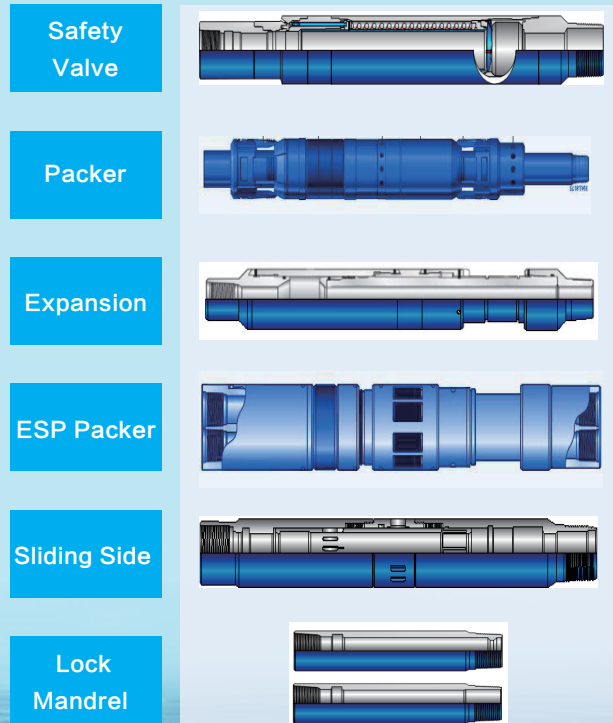


### Sand Control Tools

Top packer
Isolation packer
Sump packer
Open-hole sand guide shoe
Gravel pack sliding sleeve assembly
Shear-out safety joint
Quick connect
Seal bore

### Top Completion Tools

We can provide all kinds of completion tools included Packer / Safety Valve / Landing Nipple / Chemical Injection Mandrel / Sliding Side Door / Flow Coupling / Blast Joint / Wireline re-entry Guide / Protector for Control Line / Perforated Joint.



### 4. Fishing Service

The company has been engaged in fishing service for 13 years; the fishing operation refers to a systematic procedure to fish up the downhole fish via cutting, milling, grinding, fishing and other methods to meet the requirements of the further operation, which includes fishing sand control string, stuck filing service tool, stuck production string, permanent packer, downhole pump, stuck energized cable packer, sand control string of open-hole horizontal well, cable / wire, damaged casing, various downhole fishes and stuck tools, and treatment of downhole complex situations.

During the last 13 years, the company has served over 400 well-time for fishing various downhole string and fishes, provided technical supports and services for CNOOC oilfields in Bohai, East China Sea and west & east of South China Sea, and other overseas fields in Iraq, Qatar, etc., and obtained trust and praise from the customers.



### Our Core Technologies And Capabilities

1. Conventional sand well workover
2. Highly-deviated well and deep well workover
3. Small size strings workover
4. High-pressure gas well workover
5. Dual tubing well workover
6. Open-hole horizontal well workover
7. Old well reutilization
8. Casing taking and replacing technology

As a company providing fishing process design, fishing engineers and fishing tool onsite technical services, we has over 6000 fishing tools in various kinds and 50 fishing engineers with an education background above bachelor degree; 10 of them have served workover operation of more than 100 well-time and have the capacity of handling various complex string during the fishing drilling, completion and workover.