TAGRAS OILFIELD SERVICES COMPANY

CATALOG OF PRODUCTS AND SERVICES

Almetyevsk

Dear Partner!

Our company provides the whole spectrum of services relating to project planning, construction, infrastructure development and equipment of oil fields as well as service facilities on “turnkey” basis. Our main aim, from our perspective, is high quality and high reliability of customer service.

Many years’ experience in supporting our Customers’ ambitious projects have enabled us to come up with a long list of ready made solutions, to build up experience and gain leadership position in this country’s oil industry services. In managing our business, we are implementing a package of the newest and most successful technologies in global practice.

And this is interesting daily and strenuous work whose results we wish to generously share with you.

We would be delighted to solve the problems you may assign to us and will be of use in implementing the most complicated projects.

Anvar Yarullin, Director
TMC group Management company LLC

FULL RANGE OF OIL SERVICES

Holding Company provides services to oil and gas production facilities, construction of these facilities and development an infrastructure to all directions such as geophysics, drilling, well repair, mechanical and oil-field service, energetics, special vehicles, cargo-and-passenger transportation, major construction work and road building, also IT-service.

Integrated project control provides a "plug-and-produce" contract performance and guarantee of terms and quality.

TAGRAS oilfield services company

10
DIVISIONS

MORE THAN
100
ENTERPRISES

ALMOST
45.000
PERSONS

EXPERIENCE. RESOURSES. POTENTIAL

Holding Company incorporates enterprises, most of which were founded in the early formation of the national oil industry. During this time, Holding accumulated a unique experience in the development of many oil-producing regions in the development and implementation of new technologies and techniques, interaction with other participants of the oil business, and directly involved in the formation of industry standards.

Equipment, technology and high level of competence of specialists and workers, logistics system allow in optimal time to deploy the equipment and start production processes worldwide. Divisions of the Holding operate on the territory of Russia, CIS countries, Africa and the Middle East.

- TNG-GROUP
- TATBURNEFT
- TAGRAS-REMSERVICE
- TMC-GROUP
- SYSTEM-SERVICE
- TAGRAS-ENERGOSERVICE
- TATSPECTRANSPORT
- TAGRAS-TRANSSERVICE
- TATNEFTEDOR
- TATINTEC

ADVANTAGES AND UNICITY

Holding is a Russian company, accumulating the best world experience and innovative technological potential. Holding Company developed methods of prospecting and exploration wells, zonal isolation complications in drilling wells and processing bottomhole zone, methods of hydraulic fracturing and coiled tubing technologies which used widely in Russia and abroad.

The unique experience in the hard-to-recover oil and bitumen deposits in remote areas and in difficult climatic conditions is a special competitive advantage of the Holding.

In addition to the specialization profile, the Holding Company may provide services in other infrastructure projects, including a social orientation related to public works, transport, heat-, energy- energetics.

RELIABLE PARTNERSHIP

Holding Company strict follows to the principles of responsible business. Confirmation of Holding Company the high reputation is involved in the implementation of capital-intensive industry and infrastructure projects as suppliers of services and technologies, strategic partnership with “Tatneft” company and common initiatives with other major Russian and foreign oil producers.

Applied solutions aimed to optimization and control of Customer costs, providing a given level of profitability of oil and gas production and energy efficiency of production processes.

SOLICITOUS ATTITUDE TO ECOSYSTEM

Holding implements the principles of rational subsoil use, replenishment of natural resources and maintaining ecological balance. Current environmental management standards in Holding were developed on an integrated basis, which allows unifying the key environmental aspects with Customer for each project.

Realization of epc (epcm) contracts

Drilling equipment

Oilfield and downhole pumping equipment

Tools

Pipeline Products

TMC GROUP

- Comprehensive service of oil production equipment
- Accounting for the company's fixed assets movement and fixed assets write-off
- Anti-corrosion protection of pipe products
- Diagnostics, repairs and manufacture of oil production equipment
- Comprehensive diagnostics, repairs and manufacture of downhole pumping equipment
- Comprehensive service and manufacture of drilling equipment
- Performing a set of operations for EPC (EPCM) contract, "turnkey"

Holder of A.K. Gastev Cup of Productivity Leaders. Recognized Leader in Implementing and Developing Lean Production.

Sk Сколково

Status of accredited center for collective use of Skolkovo Technical Park

ЛУЧШИХ ТОВАРОВ РОССИИ

Laureate of Russia's 100 Best Goods – 2014 Competition

РЕСПУБЛИКА ТАТАРСТАН ЛУЧШИЕ ТОВАРЫ И УСЛУГИ

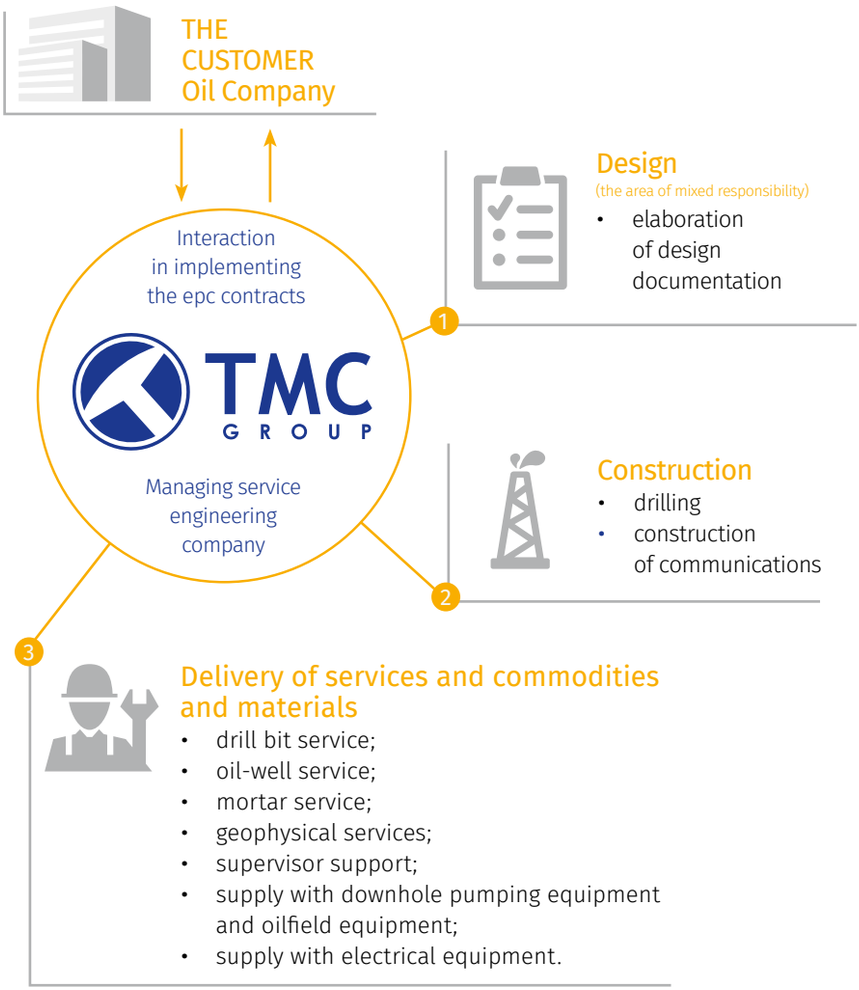
Laureate of Tatarstan's 100 Best Goods-2014 Competition

Emblem of Tatarstan Government's 2020 Quality Award

Archimedes 2020 Silver Medal

Realization
of epc (epcm) contracts

Relationship with customers throuh realization of “turnkey” epc contracts and epcm contracts.



Responsibility before the customer

- qualification of subcontractors by way of e-tendering;
- effective management of subcontractors by monitoring of the key performance indicators of each company agreed with the customer;
- standardized approach to coordination of operations of subcontractors with supervision and control public authorities;
- online informing the customer about the progress of the project.

Herewith we consciously accept a full responsibility for:

- not exceeding the budget of projects when EPC contracts implementation;
- actions of subcontractors;
- possible penalties which may be imposed by the supervisory and control authorities.

Advantages of cooperation:

- A single turnkey contract;
- Minimal risks for the Customer (because “TMC group”;
- Management Company LLC assumes most of risks on management of the project starting from the design till the delivery of a facility to the Customer);
- Full transparency in the implementation of investment and construction project;
- There is no need in direct participation of the Customer in the current project activities;
- Continuous improvement of production processes.

TMC group LLC MC is a part of TagraS-Holding LLC and having resources of contracting organizations, acts as EPC-contractor (General contractor).

Engineering, Procurement, Construction (EPC) is international contract form used in construction and engineering when Customer wants to employ TMC-group LLC MC for performance of all operation cycles for completion, infrastructure development and equipping of wells which were put into operation from drilling and were reactivated.
EPCM contractor is the general contractor, who for a strictly fixed price fully carries out an investment project and assumes all the risks for its implementation starting from the design till the delivery of finished facility to the Customer (including of warranty implementation). EPCM-contract provides: total project cost, inclusive of fee of TMC group — EPCM contractor, fixed term of commissioning, achieving the main technical parameters of the facility.

EPC-Contract envisages:

- total value of the project (fixed price) inclusive of the fees for TMC Group, i.e. EPCM Contractor;
- fixed completion date for the facility to be commissioned;
- achievement of key technical parameters of the facility;
- full financial responsibility of the EPC-Contractor for exceeding/saving the estimated cost of the project.

Capabilities Company

The Company owns a broad range of oil production equipment:

of pump rods

of tubing strings

of ellhead fittings

of sucker rod deep well pump drives

of sucker-rod pumps

of drill pipes

of hydraulic sucker rod type wrenches

Production facilities

The service department is provided with shop premises, well developed infrastructure and facilities. On the production premises of TMC Group, the following volumes are repaired annually:

Number of repair works carried out on downhole pumping equipment (tubing, deep-well rod pump, rods)

Number of anticorrosive and thermal insulated pipes manufactured

Number of oilfield and drilling equipment produced

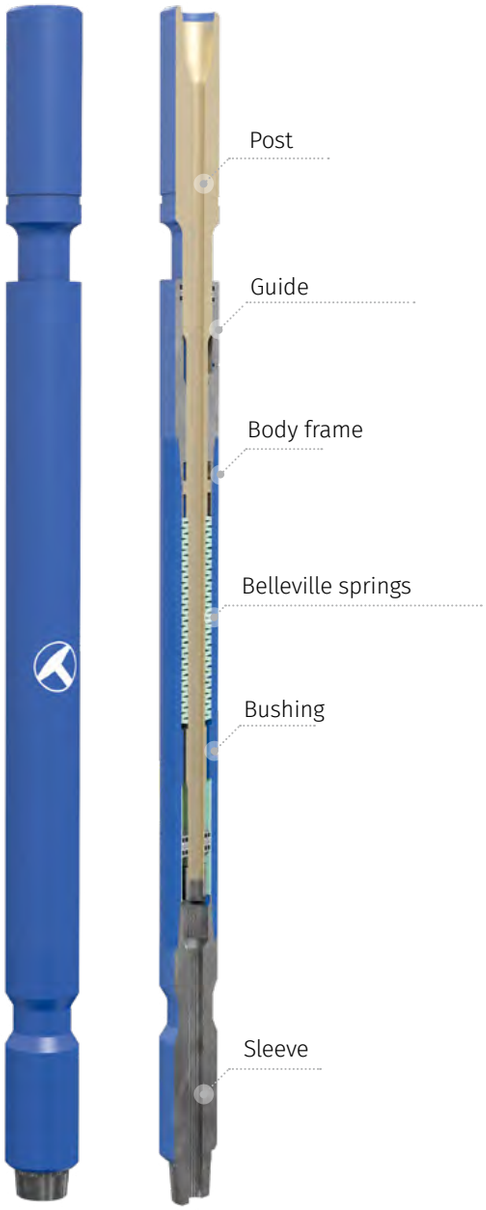
Number of oilfield and drilling equipment repair works performed

TMC GROUP

DRILLING EQUIPMENT

Drilling equipment

Defender™-120, 200
bottom-hole damper



Purpose

A mechanical shock absorber is installed above the bottom-hole motor or bore bit. It is designed to reduce the vibrational and shock loads that occur when the bore bit is operating at the bottom of the well.

Application of the shock absorber has a positive effect on:

- operational life of a drill string and its elements;
- improving the durability of bore bits;
- increasing the speed of machine drilling up to 30%.

Advantages

1. Extends the efficient operational life of bore bits and assembly elements of drill string bottom.
2. Significantly reduces the level of vibration transmitted from the drill string to elements of ground drilling equipment.
3. Especially effective when drilling on a conductor, when the load on the bit is minimal and the vibration level is high.

Technical specifications

Item No.	Parameters	Value
1	Outer diameter, in OKP code	203 (8”) 36 6840
2	Resilient member type	Belleville Spring
3	Length, in	129.9
4	Diameter of drilling mud through channel, in	2.5
5	Tensioning travel (upward), in	2
6	Compression travel (downward), in	3.7
7	Damper mass, lb	1421.9
8	Maximum axial load, kN	450
9	Maximum axial tension load, kN	600
10	Maximum torque, kN	50

Circulation sub

Purpose

The sub is designed to ensure the execution of process operations in the drilling, development and capital repairing of wells.

Field of application

Circulation sub — is a bypass valve system that allows the flow of drilling mud to be repeatedly switched from the internal space of the drill tring to the well's casing annulus.

Features of the circulation sub

1. Allows the pumping of cement slurry with inert fillers into the absorption zone of the drilling mud.
2. Allows to increase the flow velocity of the drilling mud in the casing annulus when drilling horizontal wells for more effective removal of drilling slurry.
3. Allows to carry out process operations connected with replacement of solutions, core sampling, development of wells after hydraulic fracturing of formation.

Advantages

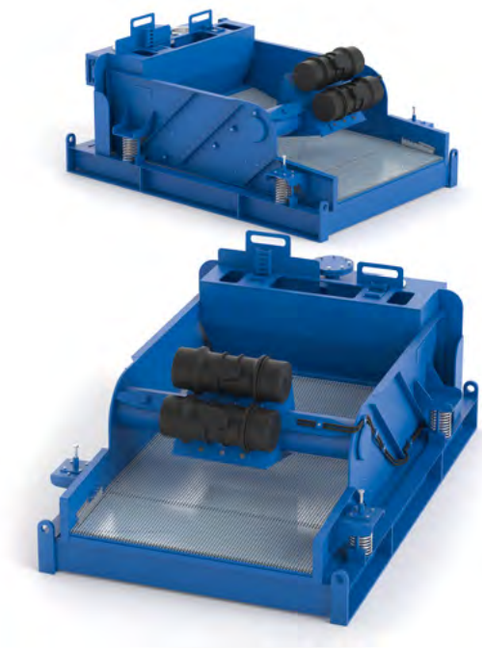
1. Savesalotofmoney,allowingforavoidanceofuptofiverunin holeoperatingcycles.
2. The circulation openings of the sub are automatically closed when the drill mud pump stops working, preventing the back flow of the flushing or cement slurry into the drill string cavity.
3. The operational life of the bore bit and bottom-hole motor is increased due to their exclusion from the flushing process and chemical treatment of the formation.

Technical specifications

Circulation sub								
External diameter, in	2.1	3.5	4.1	4.8	6.8	7	8.3	9.5
Internal diameter, in	0.31	0.98	0.98	1.2	1.2	1.2	1.4	1.4
Number of flushing holes	3	2	2	2	2	2	2	2
Diameter of flushing holes, in	0.36	0.68	0.68	1.1	1.1	1.1	1.4	1.4
Connecting threads	AMMT	3-73	3-86	3-102	3-133	3-133	3-152	3-177
Diameter of the activation ball, in	0.63	1.3	1.3	1.3	2.0	2.0	2.5	2.5
Number of activation cycles	5	5	5	5	5	5	5	5
Diameter of the deactivation ball, in	0.44	1.1	1.1	1.4	1.4	1.4	1.8	1.8
Diameter of the fixation ball, in	0.37	0.7	17.8	1.1	1.1	1.1	1.4	1.4
Maximum tension load, kN	523	2225	3178	4540	14070	14070	16800	27200
Maximum torque load, kNm	2,17	25.76	38.6	67.1	257.6	257.6	454.2	766
Screwing torque, lb•in	112.8	442.6	815.8	1371.3	4174.8	4174.8	5450.7	9747.2
Length, in	35	70	70	94	94	94	117	117
Sub mass, lb	44	154.3	220.4	330.6	815.7	881,8	992	1587.3

Guaranteed service life: 18 months from the commissioning date

Vibratory screen TMC SVELS™
TU 3663-008-78682242-2015



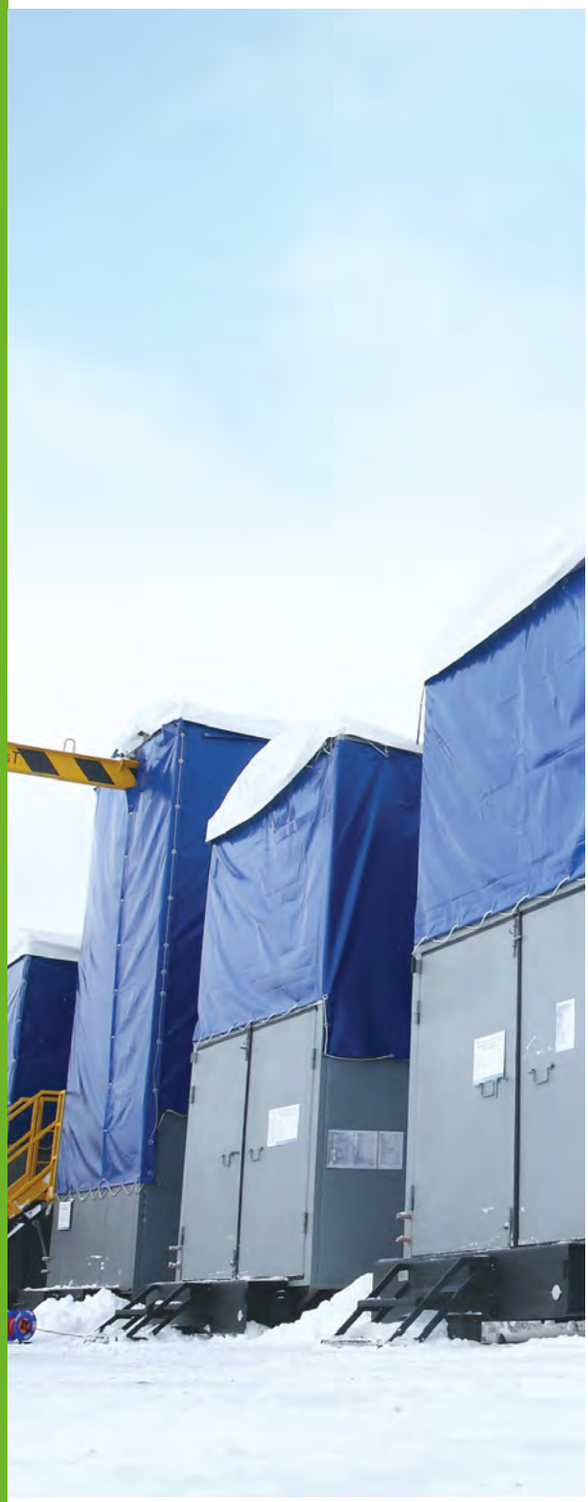
Purpose

The Vibratory screen is designed to clean drill fluid from cut out rock when drilling oil and gas wells. The Vibratory Screen is used as part of the drill rig circulation systems.

Technical specification

Parameters	Unit of measurement	Value
Overall dimensions	in	97 x 70.1 x 52
Production rate	ft^3/hr	35.3
Type of vibration		Linear
Working surface of the screen, no less than	ft^2	29.06
Number of vibratory motors	units	2
Power capacity of one vibratory motor, no more than	kW	2,2
Total capacity, no more than	kW	4,4
Vibration angle	d °F	113 °F
Oscillation amplitude of vibrating frame	in	0.08
Incline angle of vibrating frame	d °F	26.6°F
Overall dimensions of sieve cassettes, no more than	in	25 x 49.3 x 1
Mass, no more than	lb	3869.2

Circulation cleaning
systems of Acquilon family™



Purpose

Drilling mud cleaning system is designed for fine cleaning of muds from drill cuttings while drilling of oil, gas and other wells. Major tasks which circulating system fulfill are the following: cleaning of drilling mud from drill cuttings particles and further collection into special container; treatment, storage and transportation of mud from well to drilling mud receiving.

Composition

Treatment unit is designed for fine cleaning of drilling mud from drill cuttings and removal of dissolved gases from drilling mud (degassing).

- Mixing drilling mud unit is designed for mixing, treatment, weighting, dispersing and maintenance of clean drilling mud in the course of work with it.
- Process unit is designed for drilling mud storage. Mechanical agitators are generally placed in unit tank.

Advantages

- production of circulating system of any configuration at the customer's request in shortest time;
- availability of conformity certificates and permit to use;
- ample opportunities for circulating systems equipment with key production facilities of leading foreign companies;
- rendering of engineering services to customer;
- providing of customer with engineering and technical maintenance of installation and operation of circulating system;
- development and designing of circulating system according to customer requirements, as well as 3D modeling. Created 3D model allows customer to evaluate visually future circulating system.

Use of state-of-the-art technologies and individual approach to design and manufacture of the equipment allow the time period of production and selection to be reduced, allow high quality solutions to the process related tasks dictated by the Customer.

STORM – 100

The whole lineup of products are complete with quick-disconnect joints which simplify installation and cut back on the time of installation

Purpose

Used for well work-over, drilling small diameter wells, side tracking as well as for production drilling.

Technical specifications

Total useful volume of drill fluid, ft^3	3,531
Number of blocks, units	3
Number of cleaning stages, pc	3
Maximum throughput capacity of associated equipment:	
• Vibratory screen, gps	8.7
• De-silter, gps	13.8
• De-sander	58

STORM – 120

The entire lineup of products are complete with quick-disconnect joints which simplify installation and cut back on the time of installation

Purpose

Used for drilling small diameter wells, side tracking as well as for production drilling.

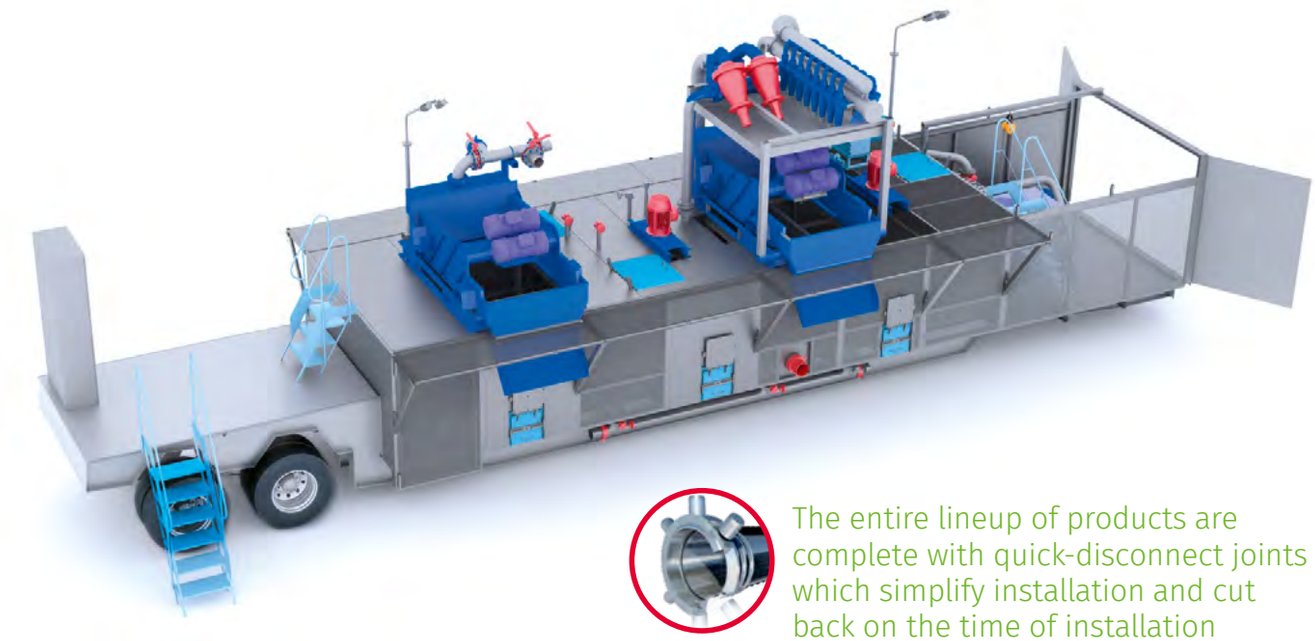
Advantages

Execution of circulating system is designed based on LEGO principle.

Technical specifications

Total useful volume of drill fluid, ft^3	4,238
Number of blocks, units	4
Number of cleaning stages, pc	4
Maximum throughput capacity of associated equipment:	
• Vibratory screen, gps	8.7
• De-silter, gps	13.8
• De-sander	58
• Centrifuge, gps	3.9
• Degasser, gps	8.7

CYCLONE – 40



The entire lineup of products are complete with quick-disconnect joints which simplify installation and cut back on the time of installation

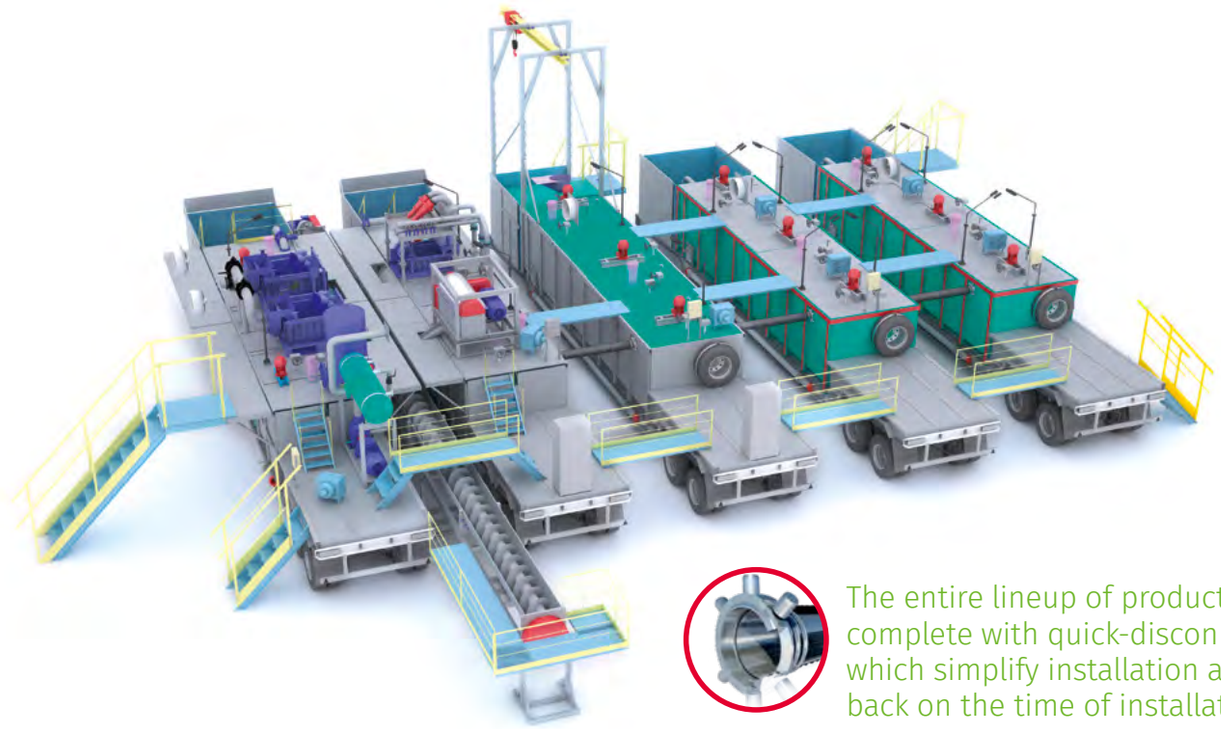
Purpose

Used for well work-over, drilling small diameter wells, side tracking as well as for production drilling.

Technical specifications

Total useful volume of drill fluid, ft^3	1,413
Number of blocks, units	1
Number of cleaning stages, pc	3
Maximum throughput capacity of associated equipment:	
• Vibratory screen, gps	1,413
• De-silter, gps	13.1
• De-sander	63

HURRICANE – 240



The entire lineup of products are complete with quick-disconnect joints which simplify installation and cut back on the time of installation

Advantages

Universal, technologically ergonomic solution with respect to a set of blocks for cleaning, preparation, adjustment of properties and continuous circulation of drill fluids.

Technical specifications

Total useful volume of drill fluid, ft^3	8,476
Number of blocks, units	7
Number of cleaning stages, pc	4
Maximum throughput capacity of associated equipment:	
• Vibratory screen, gps	11.2
• De-silter, gps	13.1
• De-sander	40
• Centrifuge, gps	2.4
• Degasser, gps	8.7

Technical specifications

Nr.	Basic engineering data	Parameter value
1	Net effective volume of drilling mud of circulating system	45–240
2	Capacity volume of circulating system: • rough cleaning unit • fine cleaning unit • mixing unit • drilling mud storage unit • technical water unit • process unit	1589.1 ft³ (988.8 ft³+600.3 ft³) 1589.1 ft³(1024.1 ft³+565.03 ft³) 1589.1 ft³(1165.3 ft³+423.7 ft³)45 1589.1 ft³ 1412.5 ft³ 353.1 ft3
3	Number of cleaning stages	up to 4
4	Maximum capacity of accessory equipment: • Brandt Mini Cobra shaker screen (three-panel) • Shale shaker-desander combination unit 2/16 on the base of Brandt Mini Cobra shaker screen (three-panel) • Brandt HS-3400 centrifuge • Kaskad-40 M degasser	8.7 gps 14.07 gps 13.4 gps 2.7 gps 8.7 gps
5	Overall dimensions of units in working position (height*width*length), in • rough cleaning unit • fine cleaning unit • mixing unit • drilling mud storage unit • technical water unit • process unit	648.1*138.1*128.3 648.1*138.1*128.3 648.1*138.1*128.3 648.1*138.1*128.3 648.1*138.1*128.3 648.1*98.4*212.5
6	Overall dimensions of units in transit condition (height*width*length), in • rough cleaning unit • fine cleaning unit • mixing unit • drilling mud storage unit • technical water unit • process unit	648,1*125,2*177,1 648,1*127.9*172.05 648.1*127.9*153.5 648.1*98.4*155.5 648.1*98.4*140.3 648.1*98.4*157.4
7	Units mass, in working position, lb • rough cleaning unit • fine cleaning unit • mixing unit • drilling mud storage unit • technical water unit • process unit	62,095 61,085 51,839 46,297 33,113 42,990
8	Units mass, in transit condition, lb • rough cleaning unit • fine cleaning unit • mixing unit • drilling mud storage unit • technical water unit • process unit	41,693 46,546 43,871 39,506 32,363 40,785
9	Unit mounting base	Semi-trailer

“TYPHOON”™ Mobile unit for centrifugation of drill fluid

Advantages

1. Principal prerequisites for choosing the mobile unit for centrifugation of drill fluid are as follows:

- for each facility, a stationary unit is required which results in excessive financial costs;
- utilization of the stationary unit is not more than 10%;
- option of transitioning to low cost stationary models does not pay off as a saving for reasons of low reliability, short service life and high maintenance cost.

2. Key advantages achieved if a mobile unit for centrifugation of drill fluid is used:

- purchase of one mobile unit can replace 10 and more stationary units;
- high utilization of the mobile units with 10 oil wells — from 90% and upwards;
- designed and manufactured with use of high technology developments, thanks to which our units are typified by long service life of the equipment, high productivity, reliability, maneuverability which allows them to be installed in any place;
- possibility of moving the equipment around drill sites. Reduced time loss and labor costs to commission into operation. Time it takes to connect the unit is not more than 10 minutes;
- the cargo is of standard size and does not require additional licenses to transport it;
- lack of negative impact on environment;
- low operating costs. The unit is simple to maintain and repair;
- manufacturer’s warranty and service support;
- winner of “Russia’s 100 Best Goods” Prize, Diploma 1-st Degree in “100 Best Goods and Services” Competition in the nomination “Products for Production and Technological Purposes”;
- the key feature of our unit is lack of linkage to particular drill sites and the possibility of easy change in operating site;
- manufactured in various configurations depending of the Customer’s needs and required cleaning parameters.

TYPHOON

Super fine cleaning of drill fluids when drilling on production (pay) horizons.

EXCLUSIVITY AND PERSONALIZATION

Use of state-of-the-art technologies and lean approach to project planning as well manufacture of systems allows us to take into account all the wishes of the Customer and to provide an individual solution within the shortest possible time. Ergonomics of controls and smooth startup of the system into operation ensures maximum efficiency and safety of operator's work. Individual approach in pricing.

GUARANTEED QUALITY

Reliable anti-corrosive protection and heat insulating protection of vessel equipment and piping, 100% output control of welded joints of support steel. All the elements of the system are executed in strict conformity to the requirements for mobilization on the general purpose roads and do not require special permits to be issued or escort by vehicles of the State Inspectorate for Safety of Road Traffic.

LUCRATIVE ACQUISITION

Each system is complete with:

- Power cabinet and starters/controls
- Exhaust fans
- Steam coils around vessel equipment housings
- Electric space heaters
- Gas indicators
- Level meters

A most varied range of attachments to suit every taste.

Technical specifications

Density, lb/ft^3	65,5-84,2
Viscosity per Viscosimeter Vmb, sec	17-60
Maximum size of hard particles, in	0.03
Acidity, pH	5-5,5
Maximum production rate, ft^3/hr, no more than	95349.6
Energy Characteristics	
- Rated voltage, V	380
- Rated current frequency, Hz	50
- Power consumption, kW	37
Classification of Electric Equipment Protection Degree	IP-64 (explosion proof)
Mass, lb	5,291

In-depth cleaning of drill fluids from cut out rock and their recuperation to initial state.

Ditch
system of tanks

Purpose

Designed to receive and purify the process fluid in wellservice and bottom-hole formation zone treatment. The temperate climate operations are provided at an ambient temperature of -49 to +104°F according to GOST 16350. The climatic performance of U2 according to GOST 15150.

Composition

The ditch system is a welded construction in the form of rectangular tank divided into six interconnected sections, mounted on the frame of the trailer chassis (or skid) and equipped with work platforms.
For the initial purification and filtration of fluid from large mud particles the folding mesh is provided. The process fluid flowing from section to section through openings in the walls is purified from light ends, which precipitate in baskets provided in each of the sections.
The nozzles being movably mounted in the wall of sections are provided for cleaning the sections from the mud. Sampling occurs through a special hatch.

Technical specifications

Parameters	SEZh 6-15	SEZh 3-19	SEZh 3-19ПХ
Working environment — the process fluid with a specific gravity, oz/in²	up to 0.006	up to 0.009	up to 0.009
Critical dimensions, in: length width height	 173.2 98.4 43.3	 236.2 90.5 59.05	 236.2 90.5 59.05
Operational capacity volume, ft³	529.7	671	671
Capacity drained weight, lb	4,299	5,577	5,577
Vehicle	trailer chassis	skid	trailer chassis
Designation under specification	RBSh 2599.00.000	RBSh 3195.00.000	RBSh 3195.00.000M

Pipeline components

Quick disconnect joint VRS

Purpose

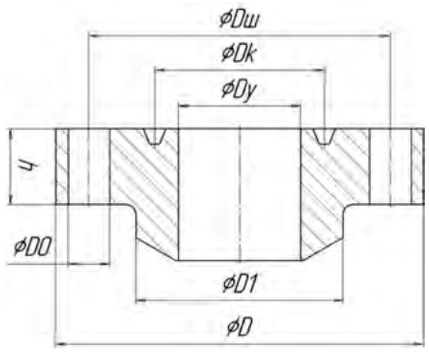
Quick disconnect Joint is designed for quick installation and removal of pipeline sections.

Technical specifications

Working pressure, PSI		5000
Nominal bore, in		2
Working medium		Industrial water, oil, petroleum products
Connecting thread		Tubing String 60 GOST 23/8
Overall dimensions, in	Length	5,5
	Width	5,1
	Height	7,3
Working medium temperature, °F no more than		+122 °F
Mass, lb		16,3

Flanges

Flanges per GOST 28919-91 and RD 26-16-40-89.



Horizontal
slurry centrifugal pump, ANSHG 150/125

Purpose

It is used for pumping drilling mud, abrasive inclusions and spent wash solution.

Application

Pump unit is an integral part of the process of circulating and cleaning drill fluids in the course of well drilling. As part of implementing the Federal government program for import substitution in oil and gas sector, we have accomplished the project for design of Centrifugal Horizontal Slurry Pump Unit ANSHG 150/125, capacity 8,829 ft^3.

Advantages

1. Designed using components produced in-house.
2. Lower production cost compared to foreign made equivalents.
3. Equipped with explosion proof control cabinet Exd class which contains the main motor control center unit for the Pump drive (if the Customer specifies, the Pump Unit may be complete with protection class IP54 electric control cabinet or class EXD explosion proof class).
4. Full manufacturing cycle proceeds on the manufacturer's production premises:
   - manufacture of cast elements of the structures;
   - machining, assembly and adjustment;
   - hydraulic testing on the test stand.
5. Special pump impeller 13 (13 inches) of in-house design.
6. Two sealing units, i.e. outside sealing unit and inner end seal from tungsten carbide (such seal characteristics are used in imported pump units made by leading world producers).
7. Two row bearing assemblies.
8. Special clutch to mate with the motor.

Implementation of such design solutions would enable leaks of medium being pumped to be eliminated, losses of pressure to be avoided and between repairs period to be lengthened more than 5 times.
Each pump unit ANSHG 150/125 undergoes hydraulic testing on a special stand to determine conformity to required specifications and to control leak tightness of the design. This guarantees constant high quality of the products made.

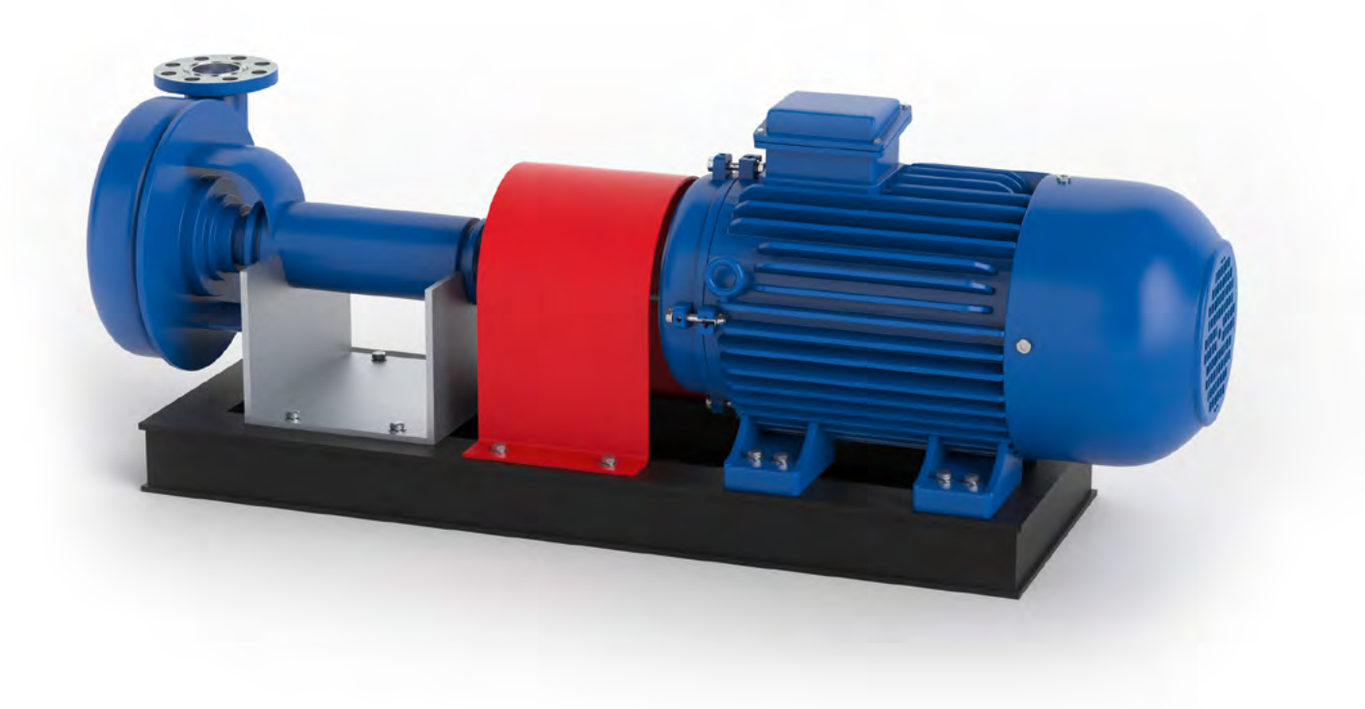
Technical specifications

Nominal feed (Water)	25
Nominal pressure (Water)	3.7 bar
Nominal bore of suction line (Input flange)	5.9 in
Nominal bore of pressure line (Output flange)	4.9 in
Electric motor power rating	55 kW
Supply voltage (3 phase, 50 Hz)	380V
Category of location per GOST 15150	UKHL 2
Electric safety degree per GOST 14254	IP54
Explosion proofness degree per GOST 51330	1ExdIIBT4x
Specifications of the mixture pumped:	
Density	Up to 81.1 lb/ft^3
Temperature	41...140 °F
Solid inclusions concentration	Up to 20%
Density of solid inclusions	Up to 156 lb/ft^3
Size of solid inclusions	Up to 0.7 in
Overall dimensions (LxWxH)	70.4x22.8x30.7 in
Mass	1,873 lb

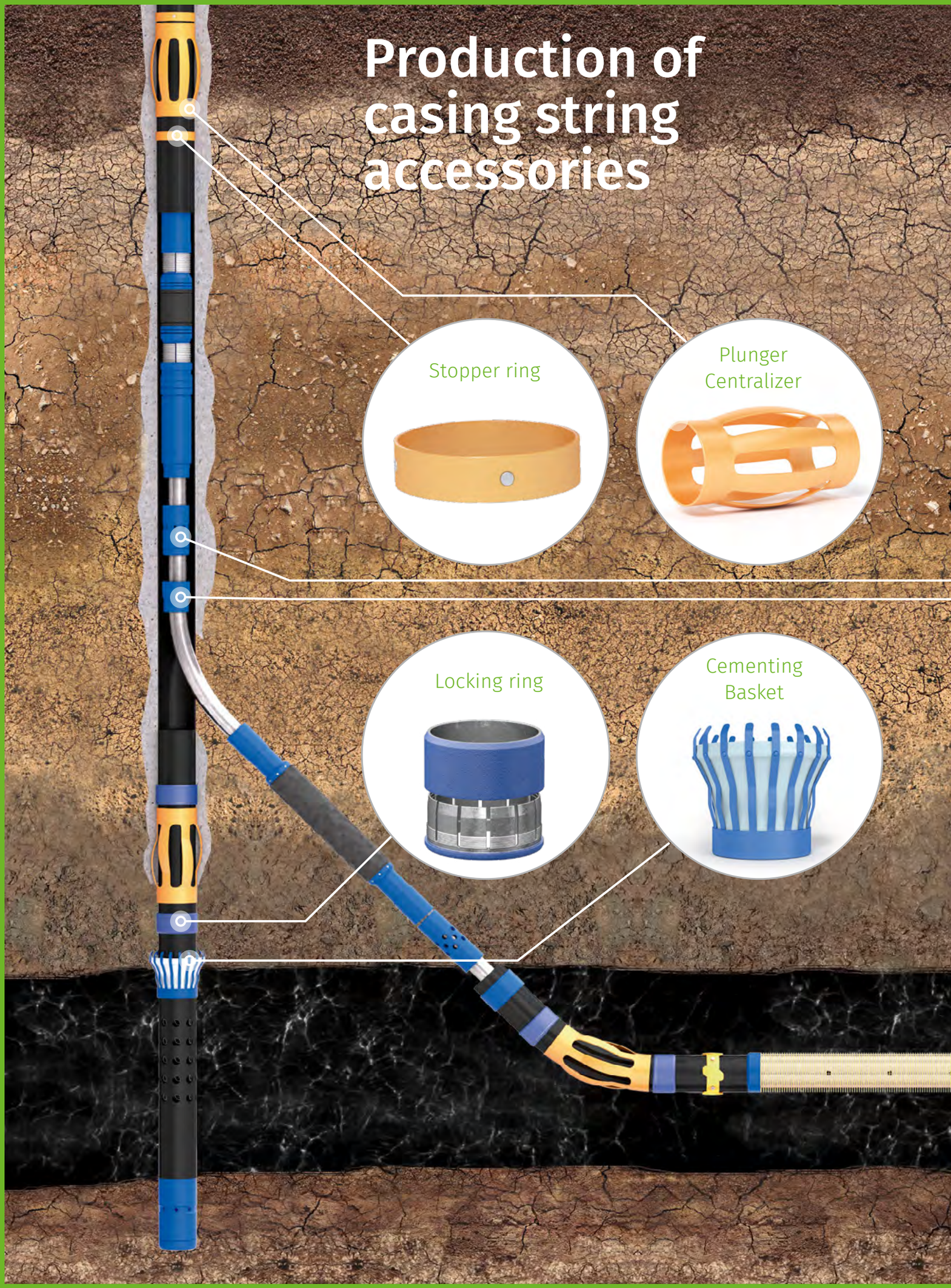
Different supply configurations ere available

- ANSHG 150/125 Pump;
- ANSHG 150/125 Pump Unit is mounted on the frame with the motor and clutch.
- ANSHG 150/125 Pump Unit with the control cabinet in explosion proof execution and a smooth startup device (control cabinets of different holding capacity are available).

At the Customer's request, our technicians can offer pump unit options with different supply-pressure characteristics.



Production of casing string accessories



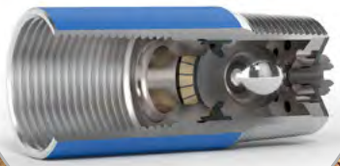
The Company manufactures and supplies:

- Casing string accessories dia from 4.4 to 16.7 inches
- Subs (GOST, API)

Connection elements of the accessories are made with triangular thread as well as buttress threads OTTG and OTTM, Tenaris® and Buttress® threads.

Cementing Device

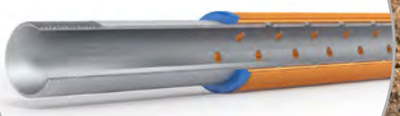
Orifice Check Valve



Casing Float Collar

Cast Centralizer

Slotted Filter



String Shoe with Check Valve

Casing liner hanger

Purpose

The liner hanger is a device designed to run in a liner string with the unit and fasten it to the well.

Application

The liner hanger is installed for subsequent running-in of the liner. It is used for technical operations on a well. Easily separated from the transport string by reverse rotation.

Advantages

- Simplicity and workability of design. The shoe combines the back pressure valve and the seating grooves «as the stop ring» of the plug in a housing.
- The displacement plug is equipped with cuffs of various diameters for a more efficient cleaning of the pipes inner surface and a secure fixation in the shoe housing.

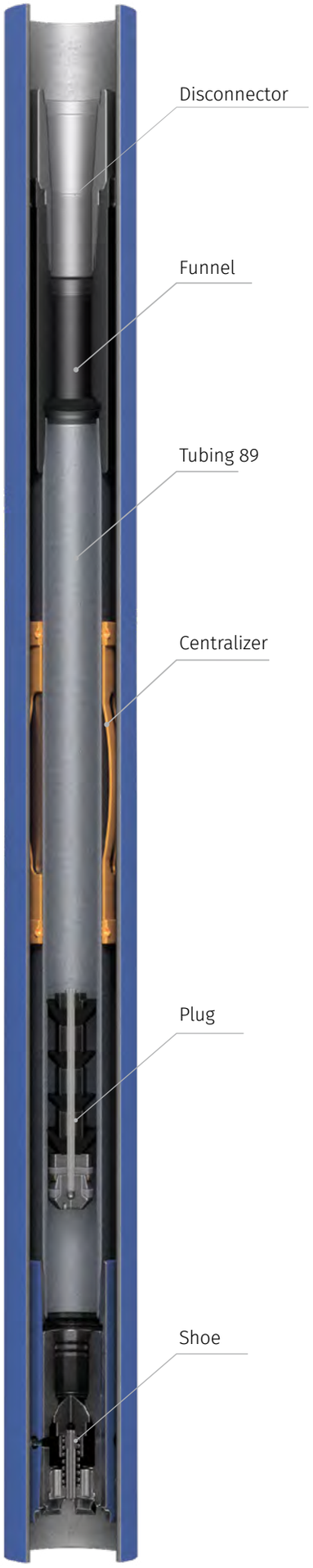
The liner hanger includes

Shoe is designed to guide the liner along the well bore, prevent it from rotating after fitting, prevent drilling mud from getting into the casing string during running-in, as well as to fit, seal and fix the plug

outer diameter, up to, in	4.1
through channel diameter, up to, in	1.5
tubing connecting thread diameter according to GOST 633, in	3.5
maximum operating pressure of the back pressure valve, bar	200
length, up to, in	11.8
weight, up to, lb	33

Hopper is designed to connect the liner to the disconnector during running, and to disconnect them after injection of cement slurry.

outer diameter, up to, in	4.4
through channel diameter, up to, in	2.9
connecting thread diameter according to GOST 633, in	Tubing 3.5
disconnector thread according to GOST 24738	Tr 85x4 LH
length, up to, in	12.9
weight, up to, lb	33



Plug is designed for separation of cement slurry from the displacement fluid, cleaning of the casing pipe wall from cement slurry residues.

maximum collar diameter collar, up to, in	3.1
metal diameter, up to, in	1.9
length, up to, in	9.8
weight, up to, lb	2.2

Centralizer is designed for tailpipe string centering during running and well cementing

Bow spring centralizer	89/120
outer diameter, up to, in	4.7
inner diameter, up to, in	3.7
length, up to, in	11.8
weight, up to, lb	4.4

Disconnector is designed to separate drill pipes from the liner by reverse rotation.

outer diameter, up to, in	4.1
through channel diameter, up to, in	2.3
connecting thread diameter according to GOST R 50854, in	0.1-3.3
hopper thread according to GOST 24738	Tr 85x4 LH
length, up to, in	7.8
weight, up to, lb	15.4

Shank
installation equipment

Purpose

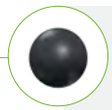
The equipment is designed to lower and cement the shank.

Field of application

The device is used in drill pipes at the oil well completion stage.

Top plug

Serves to clean the inner surface of drill pipes and to close the central channel of bottom plug when squeezing the cement slurry. Includes a tip to which a rubber collar is attached. A locking ring and plastic seal are installed on the tip.



Pressing ball

Serves to temporarily close the combination valve during pressing shank pressing. Made of polyethylene and pressed through a combined valve at a specified differential pressure.

Disconnecting adapter

It serves to disconnect the drill pipes from the shank by right-hand rotation.

Funnel

Serves to connect the shank to the disconnector when lowering into the well, to disconnect them before infecting the cement slurry and directing the tool into the shank during repair works in the well. It is a sleeve with tapered guide surface and left-hand internal thread on the top.

Stuffing box

Serves to seal the disconnector in the upper shank tube by means of tubing string (extension). Includes a bore on which gaskets are fixed by means of a head, supports and nuts.

Bottom plug

It serves to clean the shank from the cement slurry and to close the valve after the completion of the squeezing process. Includes a tubular body on which collars are fixed. The plug is equipped with the adapter ensuring the plug disconnection from stuffing box (after seating the top plug) at a specified differential pressure.

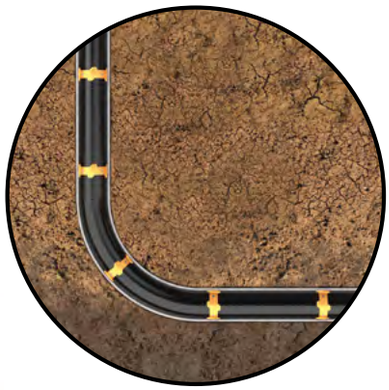
Combination valve

Serves to cover the shank with a plastic pressing ball Ø 374 mm, bottom cementing plug and rotary blocking element (lock plate). In the shank, the valve is mounted between the pipe ends.

Shoe

Serves to direct the shank along the well bore, stopping it from rotation after seating in the bottom hole and directing the tools lowered below the shoe.
It is a sleeve with bevels on the lower end and flushing holes.

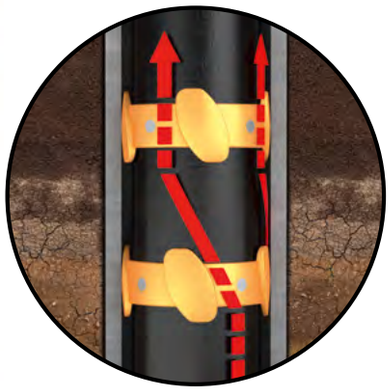
Centralizer cast centralizers SCORPIO™



Application

Centralizers Type TMC SCORPIO™ are designed to centralize casing strings during the process of cementing and are used in:

- wells with inclined and horizontal areas;
- areas with cavernous walls.



Purpose

Cast centralizers “Scorpio” ™ (TsL type) are designed for casing string centering while running and cementing in inclined and horizontal wells for formation of uniform cement column in borehole annulus.

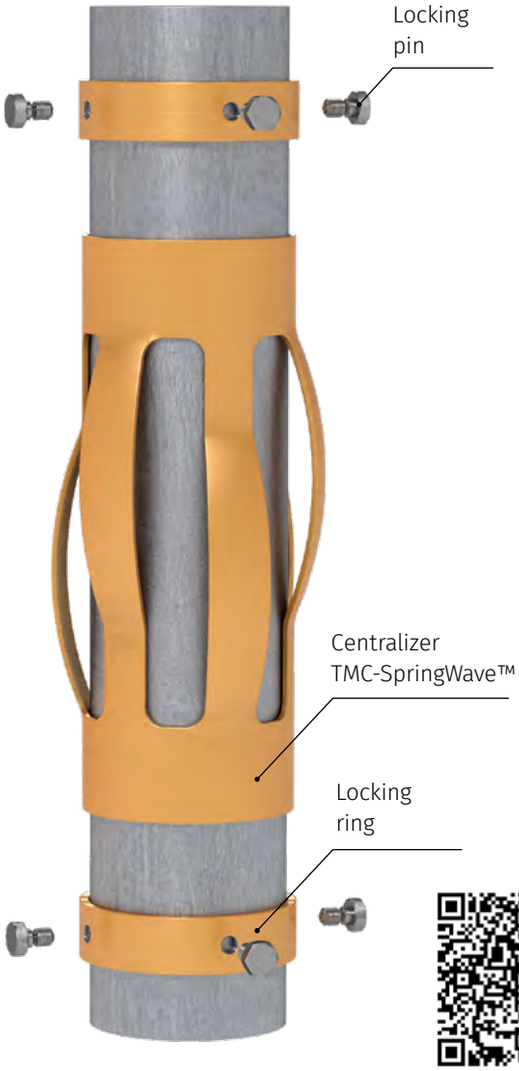
Advantages

- Light weight design of the Centralizer type TMC SCORPIO ™, made from cast steel.
- Minimum pressure drop and high non-Darcy effect
- In four locations, there are threaded holes into which with the help of a wrench lock screws are installed and the centralizer is secured to the casing string
- Barrel-like shape of the helical blades allows mud (drill fluid) to be optimally displaced when cementing.
- Unique design of the fixing element ensures secure attachment.

Technical specifications

Parameters	TsL 114/144	TsL 146/216	TsL 168/216	TsL 178/216	TsL 245/295
Centralizer’s diameter, in:					
outside, spring	5.3	8.2	8.2	8.3	11.4
outside, column	4.6	5.9	6.7	7.1	9.8
Height, in	3.9	3.9	3.9	3.9	3.9
Mass, lb	2.8	13.5	10.4	8.3	14.3

TMC-Wave™/SpringWave™
bow spring centralizer



Purpose

The TMC-Wave™/SpringWave™ bow spring centralizer is designed to facilitate the casing string landing process and ensure a uniform gap between the hole and the casing pipe.

Field of application

The centralizer is used for well construction:
- during casing of the main well bore of a compound section and side well bores
- during casing of the horizontal well bores;
- during fastening of shanks

They are used to avoid emergencies associated with casing sticking.

Advantages

- Facilitate the casing string landing into the well
- Provide a fixed and uniform gap between the compound section of the drilled well and the casing pipe
- Ensure complete replacement of drilling mud by cement slurry in the annulus along its entire length due to the small width and narrow profile of centering ribs.
- Eliminate the possibility of longitudinal movement of the centralizer in the casing pipe by securely attaching it to the pipe.
- Ensure uniform landing of the casing string in wells with the bore drift angle up to 8o for ten meters.

Technical specifications

Prod uct identification	Centralizer size	Casing pipe body diameter, d1 in	Outer diameter of the entralizer, D in	Inner diameter of the entralizer, d in	Length, L in	Sheet thickness, S in	Weight, lb.
TMC-Wave/SpringWave	89/120	3.5	4.6±1	3.6±1	11.8	0.1	3.31
-01	102/124	4	4.8±1	4.1±1	11.8	0.1	3.53
-02	102/143	4	5.6±1	4.1±1	11.8	0.1	3.53
-03	114/143	4.5	5.6±1	4.6±1	11.8	0.1	3.97
-04	114/156	4.5	6.1±1	4.6±1	11.8	0.1	3.97
-05	146/190	5.7	7.4±1	5.8±1	11.8	0.1	5.29
-06	146/216	5.7	8.5±1	5.8±1	11.8	0.1	5.29
-07	168/216	6.6	8.5±1	6.7±1	11.8	0.1	5.95
-08	178/216	7	8.5±1	7.1±1	11.8	0.15	8.38
-09	245/295	9.6	11.6±1	9.7±1	11.8	0.15	10.1
-10	324/394	12.7	15.5±1	12.8±1	11.8	0.15	14.3
-11	426/508	16.7	20±1	16.8±1	11.8	0.15	18.3

* - t° of operation: from +104 to -40°F according to GOST 16350
- climatic design of the U1 centralizer in accordance with GOST 15150

The TMC-SpringWave™ centralizer is a smart tool in your hands.

Locking ring

Purpose

The ring is designed to securely fix and prevent axial movement of the casing tooling along the casing body.

Description

The ring is used in vertical and inclined wellbores or wellbores with horizontal ends

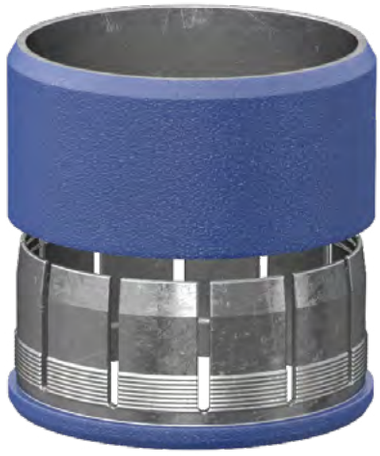
Technical Description

The locking ring consists of:
A collet, which is a split sleeve with blades that can be deflected inward. Outer surfaces of the blades have teeth that securely engage with ones of the ring;

Rings which is made of special hardened steel. Conical surface and teeth on the inside securely engage with the ones of the collet.

Installation of the locking ring is carried out on the drilling rig walkways. The collet and the ring are mounted on the casing. The ring is put on the collet with a certain force until the teeth are engaged. The tapered surface of the ring compresses the collet blades, thereby ensuring a secure engagement.

Ring installation on the collet is carried out with a special hydraulic device (wrench), which allows you to smoothly install the ring with the necessary torque.



Specifications

Standard size	Drift diameter, in	Outer diameter, in	Length, in	Set installation time, min, not exceeding	Installation/stripping force, kN	Weight, lb
114	4.5	5.07	2.9	3	up to 30/ up to 42	2.65

Benefits

- Simplicity of design and installation
- This device shear force is 1.2 times higher than the one recommended by international standard ISO 10427-2:2004

Hardware reliable attachment to the casing pipe body guarantees its bringing to the design depth

Float shoe of BKPOK type, according to TS 28.99.39.190-089-78682242-2019

Purpose

Float shoe of BKPOK type (according to TS 28.99.39.190-089-78682242-2019) is intended to equip the bottom of the casing string and protect it from damage during the landing.

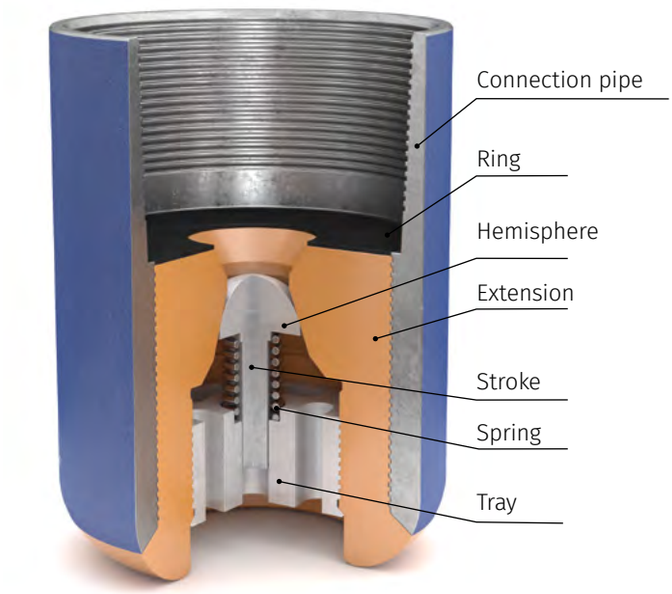
A special feature of the design is the nozzle made of special plastic that facilitates the design and has a number of structural advantages in comparison with typically used cement stone.

Field of application

In oil and gas wells as a part of technological equipment of casing strings with connecting elements made by premium threading of TMC-SRV1 and TMC-SRV2 type.

Advantages

- Equipped with a back pressure valve that prevents drilling mud from entering the casing string during the landing and prevents the circulation of the cement slurry from bottom to top. Maximum pressure difference - up to 250 bar
- Has a lightweight design, with strength characteristics equal to its analogues
- All internal parts of the shoe are made of easy-to-drill materials, thus minimizing costs for further works.
- Production of any type of thread for the surfaces according to the customer's request



Technical specifications

Name	Nominal casing string diameter, in	Type of coupling thread	Outer diameter, up to, in	Internal diameter D, at least, in	Diameter D1, up to, in	Height H, in	Weight, lb, up to
BKPOK-114 SRV	4.4	TMC1-SRV2	5.2	1.5	2.3	10.6	19.8
BKPOK-146 SRV	5.74	TMC1-SRV2	6.5	1.5	3.1	12.5	39.7
БKPOK-168 SRV	6.6	TMC1-SRV2	7.4	2.3	3.9	14.1	50.7
БKPOK-178 SRV	7	TMC1-SRV2	7.6	2.3	4.5	14.9	66.1
БKPOK-245 SRV	9.6	TMC1-SRV2	10.6	2.3	5.9	14.5	112

String shoe,
type BK-P and BKM

Purpose

The shoe is designed for bottom hole assembly (bottom equipment of casing strings) for the purpose of directing them through well bore and protecting them from damage when lowering in the process of casing oil and gas wells at bottom hole temperature of up to 482 °F.

Advantages

- The Shoe consists of a strong steel casing and semi-spherical concrete packing connected with it.
- The Product easily yields itself to drilling out.
- Shoes can be executed with connecting short triangular threads, with buttress thread OTTM and OTTG per GOST 632-80.
- as well as with Tenaris and Buttress threads per the standards of the American
  Petroleum Institute (API) and Technical Requirements
  TU 3663-004-78682242-2014.

Technical specifications of string shoe type BK-P

Shoe Type	Passage Diameter of Casing String	Device Outside Diameter, D, in	Device Drift Diameter, d, in	Central Hole Diameter in the Bit, d1 in	Diameter of Side Holes, d2 in/n (quantity)	Device Length, L, in	Connecting Thread GOST632-80*	Mass, lb
BK-P 146	146	6.5	5.4	2.7	0.5/6	11.6	OTTM146	28
BK-P 168	168	7.3	6.2	3.1	0.5/6	12.5	OTTM168	34.2
BK-P 178	178	7.6	6.6	3.5	0.7/6	12.7	OTTM178	54.5
BK-P 245	245	10.6	9.2	4.7	0.78/6	13.8	OTTM245	66.6
BK-P 324	324	13.8	12.4	6.2	0.78/6	15.6	OTTM324	106

Technical specifications of string Shoe type BKM

Outside Diameter D, in	Central Hole Diameter D1, in	Type, Shoe Designation	Passage Diameter, in	Height H, in	Mass, lb, no more than
BKM-114	4.4	130	1.9+0.3	10.6	33.1
BKM-146	5.7	166	2.7+0.3	11.6	39.7
BKM-168	6.6	188	3.1+0.3	11.8	52.9
BKM-178	7	198	3.5+0.3	12.7	70.5
BKM-245	9.6	270	4.7+0.3	14.7	121
BKM-324	12.7	351	6.2+0.3	14.1...15.3	192
BKM-426	16.7	451	8.6+0.3	16.5	331

String shoe
with check valve type BKO

Purpose

Designed to equip the bottom of the casing string per GOST 632-80 for the purpose of directing the strings through the bore of well and protecting from damage which may be caused when they are lowered into the well. Also for the purpose of preventing cementing slurry from reversing into the string after squeezing it down:

Advantages

- The Shoe consists of a strong steel casing and a hemispherical concrete guide shoe connected with it;
- The product easily lends itself to drilling out;
- They can be executed with connecting short triangle threads, with Buttress threads OTTM and OTTG per GOST 632-80;
- As well as Tenaris and Buttress threads per the standards of the American Petroleum Institute (API) and the Technical Requirements TU 3663-004-78682242-2014.

Technical specifications

Shoe Type and Thread Type	String Nominal Bore, in	Product Designation	Outside Diameter D, in	Central Hole Diameter D, in	Height H, in	Mass, lb
BKO-114	4.4	UNBR 069.00.000	5.2	2.04	10.7	24.3
BKO-127	5	UNBR 068.00.000	5.7	2.3	11.02	29.1
BKO-140	5.5	UNBR 066.00.000	6.2	2.7	12.4	38.4
BKO-146	5.7	UNBR 061.00.000	6.5	2.7	12.5	42.3
BKO-168	6.6	UNBR 071.00.000	7.4	3.1	14.1	61.1
BKO-178	7	UNBR 070.00.000	7.7	3.5	14.9	71
BKO-194	7.6	UNBR 071.00.000	8.5	3.5	15.9	80
BKO-219	8.6	UNBR 072.00.000	9.6	4.7	16.5	108
BKO-245	9.6	UNBR 073.00.000	10.6	4.7	16.9	143
BKO-273	10.7	UNBR 074.00.000	11.7	4.7	16.3	154
BKO-299	11.7	UNBR 075.00.000	12.7	4.7	15.9	167
BKO-324	12.7	UNBR 076.00.000	13.8	6.2	15.9	203
BKO-340	13.3	UNBR 077.00.000	14.3	6.2	16.3	215

Reaming shoe
with a backpressure valve

Purpose and field of application

Designed to protect the casing string against damage during descent, as well as reaming the narrowing position of the well bore during its construction in complicated mountainous-geological conditions. The reaming is carried out using spiral conical blades, equipped with carbide tips. Equipped with a backpressure valve that prevents the well fluid or cement slurry from flowing from the annulus to the casing.

Advantages

1. Any type of connecting thread, including premium.
2. Easily drilled with any type of drilling bit.
3. The nozzle has a hemispherical eccentric shape and is made of a high-strength aluminum alloy that can withstand high temperatures and loads.
4. Blades reinforced with tungsten carbide prevent premature deterioration of the housing.
5. A reliable backpressure valve withstanding pressures up to 30 MPa.

Technical specifications

Standard size / Description	102/124	114/143	114/156	146/216	168/216	245/295
External diameter of the shoe with the blades max., in	4.6	5.3	5.8	8.2	8.2	11.3
Diameter of flushing holes, in	0.7	0.8	0.8	0.9	0.9	1.1
Length, in	16.9	17.7	18.5	17.1	18.1	22.8
Number of blades, pcs	3	3	3	4	4	6

Cementing device

Purpose and field of application

Cementing device is designed for bottom hole assembly (bottom equipment of casing strings) for the purpose of making sure that the casing string fills itself up with mud (drill fluid) without overflow when lowered. For squeezing cement slurry into the casing string annulus, performing the stop ring function and for tightly seating cement plugs on it when squeezing the cementing slurry into the casing string annulus and preventing it from moving into the casing string after pressure is released.

Technical specifications

Valve Designation	Maximum Operating Pressure, bar	Outside Diameter, in	Connecting Thread
UTs-114	250	5.2±0.05	OTTM-114
UTs-127	250	5.7±0.055	OTTM-127
UTs-140	250	6.2±0.059	OTTM-140
UTs-146	250	6.5±0.06	OTTM-146
UTs-168	250	7.4±0.07	OTTM-168
UTs-178	250	7.7±0.074	OTTM-178
UTs-194	250	8.5±0.08	OTTM-194
UTs-219	150	9.6±0.09	OTTM-219
UTs-245	150	10.6±0.1	OTTM-245
UTs-273	100	11.7±0.11	OTTM-273
UTs-299	100	12.7±0.118	OTTM-299
UTs-324	100	13.8±0.118	OTTM-324
UTs-340	100	14.3±0.118	OTTM-340

Collar cementing device

Purpose

The device is designed for external casing attachments and used in the casing column cementing process.

Large diameter devices are used for attachment of the guide, conductor and intermediate column, and small diameter devices are used for casing the small diameter wells and lateral bores.

Field of application

The device is used for:

- cementing with the exclusion of productive formation gross interval;
- reverse cementing with the prevention of cement slurry entering the loss zone;
- prevention of cracking of behind-the-casing cement stone when column pressing and perforation;
- prevention of washout in behind-the-casing cement slurry in the presence of high-pressure lower water-bearing formation.

Technical specifications

Name	Body frame outer/inner diameter, in	Collar outer/inner diameter, in	Ring outer diameter, in	Body frame height, in, not more than	Mass, lb, not more than
UMTs-102/124	4.6/4.1	5.07/4.1	4.1	3.3	2.65
UMTs-114/143	5.3/4.6	5.8/4.5	4.6	3.3	5.51
UMTs-114/156	5.9/4.6	6.6/4.5	4.6	3.5	7.72
UMTs-146/216	8.1/5.9	8.7/5.8	5.9	3.9	13.7
UMTs-168/216	8.2/6.7	8.7/6.6	6.7	3.7	14.1
UMTs-178/216	8.1/7.1	8.7/7	7.1	3.5	9.92
UMTs-245/295	11.2/9.8	11.8/9.6	9.8	3.5	19
UMTs-324/393	15.1/12.9	15.7/12.9	12.9	3.7	22

Casing
float collar

Application

The casing float collar is designed for:

- the bottom hole assembly (bottom equipment of casing strings) with the aim of automatically filling up the casing string being lowered with mud (drill fluid) from the well without its overflowing on the well mouth;
- to prevent penetration of drill fluid into the casing string in the process of its lowering;
- to increase displacement force of the casing string and to reduce the load on the hook.

The casing float collar can be also used to close the return flow of cement slurry in the course of cementing.

The casing float collar is designed for the bottom hole assembly (bottom equipment of casing strings) with the aim of automatically filling up the casing string being lowered with mud (drill fluid) from the well without its overflowing on the well mouth, to prevent penetration of drill fluid into the casing string in the process of its lowering, to increase displacement force of the casing string and to reduce the load on the hook. The casing float collar can be also used to close the return flow of cement slurry in the course of cementing.

Technical specifications

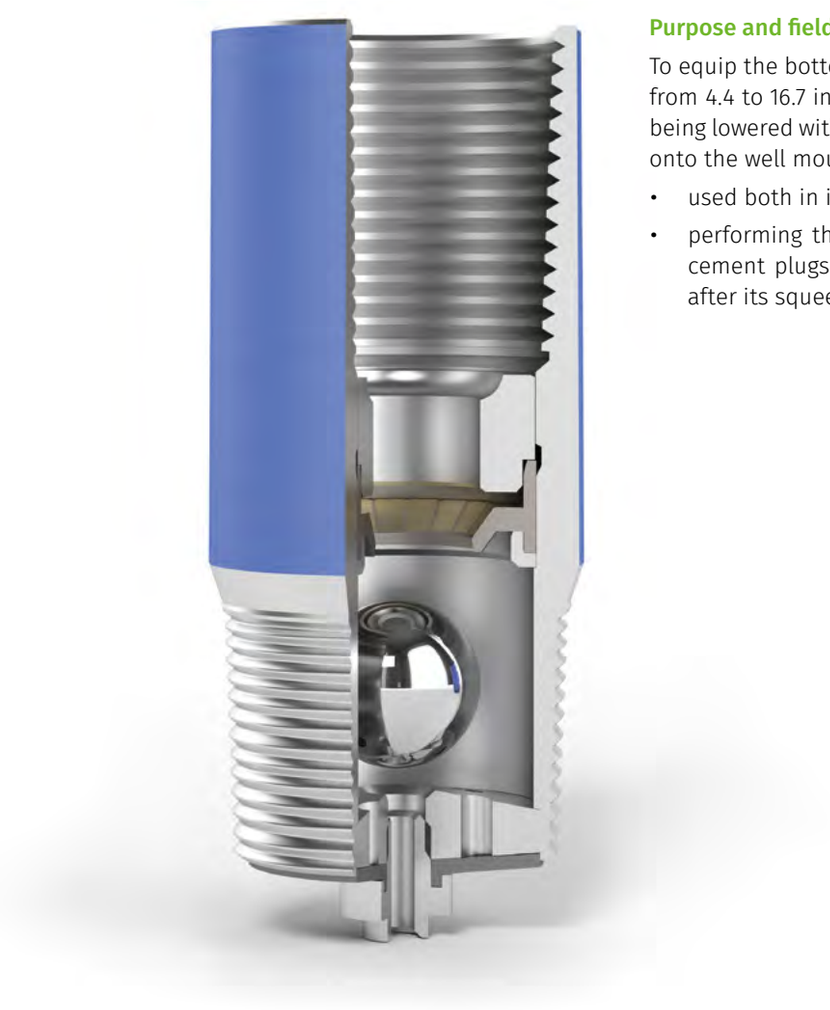
Type, Description of Collar	Passage Diameter, in	Outside Diameter, in	Central Hole Diameter D1, in	Height H, in	Mass, lb, no more than	Mass, lb
MOK-114	4.4	5.2	2.1	10.2	24.3	24.3
MOK-127	5	5.7	2.3	11.0	30.2	29.1
MOK-140	5.5	6.2	2.7	12.2	39.7	38.4
MOK-146	5.7	6.5	2.7	12.4	44.1	42.3
MOK-168	6.6	7.4	3.1	14.09	61.7	61.1
MOK-178	7	7.7	3.5	14.8	70.5	71

Cementing basket

Application

The device is designed for containing sedimentary processes in cementing slurry, which fills up the bore hole annulus behind the casing string. Cementing the casing string with release of cementing plug after injection of cementing slurry to separate the cementing fluid from displacement fluid. The working media in which the device operates are drill fluid and cementing slurry treated with chemical agents, brine, oil and gas at a temperature of up to 212 °F.

Throttle non-return valve
for casing strings type TSKODM



Purpose and field of application

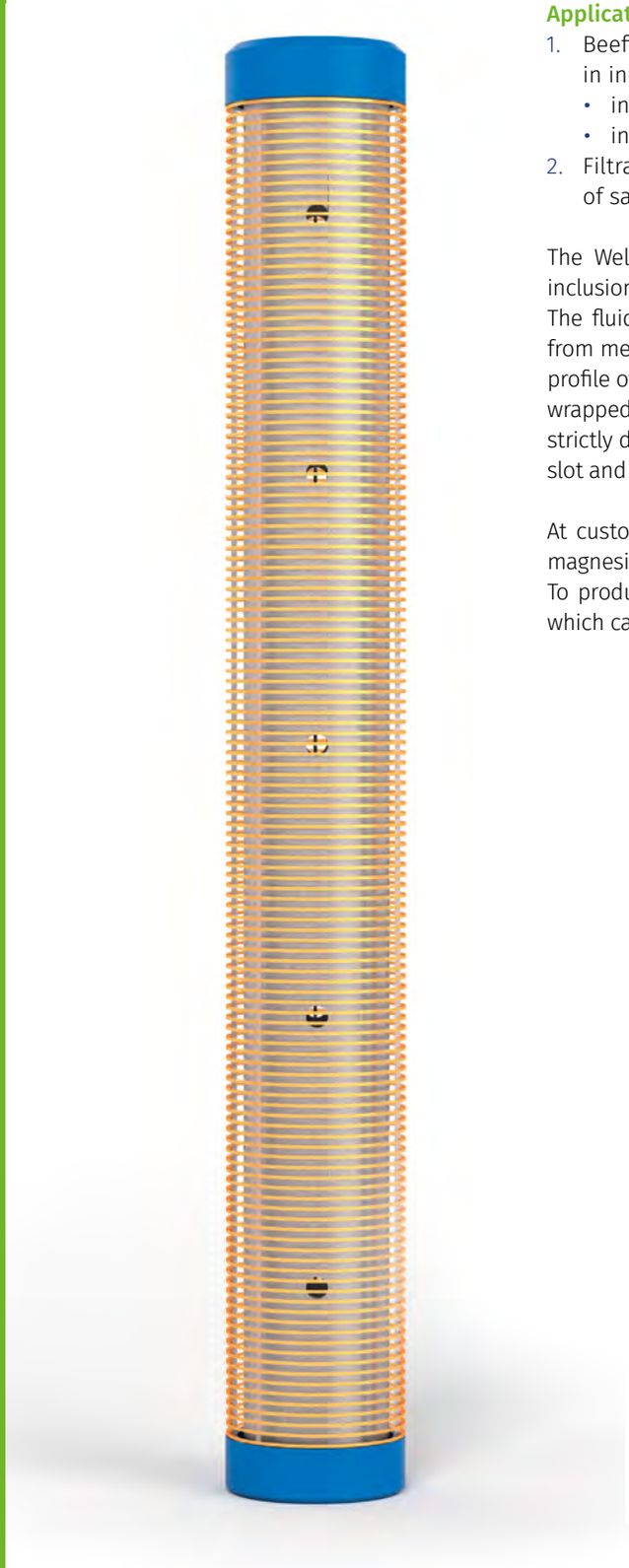
To equip the bottom of the casing strings with tubes per GOST 632-80 diameter from 4.4 to 16.7 in for the purpose of automatically filling up the casings string being lowered with drill fluid from the well without it overflowing from the string onto the well mouth:

- used both in inclined and horizontal wells;
- performing the function of the stop ring for seating the bottom and top cement plugs in the process of pumping cementing slurry into the string after its squeezing.

Technical specifications

Valve Designation	Max. Working Pressure, bar	Outside Diameter, in	Inside Diameter of Valve Housing, in, no less than	Ball Diameter, in	Ball Mass, oz	Valve Height, in, no more than	Valve Mass, lb, no more than
TsKODM-114	250	5.2±0.05	3.8	1.7±0.01	2.8...3.06	13.7	28.8
TsKODM-127	250	5.74±0.055	4.2	1.7±0.01	2.8...3.06	14.2	32.6
TsKODM-140	250	6.2±0.059	4.6	2.9±0.019	13.9...14.4	15.9	44.3
TsKODM-146	250	6.5±0.06	4.9	2.9±0.019	13.9...14.4	16.5	48.1
TsKODM-168	200	7.4±0.07	5.7	2.9±0.019	13.9...14.4	16.5	59.3
TsKODM-178	200	7.7±0.074	6.1	2.9±0.019	13.9...14.4	15.6	75
TsKODM-245	150	10.6±0.1	8.8	2.9±0.019	13.9...14.4	16.9	143
TsKODM-324	100	13.8±0.11	11.8	2.9±0.019	13.9...14.4	15.9	203
TsKODM-426	50	17.7±0.11	15.3	3±0.019	13.9...14.4	13.6	287

Well
slotted filter



Application

1. Beefing up the walls of vertical, inclined and horizontal wells drilled in incompetent reservoirs:
   - in open side holes of the wells
   - in the zone of the well productive bed
2. Filtration of the product being extracted from extraneous inclusions, sloughing of sand and penetration of mechanical impurities into the well in operation.

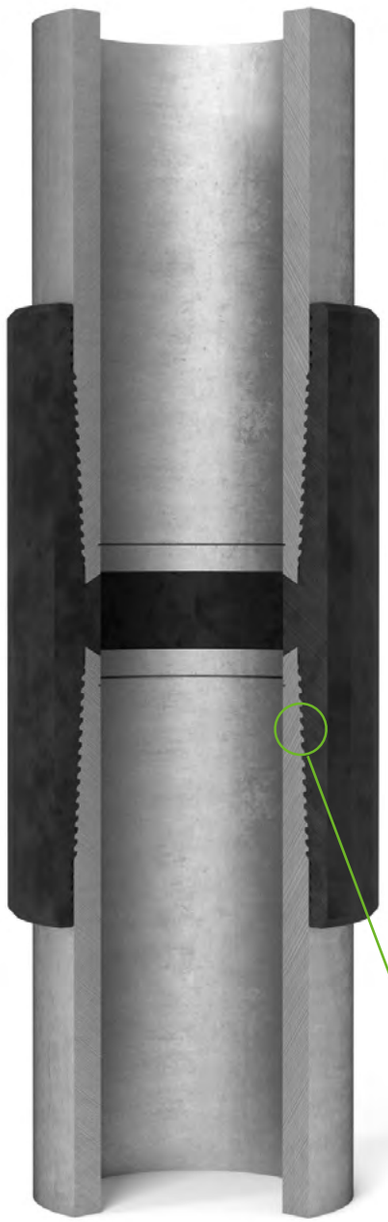
The Well Slotted Filter is used to filter the product being extracted from foreign inclusions and penetration of mechanical impurities.
The fluid being delivered to the suction pipe of the pump from the well is cleaned from mechanical particles by passing through a filtering element made from V-shaped profile of stainless steel, grade AISI 304, AISI 316, which helically, with a definite pitch, is wrapped around reference cells to provide a rigid screen with longitudinal slots with a strictly definite gap. Sharp edges create an arch (sand bridge) over certain areas of the slot and permeability over these areas is retained.

At customer's request, perforated holes are blanked off with plugs from aluminum, magnesium or polyamide alloy.
To produce filters, casing strings and tubing strings of different type sizes are used, which can be complete with centralizers.

Advantages

1. Stable throughput capacity during the period of full operation cycle;
2. Stable operation of downhole pumping equipment thanks to greater filtration surface;
3. Low clogging level of the filter element due to unsteady position of mechanical particles on the filtering surface and the clean surface of the V-shaped filter;
4. High strength of the structure in axial and radial direction due to increase in the number of reference cells;
5. High corrosive resistance and resistance to aggressive impact of acid and alkali media.

High strength highly sealed
casing string TMC-SRV1



Application

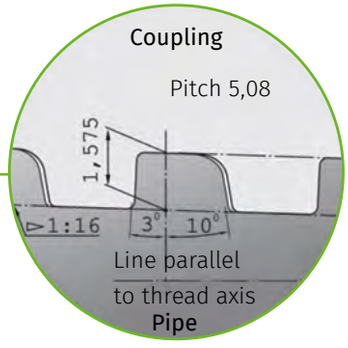
Casing strings TMC-SRV1 produced per Technical Requirements TU 1308-100-78691656-2015 by TMC-Drilling Service LLC are used to case oil and gas wells of complicated profile.

Advantages

Sealed geometrical interface of the threaded profile and two abutment elements.

Design Features of the Threaded Joint:

1. On the pipe, threads are cut per GOST equivalents and, in addition, a sealing abutment element is installed which ensures joint sealed interface between the threaded profile and two abutment elements (ridge on the pipe and the bore in the collar) “metal-to-metal”.
2. In the entire interface of the threaded profile and sealing abutment elements, there is no gap between the outside surface of the seal on the pipe nipple and in the collar bore. Geometry is sealed on the geometrical dimensions of the thread profile angle interface, on the nipple end and in the bore , i.e. on the collar end “metal-to-metal” as well as on the diameters of the sealing elements. Existence of two turns of the incomplete thread profile on the sealing diametrical surface of the pipe nipple sealing element, which serves as a damper, when the joint operates, is a distinguishing feature of the geometry and a competitive advantage of the Management Company TMC Group LLC. After triple screwing together and unscrewing of the joint, the turns of the incomplete profile disappear from the seal surface.
3. The joint allows considerable increase in the make-up torques and in the bearing capacity of the threaded joint as well as increases reliability when combined loads act cumulatively in the form of extension, compression and inner hydraulic pressure.



- ✓ Thread pitch – 0.2 in.
- ✓ Seal – top – “metal-to-metal”.
- ✓ 5 5 threads per inch.

Specifications

Pipe outer diameter	TPipe wall thickness, in	Make up torque, Nm, for a strength group														
		D, j55, K55			E, N80			L			M			R		
		M min	M opt	M max	M min	M opt	M max	M min	M opt	M max	M min	M opt	M max	M min	M opt	M max
168.3	0.35	17,500	19,400	21,300	20,000	25,000	30,000	26,300	29,200,	32,150	29,500	32,800	36,000	33100	36,800	40,500
	0.36	19,200	21,300	23,400	22,000	27,5,00	33,000	28,800	32,100	35,300	32,500	36,000	39,600	36,400	40,500	44,500
	0.47	24,900	27,700	30,400	28,600	35,700	42,900	37,400	41,700	45,900	41,200	45,300	42,100	43,500	45,000	46,200
244.5	0.35	16,100	17,900	19,700	18,800	19,800	20,700	20,700	23,000	25,500	24,500	27,000	29,700	27,300	29,500	32,500
	0.01	17,730	19,700	21,600	19,350	21,500	23,600	22,700	24,900*	27,400	26,900	29,000	32,300	29,600	30,800	34,100
	0.43	17,900	20,900	22,700	21,600	24,000	26,500	22,600	25100	27,600	27,200	30,300	33,500	27,500	32,000	35,200
	0.47	19,250	21,400	23,300	24,700	27,600	30,250	25,900	28,800	32,000	30,200	33,300	36,000	32,400	36,100	39,700
	0.018	20,800	23,200	25,500	26,800	29,800	32,700	29,500	31,200	34,300	31,400	36,100	38,200	35,100	39,000	33,700
	0.62	21,800	24,200	26,800	30,800	34,300	37,700	31,600	35,000	37,800	35,100	38,700	41,600	43,300	45,100	47,200
323,9	0.33	26,200	29,000	30,700	38,000	45,300	40,200	40,500	45,000	48,400	40,500	45,000	48,400	40,500	45,000	48,400
	0.37	29,200	32,400	35,600	40,300	44,900	48,700	40,500	45,000	48,400	40,500	45,000	48,400	40,500	45,000	48,400
	0.43	33,600	37,500	41,200	40,400	45,000	49,100	40,500	45,000	48,400	40,500	45,000	48,400	40,500	45,000	48,400
	0.48	38,100	42,300	46,500	40,400	45,000	49,100	40,500	45,000	48,400	40,500	45,000	48,400	40,500	45,000	48,400
	0.55	40,300	45,000	49,400	40,400	45,000	49100	40,500	45,000	48,400	40,500	45,000	48,400	40,500	45,000	48,400

High strength highly
sealed casing string TMC-SRV2

Application

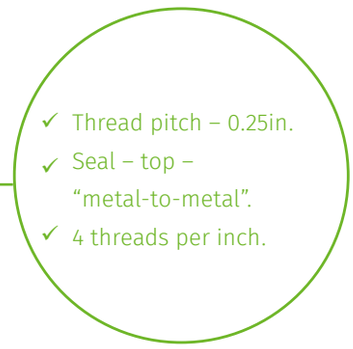
Casing strings TMC-SRV2 are used to extract high viscosity oil by steam assisted gravity drainage (SAGD) which presupposes drilling two parallel horizontal wells to inject steam into the formation and cracking viscous oil as well as for oil extraction.

Unique design

This joint is characterized by high compression strength, tensile strength, bending strength and corresponds to the CAL IV requirements level which confirms that it can be used in the most severe conditions of oil production. Another special feature of the threaded joint TMC-SRV2 is its capability of being assembled on the inclined support of the drilling rig.

Advantages of the threaded Joint “DOMINANT”

- On the pipe, the thread profile is cut and, in addition, a sealing abutment element is made which ensures joint geometrical interface of the threaded profile and the sealing unit on two toroidal surfaces “metal-to-metal”.
- In the entire interface of the threaded profile and sealing abutment elements, there is no gap between the outside surface of the seal on the pipe nipple and in the collar bore. Geometry is sealed on the geometrical dimensions of the threaded profile angle interface, the nipple end and the toroidal seal.
- The joint allows considerable increase in the make-up torques and in the bearing capacity of the threaded joint as well as increases reliability when combined loads act cumulatively in the form of extension, compression and inner hydraulic pressure.
- Torque values are different from those shown in the table of minimum, optimum and maximum Mcr. For casing strings 9.64*0.35in – Mcr = 42kN.



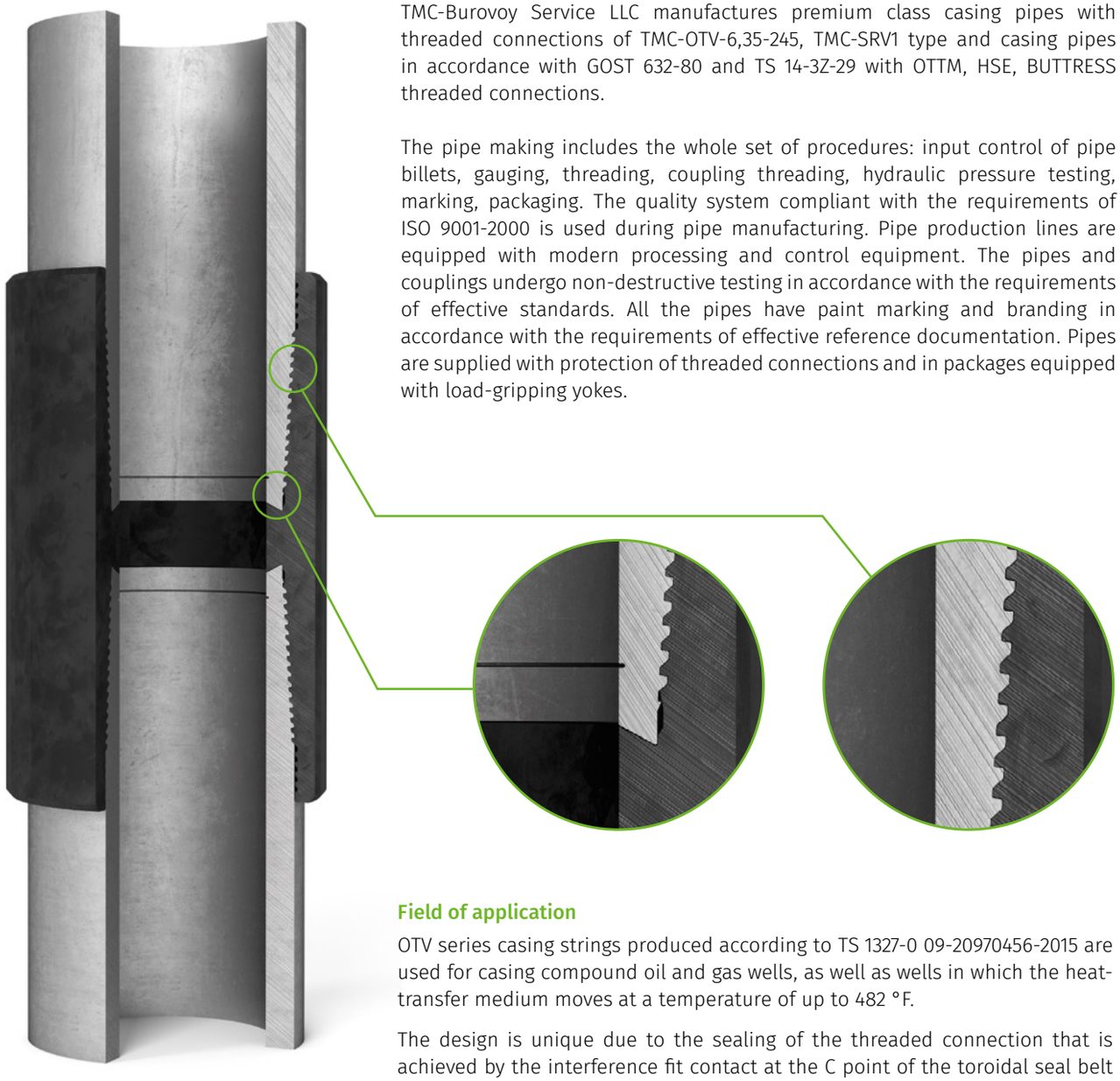
Technical specifications

Strength Group	D	E	L	M
Resistance to rupture, σt, lbf/in², no less than	94,999.7	99,931	109,938.6	125,022.5
Yield Strength, σt, lbf/in² no less than no more than	 54,969.3 80,060.8	 80,060.8 109,938.6	 94,999.7 123,572.1	 109,938.6 139,961.4
Relative Elongation, δ5, % no less than	14,3	13,0	12,3	10,8

Specifications

Pipe outer diameter	Pipe wall thikness, in	Make up torque, Nm, for a strength group													
		D, j55, K55			E, N80			L			M			R	
		Min	Opt	Max	Min	Opt	Max	Min	Opt	Max	Min	Opt	Max	Min	Opt	Max
244,5	0.35	26,200	29,100	32,000	34,020	37,800	42,000	37,400	41,600	45,700	41100	45,700	47,000	41,100	45,700	47,000
	0.39	27,300	30,700	33100	36,400	40,000	44,000	39,600	44,000	48,400	43,200	48,000	49,000	43,200	48,000	49,000
	0.4	27,300	30,800	33,200	36,400	40100	44,100	40,600	45,100	49,600	43,300	48,200	49,000	43,300	48,200	49,000
	0.47	28,000	31,500	35,000	37,000	40,700	45,000	40,600	45,100	49,600	43,300	48,200	49,000	43,300	48,200	49,000
	0.54	28,000	32,000	35,000	37,000	41,000	45,500	40,600	45,100	49,600	43,300	48,200	49,000	43,300	48,200	49,000
	0.62	28,000	32,000	35,000	37,0,00	41000	45,500	40600	45,100	49,600	43,300	48,200	49,000	43,300	48,200	49,000

High strength highly sealed casing string TMC-OTV-6.35



TMC-Burovoy Service LLC manufactures premium class casing pipes with threaded connections of TMC-OTV-6,35-245, TMC-SRV1 type and casing pipes in accordance with GOST 632-80 and TS 14-3Z-29 with OTTM, HSE, BUTTRESS threaded connections.

The pipe making includes the whole set of procedures: input control of pipe billets, gauging, threading, coupling threading, hydraulic pressure testing, marking, packaging. The quality system compliant with the requirements of ISO 9001-2000 is used during pipe manufacturing. Pipe production lines are equipped with modern processing and control equipment. The pipes and couplings undergo non-destructive testing in accordance with the requirements of effective standards. All the pipes have paint marking and branding in accordance with the requirements of effective reference documentation. Pipes are supplied with protection of threaded connections and in packages equipped with load-gripping yokes.

Field of application

OTV series casing strings produced according to TS 1327-0 09-20970456-2015 are used for casing compound oil and gas wells, as well as wells in which the heat-transfer medium moves at a temperature of up to 482 °F.

The design is unique due to the sealing of the threaded connection that is achieved by the interference fit contact at the C point of the toroidal seal belt of the nipple with a female cone in the coupling.

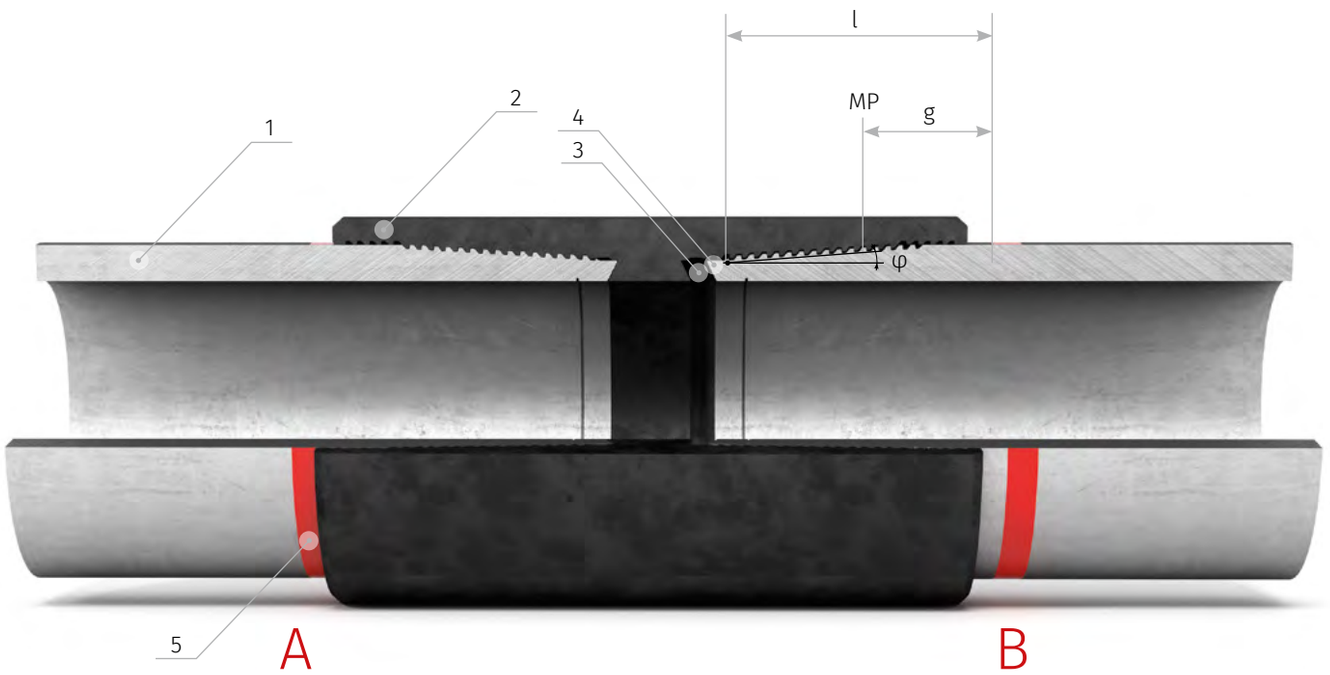
Technical specifications

Threaded Joint Type	Pipe Product Mix, D – t, in	Strength Group per GOST 632 – 80/API 5ST
Premium Joints TMC		
TMC-OTV-6.35-245	9.6-0.35; 9.6-0.39	D, E, L, M
TMC-SRV1	6.6-0.35	D(A)/155
TMC-SRV1	9.6-0.35	E/N80
Joints per GOST and Technical Requirements (TU)		
BUTTRESS	In compliance with TU 14-ZR-29	D, E, L, M
OTTM	In compliance with GOST 632-80	D, E, L, M
OTTG	In compliance with GOST 632-80	D, E, L, M

Pipe outer diameter	TPipe wall thickness, in	Make up torque, Nm, for a strength group														
		D, j55, K55			E, N80			L			M			R		
		M min	M opt	M max	M min	M opt	M max	M min	M opt	M max	M min	M opt	M max	M min	M opt	M max
9.63	0.31	16,300	18,000	20,000	18,800	19,800	20,700	20,100	22,300	24S00	22,400	24,900	27,300	22,400	24,900	27,300
	0.39	18,100	20,200	22,000	19,900	22,100	24,400	21,600	24,000	26,400	25,000	27,800	30,600	25,000	27,800	25,000
	0.43	20,000	22,200	24,400	22,300	24,800	27,200	23,800	26,500	29,100	27,900	31,000	34,000	27,900	31,000	34,000
	0.47	22,100	24,500	26,200	24,600	27,300	30,000	25,400	28,200	31,000	30,600	34,000	37,000	30,600	34,000	37,000
	0.51	24,300	27,000	29,700	27,000	30,000	32,800	28,800	32,000	33,500	33,300	37,000	40,000	33,300	37,000	40,000
	0.59	24,300	27,000	29,700	27,000	30,000	32,800	28,800	32,000	33,500	33,300	37,000	40,000	33,300	37,000	40,000

Advantages of the threaded connection

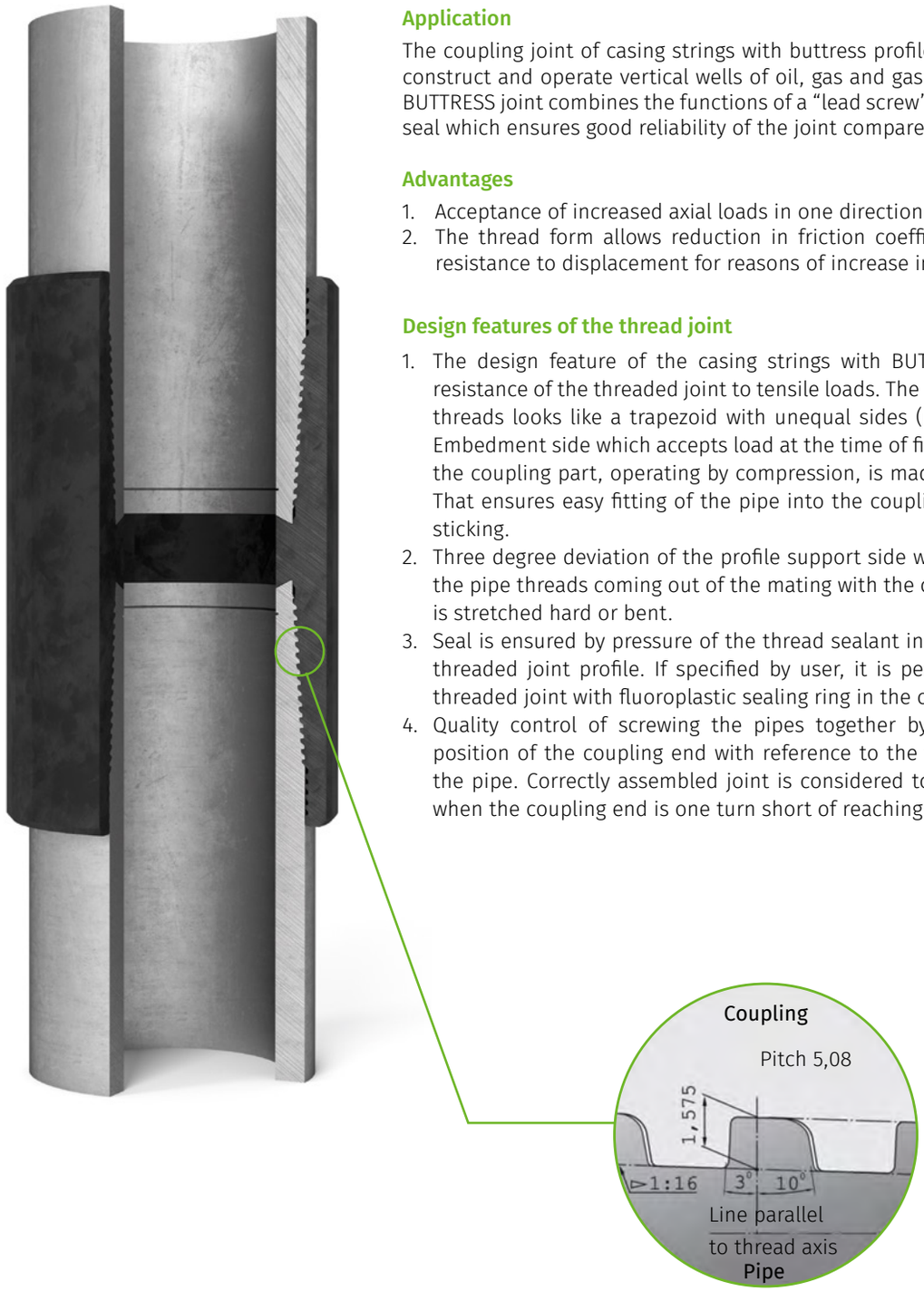
1. Improvement of the pipe assembly quality on the well by free entry without rotating the nipple into the coupling at a depth of 12 threads, which reduces the possibility of thread misalignment and ensures distribution of the load from the weight of the pipe screwed on several mutually contacting threads.
2. Increase of axial tension and compression load in the P-6.35 threaded connection practically to the load that the casing string body withstands. The load increases as a result of its redistribution to the threads of incomplete profile in the e area, under which the metal cross-section area increases.
3. Equal distribution of axial load over the threads as a result of gradual increase of the thread depth from the control belt (5) to the main plane.
4. Facilitation of visual control of the cross-threading completion by comparing the coupling end with the beginning of a wide circular belt (5).
5. Improvement of reliability of the casing string at landing into severely curved wells by optimizing the gaps near the threads and toroidal and conical design of threaded connection sealing unit



1. — Pipe Body
2. — Collar
3. — Sealing Band of the Nipple
4. — Female Cone in the Collar;
5. — Screwing Indicating Band;

MP — Main Plane

Casing string
with increased operating reliability and BUTTRESS profile



Application

The coupling joint of casing strings with buttress profile thread is designed to construct and operate vertical wells of oil, gas and gas condensate fields. The BUTTRESS joint combines the functions of a “lead screw” and the joint hydraulic seal which ensures good reliability of the joint compared to equivalents.

Advantages

1. Acceptance of increased axial loads in one direction
2. The thread form allows reduction in friction coefficient and doubles the resistance to displacement for reasons of increase in profile.

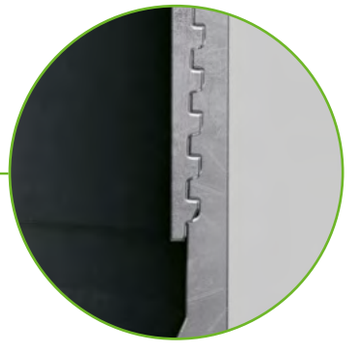
Design features of the thread joint

1. The design feature of the casing strings with BUTTRESS threads is high resistance of the threaded joint to tensile loads. The profile of the BUTTRESS threads looks like a trapezoid with unequal sides (pitch 0.2 in, cone 1:16). Embedment side which accepts load at the time of fitting the pipe joint into the coupling part, operating by compression, is made at an angle of 10 oC. That ensures easy fitting of the pipe into the coupling and reduces thread sticking.
2. Three degree deviation of the profile support side would reduce the risk of the pipe threads coming out of the mating with the coupling thread when it is stretched hard or bent.
3. Seal is ensured by pressure of the thread sealant in the design gaps of the threaded joint profile. If specified by user, it is permissible to produce a threaded joint with fluoroplastic sealing ring in the coupling.
4. Quality control of screwing the pipes together by machine is made by position of the coupling end with reference to the triangle sign shown on the pipe. Correctly assembled joint is considered to be the following one: when the coupling end is one turn short of reaching the triangle sign base.

Specifications

API 5CT				
Class	Yield strength, psi		Strength limit, psi (at least)	Strength limit, MPa (at least) *
	min	max		
J55	54,969	80,060	74,984	*
K55	54,969	80,060	94,999	*
M55	64,976	84,992	84,992	*
L80 type 1	80,060	94,999	94,999	*
N80 type 1	80,060	109,938	99,931	*
N80 type Q	80,060	109,938	99,931	*
C95	94,999	109,938	105,007	*
P110	109,938	139,961	125,022	*
* - the value depends on the sample geometry				
GOST 632-80				
GOST 632-80 Strength group	Yield strength, psi		Strength limit, psi (at least)	Relative elongation %, (at least)
	min	max		
D	54,969	80,060	94,999	14.3
E	80,060	109,938	99,931	13.0
L	94,999	125,022	109,938	12.3
M	109,938	139,961	125,022	10.8

FLUSH-JOINT CASING PIPE
N-S.*BM
internal flush high hermetic



- ✓ Thread pitch 5,08 mm
- ✓ 1 inch5 threads
- ✓ Additional sealing barrier thrust shoulder

*rated pipe diameter

Scope of application

Casing pipes are used to secure the walls of the well after drilling, flashover, and isolation of other oil, gas, aquifers, and interlayers.

Unique design

The N-S.*BM threaded connection has equal inner and outer diameters of the pipe, which allows reducing the columns' diameters and, consequently, their weight by reducing the well final diameter, a rational combination of the casing and bits diameters.

To improve the performance characteristics of the threaded connection, we use additional tapered surfaces, which, when press-fitted, create a metal-to-metal seal ensuring proper air-tightness.

When screwing the connection, the thrust faces of the pin and socket ends of the pipes contact each other and create high contact pressures on the thrust surfaces, which also contributes to the connection's air-tightness.

Advantages of coupling-free connection

- high air-tightness of the connection and increased strength under tensile loads compared to triangular profile threads;
- low cost of the pipe string due to the absence of couplings;
- straight connection;
- additional sealing barrier

Casing pipe range

Regulatory document	Pipe dimensions			Strength group	Threaded connection type
	Rated diameter, nch	Nominal diameter, nch	Wall thickness, nch		
TS 24.20.12-008-37072885-2019 Seamless steel casing pipes without coupling with N-S.BM threaded connection	4.06	4	0.23 0.26	D, K, E, L, M	N-S.102BM
	4.5	4,5	0,27 0,34		N-S.114BM
	4.7	4,75	0,27 0,31		N-S.120BM
	5,5	5,5	0,28 0,30		N-S.140BM

Couplings
to casing pipes

Purpose

The couplings are designed to connect casing pipes used in the construction of oil and gas wells, and are manufactured with OTTM and OTTG type threads in accordance with GOST 632-80, and with BATTRESS threads under TS 14-ZR-29-2000.

Premium casing pipe couplings with patented TMC-OTV, TMC-SRV1, TMC-SRV2 threads are used at compound oil and gas wells, that require enhanced performance, as well as for production of ultra-viscous oil by steam assisted gravity drainage.

Description

- The high-strength, highly hermetic TMC-OTV threaded connection is used at compound oil and gas wells, as well as at wells in which the heat-transfer medium moves at a temperature of up to 482°F. The design is unique due to the sealing of the threaded connection that is achieved by the interference fit contact at the C point of the toroidal seal belt of the nipple with a female cone in the coupling.

- The high-strength, highly hermetic TMC-SRV1 threaded connection provides high torque at screwing (up to 27500 Nm), tightness preservation under combined extension (up to 1690 kN) and compression loads (at least 80%), as well as internal hydraulic pressure (up to 5,076 psi) by coupling of threaded profile and two «metal-to-metal» baffle elements.

- The high-strength, highly hermetic TMC-SRV2 threaded connection has high compression, tensile and bending strength and meets CAL IV requirements level, which confirms its suitability for the most severe oil production conditions. Another feature of the TMC2-SRV threaded connection is its ability to be assembled on the inclined support of the drilling rig.

Competitive advantages

- Delivery time – from 5 calendar days
- An inexhaustible stock of couplings to meet the customer's needs
- Manufacture of couplings with premium threads of our own design.
- Manufacture of couplings according to additional customer's requirements
- Flexible payment system
- Warranty period is 12 months

Technical specifications

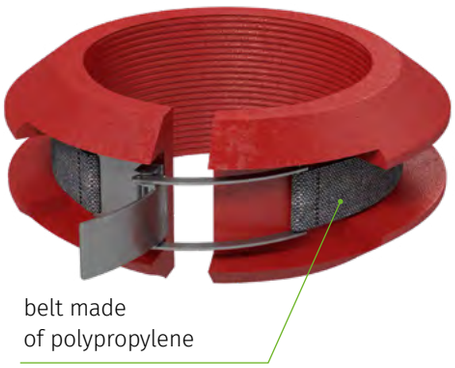
Premium Connections
TMC according to TS 1327-009-20970456-2015, TS 13 0814-100-78691656-2015

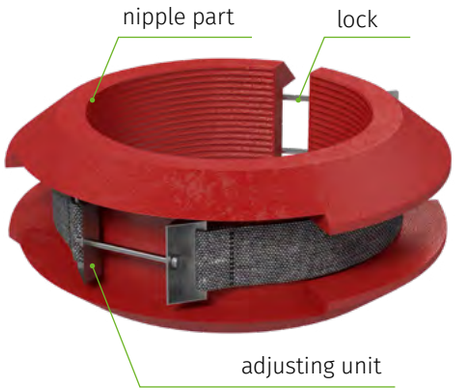
Type of t hreaded connection	Pipe nomenclature, D - t, in	Strength grade: in accordance with GOST 632-80/ API 5CT	Thread pitch, in
TMC Premium Connections			
TMC-OTV-6.35-245	9.6-0.35; 9.6-0.39	D, E, L, M	0.25
TMC-SRV1	6.6-0.35	D (A) / J55	0.2
TMC-SRV2	9.6-0.35	E / N80	0.25

GOST 632-80

Nominal pipe diameter	Outer diameter, in	Length, in	Weight, lb	Thread pitch, in	Strength grades
102'	4.3	7.4	7.28	0.2	According to GOST 632-80
114'	5	6.6	8.82	0.2	
127'	5.56	6.85	10.6	0.2	
146'	6.53	7.1	17.4	0.2	
168'	7.38	7.48	20.9	0.2	
178'	7.65	7.79	19	0.2	
245'	10.6	8.58	43.9	0.2	

Pombur ™
casing pipe threaded part protector





Purpose and field of application

A protector is designed to protect the threaded part of casing pipes during run in hole operations on a drilling site.
It serves to prevent damage to the nipple part of the threaded connection of the drill pipe, absorbing the axial and lateral impacts on the metal structure.

Specifications

A protector is a polyurethane housing with:

- resistance to shock loads with high elasticity over a wide range of temperatures;
- the internal surface of the housing is made out of grooves for simulating the threaded connections, allowing firm securing of the protector on the threaded part of the drill pipe.

Advantages

- quick installation and demounting of the protector;
- firmness of the fastening, preventing coming off of the protector from the threaded part of the drill pipe;
- high wear resistance of the protector due to the use of an elastic polyurethane composition;
- up to 20% of time saving for the entire flushing of the casing pipe operation.

Pombur ™ protector operational life —
not less than 1000 run in hole operations

Technical specifications

Name	String Nominal Bore, in	Product Designation	Outside Diameter D, in	Central Hole Diameter D1, in	Height H, in	Mass, lb
PZRU-114	4.4	UNBR 439.00.00.000	8.85	4.3	4.9	6.6
PZRU-146	5.7	UNBR 439.00.00.000-01	10.2	5.6	5.1	8.3
PZRU-168	6.6	UNBR 439.00.00.000-02	11.02	6.3	5.3	9.7
PZRU-178	7	UNBR 439.00.00.000-03	11.4	6.8	5.5	10.1
PZRU-245	9.6	UNBR 439.00.00.000-04	13.9	9.4	5.9	12.7
PZRU-324	12.7	UNBR 439.00.00.000-05	17.1	12.4	5.9	16.09

Subs
for drill pipes

TMC – Drilling Service LLC manufactures box type subs and pin type subs for drill strings in compliance with GOST 23979-80 standard and non-standard subs to customer's technical specifications.

Technical specifications

Connecting threads	**Tool-Joint thread per GOST 7915-75**
	Production string per GOST 633-80
	Casing string, OTTM per GOST 632-80
Ultimate tensile strength, psi	More than 127,923
Yield strength, psi	More than 106,602
Relative elongation, %	More than 10
Relative contraction,%	More than 45
Impact elasticity, J/cubic m	More than 685x103
Brinell hardness	HB 285...341

Starting valve
VP 50x210

Purpose

The starting valve is designed for starting drilling pumps operation.

Specifications

Operating pressure, PSI		3000
Nominal bore, in		2
Working medium		Water, drilling mud
Connecting thread		NKT 73 GOST 27/8
Overall dimensions, in	length	9.8
	width	15.7
	height	20.2
Max. weight, lb		103

Types of threaded
joints which can be repaired

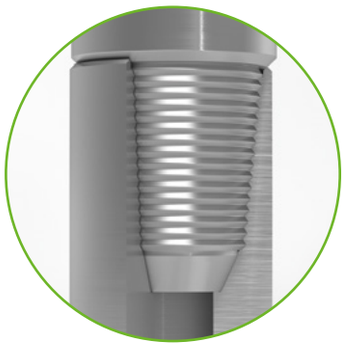



We are the only center accredited by the manufacturing plant Shanghai Hilong to cut patented double abutment threaded tool joints HLIDS in the European part of the Russian Federation.

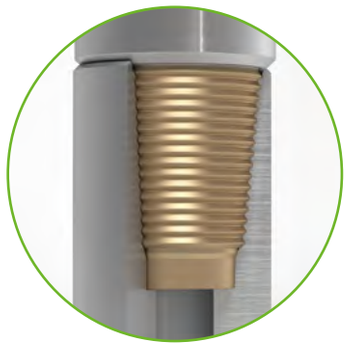
The Company makes:

1. Repairs of drill pipes Hilong Solution;
2. Subs for drill pipes with joints HLIDS 31, 38, 50.

Joints per GOST 28487



Joints per API 7-2

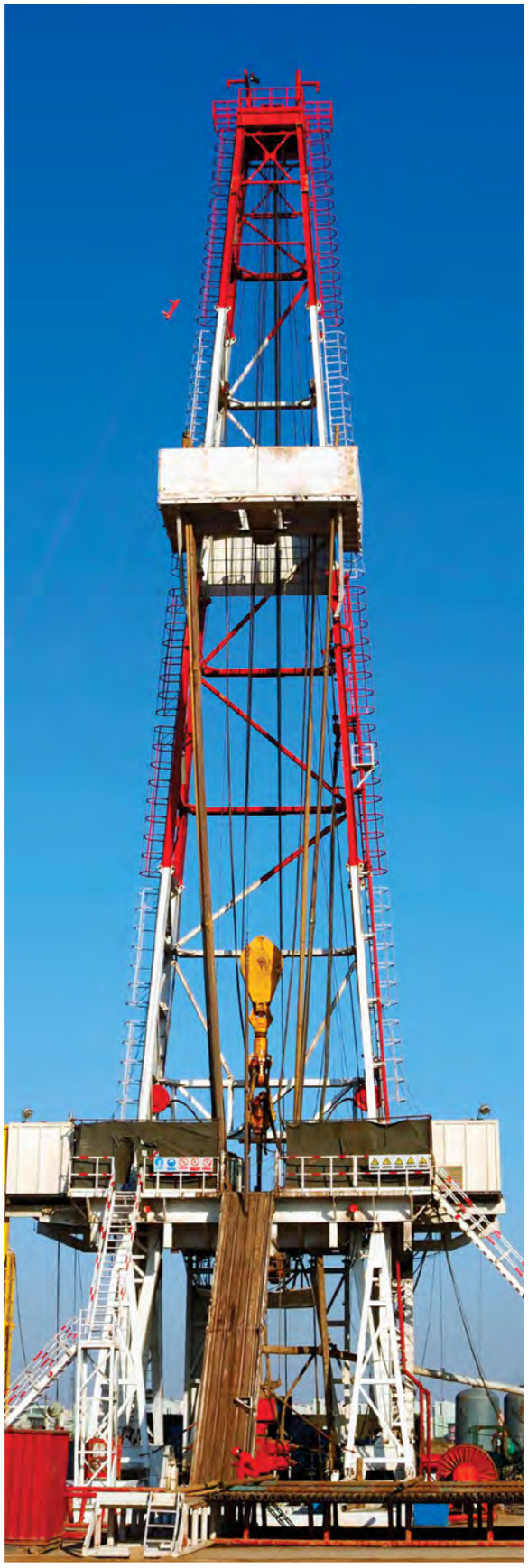


Also tool joints 3-108, 3-117, 3-121, 3-152, 3-171, 3-177, 3-178 are cut

Technical specifications

Nominal Diameter of the Pipe, in	Tool Joint Type	Thread Type
Joints per GOST 28487		
2.8	ZP-95-32	3-73
2.8	ZP-105-44	Grade 86
3.5	ZP-108-44	Grade 86
3.5	ZP-108-41	Grade 86
3.5	ZP-121-68	3-102
3.5	ZP-127-65	3-102
4.4	ZP-159-83	3-122
4.4	ZP-159-76	3-122
4.4	ZP-162-95	3-133
4.4	ZP-162-92	3-133
5	ZP-162-95	3-133
5	ZP-162-89	3-133
5	ZP-178-102	3-147
5	ZP-178-102	3-147
Joints per API7-2 (including tool joints Shanghai Hilong)		
3.5	ZP-105-51	HLIDS 31
4	ZP-127-65	HLIDS 38
5	ZP-168-89	HLIDS 50
2.8	Per API 5DP	NC31
3.5	Per API 5DP	NC38
4.5, 5	Per API 5DP	NC50

Repair
of drilling equipment



TMC-Drilling Service LLC carries out minor repairs and major repairs of Russian-made and imported drilling equipment and drilling pumps.
Following technologies are used while repairing of drilling equipment:

- recondition of body parts, shafts with weld method;
- production of new parts including for repair sizes;
- heat treatment and surface hardening;
- restoration of working surfaces by polymer coating method;
- production of rubber goods;
- metalware production;
- parts hardening by air plasma spraying method;
- running and hydraulic tests.

To reduce repair period, in the territory of TMC Drilling Service LLC, a store of spare parts for drilling equipment has been organized, logistics to deliver spare parts has been de-bugged, cooperation with machine building and repair companies of the Volga Region and the Urals has been established.

We perform major repairs of the following types of drilling equipment and drilling pumps manufactured in the countries:

- Russia: (V3BT; BU-75, BU-1600/100, BU-2000/125E, BU-2000/125EBM, BU-2500, BU-2900,
  BRN-1, NBT-600; Uralmash: UNB-600, NBT-950; Izhdril: 8T-650; KMZ: A60/80);
- USA, Canada: (Dreco, Kremco, Ideco, Carwell, IRI, Cabot, Gardner Denver, Brandt);
- China: (Honghua, SLS)

Repairable equipment:

- swivels;
- hoisting shafts;
- chain and bevel gear reducers;
- beam-pumping units gears;
- crown blocks, traveling blocks;
- hooks, hook blocks;
- transmission shafts of drilling units;
- shaker screens;
- P-560, P-700, P-410 rotors;
- hydraulic brakes;
- change-speed gearboxes;
- shaft with connecting rods of BRN-1, UNB-600 pumps;
- transmission shafts of BRN-1, UNB-600;
- fluid ends of BRN-1, UNB-600, 8T-650 pumps etc.;
- piston and screw compressors;
- top drive systems;
- welding units of domestic and foreign manufacture.

Technical audit
of the drilling equipment

Technical audit is an inspection by independent experts of production organization system, quality control and management system, technical and technological solutions used, as well as a check of technical condition of the machines, equipment, mechanisms, buildings and facilities, engineering communications, systems and networks, as well as a check of technical and project engineering documentation with an opinion expressed as to justification of the technical/technological solutions used, the methods of managing production and conformity of the technical condition of the systems and equipment, which are complicated in terms of engineering, to the requirements of the normative acts.

TMC group Management Company LLC performs technical audits of the drill string (drill pipes, drill string subs), power tongs, hydraulic tongs, blowout preventors.

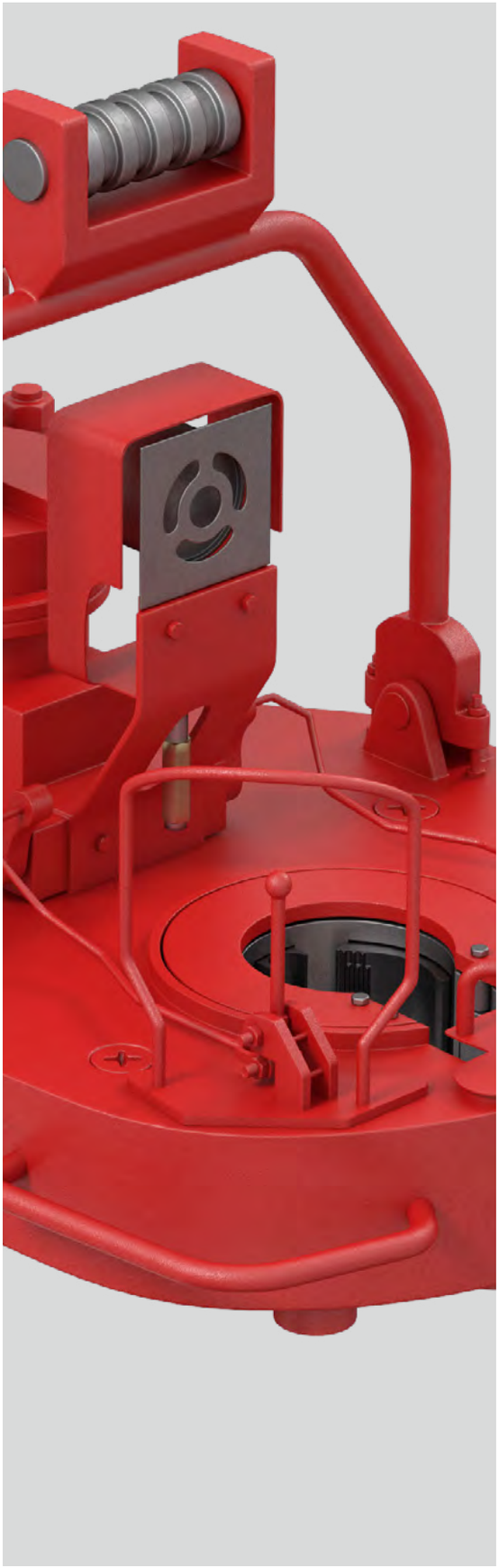
Drill string

- audit of storage, operation and rejection of drill string elements in the drill site;
- audit of production organization system with respect to storage, supply to the drill site and repair of drill string elements;
- check of technical documentation, check for conformity to the requirements of the normative acts;
- analysis of quality of work done with the drill string elements, issuing recommendations on improving the work;
- debugging the system of analyzing loads on the drill string, unacceptable use of limit values;
- providing to the interested party the quality monitoring service with respect to the work done with drilling equipment.

Power tongs, hydraulic tongs, blowout preventors

- audit of operation of power tongs, hydraulic tongs, blowout preventors in the drilling teams;
- audit of production organization system with respect to storage, supply of power tongs, hydraulic tongs, blowout preventors to the drilling site;
- inspection of the technical documentation, checking for conformity to the requirements of the normative acts;
- analysis of the quality of doing work with power tongs, hydraulic tongs, blowout preventors, issuing recommendations on how to improve work on the drill sites;
- analysis of the quality of repair and service in the drill sites and equipment repair shops.

Repair
of hydraulic and air tongs



Purpose

AK5-3; AK5-4 tongs are designed for makeup and breakout of drilling and casing pipes in the process of round trip operations while drilling of oil and gas wells.

Application

Enterprise performs repair of drilling tongs of domestic and foreign production.Hydraulic tongs rKW-4000; rKW-1500; rKW-3200 are used for servicing and workover of wells designed for quick, safe and precise makeup and breakout of drilling pipes and tubings.

Technology of tongs repair

- production of component parts and tongs units;
- restoration of components by padding;
- bench test.

Repair, maintenance and test of blowout preventer equipment

Purpose

Blowout preventer equipment is designed for wellhead sealing for the purpose of prevention of outburst and blowouts.

Preventers repair technology:

- capital repair of preventers with complete disassembly, recondition of components and assembly of units;
- restoration of preventers' bodies by padding method;
- execution of examination of industrial safety of preventers' components with issue of operating state conclusion;
- carrying out of bench tests for operating and test pressure.

Technical specifications

BPE modification	Operating pressure, psi	Test pressure, psi	Hole diameter, in	Number of each wheel revolutions necessary for shutting	Flange outside diameter	Mass, lb
PP-230x35	5,076	10,152	9.05	-	460	2,116
PPSHR-2FT-152x21	3,045	6,091	5.9	14–17		1,102
PMT-156x21	3,045	6,091	6.1	14–15	380	617.3
PPO-152x21	3,045	6,091	5.9	14–16	395	529.1

TMC GROUP

OILFIELD AND DOWNHOLE PUMPING EQUIPMENT

OILFIELD AND DOWNHOLE PUMPING EQUIPMENT

Oilfield and downhole pumping equipment

TMC group Management Company LLC builds up productive and economic relations with Customers under the complex services rendering principle associated with well construction and utilization assurance by the full package of services and repair of oil-field and downhole pumping equipment.

During the integrated maintenance the enterprise renders the following services:

- maintenance and repair of sucker-rod pump drives (beam pumping units and chain drives);

- development of sucker-rod pump drive sub-structures;

- oilfield equipment modernization;
- optimization of sucker-rod pump drives operation;
- servicing of multiphase pumps.

- assembling and dismantling, commissioning and start-up works of sucker-rod pump drives;

- maintenance and repair of well fluid field pumping equipment

Manufacturing
and servicing of sucker rod pump drives

Manufacturing the following types of sucker rod pump drives:
TMS PNSh(T) 60-3-2800/80-3-40, TMS PNSh 60-2.1-2500/80-3-40, TMS SK 60-2.1-2500/8-3.5-4000, TMS SK 100-3.5-56, TMS SK T120-56

where TMS is the manufacturer's trademark; PNSh (T) — the sucker rod pump drive (pedestal); SK — pump jack;
60/80/100/120 — maximum load on the wellhead rod (kN, not more);
6.8 / 9.8 / 11.4 - the maximum stroke length of the stuffing rod (ft);
1843.9/2065/2950/4130 — nominal torque on the driven gearbox shaft (lbf·ft)

- Complex servicing of oilfield equipment
- Rent with servicing of oilfield equipment on mutually beneficial terms
- Oilfield equipment installation/demounting services

- Dimension inspection of metallic structures;
- Restoration of damaged areas;
- Equilibrium determination of the SK instrument;
- Fastening of all fasteners and threaded connections;
- Inspection and repair of the beam in the assembly;
- Inspection and repair of the rod rotator - inspection its operating capacity;
- Lubrication of bearing units, threaded connections;
- packing of stuffing box seals;
- Topping/replacing oil in the gearbox;
- Replacement of worn out and out-of-date parts and units.
- Pump jack (SK) unit repair;
- SK installation, demounting and remounting;
- SK capital repair and foundation assembly;
- SK painting;
- Replacement of V-belt transmission;
- Geological and technical measures (change in the number of oscillations and stroke length);
- Electro-technical operations on the low side transformer (up to 1000 V);
- Servicing of the electrical part of the SK;
- Repair, manufacturing and installation of protective devices.

Specifications

Parameter Name	TMS PNShT 60-3-2800		TMS PNShT 80-3-40	TMS PNShT 60-2,1-2500	TMS PNShT 80-3-40	TMS SK 6-2,1-2500	TMS SK 8-3,5-4000			TMS SK 100	TMS SK T120
Load on wellhead rod, кН	60 (6)		80	60 (6)	80 (8)	60 (6)	80 (8)			100 (10)	120 (12)
Polished rod stroke length, ft	9.8; 8.2; 6.5; 5.2; 3.9		9.8; 8.2; 6.5; 5.2; 3.9	6.8; 5.9; 4.9; 3.9; 2.9	9.8; 8.2; 6.5; 5.2; 3.9	6.8; 5.9; 4.9; 3.9; 2.9	11.4; 9.8; 8.2; 6.8; 5.9			11.4; 9.8; 8.2; 6.8; 5.2; 3.9	9.8; 8.2; 6.8; 5.2; 3.9
Wellhead rod oscillation frequency range, min (step regulation with replaceable pulleys)	2,2-3,5	2,4-3,4	3-6	5-8	4-6	5-14	3,8-6	5,8-8,1	8,6-12	1,3-6 5,8-8,1 8,6-12	4,3-6 5,8-8,1 8,6-12
Rated torque at the gearbox driven shaft, lbf·ft	20,651		29,502	18,439	29,502	18,439	29,502			41,303	41,303
Drive overall dimensions (when the beam is in horizontal position), in, not exceeding: - length - width - height Drive weight, lb, no more than	244 100 229 19,400		279 122 265 28,682	317 105 214 18,827	279 105 212 27,337	255 105 178 19,070	332 105 244 31,305			421 131 28.9 29,762	375 131 270 29,541

Sale of used Russian-
manufactured pump jacks (PJ)

Having pump jacks, the reliability of which is checked during operation, we suggest you to purchase the submersible well (rod) pump drives of the following types from the warehouse in Almetyevsk:

SKN5-3015
SK5-3-2500
6SK4-3,0-2500
PNShT 60-3-31,5
SKDR 6-3,0
SK6-2,1-2500
SKD6-2,5-2800
PShGNT8-3,0-5500
PNShT60-3-37,5
PNSh 60-2,1-25
6SK6-2,1-2500
SKDR6-3,0
PShGN 8-3,0-5500
6SK6-2,1-2500 Sh
PShGNT 6-3,0-3500
PShGNO 6-2,5-1400
OPNSh 30-1,5-10

All assemblies and elements of the pump jacks design has passed all the stages of contact and non-contact non-destructive testing, and the defective components and parts were replaced by the new ones. After passing the multistage tests, the pump jacks were completed, preserved and transferred to storage.

Today you have the opportunity to purchase a workable and technically sound machine that is not inferior to the new one in terms of its performance characteristics. The cost of the drives is lower than the market value of new drives by 40%.

Having the annual warranty and the complete history of the pump jack, we provide you the following (an additional contract is signed):

- Painting in the Customer's corporate colors
- Delivery to the place of installation
- Full professional service twice a year
- Interventions, mounting and remounting (with balancing) on your sites
- Addition of the rod rotator in complicated operating conditions

All sold pump jacks
are equipped with guard devices.

* An additional agreement shall be signed.

Load-carrying capacity, t | Number of swings, units | Stroke Length, m

SKN5-3015

5 | 5-15 | 1,8-3,5

SK6-2,1-2500

6 | 5-15 | 2,1

PNSH 60-2,1-25

6 | 5-15 | 0,9-2,1

6SK6-2,1-2500 Ш

6 | 5-15 | 0,9-2,1

SK5-3-2500

50 | 5-12 | 1,3-3

SKD6-2,5-2800

60 | 5-15 | 0,9-2,5

6SK6-2,1-2500

60 | 4,6 - 15,3 | 0,9-2,1

PSHGNT 6-3,0-3500

6 | 0 1,2-3 | 4,2-11,8

6SK4-3,0-2500

4 | 1,29-3 | 4,8-15,3

PSHGNT8-3,0-5500

8 | 1,2-3 | 4,2-11,8

SKDR6-3,0

6 | 1,2-3 | 1,3-8,4

PSHGNO 6-2,5-1400

6 | 2-7,4 | 0,9-2,5

PNSHT 60-3-31,5

60 | 1,3 - 7,2 | 1,2-3

PNSHT60-3-37,5

6 | 1,2-3 | 1,3-7,2

PSHGN 8-3,0-5500

8 | 1,2-3 | 4,2-11,8

OPSHN 30-1,5-10

30 | 1,6 - 12,9 | 0,75-1,5

Technical specifications of the beam pumping units

Parameter Description	Unit of easurement	TMC SK-8-3.5-4000			TMC SK 6-2.1-2500	TMC SK 6-2.1-2500	TMC SKD 8-3-4000
Load on the Mouth Rod	kN (pound force), no more than	80 (17920)			60 (13440)	50 (11200)	80 (17920)
Rod Stroke Length	ft, no more than	11.4; 9.8; 8.2; 6.8; 5.9			6.8; 5.9; 4.9; 3.9; 2.9	9.8; 8.2; 6.8; 5.9; 4.2	4.06; 5.2; 6.5; 8.2; 9.8
Swing Frequency Range (Adjustment Using Change Shieves)	Swings/min	3,8 – 6	5,8 -8,1	8,6 – 12	5 – 14	5 – 12	4 – 12
Balancing System		Crank type					
Reducer Type		TS2NSH-450-40			TS2NSH -450-28	TS2NSH -450-28	TS2NSH -450-40
Reducer Transmission Ratio		37,18			39,924	39,924	37,180
Reducer Drive		V-belt drive, 3 belts of one group Belt type S(V) – 4000T GOST 1284.1 and GOST 1284.2					
Brake		Drum Type					
Electric Motor Power	kW	30			15	15	18,5
Electric Motor RPM	rpm	1000			750	750	750
Overall Dimensions	in, no more than (with horizontal position of balancer)						
– length		332			255	290	279
– width		105			105	105	105
– width (excluding guards of connecting rod and crank mechanism and service platforms)		88.5			71.2	72.4	88.5
– height		244			178	204	212
Mass	lb, no more than	31305			19070	20943	25970
Service life	years	20					

Manufacturing and sale
of tubing GOST 633-80, GOST 31446-2017

Purpose

Tubing strings are used in the process of operating oil and gas wells to transport liquids and gases inside casing strings as well as for repairs and RIH/POOH operations.

Process of tube manufacture comprises the whole set of operations:

- 100% input inspection of pipe billets from reliable suppliers;
- Gauging using high accuracy gauges;
- Cutting and strengthening threads;
- Completing with collars of required strength class;
- Supplying tubes with Premium© type threads;
- hydro-testing Pmax up to 14,223 psi;
- applying internal polymer coatings TREPP™ and Amercoat©;
- 100% output inspection of finished products using non-destructive inspection methods;
- Packing and marking to Customer's requirements;
- Provides a complete cycle of tubing string repairs.

Technology and package of equipment for diagnostics and repairs ensure a complete cycle of tubing string refurbishment which consists of the following types of process operations:

- washing;
- mechanical cleaning of pipes;
- gauging;
- defect detection;
- unscrewing collars (couplings);
- removing defective pipe sections;
- cleaning and controlling threads;
- re-threading;
- screwing on the collars;
- hydro-testing;
- Measuring length;
- Branding;
- Completing with thread protectors;
- Consolidating transport packages.

Modern methods of nondestructive inspection (ultrasound, electro-magnetic control, spectral test, etc.) allow:

- determination of residual thickness of the pipe wall;
- determination of defects both on the surface and in the pipe body;
- determination of chemical analysis of the metal structure;
- distribution of tubing strings according to strength groups.

Technical specifications

Outside Diameter, in	Wall Thickness, in	Length, ft	Strength Group	Thread Type	Coating Thickness
1.8-3.5	0.15-0.37	27.8-34.4	D, K, E, L, M J55, K72, L80, N80, T95, P110	tapered thread triangular thread	up to 700 microns

Couplings for tubing

Purpose

The couplings are designed to connect tubing to a unified pipeline for transmission of liquids in oil wells.

Description

Tubing couplings are manufactured in accordance with GOST 633-80, GOST 31446-2017 from seamless hot-rolled tubes under constant quality control performed on modern equipment of leading manufacturers.

Competitive advantages

- Delivery time – from 5 calendar days
- An inexhaustible stock of couplings to meet the customer's needs
- Manufacture of couplings according to additional customer's requirements
- Flexible payment system
- Warranty period is 12 months

Technical specifications

GOST 633-80 couplings for plain tubing

Nominal pipe diameter	Outer diameter, in	Length, in	Weight, lb	Strength grades
48'	2.2	3.7	1.1	D,K,E
60'	2.8	4.3	2.8	D,K,E,L
73'	3.5	5.1	5.2	D,K,E,L
89'	4.2	5.7	7.9	D,K,E,L
102'	4.7	5.9	9.9	D,K,E,L
114'	5.2	6.1	11.2	D,K,E,L

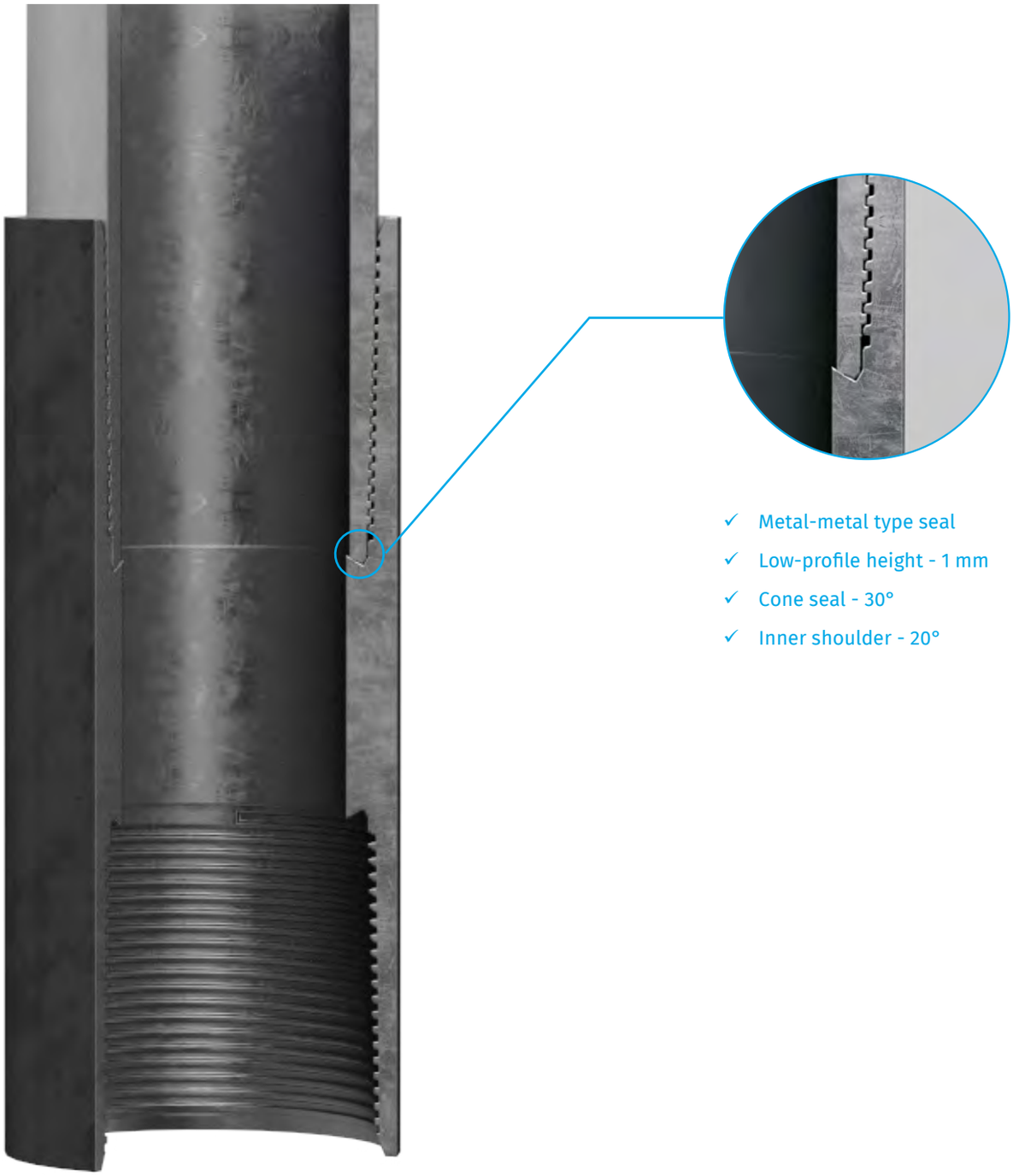
GOST 633-80 couplings for tubing with external upset ends

48'	2.5	3.93	1.7	D,K,E
60'	3.06	4.96	3.3	D,K,E,L
73'	3.66	5.27	6.1	D,K,E,L
89'	4.5	5.74	9.2	D,K,E,L
102'	5	6.06	11.02	D,K,E,L
114'	5.5	6.29	13.8	D,K,E,L

GOST 31446-2017 tubing couplings

48'	2.2	3.75	1.2
60'	2.87	4.25	2.8
73'	3.5	5.12	5.15
89'	4.25	5.62	8.17
102'	4.75	5.75	9.59
114'	5.2	6.12	4.16

HKF-G TUBING PIPE
WITH PREMIUM THREAD



- ✓ Metal-metal type seal
- ✓ Low-profile height - 1 mm
- ✓ Cone seal - 30°
- ✓ Inner shoulder - 20°

Scope of application

Tubing pipes with NKTS-G premium-class thread is used in oil, gas, and gas condensate production. Joints of this class are distinguished by high strength, resistance to tensile, bending, and compressive loads with excessive torque.

Unique design

The results of testing pipes with Premium class threads demonstrate that such threaded connections keep absolute air-tightness under various loads, which can be considered their essential characteristic when working within an aggressive environment.

The metal-to-metal seal ensures the pipe ends contact and the required pressure in the seal area, and therefore ensures 100% gas tightness. The inner shoulder intensifies the contact pressure in the seal area and serves as a stopper for screwing.

The low profile thread design (1 mm) provides easy screwing of the threaded connection. The smooth profile of the internal connection cavity ensures flush connections and good conditions for applying protective anticorrosion coatings.

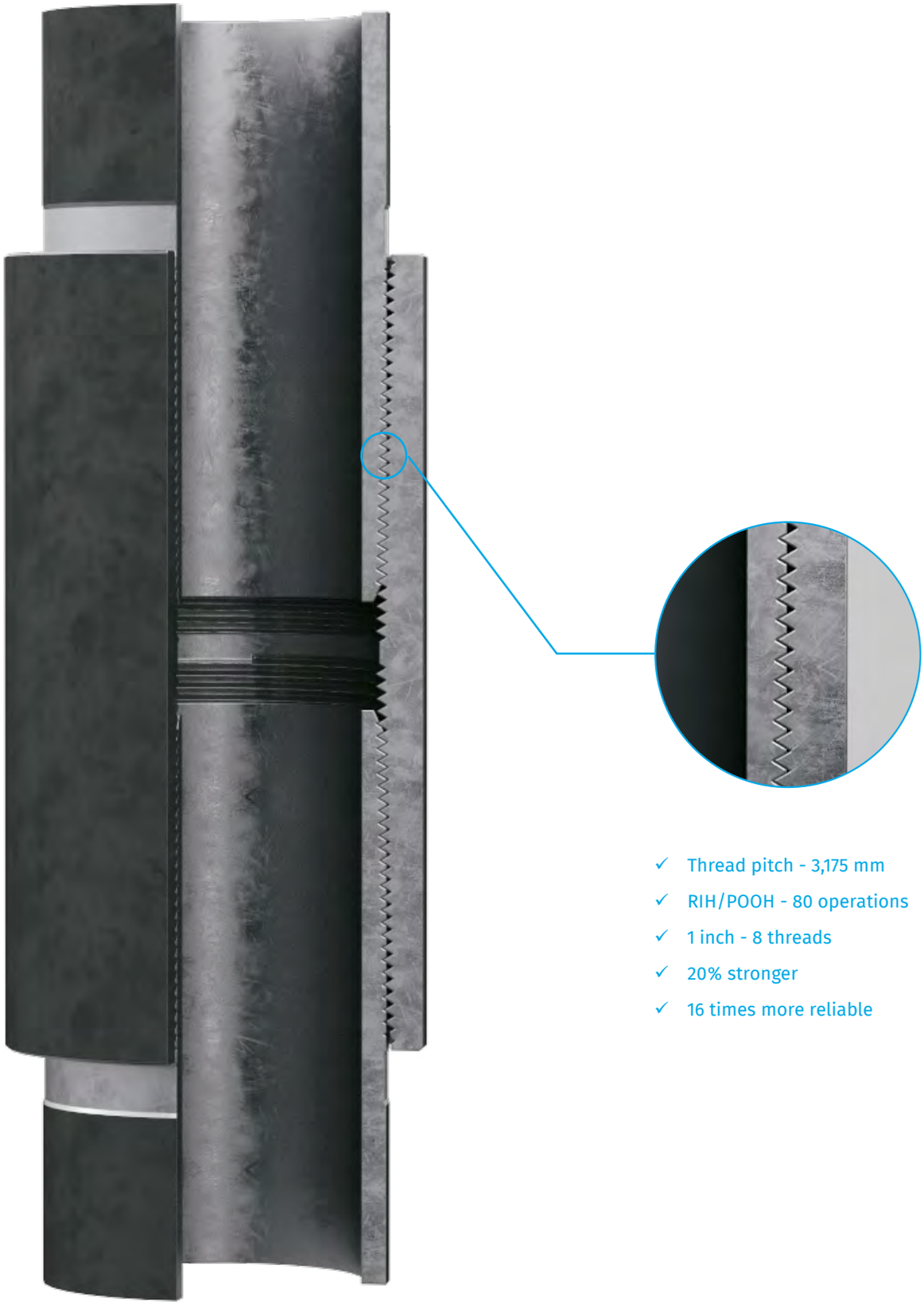
Advantages of NKS-G threaded connection

- operation in oil and gas wells in difficult conditions;
- protection against excessive make up torque;
- resistance to bending loads;
- sealing of “metal-metal” threaded connection;
- high durability

Main technical specifications of 73 mm NKTS-G threaded connection, strength group K

Seq. No.	Specifications	UOM	Indicator
1	Axial load corresponding to the strength limit of the tubing body	klb	181.2
2	Load corresponding to the yield strength of NKTS-G threaded connection	klb	130.8
3	Make up torque	bf-ft	2212.69
4	Value of tubing hydraulic testing at which stress in the pipe reaches the yield strength	psi	9572.5

TUBING PIPE
WITH HKF THREAD



- ✓ Thread pitch - 3,175 mm
- ✓ RIH/POOH - 80 operations
- ✓ 1 inch - 8 threads
- ✓ 20% stronger
- ✓ 16 times more reliable

Scope of application

High-strength wear-resistant HKF thread is applied on tubing pipes used for process operations in oil and gas wells with difficult operating conditions.

HKF threads have an elongated design and improved strength characteristics.

Unique design

The NKTU threaded connection has an elongated design compared to the usual triangular tubing thread according to GOST 633-80, which provides high strength characteristics that allow using pipes with this type of thread when performing operations in wells, including in hydraulic fractures.

Ultimate strengths and recommended torque values for pipe make up

Rated diameter of the pipe, inch	Thread standard size	Wall thickness, inch	Strength group					
			D	K	E	L	M	R
Ultimate strengths in the thread, Qult, kip								
2.9	F-3.2	0.2	71.7	92.8	104.3	123.6	136.7	175.6
		0.3	95.9	124.3	139.6	165.4	183.2	235.2
3.5	F-3.2	0.2	109	141.4	158.9	188.1	208.4	267.5
		0.3	138.9	180	202.3	239.9	265.3	340.8
Make up torque, lbf·ft								
2.9	F-3,2	0.2	1312.9	1519.4	1622.6	1843.9	2035.7	2551.97
		0.3	1733.3	1991.4	2138.9	2433.96	2699.5	3392.8
3.5	F-3,2	0.2	1563.6	1880.8	2175.8	2581.5	2802.7	3577.2
		0.3	1880.8	2463.5	2773.2	3289.5	3636.2	4646.6

Advantages of HKF threaded connection

- bearing capacity of tubing pipe HKF thread is 20% higher than conventional tubing according to GOST 633-80;
- tubing with HKF threads is 15% cheaper than pipes with upset end hardening;
- the operating time of HKF threads is 16 times higher than that of conventional threads;
- thread twist is eliminated due to increased free thread run-in into the coupling

Crossover sub for tubing pipes

Application

The crossover sub is designed for connecting tubing and casing pipes of different diameters and thread types, as well as underground equipment having connecting ends with the threads of tubing and casing pipes used in the operation of oil and gas wells.

Technical specifications

There are three types of crossover subs:

- **Type P (transitional) crossover sub –** a combination of threaded elements of a coupling-nipple type;
- **Type M (coupling) crossover sub –** a combination of threaded elements of a coupling-coupling type;
- **Type H (nipple) crossover sub –** a combination of threaded elements nipple-nipple type.

The crossover sub for tubing is certified and manufactured from steel with geometric parameters in accordance with GOST 23979-80, which provides mechanical properties of the corresponding pipe material grade in accordance with GOST 633-80. Grades: «D», «K», «E», «L».

Technical Characteristics

Nominal pipe diameter	Pipe				Coupling		
	Outer diameter, D	Wall thickness	Inner diameter, d	Weight of 1 m, lb	Outer diameter, D	Length, L_m	Weight, lb
33	1.31	0.14	1.04	5.7	1.66	3.31	0.8
42	1,66	0.14	1.39	7.2	2.06	3.54	0.8
48	1.9	0.16	1.59	9.7	2.2	3.78	1.1
60	2.37	0.2	1.98	14.9	2.87	4.33	2.8
73	2.87	0.22	2.44	20.2	3.5	5.2	5.2
		0.28	2.32	25.1			
89	3.5	0.26	2.99	29.1	4.25	5.75	7.9
102	4	0.26	3.29	33.5	4.75	5.91	9.9
114	4.5	0.28	3.95	40.7	5.2	6.14	11.2

Packer M1-X

Purpose

Production Packer M1-X installed mechanically, seated by means of compression or extension, is an extractable Packer, allowing the tubing string to be in stretched, compressed or neutral position. This particular Packer is designed for operation in a medium of aggressive in-well fluids in the course of production and injection. This Packer has been specially developed for operation in production and injection wells as well as for isolation of separate zones and in the course of a number of service operations when wells are under repair.

Special features and advantages:

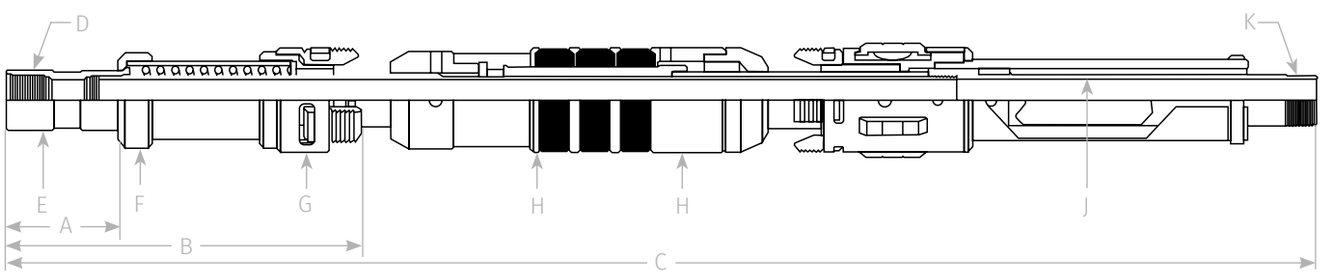
1. Additional method of seating by extension allows the Packer to be used at small depths;
2. Three assembly options are available: standard pressure of 517 atm., large bore and high pressure of 690 atm;
3. Tubing hanger may be left in stretched, compressed or neutral position;
4. Holds differential pressure over and under the Packer;
5. Seating by means of right hand rotation, releasing by right hand rotation;
6. Bayonet seating and releasing mechanism J slot type;
7. Internal bypass duct;
8. Seal below upper wedges allows accumulated slime to be washed out in the course of the Packer release;

Operational period of Packers, subject to continuous location of the Packer in the well, is up to 10 years.

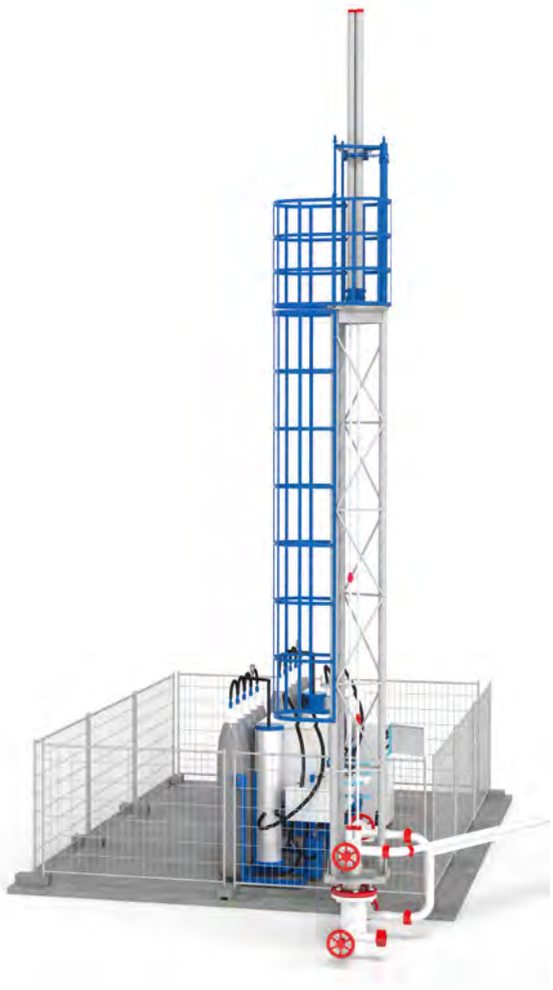
Packer specification

Packer type size	Outside diameter of production string, in	Wall thickness of roduction string, in	Inside diameter of roduction string (min.), in	Inside diameter of roduction string (max.), in	Outside diameter of the packer (max), in	Inside diameter of the Packer (min), in	Connecting thread (coupling (collar) – top – nipple bottom-)
5-1/2	5.7	0.3 – 0.37	5	5.14	4.81	2.35	2-7/8 EU 8Rd
6-5/8	6.6	0.35 – 0.41	5.7	5.92	5.59	2.35	2-7/8 EU 8Rd

Schematic illustration of production Packer Model M1-X



TMC-POWER MAN™
pneumohydraulic drive of oil-well sucker rod pump



New technologies for oil production

Purpose

"TMC POWER MAN" ™ pneumohydraulic drive is designed for making the reciprocating motion of oil-well sucker rod pump plunger while fluid pumping-out from oil-wells.

Advantages

- Multiple low metal content and mass compared to other drives of oil-well sucker rod pumps.
- Reduction of terms of assembling, dismantling and ommissioning works to 3 hours.
- Oil production process automation (hydraulic drive remote control).
- Use of effective accessory equipment consisting of hydraulic drive (adjustable pump, standard gas cylinders etc.).
- Stepless change of pumping speed and stroke length of pump plunger without stop of drive made by one operator within 5 minutes.
- The delay of pump plunger in upper position (pump fillage efficiency increase).
- Reciprocation function (removal of well from jamming).
- Reduction of energy costs to 30%.
- Effective rebuilding of hydraulic drive units for installation of auxiliary equipment according to Customer's choice.

Application

- Well completion after drilling and workover. Effective adjustment of optimal parameters of well operation during completion.
- Operation in wells equipped with one-tubing installations of dual completion.
- Carrying-out the effective investigations of well water cutting through possibility of operative change of operating conditions of rod pump plunger while selecting from one formation to another (within 5 minutes by one operator).
- Operation of intermittent well stock being in inactivity mode.
- Possibility to use oil-well sucker rod pump in wide ranges, minimum stroke length — 0.8 ft.
- Performance of resuscitation works in wells which have risk of hanging-up and jamming of sucker-rods.
- Reciprocation function availability.

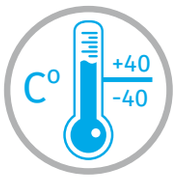
Support equipment (according to Customer's choice)

- rod rotor;
- covering of hydraulic station and boxes for high-pressure hoses;
- explosion-protected and vandal-roof special shelter (house) for hydraulic station;
- guys for hydraulic drive frame for reduction of wind loads action;
- remote control function with change of parameters, remote monitoring and online control of hydraulic drive work from operator's panel.

Technical specifications

Drive make	TMC POWER MAN (one-tubing)	TMC POWER MAN (two-tubing)	TMC POWER MAN (resuscitation)	TMC POWER MAN (long-stroke)
Maximum load on polished rod, kN (lbf)	176.37	176.37	220.46	176.37
Polished rod stroke length, ft	0.6÷13.1			0,6÷19,6
Change pitch of stroke length, ft	stepless			
Number of 2 strokes per minute	0,25÷4	0,25÷4	0,25÷5,5	0,25÷2
Electric motor power, kW	5,5-7,5-11 kW	5,5-7,5-11 kW	15-18-22 kW	5,5-7,5-11 kW
Electric motor and pump overload protection	automatic			
Balance system	pneumatic (balancing with compressed nitrogen)			
Control station	SU SKAD			
Mast mass with hydraulic drive (complete set mass), lb	1543 (5335±110)			
Weight hydroelectric, lb	3306 (hydrostation — 1 pc.)	6613 (hydrostation — 2 pc.)	3306 (hydrostation — 1 pc.)	3747 (hydrostation — 1 pc.)
Weight complete kit lb	5335.19±110	8465±110	5511±110	6613±110
Overall dimensions (length, width, height), ft				
- frame	2.2x4.5x29.5			2.2x4.5x42.6
- hydraulic station	4.42x4.59x5.57			
Environment temperature	-40 to +104° F			
Rod rotor	Complete with optional custom	No	Complete with optional customer	with rod rotor
Compatible with controller SAM Well Manager	yes			
Mode “reciprocating”	yes			

Well Reciprocation* Mode



Operating Temperature*

Compatibility with SAM Well Manager Controller*

* applicable to any grade

Design and construction of the processing line for diagnostics and repair of TMC-Hightech tubing

Purpose

TMC-Hightech production line for tubing diagnostics and repair (hereinafter referred to as the Line) is intended for inspection and repair of used tubing to determine the degree of its suitability for further use in wells.

The line is used for cleaning of tubing from oil deposits, drying, gaging by a cylindrical mandrel along the tubing, visual and instrumental control and screening, outgoing inspection. It is used for inspection and repair of used and brand new tubing with pipe sizes of 1,9, 2-3/8, 2-7/8, 3-1/2, 4. 4-1/2 in, including production pipes with wear resistant locks and tubing with internal polymer anticorrosive coating.
In addition, the Line is intended for manufacturing of new tubing from pipe billets, as necessary and sufficient number of pipe-threading machines and control and measuring equipment (hydraulic pressure testing units, non-destructive testing units, etc.) is available.

Field of application

1. For oil and service companies that own a stock of tubing, which have been in operation and require diagnostics and repair works in the workshop conditions.
2. For short term assessment of tubing repeat use based on a simplified production process: tubing delivery from the well - washing - visual inspection - gaging - rejection and replacement - dispatching to the well.
3. For non-destructive testing and hydraulic testing of the tubing at 4351 (10000) psi, depending on customer's requirements.
4. For manufacturing of new tubing from pipe billets.

Advantages

1. High capacity – over 850 tubing/day.
2. High quality of repair and manufacturing due to use of domestically produced modern equipment, tested methods and procedures of diagnostics and repair.
3. Reduced in-process relocation – minimum loss of time on transportation of pipes between areas due to professional layout solution on equipment arrangement according to the value stream map (VSM), Pareto diagram and work places management by 5S system, improvement of production efficiency and labor productivity due to application of lean manufacturing tools.
4. A layout solution that allows production to be cited in the smallest areas with the possibility of longitudinal or transverse movement of pipes, for example, 60-100 ft, etc. - depending on the layout of the production site.
5. Reduction of process waste from repairs of tubing threaded parts due to the possibility of adjusting the length of defective pipe sections to be cut, reuse of tubing couplings.
6. Use of an automated line for pipe body diagnostics, which allows pipes to be sorted by types depending on the requirements (range of controlled parameters is programmable).
7. Quick changeover when the size of tubes to be processed is changed, which should not take more than 60 minutes.

8. Ability to manufacture crossover subs and sockets at the line.
9. Additional provision of equipment required (as agreed with the customer).
10 Experience of TMC Group Managing Company LLC in design, modernization and construction of more than 10 processing lines for diagnostics and repair of tubing for facilities servicing major oil companies in Russia (Rosneft Oil Company OJSC, Lukoil OJSC, Tatneft OJSC, etc.) and their subdivisions, as well as experience in supplying lines to Surgutneftegaz OJSC, Udmurtneft OJSC, RN-Repair Research and Production Association LLC.

Technical specifications

The line includes a typical set of the process equipment, allowing to perform full diagnostics and repair, and also manufacturing of tubing. The list of technological procedures performed on the line:

1. Washing of tubes in an automated washing machine; additionally, or if necessary, internal mechanical cleaning.
2. Sorting, visual and instrumental control, identification of defective and maintainable tubing.
3. Gaging of the inner tubing cavity using a cylindrical mandrel to detect tubing drift and local body deformations.
4. Coupling back-off, visual and instrumental control and assessment of the coupling suitability for further use.
5. Non-destructive testing of tubing (magnetic induction and eddy-sonic control methods to define flaws and tubing wall thickness).
6. Triangular thread cutting at pipe threading machines with computer numerical control in accordance with API Spec 5CT.
7. Coupling back-off on a pipe nipple with the make-up control.
8. Hydraulic testing of tubing with internal pressure of fluid (up to 4351 (10000) psi) and 10-second exposure.
9. Outgoing inspection: length measurement, lubrication of threaded parts with conservation grease, installation of protectors, engraved marking, preparation of finished product packages and documentation.
10. Additional operations and features. A Metran videographic paperless recorder is used at the site and is designed to collect, visualize, record and regulate the various parameters of the technological process of hydraulic pressure testing: pressure, cycle time, the number of tested pipes, etc. The Metran recorder is equipped with a developed system of screen menus of control and operation of the archive, large internal memory and interface to the external Flash-memory.
11. Additional operations and features. Pipe-threading machines are equipped with a support and loading line. Removal of defective tubing sections is carried out automatically by a bandsaw machine.
12. Transfer of tubing along the area, the finished product warehouse and the reject pockets is performed by an automated transportation system. The layout of the tubing maintenance area is designed to minimize the path from the loading area to the finished product warehouse. This eliminates counter-current flows and blocks in the areas, and helps to organize the tubing transfer to the warehouse.
13. Other additional procedures and required equipment are defined according to the technical specifications, if necessary.

Processing line specifications

№	Name	Parameter
1	Type of tubing	Tubing according to GAPI Spec 5CT and foreign equivalents
2	Tubing specifications:	
	- nominal outer diameter, in	1,9, 2-3/8, 2-7/8, 3-1/2, 4. 4-1/2 in
	- maximum length, in	37.73 ft
	- minimum length, in	18.045 ft
3	Capacity, pipes/h	up to 40
	Degree of production automation (Over the line, as required by the Customer), %	85

Operating procedures and line make-up (main operations)

№	Name of main operations	Technological process parameters	Equipment and tools
1	Wa shing of the external and internal cavities	Washing of pipes from oil sediments	Automated washing machine with the autonomous recirculated water supply system for collection of solid oil sludge.
2	Cl eaning of the inner surface of pipes	Cleaning of pipes from oil sediments	Tubing inner surface cleaning unit
3	Gaging of inner pipe cavity	Inspection of the tubing inner cavity according to API Spec 5CT	Gaging set-up, cylindrical mandrel L=4.1 ft
4	Non-destructive testing	Controlled parameters: integrity of pipe material, thickness gauging, defective area determination, pipe grading	Automated non-destructive testing unit. Note. As required by the Customer, the equipment can be fitted with a structural sensor and an automatic structure analyzer.
5	C utting and removal of defective sections	Cutting of defective sections	Bandsaw machine
6	Mechanical treatment	Threading in accordance with API Spec 5CT	CNC pipe-threading machine (with drill steel guides)
7	C oupling breaking	Performed by mechanical means on a coupling machine with torque control.	Coupling machine
8	Hydraulic testing	Leak testing by creating an excess pressure of liquid in the inner cavity of the pipe.	Hydraulic pressure testing unit
9	Outgoing inspection	Application of the required information to the pipe outer surface. Lubrication threaded parts with conservation grease, packing of transport plugs (caps). Length measurement.	Pneumatic or laser engraving unit (as agreed with the Customer). Length measurement unit.
10	In-process relocation	Transfer of pipes between processes, the finished goods warehouse and reject pockets	Roller lines, racks, accumulation trays, transporters, cabinets, control panels, cable products, etc.
11	Storage	Storage of finished products	Racks, cells.

Approximate delivery and installation terms of the processing line

Item No.	Milestone	Months	1	2	3	4	5	6
1	Inf rastructure development (access ways, heated area, electricity and water availability)	-						
2	De sign of the processing line diagram, coordination with the Customer	1 month						
3	Pr eparatory work, delivery of equipment to the Customer's premises	1 month						
4	Mounting, commissioning.	4 month						

* The table shows the installation and commissioning terms without time for purchasing the equipment agreed with the Customer. The installation works term depends on site availability and required infrastructure.

Repair
of tubings

Modern equipment providing the whole repair and recovery cycle of tubings with operational life increase is used to carry out an integrated repair of tubings. Annual output of the service center for tubings repair is 1 500 000 pcs.

When repairing tubings the following promising directions of the pipe inner surface cleaning are used:

- cleaning of tubings by a hydro-cavitation method;
- cleaning of tubings by a thermo-abrasion method;
- cleaning of tubings by a mechanical method.

Cleaning of tubings by the hydro-cavitation method

Cleaning of the inner surface of tubings from disrupted epoxy coating, slugs, sediments, mechanical inclusions and remaining hydrocarbon sediments by the hydro-cavitation method. Plant capacity is 3 pipes per hour.

Cleaning of tubings by the thermo-abrasion method

Cleaning of the inner surface of pipes up to II degree of purification defined in the standard GOST 9.402-80. After diagnosing cleaned tubings can be used for intended purposes (in wells) or directed further for the application of inner anticorrosive coating. Plant capacity is 3 pipes per hour.

Cleaning of tubings by the mechanical method

This cleaning method is based on grinding and shearing impact. Pneumatic drive rotates the instrument provided that free elements of the instruments (stones) centrifugally repeat the inner surface of tubings ensuring the scouring of the removed coating. Stones material is cemented carbide BK15. Plant capacity is 1 pipe per hour.

Within the complex of works connected with the repair of tubings the service center renders the following services:

- washing of tubings with the further sorting;
- repair of tubings without flaw detection survey with complete or partial substitution of couplings;
- repair of tubings without pressuring with complete or partial substitution of couplings;
- complete repair of tubings with complete or partial substitution of couplings;
- production of tubings from pipe stocks with complete spinning of ouplings
  or without spinning of couplings;
- preparation for application of protecting coating;
- mechanical cleaning of the inner pipe body;
- hydro-cavitation cleaning of tubings;
- thermo-abrasion cleaning of the inner body of tubings;
- complete repair of new and used tubings with coupling boring (for dual completion);
- hydraulic testing of tubings.

Production
of pump rods

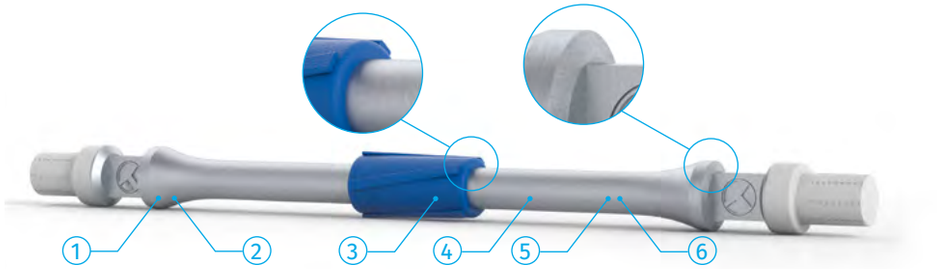
Pump rods of TMC group are produced on modern imported and home equipment made of highquality alloy steel with method of arc melting. At that chemical composition is chosen in such a way that physical and chemical properties of rod such as ductility, impact strength, fatique strength, wear and corrosion resistance are balanced for use in wells with abnormal geologic and technical conditions.

At all production stages pump rods of TMC group are subjected to visual and instrumental control and laboratory testing on the equipment of leading manufacturing companies of Austria, USA and Canada. More over except for visual inspection finished products are subjected to 100% professional inspection on the automated flaw detection survey computer system of pump rods “SONOSCOPE” ™ of “TUBOSCOPE VETCO” ™ company (USA), full non-destructive testing of the rod body, magnetic-particle inspection of couplings and control of fillet parts and rod threads with certified patterns defined in the standard API Spec 11B4 and Specification 11B API is performed.

At Customers’ request TMC group equips pump rods with fixed scratchalizers and floating scratchers made of polymeric materials which give an opportunity to utilize them in abnormal wells with asphalt, resin and paraffin depositions. Pump rods are supplied with screwed on coupling on the one side in special packets which exclude any damage of the rod surface, their contamination and deviation. To preserve the thread from external actions protecting caps are screwed on pin-rod ends and couplings are closed with polyethylene plugs.

TMC group will supply the wide range of pump rods defined in the standard API Spec 11B4 and specification 11B API with the guaranteed quality and on favorable terms for Customer.

Solid sucker-rods
without welded joints, API Spec 11B4



① Optimal selection of steel chemical composition
in production of bar for sucker rods. A broad spectrum of mechanical properties is provided which meets the most exacting sucker rod requirements in terms of strength, plasticity, shock strength, wear and corrosive resistance.

② Sucker rod production
on state-of-the-art imported and Russian made equipment from high quality alloy steels using electric arc melting method.
High product quality is guaranteed.

③ Use of molybdenum doped materials
– eliminates reversible and irreversible temper brittleness of steel; nickel doping improves resistance of steel to cold. The temperature range of sucker rods expands and their resistance to corrosion in aggressive media increases.

④ Provision of broad product range to customer
of sucker rods with different classes of strength and corrosive resistance requirements. Allows operation of sucker rods with different loads and under the conditions of corrosion active media of the oil wells.

⑤ Equipping sucker rods with scraper centralizers
from polymer materials. Capability is provided to operate Sucker Rods in wells contaminated with asphalt, resin, paraffin depositions. Scraper centralizers can be installed in any sequence and quantity which allows the Customer to select the optimal way of combating depositions inside the tubing string.

⑥ 100% quality of our products
is assured using methods of input, tooling and laboratory control on the equipment of leading global producer firms from Austria, U.S.A. and Canada.

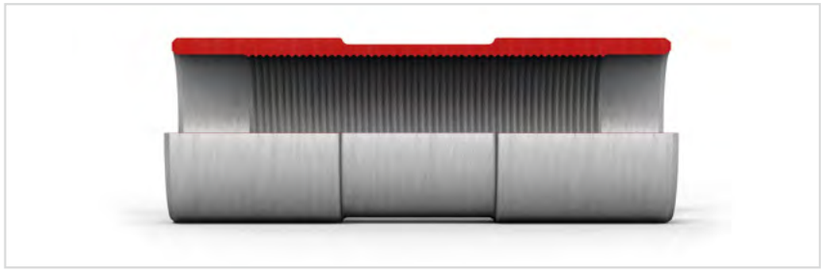
Technical specifications

Passage (nominal) diameter, mm (inches)	5/8”, 3/4”, 7/8”, 1”
length, ft	
– Normal length	25.3
– Shorter length	Any length from 1.67 at customer’s request
Accuracy class	K, C, D, D special, D super
Tensile strength* σv, psi	90000-148000
Minimum yield* σт0.2, psi	60000-105000
* According to strength index of sucker rod	

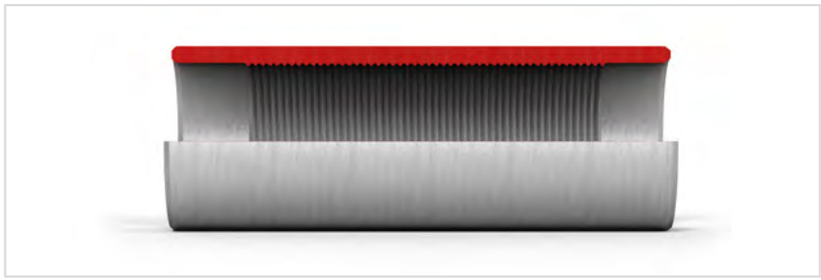
Rod couplings

Purpose

Rod couplings are designed for connection of pump rods through internal thread. Rod coupling can be connecting and crossover.
Rod connecting coupling is a coupling with thread designed for connection of rods of the same sizes.



view — 1, 2

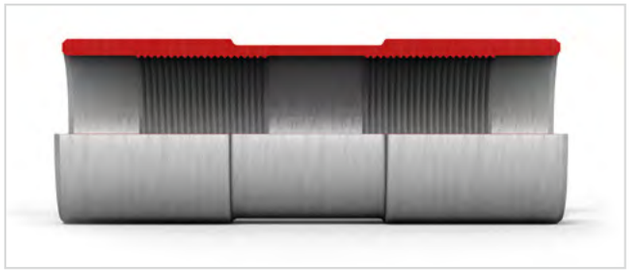


view — 3

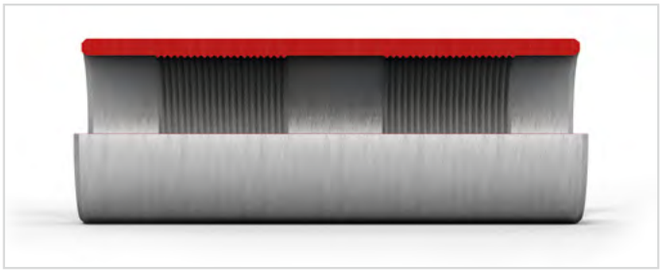
Technical specifications

Coupling conventional size	Thread designation	Version	Outside diameter D, in	Overall length L, in	Width across flat S, in	Mass, lb
MSh 16	Sh 16	1; 2	1.49	3.14	1.37	1.1
		3	1.33		-	0.74
MSh 19	Sh 19	1; 2	1.65	3.22	1.49	1.23
		3	1.57		-	0.88
MSh 22	Sh 22	1; 2	1.81	3.54	1.61	1.49
		3	1.65		-	0.92
MSh 25	Sh 25	1; 2	2.2	4.01	1.88	1.94
		3	2		-	1.58
MSh 29	Sh 29	1; 2	2.36	4.52	2.12	3.39

Rod crossover coupling is a coupling with thread designed for connection of pump rods of different diameters.



view — 1, 2



view — 3

Technical specifications

Coupling conventional size	Thread designation		Version	Outside diameter D, in	Overall length L, in	Width across flat S, in	Mass, lb
	d1	d2					
MShP 16x19	Sh 16	Sh 19	1; 2	1.65	4.01	1.49	1.58
			3	1.57		-	1.1
MShP 19x22	Sh 19	Sh 22	1; 2	1.81	4.01	1.61	1.89
			3	1.65		-	1.21
MShP 22x25	Sh 22	Sh 25	1; 2	2.20	4.52	1.88	2.86
			3	2		-	2.2
MShP 25x29	Sh 25	Sh 29	1; 2	2.36	5.11	2.12	3.61

Design and construction of the processing line for diagnostics and repair of TMC-SR Line pumping rods

Purpose

Production line for diagnosis and repair of TMC- SR Line pumping rods (hereinafter referred to as the Line) is intended for inspection and repair of used pumping rods, as well as for incoming inspection of new rods, in order to determine the degree of its suitability for further use in wells. The line is used to clean the pumping rod from oil sediments, cut off the centralizers (if necessary), unscrew the couplings, visual and instrumental control, non-destructive testing of the body and end parts, sorting and distributing by length, types and sizes, screw the couplings, outgoing inspection. The area can be used for inspection and repair of used 5/8, 3/4, 7/8, 1 in pumping rods of 25.3 ft in length.

In addition, the Line allows to carry out the incoming inspection of new 5/8, 3/4, 7/8, 1 in rods with length of 25.3 ft due to availability of required control and measuring equipment.

Field of application

1. For oil and service companies that own sets of new and used pumping rods that require comprehensive diagnostics and inspection in the workshop environment in order to determine the quality of the supplied equipment.
2. To assess the possibility of recycling used pumping rods and their type arrangement based on the flaw detection results.
3. To conduct non-destructive testing of pumping rods and couplings by electromagnetic and current-sweeping methods, as well as using magnetic powder methods of non-destructive testing and fluorescent suspension.
4. For effective incoming inspection of new rods according to API Spec 11B4 that will prevent the receipt of new rods with manufacturings flaws from various manufacturers.

Advantages

1. Increased performance of diagnostics and repair (more than 1200 rods/day).
2. Hight quality of repair of the pumping rod threaded parts due to mechanization of scrapping and instrumental testing.
3. Possibility of conducting flaw detection of pumping rods with centralizing scrapers.
4. High production efficiency due to the organization of the flow of single products.
5. Line size - 60x120 ft.
6. Rational diagrams of process equipment and work places management by 5S system, as well as improvement of production efficiency and labor productivity due to application of lean manufacturing tools.
7. Quick changeover when the size of rods to be processed is changed, which should not take more than 30 minutes.
8. Additional provision of equipment required (as agreed with the customer).
9. Experience of TMC Group Managing Company LLC in design, odernization and construction of more than 10 processing lines for diagnostics and repair of rods for facilities servicing major oil companies in Russia (Rosneft Oil Company OJSC, Lukoil OJSC, Tatneft OJSC, etc.) and their subdivisions, as well as experience in supplying lines to Surgutneftegaz OJSC, Udmurtneft OJSC, RN-Repair Research and Production Association LLC

Process sequence

The line includes a typical set of the process equipment, allowing to perform full diagnostics and repair of rods. The list of technological procedures performed on the line:

1. Preliminary sorting and screening of the pumping rods, that determine irreparable rejects by visual inspection. Preparation of suitable pumping rods for transportation to a high-pressure washer or an activator-type washer.
2. Washing of pumping rods from oil sediments at a high-pressure washer or activator-type washer.
3. Unscrewing of rod couplings from pumping rods.
4. Scrapping of pumping rods with metal brushes on a special equipment.
5. Visual and instrumental testing of the pumping rods: body, threaded and beaded parts, thread calibration.
6. Ultrasonic testing of the pumping rod body and end parts and sorting them by grades and classes.
7. Screwing of rod couplings onto pumping rods.
8. Outgoing inspection: marking of the pumping rods, installation of protectors, preparation of finished product packages and documentation, transportation and storage of finished products.
9. Additional operations and features. Removal of centralizer scrapers and centralizers.
10. Additional operations and features. Pumping rods tensioning and/or roll knurling.
11. Additional operations and features. Hardening of the surface layer of the corner-rounding part of the pumping rods.
12. Additional operations and features. Quenching of a pumping rod.
13. Additional operations and features. Cladding of fixed centralizer scrapers and centralizers and/or installation of mobile centralizers.
14. Transfer of pumping rods along the area, the finished product warehouse and the reject pockets is performed by an automated transportation system. The layout of the pumping rods maintenance area is designed to minimize the path from the loading area to the finished product warehouse. This eliminates counter-current flows and blocks in the areas, and helps to organize the pumping rods transfer to the warehouse.
15. Other additional procedures and required equipment are defined according to the technical specifications, if necessary.

Processing line specifications

№	Name	Parameter
1	Sucker-rod pump type	Pumping rods according to API Spec 11B4, GOST R 13877-96 and foreign equivalents
2	Pumping rods specifications:	
	- size, in	5/8, 3/4, 7/8, 1
	- length, in	25.3
3	Capacity, rods/day.	up to 1200 (for one line)

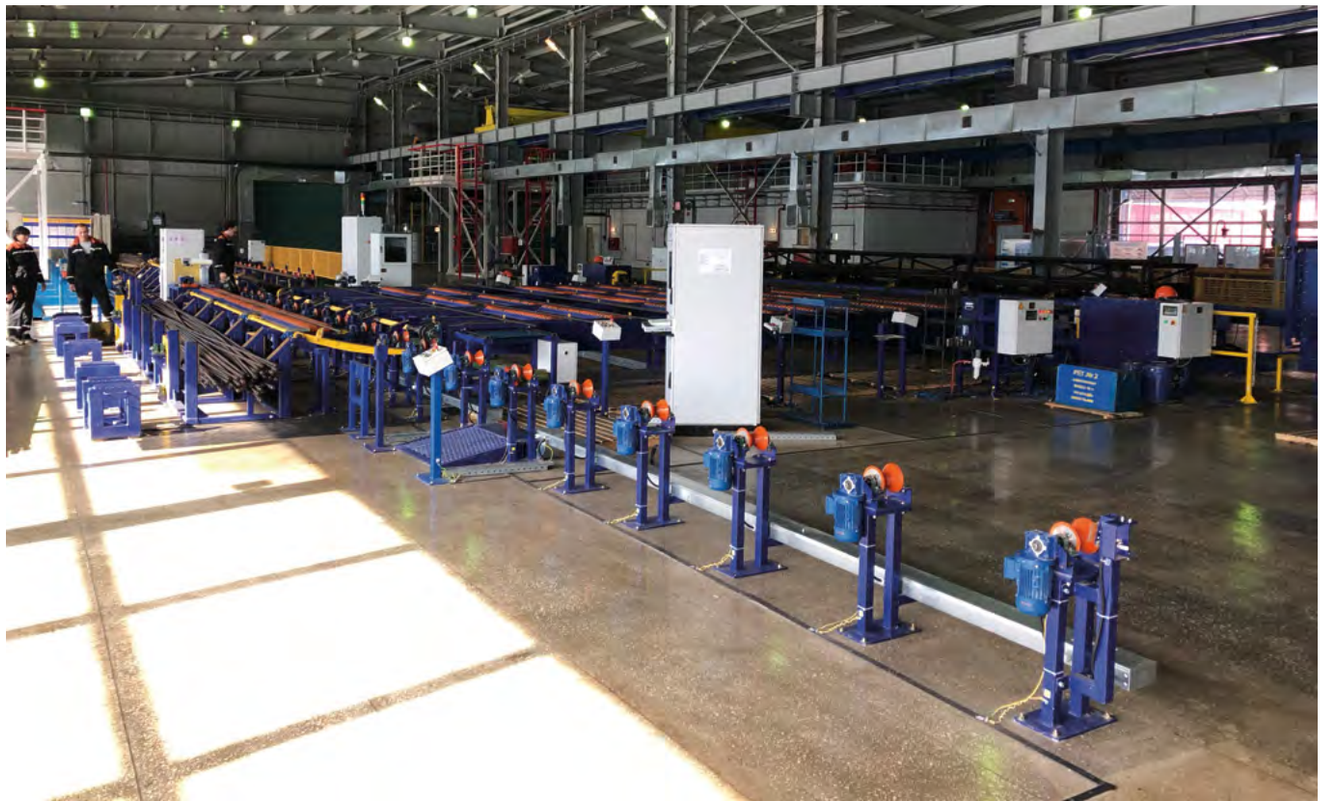
Operating procedures and line make-up (main operations)

№	Name of main operations	Equipment and tools
1	Preliminary sorting of the pumping rods and preparation of the pumping rods for feeding to the high-pressure washing unit	Pre-sorting of racks
2	Rod washing	High-pressure washer installation
3	Unscrewing of rod couplings from pumping rods	Installation of coupling cuff
4	Scrapping of pumping rods with metal brushes	Machine for mechanical scrapping of threads of the pumping rods
5	Visual and instrumental testing of the pumping rods	Post of instrumental testing of the pumping rod threads
6	Ultrasonic testing of the end parts of pumping rods	Ultrasonic testing
7	Non-destructive testing of the pumping rod body	Installation of defect detection of pumping rods
8	Removal of centralizer scrapers from rods	Centralizer-scraper cutting stand
9	Flatten the rods by stretching (if necessary)	USB installing
10	Flattening the rods by knurling in rolls (if necessary)	Installation for straightening of rods by knurlin
11	Hardening of the surface layer of the corner-rounding part of the pumping rods	Installation of running test of the corner-rounding part
12	Marking of finished products	Laser marker
13	Transportation of finished products	Handling trolley on an individual course
14	Post-operative movement of the pumping rods	Transport system, pockets, intermediate racks
15	Hardening of rods (if necessary)	Installation of heat treatment of pumping rods

Approximate installation terms of the processing line

№	Milestone	Month	1	2	3	4	5	6
1	Infrastructure development (access ways, heated area, electricity and water availability)	-						
2	Design of the processing line diagram, coordination with the Customer	1 month						
3	Preparatory work, delivery of equipment to the Customer's premises	1 month						
4	Mounting, commissioning.	4 month						

* The table shows the installation and commissioning terms without time for purchasing the equipment agreed with the Customer. The installation works term depends on site availability and required infrastructure



Repair
of pump RODS

The service center carries out incoming control, flaw detection survey, straightening, hardening of fillet parts of pump rods, padding of scratchalizers at rods surface. State-of-the-art equipment of leading manufacturing companies is used in technological processes.

Annual output of the service center of pump rods is 1 200 000 pcs. Within the complex of works connected with the repair of pump rods the service center renders the following services:

- washing of rods with sorting;
- shearing of scratchers;
- padding of nylon scratchalizers;
- surface cleaning of used rods from sediments;
- straightening of rods in rolls;
- jointing of floating scratchalizers;
- revision of new rods;
- shot blasting;
- diagnostics of rods with complete or partial substitution of couplings;
- integrated repair of rods with the fillet part rolling.

Repair
of oil-well sucker rod pumps

The service center is equipped with special-purpose technological equipment which gives an opportunity to repair pumps with quality corresponding to the requirements of oil (petroleum) companies. Annual output of service center of oil-well sucker rod pumps repair is 20 000 pcs. Service workshop equipment includes: automated washing installation, versatile powered line for the pump displacement; testing complexes “Aerotest”, “Pika” which give an opportunity to control the surface quality of pumps and carry out automated pair selection “plunger-cylinder” with necessary loading group, hydraulic and vacuum pump stand tests. Within the complex of works connected with the repair of oil-well sucker rod pumps the service center renders the following services.

Within the complex of works connected with the repair of oil-well sucker rod pumps the service center renders the following services:

- repair and testing of pipe oil-well sucker rod pumps with substitution of spare parts;
- revision and testing of new pipe oil-well sucker rod pumps;
- repair and testing of inserted oil-well sucker rod pumps with substitution of spare parts;
- revision and testing of inserted new pipe oil-well sucker rod pumps;
- repair and testing of pumps and other constructions.

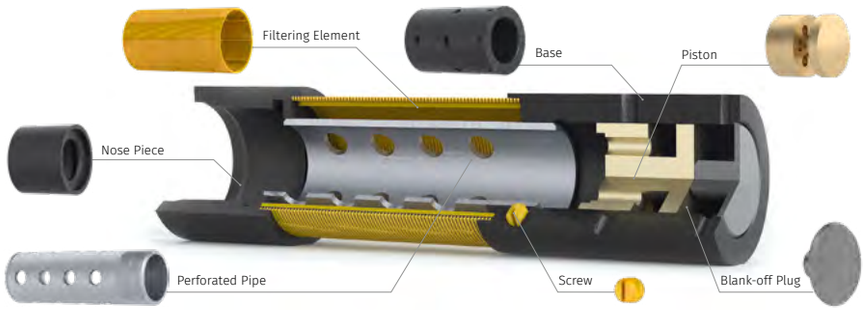
Well tube slotted filter
(Slide™ ; Silver line™)

Application
The slotted filter is used to filter the product extracted from the foreign substances and contaminant ingress.

Advantages
- stable throughput in a period of full life cycle with the ability to self-cleaning;
- stable operation of downhole pumping equipment due to increased filtering surface;
- lowest grit of the filter element through the unstable position of mechanical particles on the filter surface and cleanliness of wedge profile surface;
- high structural strength in the axial and radial direction by increasing the number of support elements;
- high corrosion resistance and resistance to aggressive acid-alkaline agents.

Principle of action
- The fluid from the pump of the well is cleaned from mechanical particles passing through the filter element made of the wedge profile of AISI 304, AISI 316 stainless steel, which is wound onto the support elements in a spiral with a certain pitch to provide the screen with a rigid longitudinal slits are strictly determined clearance. Sharp edges create an arch (sandy bridge) over the individual sections of the gap, and the permeability over these sections is retained.

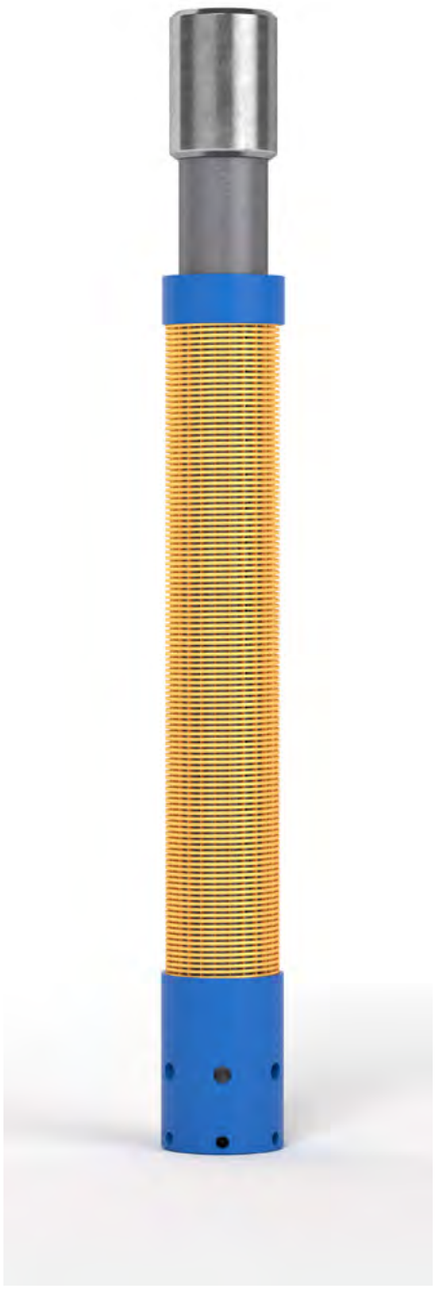
- In the lower portion of the filter, in the bore of the filter housing, the spool piece is set, which comes into operation in case of a complete clogging of the filter element. Due to the pressure difference inside the filter housing and in the plug under the spool piece, the spool piece moves upward to align the holes with a groove in the spool piece. Reciprocation of the spool piece caused by movement of the produced fluid, provides a selfcleaning of filter from impurities.



Technical specifications

Outside diameter of pipe D, in	1.8	2.3	2.8	3.5
Wall thickness S, in	According to customer's technical specifications			
Thread type	GOST 633-80			
Length of pipe L, in	up to 393.7			
Length of filter element L, in (one-piece)	up to 236			
The gap between the turns of the filter element B, in	from 0.0039±0.0015 to 0.19±0.0015			
Diameter of holes in the caps D, in*	from 0.31 to 0.78			
Number of holes per 1 running meter *	not more than 36 per running meter			
External diameter of collar D1, max, in*	2.2	2.8	3.5	4.2
Availability of spool piece	According to customer's technical specifications			
* sizes according to customer's technical specifications				

Slotted Well **Screen**



Purpose

The FVNSh plug-in screen of the sucker-rod pump is used to improve the reliability of sucker rod pumps by filtering the fluid extracted out of oil wells from mechanical impurities.
*Engineering changes are possible if requested by the customer.

Scope

The screen is an assembled structure consisting of the screen base with a freely movable spool where one spiral and slotted filtering element and a perforated pipe are secured using a sleeve and a locking screw.
The screen design allows assembling several screens into one if needed. To do this, remove the locking screws securing the adapter and the base. Then connect the free end of the pipe of one screen to the sleeve of the other screen. Thus, you can combine up to 10 screens.

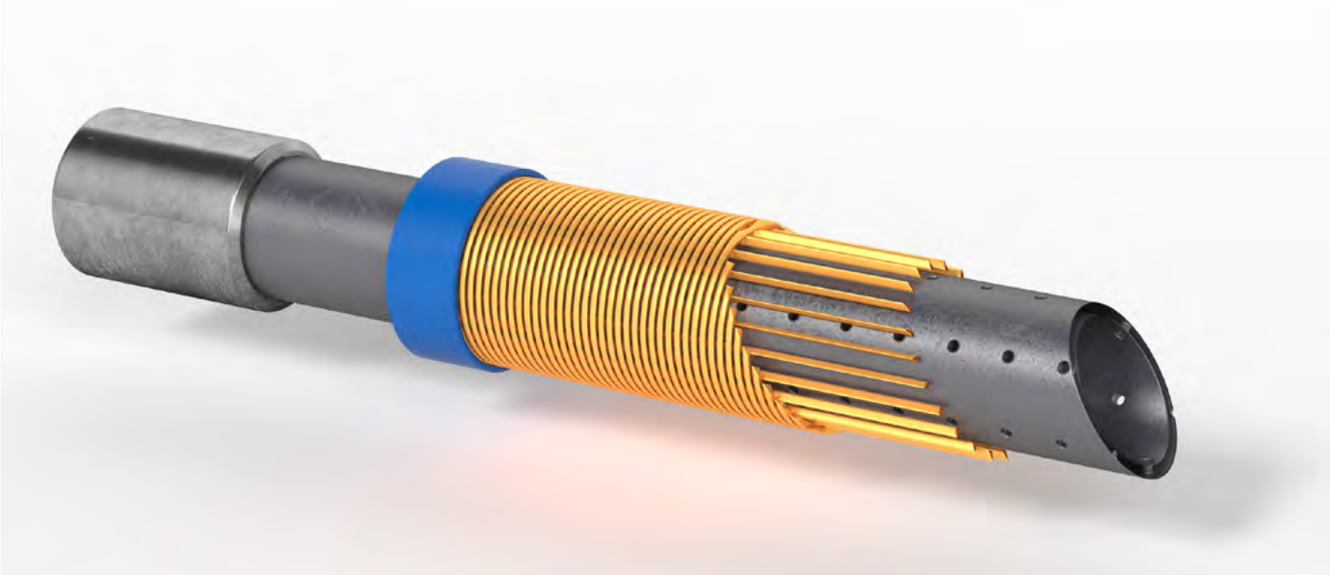
Operation principle

The liquid entering the pump from the well is cleaned of mechanical particles by a filtering element made of a triangular profile of AISI 316 stainless steel, spirally wound on skin stiffeners with a certain pitch and provides a rigid screen with longitudinal slots of a strictly defined gap. In the lower part of the filter, in the bore of the filter housing, a spool is installed, which comes into operation in case of a strong clogging of the filtering element. The spool moves upward due to the pressure drop inside the filter housing and in the plug under the spool, until the hole aligns with the bore in the spool. Spool stroke movement caused by the movement of the extracted liquid ensures filter self-cleaning.

Specifications

Name	Outer diameter D, in	Screen assembly в length L, in	Perforation length L1, in	Thread type	Slot width, in
FVNSh Screen	1.25	18.7	11.8	G 3/4”	0.007-0.047
FVNSh Screen	1.65	18.7	11.8	G 1”	0.007-0.047
FVNSh Screen	2.16	18.7	11.8	G1 1/4”	0.007-0.047

The structure of the product symbol when ordering: X1 X2 X3 X4 X5 - X6/X7 x X8 X9 X10 X11 X12 - X13	
X1	2 - fittings for dual operation (2 tubing string); 3 – fittings for dual operation (3 tubing string); - no index for other options
X2	AF – x-mass tree; AN – injection tree; ASh – rod and well fittings; AVS – water supply well fittings
X3	K – hanging of well pipelines in casing head sub; - no index for other options
X4	- Designation of standard diagram according to GOST 13864; - no index if the diagram does not comply with GOST 13864
X5	Sh – for small-sized injection tree, AFK – a choke valve is installed on the fittings side outlet (choke device); E – for rod and well fittings – cable gland availability; - no index for other options.
X6/X7	- Nominal wellbore pipe size/side outlet of the X-mass tree, in
X8	- Nominal pressure, psi. (If the test pressure differs in the valve sections, the nominal pressure can be written as a fraction).
X9	- Resistance to well medium exposure according to GOST 13864: K1 – oil with CO_2 content up to 6%; K2 – oil with CO_2 and H_2S content up to 6%; K3 – oil with CO_2 and H_2S content up to 25%
X10	GM (for AShK), M, M1 (for ANK, ANKSh) – small-sized; M2 – fittings coupling attachment (3-flanged crosspiece with a thread); M3 – fittings coupling attachment (4-flanged crosspiece with a casing flange); M4 - fittings flange attachment (4-flanged crosspiece for installation on a casing head)
X11	- Design option; - no index for basic option
X12	KU – wellhead set (availability of a manifold or a head); - no index if not available
X13	R – availability of a flow meter; D – availability of a dosing unit to supply chemical reagent into the annular space of the well (for AShK type fittings)



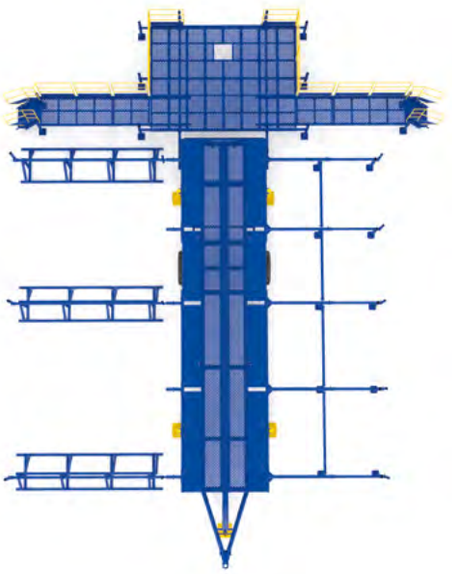
Support steel
and non-standard equipment

Test assembly of the echelon rig circulation system for Surgutneftegas OJSC manufactured by TMC Drilling service LLC to fulfill the order placed by Generation PG.

TMC Drilling service LLC produces block-type, vessel type equipment, non-standard parts and support steel of its own design and to Customer's design documentation.

Drill site UPA 60 – 80

Mobile racks



Purpose

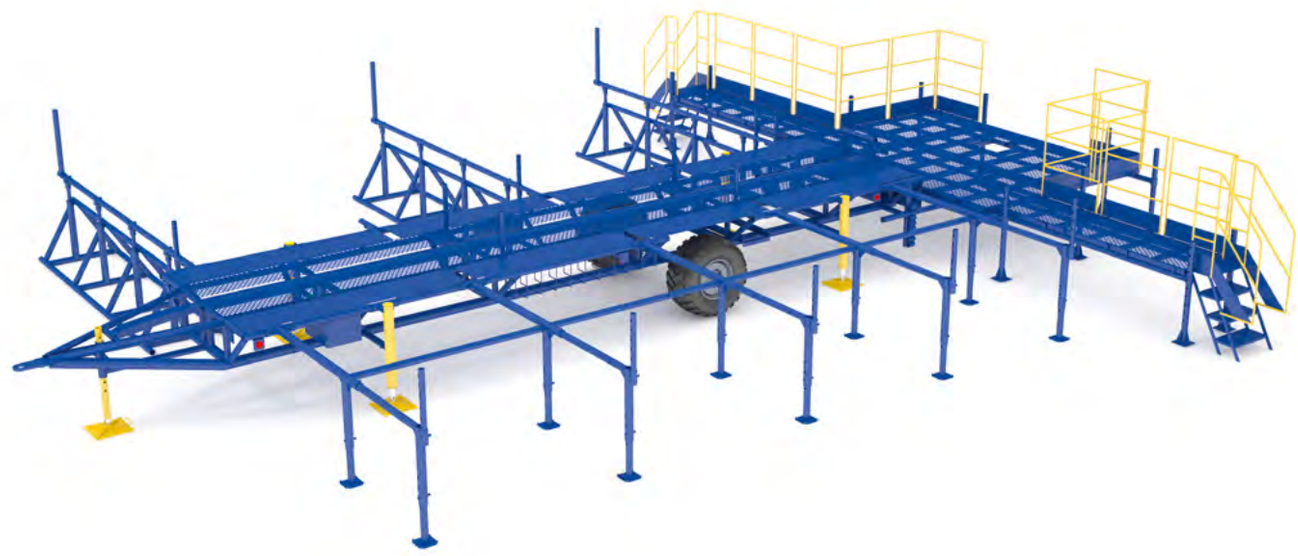
Intended for reception, storage and release of tubing and pump ods in well workover.

- The temperate climate operations are provided at an ambient temperature of -45 to +40°C according to GOST 16350.
- The climatic performance of U2 according to GOST 15150.
- Manufacture and delivery according to Technical Requirements 02.180.053-01.

Racks contain a base made in the form of skid, on which the left rack is mounted for the accumulation of well pipes and the right rack is mounted for the accumulation of tubing and pump rods. In the rear part of the base the bogie, that makes it easy to transport racks, is set. Upon the Customer's request, the racks are equipped with work platform. The platform height is controlled by the lifting mechanism.

Technical specifications

Parameters	PM-25	PKS-60	UNS 1-20
Total maximum load on the left and right racks, t	25	60	20
Critical dimensions for transport, in: length width height	 413 94.4 86.6	 433 94.4 86.6	 433 98.4 89.3
Weight, lb	8267	8487	9479
Designation under specification	RBT 657.00.000	RBSh 2947.00.000	BPO 21.00.00.000



Underground tanks
with heating

Purpose

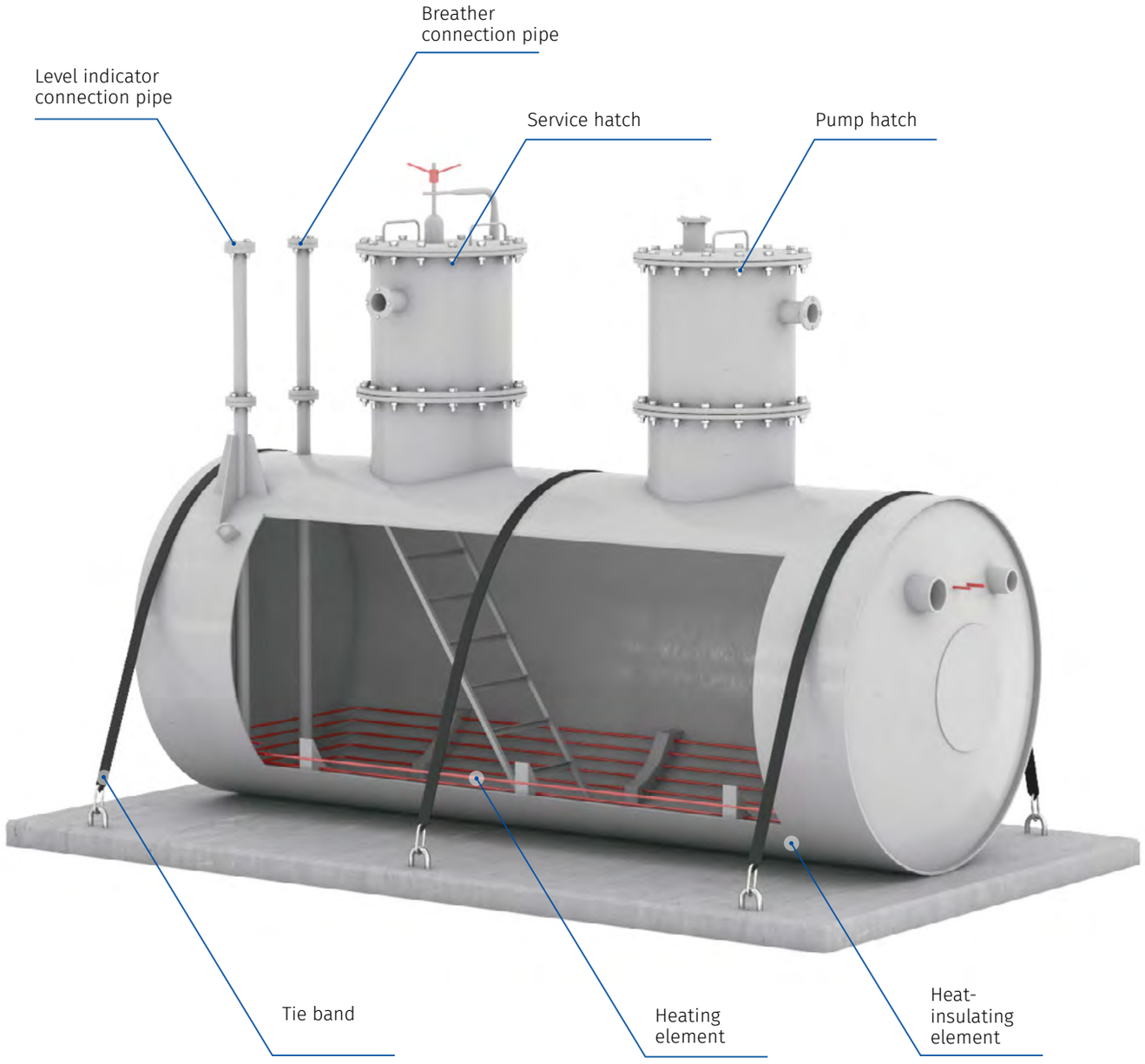
An underground tank is a one-piece welded vessel, located and operating under a pressure of no more than 0.07 MPa, can be of different volumes in the range from 35.3 to 7063 ft³.

There are two types of underground tanks for materials storage:
EP – an underground horizontal tank without a heater;
EPP – an underground horizontal steel tank with a heater.

EPP Drain tanks are equipped with a heater, therefore they can be effectively used in low temperatures. These containers are also supplied with good heat-insulating coating that increases thermal efficiency and allows to protect storage products from frost exposure.

Specifications

Characteristics	EP-5	EP-8	EP-10	EP-12,5	EP-16	EP-20	EP-25	EP-40	EP-63	EP-100
Working product	Oil products, oils, condensate, water-in-oil mixture, acids, alkalis, drain waters, etc. with a density of up to 62,42 lb/ft³ and kinetic viscosity of up to 0,046 in²/s, H2S content is not exceeding 1%									
Rated volume, ft³	176.6	282.5	353.1	441.4	565	706.3	882.9	1,413	2,225	3,531
Operating temperature of the stored product, °F	от 5 до 176									
Operating pressure, PSI	10.15 psi (test 29 psi)									
Operating temperature, °F	from -49 to +176									
Bottom types	cone, elliptic									
Service life, years	20									


Breather
connection pipe
Level indicator
connection pipe
Service hatch
Pump hatch
Tie band
Heating
element
Heat-
insulating
element

Commissioning services for overhead cranes

Overhead cranes

The following types are manufactured:

- overhead cranes with one and two beams with a capacity of up to 22,046 lb;
- suspended cranes;
- jib cranes;
- cross beams..

Cranes remote radio control

Advantages of the remote radio control:

- increasing performance level;
- increasing safety and improving working conditions;
- reducing expenses for operation, examination, repair, and safety expert review;
- simple connection to an electric drive of any lifting crane, its configuration remains unchanged, all crane characteristics are saved.

Cranes service

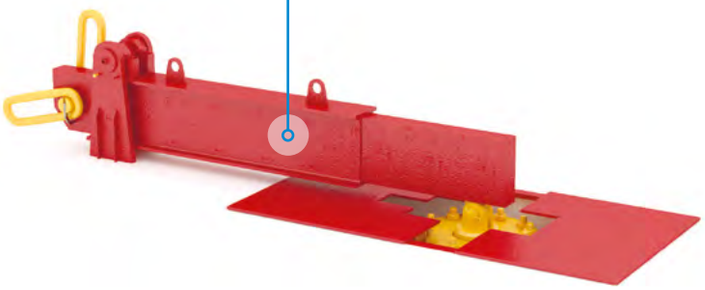
We carry out the following types of work (services):

- repair of lifting devices and gantry rails;
- cranes expert review with service life extension;
- development of data sheet documentation;
- maintenance (maintenance 1, maintenance 2, current repair, daily maintenance, bi-annual maintenance);
- 24/7 duty for the prompt execution of current repairs.

Crane trestle

- complete manufacturing cycle;
- construction and installation works;
- post-warranty service.

Testing and extension of service life of lifting machines with a capacity of up to 220,462 lb



TEST BENCH FOR LIFTING DEVICES

Specifications

Model	2C1602B3.4,1 69,9/5,8.7,5
Operating pressure, psi	580
Pump delivery capacity, gal/min	15.3/1.3
Electric motor power kW	7,5
Tank capacity, gal	35,2
Overall dimensions, in	38.9×26.7×61.9

MAIN OPERATIONS PERFORMED USING LIFTERS:

- visual equipment damage analysis;
- equipment static tests and issuance of the test certificate;
- industrial safety expert review with service life extension and registration in the Federal Service for Environmental, Technological and Nuclear Supervision (Rostechnadzor);
- equipment major and routine repairs.

Repair of drill pipes

Purpose

Enterprise performs diagnostics and capital repair of drill pipes with use of unique technology of metal weld to surfaces of tool-joint parts.

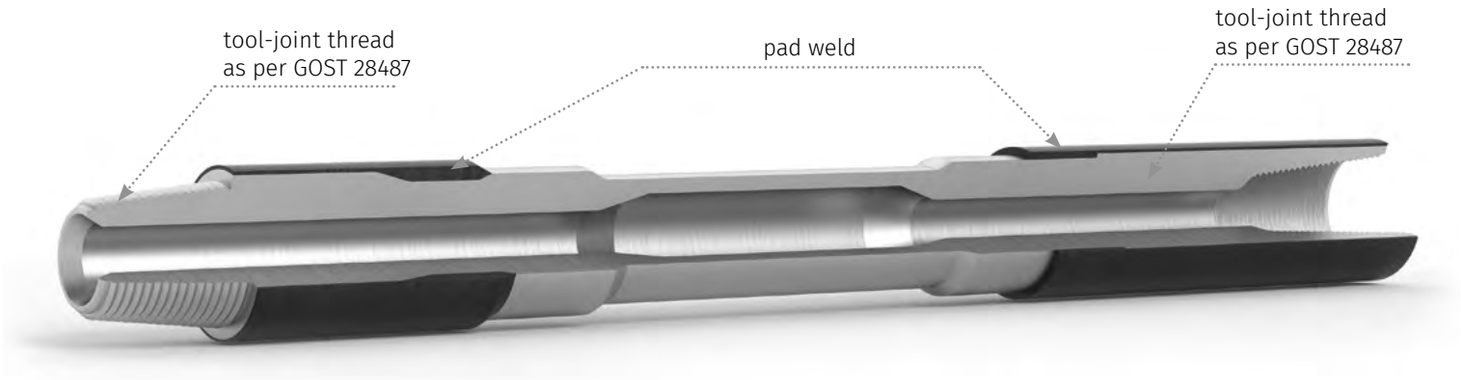
The following operations are performed during general repair of drill pipes:

- mechanical cleaning of exterior and interior pipe surfaces;
- diagnostics of wall thickness of pipe smooth surface by method of ultrasonic examination;
- determination of geometrical parameters of surfaces of tool-joint and thread parts;
- straightening of pipes for the purpose of straightness reconditioning;
- metal weld to surface of tool-joints with their stretching along the pipe body according to unique patented technology;
- machine work of deposited surfaces of tool.

Advantages

1. Major advantage of proposed technology is reconditioning of tool-joint part of used pipe to new state. Deposited metal was chosen in accordance with tool joint metal quality, in the result of which wear resistance of reconditioned surfaces is as good as wear resistance of new pipes, and machining work of deposited surfaces of tool joints is executed till full geometrical sizes reconditioning according to GOST 28487.

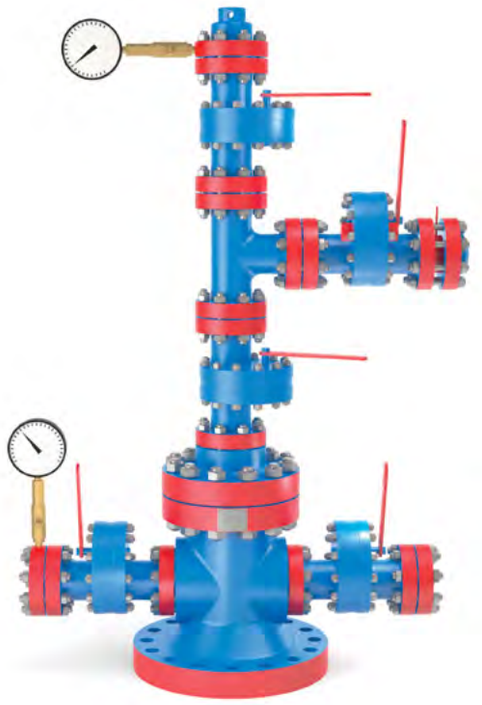
2. All technology of tool-joints weld is implemented with specially developed, installed in-line equipment, it has corresponding certificates and permits for use.



Gauge and sizes of repaired drilling pipes and basic dimensions

Size		Thread	Outside thread diameter as per GOST 50278	Outside upset diameter as per GOST 50278	Outside diameter of tool joint after repair as per GOST 27834	Pipe wall thickness			Cylindrical part diameter after repair, not less	
Pipes	Tool joint					As per GOST 27834	repair, not less		nipple, in	coupling, in
	GOST 27834					1 class	2 class	3 class		
PV-73x9	ZP-95-32	Z–73	73	76.2	95.2	9.2	7.36	5.75	5.57	6.59
PN-73x9	ZP-105-54	Z–86	73	81	104.8	9.2	7.36	5.75	5.57	7.12
PV-89x9	ZP-108-44	Z–86	88.9	92.1	108	9.4	7.52	5.88	5.57	7.12
PV-89x11	ZP-108-41	Z–86	88.9	92.1	108	11.4	9.12	7.13	5.57	7.12
PN-89x9	ZP-121-68	Z–102	88.9	98.4	120.7	9.4	7.52	5.88	5.57	7.62
PN-89x11	ZP-127-65	Z–102	88.9	98.4	127	11.4	9.12	7.13	5.57	7.62
PK-114x9	ZP-159-83	Z–132	114.3	119.1	158.8	8.6	6.88	5.38	5.57	8.48
PK-114x11	ZP-159-76	Z–122	114.3	119.1	158.8	10.9	8.72	6.81	6.34	8.48
PK-114x9	ZP-162-95-1	Z–133	114.3	127	161.9	8.6	6.88	5.38	6.27	8.48
PK-114x11	ZP-162-92	Z–133	114.3	127	161.9	10.9	8.72	6.81	6.34	8.48
PK-127x9	ZP-162-95-2	Z–133	127	130.2	161.9	12.7	10.16	7.94	6.21	8.48
PK-127x13	ZP-162-89-2	Z–133	127	130.2	161.9	12.7	10.16	7.94	6.5	8.48
PN-127x9	ZP-178-102	Z–147	127	144.5	177.8	9.2	7.36	7.94	6.84	9.01
PN-127x13	ZP-178-102	Z–147	127	144.5	177.8	12.7	10.16	7.94	6.84	9.01

Flowing wellhead equipment (Xmas Tree)
AFK1 (SH)-65 (80,100)x21 (14,35)K1(K2)



Purpose

The flowing wellhead equipment (Xmas Tree) is designed to be installed on the mouth of flowing wells and injection wells, to suspend the tubing string, to control and adjust collection of medium extracted, to perform process operations, repairs and exploratory work.

The flowing wellhead equipment is complete with butterfly valves of ZD and ZDSH type. Adjustment of flow rate is made by changing chokes on choke valves ZDSH. Chokes are changed without releasing pressure in the pipeline with the choke valve shut for 5 minutes.

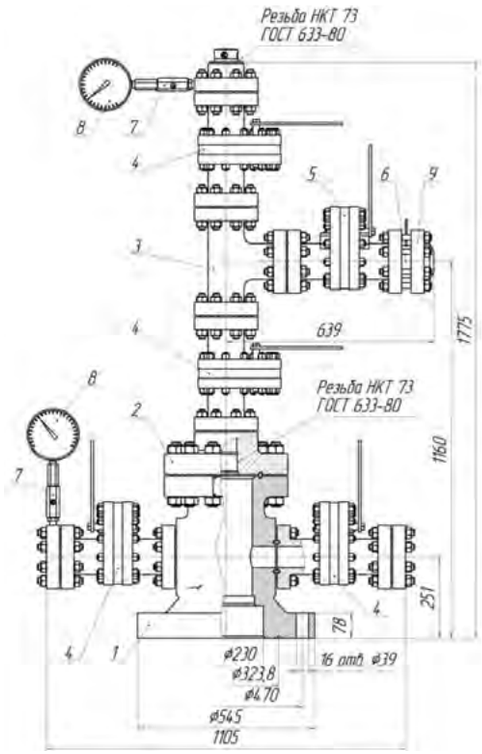
The flowing wellhead equipment has no welded joints.

The flowing wellhead equipment can be reconfigured into injection type of ANK option by removing the cable input and installing a plug.

As may be agreed with the customer, the list of components of the flowing wellhead equipment may be modified and the equipment may be complete with pipework and other types of shutoff valves (ZMS, ZMP valves, ball valves).

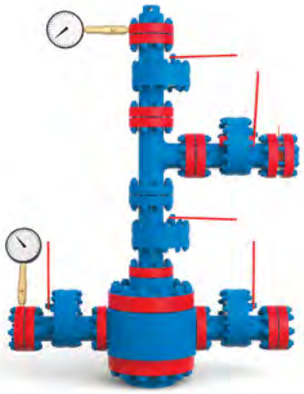
Technical specifications

Working pressure, PSI		2000, 3000, 5000
Nominal inside diameter	Xmas tree bore	2 9/16, 3 1/8, 4 1/16
	Side outlets	2, 2 9/16, 3 1/8, 4 1/16
	Casing head side outlets	2 1/16, 2 9/16
Connecting thread	To pipes of the tubing string GOST 632-80	27/8, 31/2
	To casing strings (for M2, M3) GOST 632-80	5 ¾, 6 5/8, 7
Resistance to effect of well medium per GOST 13864-89		K1, K2
Working medium temperature, °F, no more than		+250
Climatic execution per GOST 15150-69		UKHL1 (KHL1)
Limit value of ambient working temperatures, °F		From -75 up to +104

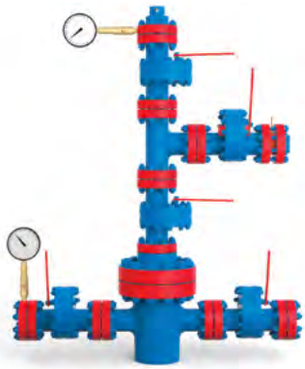


1. Cross
2. Sub
3. T-pipe
4. Disk valve (ZD)
5. Disk valve (ZD) (for Cross Type Xmas tree AFK1SH –disk valve with choke ZDSH)
6. Check valve
7. Shutoff – discharge unit (gage valve)
8. Pressure gage
9. Mating flange

Types of crosses

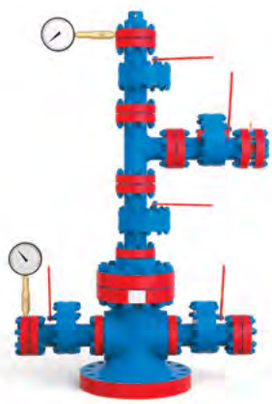


ANK1(SH)-65x21K1



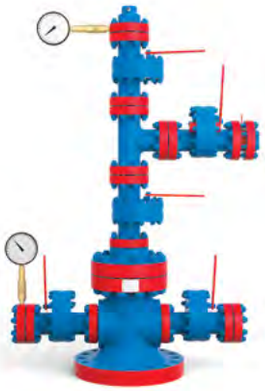
ANK1(SH)-65x21K1M2

ANK1(SH)-65x21K1M3



ANK1(SH)-65x21K1M4

Piping and fittings options



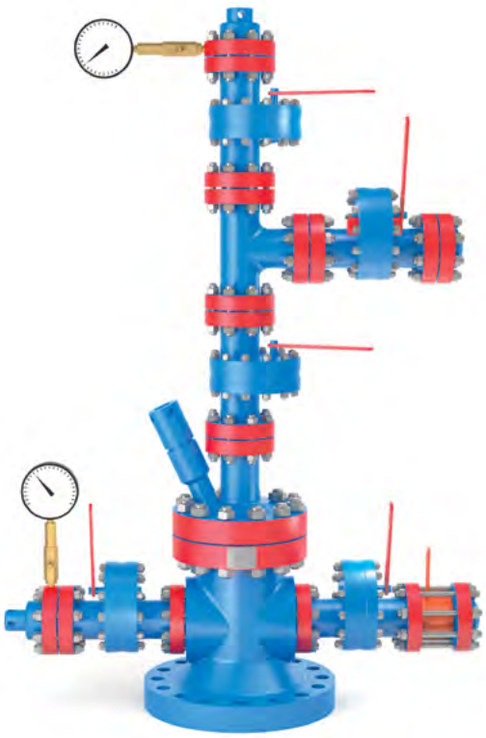
ANK1(SH)-65x21K1(K2)M4
Basic option

ANK1(SH)-65x21K1(K2)M4-01
without lubricator valve

ANK1(SH)-65x21K1(K2)M4-03
without valve on the side outlet of the cross

ANK1(SH)-65x21K1(K2)M4-05
without lubricator valve or valve
on the side outlet of the cross

Injection wellhead equipment
ANK1(SH)-65(80,100)x21(14,35)K1(K2)



Purpose

Injection wellhead equipment is designed to be installed on the mouths of injection wells, to suspend the tubing string, to control and adjust the medium injected into the well, to perform process operations, repairs and exploratory work.

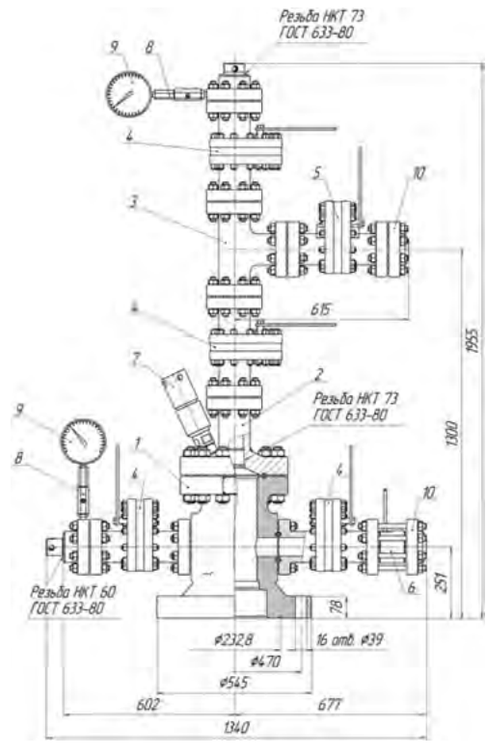
The injection wellhead equipment is complete with butterfly valves of ZD and ZDSH type. Adjustment of flow rate is made by changing chokes on the choke valve ZDSH. Chokes are changed without releasing pressure in the pipeline with the choke valve shut for 5 minutes.

The injection wellhead equipment has no welded joints.

As may be agreed with the customer, the list of components of the injection wellhead equipment may be modified and the equipment may be complete with pipework and other types of shutoff valves (ZMS, ZMP valves, ball valves).

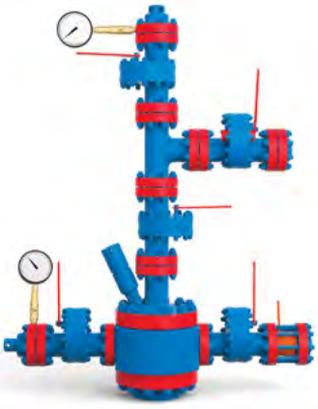
Technical specifications

Working pressure, PSI		2000, 3000, 5000
Nominal inside diameter, in	Xmas tree bore	29/16, 31/8, 41/16
	Side outlets	21/16, 29/16, 31/8, 41/16
	Casing head side outlets	2, 29/16
Connecting thread	To pipes of the tubing string GOST 633-80	27/8, 31/2
	To casing strings (for M2, M3) GOST 632-80	5 ¾, 65/8, 7
Resistance to effect of well medium per GOST 13864-89		K1, K2
Material class		AA, BB, DD, EE
Working medium temperature, °F, no more than		+250
Climatic execution per GOST 15150-69		UKHL1 (KHL1)
Limit value of ambient working temperatures, °F		From -75 °F up to +104 °F

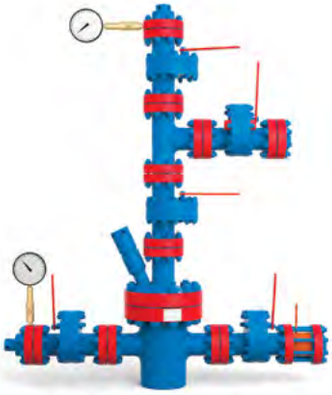


1. Cross
2. Sub.
3. T-pipe
4. Disk valve (ZD)
5. Disk valve (ZD) (for Cross Type Xmas tree AFK1SH – disk valve with choke ZDSH)
6. Check valve
7. Cable Input
8. Shutoff – discharge unit (gage valve)
9. Pressure gage
10. Mating flange

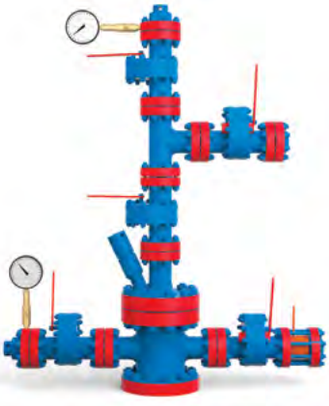
Types of crosses



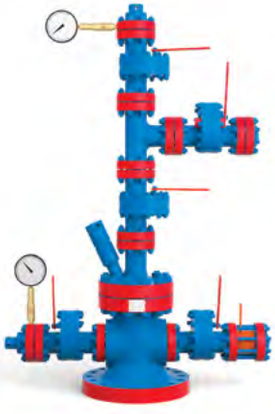
AFK1 (SH)-65 x21K1



AFK1 (SH)-65 x21 K1M2

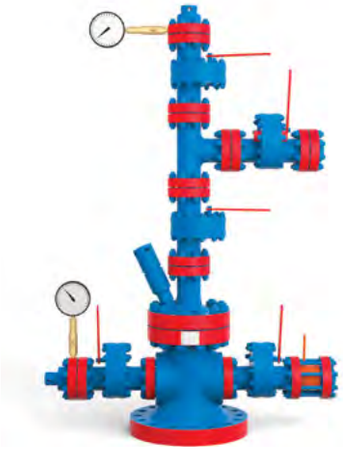


AFK1 (SH)-65 x21 K1M3



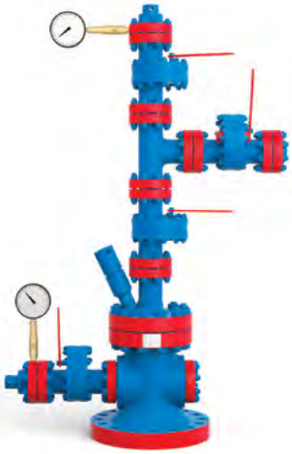
AFK1 (SH)-65 x21 K1M4

Piping and fittings options

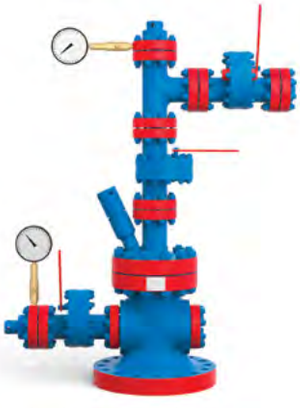


AFK1 (SH)-65 x21K1(K2)M4
Basic option

AFK1 (SH)-65 x21 K1(K2)M4-01 without lubricator valve

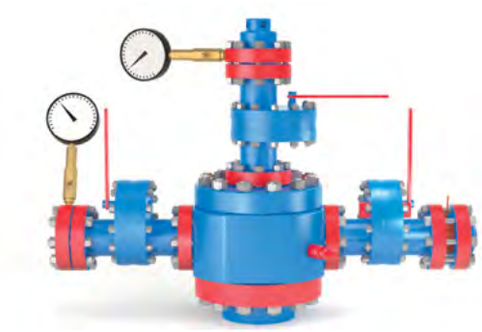


AFK1 (SH)-65 x21 K1(K2)M4-03
without valve on the side outlet of the cross



AFK1 (SH)-65 x21 K1(K2)M4-05
without lubricator valve
or valve on the side outlet of the cross

Injection wellhead equipment,
Small Size, ANK(SH)-65x21(14)K1(K2)M1



Purpose

Injection wellhead equipment is designed to be installed on the mouths of injection wells, to suspend the tubing string, to control and adjust the medium injected into the well, to perform process operations, repairs and exploratory work.

The injection wellhead equipment is complete with butterfly valves of ZD and ZDSH type. Adjustment of flow rate is made by changing chokes on the choke valve ZDSH. Chokes are changed without releasing pressure in the pipeline with the choke valve shut for 5 minutes.

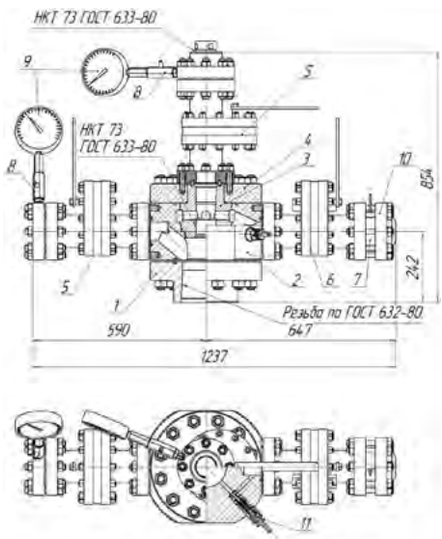
Mass and overall dimensions of the wellhead equipment are twice lower than those of the classic scheme of the wellhead equipment.

The injection wellhead equipment has no welded joints.

As may be agreed with the customer, the list of components of the injection wellhead equipment may be modified and the equipment may be complete with pipework and other types of shutoff valves (ZMS, ZMP valves, ball valves).

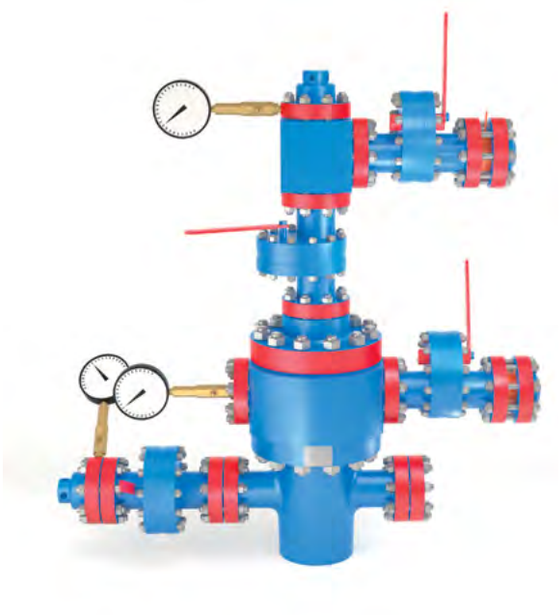
Technical specifications

Working pressure, PSI		2000, 3000, 5000
Nominal inside diameter, in	Xmas tree bore	29/16, 31/8, 41/16
	Side outlets	2, 29/16, 31/8, 41/16
Connecting thread	To pipes of the tubing string GOST 633-80	21/16, 29/16
	To casing strings (for M2, M3) GOST 632-80	27/8, 31/2
Resistance to effect of well medium per GOST 13864-89		K1, K2
Material class		AA, BB, DD, EE
Working medium temperature, °F, no more than		+250
Climatic execution per GOST 15150-69		UKHL1 (KHL1)
Limit value of ambient working temperatures, °F		From -75 °F up to +104 °F



1. Ring joint
2. Cross
3. Sub.
4. Flange
5. Disk valve (ZD)
6. Disk valve with choke valve (ZDSH)
7. Check valve
8. Shutoff – discharge unit (gage valve).
9. Pressure gage
10. Mating flange
11. Relief valve.

Injection wellhead equipment
2ANKSH-65x21(14,35)K1(K2)M



Purpose

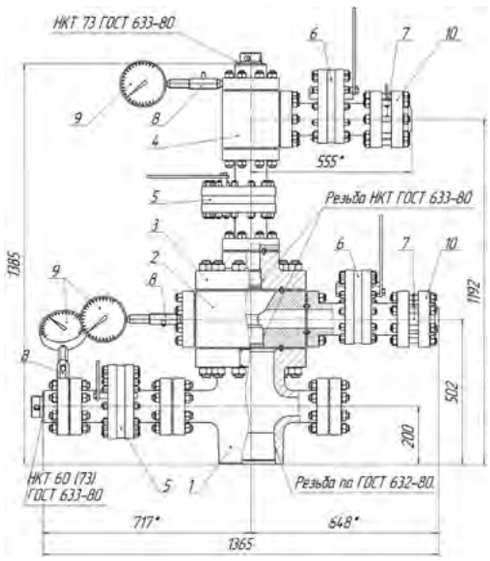
Injection wellhead equipment is designed to be installed on the mouths of injection wells, to suspend the tubing string, to control and adjust the medium injected into the well, to perform process operations, repairs and exploratory work.

The injection wellhead equipment is complete with butterfly valves of ZD and ZDSH type. Adjustment of flow rate is made by changing chokes on the choke valve ZDSH. Chokes are changed without releasing pressure in the pipeline with the choke valve shut for 5 minutes.

The injection wellhead equipment has no welded joints. As may be agreed with the customer, the list of components of the injection wellhead equipment may be modified and the equipment may be complete with pipework and other types of shutoff valves (ZMS, ZMP valves, ball valves).

Technical specifications

Working pressure, PSI		2000, 3000, 5000
Nominal inside diameter, in	Xmas tree bore	29/16, 31/8, 41/16
	Side outlets	2, 29/16, 31/8, 41/16
	Casing head side outlets	21/16, 29/16
Connecting Thread	To pipes of the tubing string GOST 633-80	27/8, 31/2
	To casing strings (for M2, M3) GOST 632-80	5 ¾, 65/8, 7
Resistance to effect of well medium per GOST 13864-89		K1, K2
Material class		AA, BB, DD, EE
Working medium temperature, °F, no more than		+250
Climatic execution per GOST 15150-69		UKHL1 (KHL1)
Limit value of ambient working temperatures, °F		From -75 up to +104



1. Cross
2. Cross
3. Sub
4. T-pipe
5. Disk valve (ZD)
6. Disk valve with choke valve (ZDSH)
7. Check valve
8. Shutoff – discharge unit (gage valve)
9. Pressure gage
10. Mating flange

Wellhead fittings

Purpose

Wellhead fittings (type AUN, AU, AUE, AUV) are designed for wellhead piping equipped respectively with sucker-rod pumps, electric centrifugal pumps and screw pumps.

Wellhead fittings (type AUD) are designed to seal the wellhead, to hang two well pipelines (tubing strings), to exercise individual control and manage production of oil well medium of the operated facilities (formations)or to re-inject medium into the facilities (formations).

Wellhead fittings (type AORZ) are designed for wellhead piping of the oil wells meant for simultaneous and separate re-injection of water into two formations.

Operation is intended in open air in the moderately cold climatic environment per GOST 16350 Standard at ambient temperature from -50 to +104 °F.

Technical specifications

Description of specifications	AUD 40x14-146/48 (ORE)			AUD 50x14-168/60 (ORE)			AU 140x50	AUE 140x50	AUV 140x50	AU 140x50-01	AU 140x50-01A	AORZ 168-146x210
Operating pressure, PSI	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	3000
Nominal inside diameter, in	1 1/2	1 1/2	1 1/2	2	2	2	2	2	2	2	2	1 1/2
Connecting thread	Thread of casing string 5 3/4 thread of tubing hanger 1.9			Thread of casing string 6 5/8 thread of tubing hanger 2 3/8			Thread of casing string 5 ¾, 6 5/8					

Wellhead equipment for installation
of sucker rod pump AU 140x50

Purpose

The wellhead equipment on the well mouths equipped with sucker rod pumps. The wellhead equipment allows conduct of process operations, repair and exploratory work.

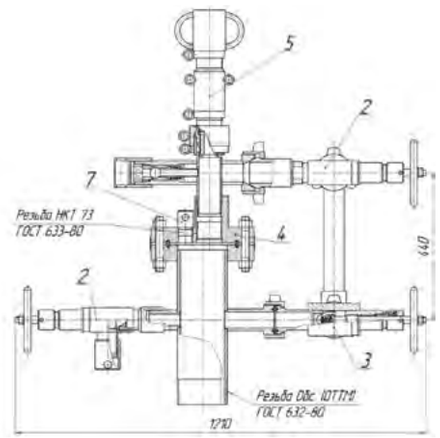
The wellhead equipment is complete with casing head stuffing box with spherical socket joint which allows compensation for angular skews due to mismatch of the well mouth centerline and the beam pumping unit.

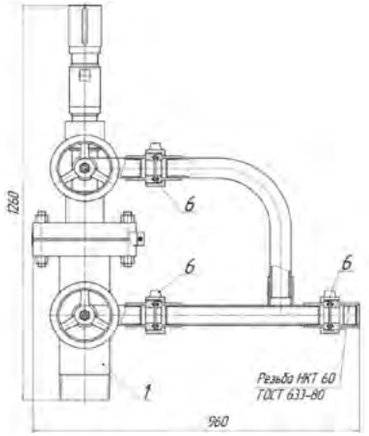
The wellhead equipment is complete with the angle valve – check valve which allows gas overpressure to be released or bled from the annulus space into the channel with the extracted medium.

With the Customer's approval, it is permitted to change the list of wellhead equipment components.

Technical specifications

Working pressure with the beam pumping unit working, PSI		580
Working pressure with the beam pumping unit not working, PSI		2000
Nominal inside bore, in		2
Connecting thread	To pipes of the tubing string GOST 633-80	2 7/8
	KTo casing string, OTTM GOST 632-80	5 ¾, 6 5/8
	To operating line of tubing strings GOST 633-80	2 3/8
Overall Dimensions, in	Length	47,6
	Width	37,8
	Height	49,6
Resistance to effect of well medium per GOST 13864-89		K1
Material class		AA, BB, DD
Working medium temperature, °F, no more than		+212
Limit value of ambient working temperatures, °F		-50 ...+104
Mass, lb		606





1. Housing
2. Angle Valve
3. Angle Valve – Check Valve
4. Sub
5. Casing head stuffing box, SUS2A-73-31;
6. Quick Disconnect Joint
7. Plug

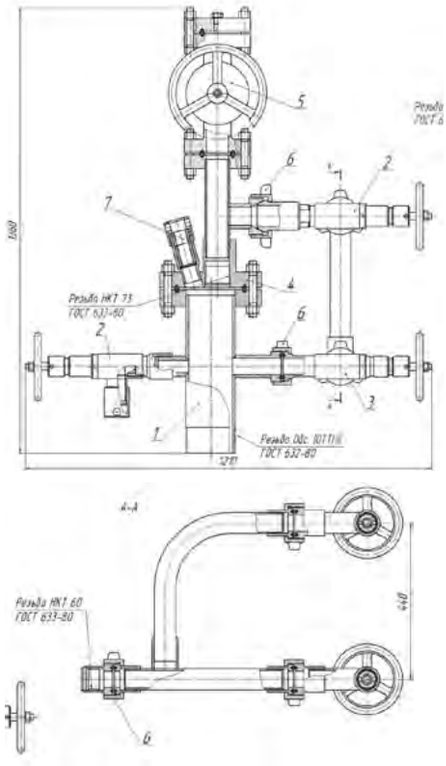
Wellhead equipment
for installation of electric pump AUE 140x50

Purpose

The wellhead equipment on the well mouths equipped with an electric centrifugal pump. The wellhead equipment allows conduct of process operations, repair and exploratory work.
The wellhead equipment is complete with the angle valve – check valve which allows gas overpressure to be released or bled from the annulus space into the channel with the extracted medium.
With the Customer's approval, it is permitted to change the list of wellhead equipment components.

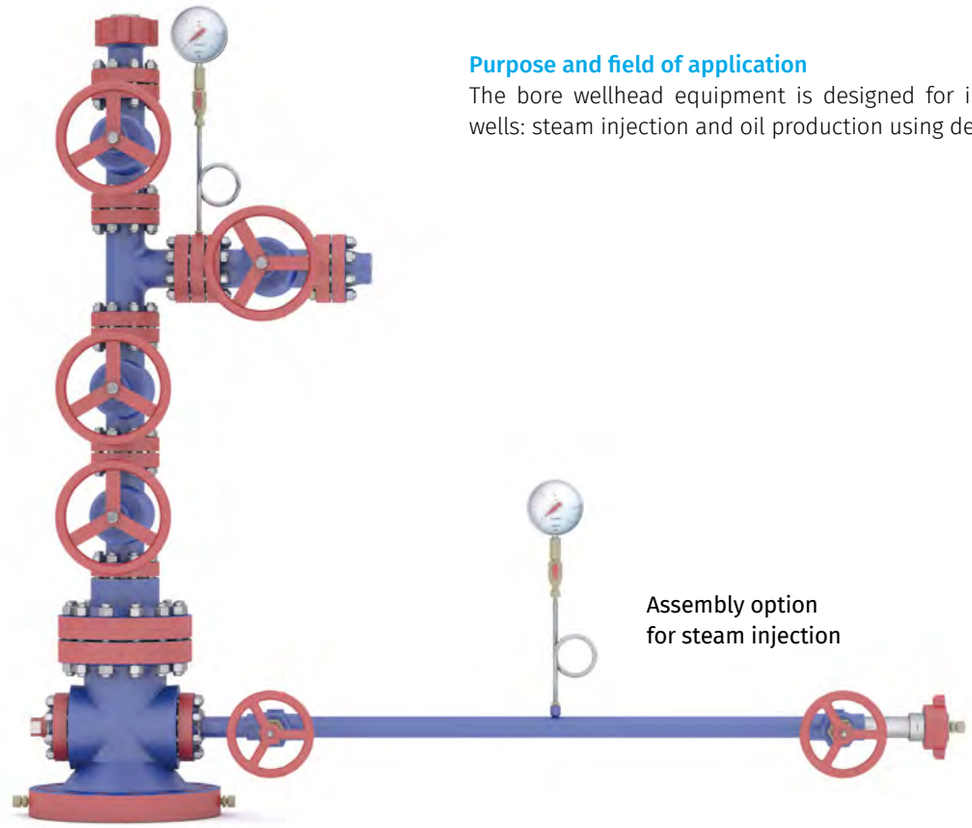
Technical specifications

Working pressure, PSI		2000
Nominal inside bore, in		2
Connecting thread	To pipes of the tubing string GOST 633-80	2
	To casing string, OTTM GOST 632-80	2 7/8
	To operating line of tubing strings GOST 633-80	5 ¾, 6 5/8
Overall Dimensions, in	Length	47,6
	Width	37,8
	Height	53,5
Resistance to effect of well medium per GOST 13864-89		K1
Material class		AA, BB, DD
Working medium temperature, °F, no more than		+212
Limit value of ambient working temperatures, °F		-50 ...+104
Mass, lb		600

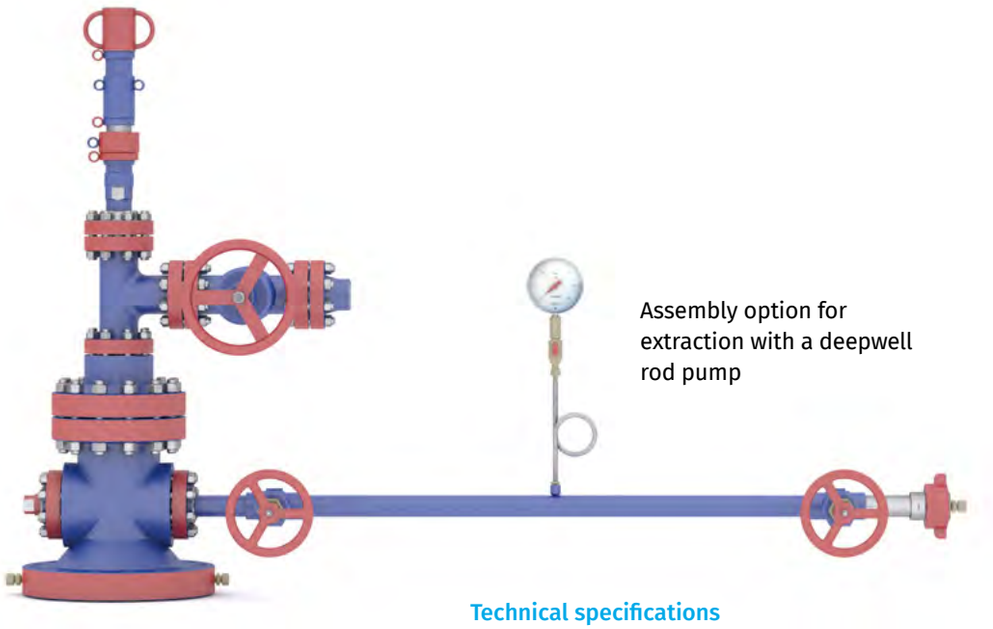


1. Housing
2. Angle Valve
3. Angle Valve – Check Valve
4. Sub
5. Lubricator valve
6. Quick Disconnect Joint
7. Cable Input

Heat-resistant steam bore wellhead equipment ATPK-65x18-350 K1



Assembly option for steam injection



Assembly option for extraction with a deepwell rod pump

Purpose and field of application

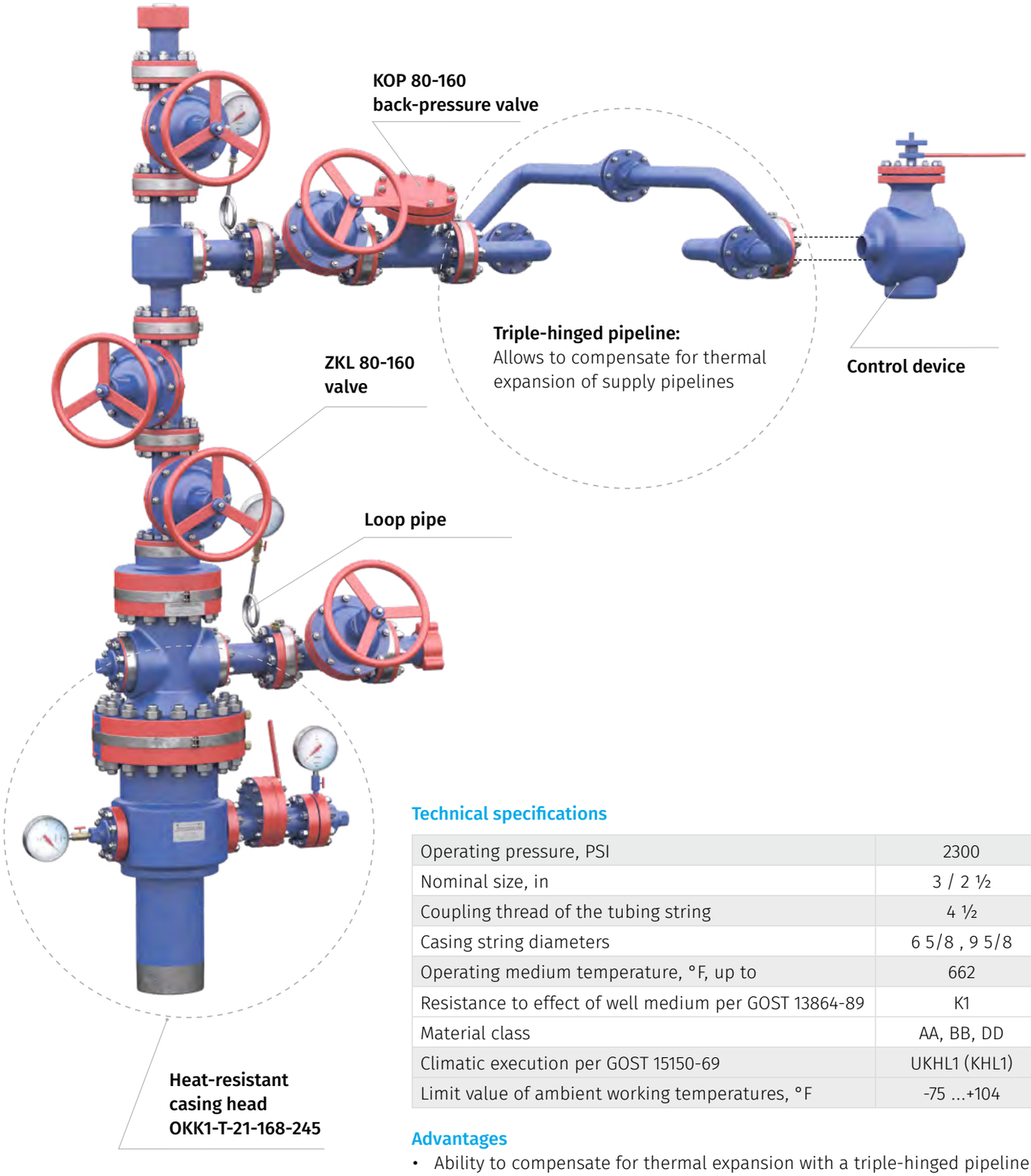
The bore wellhead equipment is designed for installation on cyclic-operating wells: steam injection and oil production using deep-well rod pumps.

Technical specifications

Working pressure, PSI	2600
Nominal inside bore, in	2 9/16
Connecting thread to pipes of the tubing string	4 1/2
Working medium temperature, °F, no more than	662
Resistance to effect of well medium per GOST 13864-89	K1
Material class	AA, BB, DD
Climatic category	UKHL1 (KHL1)
Limit value of ambient working temperatures, °F	-75 ...+104

Steam-injection heat-resistant fittings
ATPN-65x16-300K1

Purpose
Bore wellhead equipment is designed to be installed at the wellhead of steam-injection wells during ultra-viscous oil production

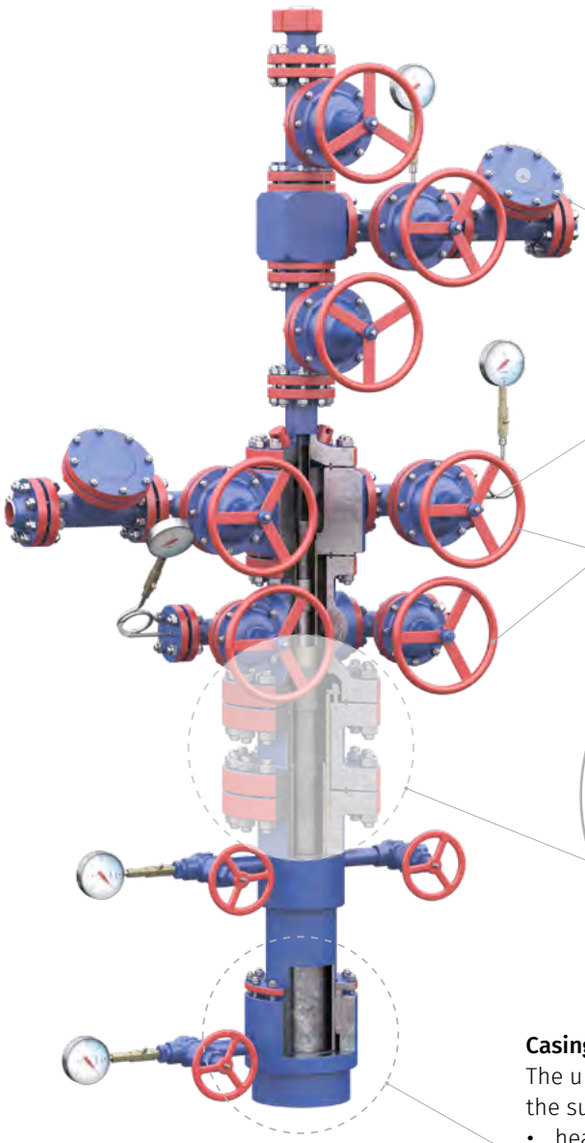


Technical specifications

Operating pressure, PSI	2300
Nominal size, in	3 / 2 ½
Coupling thread of the tubing string	4 ½
Casing string diameters	6 5/8 , 9 5/8
Operating medium temperature, °F, up to	662
Resistance to effect of well medium per GOST 13864-89	K1
Material class	AA, BB, DD
Climatic execution per GOST 15150-69	UKHL1 (KHL1)
Limit value of ambient working temperatures, °F	-75 ...+104

Advantages
- Ability to compensate for thermal expansion with a triple-hinged pipeline
- Simplicity, reliability of locking and sealing units
- Maintainability and availability of structural elements and units
- Warranty period is 18 months from the date of bore wellhead equipment commissioning

Bore wellhead equipment with thermal compensation ANK-65x14-250-TK



Purpose

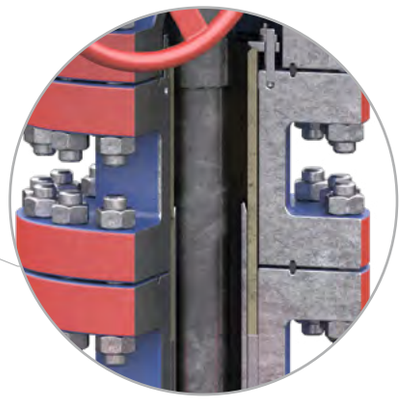
Double bore wellhead equipment with «pipe-in-pipe» suspension is designed to be installed at the wellhead of steam-injection wells during ultra-viscous oil production.

KOP 80-160 back-pressure valve

Loop pipe

- eliminates the possibility of pressure gauge overheating.

GL 80(50)-160 valve



Thermal Compensation Unit

Compensates for thermal expansion of the casing string up to 700 mm

- highly hermetic
- coil is made of a solid workpiece
- equipped with a treated nozzle

Casing head

The unit ensures the displacement of the intermediate string inside the surface casing

- heat-resistant sealed

Technical specifications

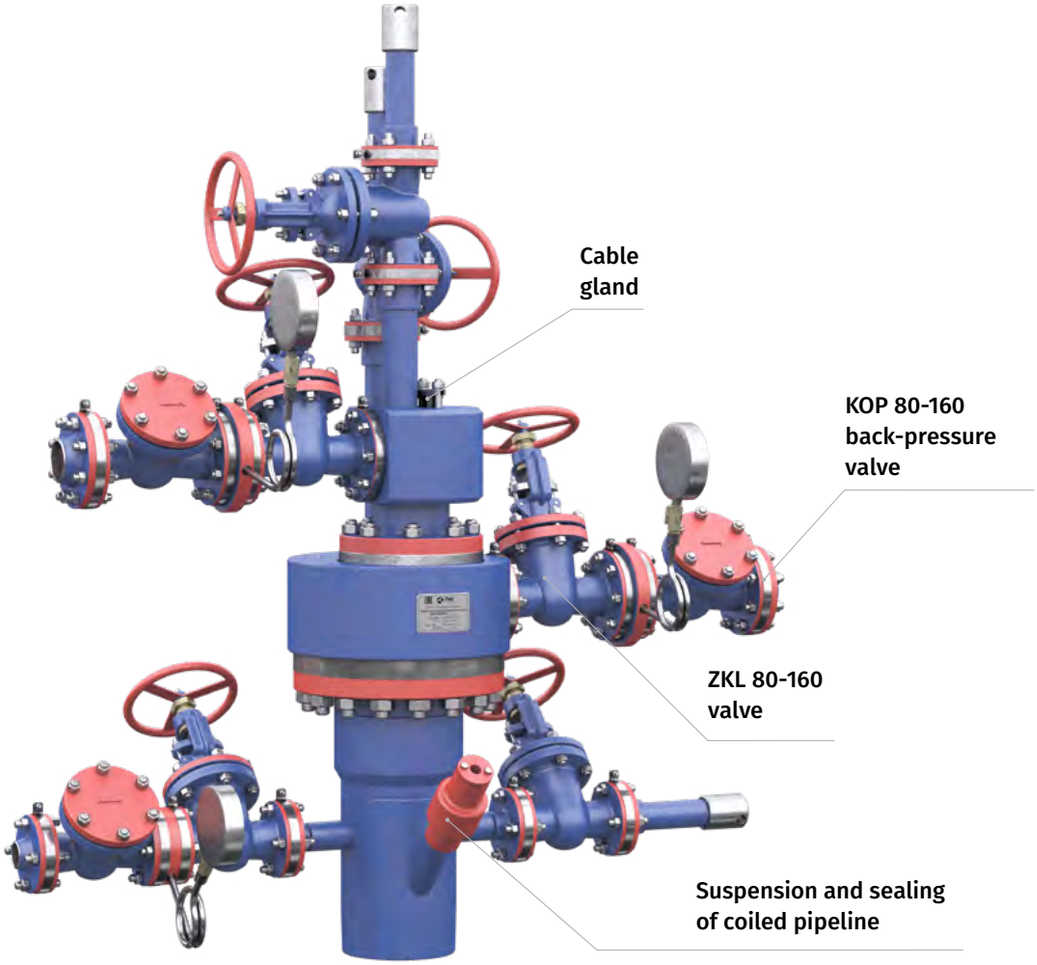
Operating pressure, psi	2030
Nominal size, in	3.14/2.5/1.96
Coupling thread of the tubing string	4 ½
Casing string diameters	6 5/8 , 9 5/8
Operating medium temperature, °F, up to	482
Resistance to effect of well medium per GOST 13864-89 Material class	K1 AA, BB, DD
Climatic design	UKHL1 (KHL1)
Limit value of ambient working temperatures, °F	-75 ...+104

Advantages

- Ability to compensate for thermal expansion of surface casing and an intermediate string
- Simplicity, reliability of locking and sealing units
- Maintainability and availability of structural elements and units
- Warranty period is 18 months from the date of bore wellhead equipment commissioning

Heat-resistant bore wellhead equipment
2AF-80/50x40

Purpose
Double bore wellhead equipment with tubing parallel suspension is designed to be installed at the wellhead of development steam-injection wells during ultra-viscous oil production.



Technical specifications

Operating pressure, PSI	580
Nominal size, in	3 / 2 ½
Coupling thread of the tubing string	2 7/8, 3 ½
Casing string diameters	9 5/8
Operating medium temperature, °F, up to	482
Resistance to effect of well medium per GOST 13864-89 Material class	K1 AA, BB, DD
Climatic execution per GOST 15150-69	UKHL1 (KHL1)
Limit value of ambient working temperatures, °F	-75 ...+104

Advantages
- Equipped with a sealing gland and suspension for the coiled pipeline of the well telemetry system.
- Simplicity, reliability of locking and sealing units
- Maintainability and availability of structural elements and units
- Warranty period is 18 months from the date of bore wellhead equipment commissioning

Gate Valves Type ZD 65x21 and ZDSH 65x21
TU 3665-099-78691656-2015

Purpose

Steel gate valve with a slide gate ZD 65x21 (full-opening valve) is designed for operation as a closing device on the wellhead equipment and in the pipelines which carry liquid and gaseous media, oil and industrial water.

The steel Gate Valve with a slide gate and a choke valve ZDSH 65x21 (with quick change choke) is intended for operation as a closing device and step-by-step adjustment of liquid flow rate on the wellhead equipment and in the pipelines which carry liquid and gaseous media, oil, industrial water with a content by volume of CO_2 and H_2S of up to 6% and the working medium temperature of no more than 248°F.

Replacement of choke valves of the ZDSH 65x21 gate valve is made by one operator with the slide valve in closed position without bleeding pressure from the pipeline within no more than 5 minutes. To replace the choke valve, it is required that plugs be screwed out on the semi-housings of the slide valve, that the choke valve be dismantled, a new choke valve be installed and the plugs be screwed in.

Technical specifications

Item No.	Description of the characteristic	Unit of measurement	Value
1	Working pressure	PSI	3000
2	Nominal diameter	in	2 9/16
3	Nominal bore of connecting pipelines	in	2 9/16
4	Nominal diameter of quick change metal ceramic choke valves (for ZDSH gate valve)	in	0,078, 0,118, 0,157, 0,196, 0,236, 0,275, 0,314, 0,354, 0,393, 0.472
5	Working medium		Industrial water, oil, gas
6	Working medium temperature	°F	No more than 250
7	Valve sealing class per GOST R 54808		A
8	Medium feed direction		any
9	Type of gate valve flange connections		Per RD 26-16-40-89, GOST 28919-91
10	Resistance to impact of well medium per GOST 13846-89		K1
11	TWorking medium temperature, no more than	°F	250
12	Limit values of surrounding air working temperatures	°F	From -75 to +104
13	Overall dimensions: - Length - Width - Height (without Handle) - Flange diameter	in	 13.8 9.8 10.6 7.6
14	Reliability indicators, no more than: - Full service life - Full average life time - Time between failures - Average service life before overhaul	 years cycles cycles years	 15 1800 600 5
15	Mass	lb	117

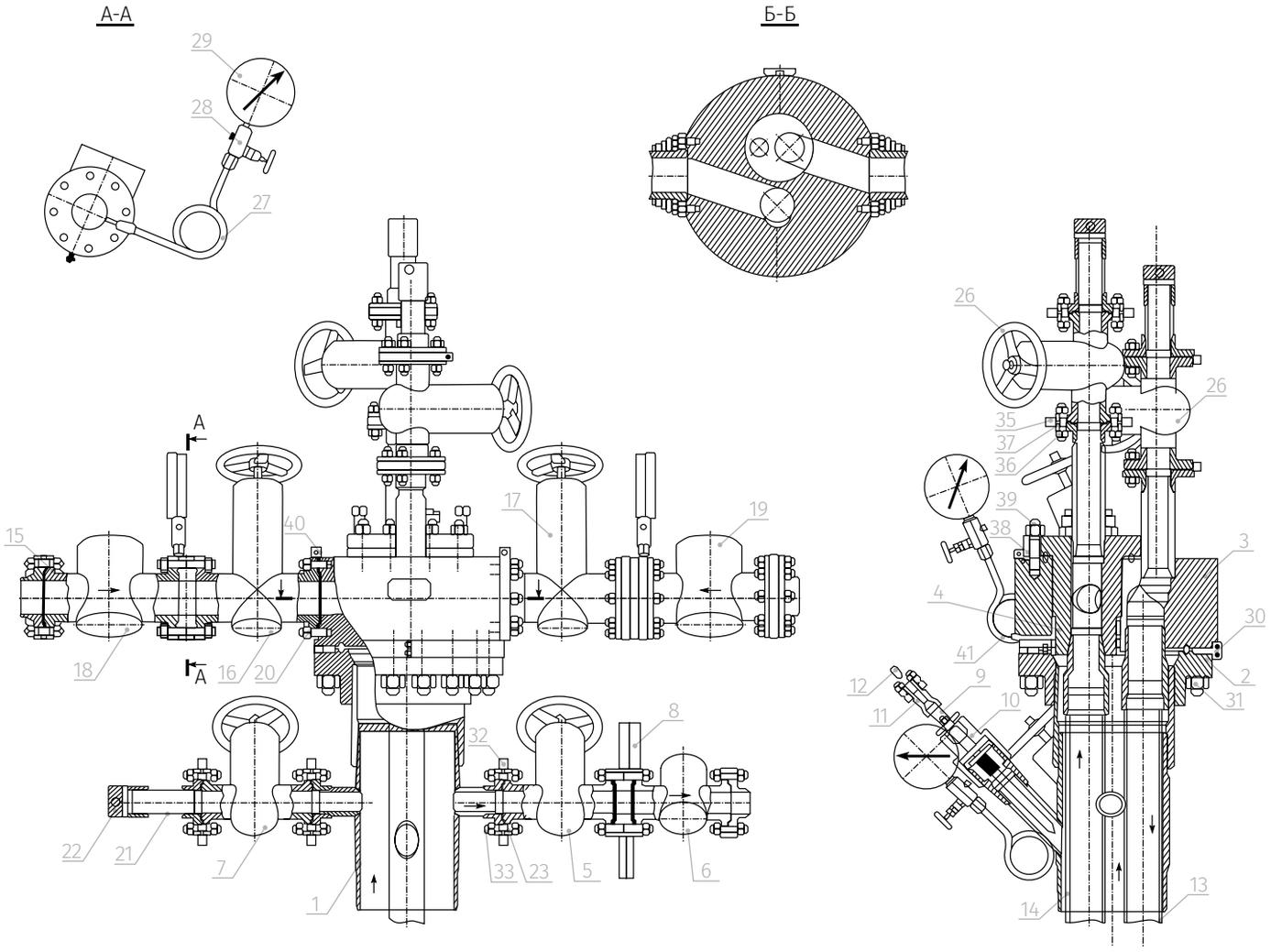
Double bore wellhead equipment
AUD 80/50-40

Purpose

The wellhead equipment is designed to pipe and seal the well mouth, to suspend two parallel well pipelines (tubing strings) and a flexible pipe with optic fiber cable sealant, designed for control and adjustment of production and (or) injection of working medium when delivering cyclic steam impact on the pay formation.

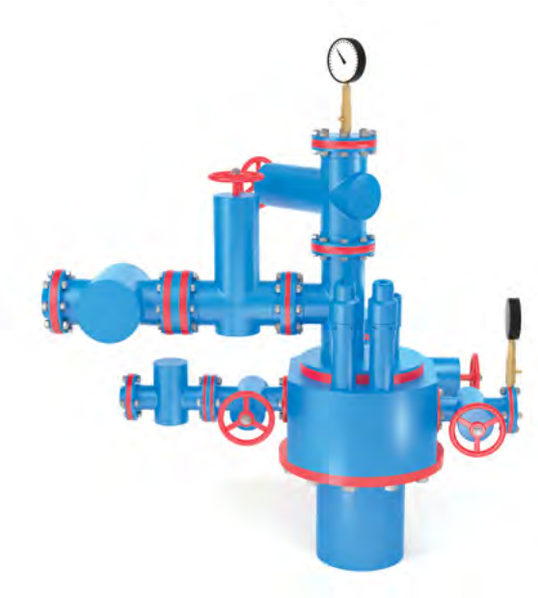
Technical specifications

Working pressure, PSI		580
Nominal inside diameter, in		
Main outlets		3
Process outlets		2
Inside diameter of cable sealer, in		0,5
Nominal diameter of flexible pipe, in		1, 1.5
Connecting thread	To casing string, GOST 632-80	9 5/8, 12 3/4
	To internal well pipeline per GOST 633-80	2 7/8, 3 1/2
	To the outside well pipeline per GOST 632-80	-
Overall Dimensions, in	Length	72
	Width	56
	Height	56
Number of suspended well pipelines, pc		2
Number of suspended flexible pipelines, pc		1
Resistance to effect of well medium per GOST 13864-89 Material class		K1 AA, BB, DD
Working medium		Steam, water, oil, gas
Working medium temperature, °F, no more than		482 °F
Climatic execution per GOST 15150-69 Temperature classification		UKHL(HL1) K
Mass, lb, no more than		1500
Operating temperature limits environment, ° F		From -75 to +104



1 – Wellhead cross;
2 – Ring joint;
3 – Cross pipe holder;
4 – Pipe holder;
5, 7, 16, 17, 25, 26 – Gate valves;
6, 18, 19 – Check valves;
8, 29 – Pressure gauges ;
9 – Flexible pipe;
10, 11 – Sealant;
12 – Fiber optic cable;
13 – Long tubing string;
14 – Short tubing string;
15, 23 – Flat paronite gasket;
20, 31, 33, 36, 39 – Doweled joints;
21 – Branch pipe;
22 – Blank-off plug;
24 – Nameplate;
27 – Siphone pipe;
28 – Needle valve;
30, 32, 35, 38, 40 – Shell;
34 – Gasket;
37 – Flange;
41 – Plug.

Single bore double row wellhead equipment
AOD 80/50-40

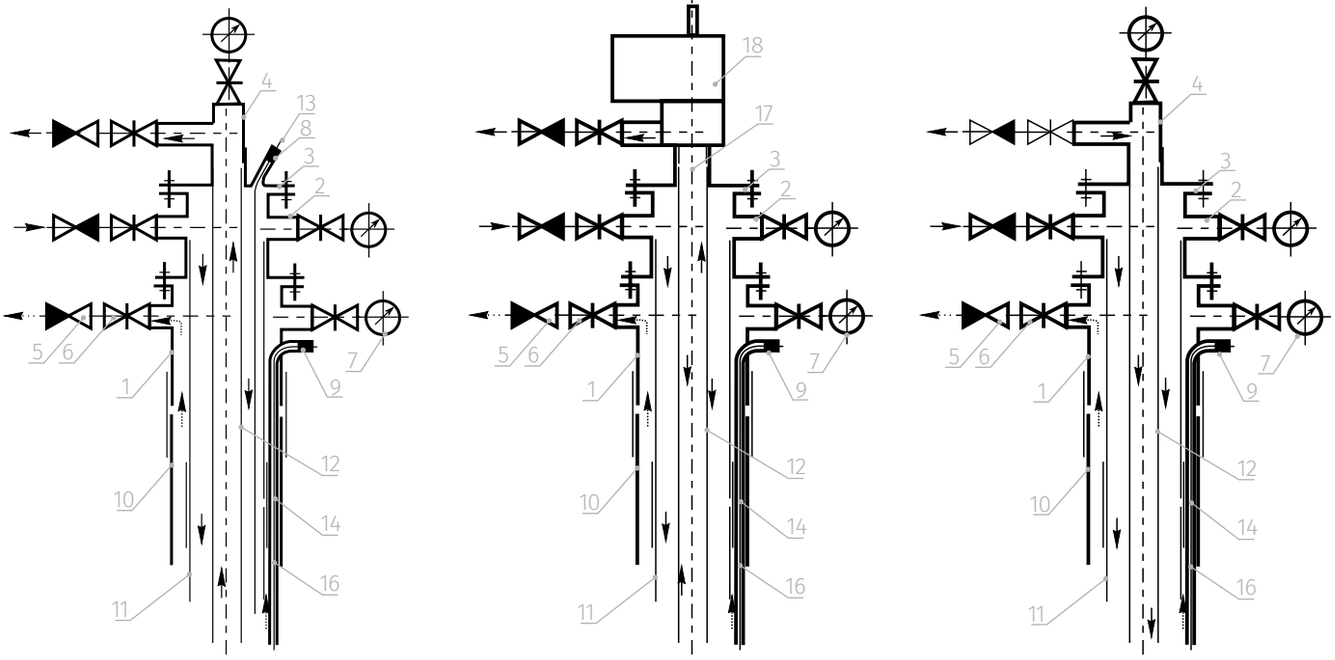


Purpose

The wellhead equipment is designed to pipe and seal the well mouth, to suspend two well pipelines (tubing strings) which are located in the well, one inside the other, designed for individual control and adjustment of production and (or) injection of working medium into the well.

Technical specifications

Working pressure, PSI		580
Nominal inside diameter, in		
– Main outlets		3
– Process outlets		2
Inside diameter of cable sealer, in		0,5
Nominal diameter of flexible pipe, in		25
Connecting thread	To casing string, GOST 632-80	9 5/8
	To internal well pipeline per GOST 633-80	3 ½
Overall dimensions, in	Length	66
	Width	44
	Height	78
Number of suspended well pipelines, pc		2
Number of suspended flexible pipelines, pc		1
Resistance to effect of well medium per GOST 13864-89 Material class		K1 AA, BB, DD
Working medium		Steam, water, oil, gas
Working medium temperature, °F, no more than		482 °F
Climatic execution per GOST 15150-69 Temperature classification		UKHL(HL1) K
Mass, lb, no more than		1590
Operating temperature limits environment, ° F		From -75 to +104



а) Piping and fittings schematic of main execution;

б) Piping and fittings schematic, execution 01;

в) Piping and fittings schematic, execution 02

1 – Wellhead cross;
2 – Cross pipe holder;
3 – Pipe holder;
4 – T-pipe;
5 – Check valves;
6 – Shut-Off devices;
7 – Pressure gauges;
8 and 9 – Seals for cable of electric centrifugal pump unit and for fiber optic cable respectively;
10 – Well production string;
11 – External well pipeline;
12 – Internal well pipeline;
13 – Power cable of electric centrifugal pump unit;
14 – Flexible pipe;
16 – Fiber optic cable;
17 – String of sucker rods of electric screw pump unit with surface drive;
18 – Drive of electric screw pump unit with surface drive

Plug tap

Purpose

Plug Tap is intended for shutting off the ducts and for routing pipelines.

Technical specifications

Working pressure, PSI		3000
Nominal bore, in		2
Working medium		Water, drilling fluid
Connecting thread		2 3/8
Overall dimensions, in	Length	7.8
	Width	4
	Height	9
Mass, lb		27
Working medium temperature, °F No more than		+122

Angle valve VU 140x50

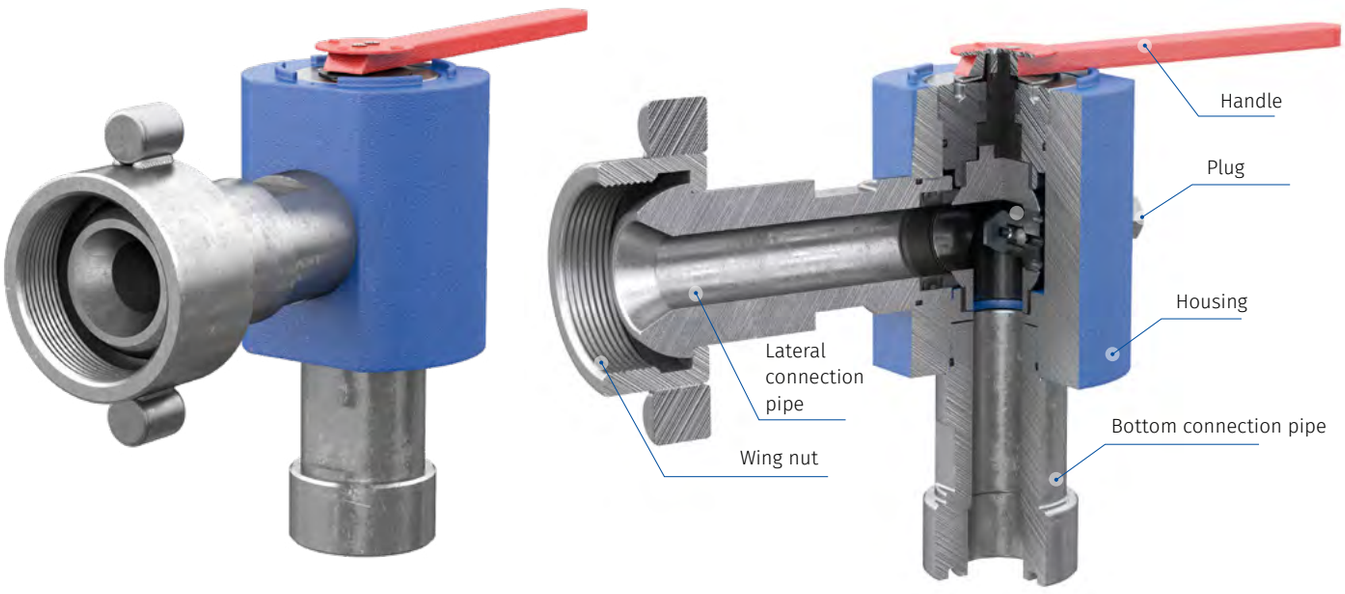
Purpose

Angle valve is intended for shutting off the passages of oil pipelines and water supply lines.

Technical specifications

Working pressure, PSI		2000
Nominal bore, in		2
Working medium		Industrial water, oil, petroleum products
Connecting thread		2 3/8
Valve sealing class		A per GOST 9544-93
Overall dimensions, in	Length	14.5
	Width	10.6
Working medium temperature, °F No more than		+212 °F
Mass, lb		33

Angle ball valve



Purpose and field of application

The angle ball valve is a wellhead equipment gate used as a more effective device for wells equipping than a classic external casing valve.

Operation principle

Angle valve equipped with a gas transfer valve is designed to cut off the fluid flow in pipeline systems. It makes it possible to completely shut off the liquid flow with a maximum temperature of up to 230 °F. There are three positions of the valve handle: O - “open”, C - “closed”, T - “throttle”. In the “throttle” mode, the associated gas is vented from the annular space to the line until the valve closing pressure is achieved - up to 435 psi.

Carried media

- service water; oil with CO_2 and H_2S content up to 6%;
- natural gas containing liquid hydrocarbons,
- ethylene glycol, methanol, turbine oils, water and mechanical impurities in the following amounts:
  - moisture and condensate up to 1500 mg/Nm^3;
  - mechanical impurities up to 10 mg/Nm^3;
  - size of mechanical impurities particle is up to 0.039 in;
  - hydrogen sulfide (H_2S) not more than 1 mg/Nm^3;
  - sodium/potassium not more than 1 mg/Nm^3.

Technical specifications

Maximum passage Do	1.57 in
Nominal pressure, psi	2030
Sealing class in accordance with	GOST 9544-A
The connection sizes of quick-release connection flanges with a thread of	M90x3; M110x6
Throttle holes of	3, 4, 5, 6, 8, 10, 12, 14.5, 17, 20 mm in diameter
Dimensions, in	9.84x12.59x4.33
Mass, up to	41.88 lb

Advantages

- time and costs reduction during technological operations at the wellhead
- high tightness of the integrally-machined housing
- high corrosion and erosion resistance of valve parts and components that guarantees their longer use period
- minimal risk of the carried media leakage (modern types of seals are used)
- high valve maintainability (modular construction and replaceable seals)

Casing head, type
OKO1-21-146 (168)x245

Purpose

The casing head, type OKO 21-146 (168) x245 is designed for suspending the production casing, tying the upper ends of the casing pipes, sealing the casing annulus and monitoring the pressure in it.

Possibilities

Casing head installation on the well allows:

- drilling for production casing through the piping body installed on the surface casing;
- installing well control equipment on the piping body through the adapter flange;
- unloading production casing directly into the piping body;
- ensuring solution circulation when cementing through channels in the suspended coupling;
- monitoring pressure in the casing annulus;
- installing X-mass tree on the wellhead coupling.

A ball valve, a spade coupling valve, a pressure valve can be used as a shut-off device on the side outlets, or they can be closed with a plug with a tubing 60 thread

Advantages

- Wide range of standard sizes for casing options.
- Small size and low cost.
- Reduces expenses when drilling due to the simplicity of the piping and well control equipment installation.

Specifications

Operating pressure, PSI	3000
Connecting thread to production casing according to GOST 632-80, in	coupling type OTTM 5 ¾ / 5 5/8
Connecting thread to surface casing according to GOST 632-80	coupling type OTTM 9 5/8
Minimum housing inner diameter, in	8.7
Connecting thread of side outlets according to GOST 633-80	coupling type NKT 2 3/8
Temperature of operating medium, max,°F	250
Resistance to well medium exposure according to GOST 13846-89 Material class	K1 AA, BB, DD
Working medium	oil, natural gas, process water, drilling mud
Limit values of ambient operating temperatures, °F	from -75 to +140
Overall dimensions: - length - width - height	 20 12 13
Weight, lb	230

Casing head
tubing hanger, OKO type

Purpose and application

A casing head is a device designed to suspend the production casing, tie the upper ends of the casing pipes to separate and seal the casing annulus, monitor the pressure in it, carry out process operations, install well control equipment during drilling, and install X-mass trees.

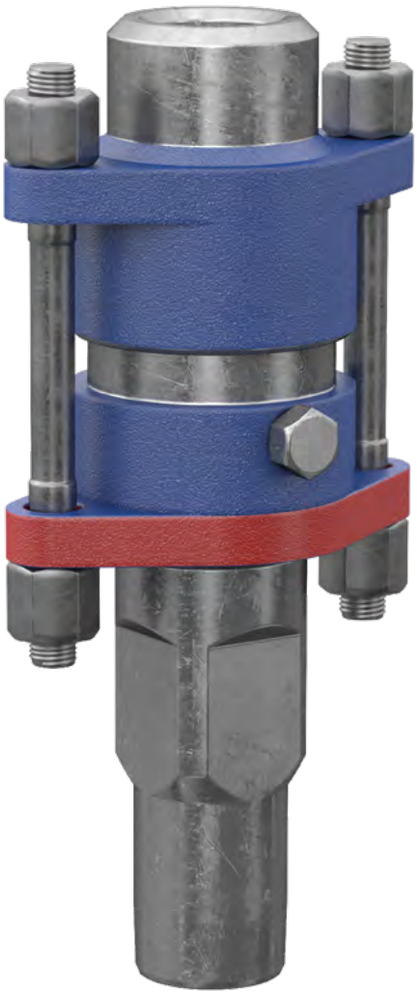
Standard types of casing heads

OKO1-21-146(168)x245
OKO1-21-114x178
OKO1-21-114x168
OKO1-21-146/114x178

Specifications

Specification	Value
Operating pressure, PSI	3000
Nominal diameter of piped casings, in	4 ½ , 5 ¾ , 6 5/8 , 7, 9 5/8
Nominal diameter of side outlets, in	2
Connecting thread of side outlets according to GOST 633-80	2 3/8
Temperature of operating medium, max, °F	250
Resistance to well medium exposure according to GOST 13846-89 Material class	K1 AA, BB, DD
Working medium	oil, natural gas, process water, drilling mud
Limit values of ambient operating temperatures, °F	from -75 to +140

Cable gland
AFK-2x21.F



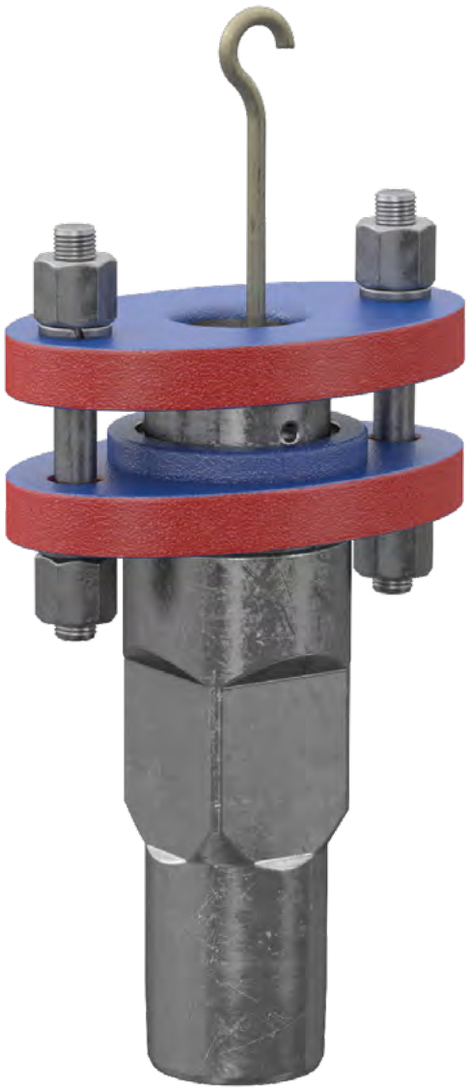
Purpose

Cable inlet AFK-2x21.F is a device designed for sealing the ESP cable in wellhead fittings of production wells. The cable gland has a single oil seal.

Specifications

Specification	Value
Operating pressure, PSI	3000
Connecting thread	2 3/8
Type	double seal
Seal types, in:	
Cable gland seal (cable 3x10 mm2) SKV 53.64.47.210	3×0.31 in
Cable gland seal (cable 3x16 mm2) SKV 53.64.47.210	3×0.35 in
Cable gland seal (cable 3x25 mm2) SKV 53.64.47.210	3×0.39 in
Cable gland seal (cable + a drop tube 4x16 mm2) SKV 53.64.47.210	4×0.35 in
Well medium according to GOST 13846-89 Material class	K1 AA, BB, DD
Temperature of operating medium, max, °F	250
Working medium	oil, natural gas, process water, drilling mud
Limit values of ambient operating temperatures, °F	from -75 to +140
Overall dimensions, in: - length - width - height	 7 5.7 14.6
Weight, lb	28

Cable gland
AFK-1x21.F



Purpose

Cable inlet AFK-1x21.F is a device designed for sealing the ESP cable in wellhead fittings of production wells. The cable gland has a single oil seal.

Specifications

Specification	Value
Operating pressure, PSI	3000
Connecting thread	2 3/8
Type	double seal
Seal types, in:	
Cable gland seal (cable 3x10 mm2) SKV 53.64.47.210	3×0.31 in
Cable gland seal (cable 3x16 mm2) SKV 53.64.47.210	3× 0.35 in
Cable gland seal (cable 3x25 mm2) SKV 53.64.47.210	3×0.39 in
Cable gland seal (cable + a drop tube 4x16 mm2) SKV 53.64.47.210	4×0.35 in
Well medium according to GOST 13846-89 Material class	K1 AA, BB, DD
Temperature of operating medium, max, °F	250
Working medium	oil, natural gas, process water, drilling mud
Limit values of ambient operating temperatures, °F	from -75 to +140
Overall dimensions, in: - length - width - height	 6.5 3.4 13.7
Weight, lb	14,5

Wellhead oil seal
SUS2A-73-31

Purpose

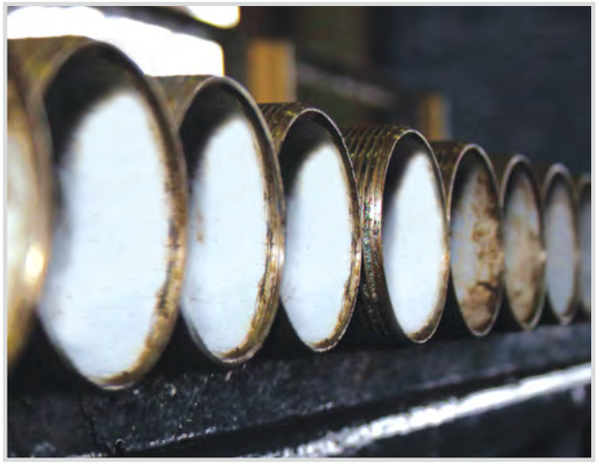
Wellhead oil seal with a self-aligning head, type SUS, is designed for sealing the stuffing rod in wells operated by sucker rod pumps.

Specifications

Specification	Value
Operating pressure, PSI	580
Maximum pressure (with a stationary wellhead rod and a tightened collars position), PSI	2000
Connecting thread	2 7/8
Wellhead rod diameter, in	1.22
Well medium according to GOST 13846-89 Material class	K1 AA, BB, DD
Temperature of operating medium, max, °F	250
Working medium	oil, natural gas, process water
Limit values of ambient operating temperatures, °F	from -75 to +140
Overall dimensions: - length - height	 22.6 9.6
Weight, lb	57

Lease equipment

This type of machinery may be available to the Customer under lease.



Lease of downhole pumping equipment

Lease of hydraulic tongs

Lease of wellhead equipment

Lease of multiphase screw pumps

Ease of oil-well sucker-rod pumps drives

Lease of centrifugal sectional pumps

Process packers

ТМС ГРУПП

TOOLS

Tools

3 Casing scraper

4 Sucker-ROD catcher
LSh 19-25

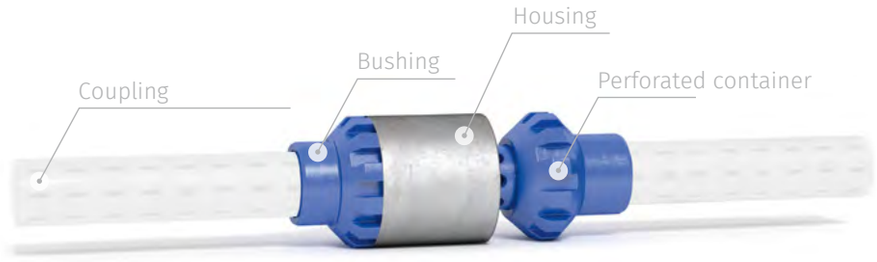
Casing scraper

Purpose

Designed to clean well fluid from mechanical impurities, as well as casing pipe strings from salt deposits that appear during well operation. Simultaneously, during operation, the scraper creates the gaging of the casing pipe around its perimeter, which allows to prepare the well for perforation operations without flushing it.

The use of a casing scraper in the process of repairing a well can improve the performance characteristics of downhole pumping equipment.

Design and operation principle



The coupling, like the scraper housing, has grooves for the fluid passage and centering in the column. The bushing freely moves between the coupling and the housing. The bushing has sharp edges for cutting deposits of salts and fibers of cementing materials from the inner surface of pipes. All waste is accumulated in a perforated container which is cleaned mechanically at the wellhead.

Technical specifications

Parameters	CK-146	CK-168
Length, max. (excluding connecting pipes), in	14.7	15.5
Rated casing pipes size, in	5.1	5.6
Maximum external diameter, max in	2.04	2.04
Minimum internal diameter, in	2.04	2.04
Connecting thread	tubing 73 GOST 633	
Weight, max lb	39.6	55.1

The use of a casing scraper will allow:

- ✓ To reduce duration of repair and eliminate the cost of wells flushing.
- ✓ To clean the fluid in the well from contamination, without resorting to launching of the “wash-jetting shoe” (special device) on the tubing, followed by flushing the well.
- ✓ To perform gaging of the casing string along its entire perimeter without an additional technological operation.
- ✓ Reduce the quantity of pump repairs due to clogging.

Sucker-ROD catcher
LSh 19-25

Purpose and description:

The sucker-rod catcher is designed to extract damaged pumping rods from oil wells. It is a versatile, compact catching device of a simple design and low mass. The rod grip is made by a special collet leaned on the support structure of the catcher part. Provides reliable grip of rods in wells with tubings of at least 2.8 in in diameter.

Operation principle:

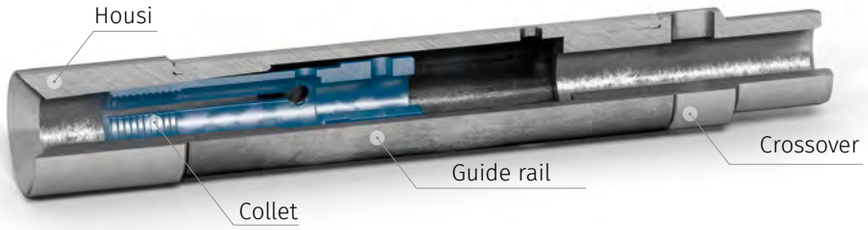
The catcher crossover sub is connected to the rods column and the device is getting down into the tubing. It is lowered until it meets a fallen rod. A guide rail on the catcher makes the damaged rod enters the device, where the it is passed through the drop-down leaf of the collet.
Then, when the catcher rises upwards, the collet with the gripped rod reaches the inner conical surface of housing. The collet leaves are compressed, ensuring a secure rod grip and installation in the device.
After the device is removed from the well to the surface, the collet is unlocked and the emergency rod is released from the grip.

Benefits of a sucker-rod catcher use:

- a damaged rod catch and its reliable fixation in a well at a significant deviation of its shape and transverse dimensions;
- a reliable grip of the rod, even if only a small part of it was gripped;
- use in wells with asphalt-paraffin deposits (APD).

Advantages

- A wide range of rods (Ø0.74, Ø0.86, Ø0.98) can be caught with one device without any housing part replacement
- A caught rod is easily released on the surface
- The device can be used in complicated downhole conditions



Technical specifications

Technical specifications	LSh 19-25
Tubing diameter	2.87
Sucker-rod catcher diameter, in	0.74, 0.86,0.98
Flow path diameter – at least, in	1.22
Connecting thread in accordance with GOST 13877-80 – MSh22	МШ22
Length, in	14.56
Outer diameter – up to, in	2.08
Complete set mass, lb	8.37

Operation warranty period – 12 months from the commissioning date.

TMC
GROUP

PIPELINE PRODUCTS

Pipeline Products

Steel tubing string, casing and line pipes with internal anticorrosive coating

TS 24.20.13-027-67740692-2018 (TS 1390-007-67740692-2017, TS 1320-002-67740692-2013)

Purpose of coating

Protects the inner surface of tubing string, casing pipes and couplings as well as line pipes against corrosion.

Field of application

Coated tubing string is designed to be used in injection and development wells operating in flowing mode or equipped with electric centrifugal pumps, as well as in wells of injection system.

Coated casing pipes are intended for fixing oil and gas wells with extended service life. Coated line pipes are used for construction, reconstruction and repair of production and technological oil, gas and water pipelines.

Types of internal coating depending on operating conditions:

- standard 186 °F;
- thermo 248 °F;
- thermo 302 °F and more.

(Maximum operating temperature is 176, 248, 302 °F).

Range of pipes with coating

- Tubing string - from 2.36» to 4,49»;
- Casing pipes - from 4,49» to 13,38»;
- Line pipes - from 2,36» to 20,87»;

Coating design

- one-layer based on high-viscosity materials;
- two-layer based on powder materials.

Coating properties

- resistant to oil, fuels, industrial water and sewage;
- resistant to the damaging effects of stray currents;
- high degree of adhesion of the coating to the steel surface;
- high mechanical strength.

Advantages

1. The products comply with GOST R
2. The management system is certified for compliance with ISO 9001-2015.
3. Full input control of steel products is provided, including steel pipe and coating materials control.
4. Qualified professionals are at all stages of manufacturing and inspection.
5. Availability of certified and accredited unified quality laboratory.
6. Selection of coating materials, grades of steel pipes depending on the operating conditions of the pipeline.

Technical specifications

Performance indicators	Regulatory information
Coating color	according to the material reference documentation
Thickness, μm, at least	350
Dielectric continuity of the coating	No breakdown at 5 V voltage per coating thickness
Coating adhesion to steel by X-type notch method, point, up to	1
Coating adhesion to steel by tearing, Bar, at least	100

Steel pipes 2,24”-32,28”
in diameter with outer two- and three-layer polyethylene coating (by Technical Requirements 1390-001-67740692-2010)

Purpose

For the safe and durable anticorrosion protection of outer surface of steel pipes, pipes pieces and pipelines’ parts we offer services on the application of outer protective polyethylene coating in the factory environment of the following types:

- outer protective two-layer coating on the basis of extruded polyethylene on the steel pipes 2,24’’–32,28’’ in diameter;
- outer protective three-layer coating on the basis of extruded polyethylene on the steel pipes 2,24’’–32,28’’ in diameter.

The award winner of
«100 Best Products of
the Republic of Tatarstan» 2018, 2017, 2015

Application

They are designed for the construction of gas pipelines, oil-pipelines, water pipelines, and also for the construction of utility systems (water pipelines, water carriage).

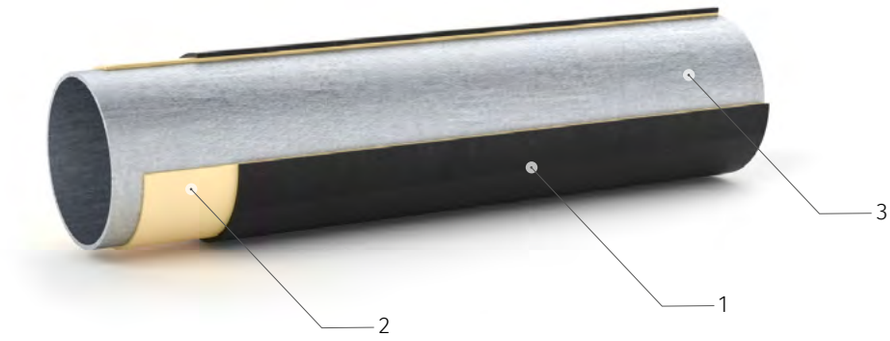
Advantages

1 In the comparison with traditional, bituminous–mastic and polymer band coatings the industrial polyethylene pipes’ coating has the high toughness factor, elevated adhesion to steel, resistance to driving, breaks, abrasive wear. On the account of good adhesion it is stable to the shear loadings appearing during the ground settlement and during the process of pipelines parts movements during the productive activity.

2 The quality of outer polyethylene coating of pipes and pipelines’ parts applying in our conditions obeys GOST P 51164, GOST 9.602. The product is certified by the number ROSS RU.11H007.H00019. There is the permission for application № РРС 00-26706.

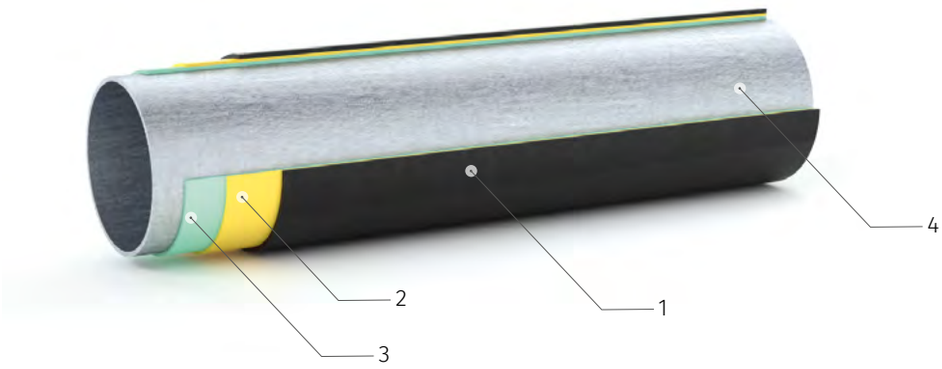
3 Three-layer polyethylene coating of pipes is differed from two-layer coating, because it has one more layerepoxide primer. The epoxide layer provides the elevated adhesion of coating to steel, adhesion water resistance and firmness of coating to the cathode shelling. The polymer adhesive interlayer is the second, intermediate layer in the construction of three-layer coating.

4. Maximum operating temperature up to 80 °F



Two-layered pipe with an outer coating:

1. polyethylene cover
2. primer
3. steel pipe



Pipe with an outer three layers:

1. polyethylene cover
2. adhesive
3. primer
4. steel pipe

Internal and external anticorrosive coating of pipeline parts and assemblies (TS 1468-020-67740692-2012)

The company sells pipe assemblies and parts with internal and external protective anticorrosive coating on the basis of paint and powder polymer compounds.

Assemblies are sections of a pipeline or other facility under construction, that consist of assembly units combinations: pipeline parts (T-pipes, branches, transitions, bottoms, end caps, transition rings) and adapters.

Pipeline parts are fittings used for various purposes in pipeline construction. They are used for twisting, bending, tilting, branching, changing the diameter of the pipe, as well as during temporary non-use of the pipeline.

Purpose

Designed for capital construction and overhaul of process and field pipelines (oil and gas pipelines, low-pressure water supply lines above-ground, underground and underwater laying). The temperature of the transported medium is up to + 302 °F.

Diameter range is from 2,24" to 20,87"

Advantages

1. The labor intensity of producing pipeline manifolds is reduced by an average of 25%.
2. Organizational losses are reduced.
3. Reduced waste and loss of materials.
4. Reduced storage costs at the installation site.
5. There is a possibility of delivering ready-made assemblies as per schedule, for the need of installing a particular facility.
6. Pipeline assemblies are produced as per Customer's sketches;
7. packaged and delivered in accordance with the scheme agreed with the Customer:
   - in boxes;
   - on pallets;
   - loose-loaded;
8. 100% visual inspection and radiographic tests of the welded joint.

Coating specifications

Internal coating of pipeline parts and assemblies is performed as follows:

- double layer consisting of an undercoat based on epoxy or epoxy-phenol primer and top coat based on epoxy powder paints;
- single-layer based on liquid epoxy, polyurethane paints.

Coating materials are selected based on the operating conditions of pipelines and transported fluids.

Coating properties

- resistant to oil, fuels, industrial water and sewage;
- resistant to the damaging effects of stray currents;
- high degree of adhesion of the coating to the steel surface;
- high mechanical strength.

Mounting methods

- pipeline parts and assemblies with an internal protective anti•corrosion coating are installed on the facility;
- construction works performed in extreme conditions are simplified as much as possible for pipe fitters during the supply of pipeline manifolds of large-sized assemblies- it allows to complete 50-70% of the volume of pipe manifold welding at the factory;

- the time for construction and mounting operations is reduced on average by 25%;
- reduced material storage costs at the installation site;
- preparation of the ends can be done for welding or flange connection.

Additional options

- As per customer's request, to protect against external corrosion, the following can be combined:
  - polymer coating based on powder materials;
  - polymer coating based on liquid materials;
  - polymer coating based on polyethylene or heat•shrinkable materials.
- To protect the welded joint and the weld•affected zone, it can be combined with a metalized coating or an end cap made of corrosion•resistant steel.

Head preparation types

- for welded joint complete with protective sleeves;
- for welded joint with installed end caps made of corrosion-resistant steel;
- for welded joint with an application of metalized coatings;
- for flange connections.

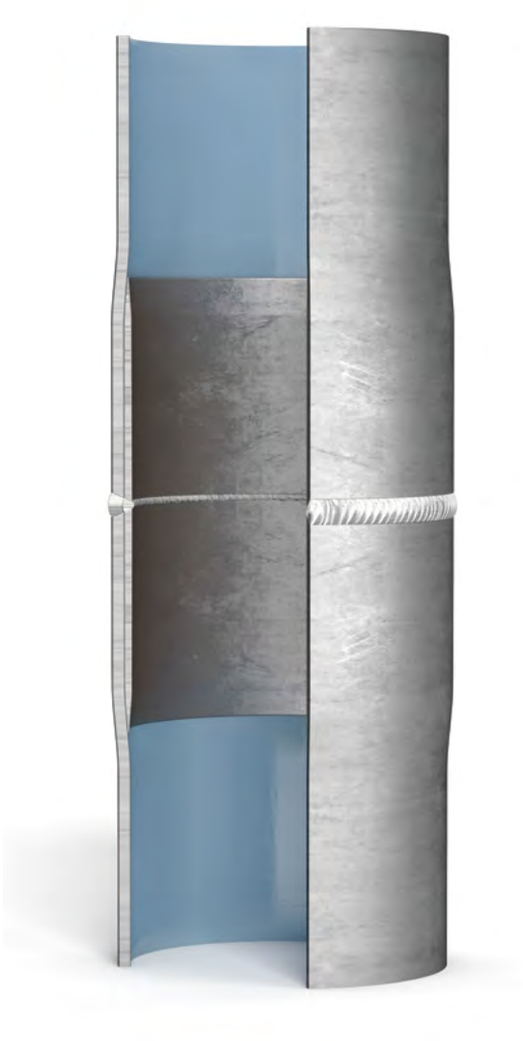
Coating materials are selected based on the pipeline operation characteristics, and shall comply with the pipeline designers and the Customer.
Materials differ in chemical and temperature resistance, they are approved for use in applicable environments and have the conclusions of laboratory tests.

Features of workshop manufacturing of pipe assemblies

- Transfer up to 70% of all labor costs from the installation site to the workshop.
- Mechanizing the majority of the manufacturing operations.
- The use of high-performance machines and mechanisms, assembling-welding devices.
- Semiautomated welding methods.
- The use of new design solutions in the manifold design

Metalized coating of pipe end sections and pipeline parts with internal anticorrosive coating

A thin-walled bushing made of corrosion resistant steel, mounted in the pipe/part section in workshop conditions.



Purpose

The metalized coating used to protect the end sections of pipes/parts with a pressed bushing is intended to protect the inner surface of a welding joint and a weld-affected zone from corrosion.

Advantages

Ease of manufacturing

The inner diameter of the pipe does not change, that allows to:

- apply mechanical means of pipeline cleaning (scraping);
- avoid creating additional local back pressure at the bushings place of installation.

Minimization of labor costs

- Up to 46% cheaper than installation of regular bushings in the field.
- Keeps the metal of a welded joint free from highly-corrosive components of the medium.

Reliability

- Fixed force when mounting the bushing ensures high insulation in the weld area.
- High barrier properties of the welded joint protection system.

Field of application

In production pipelines transporting corrosive liquids.

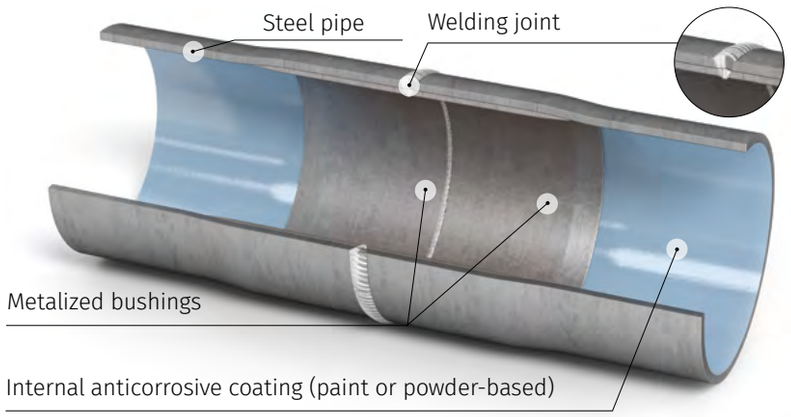
Pipes

Pipeline parts

Pipe sections

Reasons to choose out products

1. We will select the type of internal anticorrosive protection for the pipelines depending on the operating conditions.
2. The assessment of the pipe welded joint structure and bushings showed that there were no corrosion damage during the field tests.



Manufacturer's warranty

Service life of pipes with internal coating and additional metalization of pipe ends/parts is at least 15 years.

Winner of the «100 Best Goods of Russia» competition in 2018.

Diplomate of the "100 Best Goods of the Republic of Tatarstan" contest in 2018, 2017, 2015.

Technical specifications

Name	Indicators
Pipe diameter	2.24'' ÷ 12.28''
Operating pressure	up to 210 Bar
Operating temperature	-40 ÷ +302 °F

Plastic-to-metal pipes and connection pipes (TU 24.20.13-026-67740692-2018)

Plastic-to-metal pipes and connection pipes of up to 325 mm in diameter with a maximum wall thickness of 20 mm are steel pipes and connection pipes with an outer polyethylene (for underground pipelining) or varnish coating (above-ground pipelining) lined inside with a polyethylene pipe (sheath) and with tips made from:

- structural carbon steel (MPT);
- corrosion resistant steel (MPTK);
- structural alloy steel (MPTK1).

There are 2 types of MPT, MPTK and MPTK(1):

- regular – operating temperature up to +104 °F;
- heat resistant - operating temperature is above +104 °F, but not over +176 °F.

Purpose

MPT, MPTK and MPTK(1) are designed for the construction of pipelines for the transportation of:

- brine, waste and fresh water in the system of formation pressure support;
- aggressive chemical, petrochemical, oil refining industries, to which polyethylene is chemically resistant.

- effective protection of the steel pipes inner surface from the aggressive transported medium;
- effective protection of the steel pipes outer surface from damaging a polymer, powder or lacquer coating by soil corrosion;
- welded joint protection with a corrosion-resistant tip;
- Structure durability – service life is of at least 30 years;
- lack of change in pipeline flow capacity over the time due to the absence of deposits.

Products are supplied with pipeline details.

- bent branches of 5°-120° with a 1° ratio and diameter of 6,26 in;
- branches with welded connection pipes of 3,5 - 12,8 in in diameter;
- crossover and T-pipes of 3,5-12,8 in;
- S and L-shaped branches of up to 6,26 in.

Reliability

- is achieved by compliance to the welding mode in the field. We provide the author's and engineering supervision of the first 1,86-3,11 miles of the pipeline and the construction team training;
- additional visual inspection of the welding process on the color changing of the temperature indicating material applied on the length of the non-isolated area. as per Customer's request.

Advantages

Design reliability is provided by:

Polyurethane heat insulated pipes for underground and aboveground laying

Purpose

Polyurethane heat insulation is intended to keep the temperature of the medium being pumped and to protect the outer surface of the steel pipes and formed parts of the pipelines from corrosion.

Application

- heat supply systems;
- hot water supply systems;
- transportation of high viscosity petroleum products.

Diameter Range

from 1,26 to 20,87 in — for pipes with polyurethane foam thermal insulation
from 6,26 to 20,87 — for pipes with combined insulation.

Operating temperature

- 284 °F — working temperature (for pipes with polyurethane foam thermal insulation);
- 302 °F — peak temperature (for pipes with polyurethane foam thermal insulation);
- 464 °F (for pipes with combined insulation);
- 680 °F (for pipes with combined insulation).

Advantages

The pipelines with polyurethane insulation have been in use for more than 30 years in a number of countries in Europe and for more than 15 years in Russia. They make it possible to:

1. reduce losses of heat 2-2.5 times compared to conventional materials, lengthen the service life of the pipeline by up to 30 or more years;
2. provided operating remote control system is used, completely eliminate damage to pipelines caused by external corrosion;
3. reduce the cost of capital construction 1.5 times compared to trenched pipeline construction in conventional types of insulation;
4. reduce annual costs incurred in operating heat networks 9-10 times.

Structure reliability

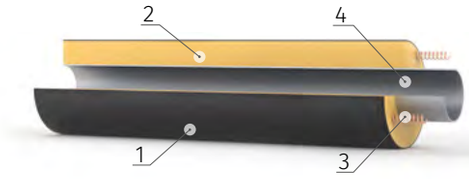
- is provided by factory assembly performed in workshop conditions;
- high-quality waterproofing is provided by a protective sheath and is monitored throughout the lifetime by the rapid remote control system;
- is provided by the durability of polyurethane foam in compression and bending within the standard value defined in GOST 30732-2006.

Product advantages

1. Minimum thermal conductivity.
2. Resistance to mechanical stress.
3. No reaction with a chemically active medium.
4. High heat- and energy-saving characteristics.

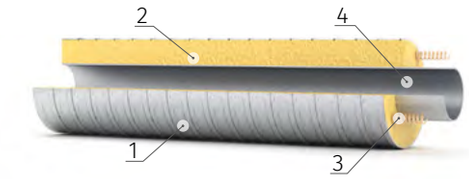
Design types of thermally insulated pipes

Steel pipes with polyurethane foam thermal insulation equipped with rapid remote control system (Technical Requirements 1390-004-67740692-2010)



Pipe with thermal insulation using foamed polyurethane with polyethylene cover, with the system of rapid remote monitoring

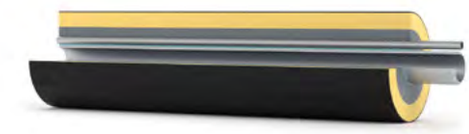
1. polyethylene cover;
2. polyurethane layer;
3. signal wire of SRRM;
4. steel pipe.



Pipe with thermal insulation using foamed polyurethane with galvanized sheet steel cover:

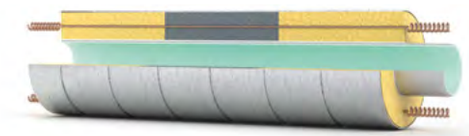
1. galvanized sheet steel cover
2. polyurethane
3. signal wire of SRRM
4. steel pipe

Steel pipes with combined insulation equipped with “skin effect” system (Technical Requirements 1390-005-67740692-2010)



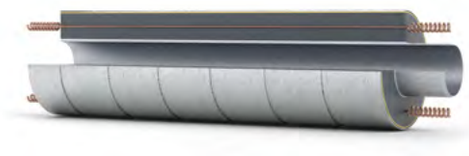
«Skin effect» system designed for freezing protection, starting warm-up and maintaining the temperature of transported product. Applied in the high explosion-hazard areas and allows to maintain the pipeline temperature of up to 30 km long without the accompanying network.

Steel pipe with polyurethane foam thermal insulation equipped with fire-protection inserts (Technical Requirements 1390-022-67740692-2014)



Purpose

To ensure reliable fire safety of the thermal insulated pipe by eliminating the possibility of spread of fire along the entire length of the pipe when insulation made from combustible material ignites.



Laureate of Russia’s 100 Best Goods – 2018 Competition

Diploma winner of Tatarstan’s 100 Best Goods-2018, 2017, 2015 Competition

Name	Parameters
Diameter nomenclature:	from 1.26 to 12.8 in
Operating temperature:	up to 680 °F
Heat loss reductionin	2.5÷3 times

1. At the customer’s request it can be fitted with an internal anticorrosive coating and a bushing to protect the weld zone.

2. Upon the customer’s request all products can be equipped with linear indicators – rapid remote insulation control system or «skin effect» system.

Formed components of pipelines with polyurethane foam thermal insulation

(Technical Requirements 1390-004-67740692-2010, Technical Requirements 2254-010-67740692-2010, Technical Requirements 1390-005-67740692-2010)

Purpose

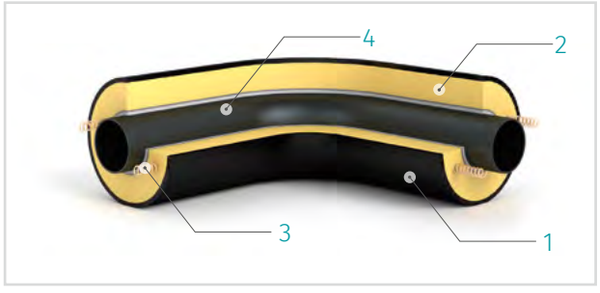
Polyurethane-insulated pipe fittings: branches, T-connectors, pipe adapters, mobile and fixed supports, used for construction of thermal insulating pipelines for trenchless underground laying and in a galvanized sheath for above-ground laying.

Products range

- branches in steel and polyethylene sheath;
- S-shaped branches;
- pipe adapter in steel and polyethylene sheath;
- T-connector;
- Z-shaped element;
- stationery support;
- pipeline element with output cable;
- sliding support;
- pipe covering of linear pipeline joints;
- pipe covering of injection wells for thermal insulation.

Advantages

1. Thermal insulation of pipes and all pipelines and fittings used in construction minimizes pipeline thermal loss;
2. Manufacture and supply of pipes and fittings with the same type of thermal insulation from one manufacturer;
3. Perfectly endure frosts and high temperatures without losing the original shape.



Pre-insulated part (branch) in polyethylene sheath with the rapid remote control system

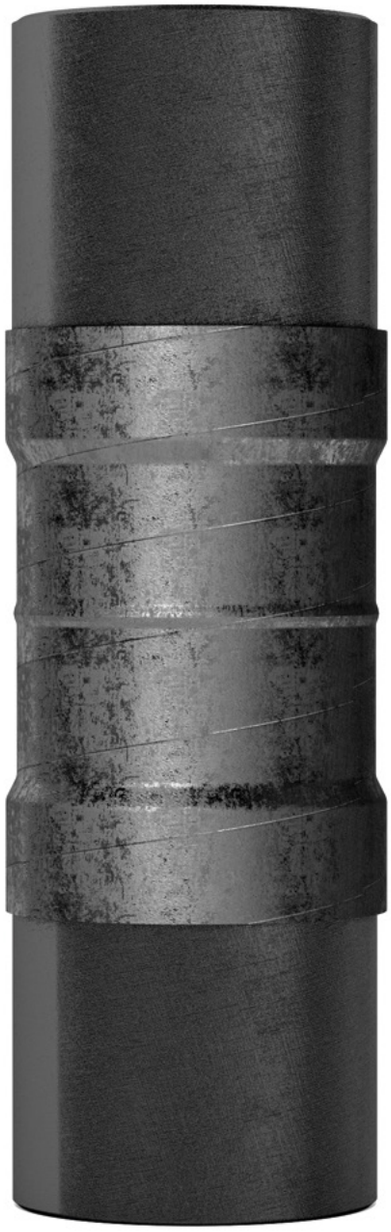
1. galvanized sheet steel cover
2. PPU
3. light conductor SODK
4. steel pipe

Pipes and steel shaped objects with combined thermal insulation

are applied in the construction of pipelines transporting high temperature fluid with a temperature of 464–680 °F depending on the thickness of basalt insulating layer.

Method of external insulation of welded joints – heat-shrinkable sleeve

TU 2245-023-67740692-2014



Design

A sleeve is a section of a two-layer structure sheath: the outer layer is made of a heat and light stabilized polyethylene, which is highly resistant to mechanical stress, and the inner layer is made of a hot-melt adhesive (glue).

Field of application

Heat-shrinkable insulation sleeves are used for anti-corrosion protection of welded joints on steel pipes with two- and three-layer polyethylene coating and branch pipes at the operating temperature of up to 176 °F.

Sleeve design:

- the outer layer is made from heat and light stabilized polyethylene;
- the inner adhesive layer is made of a hot-melt polymer compound

A wide range of sleeves for pipes of 3,5, 4,49, 6,26, 8,62, 10,75 in in diameter

Delivery set

Option 1: a sleeve, a user manual;
Option 2: a sleeve, a primer, a manual;
Option 3: a sleeve, a primer, application means, a manual.

A sleeve is delivered in a package:

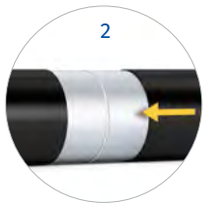
- for insulation of 1 joint (delivery set for 1 welded joint);
- for insulation of 5-10 joints (delivery set for 5-10 welded joints)

Advantages

1. No preparatory cutting or rewinding (compared to tape insulation);
2. The minimum heating temperature of a steel surface is 140 °F - 158 °F;
3. The design and thickness of a sleeve meets preinsulation requirements;
4. Installation of locks and additional overlaps is not required (compared to tape insulation);
5. Quick primer preparation right before application.

Technical specifications

Sleeve length	14.96 + 0.2 in
Sleeve thickness	0.079 + 0.039 in
Tensile strength	at T=68 °F, MPa, at least 12.0
Relative breaking elongation	at T=68 °F,%, at least 200.0
Sleeve adhesion to steel after heat shrink	at T=68 °F, n/cm, at least 35.0
Sleeves adhesion to the outer coating after heat shrink	at T=68 °F, n/cm, at least 35.0



MEST™
Mechanical Electroinsulating Connection of Pipelines

Mechanical electroinsulating connection of pipelines (MEST™) is designed for electrical isolation of pipelines from other underground structures. The purpose of electrical isolation is elimination or limitation of stray currents in the pipeline inducing by earth connections of direct or periodic currents in a high-voltage power transmission line and suppression of protective currents scattering of electrochemical (especially ground) corrosion protection.

Versions

1. Mechanical electroinsulating connections for plastic-to-metal pipelines;
2. Mechanical electroinsulating connections for pipelines of other structures (pipes with external or internal polymer coating and steel pipes)

Benefits of connections implementation

- ✓ No impact of currents induced in a common pipeline on operation of precise and expensive measuring devices;
- ✓ Elimination of discharges during pipelines operation in explosion-hazardous premises
- ✓ Elimination of protective current dissipation of electrochemical protection

Advantages

1. Simple installation without special devices;
2. Operation reliability due to simple design;
3. Fast payback due to cost reduction for repair or replacement of expensive measuring equipment.
4. Does not require servicing;
5. Can be installed at any point of a pipeline;
6. The service life is at least 15 years.

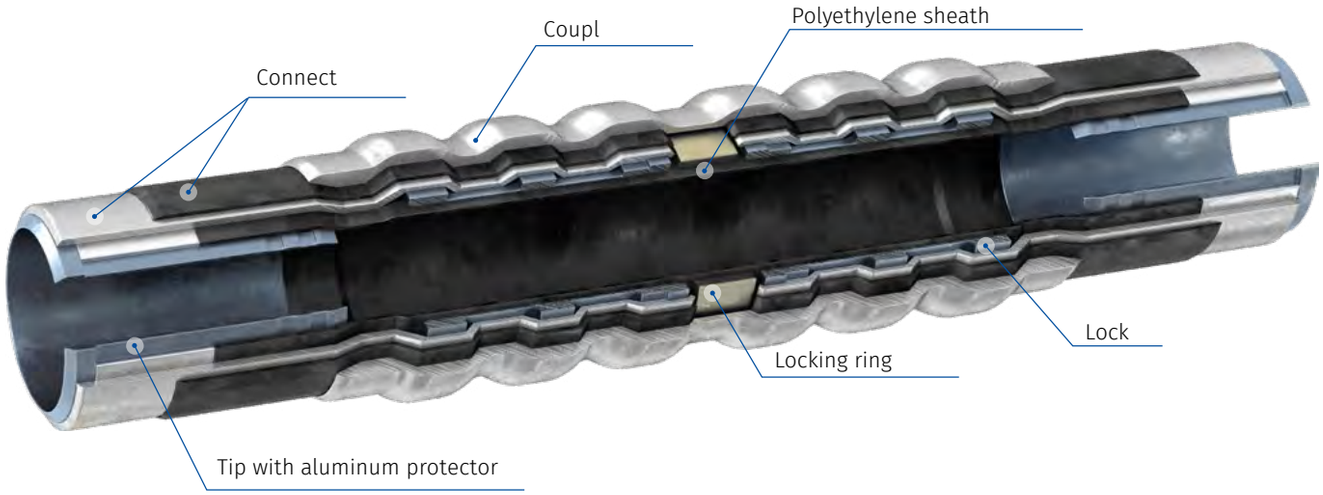
Head preparation options

1. For a welded joint;
2. For a welded joint with tips made of corrosion-resistant steel.

Technical specifications

Parameters determining the mechanical reliability of Mechanical electroinsulating connection of pipelines in axial direction	Pipeline`s standard size (diameter x wall thickness, mm)							
	3,5x0,16	3,5x0,28	4,49x0,35	4,49x0,18	6,26x0,24	6,26x0,35	8,62x0,31	10,75x0,35
Pipeline maximum working pressure P, Bar	40	210	210	40	40	210	40	40
Electrical resistance at U=1000 V		no more than 10 kOhm						

1) High pressure MEST design up to 40 Bar



2) Low pressure MEST design up to 40 Bar

External polymeric anticorrosive coating based on powder materials
(TU 1390-018-67740692-2017)

Purpose

Polymeric anticorrosive coating based on powder materials is intended for the protection of steel pipelines for various purposes from aggressive corrosive impact of the environment

Field of application

Pipes with powder coating are used for:

- underground pipelining and in areas where it is not possible to apply external polyethylene insulation due to high pipeline operating temperature (more than 176 °F);
- above-ground pipelining;
- as an anticorrosive coating with heat insulation.

Advantages:

1. The coating is resistant to ultraviolet and thermal aging, and does not crack during its entire service life;
2. Highly resistant to atmospheric and soil corrosion, to cathodic disbandment, and long-term exposure to water;
3. A wide range of colors;
4. Can be used as a part of more complex combined heat-insulating and anticorrosive coatings or an anticorrosive coating with heat insulation;
5. Lining of pipes with the polymeric powder coating can be done in all weather conditions.
6. Can be used with inner polymer powder coating

At the customer's request, the inner surface of the pipe can be lined with a polyethylene pipe with stainless steel pitching (for external laying or for ground-to-air transition); an internal paint-and-lacquer coating can be applied or combined with thermal insulation.

The service life of steel pipes with an external coating made from powder materials is more than 20 years

Technical specifications

Name	Parameters
Pipeline diameters	from 3.5 to 32.28 in
Operating temperature	from -76 °F to 302 °F
Thickness of the coating	at least 350 mkm
Adhesion peeling strength index	more than 180 Bar
Cutting depth at 110 lb load	0.0067 in

Polyethylene pipes

TU 2248-015-67740692-2010 for industrial use

TU 2248-014-67740692-2010 for potable water supply

TU 2248-017-67740692-2010 for gas pipelines

Application

- for construction of industrial free-flow water supply lines;
- for thermal insulation of pipes as an outer protection sheath;
- for cable laying;
- for construction of potable water pressure pipelines;
- for construction of underground gas pipelines at a maximum gas temperature of up to 104 °F and operating pressure of up to 12 Bar.

Diameter range

• industrial from 2,6 to 21,26 in;
• potable water in accordance with GOST 18599;
• gas in accordance with GOST P 50838.
Supplied in straight segments, bundles.

Used materials

- Polyethylene 80;
- Polyethylene 100.

Advantages

1. Any stainlessness;
2. Ow microbiological fouling;
3. Water-supply polyethylene pipes are ecofriendly, toxicologically and bacteriological non-hazardous;
4. Good thermal insulation properties;
5. Lack of action of tastiness and smell of drinking water;
6. High-wearing feature (absolute performance period is 50 years);
7. With time the capacity of polyethylene pipe is not deteriorated (the lack of mechanical weediness of water-supply pipe because of low surface finish);
8. High capability of polyethylene pipes to mechanical overworks because of such property of polyethylene as flexibility;
9. Water-supply polyethylene pipes is 2–4 times easier then steel pipes. It is easier to transport and assemble them;
10. The butt fusion of polyethylene pipes is considerably lower in cost, more firm and simpler, takes the less time and does not require expendables (isolation, electrodes);

Polyethlene
film

Purpose
It is designed for the use in the capacity of packing material in the different production branches and other technical needs, for example, in agriculture, melioration and water engineering.

The following brands are produced:

M — for the production of shipping bags and other products requiring the application of stabilized and non-stabilized, stained and non-stained films of the highest flexibility.

T — for the production of products of technical meaning, construction of temporary structures, protective covers, packing and composite stabilized and non-stabilized, stained and non-stained films.

CT — for the use in agriculture in the capacity of translucent weather-resistant coating of cultivated facilities (hothouses, greenhouses) and other aims.

CIK — for the use in agriculture in the capacity of translucent weather-resistant coating of hothouses and other cultivated facilities, providing the highest greenhouse effect, non-stained, stabilized with adsorbent of IR radiation.

CK — for the use in agriculture for the conservation of feeds and other aims; stained and non-stained, non-stabilized films.

CM — for the use in agriculture in the capacity of material for mulching and other aims; non-stained, stabilized soot.

B, B1 — for the use in meliorative and water engineering in the capacity of impervious screens.

B — non-stained, complex stabilized (also soot), high-molecular; B1 – non-stained, stabilized soot.

Operating conditions
The temperature of film operating is from -49 °F to 122 °F. The film color is depended on application and desire of Customer.

Technical specifications

Nominal thickness of film, in, for the brand					Limit deviation, %, from nominal thickness of film
M, T	CT, CK	CM	CIK	B, B1	
0.0039	0.0039	0.0039	0.0039		20
0.0047	0.0047	0.0047	0.0047		
0.0059	0.0059	0.0059	0.0059		
0.0078	0.0078	0.0078	0.007		
0.0086	0.0086	0.0086	0.0078	0.0078	
0.0098	0.0098		0.0086	0.0098	
0.0118	0.0118		0.0098	0.0118	

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