

A large, detailed image of a well completion system component, possibly a valve or tool joint, rendered in a dark, metallic finish with several circular ports and a central nozzle-like structure. The component is shown in a perspective view, highlighting its complex geometry and industrial design.

WELL COMPLETION SYSTEMS

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TSS Group – leader of the MSF market in Russia

About the Company

TSS Group is the leading manufacturer and service provider for completions and multi-stage fracturing (MSF) operations in Russia. The Group owns 2 state-of-art manufacturing facilities located in the cities of Ryazan and Sergiev Posad. The Group's total headcount is more than 750 employees.

TSS Group provides a full range of services for design, manufacturing, testing and engineering support of well completion systems.

Research and Development

Engineering support of the projects is performed by highly qualified engineering staff utilizing extensive experience in completions. That experience ensures development and introduction of new products complying with the latest engineering trends and customer requirements.

Innovative Technologies

TSS Group's technologies and competencies ensure the manufacture and introduction of innovative equipment allowing the Group to successfully compete with global players in the well completion market. Each year TSS Group introduces more than 30 new products to the market, including the following advanced technologies:

- dual casing completions including various types of MSF and flow control devices
- rotating liner hangers while running/cementing
- drillable hydraulic reamer shoes
- selective MSF with mechanical packers
- various types of full ID frac valves / flow control valves operated by: one-size dissolvable balls, dissolvable darts, intelligent valves with electric and hydraulic lines
- expandable steel packers

5000+
Wells completed

26000+
Frac stages

30+
New products
implemented
each year

RUSSIAN FEDERATION

BELARUS

METTOIL PLANT
SERGIYEV POSAD

TSS GROUP
MOSCOW

BULAT PLANT
RYAZAN

SERVICE DIVISIONS

~25%
The TSS Group's
MSF market
share in Russia

40+
Clients

11
Regions

UZBEKISTAN

■ Regions where TSS Group operates



Modern equipment

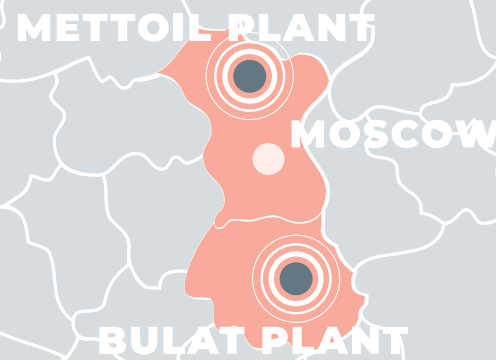
MANUFACTURING

TSS Group's Manufacturing Division is a full-cycle Q1 production enterprise with workshops for machining, heat treatment, welding, assembly, validation & testing located in:

- Ryazan, Russia. BULAT LLC
- Sergiyev Posad, Russia. METTOIL LLC

Production facilities are equipped with all required CNC lathes and other equipment that ensures high quality and fast manufacturing of equipment.

The Group also owns the one and only in Russia validation test facility that able but not limited to perform V0 validation.



The Group constantly undertakes investments in new cutting-edge equipment to modernize and expand plant's production capacities to meet rapidly growing customers demand.

TSS Group successfully passed independent audits conducted by local and foreign partners as well as going through API certification process (to be granted by Q1 22).



01

LHNP UNCEMENTED LINER HANGER

APPLICATION

The Uncemented Hydromechanical Liner Hanger is designed to run, hang and seal uncemented liners with subsequent disconnection of the liner from the work string.

DESIGN FEATURES AND ADVANTAGES

The tool incorporates the following main components:

- Anchor, used to hang the liner in the casing;
- Hydraulic disconnect assembly for disconnecting the work string from the liner;
- Mechanical top packer to seal the annulus;
- Polished bore receptacle (PBR).

Fullbore liner ID after setting tool release;

High hanging capacity;

High pressure rating;

Ability to set stinger in the PBR;

Ability to set repair packer on the PBR.



SPECIFICATIONS

Liner hanger size, in	4 1/2 x 6 5/8	4 1/2 x 7
Liner size, in	4,5	4,5
Casing size, in	6 5/8	7
Tool OD, in	5,50	5,98
Tool ID, in	3,89	3,89
Activation pressure, psi	1 800	1 800
Set down load for top packer activation, lbs	25 000	25 000
Liner top packer pressure rating, psi	10 000	10 000
Max working temperature, °F	250	250
Thread size*	4,5	4,5

*Thread type, metallurgy and elastomers are as per Customer`s requirements



02

LHNP-MSF UNCEMENTED LINER HANGER

APPLICATION

The Uncemented Hydromechanical Liner Hanger is designed to run, hang and seal uncemented liners with completion assembly for multistage hydraulic fracturing with subsequent disconnection of the liner from the work string.

DESIGN FEATURES AND ADVANTAGES

The tool incorporates the following main components:

- Anchor, used to hang the liner in the casing;
- Hydraulic disconnect assembly for disconnecting the work string from the liner;
- Mechanical top packer to seal the annulus;
- Polished bore receptacle (PBR).

Fullbore liner ID after setting tool release;

High hanging capacity;

High pressure rating;

Ability to set stinger in the PBR;

Ability to set repair packer on the PBR.



SPECIFICATIONS

Liner hanger size, in	4 x 5 1/2	4 x 5 3/4	4 1/2 x 6 5/8	4 1/2 x 7
Liner size, in	4,0	4,0	4,5	4,5
Casing size, in	5 1/2	5 3/4	6 5/8	7
Tool OD, in	4,61	4,76	5,50	5,98
Tool ID, in	3,46	3,46	3,89	3,89
Activation pressure, psi	1 800	1 800	1 800	1 800
Set down load for top packer activation, lbs	20 000	20 000	25 000	25 000
Liner top packer pressure rating, psi	10 000	10 000	10 000	10 000
Max working temperature, °F	250	250	250	250
Thread size*	4,0	4,0	4,5	4,5

*Thread type, metallurgy and elastomers are as per Customer`s requirements



03

PCD CEMENTED LINER HANGER

APPLICATION

The Cemented Liner Hanger is designed to run, hang and seal cemented liners with subsequent disconnection of the liner from the work string.

DESIGN FEATURES AND ADVANTAGES

The tool incorporates the following main components:

- Anchor, used to hang the liner in the casing;
- Hydraulic disconnect assembly for disconnecting the work string from the liner;
- Mechanical top packer to seal the annulus;
- Polished bore receptacle (PBR).

Fullbore liner ID after setting tool release;

High hanging capacity;

High pressure rating;

Ability to set stinger in the PBR;

Ability to set repair packer on the PBR.



SPECIFICATIONS

Liner hanger size, in	4 x 5 1/2	4 x 5 3/4	4 1/2 x 6 5/8	4 1/2 x 7	5 x 7
Liner size, in	4,0	4,0	4,5	4,5	5,0
Casing size, in	5 1/2	5 3/4	6 5/8	7	7
Tool OD, in	4,61	4,76	5,50	5,98	5,98
Tool ID, in	3,46	3,46	3,89	3,89	4,41
Activation pressure, psi	1 800	1 800	1 800	1 800	1 800
Set down load for top packer activation, lbs	20 000	20 000	25 000	25 000	25 000
Liner top packer pressure rating, psi	10 000	10 000	10 000	10 000	10 000
Max working temperature, °F	250	250	250	250	250
Thread size*	4,0	4,0	4,5	4,5	5,0

*Thread type, metallurgy and elastomers are as per Customer`s requirements





Rotation during
cementing



WATCH THE VIDEO

Rotating Liner Hanger

04

LHR ROTATING LINER HANGER

APPLICATION

The Liner Hanger is designed for running the liner with rotation, hanging the liner in the casing, disconnecting the liner from the work string and sealing the annular space. The liner hanger is used in cased wells with liners of the corresponding size.

DESIGN FEATURES AND ADVANTAGES

- Ability to rotate during run in hole;
- Ability to rotate during cementing operations;
- Supreme torque and tension tool characteristics;
- Validation class V0 according to ISO 14310-2014;
- Slips design to provide maximum hanging capacity and minimum damage to the casing.



SPECIFICATIONS

Liner hanger size, in	4 1/2 x 7	5 x 7	7 x 9 5/8
Liner size, in	4,5	5,0	7,0
Casing size, in	7,0	7,0	9 5/8
Tool OD, in	5,98	5,98	8,39
Tool ID, in	3,90	4,37	6,26
Activation pressure, psi	1 800	1 800	1 800
Set down load for top packer activation, lbs	25 000	25 000	30 000
Liner top packer pressure rating, psi	10 000	10 000	10 000
Max working temperature, °F	300	300	250
Thread size*	4,5	5,0	7,0

*Thread type, metallurgy and elastomers are as per Customer`s requirements



05

TIEBACK PACKER

APPLICATION

The Tieback or repair packer is used for seal and repair failed liner hangers by stinging the seal assembly into the polished bore, anchor and seal the annulus to proceed with further well construction operations.

DESIGN FEATURES AND ADVANTAGES

- The tool has minimum three seals, anchor and packer module;
- Packer module activation by slack off weight of setting module.



SPECIFICATIONS

Liner packer size, in	4 x 5.5	4 x 5 3/4	4 1/2 x 6 5/8	4 1/2 x 7	5 x 7	7 x 9 5/8
Casing size, in	5 1/3	5 3/4	6 5/8	7	7	9 5/8
Tool OD, in	4,61	4,76	5,50	5,98	5,98	8,39
Tool ID, in	3,46	3,46	3,89	3,89	4,41	6,26
Set down load for Tieback packer activation, lbs	10 000	10 000	10 000	16 000	16 000	20 000
Packer pressure rating, psi	10 000	10 000	10 000	10 000	10 000	10 000
Max working temperature, °F	250	250	250	250	250	250



*Thread type, metallurgy and elastomers are as per Customer`s requirements

06

HYDROMECHANICAL PACKER

APPLICATION

The Hydromechanical Packer is designed to isolate treatment zones for multistage hydraulic fracturing in uncemented liner.

DESIGN FEATURES AND ADVANTAGES

- The tool is equipped with the hydraulic lock that prevents premature activation during running;
- The packer is activated by creating pressure from the surface;
- The activation pressure can be adjusted prior to running;
- The inner diameter matches the inner diameter of the work string;
- Tool OD provides accident-free running.



SPECIFICATIONS

Liner size,in	4	4 1/2	4 1/2	5	5 1/2	5 3/4	7
Nominal open hole size, in	4,92	5,6	6,0	6,0	8,5	8,5	8,5
Max open hole size, in	5,51	6,18	6,69	6,69	9,45	9,45	8,70
Tool OD, in	4,57	5,24	5,75	5,75	7,99	7,99	8,10
Tool ID, in	3,46	3,90	3,90	4,41	4,76	4,76	6,27
Activation pressure, psi	2 300	2 300	2 300	2 300	2 000	2 000	1 900
Packer pressure rating at max open hole, psi	10 000	10 000	10 000	10 000	10 000	10 000	5 000
Max working temperature, °F	250	250	250	250	250	250	250
Thread size*	4,0	4,5	4,5	5,0	5,5	5,75	7,0

*Thread type, metallurgy and elastomers are as per Customer`s requirements

07

BALL DROP FRAC VALVES

APPLICATION

The Fracturing Sleeve is used for multistage hydraulic fracturing. The valve is opened by pumping the corresponding activation ball into a special seat and then pressurizing the liner.

DESIGN FEATURES AND ADVANTAGES

- The activation pressure can be adjusted prior to running;
- Once activated, the locking mechanism holds the sleeve in the open position;
- If necessary, the ball seats can be milled out to provide a full-bore diameter;
- The tool can be used with acid resistant, composite and soluble balls;
- The tool OD provides accident-free running.



SPECIFICATIONS

Liner size,in	4	4 1/2	4 1/2	5 1/2	5 3/4
Tool OD,in	4,65	5,24	5,75	6,54	6,54
Tool ID,in	3,46	3,90	3,90	4,84	5,08
Activation pressure, psi	3 500	3 500	3 500	3 000	2 700
Pressure rating, psi	10 000	10 000	10 000	10 000	10 000
Max working temperature, °F	250	300	300	250	250
Thread size*	4,0	4,5	4,5	5,5	5,75



*Thread type, metallurgy and elastomers are as per Customer`s requirements

08

SELECTIVE FRAC VALVES

APPLICATION

The Fracturing Sleeve is used for multistage hydraulic fracturing. The sleeve is operated by shifting tool, equipped with auto-release mechanism. The locking mechanism holds the sleeve in the open position.

DESIGN FEATURES AND ADVANTAGES

- Once activated, the locking mechanism holds the sleeve in the open position at certain stress value;
- Full bore ID with shifting profile of the sleeve;
- The sleeve can be opened/closed using a special shifting tool at desired shifting force;
- The tool can be used with acid resistant, composite and soluble balls;
- The tool OD provides accident-free running.



SPECIFICATIONS

Liner size, in	4	4 1/2	4 1/2	5 1/2	5 3/4
Tool OD, in	4,65	5,24	5,75	6,54	6,54
Tool ID, in	3,46	3,90	3,90	4,84	5,08
Activation pressure, psi	3 500	3 500	3 500	3 000	2 700
Pressure rating, psi	10 000	10 000	10 000	10 000	10 000
Max working temperature, °F	250	300	300	250	250
Thread size*	4,0	4,5	4,5	5,5	5,75



*Thread type, metallurgy and elastomers are as per Customer`s requirements

09

HYDRAULIC TOE FRAC VALVES

APPLICATION

The Hydraulic Toe Sleeve is used for the first fracturing stage in wells with multistage fracturing completion. The sleeve is opened by pressurizing the liner. The locking mechanism holds the sleeve in the open position.

DESIGN FEATURES AND ADVANTAGES

- The sleeve is opened by creating pressure in the liner;
- Once activated, the locking mechanism holds the sleeve in the open position;
- The sleeve provides full-bore diameter with no need to mill out;
- Small size provides accident-free running.



SPECIFICATIONS

Liner size, in	4	4 1/2	4 1/2	5 1/2	5 3/4
Tool OD, in	4,65	5,24	5,75	6,54	6,54
Tool ID, in	3,46	3,90	3,90	4,84	5,08
Activation pressure, psi	3 500	3 500	3 500	3 000	2 700
Pressure rating, psi	10 000	10 000	10 000	10 000	10 000
Max working temperature, °F	250	300	300	250	250
Thread size*	4,0	4,5	4,5	5,5	5,75



*Thread type, metallurgy and elastomers are as per Customer`s requirements

Full ID frac valves that are
operated with one-size
dissolvable balls



WATCH THE VIDEO

Frac valves REVOLVER

10

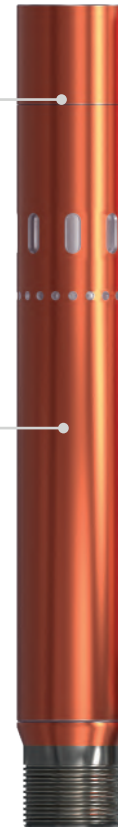
FULL ID ONE-SIZE BALL OPERATED FRAC VALVES «REVOLVER»

APPLICATION

The «REVOLVER» Frac Valve is used for multistage hydraulic fracturing using dissolvable balls of one size with the ability to open/close the sleeve afterwards with shifting tool. The tool is designed for cemented and non-cemented applications.

DESIGN FEATURES AND ADVANTAGES

- Unique Revolver mechanism;
- Protection from cement during cementing operations;
- Protection from pre-mature activation when running cementing plug;
- The ports are opened after sliding the sleeve with the ball seat and entire Revolver mechanism;
- Ability to rotate during running and cementing.



SPECIFICATIONS

Liner size, in	4 1/2	5 1/2
Tool OD, in	5,63	6,54
Tool ID, in	3,54	4,50
Stage count pressure, psi	20	20
Max working temperature, °F	250	250
Standard dissolvable ball size, in	3,7	4,7
Thread size*	4,5	5,5



*Thread type, metallurgy and elastomers are as per Customer`s requirements

Guaranteed opening
of all frac-ports



WATCH THE VIDEO

Selective MSF with burst frac ports

11

BURST PORT FRAC VALVES

APPLICATION

The Burst Port Fracturing Sleeve is designed to perform multistage fracturing using selective packer in cemented/open-hole wells. The tool can also be used as the sleeve for the first fracturing stage. The frac port is opened by pressurizing the liner interval at the depth of the sleeve.

DESIGN FEATURES AND ADVANTAGES

- Using the sleeve in conjunction with selective packer allows for an unlimited number of fracturing stages;
- Ability to work in both cemented and uncemented completions;
- The tool design ensures 100% opening of the entire area of the frac ports;
- The inner diameter of the tool corresponds to the inner diameter casing;
- The tool can be installed in cemented and uncemented completions;
- The material grade of the tool corresponds to the casing grade P-110 (M).



SPECIFICATIONS

Liner size, in	4	4 1/2	4 1/2	5 1/2	5 3/4
Tool OD, in	4,65	5,24	5,75	7,09	7,09
Tool ID, in	3,46	3,90	3,90	4,80	4,80
Burst disk activation pressure, psi	4500 - 11000	4500 - 11000	4500 - 11000	4500 - 11000	4500 - 11000
Max working temperature, °F	250	250	250	250	250
Thread size*	4,0	4,5	4,5	5,5	5,75

*Thread type, metallurgy and elastomers are as per Customer`s requirements



12

HYDRAULIC SHIFTING TOOL

APPLICATION

The Shifting Tools are designed to open/close the sleeves mechanically.

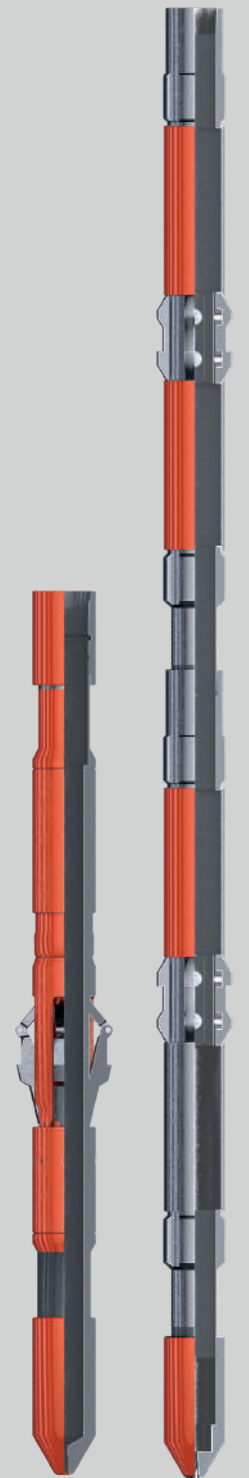
DESIGN FEATURES AND ADVANTAGES

- The tool keys are hydraulically activated at a differential pressure;
- The tool keys are automatically disengaged after opening/closing the sleeve;
- The assembly for emergency disengagement of the keys;
- Small outer diameter;
- Lever-action keys.



SPECIFICATIONS

Liner size, in	4	4 1/2	5 1/2	5 3/4
Tool OD, in	3,15	3,39	4,45	4,69
Activation pressure, psi	1 000	1 000	1 000	1 000
Maximum tensile load, lbs	90 000	110 000	140 000	140 000
Max working temperature, °F	250	250	250	250



*Thread type, metallurgy and elastomers are as per Customer`s requirements

13

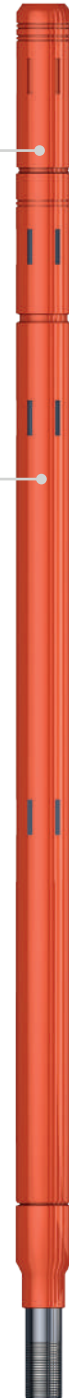
FORMATION ISOLATION VALVE

APPLICATION

The Formation Isolation Valve is used to isolate the formation from above and below. The tool prevents formation damage and provides well control. The tool is used in wells with liners of the corresponding size.

DESIGN FEATURES AND ADVANTAGES

- Formation Isolation Valve is usually installed below the packer to provide reliable formation isolation;
- The tool is opened or closed with a mechanical shifting tool;
- The tool does not require any additional operations during liner running; The valve is opened mechanically using a special shifting tool that is pulled from the well with the running tool after liner hanger activation;
- The tool can be operated in drilling fluid, cement slurry, fluids with chemical agents, formation brine, oil and gas at temperature up to 302 °F;
- The tool is pressure-tested at the manufacturer site. Additional pressure test before use is not required.



SPECIFICATIONS

Casing size, in	7	9 5/8
Outer diameter, in	5,50	8.00
Inner diameter when ball opened, in	2.95	4.55
Length, in	192.72	192.72
Maximum working temperature, °F	302	302
Ball working pressure, psi	10 000	10 000
Collapse pressure, psi	8 000	6 500



*Thread type, metallurgy and elastomers are as per Customer`s requirements

14 HYDRAULIC STAGE CEMENTING COLLAR

APPLICATION

The Stage Cementing Collar is run with the corresponding open-hole packer. The tool is used for stage cementing and providing isolation of cemented and non-cemented liner parts.

DESIGN FEATURES AND ADVANTAGES

- The cementing ports are opened hydraulically;
- Check-valve option available in case of no indication of the dart landing;
- The locking mechanism holds the cementing ports closed;
- Full-bore diameter after milling out;
- The material grade of the tool corresponds to the casing grade P-110 (M).



SPECIFICATIONS

Liner size, in	4	4 1/2	5	7
Tool OD, in	4,65	5,24	5,75	7,91
Tool ID, in	3,46	3,90	4,41	6,26
Activation pressure, psi	2 300	2 300	3 000	3 000
Closing pressure,psi	300	300	600	500
Pressure rating, psi	10 000	10 000	10 000	8 000
Max working temperature, °F	250	250	250	250
Thread size*	4,0	4,5	5,0	7,0



*Thread type, metallurgy and elastomers are as per Customer`s requirements

15

SELECTIVE HYDRAULIC TOE FRAC VALVES

APPLICATION

The tool is used for the first fracturing stage in wells with multistage fracturing completion. The sleeve incorporates two tools - circulation valve and key-operated fracturing port. The sleeve is opened by creating pressure in the liner after closing the circulation valve. The locking mechanism holds the sleeve in the open position. If necessary, the sleeve can be opened/closed using a shifting tool.

DESIGN FEATURES AND ADVANTAGES

- No need to mill out the sleeve (opening/closing using a shifting tool);
- Full-bore diameter;
- Ability to open/close any sleeve;
- Ample opportunities for re-fracturing;
- Ability to shut off unproductive intervals.



SPECIFICATIONS

Liner size, in	4 1/2	5 1/2	5 3/4
Tool OD, in	5,24	6,73	6,73
Tool ID, in	3,90	4,76	5,08
Activation pressure, psi	4 500	4 500	4 500
Pressure rating, psi	10 000	10 000	10,000
Max working temperature, °F	300	250	250
Thread size*	4,5	5,5	5,75



*Thread type, metallurgy and elastomers are as per Customer`s requirements



The guide head of the shoe is made of easily drillable material



WATCH THE VIDEO

Reaming casing shoe

16

REAMING CASING SHOE

APPLICATION

The reaming casing shoe is installed at the bottom of the casing string to guide it along the wellbore with ability to ream unstable wellbore parts with cavings, scarps, swelling clays and junk accumulations. The float shoe protects the completion equipment from damage during running.

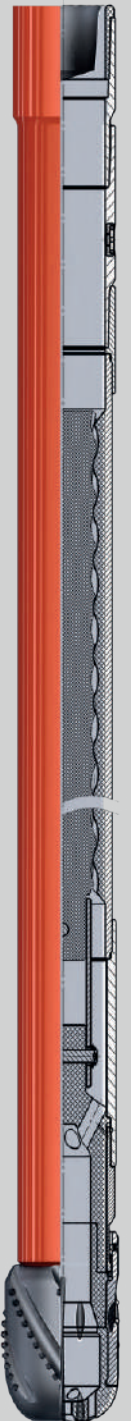
DESIGN FEATURES AND ADVANTAGES

- The guide nose of the shoe is made of easy-to-drill material;
- Any size available;
- The float shoe can be operated in drilling fluid, cement slurry, fluids with chemical agents, formation brine, oil and gas at temperature up to 248 °F;
- The rotating nose ensures smooth casing guidance to the target depth;
- The nose design prevents the shoe from cutting into the borehole wall;
- The nose can be armed with hard-alloy materials such as tungsten carbide and/or polycrystalline diamond cutters (PDC).



SPECIFICATIONS

Liner size, in	4	4 1/2	7
Outer diameter for the body (+0.08), in	4.17/4.33	4.17/4.92	7.32
Maximum bit diameter for milling the shoe, in	-	-	6.14
Shoe length, in	67.32	67.32	73.62
Weight (+5%), lbs	176.37	187.39	319.67
Maximum nose diameter, in	4.37	4.92	8.27
Number of flushing holes, pcs	6	7	7
Total area of flushing holes, in ²	1.05	2.18	4.77
Maximum axial load, lbf	22046	22046	22046
Fluid flow rate, l/s	5...36	1.5	1.5
Shaft speed at idle speed, rpm	50...290	28290	20...150
Shaft speed in maximum power mode, rpm	50...235	50...235	20...120
Torque in maximum power mode, lb*ft	159	159	1547
Maximum tensile load during emergency pull-up, lbs	213848	213848	308647
Designed operation time, circulation hours	150	150	150



*Thread type, metallurgy and elastomers are as per Customer`s requirements



Running cemented
well completions



WATCH THE VIDEO

Selective Packer

17

SELECTIVE PACKER

APPLICATION

The Selective Packer is designed for multistage fracturing operations in cased horizontal wells with one tripping operation.

DESIGN FEATURES AND ADVANTAGES

- Full-bore design along the whole liner;
- Operations are performed by a workover crew;
- Ability for reverse circulation after screen-out;
- Fast well commissioning time;
- No need for wellbore cleanout;
- Ability to perform several fracturing stages with no need to pull the packer to the surface for revision;
- Performing fracturing stages in any sequence.



SPECIFICATIONS

Liner size, in	4 1/2	5 1/2	5 3/4
Maximum differential pressure across the selective packer, psi	10 000	10 000	10 000
Cased hole diameter for installation of a burst port sleeve, in	4,5	5,5	5,0
Internal diameter of the cased hole, in	3,90	4,84	5,00
Internal drift diameter of the packer, in	1,77	1,77	2,36

*Thread type, metallurgy and elastomers are as per Customer`s requirements



Packer for multistage
fracturing through
the annulus



WATCH THE VIDEO

More than 50
fracturing stages

PARTNERS



**WELL
COMPLETION
SYSTEMS**

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