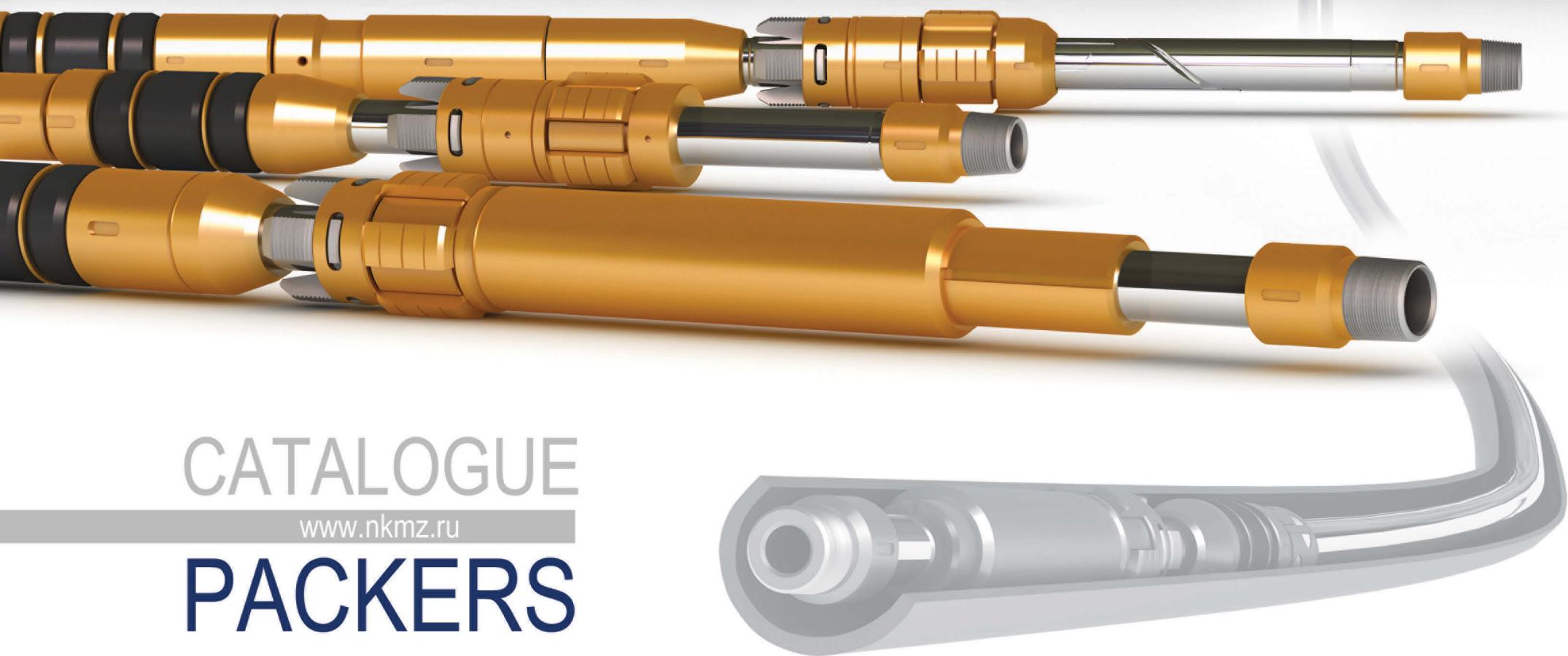




Technology Quality Reliability



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PACKERS



# NKMZ-Group LLC

NKMZ — Group Limited Liability Company (previously Neftekamsk Machinery Plant LLC) was established in 2002 at the production facilities of the Neftekamsk Drilling Tools Plant built in 1986 and its business is development and production of equipment for enterprises in the oil and gas industry.

One of the activities pursued by NKMZ-Group LLC in its operations is development and production of packer and anchor equipment, well accessories, double-packer and multi-packer set-ups of KOUS type, which meet up-to-date service requirements, as well as kits of equipment which enables performance of all the process operations during the well operation and automatic closure of the well bore using a shutoff valve if there is a disruption of the well's operating mode.

Unique, state-of-the-art and powerful production facilities, use of the newest technologies and materials, complete, independent production cycle make it possible to manufacture packer and anchor equipment at the level of the world's best products at competitive prices in the market.

Competitiveness of the Plant's products is based on the sophisticated level of production management and quality control, use of advanced technologies and cutting-edge equipment at all the stages of the production process but the main thing is employees' knowledge and experience as they are the best professionals in their discipline.

Fine tuned stable production operation and excellent logistics presuppose trouble free delivery of any necessary quantity of products to the customer on the

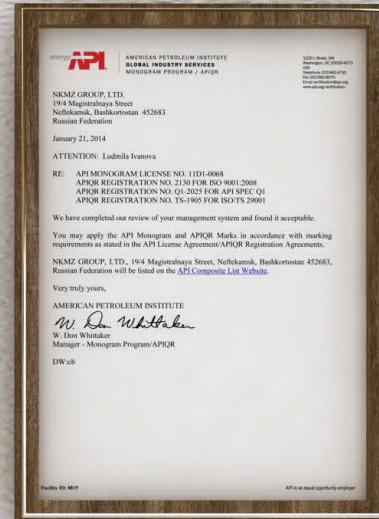
customer's terms and conditions and within the needed time frame both from the Company's warehouses and those located in direct proximity to the customer.

In 2010, our Company set up service centers in the cities of Neftekamsk, Buzuluk, Nizhnevartovsk which are provided with all the necessary production facilities, state-of-the-art high technology equipment and human resources, and render services relating to holistic delivery package, rental, repairs, technical support and service back-up for the packer and anchor equipment.

The special focus of our Company is on the quality of the products we make. During 2006, the Plant put in place the enterprise quality management system per ISO 9001:2000 International Standard (Certificate No. 199156). During 2012, recertification-audit upgrade was conducted per ISO 9001:2008.

On January 21-st 2014, our Company was one of the first to obtain License No.11D1-0068 entitling us to put the monogram on the products compliant with the requirements of the API 11D1 specification for packer validation levels V6 and V5, and the Certificate of Registration of the Quality Management System in compliance with the API Q1 requirements for design, manufacture and supply of packers and anchors for the oil and gas industry issued by the American Petroleum Institute (API).

The products which the Plant manufactures have been certified and have the authorizing documents issued by the Federal Service for Environmental, Technological and Nuclear Supervision.





# Business Geography of NKMZ-Group LLC



# Underground Equipment Manufactured by NKMZ-Group LLC is widely used by oil and gas producing and service companies:

- OAO NK Rosneft
- OAO Gazprom
- OAO NK Lukoil
- OAO Surgutneftegaz
- AO NGK Slavneft
- OAO NK RussNeft
- OAO ANK Bashneft
- OAO Tatneft
- OAO Gazpromneft
- OAO Arcticgas
- RUP PO Belorusneft
- OOO Eurasia Drilling Company
- OAO Ritek
- OOO UK TMS Group
- OOO UK Sheshmaoil
- OOO Nariyanmarneftegaz
- OOO SK Rusvietpetro
- AO Mangistaumunaygaz
- AO PF Embamunaygaz
- OAO CNPC-Aktobemunaygaz
- OAO Kogalymneftegeophizika
- OOO Permnefteotdacha

- ZAO PGO Tyumenpromgeophizika
- OAO UPNP i KRS
- ZAO OKB Zenith
- ZAO PO Strong
- Novomet Group of Companies
- OAO RU-Energy Group
- OOO Buzulukskaya NefteService Company
- OAO Siberian Department for Well Construction
- OOO KATKoneft
- ZAO Ermakovskoe Enterprise for Well Repairs
- TOO GeoMunayResource
- TOO SPO GIStekhservice
- ZAO Samotlorneftepromkhim
- OOO Repairs and Launching of Wells
- OAO Neftinvest
- OOO Oil-Service
- OOO Promtech
- OOO Technefteservice
- OOO Fosko
- ZAO Northgas
- OAO Tatnefteotdacha
- etc.



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# Packer and Anchor Equipment



## Turning Mechanical Packer PM-V

This Packer is designed for lengthy sealed zonal isolation of the production string and protection of its inner space from dynamic and aggressive effect of the downhole conditions during technological operations on the bottom-hole zone treatment.

### Application

- Remedial Cementing;
- Formation Hydraulic Fracturing;
- Formation Pressure increase;
- Casing string leakage test;
- Acidizing;
- Developing and operating oil, gas and gas-condensate wells;
- Other technological operations and routine repairs when pressurization under or above packer is needed.

PM-V Packer is supplied complete with hydraulic anchors (YAG1, YAG2, YAG3) to prevent displacement of down-hole equipment from moving up under load and to retain packer in its seat during repair works in the well.

### Special Features and Benefits

- The Packer is installed into the well by rotating the tubing to the right 1/4 of a turn and simultaneously moving it down;
- The Packer is removed by tightening up the tubing;
- The Packer is complete with two (one — protective, one — sealing) caps or three (two — protective, one — sealing) caps;
- Simple design;
- Minimal maintenance costs;
- It is recommended to install the packer along with the KU-O type axial — equalizing valve to facilitate a removal of the packer from its setting place in the deep wells (is mounted on the top of the packer). The valve provides a pressure balance between the tubing inside and its annulus.



## Technical Specifications

Type	Casing size		Packer size						Maximum pressure, psi	Maximum temperature, °F	Axial Load When Packer is Set, kN, no more than		
			OD		ID		Connection*						
	In	mm	in	mm	in	mm	in	mm					
PM-V 82-34-100	4.0	101.6	3.23	82	1.339	34	2.375 NU	60.33	45.276	48.5	14500**	266 ***	50...80
PM-V 88-38-100	4 ½	114.3	3.465	88	1.496	38	2.375 NU	60.33	45.276	55.1	14500**	266 ***	50...80
PM-V 92-38-100	4 ½	114.3	3.622	92	1.496	38	2.375 NU	60.33	45.276	57.3	14500**	266 ***	50...80
PM-V 98-42-100	4 ½; 5.0	114.3; 127.0	3.86	98	1.654	42	2.875 NU	73.03	48.819	66.1	14500**	266 ***	50...80
PM-V 101-42-100	5.0	127.0	3.976	101	1.654	42	2.875 NU	73.03	48.819	75	14500**	266 ***	50...80
PM-V 112-52-100	5 ½; 5 ¾	139.7; 146.1	4.41	112	2.047	52	2.875 NU	73.03	48.819	92.95	14500**	266 ***	80...120
PM-V 114-52-100	5 ½	139.7	4.49	114	2.047	52	2.875 NU	73.03	48.819	97	14500**	266 ***	80...120
PM-V 116-52-100	5 ½; 5 ¾	139.7; 146.1	4.567	116	2.047	52	2.875 NU	73.03	48.819	99.2	14500**	266 ***	80...120
PM-V 118-52-100	5 ½; 5 ¾	139.7; 146.1	4.646	118	2.047	52	2.875 NU	73.03	48.819	101.4	14500**	266 ***	80...120
PM-V 122-52-100	5 ¾	146.1	4.803	122	2.047	52	2.875 NU	73.03	48.819	105.8	14500**	266 ***	80...120
PM-V 136-60-100	6 ½	168.3	5.354	136	2.362	60	2.875 NU	73.03	48.819	125.7	14500**	266 ***	80...120
PM-V 140-60-100	6 ½	168.3	5.512	140	2.362	60	2.875 NU	73.03	48.819	138.9	14500**	266 ***	80...120
PM-V 142-60-100	6 ½	168.3	5.59	142	2.362	60	2.875 NU	73.03	48.819	145.5	14500**	266 ***	80...120
PM-V 145-60-100	6 ½; 7	168.3; 177.8	5.709	145	2.362	60	2.875 NU	73.03	48.819	149.9	14500**	266 ***	80...120
PM-V 150-60-100	7.0	177.8	5.906	150	2.362	60	2.875 NU	73.03	48.819	156.5	14500**	266 ***	80...120

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Packer can be made of other types.
- \*\* Packer is manufactured for 5076 psi; 7252 psi; 10150 psi; 14500 psi.
- \*\*\* By special order Packer is manufactured for working temperature of 302 °F.
- Can be manufactured for aggressive media — Option K2.
- Packer is supplied with a Spares and tool kit.
- When ordering a Packer with Hydraulic Anchor after the type designation of the Packer, please specify YAG1, YAG2 or YAG3.
- At customer's option, Packer PM-V is manufactured for other sizes of strings.

# Turning Mechanical Packer PM-V (Formation Hydraulic Fracturing)

This Packer is designed for lengthy sealed zonal isolation of the production string and protection of its inner space from dynamic and aggressive effect of the downhole conditions during technological operations on the bottom-hole zone treatment.

## Application

- Formation Hydraulic Fracturing;
- Acid fracture treatment (ACFR);
- Casing string leakage test;
- Acidizing;
- Development and Operation of Oil, Gas and Gas Condensate Wells;
- Other Technological Operations and Maintenance/Repair Operations, when pressurization under or above packer is needed.

## Special Features and Benefits

- The Packer is installed into the well by rotating the tubing to the right 1/4 of a turn and simultaneously moving it down;
- The Packer is removed by tightening up the tubing;
- The Packer is complete with two (one — protective, one — sealing) caps or three (two — protective, one — sealing) caps;
- Simple design;
- Minimal maintenance costs;
- It is recommended to install the packer along with the KU-O type axial — equalizing valve to facilitate a removal of the packer from its setting place in the deep wells (is mounted on the top of the packer). The valve provides a pressure balance between the tubing inside and its annulus.
- Packer is produced together with built-in hydraulic anchor
- Manufactured with a solid stem reinforced using special technology;
- Allows multiple uses during one run in the well;
- High level of reparability;
- Parts are wear resistant to sand pumping for Formation Hydraulic Fracturing;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Casing size		Packer size								Maximum pressure, psi	Maximum temperature, °F	Axial Load When Packer is Set, kN, no more than	
			OD		ID		Connection*		Length, in, no more than	Weight, lbs, no more than				
	In	mm	in	mm	in	mm	in	mm						
PM-V (GRP) 82-34-100 YAG1	4.0	101.6	3.23	82	1.339	34	2.375 NU	60.33	62.2	66.1	14500**	266 ***	50...80	
PM-V (GRP) 88-38-100 YAG1	4 ½	114.3	3.465	88	1.496	38	2.375 NU	60.33	62.2	77.12	14500**	266 ***	50...80	
PM-V (GRP) 92-38-100 YAG1	4 ½	114.3	3.622	92	1.496	38	2.375 NU	60.33	62.2	81.6	14500**	266 ***	50...80	
PM-V (GRP) 98-42-100 YAG1	4 ½; 5.0	114.3; 127.0	3.86	98	1.654	42	2.875 NU	73.03	63.5	88.2	14500**	266 ***	50...80	
PM-V (GRP) 101-42-100 YAG1	5.0	127.0	3.976	101	1.654	42	2.875 NU	73.03	63.5	95.6	14500**	266 ***	50...80	
PM-V (GRP) 112-52-100 YAG1	5 ½; 5 ¾	139.7; 146.1	4.41	112	2.047	52	2.875 NU	73.03	63.5	152.1	14500**	266 ***	80...120	
PM-V (GRP) 114-52-100 YAG1	5 ½	139.7	4.49	114	2.047	52	2.875 NU	73.03	63.5	156.5	14500**	266 ***	80...120	
PM-V (GRP) 116-52-100 YAG1	5 ½; 5 ¾	139.7; 146.1	4.567	116	2.047	52	2.875 NU	73.03	63.5	158.7	14500**	266 ***	80...120	
PM-V (GRP) 118-52-100 YAG1	5 ½; 5 ¾	139.7; 146.1	4.646	118	2.047	52	2.875 NU	73.03	63.5	163.1	14500**	266 ***	80...120	
PM-V (GRP) 122-52-100 YAG1	5 ¾	146.1	4.803	122	2.047	52	2.875 NU	73.03	63.5	167.6	14500**	266 ***	80...120	
PM-V (GRP) 136-60-100 YAG1	6 ½	168.3	5.354	136	2.362	60	2.875 NU	73.03	63.583	198.4	14500**	266 ***	80...120	
PM-V (GRP) 140-60-100 YAG1	6 ½	168.3	5.512	140	2.362	60	2.875 NU	73.03	63.583	207.2	14500**	266 ***	80...120	
PM-V (GRP) 142-60-100 YAG1	6 ½	168.3	5.59	142	2.362	60	2.875 NU	73.03	63.583	209.4	14500**	266 ***	80...120	
PM-V (GRP) 145-60-100 YAG1	6 ½; 7	168.3; 177.8	5.709	145	2.362	60	2.875 NU	73.03	63.583	216	14500**	266 ***	80...120	
PM-V (GRP) 150-60-100 YAG1	7.0	177.8	5.906	150	2.362	60	2.875 NU	73.03	63.583	220.46	14500**	266 ***	80...120	
PM-V (GRP) 205-100-100 YAG1	9 ½	244.5	8.07	205	3.937	100	4.5 NU	114.3	64.96	423.3	14500***	266 ****	120...160	

■ \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Packer can be made of other types.

■ \*\* Packer is manufactured for a pressure of 10150 psi; 14500 psi.

■ \*\*\* By special order Packer is manufactured for working temperature of 302 °F.

■ Can be manufactured for aggressive media — Option K2.

■ Packer is supplied with a Spares and tool kit.

■ When ordering a Packer with Hydraulic Anchor after the type designation of the Packer, please specify YAG1, YAG2 or YAG3.

■ At customer's option, Packer PM-V (GRP) is manufactured for other sizes of strings.

## Axis Mechanical Packer PVM-O

This Packer is designed for lengthy sealed zonal isolation of the production string and protection of its inner space from dynamic and aggressive effect of the downhole conditions during technological operations on the bottom-hole zone treatment.

### Application

- Increase in Formation Pressure;
- Acid fracture treatment (ACFR);
- Remedial Cementing
- Acidizing;
- Casing string leakage test;
- Development and Operation of Oil, Gas and Gas Condensate Wells;
- Other Technological Operations and Maintenance/Repair Operations, when pressurization under or above packer is needed.

To prevent the downhole equipment from moving under the pressure and to retain the Packer in the positions where it was installed, when repairs are carried out in the well, Packer PVM-O is complete with Hydraulic Anchors Type YAG1, YAG2 or YAG3.

### Special Features and Benefits

- Packer works on the principle of a "retractable ballpoint pen", i.e. packer setting is performed by moving the tubing up and then down (rotation of the tubing is not needed);
- Packer is removed from the well by tensioning the tubing upwards;
- There are two code mechanisms for switching and setting, located on the stem which ensures that the Packer is set securely in inclined wells;
- The Packer is complete with three (two — protective, one — sealing) or two (one — protective, one — sealing) caps for wells with heavily worn tubings;
- It is recommended to install the packer along with the KU-O type axial - equalizing valve to facilitate a removal of the packer from its setting place in the deep wells (is mounted on the top of the packer). The valve provides a pressure balance between the tubing inside and its annulus.
- Manufactured with built-in Hydraulic Anchor or with the possibility of using the Packer and Anchor separately (connection through a coupling);
- Convenient in operation, easy to service;
- Allows multiple uses during one run in the well;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Casing size		Packer size								Maximum pressure, psi	Maximum temperature, °F	Axial Load When Packer is Set, kN, no more than	
			OD		ID		Connection*		Length, in, no more than	Weight, lbs, no more than				
	In	mm	in	mm	in	mm	in	mm						
PVM-O 82-34-100	4.0	101.6	3.23	82	1.339	34	2.375 NU	60.33	56.1	52.9	14500**	266 ***	50...80	
PVM-O 88-38-100	4 ½	114.3	3.465	88	1.496	38	2.375 NU	60.33	56.1	61.7	14500**	266 ***	50...80	
PVM-O 92-38-100	4 ½	114.3	3.622	92	1.496	38	2.375 NU	60.33	56.1	66.1	14500**	266 ***	50...80	
PVM-O 98-42-100	4 ½; 5.0	114.3; 127.0	3.86	98	1.654	42	2.875 NU	73.03	59	72.75	14500**	266 ***	50...80	
PVM-O 101-42-100	5.0	127.0	3.976	101	1.654	42	2.875 NU	73.03	59	79.37	14500**	266 ***	50...80	
PVM-O 112-52-100	5 ½; 5 ¾	139.7; 146.1	4.41	112	2.047	52	2.875 NU	73.03	60.6	97	14500**	266 ***	80...120	
PVM-O 114-52-100	5 ½	139.7	4.49	114	2.047	52	2.875 NU	73.03	60.6	99.2	14500**	266 ***	80...120	
PVM-O 116-52-100	5 ½; 5 ¾	139.7; 146.1	4.567	116	2.047	52	2.875 NU	73.03	60.6	103.6	14500**	266 ***	80...120	
PVM-O 118-52-100	5 ½; 5 ¾	139.7; 146.1	4.646	118	2.047	52	2.875 NU	73.03	60.6	103.6	14500**	266 ***	80...120	
PVM-O 122-52-100	5 ¾	146.1	4.803	122	2.047	52	2.875 NU	73.03	60.6	110.2	14500**	266 ***	80...120	
PVM-O 136-60-100	6 ½	168.3	5.354	136	2.362	60	2.875 NU	73.03	61	138.9	14500**	266 ***	80...120	
PVM-O 140-60-100	6 ½	168.3	5.512	140	2.362	60	2.875 NU	73.03	61.42	158.7	14500**	266 ***	80...120	
PVM-O 142-60-100	6 ½	168.3	5.59	142	2.362	60	2.875 NU	73.03	61.42	160.9	14500**	266 ***	80...120	
PVM-O 145-60-100	6 ½; 7	168.3; 177.8	5.709	145	2.362	60	2.875 NU	73.03	61.42	165.35	14500**	266 ***	80...120	
PVM-O 150-60-100	7.0	177.8	5.906	150	2.362	60	2.875 NU	73.03	61.42	180.8	14500**	266 ***	80...120	

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Packer can be made of other types.
- \*\* Packer is manufactured for a pressure of 5076 psi; 7252 psi; 10150 psi; 14500 psi.
- \*\*\* By special order Packer is manufactured for working temperature of 302 °F.
- Can be manufactured for aggressive media — Option K2.
- Packer is supplied with a Spares and tool kit.
- When ordering a Packer with Hydraulic Anchor after the type designation of the Packer, please specify YAG1, YAG2 or YAG3.
- At customer's option, Packer PVM-O is manufactured for other sizes of strings.

## Axis Mechanical Packer PM-R

This Packer is designed for lengthy sealed zonal isolation of the production string and protection of its inner space from dynamic and aggressive effect of the downhole conditions during technological operations on the bottom-hole zone treatment.

### Application

- Acid fracture treatment (ACFR);
- Acidizing;
- Remedial Cementing
- Increase in Formation Pressure;
- Casing string leakage test
- Other Technological Operations and Maintenance/Repair Operations, when pressurization under or above packer is needed.

To prevent the downhole equipment from moving under the pressure and to retain the Packer in the positions where it was installed, when repairs are carried out in the well, Packer PM-R is complete with Hydraulic Anchors Type YAG1, YAG2 or YAG3.

### Special Features and Benefits

- Packer works on the principle of a "retractable ballpoint pen", i.e. packer setting is performed by moving the tubing up and then down (rotation of the tubing is not needed);
- Packer is removed from the well by tensioning the tubing upwards;
- The code grooves are located on an independent bushing (lock) which ensures that the Packer is set securely and eliminates the loosening of the stem wall;
- The Packer is complete with three (two — protective, one — sealing) or two (one — protective, one — sealing) caps for wells with heavily worn tubings;
- Packer is produced together with built-in hydraulic anchor;
- It is recommended to install the packer along with the KU-O type axial - equalizing valve to facilitate a removal of the packer from its setting place in the deep wells (is mounted on the top of the packer).  
The valve provides a pressure balance between the tubing inside and its annulus.
- Allows multiple uses during one run in the well;
- High level of reparability;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Casing size		Packer size								Maximum pressure, psi	Maximum temperature, °F	Axial Load When Packer is Set, kN, no more than	
			OD		ID		Connection*		Length, in, no more than	Weight, lbs, no more than				
	In	mm	in	mm	in	mm	in	mm						
PM-R 70-25-70	3 ½	88.9	2.756	70	0.984	25	2.375 NU	60.33	63.386	59.5	10150***	266 ***	50...80	
PM-R 80-38-70	4.0	101.6	3.15	80	1.496	38	2.375 NU	60.33	63.386	66.1	10150***	266 ***	50...80	
PM-R 82-38-100	4.0	101.6	3.23	82	1.496	38	2.375 NU	60.33	63.386	68.3	14500***	266 ***	50...80	
PM-R 88-38-100	4 ½	114.3	3.465	88	1.496	38	2.375 NU	60.33	63.386	86	14500***	266 ***	50...80	
PM-R 92-38-100	4 ½	114.3	3.622	92	1.496	38	2.375 NU	60.33	63.386	90.4	14500***	266 ***	50...80	
PM-R 98-42-100	4 ½; 5.0	114.3; 127.0	3.86	98	1.654	42	2.875 NU	73.03	64.92	92.6	14500***	266 ***	50...80	
PM-R 101-42-100	5.0	127.0	3.976	101	1.654	42	2.875 NU	73.03	67.32	101.4	14500***	266 ***	50...80	
PM-R 112-52-100	5 ½; 5 ¾	139.7; 146.1	4.41	112	2.047	52	2.875 NU	73.03	69.685	125.7	14500***	266 ***	80...120	
PM-R 114-52-100	5 ½	139.7	4.49	114	2.047	52	2.875 NU	73.03	69.685	132.3	14500***	266 ***	80...120	
PM-R 116-52-100	5 ½; 5 ¾	139.7; 146.1	4.567	116	2.047	52	2.875 NU	73.03	69.685	136.7	14500***	266 ***	80...120	
PM-R 118-52-100	5 ½; 5 ¾	139.7; 146.1	4.646	118	2.047	52	2.875 NU	73.03	69.685	136.7	14500***	266 ***	80...120	
PM-R 122-52-100	5 ¾	146.1	4.803	122	2.047	52	2.875 NU	73.03	69.685	143.3	14500***	266 ***	80...120	
PM-R 136-60-100	6 ½	168.3	5.354	136	2.362*	60*	2.875 NU	73.03	69.685	196.2	14500***	266 ***	80...120	
PM-R 140-60-100	6 ½	168.3	5.512	140	2.362*	60*	2.875 NU	73.03	69.685	202.8	14500***	266 ***	80...120	
PM-R 142-60-100	6 ½	168.3	5.59	142	2.362*	60*	2.875 NU	73.03	69.685	207.2	14500***	266 ***	80...120	
PM-R 145-60-100	6 ½; 7	168.3; 177.8	5.709	145	2.362*	60*	2.875 NU	73.03	69.685	207.2	14500***	266 ***	80...120	
PM-R 150-60-100	7.0	177.8	5.906	150	2.362*	60*	2.875 NU	73.03	70.472	227.1	14500***	266 ***	80...120	
PM-R 152-60-100	7.0	177.8	5.984	152	2.362*	60*	2.875 NU	73.03	70.472	231.5	14500***	266 ***	80...120	
PM-R 182-95-100	8 ½	219.1	7.283	185	3.74	95	4.5 NU	114.3	78.74	330.7	14500***	266 ***	80...120	
PM-R 205-100-100	9 ½	244.5	8.07	205	3.937	100	4.5 NU	114.3	78.74	383.6	14500***	266 ***	120...160	

- \* By special order the Packer is manufactured with increased bore, diameter 2.992 in (76mm).
- \*\* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Packer can be made of other types.
- \*\*\* Packer is manufactured for a pressure of 5076 psi; 7252 psi; 10150 psi; 14500 psi.
- \*\*\*\* By special order Packer is manufactured for working temperature of 302 °F.
- Can be manufactured for aggressive media — Option K2.
- Packer is supplied with a Spares and tool kit.
- When ordering a Packer with Hydraulic Anchor after the type designation of the Packer, please specify YAG1, YAG2 or YAG3.
- At customer's option, Packer PM-R is manufactured for other sizes of strings.

# Axis Mechanical Packer PM-R (Formation Hydraulic Fracturing)

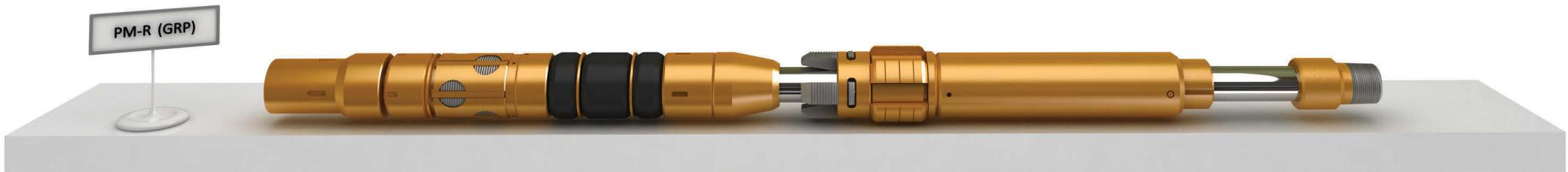
This Packer is designed for lengthy sealed zonal isolation of the production string and protection of its inner space from dynamic and aggressive effect of the downhole conditions during technological operations on the bottom-hole zone treatment.

## Application

- Formation Hydraulic Fracturing;
- Acidizing;
- Isolation of the operation tubing from the impact of operating medium during the operation of wells;
- Other Technological Operations and Maintenance/Repair Operations, when pressurization under or above packer is needed.
- Operation in injection and oil wells.

## Special Features and Benefits

- Packer works on the principle of a "retractable ballpoint pen", i.e. packer setting is performed by moving the tubing up and then down (rotation of the tubing is not needed);
- Design incorporates a built-in bypass valve. When the Packer is removed from the well by tensioning the tubing upwards, the valve is actuated, pressure above and under the Packer equalizes which ensures that the Packer is removed from the installation position;
- The code grooves are located on an independent bushing (lock) which facilitates secure setting and eliminates the loosening of the stem wall;
- The Packer is complete with three (two — protective, one — sealing) or two (one — protective, one — sealing) caps for wells with heavily worn tubings;
- Packer is produced together with built-in hydraulic anchor;
- Manufactured with solid one-piece stem which eliminates flush of the inner cavity in the case of volume proppant type Formation Hydraulic Fracturing;
- Allows multiple uses during one run in the well;
- Hydraulic Anchor is isolated from the impact of the pumped proppant flow;
- High level of reparability;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Casing size		Packer size						Length, in, no more than	Weight, lbs, no more than	Maximum pressure, psi	Maximum tempe- rature, °F	Axial Load When Packer is Set, kN, no more than			
			OD		ID		Connection*									
	In	mm	in	mm	in	mm	in	mm								
PM-R (GRP) 82-34-100 YAG1	4.0	101.6	3.23	82	1.339	34	2.375 NU	60.33	81.26	103.6	14500**	266 ***	50...80			
PM-R (GRP) 88-38-100 YAG1	4 ½	114.3	3.465	88	1.496	38	2.375 NU	60.33	81.26	114.6	14500**	266 ***	50...80			
PM-R (GRP) 92-38-100 YAG1	4 ½	114.3	3.622	92	1.496	38	2.375 NU	60.33	81.26	121.25	14500**	266 ***	50...80			
PM-R (GRP) 98-42-100 YAG1	4 ½; 5.0	114.3; 127.0	3.86	98	1.654	42	2.875 NU	73.03	87.2	187.4	14500**	266 ***	50...80			
PM-R (GRP) 101-42-100 YAG1	5.0	127.0	3.976	101	1.654	42	2.875 NU	73.03	87.2	194	14500**	266 ***	50...80			
PM-R (GRP) 112-52-100 YAG1	5 ½; 5 ¾	139.7; 146.1	4.41	112	2.047	52	2.875 NU	73.03	87.2	200.6	14500**	266 ***	80...120			
PM-R (GRP) 114-52-100 YAG1	5 ½	139.7	4.49	114	2.047	52	2.875 NU	73.03	87.2	200.6	14500**	266 ***	80...120			
PM-R (GRP) 116-52-100 YAG1	5 ½; 5 ¾	139.7; 146.1	4.567	116	2.047	52	2.875 NU	73.03	87.2	202.83	14500**	266 ***	80...120			
PM-R (GRP) 118-52-100 YAG1	5 ½; 5 ¾	139.7; 146.1	4.646	118	2.047	52	2.875 NU	73.03	87.2	205	14500**	266 ***	80...120			
PM-R (GRP) 122-52-100 YAG1	5 ¾	146.1	4.803	122	2.047	52	2.875 NU	73.03	87.2	220.5	14500**	266 ***	80...120			
PM-R (GRP) 136-60-100 YAG1	6 ½	168.3	5.354	136	2.362	60	2.875 NU	73.03	88.78	273.4	14500**	266 ***	80...120			
PM-R (GRP) 140-60-100 YAG1	6 ½	168.3	5.512	140	2.362	60	2.875 NU	73.03	88.78	277.8	14500**	266 ***	80...120			
PM-R (GRP) 142-60-100 YAG1	6 ½	168.3	5.59	142	2.362	60	2.875 NU	73.03	88.78	282.2	14500**	266 ***	80...120			
PM-R (GRP) 145-60-100 YAG1	6 ½; 7	168.3; 177.8	5.709	145	2.362	60	2.875 NU	73.03	88.78	286.6	14500**	266 ***	80...120			
PM-R (GRP) 150-60-100 YAG1	7.0	177.8	5.906	150	2.362	60	2.875 NU	73.03	89.763	304.24	14500**	266 ***	80...120			
PM-R (GRP) 158-76-100 YAG1	7 ½	193.7	6.22	158	2.992	76	4 NU	101.6	90.55	299.8	14500**	266 ***	80...120			
PM-R (GRP) 205-100-100 YAG1	9 ½	244.5	8.07	205	3.937	100	4.5 NU	114.3	96.457	423.3	14500***	266 ****	120...160			

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Packer can be made of other types.
- \*\* Packer is manufactured for a pressure of 10150 psi; 14500 psi.
- \*\*\* By special order Packer is manufactured for working temperature of 302 °F.
- Can be manufactured for aggressive media — Option K2.
- Packer is supplied with a Spares and tool kit.
- When ordering a Packer with Hydraulic Anchor after the type designation of the Packer, please specify YAG1, YAG2 or YAG3.
- At customer's option, Packer PM-R (GRP) is manufactured for other sizes of strings.

# Axial Mechanical Packer PM-A

This Packer is designed for lengthy sealed zonal isolation of the production string and protection of its inner space from dynamic and aggressive effect of the downhole conditions during technological operations on the bottom-hole zone treatment.

## Application

- Increase in Formation Pressure;
- Acidizing;
- Development and Operation of Oil, Gas and Gas Condensate Wells;
- For lengthy autonomous (without connection to tubing) isolation required with respect to the section of the operation string;
- Other Technological Operations and Maintenance/Repair Operations, when pressurization under or above packer is needed.

## Special Features and Benefits

- The Packer is installed into the well by rotating the tubing to the right 1/4 of a turn and simultaneously moving it down;
- The Packer is removed by rotating the pipe column to the right 1/4 of a turn and simultaneously tightening up the tubing;
- The Packer is complete with two (one — protective, one — sealing) or three (two — protective, one — sealing) caps;
- Original lock design allows release of the Packer from the load of the tubing by means of the column disconnect Type RK, as well as allows replacement of the tubing without dislodging or lifting the Packer;
- There are two mechanical anchor units which ensure reliable retention of the Packer in the well both when the pressure is from above and from below;
- Joint use with hydraulic anchors is unnecessary;
- Reliable design;
- Reliable sealing of the production casing in cyclical fluid supply;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Casing size		Packer size						Maximum pressure, psi	Maximum temperature, °F	Axial Load When Packer is Set, kN, no more than	
			OD		ID		Connection*					
	In	mm	in	mm	in	mm	in	mm				
PM-A 112-50-70	5 ½; 5 ¾	139.7; 146.1	4.41	112	1.969	50	2.875 NU	73.03	96.575	165.35	10150**	266 ***
PM-A 114-50-70	5 ½	139.7	4.49	114	1.969	50	2.875 NU	73.03	96.575	171.96	10150**	266 ***
PM-A 116-50-70	5 ½; 5 ¾	139.7; 146.1	4.567	116	1.969	50	2.875 NU	73.03	96.575	180.8	10150**	266 ***
PM-A 118-52-70	5 ½; 5 ¾	139.7; 146.1	4.646	118	2.047	52	2.875 NU	73.03	96.575	189.6	10150**	266 ***
PM-A 122-52-70	5 ¾	146.1	4.803	122	2.047	52	2.875 NU	73.03	96.575	205	10150**	266 ***
PM-A 136-60-70	6 ½	168.3	5.354	136	2.362	60	2.875 NU	73.03	96.575	268.96	10150**	266 ***
PM-A 140-60-70	6 ½	168.3	5.512	140	2.362	60	2.875 NU	73.03	96.575	286.6	10150**	266 ***
PM-A 142-60-70	6 ½	168.3	5.59	142	2.362	60	2.875 NU	73.03	96.575	295.42	10150**	266 ***
PM-A 145-60-70	6 ½; 7	168.3; 177.8	5.709	145	2.362	60	2.875 NU	73.03	96.575	302	10150**	266 ***
PM-A 150-60-70	7.0	177.8	5.906	150	2.362	60	2.875 NU	73.03	97.244	335.1	10150**	266 ***

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Packer can be made of other types.
- \*\* Packer is manufactured for a pressure of 5076 psi; 7252 psi; 10150 psi.
- \*\*\* By special order Packer is manufactured for working temperature of 302 °F.
- Can be manufactured for aggressive media — Option K2.
- Packer is supplied with a Spares and tool kit.
- At customer's option, Packer PM-A is manufactured for other sizes of strings.

## Axial Mechanical Packer PM-A1

This Packer is designed for lengthy sealed zonal isolation of the production string and protection of its inner space from dynamic and aggressive effect of the downhole conditions during technological operations on the bottom-hole zone treatment.

### Application

- Increase in Formation Pressure;
- Remedial Cementing;
- Other Technological Operations and Maintenance/Repair Operations, when pressurization under or above packer is needed.

### Special Features and Benefits

- Packer works on the principle of a "retractable ballpoint pen", i.e. packer setting is performed by moving the tubing up and then down (rotation of the tubing is not needed);
- Packer is removed from the well by tensioning the tubing upwards;
- The Packer is complete with two (one — protective, one — sealing) or three (two — protective, one — sealing) caps;
- It has two mechanical Anchor Units which ensure secure retention of the Packer in the well both with the impact of the pressure from above and from below;
- Reliable design;
- Reliable sealing of the production casing in cyclical fluid supply;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Casing size		Packer size								Maximum pressure, psi	Maximum temperature, °F	Axial Load When Packer is Set, kN, no more than	
			OD		ID		Connection*		Length, in, no more than	Weight, lbs, no more than				
	In	mm	in	mm	in	mm	in	mm						
PM-A1 101-42-70	5.0	127.0	3.976	101	1.654	42	2.875 NU	73.03	106.3	209.4	10150***	266 ****	80...120	
PM-A1 114-50-70	5 ½	139.7	4.49	114	1.969	50	2.875 NU	73.03	107.874	235.9	10150***	266 ****	80...120	
PM-A1 116-50-70	5 ½; 5 ¾	139.7; 146.1	4.567	116	1.969	50	2.875 NU	73.03	107.874	240.3	10150***	266 ****	80...120	
PM-A1 118-52-70	5 ½; 5 ¾	139.7; 146.1	4.646	118	2.047	52	2.875 NU	73.03	109.65	251.3	10150***	266 ****	80...120	
PM-A1 122-52-70	5 ¾	146.1	4.803	122	2.047	52	2.875 NU	73.03	109.65	255.7	10150***	266 ****	80...120	
PM-A1 136-60-70	6 ½	168.3	5.354	136	2.362*	60*	2.875 NU	73.03	111.22	330.7	10150***	266 ****	80...120	
PM-A1 140-60-70	6 ½	168.3	5.512	140	2.362*	60*	2.875 NU	73.03	111.22	332.9	10150***	266 ****	80...120	
PM-A1 142-60-70	6 ½	168.3	5.59	142	2.362*	60*	2.875 NU	73.03	111.22	337.3	10150***	266 ****	80...120	
PM-A1 145-60-70	6 ½; 7	168.3; 177.8	5.709	145	2.362*	60*	2.875 NU	73.03	111.22	377	10150***	266 ****	80...120	
PM-A1 150-60-70	7.0	177.8	5.906	150	2.362*	60*	2.875 NU	73.03	112.2	383.6	10150***	266 ****	80...120	

- \* By special order the Packer is manufactured with increased bore, diameter 2.992 in (76mm).
- \*\* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Packer can be made of other types.
- \*\*\* Packer is manufactured for a pressure of 5076 psi; 7252 psi; 10150 psi.
- \*\*\*\* By special order Packer is manufactured for working temperature of 302 °F.
- Can be manufactured for aggressive media — Option K2.
- Packer is supplied with a Spares and tool kit.
- At customer's option, Packer PM-A1 is manufactured for other sizes of strings.

# Axial Mechanical Packer (Retainer) PM-A1 (F)

This Packer is designed for lengthy sealed zonal isolation of the production string and protection of its inner space from dynamic and aggressive effect of the downhole conditions during technological operations on the bottom-hole zone treatment.

## Application

- Increase in Formation Pressure;
- Remedial Cementing;
- For lengthy autonomous (without connection to tubing) isolation required with respect to the section of the operation string;
- Other Technological Operations and Maintenance/Repair Operations, when pressurization under or above packer is needed.
- Use of the Packer in a package with other downhole equipment is shown at pages 93, 94, 100.

## Special Features and Benefits

- Packer works on the principle of a "retractable ballpoint pen", i.e. packer setting is performed by moving the tubing up and then down (rotation of the tubing is not needed);
- Packer is removed from the well by tensioning the tubing upwards;
- The Packer is complete with two (one — protective, one — sealing) or three (two — protective, one — sealing) caps;
- It has two mechanical Anchor Units which ensure secure retention of the Packer in the well both with the impact of the pressure from above and from below;
- Reliable design;
- Reliable sealing of the production casing in cyclical fluid supply;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Casing size		Packer size						Maximum pressure, psi	Maximum temperature, °F	Axial Load When Packer is Set, kN, no more than	
			OD		ID		Connection*					
	In	mm	in	mm	in	mm	in	mm				
PM-A1 (F) 114-50-70	5 ½	139.7	4.49	114	1.969	50	2.875 NU	73.03	106.89	198.4	10150**	266 ***
PM-A1 (F) 116-50-70	5 ½; 5 ¾	139.7; 146.1	4.567	116	1.969	50	2.875 NU	73.03	106.89	202.83	10150**	266 ***
PM-A1 (F) 118-52-70	5 ½; 5 ¾	139.7; 146.1	4.646	118	2.047	52	2.875 NU	73.03	106.89	213.85	10150**	266 ***
PM-A1 (F) 122-52-70	5 ¾	146.1	4.803	122	2.047	52	2.875 NU	73.03	106.89	229.28	10150**	266 ***
PM-A1 (F) 136-62-70	6 ½	168.3	5.354	136	2.441	62	2.875 NU	73.03	104.41	282.2	10150**	266 ***
PM-A1 (F) 140-62-70	6 ½	168.3	5.512	140	2.441	62	2.875 NU	73.03	104.41	291	10150**	266 ***
PM-A1 (F) 142-62-70	6 ½	168.3	5.59	142	2.441	62	2.875 NU	73.03	104.41	308.65	10150**	266 ***
PM-A1 (F) 145-62-70	6 ½; 7	168.3; 177.8	5.709	145	2.441	62	2.875 NU	73.03	104.41	319.7	10150**	266 ***
PM-A1 (F) 150-62-70	7.0	177.8	5.906	150	2.441	62	2.875 NU	73.03	104.41	326.3	10150**	266 ***

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Packer can be made of other types.
- \*\* Packer is manufactured for a pressure of 5076 psi; 7252 psi; 10150 psi.
- \*\*\* By special order Packer is manufactured for working temperature of 302 °F.
- Can be manufactured for aggressive media — Option K2.
- Packer is supplied with a Spares and tool kit.
- At customer's option, Packer PM-A1 (F) is manufactured for other sizes of strings.

## Thrust Packer PU

This Packer is designed for lengthy sealed zonal isolation of the production string and protection of its inner space from dynamic and aggressive effect of the downhole conditions during technological operations on the bottom-hole zone treatment.

### Application

- In two-Packer and three-Packer set-ups for conduct of simultaneously segregated operation of several formations of wells (multiple completion) or simultaneously segregated injection (dual injection);
- Other technological operations as well as repairs and preventive maintenance, whose conduct requires generating overpressure above or below the Packer;
- To prevent the downhole equipment from moving under load and to retain the Packer in the positions where it was installed, when repairs are carried out in the well, Packer PU is complete with Hydraulic Anchors Type YAG1, YAG2 or YAG3.

### Special Features and Benefits

- Installed by abutting the shank against bottom of the well or by abutting against the bottom Packer;
- Secure Packer setting in inclined and horizontal wells;
- Provided with a key which ensures transmission of torque to the tubing and equipment located under the Packer;
- Easy removal of the Packer;
- The Packer is complete with three (two — protective, one — sealing) or two (one — protective, one — sealing) caps for wells with heavily worn tubings;
- Simple design;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Casing size		Packer size								Maximum pressure, psi	Maximum temperature, °F	Axial Load When Packer is Set, kN, no more than	
			OD		ID		Connection*		Length, in, no more than	Weight, lbs, no more than				
	In	mm	in	mm	in	mm	in	mm						
PU 80-38-70	4.0	101.6	3.15	80	1.496	38	2.375 NU	60.33	35.236	39.68	10150**	266 ***	50...80	
PU 82-38-70	4.0	101.6	3.23	82	1.496	38	2.375 NU	60.33	35.236	41.9	10150**	266 ***	50...80	
PU 88-38-100	4 ½	114.3	3.465	88	1.496	38	2.375 NU	60.33	35.236	48.5	14500**	266 ***	50...80	
PU 92-38-100	4 ½	114.3	3.622	92	1.496	38	2.375 NU	60.33	35.236	52.91	14500**	266 ***	50...80	
PU 98-42-100	4 ½; 5.0	114.3; 127.0	3.86	98	1.654	42	2.875 NU	73.03	35.433	55.1	14500**	266 ***	50...80	
PU 101-42-100	5.0	127.0	3.976	101	1.654	42	2.875 NU	73.03	35.433	57.3	14500**	266 ***	50...80	
PU 112-52-100	5 ½; 5 ¾	139.7; 146.1	4.41	112	2.047	52	2.875 NU	73.03	35.63	61.73	14500**	266 ***	80...120	
PU 114-52-100	5 ½	139.7	4.49	114	2.047	52	2.875 NU	73.03	35.63	61.73	14500**	266 ***	80...120	
PU 116-52-100	5 ½; 5 ¾	139.7; 146.1	4.567	116	2.047	52	2.875 NU	73.03	35.63	66.14	14500**	266 ***	80...120	
PU 118-52-100	5 ½; 5 ¾	139.7; 146.1	4.646	118	2.047	52	2.875 NU	73.03	35.63	68.34	14500**	266 ***	80...120	
PU 122-52-100	5 ¾	146.1	4.803	122	2.047	52	2.875 NU	73.03	35.63	70.55	14500**	266 ***	80...120	
PU 136-60-100	6 ½	168.3	5.354	136	2.362	60	2.875 NU	73.03	35.827	90.4	14500**	266 ***	80...120	
PU 140-60-100	6 ½	168.3	5.512	140	2.362	60	2.875 NU	73.03	35.827	97	14500**	266 ***	80...120	
PU 142-60-100	6 ½	168.3	5.59	142	2.362	60	2.875 NU	73.03	35.827	97	14500**	266 ***	80...120	
PU 145-60-100	6 ½; 7	168.3; 177.8	5.709	145	2.362	60	2.875 NU	73.03	35.827	97	14500**	266 ***	80...120	
PU 150-60-100	7.0	177.8	5.906	150	2.362	60	2.875 NU	73.03	35.827	101.4	14500**	266 ***	80...120	
PU 182-76-100	8 ½	219.1	7.283	185	2.992	76	4.5 NU	114.3	40.748	126.46	14500**	266 ***	80...120	
PU 205-100-100	9 ½	244.5	8.07	205	3.937	100	4.5 NU	114.3	40.748	185.39	14500**	266 ***	120...160	

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Packer can be made of other types.
- \*\* Packer is manufactured for a pressure of 5076 psi; 7252 psi; 10150 psi; At a pressure of 14500 psi the Packer is used in combination with YAG1, YAG2, YAG3.
- \*\*\* By special order Packer is manufactured for working temperature of 302 °F.
- Can be manufactured for aggressive media — Option K2.
- Packer is supplied with a Spares and tool kit.
- When ordering a Packer with Hydraulic Anchor after the type designation of the Packer, please specify YAG1, YAG2 or YAG3.
- At customer's option, Packer PU is manufactured for other sizes of strings.

## Thrust Mechanical Packer PU-M

This Packer is designed for lengthy sealed zonal isolation of the production string and protection of its inner space from dynamic and aggressive effect of the downhole conditions during technological operations on the bottom-hole zone treatment.

### Application

- In the wells operated with Electric Submersible Centrifugal Pump;
- Casing string leakage test under the Packer;
- In Multi-packer set-ups for conduct of simultaneously segregated operation of several formations of wells (multiple completion) or simultaneously segregated injection (dual injection);
- Conducting the Formation Hydraulic Fracturing when the casing string interval located above needs to be isolated (two-Packer set-up);
- Other technological operations as well as repairs and preventive maintenance, whose conduct requires generating overpressure above or below the Packer.
- Combined with other downhole equipment (pages 91, 92, 105).

### Special Features and Benefits

- Installed by abutting the shank against bottom of the well or by abutting against the bottom Packer;
- The design allows Packer to be left on its own in the well (without being connected with the tubing);
- Use in two-Packer, three-Packer set-ups;
- Secure Packer setting in inclined and horizontal wells;
- Provided with a key which ensures transmission of torque to the tubing and equipment located under the Packer;
- Easy removal of the Packer;
- The Packer is complete with three (two — protective, one — sealing) or two (one — protective, one — sealing) caps for wells with heavily worn tubings;
- Simple design;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Casing size		Packer size								Maximum pressure, psi	Maximum temperature, °F	Axial Load When Packer is Set, kN, no more than	
			OD		ID		Connection*		Length, in, no more than	Weight, lbs, no more than				
	In	mm	in	mm	in	mm	in	mm						
PU-M 101-42-70	5.0	127.0	3.976	101	1.654	42	2.875 NU	73.03	88.583	154.3	10150**	266 ***	50...80	
PU-M 105-42-70	5.0	127.0	4.114	105	1.654	42	2.875 NU	73.03	88.583	180.8	10150**	266 ***	50...80	
PU-M 112-50-70	5 ½; 5 ¾	139.7; 146.1	4.41	112	1.969	50	2.875 NU	73.03	89.37	187.39	10150**	266 ***	80...120	
PU-M 114-50-70	5 ½	139.7	4.49	114	1.969	50	2.875 NU	73.03	89.37	191.8	10150**	266 ***	80...120	
PU-M 116-50-70	5 ½; 5 ¾	139.7; 146.1	4.567	116	1.969	50	2.875 NU	73.03	89.37	196.2	10150**	266 ***	80...120	
PU-M 118-50-70	5 ½; 5 ¾	139.7; 146.1	4.646	118	1.969	50	2.875 NU	73.03	89.37	202.83	10150**	266 ***	80...120	
PU-M 122-50-70	5 ¾	146.1	4.803	122	1.969	50	2.875 NU	73.03	89.37	209.44	10150**	266 ***	80...120	
PU-M 136-56-70	6 ½	168.3	5.354	136	2.205	56	2.875 NU	73.03	90.551	264.56	10150**	266 ***	80...120	
PU-M 140-56-70	6 ½	168.3	5.512	140	2.205	56	2.875 NU	73.03	90.551	291	10150**	266 ***	80...120	
PU-M 142-56-70	6 ½	168.3	5.59	142	2.205	56	2.875 NU	73.03	90.551	297.6	10150**	266 ***	80...120	
PU-M 145-56-70	6 ½; 7	168.3; 177.8	5.709	145	2.205	56	2.875 NU	73.03	90.551	299.83	10150**	266 ***	80...120	
PU-M 150-56-70	7.0	177.8	5.906	150	2.205	56	2.875 NU	73.03	90.551	308.65	10150**	266 ***	80...120	
PU-M 182-76-70	8 ½	219.1	7.283	185	2.992	76	4.5 NU	114.3	96.457	412.26	10150**	266 ***	80...120	
PU-M 205-100-70	9 ½	244.5	8.07	205	3.937	100	4.5 NU	114.3	101.968	520.29	10150**	266 ***	120...160	

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Packer can be made of other types.
- \*\* Packer is manufactured for a pressure of 5076 psi; 7252 psi; 10150 psi.
- \*\*\* By special order Packer is manufactured for working temperature of 302 °F.
- Can be manufactured for aggressive media — Option K2.
- Packer is supplied with a Spares and tool kit.
- At customer's option, Packer PU-M is manufactured for other sizes of strings.

## Thrust Mechanical Packer (with Split Cone) PU-M (R)

This Packer is designed for lengthy sealed zonal isolation of the production string and protection of its inner space from dynamic and aggressive effect of the downhole conditions during technological operations on the bottom-hole zone treatment.

### Application

- In the wells operated with Electric Submersible Centrifugal Pump;
- Checking leak tightness of the tubing under the Packer;
- In multiple-Packer set-ups for conduct of simultaneously segregated operation of several formations of wells (multiple completion) and simultaneously segregated injection (dual injection);
- Conducting the Formation Hydraulic Fracturing when the tubing interval located above needs to be isolated (two-Packer set-up);
- Other technological operations as well as repairs and preventive maintenance, whose conduct requires generating overpressure above or below the Packer.

### Special Features and Benefits

- Design incorporates top split cone.
- Installed by abutting the shank against bottom of the well or by abutting against the bottom Packer;
- The design allows Packer to be left in the well (without being connected with the tubing);
- Use in two-Packer, three-Packer set-ups;
- Secure Packer setting in inclined and horizontal wells;
- Provided with a key which ensures transmission of torque to the tubing and equipment located under the Packer;
- Easy removal of the Packer;
- The Packer is complete with three (two — protective, one — sealing) or two (one — protective, one — sealing) caps for wells with heavily worn tubings;
- Simple design;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Casing size		Packer size							Maximum pressure, psi	Maximum temperature, °F	Axial Load When Packer is Set, kN, no more than	
			OD		ID		Connection*						
	In	mm	in	mm	in	mm	in	mm					
PU-M (R) 118-52-70	5 ½; 5 ¾	139.7; 146.1	4.646	118	2.047	52	2.875 NU	73.03	96.457	205	10150**	266 ***	80...120
PU-M (R) 122-52-70	5 ¾	146.1	4.803	122	2.047	52	2.875 NU	73.03	96.457	211.6	10150**	266 ***	80...120
PU-M (R) 140-60-70	6 ½	168.3	5.512	140	2.362	60	2.875 NU	73.03	98.03	297.6	10150**	266 ***	80...120

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Packer can be made of other types.
- \*\* Packer is manufactured for a pressure of 5076 psi; 7252 psi.
- \*\*\* By special order Packer is manufactured for working temperature of 302 °F.
- Can be manufactured for aggressive media — Option K2.
- Packer is supplied with a Spares and tool kit.
- At customer's option, Packer PU-M (P) is manufactured for other sizes of strings.

## Hydraulic Packer PM-D-YAG

This Packer is designed for lengthy sealed zonal isolation of the production string and protection of its inner space from dynamic and aggressive effect of the downhole conditions during technological operations on the bottom-hole zone treatment.

### Application

- Remedial Cementing;
- Repairs and Preventive Maintenance as well as Technological Operations requiring single isolation;
- Water injection into inclined wells
- In horizontal wells.

### Special Features and Benefits

- Packer is installed into the well hydraulically, by generating pressure in the tubing;
- Setting is done by discharging steam and feeding pressure or by installing removable tools;
- Extraction from the well happens by tightening the tubing upwards;
- Accepts force from pressure differential directed both downwards and upwards;
- Possibility of setting at small depths without limiting minimum weight of the tubing;
- Hydraulic Anchor is isolated from impact of pumped medium;
- High accuracy of setting;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Casing size		Packer size								Maximum pressure, psi	Maximum temperature, °F	Axial Load When Packer is Set, kN, no more than	
			OD		ID		Connection*		Length, in, no more than	Weight, lbs, no more than				
	In	mm	in	mm	in	mm	in	mm						
PM-D-YAG 112-50-100	5 ½; 5 ¾	139.7; 146.1	4.41	112	1.969	50	2.875 NU	73.03	76.181	180.78	14500**	266 ***	80...120	
PM-D-YAG 114-50-100	5 ½	139.7	4.49	114	1.969	50	2.875 NU	73.03	76.181	185.2	14500**	266 ***	80...120	
PM-D-YAG 116-50-100	5 ½; 5 ¾	139.7; 146.1	4.567	116	1.969	50	2.875 NU	73.03	76.181	189.6	14500**	266 ***	80...120	
PM-D-YAG 118-50-100	5 ½; 5 ¾	139.7; 146.1	4.646	118	1.969	50	2.875 NU	73.03	76.181	194	14500**	266 ***	80...120	
PM-D-YAG 122-50-100	5 ¾	146.1	4.803	122	1.969	50	2.875 NU	73.03	76.181	200.6	14500**	266 ***	80...120	
PM-D-YAG 136-60-100	6 ½	168.3	5.354	136	2.362	60	2.875 NU	73.03	80.7	242.51	14500**	266 ***	80...120	
PM-D-YAG 140-60-100	6 ½	168.3	5.512	140	2.362	60	2.875 NU	73.03	80.7	260.15	14500**	266 ***	80...120	
PM-D-YAG 142-60-100	6 ½	168.3	5.59	142	2.362	60	2.875 NU	73.03	80.7	271.17	14500**	266 ***	80...120	
PM-D-YAG 145-60-100	6 ½; 7	168.3; 177.8	5.709	145	2.362	60	2.875 NU	73.03	80.7	308.65	14500**	266 ***	80...120	
PM-D-YAG 150-60-100	7.0	177.8	5.906	150	2.362	60	2.875 NU	73.03	82.48	321.88	14500**	266 ***	80...120	

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Packer can be made of other types.
- \*\* Packer is manufactured for a pressure of 5076 psi; 7252 psi; 10150 psi.
- \*\*\* By special order Packer is manufactured for working temperature of 302 °F.
- Can be manufactured for aggressive media — Option K2.
- Packer is supplied with a Spares and tool kit.
- At customer's option, Packer PM-D-YAG is manufactured for other sizes of strings.

# Axial Mechanical Packer with Cable Input PVM-O (KV)

This Packer is designed for operation of wells using electric submersible pump equipment with leak intervals of the production string higher than production horizon.

## Application

- Isolation of water inflow from leaks of the production string located above input of the Electric Submersible Centrifugal Pump Unit.
- In multi-Packer set-ups of dual completion.
- In combination with other downhole equipment (pages 96–99, 103, 104).

## Special Features and Benefits

- Packer operates per "ballpoint pen" principle, i.e. setting happens by moving the tubing upwards and then downwards (no rotation of the tubing is required);
- Extraction from the well happens by tightening the tubing up;
- Packer has two code grooves in its switching and seating mechanism, located on the packer mandrel, which ensure a reliable packer setting in inclined wells;
- Availability of the Swivel Unit ensures correct and reliable orientation of the Packer with reference to the tubing with the Electric Submersible Centrifugal Pump Unit cable;
- Simple and reliable Sealing Unit;
- Convenient in operation, simple in service;
- Reusable equipment in one tripping;
- High reparability;
- Parts have protective plating (phosphate coating).

## It is possible to manufacture

- Packer with Gas Diversion Pipe;
- Packer with Gas Diversion Pipe and Pipe for Injection of Chemical Agent.



## Technical Specifications

Type	Casing size		Packer size										Maximum pressure, psi	Maximum temperature, °F	Axial Load When Packer is Set, kN, no more than		
			OD		ID		Connection*				Length, in, no more than	Weight, lbs, no more than					
	in	mm	in	mm	in	mm	in	mm	in	mm							
PVM-O (KV) 112-35-50	5 ½; 5 ¾	139.7; 146.1	4.41	112	1.378	35	2.875	NU	73.03	2.875	NU	73.03	96.969	149.91	7252**	266 ***	80...120
PVM-O (KV) 114-35-50	5 ½	139.7	4.49	114	1.378	35	2.875	NU	73.03	2.875	NU	73.03	96.969	154.3	7252**	266 ***	80...120
PVM-O (KV) 116-35-50	5 ½; 5 ¾	139.7; 146.1	4.567	116	1.378	35	2.875	NU	73.03	2.875	NU	73.03	96.969	154.3	7252**	266 ***	80...120
PVM-O (KV) 118-35-50	5 ½; 5 ¾	139.7; 146.1	4.646	118	1.378	35	2.875	NU	73.03	2.875	NU	73.03	95.669	189.6	7252**	266 ***	80...120
PVM-O (KV) 122-35-50	5 ¾	146.1	4.803	122	1.378	35	2.875	NU	73.03	2.875	NU	73.03	96.81	191.8	7252**	266 ***	80...120
PVM-O (KV) 136-45-50	6 ½	168.3	5.354	136	1.772	45	3.5	NU	88.9	2.875	NU	73.03	97.087	233.7	7252**	266 ***	80...120
PVM-O (KV) 140-52-50	6 ½	168.3	5.512	140	2.047	52	3.5	NU	88.9	2.875	NU	73.03	97.99	233.7	7252**	266 ***	80...120
PVM-O (KV) 142-52-50	6 ½	168.3	5.59	142	2.047	52	3.5	NU	88.9	2.875	NU	73.03	97.99	238.1	7252**	266 ***	80...120
PVM-O (KV) 145-52-50	6 ½; 7	168.3; 177.8	5.709	145	2.047	52	3.5	NU	88.9	2.875	NU	73.03	97.99	242.51	7252**	266 ***	80...120
PVM-O (KV) 150-62-50	7.0	177.8	5.906	150	2.44	62	3.5	NU	88.9	2.875	NU	73.03	104.33	264.6	7252**	266 ***	80...120
PVM-O (KV) 190-62-50	8 ½	219.1	7.48	190	2.44	62	3.5	NU	88.9	2.875	NU	73.03	109.763	407.86	7252**	266 ***	120...160

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Packer can be made of other types
- \*\* Packer is manufactured for a pressure of 5076 psi; 7252 psi.
- \*\*\* By special order Packer is manufactured for working temperature of 302 °F.
- Can be manufactured for aggressive media — Option K2.
- Packer is supplied with a Spares and tool kit.
- When ordering a Packer with Hydraulic Anchor after the type designation of the Packer, please specify YAG2 (KV).
- At customer's option, Packer PVM-O (KV) is manufactured for other sizes of strings.
- Overall dimensions of the power cable (Flat Rubber Armored Cable) used with Packer — 0.59x1.472 (0.118x0.63). By customer specification, Packer can be manufactured to fit other sizes of the power cable (per GOST Standard) used together with Packer.

# Axial Mechanical Packer with Cable Input, Modernized PVM-O (KV) M

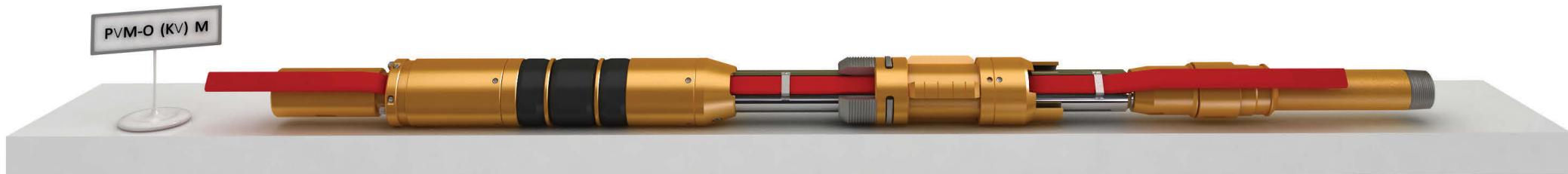
This Packer is designed for operation of wells using electric submersible pump equipment with leak intervals of the production string higher than production horizon.

## Application

- Isolation of water inflow from leaks of the production string located above input of the Electric Submersible Centrifugal Pump Unit.
- In multi-Packer set-ups of dual completion.
- In combination with other downhole equipment (page 95 Fig.1).

## Special Features and Benefits

- Packer operates per "ballpoint pen" principle, i.e. setting happens by moving the tubing upwards and then downwards (no rotation of the tubing is required);
- Extraction from the well happens by tightening the tubing up;
- Packer has two symmetrically located code grooves of the switching and setting mechanism on the stem, which ensures secure seating (setting) in inclined wells;
- Increased inner bore of the Packer;
- Installation is made without disturbing integrity of the electric cable strands;
- Availability of the Swivel Unit ensures correct and reliable orientation of the Packer with reference to the tubing with the Electric Submersible Centrifugal Pump Unit cable;
- Convenient in operation, simple in service;
- Reusable equipment in one tripping;
- High reparability;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Casing size		Packer size										Length, in, no more than	Weight, lbs, no more than	Maximum pressure, psi	Maximum tempe- rature, °F	Axial Load When Packer is Set, kN, no more than	
			OD		ID		Connection*				Box		Pin					
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm				
PVM-O (KV) M 118-50-50	5 ½; 5 ¾	139.7; 146.1	4.646	118	1.969	50	2.875 NU	73.03	2.875 NU	73.03	87.0	167.55	7252**	266 ***	80...120			
PVM-O (KV) M 122-50-50	5 ¾	146.1	4.803	122	1.969	50	2.875 NU	73.03	2.875 NU	73.03	87.0	171.96	7252**	266 ***	80...120			
PVM-O (KV) M 140-60-50	6 ½	168.3	5.512	140	2.362	60	3.5 NU	88.9	2.875 NU	73.03	97.244	211.64	7252**	266 ***	80...120			
PVM-O (KV) M 142-60-50	6 ½	168.3	5.59	142	2.362	60	3.5 NU	88.9	2.875 NU	73.03	97.244	216.05	7252**	266 ***	80...120			
PVM-O (KV) M 145-60-50	6 ½; 7	168.3; 177.8	5.709	145	2.362	60	3.5 NU	88.9	2.875 NU	73.03	97.244	244.71	7252**	266 ***	80...120			
PVM-O (KV) M 150-60-50	7.0	177.8	5.906	150	2.362	60	3.5 NU	88.9	2.875 NU	73.03	97.244	253.5	7252**	266 ***	80...120			

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Packer can be made of other types
- \*\* Packer is manufactured for a pressure of 5076 psi; 7252 psi.
- \*\*\* By special order Packer is manufactured for working temperature of 302 °F.
- Can be manufactured for aggressive media — Option K2.
- Packer is supplied with a Spares and tool kit.
- At customer's option, Packer PVM-O (KV) M is manufactured for other sizes of strings.
- Overall dimensions of the power cable (Flat Rubber Armored Cable) used with Packer — 0.59x1.472 (0.118x0.63). By customer specification, Packer can be manufactured to fit other sizes of the power cable (per GOST Standard) used together with Packer.

# Axial Mechanical Packer With Cable Input, With Gas Removal Pipe, Modernized PVM-O (KV) M

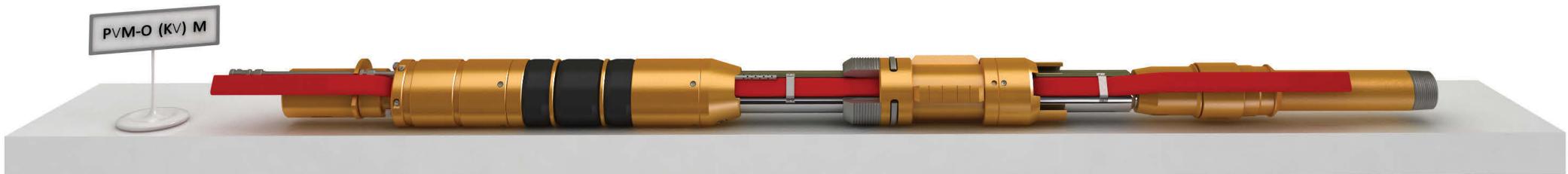
This Packer is designed for operation of wells using electric submersible pump equipment with leak intervals of the production string higher than production horizon.

## Application

- Isolation of water inflow from leaks of the production string located above input of the Electric Submersible Centrifugal Pump Unit.
- In multi-Packer set-ups of dual completion.
- In combination with other downhole equipment (page 95 Fig. 1).

## Special Features and Benefits

- Packer operates per "ballpoint pen" principle, i.e. setting happens by moving the tubing upwards and then downwards (no rotation of the tubing is required);
- Extraction from the well happens by tightening the tubing up;
- Packer has a gas removal pipe to divert gas accumulated from the zone under the Packer;
- Increased inner bore of the Packer;
- Packer has two symmetrically located code grooves of the switching and setting mechanism on the stem, which ensures secure seating (setting) in inclined wells;
- Installation is made without disturbing integrity of the electric cable strands;
- Availability of the Swivel Unit ensures correct and reliable orientation of the Packer with reference to the tubing with the Electric Submersible Centrifugal Pump Unit cable;
- Simple and reliable Sealing Unit;
- Convenient in operation, simple in service;
- Reusable equipment in one tripping;
- High reparability;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Casing size		Packer size										Maximum pressure, psi	Maximum temperature, °F	Axial Load When Packer is Set, kN, no more than	
			OD		ID		Connection*				Length, in, no more than	Weight, lbs, no more than				
	in	mm	in	mm	in	mm	Box	Pin								
PVM-O (KV) M 118-50-50	5 ½; 5 ¾	139.7; 146.1	4.646	118	1.969	50	2.875 NU	73.03	2.875 NU	73.03	87.0	167.55	7252**	266 ***	80...120	
PVM-O (KV) M 122-50-50	5 ¾	146.1	4.803	122	1.969	50	2.875 NU	73.03	2.875 NU	73.03	87.0	171.96	7252**	266 ***	80...120	
PVM-O (KV) M 140-60-50	6 ½	168.3	5.512	140	2.362	60	3.5 NU	88.9	2.875 NU	73.03	97.244	211.64	7252**	266 ***	80...120	
PVM-O (KV) M 142-60-50	6 ½	168.3	5.59	142	2.362	60	3.5 NU	88.9	2.875 NU	73.03	97.244	216.05	7252**	266 ***	80...120	
PVM-O (KV) M 145-60-50	6 ½; 7	168.3; 177.8	5.709	145	2.362	60	3.5 NU	88.9	2.875 NU	73.03	97.244	244.71	7252**	266 ***	80...120	
PVM-O (KV) M 150-60-50	7.0	177.8	5.906	150	2.362	60	3.5 NU	88.9	2.875 NU	73.03	97.244	253.5	7252**	266 ***	80...120	

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Packer can be made of other types
- \*\* Packer is manufactured for a pressure of 5076 psi; 7252 psi.
- \*\*\* By special order Packer is manufactured for working temperature of 302 °F.
- Can be manufactured for aggressive media — Option K2.
- Packer is supplied with a Spares and tool kit.
- At customer's option, Packer PVM-O (KV) M is manufactured for other sizes of strings.
- Overall dimensions of the power cable (Flat Rubber Armored Cable) used with Packer — 0.59x1.472 (0.118x0.63). By customer specification, Packer can be manufactured to fit other sizes of the power cable (per GOST Standard) used together with Packer.

# Thrust Mechanical Packer with Cable Input PU-M (KV)

This Packer is designed for operation of wells using electric submersible pump equipment and isolation of leaks of the production string located above the input of the Electric Submersible Centrifugal Pump Unit.

## Application

- In multi-Packer set-ups for downhole pumping of liquid (from bottom up).
- In combination with other downhole equipment (page 103).

## Special Features and Benefits

- Packer is installed by abutting against the bottom Packer;
- Packer is plated (phosphate), which reduces effect of the aggressive medium on the Packer;
- Easy Packer removal;
- Reliable operation in inclined wells;
- Availability of the Swivel Unit ensures correct and reliable orientation of the Packer with reference to the tubing with the Electric Submersible Centrifugal Pump Unit cable;



## Technical Specifications

Type	Casing size		Packer size								Maximum pressure, psi	Maximum temperature, °F	Axial Load When Packer is Set, kN, no more than	
			OD		ID		Connection*		Length, in, no more than	Weight, lbs, no more than				
	In	mm	in	mm	in	mm	in	mm						
PU-M (KV) 118-35-35	5 ½; 5 ¾	139.7; 146.1	4.646	118	1.378	35	2.875 NU	73.03	140.71	277.78	5076**	266 ***	80...120	
PU-M (KV) 122-35-35	5 ¾	146.1	4.803	122	1.378	35	2.875 NU	73.03	140.71	282.19	5076**	266 ***	80...120	
PU-M (KV) 140-50-35	6 ½	168.3	5.512	140	1.969	50	3.5 NU	88.9	97.244	343.92	5076**	266 ***	80...120	
PU-M (KV) 142-50-35	6 ½	168.3	5.59	142	1.969	50	3.5 NU	88.9	97.244	348.3	5076**	266 ***	80...120	

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Packer can be made of other types
- \*\* Packer is manufactured for a pressure of 5076 psi; 7252 psi.
- \*\*\* By special order Packer is manufactured for working temperature of 302 °F.
- Can be manufactured for aggressive media — Option K2.
- Packer is supplied with a Spares and tool kit.
- At customer's option, Packer PU-M (KV) M is manufactured for other sizes of strings.
- Overall dimensions of the power cable (Flat Rubber Armored Cable) used with Packer — 0.59x1.472 (0.118x0.63). By customer specification, Packer can be manufactured to fit other sizes of the power cable (per GOST Standard) used together with Packer.

## Tubular Plug Packer P-PT

Designed for sealed zonal isolation of the casing string stem.

### Application

- Installing bridges and temporary formation shutoff;
- Abandoning well or conservation of reservoir;
- Remedial Cementing using plugging material in the zone over the product.

### Special Features and Benefits

- Simple design;
- Convenient transportation and installation due to small overall dimensions;
- Average drilling out time — 5–6 hours.



## Technical Specifications

Type	Casing size		Packer size						Maximum pressure, psi	Pressure Required To Move Plug Packer from Shipping To Working Position, psi	Maximum temperature, °F	Axial Load When Packer is Set, kN, no more than		
			OD		Connection*		Length, in, no more than	Weight, lbs, no more than						
	In	mm	in	mm	in	mm								
P-PT 118-50	5 ½; 5 ¾	139.7; 146.1	4.646	118	2.875 NU	73.03	30	57.32	7252**	1740	266 ***	80...120		
P-PT 122-50	5 ¾	146.1	4.803	122	2.875 NU	73.03	30	61.73	7252**	1740	266 ***	80...120		
P-PT 136-50	6 ½	168.3	5.354	136	2.875 NU	73.03	30	83.776	7252**	1740	266 ***	80...120		
P-PT 140-50	6 ½	168.3	5.512	140	2.875 NU	73.03	30	94.8	7252**	1740	266 ***	80...120		

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Packer can be made of other types
- \*\* Packer is manufactured for a pressure of 5076 psi; 7252 psi.
- \*\*\* By special order Packer is manufactured for working temperature of 302 °F.
- At customer's option, Packer P-PT is manufactured for other sizes of strings.

# Hydraulic Anchor YAG1, YAG2, YAG3

Designed to prevent downhole equipment from slipping inside the production tubing when repairs and formation treatment operations are carried out.

## Application

- In combination with mechanically and hydraulically installed Packers;
- In combination with tubings.

## Special Features and Benefits

- Installation in the well by generating hydraulic pressure in the tubing
- Increased reliability of traction between hydraulic anchor jaws and casing string walls;
- Convenient, easy assembly and disassembly;
- Anchor YAG1 — 6 jaws, Anchor YAG2 — 9 jaws, Anchor YAG3 — 15 jaws;
- Anchor has protective plating (phosphate coating) ;
- No screws for fastening (dovetail).



## Technical Specifications

Type	Casing size		Anchor size								Maximum pressure, psi	Maximum temperature, °F
			OD		ID		Connection*		Length, in, no more than	Weight, lbs, no more than		
	In	mm	in	mm	in	mm	in	mm				
YAG1/YAG2/YAG3 80-34-100	4.0	101.6	3.15	80	1.339	34	2.375 NU	60.33	13.7/16.457/19.685	13.2/15.4/17.6	14500**	266 ***
YAG1/YAG2/YAG3 82-34-100	4.0	101.6	3.23	82	1.339	34	2.375 NU	60.33	13.7/15.669/19.685	15.4/19.8/22	14500**	266 ***
YAG1/YAG2/YAG3 88-38-100	4 ½	114.3	3.465	88	1.496	38	2.375 NU	60.33	13.7/15.669/19.685	17.6/24.3/26.4	14500**	266 ***
YAG1/YAG2/YAG3 92-38-100	4 ½	114.3	3.622	92	1.496	38	2.375 NU	60.33	13.7/15.669/19.685	17.6/24.3/26.4	14500**	266 ***
YAG1/YAG2/YAG3 98-42-100	4 ½; 5.0	114.3; 127.0	3.86	98	1.654	42	2.875 NU	73.03	15/17.756/22.835	19.8/33/35.3	14500**	266 ***
YAG1/YAG2/YAG3 101-42-100	5.0	127.0	3.976	101	1.654	42	2.875 NU	73.03	15/17.756/22.835	22/35.3/37.5	14500**	266 ***
YAG1/YAG2/YAG3 112-52-100	5 ½; 5 ¾	139.7; 146.1	4.41	112	2.047	52	2.875 NU	73.03	15/17.756/22.835	28.7/37.5/39.7	14500**	266 ***
YAG1/YAG2/YAG3 114-52-100	5 ½	139.7	4.49	114	2.047	52	2.875 NU	73.03	15/17.756/22.835	30.9/37.5/39.7	14500**	266 ***
YAG1/YAG2/YAG3 116-52-100	5 ½; 5 ¾	139.7; 146.1	4.567	116	2.047	52	2.875 NU	73.03	15/17.756/22.835	33/39.7/46.3	14500**	266 ***
YAG1/YAG2/YAG3 118-52-100	5 ½; 5 ¾	139.7; 146.1	4.646	118	2.047	52	2.875 NU	73.03	15/17.756/22.835	35.3/44.1/52.9	14500**	266 ***
YAG1/YAG2/YAG3 122-52-100	5 ¾	146.1	4.803	122	2.047	52	2.875 NU	73.03	15/17.756/22.835	35.3/47.4/57.3	14500**	266 ***
YAG1/YAG2/YAG3 136-60-100	6 ½	168.3	5.354	136	2.362	60	2.875 NU	73.03	15/17.756/22.835	41.9/48.5/72.7	14500**	266 ***
YAG1/YAG2/YAG3 140-60-100	6 ½	168.3	5.512	140	2.362	60	2.875 NU	73.03	15/17.756/22.835	46.3/63.9/77.2	14500**	266 ***
YAG1/YAG2/YAG3 142-60-100	6 ½	168.3	5.59	142	2.362	60	2.875 NU	73.03	15/17.756/22.835	48.5/66.1/79.4	14500**	266 ***
YAG1/YAG2/YAG3 145-60-100	6 ½; 7	168.3; 177.8	5.709	145	2.362	60	2.875 NU	73.03	15/17.756/22.835	48.5/66.1/79.4	14500**	266 ***
YAG1/YAG2/YAG3 150-60-100	7.0	177.8	5.906	150	2.362	60	2.875 NU	73.03	15/17.756/22.835	55.1/75/88.2	14500**	266 ***

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Anchor can be made of other types.
- \*\* Anchor is manufactured for a pressure of 5076 psi; 7252 psi; 10150 psi; 14500 psi.
- \*\*\* By special order Anchor is manufactured for working temperature of 302 °F.
- Hydraulic Anchor can be manufactured for aggressive media — Option K2.
- Hydraulic Anchor is supplied with a Spares and tool kit.
- At customer's option, Hydraulic Anchor is manufactured for other sizes of strings.

# Mechanical Anchor YAM

Designed to create support on the walls of the production string and to keep equipment from moving down.

## Application

- Preventing rotation and flight of the string hanger on well bottom when sucker rod pumps and screw-type pumps are used.

## Special Features and Benefits

- installed mechanically in the well by axially moving the tubing (rotating the string is not necessary), moved into shipping position by tightening the tubing;
- Multiple action equipment in one tripping;
- Simple design;
- High level of reparability;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Casing size		Anchor size						Maximum pressure, psi	Maximum temperature, °F	
			OD		ID		Connection*				
	In	mm	in	mm	in	mm	in	mm			
YAM 118-52-50	5 1/2; 5 3/4	139.7; 146.1	4.646	118	2.047	52	2.875 NU	73.03	70.866	92.6	14500**
YAM 122-52-50	5 3/4	146.1	4.803	122	2.047	52	2.875 NU	73.03	70.866	99.2	14500**
YAM 140-62-50	6 5/8	168.3	5.512	140	2.44	62	2.875 NU	73.03	72.835	132.3	14500**

- \* Thread on the Coupling and the Nipple can be made of other types.
- Hydraulic Anchor can be manufactured for aggressive media — Option K2.
- At customer's option, Hydraulic Anchor is manufactured for other sizes of strings.

# Hydraulic Anchor with Cable Input YAG1 (KV), YAG2 (KV), YAG3 (KV)

Designed to prevent downhole equipment from slipping inside the production tubing when repairs and formation treatment operations are carried out.

## Application

- Operating wells using Electric Submersible Pump and carrying out different operations in injection wells and production wells.

## Special Features and Benefits

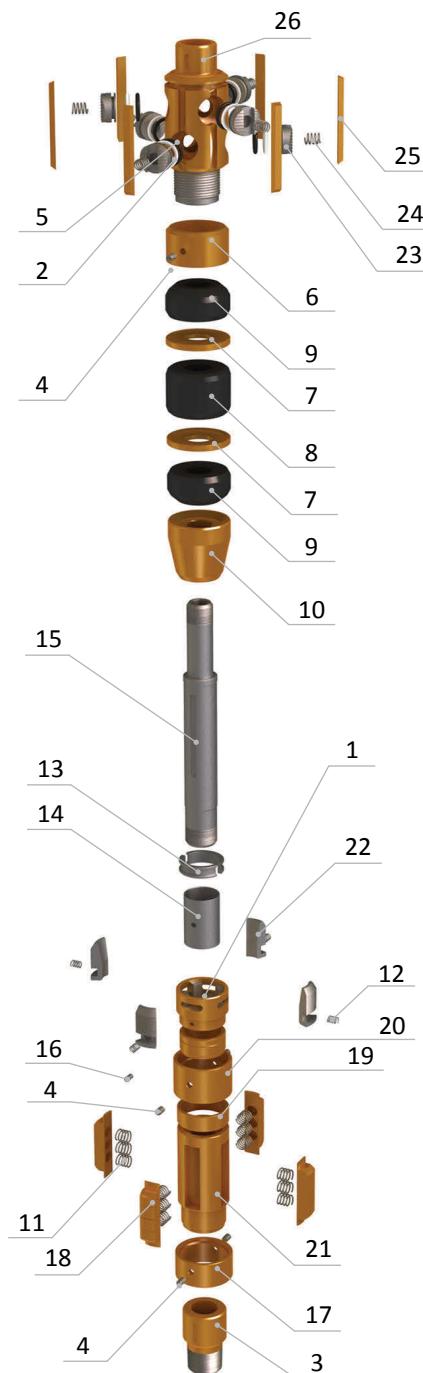
- Installing in the well by generating hydraulic pressure in the tubing
- On the housing there is a longitudinal slot in which a power cable is inserted;
- Increased reliability of traction between the jaws and the walls of the casing string;
- Convenient, easy assembly and disassembly;
- Anchor has protective plating (phosphate coating) ;
- No screws for fastening (dovetail).



## Technical Specifications

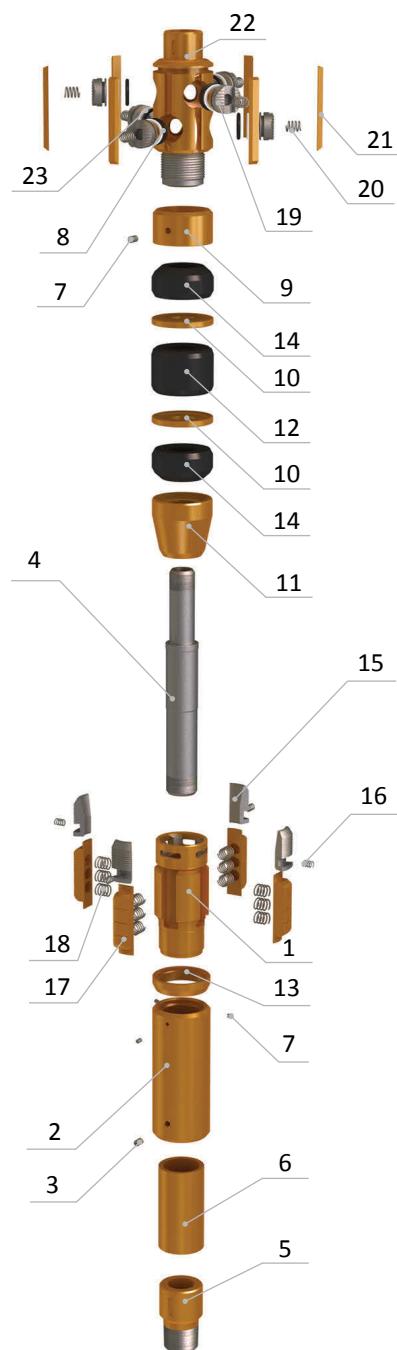
Type	Casing size		Anchor size								Maximum pressure, psi	Maximum temperature, °F
			OD		ID		Connection*		Length, in, no more than	Weight, lbs, no more than		
	In	mm	in	mm	in	mm	in	mm				
YAG1 (KV)/YAG2 (KV)/YAG3 (KV) 112-52-100	5 ½; 5 ¾	139.7; 146.1	4.41	112	2.047	52	2.875 NU	73.03	15/17.76/22.84	24.25/30.9/44.1	14500**	266 ***
YAG1 (KV)/YAG2 (KV)/YAG3 (KV) 114-52-100	5 ½	139.7	4.49	114	2.047	52	2.875 NU	73.03	15/17.76/22.84	28.7/35.3/50.7	14500**	266 ***
YAG1 (KV)/YAG2 (KV)/YAG3 (KV) 116-52-100	5 ½; 5 ¾	139.7; 146.1	4.567	116	2.047	52	2.875 NU	73.03	15/17.76/22.84	28.7/35.3/50.7	14500**	266 ***
YAG1 (KV)/YAG2 (KV)/YAG3 (KV) 118-52-100	5 ½; 5 ¾	139.7; 146.1	4.646	118	2.047	52	2.875 NU	73.03	15/17.76/22.84	30.9/39.7/55.1	14500**	266 ***
YAG1 (KV)/YAG2 (KV)/YAG3 (KV) 122-52-100	5 ¾	146.1	4.803	122	2.047	52	2.875 NU	73.03	15/17.76/22.84	33/41.6/57.3	14500**	266 ***
YAG1 (KV)/YAG2 (KV)/YAG3 (KV) 136-60-100	6 ½	168.3	5.354	136	2.362	60	2.875 NU	73.03	15/17.76/22.84	41.9/52.96/74.96	14500**	266 ***
YAG1 (KV)/YAG2 (KV)/YAG3 (KV) 140-60-100	6 ½	168.3	5.512	140	2.362	60	2.875 NU	73.03	15/17.76/22.84	46.3/59.5/79.4	14500**	266 ***
YAG1 (KV)/YAG2 (KV)/YAG3 (KV) 142-60-100	6 ½	168.3	5.59	142	2.362	60	2.875 NU	73.03	15/17.76/22.84	48.5/63.9/81.6	14500**	266 ***
YAG1 (KV)/YAG2 (KV)/YAG3 (KV) 145-60-100	6 ½; 7	168.3; 177.8	5.709	145	2.362	60	2.875 NU	73.03	15/17.76/22.84	52.9/66.1/86	14500**	266 ***
YAG1 (KV)/YAG2 (KV)/YAG3 (KV) 150-60-100	7.0	177.8	5.906	150	2.362	60	2.875 NU	73.03	15/17.76/22.84	57.3/70.55/88.2	14500**	266 ***

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Anchor can be made of other types.
- \*\*Anchor is manufactured for a pressure of 5076 psi; 7252 psi; 10150 psi; 14500 psi.
- \*\*\* By special order Anchor is manufactured for working temperature of 302 °F.
- Hydraulic Anchor can be manufactured for aggressive media — Option K2.
- Hydraulic Anchor is supplied with a Spares and tool kit.
- At customer's option, Hydraulic Anchor is manufactured for other sizes of strings.



## Table for Ordering Spare Parts for Packer PVM-O 122-52-100 YAG1

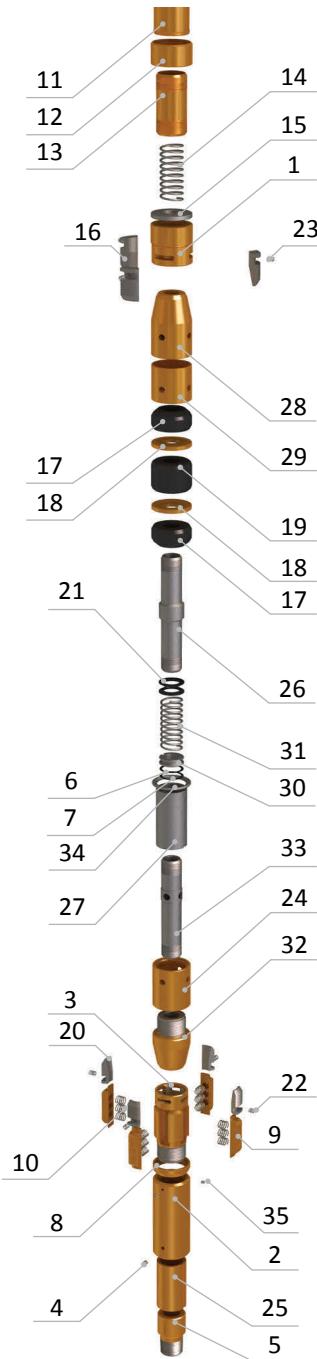
Description of Spare Parts, Tools and Accessories				Kit No.1	Kit No.2	Kit No.3
Item	Part Description	Part Designation Per Design Docum.	Q-ty in Packer, pcs.	Q-ty in Kit, pcs.	Q-ty in Kit, pcs.	Q-ty in Kit, pcs.
1	Housing	PVM-O 122.00.100-01	1			
2	Protective Ring	PM-R (M) 122.00.004	6	6	6	6
3	Adaptor Piece	PM-R 116.00.004	1			
4	Screw	M10-6g x 10.45H.40X.05 ГОСТ 11074-93	5			
5	Sealing Ring	049-055-36 ГОСТ 9833-73	6	6	6	6
6	Adjustment Nut	PM-R 122.00.001	1			
7	Spacer	PM-R 122.00.002	2			
8	Sealing Collar	PM-R 122.00.004-01	1	1	1	1
9	Protective Collar	PM-R 122.00.006-01	2	2	2	2
10	Cone	PM-R 122.02.003	1			
11	Spring	PM-R 136.00.014 ЕК2	12	-	6	12
12	Spring	PVM-O 118.00.008 ЕК2	4	-	4	4
13	Trunnion	PVM-O 118.00.004-01	2			
14	Bushing	PVM-O 118.00.013-02	1			
15	Stem	PVM-O 118.01.001	1			
16	Finger	PVM-O 118.01.007	2			
17	Binding Nut	PVM-O 122.00.001	1			
18	Centralizer	PM-R 122.00.012	4	-	-	4
19	Ring	PVM-O 122.00.005	1			
20	Nut	PVM-O 122.00.006	1			
21	Race	PVM-O 122.00.004-01	1			
22	Jaw	PVM-O 122.02.003	4	-	1	4
23	Round jaw	PM-R (M) 122.00.002-01	6	-	1	6
24	Spring	PM-R (M) 122.00.003 ЕК2	6	-	6	6
25	Strip	PM-R (M) 116.01.003	6			
26	Anchor Housing	PM-R (M) 122.01.001	1			
-	Wrench	7812-0374 ГОСТ 11737-93	1			



## Table for Ordering Spare Parts for Packer PM-R 122-52-100 YAG1

Description of Spare Parts, Tools and Accessories				Kit No.1	Kit No.2	Kit No.3
Item	Part Description	Part Designation Per Design Doc	Q-ty in Packer, pcs.	Q-ty in Kit, pcs.	Q-ty in Kit, pcs.	Q-ty in Kit, pcs.
1	Race	PM-R 122.00.100	1			
2	Housing	PM-R 116.00.202	1			
3	Finger (Pin)	PM-R 116.00.201	1			
4	Stem	PM-R 116.00.001	1			
5	Adaptor Piece	PM-R 116.00.004	1			
6	Lock	PM-R 116.00.015	1			
7	Screw	M10-6g x 10.45H.40X.05 GOST 11074-93	4			
8	Sealing Ring	049-055-36 GOST 9833-73	6	6	6	6
9	Adjustment Nut	PM-R 122.00.001	1			
10	Spacer	PM-R 122.00.002	2			
11	Cone	PM-R 122.00.003	1			
12	Sealing Collar	PM-R 122.00.004-01	1	1	1	1
13	Ring	PM-R 122.00.005	1			
14	Protective Collar	PM-R 122.00.006-01	2	2	2	2
15	Jaw	PM-R 122.00.009	4	-	1	4
16	Spring	PVM-O 140.00.017 EK2	4	-	4	4
17	Centralizer	PM-R 122.00.012	4	-	-	4
18	Spring	PM-R 136.00.014 EK2	12		6	12
19	Round Jaw	PM-R (M) 122.00.002-01	6	-	1	6
20	Spring	PM-R (M) 122.00.003 EK2	6	-	6	6
21	Strip	PM-R (M) 116.01.003	6			
22	Anchor Housing	PM-R (M) 122.01.001	1			
23	Protective Ring	PM-R (M) 122.00.004	6	6	6	6
-	Wrench	7812-0374 GOST 11737-93	1			

## Table for Ordering Spare Parts for Packer PM-A1 122-52-70



Item	Part Description	Designation of Part per Design Doc	Q-ty in Packer, pcs.	Kit No.1	Kit No.2	Kit No.3
				Q-ty in Kit, pcs.	Q-ty in Kit, pcs.	Q-ty in Kit, pcs.
1	Jaw Holder Housing (Top)	ПМ-A1 122.03.200	1			
2	Housing	ПМ-A1 122.02.200	1			
3	Race	ПМ-A1 122.03.100	1			
4	Finger (Pin)	ПМ-R 116.00.201	1			
5	Adaptor Piece	ПМ-R 116.00.004	1			
6	Sealing Ring	074-082-46 GOST 9833-73	1	1	1	1
7	Sealing Ring	104-110-36 GOST 9833-73	1	1	1	1
8	Ring	PM-R 122.00.005	1			
9	Centralizer	PM-R 122.00.012	4	-	-	4
10	Spring	PM-R 136.00.014 EK2	12	-	6	12
11	Substitute (Top)	PM-A 122.00.001	1			
12	Acorn Nut	PM-A 122.00.002	1			
13	Cover	PM-A 122.00.003	1			
14	Spring	PM-A 122.00.004	1			
15	Washer	PM-A 122.00.005	1			
16	Top Jaw	PM-A1 122.03.011	3	-	1	3
17	Protective Collar	PM-A1 122.02.006	2	2	2	2
18	Spacer	PM-A1 122.03.010	2			
19	Sealing Collar	PM-A1 122.02.005	1	1	1	1
20	Bottom Jaw	PM-A 122.00.018	4	-	1	4
21	Collar	PM-A 122.00.025	2			
22	Spring	PVM-O 118.00.008 EK2	4	-	4	4
23	Spring	PM-R 136.00.015 EK2	3	-	3	3
24	Nut	PM-A1 122.02.003	1			
25	Lock	PM-A1 122.02.011	1			
26	Spindle	PM-A1 122.03.001-01	1			
27	Stem	PM-A1 122.03.002	1			
28	Top Cone	PM-A1 122.03.003-01	1			
29	Rest	PM-A1 122.03.004	1			
30	Trunnion	PM-A1 122.03.005	2			
31	Spring	PM-A1 122.03.006	1			
32	Bottom Cone	PM-A1 122.03.007	1			
33	Spindle	PM-A1 122.03.008	1			
34	Limiter Ring	PM-A1 122.03.009	1			
36	Screw	M10-6g x 10.45H.40X.05 GOST 11074-93	3			
-	Wrench	7812-0374 GOST11737-93	1			

# **Valves and Well Accessories**



## Axis Equalizing Valve KU-O

Designed to equalize the annular space with the pressure of the inner space of the tubing.

### Application in combination with packer

- Formation Hydraulic Fracturing;
- Perforating-explosive operation on tubing
- Other technological operations after which circulation needs to be ensured between the annular space and the internal cavity of the tubing.

### Design Features and Advantage

- Actuation or tripping happens as a result of axial movement of the tubing upwards;
- Equipped with key to ensure that torque is transmitted to the equipment installed below the valve;
- Simple design;
- Valve closes as a result of axial movement of the tubing downwards;
- Possibility of adjusting valve actuation;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Casing size		Valve size								Maximum pressure, psi	Flow area through ports, in <sup>2</sup>	Maximum temperature, °F	
			OD		ID		Connection*		Length, in, no more than	Weight, lbs, no more than				
	In	mm	in	mm	in	mm	in	mm						
KU-O 82-40-70	3.465	88	3.23	82	1.575	40	2.375 NU	60.33	21.38	26.5	10150**	0.53	266 ***	
KU-O 101-42-70	4.41	112	3.976	101	1.654	42	2.875 NU	73.03	21.38	33	10150**	0.62	266 ***	
KU-O 112-52-70	4.646	118	4.41	112	2.047	52	2.875 NU	73.03	21.73	46.3	10150**	0.81	266 ***	
KU-O 114-62-70	4.724	120	4.49	114	2.44	62	2.875 NU	73.03	23.15	46.3	10150**	0.81	266 ***	
KU-O 136-76-70	5.667	144	5.354	136	2.992	76	3.5 NU	88.9	27.52	55.1	10150**	0.84	266 ***	

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Valve can be made of other types.
- \*\* Valve is manufactured for a pressure of 5076 psi; 7252 psi; 10150 psi; 14500 psi.
- \*\*\* By special order Valves are manufactured for working temperature of 302 °F.
- The force necessary for valve to actuate with the tool tensioned upwards is between 2205...13228 lbs, depending on customer's requirements.
- Valve can be manufactured for aggressive media — Option K2.
- Valve is supplied with a Spares and tool kit.
- At customer's option, Valve is manufactured for other sizes of strings.

## Flush Valve KP

Designed for communication with annular space and inner cavity of the lifting pipes when carrying out different technological operations in the development and operation of wells.

### Application

- Consistent conduct of swabbing operations for two and more formations in the well;
- Levelling off annular space pressure and that of the inner space of the tubing;
- Flushing with chemical agent asphalt, resin and paraffin depositions.

### Special Features and Benefits

- Valve trips upon subsequent rise of hydraulic pressure in the annular space;
- Possibility of adjusting the tripping feature for necessary pressure;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Casing size		Valve size							Maximum pressure, psi	Differential pressure valve opening, psi	Flow area through ports, in <sup>2</sup>	Maximum temperature, °F		
			OD		ID		Connection*								
	In	mm	in	mm	in	mm	in	mm							
KP-NKT 73-114-52-50	4.49	114	2.047	52	2.875 NU	73.03	29.3	57.3	7252**	1015-1450	2.178	266 ***	0.53	266 ***	
KP-NKT 73-122-60-50	4.803	122	2.362	60	2.875 NU	73.03	29.6	61.7	7252**	1015-1450	2.558	266 ***	0.62	266 ***	
KP-NKT 73-140-60-50	5.512	140	2.362	60	2.875 NU	73.03	32.1	88.2	7252**	1015-1450	2.906	266 ***	0.81	266 ***	

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Valve can be made of other types.
- \*\* Valve is manufactured for a pressure of 5076 psi; 7252 psi.
- \*\*\* By special order Valves are manufactured for working temperature of 302 °F.
- Valve can be manufactured for aggressive media — Option K2.
- Valve is supplied with a Spares and tool kit.
- At customer's option, Valve is manufactured for other sizes of strings.

# Circulating Flush Valve KTSP

Designed for communication between the inner space of the tubing and the annular space.

## Application

- Well development;
- Flushing wells;
- Removing asphalt, resin and paraffin depositions;
- Other technological operations in oil, gas condensate, gas wells.

## Special Features and Benefits

- Valve is taken down the well in closed position;
- Opening and closing are done using tool – tappet and mechanical jar;
- Reliable design;
- Wide use as part of other downhole equipment;
- Possibility of installing under the Packer and over the Packer;
- Parts have protective plating (phosphate coating).

## Technical Specifications

Type	Casing size		Valve size								Maximum pressure, psi	Flow area through ports, in <sup>2</sup>	Maximum temperature, °F	
			OD		ID		Connection*		Length, in, no more than	Weight, lbs, no more than				
	In	mm	in	mm	in	mm	in	mm						
KTSP-1.87-50	3.346	85	1.87	47.53	2.375 NU	60.33	37.13	3.1	7252**	3.1	266 ***	0.53	266 ***	
KTSP-2.313-50	3.7	94	2.313	58.75	2.875 NU	73.03	37.795	3.875	7252**	3.875	266 ***	0.62	266 ***	
KTSP-2.25-50	4.134	105	2.25	57.15	2.875 NU	73.03	39.173	5.425	7252**	5.425	266 ***	0.81	266 ***	
KTSP-3.313-50	5.315	135	3.313	84.15	4.5 NU	114.3	35.551	7.905	7252**	7.905	266 ***	0.81	266 ***	

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Valve can be made of other types.
- \*\* Valve is manufactured for a pressure of 5076 psi; 7252 psi.
- \*\*\* By special order Valves are manufactured for working temperature of 302 °F.
- Valve can be manufactured for aggressive media — Option K2.
- At customer's option, Valve is manufactured for other sizes of strings.



## Tappet T

Designed for opening and closing the Circulating Flush Valve.

### Technical Specification

Type	OD		ID		Connection		Length, in, no more than	Weight, lbs, no more than
	In	mm	in	mm	in	mm		
T 54.8-65.8	2.157	54.8	2.59	65.8	UNS 23.825	SH 16	15.079	8.82
T 80.75-93.5	3.179	80.75	3.681	93.5	UNS 27.000	SH 19	16.142	22

- Tappet can be manufactured for aggressive media — Option K2.
- At customer's option, the tappet is manufactured for other sizes of strings.

## Mechanical Jar YAM

Designed to deliver blows "from top to bottom" or "from bottom up" against sidewall stuck equipment for the purpose of overcoming overpull and slackening off or jamming of equipment.

### Application

- In tubings in sets of downhole equipment lowered by wireline.

### Technical Specifications

Type	OD		Fish neck OD		Rod Stroke Length, no more than		Connection		Length, in, no more than	Weight, lbs, no more than
	In	mm	in	mm	in	mm				
YAM-38.1 K1	1.5	38.1	1.5	38.1	34.252	870	UNS 23.825	SH 16	57.08	24.46
YAM-47.5 K1	1.87	47.5	1.752	44.5	34.252	870	UNS 27.000	SH 19	57.08	35.3

- Jar can be manufactured for aggressive media — Option K2.
- At customer's option, the Jar is manufactured in other sizes.

## Upper Circulating Flush Valve KTSP-V

Designed to ensure liquid (gas) circulation between annular space and inner space of the oil string when technological operations are performed in the well.

### Application

- In two-Packer systems for maintenance of formation pressure;
- Equalizing the pressure in the production string and annular space;
- In multi-Packer set-ups (using it paired with KTSP-N) for consistent (sequential) and dual string production;
- Sequential conduct of swabbing operations for two and more formations in the well.
- In combination with other downhole equipment (page 108).

### Special Features and Benefits

- Lowered into the well in closed position;
- To avoid premature opening, the design uses safeguards which make it possible to adjust opening pressure;
- Easy actuation — ball is released into the tubing, when the hydraulic pressure rises subsequently, in the inner space of the tubing, the safeguards are cut off, that triggers the valve and side holes open up;
- Parts have protective plating (phosphate coating).

### Technical Specifications

Type	Casing size		Valve size						Length, in, no more than	Weight, lbs, no more than	Maximum pressure, psi	Differential pressure valve opening, psi	Flow area through ports, in <sup>2</sup>	Maximum tempe- rature, °F				
			OD		ID		Connection*											
	In	mm	in	mm	in	mm	in	mm										
KTSP-V 122-54-50	4.803	122	2.126	54	2.875	NU	73.03	29.13	67.2	7252**	1160-2176	4.805	266 ***	0.53	266 ***			

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Valve can be made of other types.
- \*\* Valve is manufactured for a pressure of 5076 psi; 7252 psi.
- \*\*\* By special order Valves are manufactured for working temperature of 302 °F.
- Valve can be manufactured for aggressive media — Option K2.
- Valve is supplied with a Spares and tool kit.
- At customer's option, Valve is manufactured for other sizes of strings.



## Lower Circulating Flush Valve KTSP-N

Designed for operation in two-Packer, three-Packer set-ups of the underground equipment.

### Application

- Doing work relating to selective treatment of two zones with different kinds of chemical agents in one tripping;
- Split stream testing of zones for inflow;
- Conducting hydrodynamic tests of the wells;
- Improving safe working conditions when performing tripping operations involving Packer equipment.
- In combination with other downhole equipment (page 108).

### Special Features and Benefits

- Lowered into the well in open position;
- Provision for shear screws to protect the valve from premature closure;
- Easy actuation — ball is released into the production string, when hydraulic pressure rises subsequently in the inner space of the tubing, the safeguard is cut off, the Valve operates and the side holes close up;
- Parts have protective plating (phosphate coating).

### Technical Specifications

Type	Casing size		Valve size						Length, in, no more than	Weight, lbs, no more than	Maximum pressure, psi	Differential pressure valve opening, psi	Flow area through ports, in <sup>2</sup>	Maximum temper- ature, °F				
			OD		ID		Connection*											
	In	mm	in	mm	in	mm	in	mm										
KTSP-N 108-45-50	4.252	108	1.772	45	2.875 NU	73.03	24.567	55.12	7252**	1160-2176	2.403	266 ***	0.53	266 ***				

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Valve can be made of other types.
- \*\* Valve is manufactured for a pressure of 5076 psi; 7252 psi.
- \*\*\* By special order Valves are manufactured for working temperature of 302 °F.
- Valve can be manufactured for aggressive media — Option K2.
- Valve is supplied with a Spares and tool kit.
- At customer's option, Valve is manufactured for other sizes of strings.



## (Sealing) Circulating Flush Valve KTSP (U)

Designed for sealed isolation of bottomhole zone, borehole annulus between Packers and tubing annulus (over Packers) of the injection wells for purposes of ensuring independent water injection into the two formations of the well, making sure, at the same time, that axial movements of the internal tubing with respect to the outside one are compensated for.

### Application

- Development of wells;
- Flushing of wells;
- Two lift dual injection operation in two formations in two-Packer set-ups.

### Special Features and Benefits

- This Valve ensures that tubing column is loosened and compensates for column temperature changes;
- Two functions are built into one product: compensator and injection valve;
- Reliable sealing unit;
- Possibility of increasing the number of holes for injecting a large volume of liquid;
- Design of the Valve's flush holes prevents the walls of the production column from being washed out;
- Parts have protective plating (phosphate coating).

### Technical Specifications

Type	Minimum inner diameter of the casing string		Valve size										Rod Stroke Length, no more than	Flow area through ports, in <sup>2</sup>	Rated string size, in	Maximum temperature, °F	
			OD		ID		Connection*				Box		Pin				
	In	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	
KTSP (U) NKT 89-35-108-50	4.646	118	4.252	108	1.378	35	3.5 NU	88.9	2.875 NU	73.03	60.24	52.9	47.244	1200	4.805	1.654	266 **
KTSP (U) NKT 89-40-108-50	4.646	118	4.252	108	1.575	40	3.5 NU	88.9	2.875 NU	73.03	60.24	52.9	47.244	1200	4.805	1.89	266 **

- \* Valve can be manufactured with other connecting threads for outside pipes of the string.
- \*\* By special order Valves are manufactured for working temperature of 302 °F.
- Valve can be manufactured for aggressive media — Option K2.
- Valve is supplied with a Spares and tool kit.
- At customer's option, Valve is manufactured for other sizes of strings.



## Gas Relief Valve KGP

Designed to divert gas from wells with high annular pressure and to reduce gas counter pressure on the formation.

### Application

- Together with Packer with Cable Input to operate wells using Electric Submersible Pump equipment with leak intervals of the production string above producing horizon.
- Intensifying oil production by achieving "gas lift" effect and by facilitating oil extraction to the surface.

### Technical Specification

Type	Minimum inner diameter of the casing string		Valve size							Differential pressure valve opening, psi	Flow area through ports, in <sup>2</sup>	Maximum tempe-rature, °F	
			OD		ID		Connection*						
	In	mm	in	mm	in	mm	in	mm					
KGP 108-62	4.646	118	4.252	108	2.44	62	2.875 NU	73.03	9.291	8.82	1.45	0.062	266 **

- \* Valve can be manufactured with other connecting threads for outside pipes of the string.
- \*\* By special order Valves are manufactured for working temperature of 302 °F.
- Valve can be manufactured for aggressive media — Option K2.
- Valve is supplied with a Spares and tool kit.
- At customer's option, Valve is manufactured for other sizes of strings.



## Rotary Relief Valve KRP

Designed for intake of gas from the valve with high annular pressure and to reduce gas counter pressure on the formation.

### Application

- Together with Packer with Cable Input to operate wells using Electric Submersible Pump equipment with leak intervals of the production string above producing horizon.
- Valve allows Intensification of oil production by achieving "gas lift" effect and by facilitating oil extraction to the surface.

### Special Features and Benefits

- Simple design;
- Parts have protective plating (phosphate coating).

### Technical Specifications

Type	Minimum inner diameter of the casing string		Valve size							Diameter of Union Bore, in	Differential pressure valve opening, psi	Maximum pressure, psi	Maximum temperature, °F	
			OD		ID		Connection*		Length, in, no more than					
	In	mm	in	mm	in	mm	in	mm						
KPP 100-50	4.724	120	3.937	100	1.969	50	2.875 NU	73.03	16.22	20.944	0.315	1.45	7252	266 **

- \* Valve can be manufactured with other connecting threads for outside pipes of the string.
- \*\* By special order Valves are manufactured for working temperature of 302 °F.
- Valve can be manufactured for aggressive media — Option K2.
- Valve is supplied with a Spares and tool kit.
- At customer's option, Valve is manufactured for other sizes of strings.



## Pressurizing Poppet Valve KKO

### Special Features and Benefits

Designed to pressurize elements of the tubing or drilling string for the purpose of establishing leaks in them.

- Installed in the seat of the substitute either by dropping it into the tubing string from the mouth — the Valve is lowered down the string filled up with liquid under its own weight — or using wireline with running tool;
- Removal can be also carried out using two methods:
  - using the method of washing out upwards by feeding liquid into the annular space and due to provision for a parachute;
  - using wireline by means of fishing tool;
- Parachute is made from special light alloy material which allows the valve washout time to be considerably reduced;
- Simple design;
- Parts have protective plating (phosphate coating).

### Technical Specifications

Type	Valve size						Maximum pressure, psi	
	OD		Connection*		Length, in, no more than	Weight, lbs, no more than		
	in	mm	in	mm				
KKO NKT V-60-43-70	1.693	43	2.375 EU	60.33	5.9	6.06	10150	
KKO NKT V-73-47.63-70	1.875	47.63	2.875 EU	73.03	6.14	8.8	10150	
KKO NKT V-89-60-70	2.362	60	3.5 EU	88.9	7.68	16.27	10150	

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Valve can be made of other types.
- Pressurization working pressure at the mouth of 5802 psi; 10150 psi.
- Valve can be manufactured for aggressive media - Option K2.
- At customer's option, Valve is manufactured for other sizes of strings.



## Multi-Functional Check Valve KO (M)

Designed for temporary closure of lift tubing (check valve function), with provision for washout of the pump cavity to be made or for different kinds of chemical agents to be injected.

### Application

- Operation of wells using Electric Submersible Centrifugal Pump Unit;
- Other technological operations requiring temporary closure of the internal space of the tubing string.

### Special Features and Benefits

- Allows direct flush of the pump cavity or under valve space during the process of operation;
- During the process of operation, it does not create obstacles for a flow of liquid being produced;
- Holds a column of liquid in the tubing string, carrying out the check valve function;
- When pressure drop is generated, relief valves open for communication between over-the-valve space and under-the-valve space;
- It has protective plating (phosphate coating), which reduces aggressive medium effect.

### Technical Specifications

Type	Minimum inner diameter of the casing string		Valve size										Rod Stroke Length, no more than	Flow area through ports, in <sup>2</sup>	Rated string size, in	
			OD		ID		Connection*				Length, in, no more than	Weight, lbs, no more than				
	In	mm	in	mm	in	mm	Box	Pin	in	mm		in		mm		
KO (M) 92-40-50	3.937	100	3.622	92	1.575	40	2.875 NU	73.03	20.24	30.07	1.45	1450-2176	7252	266 **	4.805	1.654
KO (M) 108-52-50	4.409	112	4.25	108	2.05	52	2.875 NU	73.03	20.59	41.9	21.76	1450-2901	7252	266 **	4.805	1.89

- \* Valve can be manufactured with other connecting threads for outside pipes of the string.
- \*\* By special order Valves are manufactured for working temperature of 302 °F.
- Valve can be manufactured for aggressive media — Option K2.
- Valve is supplied with a Spares and tool kit.
- At customer's option, Valve is manufactured for other sizes of strings.



## Check Valve KO-GRP

Designed for sealed closure of the lift tubing bore when the pressure is excessive, in the course of plugging operations, formation testing, when leaks in the casing string are found.

### Application

- In set-ups for selective Formation Hydraulic Fracturing (page 107).

### Special Features and Benefits

- Valve allows pumping volumes of liquid during selected intervals of treatment;
- Shutoff occurs as a result of left hand rotation of the string half a turn;
- Parts are wear resistant to passage of sand for Formation Hydraulic Fracturing;
- Multiple action equipment in one tripping;
- Parts have protective plating (phosphate coating).

### Technical Specifications

Type	Minimum inner diameter of the casing string		Valve size								Maximum pressure, psi	Maximum temperature, °F
			OD		ID		Connection*					
	In	mm	in	mm	in	mm	in	mm				
KO-GRP 140-72-100	5.79	147.1	5.512	140	2.84	72	3.5 NU	88.9	37.95	134.48	14500**	266 ***

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Valve can be made of other types.
- \*\* Valve is manufactured for a pressure of 7252 psi; 10150 psi; 14500 psi.
- \*\*\* By special order Valves are manufactured for working temperature of 302 °F.
- Valve can be manufactured for aggressive media — Option K2.
- Valve is supplied with a Spares and tool kit.
- At customer's option, Valve is manufactured for other sizes of strings.



# Flush Valve With Diverter KR-D

Designed for use in Packer set-ups.

## Application

- When pumping in large volumes of frac sand (propant) during the selected interval when performing Formation Hydraulic Fracturing.

## Special Features and Benefits

- Parts are wear resistant to the pumping of sand for Formation Hydraulic Fracturing;
- Possibility of the production string wall of the well getting washed out when liquid is pumped through the valve has been minimized;
- The housing has slots for communication of inner space of the pipes with annular space;
- Parts have protective plating (phosphate coating).

## Technical Specifications

Type	Minimum inner diameter of the casing string		Valve size						Flow area through ports, in <sup>2</sup>
			OD		Connection*		Length, in, no more than		
	in	mm	in	mm	in	mm	in	in	
KP-D 120	5.04	128	4.724	120	3.5 NU	88.9	24.2	55.12	35.96

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Valve can be made of other types.
- Valve can be manufactured for aggressive media — Option K2.
- At customer's option, Valve is manufactured for other sizes of strings.



# Controlled Shutoff Valve KO-U

## Special Features and Benefits

- Complete shutoff and sealed condition are brought about without using the well pressure;
- Design incorporates a pressure equalizing device;
- In open condition, the wedge shaped shutter does not come into contact with the flow of liquid;
- Stem protects the shutter and seat from damage caused by tools in the course of wireline operation.

## Technical Specifications

Type	Casing size		Valve size						Maximum pressure, psi	Differential pressure valve opening, psi	Maximum temperature, °F	
			OD		ID		Connection*	Length, in, no more than	Weight, lbs, no more than			
	In	mm	in	mm	in	mm						
KO-U 146-72-70 K1 HL	7	177.8	5.75	146	2.835	72	TMK FMT 89	59.06	216	10150	1740	266 **
KO-U 190-98-21 K1 HL	9 ½	244.5	7.48	190	3.858	98	TMK FMT 114	61.1	324.1	3046	1740	266 **

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Valve can be made of other types.
- \*\* By special order Valves are manufactured for working temperature of 302 °F.
- Valve can be manufactured for aggressive media — Option K2.
- Valve is supplied with a Spares and tool kit.
- At customer's option, Valve is manufactured for other sizes of strings.



## Hydraulic Booster Valve K-UG

Designed for installation of Packer (Multiple Packer Set-Up) when it is impossible to transfer the weight of tubing string to the Packer or when the weight of the tubing string is not enough (at small depths).

### Application

- Operation of oil, gas wells and water injection;
- Carrying out Remedial Cementing work;
- Dual completion;
- Dual injection.

### Special Features and Benefits

- Sufficient stroke for setting the Packers;
- Equipped with a key to ensure that torque is transmitted to the equipment to be installed below the Hydraulic Booster Valve;
- Simple Design;
- Fixed in the tubing string using a hydraulic anchor;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Minimum inner diameter of the casing string		Valve size						Force Generated When Pressure Drop Is 3626 psi, KN	Torque Transmitted, kN•m	Maximum pressure, psi	Maximum temperature, °F		
			OD		ID		Connection*							
	In	mm	in	mm	in	mm	in	mm						
K-UG 114-62-70	4.72	120	4.488	114	2.44	62	2.875 NU	73.03	41.575	101.4	170	25	7252**	266 ***

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Valve can be made of other types.
- \*\* Valve is manufactured for a pressure of 5076 psi; 7252 psi; 10150 psi.
- \*\*\* By special order Valves are manufactured for working temperature of 302 °F.
- Valve can be manufactured for aggressive media — Option K2.
- Valve is supplied with a Spares and tool kit.
- At customer's option, Valve is manufactured for other sizes of strings.

## Column Disconnect RK-S

Designed to disconnect and automatically connect the tubing string with Packer equipment left alone.

### Application

- Treatment, testing, operation, well completion and other technological operations which require the tubing to be disconnected;
- In combination with other downhole equipment (pages 91, 92, 99, 102, 105, 106).

### Special Features and Benefits

- Design option — left hand or right hand disconnect at customer's option;
- Disconnect occurs as a result of prior generation of moment (1/4 of a turn) to be followed up by lift of the tubing string;
- Connection is made automatically;
- For safe release, the design provides for shear screws to be installed;
- High reliability of sealing elements;
- Parts have protective plating (phosphate coating).



## Technical Specifications

Type	Disconnect size						Length, in, no more than	Weight, lbs, no more than	Maximum pressure, psi	Maximum temperature, °F	Maximum Allowable Load When Disconnect Is Torn Off with Packer, lbs, no more than					
	OD		ID		Connection*											
	in	mm	in	mm	in	mm										
RK-S 94-40-100	3.7	94	1.575	40	2.375 NU	60.33	29.53	44.09	14500**	266 ***	44090-55120					
RK-S 105-42-100	4.134	105	1.654	42	2.875 NU	73.03	29.53	55.12	14500**	266 ***	44090-55120					
RK-S 110-52-110	4.33	110	2.047	52	2.875 NU	73.03	29.53	59.5	14500**	266 ***	44090-55120					
RK-S 112-52-100	4.41	112	2.047	52	2.875 NU	73.03	29.53	59.5	14500**	266 ***	44090-55120					
RK-S 114-52-100	4.49	114	2.047	52	2.875 NU	73.03	29.53	59.5	14500**	266 ***	44090-55120					
RK-S 116-52-100	4.567	116	2.047	52	2.875 NU	73.03	29.53	59.5	14500**	266 ***	44090-55120					
RK-S 118-52-100	4.646	118	2.047	52	2.875 NU	73.03	29.53	59.5	14500**	266 ***	44090-55120					
RK-S 122-52-100	4.803	122	2.047	52	2.875 NU	73.03	29.53	59.5	14500**	266 ***	44090-55120					
RK-S 136-60-100	5.354	136	2.362	60	2.875 NU	73.03	31.18	61.7	14500**	266 ***	44090-55120					
RK-S 140-60-100	5.512	140	2.362	60	2.875 NU	73.03	31.18	61.7	14500**	266 ***	44090-55120					
RK-S 142-60-100	5.59	142	2.362	60	2.875 NU	73.03	31.18	61.7	14500**	266 ***	44090-55120					
RK-S 145-60-100	5.709	145	2.362	60	2.875 NU	73.03	31.18	61.7	14500**	266 ***	44090-55120					
RK-S 150-60-100	5.906	150	2.362	60	2.875 NU	73.03	31.18	61.7	14500**	266 ***	44090-55120					
RK-S 205-100-100	8.07	205	3.937	100	4.5 NU	114.3	31.18	97	14500**	266 ***	44090-55120					

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Disconnect can be made of other types.
- \*\* String Disconnect is manufactured for the pressure of 5076 psi; 7252 psi; 10150 psi.
- \*\*\* By special order the String Disconnect is manufactured for working temperature of 302 °F.
- String Disconnect can be manufactured for aggressive media — Option K2.
- String Disconnect is supplied with a Spares and tool kit.
- At customer's option, String Disconnect is manufactured for other sizes of strings.

# Column Disconnect RK

Designed to disconnect and automatically connect the tubing string with Packer equipment left alone.

## Application

- Treatment, testing, operation, well completion and other technological operations which require the tubing to be disconnected.

## Special Features and Benefits

- Disconnect occurs as a result of prior right hand generation of moment (16 turns) to be followed up by lift of the tubing string;
- Connection is made by mechanically unloading the tubing string weight of no less than 11023 lbs;
- High reliability of sealing elements;
- Parts have protective plating (phosphate coating).

## Technical Specifications

Type	Disconnect size						Maximum pressure, psi	Maximum temperature, °F	Maximum Allowable Load When Disconnect Is Torn Off with Packer, lbs, no more than			
	OD		ID		Connection*							
	in	mm	in	mm	in	mm						
RK-NKT 73-60-110-35	4.33	110	2.362	60	2.875 NU	73.03	27.165	55.1	7252**			
									266 ***			
									44090-55120			

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Disconnect can be made of other types.
- \*\* String Disconnect is manufactured for the pressure of 5076 psi; 7252 psi; 10150 psi.
- \*\*\* By special order the String Disconnect is manufactured for working temperature of 302 °F.
- String Disconnect can be manufactured for aggressive media — Option K2.
- String Disconnect is supplied with a Spares and tool kit.
- At customer's option, String Disconnect is manufactured for other sizes of strings.



## Column Disconnect (Sealing Type) RK-S (U)

Designed to disconnect the Columns located above the Disconnect after the Packer or Packer system has been set followed up by the lowering of the Electric Submersible Centrifugal Pump Unit together with polished stem for operation of below-Packer intervals.

### Application

- Treatment, testing, operation, well completion and other technological operations which require the tubing to be disconnected.
- Use in set-ups for downhole pumping-over, dual production, dual injection.

### Technical Specifications

Type	Disconnect size						Maximum pressure, psi	Maximum temperature, °F	Maximum Allowable Load When Disconnect Is Torn Off with Packer, lbs, no more than			
	OD		ID		Connection*							
	in	mm	in	mm	in	mm						
RK-S (U) 122-60-100	4.803	122	2.362	60	2.875 NU	73.03	66.338	112.4	14500**			
RK-S (U) 142-60-100	5.59	142	2.362	60	2.875 NU	73.03	66.338	123.5	14500**			

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Disconnect can be made of other types.
- \*\* String Disconnect is manufactured for the pressure of 5076 psi; 7252 psi; 10150 psi; 14500 psi.
- \*\*\* By special order the String Disconnect is manufactured for working temperature of 302 °F.
- String Disconnect can be manufactured for aggressive media - Option K2.
- String Disconnect is supplied with a Spares and tool kit.
- At customer's option, String Disconnect is manufactured for other sizes of strings.



## Hydraulic Column Disconnect RK-G

Disconnection is made hydraulically by installing a ball and increasing pressure in the tubing strings.

### Application

- Treatment, testing, operation, well completion and other technological operations which require the tubing to be disconnected.

### Special Features and Benefits

- Disconnection is made hydraulically by installing a ball and increasing pressure in the tubing strings;
- The kit includes the lifting tool for connection with the housing and subsequent removal of the equipment;
- Connection of the lifting tool is made by mechanically unloading the tubing string weight of no less than 11023 lbs;
- High reliability of sealing elements;
- Parts have protective plating (phosphate coating).

### Technical Specifications

Type	Disconnect size						Maximum pressure, psi	Maximum temperature, °F	Maximum Allowable Load When Disconnect Is Torn Off with Packer, lbs, no more than			
	OD		ID		Connection*							
	in	mm	in	mm	in	mm						
RK-G 114-60-70	4.49	114	2.362	60	2.875 NU	73.03	34.65	77.16	10150**			
RK-G 118-60-70	4.646	118	2.362	60	2.875 NU	73.03	34.65	83.776	10150**			
RK-G 140-60-70	5.512	140	2.362	60	2.875 NU	73.03	34.65	101.4	10150**			

- \* Connecting Thread on the Coupling (top) and the Nipple (bottom) of the Disconnect can be made of other types.
- \*\* String Disconnect is manufactured for the pressure of 5076 psi; 7252 psi; 10150 psi.
- \*\*\* By special order the String Disconnect is manufactured for working temperature of 302 °F.
- String Disconnect can be manufactured for aggressive media — Option K2.
- At customer's option, String Disconnect is manufactured for other sizes of strings.



# Hydrostatic Bailer ZHG

Designed to clean wells from loose materials (scale, sand, sludge, metal, etc.).

## Application

- When it is impossible to generate circulation in the well;
- When the well is loaded with flushing fluid.

## Special Features and Benefits

- The sucking of sand and other mechanical impurities out of the well bottom is done together with the flow fluid due to the difference in the pressures in the production string and the tubing;
- During the operation of the Bailer, the process of feeding fluid from the well into the tubing string can be interrupted many times by lifting the tubing string.

## Technical Specifications

Type	Minimum inner diameter of the casing string		Valve size						Flow area through ports, in <sup>2</sup>	Maximum temperature, °F		
			OD		ID		Connection*					
	in	mm	in	mm	in	mm	in	mm				
ZHG-90	3.898	99	3.66	93	2.362	60	2.875 EU	73.03	26.77	50.7	3.543	248 **

- \* Connecting Thread on the Coupling and the Nipple can be made of other types.
- \*\* By special order the Hydrostatic Bailer is manufactured for working temperature of 302 °F.
- The Hydrostatic Bailer can be manufactured for aggressive media — Option K2.
- The Hydrostatic Bailer is supplied with a Spares and tool kit.
- At customer's option, the Hydrostatic Bailer is manufactured in other sizes of strings.



# Well Cleaning Kit KOS

Designed to clean wells from loose materials (scale, sand, sludge, metal pieces, etc.).

## Application

- When it is impossible to generate circulation in the well;
- When the well is loaded with flushing fluid.

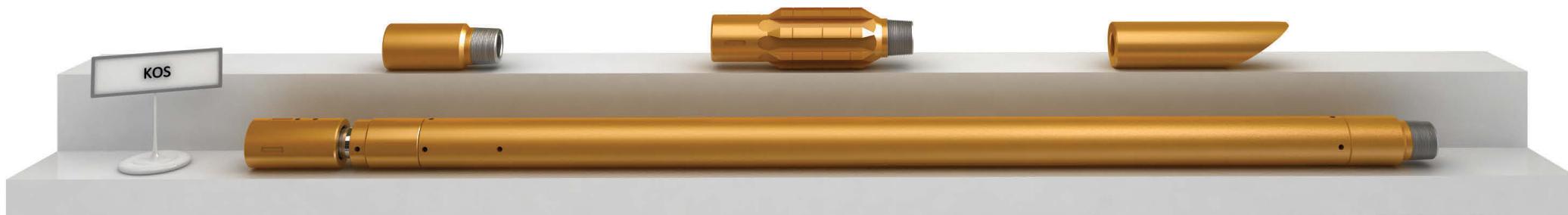
## Makeup of the Kit

- |                        |                                |
|------------------------|--------------------------------|
| 1. Wash Jetting Shoe P | 3. Substitute-Centralizer P-TS |
| 2. Suction Valve KV    | 4. Pressure valve KN           |

## Technical Specifications

Type	Minimum inner diameter of the casing string		Valve size						Flow area through ports, in <sup>2</sup>	Maximum temperature, °F
			OD		Connection*		Length, in, no more than	Weight, lbs, no more than		
			in	mm	in	mm	in	mm		
KOS 89	5.04	128	3.5	89	2.875 NU	73.03	181.5	240.3	100.4	266 **
KOS 112	5.04	128	4.409	112	2.875 NU	73.03	183.07	319.7	100.4	266 **

- \* Connecting Thread on the Coupling and the Nipple can be made of other types.
- \*\* By special order the Well Cleaning Kit is manufactured for working temperature of 302 °F.
- The Well Cleaning Kit can be manufactured for aggressive media — Option K2.
- The Well Cleaning Kit is supplied with a Spares and tool kit.
- At customer's option, the Well Cleaning Kit is manufactured in other sizes of strings.



## Lift Mandrel KS

### Special Features and Benefits

Designed for dual (multiple) injection of fluid into several formations, as well as to operate wells by fountain method or gas lift method.

- In the course of repairs and maintenance in the pocket of the Lift Mandrel, a circulation plug, inhibition valve or blind plug are installed;
- The pocket is located eccentrically which provides an invariable bore hole of the mandrel and the lift tubing;
- The valve and plug are installed into the mandrel pocket using wireline and a set of tools.

### Technical Specifications

Type	Casing size		Mandrel size								Length, in, no more than	Weight, lbs, no more than	Maximum pressure, psi	Seat Diameter of Inhibition Valve, Blind Plug and Circulation Plug, in, no more than	Maximum Allowable Ultimate Joint Strength of Lift Mandrel, lbs, no more than	Maximum tempe- rature, °F				
			Height		Width		ID		Connection*											
	in	mm	in	mm	in	mm	in	mm	in	mm										
KS-NKT 73-60-35 K1	5 1/4	146.1	4.57	116	3.85	97.8	2.362	60	2.875 NU	73.03	88.19	121.3	5076	1	99210	266 **				

- \* Connecting Thread on the Coupling and the Nipple can be made of other types.
- \*\* By special order the Lift Mandrel is manufactured for working temperature of 302 °F.
- The Lift Mandrel can be manufactured for aggressive media — Option K2.
- The Lift Mandrel is supplied with a Spares and tool kit.
- At customer's option, the Lift Mandrel is manufactured in other sizes.



# Magnetic Catcher LM

Designed to clean oil and gas wells from fastening tools, working tools including large fragments of hard alloy teeth of drilling bit roller cutters, drilling bits and items having ferromagnetic properties.

## Special Features and Benefits

- Magnetic elements are manufactured based on high energy rare earth permanent magnets;
- Magnetic elements have three layer protective coating;
- The design provides for flushing fluid to be delivered into the bottom of the well;
- Magnetic effect does not spread to the tubing string;
- Operating temperature range is between -40 and 248 °F;
- This Magnetic Catcher has no limitation on the setting depth.

## Technical Specifications

Type	Minimum inner diameter of the casing string		Catcher size						Rated Loading Capacity, lbs	Maximum temperature, °F
			OD		Connection*		Length, in, no more than	Weight, lbs, no more than		
	in	mm	in	mm	in	mm				
LM 80	3.465	88	3.15	80	2.375 EU	60.33	28.07	27.34	330.7	248 **
LM 92	3.86	98	3.622	92	2.875 NU	73.03	28.07	37.5	440.9	248 **
LM 118	4.882	124	4.646	118	2.875 EU	73.03	28.74	37.5	771.6	248 **

- \* Connecting thread can be manufactured of other types.
- At customer's option, the Magnetic Catcher is manufactured in other sizes of strings.
- Protective coating of magnetic elements as well as magnetic properties are produced at the customer's option.



## Safety Joint P-B

### Special Features and Benefits

Designed to easily disconnect tubing from the wall-stock underground equipment when doing work in the well as well as to disconnect the string in the well from Packer.

- Disconnection occurs as a result of prior generation of right hand moment (16 turns) with subsequent lift of the tubing string;
- High reliability of sealing elements;
- Parts of the Safety Joint have protective plating (phosphate coating).

### Technical Specifications

Type	Joint size							Maximum pressure, psi	Maximum temperature, °F	Maximum Allowable Load When Disconnect Is Torn Off with Packer, lbs, no more than		
	OD		ID		Connection*		Length, in, no more than	Weight, lbs, no more than				
	in	mm	in	mm	in	mm						
P-B 89-52-70	3.5	89	2.047	52	2.875 NU	73.03	16.14	22.05	10150**	266 ***		
P-B 95-60-70	3.74	95	2.362	60	2.875 NU	73.03	16.14	24.25	10150**	266 ***		
P-B 108-62-70	4.25	108	2.44	62	3.5 NU	88.9	16.54	30.87	10150**	266 ***		
P-B 118-76-70	4.646	118	2.992	76	3.5 NU	88.9	17.52	35.27	10150**	266 ***		
P-B 145-100-70	5.709	145	3.937	100	4.5 NU	114.3	18.78	46.3	10150**	266 ***		

- \* Connecting Thread on the Coupling and the Nipple of the Safety Joint can be made of other types.
- \*\* At customer's option, the Safety Joint is manufactured for the pressure of 5076 psi; 7252 psi; 10150 psi.
- \*\*\* By special order the Safety Joint is manufactured for working temperature of 302 °F.
- Safety Joint can be manufactured for aggressive media — Option K2.
- At customer's option, Safety Joint is manufactured in other sizes of strings.



## Drill Column Filter FBK-N, FBK-V

Designed to clean drill fluid from mechanical impurities directly downhole with a view to preventing failure of drill tools as well as penetration into drill tubing string of foreign matter in the course of the process of drill tool or equipment change: dirt, mud, scale.

### Application

- Construction of oil and gas wells.

### Technical Specifications

Type	Rated Diameter of Drill Pipe Joint		Drill Pipe Joint Bore Diameter, no less than		Filter size					Flow area through ports, in <sup>2</sup>	
	in	mm	in	mm	OD	in	mm	in	mm		
FBK-N-73-86 K1 FBK-V-73-86 K1	NC 31	Z-86	2	50.8	2.32	59	1.575	40	27.7	5.3	27.9
FBK-N -89-102 K1 FBK-V -89-102 K1	NC 38	Z-102	2.244	57	2.953	75	1.969	50	38.9	9.5	50.55
FBK-N -108-122 K1 FBK-V -108-122 K1	NC 46	Z-122	2.811	71.4	3.996	101.5	2.677	68	38.9	13.23	62.4
FBK-N -108/112-133 K1 FBK-V -108/112-133 K1	NC 50	Z-133	2.811	71.4	3.996	101.5	2.677	68	38.9	13.23	62.4
FBK-N -140-147 K1 FBK-V -140-147 K1	51/2 FH	Z-147	3.976	101	4.53	115	2.992	76	38.9	15.43	72.56

- At customer's option, the Filter is manufactured for other sizes of strings.



## Pipe Filter FT-N-DS

Designed to clean the solution from mechanical impurities directly downhole with a view to preventing failure of downhole drilling motor, as well as preventing penetration into the drill tubing of foreign matter during the process of tool or equipment change: dirt, scale, etc.

### Application

- Construction of oil and gas wells.

### Special Features and Benefits

- Filter holes allow flush fluid to pass freely but are an obstruction for slime;
- Inner and outer tapers serve or (are designed for) the purpose of better cleaning the solution from mechanical impurities as well as increasing the service life of the downhole drilling motor);
- Secured in the inner taper of tool-joint threads of the coupling;
- Manufactured for aggressive media — Option K2;
- Installed with taper down.

### Technical Specifications

Type	Rated Diameter of Square Hubs		Rated Diameter of Drill Pipe Joint		Drill Pipe Joint Bore Diameter, no less than		Filter size						Flow area through ports, in <sup>2</sup>
	in	mm	in	mm	in	mm	OD	in	mm	in	mm	Length, in, no more than	Weight, lbs, no more than
FT-N-DS-89-102K1	3.5	88.9	NC 38	Z-102	2.244	57	2.953	75	1.969	50	38.9	9.5	39.84

- At customer's option, the Filter is manufactured for other sizes of strings.



## Drill Column with Cover FBK-N-K

Designed for cleaning drilling fluid from mechanical impurities directly downhole with a view to preventing failure of drilling tools, as well as preventing penetration into the drilling tubing string of foreign matter (dirt, scale, etc.) during the process of drilling tool or equipment change.

### Application

- Construction of oil and gas wells.

### Special Features and Benefits

- Filter holes allow flush fluid to pass freely but are an obstruction for slime;
- Protective cover minimizes the possibility of washing out the wall of drill tubing and increases its service life;
- Secured in the inner taper of tool-joint threads of the coupling;
- Manufactured for aggressive media — Option K2;
- Installed with taper down.

### Technical Specifications

Type	Rated Diameter of Drill Pipe Joint		Drill Pipe Joint Bore Diameter, no less than		Filter size								Flow area through ports, in <sup>2</sup>
					OD		Maximum Diameter of Top Taper Part		OD Protective Cover		Length, in, no more than	Weight, lbs, no more than	
	in	mm	in	mm	in	mm	in	mm	in	mm			
FBK-N-K-108/112-133 K1	NC 50	Z-133	2.811	71.4	3.996	101.5	2.52	64	2.68	68	19.8	11.68	27.3
FBK-N-K-140-147 K1	51/2 FH	Z-147	3.976	101	4.53	115	2.835	71	2.95	75	19.8	13.9	30.78

- At customer's option, the Filter is manufactured for other sizes of strings.



## Funnel V

Designed to provide unhampered entry of the tool into the lift string.

### Application

- Conducting geophysical operations in the well.

### Special Features and Benefits

- Simple design, low cost;
- Parts have protective covering (phosphate coating).

### Technical Specifications

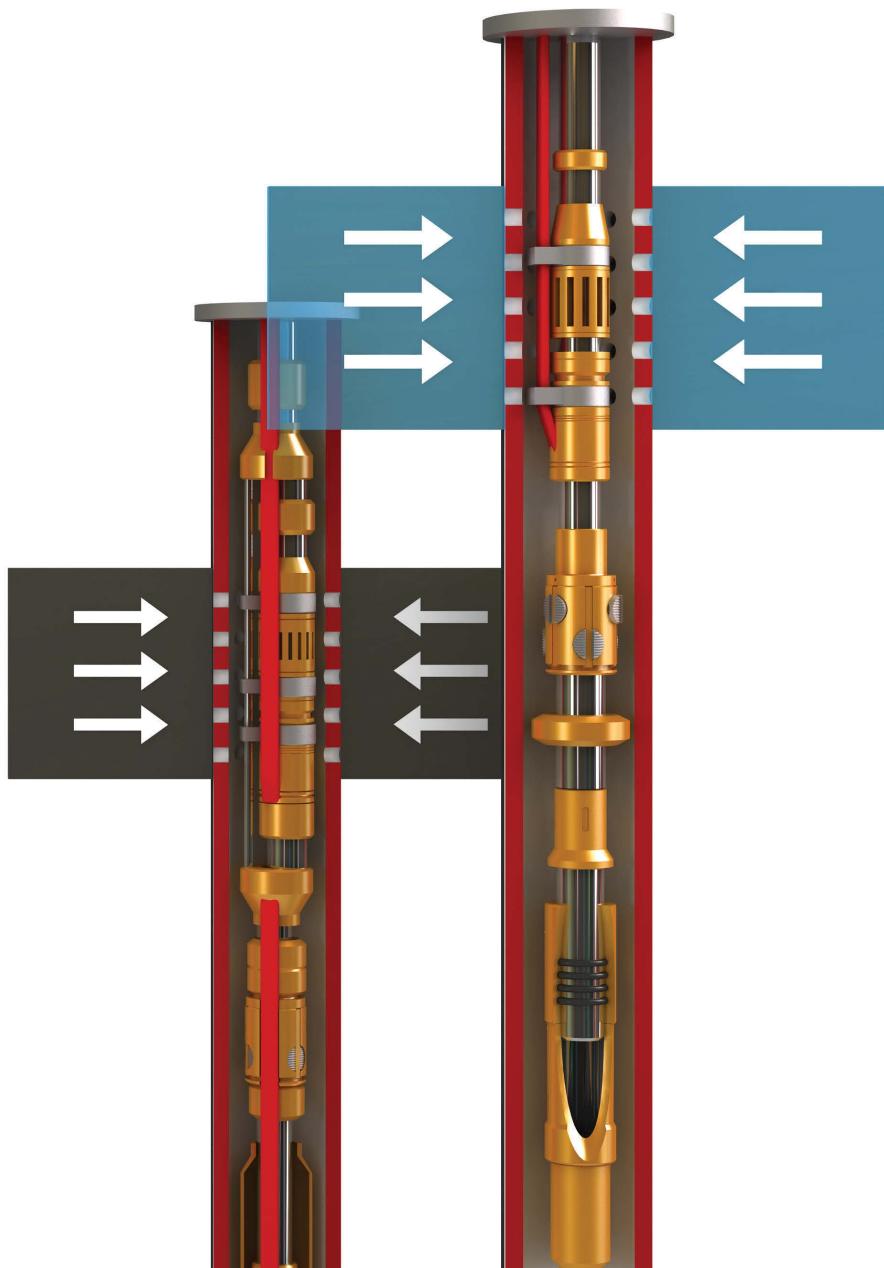
Type	Rated Diameter of Drill Pipe Joint		Filter size							
			OD		ID		Connection*		Length, in, no more than	Weight, lbs, no more than
	in	mm	in	mm	in	mm	in	mm		
V NKT 73-90	3.78	96	3.54	90	2.44	62	2.875 EU	73.03	5.51	6.6

- \* Connecting Thread on the Coupling (Top) of the Funnel can be made of other types.
- The Funnel can be manufactured for aggressive media — Option K2.
- At customer's option, the Funnel is manufactured in other sizes.

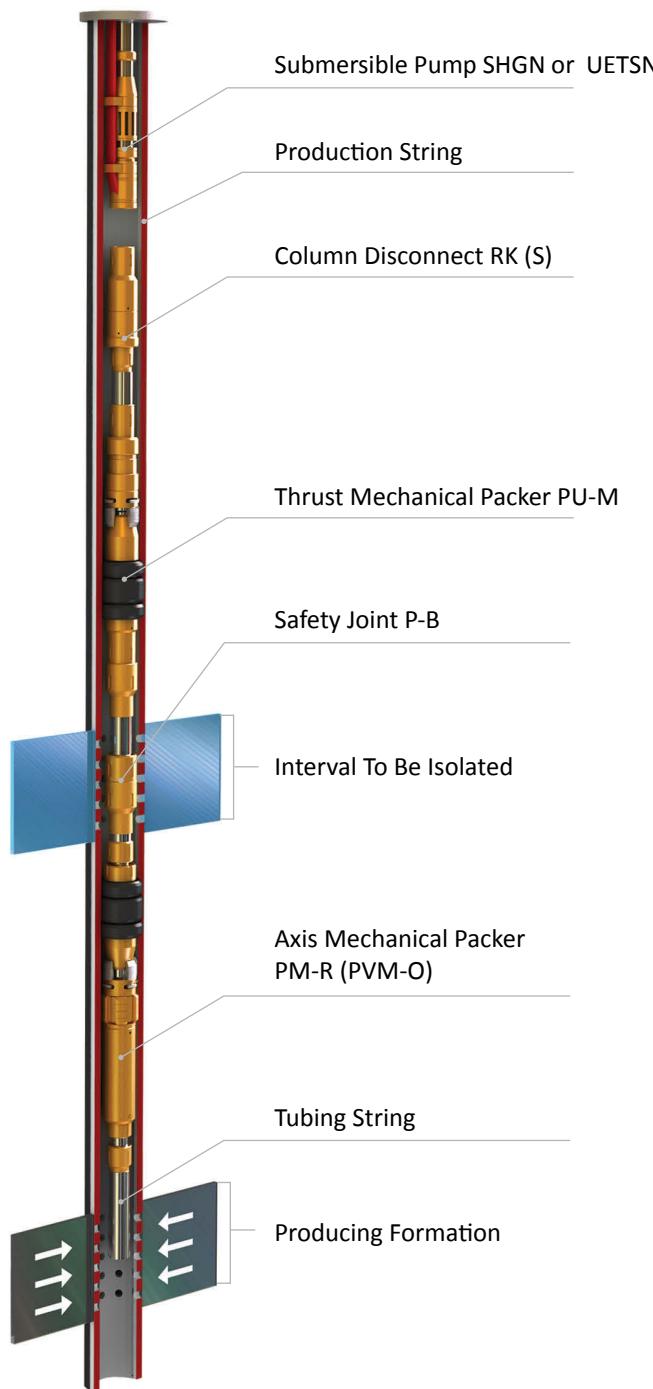




# Multi-Packer Set-Ups







## Equipment Kit KOUS-DPK (A)

Designed to operate wells using downhole pump equipment with simultaneous isolation of the above perforated or fault area of the casing string.

### This Set Up allows the following

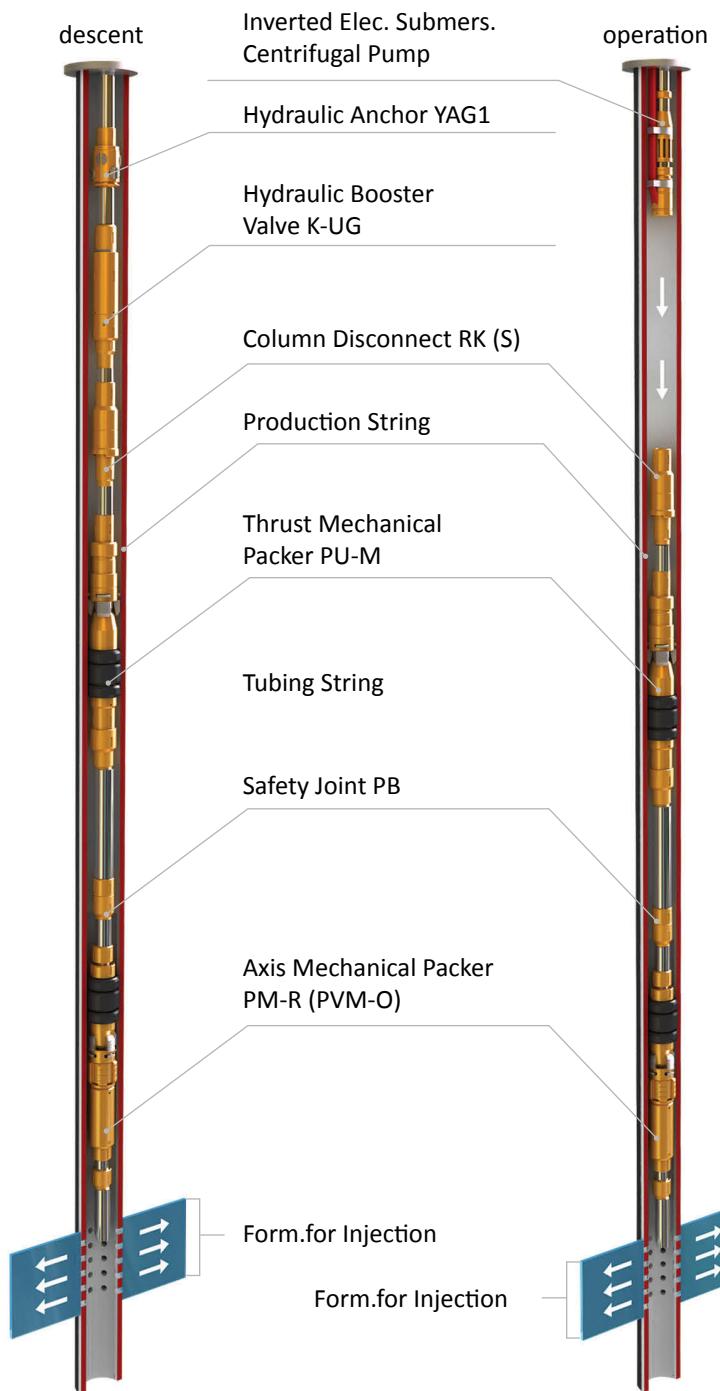
- To assure lengthy autonomous (without connection to the tubing string) sealed isolation of the casing stem intervals;
- Protection of the production string from dynamic impact of operating medium during the process of carrying out various technological operations.

### Kit Makeup

- Column Disconnect RK (S);
- Thrust Mechanical Packer PU-M;
- Safety Joint P-B;
- Axis Mechanical Packer PM-R (PVM-O).

Type	Casing size		Equipment size				Maximum pressure, psi
	in	mm	OD	ID	in	mm	
KOUS-DPK (A) 114-50	5 ½	139.7	4.49	114	1.969	50	7252*
KOUS-DPK (A) 118-50	5 ½; 5 ¾	139.7; 146.1	4.646	118	1.969	50	7252*
KOUS-DPK (A) 122-50	5 ¾	146.1	4.803	122	1.969	50	7252*
KOUS-DPK (A) 140-50	6 ½	168.3	5.512	140	2.205	56	7252*
KOUS-DPK (A) 145-50	6 ½; 7	168.3; 177.8	5.709	145	2.205	56	7252*

## Equipment Kit KOUS-DPK (A) K-UG



Designed to protect production string from injection fluid supplied from the mouth of the well using the set-up with Electric Submersible Centrifugal Pump (Inverted).

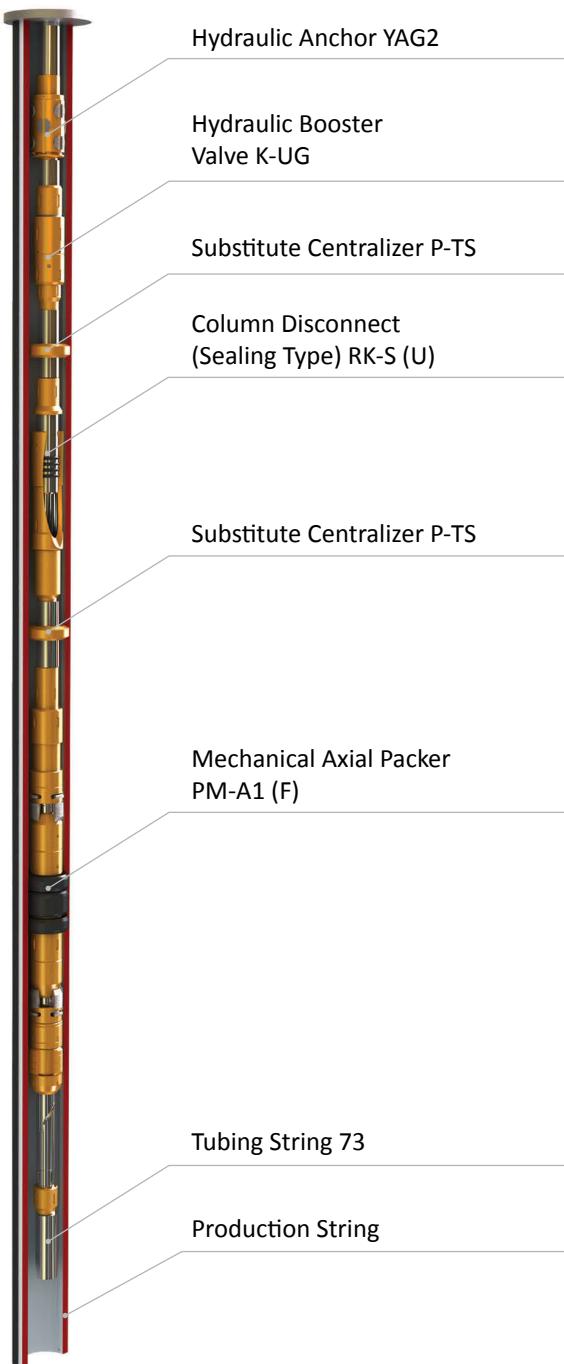
### This Set-Up allows the following

- Sealed setting of the top Packer when the weight of the tubing string is not enough or at small depths (on its own);
- Its installation in horizontal wells;
- Replacement of the Electric Submersible Centrifugal Pump without lifting the set-up.

### Kit Makeup

- Hydraulic Anchor YAG1;
- Hydraulic Booster Valve K-UG;
- Column Disconnect RK (S);
- Thrust Mechanical Packer PU-M;
- Safety Joint P-B;
- Axis Mechanical Packer PM-R.

Type	Casing size		Equipment size				Maximum pressure, psi
	in	mm	in	mm	in	mm	
KOUS-DPK (A) KU-G 114-50	5 1/2	139.7	4.49	114	1.969	50	7252*
KOUS-DPK (A) KU-G 118-50	5 1/2; 5 3/4	139.7; 146.1	4.646	118	1.969	50	7252*
KOUS-DPK (A) KU-G 122-50	5 3/4	146.1	4.803	122	1.969	50	7252*
KOUS-DPK (A) KU-G 140-50	6 5/8	168.3	5.512	140	2.205	56	7252*
KOUS-DPK (A) KU-G 145-50	6 5/8; 7	168.3; 177.8	5.709	145	2.205	56	7252*



## Equipment Kit KOUS-PK (A) K-UG

Designed for operation in horizontal wells, for installation of Packer at small depths on its own.

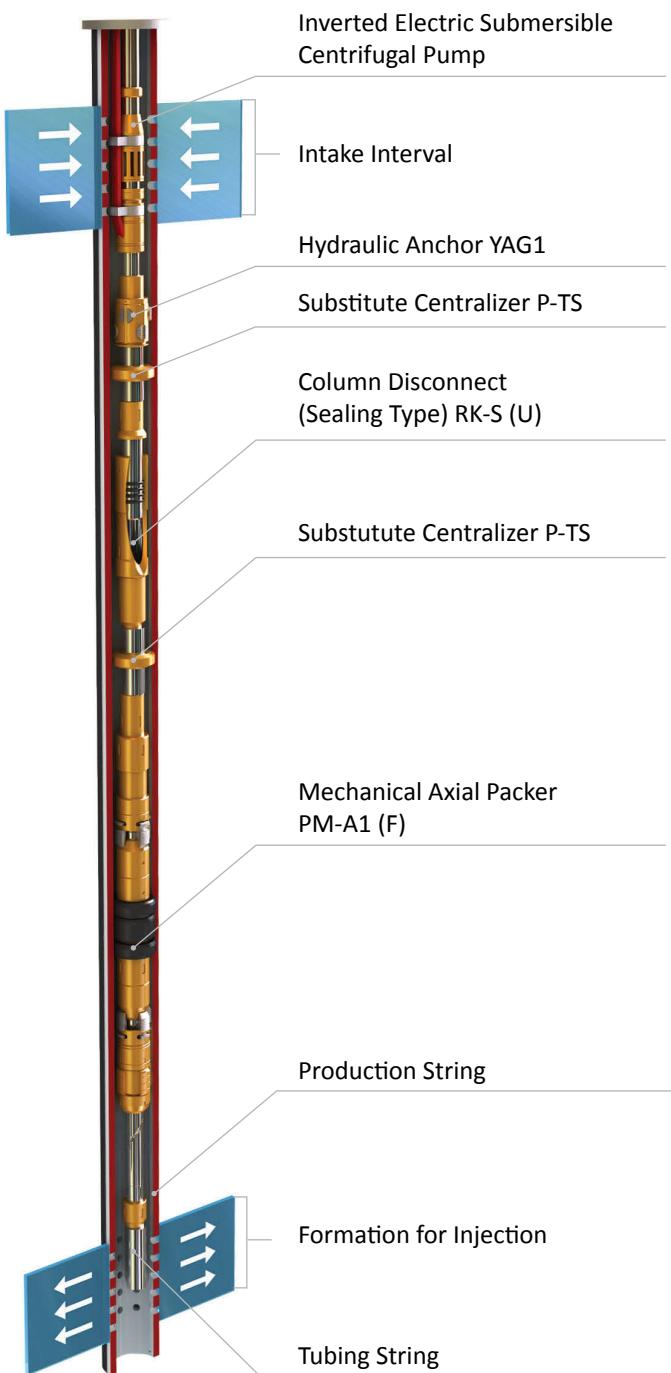
### This Set-Up allows the following

- Setting of the Packer with the weight of the tubing string being not enough;
- Setting of the Packer on its own in horizontal wells;
- Setting of the Packer at small depths (down to 120 m).

### Kit Makeup

- Hydraulic Anchor YAG1;
- Substitute - Centralizer P-TS;
- Column Disconnect (Sealing Type) RK-S (U);
- Axial Mechanical Packer PM-A1 (F);
- Hydraulic Booster Valve K-UG.

Type	Casing size		Equipment size				Maximum pressure, psi
	in	mm	in	mm	in	mm	
KOUS-PK (A) KU-G 118-50	5 1/2; 5 3/4	139.7; 146.1	4.646	118	2.047	52	7252*
KOUS-PK (A) KU-G 122-50	5 3/4	146.1	4.803	122	2.047	52	7252*
KOUS-PK (A) KU-G 140-50	6 5/8	168.3	5.512	140	2.362	60	7252*
KOUS-PK (A) KU-G 145-50	6 5/8; 7	168.3; 177.8	5.709	145	2.362	60	7252*



## Equipment Kit for Downhole From Top To Bottom Pumping KOUS-PK (F)

Designed for downhole pumping of fluid from the top interval of water intake to the bottom formation being worked at using the scheme with the Electric Submersible Centrifugal Pump (inverted).

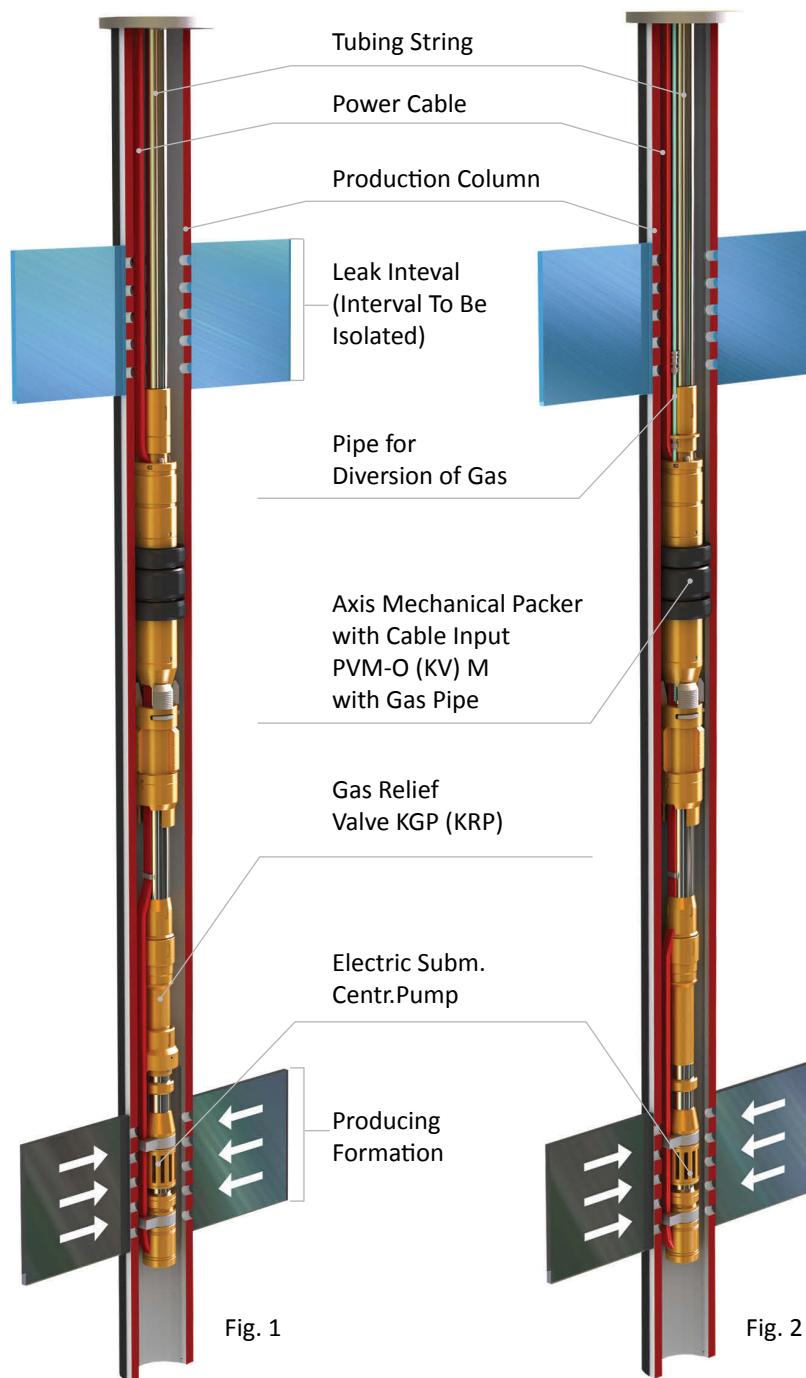
### Set-Up allows the following

- Sealed connection of tubing string lift and, as a result, supply of injection fluid directly into the formation;
- Protection of production string from injection fluid;
- Replacement of the Electric Submersible Centrifugal Pump without lifting the Packer set-up.

### Kit Makeup

- Hydraulic Anchor YAG1;
- Centralizer Substitute PTS;
- Column Disconnect (Sealing Type) RK-S (U);
- Mechanical Axial Packer PM-A1 (F).

Type	Casing size		Equipment size				Maximum pressure, psi
	in	mm	in	mm	in	mm	
KOUS-PK (F) 118-50	5 1/2; 5 3/4	139.7; 146.1	4.646	118	2.047	52	7252*
KOUS-PK (F) 122-50	5 3/4	146.1	4.803	122	2.047	52	7252*
KOUS-PK (F) 140-50	6 5/8	168.3	5.512	140	2.362	60	7252*



## Equipment Kit KOUS-PVM-O (KV) M (Upgraded)

Designed for operation of the wells using Electric Submersible Centrifugal Pump equipment which have faulty production string.

### Set-Up allows the following

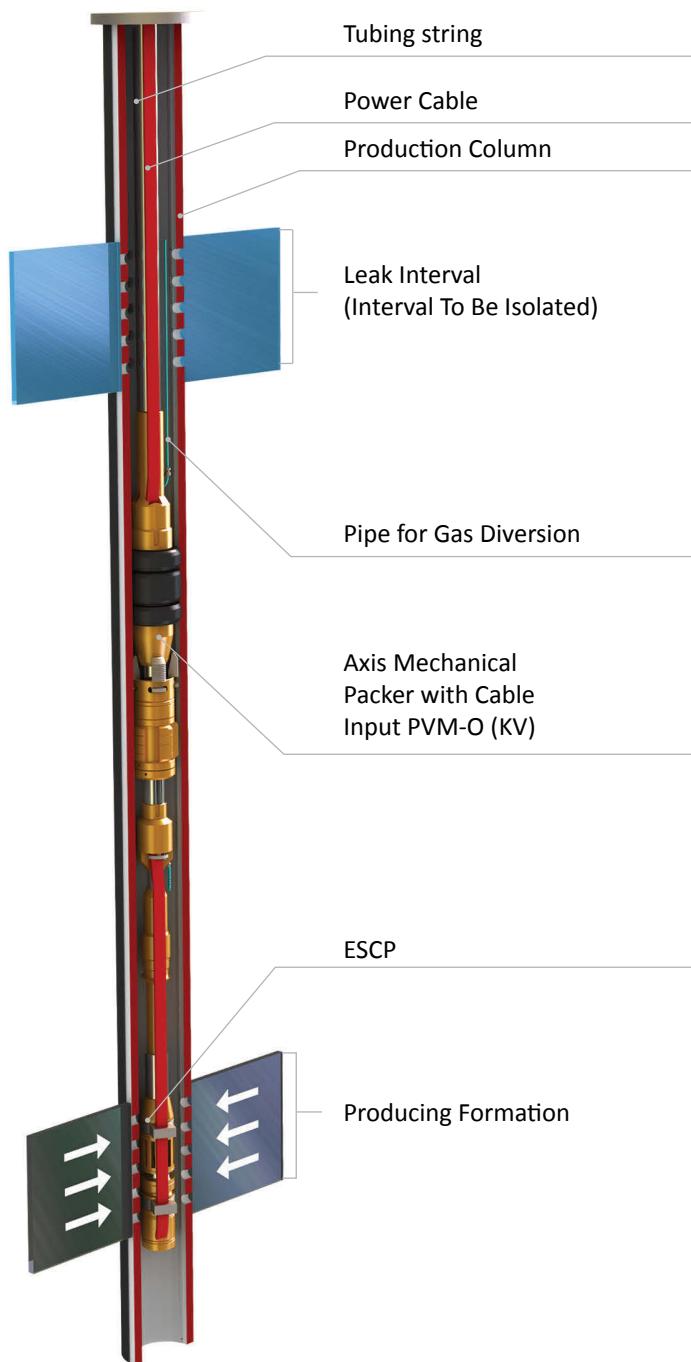
- Gas diversion from under-the-Packer space into the inner space of the tubing using gas relief valves type KGP and KRP (Fig. 1);
- Gas diversion from under-the-Packer space through gas diversion tubing (Fig. 2);
- Multiple resetting in one tripping, including resetting during mouth expansion
- Quick and convenient installation without disturbing integrity of the electric cable strands.

### Kit Makeup

- Mechanical Packer PVM-O (KV) M with Gas Pipe;
- Pipe for Diversion of Gas;
- Gas Relief Valve KGP (KRP).

Type	Casing size		Equipment size				Maximum pressure, psi
	in	mm	OD	ID	in	mm	
KOUS-PVM-O (KV) M 118-50	5 1/2; 5 3/4	139.7; 146.1	4.646	118	1.969	50	7252*
KOUS-PVM-O (KV) M 122-50	5 3/4	146.1	4.803	122	1.969	50	7252*
KOUS-PVM-O (KV) M 140-50	6 5/8	168.3	5.512	140	2.362	60	7252*
KOUS-PVM-O (KV) M 145-50	6 5/8; 7	168.3; 177.8	5.709	145	2.362	60	7252*

## Equipment Kit KOUS-PVM-O (KV)



Designed for operation of the wells using Electric Submersible Centrifugal Equipment which have faulty production string.

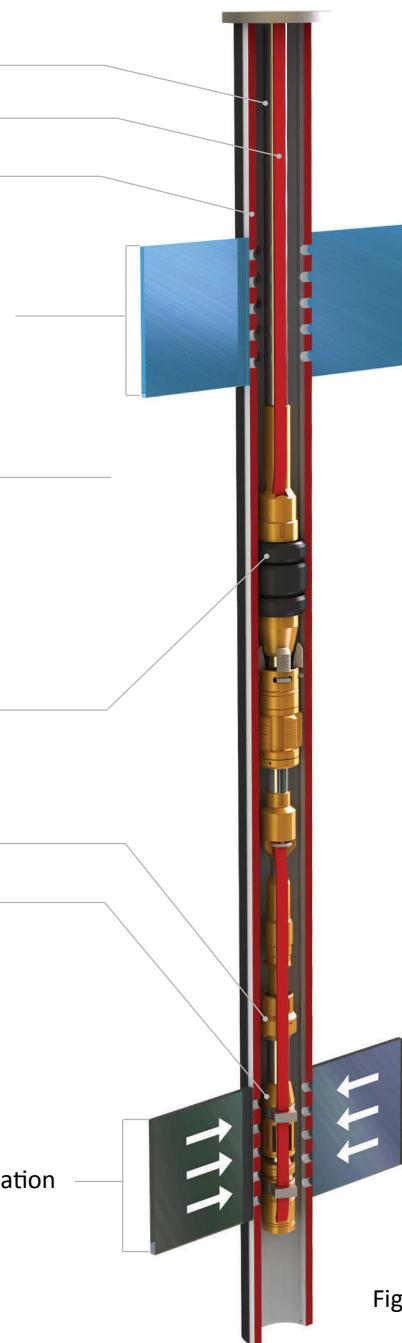
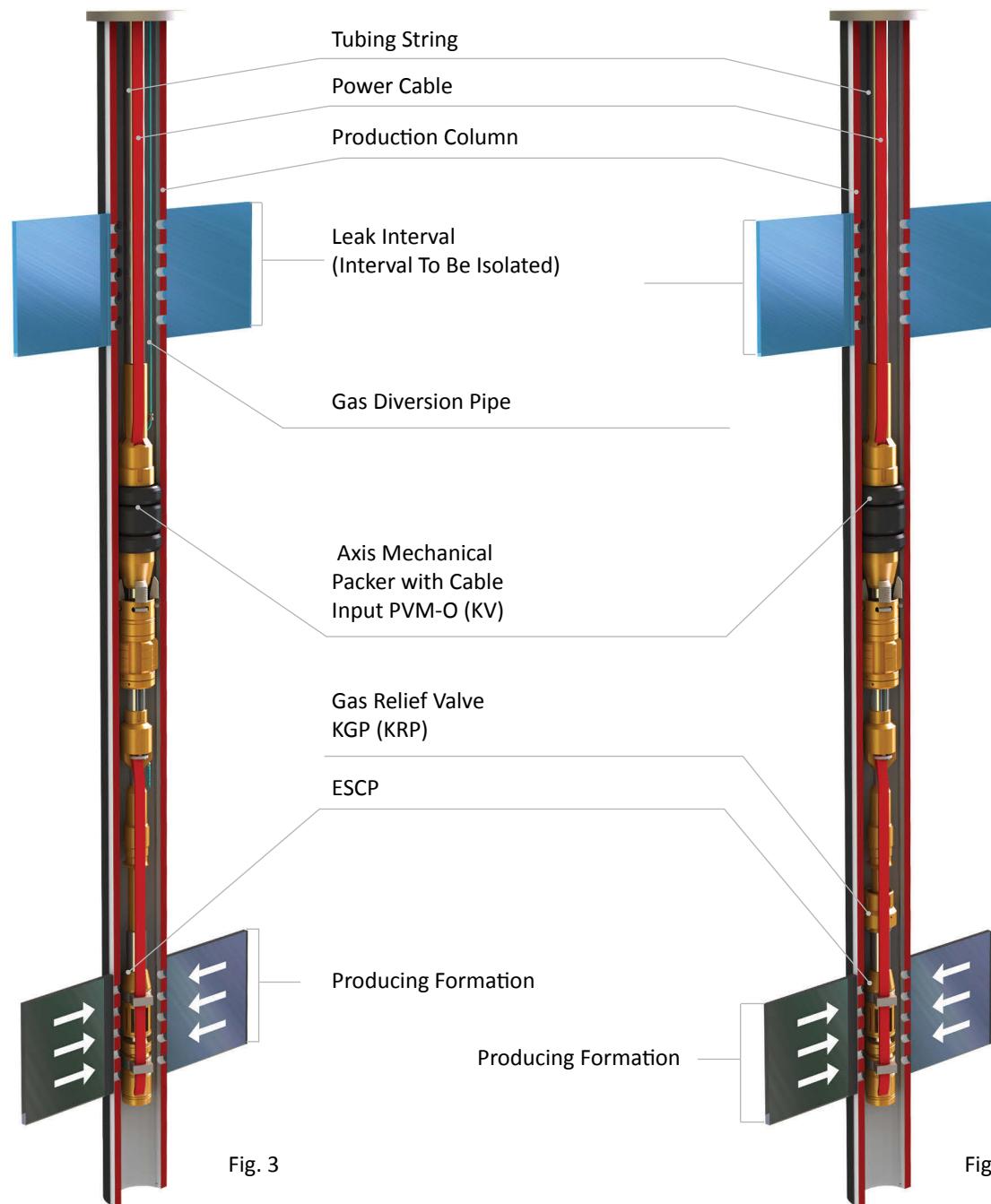
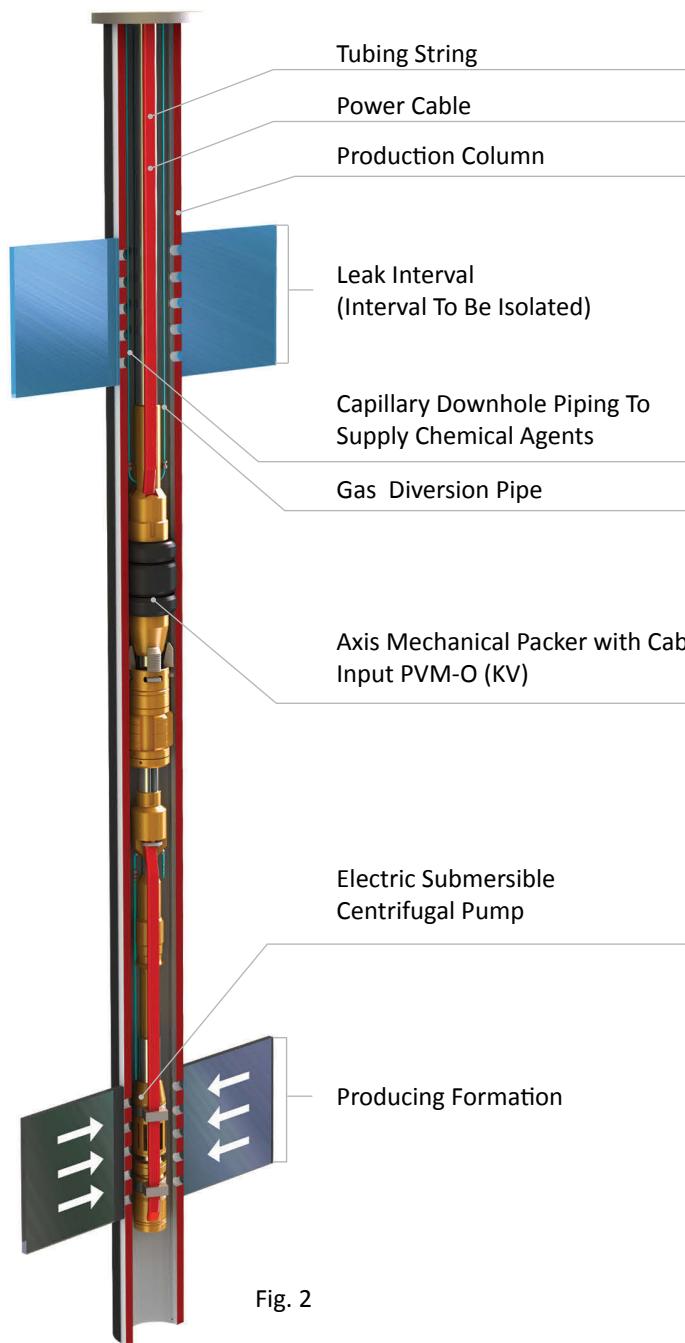
### Set-Up allows the following

- Diversion of gas from the under-the-Packer space through a gas diversion tube (Fig. 1);
- Diversion of gas from the under-the-Packer space through a gas diversion tube and supply of chemical agents to flush the Electric Submersible Centrifugal Pump (Fig. 2);
- Diversion of gas from the under-the-Packer through a gas diversion pipe to the discharge line at the mouth, which allows flushing to be made to get rid of asphalt, resin and paraffins deposits (Fig. 3);
- Diversion of gas from the under-the-Packer space into the inner space of tubing string using tubing string type KGP and KRP (Fig. 4);
- Multiple resetting in one tripping, including the resetting during expansion at the mouth.

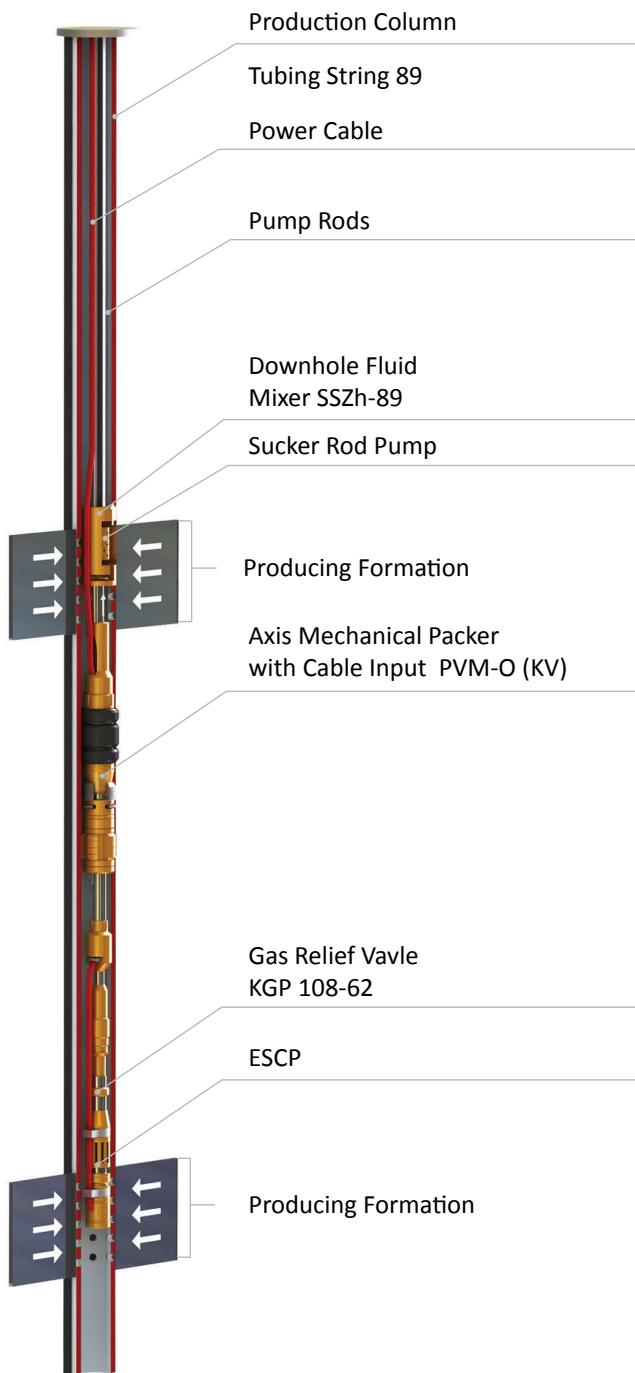
### Kit Makeup

- Packer PVM-O (KV) with Gas Diversion Pipe and a Pipe To Supply Chemical Agents;
- Capillary downhole tubing.

Type	Casing size		Equipment size				Maximum pressure, psi
	in	mm	OD	ID	in	mm	
KOUS-PVM-O (KV) 114-50	5 ½	139.7	4.49	114	1.378	35	7252*
KOUS-PVM-O (KV) 118-50	5 ½; 5 ¾	139.7; 146.1	4.646	118	1.378	35	7252*
KOUS-PVM-O (KV) 122-50	5 ¾	146.1	4.803	122	1.378	35	7252*
KOUS-PVM-O (KV) 140-50	6 ½	168.3	5.512	140	2.047	52	7252*
KOUS-PVM-O (KV) 145-50	6 ½; 7	168.3; 177.8	5.709	145	2.047	52	7252*



# Equipment Kit KOUS-PVM-O (KV)-ORD for Dual Production



Designed for operation of the wells from two formations being developed.

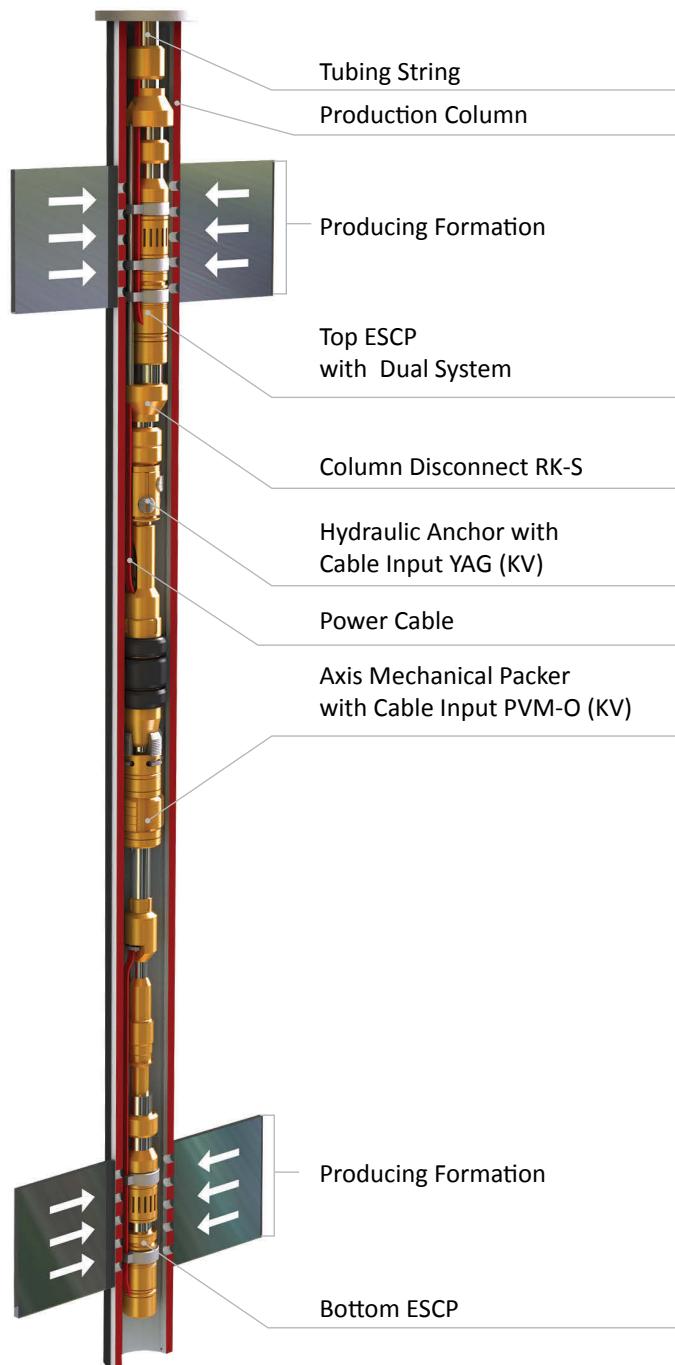
## This Set-Up allows the following

- Collection of the fluid being produced from the bottom interval using the Electric Submersible Centrifugal Pump, from the top interval using the Sucker-Rod Pump through hollow rods.

## Kit Makeup

- Axis Mechanical Packer PVM-O (KV) M with Cable Input;
- Gas Relief Valve KGP.

Type	Casing size		Equipment size				Maximum pressure, psi
	in	mm	OD	ID	in	mm	
KOUS-PVM-O (KV)-ORD 114-50	5 1/2	139.7	4.49	114	1.378	35	7252*
KOUS-PVM-O (KV)-ORD 118-50	5 1/2; 5 3/4	139.7; 146.1	4.646	118	1.378	35	7252*
KOUS-PVM-O (KV)-ORD 122-50	5 3/4	146.1	4.803	122	1.378	35	7252*
KOUS-PVM-O (KV)-ORD 140-50	6 5/8	168.3	5.512	140	2.047	52	7252*
KOUS-PVM-O (KV)-ORD 145-50	6 5/8; 7	168.3; 177.8	5.709	145	2.047	52	7252*



## Equipment Kit KOUS-PVM-O (KV)-ORD For Dual System

Designed for dual production from the wells which have significantly different reservoir properties of the formations and petroleum characteristics.

**This Set-Up allows the following**

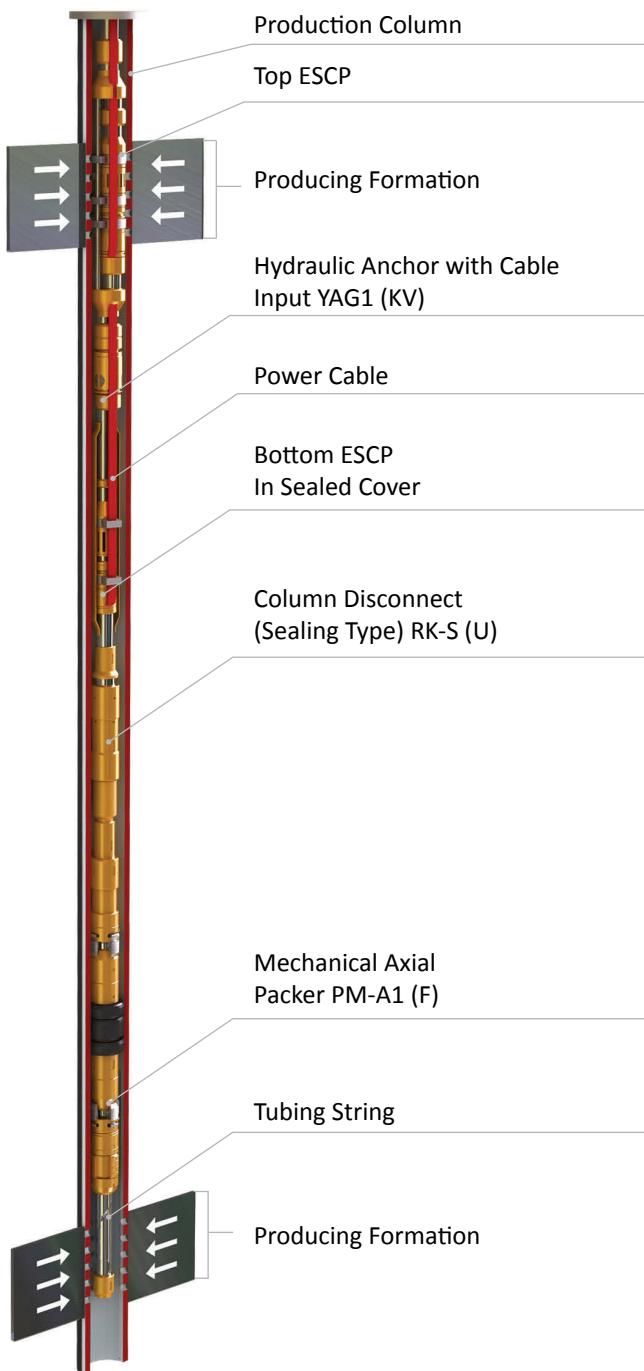
- Running two or more production operations;
- Accounting for dual or multiple production of fluid.

### Kit Makeup

- Column Disconnect RK-S;
- Hydraulic Anchor with Cable Input YAG1 (KV);
- Axis Mechanical Packer with Cable Input PVM-O (KV).

Type	Casing size		Equipment size				Maximum pressure, psi
	in	mm	OD	in	mm	ID	
KOUS-PVM-O (KV)-ORD 114-50	5 1/2	139.7	4.49	114	1.378	35	7252*
KOUS-PVM-O (KV)-ORD 118-50	5 1/2; 5 3/4	139.7; 146.1	4.646	118	1.378	35	7252*
KOUS-PVM-O (KV)-ORD 122-50	5 3/4	146.1	4.803	122	1.378	35	7252*
KOUS-PVM-O (KV)-ORD 140-50	6 5/8	168.3	5.512	140	2.047	52	7252*
KOUS-PVM-O (KV)-ORD 145-50	6 5/8; 7	168.3; 177.8	5.709	145	2.047	52	7252*

# Equipment Kit KOUS-PM-A1 (F)-ORD



Designed for dual production from the wells which have significantly different reservoir properties of the formations and petroleum characteristics.

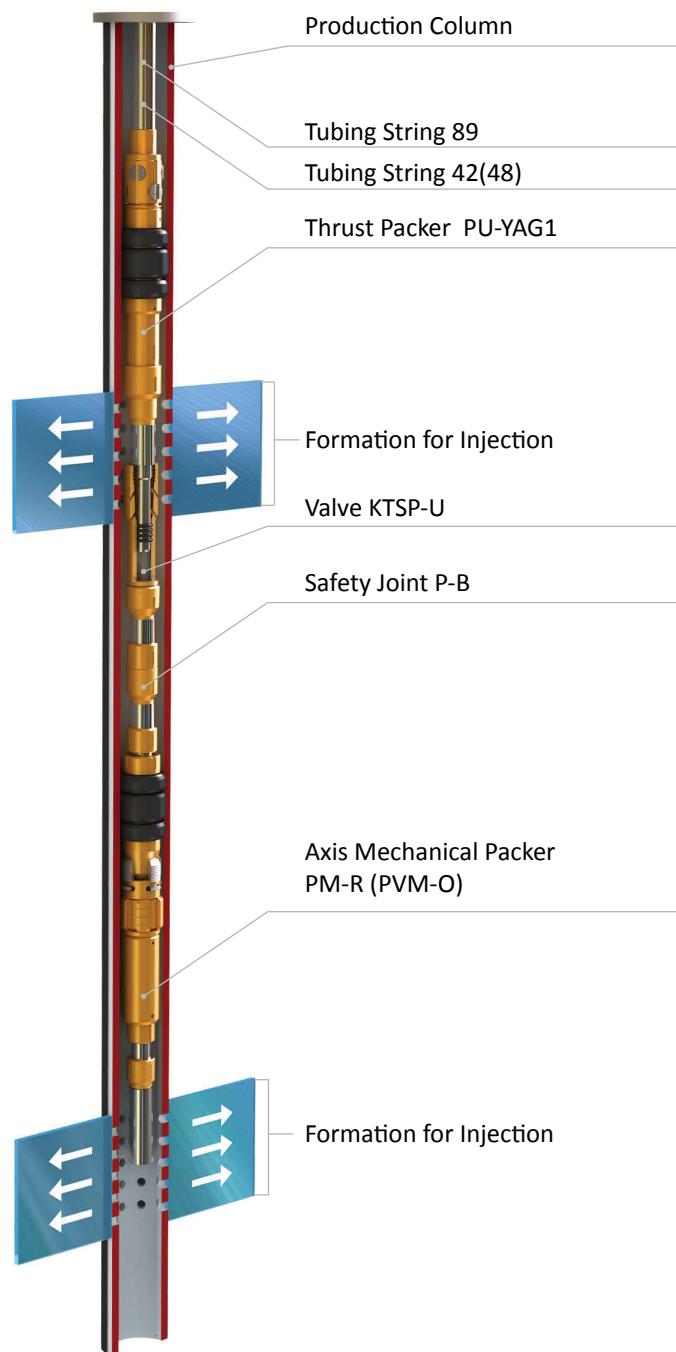
## This Set-Up allows the following

- Running two or more production operations;
- Accounting for dual or multiple production of fluid.

## Kit Makeup

- Hydraulic Anchor with Cable Input YAG1 (KV);
- Column Disconnect (Sealing Type) RK-S (U);
- Axial Mechanical Packer PM-A1 (F).

Type	Casing size		Equipment size				Maximum pressure, psi
	in	mm	OD	in	mm	ID	
KOUS-PM-A1 (F)-ORD 118-50	5 ½; 5 ¾	139.7; 146.1	4.646	118	2.047	52	7252*
KOUS-PM-A1 (F)-ORD 122-50	5 ¾	146.1	4.803	122	2.047	52	7252*
KOUS-PM-A1 (F)-ORD 140-50	6 ½	168.3	5.512	140	2.362	60	7252*
KOUS-PM-A1 (F)-ORD 145-50	6 ¾; 7	168.3; 177.8	5.709	145	2.362	60	7252*



# Equipment Kit KOUS-DL-ORZ

Designed for two lift dual injection on multi-horizon fields. When injecting fluid between pipes, it is supplied through a string of pump compressor tubes, diameter Ø3.504". For injection into the bottom formation, fluid is supplied into the inner string of pump compressor tubes, diameter Ø1.89"/1.654".

This Set-Up allows the following

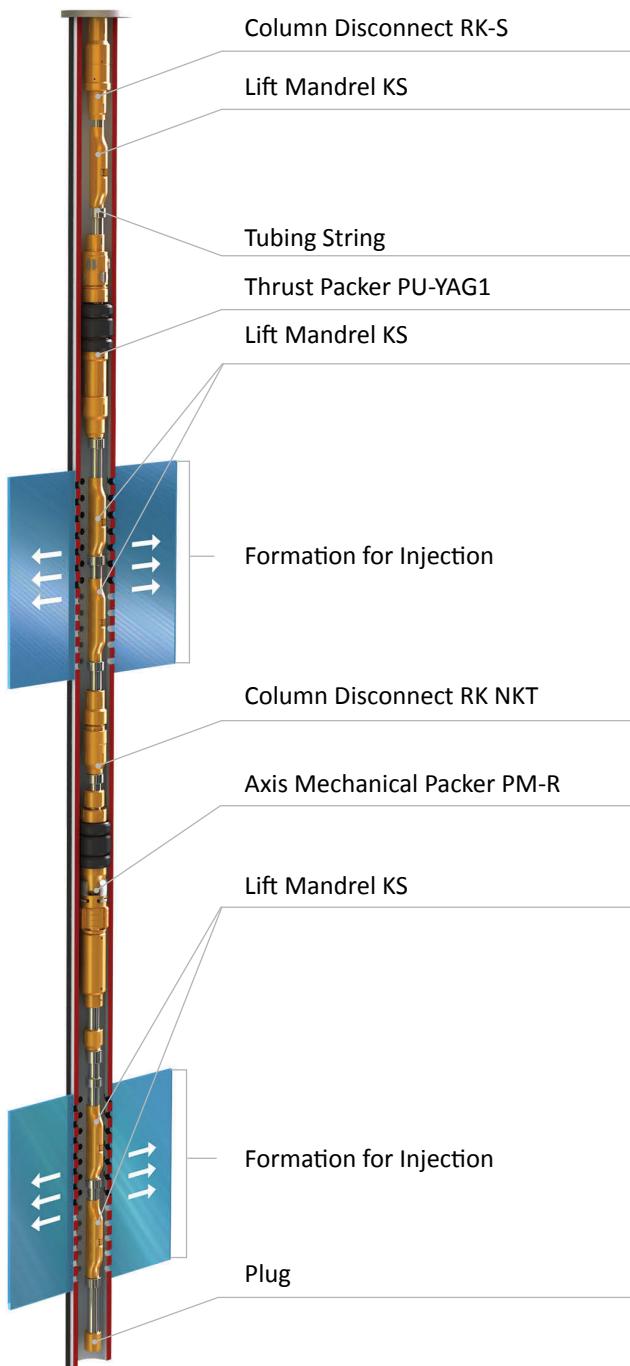
- Reliable isolation of production column from the effect of high pressures of the injection fluid;
  - Adjustment of the volume of the fluid injected and study of each interval.

## Kit Makeup

- Thrust Packer PU-YAG1;
  - Circulating Flush Valve (Sealing Type) KTSP (U);
  - Safety Joint PB;
  - Axis Mechanical Packer PM-R (PVM-O).

Type	Casing size		Equipment size						Maximum pressure, psi
			OD		ID		ID of the valve		
	in	mm	in	mm	in	mm	in	mm	
KOUS-DL-ORZ 118-50	5 ½; 5 ¾	139.7; 146.1	4.646	118	2.047	52	1.378/1.575	35/40	7252*
KOUS-DL-ORZ 122-50	5 ¾	146.1	4.803	122	2.047	52	1.378/1.575	35/40	7252*
KOUS-DL-ORZ 140-50	6 %	168.3	5.512	140	2.362	60	1.378/1.575	35/40	7252*
KOUS-DL-ORZ 145-50	6 %; 7	168.3; 177.8	5.709	145	2.362	60	1.378/1.575	35/40	7252*

## Equipment Kit KOUS-ORZ-DPK (KS)



Designed for operation of the wells on formation pressure maintenance basis with dual fluid injection into two formations through one tubing string.

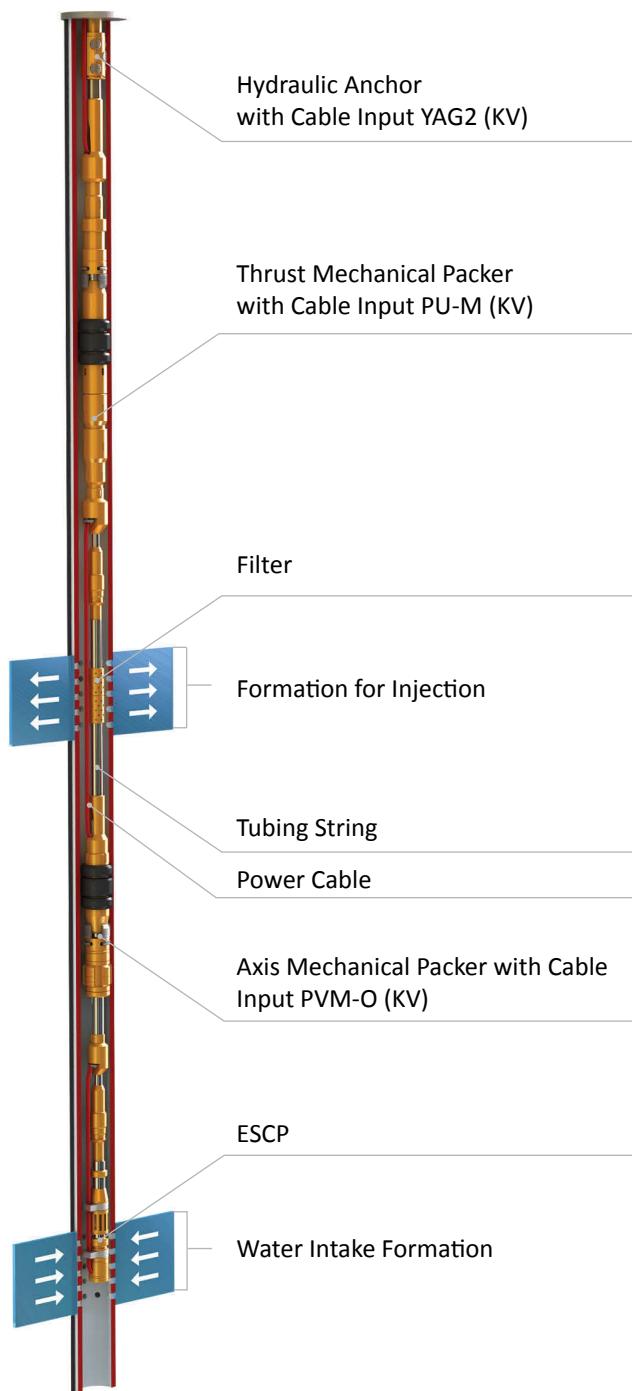
### This Set-Up allows the following

- Reliable isolation of production column from the effect of high pressures of the injection fluid;
- Adjustment of the volume of the fluid injected and study of each interval.

### Kit Makeup

- Column Disconnect RK-S;
- Lift Mandrel KS;
- Thrust Packer PU-YAG1;
- Axis Mechanical Packer PM-R;
- Plug

Type	Casing size		Equipment size				Maximum pressure, psi
	in	mm	in	mm	in	mm	
KOUS-ORZ-DPK (KS) 122-50	5 ½	146.1	4.803	122	2.047	52	7252*
KOUS-ORZ-DPK (KS) 140-50	6 ½	168.3	5.512	140	2.362	60	7252*
KOUS-ORZ-DPK (KS) 145-50	6 ½; 7	168.3; 177.8	5.709	145	2.362	60	7252*



## Equipment Kit KOUS-DPK (KV) YAG2 (KV)

Designed for downhole pump-over of fluid from the bottom interval of water intake and pumping into above formations being worked at.

### This Set-Up allows the following

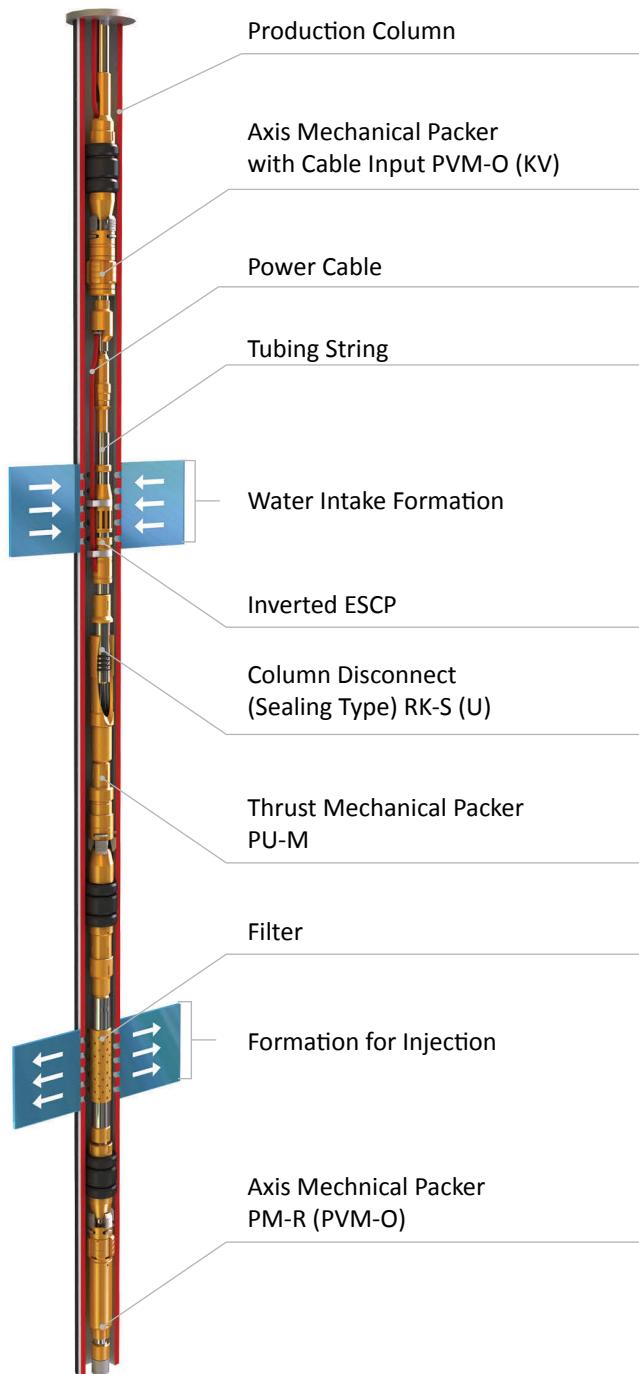
- Reliable isolation of production column from the effect of high pressures during the process of downhole pump-over of the fluid;
- Simultaneous maintenance of formation pressure when there are no water injectors or when the Formation Pressure Maintenance System is too far away;
- Significant savings on construction of supplementary water injection systems.

### This Set-Up allows the following

- Hydraulic Anchor with Cable Input YAG2 (KV);
- Thrust Mechanical Packer with Cable Input PU-M (KV);
- Axis Mechanical Packer with Cable Input PVM-O (KV).

Type	Casing size		Equipment size				Maximum pressure, psi
	in	mm	OD	ID	in	mm	
KOUS- DPK (KV) YAG2 (KV) 122-50	5 ½	146.1	4.803	122	1.378	35	7252*
KOUS- DPK (KV) YAG2 (KV) 140-50	6 ½	168.3	5.512	140	2.047	52	7252*

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## Equipment Kit KOUS-TPK-OZ

Designed for downhole pump-over or boosting of fluid from the top interval of water intake into the formations being developed and lying below.

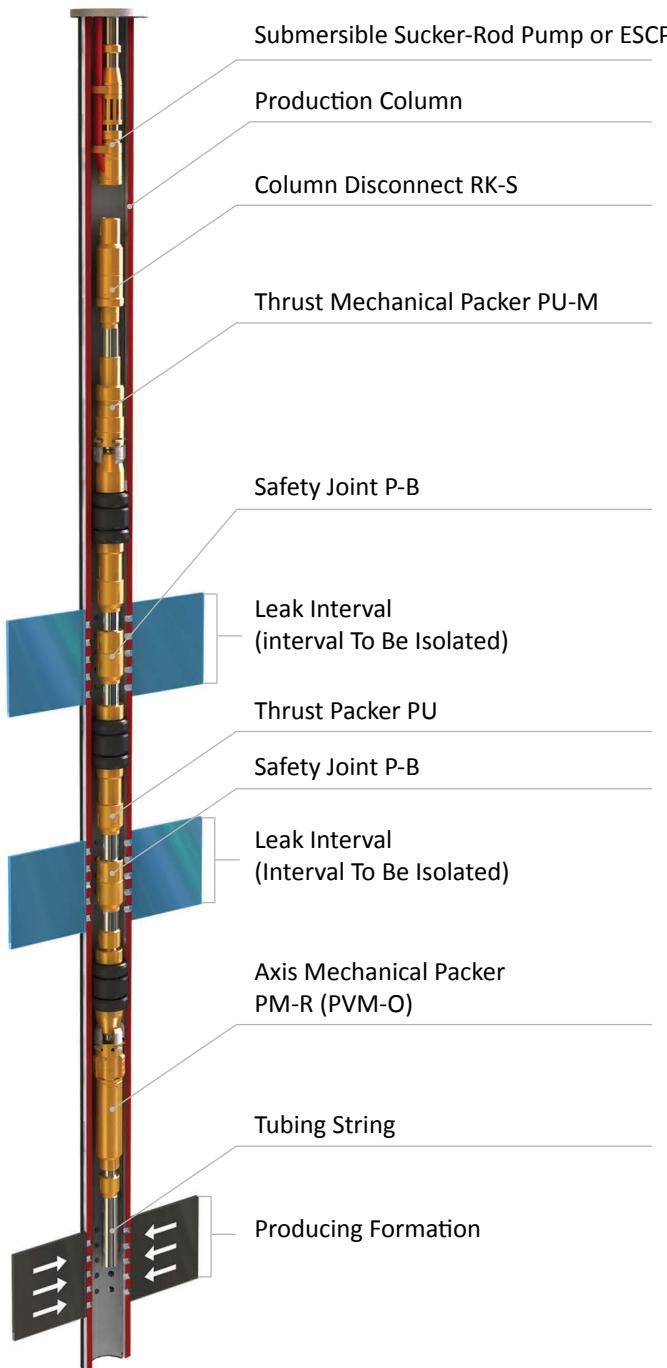
### This Set-Up allows the following

- Reliable isolation of production column from the effect of high pressures during the process of downhole pump-over of the fluid;
- Sealed connection of the tubing string lift, as a result of which fluid is delivered directly to the formation
- Replacement of the Electric Submersible Centrifugal Pump without lifting the Set-Up.

### Kit Makeup

- Axis Mechanical Packer with Cable Input PVM-O (KV);
- Column Disconnect (Sealing Type) RK-S (U);
- Thrust Mechanical Packer PU-M;
- Axis Mechanical Packer PM-R (PVM-O).

Type	Casing size		Equipment size				Maximum pressure, psi
			OD	ID	in	mm	
	in	mm	in	mm	in	mm	
KOUS-TPK-OZ 122-50	5 $\frac{3}{4}$	146.1	4.803	122	1.378	35	7252*
KOUS-TPK-OZ 140-50	6 $\frac{5}{8}$	168.3	5.512	140	2.047	52	7252*
KOUS-TPK-OZ 145-50	6 $\frac{5}{8}$ ; 7	168.3; 177.8	5.709	145	2.047	52	7252*



## Production Column Equipment Kit KOUS-TPK (A)

Designed for lengthy trouble-free operation of the wells using submersible pump equipment with simultaneous isolation of several leak intervals of the production column.

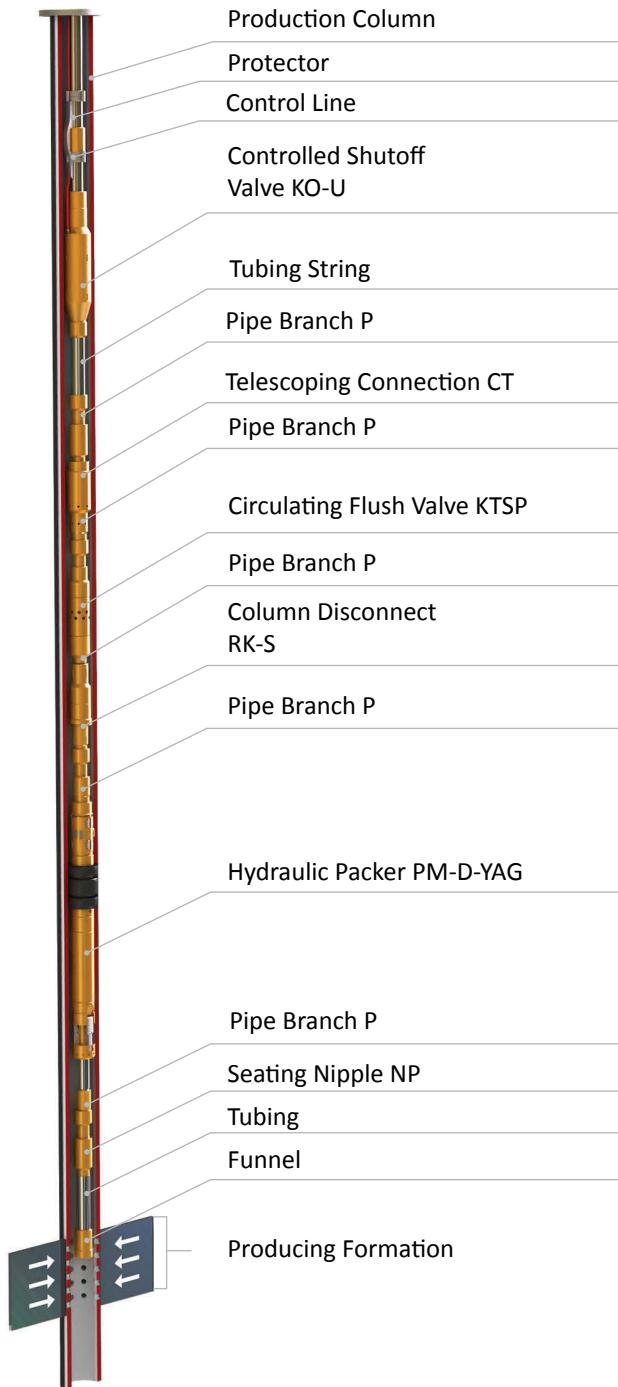
### This Set-Up allows the following

- Reliable isolation of leak intervals of the production column;
- Autonomous location in the well without connection of the tubing string;
- Replacement of the Electric Submersible Centrifugal Pump without lifting the Set-Up.

### Kit Makeup

- Column Disconnect RK-S;
- Thrust Mechanical Packer PU-M;
- Safety Joint P-B;
- Thrust Packer PU;
- Axis Mechanical Packer PM-R (PVM-O).

Type	Casing size		Equipment size				Maximum pressure, psi
			OD	ID			
KOUS-TPK (A) 118-50	5 ½; 5 ¾	139.7; 146.1	4.646	118	1.969	50	7252*
KOUS-TPK (A) 122-50	5 ¾	146.1	4.803	122	1.969	50	7252*
KOUS-TPK (A) 140-50	6 ½	168.3	5.512	140	2.205	56	7252*
KOUS-TPK (A) 145-50	6 ½; 7	168.3; 177.8	5.709	145	2.205	56	7252*



## Equipment Kit KPO

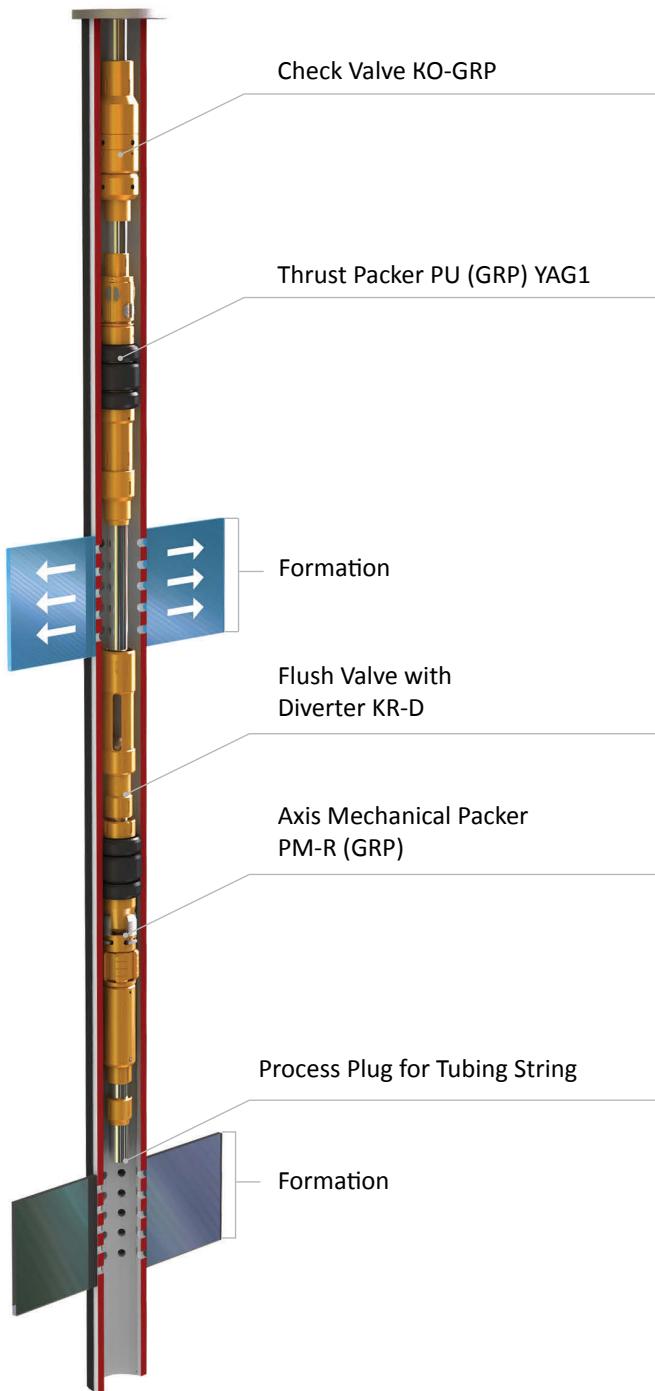
Designed for sealing the tubing string stem of the flowing oil, gas and gas condensate wells in emergency situations and contains a complete scope of equipment and tools covering the whole spectrum of operations on the well, i.e. from production to well workover.

This Set-Up allows the following

- Protector P;
- Controlled Shutoff Valve KO-U;
- Pipe Branch P;
- Telescoping Connection CT;
- Circulating Flush Valve KTSP;
- Column Disconnect RK-S;
- Hydraulic Packer PM-D-YAG;
- Seating Nipple NP;
- Funnel.

Type	Casing size		Equipment size				Maximum pressure, psi
	in	mm	in	mm	in	mm	
KPO 114-168/142-21 K1 HL	9 5/8; 6 5/8	244.5;168.3	7.48/5.59	190/142	2.992	76	7252*

Equipment Kit KPO is successfully operated in the wells of OOO Gazprom Production Nadym.



## Equipment Kit (Double Packer Type) For Selective Hydraulic Fracturing of Formations GRP KOUS-DPK GRP-SO

Designed for Hydraulic Fracturing of a Formation, plugging work, Acidizing, formation testing, finding leaks in the casing string.

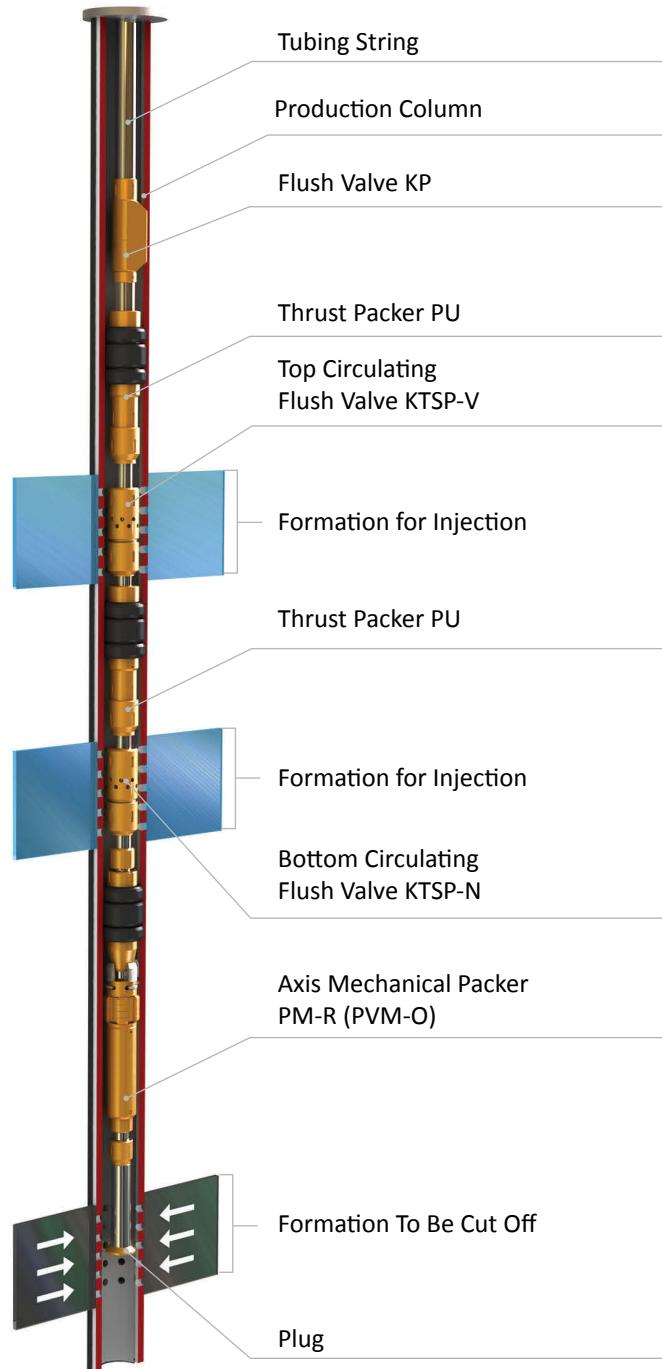
This Set-Up allows the following

- Selective and multiple impact on the formation;
- Changing the location of the equipment installation.

### Kit Makeup

- Check Valve KO-GRP;
- Flush Valve with Diverter KR-D;
- Thrust Packer with Hydraulic Anchor PU (GRP) YAG1;
- Axis Mechanical Packer PM-R (GRP);
- Process Plug for Tubing String.

Type	Casing size		Equipment size				Maximum pressure, psi
			OD	ID	in	mm	
KOUS-DPK GRP-SO-122-50	5 $\frac{3}{4}$	146.1	4.803	122	2.047	52	7252*
KOUS-DPK GRP-SO-140-50	6 $\frac{5}{8}$	168.3	5.512	140	2.362	60	7252*
KOUS-DPK GRP SO-145-50	6 $\frac{5}{8}$ ; 7	168.3; 177.8	5.709	145	2.362	60	7252*



## Equipment Kit KOUS-TPK-SO

Designed for selective treatment or trial of two formations with different fluids.

### This Set-Up allows the following

- Reliable isolation of leak intervals of the production column;
- Pumping the fluid in one tripping without re-seating the equipment.

### Kit Makeup

- Flush Valve KP;
- Thrust Packers PU;
- Top Circulating Flush Valve KTSP-V;
- Bottom Circulating Flush Valve KTSP-N;
- Axis Mechanical Packer (PVM-O).

Type	Casing size		Equipment size				Maximum pressure, psi
			OD in	OD mm	ID in	ID mm	
KOUS-TPK-SO 118-50	5 1/4; 5 3/4	139.7; 146.1	4.646	118	1.969	50	7252*
KOUS-TPK-SO 122-50	5 3/4	146.1	4.803	122	1.969	50	7252*
KOUS-TPK-SO 140-50	6 5/8	168.3	5.512	140	2.205	56	7252*
KOUS-TPK-SO 145-50	6 5/8; 7	168.3; 177.8	5.709	145	2.205	56	7252*





The Catalogue describes the design and the operating principle of the Packers as well as those of underground equipment set-ups serially produced by NKMZ-Group LLC. The list of the equipment given in this Catalogue is not exhaustive. For more detailed information, please contact the Plant's representatives.

You are kindly invited to visit the production facilities of NKMZ-Group LLC to get familiar with the state-of-the-art production process of the underground equipment and the new developments of the Packer and Anchor equipment.

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