



**FISHING, MILLING AND
CLEANING EQUIPMENT
FOR OIL AND GAS WELLS**



BITTEKHNIKA LLC was established in 1996. Through all these years of successful experience we have developed a sustainable manufacturing system of oilfield equipment. Our products are produced on high professional level and meet requirements of international standards. Our geography of products and service supply covers not only territory of the Russian Federation but also Eastern Europe, Middle East and Asia. We work to develop and maintain strong relationships with Russian and foreign partners.

BITTEKHNIKA LLC specializes in manufacturing tools for sidetracking, fishing, milling and cleaning equipment: whipstocks, different kinds of mills, reamers, die collars, taper taps, overshots, spears, pipe cutters and other products. The company also produces small-sized equipment for works in wells with coiled tubing units.

BITTEKHNIKA LLC has received considerable number of letters of appreciation and awards. We prioritize ongoing innovation and development in production, processing and distribution.

The company provides technical assistance and consulting service. Our experienced and highly professional engineering and technical staff can guarantee realisation of any kind of complex work. Our knowledge and broad exchange of experience allow to provide the best solution to a specific task.

BITTEKHNIKA LLC aspires to increase the number of business contacts, find new partners and strengthen position on the market of oilfield equipment.

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RELEASING OVERSHOT TLN/TLNT



Application:

The Releasing Overshot TLN/TLNT is designed to engage and retrieve elements of tubular columns during fishing operations in the well.

TLN is used for standard working conditions.
TLNT is used for heavy working conditions.

Design:

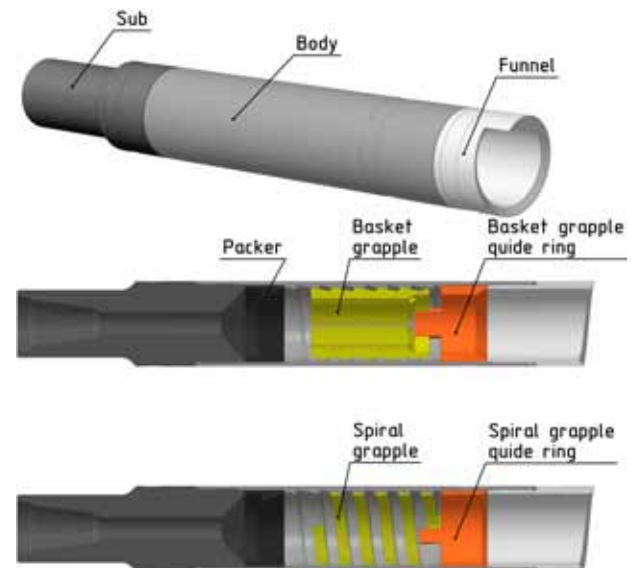
The Releasing Overshot consists of body, sub, funnel and set of replaceable elements (spiral and basket grapple guide rings).

Releasing overshot can be supplied with:

- extensions 500-1000 mm long;
- control guides of greater diameter;
- limiting sleeve.

To provide hermetic sealing of overshot connection with emergency string it is possible to set packers (it is set in annular groove at the upper part of body).

Releasing overshot can be produced in left/right hand configuration.



RELEASING OVERSHOT

TLN/TLNT

Technical data

Code	OD, in	Load capacity, lbf	Grapple, inches				Connecting thread, API*	Total length, ft	Weight, lb
			spiral		basket				
			min.	max.	min.	max.			
TLN-90	3.57	134 900	2- ¹ / ₂	2- ⁷ / ₈	1- ³ / ₄	2- ³ / ₈	NC26	1.97	26.24
TLN-114	4.51	215 800	3- ⁵ / ₁₆	3- ⁵ / ₈	1- ⁷ / ₈	3- ¹ / ₄	2- ⁷ / ₈ Reg	2.82	48.94
TLN-118	4.63	231 600	3- ¹ / ₂	3- ³ / ₄	1- ⁷ / ₈	3- ³ / ₈	2- ⁷ / ₈ Reg	2.82	50.04
TLN-119	4.7	231 600	3- ¹ / ₂	3- ¹³ / ₁₆	1- ⁵ / ₁₆	3- ³ / ₈	2- ⁷ / ₈ Reg	2.82	52.69
TLN-122	4.81	272 000	3- ¹ / ₂	3- ⁷ / ₈	2- ¹ / ₄	3- ¹ / ₂	2- ⁷ / ₈ Reg	2.82	55.12
TLN-124	4.87	238 300	3- ⁵ / ₈	4.0	2- ³ / ₈	3- ⁵ / ₈	2- ⁷ / ₈ Reg	2.82	64.15
TLN-130	5.13	249 500	4.0	4- ¹ / ₄	2- ³ / ₄	3- ⁷ / ₈	2- ⁷ / ₈ Reg	2.82	66.36
TLN-140	5.51	272 000	4- ³ / ₁₆	4- ⁵ / ₈	1- ⁷ / ₈	4.0	2- ⁷ / ₈ Reg	3.15	67.46
TLN-146	5.75	292 300	4- ³ / ₈	4- ¹³ / ₁₆	2- ⁷ / ₈	4- ⁵ / ₁₆	3- ¹ / ₂ Reg	3.15	84.44
TLN-156	6.14	395 700	4- ⁵ / ₈	5- ¹ / ₈	2- ⁵ / ₈	4- ¹ / ₂	3- ¹ / ₂ Reg	3.15	89.51
TLN-168	6.64	476 600	5.0	5- ¹ / ₂	2- ⁵ / ₈	4- ¹⁵ / ₁₆	3- ¹ / ₂ Reg	3.15	97.44
TLN-175	6.89	550 800	5- ¹ / ₈	5- ³ / ₄	3- ¹ / ₈	4- ³ / ₄	NC 50	3.15	101.4
TLN-188	7.39	503 600	5- ⁵ / ₈	6- ¹ / ₄	3- ⁵ / ₈	5- ⁹ / ₁₆	NC 50	3.15	104.3
TLN-194	7.64	562 000	5- ⁷ / ₈	6- ¹ / ₂	3- ⁵ / ₈	5- ³ / ₄	5- ¹ / ₂ FH	3.15	114.6
TLN-206	8.13	651 900	6- ¹ / ₂	7.0	4- ¹ / ₈	6- ⁷ / ₁₆	5- ¹ / ₂ FH	3.15	156.5
TLN-220	8.65	719 400	7.0	7- ¹ / ₂	4- ³ / ₄	6- ⁷ / ₈	5- ¹ / ₂ FH	3.15	178.6
TLNT-90	3.57	224 800	2- ¹ / ₂	2- ³ / ₄	1- ³ / ₄	2- ³ / ₈	NC26	1.97	28.0
TLNT-118	4.63	382 200	3- ¹ / ₈	3- ¹ / ₂	1- ⁷ / ₈	3- ¹ / ₈	2- ⁷ / ₈ Reg	2.54	54.67
TLNT-122	4.81	400 200	3- ⁵ / ₁₆	3- ⁵ / ₈	1- ⁷ / ₈	3- ¹ / ₄	2- ⁷ / ₈ Reg	2.55	60.41
TLNT-124	4.89	388 900	3- ¹ / ₂	3- ³ / ₄	2- ¹ / ₈	3- ³ / ₈	2- ⁷ / ₈ Reg	2.55	55.78
TLNT-130	5.13	485 600	3- ⁵ / ₈	4.0	1- ⁷ / ₈	3- ⁵ / ₈	2- ⁷ / ₈ Reg	2.55	73.63
TLNT-140	5.51	442 900	4.0	4- ³ / ₈	2- ⁵ / ₈	3- ³ / ₄	2- ⁷ / ₈ Reg	2.87	76.72
TLNT-146	5.75	449 600	4.0	4- ⁵ / ₈	2- ¹ / ₈	3- ⁷ / ₈	3- ¹ / ₂ Reg	2.87	86.64
TLNT-156	6.14	494 600	4- ¹ / ₄	4- ¹³ / ₁₆	2- ³ / ₈	4- ¹ / ₈	3- ¹ / ₂ Reg	2.85	92.59
TLNT-168	6.64	674 400	4- ¹ / ₂	5- ¹ / ₈	2- ⁵ / ₈	4- ³ / ₈	3- ¹ / ₂ Reg	2.85	101.4
TLNT-175	6.89	730 600	4- ³ / ₄	5- ³ / ₈	2- ⁷ / ₈	4- ⁵ / ₈	NC 50	2.85	105.8
TLNT-188	7.39	813 800	5- ¹ / ₈	5- ³ / ₄	3- ¹ / ₃	4- ³ / ₄	NC 50	2.85	114.6
TLNT-194	7.64	854 300	5- ³ / ₈	6.0	3- ³ / ₈	5- ¹ / ₄	5- ¹ / ₂ FH	2.85	125.7
TLNT-206	8.13	1 012 000	5- ⁷ / ₈	6- ¹ / ₂	3- ⁵ / ₈	5- ³ / ₄	5- ¹ / ₂ FH	2.85	167.6
TLNT-220	8.65	1 124 000	6- ³ / ₈	7.0	4- ¹ / ₈	6- ¹ / ₄	5- ¹ / ₂ FH	2.85	189.6

* can be designed and manufactured according to client's specification

SHORT-CATCH RELEASING OVERSHOT TLNK / TLNKT



Application:

The Short-Catch Releasing Overshot TLNK\TLNKT is used to engage and retrieve elements of tubular columns during fishing operations in the well. TLNK is used for standard working conditions. TLNKT is used for heavy working conditions.

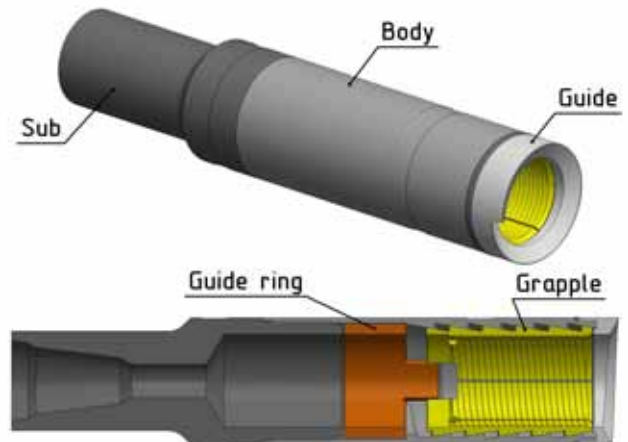
Design:

The Short-Catch Releasing Overshot consists of body, sub and control guide with set of replacement basket grapples of different diameter.

Ring with cutlip guide is welded inside the body in order to avoid fallout of basket. It also operates as guide funnel.

To retrieve short elements of column the basket grapple is placed close to lower part of overshot.

The Short-Catch Releasing Overshot can be produced in left/right hand configuration.



SHORT-CATCH RELEASING OVERSHOT

TLNK / TLNKT

Technical data

Code	OD, in	Load capacity, lbf	Basket grapple, in	Connecting thread, API*	Length, ft	Weight, lb
TLNK-59	2.31	101 200	$1/2 - 1-1/8$	NC 16	2.13	22.05
TLNK-92	3.63	168 600	$1,0 - 2-3/8$	NC 26	1.86	29.32
TLNK-95	3.76	179 800	$1,0 - 2-5/8$	$2-7/8$ Reg	1.8	31.09
TLNK-111	4.39	213 600	$1-5/8 - 2-7/8$	$2-7/8$ Reg	1.94	39.46
TLNK-118	4.64	314 700	$1-5/8 - 3-1/8$	$2-7/8$ Reg	1.94	48.06
TLNK-119	4.71	215 800	$1-7/8 - 3-1/2$	$2-7/8$ Reg	1.94	49.6
TLNK-122	4.82	247 300	$2-3/8 - 3-1/2$	$2-7/8$ Reg	1.94	53.57
TLNK-124	4.88	224 800	$1-11/16 - 3-5/8$	$2-7/8$ Reg	2.0	56.0
TLNK-130	5.14	224 800	$2-3/8 - 3-13/16$	$2-7/8$ Reg	2.03	60.19
TLNK-140	5.51	224 800	$2-1/8 - 4-1/8$	$2-7/8$ Reg	2.13	60.19
TLNK-146	5.75	247 300	$3-1/3 - 4-7/16$	$2-7/8$ Reg	2.15	63.27
TLNK-168	6.64	449 600	$2-5/8 - 4-9/10$	NC 50	2.2	95.24
TLNK-210	8.27	584 500	$4-1/2 - 6-1/2$	NC 50	2.2	110.9
TLNKT-59	2.31	146 100	$1/2 - 1,0$	NC 16	1.8	28.66
TLNKT-92	3.63	213 600	$1,0 - 2-1/4$	NC 26	1.86	30.64
TLNKT-95	3.76	247 300	$1,0 - 2-3/8$	NC 26	1.8	31.97
TLNKT-111	4.39	254 000	$1-5/8 - 2-7/8$	$2-7/8$ Reg	1.94	39.9
TLNKT-118	4.64	314 700	$1-5/8 - 3-1/8$	$2-7/8$ Reg	1.94	48.5
TLNKT-119	4.71	314 700	$1-7/8 - 3-1/4$	$2-7/8$ Reg	1.94	48.06
TLNKT-122	4.82	359 700	$1-7/8 - 3-3/8$	$2-7/8$ Reg	1.94	55.12
TLNKT-124	4.88	359 700	$1-7/8 - 3-3/8$	$2-7/8$ Reg	2.0	58.86
TLNKT-130	5.14	427 100	$2-3/8 - 3-3/8$	$2-7/8$ Reg	2.03	62.61
TLNKT-140	5.51	449 600	$2-1/8 - 3-3/4$	$2-7/8$ Reg	2.13	65.04
TLNKT-143	5.63	427 100	$3-1/8 - 4-3/5$	$2-7/8$ Reg	2.13	80.47
TLNKT-146	5.75	449 600	$3-1/8 - 4-1/4$	$2-7/8$ Reg	2.15	82.23

* can be designed and manufactured according to client's specification

RELEASING ROD OVERSHOT TLNSH



Application:

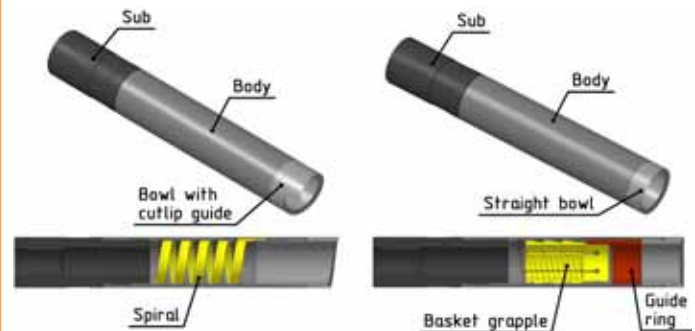
The Releasing Rod Overshot TLNSH is used to retrieve elements of pipe strings (mostly pump rods) by catching external cylindrical surface during fishing operations in the well.

Design:

The body of Releasing Rod Overshot has thread for sub connection in the upper part. This sub is connected to the fishing string by rod thread or tool-joint thread. Guide funnel with screw cut is fixed by thread to lower part of body. It is used to guide upper end of fished string into releasing rod overshot.

The Releasing Rod Overshot with basket grapple is used at lower diameters of gripping elements of emergency string, and spiral grapple – at bigger diameters, coming to outer diameter of overshot.

The process of gripping by Releasing Rod Overshot is realized due to presence of cone spiral surfaces made at internal surface of body.



RELEASING ROD OVERSHOT

TLNSH

Technical data

Code	OD, in	Load capacity, lbf	Connecting thread, API*	Spiral grapple, in	Basket grapple, in	Length, ft	Weight, lb
TLNSH-40	1.56	22 930	Rod $\frac{3}{4}$ box	1.0 - $1\frac{1}{8}$	$\frac{5}{8}$ - $\frac{7}{8}$	1.02	4.41
TLNSH-42	1.66	22 930	Rod $\frac{3}{4}$ box	$1\frac{1}{8}$ - $1\frac{3}{8}$	$\frac{1}{2}$ - $1\frac{1}{16}$	1.02	4.85
TLNSH-45	1.8	22 480	Rod $\frac{7}{8}$ box	$1\frac{5}{16}$ - $1\frac{7}{16}$	$\frac{1}{2}$ - $1\frac{1}{8}$	1.05	6.28
TLNSH-47	1.85	23 160	Rod $\frac{7}{8}$ box	$1\frac{3}{8}$ - $1\frac{1}{2}$	$\frac{1}{2}$ - $1\frac{1}{4}$	1.05	6.5
TLNSH-48	1.93	24 050	Rod $\frac{7}{8}$ box	$1\frac{5}{16}$ - $1\frac{9}{16}$	$\frac{1}{2}$ - $1\frac{5}{16}$	1.08	6.77
TLNSH-54	2.15	23 160	Rod $\frac{7}{8}$ box	$1\frac{9}{16}$ - $1\frac{3}{4}$	$\frac{3}{4}$ - $1\frac{1}{2}$	1.12	7.67
TLNSH-57	2.26	42 710	Rod $\frac{7}{8}$ box	$1\frac{5}{8}$ - $1\frac{13}{16}$	$\frac{3}{4}$ - $1\frac{5}{8}$	1.12	8.07
TLNSH-58	2.28	42 710	Rod $\frac{7}{8}$ box	$1\frac{11}{16}$ - $1\frac{7}{8}$	$\frac{5}{8}$ - $1\frac{11}{16}$	1.17	9.39
TLNSH-60	2.37	46 540	Rod $\frac{7}{8}$ box	$1\frac{11}{16}$ - $1\frac{7}{8}$	$\frac{5}{8}$ - $1\frac{11}{16}$	1.29	11.07
TLNSH-71	2.81	50 810	NC 16	$1\frac{15}{16}$ - $2\frac{1}{16}$	1,0 - $1\frac{7}{8}$	1.56	14.66
TLNSH-73	2.88	63 400	NC 16	$2\frac{3}{16}$ - $2\frac{3}{8}$	1,0 - $1\frac{1}{16}$	1.56	15.21

* can be designed and manufactured according to client's specification

NON-RELEASING SPEAR TVP



Application:

The Non-Releasing Spear TVP is used to retrieve tubular items during repair and emergency operations in the well.

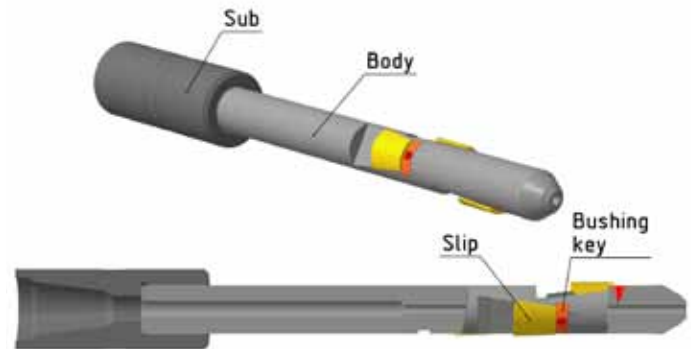
Design:

The Non-Releasing Spear consists of body, sub, mandrel, slip and screw.

Sub has collar end with tool-joint thread for connection to fishing string. The other side of sub has special thread for connecting spear body.

Spear body has pup joint form with inclined grooves and slips moving inside.

The Non-Releasing Spear has central watercourse.
The tool can be produced in left/right hand configuration.



NON-RELEASING SPEAR

TVP

Technical data

Code	ID of caught pipes, in	Total length, ft	Connecting thread, API*	Number of slips	Load capacity, lbf	Weight, lb
TVP-60	1- ¹⁵ / ₁₆ - 2- ³ / ₁₆	2.63	2- ⁷ / ₈ Reg	3	67 440	36.16
TVP-73	2- ⁵ / ₁₆ - 2- ⁹ / ₁₆	2.63	2- ⁷ / ₈ Reg	3	89 920	42.33
TVP-89	2- ⁴ / ₅ - 3- ¹ / ₈	2.82	2- ⁷ / ₈ Reg	3	112 400	56.44
TVP-102	3- ¹ / ₄	3.15	2- ⁷ / ₈ Reg	3	134 900	80.25
TVP-114	3- ³ / ₄ - 4- ⁵ / ₁₆	3.22	2- ⁷ / ₈ Reg	6	224 800	99.21
TVP-140	4- ¹ / ₂ - 5- ¹ / ₂	3.28	3- ¹ / ₂ Reg	6	494 600	158.7
TVP-146	4- ⁷ / ₈ - 5- ³ / ₄	3.28	3- ¹ / ₂ Reg	6	494 600	172.0
TVP-168	5- ³ / ₈ - 6- ¹ / ₄	3.28	3- ¹ / ₂ Reg	6	584 500	183.0

* can be designed and manufactured according to client's specification

SLIP RELEASING SPEAR TLVPM



Application:

The Slip Releasing Spear TLVPM is used to retrieve tubular items during repair and emergency works in the well.

Design:

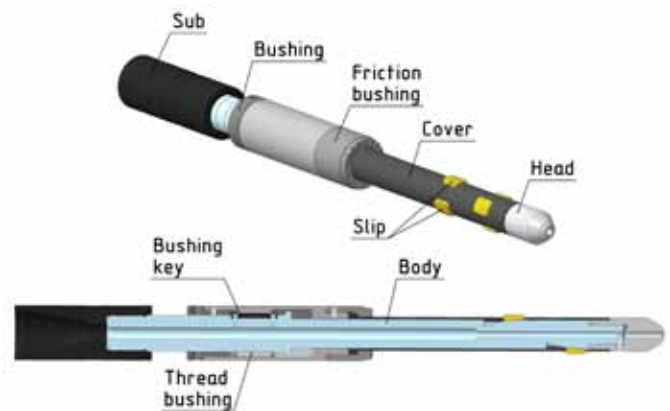
The Slip Releasing Spear TLVPM consists of body, slip, head, mandrel, top sub, threaded slip, friction slip and screws.

The Releasing Slip Spear body has pup joint form with milling head at the lower end.

The body has inclined grooves with slips moving inside. Slips have fishing cuts of thrust profile.

The lower end of friction slip has teeth which help to attach it to the top of emergency string during releasing of spear from captured pipes in the well.

The Slip Releasing Spear can be produced in left/right hand configuration.



SLIP RELEASING SPEAR

TLVPM

Technical data

Code	ID of caught pipes, in	Total length, ft	Connecting thread, API*	Max D of releasing unit, in	Number of slips	Load capacity, lbf	Weight, lb
TLVPM-60	1- ⁵ / ₁₆ - 2- ¹ / ₁₆	3.77	NC 26	3- ⁵ / ₈	3	44 960	44.09
TLVPM-73	2- ⁵ / ₁₆ - 2- ⁹ / ₁₆	3.58	2- ⁷ / ₈ Reg	3- ⁵ / ₈	6	67 440	78.04
TLVPM-89	2- ⁴ / ₅ - 3- ¹ / ₈	3.58	2- ⁷ / ₈ Reg	4- ¹ / ₄	6	112 400	85.98
TLVPM-102	3- ³ / ₈ - 3- ⁵ / ₈	3.77	2- ³ / ₈ Reg	4- ³ / ₄	6	157 400	110.2
TLVPM-114	3- ¹ / ₂ - 4- ¹ / ₄	3.77	NC 26	4- ³ / ₄	6	179 800	136.7
TLVPM-127	4,0 - 4- ⁹ / ₁₆	4.27	NC 26	5- ¹ / ₂	6	179 800	220.5
TLVPM-140	4- ⁷ / ₁₆ - 5- ¹ / ₁₆	4.92	3- ¹ / ₂ Reg	6- ⁵ / ₁₆	6	179 800	330.7
TLVPM-146	4- ³ / ₄ - 5- ⁷ / ₁₆	4.92	3- ¹ / ₂ Reg	6- ⁵ / ₁₆	6	269 800	440.9
TLVPM-168	5- ¹¹ / ₁₆ - 6- ¹ / ₄	6.5	3- ¹ / ₂ IF	5- ¹ / ₂	6	269 800	551.2

* can be designed and manufactured according to client's specification

RELEASING SPEAR TLV



Application:

The Releasing Spear TLV is used to retrieve tubular items by catching their internal cylindrical surface during repair and emergency works in the well.

Design:

The Releasing Spear consists of body, basket grapple, milling head, release ring and packer.

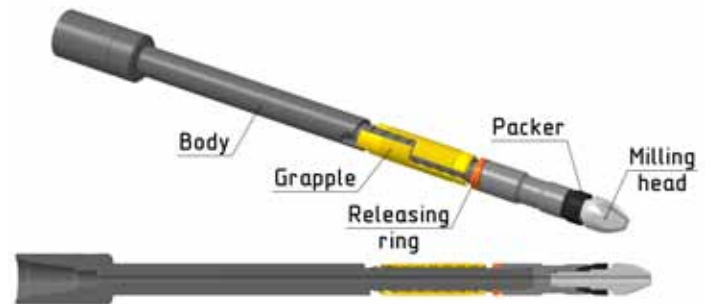
The original design of basket grapple allows applying bigger torque during revers without any danger of breaking or damaging the basket.

Milling head provides easier passing of spear into the fished object, removes small foreign objects from the head of emergency string (cable bands, metal pieces, etc.), pushes pieces of cable inside and removes hard sediments.

Packer seals area between spear and fished object, permits to obtain circulation below emergency "head". It is also used to facilitate retrieval in case of reciprocation with circulation or to pump lubricating agent to seizure area.

Increased length of spear permits to avoid usage of extension and to catch the element below damaged area.

Spears can be produced in left/right hand configuration.



RELEASING SPEAR

TLV

Technical data

Code	OD, in	Load capacity, lbf	Connecting thread, API*	Grapple, in	Length, ft	Water course D, in
TLV-34	1.28	56 200	NC 23	1- ⁷ / ₁₆ - 1- ³ / ₄	2.13	³ / ₈ in upper joint
TLV-48	1.43	44 960	NC 10	1- ⁷ / ₁₆ - 2.0	3.45	³ / ₈ in upper joint
TLV-60	1.87	76 440	NC 13	2- ¹⁵ / ₁₆ - 2- ⁷ / ₁₆	3.94	³ / ₈
TLV-73	2.32	146 100	NC 23	2- ³ / ₈ - 3- ¹ / ₁₆	3.95	¹ / ₂
TLV-89	2.8	224 800	NC 23	2- ⁷ / ₈ - 3- ¹⁵ / ₁₆	4.27	¹ / ₂
TLV-102	3.31	292 300	NC 26	3- ³ / ₈ - 4.0	4.58	¹¹ / ₁₆
TLV-114	3.74	359 700	2- ⁷ / ₈ Reg	3- ⁷ / ₈ - 4- ³ / ₈	4.76	¹³ / ₁₆
TLV-127	4.08	449 600	2- ⁷ / ₈ Reg	4- ³ / ₁₆ - 6- ¹ / ₁₆	4.76	⁷ / ₈
TLV-146	4.72	562 000	3- ¹ / ₂ Reg	4- ⁷ / ₈ - 5- ⁵ / ₁₆	4.77	⁷ / ₈
TLV-168	5.1	651 900	3- ¹ / ₂ Reg	5- ¹ / ₄ - 6- ¹ / ₈	4.84	1.0
TLV-178	5.82	651 900	4- ¹ / ₂ Reg	6- ¹ / ₈ - 7- ¹⁵ / ₁₆	4.84	1- ³ / ₁₆
TLV-219	7.0	1 012 000	5- ¹ / ₂ FH	7- ¹¹ / ₁₆ - 11.0	5.46	2- ³ / ₄
TLV-245	7.87	1 461 000	5- ¹ / ₂ FH	8- ⁵ / ₈ - 19.0	5.96	2- ³ / ₄
TLV-324	10.94	1 461 000	5- ¹ / ₂ FH	11,89 - 15,09	4.45	4.0
TLV-426	11.42	1 911 000	5- ¹ / ₂ FH	16 - ¹ / ₄ - 19.0	4.49	4.0

* can be designed and manufactured according to client's specification

UNIVERSAL FISHING TOOL UL



Application:

The Universal Fishing Tool UL is used to retrieve parts of pipe strings (mainly pump rods) by catching external cylindrical surface during repair and emergency works in the well.

Design:

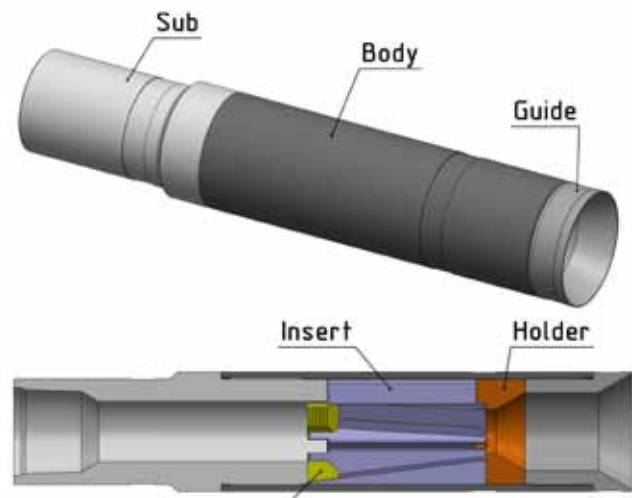
The Universal Fishing Tool consists of sub, body, three inserts, set of replaceable slips, replaceable retainer and funnel. Catch gripping unit consists of three inserts fixed in body by retainer with indicators and three slips.

Slips move along guides of inserts with dovetail profile. Slips have toothed cut.

Slips are moved by stretching of fishing string and cut into emergency string with its teeth.

Further stretching of string brings to wedging of slips and gripping element as a result fishing tool and emergency string are connected securely.

The Universal Fishing Tool can be designed in left/right hand configuration.



UNIVERSAL FISHING TOOL

UL

Technical data

Code	Production casing D, in	Connection, API*	Tubing string and tubing parts OD, in		Load capacity, lbf	Total length, ft	Weight, lb
			min	max			
UL-116	5- $\frac{1}{2}$	Tubing string, 89	$\frac{9}{16}$	2.0	89 920	2.07	66.14
UL-118	5- $\frac{1}{2}$	Tubing string, 89	$\frac{1}{2}$	2- $\frac{1}{16}$	89 920	2.17	72.75
UL-122	5- $\frac{3}{4}$	Tubing string, 89	$\frac{9}{16}$	2- $\frac{1}{4}$	89 920	2.17	88.18
UL-136	6- $\frac{5}{8}$	Tubing string, 89	$\frac{1}{2}$	2- $\frac{3}{8}$	89 920	2.24	101.4

* can be designed and manufactured according to client's specification

To increase range of catch sizes two sets of slips are available:

Code	Code of slip sets	Range of external diameters for catch-up of restrainer with slips, min-max, in
UL-116	Set №1	$\frac{9}{16}$ - 1- $\frac{11}{16}$
	Set №2	$\frac{7}{8}$ - 2.0
UL-118	Set №1	$\frac{1}{2}$ - 1- $\frac{7}{8}$
	Set №2	$\frac{7}{8}$ - 2- $\frac{1}{16}$
UL-122	Set №1	$\frac{7}{8}$ - 2- $\frac{1}{4}$
	Set №2	$\frac{9}{16}$ - 1- $\frac{11}{16}$
UL-136	Set №1	$\frac{15}{16}$ - 2- $\frac{7}{16}$
	Set №2	$\frac{1}{2}$ - 1- $\frac{7}{8}$

* can be designed and manufactured according to client's specification

PLAIN DIE COLLAR WITH CUTLIP GUIDE LKGz



Application:

The Plain Die Collar With Cutlip Guide LKGz is used to retrieve string elements by catching external cylindrical surface during fishing operations in the well.

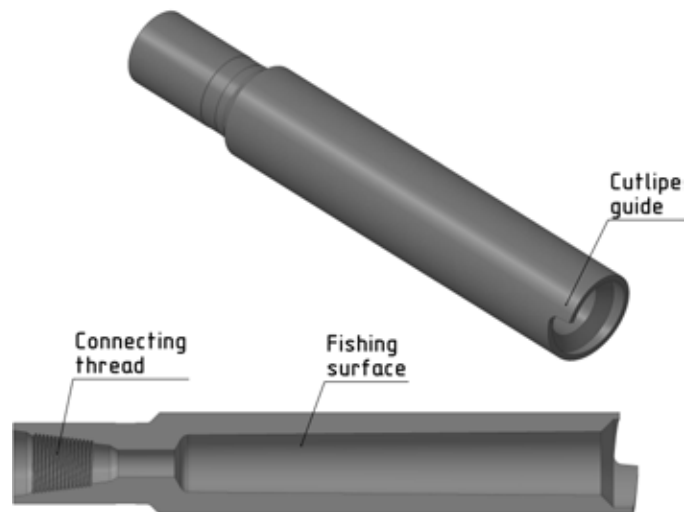
Design:

The Plain Die Collar is a single piece construction with box joint at the top and internal fishing cone at the bottom.

There is a watercourse for drilling fluid.

The Plain Die Collar can be designed in left/right hand configuration depending on the shape of bottom edge of die collar – cutlip guide or plain end.

The Die Collar is released by tensioning with force 25-50% bigger than force applied for fixing the die collar.



PLAIN DIE COLLAR WITH CUTLIP GUIDE

Technical data

LKGz

Code	Total length, ft	Joint OD, in	Connecting thread, API*	Weight, lb
LKGz-90.75x70	1.57	3 ⁻⁹ / ₁₆	2 ⁻³ / ₈ Reg	24.25
LKGz-96.81x76	1.57	3 ⁻³ / ₄	2 ⁻⁷ / ₈ Reg	26.46
LKGz-102.88x83	1.57	4.0	3 ⁻¹ / ₂ Reg	30.86
LKGz-102.91x86	1.85	4.0	3 ⁻¹ / ₂ Reg	31.09
LKGz-110.95x90	1.64	4 ⁻⁵ / ₁₆	3 ⁻¹ / ₂ Reg	35.27
LKGz-110.97x92	1.64	4 ⁻⁵ / ₁₆	3 ⁻¹ / ₂ Reg	35.27
LKGz-114.99x94	1.64	4 ⁻¹ / ₂	3 ⁻¹ / ₂ Reg	37.48
LKGz-114.104x99	1.64	4 ⁻¹ / ₂	3 ⁻¹ / ₂ Reg	33.07
LKGz-118.107x101	1.84	4 ⁻⁵ / ₈	3 ⁻¹ / ₂ Reg	37.48
LKGz-122.110x104	1.84	4 ⁻¹³ / ₁₆	3 ⁻¹ / ₂ Reg	39.68
LKGz-128.115x109	1.84	5 ⁻¹ / ₁₆	3 ⁻¹ / ₂ Reg	41.89
LKGz-132.117x111	1.84	5 ⁻³ / ₁₆	3 ⁻¹ / ₂ Reg	44.09
LKGz-140.120x114	1.9	5 ⁻¹ / ₂	3 ⁻¹ / ₂ Reg	57.32
LKGz-140.122x116	1.9	5 ⁻¹ / ₂	3 ⁻¹ / ₂ Reg	55.12
LKGz-140.123x117	1.9	5 ⁻¹ / ₂	3 ⁻¹ / ₂ Reg	55.12
LKGz-146.129x123	1.91	5 ⁻³ / ₄	3 ⁻¹ / ₂ Reg	57.32
LKGz-146.134x128	1.9	5 ⁻³ / ₄	3 ⁻¹ / ₂ Reg	50.71
LKGz-152.135x129	1.91	6.0	3 ⁻¹ / ₂ Reg	57.32
LKGz-152.142x136	1.9	6.0	3 ⁻¹ / ₂ Reg	48.5
LKGz-156.142x136	1.91	6 ⁻¹ / ₈	3 ⁻¹ / ₂ Reg	55.12
LKGz-159.148x142	1.9	6 ⁻¹ / ₄	3 ⁻¹ / ₂ Reg	52.91
LKGz-174.156x150	2.1	6 ⁻⁷ / ₈	NC 50	90.39
LKGz-180.157x151	2.1	7 ⁻¹ / ₁₆	NC 50	101.4
LKGz-194.173x167	2.1	7 ⁻⁵ / ₈	NC 50	103.6
LKGz-194.174x168	2.1	7 ⁻⁵ / ₈	NC 50	101.4
LKGz-207.180x174	2.17	8 ⁻¹ / ₈	NC 50	130.1
LKGz-207.187x181	2.17	8 ⁻¹ / ₈	NC 50	119.0
LKGz-210.196x190	2.17	8 ⁻¹ / ₄	NC 50	110.2
LKGz-216.199x193	2.17	8 ⁻¹ / ₂	NC 50	116.8
LKGz-219.205x199	2.23	8 ⁻⁵ / ₈	NC 50	125.7
LKGz-241.221x215	2.23	9 ⁻¹ / ₂	NC 50	149.9
LKGz-266.247x241	2.23	10 ⁻¹ / ₂	NC 50	209.4

* can be designed and manufactured according to client's specification

THREADED DIE COLLAR LKz



Application:

The Threaded Die Collar LKz is used for gripping by screwing over external surface to retrieve tubular parts of strings during fishing operations in the well.

Design:

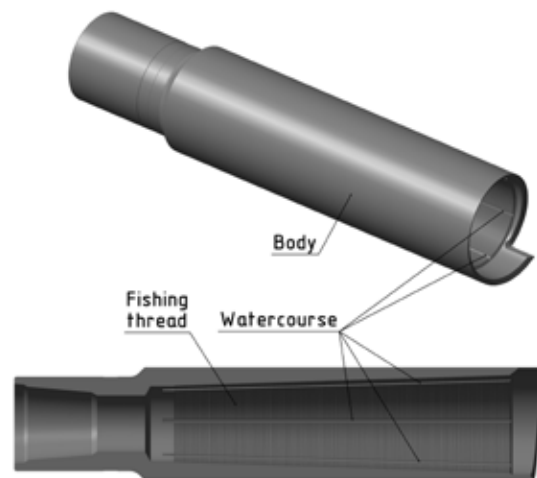
The Threaded Die Collar is a single piece construction with box joint at the top and internal fishing thread at the bottom.

The cone of die collar has special fishing cemented thread with thrust profile.

To help the collar to cut deeply into the fished object and improve conditions for chips removal special profiled grooves are made along the fishing thread.

All die collars are provided with cutlip guide for pipe deflection from the well wall.

The Threaded Die Collar can be designed in left/right hand configuration. There is a watercourse for drilling fluid.



THREADED DIE COLLAR

LKz

Technical data

Code	Total length, ft	Joint OD, in	Connecting thread, API*	Weight, lb
LKz-46.35x22	1.38	1- ¹³ / ₁₆	NC 13	11.02
LKz-48.37x24	1.38	1- ⁷ / ₈	NC 13	15.43
LKz-55.44x32	1.31	2- ³ / ₁₆	NC 16	17.64
LKz-59.48x35	1.31	2- ⁵ / ₁₆	NC 16	22.05
LKz-65.52x30	1.84	2- ⁹ / ₁₆	NC 16	24.25
LKz-80.67x45	1.84	3- ³ / ₁₆	NC 16	26.46
LKz90.77-55	1.84	3- ⁹ / ₁₆	NC 26	30.86
LKz95.82-60	1.84	3- ³ / ₄	NC 26	33.07
LKz102.90-68	1.9	4.0	2- ⁷ / ₈ Reg	41.89
LKz110.94-72	1.9	4- ⁵ / ₁₆	2- ⁷ / ₈ Reg	46.3
LKz114.98-76	1.9	4- ¹ / ₂	2- ⁷ / ₈ Reg	48.5
LKz118.105-60	1.9	4- ⁵ / ₈	2- ⁷ / ₈ Reg	22.05
LKz120.105-60	3.12	4- ³ / ₄	2- ⁷ / ₈ Reg	97.0
LKz122.105-60	3.12	4- ³ / ₁₆	2- ⁷ / ₈ Reg	101.4
LKz124.114-69	3.12	4- ⁷ / ₈	2- ⁷ / ₈ Reg	92.59
LKz128.112-90	1.9	5- ¹ / ₁₆	3- ¹ / ₂ Reg	55.12
LKz132.116-94	1.9	5- ³ / ₁₆	3- ¹ / ₂ Reg	59.52
LKz140.124-79	3.12	5- ¹ / ₂	3- ¹ / ₂ Reg	119.0
LKz146.120-90	2.33	5- ³ / ₄	3- ¹ / ₂ Reg	97.0
LKz159.142-97	3.2	6- ¹ / ₄	4- ¹ / ₂ FH	152.1
LKz162.137-102	2.69	6- ³ / ₈	4- ¹ / ₂ FH	136.7
LKz170.145-110	2.69	6- ¹¹ / ₁₆	4- ¹ / ₂ FH	143.3
LKz174.149-114	2.69	6- ⁷ / ₈	NC 50	143.3
LKz180.155-120	2.69	7- ¹ / ₈	NC 50	149.9
LKz194.168-118	3.68	7- ⁵ / ₈	5- ¹ / ₂ FH	273.4
LKz210.182-134	3.68	8- ¹ / ₄	5- ¹ / ₂ FH	308.6
LKz216.185-137	3.68	8- ¹ / ₂	5- ¹ / ₂ FH	328.5
LKz235.204-156	3.68	9- ¹ / ₄	6- ⁵ / ₈ FH	399.0
LKz241.210-162	3.68	9- ¹ / ₂	6- ⁵ / ₈ FH	407.9
LKz254.222-174	3.68	10.0	6- ⁵ / ₈ FH	432.1
LKz237.241-193	3.68	9- ⁵ / ₁₆	6- ⁵ / ₈ FH	260.1
LKz291.260-212	3.68	11- ⁷ / ₁₆	6- ⁵ / ₈ FH	480.6

* can be designed and manufactured according to client's specification

PLAIN TAPER TAP MLG



Application:

The Plain Taper Tap MLG is used to retrieve tubing parts of strings by catching internal surface during fishing operations in the well.

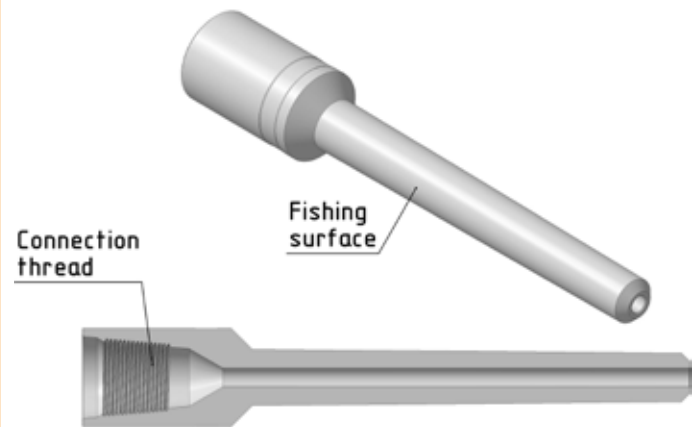
Design:

The Taper Tap is a single piece construction with fishing cone ($0^{\circ}30'$) at one end and tool-joint thread at the other end.

The Taper Tap is put into pipe gripping it by friction force. After that Taper Tap is retrieved with captured pipe. If needed the Plain Taper Tap is released by tensioning with force 25-50% bigger than force applied for fixing the Plain Taper Tap.

The Plain Taper Tap can be designed in left/right hand configuration.

There is a watercourse for drilling fluid.



PLAIN TAPER TAP

MLG

Technical data

Code	Watercourse OD, in	Pressure load, lbf	Load capacity, lbf	Total length, ft	Joint OD, in	Weight, lb
MLG-18x29	$\frac{3}{16}$	8 768	6744	2.43	$1\text{-}\frac{3}{16}$	6.28
MLG-24x38	$\frac{5}{16}$	14 610	11 240	2.95	$1\text{-}\frac{3}{16}$	11.79
MLG-30x44	$\frac{3}{8}$	17 540	13 490	2.95	$1\text{-}\frac{3}{16}$	15.83
MLG-40x54	$\frac{1}{2}$	37 990	29 230	3.25	$3\text{-}\frac{3}{16}$	31.09
MLG-46x60	1.0	43 840	33 720	3.15	$3\text{-}\frac{3}{16}$	31.09
MLG-54x68	1.0	62 950	49 460	3.15	$3\text{-}\frac{3}{16}$	41.89
MLG-62x76	1.0	67 440	53 950	3.15	$3\text{-}\frac{3}{16}$	53.35
MLG-76x90	$1\text{-}\frac{1}{4}$	76 440	58 450	3.22	$3\text{-}\frac{3}{4}$	77.6
MLG-84x98	$1\text{-}\frac{1}{2}$	76 440	58 450	3.22	$4\text{-}\frac{1}{4}$	91.05
MLG -90x104	$1\text{-}\frac{1}{2}$	76 440	58 450	3.22	$4\text{-}\frac{1}{4}$	103.6
MLG-96x110	$2\text{-}\frac{5}{16}$	76 440	58 450	3.8	$5\text{-}\frac{1}{2}$	170.2
MLG-104x118	$2\text{-}\frac{5}{16}$	76 440	58 450	3.42	$5\text{-}\frac{1}{2}$	130.1
MLG-108x126	$2\text{-}\frac{5}{16}$	76 440	58 450	4.27	$5\text{-}\frac{1}{2}$	183.0
MLG-118x136	$2\text{-}\frac{5}{16}$	76 440	58 450	4.1	$5\text{-}\frac{1}{2}$	210.5
MLG-126x144	$3\text{-}\frac{3}{4}$	76 440	58 450	4.27	$6\text{-}\frac{1}{8}$	254.6
MLG-140x158	$3\text{-}\frac{3}{4}$	76 440	58 450	4.27	$6\text{-}\frac{1}{8}$	226.0
MLG-148x166	$3\text{-}\frac{3}{4}$	76 440	58 450	4.27	$6\text{-}\frac{1}{8}$	262.4

THREADED TAPER TAP ML



Application:

The Threaded Taper Tap ML is used for gripping by screwing over external surface to retrieve tubular parts of strings during fishing operations in the well.

Design:

The Threaded Taper Tap is steel pup-joint with cone on one end and box joint on the other. Cone has special fishing thread with thrust profile.

To help taper tap to cut deeply into fished object and improve conditions for chips removal special profiled grooves are made along fishing thread.

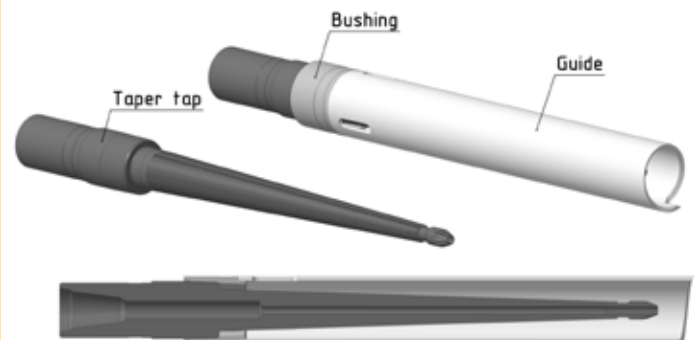
To provide passing into fished object there is a milling element with increased hardness at the end of Taper Tap.

The upper part of Taper Tap has a thread for guide connection.

When Taper Tap is used without guide special safety ring is used to prevent thread from damage.

The Threaded Taper Tap can be designed in left/right hand configuration.

There is a watercourse for drilling fluid.



THREADED TAPER TAP

ML

Technical data

Code	Watercourse OD, in	Axial load, lbf	Total length, ft	Joint OD, in	Connecting thread, API*	Weight, lb
ML-20-45	$\frac{3}{16}$	54 400	1.84	$1\text{-}\frac{13}{16}$	NC 13	20.06
ML-22-48	$\frac{3}{8}$	63 620	1.9	$2\text{-}\frac{1}{8}$	NC 16	10.36
ML-22-54	$\frac{3}{8}$	65 640	2.2	$2\text{-}\frac{1}{8}$	NC 16	13.23
ML-25-65	$\frac{3}{8}$	99 370	2.69	$3\text{-}\frac{3}{16}$	$2\text{-}\frac{3}{8}$ Reg	27.78
ML-32-72	$\frac{9}{16}$	134 900	2.72	$3\text{-}\frac{3}{16}$	$2\text{-}\frac{3}{8}$ Reg	38.36
ML-40-80	$\frac{9}{16}$	144 600	2.72	$3\text{-}\frac{3}{8}$	NC 26	42.33
ML-45x85	$\frac{7}{8}$	159 600	2.72	$3\text{-}\frac{3}{4}$	$2\text{-}\frac{7}{8}$ Reg	66.36
ML-55-95	$\frac{7}{8}$	170 900	2.72	$4\text{-}\frac{1}{4}$	$3\text{-}\frac{1}{2}$ Reg	66.36
ML-60-100	$1\text{-}\frac{1}{8}$	196 300	2.84	$4\text{-}\frac{1}{4}$	$3\text{-}\frac{1}{2}$ Reg	74.52
ML-65-109	$1\text{-}\frac{1}{4}$	206 800	3.08	$4\text{-}\frac{5}{16}$	$3\text{-}\frac{1}{2}$ Reg	93.04
ML-70-114	$1\text{-}\frac{7}{16}$	229 300	2.92	$4\text{-}\frac{3}{4}$	NC 38	105.8
ML-75-120	$1\text{-}\frac{1}{2}$	242 800	2.95	5.0	NC 38	110.2
ML-80-125	$1\text{-}\frac{9}{16}$	251 800	2.98	$5\text{-}\frac{1}{4}$	NC 40	141.1
ML-90-135	$1\text{-}\frac{3}{4}$	272 000	3.02	$5\text{-}\frac{1}{2}$	$4\text{-}\frac{1}{2}$ Reg	149.9
ML-100-145	$1\text{-}\frac{15}{16}$	278 800	3.02	6.0	$4\text{-}\frac{1}{2}$ FH	174.2
ML-120-165	$2\text{-}\frac{3}{8}$	296 700	3.05	$6\text{-}\frac{5}{8}$	NC 50	220.5

* can be designed and manufactured according to client's specification

SPECIAL OPERATIONAL TAPER TAP MES



Application:

The Special Operational Taper Tap MES is used for gripping by screwing into box thread of tubing pipes and its further retrieval during fishing operations in the well.

Design:

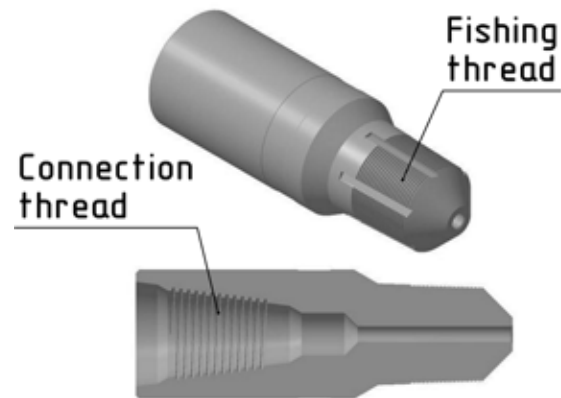
The Taper Tap is a single piece construction made of alloyed forged steel.

It has connection thread at the top and external fishing thread at the bottom.

To make the Taper Tap to cut deeply into fished object special profiled grooves are made along fishing thread.

The Taper Tap can be designed in left/right hand configuration.

There is a watercourse for drilling fluid.



SPECIAL OPERATIONAL TAPER TAP

MES

Technical data

Code	Fishing thread	Watercourse OD, in	Load capacity, lbf	External diameter, in	Total length, ft
MES-48	NKT-48	$1/2$	80 930	$2-9/16$	0.59
MES-60	NKT-60	$9/16$	123 600	$3-3/14$	0.89
MES-73	NKT-73	$1/2$	168 600	$3-3/14$	0.92
MES-89	NKT-89	$13/16$	224 800	$4-1/4$	0.92
MES-102	NKT-89	$5/8$	269 800	$4-1/4$	0.92
MES-114	NKT-114	$9/16$	337 200	$4-3/4$	0.92
MES-V33	NKTV-33	$1/4$	47 210	$2-9/16$	0.76
MES-V42	NKTV-42	$5/16$	62 950	$2-9/16$	0.76
MES-V48	NKTV-48	$1/2$	80 930	$2-9/16$	0.76
MES-V60	NKTV-60	$9/16$	123 600	$3-3/14$	0.92
MES-V73	NKTV-73	$1/2$	168 600	$3-3/14$	0.92
MES-V89	NKTV-89	$13/16$	224 800	$4-1/4$	0.92
MES-V102	NKTV-102	$1-1/4$	269 800	$4-1/4$	0.92
MES-V114	NKTV-114	$1-9/16$	337 200	$4-3/4$	0.92

* can be designed and manufactured according to client's specification

SPECIAL TAPER TAP FOR JOINTS MSZ



Application:

The Special Taper Tap for Joints MSZ is used for gripping by cutting into drill pipe joint and its further retrieval during well fishing operations.

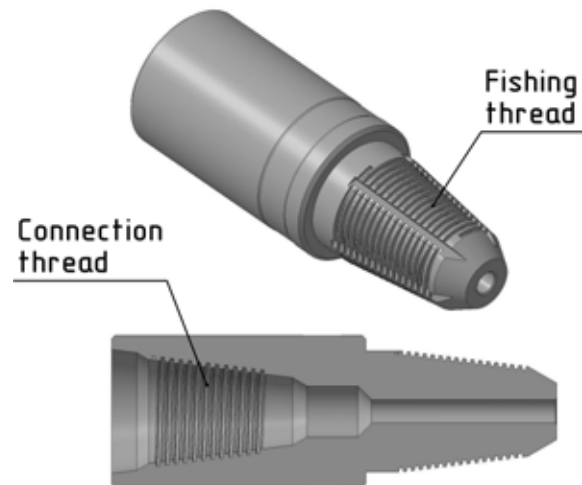
Design:

The Special Taper Tap is a single piece construction with connection thread at the top and external fishing thread at the bottom.

The surface of fishing thread is cemented and hardened.

To make the Taper Tap to cut deeply into fished object special profiled grooves are made along the fishing thread.

There is watercourse for drilling fluid.



SPECIAL TAPER TAP FOR JOINTS

MSZ

Technical data

Code	Fishing connection, API*	Water course OD, in	Load capacity, lbf	Joint OD, in	Total length, ft	Connection to fishing string, API*	Weight, lb
MSZ-66	2- ³ / ₈ Reg	⁹ / ₁₆	224 800	3- ³ / ₁₆	0.85	2- ³ / ₈ Reg	14.55
MSZ-73	NC 26	⁹ / ₁₆	337 200	3- ³ / ₈	0.92	NC 26	16.98
MSZ-76	2- ⁷ / ₈ Reg	⁹ / ₁₆	337 200	3- ³ / ₄	0.92	2- ⁷ / ₈ Reg	20.5
MSZ-86	NC 31	¹³ / ₁₆	449 600	4- ¹ / ₈	0.92	NC 31	23.15
MSZ-88	3- ¹ / ₂ Reg	1.0	449 600	4- ¹ / ₄	0.92	3- ¹ / ₂ Reg	25.13
MSZ-102	3- ¹ / ₂ IF	1- ¹³ / ₁₆	584 500	4- ¹⁵ / ₁₆	1.18	3- ¹ / ₂ IF	55.12
MSZ-133	NC 50	1- ¹ / ₂	607 000	6- ¹ / ₄	1.25	NC 50	74.52
MSZ-147	5- ¹ / ₂ FH	2- ³ / ₈	674 400	7- ¹ / ₁₆	1.34	5- ¹ / ₂ FH	87.52

* can be designed and manufactured according to client's specification

INTERNAL WIRELINE SPEAR PIKV



Application:

The Internal Wireline Spear PIKV is designed to grip and retrieve electric line, wire line and rope during fishing operations in the well.

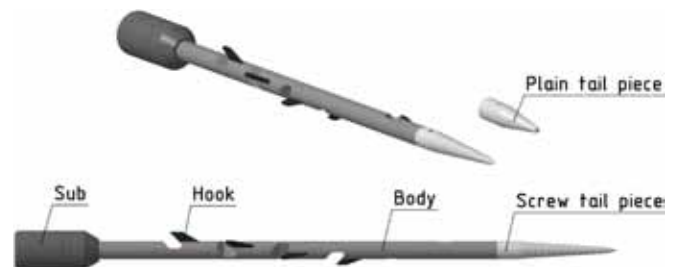
Design:

The Internal Wireline Spear has strong construction permitting to retrieve wire line or wire rope from the well.

Hooks are placed spirally and have different sizes (increasing from down to up), what permits to screw it into solid wire seal.

The head has cone form and penetrates into solid seal from cable or wire.

Top sub operates as stopping ring and has hole for technological flushing.



INTERNAL WIRELINE SPEAR

PIKV

Technical data

Code	Body OD, in	Total length, ft	Joint OD, in	Connecting thread, API*	Load capacity, lbf	Weight, lb
PIKV-20x56	$\frac{3}{16}$	2.33	$2\text{-}\frac{3}{16}$	NKT-42	33 720	12.13
PIKV-40x92	$1\text{-}\frac{9}{16}$	3.42	$3\text{-}\frac{5}{8}$	$2\text{-}\frac{3}{8}$ IF	33 720	37.48
PIKV-55x114	$2\text{-}\frac{3}{16}$	4.75	$4\text{-}\frac{1}{2}$	$2\text{-}\frac{3}{8}$ Reg	44 960	61.73
PIKV-50x120	$2\text{-}\frac{3}{16}$	4.75	$4\text{-}\frac{3}{4}$	$2\text{-}\frac{7}{8}$ Reg	62 950	92.59
PIKV-55x120	$2\text{-}\frac{3}{16}$	5.58	$4\text{-}\frac{3}{4}$	$2\text{-}\frac{7}{8}$ Reg	62 950	99.21
PIKV-60x120	$2\text{-}\frac{3}{8}$	5.42	$4\text{-}\frac{3}{4}$	$2\text{-}\frac{7}{8}$ Reg	67 440	125.7
PIKV-65x190	$2\text{-}\frac{9}{16}$	7.17	$7\text{-}\frac{1}{2}$	$3\text{-}\frac{1}{2}$ Reg	67 440	160.9

* can be designed and manufactured according to client's specification

EXTERNAL WIRELINE SPEAR PIKN



Application:

The External Wireline Spear PIKN is used to grip and retrieve electric wires with external grapple during fishing operations in the well.

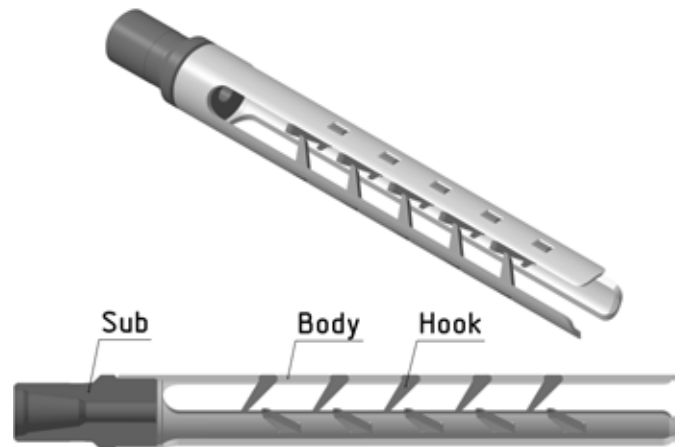
Design:

The External Wireline Spear has strong construction which allows retrieving cable and wire out of the well.

Hooks are placed spirally and have different sizes (increasing from down to up), what permits to screw it into solid wire seal.

Large number of hooks permits to bear high load during retrieval of cable seal.

The nozzle has shear pattern. The top sub has hole for technological flushing.



EXTERNAL WIRELINE SPEAR

PIKN

Technical data

Code	Sub OD, in	Body ID, in	Total length, ft	Connecting thread, API*	Load capacity, lbf	Number of hooks, pc	Weight, lb
PIKN-56	2- ³ / ₁₆	1- ³ / ₄	4.92	NKT 48	16 190	12	15.43
PIKN-114	4- ¹ / ₂	3- ¹⁵ / ₁₆	3.58	2- ³ / ₈ IF	44 960	15	46.3
PIKN-121	3- ³ / ₄	4.0	3.42	2- ⁷ / ₈ Reg	112 400	15	48.5
PIKN-133	4- ¹ / ₄	4- ⁵ / ₁₆	3.92	3- ¹ / ₂ Reg	123 600	15	85.98
PIKN-203	6- ¹ / ₂	6- ⁷ / ₈	5.94	NC 50	168 600	15	231.5

* can be designed and manufactured according to client's specification

AUGER-TYPE SPEAR PIKSH



Application:

The Auger-type Spear PIKSH is designed to catch, fix and retrieve logging cable, electric cable and wireline during fishing works in the well.

Design:

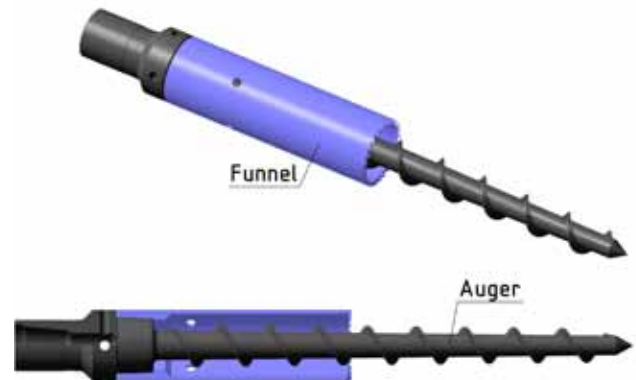
The Auger-type Spear consists of catching element (auger), which looks like helical spiral. It is placed along the full length of body and milling funnel.

Auger and joint are designed as one complete unit. There is connection thread to pipe string at the upper part and tubing thread for funnel connection at the lower part. Auger and funnel are made of alloyed steel.

The funnel is used for cable milling and at the same time it is a directing and limiting tool of axial movement of retrievable cable.

The emergency cable drum is formed in closed space of funnel, which makes the process of retrieval much easier.

The Spear movability allows to loosen it from cable rests and prepare it for further operating.



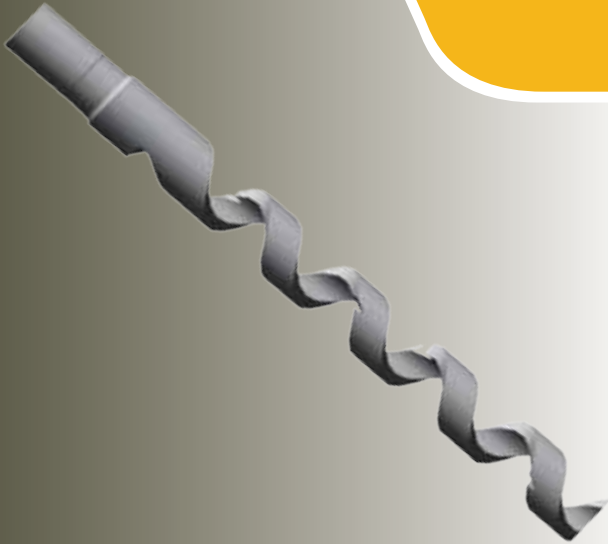
AUGER-TYPE SPEAR PIKSH

PIKSH

Technical data

Code	ID, in	External D of funnel, in	Min D of auger, in	Max D of auger, in	Total length, ft	Load capacity, lbf	Weight, lb
PIKSH-124.60x80	4 ^{-5/16}	4 ^{-7/8}	2 ^{-3/8}	3 ^{-3/16}	4.17	33 720	79.81
PIKSH-146.70x90	4 ^{-5/16}	4 ^{-7/8}	2 ^{-3/4}	3 ^{-9/16}	4.17	33 720	94.14

CABLE SPIRAL SPEAR KSU



Application:

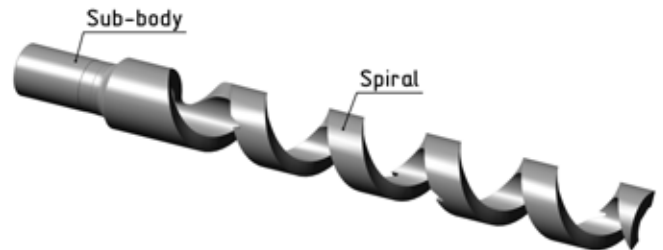
The Cable Spiral Spear KSU is used to retrieve wireline, electric cable and logging cable from casing during repair works in the well.

Design:

The Cable Spiral Spear is one piece twisted catching element in form of ribbon spiral.

The spiral part is manufactured as part of sub, which has connection thread to tubing string at the top.

The Spear is made of alloyed steel and is heat treated. To prevent cable slippage during retrieving special hooks are placed on turns of Spiral Spear.



CABLE SPIRAL SPEAR

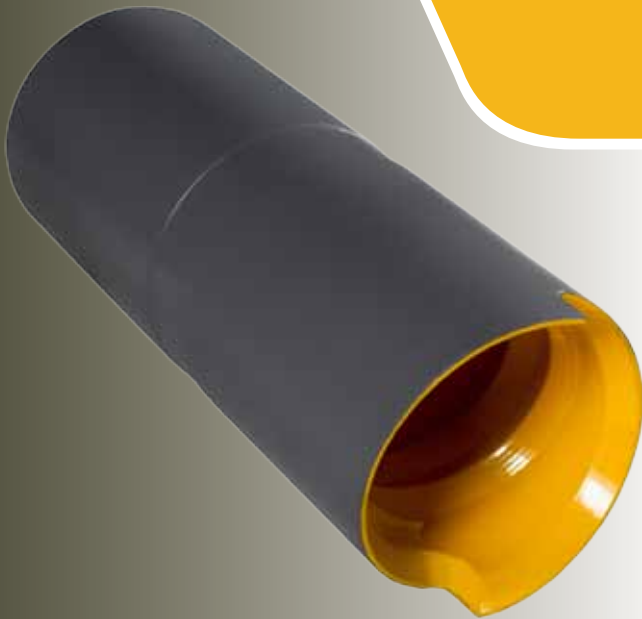
KSU

Technical data

Code	KSU-122
OD, in	4- ¹³ / ₁₆
ID, in	2- ³ / ₄
Total length, ft	3.92
Length of working part, in	3.08
Connecting thread, API*	2- ⁷ / ₈ IF
Load capacity, lbf	33 720
Weight, lb	78.26

* can be designed and manufactured according to client's specification

CABLE MULE SHOE PRK



Application:

The Cable Mule Shoe PRK is used to destroy cable in production string and annular space between wellbore wall and tubing during repair and recovery works in the well.

Design:

The Cable Mule Shoe is connection pipe made of alloyed steel, which has toothed cutter at the bottom. Teeth have hardened surface. The Cable Mule Shoe is made of high-strength cemented steel.

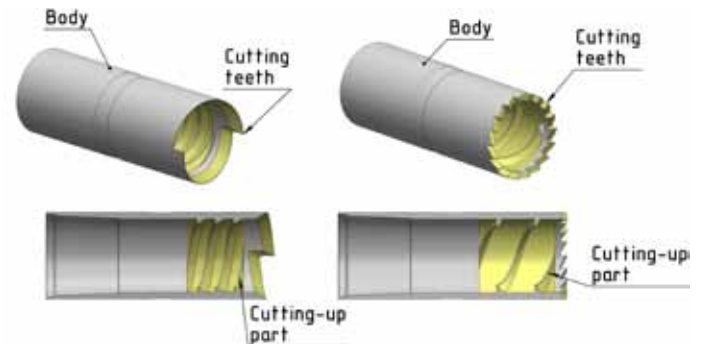
The internal part has screw conveyor form in order to tighten rests of cable during milling process and provide its further retrieval.

Screw conveyers are designed with narrow or wide pitch depending on size of cable.

There are three types of Cable Mule Shoe depending on the amount of teeth on the lower part of body:

- PRK 2 has 2 large cutting elements on the edge.
- PRK 4 has 4 large cutting elements on the edge.
- PRKz has a variety of small cutting elements on the edge.

It is recommended to set junk basket SHMU above PRK 2-3.



CABLE MULE SHOE

PRK

Technical data

Code	OD, in	ID, in	Total length, ft	Direction of screw slots *
PRK 2-114x96	4- ¹ / ₂	3- ³ / ₄	1.31	right
PRK 2-120x100	4- ³ / ₄	3- ¹⁵ / ₁₆	1.31	right
PRK 2-136x117	5- ³ / ₈	4- ⁵ / ₈	1.31	right
PRK 4-114x96	4- ¹ / ₂	3- ³ / ₄	1.31	right
PRK 4-120x100	4- ³ / ₄	3- ¹⁵ / ₁₆	1.31	right
PRK 4-136x117	5- ³ / ₈	4- ⁵ / ₈	1.31	right
PRKz-114x96	4- ¹ / ₂	3- ³ / ₄	1.31	right
PRKz-120x100	4- ³ / ₄	3- ¹⁵ / ₁₆	1.31	right
PRKz-136x117	5- ³ / ₈	4- ⁵ / ₈	1.31	right

* can be designed and manufactured according to client's specification

INTERNAL MECHANICAL CUTTER TRV



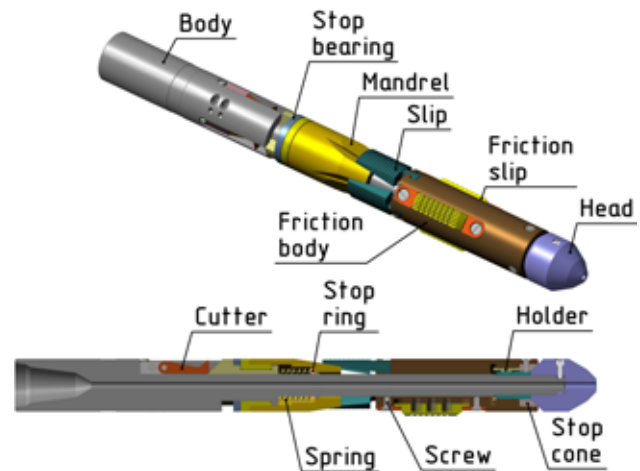
Application:

The Internal Mechanical Cutter TRV is used to cut and retrieve drilling, casing and tubing parts of pipes during emergency and recovery works in the well.

Design:

The Internal Mechanical Cutter consists of body, cutting blades, retractable device for cutting blades and slip.

Internal cutters can be designed in left/right hand configuration.



INTERNAL MECHANICAL CUTTER

TRV

Technical data

Code	D of cut pipes, inches	Body OD, inches	Connecting thread, API*
TRV-48	1- ⁷ / ₈	1- ⁷ / ₁₆	NC10
TRV-60	2- ³ / ₈	1- ⁷ / ₈	NC10
TRV-73	2- ⁷ / ₈	2- ¹ / ₄	NC 16
TRV-89	3- ¹ / ₂	2- ⁵ / ₈	NC 23
TRV-102	4.0	3- ¹ / ₄	2- ³ / ₈ Reg
TRV-114	4- ¹ / ₂	3- ⁹ / ₁₆	NC 26
TRV-127	5.0	4.0	2- ⁷ / ₈ Reg
TRV-140	5- ¹ / ₂	4- ⁵ / ₁₆	3- ¹ / ₂ Reg
TRV-146	5- ³ / ₄	4- ⁵ / ₈	3- ¹ / ₂ FH
TRV-168	6- ⁵ / ₈	5- ¹ / ₄	NC 40
TRV-178	7.0	5- ⁵ / ₈	4- ¹ / ₂ Reg
TRV-194	7- ⁵ / ₈	6- ¹ / ₄	4- ¹ / ₂ Reg
TRV-219	8- ⁵ / ₈	7- ³ / ₈	5- ¹ / ₂ FH
TRV-245	9- ⁵ / ₈	8- ¹ / ₄	5- ¹ / ₂ FH
TRV-273	10- ³ / ₄	9- ¹ / ₂	5- ¹ / ₂ FH
TRV-299	11- ³ / ₄	10- ¹ / ₂	5- ¹ / ₂ FH

* can be designed and manufactured according to client's specification

EXTERNAL MECHANICAL CUTTER TRN



Application:

The External Mechanical Cutter TRN is used to cut and retrieve elements of drilling, casing and tubing pipes during repair, emergency and recovery works in the well.

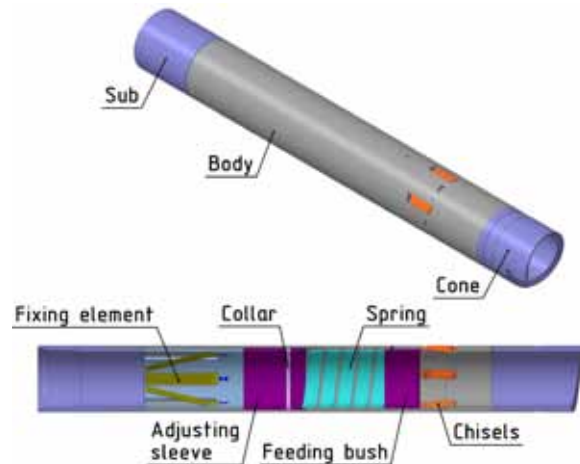
Design:

The External Mechanical Cutter consists of body, sub, fixing element, axial bearing, adjusting sleeve, laying, collar, baffle collar, spring, feeding bush, spear spins, cone, joint pins, screws of joint pints and chisels.

The body is a pipe branch which has box metric thread on lower and upper end. It is used for connection between sub and cone. There are radial cuts at the lower part of body.

Chisels with possibility of radial displacement are set on the axis of cuts. In run-in position feeding bush is fixed in body with the help of brass spear pins.

The lower edge of cone has form of cutlip guide which alleviates the entry of string "head" to the tool.



EXTERNAL MECHANICAL CUTTER

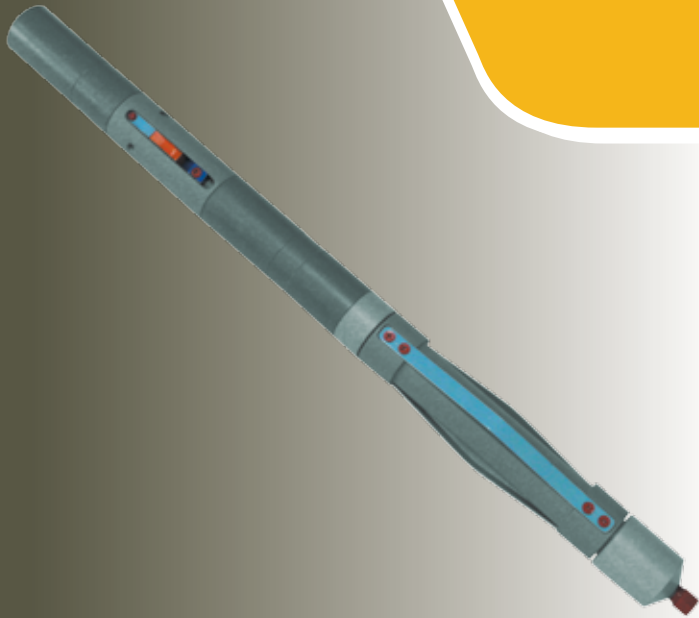
TRN

Technical data

Code	Nominal D of cut pipes, in	External diameter of cutter, in	Internal channel, in	Maximal tensile load, lbf	Effort for cutting pin, lbf	Total length, ft	Connecting thread*	Weight, lb
TRN-42	1- ⁵ / ₁₆ – 1- ¹¹ / ₁₆	3- ¹ / ₁₆	2- ¹ / ₈	8 992	449.6	2.88	NKTV-60	38.14
TRN-50	1- ⁷ / ₈ – 2.0	3- ⁹ / ₁₆	2- ³ / ₄	11 240	562.0	3.25	NKTV-73	55.12
TRN-60	2- ³ / ₈ – 2- ¹ / ₂	4- ¹ / ₂	3- ¹ / ₈	13 490	786.8	3.33	NKTV-89	80.25
TRN-73	1- ⁷ / ₈ – 2- ⁷ / ₈	4- ¹¹ / ₁₆	3- ¹³ / ₁₆	13 490	1 191	3.67	NKTV-102	88.18
TRN-89	2- ⁷ / ₈ – 3- ¹ / ₂	5- ¹ / ₂	4- ⁵ / ₁₆	22 480	1 191	4.0	NKTV-114	91.05
TRN-102	3- ¹ / ₂ – 4.0	5- ¹⁵ / ₁₆	4- ⁷ / ₈	22 480	1 191	4.46	OTTM-140	114.6
TRN-114	4.0 – 4- ¹ / ₂	7- ¹ / ₈	5- ⁷ / ₈	24 730	1 349	4.58	OTTM-168	132.3
TRN-127	4- ¹ / ₂ – 5.0	7- ¹ / ₂	6- ¹ / ₄	26 980	1 574	4.92	OTTM-178	154.3
TRN-140	5.0 – 5- ¹ / ₂	8- ¹ / ₈	6- ⁷ / ₈	29 230	1 798	5.25	OTTM-194	154.3
TRN-146	5- ¹ / ₂ – 5- ³ / ₄	9- ¹ / ₈	7- ⁹ / ₁₆	31 470	1 798	5.25	OTTM-219	176.4

* can be designed and manufactured according to client's specification

INTERNAL HYDRAULIC PIPE CUTTER TVG



Application:

The Internal Hydraulic Pipe Cutter TVG is designed to cut elements of drilling strings and oil-well tubings during repair and recovery works in the well.

Design:

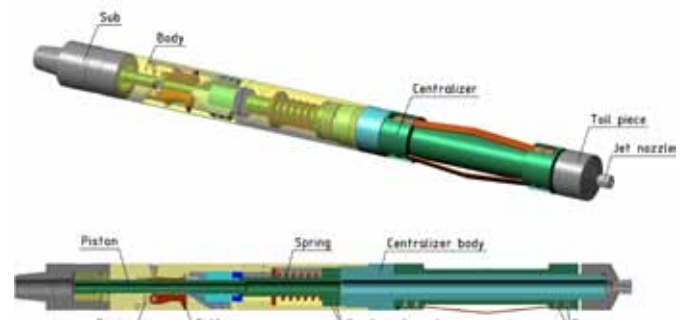
The Internal Hydraulic Pipe Cutter is used in assembly with downhole motor. Set the hydraulic tubing anchor above the motor. It fixes body during operation and eliminates axial throw and turn under influence of counter torque.

It is forbidden to provide pressure at the downstream line while lowering the Pipe Cutter. It may lead to premature moving-out of cutters.

When Pipe Cutter reaches required depth, fix the weight of string via weight indicator. Create circulation with required working pressure. At the same time under influence of excess pressure slips of anchor are pressed to well's wall.

The Pipe Cutter starts its operation. Circulation of drilling fluid through annular space between casing and tubing signalizes that the pipe was cut.

After finishing operations stop pressure feed in downstream line. As a result Pipe Cutter and hydraulic anchor come back to transport position.



INTERNAL HYDRAULIC PIPE CUTTER

TVG

Technical data

Code	Body OD, in	Nominal D of cut pipes, in	Working pressure, psi	Connecting thread, API
TVG-73	2.24	2- ⁷ / ₈		NC 16
TVG-89	2.75	3- ¹ / ₂	74 - 294	NC 16
TVG-102	3.15	4.0		AMMT 1.5

HYDRAULIC TUBING ANCHOR YAGT



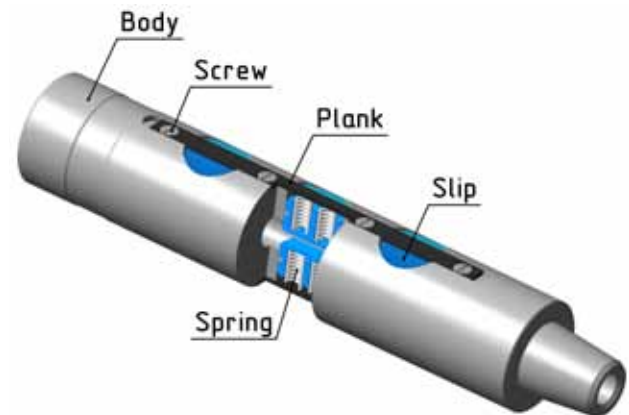
Application:

The Hydraulic Tubing Anchor YAGT is designed to fix body of screw downhole motor during its operation. It eliminates axial throw and turn under influence of counter torque. The anchor is used in an assembly with downhole motor and internal hydraulic pipe cutter TVG. It can also be used for other technological operations. The assembly is lowered into the well on small-size pipes or from coiled tubing units.

Design:

The Hydraulic Tubing Anchor consists of body, hold-down slips pressed by springs, which are fixed by planks by means of screws and sealing elements.

The Anchor is set above the downhole motor. Under pressure of increasing drilling fluid rate, slips move out of body. After that slips are fixed on the internal pipe wall. When circulation goes down, pressure decreases and slips move back into body (transport position).



HYDRAULIC TUBING ANCHOR

YAGT

Technical data

Code	OD, in	Max D of outcome, in	Nominal D of pipes, in	Length, ft	Weight, lb
YAGT-73	2.24	2.52	2.87	1.14	11.46
YAGT-89	2.75	3.13	3.5	1.31	20.5
YAGT-102	3.15	3.78	4.0	1.73	29.76

HYDRAULIC PIPE PUNCHER DGT

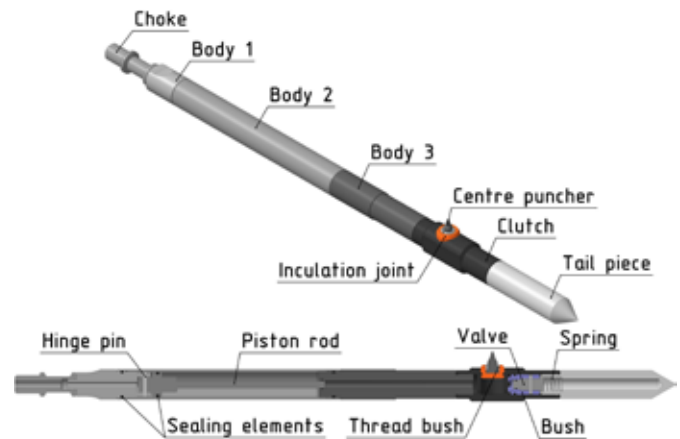


Application:

The Hydraulic Pipe Puncher DGT-1 is used to punch hole to drain fluid from tubing during repair and emergency works in the well.

Design:

The Hydraulic Pipe Puncher consists of choke, body 1, rod bush, body 2, rod, thrust bush, body3, clutch, isolation joint, puncher, thread bush, ring, valve bush, valve, cup, spring, tail piece, rod hinge pin, set of sealing rings and valve hinge pin.



HYDRAULIC PIPE PUNCHER

DGT

Technical data

Code	DGT-60	DGT-73	DGT-89
Nominal diameter of tubing punched, in	2.36	2.87	3.5
Connecting thread	ShN-22	ShN-22	M42x2
Outer diameter of body 1, in	1.57	1.99	2.36
Outer diameter of sleeve, in	0.7	2.23	2.69
Outer diameter of nose piece, in	1.57	1.87	2.36
Outer diameter of prick puncher, in	0.47	0.61	0.61
Outer diameter of shear pin, in	0.17	0.22 or 0.25	0.27
Pressure differential necessary to cut shear pin, psi			
- diameter 0.22 in	3 046 +/- 304	3 771 +/- 290	-
- diameter 0.25 in	-	4 206 +/- 290	-
- diameter 0.27 in	-	-	3 553 +/- 290
Length, ft	3.29	3.66	3.73
Weight, lb	17.64	26.46	41.89

* can be designed and manufactured according to client's specification

MECHANICAL JAR YAM



Application:

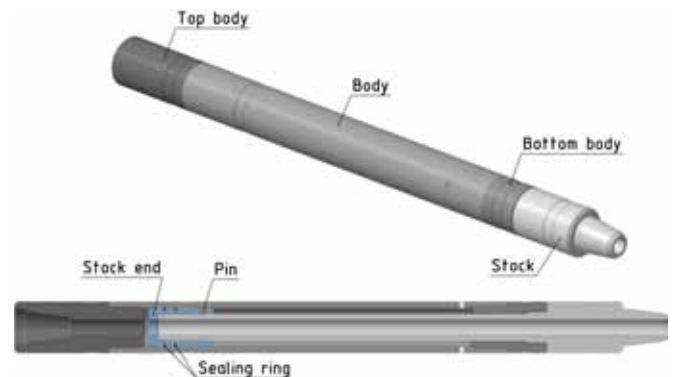
The Mechanical Jar YAM is used to create load impact (impacts can be directed both up and down) during emergency works because of locking of drilling, casing, tubing strings, string parts, formation testers, calibrators, bits, fishing tools, mills, etc.

Design:

The Mechanical Jar consists of three-section body, stock, stock end, stopping screw and sealing parts.

The body consists of three parts connected with special threads. There is box thread at the top. The Mechanical Jar can be designed in left/right hand configuration depending on connection threads.

It is recommended to set the Mechanical Jar into BHA while using releasing fishing tools (overshot, spear) in order to make releasing process much easier.



MECHANICAL JAR

YAM

Technical data

Code	D, in	Water-course D, in	Free stroke of stock, ft, not less	Tensile yield, lbf	Yield torque, lbsf.ft	Connection, API*	Average number of impact	Length, ft	Weight, lb
YAM-95	3.74	1- ¹ / ₄	1.64	258 530	11 432	2- ⁷ / ₈ Reg	800	4.29	110.2
YAM-103	4.05	1- ¹ / ₄	1.64	258 530	11 432	2- ⁷ / ₈ Reg	800	4.29	136.6
YAM-122	4.8	1- ¹ / ₂	1.64	404 660	22 864	3- ¹ / ₂ Reg	800	4.29	189.6

* can be designed and manufactured according to client's specification

HYDRAULIC JAR YAG



Application:

The Hydraulic Jar YAG is used to create single, upward, repeated load impacts during emergency works in the well.

Design:

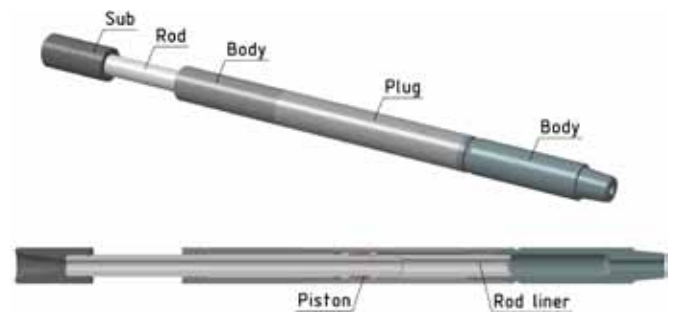
The Hydraulic Jar consists of body, rod, sub, piston and set of sealing elements. The sub with special profile connecting box thread is connected to the upper part of rod, rod liner is connected to the bottom part.

The piston is set between liner and cylindrical wedge of rod. The body consists of three parts connected by special threads.

On the internal surface of upper part of body there are grooves which interact with other grooves on rod used to torque transmission.

The surface of middle part which contacts the piston has watercourses. There is pin connection thread at the lower part of body.

The shank bore of Hydraulic Jar is filled with special oil. All connections have sealing rings. The filling of Hydraulic Jar is made through holes in body, which are closed with special plugs.



HYDRAULIC JAR

YAG

Technical data

Code	YaG-95	YaG-103	YaG-122
Outer diameter, in	3.76	4.05	4.81
Internal pass-through channel, in, not less	1.26	1.26	1.5
Free rod movement, in, not less	3.94	3.94	3.94
Full rod movement, in, not less	10.12	10.12	14.57
Maximal stretching load to hydraulic jar for striking, lbf	56 200	56 200	78 680
Maximal stretching load to open hydraulic jar after striking, lbf	269 800	269 800	449 600
Maximal torque passed by hydraulic jar, lbf.ft	11 430	11 430	22 130
Connecting thread, API*	2-7/8 Reg	2-7/8 Reg	NC 31
Length, ft	5.24	5.24	6.79
Weight, lb	149.9	165.3	352.7

* can be designed and manufactured according to client's specification

SAFETY JOINT PB



Application:

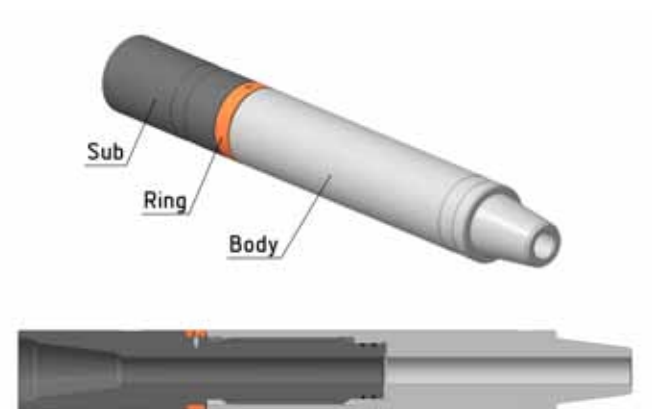
The Safety Joint PB is used for easy release from stuck tool or pipes during fishing works in the well.

Design:

The Safety Joint is a connection pipe which consists of two parts – sub and body which are connected with trapezoidal thread. There is a stop-ring between them which helps to prevent tightening of thread at high torque.

There are two sealing rings which guarantee good hermeticity. The sub has watercourse.

The Safety Joint can be designed in left/right hand configuration.



SAFETY JOINT

PB

Technical data

Code	OD, in	Total length, ft	Water course D, in	Connection, API*	Weight, lb
PB-66	3 ^{-3/16}	2.01	1.0	2 ^{-3/8} Reg	52.91
PB-73	3 ^{-3/8}	2.37	1 ^{-1/4}	NC 26	55.12
PB-76	3 ^{-3/4}	2.37	1 ^{-1/4}	2 ^{-7/8} Reg	83.78
PB-86	4 ^{-1/4}	2.37	2 ^{-1/8}	NC 31	77.16
PB-88	4 ^{-1/4}	2.37	1 ^{-1/2}	3 ^{-1/2} Reg	88.18
PB-102	4 ^{-3/4}	2.37	2 ^{-3/4}	NC 38	88.18
PB-122	5 ^{-3/4}	2.63	3 ^{-1/4}	4 IF	141.1
PB-133	6 ^{-1/8}	2.63	3 ^{-3/4}	4 ^{-1/2} IF	145.5
PB-147	7.0	2.71	4.0	5 ^{-1/2} FH	209.4

* can be designed and manufactured according to client's specification

HYDRAULIC SAFETY SUB PB-G



Application:

The Hydraulic Safety Sub PB-G is designed to provide easy release from stuck tool or pipes during fishing works in the well.

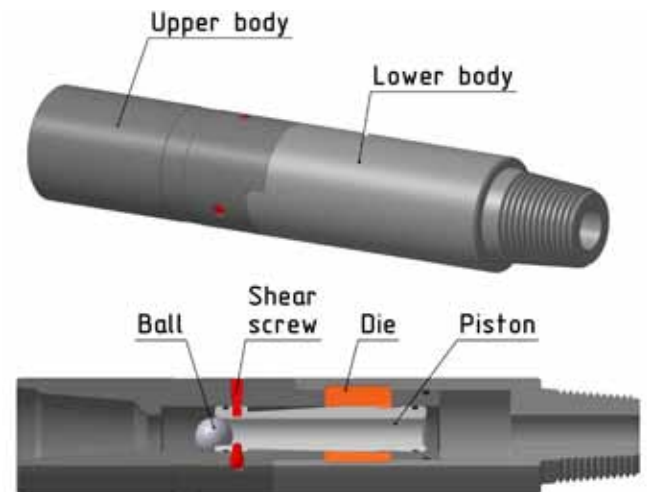
Design:

The Safety Sub is a connection pipe made of alloy steel. The tool consists of upper body, lower body, piston and dies.

Fixation of piston in working position is provided by 3 shear screws. Torque from upper body to lower body transfers connection to grooves which are made on the outer surface.

The hermeticity of tool is provided by sealing rings. The Sub has watercourse for drilling fluid. The tool can be designed in left/right hand configuration.

If there is necessity of detachment from stuck tool or pipes, drive the ball into pipe and provide pressure required for pin cut. When the Sub is disconnected, raise the unconnected part of pipe string.



HYDRAULIC SAFETY SUB

PB-G

Technical data

Code	OD, in	Total length, ft	Water course D, in	D of ball, in	Actuation pressure, psi	Weight, lb
PB-73G	3- ³ / ₈	1.77	1.0	1- ¹ / ₁₆	2 057	41.89
PB-76G	3- ³ / ₄	1.82	1- ¹ / ₈	1- ³ / ₁₆		46.3
PB-86G	4- ¹ / ₈	1.92	1- ¹ / ₄	1- ¹ / ₈		61.73
PB-102G	5.0	2.3	1- ⁹ / ₁₆	1- ¹¹ / ₁₆		110.2
PB-133G	7.0	3.17	2- ¹ / ₈	2- ¹ / ₄		286.6
PB-147G	7.0	3.25	2- ¹ / ₈	2- ¹ / ₄		291.0

MECHANICAL JUNK BASKET PM



Application:

The Mechanical Junk Basket PM is designed to retrieve different metal pieces (rolling cones and bearings of drilling bits, cutter arms, cable pieces, metal fragments which have appeared after milling process, etc.) from bottom hole.

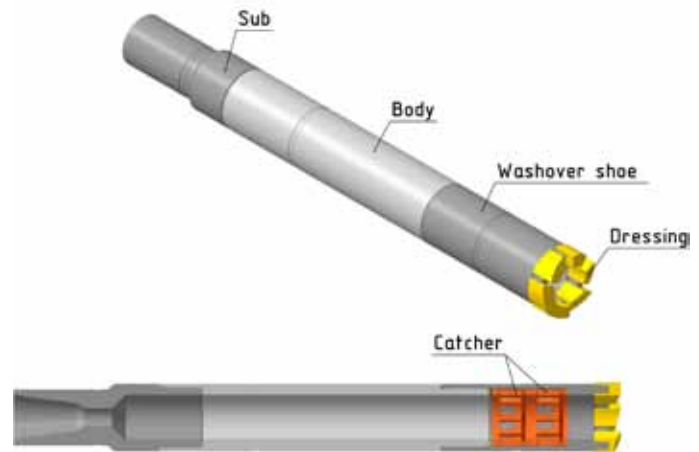
Design:

The Mechanical Junk Basket consists of tubular body (made of high-strength alloyed steel), sub, two mechanical petal type catchers and washover shoe.

Catchers are set at lower part of body in two levels with possibility of free rotation.

The catcher is equipped with interlaced and extended to the center of tool short and long pins. This tool operates as float valve. The catcher lets core sampler and small metal pieces in one direction (into the tool) by deviation of spring-loaded joint pins upwards. It doesn't transmit captured pieces in reverse direction (from the tool).

The Mechanical Junk Basket can be designed in left/right configuration depending on direction of connection threads.



MECHANICAL JUNK BASKET

PM

Technical data

Code	Max torque, ft.lbf	Body OD, in	Milling cone OD, in	Milling cone ID, in	Length, ft	Weight, lb
PM-95	2 213	3 ⁻⁵ / ₈	3 ⁻¹¹ / ₁₆	2 ⁻⁵ / ₁₆	3.28	44.09
PM-112	2 213	4.0	4 ⁻⁷ / ₁₆	2 ⁻¹ / ₂	3.87	66.14
PM-119	2 213	4 ⁻¹ / ₂	4 ⁻¹ / ₂	2 ⁻¹⁵ / ₁₆	3.87	88.18
PM-136	5 900	5 ⁻¹ / ₈	5 ⁻³ / ₈	3 ⁻⁹ / ₁₆	4.07	138.5
PM-150	5 900	5 ⁻³ / ₄	5 ⁻¹⁵ / ₁₆	4 ⁻¹ / ₄	4.26	154.3
PM-196	8 113	7 ⁻¹ / ₄	7 ⁻¹⁵ / ₈	4 ⁻¹⁵ / ₁₆	5.24	187.4
PM-206	10 330	7 ⁻¹ / ₂	8 ⁻¹ / ₈	5 ⁻¹ / ₁₆	4.92	220.5
PM-257	14 750	9 ⁻³ / ₄	10 ⁻¹ / ₈	6 ⁻¹ / ₂	5.24	264.6
PM-265	14 750	9 ⁻¹⁵ / ₁₆	10 ⁻⁷ / ₁₆	6 ⁻¹¹ / ₁₆	5.9	297.6
PM-286	14 750	9 ⁻¹⁵ / ₁₆	11 ⁻¹ / ₄	7 ⁻¹ / ₂	6.23	330.7

* can be designed and manufactured according to client's specification

HYDRAULIC JUNK BASKET PG



Application:

The Hydraulic Junk Basket PG with reverse circulation is used to retrieve different pieces, cutters of drilling bits, bearings, broken slips, cable fragments, different manual tools, fragments of drilling pipes, milling chips etc.

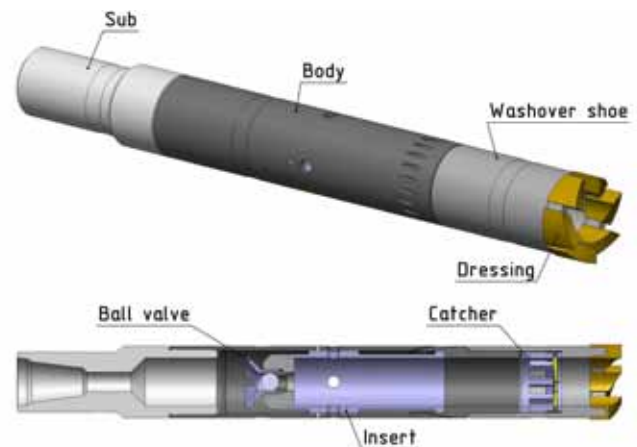
Design:

The Hydraulic Junk Basket consists of top sub, body with ball valve guide, catcher and washover shoe.

The tool can be made with different type of cutting-and-wearing surface – plain, wave-like, toothed, salient or flushed with body.

The Hydraulic Junk Basket is screwed on drilling pipe with the help of top sub. The Junk Basket is made of manganese bronze and is equipped with interlaced and stretched to the center long and short pins.

The tool can be designed in left/right configuration depending on connection guides.



HYDRAULIC JUNK BASKET

PG

Technical data

Code	Max torque, ft.lbf	Body OD, in	Max D of caught pieces, in	Length, ft	Connection, API*
PG-94	2 213	3- ⁵ / ₈	2- ⁵ / ₁₆	3.92	NC 26
PG-112	2 213	4.0	2- ¹ / ₂	3.83	2- ⁷ / ₈ Reg
PG-119	2 213	4- ¹ / ₂	2- ⁵ / ₁₆	3.83	2- ⁷ / ₈ Reg
PG-130	5 900	5.0	2- ⁵ / ₁₆	4.0	NC 38
PG-136	5 900	5- ¹ / ₈	3- ⁹ / ₁₆	3.83	3- ¹ / ₂ Reg
PG-146	5 900	5- ¹ / ₂	4.0	3.83	2- ³ / ₈ IF
PG-150	5 900	5- ³ / ₄	4- ¹ / ₄	3.83	3-1/2 Reg
PG-196	8 113	7- ¹ / ₄	4- ³ / ₄	4.83	NC 50
PG-206	10 330	7- ¹ / ₂	5- ¹ / ₁₆	4.83	NC 50
PG-257	14 750	9- ³ / ₄	6- ⁵ / ₈	6.17	NC 50
PG-265	14 750	9- ¹⁵ / ₁₆	6- ¹¹ / ₁₆	6.17	4- ¹ / ₂ IF
PG-286	14 750	10- ³ / ₄	7- ¹ / ₂	6.17	NC 50
PG-340	14 750	13.0	9- ⁵ / ₈	6.25	6- ⁵ / ₈ Reg

* can be designed and manufactured according to client's specification

BOTTOM-HOLE JUNK MILL FZ-T



Application:

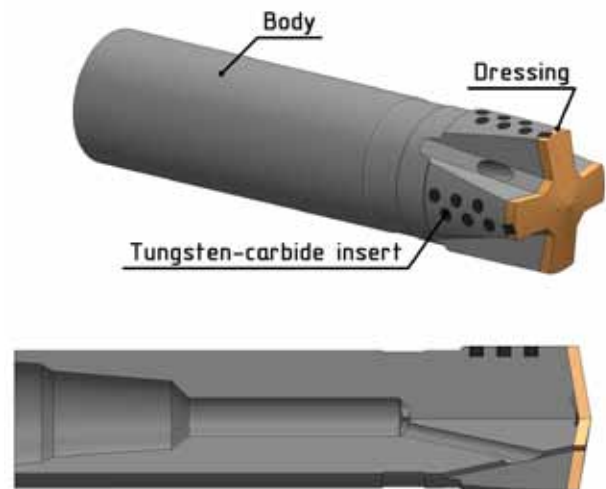
The Bottom-hole Junk Mill is used to destruct cemented stone around all cross-section of well, to drill out sand plugs and casing production tools consisting of soft metals.

Design:

The Bottom-hole Junk Mill consists of body and dressing with tungsten-carbide and carbide inserts.

The lateral surface is strengthened with tungsten-carbide teeth which guarantee high wear resistance.

There is connecting thread at the upper part of body, ports and grooves for effective cooling and intensive washing are placed at the bottom part.



BOTTOM-HOLE JUNK MILL

FZ-T

Technical data

Code	Outer diameter of mill, in	Length, ft	Connecting thread, API*	Weight, lb
FZ-85T	3.34	1.1	NC 23	22.05
FZ-97T	3.81	1.19	NC 23	26.46
FZ-118T	4.64	1.37	2-7/8 Reg	59.52
FZ-120T	4.72	1.37	2-7/8 Reg	61.73
FZ-122T	4.8	1.5	NC 31	72.75
FZ-124T	4.88	1.5	NC 31	74.96
FZ-130T	5.11	1.64	NC 31	83.78
FZ-133T	5.23	1.64	NC 31	88.18

* can be designed and manufactured according to client's specification

CEMENTED BOTTOM-HOLE MILL FZ-TS



Application:

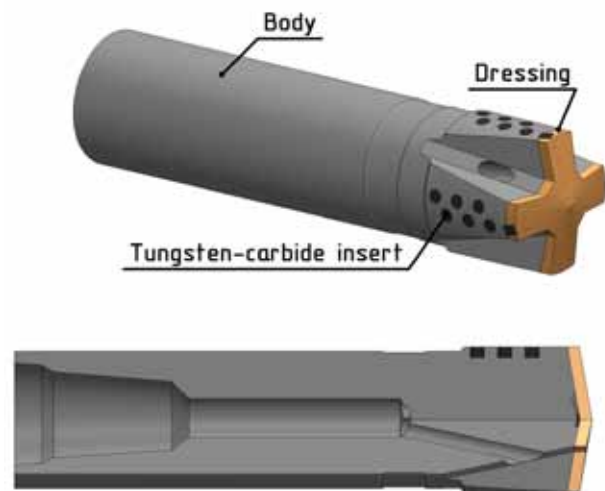
The Cemented Bottom-hole Mill FZ-TS is designed to destruct cement stones over all section of casing hole, drill out sand plugs, equip casing string and to mill metal objects at bottomhole.

Design:

The Cemented Bottom-hole Mill consists of body and dressing with tungsten-carbide and carbide inserts.

The lateral surface of mill is strengthened with tungsten-carbide teeth that guarantee high wear resistance.

There is connecting thread at the upper part of body, ports and grooves for effective cooling and intensive washing are placed at the bottom part.



CEMENTED BOTTOMHOLE MILL

FZ-TS

Technical data

Code	Outer diameter of mill, in	Length, ft	Rotation speed, rpm	Load capacity, lb	Connecting thread, API*	Weight, lb
FZ-85TS	3- ³ / ₈	0.87			2- ³ / ₈ Reg	26.46
FZ-118TS	4- ⁵ / ₈	1.14			2- ⁷ / ₈ Reg	48.55
FZ-120TS	4- ³ / ₄	1.14			2- ⁷ / ₈ Reg	52.91
FZ-122TS	4- ¹³ / ₁₆	1.14	30 - 120	4 409 - 6 614	NC 31	55.12
FZ-124TS	4- ⁷ / ₈	1.14			NC 31	57.32
FZ-133TS	5- ¹ / ₄	1.31			NC 31	66.14
FZ-140TS	5- ¹ / ₂	1.31			NC 31	70.55

* can be designed and manufactured according to client's specification

WASHOVER SHOE FK



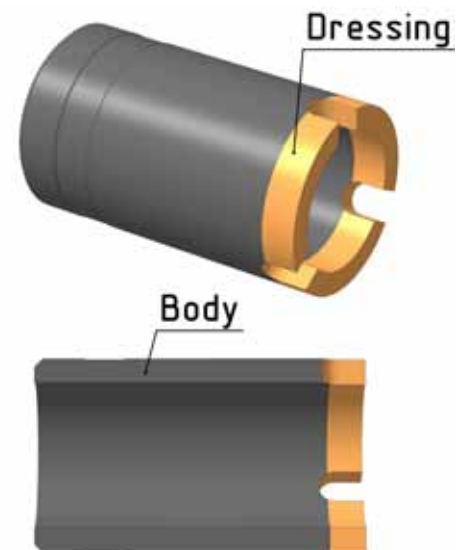
Application:

The Washover Shoe FK is designed for annular milling (drilling off) of space between milled casing and walls of the well.

Design:

The Washover Shoe is a connection pipe with flat cutting and grinding dressing at the bottom and holes for washing fluid.

The connection type: welded or threaded. The dressing comes with tungsten carbide powder.



WASHOVER SHOE

FK

Technical data

Code	Outer diameter, in	Internal diameter, in	Length, ft
FK-90/61	3.54	2.4	
FK-95/61	3.74	2.4	
FK-109/75	4.29	2.95	
FK-112/64	4.41	2.52	
FK-115/75	4.53	2.95	
FK-118/75	4.65	2.95	
FK-120/78	4.72	3.07	
FK-122/82	4.80	3.23	
FK-124/80	4.88	3.15	
FK-127/92	5.0	3.62	
FK-127/102	5.0	4.02	
FK-130/92	5.12	3.62	1.31
FK-130/102	5.12	4.02	
FK-136/96	5.35	3.78	
FK-136/100	5.35	3.78	
FK-136/102	5.35	4.02	
FK-140/96	5.51	3.78	
FK-144/102	5.67	4.02	
FK-147/104	5.79	4.09	
FK-149/110	5.87	4.33	
FK-160/120	6.3	4.72	
FK-190/152	7.48	5.98	
FK-248/205	9.76	8.07	

* can be designed and manufactured according to client's specification

WAVE-LIKE WASHOVER SHOE FK-V



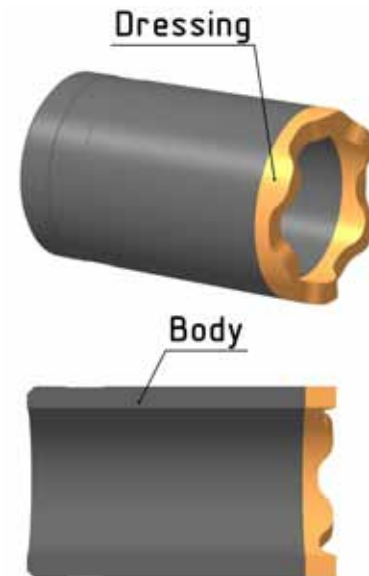
Application:

The Wave-like Washover Shoe FK-V has wave-like tungsten carbide dressing and is used for annular milling (drilling off) of space between the milled casing and walls of the well.

Design:

The Wave-like Washover Shoe is a connection pipe with tungsten carbide dressing at the bottom.

Connection type: threaded or welded.



WAVE-LIKE WASHOVER SHOE

FK-V

Technical data

Code	Outer diameter, in	Internal diameter, in	Length, ft
FK-90/61	3.54	2.4	
FK-95/61V	3.74	2.4	
FK-109/75V	4.29	2.95	
FK-112/64V	4.41	2.52	
FK-115/75V	4.53	2.95	
FK-118/75V	4.65	2.95	
FK-120/78V	4.72	3.07	
FK-122/82V	4.80	3.23	
FK-124/80V	4.88	3.15	
FK-127/92V	5.0	3.62	
FK-127/102V	5.0	4.02	
FK-130/92V	5.12	3.62	1.31
FK-130/102V	5.12	4.02	
FK-136/96V	5.35	3.78	
FK-136/100V	5.35	3.78	
FK-136/102V	5.35	4.02	
FK-140/96V	5.51	3.78	
FK-144/102V	5.67	4.02	
FK-147/104V	5.79	4.09	
FK-149/110V	5.87	4.33	
FK-160/120V	6.3	4.72	
FK-190/152V	7.48	5.98	
FK-248/205V	9.76	8.07	

* can be designed and manufactured according to client's specification

STRAIGHT-TOOTHED TAPER MILL FKP



Application:

The Straight-Toothed Taper Mill FKP is designed to mill collapsed pipes, recover internal diameter of pipes and open boreholes.

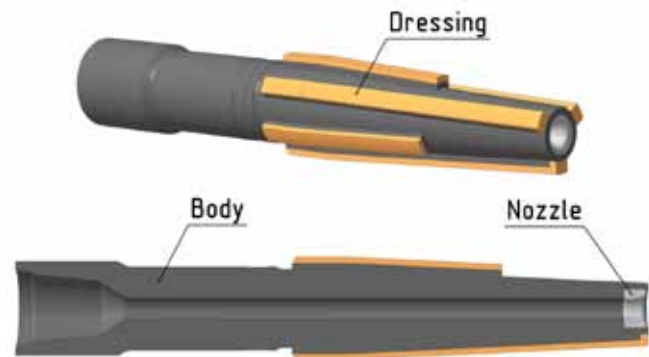
Design:

The Straight-Toothed Taper Mill consists of body and cutting and grinding dressing with tungsten carbide powder.

Cutting and grinding elements are dressed as stripes.

There is a connection thread at the upper part of body, ports and grooves for effective cooling and intensive washing are placed at the bottom part.

The Mill can be designed in left/right hand configuration.



STRAIGHT-TOOTHED TAPER MILL

FKP

Technical data

Code	Casing D, in	Length, ft	Connecting thread, API	Weight, lb
FKP-80	4.0	3.54	NC 23	79.37
FKP-95	4- ¹ / ₂	3.54	NC 23	88.18
FKP-105/110	5.0	3.54	2- ⁷ / ₈ Reg	99.21
FKP-122/125	5- ³ / ₄	3.54	2- ⁷ / ₈ Reg	110.2
FKP-142/144	6- ⁵ / ₈	3.54	3- ¹ / ₂ Reg	143.3
FKP-151/156	7.0	3.54	3- ¹ / ₂ Reg	149.9
FKP-158/170	7- ⁵ / ₈	3.93	NC 38	198.4
FKP-180/195	8- ⁵ / ₈	3.93	4- ¹ / ₂ Reg	271.2
FKP-195/215	9- ⁵ / ₈	3.93	4- ¹ / ₂ Reg	341.7
FKP-220/240	10- ³ / ₄	3.93	NC 50	443.1
FKP-240/255	11- ¹³ / ₁₆	3.93	NC 50	469.6
FKP-260/275	12- ³ / ₄	3.93	5- ¹ / ₂ FH	507.1

* can be designed and manufactured according to client's specification

SPECIAL TAPER MILL FKS



Application:

The Special Taper Mill FKS is designed to remove metal pieces and imperfections from internal surface of pipe string; to form chamfer on internal diameter of pipes; to work out pipes having ellipticity (restore internal diameter); to mill collapsed pipes during repair and emergency operations in the well.

Design:

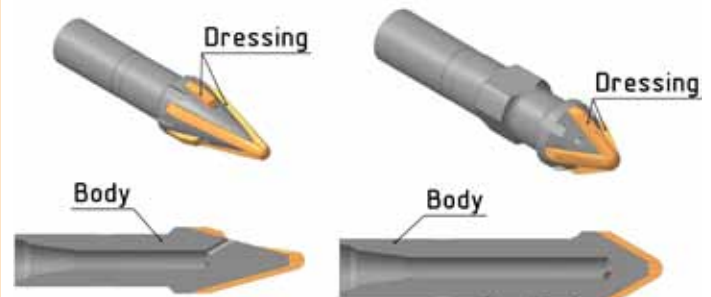
The Special Taper Mill consists of body made of high strength alloy steel and cutting and grinding dressing with crushed tungsten carbide inserted into matrix of nickel-containing brass.

There is a connection thread at the upper part of body, stabilizing elements are placed in the middle part (if needed). Cutting and grinding elements are soldered on the taper as stripes, which are gathered at the top. Circulation of drilling fluid is provided through inclined apertures in the middle part of taper and through side channels.

Construction of mill:

- two variants depending on slope angle:
1) angle 30° 2) angle 60°
- two variants depending on connection thread:
1) right 2) left.

Construction of the Special Taper Mill allows lower cutting end of small diameter reach the narrow section of pipe string. Expansible wedge-shaped edges mill off-quality part of pipe until it reaches full internal diameter.



SPECIAL TAPER MILL

FKS

Technical data

Code	Maximal diameter, in	Minimal diameter, in	Connecting thread, API*	Length, ft	Weight, lb
FKS-90	3.54	0.98	2- ³ / ₈ Reg	1.49	44.1
FKS-111	4.37	1.77	2- ⁷ / ₈ Reg	1.71	46.31
FKS-114	4.5	1.77	2- ⁷ / ₈ Reg	1.71	48.07
FKS-117	4.63	1.77	2- ⁷ / ₈ Reg	1.71	48.51
FKS-120	4.72	1.77	2- ⁷ / ₈ Reg	1.71	51.6
FKS-125	4.92	1.77	2- ⁷ / ₈ Reg	1.77	55.13
FKS-130	5.13	1.85	2- ⁷ / ₈ Reg	1.87	59.54
FKS-133	5.25	1.85	2- ⁷ / ₈ Reg	1.87	61.74
FKS-136	5.37	1.77	2- ⁷ / ₈ Reg	1.83	63.95
FKS-140	5.5	1.85	2- ⁷ / ₈ Reg	1.89	66.37
FKS-156	6.13	1.77	3- ¹ / ₂ Reg	1.98	85.55
FKS-159	6.25	1.77	3- ¹ / ₂ Reg	2.01	88.42
FKS-171	6.75	3.15	4- ¹ / ₂ FH	2.09	111.57
FKS-175	6.87	3.15	4- ¹ / ₂ FH	2.11	115.32
FKS-178	7.0	3.15	4- ¹ / ₂ FH	2.13	119.07
FKS-181	7.13	3.15	4- ¹ / ₂ FH	2.15	122.82
FKS-194	7.63	3.15	4- ¹ / ₂ FH	2.22	138.92
FKS-197	7.75	3.15	4- ¹ / ₂ FH	2.24	143.33
FKS-200	7.87	3.15	4- ¹ / ₂ FH	2.26	147.74
FKS-210	8.25	3.15	4- ¹ / ₂ FH	2.32	162.51
FKS-213	8.37	3.98	5- ¹ / ₂ FH	2.34	177.5
FKS-216	8.5	3.98	5- ¹ / ₂ FH	2.36	182.57
FKS-219	8.63	3.98	5- ¹ / ₂ FH	2.38	188.09
FKS-225	8.87	3.98	5- ¹ / ₂ FH	2.42	198.89
FKS-241	9.5	3.98	5- ¹ / ₂ FH	2.52	229.76
FKS-245	9.63	3.98	5- ¹ / ₂ FH	2.54	236.38
FKS-248	9.75	3.98	5- ¹ / ₂ FH	2.56	242.77
FKS-251	9.87	3.98	5- ¹ / ₂ FH	2.58	249.39
FKS-264	10.37	3.98	5- ¹ / ₂ FH	2.66	278.05
FKS-267	10.5	3.98	5- ¹ / ₂ FH	2.68	285.77
FKS-270	10.63	3.98	5- ¹ / ₂ FH	2.7	293.49

* can be designed and manufactured according to client's specification



Application:

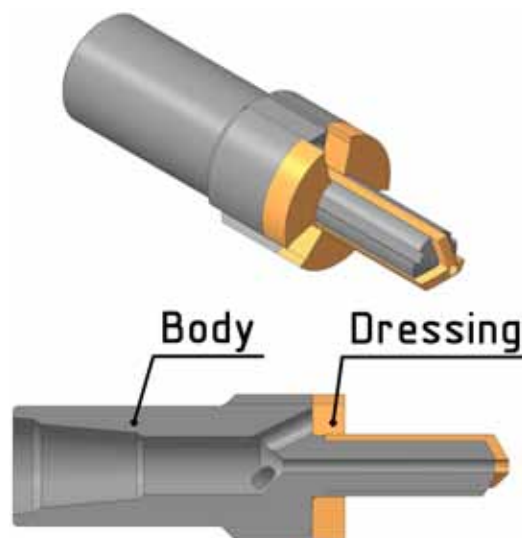
The Pilot Mill FP is used to mill pipe string elements (tubing, drill pipes, sleeves, tails, packers, etc.) during emergency operations in the well.

Design:

The Pilot Mill can be produced in left/right hand configuration.

Dressing of mill can be made in two variants:
1) Flat 2) Toothed

The pilot part of mill performs centering of the main part relative to emergency object.



PILOT MILL

FP

Technical data

Code	Connecting thread, API*	Nominal diameter of mill, in	Nominal diameter of pilot, in	Thickness of cutting and abrasive welding, in	Diameter of flushing channels, in	Length, ft	Length of pilot part, ft	Weight, lb
FP-86/38	NC 16	3.40	1.5	0.71	0.47	1.12	0.41	14.77
FP-90/38	NC 16	3.56	1.5	0.79	0.63	1.38	0.56	22.93
FP-92/47	NC 16	3.62	1.85	0.79	0.63	1.38	0.56	23.59
FP-99/47	NC 16	3.91	1.85	0.79	0.63	1.38	0.56	25.8
FP-103/47	NC 26	4.06	1.85	0.79	0.63	1.38	0.56	26.9
FP-108/47	NC 26	4.24	1.85	0.79	0.63	1.38	0.56	29.33
FP-110/47	NC 26	4.32	1.85	0.79	0.63	1.38	0.56	30.21
FP-112/47	2- ⁷ / ₈ Reg	4.40	1.85	0.79	0.63	1.38	0.56	34.4
FP-114/47	2- ⁷ / ₈ Reg	4.48	1.85	0.79	0.63	1.38	0.56	35.06
FP-116/47	2- ⁷ / ₈ Reg	4.56	1.85	0.79	0.63	1.38	0.56	36.16
FP-118/47	2- ⁷ / ₈ Reg	4.65	1.85	0.79	0.63	1.38	0.56	37.93
FP-120/57	2- ⁷ / ₈ Reg	4.72	2.24	0.79	0.63	1.38	0.56	39.03
FP-130/57	2- ⁷ / ₈ Reg	5.13	2.24	0.79	0.63	1.38	0.56	43.0
FP-136/57	2- ⁷ / ₈ Reg	5.37	2.24	0.79	0.63	1.38	0.56	46.31
FP-140/57	3- ¹ / ₂ Reg	5.52	2.24	0.79	0.63	1.38	0.56	50.94
FP-146/74	3- ¹ / ₂ Reg	5.74	2.91	0.79	0.79	1.38	0.56	53.8
FP-150/74	3- ¹ / ₂ Reg	5.9	2.91	0.79	0.79	1.38	0.56	55.57
FP-156/74	3- ¹ / ₂ Reg	6.13	2.91	0.79	0.98	1.38	0.56	57.99
FP-164/74	3- ¹ / ₂ Reg	6.44	2.91	0.79	0.98	1.38	0.56	62.4
FP-168/74	3- ¹ / ₂ Reg	6.6	2.91	0.79	1.26	1.38	0.56	64.83
FP-180/85	NC 50	7.11	3.35	1.18	1.97	1.64	0.74	102.09
FP-187/85	NC 50	7.11	3.35	1.18	2.20	1.64	0.74	108.27
FP-191/85	NC 50	7.52	3.35	1.18	2.64	1.64	0.74	116.42
FP-206/85	NC 50	8.13	3.35	1.18	2.64	1.64	0.74	124.14
FP-212/85	NC 50	8.37	3.35	1.18	2.64	1.64	0.74	127.23
FP-216/85	NC 50	8.52	3.35	1.18	2.76	1.64	0.74	130.98

* can be designed and manufactured according to client's specification

CONCAVE JUNK MILL FT-V



Application:

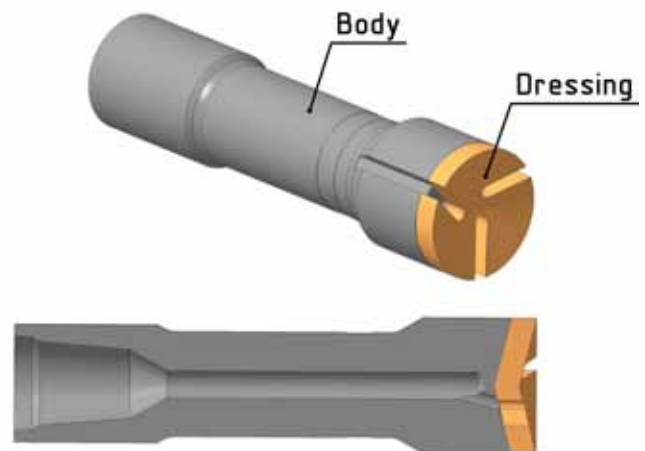
The Concave Junk Mill FT-V is used to destruct metal parts and drill out cemented stones during repair and recovery works in the well.

Design:

The Concave Junk Mill consists of body and concave cutting and grinding dressing with tungsten-carbide powder.

There is a connection thread at the upper part of body, ports and grooves for effective cooling and intensive washing are placed at the bottom.

The lateral surface of dressing is flush grinded with external body diameter.



CONCAVE JUNK MILL

FT-V

Technical data

Code	OD, in	Length, ft	Rotary frequency, rpm	Load capacity, lbf	Connecting thread, API	Weight, lb
FT-86V	3- ³ / ₈	1.03	60 – 120	1 102 - 6 614	2- ³ / ₈ Reg	19.8
FT-112V	4- ⁷ / ₁₆	1.03		1 102 - 6 614	2- ⁷ / ₈ Reg	34.1
FT-118V	4- ⁵ / ₈	1.03		1 102 - 6 614	2- ⁷ / ₈ Reg	37.4
FT-124V	4- ⁷ / ₈	1.03		1 102 - 6 614	NC 31	46.3
FT-133V	5- ¹ / ₄	1.03		1 102 - 6 614	NC 31	48.5
FT-140V	5- ¹ / ₂	1.14		1 102 - 8 818	NC 31	51.8
FT-178V	7.0	1.47		1 102 - 8 818	4- ¹ / ₂ FH	89.3
FT-220V	8- ¹¹ / ₁₆	1.9		1 102 - 8 818	NC 50	220.5

* can be designed and manufactured according to client's specification

JUNK MILL WITH STABILIZING ELEMENTS FT-S



Application:

The Junk Mill with Stabilizing Elements FT-S is used to destruct metal parts in the well.

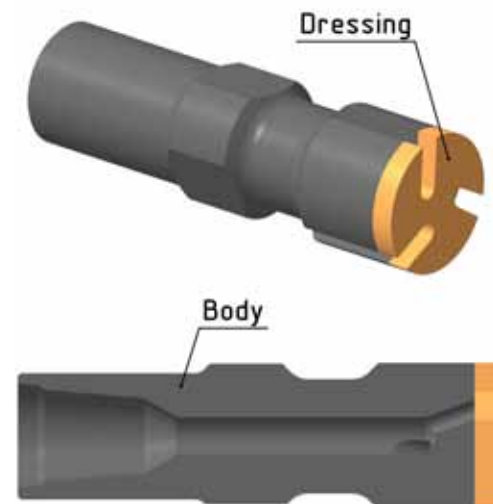
Design:

The mill consists of body and flat cutting and grinding dressing with tungsten-carbide powder.

There is a connection thread at the upper part of body, stabilizing element – in the middle, ports and grooves for effective cooling and intensive washing are placed at the bottom.

The lateral surface of dressing is flush grinded with external body diameter.

Stabilizing elements protect production casing walls from damage at long-time milling.



JUNK MILL WITH STABILIZING ELEMENTS

FT-S

Technical data

Code	OD, in	Length, ft	Rotary frequency, rpm	Load capacity, lbf	Connecting thread, API	Weight, lb
FT-86S	3- ³ / ₈	1.08		1102 - 6 614	2- ³ / ₈ Reg	19.8
FT-112S	4- ⁷ / ₁₆	1.48		1102 - 6 614	2- ⁷ / ₈ Reg	50.7
FT-118S	4- ⁵ / ₈	1.48		1102 - 6 614	2- ⁷ / ₈ Reg	59.5
FT-120S	4- ³ / ₄	1.48		1102 - 6 614	2- ⁷ / ₈ Reg	61.7
FT-124S	4- ⁷ / ₈	1.82	60 - 120	1102 - 6 614	NC 31	70.6
FT-133S	5- ¹ / ₄	1.97		1102 - 6 614	NC 31	83.8
FT-140S	5- ¹ / ₂	1.97		1102 - 8 818	NC 31	94.8
FT-178S	7.0	2.62		1102 - 8 818	4- ¹ / ₂ FH	176.4
FT-220S	8- ¹¹ / ₁₆	2.95		1102 - 8 818	NC 50	277.8

* can be designed and manufactured according to client's specification

SPECIAL JUNK MILL WITH STABILIZING ELEMENTS FTS X-S



Application:

The Special Junk Mill With Stabilizing Elements FTS X-S is used to destruct metal objects, cement stone and cemented metal objects over all well section during repair and recovery works in the well.

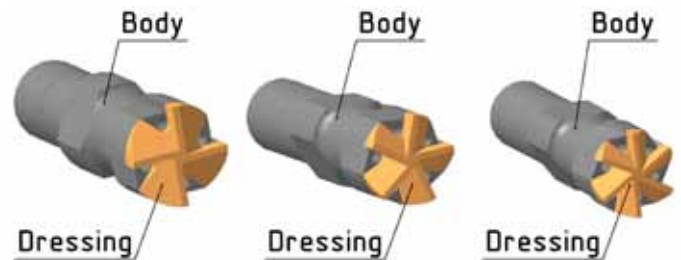
Design:

The Special Junk Mill With Stabilizing Elements consists of high-strength alloy steel body and cutting and grinding dressing with crushed tungsten carbide.

There is a connection thread at the upper part of body, stabilizing element – in the middle, ports and grooves for effective cooling and intensive washing are placed at the bottom.

The Mill can be produced:

- with toothed abrasive surface of dressing with four, five or six blades for different milling conditions;
- in left/right configuration.



SPECIAL JUNK MILL WITH STABILIZING ELEMENTS

Technical data

FTS X-S

Code	Connecting thread, API	Max OD, in	Thickness of cutting abrasive welding, in, not more	Watercourses D, in, not less
FT-S X-111S	2-7/8 Reg	4-3/8	13/16	5/7
FT-S X-117S	2-7/8 Reg	4-5/8	13/16	5/7
FT-S X-124S	2-7/8 Reg	4-7/8	13/16	5/7
FT-S X-130S	2-7/8 Reg	5-1/8	13/16	5/7
FT-S X-136S	2-7/8 Reg	5-3/8	13/16	5/7
FT-S X-143S	3-1/2 Reg	5-5/8	13/16	13/16
FT-S X-149S	3-1/2 Reg	5-7/8	13/16	13/16
FT-S X-156S	3-1/2 Reg	6-1/8	13/16	13/16
FT-S X-162S	3-1/2 Reg	6-3/8	13/16	13/16
FT-S X-168S	4-1/2 FH	6-5/8	13/16	1-7/16
FT-S X-175S	4-1/2 FH	6-7/8	13/16	1-7/16
FT-S X-181S	4-1/2 FH	7-1/8	13/16	1-7/16
FT-S X-187S	4-1/2 FH	7-3/8	13/16	1-7/16
FT-S X-194S	4-1/2 FH	7-5/8	13/16	1-7/16
FT-S X-200S	4-1/2 FH	7-7/8	13/16	1-7/16
FT-S X-206S	4-1/2 FH	8-1/8	13/16	1-7/16
FT-S X-213S	5-1/2 FH	8-3/8	1.0	1-9/16
FT-S X-219S	5-1/2 FH	8-5/8	1.0	1-9/16
FT-S X-225S	5-1/2 FH	8-7/8	1.0	1-9/16
FT-S X-232S	5-1/2 FH	9-1/8	1.0	1-9/16
FT-S X-238S	5-1/2 FH	9-3/8	1.0	1-9/16
FT-S X-245S	5-1/2 FH	9-5/8	1.0	1-9/16
FT-S X-251S	5-1/2 FH	9-7/8	1.0	1-9/16
FT-S X-257S	5-1/2 FH	10-1/8	1.0	1-9/16
FT-S X-264S	5-1/2 FH	10-3/8	1.0	1-9/16
FT-S X-270S	5-1/2 FH	10-5/8	1.0	1-9/16

* X – amount of blades (4, 5 or 6)

JUNK MILL WITH CUTLIP GUIDE FTL



Application:

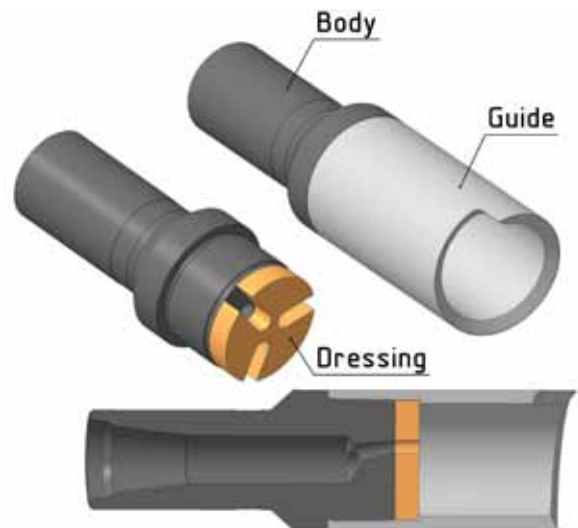
The Junk Mill With Cutlip Guide FTL is used to catch and destruct cylindrical metal pieces (tubing string, bars) during repair-and-renewal operations in oil, gas and exploration wells with washover through holes in body. It is also used to prepare emergency tools for further work with die collars, washover shoes and overshots.

Design:

The Junk Mill With Cutlip Guide consists of body, flat cutting and grinding dressing with tungsten carbide powder.

There is a connection thread at the upper part of body, ports and grooves for effective cooling and intensive washing are placed at the bottom.

The guide is screwed on body to take the pipe away from production casing wall and to hold it during milling.



JUNK MILL WITH CUTLIP GUIDE

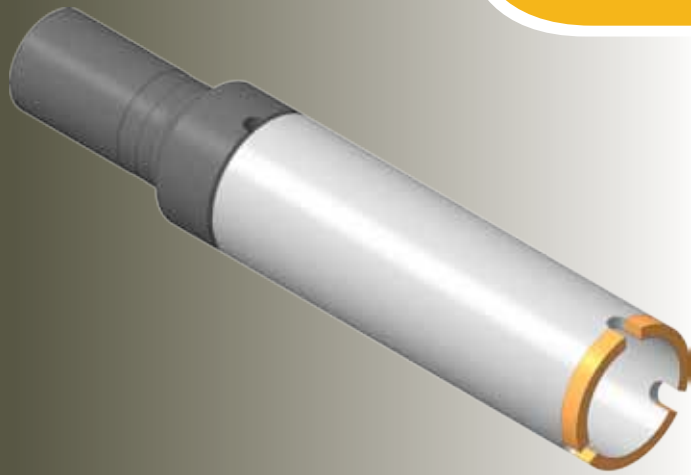
FTL

Technical data

Code	OD, in	Length, ft	Rotary frequency, rpm	Load capacity, lbf	Connecting thread, API	Weight, lb
FTL-118	4- ⁵ / ₈	1.38			2- ³ / ₈ Reg	26.46
FTL-121	4- ³ / ₄	1.38			NC 26	30.8
FTL-124	4- ⁷ / ₈	1.38			NC 26	33.0
FTL-130	5- ¹ / ₈	1.47			2- ⁷ / ₈ Reg	39.6
FTL-133	5- ¹ / ₄	1.47	45 - 90	1102 - 6 614	2- ⁷ / ₈ Reg	44.1
FTL-135	5- ⁵ / ₁₆	1.47			2- ⁷ / ₈ Reg	46.3
FTL-140	5- ¹ / ₂	1.54			NC 31	55.1
FTL-152	6.0	1.54			NC 31	59.5
FTL-165	6- ¹ / ₂	1.54			3- ¹ / ₂ Reg	63.9

* can be designed and manufactured according to client's specification

DOWNHOLE WASHOVER SHOE FZK



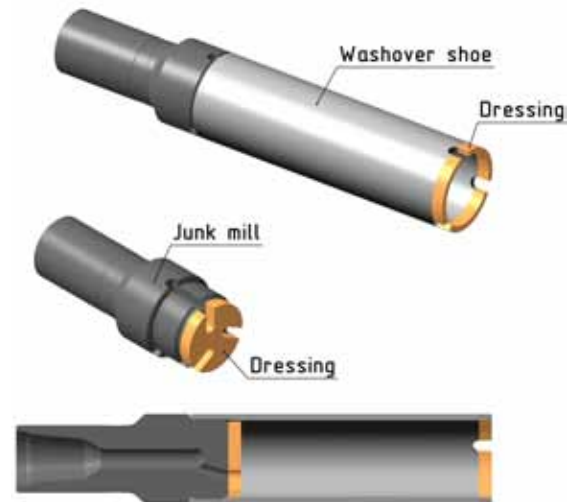
Application:

The Downhole Washover Shoe FZK is used to destroy metal objects, cement stone and cemented metal objects over all cross section of borehole during repair and emergency works in the well.

Design:

The Washover Shoe has plain cutting and grinding dressing and guide funnel in shape of washover shoe.

The Washover Shoe simplifies pretreatment of emergency "head" for catch by overshot TLN providing running in and smoothing of the upper end of damaged pipe.



DOWNHOLE WASHOVER SHOE

FZK

Technical data

Code	Max mill OD, in	Connecting thread, API	Min washover shoe ID, in	Watercourses D, in, not less	Length of washover shoe, ft, not less	Total length of the mill in case of min size, ft, not more
FZK-85/65	3- ³ / ₈	2- ³ / ₈ Reg	2- ⁹ / ₁₆	1/2	0.85 - 2.62	1.16
FZK-102/80	4.0	2- ³ / ₈ Reg	3- ³ / ₁₆	1/2	0.85 - 2.62	1.16
FZK-114/91	4- ¹ / ₂	2- ⁷ / ₈ Reg	3- ⁹ / ₁₆	5/8	0.92 - 2.62	1.29
FZK-117/95	4- ⁵ / ₈	2- ⁷ / ₈ Reg	3- ³ / ₄	5/8	0.92 - 2.62	1.29
FZK-121/99	4- ³ / ₄	2- ⁷ / ₈ Reg	3- ⁷ / ₈	5/8	0.92 - 2.62	1.42
FZK-124/100	4- ⁷ / ₈	2- ⁷ / ₈ Reg	3- ¹⁵ / ₁₆	5/8	0.92 - 2.62	1.29
FZK-127/100	5.0	2- ⁷ / ₈ Reg	3- ¹⁵ / ₁₆	5/8	0.92 - 2.62	1.29
FZK-133/110	5- ¹ / ₄	2- ⁷ / ₈ Reg	4- ⁵ / ₁₆	5/8	0.92 - 2.62	1.42
FZK-140/118	5- ¹ / ₂	2- ⁷ / ₈ Reg	4- ⁵ / ₈	5/8	0.92 - 2.62	1.42
FZK-143/118	5- ⁵ / ₈	2- ⁷ / ₈ Reg	4- ⁵ / ₈	5/8	0.92 - 2.62	1.38
FZK-152/129	6.0	2- ⁷ / ₈ Reg	5- ¹ / ₁₆	5/8	0.92 - 2.62	1.38
FZK-203/176	7- ⁷ / ₈	4- ¹ / ₂ IF	6- ¹⁵ / ₁₆	17/16	1.24 - 2.62	1.92
FZK-206/176	8- ¹ / ₂	4- ¹ / ₂ FH	6- ¹⁵ / ₁₆	17/16	1.24 - 2.62	1.92

* can be designed and manufactured according to client's specification

HARD-ALLOYED STRENGTHENED JUNK MILL FTU-T



Application:

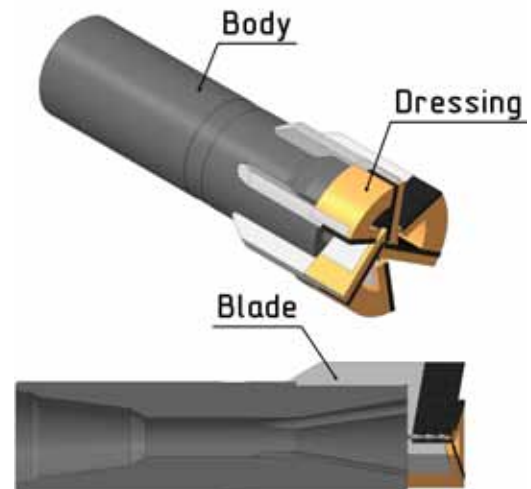
The Hard-alloyed Strengthened Junk Mill FTU-T is used to destruct metal objects, cement stone and cemented metal objects over all well section during repair and recovery works in the well.

Design:

The Hard-alloyed Strengthened Junk Mill FTU-T consists of body made of high-strength alloy steel, cutting and grinding dressing with crushed tungsten carbide introduced into matrix of nickel-containing brass.

There is a connection thread at the upper part of body, stabilizing element – in the middle, ports and grooves for effective cooling and intensive washing are placed at the bottom.

The mill can be designed in left/right hand configuration.



HARD-ALLOYED STRENGTHENED JUNK MILL

FTU-T

Technical data

Code	Max OD, in	Max ID, in	Watercourse D, in, not less	Connecting thread, API
FTU-111T	4 ³ / ₈	¹³ / ₁₆	⁵ / ₇	2 ⁷ / ₈ Reg
FTU-117T	4 ⁵ / ₈	¹³ / ₁₆	⁵ / ₇	2 ⁷ / ₈ Reg
FTU-124T	4 ⁷ / ₈	¹³ / ₁₆	⁵ / ₇	2 ⁷ / ₈ Reg
FTU-130T	5 ¹ / ₈	¹³ / ₁₆	⁵ / ₇	2 ⁷ / ₈ Reg
FTU-136T	5 ³ / ₈	¹³ / ₁₆	⁵ / ₇	2 ⁷ / ₈ Reg
FTU-143T	5 ⁵ / ₈	¹³ / ₁₆	1 ³ / ₁₆	3 ¹ / ₂ Reg
FTU-149T	5 ⁷ / ₈	¹³ / ₁₆	1 ³ / ₁₆	3 ¹ / ₂ Reg
FTU-156T	6 ¹ / ₈	¹³ / ₁₆	1 ³ / ₁₆	3 ¹ / ₂ Reg
FTU-162T	6 ³ / ₈	¹³ / ₁₆	1 ³ / ₁₆	3 ¹ / ₂ Reg
FTU-168T	6 ⁵ / ₈	¹³ / ₁₆	1 ⁷ / ₁₆	4 ¹ / ₂ FH
FTU-175T	6 ⁷ / ₈	¹³ / ₁₆	1 ⁷ / ₁₆	4 ¹ / ₂ FH
FTU-181T	7 ¹ / ₈	¹³ / ₁₆	1 ⁷ / ₁₆	4 ¹ / ₂ FH
FTU-187T	7 ³ / ₈	¹³ / ₁₆	1 ⁷ / ₁₆	4 ¹ / ₂ FH
FTU-194T	7 ⁵ / ₈	¹³ / ₁₆	1 ⁷ / ₁₆	4 ¹ / ₂ FH
FTU-200T	7 ⁷ / ₈	¹³ / ₁₆	1 ⁷ / ₁₆	4 ¹ / ₂ FH
FTU-206T	8 ¹ / ₈	¹³ / ₁₆	1 ⁷ / ₁₆	4 ¹ / ₂ FH
FTU-213T	8 ³ / ₈	1.0	1 ⁹ / ₁₆	5 ¹ / ₂ FH
FTU-219T	8 ⁵ / ₈	1.0	1 ⁹ / ₁₆	5 ¹ / ₂ FH
FTU-225T	8 ⁷ / ₈	1.0	1 ⁹ / ₁₆	5 ¹ / ₂ FH
FTU-232T	9 ¹ / ₈	1.0	1 ⁹ / ₁₆	5 ¹ / ₂ FH
FTU-238T	9 ³ / ₈	1.0	1 ⁹ / ₁₆	5 ¹ / ₂ FH
FTU-245T	9 ⁵ / ₈	1.0	1 ⁹ / ₁₆	5 ¹ / ₂ FH
FTU-251T	9 ⁷ / ₈	1.0	1 ⁹ / ₁₆	5 ¹ / ₂ FH
FTU-257T	10 ¹ / ₈	1.0	1 ⁹ / ₁₆	5 ¹ / ₂ FH
FTU-264T	10 ³ / ₈	1.0	1 ⁹ / ₁₆	5 ¹ / ₂ FH
FTU-270T	10 ⁵ / ₈	1.0	1 ⁹ / ₁₆	5 ¹ / ₂ FH

STRAIGHT-TOOTHED TAPER REAMER RKP

RKP



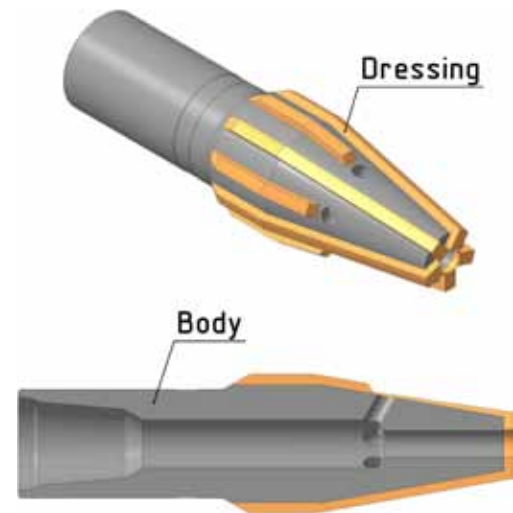
Application:

The Straight-toothed Taper Reamer RKP is used to clean "window" in casing during sidetracking and to restore internal diameter of casing during repair and emergency operations in the well.

Design:

The Straight-toothed Taper Reamer consists of body made of high-strength alloy steel, cutting and grinding dressing with crushed tungsten carbide introduced into matrix of nickel-containing brass.

There is a connection thread at the upper part of body, lower end and side surface are provided with holes and channels for effective cooling and intense flushing for chips removal.



STRAIGHT-TOOTHED TAPER REAMER

RKP

Technical data

Code	Nominal D of casing	Connecting thread, API	OD, in, not more	Watercourse D, in, not less	Length, ft, not more	Weight, lb
RKP-75	3- ¹ / ₂	NC 23	2.95	0.79	1.39	16.1
RKP-89	4- ¹ / ₂	NC 76	3.5	0.79	1.61	31.09
RKP-100	5.0	NC 76	3.94	0.79	1.61	40.13
RKP-120	5- ³ / ₄	2- ⁷ / ₈ Reg	4.76	0.79	1.5	44.1
RKP-121	5- ³ / ₄	2- ⁷ / ₈ Reg	4.84	0.79	1.5	44.1
RKP-123	5- ³ / ₄	2- ⁷ / ₈ Reg	5.12	0.79	1.56	50.72
RKP-130	6- ⁵ / ₈	2- ⁷ / ₈ Reg	2.95	0.79	1.44	57.33

WASHOVER PIPE TO



Application:

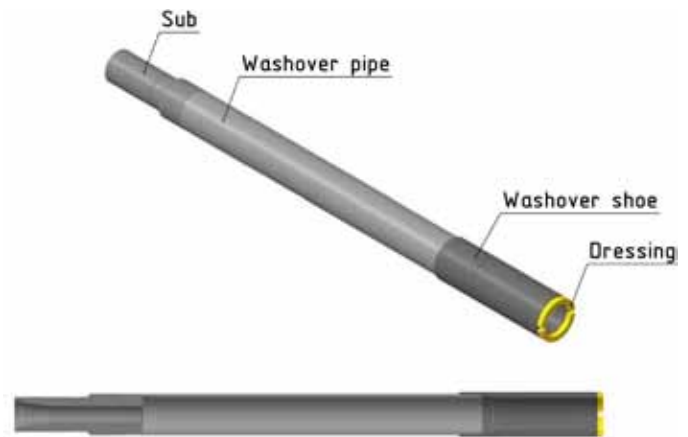
The Washover Pipe TO is used for annular milling of space between pipe and wall of the well using mills FK and PRK (for cable).

Design:

The Washover Pipe TO consists of sub, washover pipe and washover shoe.

Equipment of mill is chosen in compliance with material which is going to be drilled (sludge, cement stone or metal).

Special threads are used in order to avoid its damage. It can be designed in left/right hand configuration.



WASHOVER PIPE

TO

Technical data

Code	Max OD, in	Wall thickness, in	ID, in	Length, ft, not more	Connection thread	Tensile yield, lbf	Yield torque, ft.lbf	Makeup torque, ft.lbf
TO-102/82x3000	4.0	0.39	3.21	9.84	RDU-102	29 740	2 581	1 844
TO-114/97x3000	4.5	0.34	3.82		RDU-114	31 630	2 876	1 844
TO-127/108x3000	5.0	0.36	4.28		RDU-127	36 820	3 983	2 803
TO-140/121x3000	5.5	0.36	4.78		RDU-140	41 070	4 942	3 393
TO-146/127x3000	5.75	0.37	5.0		RDU-146	45 010	5 679	3 983
TO-168/150x3000	6.63	0.35	5.93		RDU-168	48 330	7 154	5 015
TO-178/160x3000	7.0	0.36	6.28		RDU-178	53 660	8 408	5 900
TO-194/175x3000	7.63	0.37	6.88		RDU-194	61 370	10 550	7 376
TO-203/184x3000	7.99	0.37	7.24		RDU-203	64 830	11 730	8 113
TO-219/199x3000	8.63	0.4	7.82		RDU-219	77 450	15 120	10 620
TO-245/224x3000	9.63	0.39	8.84		RDU-245	84 820	18 730	13 130
TO-273/253x3000	10.75	0.4	9.95		RDU-273	98 020	24 410	16 960
TO-324/302x3000	12.75	0.43	11.89		RDU-324	130 000	38 570	26 990

TOOL FOR PROPPANT PLUGS WASHOVER UPP



Application:

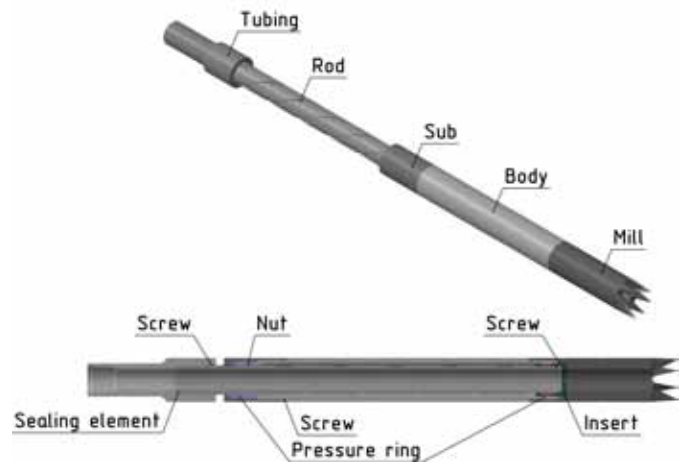
The Tool for Proppant Plugs Washover UPP is used to destruct and remove proppant plug after conducting hydraulic fracturing.

Design:

The Tool for Proppant Plugs Washover consists of mill with milled cemented teeth, body, helical rod, screw, backup ring and sealing elements.

After conducting frac job the tool is lowered into well on tubing string. Intensive reverse washover switches on. The rod is extended and mill is placed in the downward most position. When mill leans against hard crust and rod gets load it moves down due to its helical surface and turns the body of tool creating torsion torque on the mill. Hard teeth of mill destruct the crust of proppant and fluid brings it upwards.

By pulling the tubing string at the rod length and creating the load repeat operation until total destruction of solid crust and continue washing of free proppant.



TOOL FOR PROPPANT PLUGS WASHOVER

UPP

Technical data

Code	Diemeter D, in	Watercourse D, in, not less	Free movement along the road, ft, not less	Tensile yield, lbf	Yield torque, lbf.ft	Connection tread, API	Length, ft	Weight, lb
UPP-90	3- ⁹ / ₁₆	1.0	2.41	89 290	2 213	Non-upset tubing 2 1/2	7.61	127.9
UPP-118	4- ⁵ / ₈	2- ⁵ / ₆	2.41	89 290	2 213	Non-upset tubing 2 1/2	7.61	174.2
UPP-140	5- ¹ / ₂	2- ⁵ / ₆	2.41	89 290	2 213	Non-upset tubing 2 1/2	7.61	260.1

* can be designed and manufactured according to client's specification

JUNK BASKET SHMU



Application:

The Junk Basket SHMU is used to catch pieces, metal objects and other separate pieces of destroying tool (drill bits, mills, etc.).

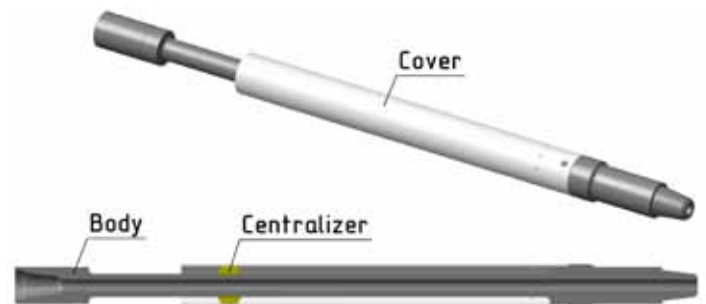
Design:

The Junk Basket consists of body having connector ends with tool-joint thread.

There is a passage opening for drilling fluid circulation.

The body has removable cover with holes to discharge drilling fluid during lift.

The cover is fixed on body by screws with washer springs and by centralizer which helps to keep the cover centered relative to body.



JUNK BASKET

SHMU

Technical data

Code	Max D of the skirt, in	Body OD, in	Water-course D, in	Annular velocity of flow, ft/sec, not less	Depth of the basket, ft, not less	Length, ft	Connection, API	Weight, lb
SHMU-92	3 ⁻⁵ / ₈	2 ⁻¹ / ₁₆	1,0			4.59	2 ⁻³ / ₈ Reg	83.78
SHMU-94	3 ⁻¹¹ / ₁₆	2 ⁻³ / ₁₆	1,0			4.59	2 ⁻³ / ₈ Reg	88.18
SHMU-102	4.0	2 ⁻³ / ₁₆	1 ⁻¹ / ₄			4.85	2 ⁻⁷ / ₈ Reg	114.6
SHMU-108	4 ⁻¹ / ₄	2 ⁻⁵ / ₁₆	1 ⁻¹ / ₄			4.85	2 ⁻⁷ / ₈ Reg	132.3
SHMU-112	4 ⁻⁷ / ₁₆	2 ⁻⁵ / ₁₆	1 ⁻¹ / ₄			4.85	2 ⁻⁷ / ₈ Reg	138.9
SHMU-114	4 ⁻¹ / ₂	2 ⁻¹ / ₂	1 ⁻¹ / ₄			4.85	2 ⁻⁷ / ₈ IF	145.5
SHMU-127	5.0	2 ⁻¹ / ₂	1 ⁻¹ / ₂			4.85	2 ⁻⁷ / ₈ IF	149.9
SHMU-136	5 ⁻³ / ₈	2 ⁻¹ / ₂	1 ⁻¹ / ₄			4.85	2 ⁻⁷ / ₈ IF	154.3
SHMU-146	5 ⁻³ / ₄	2 ⁻¹ / ₂	1 ⁻¹ / ₂	12.14	2.63	4.9	3 ⁻¹ / ₂ Reg	165.3
SHMU-165	6 ⁻¹ / ₂	3 ⁻¹⁵ / ₁₆	1 ⁻¹ / ₂			5.15	3 ⁻¹ / ₂ Reg	169.8
SHMU-168	6 ⁻⁵ / ₈	3 ⁻¹⁵ / ₁₆	2 ⁻¹³ / ₁₆			5.15	4 IF	172.0
SHMU-178	7.0	4 ⁻⁵ / ₁₆	2 ⁻¹³ / ₁₆			5.24	4 ⁻¹ / ₂ IF	180.8
SHMU-195	7 ⁻¹¹ / ₁₆	4 ⁻⁵ / ₁₆	2 ⁻¹³ / ₁₆			5.24	4 ⁻¹ / ₂ IF	191.8
SHMU-203	8.0	4 ⁻⁵ / ₁₆	2 ⁻¹³ / ₁₆			5.41	4 ⁻¹ / ₂ IF	198.4
SHMU-240	9 ⁻⁷ / ₁₆	5 ⁻⁹ / ₁₆	4.0			5.58	5 ⁻¹ / ₂ IF	216.1
SHMU-245	9 ⁻⁵ / ₈	5 ⁻⁹ / ₁₆	4.0			5.73	6 ⁻⁵ / ₈ Reg	220.5
SHMU-268	10 ⁻⁹ / ₁₆	5 ⁻⁹ / ₁₆	4.0			5.73	5 ⁻¹ / ₂ FH	264.6
SHMU-330	13.0	5 ⁻⁹ / ₁₆	4.0			5.9	5 ⁻¹ / ₂ FH	330.7

* can be designed and manufactured according to client's specification

JUNK LEAD SEAL PS-T



Application:

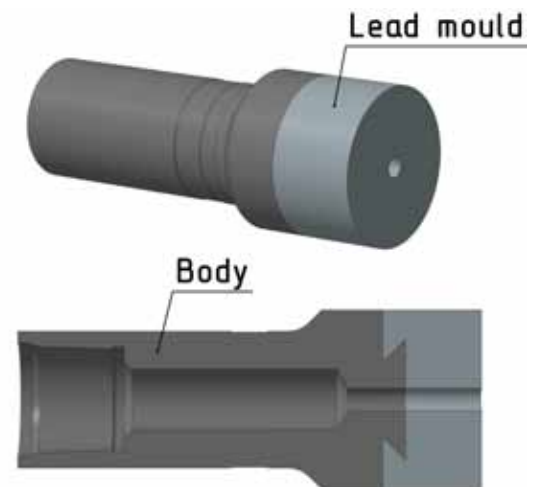
The Junk Lead Seal PS-T is used to define dimensional specifications and position of tool or equipment in casing string during repair-and-recovery works in the well.

Design:

The Junk Lead Seal consists of body with connection thread and lead mould which is tightly attached and prevented from being left at bottom hole.

There is a groove for washover.

Lead plasticity allows to get impression of tool in the well.



JUNK LEAD SEAL

PS-T

Technical data

Code	Max OD, in	Watercourse D, in, not less	Lead thickness, in, not more	Length, ft, not more	Weight, lb	Connection, API
PS-41T	1- ⁵ / ₈	-	1- ³ / ₁₆	0.57	0.9	NC 10
PS-45T	1- ³ / ₄	-	1- ³ / ₁₆	0.57	1.1	NC 12
PS-54T	2- ¹ / ₈	³ / ₁₆	1- ³ / ₈	0.65	5.6	NC 13
PS-57T	2- ¹ / ₄	³ / ₁₆	1- ³ / ₈	0.65	6.3	NC 13
PS-70T	2- ³ / ₄	³ / ₁₆	1- ³ / ₈	0.67	8.4	NC 13
PS-85T	3- ³ / ₈	⁵ / ₈	1- ³ / ₄	0.79	19.0	2- ⁷ / ₈ IF
PS-89T	3- ¹ / ₂	³ / ₁₆	1- ⁹ / ₁₆	0.79	19.8	2- ³ / ₈ Reg
PS-95T	3- ³ / ₄	⁵ / ₈	1- ³ / ₄	0.79	19.0	2- ⁷ / ₈ IF
PS-98T	3- ⁷ / ₈	⁵ / ₁₆	2- ⁹ / ₁₆	0.90	32.4	2- ⁷ / ₈ Reg
PS-105T	4- ¹ / ₈	³ / ₈	2- ⁹ / ₁₆	0.90	35.3	2- ⁷ / ₈ Reg
PS-121T	4- ³ / ₄	⁵ / ₈	2- ⁹ / ₁₆	0.92	58.2	2- ⁷ / ₈ Reg
PS-140T	5- ¹ / ₂	⁵ / ₈	2- ⁹ / ₁₆	0.95	72.8	3- ¹ / ₂ Reg
PS-203T	8.0	1- ¹ / ₈	2- ⁹ / ₁₆	1.76	178.6	4- ¹ / ₂ Reg
PS-216T	8- ¹ / ₂	1- ¹ / ₈	2- ⁹ / ₁₆	1.76	191.6	4- ¹ / ₂ Reg
PS-292T	11- ¹ / ₂	1- ³ / ₈	2- ⁹ / ₁₆	1.89	327.2	NC 50
PS-299T	11- ³ / ₉	1- ³ / ₈	2- ⁹ / ₁₆	1.89	337.4	NC 50
PS-355T	14.0	1- ⁴ / ₅	3- ¹⁵ / ₁₆	1.97	579.9	6- ⁵ / ₈ Reg
PS-381T	15.0	3.0	3- ¹⁵ / ₁₆	2.64	789.4	6- ⁵ / ₈ Reg
PS-431T	17.0	3- ¹ / ₇	3- ¹⁵ / ₁₆	2.79	1111.3	NC 31
PS-609T	24.0	3- ¹ / ₇	3- ¹⁵ / ₁₆	3.08	2022.0	6- ⁵ / ₈ FH

* can be designed and manufactured according to client's specification

LEAD CONICAL IMPRESSION BLOCK PS-K



Application:

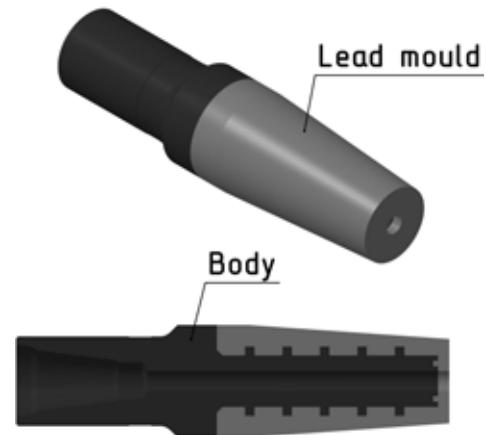
The Lead Conical Impression Block PS-K is used to determine casing string defects during repair and recovery works in the well.

Design:

The Lead Conical Impression Block consists of body filled with lead. The Impression Block has conical form.

There is a connection thread at the upper part. The Impression Block has central washing channel for fluid.

The Impression Block is connected to pipe string and lowered into the well. The lead plasticity allows to obtain imprint of object located in the well.



LEAD CONICAL IMPRESSION BLOCK

PS-K

Technical data

Code	Max OD, in	Watercourse D, in, not less	Minimal D of cone, in	Length, ft, not more	Weight, lb	Connection, API
PS-41K	1 ⁵ / ₈	-	9 ⁹ / ₁₆	0.89	4.63	SH-19
PS-45K	1 ³ / ₄	-	5 ⁵ / ₈	0.92	5.51	SH-19
PS-54K	2 ¹ / ₈	-	1 ¹¹ / ₈	1.07	9.7	NC 13
PS-57K	2 ¹ / ₄	3 ³ / ₁₆	1 ¹³ / ₁₆	1.07	10.14	NC 13
PS-70K	2 ³ / ₄	3 ³ / ₁₆	1 ¹³ / ₁₆	1.15	14.11	NC 13
PS-89K	3 ¹ / ₂	3 ³ / ₁₆	1 ¹³ / ₁₆	1.39	35.72	2 ³ / ₈ Reg
PS-98K	3 ⁷ / ₈	3 ³ / ₁₆	2.0	1.48	47.63	2 ⁷ / ₈ Reg
PS-105K	4 ¹ / ₈	3 ³ / ₈	2 ¹ / ₁₆	1.64	57.77	2 ⁷ / ₈ Reg
PS-121K	4 ³ / ₄	3 ³ / ₈	2 ³ / ₁₆	1.64	69.68	2 ⁷ / ₈ Reg
PS-140K	5 ¹ / ₂	3 ³ / ₈	2 ¹ / ₂	1.64	88.2	3 ¹ / ₂ Reg
PS-142K	5 ⁵ / ₈	1 ¹³ / ₁₆	4 ⁹ / ₁₆	1.79	123.48	2 ⁷ / ₈ Reg
PS-146K	5 ³ / ₄	1 ¹³ / ₁₆	4 ⁹ / ₁₆	1.79	127.89	2 ⁷ / ₈ Reg
PS-203K	8.0	1.0	3 ⁹ / ₁₆	2.13	241.01	4 ¹ / ₂ Reg
PS-216K	8 ¹ / ₂	1.0	3 ¹⁵ / ₁₆	2.13	266.81	4 ¹ / ₂ Reg
PS-292K	11 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₈	2.62	543.31	NC 50
PS-299K	11 ³ / ₉	1 ¹ / ₂	5 ¹ / ₈	2.62	560.95	NC 50

* can be designed and manufactured according to client's specification

ROLLER SWAGE OR



Application:

The Roller Swage OR is designed to restore internal diameter of damaged casing pipes by means of rolling-off during repair-and-renewal operations in the well.

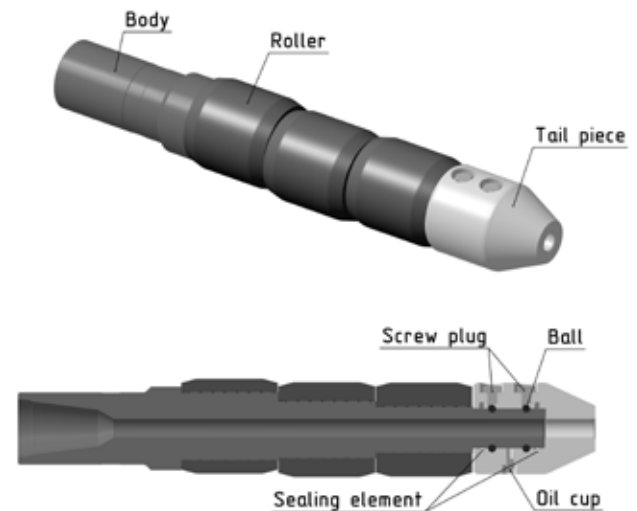
Design:

The Roller Swage OR consists of body made of alloy steel, three rollers and tail piece. There is a box connection tool-joint thread at the top. The middle part has rotating rollers which are set on three eccentric grooves located at 120° angle. Rollers are set on the body by rotary tail piece which is fixed by balls located in grooves of body and tail piece. Balls are fixed in grooves by thread plug.

Sets of rollers have different diameter. They are chosen depending on required diameter of swage and internal diameter of casing pipe.

There are slots on surface of eccentric guide grooves, which are filled with graphite grease.

Construction of the Roller Swage provides usage of same body after changing rollers to straighten casing pipes with same nominal diameter but with different internal diameter (with different well thickness). Each nominal size of the roller fits its own outer diameter of tail piece.



ROLLER SWAGE

OR

Technical data

Code	Nominal D of restored casing string, in	Nominal D of the swage (along rollers), in	Nominal axial load, lbf	Yield torque, lbsf.ft	Watercourse D, in, not less	Connection, API	Length, ft	Weight (1 set), lb
OR-114	4 1/2	3.76 - 4.02	56 200	7 376	1/2	2 3/8 IF	1.97	53.1
OR-127	5.0	4.09 - 4.49	62 950	11 060	5/8	2 7/8 Reg	1.97	67.2
OR-140	5 1/2	4.6 - 5.16	71 490	11 060	11/16	2 7/8 Reg	1.99	117.0
OR-168	5 3/4	5.58 - 5.97	78 680	11 060	15/16	3 1/2 Reg	2.66	177.7
OR-178	7.0	5.83 - 6.09	85 430	11 060	1.0	3 1/2 Reg	3.04	208.8
OR-245	9 5/8	8.37 - 8.72	94 420	11 060	4 3/8	3 1/2 IF	3.79	546.4

FISHING MAGNET MI

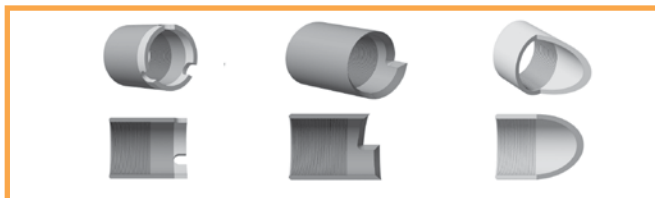


Application:

The Fishing Magnet MI is designed to remove small objects having ferromagnetic attraction from oil, gas and exploratory well bores.

Design:

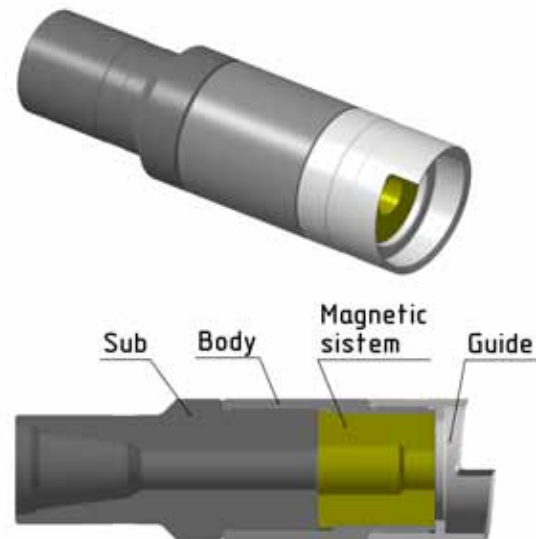
The Fishing Magnet consists of body, sub, magnet element and guide. The sub has tool-joint thread at the end. The removable guide can be designed in three different types: mill guide (Pic. 1), lipped guide (Pic. 2) and flush guide (Pic. 3). The Fishing Magnet has a central water course. The magnet element has direct magnetic action and does not require additional magnification during its service.



Pic.1

Pic.2

Pic.3



FISHING MAGNET

MI

Technical data

Code	Guide ID, in	Load capacity, lbf	Total length, ft	Connecting thread, API*
MI-82	3- ¹ / ₄	474.0	1.52	2- ³ / ₈ Reg
MI-89	3- ¹ / ₂	474.0	1.21	NC 26
MI-102	4,0	771.6	1.28	2- ⁷ / ₈ Reg
MI-114	4- ¹ / ₂	771.6	1.23	2- ⁷ / ₈ Reg
MI-118	4- ⁵ / ₈	771.6	1.28	2- ⁷ / ₈ Reg
MI-127	5.0	1 213.0	1.31	2- ⁷ / ₈ Reg
MI-135	5- ⁵ / ₁₆	1 213.0	1.25	2- ⁷ / ₈ Reg
MI-140	5- ¹ / ₂	1 323.0	1.25	3- ¹ / ₂ Reg
MI-146	5- ³ / ₄	1 323.0	1.26	3- ¹ / ₂ Reg
MI-152	6.0	1 543.0	1.33	3- ¹ / ₂ Reg
MI-170	6- ¹¹ / ₁₆	1 543.0	1.38	3- ¹ / ₂ Reg
MI-188	7- ³ / ₈	1 984.0	1.38	4- ¹ / ₂ Reg
MI-198	7- ¹³ / ₁₆	1 984.0	1.38	4- ¹ / ₂ Reg
MI-203	8.0	2 205.0	1.9	NC 50
MI-243	9- ⁹ / ₁₆	2 205.0	1.82	5- ¹ / ₂ FH
MI-279	11.0	2 205.0	2.1	NC 50
MI-292	11- ¹ / ₂	4 806.0	2.01	6- ⁵ / ₈ Reg
MI-295	11- ⁵ / ₈	4 806.0	2.09	5- ¹ / ₂ FH
MI-315	12- ⁷ / ₁₆	4 850.0	2.69	6- ⁵ / ₈ FH
MI-355	14.0	4 850.0	3.83	6- ⁵ / ₈ FH

* can be designed and manufactured according to client's specification

FISHING MAGNET WITH REVERSE CIRCULATION MIP

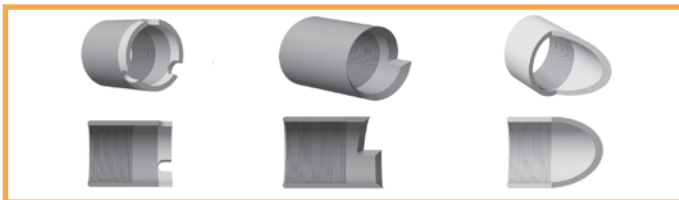


Application:

The Fishing Magnet with Reverse Circulation MIP is used to remove such objects as bit cones, bearings, broken slips, various hand tools, fragments of broken drill pipes, mill cuttings, etc. from the well.

Design:

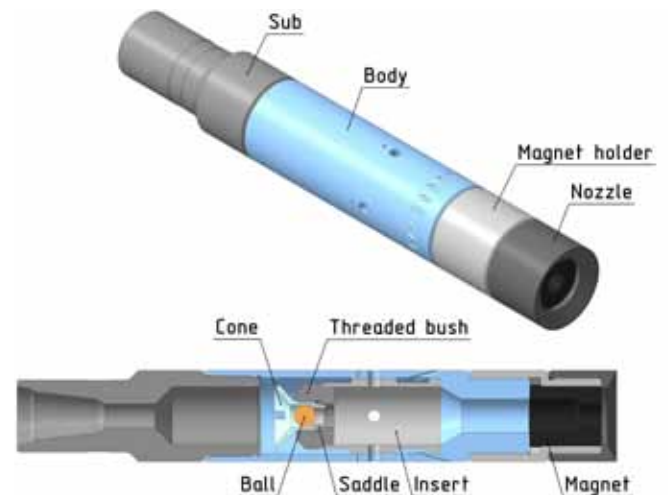
The Fishing Magnet with Reverse Circulation can be designed in left/right hand configuration. It can be equipped with three different types of guide: mill guide (Pic. 1), lipped guide (Pic. 2) and flush guide (Pic. 3). Reverse circulation helps to clear removed object from dirt and press it closer to magnetic surface.



Pic. 1

Pic. 2

Pic. 3



FISHING MAGNET WITH REVERSE CIRCULATION

MIP

Technical data

Code	Load capacity, lbf	Connecting thread. API*	External diameter of body, in
MIP-94	474.0	NC 26	3- ¹¹ / ₁₆
MIP -112	771.6	2- ⁷ / ₈ Reg	4- ⁷ / ₁₆
MIP-119	771.6	2- ⁷ / ₈ Reg	4- ¹¹ / ₁₆
MIP-130	1213.0	NC 38	5- ¹ / ₈
MIP-150	1323.0	NC 38	5- ⁷ / ₈
MIP-196	1984.0	NC 50	7- ¹¹ / ₁₆
MIP-206	2 205.0	NC 50	8- ¹ / ₈
MIP-257	2 205.0	NC 50	10- ¹ / ₈

* can be designed and manufactured according to client's specification

MAGNET FOR CHIPS COLLECTION MSS



Application:

The Magnet for Chips Collection MSS is used to remove metal chips having ferromagnetic attraction from drilling fluid during milling operation.

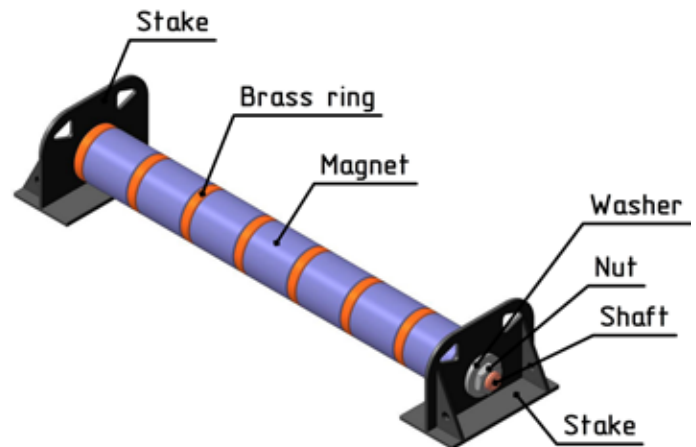
Design:

The Magnet consists of two stakes, shaft, alternate brass rings and neodymium magnets.

The shaft with rings and magnets is fixed on stakes by thread connection.

The magnet is set at the bottom of vibrating screen and is fixed by binding wire.

When drilling fluid passes through vibrating screen, metal chips settle on magnets by means of magnetic field. After chips accumulation, the Magnet should be retrieved and cleaned.



MAGNET FOR CHIPS COLLECTION

MSS

Technical data

Code	Width, in	Diameter with magnets, in	Total length, ft	Weight, lb
MSS-50	4 ⁻³ / ₄	2.0	1.63	17.64

BOREHOLE FISHING MAGNET MIS



Application:

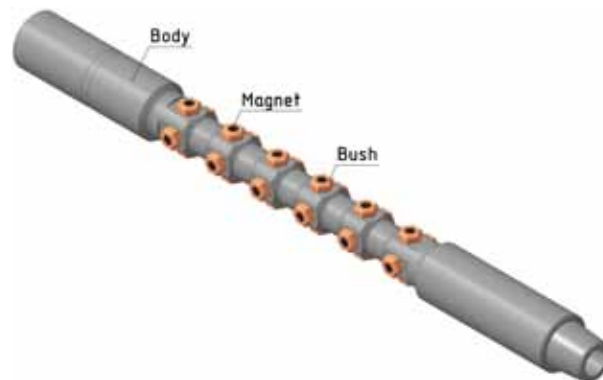
The Borehole Fishing Magnet MIS is used to remove different pieces having ferromagnetic attraction from the well.

The Borehole Fishing Magnet can be used:

- while cutting the "window", drilling-out packers to magnetize metal objects;
- during washover to clean bottom hole from metal objects;
- to remove metal objects from horizontal well;
- to remove debris after cutting and milling when flow speed in annular space is poor and when down hole fluid has low capacity for cutting transport.

Design:

The Borehole Fishing Magnet has cylindrical body with central watercourse for drilling fluid. There are connection threads of relevant size on both ends of the tool. There are magnet systems, divided by grooves, along the length and diameter of the tool. Magnet systems can be changed if necessary.



BOREHOLE FISHING MAGNET

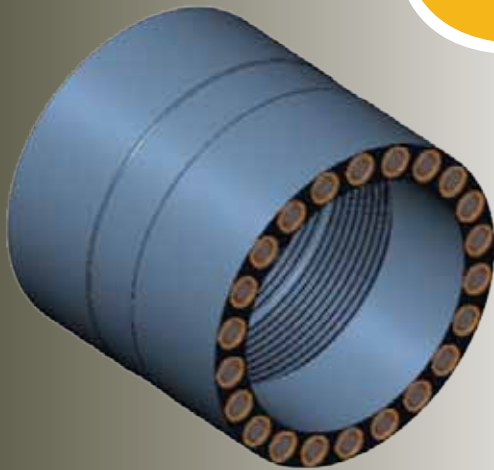
MIS

Technical data

Code	Body OD, in	Load capacity, lbf	Amount of magnet systems, items	Total length, ft	Weight, lb
MIS-92	3- ⁵ / ₈	220.5	15	4.26	176.4
MIS-165	6- ¹ / ₂	330.7	24	6.67	407.9

* can be designed and manufactured according to client's specification

ANNULAR FISHING MAGNET MIK

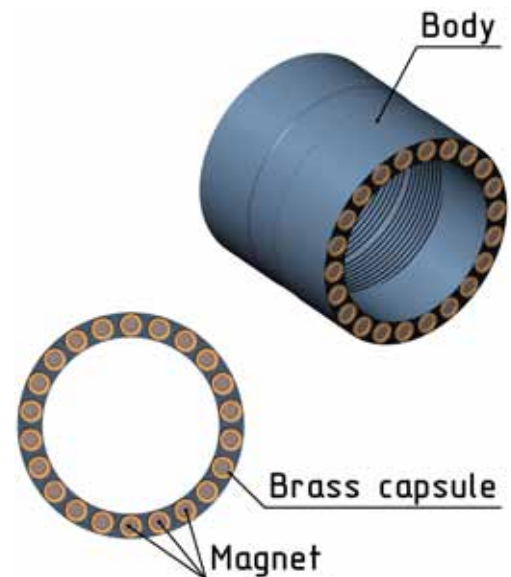


Application:

The Annular Fishing Magnet MIK is used to remove small particles having ferromagnetic attraction from oil, gas and geological wells.

Design:

The Annular Fishing Magnet MIK has tubular body. On one side it has double-stage buttress thread for connecting to washover pipe. On the other side there is a magnet system, which consists of permanent magnets. Magnet system magnetizes and retains pieces having ferromagnetic attraction from tubular annulus between pipe, electric submersible pump and casing string.



ANNULAR FISHING MAGNET

MIK

Technical data

Code	Load capacity, lbf	OD, in	ID, in	Total length, ft	Connecting thread*	Weight, lb
MIK-123/96	154.3	4-7/8	3-3/16	0.38	RDU-122	2.65

* can be designed and manufactured according to client's specification

