

CATALOGUE

FISHING TOOLS

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“SC” TYPE OVERSHOT

The SC type overshot is a fishing tool which is used to catch from the outside the tubular material for the purpose of extracting it when, accidentally, it gets stuck in the well hole.

This type of overshot is equipped with two types of grapples:

- spiral S;
- basket C;

CONSTRUCTION

The main component parts of the overshot are the following:

- connection, which by means of the upper part thread connects the overshot with the fishing string.
- body, which is a cylindrical tube provided with threads at both ends to be assembled to the connection respectively to the guide. Inside the body there is a helical left handed channel with large step and inclined flank. Inside this channel is screwed the basket grapple or the spiral grapple which are elements for gripping the tubular material which is being fished.

During the fishing operation the tensile effort operating on the overshot has a uniform distribution in the entire section of the body and along the entire spire.

- the spiral grapple has the shape of a screw with the winding direction to the left. At the outside the screw is conical, in compliance with the flank of the channel in the body of the overshot, and at the inside the grapple is provided with a left thread for gripping, with a special profile and more leads. The spiral grapple is destined to grip tubular material with the outside diameter close to the maximum gripping diameter of the overshot.

- the basket grapple, is provided at the outside with a screw identical with the one of the overshot body, and at the inside has a connection thread with special profile and more leads. The grapple is provided with longitudinal cuts which assure the flexibility necessary to the radial stretching.

- arrester, is smooth and is used when the overshot is equipped with the spiral grapple. The arrester is provided with a lamella which enters the seat made in the body to prevent the rotation of the spiral grapple during functioning.

- the guide is used to search and center inside the overshot the broken tubular material. The outer diameter of the guide is coordinated with the inside diameter of the string or of the well hole in which the fishing is performed, and the inner diameter is coordinated with the outer diameter of the tubular material for which the fishing is done.

- gasket, assures the sealing of the overshot on the fished tubular material such as to achieve the circulation of the drilling fluid during the fishing operation. The gasket is used in case the overshot is equipped with spiral grapple.

- the mill is used when the overshot is equipped with basket grapple. It has the purpose to mill the junks and irregularities in the broken section of the tubular material.

FUNCTIONING

After being introduced in the well hole, the overshot is rotated to the right with circulation until the guide wraps the broken end of the tubular material. During handling, the broken end hits the grapple and pushes it inside the helical seat stretching it, passes through the sealing gasket and hits the lower part of the connection. In this moment the rotation is stopped and the traction starts, which make the grapple, engage on the tubular material, the action being signaled by the load marker which shows the increase of the load.

DISENGAGING

In case the fishing is not successful the overshot is disengaged. For this operation, the jar hits from bottom to top until the grapple reaches the large part of the body. The weight is leaned on the overshot and the rotation to the right starts together with a small lifting of the string.

ACCESSORIES OF THE “SC” TYPE OVERSHOT

Upon customer’s request there can be delivered the following accessories:

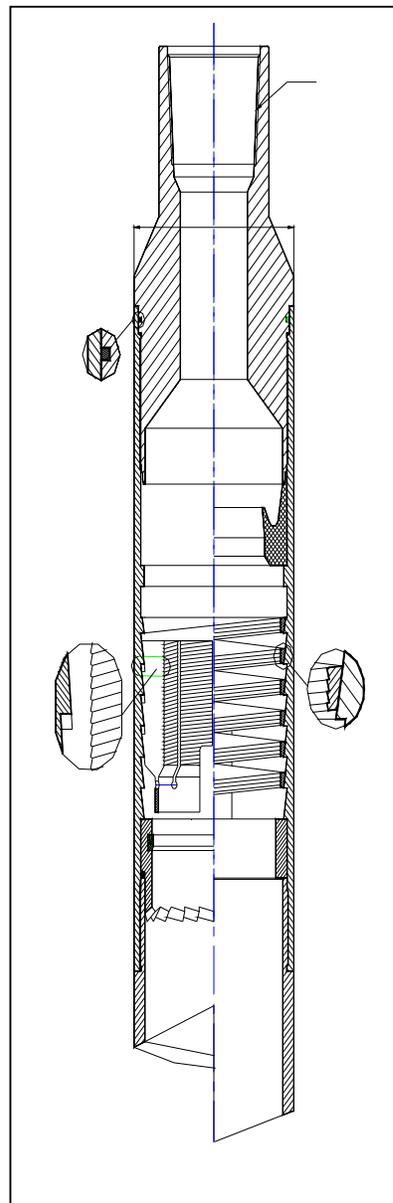
- Extension sub coupling;
- Guide;
- Special guide.

Data to be introduced in the order:

- 1) Nominal dimension (outer diameter).
- 2) Connection thread.
- 3) Grapple gripping diameter or outer diameter of the fished tubular material.
- 4) Outer diameter of guide.

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OD of OVERSHOT		SPIRAL GRAPPLE		BASKET GRAPPLE		CONNECTION
mm	in	mm	in	mm	in	IN
79.4	3 1/8	60.33	23/8	50.80	2	2 3/8 REG
88.90	3 1/2	60.33	23/8	-	-	2 3/8 IF
101.60	4	73	27/8	-	-	2 3/8 IF
104.80	4 1/8	60.33	23/8	47.63	1 7/8	2 7/8 EU
104.80	4 1/8	73.03	27/8	60.33	2 3/8	2 7/8 EU
111.10	4 3/8	88.90	31/2	-	-	2 3/8 IF
130.20	5 1/8	88.90	31/2	73.03	2 7/8	3 1/2 IF
134.90	5 5/16	92.87	4	-	-	3 1/2 IF
127.00	5	104.78	4 1/8	-	-	2 7/8 IF
136.90	5 3/8	114.30	107.8 114.3	4 1/4 4 3/8		3 1/2 IF
147.60	5 13/16	114.30	4 3/8	96.40	3 7/8	3 1/2 IF
142.90	5 5/8	117.50	4 5/8	104.8	4 1/8	3 1/2 IF
142.90	5 5/8	120.7	43/4	108	41/4	31/2IF
138.10	5 7/16	104.8	41/8	88.9	31/2	31/2IF
152.40	6	120.65	43/4	104.78	41/8	3 1/2 IF
168.30	6 5/8	127.00	5	-	-	4 1/2 IF
181.00	7 1/8	139.70	51/2	-	-	4 1/2 IF
174.60	6 7/8	141.3	59/16	-	-	4 1/2 IF
193.70	7 5/8	165.1	61/2	149.2	57/8	4 1/2 IF
190.50	7 1/2	161.9	63/4	146.1	53/4	41/2IF
196.90	7 3/4	168.3	6 5/8	136.5	5 3/8	4 1/2 IF
206.40	8 1/8	165.1	61/2	146.1	53/4	41/2IF
209.60	8 1/4	168.3	65/8	149.2	57/8	41/2IF
219.10	8 5/8	177.80	7	158.8	61/4	41/2IF
225.40	8 7/8	184.1	71/4	164.1	61/2	41/2IF
244.50	9 5/8	203.20	8	184.1	714	51/2IF
269.90	10 5/8	228.60	9	209.6	81/4	51/2IF
285.80	11 1/4	244.50	95/8	225.4	87/8	51/2IF
298.50	11 3/4	254.00	10	228.6	9	51/2IF
317.50	12 1/2	257.18	101/8	241.30	91/2	41/2 REG
323.80	12 3/4	285.8	111/4	266.7	101/2	51/2IF
349.30	13 3/4	304.50	12	285.80	111/4	41/2REG



FISHING TOOLS

“N” TYPE OVERSHOT

The “N” type overshoot is used for fishing a large range of types and dimensions of drill pipes and tubing.

CONSTRUCTION

Regardless their size, the N type overshoots, from a constructive point of view, consist of the following main elements:

- Connection, which by means of the thread at the upper part makes the connection of the overshoot with the fishing string.
- Body, which is connected with the lower thread of the special connection.
- Expandable grapple, which slides on the conical surface from the inside of the body.
- Compression spring, which pushes the grapples on the material to be fished.
- Sealing gasket, which assures the sealing between the overshoot and the tubular material during the fishing.
- Guide, which helps the centering of the tubular material.

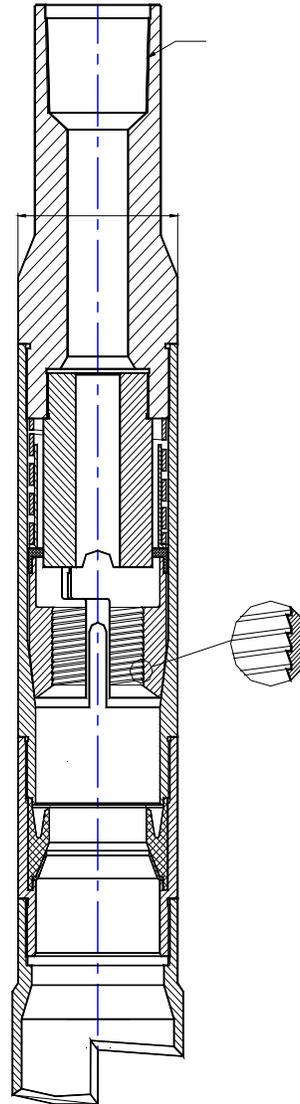
FUNCTIONING

When the overshoot mounted in the fishing string reached the tubular material stuck in the well, starts the rotation until the upper part of the tubular material enters the overshoot up to the level of the grapples. Next, the weight of the fishing string is easily leaned on the overshoot and thus the grapples move up and compress the spring until the tubular material is gripped by the grapples.

After this operation a controlled traction force is applied, which allows the extraction of the spring which was stuck in the well hole.

DISENGAGING

In case the tubular material string, stuck in the well hole, cannot be extracted, the overshoot is disengaged. For this purpose the tension applied to the fishing string is loosened together with its rotation until the grapples are disengaged, after which the fishing string is extracted together with the overshoot.



Data to be introduced in the order:

- 1) Nominal dimension (outer diameter).
- 2) Connection thread.
- 3) Grapple gripping diameter or outer diameter of the tubular material.
- 4) Outer diameter of guide.

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DRILL PIPE "N" TYPE OVERSHOT

NOMINAL DIMENSION " D "	CONNECTION THREAD " F "	GRAPPLE GRIPPING DIAMETER	TUBULAR MATERIAL SYMBOL	LENGTH	ESTIMATED WEIGHT
mm	in	mm	-	mm	kg
117	2 7/8 REG 2 7/8 IF 3 1/2 REG	61.52	PF 2 3/8	965	80
		74.61	PF 2 7/8		
		81	RS 2 3/8 REG		
128	2 7/8 IF 3 1/2 REG 3 1/2 FH 3 1/2 IF	74.61	PF 2 7/8	988	110
		81	RS 2 3/8 REG		
		90	PF 3 1/2		
		95.44	RS 2 7/8 REG		
140	2 7/8 IF 3 1/2 REG 3 1/2 IF 4 1/2 REG	90	PF 3 1/2	1000	125
		95.44	RS 2 7/8 REG		
		103	PF 4		
		109	RS 3 1/2 REG		
152	3 1/2 REG 3 1/2 IF 4 1/2 REG 4 1/2 FH	90	PF 3 1/2	1163	155
		109	RS 3 1/2 REG		
		115	PF 4 1/2		
		118.67	RS 3 1/2 FH		
170	4 IF 4 1/2 REG 4 1/2 FH 4 1/2 IF	109	RS 3 1/2 REG	1263	170
		115	PF 4 1/2		
		118.67	RS 3 1/2 FH		
		122.24	RS 3 1/2 IF		
188	4 1/2 REG; FH; IF 5 1/2 REG; FH; IF	115	PF 4 1/2	1280	182
		128	PF 5 1/2		
		142	RS 4 1/2 REG		
		146.84	RS 4 1/2 FH		
205	4 1/2 REG; FH; IF 5 1/2 REG; FH; IF 6 5/8 REG; FH	115	PF 4 1/2	1280	210
		121.44	RS 3 1/2 IF		
		128	PF 5 1/2		
		142	RS 4 1/2 REG		
		146.84	RS 4 1/2 FH		
228	4 1/2 IF 5 1/2 REG; FH; IF 6 5/8 REG	157	RS 4 1/2 IF	1340	272
		115	PF 4 1/2		
		121.44	RS 3 1/2 IF		
		128	PF 5 1/2		
		142	RS 4 1/2 REG		
		146.84	RS 4 1/2 FH		
		158.75	RS 4 1/2 IF		
		165.89	PG 6 1/2		
240	4 1/2 IF 5 1/2 REG; FH; IF 6 5/8 REG 6 5/8 FH	171.85	RS 5 1/2 REG	1403	293
		177.80	RS 5 1/2 FH		
		115	PF 4 1/2		
		121.44	RS 3 1/2 IF		
		128	PF 5 1/2		
		142	RS 4 1/2 REG		
		146.84	RS 4 1/2 FH		
		153	PG 6		
		157	RS 4 1/2 IF		
		161	RS 4 1/2 IF		
		166	PG 6 1/2		
265	5 1/2 IF 6 5/8 REG 6 5/8 FH	169	PF 6 5/8	1418	310
		177.80	RS 5 1/2 FH		
		188	RS 5 1/2 IF		
		198.44	RS 6 5/8 REG		
		204	RS 6 5/8 FH		

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NOMINAL DIMENSION "" D ""	CONNECTION THREAD "" F ""	GRAPPLE GRIPPING DIAMETER	GRIPPED TUBULAR MATERIAL				LENGTH	ESTIMATED WEIGHT
			The Body	Upset Tbg	Nonupset body box	Upset body box		
92	EUE 1,9 EUE 2 3/8 2 3/8 REG 2 3/8 IF	42.86	1,66	-	-	-	950	38
		46.83	-	1,66	-	-		
		48.82	1,9	-	-	-		
		54	-	1,9	-	-		
		57	-	-	1,9	1,66		
		61	2 3/8	-	-	-		
115	EUE 2 3/8 EUE 2 7/8 2 3/8 REG 2 3/8 IF 2 7/8 REG 2 7/8 IF	64	-	-	-	1,9	980	48
		48.82	1,9	-	-	-		
		54	-	1,9	-	-		
		56	-	-	1,9	-		
		61	2 3/8	-	-	-		
		65	-	-	-	1,9		
		67	-	2 3/8	-	-		
74.61	2 7/8	-	2 3/8	-				
127	EUE 2 7/8 EUE 3 1/2 2 3/8 IF 2 7/8 REG 2 7/8 IF 3 1/2 REG 3 1/2 FH	87.31	-	2 7/8	-	2 3/8	1010	68
		61	2 3/8	-	-	-		
		67	-	2 3/8	-	-		
		74.61	2 7/8	-	2 3/8	-		
		90	3 1/2	-	2 7/8	-		
		94	-	-	-	2 7/8		
140	EUE 3 1/2 2 3/8 IF 2 7/8 REG 2 7/8 IF 3 1/2 REG 3 1/2 FH 3 1/2 IF 4 1/2 REG 4 1/2 FH	87.31	-	2 7/8	-	2 3/8	1100	95
		61	2 3/8	-	-	-		
		67	-	2 3/8	-	-		
		74.61	2 7/8	-	2 3/8	-		
		90	3 1/2	-	2 7/8	-		
		94	-	-	-	2 7/8		
		96	-	3 1/2	-	-		
		109	-	-	3 1/2	-		
152	EUE 3 1/2 2 3/8 IF 2 7/8 REG 2 7/8 IF 3 1/2 REG 3 1/2 FH 3 1/2 IF 4 1/2 REG 4 1/2 FH	123.83	-	4	-	-	1150	146
		61	2 3/8	-	-	-		
		67	-	2 3/8	-	-		
		74.61	2 7/8	-	2 3/8	-		
		87.31	-	2 7/8	-	2 3/8		
		90	3 1/2	-	2 7/8	-		
		94	-	-	-	2 7/8		
		96	-	3 1/2	-	-		
		102	4	-	-	-		
		109	-	-	3 1/2	-		
188	4 1/2 REG	142.88	-	-	-	4 1/2	1280	220
		90	3 1/2	-	2 7/8	-		
		96	-	3 1/2	-	-		
		102	4	-	-	-		
		109	-	-	3 1/2	-		
		115	-	-	-	3 1/2		
		122.24	-	4 1/2	-	-		
		128	-	-	4	-		
133.35	-	-	4 1/2	-				

FISHING TOOLS

“MI“ TYPE OVERSHOT

The MI type overshots are made in a large dimensional range, which allows their use for fishing both drill pipe and tubing.

CONSTRUCTION

From constructive point of view the MI type overshots consist of the following main elements:

- special connection, which by means of the thread from the top part makes the connection of the overshot with the fishing string.
- Body, which is connected by means of the thread to the lower part of the connection.
- Expandable grapple, which slides on the conical inner surface of the overshot body.
- Compression spring, which by means of the sleeve for supporting the grapples pushes them, is making them to engage on the tubular material which is being fished.
- Sealing gasket, which assures the sealing of the overshot on the tubular material which is being fished, thus allowing the circulation of the drilling fluid during the fishing operation.
- Tripper, which commands the retrieval in the larger section of the overshot body during overshot arming.
- Guide, which assures the centering and guiding of the tubular material to be fished.

FUNCTIONING

When the overshot mounted in the fishing string has reached the tubular material stuck inside the well, it rotates in a manner in which the guide of the overshot centers and guides the tubular material which enters inside the overshot up to the grapples.

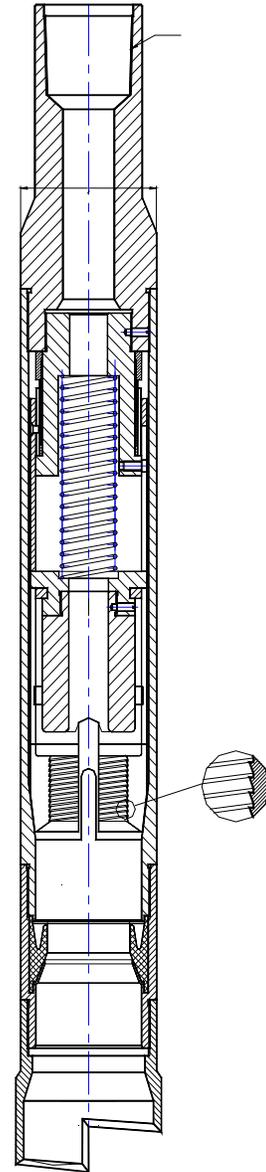
The fishing string is easily leaned on the overshot, the guiding bolts of the sleeve pass from the long channels to the short channels of the tripper, thus allowing the entrance of the tubular material inside the grapples.

When a new handling is performed the guiding bolts of the sleeve pass from the short channel to the long one, thus allowing the lowering of the grapples on the conical surface of the overshot body and also their arming on the tubular material.

In this situation it is applied a traction force big enough to retrieve the tubular material stuck in the well hole.

Data to be introduced in the order:

- 1) Nominal dimension (outer diameter).
- 2) Connection thread.
- 3) Grapple gripping diameter or outer diameter of the fished tubular material.
- 4) Outer diameter of guide



FISHING TOOLS

DRILL PIPE "MF" TYPE OVERSHOT

NOMINAL DIMENSION "D"	CONNECTION THREAD "F"	GRAPPLE GRIPPING DIAMETER	TUBULAR MATERIAL TO BE GRIPPED					LENGTH	ESTIMATED WEIGHT
			DRILL PIPE	DRILL COLLAR	SPEC. CONN. REG	SPEC. CONN. FH	SPEC. CONN. IF		
mm	in	mm	in	in	in	in	in	mm	kg
117	2 7/8 REG	61.52	2 3/8	-	-	-	-	1170	90
	2 7/8 IF	74.61	2 7/8	-	-	-	-		
	3 1/2 REG	81	-	-	2 3/8	-	-		
128	2 7/8 IF 3 1/2 REG 3 1/2 FH 3 1/2 IF	61.52	2 3/8	-	-	-	-	1165	100
		74.61	2 7/8	-	-	-	-		
		81	-	-	2 3/8	-	-		
		86.52	-	-	-	-	2 3/8		
		90	3 1/2	-	-	-	-		
140	2 7/8 IF 3 1/2 REG 3 1/2 FH 3 1/2 IF 4 FH 4 1/2 REG	90	3 1/2	-	-	-	-	1400	125
		96	-	-	2 7/8	-	-		
		102	4	-	-	-	-		
		104.78	4	-	-	-	-		
		109	-	-	3 1/2	-	-		
152	3 1/2 REG 3 1/2 FH 3 1/2 IF 4 FH 4 IF 4 1/2 REG 4 1/2 FH	90	3 1/2	-	-	-	-	1430	140
		102	4	-	-	-	-		
		109	-	-	3 1/2	-	-		
		115	4 1/2	-	-	-	-		
		118.67	-	-	-	3 1/2	-		
		121	-	-	-	-	3 1/2		
170	4 1/2 REG 4 1/2 FH 4 1/2 IF 4 IF	90	3 1/2	-	-	-	-	1560	200
		102	4	-	-	-	-		
		109	-	-	3 1/2	-	-		
		115	4 1/2	-	-	-	-		
		118.67	-	-	-	3 1/2	-		
		121	-	-	-	-	3 1/2		
188	4 1/2 REG 4 1/2 IF 5 1/2 REG 5 1/2 IF	115	4 1/2	-	-	-	-	1545	225
		128.19	5 1/2	-	-	-	-		
		142	-	-	4 1/2	-	-		
		146.84	-	-	-	4 1/2	-		
205	4 1/2 REG 4 1/2 IF 5 1/2 REG 5 1/2 IF 6 5/8 REG 6 5/8 FH	115	4 1/2	-	-	-	-	1773	260
		121	-	-	-	-	3 1/2		
		128	5 1/2	-	-	-	-		
		142	-	-	4 1/2	-	-		
		146.84	-	-	-	4 1/2	-		
		157	-	-	-	-	4 1/2		
222	4 1/2 IF 5 1/2 REG 5 1/2 FH 5 1/2 IF 6 5/8 REG 6 5/8 FH	115	4 1/2	-	-	-	-	1753	290
		142	-	-	4 1/2	-	-		
		146.84	-	-	-	4 1/2	-		
		157	-	-	-	-	4 1/2		
		169	6 5/8	-	-	-	-		
		177.80	-	-	-	5 1/2	-		
228	4 1/2 IF 5 1/2 REG 5 1/2 FH 5 1/2 IF 6 5/8 REG 6 5/8 FH	115	4 1/2	-	-	-	-	1900	320
		142	-	-	4 1/2	-	-		
		146.84	-	-	-	4 1/2	-		
		157	-	-	-	-	4 1/2		
		169	6 5/8	-	-	-	-		
		177.80	-	-	-	5 1/2	-		
240	4 1/2 IF 5 1/2 REG 5 1/2 IF 6 5/8 REG 6 5/8 FH	142	-	-	4 1/2	-	-	1900	375
		153.19	-	6	-	-	-		
		169	6 5/8	-	-	-	-		
		171.85	-	-	5 1/2	-	-		
		177.80	-	-	-	5 1/2	-		
265	5 1/2 IF 6 5/8 REG 6 5/8 FH	153	-	6	-	-	-	1900	400
		169	6 5/8	-	-	-	-		
		188	-	-	-	-	5 1/2		
		198	-	-	6 5/8	-	-		
		204	-	-	-	6 5/8	-		

FISHING TOOLS

TUBING "MI" TYPE OVERSHOT

NOMINAL DIMENSION "D"	CONNECTION THREAD "F"	GRAPPLE GRIPPING DIAMETER	TUBULAR MATERIAL TO BE GRIPPED				LENGTH	ESTIMATED WEIGHT
			Tbg Body	Upset Tbg	Non upset body box	Upset body box		
mm	in	mm	in	in	in	in	mm	kg
92	EUE 1,9 EUE 2 3/8 RS 2 3/8 REG RS 2 3/8 IF	42.86	1,66	-	-	-	1180	32
		46.83	-	1,66	-	-		
		48.82	1,9	-	-	-		
		53.98	-	1,9	-	-		
		57.15	-	-	1,9	1,66		
		61.12	2 3/8	-	-	-		
115	EUE 2 3/8 EUE 2 7/8 2 3/8 REG 2 3/8 IF 2 7/8 REG 2 7/8 IF 3 1/2 REG	48.82	1,9	-	-	-	1220	67
		53.98	-	1,9	-	-		
		55.96	-	-	1,9	-		
		61.12	2 3/8	-	-	-		
		65.09	-	-	-	1,9		
		67.07	-	2 3/8	-	-		
		74.61	2 7/8	-	2 3/8	-		
127	EUE 2 7/8 EUE 3 1/2 3 1/2 REG 3 1/2 FH 4 1/2 FH	61.12	2 3/8	-	-	-	1240	75
		67.07	-	2 3/8	-	-		
		74.61	2 7/8	-	2 3/8	-		
		78.98	-	2 7/8	-	2 3/8		
		90.09	3 1/2	-	2 7/8	-		
140	EUE 3 1/2 2 3/8 IF 2 7/8 REG 2 7/8 IF 3 1/2 REG 3 1/2 IF 4 1/2 REG 4 1/2 FH	61.12	2 3/8	-	-	-	1400	100
		67.07	-	2 3/8	-	-		
		74.61	2 7/8	-	2 3/8	-		
		78.98	-	2 7/8	-	2 3/8		
		90.09	3 1/2	-	2 7/8	-		
		94.06	-	-	-	2 7/8		
		96.04	-	3 1/2	-	-		
		109.14	-	-	3 1/2	-		
152	EUE 3 1/2 2 3/8 IF 2 7/8 REG 2 7/8 IF 3 1/2 REG 3 1/2 FH 3 1/2 IF 4 1/2 REG 4 1/2 FH	61.12	2 3/8	-	-	-	1450	158
		67.07	-	2 3/8	-	-		
		74.61	2 7/8	-	2 3/8	-		
		78.98	-	2 7/8	-	2 3/8		
		90.09	3 1/2	-	2 7/8	-		
		94.06	-	-	-	2 7/8		
		96.04	-	3 1/2	-	-		
		104.38	4	-	-	-		
		109.14	-	-	3 1/2	-		
188	4 1/2 REG	90.09	3 1/2	-	2 7/8	-	1675	230
		96.04	-	3 1/2	-	-		
		102.00	4	-	-	-		
		109.14	-	-	3 1/2	-		
		115.09	-	-	-	3 1/2		
		122.24	-	4 1/2	-	-		
		128.19	-	-	4	-		
		130.18	-	-	4 1/2	-		
142.88	-	-	-	4 1/2				

FISHING TOOLS

SUCKER ROD OVERSHOT

FIELD OF USE

The sucker rod overshots are used to grip and extract to the surface the sucker rods broken and stuck in the well hole during the exploitation of the wells.

PERFORMANCE LEVEL

The sucker rods overshots are designed and manufactured in compliance with CONFIND Specifications.

CLASIFICATION

According to the functioning system, the sucker rod and couplings overshots are manufactured in the following solutions:

- a) A type – with one grapple which grips on the rod body, with releasing by pushing;
- b) B type – with one grapple which grips below the coupling, with release by pushing;
- c) C type – with one grapple which grips on the rod body and one grapple which grips below the coupling, with releasing by pushing;
- d) CBM type – multiple grapple overshoot which grips on the rod body, with release by pushing and right hand rotation;
- e) CÎBM type – overshoot to complete the sucker rod string, with multiple grapples and release by pushing with right hand rotation, grapples grip both broken ends of the rod;
- f) CÎBL type - overshoot to complete the sucker rod string, with long grapple and release by pushing, the grapple gripping the broken end of the rod body in the well hole;
- g) CDUC type – universal release overshoot which grips on the rod, with release by pushing and right hand rotation;
- h) CDUM type - universal release overshoot which grips below the coupling, with release by pushing and right hand rotation;

DESCRIPTION

The sucker rod overshots consist mainly of a connection, provided at one end with a connection thread to the coupling and at the other end with metric thread for assembly with a cell body, at the inside of which it is mounted the type of grapple appropriate to grip the rod or coupling. Both parts are made of alloy steel, heat treated.

The lower end is connected to a shoe straight or enhanced, which allows guiding the overshoot on the inside of the tubing and engaging the broken rod towards the grapple.

The grapples to grip on the sucker rod body are made of alloy carburizing steel, heat treated. The cementing depth of the teeth surface is of 0.6 - 0.8 mm, for a hardness of 58 - 60 HRC.

The grapples for gripping below the coupling are made of alloy tempered steel, heat treated.

The initial grip of the grapples on the rod or below the coupling is made due to the action of a spring.

Detaching the grapples from the sucker rod for overshots type : A; B; C and CÎBL, is made by pushing with a short hit in the overshoot, in order to push the grapples from the conical areas, and allow their opening.

Detaching the grapples from the sucker rod for overshots type: CBM; CÎBM, is made by pushing and right hand rotation. Due to the locking of the rod, the grapples are rotated together with the overshoot and by rotating to the right, allowing the detachment from the rod, the sense of the gripping thread with 3 leads being left.

Detaching the grapples from below the coupling for overshots type : C; CDUM, is made by pushing, in order to move the grapples into the opening from inside the cell body where their elastic opening is allowed.

FISHING TOOLS

For overshots type CÎBM, completing the sucker rod string in order to resume pumping, is made without extracting for replacement of the broken rod.

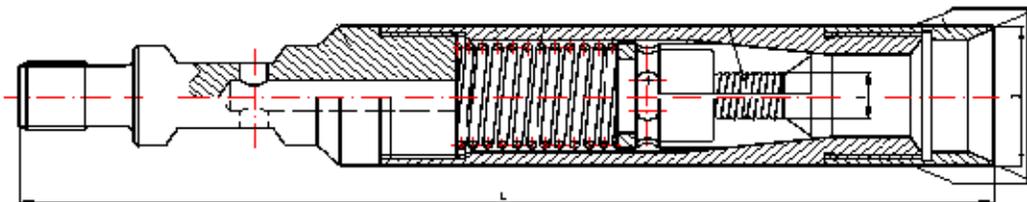
The overshots type CDU are provided with a tripper, which, under the action of a spring, performs the gripping and ungridding of the grapple. Ungripping is made by pushing and rotating to the right the sucker rod string.

Data to be introduced in the order by beneficiary:

- 1) *Abbreviation of the overshot for sucker rods;*
- 2) *Symbol of the type;*
- 3) *Outer diameter of the overshot: D, in mm;*
- 4) *Outer diameter of the sucker rod, in mm;*
- 5) *Outer diameter of coupling (normal or reduced diameter R), in mm.*

1
SUCKER ROD OVERSHOT
Type A

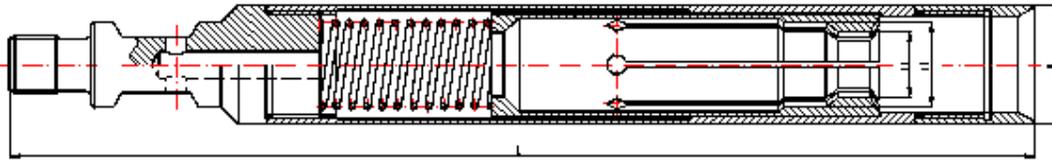
FISHING TOOLS



Gripping dimension of the grapple		Outer diameter	Minimum diameter of the tubing in which is introduced		Connection	Maximum working load	Length	Net weight
d	Body		Outer	Inner			L	
15,0	5/8	47	2 3/8	50,67	15,9 (5/8)	7	312	3,50
18,2	3/4					10		
15,0	5/8	57	2 7/8	62	19,1 (3/4)	7	360	4,43
18,2	3/4					10		
21,2	7/8					14		
24,3	1					18		
18,2	3/4	71	3 1/2	76	25,4 (1)	10	405	7,15
21,2	7/8					14		
24,3	1					18		
27,5	1 1/8					22		

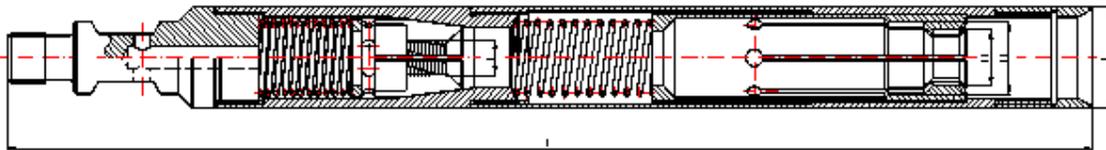
FISHING TOOLS

SUCKER ROD OVERSHOT Type B



Gripping dimension of the grapple			Outer diameter	Minimum diameter of the tubing in which is introduced		Connection thread	Maximum working load	Length L	Net weight
d1	d2	Coupling		Outer	Inner				
mm	mm	in	mm	in	mm	mm (in)	tf	mm	kg
36	38,9	5/8	57	2 7/8	62	19,1 (3/4)	7	495	3,86
39,5	42,5	3/4					10		
43	47	7/8					14		
39,5	42,5	3/4	71	3 1/2	76	25,4 (1)	10	600	7,31
43,8	46,9	7/8					14		
52,5	56,4	1					18		

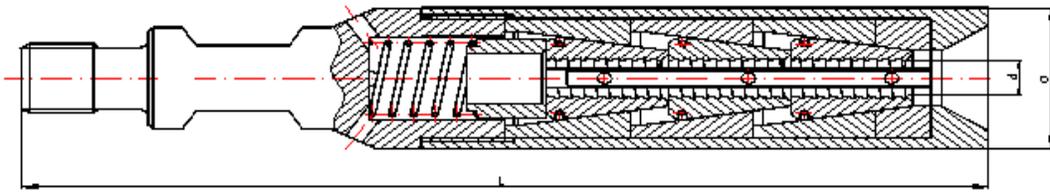
SUCKER ROD OVERSHOT Type C



Gripping dimension of the grapple				Outer diameter	Minimum diameter of the tubing in which is introduced		Connection	Maximum working load	Length L	Weight
d	d1	d2	Body; Coupling		Exterior	Interior				
15,0	36	38,9	5/8	57	2 7/8	62	19,1 (3/4)	7	665	6,44
18,2	39,5	42,5	3/4					10		
21,2	43	47	7/8					14		
18,2	39,5	42,5	3/4	71	3 1/2	76	25,4 (1)	10	785	11,26
21,2	43,8	46,9	7/8					14		
24,3	52,5	56,4	1					18		

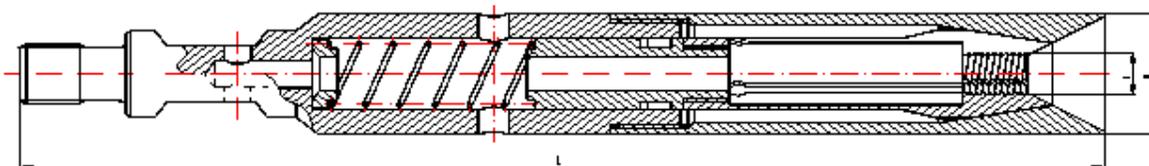
FISHING TOOLS

SUCKER ROD OVERSHOT Type CBM



Gripping dimension of the grapple		Outer diameter D	Minimum diameter of the tubing in which is introduced		Connection thread SR ISO 10428	Maximum working load	Length L	Net weight
d	Body		Outer	Inner				
15,0	5/8	55	2 7/8	62	19,1 (3/4)	16	360	4,00
18,2	3/4							3,90
21,2	7/8							3,80
18,2	3/4	66	3 1/2	74,2	22,2 (7/8)	20	405	6,10
21,2	7/8							6,00
24,3	1							5,80
27,5	1 1/8							5,70

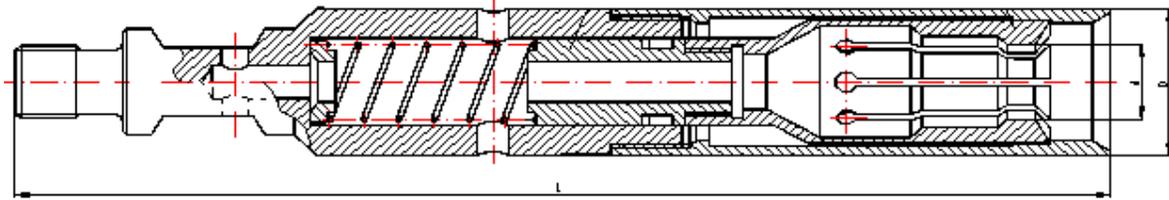
SUCKER ROD OVERSHOT Type CDUC



Gripping dimension of the grapple		Outer diameter D	Minimum diameter of the tubing in which is introduced		Connection thread SR ISO 10428	Maximum working load	Length L	Net weight
d	Body		Outer	Inner				
mm	in	mm	in	mm	mm (in)	tf	mm	kg
12,7	1/2	47	2 3/8	50,67	15,9 (5/8)	12	400	3,90
15,9	5/8							
19,1	3/4							
15,9	5/8	57	2 7/8	62	19,1 (3/4)	16	445	4,80
19,1	3/4							
22,2	7/8							
25,4	1							
19,1	3/4	67	3 1/2	74,22	25,4 (1)	20	485	6,50
22,2	7/8							
25,4	1							
28,6	1 1/8	86	4	90,12	25,4 (1)	22	650	16,40
22,2	7/8							
25,4	1							
28,6	1 1/8							

FISHING TOOLS

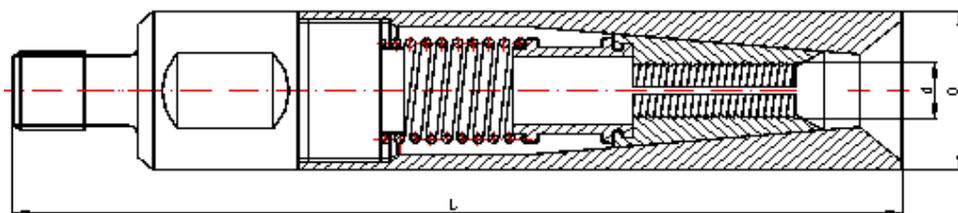
SUCKER ROD OVERSHOT Type CDUM



Gripping dimension of the grapple		Outer Diameter D	Minimum diameter of the tubing in which is introduced		Connection	Working Load	Length L	Weight
d	Body		Outside	Inside				
mm	in	mm	in	mm	mm (in)	tf	mm	kg
38,1	5/8	47	23/8	50,67	15,9 (5/8)	8	450	3,90
38,1	5/8	57	2 7/8	62	19,1 (3/4)	12	515	4,80
41,3	3/4							
46,0	7/8	67	3 1/2	74,22	25,4 (1)	16	505	6,50
41,3	3/4							
46,0	7/8							
55,6	1	86	4	90,12	25,4 (1)	22	650	14,90
41,3	3/4							
46,0	7/8							
55,6	1							

FISHING TOOLS

LONG GRAPPLE OVERSHT TO COMPLETE THE SUCKER RODS Type CÎBL



Gripping dimension of the grapple		Outer diameter D	Minimum diameter of the tubing in which is introduced		Connection thread	Maximum working load	Length	Net weight
d	Body		Outer	Inner			L	
mm	in	mm	in	mm	mm (in)	tf	mm	kg
15,0	5/8	45	2 3/8	50,67	22,2 (7/8)	7	250	4,70
18,2	3/4					10		
21,2	7/8					14		
18,2	3/4	56	2 7/8	62,0	25,4 (1)	10	335	4,97
21,2	7/8					14		
24,3	1					18		
21,2	7/8	68	3 1/2	74,2	25,4 (1)	14	340	7,30
24,3	1					18		

“DONTOV” TYPE BAYONETTE FOR SUCKER RODS

FIELD OF USE

Dontov type bayonettes used at the high depth production wells, is mounted on the sucker rods string below the paraffin-removal area, in order to avoid the leakage of oil inside the tubing during paraffin-removal operation.

This device offers the possibility to extract only a part of the sucker rods string, the pump and the remaining of the string stay in the well.

DESCRIPTION

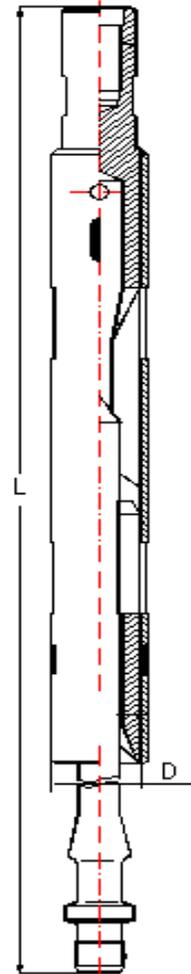
The Dontov type bayonettes consist of a cylindrical liner, which wraps the bayonet at the outside and which is welded. The bayonet is provided at the upper end with a box thread for sucker rods and has two parallel channels: one closed for hanging and one opened for detaching. The puller stem is provided at the lower end with a pin thread for sucker rods and has two antipodal ailerons. The ailerons enter in the opened channels of the bayonet, lowering the rod string easily, the bayonet construction changes the placement of the ailerons, directioning them towards the closed channels of the bayonet, thus completing the rod string.

For releasing the bayonet part of the rod string weight is released, rotating to the right until the ailerons of the puller stem are directed towards the opened channels of the bayonet, and thus the rod string will be released. The bayonet and the puller stem are made of alloy steel, heat treated.

Connection thread SR ISO 10428		Tubing diameter in which the bayonet is introduced		Maximum working load	D	L	Net weight
Box	Pin	Outer	Inner				
in	in	in	mm	tf	mm	mm	kg
3/4	3/4	2 7/8	57,38	12	51	920	6,60
7/8	7/8	3 1/2	69,85		64	945	11,70

Data to be introduced in the order by beneficiary:

- 1) Product name;
- 2) Connection thread dimension, in”in”;
- 3) Dimension of tubing in which is introduced the bayonet, in”in”;



FISHING TOOLS

IMPRESSION BLOCK

The impression block, consists of a cylindrical body made of steel which has at the lower part a lead block, is used in the fishing activity of the wells.

The impression block is destined to determine the configuration of the broken end of the tubular material, for which the fishing is done as well as its position in the well.

Using the impression block offers to the operator the possibility to evaluate with more accuracy the conditions in which the fishing takes place and also to choose the tool or tools most appropriate to perform the fishing successfully.

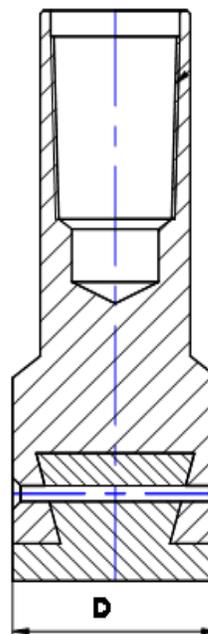
For operating, the impression block is mounted at the top side of the fishing string, which generally consists of drill pipes, but, when needed, can also be made of tubing or even sucker rods.

The fishing string is introduced in the well hole together with the impression block close to the object which is fished for. The impression blocks are lowered slowly until they are in contact with the subject object.

In this moment, part of the weight of the fishing string is leaned on the impression block, thus impressing the broken end of the rods or of the object which is stuck in the well.

It is not allowed the rotation or the sudden lowering of the impression block on the fished object, because this could lead to the modification of the results of the operation.

ITEM	OD OF IMPRESSION BLOCK "D"		CONNECTION	WEIGHT
	mm	in		
-	mm	in	in	kg
1	88.90	3 1/2	2 7/8 CI	10,5
2	98.43	3 7/8	2 7/8 CI	11,0
3	104.8	4 1/8	2 7/8 CI	12,0
			2 3/8 REG	
4	114.30	4 1/2	2 7/8 CI	12,5
			2 7/8 REG	
5	120.65	4 3/4	3 1/2 CI	26,0
			3 1/2 REG	
6	127	5	3 1/2 REG	32,0
7	140	5 1/2	3 1/2 CI	37,0
			3 1/2 REG	
8	146	5 3/4	3 1/2 CI	37,5
			3 1/2 REG	
9	200	7 7/8	4 1/2 REG	62
10	203.20	8	4 1/2 REG	65,0
11	215.90	8 1/2	4 1/2 REG	65,0
12	235	9 1/4	4 1/2 REG	75,0
13	254.00	10	6 5/8 REG	95,0
14	279.40	11	6 5/8 REG	115,0
15	292.10	11 1/2	6 5/8 REG	150,0



GRAPPLE RELEASING SPEARS

The releasing spears are fishing tools used to catch at the inside and extract from the well hole the tubular material.

The retrieval of the tubular material from the well hole is made by pulling, after the spear has been introduced inside the drill pipe, tubing or casing which has been damaged and after its arming maneuver.

There can be used only spears in the fishing string or together with a jar which is used to set-free.

The spears can be:

- Tubing Spears
- Casing Spears

A. Tubing Spears

DESCRIPTION

The Tubing Spear consists of the following items: the body provided at the inside with a circulation hole, at the upper part is provided with a thread in which a coupling is screwed by means of which it is connected to the fishing string and it is introduced inside the well. At the lower side it is provided with a thread where a guide is connected, the guide being also provided with a circulation hole. The guide comes with a screw that is secured on the body.

At the inside the body has 3 channels placed on the generator at 120° alternating with 3 inclined plans in the form of a truncated cone arranged with the taper downwards.

On the channels are introduced 3 dies provided with upward-inclined transverse teeth which have on their inside 3 inclined plans, same as the teeth on the body of the spear. The dies are maintained onto the body of the spear by means of a cage, provided with orifices through which the dies are released.

Alternatively with the dies, located at 120° as well, are the springs having the purpose to arm the spear.

For this purpose the springs are attached to the cage by brassing.

FUNCTIONING

Depending on the situation existent in the wells, first of all, it is established the dimension of spear which is necessary to be used with the tubing. The nominal dimension of the spear it is chosen according to the inside diameter of the tubing so that it is within the gripping range of the spear.

It is checked its operation, and then the spear is connected to the fishing string (and possibly an auxiliary tools:jar, aso.)

The spear is adjusted in the disarmed position, and then it is introduced in the well down to the desired depth. If after its introduction into the tubing it is observed a decrease of the value indicated by hook load indicator, can proceed with the arming operation of the spear. The fishing string is rotated 1/4 up to 1/2 turns left (right) so as the dies will be positioned on the inclined plans of the body. This operation is allowed due to the leaf springs which fix the cage on the inside of the tubing and allows the rotation of the body of the spear.

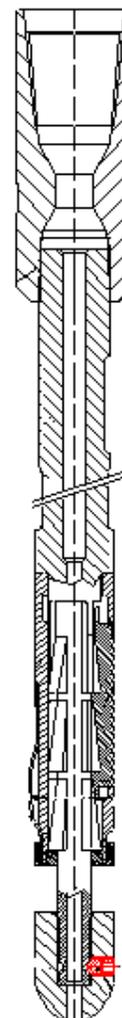
The fishing string is pulled up slowly approximately 25-50 mm and if it is observed the increase of the value to the hook load indicator, we consider the arming operation a success.

The fishing string is then pulled to achieve the contact of the dies with the tubing. In order to detach the tubing we do not use a force bigger than the maximum working load indicated in Table 1.

If the tubing is not loose, in order to detach (disarm) the spear, the fishing string is lowered approximately 50-75 mm and is rotated to the right 1/4 to 1/2 turns.

Note : For the unscrewing operation, one of the dies will mandatory have longitudinal teeth with the inclination to the left /right according to the type of the string which is to be unscrewed (right/left).

FISHING TOOLS



Tubing Dimension	Connection	OD Body	Catching range	maximum Load	Estimated Weight
in	in	mm	mm	kN	kg
1,9	RS1 2.3/8 N dr.-stg.	37	39-45	120	15
2 3/8	RS1 2.3/8 N dr.-stg.	45	49-56	200	20.85
	2.3/8 Reg	53	55-60	200	21.35
2 7/8	RS1 2.3/8 N dr.-stg.	59	59-66	400	32.3
2 7/8	RS1 2.7/8 N dr.-stg.	59	59-60	400	36.3
2 7/8	2.7/8 IF dr/stg	59	60-65	200	32
3 1/2	2.7/8 Reg dr/stg	71	72-81	200	48.5
3 1/2	RS1 3.1/2L (N) dr.-stg.	81	81.8-91	900	50.05
3 1/2	3.1/2 Reg dr./stg.	71	72-81	200	50
4	3.1/2 Reg dr./stg.	88.9	82-90	900	51
4	4.1/2 Reg dr./stg.	90.5	90-100	700	60.5
4.1/2	2.7/8 IF dr/stg	90.5	95-105	700	70
4.1/2	4.1/2 Reg dr./stg.	90.5	95-105	700	57

Data to be introduced in the order:

- 1) Nominal dimension of spear.
- 2) Tubular material
- 3) Connection thread.
- 4) Catching range.

B. Casing Spears

DESCRIPTION

The Casing Spear consists of the following items: the body provided at the inside with a circulation hole, at the upper part is provided with a box thread in which a pin of fishing string is screwed and it is introduced inside the well. At the lower side it is provided with a thread where a guide is connected, the guide being also provided with a circulation hole. The guide comes with a screw that is secured on the body.

At the inside the body has 3 channels placed on the generator at 120° alternating with 3 inclined plans in the form of a truncated cone arranged with the taper downwards.

On the channels are introduced 2 dies provided with upward-inclined transverse teeth which have on their inside 3 inclined plans, same as the teeth on the body of the spear. The dies are maintained onto the body of the spear by means of a cage, provided with orifices through which the dies are released.

Alternatively with the dies, located at 120° as well, are the springs having the purpose to arm the spear.

For this purpose the springs are attached to the cage by brassing.

The cage with dies slides along channels, the run is limited by the guide.

FUNCTIONING

Depending on the situation existent in the wells, first of all, it is established the dimension of spear which is necessary to be used with the casing. The nominal dimension of the spear it is chosen according to the inside diameter of the casing so that it is within the gripping range of the spear.

It is checked its operation, and then the spear is connected to the fishing string (and possibly an auxiliary tools:jar, aso.)

The spear is adjusted in the disarmed position, and then it is introduced in the well down to the desired depth. If after its introduction into the casing it is observed a decrease of the value indicated by hook load indicator, can proceed with the arming operation of the spear. The fishing string is rotated $1/4$ up to $1/2$ turns left (right) so as the dies will be positioned on the inclined plans of the body. This operation is allowed due to the leaf springs which fix the cage on the inside of the tubing and allows the rotation of the body of the spear.

The fishing string is pulled up slowly approximately 25-50 mm and if it is observed the increase of the value to the hook load indicator, we consider the arming operation a success.

The fishing string is then pulled to achieve the contact of the dies with the tubing. In order to detach the casing we do not use a force bigger than the maximum working load indicated in Table 1.

If the tubing is not loose, in order to detach (disarm) the spear, the fishing string is lowered approximately 50-75 mm and is rotated to the right $1/4$ to $1/2$ turns.

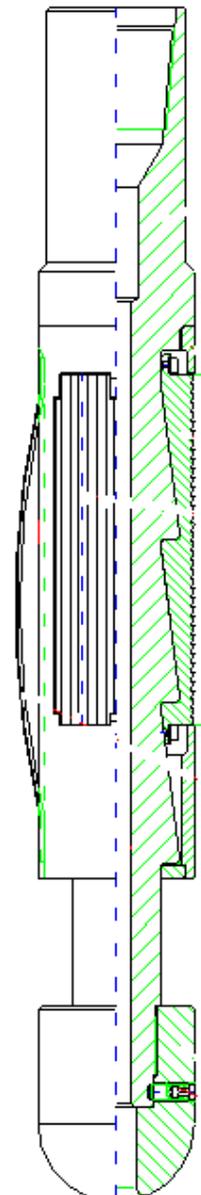
Note : For the unscrewing operation, one of the dies will mandatory have longitudinal teeth with the inclination to the left /right according to the type of the string which is to be unscrewed (right/left).

FISHING TOOLS

Item	Nominal Dimension	Connection	Catching Range	Working Load
-	in	in	mm	kN
1	4 1/2	4 1/2 Reg	95 - 108	550
2	5 1/2	3 1/2 IF	116,5 - 136	700
3	6 5/8	3 1/2 IF	139 - 161	700
4	7 5/8	4 1/2 Reg	160 - 185	900
5	8 5/8	4 1/2 Reg	184 - 212	900
6	9 5/8	5 1/2 Reg	209 - 237	900
7	13 3/8	5 1/2 Reg	305 - 332	1000
8	16	6 5/8 Reg	371 - 398	1000
9	18 5/8	6 5/8 Reg	438 - 464	1000

Data to be introduced in the order:

- 1) Nominal dimension of spear.
- 2) Tubular material
- 3) Connection thread.
- 4) Catching range.



TAPER TAPS

Taper taps for fishing tubular material are tools used to catch by screwing at the inside and retrieving the tubular material stuck in the well.

Taper taps for fishing tubular material are made in the following types:

- P type, for catching in the upset end or the drill pipe body or the tubing, drill collars and knock-off joints acc. to fig.1, tab.1 and tab.4.
- S type, short for catching in the extraction coupling head, fig.2, and table 2.
- R type, for catching in the coupling head the knock-off joint, acc. to fig.2, tab.3.
- N type, to catch in the upset end or in the body of the drill pipe, drill collars or knock-off joints acc. to fig.3, tab.1 and tab.4.

According to the taper for which they can be manufactured the taper taps for fishing tubular material can be:

- with taper of 1 : 30 acc. to tab.1, tab.2, tab.3.
- with taper of 1 : 16 acc. to tab.4.

DESCRIPTION

The taper taps for fishing tubular material consist of a body provided at the upper part with connection thread and at the lower end with taper gripping part, threaded, with a special profile thread or with metric thread with the thread pitch of 3 mm.

Taper taps can be provided with guiding tube and guide.

The guiding tube is fixed by means of a thread from the upper part on the taper body, and by means of the thread at the lower part is connected with the guide.

The guide has the role to straighten the tubular material towards the center of the hole.

All the threads of the taper are made right handed. Upon customer's request they can be made left handed.

Data to be introduced in the order:

- 1) Taper tap type
- 2) Outer diameter of taper tap
- 3) Minimum diam. of the taper tap cone
- 4) Max. diam. of taper tap cone
- 5) Connection thread
- 6) Conn. Thread direction
- 7) Outer diam. of guide

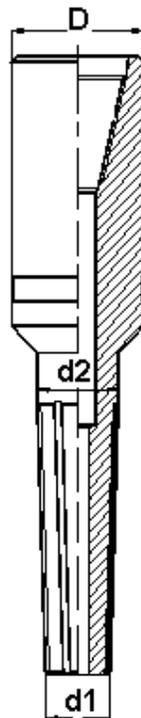


Fig. 3

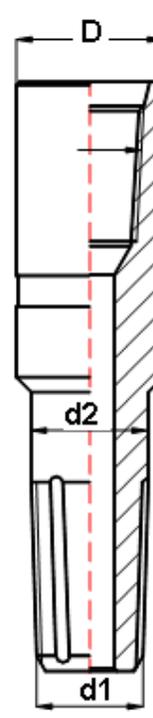


Fig. 2

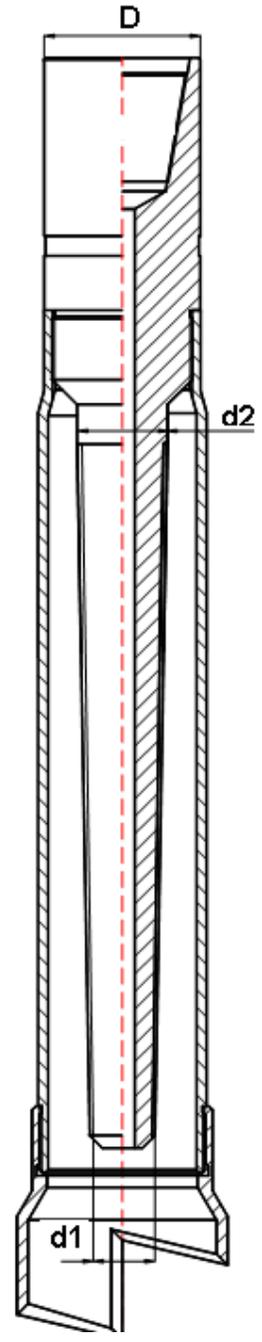


Fig.1

FISHING TOOLS

Table no. 1		TAPER TAPS TYPE " P " and " N "			
OUTER DIAMETER " D "	MINIMUM DIAM OF TAPER " d1 "	MAXIMUM DIAM. OF TAPER " d2 "	CONNECTION THREAD " F "	TOTAL LENGTH	WEIGHT
mm	mm	mm	in	mm	kg
56	30	48	EUE 1,66	710	18
63.50			EUE 1,9		20
79.4			2 3/8 REG		24,5
85.7			2 3/8 IF		26
79.4	34	59	2 3/8 REG	880	25
85.7			2 3/8 IF		26,5
95.3			2 7/8 REG		27,3
104.8			2 7/8 IF		28,6
108			3 1/2 REG		29,,5
117.5			3 1/2 FH		30,4
120.65	40	70	3 1/2 IF	1000	31,5
95.3			2 7/8 REG		51,0
104.8			2 7/8 IF		52,3
108			3 1/2 REG		53,4
117.5	26	43	3 1/2 FH	780	54,6
120.65			3 1/2 IF		56,5
95.3			2 7/8 REG		17
104.8			2 7/8 IF		18
95.3	34	48	2 7/8 IF	930	19
95.3		55	2 7/8 IF	900	20
104.8	40	50	2 7/8 IF	750	18
95.3		57	2 7/8 REG	780	19,5
104.8		2 7/8 IF	780	21,0	
95.3		63	2 7/8 REG	930	22,3
95.3	45	66	2 7/8 REG	900	24,5
95.3		70	2 7/8 REG	1020	26,0
108	54	85	3 1/2 REG	1030	55,0
117.5			3 1/2 FH		56,5
120.65			3 1/2 IF		57,8
108	56	76	3 1/2 REG	890	27
117.5			3 1/2 FH		29
108	56	81	3 1/2 REG	35 1/16	33
117.5			3 1/2 FH		35,0
120.65			3 1/2 IF		37,0
108	64	86	3 1/2 REG	950	32,0
117.5			3 1/2 FH		33,5
120.65			3 1/2 IF		35,0
108	64	91	3 1/2 REG	1080	44,0
117.5			3 1/2 FH		46,0
79.4	16	41	2 3/8 REG	610	7,7
85.7	35	60	2 3/8 IF	610	12
95.3	22	48	2 7/8 REG	622	12,6
104.8	44	70	2 7/8 IF	622	16
117.5			3 1/2 FH		18
108.0	25	64	3 1/2 REG	825	25,6
117.5	41	79	3 1/2 FH	825	29

FISHING TOOLS

120.7	71	94	3 1/2 IF	825	30
139.7			4 1/2 REG		32
133.4	59	100	4 FH	880	40
139.7	44	86	4 1/2 REG	880	43
146.1	67	108	4 1/2 FH	880	43,5
152.4					46
158.8					48
155.6	92	121	4 1/2 IF	825	54
158.8					54,5
171.5					55
165.1					56,5
168.3					58
171.5					57
177.8	92	137	5 1/2 FH	930	72
184.2					74
190.5					75
187.3	108	152	5 1/2 IF	930	80
196.9	76	121	6 5/8 REG	930	85
203.2	117	171	6 5/8 FH	930	125
139.7	76,2	98	4 1/2 REG	1200	52
146			4 1/2 FH		54
155.6			4 1/2 IF		56
139.7	76,2	102	4 1/2 REG	1200	56
146			4 1/2 FH		57,5
155.6			4 1/2 IF		59
139.7	84	112	4 1/2 REG	970	77
146			4 1/2 FH		79
155.6			4 1/2 IF		85
139.7	86	107	4 1/2 REG	940	59,5
146			4 1/2 FH		61
155.6			4 1/2 IF		63,5
139.7	86	111	4 1/2 REG	1040	72,5
146			4 1/2 FH		74,5
155.6			4 1/2 IF		76
171.5	96	117	5 1/2 REG	975	88,8
177.8			5 1/2 FH		92,3
187.3			5 1/2 IF		94
171.5	96	122	5 1/2 REG	1100	97,5
177.8			5 1/2 FH		100
171.5	104	125	5 1/2 REG	950	98,5
177.8			5 1/2 FH		100,7
187.3			5 1/2 IF		102
171.5	104	130	5 1/2 REG	1100	118
177.8			5 1/2 FH		120
187.3			5 1/2 IF		122
171.5	114	134	5 1/2 REG	945	100
177.8			5 1/2 FH		102,5
187.3			5 1/2 IF		104
171.5	114	140	5 1/2 REG	1100	122,5
177.8			5 1/2 FH		124,6
187.3			5 1/2 IF		126,5
196.8	123	144	6 5/8 REG	975	123

FISHING TOOLS

203.2			6 5/8 FH		125,5
196.8	123	150	6 5/8 REG	1120	143,2
203.2			6 5/8 FH		145,5
196.8	144	162	6 5/8 REG	885	125
203.2			6 5/8 FH		127
196.8	144	167	6 5/8 REG	1040	153
203.2			6 5/8 FH		155

Table no. 2		TAPER TAPS TYPE " S "			
OUTER DIAMETER " D "	MINIMUM DIAM. OF TAPER " d1 "	MAXIMUM DIAM. OF TAPER " d2 "	CONNECTI ON THREAD " F "	CATCHING DIAMETER	WEIGHT
mm	mm	mm	in	in	kg
79.4	41	49	2 3/8 REG	1.66 NU	10.3
85.7			2 3/8 IF		10
79.4	45	53	2 3/8 REG	1.66 EU	10.5
85.7			2 3/8 IF		9.8
79.4	47	55	2 3/8 REG	1.9 NU	10,8
85.7			2 3/8 IF		10,2
79.4	52	69	2 3/8 REG	1.9 EU	11.7
85.7			2 3/8 IF		10.6
79.4	59	67	2 3/8 REG	2 3/8 NU	11.8
85.7			2 3/8 IF		10.5
79.4	64	72	2 3/8 REG	2 3/8 EU	13
85.7			2 3/8 IF		12.5
95.3	51	79	2 7/8 REG	2 7/8 NU	15
104.8			2 7/8 IF		14.5
95.3	76	84	2 7/8 REG	2 7/8 EU	15.5
104.8			2 7/8 IF		15
108.0	86	94	3 1/2 REG	3 1/2 NU	20
117.5			3 1/2 FH		20.5
120.7			3 1/2 IF		21
108.0	92	100	3 1/2 REG	3 1/2 EU	20
117.5			3 1/2 FH		20.5
120.7			3 1/2 IF		21
139.7	99	107	4 1/2 REG	4 NU	32
146.1			4 1/2 FH		33
155.6			4 1/2 IF		34.2
139.7	105	113	4 1/2 REG	4 EU	33
146.1			4 1/2 FH		34
155.6			4 1/2 IF		35.5
139.7	111	119	4 1/2 REG	4 1/2 NU	34
146.1			4 1/2 FH		35
155.6			4 1/2 IF		36.3
139.7	119	127	4 1/2 REG	4 1/2 EU	35
146.1			4 1/2 FH		36
155.6			4 1/2 IF		36.8

FISHING TOOLS

TABELUL NR.3			DORNURI TIP " R "			
OUTER DIAMETER " D "	MINIMUM DIAM. OF TAPER " d1 "	MAXIMUM DIAM. OF TAPER " d2 "	CONNECTION THREAD	CATCHING THREAD	TOTAL LENGTH	WEIGHT
mm	mm	mm	-	-	mm	kg
79.4	48	70	2 3/8 REG	2 3/8 REG	360	10
85.7	61	76	27/8IF	23/8IF	360	10
95.2	54	80	2 7/8 REG	2 7/8 REG	360	13.5
104.8	72	89	27/8IF	27/8IF	360	14
108.0	66	92	3 1/2 REG	3 1/2 REG	380	17.5
108.0	78	105	3 1/2 REG	3 1/2 FH	380	17.5
120.6	85	105	31/82IF	31/2IF	380	18
133.4	90	112	4FH	4FH	400	22
139.7	91	121	4 1/2 REG	4 1/2 REG	400	27
139.7	97	125	4 1/2 REG	4 1/2 FH	400	27
146	104	126	4IF	4IF	400	24
155.6	115	136	41/2IF	41/2IF	400	33
171.4	110	143	5 1/2 REG	5 1/2 REG	420	38
171.4	127	151	5 1/2 REG	5 1/2 FH	420	42
187.3	142	165	5 1/2 IF	5 1/2 IF	420	46
196.9	131	155	6 5/8 REG	6 5/8 REG	450	48
196.9	151	175	6 5/8 REG	6 5/8 REG	450	55

DIE COLLARS

The die collars for fishing tubular material are used at the drilling or production wells for catching by screwing at the outside the tubular material stuck in the well hole.

The die collars for fishing tubular material are made in the following solutions:

- simple die collars with milled teeth at the lower part - Fig. 1
- simple die collars without milled teeth at the lower part
- die collars with guide - Fig. 2.

DESCRIPTION

The simple die collars for fishing tubular material consist of a body which is provided at the upper part with a connection thread.

At the lower part the die collars are provided at the inside with a conical part with a special shape thread, or with metric type thread with the thread pitch of 3 mm.

The taper for which are made both the die collars for drill pipe and the ones for tubing is of 1 : 30 or 1 : 16.

The die collars with guide are provided on the body, at the lower part, with an external thread on which a guide can be mounted. The guides who can equip a die collar can be, as follows:

- standard guide, for which the outer diameter is identical with the one of the die collar body;
- special guide, for which the outer diameter is bigger than the one of the die collar body.

The die collars for fishing tubular material are made with right handed thread, and upon beneficiary's request they can be made with left handed thread.

Data to be introduced in the order:

- 1) Outer diameter of die collar
- 2) Min. & Max. diam. of Catching Diameter
- 3) Taper
- 4) Connection thread
- 5) Connection thread direction
- 6) Outer diameter of the special guide

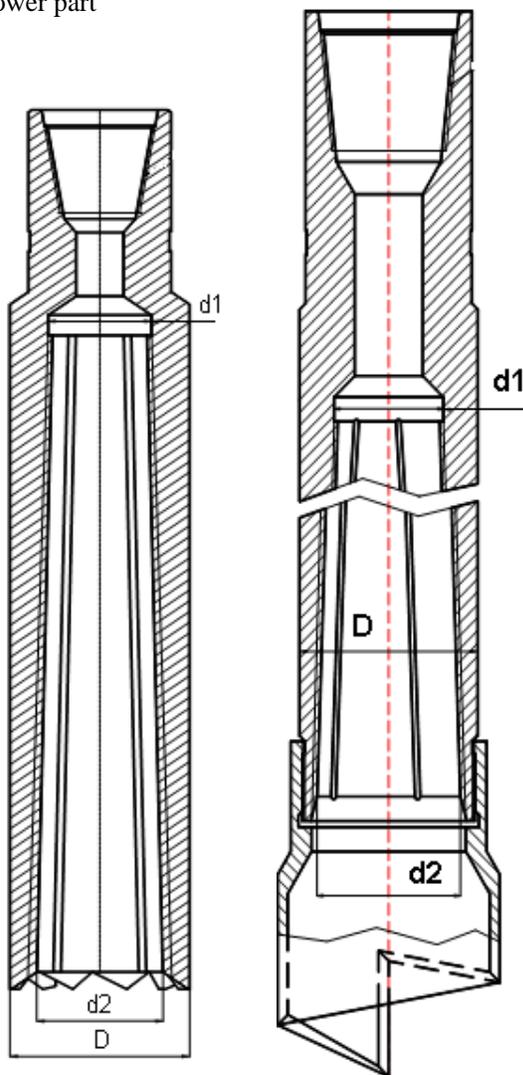


Fig. 1

Fig.2

FISHING TOOLS

DIE COLLAR WITH TAPER 1:30

Outer Diameter D	Min Diam of Taper:d1	Max Diam of Taper:d2	Connection	Total Length	Weight
[mm]	[mm]	[mm]		[mm]	[Kg]
42	22.00	30.00	1.66NU	203	7.00
46	25.00	38.00	1.9NU	435	7.50
49	28.00	41.00	1.9NU	385	9.00
60	35.00	48.00	1.9EU	310	10.00
62	44.00	65.00	23/8NU	610	15.00
95	51.00	71.00	23/8IF	610	16.00
106	63.00	84.00	27/8IF	610	20.00
115	70.00	90.00	31/2REG	610	23.00
102	57.00	78.00	27/8REG	610	25.00
111	67.00	87.00	27/8IF	610	28.00
125	79.00	100.00	31/2IF	610	33.00
135	89.00	110.00	31/2IF	610	38.00
121	66.00	95.00	31/2REG	815	43.00
130	75.00	103.00	31/2IF	815	50.00
140	86.00	114.00	31/2IF	815	55.00
150	95.00	124.00	41/2REG	815	60.00
153	98.00	127.00	41/2REG	815	63.00
150	86.00	121.00	41/2REG	915	70.00
162	98.00	133.00	41/2IF	915	80.00
175	111.00	146.00	41/2IF	915	90.00
181	117.00	152.00	41/2IF	915	97.00
191	127.00	162.00	41/2IF	915	108.00
180	100.00	148.00	41/2IF	1100	110.00
192	113.00	160.00	41/2IF	1100	132.00
210	130.00	178.00	65/8REG	1100	142.00
216	136.00	184.00	65/8REG	1100	148.00
225	146.00	193.00	65/8REG	1100	155.00
207	127.00	174.00	65/8REG	1100	146.00
219	140.00	187.00	65/8REG	1100	155.00
235	155.00	203.00	65/8REG	1100	167.00
241	162.00	210.00	75/8REG	1100	173.00
254	174.00	222.00	75/8REG	1100	184.00
273	200.00	247.00	75/8REG	1100	181.00
346	254.00	304.00	75/8REG	1200	250.00
92.1	52	64	2 3/8 IF	660	20
104.8	63	76	2 3/8 IF	780	32
104.8	63	76	2 7/8 REG	780	32
104.8	63	76	2 7/8 IF	780	32
120.7	72	89	2 3/8 REG	810	40
120.7	72	89	2 3/8 IF	810	42

FISHING TOOLS

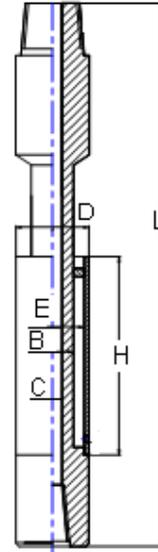
120.7	72	89	2 7/8 REG	810	43,7
120.7	72	89	2 7/8 IF	810	45,9
130.2	83	100	2 7/8 REG	885	46
130.2	83	100	3 1/2 REG	885	46,5
130.2	83	100	3 1/2 FH	885	47,4
130.2	83	100	3 1/2 IF	885	48,5
142.9	96	111	2 7/8 IF	800	50
142.9	96	111	3 1/2 REG	800	52
142.9	96	111	3 1/2 FH	800	54
150.0	105	121	3 1/2 FH	840	55
150.0	105	121	3 1/2 IF	840	58
150.0	105	121	4 1/2 REG	840	64
150.0	105	121	4 1/2 FH	840	68
165.1	114	130	3 1/2 FH	900	74
165.1	114	130	3 1/2 IF	900	78
165.1	114	130	4 1/2 REG	900	82
185.3	130	149	4 1/2 FH	960	92
185.3	130	149	4 1/2 IF	960	96
185.3	130	149	5 1/2 REG	960	98
185.3	130	149	5 1/2 FH	960	105
200.0	140	159	4 1/2 FH	991	120
200.0	140	159	4 1/2 IF	991	128
200.0	140	159	5 1/2 REG	991	135
225.4	159	181	5 1/2 REG	1060	152
225.4	159	181	5 1/2 FH	1060	155
225.4	159	181	5 1/2 IF	1060	158
225.4	159	181	6 5/8 REG	1060	162
235.0	171	178	5 1/2 FH	1005	165
235.0	171	178	5 1/2 IF	1005	168
252.0	188	208	6 5/8 REG	1005	172
252.0	188	208	6 5/8 FH	1005	175

At request we can provide other dimensions.

JUNK BASKETS

The junk baskets are mounted in the drill pipe string, above the mill, for the purpose of collecting the metal junks resulted from the milling of the plugs, permanent packers, cement retainers etc .

Junk baskets can be introduced both in the uncased well hole and inside the casing string.



DIAM. OF THE HOLE IN WHICH IS INTRODUCED	CONNECTION	C	D	E	B	H		L		WEIGHT	
						mm	mm	mm	mm	kg	kg
4 1/2 to 5 5/8	2 3/8 REG	19.1	93.7	84.1	50.8	254	508	737	1092	25	40
4 5/8 to 4 7/8	2 7/8 REG	31.8	101.6	92.1	66.7	254	508	749	1118	29	60
5 1/8 to 5 7/8	3 1/2 REG	38.1	114.3	108.0	79.4	254	508	775	1130	36	63
6 to 6 3/8	3 1/2 REG	38.1	127.0	115.9	82.6	254	508	775	1143	38	66
6 1/2 to 7 1/2	3 1/2 REG	38.1	139.7	123.8	82.6	254	508	775	1156	44	75
7 11/2 to 8 1/2	4 1/2 REG	57.2	168.3	150.8	114.3	254	508	800	1168	73	118
8 5/8 to 9 5/8	4 1/2 REG	57.2	177.8	159.5	114.3	254	508	800	1168	84	125
9 5/8 to 11 5/8	6 5/8 REG	88.9	219.1	201.6	146.1	254	508	838	1219	110	221
11 1/2 to 13	6 5/8 REG	88.9	244.5	216.7	146.1	254	508	838	1219	127	235
14 1/2 to 17 1/2	7 5/8 REG	101.6	327.0	295.3	193.7	254	508	914	1245	244	300

Data to be introduced in the order:

- 1) Outer diameter of the cup (D)
- 2) Connection threads (F)
- 3) Active length of cup (H)

FISHING TOOLS

SAFETY LOCK JOINT

The safety lock joint has a relatively simple construction consisting of the following parts: pin connection, box connection, lock and spring. During circulation, the isolation of the thread connection trapeze shaped between the pin and box connections are made by means of two rubber sealing rings.

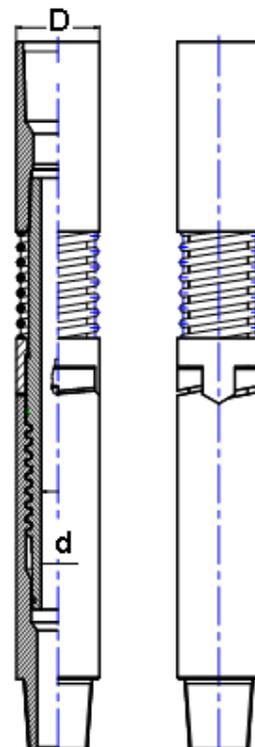
The safety lock joint is mounted in the drill pipe string or in the fishing string.

The safety lock joint transmits in one direction a total torque specific to the operations for which the string is used in which it is mounted and in the other direction is unscrewed at a moderate torque applied only when needed. The normal screw direction is the same with the direction of all threads of the joint which is right for drilling and left for fishing.

The torque is transmitted when screwing by means of the special shoulders made to the pin and box connections in the working area of the lock.

When unscrewing, the resistant torque is created by the friction from the trapeze thread and by the lock of the connection, which must be released from the seat made in the box connection by compressing the spiral spring. The unscrew torque depends mostly upon the effort necessary to compress the spring during the pull out of the lock from the seat by rotating it.

NOMINAL DIMENSION		CONNECTION THREAD " F "	OUTER DIAMETER " D "	INNER DIAMETER " d "	WEIGHT
mm	in	-	mm	mm	kg
60,3	2 3/8	REG	79.4	25.4	24,5
		IF	85.7	38.1	27,0
73,0	2 7/8	REG	95.3	31.8	39,0
		IF	104.8	54.0	33,5
88,9	3 1/2	REG	108.0	38.1	61,0
		FH	117.5	54.0	61,0
		IF	120.7	63.9	66,0
114,3	4 1/2	REG	139.7	57.2	112,0
		FH	146.1	76.2	112,0
		IF	155.6	95.3	114,0
139,7	5 1/2	REG	171.5	69.9	170,0
		FH	177.8	101.6	170,0
		IF	184.9	120.7	172,0
168,3	6 5/8	REG	196.9	88.9	202,0
		FH	203.2	127.0	202,0



Data to be introduced in the order:

- 1) Diameter and type of the thread connection
- 2) Thread dimension (right or left)
- 3) Outer diameter of connection
- 4) Inner diameter of connection

SHAPED SURFACE SAFETY JOINT

Shaped surface safety joints have a simple construction, consisting of a pin and a box which are jointed by a special thread with large pitch.

The isolation of the threaded area during the circulation of the fluid through the connection is made with two rubber rings.

Shaped surface safety joints are mounted in the drill pipe string or in the fishing string. They provide the possibility to separate the strings in two parts at the level at which they are mounted.

Shaped surface safety joints transmit in one direction the total torque specific to the operations for which the string is used, in which is mounted, and in the other direction it is unscrewed at a moderate torque applied only when needed.

The normal screwing direction is the same with the one of all the threads of the connection, which is right for drilling and left for fishing.

UNSCREWING Shaped surface safety joints in the well are made as follows:

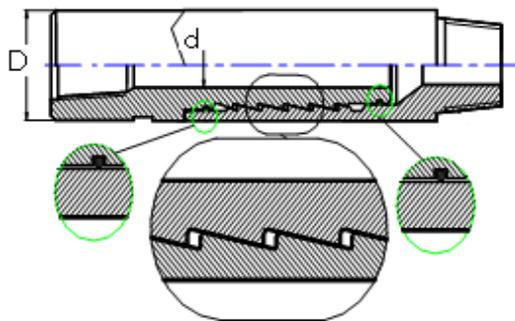
- the drilling string is rotated to the left 1...3 turns simultaneous with the application of a push of minimum 450 kg and maximum 900 kg.

For the fishing string the rotation for unscrewing is made to the right.

RE-SCREWING Shaped surface safety joints in the well is made as follows:

- the drill pipe or tubing string is lowered until the two elements of the connection are in contact.
- part of the string weight, approx. one mark at the indicating device is left and at the same time is slowly rotated to the right. For the fishing string the rotation for re-screwing is made by rotation to the left.

The increase of the torque indicates the fact that the shaped surface safety joints have been screwed.



Data to be introduced in the order:

- 1) Dimension and type of connection thread
- 2) Thread direction (right or left)
- 3) Outer diameter of connection
- 4) Inner diameter of connection

NOMINAL DIMENSIO N		CONN. THREAD	OUTER DIAM. D	INNER DIAM. d	WEI GHT	
mm	in	-	mm	mm	kg	
60,3	2 3/8	EUE	77.8	47.6	8,0	
		REG	79.4	25.4	18,5	
		FH	85.7	44.5	16,5	
		IF	85.7	44.5	16,5	
73,0	2 7/8	EUE	93.7	57.2	15,5	
		REG	95.3	31.8	25,0	
		IF	104.8	50.8	30,0	
			111.1	41.3	34,0	
88,9	3 1/2	EUE	114.3	69.9	14,5	
		REG	108.0	38.1	32,5	
		FH	117.5	63.5	37,5	
				61.9	35,0	
		IF	120.7	68.3	33,0	
			127.0	54.0	42,5	
101,6	4	EUE	127.0	76.2	30,0	
		FH	133.4	71.4	49,0	
				51.2	59,0	
		IF	152.4	82.6	73,5	
				76.2	77,0	
				158.8	63.5	89,0
57.2	91,5					
114,3	4 1/2	EUE	141.3	100.0	26,5	
		REG	139.7	57.2	60,0	
		FH	146.1	76.2	62,5	
				152.4	63.5	75,5
				158.8	63.5	83,0
		IF	158.8	98.4	50,0	
				161.9	88.9	58,0
				168.3	69.9	74,5
139,7	5 1/2	REG	171.5	69.9	106,5	
		FH	177.8	88.9	108,5	
				95.3	104,5	
				101.6	99,5	
				82.6	123,5	
		IF	184.2	88.9	119,5	
				76.2	130,5	
		IF	187.3	122.2	81,5	
190.5	76.2			130,5		
168,3	6 5/8	REG	196.9	88.9	125,0	
		FH	203.2	127.0	120,5	
				215.9	150.0	118,0

INTERNAL CUTTERS FOR TUBULAR GOODS

The internal cutters are used to cut from the inside the casing, drill pipes and tubing when the subject tubular material has been stuck in the well and cannot be extracted.

The internal cutters are introduced in the well with a fishing string usually consisting of drill pipes.

In order to indicate the location at which the tubular material stuck in the well has box connections, the cutter works in coordination with a couplings detector.

For operating the cutter, it is introduced together with the fishing string in the well until the cutter is introduced together in the detector inside the tubular material which must be cut (which previously has been centered).

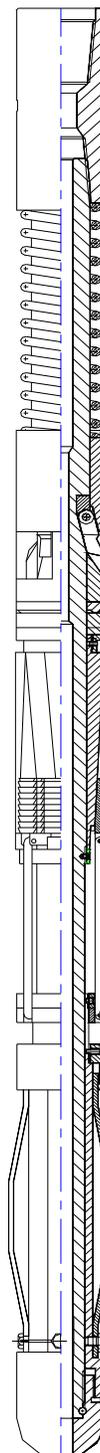
After establishing the location in which the cutting of the tubular material will be done, the cutter will be fixed to cut through rotation to the right and pushing. After fixing, the cutting operation starts and it is also made by pushing and slowly rotating to the right.

In order to perform the cutting, the cutter will be introduced in the well hole by means of a string with right thread.

NOMINAL DIMENSION OF THE TUBULAR MATERIAL TO BE CUT	CONNECTION THREAD	MAX. CUTTING DIAM.		MAX. FIXING DIAM.		EST. IMATED WEIGHT
		in	mm	in	mm	
in	-	in	mm	in	mm	kg
INTERNAL CUTTERS, TUBING						
2 3/8	SR 7/8	2 13/16	72	2 1/16	53	12
2 7/8	SR 1	3 3/8	86	2 9/16	65	16
3 1/2	SR 1 1/8	4 1/8	104	3 3/16	80	18
4	EUE 2 3/8	4 1/2	114	3 9/16	90	28
INTERNAL CUTTERS, DRILL PIPE						
2 7/8	SR 7/8	2 15/16	75	2 1/4	57	14
3 1/2	SR 1	3 15/16	100	2 13/16	72	20
4 1/2	2 7/8 IF	4 3/4	120	3 15/16	100	45
5 1/2	2 7/8 IF	5 11/16	145	4 15/16	126	60
INTERNAL CUTTERS, CASING						
4 1/2	2 3/8 IF	4 7/8	124	4 5/16	110	60
5 1/2	2 7/8 IF	6 1/8	155	5 1/16	129	110
5 3/4	3 1/2 FH	6 5/16	160	5 1/4	134	120
6 5/8	3 1/2 FH	7	178	6 1/4	158	130
7	3 1/2 FH	7 1/2	190	6 3/4	172	140
7 5/8	3 1/2 FH	8 2/3	220	7 2/3	195	190
8 5/8	4 1/2 FH	9	228	8 3/16	208	240
9 5/8 - 10	4 1/2 FH	10 7/16	265	9 3/4	248	480
10 3/4 - 12 3/4	4 1/2 FH	11 5/8	295	10 5/8	270	560
13 3/8	4 1/2 IF	14	355	13	332	740

Data to be introduced in the order:

- 1) Type and nominal dimension of the tubular material to be cut
- 2) Wall thickness or inner diameter of the tubular material
- 3) Connection thread



MECHANICAL DRILLING JARS

The mechanical drilling jars are mounted in the drilling string or fishing string for the purpose of releasing the strings stuck in the well hole.

The threads of the body and stem can be made on the right or on the left, the teeth of the body having the same direction with the one of the thread.

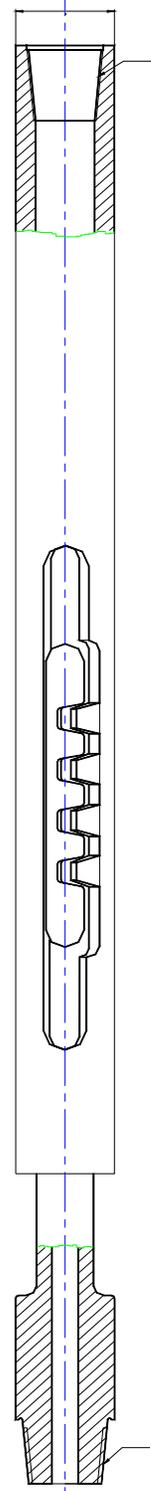
For the purpose of releasing the strings stuck in the well hole, the jar is lowered obtaining an easy push, and than is rotated to the right or to the left, (acc. to the working direction of the jar) permanently maintaining a torque necessary to engage the teeth of the window in the body of the jar with the teeth in the shoulders of the stem. The torque will be chosen according to the intensity of the hit which will be made.

The string it is slowly lifted, maintaining the torque, the teeth of the body being engaged With the ones of the stem and starting to increase the traction up to the value At which the hit will be done. At this value the torque is reduced, the teeth are disengaged And the body of the jar hits with the lower surface of the window in the stem shoulders.

NOMINAL DIMENSION	CONNECTION THREAD " F "	OUTER DIAMETER " D "	HIT STROKE	WORKING LOAD	ESTIMATED WEIGHT.
in	-	mm	mm	kN	kg
2 7/8	2 7/8 REG	95.3	380	350	95.0
	2 7/8 IF	104.8			100.0
3 1/2	3 1/2 REG	108.0	340	450	105.0
	3 1/2 FH	117.5			140.0
	3 1/2 IF	120.7			160.0
4 1/2	4 1/2 REG	140.1	310	600	230.0
	4 1/2 FH	146.1			240.0
	4 1/2 IF	155.6			250.0
5 1/2	5 1/2 REG	145.7	300	800	380.0
	5 1/2 FH	177.8			390.0
	5 1/2 IF	184.9			400.0
6 5/8	6 5/8 REG	196.9	300	1000	430.0
	6 5/8 FH	203.2			450.0

Data to be introduced in the order:

- 1) Nominal dimension
- 2) Connection thread
- 3) Thread direction



FISHING TOOLS

FISHING MAGNET

The fishing magnets are used to pull out of the well, different parts or metal tools as well as different parts of the tools left or dropped in the well.

DESCRIPTION

The fishing magnet consists of a tubular body provided at the upper part with a thread in which will be connected a sub coupling. The inside of the body is conical at the lower end.

The sub coupling is provided with a connection thread by means of which the magnet is connected to the fishing string.

Inside the body it is introduced the magnetic element which is protected with a liner made of a non-magnetic material.

The fishing magnet inside the liner is pushed by means of a nut.

At the lower part, the body is provided with a thread for fixing a protector or a guide with teeth.

FUNCTIONING

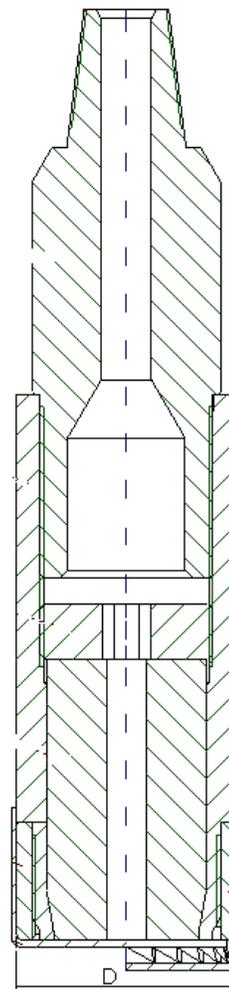
The fishing magnet is introduced in the well hole by means of the fishing string consisting of sucker rods, tubing or drill pipe.

During the introduction of the magnet circulation is made whenever needed.

Before reaching the bottom of the well the circulation is stopped and the magnet is left on the bottom with part of its weight in order to avoid stuck in field the objects to be catch. In case the magnet is used with the teeth guide mounted, the string can be handled and rotated with a small speed.

The magnet without guide is more efficient to extract the broken objects which are not stuck in the well, because the part to be catch comes easier into contact with the active surface of the magnet.

Also, the guide will not be used when it is necessary the cleaning of the well bottom of steel junks for the purpose of introducing special tools (bits or diamond core boring bits).



NOMINAL DIMENSION		OUTER DIAMETER "D"	OUTER DIAMETER "D"	CONN. THREAD "F"	PORTATIVE FORCE
in	mm	mm	in	-	daN
4	100	100	4	2 3/8 REG	80
4 9/64	105	105	4 9/64	2 3/8 REG	80
4 11/64	106	106	4 11/64	2 3/8 REG	80
4 21/64	110	110	4 21/64	2 7/8 REG	180
4 1/2	114	114	4 1/2	2 7/8 REG	180
4 37/64	116	116	4 37/64	2 7/8 REG	180
4 21/32	118	118	4 21/32	2 7/8 REG	180
4 3/4	120	120	4 3/4	2 7/8 REG	180
5 5/16	135	134.9	5 5/16	2 7/8 REG	180
5 1/2	140	140	5 1/2	3 1/2 REG	200
5.75	146	146	5.75	3 1/2 REG	200

Data to be introduced in the order

- 1) Outer diameter of magnet
- 2) Connection thread

FISHING TOOLS

MILLS

FIELD OF USE

The mills are used for milling the metal objects stuck or dropped in the well, cementing plugs or sand plugs, etc.

CLASIFICATION

The mills are made in two constructive solutions:

- without metal carbide layer, used for milling the cement plugs, the sand or metal material with low hardness;
- hardfaced with Kutrite, used to mill steel objects or other metal materials with high hardness.

After the type of the milling element, the mills are classified as follows:

a) Mills with teeth from the body, of the following types:

- A1 type – cylindrical mills, provided with teeth only on the front surface;
- A2 type - cylindrical mills, provided with teeth on the front surface and on the outer cylindrical surface;
- A3 type – cylindrical-cut-conned mills, provided with teeth only on the cut-conned surface;
- A4 type - cylindrical-cut conned mills, provided with teeth on the entire outer surface;
- A5 type - cylindrical-conned mills, provided with teeth only on the cone surface;
- A6 type - cylindrical-conned mills, provided with teeth on the entire outer surface.

b) Mills with welded cutters of the following types:

- B1 type - cylindrical mills, with welded cutters only on the front surface;
- B2 type - cylindrical mills, with welded cutters on the front surface and external cylindrical surface;
- B3 type - cylindrical-cut conned mills, with welded cutters only on the cut-conned surface;
- B4 type - cylindrical-cut conned mills, with welded cutters on the cut conned and cylindrical surface.

c) Mills with integral teeth, with metal carbide layer, of the following types:

- C1 type - cylindrical-cut conned mills;
- C2 type – front mills with teeth from body;

d) Mills with welded ribs with metal carbide layer, of the following types:

- Tip D1 – short cone mills;
- Tip D2 – long cone mills;
- Tip D4 – front mills with stabilizer.

DESCRIPTION

- The mills with teeth from body are made of alloy carburizing steel.

The depth of the carburized layer is of minimum 1 mm.

After the heat treatment, the hardness of the teeth surface is of 60 ÷ 64 HRC.

- Mills with welded cutters with the body made of quality carbon steel, heat treated.

The milling cutters are fixed on the body by welding and is made of high-speed tool steel, heat treated, and hardness of the cutter's surface is of 62 ÷ 65 HRC.

FISHING TOOLS

- Mills with teeth from body with metal carbide layer and also the mills with welded ribs with metal carbide layer, have the body made of quality alloy steel, heat treated. The cutting surface of the teeth is hardfaced with Kutrite with different grain structure.
- The thread connections of the mills comply to the threaded shouldered connections, acc. to API Spec. 7-1 and API Spec. 5CT, pin or box shape.

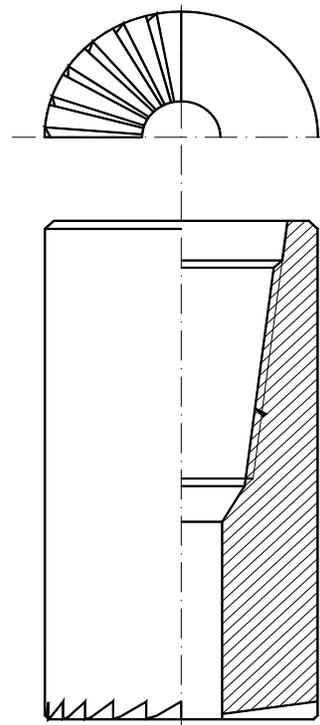
Upon beneficiary's request, the mills can be made with other types of connection threads. There can also be made other dimensions of mills besides the ones in the catalog, upon beneficiary's request.

Data to be introduced in the order:

- 1) Mill name and type
- 2) Nominal dimension of mill
- 3) Type and size of connection thread
- 4) Size of the casing through which the mill passes.

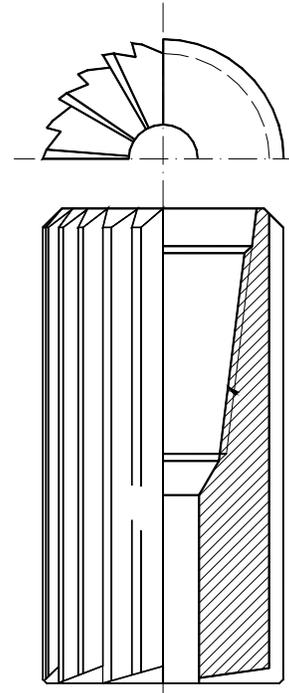
CYLINDRICAL FRONT MILLS - A1 type

Nominal dimension of mill: d	Casing	Connection thread	d1	L	Estimated weight
mm	in	in	mm	mm	kg
92	4 1/2	2 3/8 REG or (2 3/8 IF)	25	200	8
95					9,2
98					5
101	5 1/2	2 7/8 REG or (2 7/8 IF)			10,1
105					11,1
109					12,2
113					13,2
132	6 5/8		30	250	23,7
138			26,2		



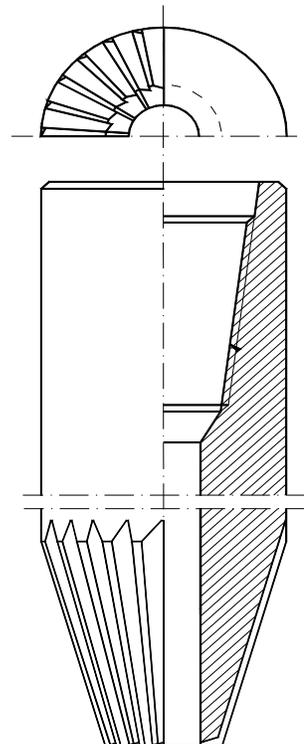
CYLINDRICAL MILLS - A2 type

Nominal dimension of mill: d	Casing	Connection thread	d1	L	Estimated weight	
mm	in	in	mm	mm	kg	
85	4 1/2	2 3/8 REG or (2 3/8 IF)	25	200	5,7	
90					6,7	
92					6,8	
95					7,8	
98					8,5	
100	5	8,9				
101	5 1/2	2 7/8 REG or (2 7/8 IF)			9,2	
105					9,6	
109					10,6	
110					11,4	
113			11,6			
115	12,4					
132	6 5/8			30	250	21,3
138						23,7



CYLINDRICAL-CUT-CONE MILLS - A3 type

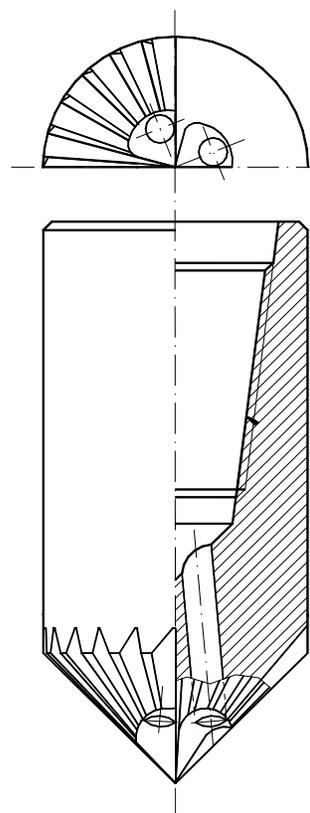
Nominal dimension of mill: d	Casing	Connection thread	d1	d2	L	Estimated weight	
mm	in	in	mm	mm	mm	kg	
92	4 1/2	2 3/8 REG or (2 3/8 IF)	25	46	292	9,9	
95				47,5	295	10,9	
98				49	298	11,9	
101	5	50,5		301	12		
105	5 1/2	2 7/8 REG or (2 7/8 IF)		52,5	305	12,5	
109				54,5	309	13,6	
113				56,5	312	15,3	
114				57	314	16	
116	6 5/8			2 7/8 REG or (2 7/8 IF)	58	316	16,7
118					59	318	17,4
120			60		320	18,1	
122			61		322	19	
123			61,5		323	19,5	
126			63		326	20,8	
132		66	332		23,8		
138	69	338	26,5				



FISHING TOOLS

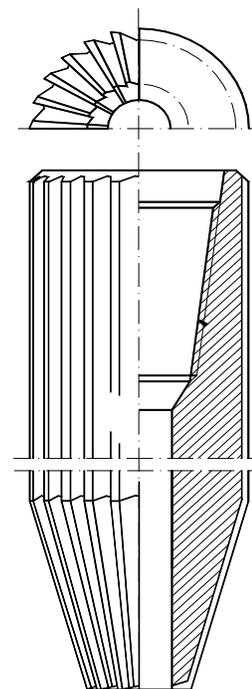
CYLINDRICAL – CONE MILLS - A5 type

Nominal dimension of mill: d	Casing	Connection thread	L	Estimated weight
mm	in	in	mm	kg
92	4 1/2	2 3/8 REG or (2 3/8 IF)	200	6,5
95				7
98				7,5
101	5 1/2	2 7/8 REG or (2 7/8 IF)	210	8
105				8,5
109				9
113				10
132	6 5/8		220	15
138				17
147				19



CYLINDRICAL – CUT-CONE MILLS - A4 type

Nominal dimension of mill: d	Casing	Connection thread	d1	d2	L	Estimated weight
mm	in	in	mm	mm	mm	kg
85	4 1/2	2 3/8 REG	25	42,5	285	7
87				43,5	287	7,4
90				45	290	7,8
91				45,5	291	8,2
92				46	292	8,6
93	5	2 3/8 REG or (2 3/8 IF)	25	46,5	293	9,2
95				47,5	295	9,8
97				48,5	297	10,5
98				49	298	11,3
100				50	300	11,5
101	5 1/2	2 7/8 REG or (2 7/8 IF)	25	50,5	301	11,7
102				51	302	11,8
105				52,5	305	12
107				53,5	307	12,3
109				54,5	309	12,9
110	6 5/8		25	55	310	13,1
113				56,5	313	14,4
114				57	314	15,2
115				57,5	315	15,4
116				58	316	16
118				59	318	16,7

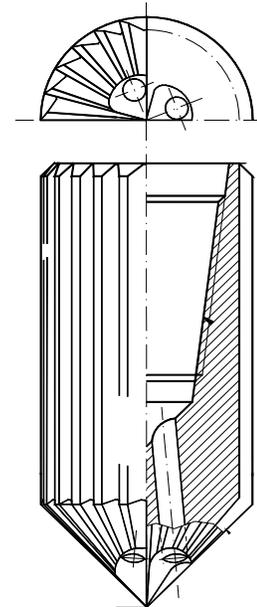


FISHING TOOLS

120		30	60	320	17,2		
122			61	322	18,3		
123			61,5	323	18,6		
124			62	324	19		
126			63	326	19,8		
128			64	328	20,5		
129			64,5	329	21		
130			65	330	22		
132			66	332	23		
135			67,5	335	24		
138			69	338	25,4		
140			7	40	70	340	26
142					71	342	26,8
143					71,5	343	26
145	72,5	345			28		
146	73	346			28,5		
147	73,5	347			29,5		

CYLINDRICAL – CONE MILLS - A6 type

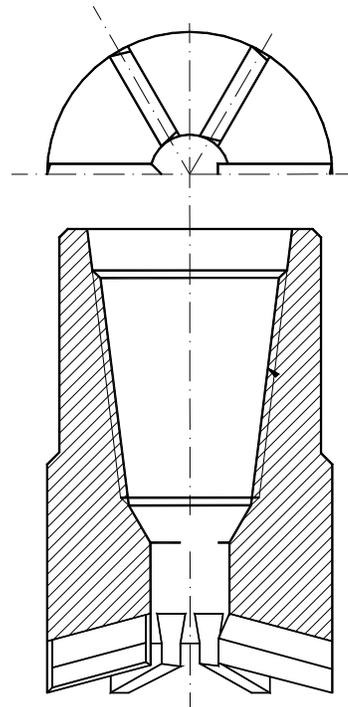
Nominal dimension of mill: d	Casing	Connection thread	L	Estimated weight
mm	in	in	mm	kg
92	4 1/2	2 3/8 REG or (2 3/8 IF)	200	5,5
95				6,5
98				7
101	5 1/2	2 7/8 REG or (2 7/8 IF)	210	7,5
105				8
109				8,5
113				9
132	6 5/8		220	14,5
138				16,5
147	7	3 1/2 REG or (3 1/2 IF)		18,5



FISHING TOOLS

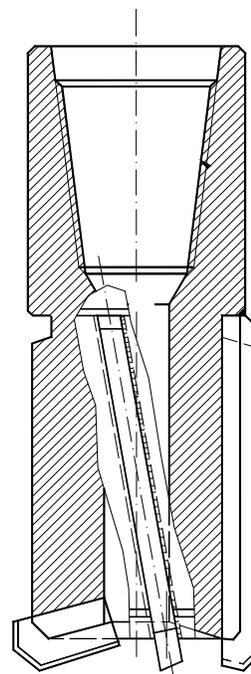
CYLINDRICAL MILLS with WELDED CUTTERS - B1 type

Nominal dimension of mill: d	Casing	Connection thread	d1	L	Estimated weight
mm	in	in	mm	mm	kg
95	4 1/2	2 3/8 REG or (2 3/8 IF)	25	157	5
98	5				6
105	5 1/2			8	
109				9	
113				10	
132	6 5/8	2 7/8 REG or (2 7/8 IF)	30	207	16
138					18



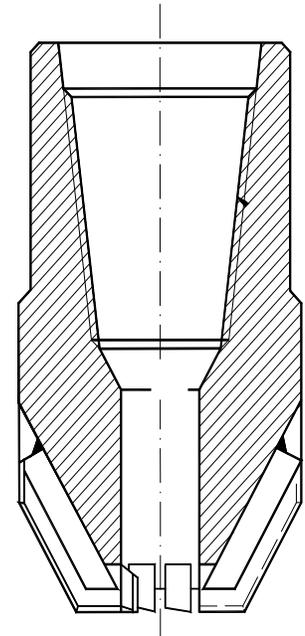
CYLINDRICAL MILLS with WELDED CUTTERS - B2 type

Nominal dimension of mill: d	Casing	Connection thread	d1	L	Estimated weight
85	4 1/2	2 3/8 REG or (2 3/8 IF)	25	297	10,5
90					12
95					13,5
98					14,5
100	5 1/2	2 3/8 REG or (2 3/8 IF)	25	297	15
102					16
105					17
109					18
111					19,5
113	6 5/8	2 7/8 REG or (2 7/8 IF)	30	307	20
115					21
132					28,5
138	31,5				



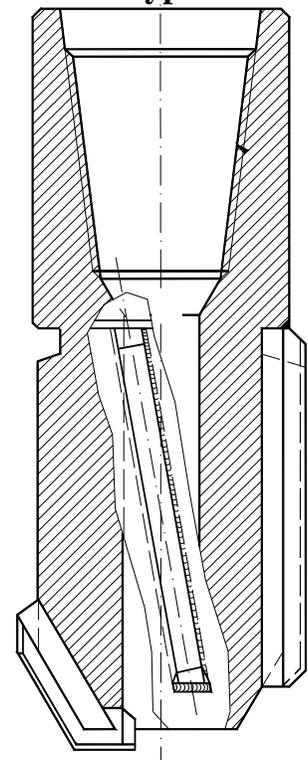
CYLINDRICAL – CUT-CONE MILLS with WELDED CUTTERS - B3 type

Nominal dimension of mill: d	Casing	Connection thread	d1	L	Estimated weight
mm	in	in	mm	mm	kg
85	4 1/2	2 3/8 REG	25	197	5,5
90					6,5
95					7,5
98					8,5
100	5 1/2	2 3/8 IF or (2 3/8 REG)	25	207	9
102					9,5
105					10
109					11
111					11,5
113					12
115					12,5
132	6 5/8	2 7/8 IF or (2 7/8 REG)	30	257	21,5
138					24



CYLINDRICAL – CUT-CONE MILLS with WELDED CUTTERS - B4 type

Nominal dimension of mill: d	Casing	Connection thread	d1	L	Estimated weight
mm	in	in	mm	mm	kg
95	4 1/2	2 3/8 IF or (2 3/8 REG)	25	275	11,5
98	5				13
105	5 1/2			285	15
109					16
113					18
132	6 5/8	2 7/8 IF or (2 7/8 REG)	30	307	26,5
138					29,5
143	7				35,5
150					
155	7 5/8	3 1/2 IF or (3 1/2 REG)	40	350	42,5

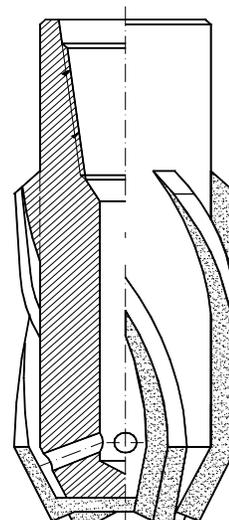


FISHING TOOLS

163					44
174	8 5/8	4 1/2 IF or (4 1/2 REG)	45	370	52,5
184					60
190					65
197					67
211	9 5/8		50		79
342	14 3/4	6 5/8 FH or (6 5/8 REG)	70	400	247
372	16		80	430	326
390	16 3/4			450	364

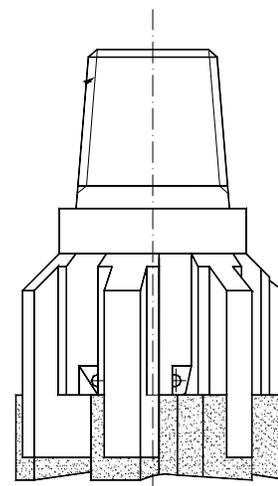
CYLINDRICAL – CUT-CONE MILLS - C1 type

Nominal dimension of mill: d	Casing	Connection thread	d1	L	Estimated weight
mm	in	in	mm	mm	kg
127	6 5/8	3 1/2 IF or (3 1/2 REG)	40	490	35
132					37
138					38
174	8 5/8	4 1/2 IF or (4 1/2 REG)	45	580	45
184					48
190					50
197					53
211	9 5/8		50	620	55



FRONT MILLS with INTEGRAL TEETH - C2 type

Nominal dimension of mill: d	Casing	Connection thread	L	Estimated weight
mm	in	in	mm	kg
85	4 1/2	2 3/8 REG	205	5
90				6,5
95				
100	5	2 3/8 IF)		
110	5 1/2	2 7/8 REG or (2 7/8 IF)	225	10
114	6 5/8			11
116				11
118				11
120				13
122				13

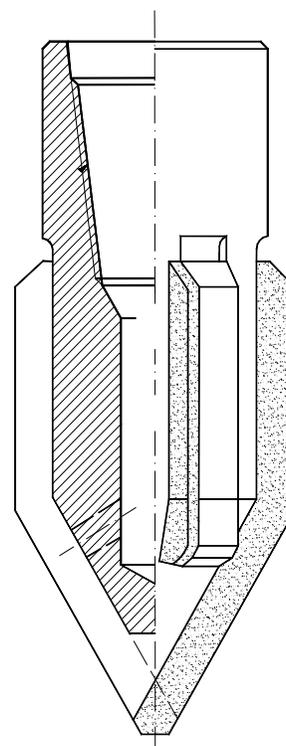


FISHING TOOLS

124				14
126				
130				15
135				
142			237	16
146	7	3 1/2 REG or (3 1/2 IF)	240	17
161	7 5/8		280	25
186	8 5/8	4 1/2 REG or (4 1/2 IF)	290	30
212	9 5/8			34
242	11 3/4			300
293	13 3/8	5 1/2 REG or (5 1/2 FH)	320	55

SHORT CONE MILLS - D1 type

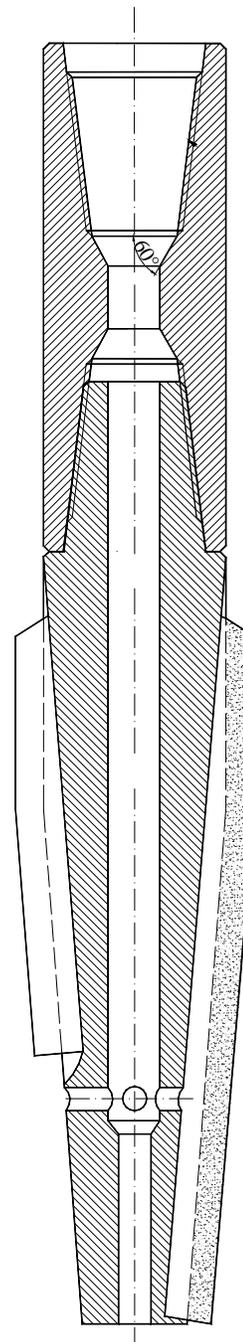
Nominal dimension of mill: d	Casing	Connection thread	d1	L	Estimated weight			
mm	in	in	mm	mm	kg			
102	5 1/2	2 3/8 REG	25	330	9,7			
104					9,8			
108					9,9			
114	6 5/8	2 7/8 REG	30	400	10,2			
118					19,5			
120					19,6			
122					19,8			
124					19,9			
128					20,2			
144	7	3 1/2 REG	40	450	23,6			
146					27,8			
150	7 5/8							34
154					34,3			
186	8 5/8	4 1/2 REG	45	520	53,9			
190	9 5/8		50			54,3		
194					54,5			
208					54,7			
210						54,9		
292	12 3/4	6 5/8 REG	70	650	121,4			
309	14 3/4				125,4			



FISHING TOOLS

LONG CONE MILL - D2 type

Nominal dimension of mill: d	Casing	Connection thread	d1	L	Estimated weight	
mm	in	in	mm	mm	kg	
94	4 1/2	2 3/8 REG	25	612	23,2	
104	5				33,7	
112	5 1/2				40,3	
114	6 5/8	2 7/8 REG	30	610	42,3	
120					47,3	
144	7	3 1/2 REG	40	745	50,1	
154	7 5/8				51,6	
185	8 5/8	4 1/2 REG	45	880	91,9	
195	9 5/8				823	99,1
210					948	129,5
224	10 3/4	50	940	157,4		
295	13 3/8	6 5/8 REG	70	1150	311,6	
302					362,8	
308	14 3/4				387,8	
317		416,4				



FISHING TOOLS

FRONT MILLS with STABILIZER - D4 type

Nominal dimension of mill: d	Casing	Connection thread	d1	d2	L	Estimated weight		
mm	in	in	mm	mm	mm	kg		
92	4 1/2	2 3/8 REG	90	25	508	21,1		
94	5		92			21,3		
102	5 1/2		100			21,5		
104			102			21,6		
108			106			21,8		
114	6 5/8	2 7/8 REG	112	30	534	22,1		
118			116			27,6		
120			118			27,7		
122			120			27,9		
124			122			28,1		
128		126	28,3					
144	7	3 1/2 REG	142	40	560	38,1		
146			144			38,3		
150	7 5/8		148			38,6		
154			152			38,8		
158			156			39,6		
160			158			39,7		
166	8 5/8		164			40	610	40,1
170			168					40,2
185			184					46,8
190	9 5/8		188			50	712	47,5
192		190	47,6					
194		192	47,8					
196		194	47,9					
200		4 1/2 REG	198	50	68,,5			
210	208		68,6					
216	214		69,7					
220	218		70,8					
238	11 3/4	6 5/8 REG	236	70	712	129,3		
240			238			129,4		
242			240			129,5		
270	12 3/4		268			136,3		
272			270			136,7		
275	13 3/8		273			137,1		
292			290			140,6		
298			296			140,8		
309	14 3/4		307			143,1		
311			309			143,2		
340		338	151,4					
440	18	438	80	712	227,1			

