5 1/2" Injection Tubing Inside of 7 5/8"

Specs/Thechs

5 ½"	OD	ID	Length	Lined ID	Flare Drift
Coupling	6.104"	4.779"	10.369"		
Body	5.5"	4.778"		4.52"	4.269

7 5/8"	OD	ID	Wall thickness	5.5" cpl cleareance	5.5" body clearance
39#	7.625"	6.625"	.500"	.521"	1.125"

All fishing procedures are subject to well conditions. Determinations are made onsite on a case by case scenario.

Overshot fishing procedure.

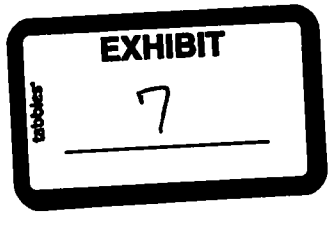
In the event of a collar looking up

1. Trip in hole with a mill and mill off collar to allow for an overshot spiral grapple to be used to latch on to the pipe body.
2. Trip in hole with turned down overshot assembly and latch onto pipe.
3. Once latched establish neutral string weight, and pick up 1-2 points over. Turn to the right 10-15 times to release seal assembly from packer.
4. Once released from the packer, trip of out the hole with fish.

In the event of a body break

1. If dressing is needed trip in hole with a mill and mill pipe body to allow for an over shot to be able to latch on to the body of the pipe. *If no milling is needed trip in hole with turned down overshot and latch on to fish.
2. Once latched onto fish, pick up 1-2 points over string weight and turn to the right 10-15 times and release from packer.
3. Trip out of hole with fish.

*Wash pipe with a mill may be substituted for dressing off a break instead of a standard mill to ensure pipe stabilization, and to ensure the casing is not damaged do to milling.



In the event a mill cannot be used

If a collar is looking up and a mill cannot be used to mill the collar off a cutting tool may be utilized to cut the collar off and then a spear used to retrieve to the cut off collar. Then a turned down overshot may be utilized to retrieve the fish and release from the packer.

Spear fishing procedure

A spear may be used as well to spear into the fish. Be it a collar or body looking up. With an insert lined pipe a smaller spear will be used to go in and pull the lining out of the pipe, and then trip out of the hole to change out spears to the proper size for the pipe ID. Then trip back in to spear into the fish. Once the fish has been speared, pick up 1-2 points over neutral weight and turn 10-15 times to release from the packer and trip out of hole with the fish and packer assembly.

Abandonment Procedure – can cut w/ multi-tool

In the event that pipe cannot be fished out and the operator elects to abandon the well. The operator would need to ensure that geological formations are isolated and cannot communicate due to casing failures in the long term. To do this the operator would ensure the pipe ID is open and clear and then run in hole with wireline and set a profile plug inside of the packer assembly. Then with wireline shoot perforations at the bottom most part of pipe still in the well bore. Then the operator would trip in hole with a work string and latch onto pipe with an overshot, spear, cement retainer or any other tool that would ensure a seal and allow the operator to pump cement down the remaining injection tubing and up the annulus between the 5.5" tubing and 7.625". This would allow for the cement to fill both the ID of the pipe, and the annulus to provided isolation between the different geological formations affected by the abandoned pipe. Then plug the remaining well according to proper plugging procedures.

Allowed Clearances by the OCD

3.5" inside of 5.5"

- 3.5" tubing: Collar OD- 4.5"
  *MOST COMMON 5.5" WEIGHTS USED

5.5" Weight	ID	3.5" Upset clearance
15	4.950"	0.45"
17	4.892"	0.392"
20	4.776"	0.276"

2 7/8" INSIDE 4.5"

- 2 7/8" Tubing: Collar OD- 3.668"

4.5" Weight	ID	2 7/8" clearance
9.5	4.090"	0.442"

*** BOTH MINIMUM WEIGHT CASINGS HAVE LESS CLEARANCE THAT THE 5.5" INSIDE OF 7.625"**

From: Clay Wilson <claylwilson@hotmail.com>
Sent: Friday, February 17, 2017 2:22 PM
To: david.catanach@state.nm.us; Riley Neatherlin
Subject: Fw: Fishability

Good afternoon David,
I'm forwarding Steve's email response he is out on a job and had no way of putting it on his letter, he said he would be glad to do it and resend when he got in if you needed it on one. Steve is the best fisher man in the oil field with 40 plus years of experience and very will respected. Below is his response, he said to call him with any question you may have.
Thank you for addressing this request for Mesquite. I look forward to hearing back from you on this matter

Clay Wilson
Mesquite SWD, Inc.
575-706-1840

From: Riley Neatherlin <rgneatherlin@gmail.com>
Sent: Friday, February 17, 2017 10:34 AM
To: claylwilson
Subject: Fwd: Fishability

---------- Forwarded message ---------
From: Steve Nave <sjnave@gmail.com>
Date: Fri, Feb 17, 2017 at 10:17 AM
Subject: Fishability
To: <Rgneatherlin@gmail.com>

EXHIBIT
8

Recommend procedure for fishing 5 1/2" inside of 7 5/8" 39# casing:
Internal diameter of 7 5/8"
39# is 6.625. Drift diameter is 6.5".
5 1/2" LTC or Buttress standard couplings is 6 1/16". With tube diameter of 5.5".

The 5 1/2" is easily fished from the inside, with mechanical and e-line cutters readily available. Then attachment with standard releasing spear.

The body of the 5 1/2" may also be engaged using a series 150 overshot, grapple #8619. This overshot is standard 6.625" outside diameter, however may be turned to 6.5" with little loss of strength. Couplings will need to be milled away, as they are too large to catch from the outside.

Washover is possible, with
Readily available 6 3/8" diameter wash pipe.

It is my opinion that 5 1/2" inside of 7 5/8" 39# casing, should not present an unreasonable problem to fish. In the worst case scenario, it has a large enough inside diameter to allow for standard plugging.

Thanks;
Steve Nave
President, Nave Oil & Gas
Fishing and rental tool.
Sent from my iPhone
--
Thanks, Riley G. Neatherlin Mesquite SWD, INC. (575)706-7288

OD Inches	Wt/Ft w/ Couplings	ID (Inches)	Capacity Bbl/Ft	Disp. Bbl/Ft	Capacity plus Disp.
4 1/2	9.50	4.090	0.01625	0.00346	0.01971
4 1/2	10.50	4.052	0.01595	0.00382	0.01977
4 1/2	11.60	4.000	0.01554	0.00422	0.01976
4 1/2	13.50	3.920	0.01493	0.00491	0.01984
4 1/2	15.10	3.826	0.01422	0.00549	0.01971
5	11.50	4.560	0.02020	0.00418	0.02438
5	13.00	4.494	0.01962	0.00473	0.02435
5	15.00	4.408	0.01888	0.00546	0.02434
5	18.00	4.276	0.01776	0.00655	0.02431
5 1/2	14.00	5.012	0.02440	0.00509	0.02949
5 1/2	15.50	4.950	0.02380	0.00564	0.02944
5 1/2	17.00	4.892	0.02325	0.00619	0.02944
5 1/2	20.00	4.778	0.02218	0.00728	0.02946
5 1/2	23.00	4.670	0.02119	0.00837	0.02956
6	18.00	5.424	0.02858	0.00655	0.03513
6 5/8	24.00	5.921	0.03406	0.00873	0.04279
6 5/8	28.00	5.791	0.03258	0.01019	0.04277
6 5/8	32.00	5.675	0.03129	0.01164	0.04293
7	17.00	6.538	0.04152	0.00619	0.04771
7	20.00	6.456	0.04049	0.00728	0.04777
7	23.00	6.366	0.03937	0.00837	0.04774
7	26.00	6.276	0.03826	0.00946	0.04772
7	29.00	6.184	0.03715	0.01055	0.04770
7	32.00	6.094	0.03608	0.01164	0.04772
7	35.00	6.004	0.03502	0.01273	0.04775
7	38.00	5.920	0.03405	0.01383	0.04788
7 5/8	24.00	7.025	0.04794	0.00873	0.05667
7 5/8	26.40	6.969	0.04718	0.00960	0.05678
7 5/8	29.70	6.875	0.04592	0.01081	0.05673
7 5/8	33.70	6.765	0.04446	0.01226	0.05672
7 5/8	39.00	6.624	0.04262	0.01419	0.05681
8	26.00	7.386	0.05299	0.00946	0.06245
8 1/8	35.00	7.285	0.05156	0.01273	0.06429
8 5/8	28.00	8.017	0.06244	0.01019	0.07263

OD Inches	Wt/Ft w/ Couplings	ID (Inches)	Capacity Bbl/Ft	Disp. Bbl/Ft	Capacity plus Disp.
8 5/8	32.00	7.921	0.06095	0.01164	0.07259
8 5/8	36.00	7.825	0.05948	0.01310	0.07258
8 5/8	40.00	7.725	0.05797	0.01455	0.07252
8 5/8	44.00	7.625	0.05648	0.01601	0.07249
8 5/8	49.00	7.511	0.05480	0.01783	0.07263
9	40.00	8.150	0.06453	0.01455	0.07908
9 5/8	32.30	9.001	0.07870	0.01175	0.09045
9 5/8	36.00	8.921	0.07731	0.01310	0.09041
9 5/8	40.00	8.835	0.07583	0.01455	0.09038
9 5/8	43.50	8.755	0.07446	0.01583	0.09029
9 5/8	47.00	8.681	0.07321	0.01710	0.09031
9 5/8	53.50	8.535	0.07077	0.01946	0.09023
10	33.00	9.384	0.08554	0.01201	0.09755
10 3/4	32.75	10.192	0.10091	0.01192	0.11283
10 3/4	40.50	10.050	0.09812	0.01473	0.11285
10 3/4	45.50	9.950	0.09617	0.01655	0.11272
10 3/4	51.00	9.850	0.09425	0.01858	0.11281
10 3/4	55.50	9.760	0.09254	0.02019	0.11273
11 3/4	42.00	11.084	0.11935	0.01528	0.13463
11 3/4	47.00	11.000	0.11754	0.01710	0.13464
11 3/4	54.00	10.880	0.11499	0.01965	0.13464
11 3/4	60.00	10.772	0.11272	0.02183	0.13455
12	40.00	11.384	0.12589	0.01455	0.14044
13	45.00	12.360	0.14841	0.01637	0.16478
13 3/8	48.00	12.715	0.15705	0.01746	0.17451
13 3/8	54.50	12.615	0.15459	0.01983	0.17442
13 3/8	61.00	12.515	0.15215	0.02219	0.17434
13 3/8	68.00	12.415	0.14973	0.02474	0.17447
13 3/8	72.00	12.347	0.14809	0.02620	0.17429
16	65.00	15.250	0.22592	0.02365	0.24957
16	75.00	15.124	0.22220	0.02729	0.24949
16	84.00	15.010	0.21887	0.03056	0.24943
20	94.00	19.124	0.35528	0.03420	0.38948
20	106.50	19.000	0.35069	0.03875	0.38944
20	133.00	18.730	0.34079	0.04839	0.38918

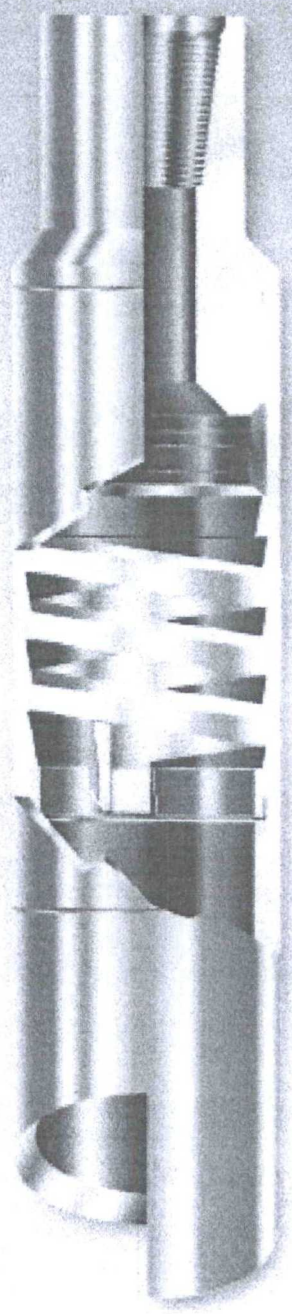
EXHIBIT
tabbies
9

OD Inches	Wt/Ft w/ Couplings	ID (Inches)	Capacity Bbl/Ft	Disp. Bbl/Ft	Capacity plus Disp.
4 1/2	9.50	4.090	0.01625	0.00348	0.01973
4 1/2	10.50	4.052	0.01595	0.00382	0.01977
4 1/2	11.60	4.000	0.01554	0.00422	0.01976
4 1/2	13.50	3.920	0.01493	0.00491	0.01984
4 1/2	15.10	3.826	0.01422	0.00549	0.01971
5	11.50	4.560	0.02020	0.00418	0.02438
5	13.00	4.494	0.01982	0.00473	0.02435
5	15.00	4.408	0.01888	0.00546	0.02434
5	18.00	4.276	0.01776	0.00655	0.02431
5 1/2	14.00	5.012	0.02440	0.00509	0.02949
5 1/2	15.50	4.950	0.02380	0.00564	0.02944
5 1/2	17.00	4.892	0.02325	0.00619	0.02944
5 1/2	20.00	4.778	0.02218	0.00728	0.02946
5 1/2	23.00	4.670	0.02119	0.00837	0.02956
6	18.00	5.424	0.02858	0.00655	0.03513
6 5/8	24.00	5.921	0.03406	0.00873	0.04279
6 5/8	28.00	5.791	0.03258	0.01019	0.04277
6 5/8	32.00	5.675	0.03129	0.01164	0.04293
7	17.00	6.538	0.04152	0.00619	0.04771
7	20.00	6.456	0.04049	0.00728	0.04777
7	23.00	6.366	0.03937	0.00837	0.04774
7	26.00	6.276	0.03826	0.00946	0.04772
7	29.00	6.184	0.03715	0.01055	0.04770
7	32.00	6.094	0.03608	0.01164	0.04772
7	35.00	6.004	0.03502	0.01273	0.04775
7	38.00	5.920	0.03405	0.01383	0.04788
7 5/8	24.00	7.025	0.04794	0.00873	0.05667
7 5/8	26.40	6.969	0.04718	0.00960	0.05678
7 5/8	29.70	6.875	0.04592	0.01081	0.05673
7 5/8	33.70	6.765	0.04446	0.01226	0.05672
7 5/8	39.00	6.624	0.04262	0.01419	0.05681
8	26.00	7.386	0.05299	0.00946	0.06245
8 1/8	35.00	7.285	0.05156	0.01273	0.06429
8 5/8	28.00	8.017	0.06244	0.01019	0.07263

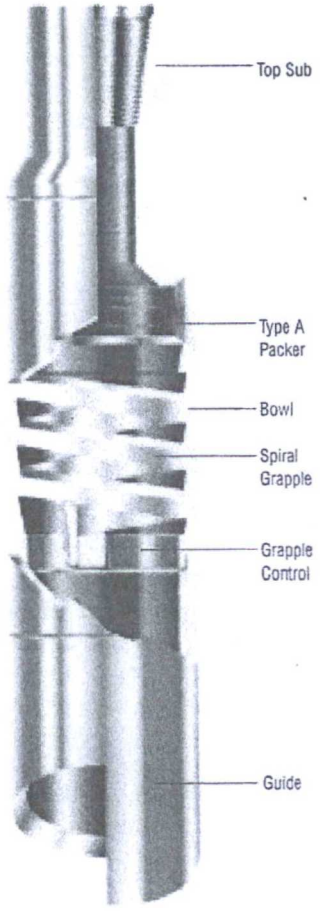
OD Inches	Wt/Ft w/ Couplings	ID (Inches)	Capacity Bbl/Ft	Disp. Bbl/Ft	Capacity plus Disp.
8 5/8	32.00	7.921	0.06095	0.01164	0.07259
8 5/8	36.00	7.825	0.05948	0.01310	0.07258
8 5/8	40.00	7.725	0.05797	0.01455	0.07252
8 5/8	44.00	7.625	0.05648	0.01601	0.07249
8 5/8	49.00	7.511	0.05480	0.01783	0.07263
9	40.00	8.150	0.06453	0.01455	0.07908
9 5/8	32.30	9.001	0.07870	0.01175	0.09045
9 5/8	36.00	8.921	0.07731	0.01310	0.09041
9 5/8	40.00	8.835	0.07583	0.01455	0.09038
9 5/8	43.50	8.755	0.07446	0.01583	0.09029
9 5/8	47.00	8.681	0.07321	0.01710	0.09031
9 5/8	53.50	8.535	0.07077	0.01946	0.09023
10	33.00	9.384	0.08554	0.01201	0.09755
10 3/4	32.75	10.192	0.10091	0.01192	0.11283
10 3/4	40.50	10.050	0.09812	0.01473	0.11285
10 3/4	45.50	9.950	0.09617	0.01655	0.11272
10 3/4	51.00	9.850	0.09425	0.01856	0.11281
10 3/4	55.50	9.760	0.09254	0.02019	0.11273
11 3/4	42.00	11.084	0.11935	0.01528	0.13463
11 3/4	47.00	11.000	0.11754	0.01710	0.13464
11 3/4	54.00	10.880	0.11499	0.01985	0.13464
11 3/4	60.00	10.772	0.11272	0.02183	0.13455
12	40.00	11.384	0.12589	0.01455	0.14044
13	45.00	12.360	0.14841	0.01637	0.16478
13 3/8	48.00	12.715	0.15705	0.01746	0.17451
13 3/8	54.50	12.615	0.15459	0.01983	0.17442
13 3/8	61.00	12.515	0.15215	0.02219	0.17434
13 3/8	68.00	12.415	0.14973	0.02474	0.17447
13 3/8	72.00	12.347	0.14809	0.02620	0.17429
16	65.00	15.250	0.22592	0.02365	0.24957
16	75.00	15.124	0.22220	0.02729	0.24949
16	84.00	15.010	0.21887	0.03056	0.24943
20	94.00	19.124	0.35528	0.03420	0.38948
20	106.50	19.000	0.35069	0.03875	0.38944
20	133.00	18.730	0.34079	0.04839	0.38918

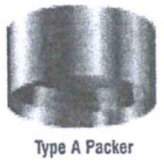
SERIES 150 OVERSHOTS

Instruction Manual 1150



Series 150 Releasing and Circulating Overshots



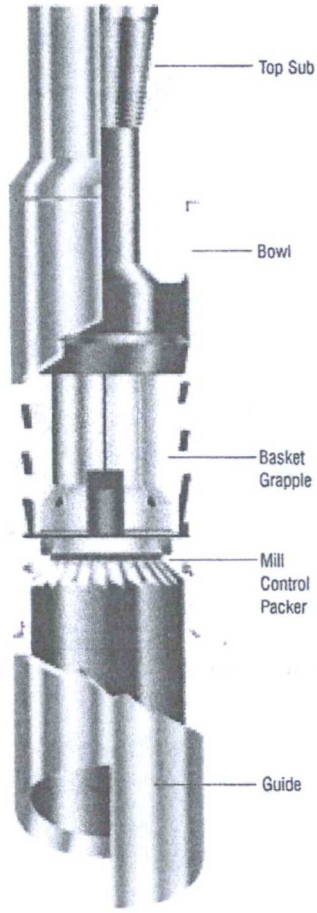


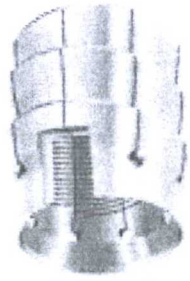
Type A Packer

Spiral Grapple

Spiral Grapple Control

Series 150 Releasing and Circulating Overshot Dressed with Spiral Grapple and Parts





Basket Grapple

Basket Grapple Control

Basket Grapple Mill Control Packer

Series 150 Releasing and Circulating Overshot Dressed with Basket Grapple and Parts

General Description

The **Bowen Series 150 Releasing and Circulating Overshot** provides the strongest tool available to externally engage, pack-off, and pull a fish. The basic simplicity and rugged construction with which it is designed have made it the standard of all external catch fishing tools.

The **Bowen Series 150 Releasing and Circulating Overshot** has gained worldwide acceptance for fishing by means of external engagement of a fish. Each Overshot is a carefully engineered unit. In service, it takes a positive grip over a large area of fish and is therefore capable of withstanding extremely heavy pulling, torsional and jarring strains without damage or distortion to either the tool or the fish.

Bowen Overshots are continually developed to new standards of strength and efficiency and are expertly constructed of the highest quality material.

Each Bowen Series 150 Releasing and Circulating Overshot is a compact unit designed to engage, pack off and pull a specific size of tubing, pipe, coupling, tool joint, drill collar or smooth O.D. tool. Through the installation of proper undersize parts, they may be adapted to engage and pack off any smaller size.

Specifications

Maximum Catch Size *(Spiral)*		4-3/4	4-3/4	5	5	5-1/8	5-1/4	5-3/8	5-1/2	6-1/4	6-1/4	6-1/4
Maximum Catch Size *(Basket)*		4-1/4	4-1/4	4-1/2	4-3/8	4-5/8	4-5/8	4-3/4	4-7/8	5-5/8	5-9/16	5-1/2
Overshot O.D.		5-5/8	5-3/4	5-29/32	6-1/8	5-3/4	6-3/8	6-1/2	6-5/8	7-3/8	7-5/8	7-7/8
Standard Box Connection		Per Customer Order										
Type		SH	FS	SH	SFS	SH	SH	SH	SH	SH	SFS	FS
Complete Assembly	Part No.	C-5168	8975	C-5171	7787	C-11823	6655	4773	8625	9692	8741	C-2108
(Dressed with Spiral Parts)	Weight	133	138	140	157	160	176	182	185	216	241	261

Replacement Parts

Top Sub	Part No.	A-5169	8976	A-5172	7789	A-11824	6656	4774	8626	9693	8742	B-2106
	Weight	62	64	65	69	69	78	79	78	87	99	105
Bowl	Part No.	B-5170	8977	B-5173	7788	B-11825	4503	9205	8617	9694	1641	B-2109
	Weight	32	33	34	40	33	52	53	54	62	69	76
Packer	Part No.	B-2199	6114	L-5950	5950	B-11826	94505	9209	8618	9689	1642	L-1680
	Weight	3/4	3/4	3/4	3/4	3/4	33/4	7/8	3/4	1-1/8	1-1/8	1-1/8
Packer Seat Ring	Part No.	A-2200	6120	A-4368	5945	LA-11827	4510	9210	8622	9690	1643	A-2072
	Weight	1/8	1/8	1/8	1/4	1/8	3/8	3/8	3/8	1/4	3/8	3/8
Spiral Grapple	Part No.	B-2021	6112	B-4369	5942	B-11828	4498	9207	8619	9687	1644	B-2073
	Weight	2-1/2	2-3/4	2-1/2	2-1/2	2-1/2	33	3	4	5	5-1/4	5-3/4
Spiral Grapple Control	Part No.	B-2202	6113	B-4370	5944	A-11829	4499	9208	8620	9688	1645	A-2074
	Weight	2	2-1/4	2	2-1/4	2	2-1/2	2-1/2	2-1/2	3	3-1/4	3-1/2
Standard Guide	Part No.	B-2203	6121	B-4371	5946	A-11830	4504	4775	8621	9691	5525	A-2075
	Weight	33	34	34	42	33	39	43	45	58	63	69

Basket Parts

Basket Grapple	Part No.	B-2201	6112	B-4369	5942	B-11828	4498	9207	8619	9687	1644	B-2073
	Weight	12-1/2	13-1/2	12-1/2	14	12-1/2	15	16	20	25	27	28-3/4
Basket Grapple Control	Part No.	B-2202	6113	B-4370	5944	A-11829	4499	9208	8620	9688	1645	A-2074
	Weight	6	6-1/2	6	7	6	7-1/2	8	7-1/2	9	10	10-1/2
Mill Control Packer	Part No.	B-2199-R	6114-R	L-5950-R	5950-R	11826-R	4505-R	L9209-R	L-8618-R	9689-R	1642-R	L-1680-R
	Weight	8	8	8	9	18	10	10	10	12	13	14

How to Order

Specify:

(1) Name and number of assembly or part
(2) Size and type of fish to be caught
(3) Top connection
(4) O.D., if other than standard

RECOMMENDED SPARE PARTS:

Spiral:

(1) 3 Packers
(2) 2 Grapples for each size
(3) 1 Control

Basket:

(1) 2 Grapples
(2) Mill Control Packers for each size

Mill Control Packer:

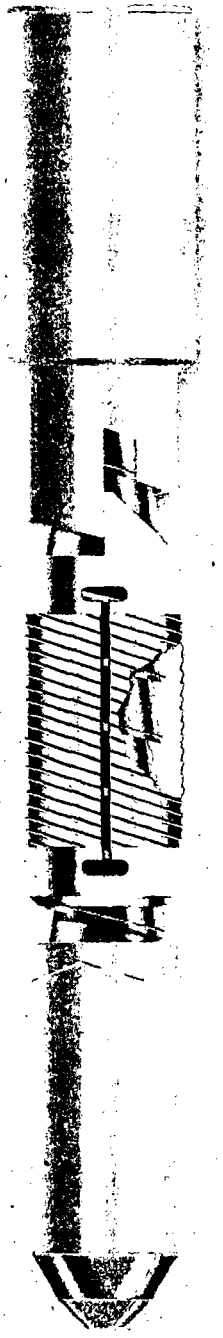
(1) 3 Inner and 3 Outer Seals

SPECIAL NOTES:

FS (Full Strength) ..... *Engineered to withstand all pulling, torsional, and jarring strain.*
XFS (Extra Full Strength) ..... *Engineered for extreme abuse.*
SFS (Semi Full Strength) ..... *Engineered for special hole conditions commensurate with maximum strength.*
SH (Slim Hole) ..... *Engineered to withstand heavy pulling strain only.*
XSH (Slim Hole) ..... *Engineered for pickup jobs only.*

ITCO TYPE RELEASING SPEARS

Instruction Manual 2300



Itco Type Releasing Spears

NOV NATIONAL OIL

One Company | Unlimited Solutions

EXHIBIT

tabbies

11

General Description

The **Bowen Itco Type Releasing Spear** is a superior fishing spear which is designed to assure positive internal engagement with the fish. It is ruggedly built to withstand severe jarring and pulling strains. It engages the fish over a large area without damage to, or distortion of the fish. The simple design eliminates any small parts which could become lost or damaged in the hole. If the fish cannot be pulled, the spear may easily be released and disengaged.

Use

The Bowen Itco Type releasing Spear is used to internally engage and to retrieve all sizes of tubing, drill pipe and casing. It may be used in conjunction with cutters, spear pack-offs and other tools, where this is desirable.

Construction

The Bowen Itco Type Releasing Spear consists of a Mandrel, Grapple, Release Ring and Nut. The Mandrel may be ordered in ether a Flush Type or a Shoulder Type. Mandrel top connections are furnished to order.

The flexible one-piece Grapple has an internal helix matching the Mandrel helix. The tang of the Grapple rests against a stop on the Mandrel when the Spear is in the engaged position. The large engaging surface of the Grapple permits heavy jarring and pulling strains without distorting the fish.

The helix of the Mandrel ends at the point where the Release Ring is mounted. The cam of the Release Ring matches the cam on the face of the Nut. The matching cams of the Release Ring and the Nut are a safety device which resists locking, freezing or jamming of the Spear, assuring an easy release.

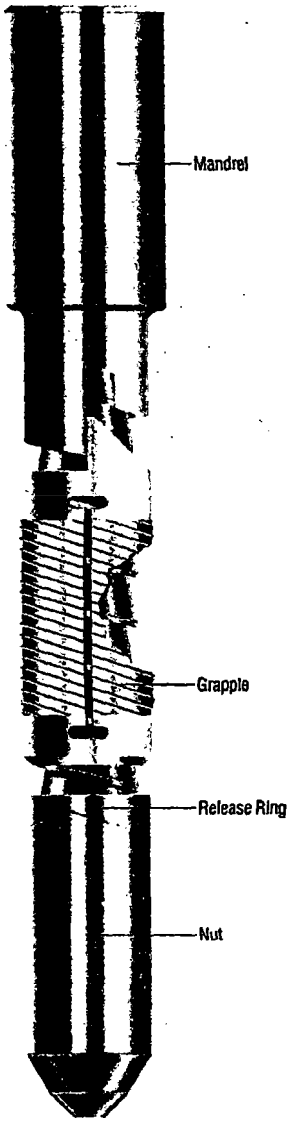
The standard plain bull-nose nut is furnished on the tool when ordered unless an alternate type is specified. Also available as accessory items at extra cost are Mill Type, Sub Type and Side-hill Type nuts.

Heavy Duty Itco Type Releasing Spears

Bowen Heavy Duty Itco Type Releasing Spears have a relatively longer Mandrel and Grapple than the Standard Spear resulting in twice as much supported wickered area in engagement with the fish. These assemblies are listed, along with the standard assemblies, in the specifications found below in this manual.

The Heavy Duty Itco Type Spear is intended for use in situations where swelling of the fish is a problem. This spear, which has a much longer mandrel and grapple, distributes the swelling forces over a greater area and thus substantially reduces these forces. While the tensile strength of the mandrel is the same as the standard spear, the Heavy Duty Spear is far less prone to damage from swelling of the fish and is actually much stronger in this sense.

Since the swelling forces being delivered to the fish vary with grapple size, type of lubrication used, straight pull or jarring, etc.; it is very difficult to provide meaningful strength data for each condition. While such calculations are possible, it would mean providing a different strength for each casing or tubing size, weight, and material grade for each spear size. Since it would require many pages of published data, many hours of calculations, many assumptions regarding coefficient of friction and condition of casing, we have never attempted to provide such data.



Shoulder Type in Engaging Position

Sidehill Type Nut

Sidehill Type Nut

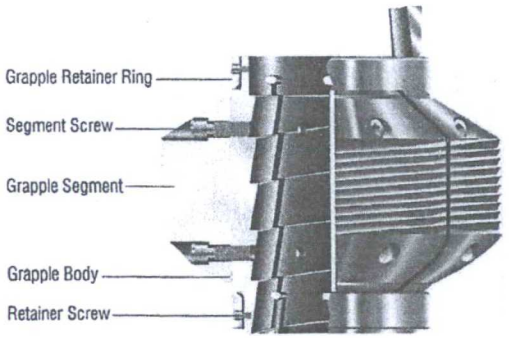
The Sidehill Type Nut is used in place of the standard bullnose nut to align the Spear with a fish that is imbedded in the side wall of the hole.

Sub Type Nut

Sub Type Nut

The Sub Type Nut is used in place of the standard bullnose nut to provide the connection required to utilize other tools below the Spear, such as the Spear Pack-Off or Internal Cutters.

Spear Pack-Off Assembly



Segment-Type Spear Grapple Assembly for 8-5/8 Casing Spear, Part No. 9380

Segment-Type Spear Grapple Assembly

The Segment-Type Spear Grapple is used in place of the standard one-piece Grapple on the 8⅝" and 9⅝" size Spears to convert them to Spears capable of engaging up to 20" casing. The Segment Type Spear Grapple consists of a Grapple Body, eight grapple segments and 16 Grapple Segment Screws. The helix of the Grapple Body matches the helix of the Spear Mandrel making the action of the Spear the same as with the standard Grapple.

Spear Pack-Off Assembly

The Spear Pack-Off Assembly is attached to the Sub Type Nut below the Spear to pack off the fish in order to circulate through the fish. The Spear Pack-Off Assembly consists of an Adapter Sub, Packer Thimble, Packer and Mandrel. The Adapter Sub of the Spear Packoff will be furnished with a box connection to match the pin connection of the Sub Type Nut on which it is to be used, or as otherwise ordered. The Mandrel of the Spear Pack-Off may be ordered plain bullnose or with a pin connection for attachment of other tools, as specified.

Bowen Internal Cutters For Use in Cut and Pull Operations

Bowen Internal Cutters may be run below the Bowen Releasing Spear and are spaced as desired, depending upon the length of the fish and the length of the cut to be made. The Spear should be spaced far enough above the cutter so that the Spear is clear of the fish during cutting operations. After cutting is completed, the Spear can be lowered to retrieve the cut-off section. Bowen Internal Cutters are fully described in Instruction Manual No. 5600.

Operation

Examine and assure that the Bowen Releasing Spear is the correct size for the pipe to be caught and is properly assembled. Refer to the Specification Chart and to the Grapple Range Chart in this manual.

Connect the Spear to the fishing string. Set the Spear in released position by screwing the Grapple down the helix against the Release Ring as far as it will go by hand. In this position the Grapple is caused to contract inward and will not engage the pipe as it is run in.

Specifications

Nominal Catch Size		5 O.D. Casing	5 O.D. Casing	5 O.D. Casing	5 O.D. Casing	6 O.D. Casing	6 O.D. Casing	6 O.D. Casing	7 O.D. Casing	7 O.D. Casing	7 O.D. Casing
Additional Catch Size		5-1/2, 5-3/4, & 6 Casing	5-1/2, 5-3/4, & 6 Casing	5-1/2, 5-3/4, & 6 Casing	5-1/2, 5-3/4, & 6 Casing	6-5/8 & 7 Casing	6-5/8 & 7 Casing	6-5/8 & 7 Casing	7-5/8, 8, & 8-1/8 Casing	7-5/8, 8, & 8-1/8 Casing	7-5/8, 8, & 8-1/8 Casing
Spear O.D. (H)		4-1/32	4-1/32	4-1/32	4-1/32	5	5	5	5-11/16	5-11/16	5-11/16
Spear I.D.		7/8	1	1	7/8	1	1	1	2	2	2
Class		Light Duty	Std.	Std. L.H.	Light Duty, L.H	Light Duty	Std.	Std. L.H.	Std.	Std. L.H.	Heavy Duty
Complete Assembly	**Part No.**	1332	9680	18270	20115	9715	17234	58292	9266	20890	17237
	Weight	110	115	175	117	150	186	186	241	241	310

Replacement Parts

Mandrel – Flush Type	**Part No.**	1333	9681	18271	20116	9716	17235	58293	9267	20891	17238
	Weight	65	72	85	73	110	118	118	141	141	205
Mandrel – Shoulder Type (A)	**Part No.**	1333	9681	18271	20116	9716	17235	58293	9267	20891	17238
	Weight	67	77	91	80	115	123	123	146	146	214
Grapple	**Part No.**	1334	9682	18272	20117	9717	17236	58294	9268	20892	17239
(For weights and catch ranges, see Calculated Strength Chart.)											
Release Ring	**Part No.**	1336	1336	20119	20119	9718	9718	9718	9279	152677	9279
	Weight	1	1	1	1	2	2	2	3-1/2	3-1/2	3-1/2
Bullnose Nut	**Part No.**	1335	1335	20118	20118	9719	9719	58295	9269	20893	9269
	Weight	28	28	28	29	48	48	48	65	65	65

Accessories

Mill Type Nut	**Part No.**	1335-A	1335-A	1335-A	20118-A	9719-A	9719-A	58295-A	9269-A	20893-A	9269-A
	Weight	28	28	28	29	48	48	48	65	65	65
Sub Type Nut	**Part No.**	1335-B	1335-B	1335-B	20118-B	9719-B	9719-B	58295-B	9269-B	20893-B	9269-B
	Weight	28	28	28	29	48	48	48	65	65	65
Side Hill Type Nut	**Part No.**	1335-C	1335-C	1335-C	20118-C	9719-C	9719-C	58295-C	9269-C	20893-C	9269-C
	Weight	28	28	28	29	48	48	48	65	65	65

Stop Subs - Stop Rings

Stop Sub Body O.D.		4-1/32	4-1/32	4-1/32	4-1/32	5	5	5	5-11/16	5-11/16	5-11/16
Stop Sub Stop O.D.		5	5	5	5	6	6	6	7	7	7
Stop Ring O.D.		5-1/2	5-1/2	5-1/2	5-1/2	6-5/8	6-5/8	6-5/8	7-5/8	7-5/8	7-5/8
Stop Sub Type F	**Part No.**	19056	19056	19056	19056	19057	19057	19057	19058	19058	19058
Stop Ring Type S	**Part No.**	18804	18804	18804	18804	18805	18805	18805	18806	18806	18806

How to Order

Specify:

(1) Name and part number of assembly or part
(2) Size and type of top connection
(3) Size and weight or weights of pipe to be caught
(4) Flush or shoulder type
(specify O.D. of shoulder – A)
(5) Mandrel length desired (C)
(6) Thread size and type of nut, if wanted
See page 8 for dimensions

RECOMMENDED SPARES:
(1) 2 Grapples for Each Catch Size

How to Order Type F Stop

Specify:

(1) O.D. of Stop Sub Body
(2) Length from Stop to thread connection
(3) Top and bottom connection desired
(4) Number of spear on which Stop Sub
will be used

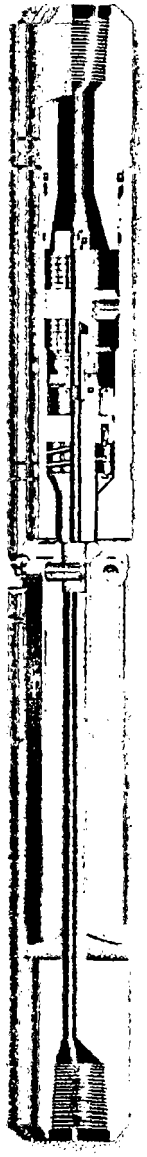
How to Order Type S Stop Ring

Specify:

(1) O.D. of Ring
(2) O.D. on Spear shoulder or Stop Sub shoulder
with which Stop Ring is to be used

PRESSURE PIPE CUTTER

Instruction Manual 5680



Pressure Pipe Cutter

One Company | Unlimited Solutions

NOV NATIONAL OILWELL

EXHIBIT

tabbies

12

General Description

The **Bowen Pressure Pipe Cutter** is designed to cut single and multiple strings of pipe from 4" O.D. to 36" O.D., using pump pressure to actuate three (3) Itcoloy coated Knives. Different lengths of Knives are used, depending on the size of pipe to be cut. The Cutter works on the principle of flow restriction across an orifice while cutting, and pressure drop when the pre-set diameter of the Knives is reached. This tells the operator that the pipe has been severed.

Operation

A drill bit is attached to the bottom of the Cutter for stabilizing purposes, if desired, and the Cutter is then attached to the Drill Pipe or Tubing. Use bailing wire in the O.D. grooves provided on the Body to keep the Knives in a closed position while the Cutter is lowered to the desired depth. Begin rotation before mud pump is turned on.

The continued downward movement of the Piston reacting to the pump pressure forces the Knives to pivot about their pins. When the Knives reach their pre-set diameter, the Piston will separate from the Bit Jet Retainer Stem, causing an increase in mud flow through the tool. This, in turn will cause a decrease in pump pressure, indicating the Knives have severed the pipe.

Complete Disassembly

Refer to page 4 for proper location of parts.

National Oilwell recommends an assembly drawing of the size Pressure Pipe Cutter being serviced be available when disassembling and reassembling.

Secure the Bowen Pressure Pipe Cutter in an appropriate vise on the Body just above the Knives. Using a pipe wrench and V-Belt Pulley Assembly, break Top Sub connection and remove Top Sub. Using a screwdriver, remove Top Sub O-Ring.

After the Top Sub is removed, reach inside the Body and remove Valve Assembly. The Valve Assembly consists mainly of Bit Jet, Bit Jet Retainer, Bit Jet Retainer Stem and Stop Spider. Lay Valve Assembly on clean shop table. Using retainer ring pliers, remove retainer ring from Bit Jet Retainer. Insert drill rod or brass bar through Bit Jet Retainer Stem and remove Bit Jet by tapping it out. Remove I.D. O-Ring from Bit Jet Retainer.

Remove three (3) set screws from Stop Spider. Remove Bit Jet Retainer Stem from Bit Jet Retainer. Remove Bit Jet Retainer from Stop Spider. Next, remove the three (3) Knives from Body by first, removing the three (3) retaining screws at the head of each knife pin. Using a screwdriver or metal punch, remove the three (3) Knife Pins. Remove Knives from Body.

Insert pipe or brass bar into one of the Knife grooves on Body and tap out Piston. Remove Piston Spring from Body also. Lay Piston on clean shop table and remove Piston I.D. Retainer Ring with retainer ring pliers. Remove Piston Bushing with a screwdriver and also the I.D. O-Ring inside Piston Bushing bore. Secure Piston in a bench vise on small diameter using soft jaws (brass or copper).

NOTE: Do not score or mark any O.D. surface on piston.

With a screwdriver, remove O.D. seal Retainer Ring, Plate and O.D. seal (on $3\frac{5}{8}$" O.D. and $5\frac{9}{16}$" O.D. tools, Piston O.D. seal consists of an O-Ring only). The Bowen Pressure Pipe Cutter is now completely disassembled.

Carefully clean and inspect all parts for wear and damage. Replace all worn and damaged parts with new parts.

Complete Reassembly and Knife Cutting Diameter Adjustment

Refer to page 4 for proper location of parts.

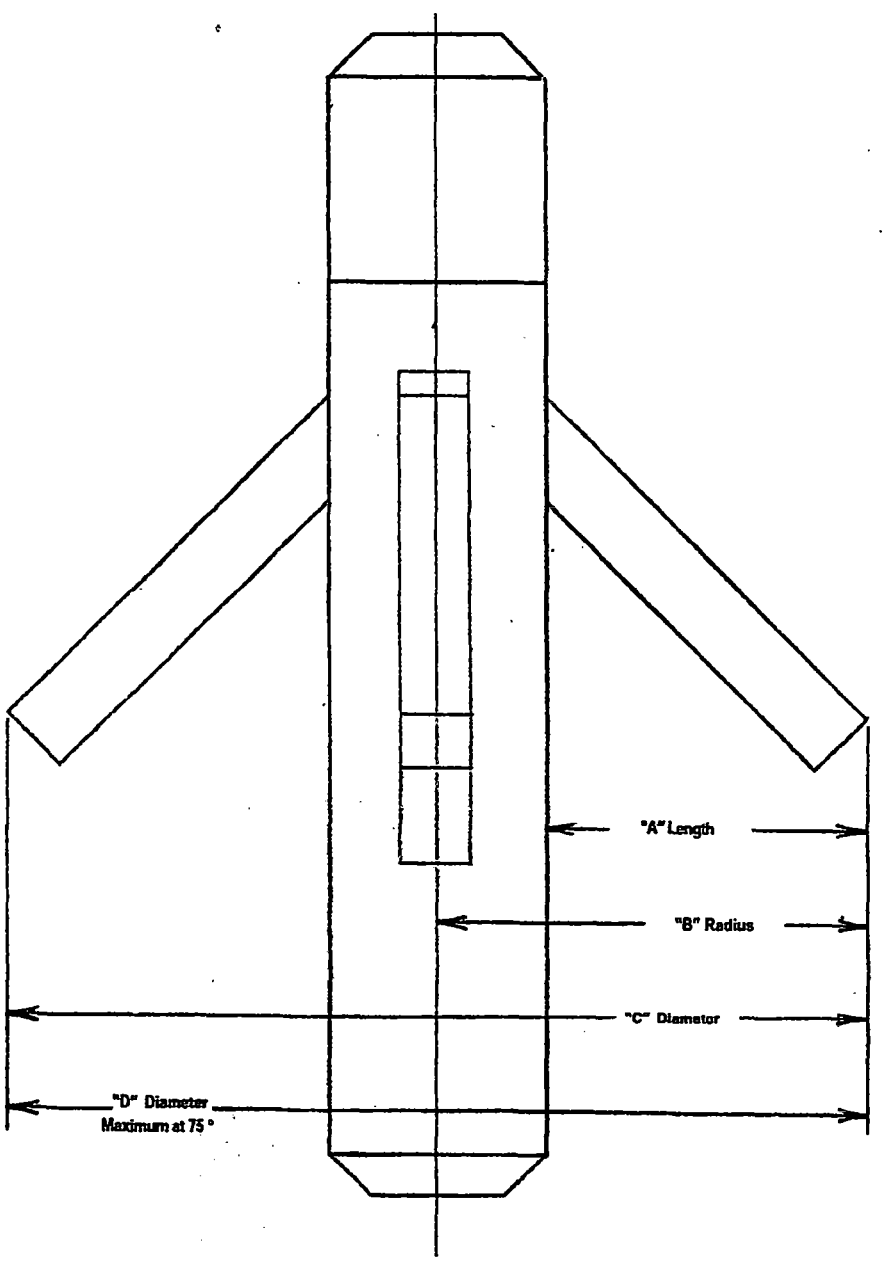
National Oilwell recommends an assembly drawing of the size Pressure Pipe Cutter being serviced be available when disassembling and reassembling.

The Bowen Pressure Pipe Cutter is easy to reassemble. The Body is dressed with the appropriate length of Knives, Knife Pins and set screws. The Knives are inserted into the three (3) Knife slots with the Itcoloy surfaces facing outward and holes in Knives and Body aligned. The Knife Pins are inserted into each of the through drilled holes on the Body. With the head of the Knife Pin inserted into the slot on the Body, the three (3) retaining screws are then installed to hold the Knife Pin in place. The Knives are then checked, assuring they hinge freely.

The Piston O.D. Seal is fitted, then Plate and Retainer Ring installed, (install appropriate Piston O.D. O-Ring on $3\frac{5}{8}$" and $5\frac{9}{16}$" O.D. tools). Install Piston I.D. O-Ring inside Piston bore and insert Piston Bushing until it rests on the shoulder of the Piston. The Retainer Ring is inserted in the groove, locking the Piston Bushing into the I.D. of the Piston. The Piston Assembly is inserted into the Body until it touches the Knives.

NOTE: Piston spring is not installed at this time.

The Bit Jet Retainer Stem is screwed and tightened securely to the Bit Jet Retainer. Next, install I.D. O-Ring inside the Bit Jet Retainer, followed by the Bit Jet and Retainer Ring in that order. The Stop Spider is then threaded onto the Bit Jet Retainer.


"A" Length
"B" Radius
"C" Diameter
"D" Diameter
Maximum at 75 °

Single Cut Operation Running Chart

3-1/4" (83 mm) O.D. Pressure Pipe Cutter

Casing or Pipe Size	Knife					Rotary Speed	Orifice Pressure Differential	Orifice I.D. Std.
	Part No.	"A" Length	"B" Radius	"C" Diameter	"D" Max. Diameter @ 75°*			
4 O.D. Pipe	150446	.625 (16 mm)	2-1/4 (57 mm)	4-1/2 (114 mm)	5-3/8 (136 mm)	80	180 psi (13 Kg/cm²)	1/4

3-5/8" (92 mm) O.D. Pressure Pipe Cutter

Casing or Pipe Size	Knife					Rotary Speed	Orifice Pressure Differential	Orifice I.D. Std.
	Part No.	"A" Length*	"B" Radius*	"C" Diameter*	"D" Max. Diameter @ 75°*			
4-1/2 (114 mm)	80357	9/16 (14 mm)	2-3/8 (60 mm)	4-3/4 (121 mm)	6-1/2 (165 mm)	80	180 psi (13 kg/cm²)	
5 (127 mm)	80357	13/16 (21 mm)	2-5/8 (67 mm)	5-1/2 (133 mm)	6-1/2 (165 mm)	80	180 psi (13 kg/cm²)	
5-1/2 (140 mm)	80357	11/16 (27 mm)	2-7/8 (73 mm)	5-3/4 (146 mm)	6-1/2 (165 mm)	80	240 psi (17 kg/cm²)	1/4
6 (152 mm)	80357	15/16 (33 mm)	3-1/8 (79 mm)	6-1/4 (159 mm)	6-1/2 (165 mm)	80	240 psi (17 kg/cm²)	

5-9/16" (141 mm) O.D. Pressure Pipe Cutter

Casing or Pipe Size	Knife					Rotary Speed	Orifice Pressure Differential	Orifice I.D. Std.
	Part No.	"A" Length*	"B" Radius*	"C" Diameter*	"D" Max. Diameter @ 75°*			
6-5/8 (168 mm)	80717	5/8 (17 mm)	3-7/16 (87 mm)	6-7/8 (175 mm)	8-3/4 (222 mm)	80	750 psi (53 kg/cm²)	
7 (178 mm)	80717	13/16 (21 mm)	3-5/8 (92 mm)	7-1/4 (184 mm)	8-3/4 (222 mm)	80	750 psi (53 kg/cm²)	
7-5/8 (194 mm)	81896	1-1/8 (29 mm)	3-15/16 (100 mm)	7-7/8 (200 mm)	10-1/2 (267 mm)	70	800 psi (56 kg/cm²)	1/4
8-5/8 (219 mm)	81896	1-5/8 (42 mm)	4-7/16 (113 mm)	8-7/8 (225 mm)	10-1/2 (267 mm)	60	900 psi (63 kg/cm²)	
9-5/8 (244 mm)	81896	2-1/8 (55 mm)	4-15/16 (125 mm)	9-7/8 (251 mm)	10-1/2 (267 mm)	60	900 psi (63 kg/cm²)	

7-3/8" (187 mm) O.D. Pressure Pipe Cutter

Casing or Pipe Size	Knife					Rotary Speed	Orifice Pressure Differential	Orifice I.D. Std.
	Part No.	"A" Length	"B" Radius	"C" Diameter	"D" Max. Diameter @ 75°*			
8-5/8 (219 mm)	151023	7/8 (22 mm)	4-9/16 (115 mm)	9-1/8 (231 mm)	10-9/16 (268 mm)	70	450 psi (32 kg/cm²)	
9-5/8 (244 mm)	151023	1-3/8 (34 mm)	5-9/16 (128 mm)	10-1/8 (257 mm)	10-9/16 (268 mm)	70	450 psi (32 kg/cm²)	
10-3/4 (273 mm)	151029	1-15/16 (49mm)	5-5/8 (142 mm)	11-1/4 (285 mm)	19-1/2 (495 mm)	60	450 psi (32 kg/cm²)	3/8
11-3/4 (298 mm)	151029	2-7/16 (61 mm)	61/8 (155 mm)	12-1/4 (311 mm)	19-1/2 (495 mm)	60	500 psi (35 kg/cm²)	
13-3/8 (340 mm)	151029	3-1/4 (82 mm)	6-15/16 (176 mm)	13-1/8 (333 mm)	19-1/2 (495 mm)	60	600 psi (42 kg/cm²)	

* See drawing on page 8.