



HYDRO PLUG

9-5/8"

Manual No:
DL-852-9625-711

Revision: **A**

Revision Date:
07/01/2016

Authored by: *J.Anderson*

Approved by: *D.Hushbeck*

A) DESCRIPTION

The Hydro Plug is designed to have excellent running characteristics and secure sets. The plug can be set hydro-mechanically without the use of special pressure setting tools. The plug is designed for rapid drill-out while maintaining sufficient strength during the set. It is designed for high differential pressures and up to 300° F temperatures with standard nitrile element and o-ring. Different elastomers are available for higher temperatures.

The short, compact, interlocked construction assures the user that the Hydro Plug will provide faster, safer run-in, dependable set and pack-off and hold pressure that is safe for the casing weight and grade. The interlock construction and compact size requires minimal material removal during drill out.

B) SPECIFICATION GUIDE

CASING			TOOL OD (INCHES)	PART NUMBER
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)		
9-5/8	29.3 – 61.1	8.375 – 9.063	8.125	85295 85295H ¹ 85295V ²

Elastomer Trim Options: ¹HSN, ²Viton

DIFFERENTIAL PRESSURE (MAX)
6,000 PSI

SETTING			
SETTING AREA (SQ INCHES)	SHEAR VALUE (PSI/SCREW)	INITIATION PRESSURE (PSI)	RECOMMENDED SETTING PRESSURE (PSI)
17.28	197	1,575	3,475

C) PRE-INSTALLATION INSPECTION PROCEDURES

Before use, D&L recommends inspection of the tool. Ensure parts have not been damaged during shipping. Replace damaged parts with D&L replacement parts. Contact D&L sales for replacement part information.

D) STORAGE RECOMMENDATIONS

Store the tool, if possible, in an enclosed, temperature and humidity controlled environment. Avoid excessively high temperatures over long periods of time. Shield elastomeric parts from ultraviolet light sources. Keep tool dry and protected from condensation. Do not store in contact with or near volatile or corrosive chemicals. Do not store near ozone generating equipment or operations such as welding.

D & L OIL TOOLS
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E) SETTING PROCEDURES

Make up the plug and the running sub (**NOTE₂**: Running sub sold separately). Tighten the running sub with 200 ft-lbs torque and back off at least two (2) turns. Repeat tightening and backing off of running sub. Finally tighten running sub with a maximum 200 ft-lbs torque.

Run the plug downhole to desired depth. Drop the ball downhole. Once the ball is seated, apply sufficient pressure to shear the shear screws. Hold pressure until slips have set and the element has sealed against the casing. Pick up on the work string to assure that the slips have set. Continue to pick up on the work string with up to 60,000 lbs or with the maximum allowable tension. Set down on the plug and then pick up 1,000 – 2,000 lbs. Disengage the running sub from the plug with right-hand rotation. Pick up on the work string to retrieve.

F) REMOVAL TECHNIQUES

F-1) GENERAL

Drilling is the preferred method of removing Hydro Plugs since drilling can usually be accomplished in less than 10% of the time it takes to millout the same tool. The high removal time for the milling technique is explained by the mechanics of the two methods. Drilling causes a chiseling effect, and milling has a shaving effect of the target. Further, milling yields more debris of the type that causes penetration stoppage. Drilling with a short tooth, medium hard formation rock bit is usually the best combination for Hydro Plug removal.

F-2) SUGGESTED MILLING TECHNIQUE

If equipment availability or other considerations dictate that the plug be milled, the recommended combination is a junk type mill tool rotated at 60-150 RPM with 5,000-8,000 lbs on the mill.

Use a mud viscosity of 60 CPS and a minimum annular velocity of 120 Ft/min to assure cutting removal. When ready to begin milling operations, start rotating the mill above the target and lower it slowly onto the target. Do not apply weight in excess of recommended amount. Excessive weight can tear out chunks of the plug and make a bailer trip necessary to remove the chunks to allow further penetration. Maintain a constant milling rate by adding weight as the tool is milled away.

F-3) SUGGESTED DRILLING TECHNIQUE

Though the best drilling technique will vary with available equipment, a typical combination of a short tooth, medium hard formation rock bit (ADC Codes 2-1, 2-2, 2-3, 2-4, and 3-1), 75 to 120 RPM rotary speed and such drill collars as necessary for weight and bit stabilization will provide desirable results. To drill the plug:

- Apply 5,000-7,000 lbs. until top end of the mandrel is drilled (4 to 5 inches)
- Increase weight to 2,500-3,000 lbs. per inch of bit diameter to drill out remainder
Example: Use 12,000-14,500 lbs for a 4-3/4" OD bit
- Drill collars should be used as required for weight and bit stabilization
- A rotary speed of 75-125 RPM is recommended
- A Junk Basket should be used
- The mud viscosity and gel strength should be sufficient to remove and support the cuttings. A minimum annular velocity of 120 Ft/min is recommended

When normal circulation is to be used, place a junk basket above the bit. If reverse circulation is planned, the casing scraper or other equipment in the tubing string should have an inside fluid passage as large as the passage through the bit so cuttings will not bridge.

Variations in bit speed and bit weight should be made to help break up debris to re-establish penetration should it cease while drilling.



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F) REMOVAL TECHNIQUES (cont'd)

Penetration may be stopped by "bit tracking" which is usually caused by insufficient weight on the bit. Bit tracking occurs when bit teeth travel in the same indentation of "track" made previously by another tooth. Successive tooth impact to the same location will sometimes deepen the track until indentations equal bit tooth length, reducing the impact of teeth to the point that they will not penetrate. Drilling penetration may be re-established by raising the bit off of the tool and then lowering the bit while maintaining rotation and making rapid bit contact with extra weight.

NOTE₁: Drilling times are directly related to tool size, bit stability, drilling weight, pump rate, bit RPM, type of bit, drilling fluid, etc. The same considerations should be used when drilling plugs as would be used when drilling medium hard formations.

G) MANUFACTURER'S RECOMMENDATIONS

- G-1) Use the plug that conforms to well conditions, such as but not limited to casing size and weight, temperature, pressure and fluid/gas composition.
- G-2) Always follow recommendations of the Wireline Setting Tool manufacturer as to proper cleaning, redressing and operational procedures.
- G-3) Always run a gauge ring and junk basket prior to running plug.
- G-4) Do not over tighten the plug onto the notesetting tool. This action could cause the upper slip to crack. "Snug" the plug onto tool by hand. Never use a wrench.
- G-5) Do not allow the weight of the setting tool to rest on the plug after make up.
- G-6) A bit and scraper should always be run prior to entering wellbore. The well should be circulated clean.
- G-7) Visually check slips for cracks before lowering the plug into Blowout Preventers/Wellhead.
- G-8) Hand guide the Wireline Setting Tool and plug through Blowout Preventers/Wellhead.
- G-9) Run the plug slowly into well. A good running speed is 100 Ft/minute. Run considerably slower when entering a liner or going through damaged casing. Well conditions may require a slower speed.
- G-10) Should the tool misfire at setting depth or the plug is pulled from the hole for any reason do not retrieve at a speed greater than the running speed going in the hole.
- G-11) Always set the plug in casing that has 100% cement bond.
- G-12) Never set a plug in a casing collar or where a packer has previously been set or milling has occurred.
- G-13) When the plug is being set under pressure and is in lubricator, equalize pressure slowly from well into lubricator. If during the process the tool slams into the top of the lubricator the jarring action could crack or break the slips. The tool should be removed and the plug inspected if this occurs.
- G-14) Only set the plug in static well conditions. Do not set in well that has fluid or gas movement.
- G-15) A minimum of ten (10) feet of uncontaminated cement should be placed on top of the plug after setting. Lab test should be run on the cement to determine "Set" time for the well conditions. The cement and plug should be pressure tested prior to further well work.
- G-16) The plug must be a minimum of fifty (50) feet from the bottom shot when perforating or "Shooting" off casing. A string shot is included in this category.
- G-17) Tubular weight should never be placed on plug.
- G-18) After setting the plug, the setting tool should not be dropped on plug. Gently ease tool to plug.
- G-19) Never hit plug with Dump Bailer.
- G-20) Go very slow when going through fluid level.
- G-21) **Always** use a slow burn charge in wireline setting tool. The burn time for setting Hydro Plugs must be greater than 30 seconds.



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H) ELASTOMER TRIM TEMPERATURE GUIDE

RUBBER TYPE	TEMPERATURE RANGE
NITRILE	70° - 250°F
HSN (HNBR)	70° - 300°F
VITON	100° - 350°F

I) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 85295
1	1	TOP SUB	DLMCIG2	85095610
2	1	INNER MANDREL	DLMCIG2	85095210
3	2	FEMALE EXPANSION RING	DLMDB65	84095815
4	2	MALE EXPANSION RING	DLMDB65	84095810
5	2	LOWER CONE	DLMCIG2	84095420
6	2	SLIP	DLMCIG2	84095135
7	1	LOCK RING	DLMS80	85095011
8	1	ELEMENT	80 DURO NITRILE	84095512
9	1	BOTTOM SUB	DLMDB65	85095620
10	4	SET SCREW 1/4-20 UNC X 1/2	STEEL	SSS025C050
11	1	KEY 3/16 X 3/16 X 1"	DLMS110	KS018X018X100
12	8	ROLL PIN 3/16 X 1"	STEEL	RP018100
13	1	INNER ADAPTER	DLMCIG2	85295230
14	1	SETTING SLEEVE	DLMCIG2	85295260
15	1	MANDREL PLUG	DLMCIG2	85295215
16	1	SLEEVE EXTENSION	DLMCIG2	85295261
17	8	SHEAR SCREW (3400#) 3/8-16 UNC X 5/8	DLM360BRS	BSSSLT037C062
18	1	342 O-RING	90 DURO NITRILE	90342
19	1	349 O-RING	90 DURO NITRILE	90349
20	1	361 O-RING	90 DURO NITRILE	90361
21	1	WEIGHTED PHENOLIC BALL 2"	DLMPHW	85220900

ASSEMBLED WEIGHT	397 LBS
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I) PARTS LIST (cont'd)

I-1) ELASTOMER TRIM OPTIONS

NOTE₂: For temperature range, refer to Elastomer Trim Temperature Guide.

I-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 85295H
8	1	ELEMENT	80 DURO HSN	84095512H
18	1	342 O-RING	90 DURO HSN	90342H
19	1	349 O-RING	90 DURO HSN	90349H
20	1	361 O-RING	90 DURO HSN	90361H

I-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 85295V
8	1	ELEMENT	80 DURO VITON	84095512V
18	1	342 O-RING	90 DURO VITON	90342V
19	1	349 O-RING	90 DURO VITON	90349V
20	1	361 O-RING	90 DURO VITON	90361V

J) ACCESSORIES – RUNNING SUB



NOTE₃: Standard running sub is listed. Other tubing sizes/configurations and threads are available. Sold separately.

DESCRIPTION	MATERIAL	THREAD CONNECTION	PART NUMBER
RUNNING SUB	DLMS110	NC 38 TOOL JOINT	85395



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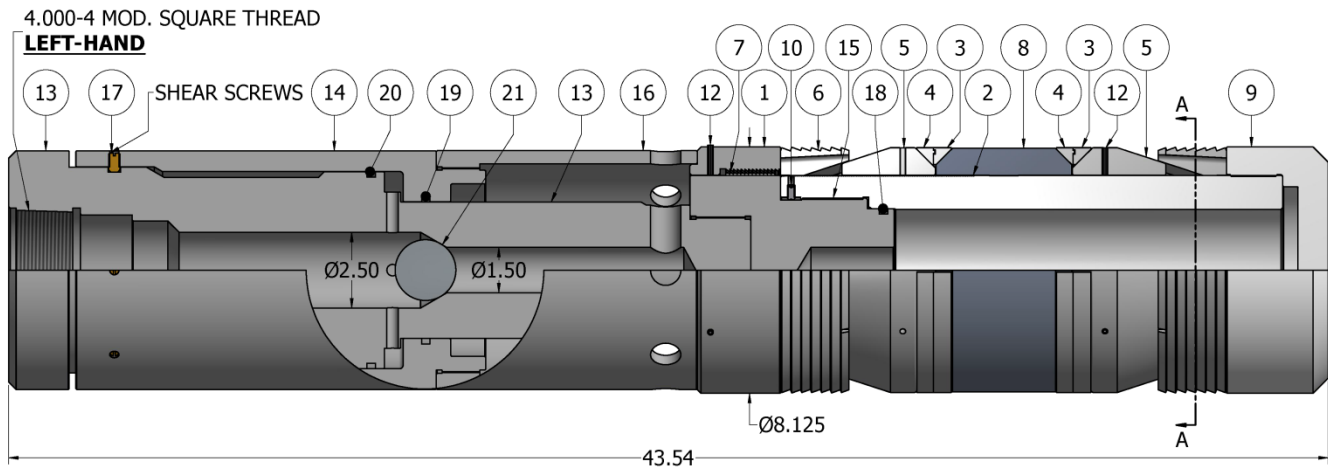
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K) TECHNICAL ILLUSTRATION



L) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
07/01/2016	A	Created new manual	-	-