ALPHA MagnaBore™ & H-M Bridge Plug

Introducing the Alpha H-M Bridge Plug, engineered to withstand high pressure and temperature conditions with ease. This plug revolutionizes the setting process, utilizing hydraulic power to engage the top slips and then employing mechanical pull to finalize the set. Unlike traditional methods, there's no need for a separate mechanical setting tool as the mechanism is integrated within the plug itself.

Setting the plug is straightforward: a ball is inserted into the tubing string, blocking the built-in equalizing ports. Pressure is then applied to activate the top slip, followed by mechanical pull to secure the set. Releasing the tubing string from the plug with right hand rotation.

After release, the full tubing I.D. is restored, allowing seamless extension of other equipment through the tubing string's end. Experience unparalleled efficiency and reliability with the Alpha H-M Bridge Plug Model "P".

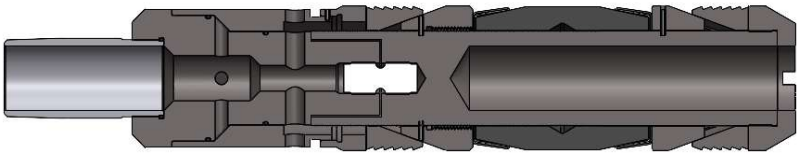
Also available in Alpha Oil Tools product line is the MagnaBore™ HM Bridge Plug: a revolutionary solution designed for high-profile well environments, enabling seamless single trip abandonment and cementing operations. With its advanced hydromechanical set mechanism, the MagnaBore™ offers unparalleled reliability and efficiency. Thanks to its unique and enlarged flow area design, fluid circulation above the plug is facilitated at any time before setting, providing exceptional flexibility in well operations. Experience the efficiency and reliability of the MagnaBore™ HM Bridge Plug for your well operations.

Features:

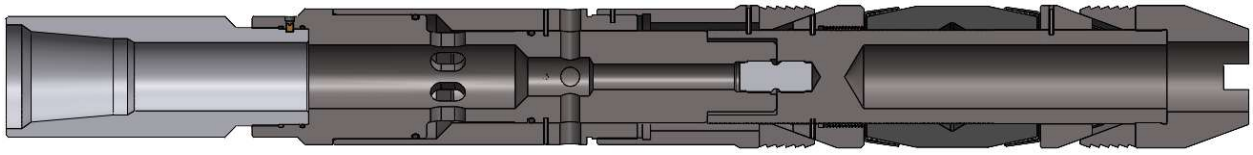
- Drillable Cast Iron construction.
- Sets in any grade casing including P-110.
- Form fitting metal back-ups prevent rubber extrusion.
- For permanent service.
- Ratcheting lock ring holds setting force.
- Can be upgraded to 400°F temperature rating upon request.
- Available sizes for setting range from 2.922 to 20.312 in.

MagnaBore™ HM Bridge Plug features:

- Enlarged flow area design.



ALPHA 5.610 H-M Bridge Plug illustration.



ALPHA 5.610 MagnaBore™ Bridge Plug illustration.

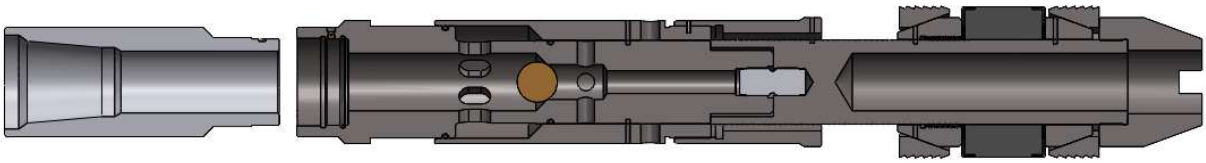
H-M & MagnaBore™ BRIDGE PLUG SIZE CHART

Part Number H-M BP	Plug OD (in)	Setting Range Min (in)	Setting Range Max (in)	Max Pressure (psi)
000-2750-055	2.750	2.922	3.068	10,000
000-3120-055	3.120	3.340	3.548	10,000
000-3500-055 **000-3500-065**	3.500	3.826	4.090	10,000 6,000
000-3710-055	3.710	3.920	4.408	10,000
000-4240-055 **000-4240-065**	4.240	4.548	5.012	10,000 6,000
000-4750-055	4.750	5.007	5.595	10,000
000-5340-055	5.340	5.626	6.094	10,000
000-5610-055 **000-5610-065**	5.610	5.921	6.538	10,000 6,000
000-6090-055	6.090	6.625	7.025	10,000
000-6960-055	6.960	7.511	8.097	8,000
000-7710-055	7.710	8.281	9.001	8,000
000-8690-055	8.690	9.000	9.342	5,000
000-8710-055	8.710	9.282	9.760	5,000
000-9500-055	9.500	9.850	10.369	5,000
000-1200-055	12.00	12.347	12.715	3,000
000-1425-055	14.25	14.688	15.250	2,000
000-1725-055	17.25	17.655	18.730	2,000
000-1800-055	18.00	18.730	20.312	2,000
Part Number MagnaBore™	**Plug OD (in)**	**Setting Range Min (in)**	**Setting Range Max (in)**	**Max Pressure (psi)**
000-5610-090	5.610	5.921	6.538	10,000
000-6090-090	6.090	6.625	7.025	10,000
000-6960-090	6.960	7.511	8.097	8,000
000-7710-090	7.710	8.281	9.001	8,000
000-8690-090	8.690	9.000	9.342	5,000
000-8710-090	8.710	9.282	9.760	5,000
000-9500-090	9.500	9.850	10.369	5,000
000-1200-090	12.00	12.347	12.715	3,000
000-1425-090	14.25	14.688	15.250	2,000
000-1625-090	16.25	16.500	17.197	2,000
000-1725-090	17.25	17.655	18.730	2,000
000-1800-095	18.00	18.730	20.312	2,000

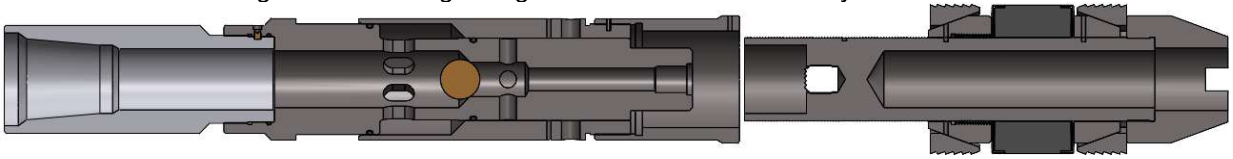
HOW THE H-M BRIDGE PLUG WORKS

The H-M bridge plug is run into wellbore to the desired depth with no setting tool required. The setting mechanism is triggered by dropping the ball down tubing string and pressuring up causing the top slip to break into segments outward to grip the wellbore wall. Once the top slip breaks, the setting of the plug will be completed by pull recommended tension above the pipe weight at the tool. The release options for the H-M bridge plug include both rotational release and stud fracturing.

Once set, the plug isolates the wellbore sections below and above it, preventing fluid flow and pressure communication.



5.610 MagnaBore™ Bridge Plug in Set Position released by rotation illustration.



5.610 MagnaBore™ Bridge Plug in Set Position released by stud fracture illustration.

RUNNING GUIDELINES

GUIDELINES FOR RUNNING H-M BRIDGE PLUG

DISCLAIMER These are **guidelines only** recommended by Alpha Oil Tools. It is the responsibility of the service company to evaluate all the variables for each specific job to formulate the exact procedure for each individual job.

RECOMMENDED PROCEDURE BEFORE RUNNING H-M BRIDGE PLUG:

1. Run a casing scraper (if necessary) to clean inner wall of casing and free any debris or obstructions.
2. Circulate well to clean well of debris and junk.
3. Check casing I.D. 2 ft.-3 ft. below setting depth to ensure no restrictions exist.

MAKE-UP PROCEDURE:

1. Make up tubing on tubing adapter by placing back-up on tubing adapter and rotate tubing to the right until tight.
2. DO NOT REMOVE TUBING ADAPTER FROM PLUG TO MAKE-UP.
3. Do not rest string weight on plug during or after make-up.

RUNNING IN:

1. Run into well at uniform rate - no faster than 30 seconds per 90 foot stand. Be certain tubing is free of debris and excessive scale.
2. Avoid right-hand rotation of tubing string.
3. Use slow starts and stops when moving tubing string - no jerking.

SETTING PROCEDURE H-M PLUG:

1. Run tubing to desired setting point. Use the following parameters to determine optimum setting depth.
   1.a. Never set within 3 feet of a casing collar.
   1.b. Never set where milling has occurred (ie. “Shoe track”).
   1.c. Always set in static conditions (no fluid or gas movement).
   1.d. Never set in a casing joint that has been perforated.
   1.e. Never perforate within 200 feet unless the plug is covered by at least 10 feet of hardened cement. Under no conditions should perforations be made within 50 feet of the plug.
2. Drop ball down tubing string. The ball should be 1-1/4” diameter for HM-P/HM-E. The ball should be 1-3/4” diameter for MagnaBore™. Allow approximately 5 minutes per 1,000 feet for ball to travel in water. More time is needed in mud or viscous fluids.
3. Slowly apply pump pressure to tubing string until 2,000 psi is reached. This pressure will stroke the Hydro-Sleeve down onto slip. The slip will break into segments and make contact with casing. NOTE: If you lose pressure before reaching 2,000 psi, go on to the next step. In heavier weights of casing, slip and hydro sleeve travel is limited which prevents pressure loss. Simply stop at 2,000 psi and proceed to the next step.
   CAUTION: DO NOT EXCEED 2,500 psi. If it is believed that the slips have not broken with a maximum of 2,500 psi, then POOH and evaluate the condition of the tools and well. **Continued high pressure pumping can render the tool inoperable.**

4. **Bleed off all pressure** and pull recommended tension above the pipe weight at the tool, to complete setting the plug. See Table 1. Hold tension for at least 5 minutes to complete the set. It is recommended to calculate tubing stretch versus using weight indicator for true pull.
5. If experiencing difficulties getting the upper slips to bite into the casing, increase the pressure to 200 psi in the tubing.
6. With 200 psi in the tubing, pick up 1,000-2,000lbs to assist in engaging the upper slips with casing I.D.
7. Once confirmed upper slips are engaged, then return to Step 4. ***IMPORTANT* - DO NOT EXCEED 200 psi AND 2,000lbs TENSION.** This causes a cumulative tensile load to the shear stud. Premature shearing of the stud can occur if these values are exceeded.

Table 1: Recommended Tension to Set H-M Bridge Plug and MagnaBore™

Plug Size OD	SETTING FORCES	
	Minimum Tension	Maximum Tension
2.750”	9,000 lbs	12,500 lbs
3.120”	20,000 lbs	23,500 lbs
3.500” - 4.750”	22,000 lbs	24,000 lbs
5.340” – 6.090”	30,000 lbs	44,000 lbs
6.960” – 7.710”	35,000 lbs	44,000 lbs
8.690” – 9.500”	35,000 lbs	44,000 lbs
11.560” – 12.000”	35,000 lbs	44,000 lbs
14.250” – 18.000”	40,000 lbs	44,000 lbs

8. Once the tool is packed off, apply slack off weight (equivalent to tension applied) to ensure the bottom slips are properly engaged.

RELEASING FROM H-M PLUG:

1. The primary tubing release method from the H-M Plug may be achieved by pulling 500 lbs tension at the tool and rotating the work string 9 turns to the right at the tool.
2. The secondary tubing release method from the H-M Plug may be achieved by overcoming the tensile value of the shear stud by pulling tension in the work string to values shown in Table 2.

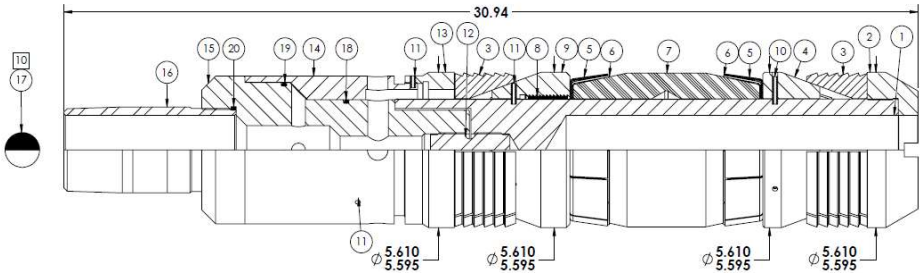
Table 2: Tensile Force to Shear Stud for HM-P Bridge Plugs

Plug Size OD	TENSILE SHEAR FORCES	
	Minimum Tension	Maximum Tension
2.750”	15,500 lbs	22,500 lbs
3.120”	29,500 lbs	34,500 lbs
3.500” - 4.750”	30,000 lbs	40,000 lbs
5.340” – 6.090”	55,000 lbs	60,000 lbs
6.960” – 7.710”	55,000 lbs	60,000 lbs
8.690” – 9.500”	55,000 lbs	60,000 lbs
11.560” – 12.000”	55,000 lbs	60,000 lbs
14.250” – 17.250”	55,000 lbs	60,000 lbs
18.000”	70,000 lbs	80,000 lbs

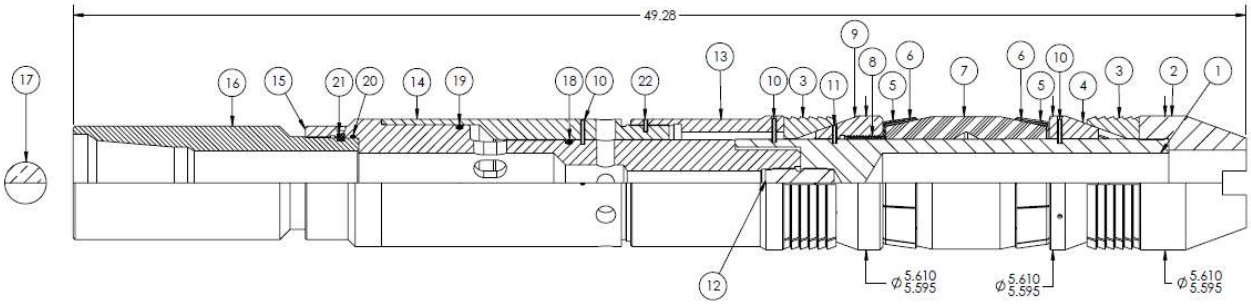
Table 3: Tensile Force to Shear Stud for MagnaBore™

Plug Size OD	TENSILE SHEAR FORCES*	
	Minimum Tension	Maximum Tension
5.610” – 18.000”	70,000 lbs	80,000 lbs

H-M & MagnaBore™ BRIDGE PLUG PARTS LIST



5.610 H-M BRIDGE PLUG ILLUSTRATION (000-5610-055)



5.610 MagnaBore™ BRIDGE PLUG ILLUSTRATION (000-5610-090)

5.610 H-M BRIDGE PLUG BOM

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	000-5610-025	BODY	1
2	002-5610-038	SHOE	1
3	000-5610-011	SLIP	2
4	000-5610-009	CONE	1
5	000-5610-016	OUTER METAL BACK-UP	2
6	000-5610-015	INNER METAL BACK-UP	2
7	000-5610-034	PACKING ELEMENT	1
8	000-5610-013	LOCK RING	1
9	000-5610-008	TOP CONE	1
10	RP0187X100	ROLL PIN	3
11	RP0187X750	ROLL PIN	11
12	000-5610-060	SHEAR STUD	1
13	000-5610-056	ADJUSTER NUT	1
14	000-5610-059	HYDRO SLEEVE	1
15	000-5610-058	TOP SUB	1
16	000-5610-057	TUBING ADAPTER	1
17	000-3500-050	1.25" PHENOLIC BALL	1
18	000-237N-090	237 O-RING	1
19	000-247N-090	247 O-RING	1
20	000-233N-090	233 O-RING	1

5.610 MagnaBore™ BOM

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	000-5610-025	BODY	1
2	000-5610-097	TAPERED SHOE	1
3	000-5610-011	SLIP	2
4	000-5610-009	CONE	1
5	000-5610-016	OUTER METAL BACK-UP	2
6	000-5610-015	INNER METAL BACK-UP	2
7	000-5610-034	PACKING ELEMENT	1
8	000-5610-013	LOCK RING	1
9	000-5610-008	TOP CONE	1
10	RP0187X100	ROLL PIN	8
11	RP0187X750	ROLL PIN	6
12	000-7710-060	SHEAR STUD	1
13	000-5610-096	ADJUSTER SLEEVE	1
14	000-5340-059	HYDRO SLEEVE	1
15	000-5340-058	TOP SUB	1
16	000-7710-057	TUBING ADAPTER	1
17	000-7710-051B	1.75 BRASS/BRONZE BALL	1
18	000-339N-090	339 O-RING	1
19	000-349N-090	349 O-RING	1
20	000-240N-090	240 O-RING	1
21	062-4500-127	SHEAR SCREW	1
22	RP0187X500	ROLL PIN	1

Elastomer Compatibility Guideline Table:

Elastomer Type	Nitrile (NBR)	Hydrogenated Nitrile (HNBR / HSN)	Viton / Fluoroelastomer (FKM)	Aflas (TFE/P)
Low Temp Resistance, °F	-4	-4	5	100
Maximum Heat Resistance, °F	250	300	350	400
H_2S	Very Poor (<0.5%)	Poor (<1%)	Fair (<2%)	Very Good (<20%)
CO_2	Poor (<1%)	Fair (<2%)	Very Good (Unrestricted)	Very Good (Unrestricted)
Amine Inhibitors	Very Poor (Not Recommended)	Very Poor (Not Recommended)	Very Poor (Not Recommended)	Very Good (Unrestricted)
Zn & Ca Bromides	Very Poor (Not Recommended)	Very Poor (Not Recommended)	Very Good (Unrestricted)	Good
Xylene	Very Poor (Not Recommended)	Very Poor (Not Recommended)	Fair	Very Poor (Not Recommended)
HCl & HF Acid	Very Poor (Not Recommended)	Very Poor (Not Recommended)	Fair	Good
Toluene	Very Poor (Not Recommended)	Poor	Fair	Very Poor (Not Recommended)
Sulfuric Acid	Very Poor (Not Recommended)	Poor	Good	Good
Steam	Very Poor (Not Recommended)	Poor	Poor	Poor
Crude Oil	Very Good (Unrestricted)	Very Good (Unrestricted)	Very Good (Unrestricted)	Very Good (Unrestricted)
Methane	Very Good (Unrestricted)	Very Good (Unrestricted)	Very Good (Unrestricted)	Very Good (Unrestricted)
KCl & Salt Water	Very Good (Unrestricted)	Very Good (Unrestricted)	Very Good (Unrestricted)	Very Good (Unrestricted)

Recommended Drillout/Millout of Cast Iron Bridge Plugs or Cement Retainers

General

Preferred method is drilling with medium steel tooth tri-cone bit as it is usually faster than mill- out time for same bridge plug or cement retainer. Drilling results in a chiseling effect, where milling is more of a grinding or shaving effect of the targeted tool. Milling out also results in more debris that can hinder penetration as well as circulation to clear the targeted tool face. History has shown that utilizing a short to medium tooth hard formation rock bit to yield the best results.

Suggested Drilling Techniques

While best methods vary based on equipment, depth of objective, or other factors, Alpha Oil Tools suggests rock bit as suggested above with a rotary speed 75-120 RPM. Use drill collars as required to maintain necessary weight and bit stabilization.

To drill the bridge plug or cement retainer:

1. Apply 5000-7000 pounds until the top end of the retainer/plug mandrel is drilled (4-5 inches).
2. Increase weight to 2000-3000 pounds per inch of bit diameter to complete the drill out. For example, apply 9500 up to 14,250 pounds when using a 4.75-inch bit.

When circulating normally, place a junk basket above the bit. If using reverse circulation, any casing scraper or other equipment above the bit should have an inside fluid passage at least as large as that through the bit so as to allow any/all cuttings to be circulated clear. Utilize varying RPM's and weight on bit to optimize drill out, especially if getting indications that penetration by the bit has slowed or stopped.
Loss of penetration may occur by "bit tracking" usually caused by too little weight on the bit. Besides changing weight and RPM's, bit tracking can be overcome by picking up the bit above the retainer, then re-engaging the objective while maintaining same RPM's as before.

Drilling times are directly related to tool size, bit stability, bit type, weight/RPM's on bit, wellbore fluids, and pump rate/pressure. High viscosity fluids combined with high pump rates may result in sufficient hydraulic force and cause the bit to lift off the objective.

Suggested Milling Technique

If conditions mandate milling be used as the preferred removal method, it is recommended to use a concave junk mill, 60-150 RPM maintaining 5000-8000 pounds on the mill. Use a mud viscosity 60 cps with a minimum annular velocity of 120 ft/min for cuttings removal.

When ready to begin milling, start the mill above the target then slowly lower to the objective. Do not apply excess weight since this can cause "chunking" which will not allow cuttings removal and then slow the millout. If chunking does occur, it will be necessary for a bailer or junk basket to remove chunked debris before milling can resume. A constant milling rate will require added weight as milling progresses.