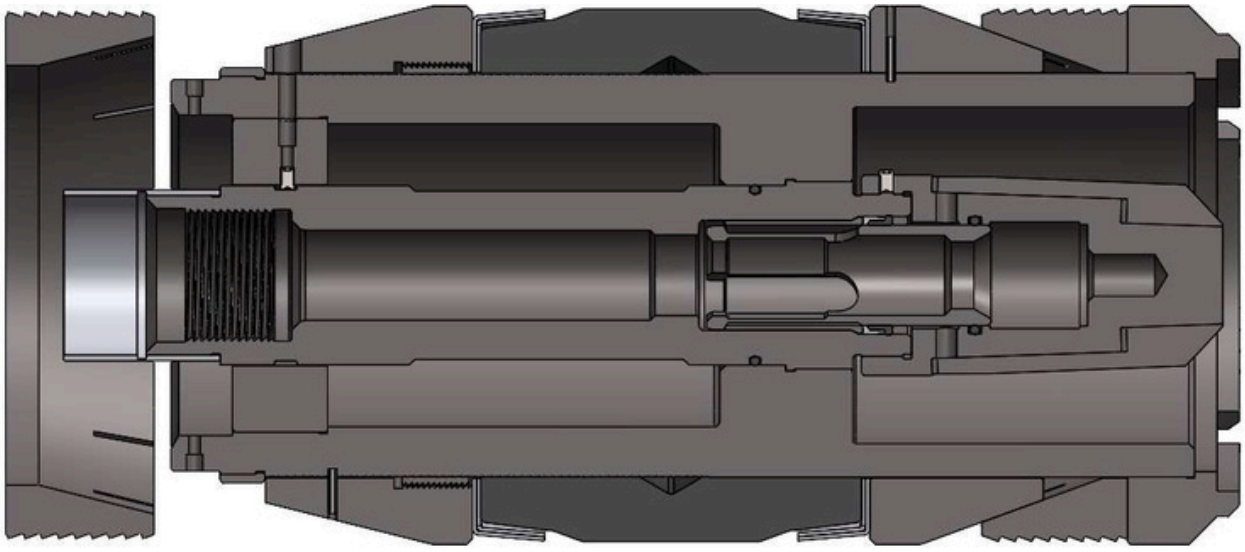
ALPHA FH™ Cement Retainer

Introducing the Model FH™ Sleeve Valve Cement Retainer, a versatile solution designed for efficient one-trip operations when paired with the Alpha Model FH™ Hydraulic Setting Tool. Rotation is unnecessary, making it ideal for deviated wells and challenging conditions where mechanical or wireline set cement retainers may not be suitable.

Controlled by a sliding sleeve valve, operation is simplified: pick up 2” to close and set down weight to open for squeezing. Additionally, cement can be placed on top of the cement retainer or bridge plug.

Features:

- Hydro Set with FH™ Hydraulic Setting Tool
- 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 1.931in to 15.250in (casing ID).



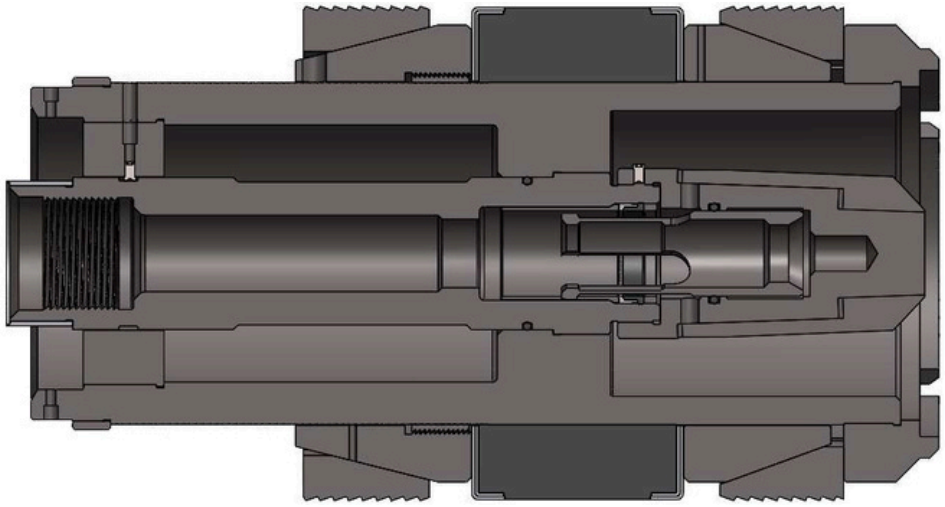
1200 FH™ Cement Retainer illustration.

FH™ CEMENT RETAINER SIZE CHART

Part Number	OD (in)	Setting Range Min (in)	Setting Range Max (in)	Hydraulic Setting Tool	Max Pressure (psi)
005-1750-500	1.750	1.931	2.089	019-1750-200	5,000
005-2187-500	2.187	2.373	2.494	019-2125-200	5,000
005-2725-500	2.725	2.843	3.047	019-2125-200	5,000
005-2750-500	2.750	2.843	3.047	019-2125-200	5,000
005-3125-500	3.125	3.340	3.548	019-2125-200	5,000
005-3593-500	3.593	3.826	4.090	019-3500-200	5,000
005-4312-500	4.312	4.560	5.044	019-3500-200	5,000
005-5687-500	5.687	6.004	6.560	019-5312-200	10,000
005-6312-500	6.312	6.625	7.025	019-5312-200	10,000
005-8125-500	8.125	8.535	9.001	019-5312-200	8,000
005-9437-500	9.437	9.660	10.192	019-5312-200	5,000
005-9500-500	9.500	9.850	10.369	019-5312-200	5,000
005-1200-500	12.00	12.347	12.715	019-5312-200	3,000
005-1425-500	14.25	14.688	15.250	019-5312-200	2,000

HOW THE FH™ CEMENT RETAINER WORKS

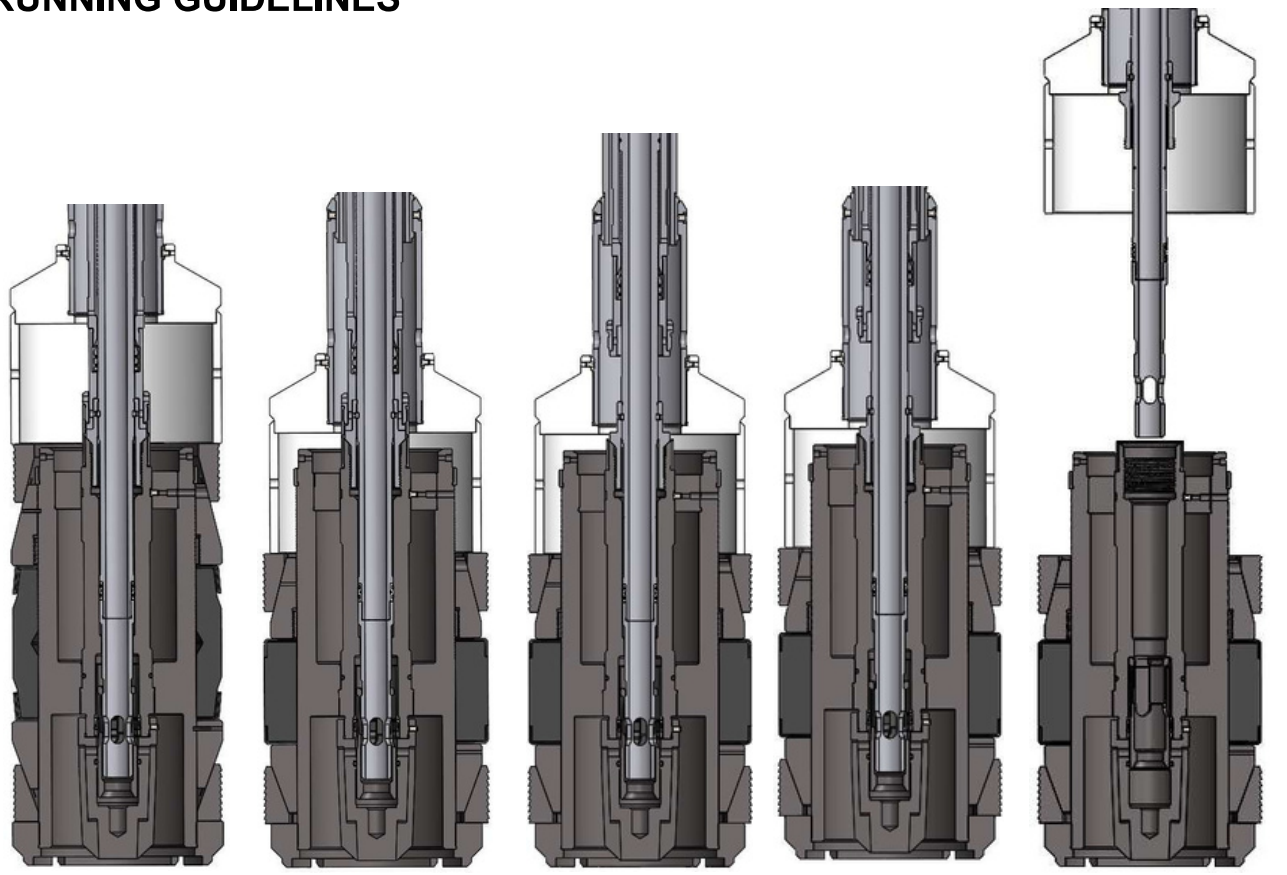
The FH™ Cement Retainer is run into wellbore to the desired depth. The setting mechanism is triggered, causing the cone to push slips outward to grip the wellbore wall and compress the sealing element to form a tight seal. Once the slips are fully anchored and the packing element is compressed, the lock ring will secure the retainer in place. The FH™ cement retainer is equipped with a slide valve that enables the squeezing operation to be initiated or halted at any time. After the cementing process is complete, the valve can be closed, making the retainer to function as a plug. This action retains the squeeze pressure on the cement beneath the retainer and isolates the newly cemented area from the hydrostatic pressures exerted above the cement retainer.



1200 FH™ Cement Retainer in Set Position illustration.

Once the FH™ Cement Retainer is securely installed and on setting depth, initiate the set via hydraulic setting tool to fracture the ring and detach the setting tool from the Retainer.

RUNNING GUIDELINES

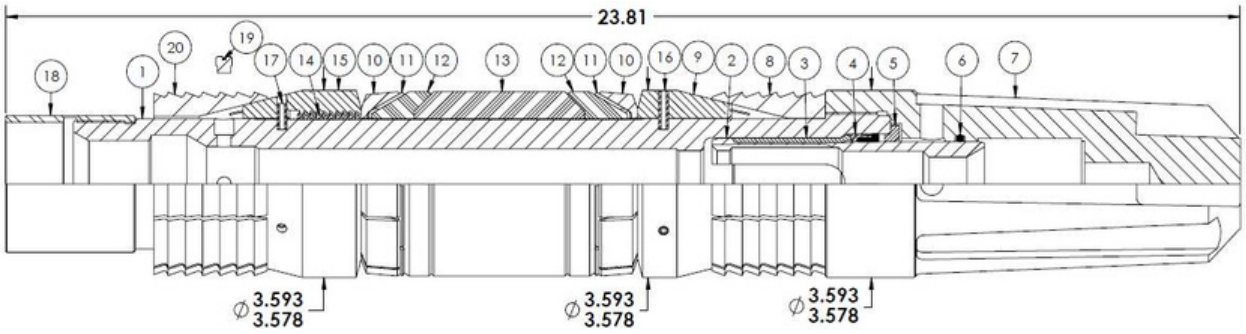


GUIDELINES FOR RUNNING FH™ CEMENT RETAINER

1. Use casing scraper before running any equipment in the well to remove scale and other materials from the casing wall. Any tool that is expected to grip the casing wall has to first reach the casing wall. Follow scraper with gage ring and junk basket.
2. Always follow cleaning, redressing and operational procedures on the setting tool.
3. Use the correct cement retainer for the temperature, pressure, casing size, casing weight and environment.
4. Casing should have 100% cement bond before running plug/retainer in the well.
5. Do not overtighten cement retainer onto setting tool. This action causes the slips to crack which leads to premature setting. Snug tight is sufficient for a cement retainer. The lock spring or nut, depending on make of setting tool, must accompany the tension mandrel to prevent plug/retainer from backing off.
6. Do not allow the setting tool weight to rest on the cement retainer after making up. This can cause the slips to crack.

7. Help guide the setting tool and cement retainer through lubricators, wellhead and blowout preventer. When running under pressure raise tools to the top of lubricator before equalizing the pressure into lubricator.
8. Running speed should not exceed 300 feet per minute to avoid fluid displacement cutting on elastomer. Should setting tool misfire, retrieve equipment no faster than it went in. Slow down for liners and other restrictions.
9. Never set retainer in casing collar or where milling has occurred.
10. Always set retainers in static well conditions (no fluid or gas movement).
11. Shock to the retainers can result in failure. Warn service companies of the retainer depth to avoid high impact collisions. Never use a cement retainer for a reference point (tagging) before cement job is completed.

FH™ CEMENT RETAINER PLUG PARTS LIST

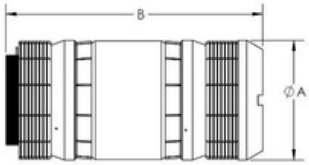


3.593 FH™ CEMENT RETAINER ILLUSTRATION (005-3593-500)

ITEM NO.	PART NUMBER	PART NAME	QTY.
1	005-3593-506	BODY	1
2	005-3593-021	VALVE BODY	1
3	005-3593-026	COLLET SLEEVE	1
4	003-3500-025	MOLDED SEAL	1
5	003-3500-020	SEAL RETAINER	1
6	000-223N-090	223 O-RING	1
7	005-3593-007FC	VALVE SHOE	1
8	005-3593-011	SLIP	1
9	005-3593-009	BOTTOM CONE	1
10	005-3593-024	OUTER METAL BACK-UP	2
11	005-3593-023	INNER METAL BACK-UP	2
12	005-3593-036	END PACKING ELEMENT	2
13	005-3593-037	CENTER PACKING ELEMENT	1
14	005-3593-013	LOCK RING	1
15	005-3593-508	TOP CONE	1
16	RP0187X750	ROLL PIN	3
17	RP0187X500	ROLL PIN	3
18	005-3593-514	SHEAR RING	1
19	062-4500-127	SHEAR SCREW	4
20	005-3593-511	SLIP	1

Models with a size of 8.125 and larger are equipped with both inner and outer body components. Example provided on next page.

FH™ CEMENT RETAINER DIMENSIONAL DATA



Part Number	Dim. "A"	Dim. "B"	Setting Kit	1st Pull Force (lbs.) Shear Screws	2nd Pull. Release from Setting Tool Force (lbs.) Shear Screws.
005-1750-500	1.750	14.87	019-1750-210	8,000 – 9,200	2,000 – 2,600
005-2187-500	2.187	18.38	019-2187-210	10,000 – 11,500	2,000 – 2,600
005-2725-500	2.725	18.63	019-2725-210	12,000 – 13,800	2,000 – 2,600
005-2750-500	2.750	18.63	019-2750-210	12,000 – 13,800	2,000 – 2,600
005-3125-500	3.125	18.63	019-3125-210	12,000 – 13,800	2,000 – 2,600
Part Number	**Dim. "A"**	**Dim. "B"**	**Setting Kit**	**1st Pull Force (lbs.) Shear Ring**	**2nd Pull. Release from Setting Tool Force (lbs.) Shear Screws.**
005-3593-500	3.593	23.81	019-3593-210	24,000 – 25,000	8,000 – 9,200
005-4312-500	4.312	23.81	019-4312-210	24,000 – 25,000	8,000 – 9,200
Part Number	**Dim. "A"**	**Dim. "B"**	**Setting Kit**	**1st Pull Force (lbs.) Shear Ring**	**2nd Pull. Release from Setting Tool Force (lbs.) Latch System**
005-5687-500	5.687	25.53	019-5687-210	50,000 – 55,000	5,000
005-6312-500	6.312	25.31	019-6312-210	50,000 – 55,000	5,000
005-8125-500	8.125	25.84	019-8125-210	50,000 – 55,000	5,000
005-9437-500	9.437	25.84	019-9437-210	50,000 – 55,000	5,000
005-9500-500	9.500	25.84	019-9500-210	50,000 – 55,000	5,000
005-1200-500	12.00	26.22	019-1200-210	50,000 – 55,000	5,000
005-1425-500	14.25	26.22	019-1425-210	50,000 – 55,000	5,000

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.