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AZM OILFIELD TECHNOLOGIES



WE OFFER COMPLETION TOOLS FOR
OIL AND GAS DRILLING OPERATION

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Doc no.	AZM/DEG
Product Name	Azmset CTCR
Tech Unit No.	AZM-524-CTCR
ISSUE DATE	19-Feb-2024
Revision	00

Composite Cement Retainer

The CTCR Composite Cement Retainer's modular, field proven design makes it a versatile tool in a variety of applications. The CTCR may be set mechanically or on a wireline setting tool by changing the top slips. The CTCR also converts to a CTBP bridge plug by replacing the sleeve valve with a solid plug.

Features

- Composite Easy drillable design
- Simple, surface-controlled valve automatically closes when the stinger is removed
- Converts between mechanical or wireline set by changing top slips
- Components rotationally locked for easy drill out
- Converts to a Bridge Plug
- Temperature rating to 400 ° Fahrenheit
- Differential pressure rating to 10,000 psi thru 8-5/8"

Benefits

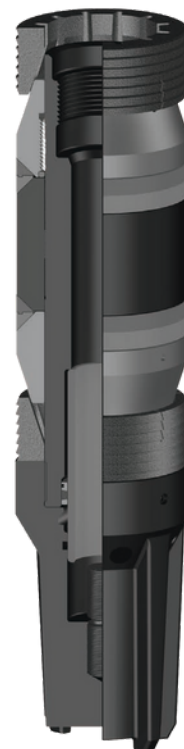
- Allows pressure-testing before squeeze
- Valve protects sensitive zones in low-fluid wells
- Convertibility reduces inventory requirements
- Fast drill out saves rig time

Applications

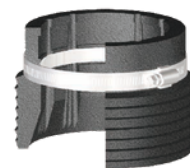
- Cementing
- Stimulation
- Well abandonment
- Temporary or permanent zone isolation

Related Products

- Stinger Seal Assembly
- Drag Spring Tubing Centralizer
- MST Mechanical Setting Tool
- HST Hydraulic Setting Tool



Wireline Set
Cement Retainer



Mechanical Slip
Kit

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SPECIFICATION GUIDE

CASING				TOOL
O.D. (IN./mm)	WEIGHT (LB/FT.-kg/m)	MIN. I.D. (IN/mm)	MAX. O.D. (IN/mm)	MAX. O.D. (IN/mm)
4-1/2 11,430	9.5 - 15.1 14,14 - 22,47	3.826 97,18	4.09 103,89	3.593 96,26
5 12,700	11.5 - 18.0 17,11 - 26,78	4.276 108,61	4.56 115,82	3.937 100,00
5-1/2 13,970	13.0 - 23.0 19,34 - 34,22	4.67 118,62	5.118 129,00	4.312 109,52
5-3/4 14,605	14.0 - 25.2 20,83 - 37,50	4.89 124,21	5.29 134,37	4.7 119,38
6-5/8 16,828	17.0 - 34.5 25,30 - 51,34	5.575 144,61	6.135 155,83	5.375 136,53
7 17,780	17.0 - 35.0 25,30 - 52,08	6.004 152,50	6.538 166,07	5.688 144,48
7-5/8 193,68	20.0 - 39.0 29,76 - 58,03	6.625 168,28	7.125 180,98	6.312 160,32
8-5/8 224,48	24.0 - 49.0 35,71 - 72,90	7.511 190,77	8.097 205,66	7.125 180,98
9-5/8 224,48	29.3 - 61.1 43,60 - 90,92	8.375 212,73	9.063 230,22	8.125 206,38
10-3/4 273,05	32.75 - 60.7 48,73 - 90,32	9.66 245,36	10.192 258,88	9.44 239,78
11-3/4 298,45	60.0 - 83.0 89,28 - 123,50	10.192 258,88	10.772 273,61	9.937 252,40
11-3/4 298,45	38.0 - 60.0 56,54 - 89,28	10.772 273,61	11.15 283,21	10.44 265,18
13-3/8 339,73	48.0 - 72.0 71,42 - 107,14	12.347 313,61	12.715 322,96	12 304,80
16 406,40	65.0 - 128.0 96,72 - 190,46	14.438 366,73	15.25 387,35	14.125 358,78
18 457,20	70.58 - 87.5 105,02 - 130,20	17.088 434,04	17.25 438,15	16.65 422,91
18-5/8 473,08	87.5 130,20	17.48 443,99	18 457,20	17.125 434,98
20 508,00	94.0 - 133.0 139,87 - 197,90	18.33 475,74	19.124 485,74	18.375 166,72
30 762,00	157.73 - 310.0 234,70 - 461,28	28 711,20	29 736,60	27.5 698,50

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TEMPERATURE RATING FOR TCR AND TBP

PACKING ELEMENT	MAXIMUM TEMPERATURE
70 DURO	300 149
80 DURO	350 177
90 DURO	400 204

PRESSURE RATING

SIZE (IN./mm)	PRESSURE RATING (PSI/bar)	SIZE (IN./mm)	PRESSURE RATING (PSI/bar)	SIZE (IN./mm)	PRESSURE RATING (PSI/bar)
4-1/2 - 8-5/8 114,30 - 219,08	10,000 689,48	11-3/4 298,45	4,000 275,79	30.0 762,00	500 34,47
9-5/8 244,48	8,000 551,58	13-3/8 288,93	3,000 206,84		
10-3/4 273,05	5,000 344,74	16.0 - 20.0 406,40 - 508,00	2,000 137,90		

GENERAL OPERATION - Running the CTCR on tubing or drill pipe with the MST Mechanical Setting Tool

The mechanical set CTCR Cement Retainer is run on tubing or drill pipe using the MST mechanical setting tool. The MST mechanical setting tool contains the upper slips of the cement retainer/bridge plug in a safe retracted position while running to setting depth. The slide valve on the retainer is in the open position while being run in the well to allow the tubing to fill, and to allow circulation if necessary.

The upper slips are released by right hand rotation and slack off on the work string. The cement retainer/bridge plug is anchored to the casing by pulling 25-50,000 lb. tension at the tool. When the setting procedure is completed, the slide valve is closed by picking up (2) two inches at the tool or opened by slacking off (2) two inches. With the slide valve in the closed position, the work string may be pressure tested.

The MST mechanical setting tool contains a built in snap-out feature which provides approximately 5,000 lb. snap out tension indicator when the work string is picked up to close the slide valve. This tension indicator is reengaged each time the work string is lowered to open the slide valve.

The MST mechanical setting tool is equipped with drag pads or springs to assure positive control during running and setting procedures at all depths or in highly deviated wells. When the CTCR is converted to a CTBP Bridge plug, the mechanical setting tool must be converted as well by changing the top coupling to a ported coupling, bottom stinger sub and removing the stinger seal. Refer to the MST Tech Unit for details.

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RUNNING INSTRUCTIONS

1. Make up the top sub of the running tool to the lower pin end of the work string. Use a good quality API approved thread lubricant and torque all work string connections to manufactures torque specifications. During run in, take care to avoid any right hand rotation at the setting tool. As a precaution, one left hand turn should be placed in the work string every 10 to 15 stands.
2. When the desired setting depth has been reached, the tools should be picked up two feet (0.6 m) above the desired setting point. This movement is necessary to provide the required tool stroke to release the upper slips and allow the control nut to move freely.
3. Rotate the work string to the right sufficiently to transmit 10 turns to the tool. This right hand rotation will thread the control nut off of its matching threads on the mandrel and release the control sleeve and setting sleeve from the controlled position.
4. Lower the tools back downward to the desired setting point, the drag blocks or springs will support the control sleeve and setting sleeve. The downward motion of the tool mandrel will move the slips from under the setting sleeve, the slips are forced outward toward the casing wall by the leaf springs attached to the inside of each slip segment. When the slips are released, there is sufficient clearance for the locking dog to move outward and release the control latch from the stinger sub body.
5. Pull recommended tension above pipe weight at the tool to set the slips and affect a pack-off.

TOOL SIZE	MINIMUM TENSION (LB./daN)	MAXIMUM TENSION (LB./daN)
4-1/2 - 5-1/2	25000 111205	30000 133447
6-5/8 - 7.0	35000 155688	45000 200170
7-5/8 - 16.0	40000 177929	50000 222411

To assure a pack-off you must pull at least the minimum tension shown in the above chart and hold five minutes. Set down an equivalent amount of weight on the tool and then re-apply the recommended tension. The tool should now be set and pressure testing of the cement retainer and tubing may be performed.

6. The setting tool may be released from the cement retainer by pulling 500 pounds of tension at the tool and rotating the work string 10 turns to the right at the tool. The above movement will shear the shear screw and unscrew the setting tool's control latch from the retainer.
7. The setting tool may be re-latched to the cement retainer by setting down 500 to 1,000 pound of work string weight and snapped out again by pulling 5,000 to 8,000 lb. tension at the tool. The seal assembly will remain in the retainer until the control latch retaining force is exceeded. Each time the setting tool is snapped in and snapped out, the snap-in and snap-out values are reduced until they reach 500 pounds (snap-in) and 5,000 pounds (snap-out).

SPECIAL NOTE: In wells where paraffin or suspended solids in the well fluids are present, the dog on the control latch may not fully release from the stinger sub body. This is indicated when the cement retainer sets properly, as in steps 1 thru 4, but the slide valve will not close so that a tubing pressure test may be performed. In this event the tubing should be alternately picked up and slacked off. This movement will cause the dog to move outward on the inclined edges of the control groove in the stinger sub body, thus freeing the body for the required vertical movement. Two (2) inches of upward vertical movement at the retainer will close the slide valve while two (2) inches of downward vertical movement at the retainer will open the slide valve.

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MOUNTING PCR OR PBP ON THE MST MECHANICAL SETTING TOOL

1. Place top collar of mechanical setting tool in vise with dog of setting tool in an upright position. 2. Move drag block assembly downward until it stops. 3. Rotate drag block assembly to the right until it engages the clutch and stops. Rotate setting sleeve towards drag block assembly until upset on control latch is exposed.
4. Slide upper slips over stinger sub body. Loosen clamp on slips only enough to slide slips over upset on control latch then retighten. Lubricate upper non-wickered portion of slips where setting sleeve contracts slips with grease. Rotate setting sleeve downward over slips until setting sleeve contacts the clamp on slips. Loosen and move the clamp to wickered portion of slips. Continue rotating the setting sleeve downward until sleeve bottoms out against top wicker of slips. Back off 3 turns. Check to ensure that drag block assembly is still engaged with the clutch. Readjust setting sleeve if necessary.
6. Lubricate stinger sub and latch with grease. Place a liberal amount of grease in retainer bore.
7. Slide cement retainer/bridge plug over stinger. Drive retainer over stinger seal until the retainer shoulders out on control latch. Use a wood block to protect lower end of retainer when driving the retainer onto stinger seal.
8. Rotate retainer to make up left hand thread of control latch into left hand thread at top of cement retainer/bridge plug. Make up hand tight.
9. Align screw hole of retainer body and control latch, install shear screw.
10. Rotate setting sleeve downward until it bottoms out on wickered portion of slip. Back up setting sleeve 1/2 turn and secure with 2 set screws.
11. Tighten clamp on upper slips for transport purposes. Remove clamp on upper slips before running in well.

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SETTING EQUIPMENT GUIDE FOR ELECTRIC LINE SET PCR CEMENT RETAINER OR PBP BRIDGE PLUG

The CTCR Cement Retainer/CTBP Bridge Plugs are designed to be set utilizing a Gearhart, Pengo, or Baker E-4 or E-5 Electric Line setting tool. A wireline adapter kit is required to adapt the appropriate size electric line setting tool to the cement retainer/bridge plug. Please check the setting equipment guide on for the proper setting and cementing tool requirements.

You will also find included in this unit individual parts lists and dimensional data for each of the electric line setting equipment. Assembly instructions for attaching the cement retainer/bridge plug to the electric line setting tool should be very carefully read and followed.

The setting and cementing tools are designed to be used many times. For maximum utilization, the tools should be disassembled after each usage, carefully cleaned, inspected and reassembled using new o-rings and seals.

OPERATION

The CTCR Cement Retainer/CTBP Bridge Plug is attached to the wireline pressure setting assembly with the proper size wireline adapter kit and run to setting depth. When the pressure setting assembly is actuated, the tension mandrel moves upward in relation to the setting sleeve of the adapter kit, thus setting and packing off the cement retainer. The pressure setting tool develops force that is in excess of that required to set the cement retainer/bridge plug and the continued upward movement then breaks the release stud allowing the pressure setting tool and adapter kit to be retrieved. The cement retainers sliding valve will be in the closed position after setting and releasing from the pressure setting tool. This provides a high pressure seal from above or below.

CTCR & CTBP SHEAR STUD GUIDE

SIZE (IN.)	SHEAR VALUE
4-1/2	35K
5	35K
5-1/2	35K
5-3/4	35K
6-5/8	55K
7	55K
7-5/8	55K
8-5/8	55K
9-5/8	55K
10-3/4	55K
11-3/4	55K
13-3/8	55K
16	55K
18	55K
18-5/8	55K
20	55K
30	80K

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CONVERSION OF CEMENT RETAINER TO BRIDGE PLUG

1. Clamp the retainer in vise on the lower cone and remove set screw from guide (sizes 8-5/8" and larger, remove set screws from flange of outer mandrel) and remove lower guide.
Remove valve using the stinger sub from the MST Mechanical Setting Tool or Snap-Out Seal Assembly. Slide small end of stinger sub into bore of the cement retainer. Push the stinger down the bore with a bar until it seats inside the valve of the retainer. Bump the valve and the stinger sub out of the retainer mandrel. CAUTION: DO NOT damage valve or stinger sub during valve removal.
3. Lubricate the bore of the cement retainer guide and the lower end of the bridging plug. Inspect the bridge plug and make sure it has an o-ring installed.
4. Install the bridging plug into the bore of the guide.
NOTE: The drive pin in the side of the plug must align with one of the fluid bypass holes in the guide.
NOTE: The thread in the bridging plug MUST be visible.
5. Press the plug into the bore of the guide. Turn the guide upside down, if the plug moves or drops out, clean and lubricate the back of the plug and the bore of the guide, and reseat the plug in the guide. When the plug is properly stuck in place, make-up the guide to the retainer mandrel. Tighten the guide with a wrench and install the two (2) set screws through the lower flange.

CTCR RETAINER / CTBP BRIDGE PLUG EQUIPMENT GUIDE

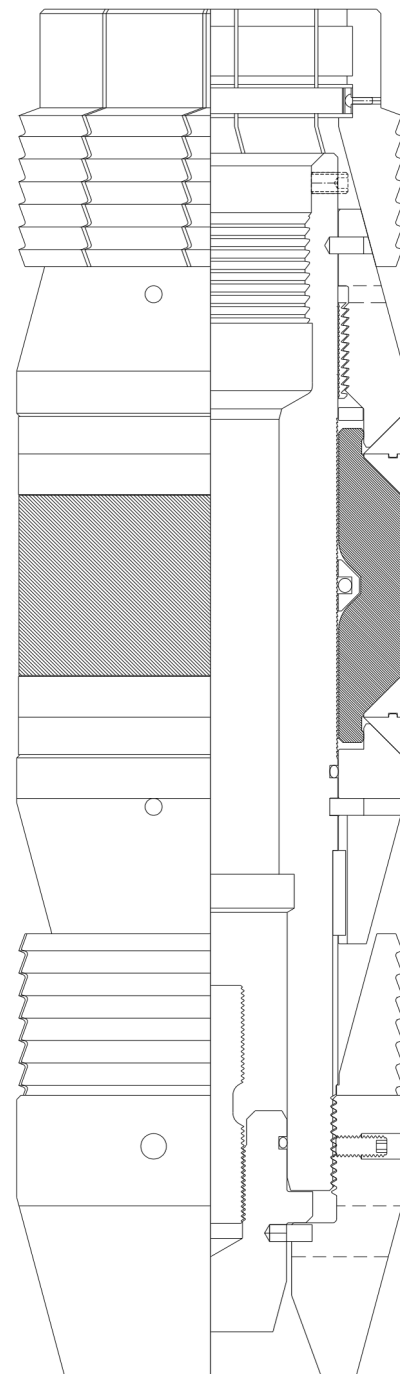
WIRELINE SET: CTCR / CTBP comes with solid wireline settingslips and shear stud.

MECHANICAL SET: CTCR / CTBP comes with mechanical slips (segmented with internal springs held together w/ clamp until it is assembled to mechanical setting tool. Brass shear screws (1-4) depending on size of tool.

MECHANICAL SETTING TOOL: MST does not come with a thread protector as standard but if the tool is to be used to run a CTBP bridge plug, a thread protector is required along with a ported sub to run above tool.

SNAP OUT SEAL ASSEMBLY: SSA requires no additional parts.

WIRELINE ADAPTER KIT



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MILLING PROCEDURE

The recommended mill is a 4 or 5 blade carbide junk mill with one blade extending across the face of the mill 60 – 70% of diameter.. This type mill will reduce the possibility of casing damage during mill-up of the composite plug. Proper bit size should be 92 – 95% of casing drift diameter for jointed pipe and 95 - 98% for coiled tubing motor. Drill collars for weight and centralization are recommended. A Junk Basket is recommended to prevent larger cuttings from settling on the plug while milling. Rotary speeds from 50 – 150 RPM are recommended for coiled tubing motors.

Tag plug with mill and begin circulation to wash any loose debris from top of plug. Circulation rates of ½ to 3 bbl./min. are recommended. Pick-up twelve inches and begin rotation. Set down 5,000 – 8,000 lb. for jointed pipe mill up operations and 500 – 2,000 lb. for coiled tubing motor milling while rotating. Set down weight and pump rate will dictate milling time required. Maintain slack off weight until plug is removed.

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Stinger Sub Seal Assembly

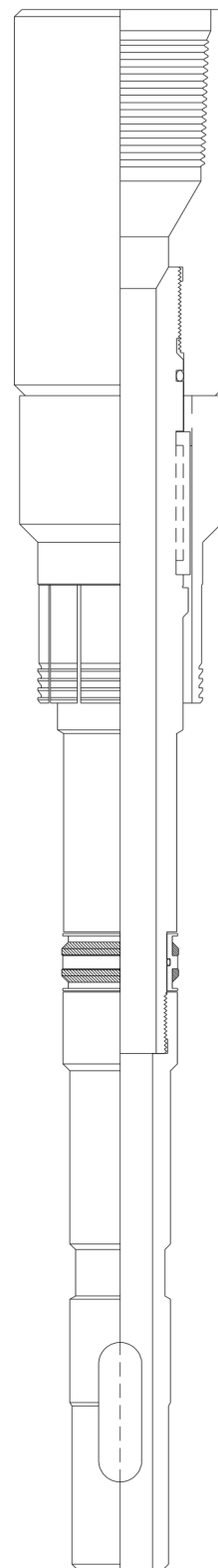
The **Azm oilfield technologies** SSA Stinger Seal Assembly is a tubing conveyed latching seal assembly that is used to operate the sliding valve in a Cement Retainer previously set on wireline. The SSA should always be run with Tubing Centralizer to provide for easier entry into the cement retainer.

The SSA Stinger Seal Assembly features a built in snap out indicator. This provides positive control when the work string is picked up to close the slide valve. The snap out indicator re-engages each time the work string is lowered to open the valve. The snap out indicator helps prevent the seal from pumping out during pumping operations or tubing testing. The snap out indicator may be removed from the cement retainer by straight pull or by rotation if desired.

OPERATION

The **Azm oilfield technologies** Stinger Sub Seal Assembly is used for sealing into, cementing thru and closing the valve on a Cement Retainer. The SSA will open the valve and latch into the cement retainer when approximately 3,000 to 5,000 lb. of set down weight is landed on the cement retainer. Two inches of upward work string movement at the cement retainer will close the valve for fluid containment above or below the cement retainer and will allow tubing testing. Two inches of downward movement at the cement retainer will open the valve and allow fluid to be pumped through the cement retainer.

Approximately 5,000 to 10,000 lb. tension at the cement retainer is required to snap-out. Each time the seal assembly is snapped out, the snap-out force is reduced. The snap-out force will stabilize at approximately 5,000 lb. Snap in force will stabilize at approximately 2,500 lb. The SSA can also be released from the cement retainer by pulling tension (500 to 1,000 lb.) over string weight at the tool and rotating 8 to 10 rounds to the right at the tool. Forces created by pressures applied to the work string and annulus act upon the SSA and work string during cementing operations. Under certain conditions, these forces can cause the SSA to pump out of the cement retainer.



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Tubing Centralizer

The **Azm oilfield technologies** Tubing Centralizer is used to center the tubing and provide for easier entry into a Cement Retainer previously set by wireline. The allows tubing torque to be transmitted to tools below and allows one size tubing centralizer to cover a large range of casing weights by changing drag springs.

SPECIFICATION GUIDE

CASING				TOOL	
O.D. (IN./mm)	WEIGHT (LB/FT.-kg/m)	MIN. I.D. (IN/mm)	MAX. I.D. (IN/mm)	MAX. O.D. BODY (IN./mm)	THREAD CONNECTION BOX X PIN
4-1/2 114,30	9.5 - 15.1 14,14 - 22,47	3.826 97,18	4.090 103,89	3.593 96,26	2-3/8" EU 8 RD
5 127,00	11.5 - 18.0 17,11 - 26,78	4.276 108,61	4.560 115,82	3.593 96,26	2-3/8" EU 8 RD
5-1/2 139,70	13.0 - 23.0 19,34 - 34,22	4.670 118,62	5.118 129,00	3.593 96,26	2-3/8" EU 8 RD
5-3/4 146,05	14.0 - 25.2 20,83 - 37,49	4.890 124,21	5.290 134,37	3.593 96,26	2-3/8" EU 8 RD
6-5/8 168,28	17.0 - 34.5 25,30 - 51,34	5.575 144,61	6.135 155,83	5.375 136,53	2-7/8" EU 8 RD
7 177,80	17.0 - 35.0 25,30 - 52,08	6.004 152,50	6.538 166,07	5.688 144,48	2-7/8" EU 8 RD
7-5/8 193,68	20.0 - 39.0 29,76 - 58,03	6.625 168,28	7.125 180,98	6.312 160,32	2-7/8" EU 8 RD
8-5/8 224,48	24.0 - 52.0 35,71 - 77,38	7.435 188,85	8.097 205,66	7.125 180,98	2-7/8" EU 8 RD
9-5/8 224,48	29.3 - 61.1 43,60 - 90,92	8.375 212,73	9.063 230,22	8.125 206,38	2-7/8" EU 8 RD
10-3/4 273,05	32.75 - 60.7 48,73 - 90,32	9.660 245,36	10.192 258,88	9.440 239,78	2-7/8" EU 8 RD
11-3/4 298,45	60.7-83.0 89,28 -123,50	10.192 258,88	10.772 273,61	9.937 252,40	2-7/8" EU 8 RD
11-3/4 298,45	38.0 - 60.7 56,54 - 90,32	10.772 273,61	11.150 283,21	10.440 265,18	2-7/8" EU 8 RD
13-3/8 339,73	48.0 - 72.0 71,42 - 107,14	12.347 313,61	12.715 322,96	12.000 304,80	2-7/8" EU 8 RD
16 406,40	65.0 - 128.0 96,72 - 190,46	14.438 366,73	15.250 387,35	14.125 358,78	2-7/8" EU 8 RD
20 508,00	94.0 - 133.0 139,87 - 197,90	18.330 475,74	19.124 485,74	18.375 166,72	2-7/8" EU 8 RD



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