

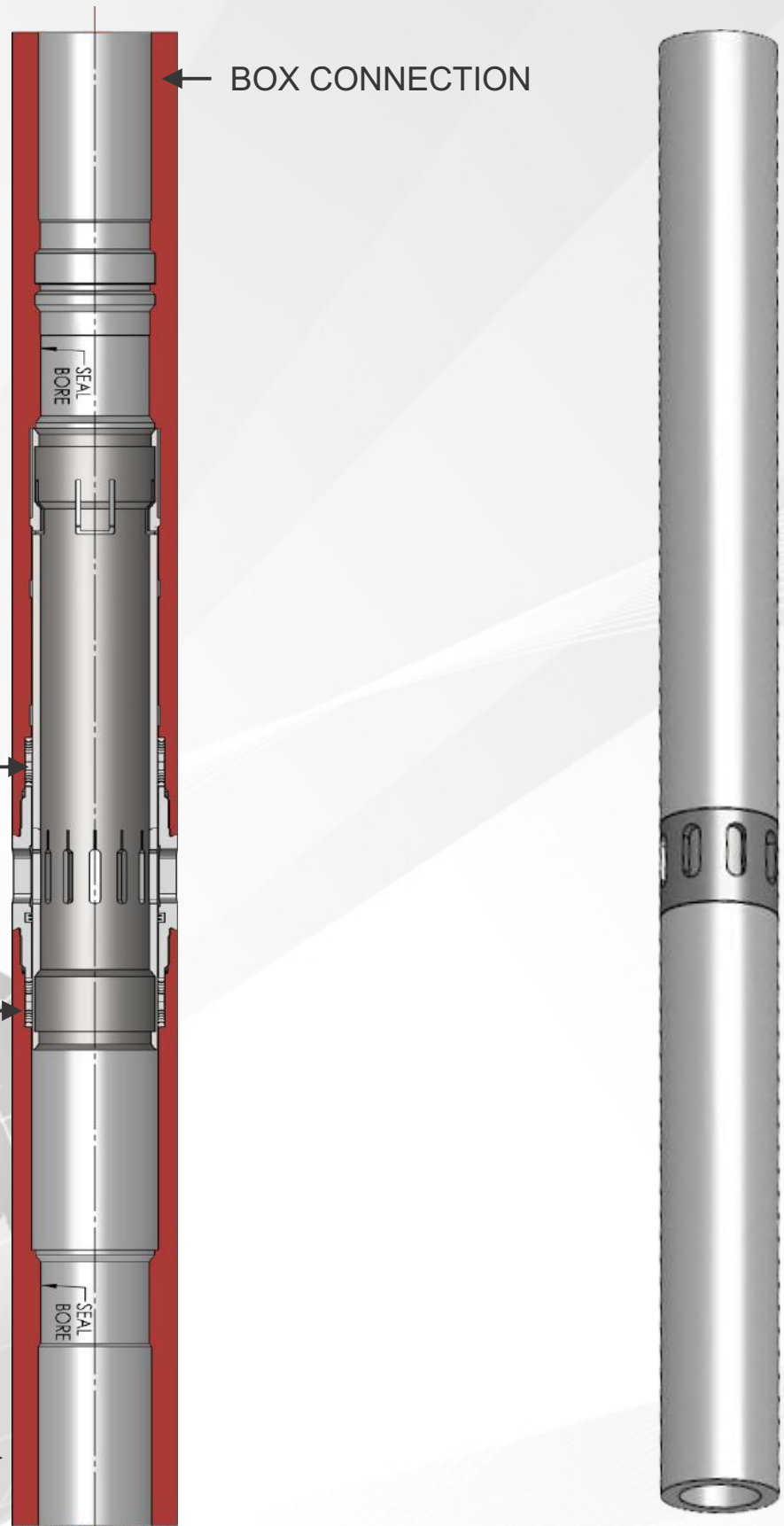
MAXIMUS

Completion Systems

FLOW CONTROL SYSTEMS



MXA - Sliding Sleeve Non-Elastomeric



MXA - Sliding Sleeve Non-Elastomeric

MXA Non-Elastomeric Sliding Sleeve is a communication device with a ported inner sleeve that can be opened or closed using a shifting tool by standard slickline or coiled tubing methods. Equalizing holes in the inner sleeve provide pressure equalization between the tubing and casing annulus as the sleeve is opened.

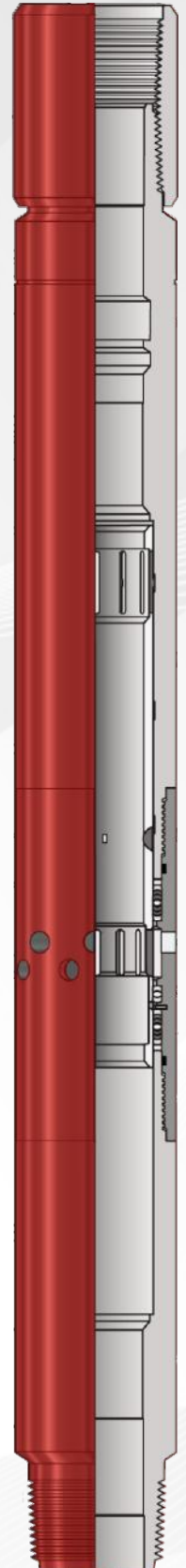
The MXA Sliding Sleeve is a shift-up-to-open tool.

The MXA Non-Elastomeric Sliding Sleeve is designed for use in high temperature wells to establish a means of communication between the tubing string and the casing annulus for single-tubing or multiple-tubing string completions.

MXA Sliding Sleeve may be used for directing flow from the casing to the tubing in alternate or selective completions. Other applications include killing a well, spot acidizing and fracturing, or equalizing pressure between an isolated formation and the tubing string.

Technical Details

- **Temperature Rating:** 350°F
- **Pressure Rating:** 7,000 Psi.
- **Shifting Tools:** "B" & "BO"
- **V-Packings:** Non Elastomeric material. All O-rings are Viton
- **Metallurgy:** L-80, 18-22 HRc as standard body material
- **Metallurgy:** 9Cr. 1Mo. & 13Cr. body material also available
- **Suitable for Well Environment:** H₂S & Co₂ as per NACE MR-01-75



MXA - Sliding Sleeve Non-Elastomeric

Seal Bore ID	Flow Area (Ports)		Flow Area (Min ID)		Max OD	Shifting Tool "MB"
	in.	Sq in.	Sq cm.	Sq in.		
1.875	2.355	15.19	2.762	17.82	3.063	1.875
2.312	3.974	25.64	4.199	27.09	3.668	2.312
2.750	7.212	46.53	5.940	38.32	4.281	2.750
2.812			6.211	40.07	4.281	2.812
3.312	11.426	73.72	8.611	55.55	5.680	3.250
3.812			11.413	73.63	5.680	3.812
4.312	10.598	68.37	14.596	94.17	6.400	4.312
4.562			16.337	105.40	7.500	4.562

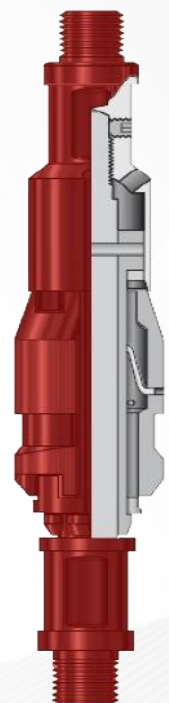
MB Shifting Tool

MB Shifting Tool is designed to selectively locate and shift most sliding sleeves. This is accomplished by the "MB" Shifting Tool keys engaging the Inner Sleeve of the Sliding Sleeve, depending on the direction the tool is run, up or down, the sleeve is shifted.

MB Shifting Tools are supplied standard with self-releasing keys, allowing the shifting tool to disengage.

Self-releasing keys also allow multiple Sliding Sleeves to be shifted in 1 trip.

MB Shifting Tools can also be supplied dressed with Shear-To-Release keys allowing the Shifting Tool to shift only 1 Sliding Sleeve.



MB Shifting Tool

2-7/8" 'MXA' NON-ELASTOMERIC SLIDING SLEEVE

TOP SIDE

BOX CONNECTION

MAX. O.D. 'A'	MIN. I.D. 'B'	PRES.	TEMP. (°F)	MATERIAL	CONNECTION
3.750"	2.312"	-	350	L-80	6.5# EUE BOX X PIN
3.750"	2.312"	-	400	L-80 Cr-13	6.4# VAM TOP BOX X PIN
3.750"	2.312"	-	400	L-80 Cr-13	6.5# VAM TOP BOX X PIN
3.750"	2.312"	7,500	400	L-80	6.5# EUE BOX X PIN
3.750"	2.312"	10,000	400	Cr-13	6.5# VAM TOP BOX X PIN
3.750"	2.312"	7,500	400	L-80	6.5# EUE BOX X PIN

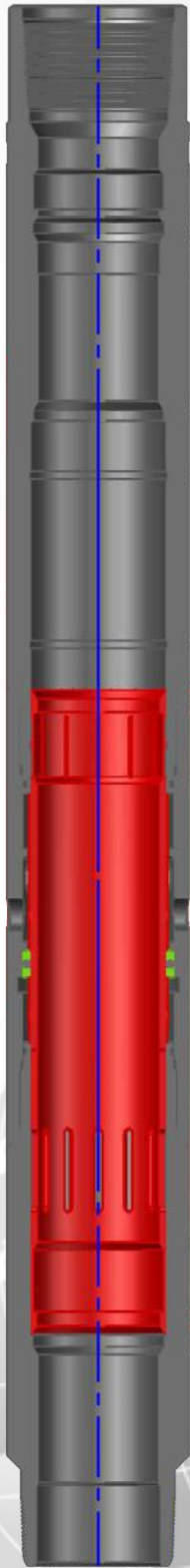
A

LOWER SEAL BORE 'B'

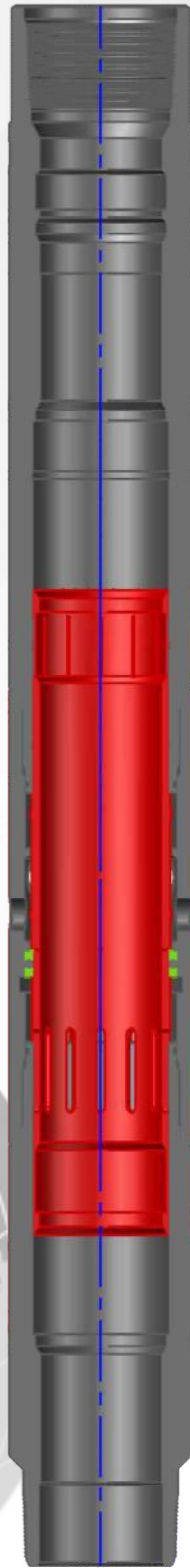
PIN CONNECTION

BOTTOM SIDE

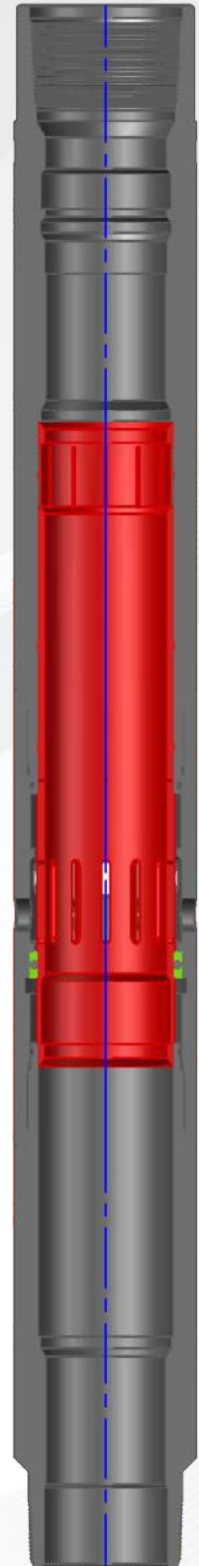
'MXA' NON-ELASTOMERIC SLIDING SLEEVE



Closed position



Equalized position



Open position

'MXA' NON-ELASTOMERIC SLIDING SLEEVE

Description

The MXA Non-Elastomeric Sliding Sleeve is a communication device with a ported inner sleeve that can be opened or closed using a shifting tool by standard slickline or coiled tubing methods. Equalizing holes in the inner sleeve provide pressure equalization between the tubing and casing annulus as the sleeve is opened. The Sliding Sleeve is made up to and forms part of the tubing string. The MXA Sliding Sleeve is a shift-up-to-open tool.

The MXA Non-Elastomeric Sliding Sleeve uses common machined parts that allow the shift-open direction to be changed from up-to-open to down-to-open by simply substituting different sub ends

The MXA Non-Elastomeric Sliding Sleeve is designed for use in high temperature wells to establish a means of communication between the tubing string and the casing annulus for single-tubing or multiple-tubing string completions. The MXA Sliding Sleeve may be used for directing flow from the casing to the tubing in alternate or selective completions. Other applications include killing a well, spot acidizing and fracturing, or equalizing pressure between an isolated formation and the tubing string.

Features and Benefits

- Proven non-elastomeric sealing design, that is cost effective and reliable, with a long operating life.
- Manufactured standard in 4140 18-22Rc Alloy Steel.
- MX Selective Nipple Profile to land slickline tools.



JAS-ANZ



ISO 9001:2015
OHSAS 18001:2007

Technical Accessory Info

- Maximum OD: Coupling OD is standard, but OD can be larger, or smaller upon request.
- Minimum ID: Seal Bores.
- Opening Direction: UP
- Drift Diameter: 0.0010" to 0.0015" smaller than seal bore Minimum ID.
- Shifting Tools: Otis "B", Otis "BO", and DFAST
- Separation Sleeve: MXS
- Blanking Plug: MPX
- Standing valve: MVX

Testing

It is important that the sealing surfaces for the non-elastomeric seals are polished to a high finish to help load the seal stack at low pressure, this is important to ensure successful testing and operation.

All MXA Sliding Sleeves are pressure tested to 7,500 psi using internal seal bore seals that pressure test both the seal stacks and the seal bores.

As previously noted, MXA Sliding Sleeves are shifted with Otis type "B" shifting tools, for testing purposes, a shifting tool dressed with self-releasing keys is used; shear to release keys can also be used.

Depending on the amount of squeeze applied to the V-Rings after assembling the sliding sleeve, the shifting force required to open and close the sliding sleeve may vary, therefore a steel pin is used inside the shifting tool to stop premature shearing of the pin before the sliding sleeve has been fully opened or closed.



1. After fully assembling the sliding sleeve, tighten it in a vise horizontally and shift the sliding sleeve closed-open-closed, verifying that the sliding sleeve is fully closed and open each time.
2. Insert the test plugs into either end of the sliding sleeve; you will feel the seals grab the seal bores, confirming location.
3. Fill the Sliding Sleeve with water or hydraulic fluid and apply pressure up to 500 psi.
4. Apply pressure in 1,000 psi increments, pausing every 1,000 psi for 5 seconds; up to 6,000 psi. Hold at 6,000 psi for 10 minutes.
5. If no pressure drop is found, continue till 7,500 Psi. & hold pressure, ensure there are no leaks and drop in pressure, engrave the sliding sleeve with a pressure test serial number and mark the pressure test chart with the same serial number.
6. Bleed off pressure, shift the sliding sleeve open-closed to ensure functionality and tighten sliding sleeve body connections, wipe down and store.

Well Operation: Operating an MXA Sliding Sleeve

When one or more MXA Sliding Sleeves are run on the same production string, special slickline tool strings might be required to selectively open or close the Sliding Sleeve depending on which Sliding Sleeve is to be opened or closed first.

In the MXA Sliding Sleeve, there is an open, equalized, and closed position. The equalized position allows differential pressure across the Sliding Sleeve to equalize prior to the final full open position and prevent the full force of the differential pressure from acting on the v-seal stacks.



Well operation : Opening an MXA Sliding Sleeve

Important Note:

When opening an MXA Sliding Sleeve, ensure that there is minimal to no differential pressure across the Sliding Sleeve. Differential pressure across the Sliding Sleeve from the annulus to tubing or tubing to annulus could cause damage to the seals of the sliding sleeve.

1. With the keys facing upward, attach the Otis "B" shifting tool to the slickline tool string. Lower the slickline tool string in the tubing until below the Sliding Sleeve. Move the slickline tool string upward until the keys engage in the Upper recess of the Inner Sleeve.
2. Jar upward until the pressure across the Sliding Sleeve starts to equalize.
3. Once the pressure across the Sliding Sleeve has equalized, continue to jar upward until the Inner Sleeve is completely shifted, fully opening the Sliding Sleeve.
4. Continue jarring upward until the inclined shoulder of the Sliding Sleeve forces the keys inward, allowing the shifting tool to pass through the sleeve.
5. Before returning the shifting tool to the surface, run it back through the Sliding Sleeve several times to ensure the inner sleeve is in the OPEN position.



Well operation : Closing an MXA Sliding Sleeve

1. With the keys facing downward, attach the Otis "B" shifting tool to the slickline tool string. Run the slickline tool string in the tubing until the keys of the shifting tool lock in the Lower recess of the Inner Sleeve.
2. Jar downward until the Inner Sleeve is completely shifted, placing the Sliding Sleeve in the closed position.
3. Continue jarring downward until the inclined shoulder of the Sliding Sleeve forces the keys of the shifting tool inward, disengaging it from the recess of the Inner Sleeve, and allow the shifting tool to pass through the sliding sleeve.
4. Before returning the shifting tool to the surface, run it back through the Sliding Sleeve several times to ensure the inner sleeve is in the CLOSE position.

Maximus Completion Systems, Model MXA Sliding Sleeve										
Seal bore I.D.		Flow Area (Ports)		Flow Area (Min. I.D.)		Max. O.D.		Thread Box x Pin	Shifting Tool	Max. Working Pressure (psi)
Inch	mm.	Sq.In.	Sq. cm.	Sq.In.	Sq. cm.	Inch	mm.			
1.250	31.50	0.245	1.58	1.227	7.91	2.054	52.17	1.660" IJ	1.250" B"	9,000
1.500	37.80	0.919	5.93	1.768	11.41	2.375	60.33	1.900" NUE	1.500" B"	8,000
1.625	40.95			2.073	13.37	2.625	66.68	2-1/16" IJ	1.625" B"	
1.875	47.25	2.355	15.19	2.762	17.82	3.063	77.80	2-3/8" EUE	1.875" B"	10,000
2.312	58.26	3.974	25.64	4.199	27.09	3.668	93.17	2-7/8" EUE	2.312" B"	
2.750	69.30	7.212	46.53	5.940	38.32	4.281	108.74	3-1/2" EUE	2.750" B"	7,500
2.812	70.86			6.211	40.07	4.281	108.74		2.812" B"	
3.312	83.46	11.426	73.72	8.611	55.55	5.680	144.27	4-1/2" EUE	3.250" B"	6,500
3.812	96.06			11.413	73.63	5.680	144.27		3.812" B"	
4.312	108.66	10.598	68.37	14.596	94.17	6.400	162.56	5-1/2" EUE	4.312" B"	
4.562	114.96			16.337	105.40	7.500	190.50		4.562" B"	