



Weatherford®

Gas Lift

Chemical-Injection Side-Pocket Mandrels—Round, Solid-Body SBRO-CI Series

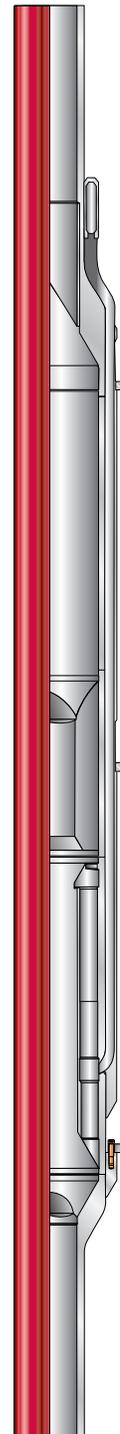
Weatherford's premium **SBRO-CI series** side-pocket mandrels feature a round cross-sectional profile, an integral orienting sleeve, and a unique bat-wing tool guard for the installation of 1-in. and 1 1/2-in. OD chemical-injection devices. The mandrels have a pocket and deflector section that is machined from solid bar stock. This design eliminates all longitudinal welds, providing an extremely strong mandrel for the most demanding environments. Internal profiles, including the bat-wing tool guard, are designed and tested to provide smooth wireline tool passage in highly deviated wellbores, ensuring trouble-free operation throughout the life of the well.

The **SBRO-CI series** mandrels are ideal for applications in which superior strength and increased pressure capabilities are required. Chemical-injection devices are installed in the side pocket, using a kickover tool, which is run into the well using standard wireline techniques. The upper swage section contains an orienting sleeve that aligns the kickover tool with the side pocket for precise installation of chemical-injection devices in straight and deviated wellbores. The special bat-wing tool guard at the top of the pocket captures and guides the chemical-injection device into the pocket and deflects tools larger than the pulling/running tool back into the tubing bore of the mandrel.

These side-pocket mandrels also feature an integral injection tube, attached to the mandrel pocket. The injection tube is connected to the capillary injection line, which is used to transport chemicals from the surface to the mandrel downhole.

Because of their totally machined design, the **SBRO-CI series** mandrels are available in a number of configurations and materials.

Weatherford is the first company to offer the industry 4 1/2-in. side-pocket mandrels certified to ISO 17078-1, Levels V1, E1, F1, and Q1.





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Applications

- SBRO-CI series mandrels are used as internal receivers for the installation and retrieval of chemical-injection devices, primarily in single-string completions.
- These mandrels can be installed in deviated and straight wellbores.

Features, Advantages and Benefits

- Solid-body design eliminates longitudinal welds, which makes the SBRO-CI mandrels ideal for applications in which superior strength and increased pressure capabilities are required.
- Side pocket, guard, and swages have smooth and tapered surfaces specifically designed to avoid wireline snags and corrosion traps. The smooth surfaces also prevent shielded areas that can inhibit the application of proper protective coating.
- The bat-wing tool guard profile ensures that chemical-injection devices are guided into the pocket while larger tools are deflected back into the tubing bore of the mandrel to prevent damage to the valve latch.
- Mandrel material is heat-treated to provide the best combination of strength and corrosion resistance for its intended use.
- The slotted orienting sleeve guarantees positive alignment of the kickover tool, ensuring reliable running and pulling of chemical-injection equipment in deviated wellbores.
- The injection lug is tucked under the upper swedge for added protection of injection line termination.
- Side-pocket mandrel allows for installation or removal of chemical-injection valve without having to pull tubing.



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Specifications

Tubing Size (in./mm)	Pocket Size (in./mm)	Body Configuration	Mandrel Series Model*	Pocket Type	Pocket Latch Configuration	Orienting Sleeve	Running OD*		Drift		Length		Weight	
							(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(lb)	(kg)
2-3/8 60.33	1.0 25.4	Round	SBRO-1CI	Solid Machined	180°	Yes	4.56	115.82	1.901	48.29	83.25	2,115	49	22
2-7/8 73.03	1.0 25.4	Round	SBRO-1CI	Solid Machined	180°	Yes	5.28	134.11	2.347	59.61	85.25	2,165	68	31
3-1/2 88.90	1.0 25.4	Round	SBRO-1CI	Solid Machined	180°	Yes	6.00	152.40	2.867	72.82	87.25	2,216	101	46
	1.5 38.1		SBRO-2CI		180°	Yes	6.59	167.39	2.867	72.82	104.25	2,648	160	73
4-1/2 114.30	1.0 25.4	Round	SBRO-1CI	Solid Machined	180°	Yes	7.00	177.80	3.873	98.37	91.38	2,321	190	86
	1.5 38.1		SBRO-2CI		180°	Yes	7.69	195.33	3.833	97.36	118.00	2,997	245	111
5-1/2 139.70	1.0 25.4	Round	SBRO-1CI	Solid Machined	180°	Yes	8.06	204.80	4.653	118.19	88.09	2,237	250	113
	1.5 38.1		SBRO-2CI		180°	Yes	8.63	219.20	4.653	118.19	122.00	3,099	345	156
7 177.80	1.5 38.1	Round	SBRO-2CI	Solid Machined	180°	Yes	9.13	231.90	6.059	153.90	120.00	3,048	580	263

*Round-body mandrels are custom made, so their dimensions and pressure ratings represent the standard (average) for the tubing size. Slight differences in OD, ID, metallurgy, thread weight, thread, etc. will result in variations to the specifications listed above. Contact Weatherford for further information.

Mandrel Series Model ^a	Assembly Number	Tubing Size (in.) (mm)		Test Pressure							
				Standard Service				Sour Service			
				Internal		External		Internal		External	
(PSI)	(bar)	(PSI)	(bar)	(PSI)	(bar)	(PSI)	(bar)				
SBRO-1CI	2752-XXX	2-3/8	60.33	10,100	696.37	9,500	655.00	7,700	530.90	7,300	503.32
	2753-XXX	2-7/8	73.03	12,700	875.63	11,900	820.48	9,700	668.79	9,000	620.53
	2754-XXX	3-1/2	88.90	11,800	813.58	11,000	758.42	9,000	620.53	8,400	579.16
	2756-XXX	4-1/2	114.30	11,600	799.79	10,200	703.27	8,900	613.63	7,700	530.90
	2758-XXX	5-1/2	139.70	13,000	896.32	11,000	758.42	9,900	682.58	8,300	572.26
SBRO-2CI ^b	2864-XXX	3-1/2	88.90	12,800	882.53	12,000	827.37	9,700	668.79	9,100	627.42
	2866-XXX	4-1/2	114.30	11,600	799.79	10,900	751.53	8,800	606.74	8,300	572.26
	2868-XXX	5-1/2	139.70	10,400	717.05	9,800	675.69	8,000	551.58	7,500	517.11
	2869-XXX	7	177.80	10,200	703.27	9,600	661.90	7,800	537.79	7,300	503.32

^a Round-body mandrels are custom made, so their dimensions and pressure ratings represent the standard (average) for the tubing size. Slight differences in OD, ID, metallurgy, thread weight, thread, etc. will result in variations to the specifications listed above. Contact Weatherford for further information.

^b This mandrel is certified to ISO 17078-1 Side-Pocket Mandrels, Levels V1, E1, F1, and Q1.



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Options

- **SBRO-CI series** mandrels are available in AISI 4130 alloy material, which can be specially heat-treated for corrosive hydrogen sulfide (H₂S) service. Optional materials are available to meet the challenges of harsh downhole environments.
- API and premium standard threads are available in box-by-box or box-by-pin configurations.
- Custom designs with protective rails are available for cable and injection bypass applications.
- **SBRO-CI series** mandrel configurations are available with a special-clearance OD for installation in smaller-diameter casing, where standard-diameter mandrels may not be practical.
- Injection-line termination lug can be provided with various premium metal-to-metal connections.