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# CATALOGUE

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**GAS LIFT EQUIPMENT**

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## The Gas Lift Equipment- An overview

As oil production continues, oil wells get deeper and have reduced reservoir pressure which requires external assistance to take the fluid to surface. To meet these demands, BOTIL offers complete range of Gas lift equipment including Conventional Gas Lift Mandrels, Side Pocket Mandrels and Flow-control devices like Gas Lift Valves, Dummy Valves, Chemical injection Valves , Orifice Valves etc.

BOTIL Wireline Valves (FCDs) of each design, type and size are validated and tested in accordance with ISO 17078-2/API Spec 19G2 as well as Customer specification. These Valves are offered in customer specified materials.

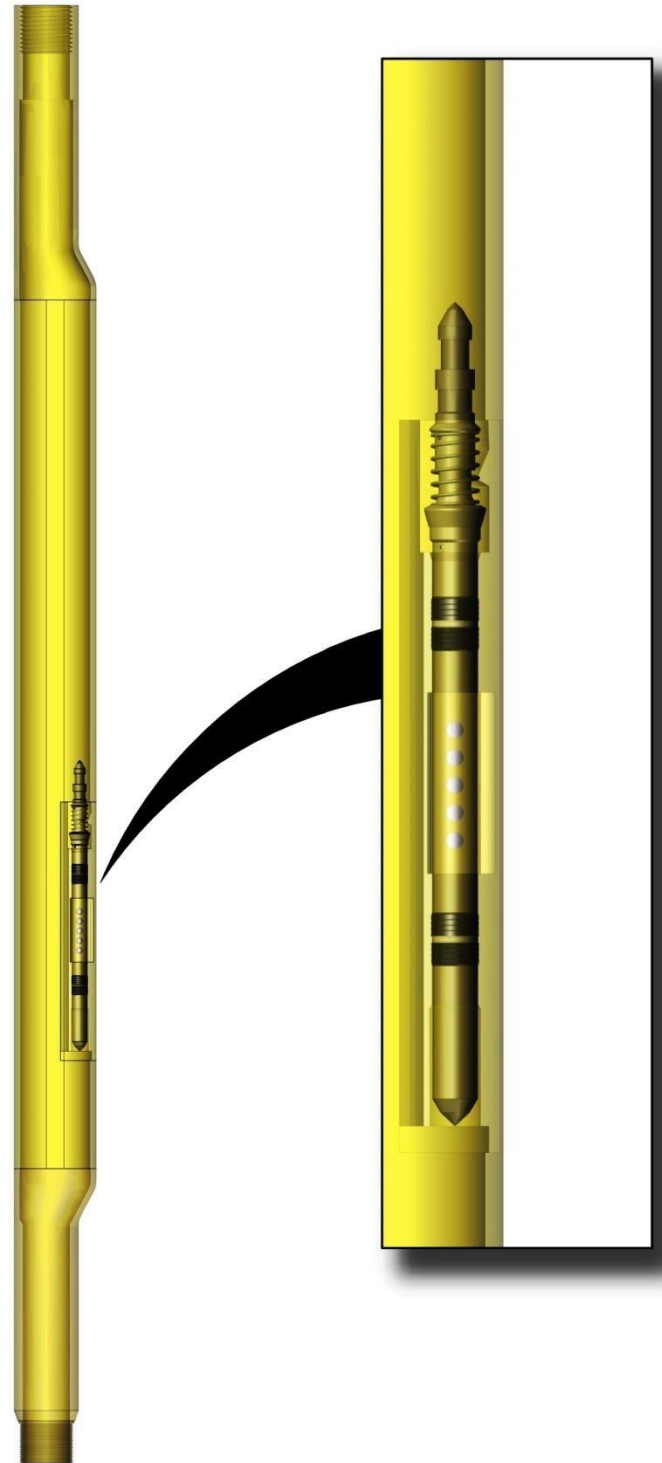
To accommodate these flow-control devices, BOTIL offers Side Pocket Mandrels, specially designed, Manufactured, Validated and tested as per ISO 17078-1/API Specification 19G1 as well as customer specification.

BOTIL SPM range includes operating accessories viz. Latches, Kick-over tool, Running and Pulling tool manufactured and tested as per ISO 17078-3/API Specification 19G3.

The integral Latch and Gas Lift Valve are installed in the Side-pocket Mandrel using standard slick line method with Running tool and Kick-over tool. The Latch secures the Flow-control device inside Pocket seal bore of Side-pocket Mandrel until human intervention takes place.

The Pulling tool is used with Kick-over tool to retrieve flow-control devices from a Side-pocket Mandrel. This releases the locking mechanism of the Latch and retrieves Flow-control devices attached to it.

Other Gas lift equipment such as Conventional Gas lift mandrels, Conventional Valves (tubing retrievable) etc. are also offered to meet the industry requirements



## SIDE POCKET MANDREL (STANDARD)

**BI 820-02**

BOTIL model 'B1M' & 'B2M' Side Pocket Mandrels allow use of standard Wireline tools for installation and retrieval of different types of flow control devices.

### MATERIALS:

Generally low alloy steel AISI 4130 is used. For corrosive application, 410 Stainless Steel, 13Cr is used. Other materials may be used as per NACE MR-01-75 /ISO 15156 (all Parts)/ customer's requirement.

### FORGINGS:

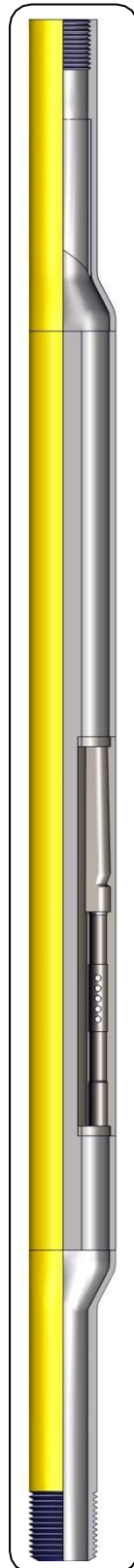
Pockets & Tool discriminators are closed die forged and are integral part of the Pocket. Swages are forged from seamless mechanical tubing or it can be machined from solid bar stock. Forgings are made by using a precision closed die process. All forged parts are visually and dimensionally inspected by Quality Control before machining. After Heat treatment, additional testing i.e. Grain Flow, Micro Examination, Hardness Testing, Dye Penetrant Testing Magnetic Particle Testing & Ultrasonic Testing are also carried out.

### MACHINING:

Pockets are machined using Deep Hole Drilling & boring process that provides accurate polished bore diameters, alignment and better surface finish for packing seals. The Orienting Sleeve and Swages are machined with precision accuracy. Threads are machined as per design specification. All components are dimensionally inspected before welding and assembly as per BOTIL procedure.

### WELDING & HEAT TREATMENT:

Welding is done as per ASME Section IX and BOTIL welding process to ensure full penetration of weld joints during welding of Swages and Pocket with Round pipe. After welding, grinding operations are carried out to remove external weld deposits and to match mandrels outside profile.



All mandrels are heat treated, quenched & tempered to required hardness as per well environmental service class specified by customer/end user.

### ASSEMBLED MANDREL:

After welding and post-weld heat treatment each mandrel is tested as per ISO 17078-1 /API Specs 19G1 for hardness, internal and external drift and rated pressure etc. Additionally, non-destructive testing (Magnetic particle/ Radiography) can be done if requested by customer.

ENGINEERING DATA							
Tubing Size (inch)	Valve OD (inch)	Mandrel		SPM Configuration			
		Type	Shape	Length	Major OD	Minor OD	ID
2 3/8	1.0	B1M	OVAL	83	4.25	2.92	2.000
2 3/8	1.5	B2M	OVAL	102	4.75	4.00	2.000
2 7/8	1.0	B1M	OVAL	85	4.75	4.00	2.441
2 7/8	1.5	B2M	OVAL	103	5.50	4.59	2.441
3 1/2	1.0	B1M	OVAL	85	5.31	4.12	2.992
3 1/2	1.5	B2M	OVAL	104	6.06	5.00	2.992
4.0	1.0	B1M	OVAL	86	5.85	5.00	3.476
4.0	1.5	B2M	OVAL	107	6.63	5.55	3.476
4 1/2	1.0	B1M	OVAL	90	5.86	5.00	3.897
4 1/2	1.0	B1M	OVAL	86	6.45	5.50	3.958
4 1/2	1.5	B2M	OVAL	107	7.03	5.625	3.958
5.0	1.5	B2M	OVAL	116	7.94	6.80	4.408
5 1/2	1.0	B1M	OVAL	87	7.94	6.80	4.778
5 1/2	1.5	B2M	OVAL	115	7.44	6.05	4.000

PRESSURE RATING					
Tubing Size (inch)	Valve OD (inch)	STD Service		Sour Service	
		Internal	External	Internal	External
2 3/8	1.0	8000	7000	6000	5500
2 3/8	1.5	7500	6500	6000	5000
2 7/8	1.0	8000	7000	6000	5500
2 7/8	1.5	7500	6500	6000	5000
3 1/2	1.0	8000	6500	6000	5000
3 1/2	1.5	8000	6500	7000	5500
4.0	1.0	8000	6500	7000	5500
4.0	1.5	8000	6500	7000	5500
4 1/2	1.0	7500	6000	6000	5000
4 1/2	1.0	7500	6000	6000	5000
4 1/2	1.5	7500	6000	6000	5000
5.0	1.5	8500	7000	6500	5500
5 1/2	1.0	7500	6000	6000	5000
5 1/2	1.5	7500	6000	6000	5000

## SIDE POCKET MANDREL (ML SERIES)

**BI 820-02**

**BOTIL** model 'B1ML' & 'B2ML' Side Pocket Mandrels allow use of standard wireline tools for installation and retrieval of different types of flow control devices.

### MATERIALS:

Generally low alloy steel AISI 4130 is used. For corrosive application, 410 Stainless Steel, 13Cr is used. Other materials may be used as per NACE MR-01-75 /ISO 15156 (all Parts)/ customer's requirement.

### FORGINGS:

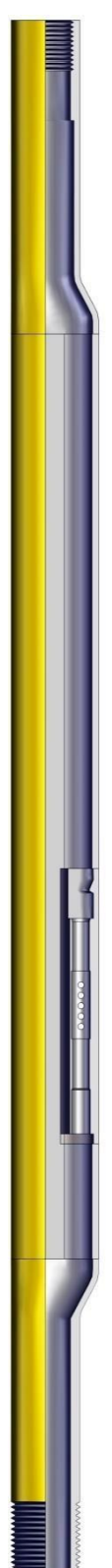
Swages are forged from seamless mechanical tubing or machined from solid bar stock for low volume. Forgings are made by using a precision upsetting process. All parts are visually and dimensionally inspected before machining. After forging, heat-treatment and other additional testing i.e. Grain flow, micro examination, hardness testing, Penetrant testing, Ultrasonic testing are also carried out.

### MACHINING:

Pockets are made from solid bar without tool discriminators and machined using Deep Hole Drilling & boring process that provides accurate polished bore diameters, alignment and required surface finish to suit packing seals. The swages are machined with precision accuracy and threads are machined as per customer requirements/ design specification. All components are dimensionally inspected before welding and assembly as per BOTIL procedure.

### WELDING & HEAT TREATMENT:

Welding is done as per ASME Section IX and BOTIL welding process to ensure full penetration of weld joints during welding of Swages and Pocket with Oval pipe. After welding, grinding operations are carried out to remove external weld deposits and to match mandrels outside profile.



All mandrels are heat treated, quenched & tempered to required hardness as per well environmental service class specified by customer/end user.

### ASSEMBLED MANDREL:

After welding and post-weld heat treatment each mandrel is tested as per ISO 17078-1/API Specs 19G1 for hardness, internal and external drift and rated pressure etc. Additionally, non-destructive testing (Magnetic particle/ Radiography) can be done if requested by customer.

ENGINEERING DATA							
Tubing Size (inch)	Valve OD (inch)	Mandrel		SPM Configuration			
		Type	Shape	Length	Major OD	Minor OD	ID
2 3/8	1.0	B1ML	OVAL	83	4.25	2.92	2.000
2 3/8	1.5	B2ML	OVAL	102	4.75	4.00	2.000
2 7/8	1.0	B1ML	OVAL	85	4.75	4.00	2.441
2 7/8	1.5	B2ML	OVAL	103	5.50	4.59	2.441
3 1/2	1.0	B1ML	OVAL	85	5.31	4.12	2.992
3 1/2	1.5	B2ML	OVAL	104	6.06	5.00	2.992
4.0	1.0	B1ML	OVAL	86	5.85	5.00	3.476
4.0	1.5	B2ML	OVAL	107	6.63	5.55	3.476
4 1/2	1.0	B1ML	OVAL	90	5.86	5.00	3.897
4 1/2	1.0	B1ML	OVAL	86	6.45	5.50	3.958
4 1/2	1.5	B2ML	OVAL	107	7.03	5.625	3.958
5.0	1.5	B2ML	OVAL	116	7.94	6.80	4.408
5 1/2	1.0	B1ML	OVAL	87	7.94	6.80	4.778
5 1/2	1.5	B2ML	OVAL	115	7.44	6.05	4.000

PRESSURE RATING					
Tubing Size (inch)	Valve OD (inch)	STD Service		Sour Service	
		Internal	External	Internal	External
2 3/8	1.0	8000	7000	6000	5500
2 3/8	1.5	7500	6500	6000	5000
2 7/8	1.0	8000	7000	6000	5500
2 7/8	1.5	7500	6500	6000	5000
3 1/2	1.0	8000	6500	6000	5000
3 1/2	1.5	8000	6500	7000	5500
4.0	1.0	8000	6500	7000	5500
4.0	1.5	8000	6500	7000	5500
4 1/2	1.0	7500	6000	6000	5000
4 1/2	1.0	7500	6000	6000	5000
4 1/2	1.5	7500	6000	6000	5000
5.0	1.5	8500	7000	6500	5500
5 1/2	1.0	7500	6000	6000	5000
5 1/2	1.5	7500	6000	6000	5000

**SIDE POCKET MANDREL  
(SPECIAL CLEARANCE ROUND BODY)  
BI 820-07**

**BOTIL** model 'B1MR-U' special clearance round body Side Pocket Mandrels allow use of Wireline tools for installation and retrieval of different types of flow- control devices in smaller-diameter casing, where standard-diameter mandrels may not be practical.

**MATERIALS:**

Generally low alloy steel AISI 4130 is used. For corrosive application, 410 Stainless Steel, 13Cr is used. Other materials may be used as per NACE MR-01-75 /ISO 15156 (all Parts)/ customer's requirement.

**FORGINGS:**

Swages are forged from seamless mechanical tubing or machined from solid bar stock for low volume. Forgings are made by using a precision upsetting process. All parts are visually and dimensionally inspected before machining. After forging, heat-treatment and other additional testing i.e. Grain flow, micro examination, hardness testing, Penetrant testing, Ultrasonic testing are also carried out.

**MACHINING:**

Pockets with integral tool discriminators are machined from solid bar using Deep Hole Drilling & boring process that provides accurate polished bore diameters, alignment and required surface finish to suit packing seals. The Orienting sleeve and Swages are machined with precision accuracy and threads are machined as per customer requirements / design specification. All components are dimensionally inspected before welding and assembly as per BOTIL procedure.

**WELDING & HEAT TREATMENT:**

Welding is done as per ASME Section IX and BOTIL welding process to ensure full penetration of weld joints during welding of



Swages, Orienting Sleeve and Pocket with Round pipe. After welding, grinding operations are carried out to remove external weld deposits and to match mandrels outside profile.

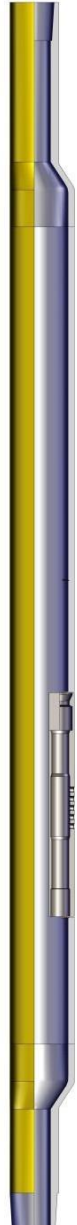
All mandrels are heat treated, quenched & tempered to required hardness as per well environmental service class specified by customer/end user.

**ASSEMBLED MANDREL:**

After welding and post-weld heat treatment each mandrel is tested as per ISO 17078-1/API Specs 19G1 for hardness, internal and external drift and rated pressure etc. Additionally, non-destructive testing (Magnetic particle/ Radiography) can be done if requested by customer.

**SIDE POCKET MANDREL  
(SPECIAL CLEARANCE ROUND BC  
WITHOUT ORIENTING SLEEVE)  
BI 820-29**

**BOTIL** model 'B1MLR' & 'B2MLR' Side Pocket Mandrels are similar to above model B1MR-U' SPM but does not have Orienting Sleeve and tool discriminators for Pocket.



ENGINEERING DATA- MODEL B1MR-U & B1MLR						
Tubing Size (inch)	Valve OD (inch)	Mandrel		Dimensions (inch)		
		Type	Shape	Length	OD	I.D.
2 3/8	1.0	B1MR-U B1MLR	ROUND	85	3.9	1.995

PRESSURE RATING					
Tubing Size (inch)	Valve OD (inch)	STD Service		Sour Service	
		Internal	External	Internal	External
2 3/8	1.0	6000	3600	5000	3300

**SIDE POCKET MANDREL  
(CHAMBER LIFT)**

**BI 820-27**

**BOTIL** model 'B1ME' & 'B2ME' Chamber Lift Side Pocket Mandrels allow use of standard wireline tools for installation and retrieval of different types of flow control devices.

**MATERIALS:**

Generally low alloy steel AISI 4130 is used. For corrosive application, 410 Stainless Steel, 13Cr is used. Other materials may be used as per NACE MR-01-75 /ISO 15156 (all Parts)/ customer's requirement.

**FORGINGS:**

Pockets & Tool guard discriminators are closed die forged and are integral part of the Pocket. Swages are forged from seamless mechanical tubing or it can be machined from solid bar stock. Forgings are made by using a precision closed die process. All forged parts are visually and dimensionally inspected by Quality Control before machining. After Heat treatment, additional testing i.e. Grain Flow, Micro Examination, Hardness Testing, Dye Penetrant Testing Magnetic Particle Testing & Ultrasonic testing are also carried out.

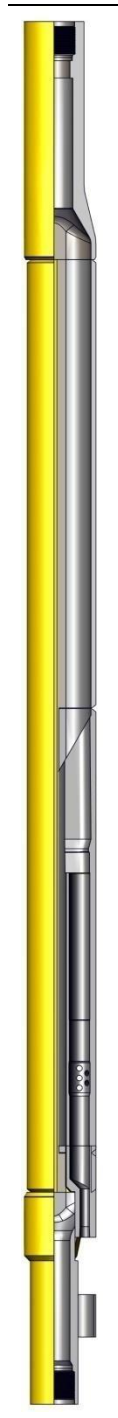
**MACHINING:**

Pockets are machined using Deep Hole Drilling & boring process that provides accurate polished bore diameters, alignment and better surface finish for packing seals. The swages are machined with precision accuracy. Threads are machined as per design specification. The exhaust port is welded with Pocket outlet.

All components are dimensionally inspected before welding and assembly as per BOTIL procedure.

**WELDING & HEAT TREATMENT:**

Welding is done as per ASME Section IX and BOTIL welding process to ensure full penetration of weld joints during welding of



Swages, Orienting Sleeve and Pocket with Oval pipe. After welding, grinding operations are carried out to remove external weld deposits and to match mandrels outside profile.

All mandrels are heat treated, quenched & tempered to required hardness as per well environmental service class specified by customer/end user.

**ASSEMBLED MANDREL:**

After welding and post-weld heat treatment each mandrel is tested as per ISO 17078-1/API Specs 19G1 for hardness, internal and external drift and rated pressure etc. Additionally, non-destructive testing (Magnetic particle/ Radiography) can be done if requested by customer.

For CRA alloys copper plating followed by glass-bead peening on box threads are done to prevent threads galling. For low-alloy medium carbon steels phosphate coating are done. Other specific coating/plating requirements can be done if specified by the user/purchaser and agreed by BOTIL.

ENGINEERING DATA							
Tubing Size (inch)	Valve OD (inch)	Mandrel		SPM Configuration			
		Type	Shape	Length	Major OD	Minor OD	ID
2 7/8	1.0	B1ME	OVAL	85	4.75	4.00	2.441
2 7/8	1.5	B2ME	OVAL	103	5.50	4.59	2.441
3 1/2	1.0	B1ME	OVAL	85	5.31	4.12	2.992
3 1/2	1.5	B2ME	OVAL	104	6.06	5.00	2.992

PRESSURE RATING					
Tubing Size (inch)	Valve OD (inch)	STD Service		Sour Service	
		Internal	External	Internal	External
2 7/8	1.0	8000	7000	6000	5500
2 7/8	1.5	7500	6500	6000	5000
3 1/2	1.0	8000	6500	6000	5000
3 1/2	1.5	8000	6500	7000	5500

## WIRELINE RETRIEVABLE GAS LIFT VALVES (IPO)

**BI 01-40-1000 ('GR-40' GAS LIFT VALVES)**  
**BI 01-20-1000 ('GR-20' GAS LIFT VALVES)**

### DESCRIPTION

BOTIL GR Series valve utilizes nitrogen charged bellow configuration designed for either continuous or intermittent flow applications. They are especially suitable for use as unloading and operating valves in areas where high gas lift pressures are available. Since the charge pressure above the bellows is affected by temperature, it is important that the operating temperatures at the valve be known. These valves are available in Wireline installations.

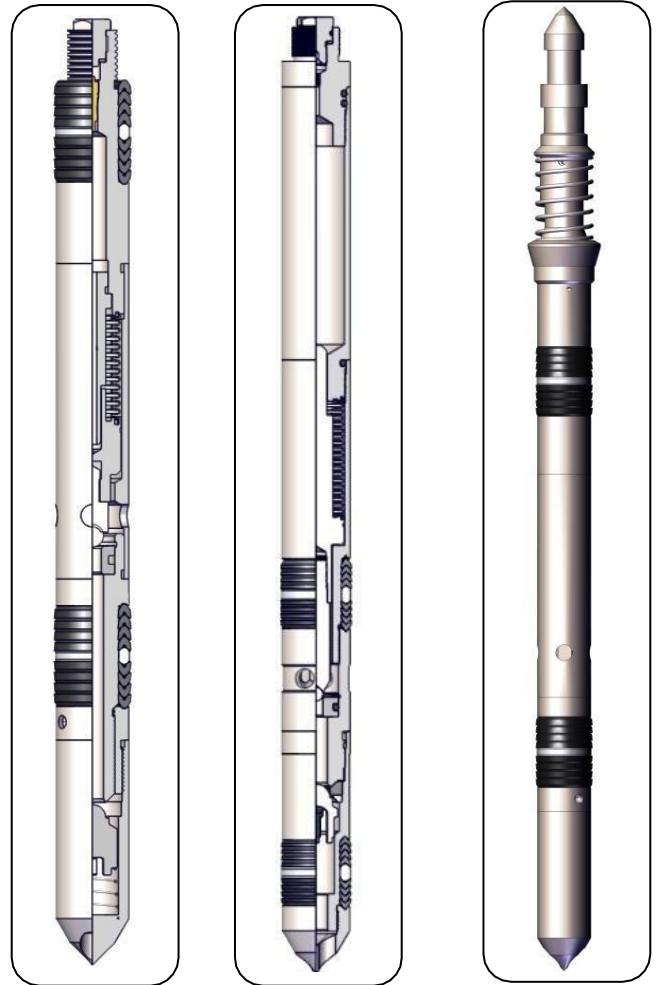
### ADVANTAGES

Vibration protected 3-ply Monel bellow are designed to withstand hydrostatic pressure up to 5000 psi. Nitrogen dome charge, acting on the O.D. of the bellow, permits bellows to expand uniformly without stacking, thus prolonging bellow's life. The multiple port size availability, make this valve series appropriate for a wide range of operating conditions. Reversible seat are available in several different materials.

### OPERATING PRINCIPLE

The nitrogen charged dome applies pressure to the external area of the bellows provides the downward force, holding the valve on its seat. This dome pressure is preset at the reference temperature and corrected to operating temperature. The opening forces on the valve are the casing pressure acting on the internal area of the bellows (less the area of the seat) and the tubing pressure acting on the seat area. When the combined Casing & Tubing pressures are sufficient, the valve opens. Once the valve is open, it remains open until the casing pressure is reduced to predetermined closing pressure. The spread (the difference between

opening & closing casing pressure) is controlled by the tubing sensitivity of the valve. The larger the seat port area, the more tubing sensitive the valve is.



GR-40  
Gas Lift Valve

GR-20  
Gas Lift Valve

Gas Lift Valve  
with Latch

ENGINEERING DATA					
BOTIL Valve Model	Valve OD (inch)	Packing OD (inch)		SPM Compatibility	Port size Range (inch)
		Upper	Lower		
GR-40	1.0	1 1/32	1 1/32	B1M, B1MR, TMP	1/8 – 5/16
GR-20	1.5	1 9/16	1 1/2	B2M, B2MR, TP	1/8 – 1/2

TOOLING COMPATIBILITY					
BOTIL Valve Model	Valve OD (inch)	Latch	Kick-over tool	Running tool	Pulling tool
GR-40	1.0	GBK-2	BK-5	JK/BC-1	1 1/4 JDC/MP
GR-20	1.5	GRK	BM1	RK-1/BC-1	1 5/8 JDS/PTG

## WIRELINE RETRIEVABLE ORIFICE VALVES BI 820-06

### DESCRIPTION

BOTIL 'GRO' series, single-point injection Orifice valves are designed for circulating operations and provide means for communication between the tubing and the annulus at the operating valve depth. All of these valves contain integral reverse flow check valves which prevent reverse flow communication back through the valves.

These valves are available in 1in [25.4 mm] OD 'GRO-40' & 1-1/2-in [38.1 mm] OD 'GRO-20' in either stainless steel or nickel alloys for corrosion resistance in wells with high concentrations of H<sub>2</sub>S or CO<sub>2</sub>. Packing and elastomeric materials for the valves are available for various service classes to suit individual well conditions.

### ADVANTAGES

- No need to pull the entire tubing for maintenance or exchange.
- Positive sealing feature of Integral reverse flow check valve prevents intrusion of production fluids into annulus.
- Replaceable square edged orifice in Tungsten Carbide material
- Flow capacity determined by orifice sizing
- May be coated, if necessary, to meet the most demanding applications.
- Compatible with other manufacturers Side-pocket Mandrels e.g. TMP/TP.

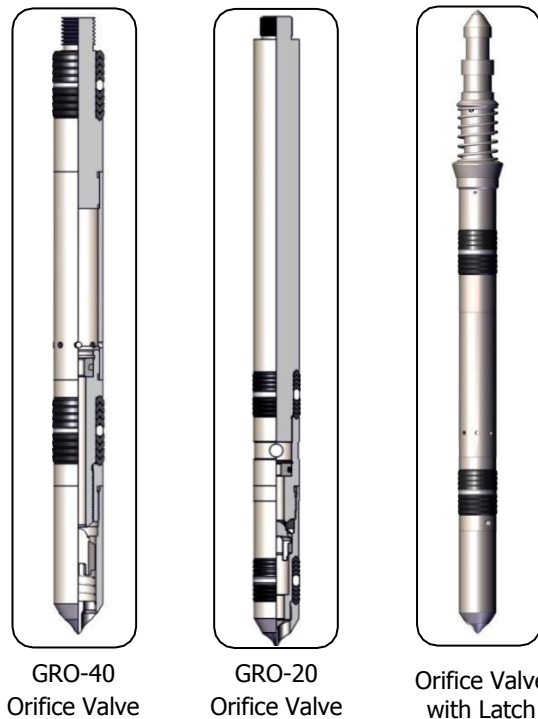
### APPLICATIONS

The Wireline retrievable Orifice valves are used to establish communication between the tubing and annulus during circulating, gas or fluid injection operations. They are utilized in single point injection continuous flow completions. These valves have no

closing function and are commonly used to control stable injection at the operating valve depth.

### OPERATING PRINCIPLE

Injection fluid or gas enters through the entry ports and through an orifice. Injection pressure moves the back check valve off seat allowing gas or fluids to enter into the tubing. Reverse flow pushes the check valve on seat to prevent flow into the casing. The port sizes designs are suitable for a wide range of operating conditions.



ENGINEERING DATA					
BOTIL Valve Model	Valve OD (inch)	Packing OD (inch)		SPM Compatibility	Port size Range (inch)
		Upper	Lower		
GRO-40	1.0	1 1/32	1 1/32	B1M, B1MR, TMP	1/8 – 5/16
GRO-20	1.5	1 9/16	1 1/2	B2M, B2MR, TP	1/8 – 1/2

TOOLING COMPATIBILITY					
BOTIL Valve Model	Valve OD (inch)	Latch	Kick-over tool	Running tool	Pulling tool
GRO-40	1.0	GBK-2	BK-5	JK/BC-1	1 1/4 JDC/MP
GRO-20	1.5	GRK	BM1	RK-1/BC-1	1 5/8 JDS/PTG



## WIRELINE RETRIEVABLE DUMMY VALVES (NON-EQUALIZING)

**BI 04-01-1000 ('E' DUMMY VALVES)**  
**BI 04-01-1000 ('RD' DUMMY VALVES)**

### DESCRIPTION

The Wireline Retrievable Dummy Valve is an isolation tool designed to seal off the Side-pocket Mandrel preventing communication between the Casing & Tubing. The Dummy Valve with appropriate Latch is installed in Pocket seal bore of Side-pocket Mandrel either at the surface, before the tubing string is run into the well or into a completed tubing string by Wireline operation.

It is retrieved only after equalizing the casing and tubing pressures at valve depth prior to installation of Flow-control device.

### ADVANTAGES

- Isolate Tubing and Casing flow during single alternative production.
- Isolate Tubing & Casing flow for test purpose during multi-point waterflood or gas injection.
- Allow pressure to be applied to the tubing by blanking-off Side-pocket Mandrel inside the well.

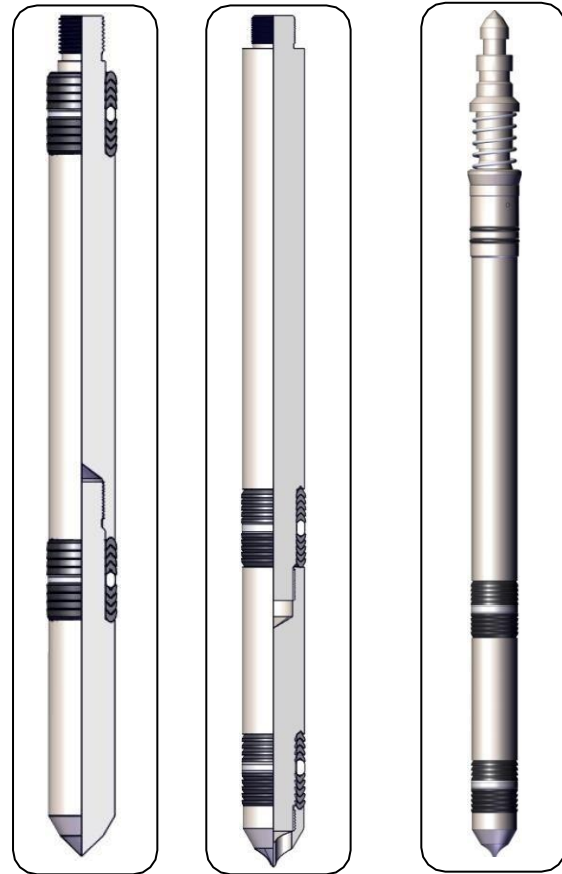
### APPLICATIONS

The Wireline retrievable Orifice valves are used to establish communication between the tubing and annulus during circulating, gas or fluid injection operations. They are utilized in single point injection continuous flow completions. These valves have no closing function and are commonly used to control stable injection at the operating valve depth.

### OPERATING PRINCIPLE

Injection fluid or gas enters through the entry ports and through an orifice. Injection pressure moves the back check valve off seat allowing gas or fluids to enter

into the tubing. Reverse flow pushes the check valve on seat to prevent flow into the casing. The port sizes designs are suitable for a wide range of operating conditions.



E  
Dummy Valve
RD  
Dummy Valve
Dummy Valve  
with Latch

ENGINEERING DATA				
BOTIL Valve Model	Valve OD (inch)	Packing OD (inch)		SPM Compatibility
		Upper	Lower	
E	1.0	1 1/32	1 1/32	B1M, B1MR, TMP
RD	1.5	1 9/16	1 1/2	B2M, B2MR, TP

TOOLING COMPATIBILITY					
BOTIL Valve Model	Valve OD (inch)	Latch	Kick-over tool	Running tool	Pulling tool
E	1.0	GBK-2	BK-5	JK/BC-1	1 1/4 JDC/MP
RD	1.5	GRK	BM1	RK-1/BC-1	1 5/8 JDS/PTG

## WIRELINE RETRIEVABLE CHEMICAL INJECTION VALVES

**BI 820-09**

### DESCRIPTION

BOTIL Chemical injection valves for Side-pocket Mandrels are designed to control chemicals injected into the production fluid at the valve depth. The valves are designed with an Inconel Spring which provides the closing force of the valve. Reverse flow checks are included as an integral part of these valves.

These valves are available in 1 inch [25.4 mm] OD 'BCLK-2' & 1-1/2 inch [38.1 mm] OD 'BCLK-3' in either stainless steel or nickel alloys for corrosion resistance in wells with high concentrations of H<sub>2</sub>S or CO<sub>2</sub>. Packing and elastomeric materials for the valves are available for various service classes to suit individual well conditions.

### ADVANTAGES

- No need to pull the entire tubing for maintenance or exchange.
- The spring allows mechanical setting at test rack opening pressure for the required operating differential pressure.
- Positive sealing feature of Integral reverse flow check valve prevents intrusion of production fluids into annulus.
- Replaceable square edged orifice in Tungsten Carbide material.

### APPLICATIONS

The Wireline retrievable Chemical injection valves are used to control the amount of chemicals or fluids injected into the tubing at the valve depth. The injected chemicals or fluid controls corrosion in wells, treats paraffin, salt and or hydrate formation.

### OPERATING PRINCIPLE

Injected chemicals enter the valves from the annulus in an open injection system.

Chemicals also may enter the valve from a separate injection line as in a closed injection system. The hydraulic pressure of the injected chemicals compresses the Spring & lift the Stem Tip of the Seat & open the valve. Chemicals then flow through the valve into the production conduit.



ENGINEERING DATA					
BOTIL Valve Model	Valve OD (inch)	Packing OD (inch)		SPM Compatibility	Port Size
		Upper	Lower		
BCLK-2	1.0	1 1/32	1 1/32	B1M, B1MR, TMP	1/8, 3/16
BCLK-3	1.5	1 9/16	1 1/2	B2M, B2MR, TP	1/8, 3/16

TOOLING COMPATIBILITY					
BOTIL Valve Model	Valve OD (inch)	Latch	Kick-over tool	Running tool	Pulling tool
BCLK-2	1.0	GBK-2	BK-5	JK/BC-1	1 1/4 JDC/MP
BCLK-3	1.5	GRK	BM1	RK-1/BC-1	1 5/8 JDS/PTG

## WIRELINE RETRIEVABLE DUMP/KILL VALVES

**BI 820-20**

### DESCRIPTION

BOTIL Wireline retrievable Dump/Kill Valve provides a means of communication between the casing annulus and tubing when the casing annulus pressure is increased above the tubing pressure. Initially it functions as dummy valve using a movable piston to block off the circulating port in the valve and the Side-Pocket Mandrel. The Piston is held in closed position with the help of shear screws. After the valve opens, it restricts the flow to a desired rate but cannot be closed again.

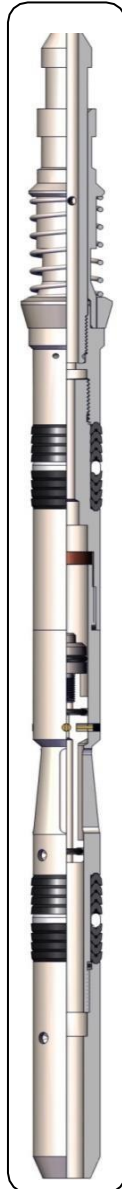
These valves are available in 1 inch [25.4 mm] OD 'BEDK' in either stainless steel or nickel alloys for corrosion resistance in wells with high concentrations of H<sub>2</sub>S or CO<sub>2</sub>. Packing and elastomeric materials for the valves are available for various service classes to suit individual well conditions.

### ADVANTAGES

- No need to pull the entire tubing for maintenance or exchange.
- Wireline operation is not required to activate valve into open position.
- Calibrated opening pressure (between 1000 to 5000 psi shear differentials).
- No reverse-flow check to allow a high injection rate to kill the well
- May be coated, if necessary, to meet the most demanding applications.
- Compatible with other manufacturers Side-pocket Mandrels e.g. CAMCO, TMP/TP etc.

### APPLICATIONS

The Wireline retrievable Dump/kill Valves are used to establish communication between the tubing and casing annulus when the casing annulus pressure is



increased. Initially these valves function as dummy valves valve using a movable piston to block off the circulating port in the valve and the Side-Pocket.

### OPERATING PRINCIPLE

Prior to running, a GBEK-2 latch is assembled on to the top of the BEDK Dump/kill valve. The assembly can then be installed into a Side-pocket mandrel on the surface before running the tubing string into the well or by using standard wireline tools and methods if the tubing string has already been installed in the well.

When the valve has been installed in the mandrel's pocket, the tubing is isolated from the casing annulus by the packing sets.

In operation, injection gas that is injected into the casing annulus enters through the communication ports in the Side-pocket Mandrel. This gas then enters through valve ports that are located between packing sets. The hydraulic pressure of the injected fluids shears the Shear Screw and moves the Piston downward causing the valve to open. The injection gas then flow downward past the valve nose and out into the tubing.



BEDK  
Dump/Kill Valve

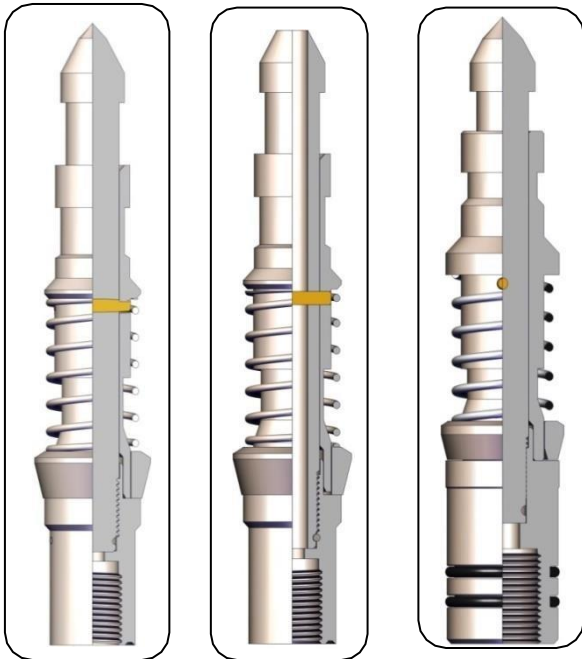
ENGINEERING DATA					
BOTIL Valve Model	Valve OD (inch)	Packing OD (inch)		SPM Compatibility	Port Size
		Upper	Lower		
BEDK	1.0	1 1/32	1 1/32	B1M, B1MR, TMP	1/8, 3/16

TOOLING COMPATIBILITY					
BOTIL Valve Model	Valve OD (inch)	Latch	Kick-over tool	Running tool	Pulling tool
BEDK	1.0	GBEK-2	BK-5	JK/BC-1	1 1/4 JDC/MP

**ACCESSORIES: LATCHES  
FOR WIRELINE RETRIEVABLE VALVES**

**DESCRIPTION**

BOTIL Wireline retrievable Latches are designed for installation in G-type pocket profile Side Pocket Mandrels. They utilize a locking ring which is held in position by spring forces. As the Latch enters the Pocket latch profile, the locking ring moves up and into the recessed area of the latch. When the latch seats, the ring is positioned in the locking recess of the Pocket. To retrieve the Latch, a pin is sheared by upward force allowing the locking ring mandrel to move up and out of the way. The ring is then freed to disengage from the locking recess as the valve and Latch is retrieved.



GBK-2 Latch  
BI 10-01-1000

GBEK-2 Latch  
BI 10-01-1000

GRK Latch  
BI 10-25-1000

TOOLING COMPATIBILITY					
BOTIL Latch Model	Valve OD (inch)	Kick-over tool	Running tool	Pulling tool	SPM Compatibility
GBK-2	1.0	BK-5	JK/BC-1	1 ¼ JDC/MP	B1M, B1MR, TMP
GBEK-2	1.0	BK-5	JK/BC-1	1 ¼ JDC/MP	B1M, B1MR, TMP
GRK	1.5	BM1	RK-1/BC-1	1 5/8 JDS/PTG	B2M, B2MR, TP

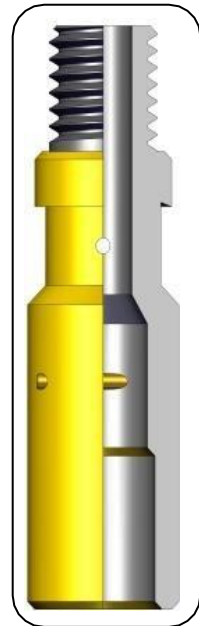
**ACCESSORIES: RUNNING TOOLS  
FOR WIRELINE RETRIEVABLE VALVES  
BI 820-04 ('JK' RUNNING TOOLS)  
BI 820-05 ('RK-1' RUNNING TOOLS)**

**DESCRIPTION**

The Running tool is used to secure Valves and Latch assembly into pocket of Side-pocket Mandrels by wireline running operation. The tool is simple in design, consisting of one part. The inside is machined with two different inside diameters allowing the running tool to shoulder on the side pocket mandrel latch being run. The upper portion of the body has a set of 1/8" shear pin holes on the outer circumference to permit pinning the running tool to the side pocket latch. The running tool is run in conjunction with the appropriate kick over tool.

**OPERATION**

1. Pin valve onto running tool and attached to tool string.
2. Lower tool string into well bore to desired depth.
3. Trip the Kick-over tool, set down into side pocket mandrel and jar down to set valve as well as shear the pin in the running tool.
4. Remove tool string from well bore.



Running Tool

ENGINEERING DATA-RUNNING TOOL				
BOTIL Running Tool Model	Nom. Size (inch)	Max. OD. (inch)	Fishing Neck size (inch)	Thread
JK	1.00	1.33	1.187	15/16-10 UN
RK-1	1.50	1.43	1.187	15/16-10 UN

**ACCESSORIES: KICK-OVER TOOLS  
FOR WIRELINE RETRIEVABLE VALVES  
BI 820-01**

**DESCRIPTION**

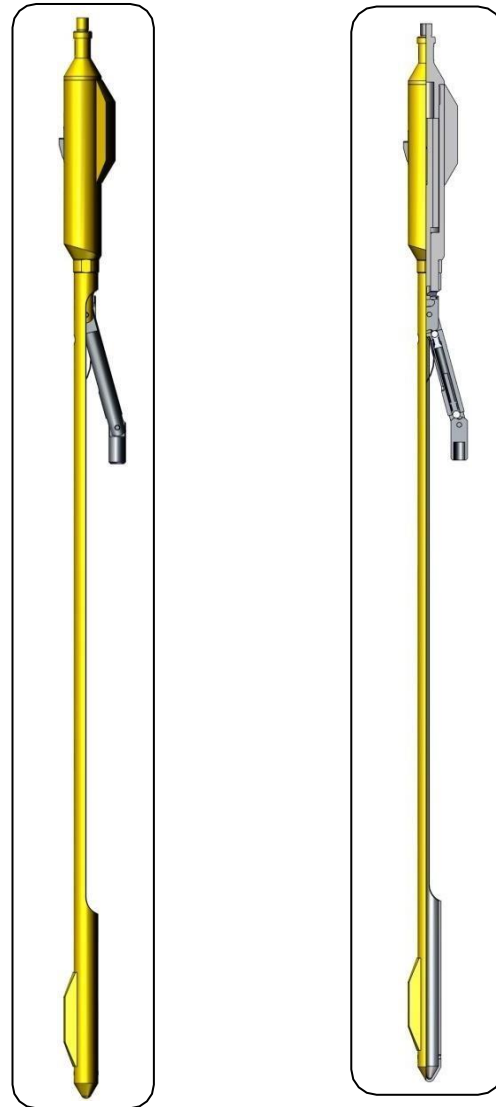
The Kick-over tool (KOT) is used to install and retrieve valve and latch assembly into/from the Side pocket mandrels.

**ADVANTAGES**

The KOT features removable pads to allow the Kick-over tool to operate in two sizes of tubing such as 2-3/8" and 2-7/8" or 3-1/2" and 4-1/2" respectively.

**OPERATING PRINCIPLE**

The Kick-over tool is lowered into the well by standard wireline techniques until the tool is below the selected mandrel. As the tool string is raised, the locator finger of the Kick-over tool contacts the top of the slot in the orienting sleeve in the mandrel, and the kick spring pivots the lower section of the Kick-over tool, the pulling or running tool and the valve into the Kick-over position. The orienting sleeve in the mandrel provides positive installation and retrieval of the flow control device by the Kick-over tool. Once the flow control device is installed or retrieved, and the wireline operator raises the Kick-over tool the latch spring is compressed thus permitting the Kick-over tool to pass through all mandrels above the one in which the wireline operation was performed.



Kick over Tool

TOOLING COMPATIBILITY				
Kick-over Tool Model	Valve OD (inch)	Running tool	Pulling tool	SPM Compatibility
BK-5	1.0	JK/BC-1	1 ¼ JDC/MP	B1M, B1MR, TMP
BK-5	1.0	JK/BC-1	1 ¼ JDC/MP	B1M, B1MR, TMP
BM1	1.5	RK-1/BC-1	1 5/8 JDS/PTG	B2M, B2MR, TP

ENGINEERING DATA- BK-5 KICK OVER TOOL				
Configuration	BK-5 Kick-over tool size			
	2"	2-1/2"	3"	4-1/2"
Fishing Neck OD	1.375	1.375	1.375	1.375
Max OD	1.75	2.063	2.5	3.5
Length	72.844	72.844	70.031	70.562
Top Pin Thread	15/16-10	15/16-10	15/16-10	15/16-10

ENGINEERING DATA- B1M KICK OVER TOOL				
Configuration	B1M Kick-over tool size			
	2-1/2"	3"	4-1/2"	5-1/2"
Fishing Neck OD	1.375	1.375	1.375	2.31
Max OD	2.218	2.734	3.71	4.25
Length	81.75	81.875	82	78.125
Top Pin Thread	15/16-10	15/16-10	15/16-10	1 9/16-10

**ACCESSORIES: PULLING TOOLS FOR WIRELINE RETRIEVABLE VALVES**

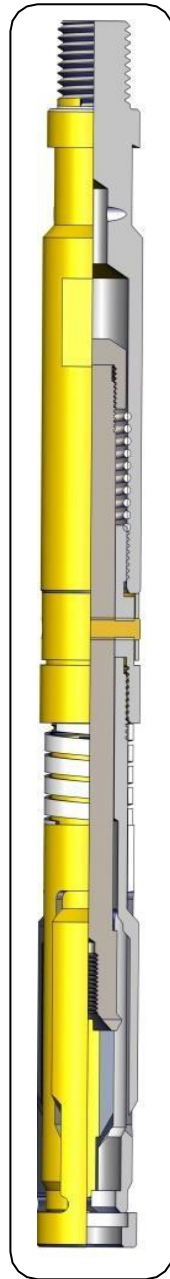
**BI 811-90 ('JDC' PULLING TOOLS)**  
**BI 811-97 ('JDS' PULLING TOOLS)**

**DESCRIPTION**

The Pulling tool is a wireline service tool designed to remove retrievable subsurface devices with external fishing necks from well. This tool has collet-type dogs with large latching area. It is also available with different length cores which make the reach of the tool adaptable to retrieve subsurface devices with fishing necks of different lengths.

The Pulling tool utilizes the top sub which is made up to the skirt of the tool. The dogs, which are mounted on the skirt, are inserted into the vertical openings in the skirt. The JD series Pulling Tool can be released, if necessary from the retrievable device by downward jarring.

In the Pulling tool nomenclature, the second letter is used to designate the direction of shear release. The "JDC/JDS" is a "jar down" release tool. The third letter designates core length with a "C" being a "long" core and an "S" core being a "short" core.

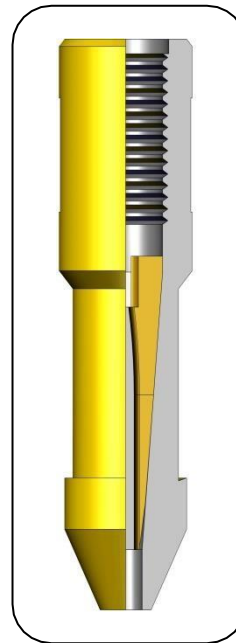


Pulling Tool

**WIRELINE ACCESSORIES: ROPE SOCKET**

**BI 820-17**

BOTIL Wireline Socket (Wedge type Rope Socket) is designed to connect wireline to the tool string. It utilizes a brass or soft alloy wedge to keep the wireline attached within the rope socket.



Rope Socket

**ENGINEERING DATA- ROPE SOCKET**

Tool nominal size	Max OD (inch)	Fishing Neck OD (inch)	Thread Size and type	Wire Size (inch)
1-1/8	1.125	0.875	5/8-11 UNC	0.066-0.092
1-1/2	1.500	1.375	15-16-10 UN	0.092-0.108
1-1/2	1.500	1.375	1-1/16-10 UN	0.092-0.108
1-7/8	1.875	1.750	15/16-10 UN	0.092-0.108

**ENGINEERING DATA- PULLING TOOLS**

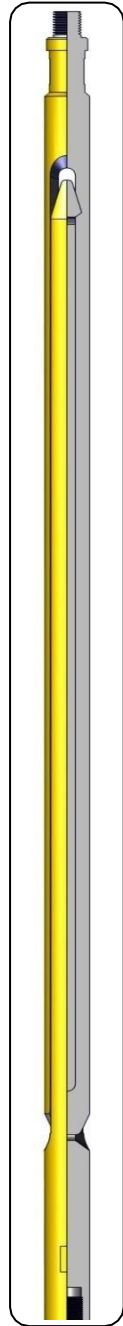
Tool Size	1 1/4"	1 3/8"	1 1/2"	1 1/2"
Model	JDC	JDC	JDC	JDS
Fishing Neck OD	0.875"	1.000"	1.187"	1.187"
Reach	1.937"	1.875"	1.093"	1.843"
Max OD	1.281"	1.375"	1.422"	1.422"
Top Pin Thread	15/16-10	15/16-10	15/16-10	15/16-10

**WIRELINE ACCESSORIES: WIRELINE JAR (MECHANICAL JAR)  
BI 820-18**

BOTIL Wireline Jar designed to act like a sliding hammer, which utilizes the impact load transferred by Stem Bar attached above to it. Upward and downward impacts (jarring actions) are achieved by controlling the direction and speed of the wireline at surface provided with pin connections and fishing necks at one end and box connections at the lower ends.

The impact load by jarring action will depend on the speed of movement, stem weight, the jar's stroke length, tubing size and deviation, fluid viscosity and well pressure.

These jars are composed of two pieces linked together rather like long chain links which are free to be extended or collapsed (stroke).



Mechanical Jar

ENGINEERING DATA- MECHANICAL JAR				
Tool nominal size	Max OD (inch)	Fishing Neck OD (inch)	Top and Bottom Thread	Stroke Length (inch)
1-1/8	1.250	1-3/16"	15-16-10 UN	20
1-1/2	1.500	1- 3/8"	15-16-10 UN	20
1-1/2	1.500	1- 3/8"	15-16-10 UN	20

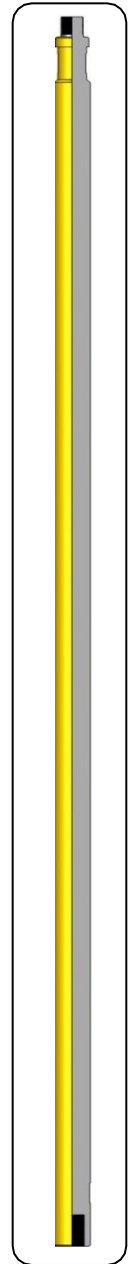
**WIRELINE ACCESSORIES: WEIGHT BAR (SINKER BAR)  
BI 820-19**

BOTIL Wireline Stem / Weight Bar or Sinker Bars are designed to overcome forces created by Well pressure and to deliver necessary impact load during Setting or Pulling of Flow-control devices inside the tubing.

The impact load by jarring action will depend on the speed of movement, stem weight, the jar's stroke length, tubing size and deviation, fluid viscosity and well pressure.

BOTIL Wireline Stem / Weight Bar (Sinker Bar) provided with pin connections and fishing necks at one end and box connections at the lower ends.

Special lead filled stems are available whenever more weight per foot is required. These are available in 2 ft, 3 ft and 5 ft in length.



Weight Bar

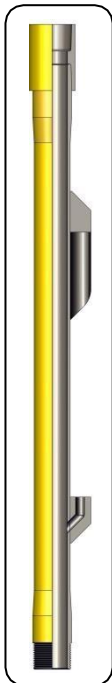
ENGINEERING DATA- STEM / WEIGHT BAR		
Tool nominal size	Fishing Neck OD (inch)	Top and Bottom Thread
1-1/4	1-3/16"	15-16-10 UN
1-1/2	1- 3/8"	15-16-10 UN

**MODEL 'B' CONVENTIONAL GAS LIFT MANDRELS (TUBING RETRIEVABLE VALVE MANDRELS)**

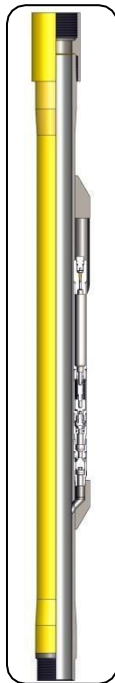
**BI 06-115-601**

The Model 'B' Mandrels are designed to accept the 1" conventional G-40 pressure operated gas lift valve and G-40 tubing flow check Valve. The Mandrels are manufactured with side guards to protect the valve when running or pulling the tubing string.

These mandrels are available in various tubing grades such as J-55, N-80, L-80, P-110 & other grades of material as per customer requirement.



Model 'B' Conventional Mandrel



Conventional Mandrel with Conventional Valve and RFCV

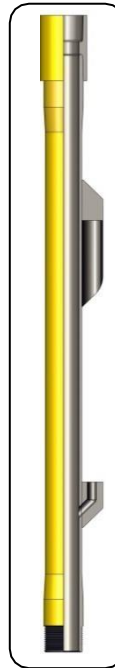
ENGINEERING DATA MODEL 'B' GAS LIFT MANDREL					
Tubing size	Maximum OD (inch)	Minimum ID (inch)	Length (inch)	Pressure (psi)	
				Internal	External
2-3/8	3.781	1.995	48	8000	6000
2-7/8	4.396	2.441	48	8000	6000
2-7/8	4.396	2.259	48	8000	6000
3-1/2	5.062	2.992	48	8000	6000

**MODEL 'C' CONVENTIONAL GAS LIFT MANDRELS (TUBING RETRIEVABLE VALVE MANDRELS)**

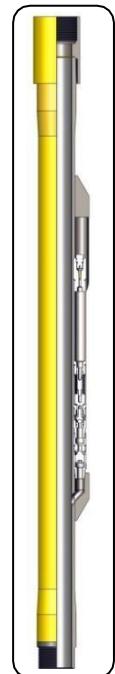
**BI 06-535-501**

The Model 'C' Mandrels are designed to accept the 1-1/2" conventional G-20 pressure operated gas lift valve and G-20 tubing flow check Valve. The Mandrels are manufactured with side guards to protect the valve when running or pulling the tubing string.

These mandrels are available in various tubing grades such as J-55, N-80, L-80, P-110 & other grades of material as per customer requirement.



Model 'C' Conventional Mandrel



Conventional Mandrel with Conventional Valve and RFCV

ENGINEERING DATA MODEL 'C' GAS LIFT MANDREL					
Tubing size	Maximum OD (inch)	Minimum ID (inch)	Length (inch)	Pressure (psi)	
				Internal	External
2-3/8	4.375	1.995	48	8000	6000
2-7/8	4.929	2.441	48	8000	6000
2-7/8	4.929	2.259	48	8000	6000
3-1/2	5.655	2.992	48	8000	6000
4-1/2	6.875	3.958	48	8000	6000



## CONVENTIONAL GAS LIFT VALVE -IPO (TUBING RETRIEVABLE VALVE)

**BI 02-40-1000 ('G-40' GLV)**

**BI 02-20-1000 ('G-20' GLV)**

### DESCRIPTION

BOTIL G-Series conventional gas Lift valves are Nitrogen charged gas lift valves which can be used as an intermittent valve or a continuous flow valve. This valve is installed with a reverse check valve on the conventional tubing retrievable gas lift mandrel. Dome pressure is set in a shop at a reference temperature and corrected to an operating depth temperature. The nitrogen charge inside the bellows provides a downward force tending to hold the valve on its seat.

BOTIL gas lift valves has 1/2"-14 NPT Pin connection to suit Reverse flow check Valves and these are available in various port sizes as required.

### ADVANTAGES

Vibration protected 3-ply Monel bellow are designed to withstand hydrostatic pressure up to 5000 psi. Nitrogen dome charge, acting on the O.D. of the bellows, permits bellows to expand uniformly without stacking, thus prolonging bellows' life. The multiple port size availability, make this valve series appropriate for a wide range of operating conditions.

### OPERATING PRINCIPLE

The nitrogen charged dome applies pressure to the external area of the bellows provides the downward force, holding the valve on its seat. This dome pressure is preset at the reference temperature and corrected to operating temperature. The opening forces on the valve are the casing pressure acting on the internal area of the bellows (less the area of the seat) and the tubing pressure acting on the seat area. When the combined Casing & Tubing pressures are sufficient, the valve opens. Once the valve is open, it remains open until the casing pressure is reduced to predetermined closing pressure.

The spread (the difference between opening & closing casing pressure) is controlled by the tubing

sensitivity of the valve. The larger the seat port area, the more tubing sensitive the valve is.



Model 'G-40'  
Conventional Gas  
Lift Valve

Model 'G-20'  
Conventional Gas  
Lift Valve

Conventional Mandrel  
with Conventional Valve  
and RFCV

ENGINEERING DATA				
BOTIL Valve Model	Valve OD (inch)	Gas Lift Mandrel Compatibility	Port size Range (inch)	Check Valve
G-40	1.0	(B Series) JR Mandrel	1/8 – 5/16	G-40, GCF-40
G-20	1.5	(C Series) SR Mandrel	1/8 – 1/2	G-20, GCF-20

## REVERSE FLOW CHECK VALVE

**BI 02-90-1000 ('G-40' RFCV)**

**BI 02-70-1000 ('G-20' RFCV)**

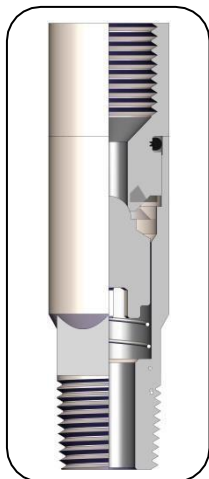
### DESCRIPTION

BOTIL G-Series Reverse flow check valves (RFCV) are used with conventional gas Lift valves and Mandrels. The RFCV assembly utilizes the same metal to metal seal as well as metal dart to soft Hy-car pad seal as does the retrievable valve checks. The check is a velocity type check requiring flow pressure to force the dart on seat but is also available in a normally closed variation with a spring attachment.

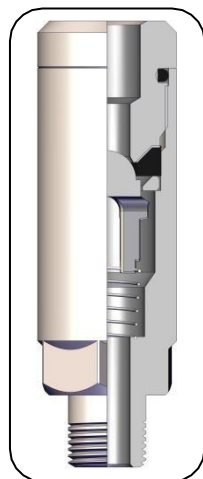
BOTIL Reverse flow check valves (RFCV) have 1/2"-14 NPT internal and external threaded connections to suit conventional Gas lift Valves and Mandrels respectively.

### ADVANTAGES

The RFCV protect the casing from backflow, allowing the tubing to be pressurizing in various procedures, and prevent any comingling of fluids in dual installation for a wide range of operating conditions.



Model 'G-40'  
RFCV



Model 'G-20'  
RFCV

ENGINEERING DATA - RFCV				
BOTIL RFCV Model	Valve OD (inch)	Gas Lift Mandrel Compatibility	Port size (inch)	BOTIL Valve Model
G-40	1.0	(B Series) JR Mandrel	5/16	G-40
G-20	1.5	(C Series) SR Mandrel	9/16	G-20

## TUBING RETRIEVABLE ORIFICE VALVES

**BI 820-12**

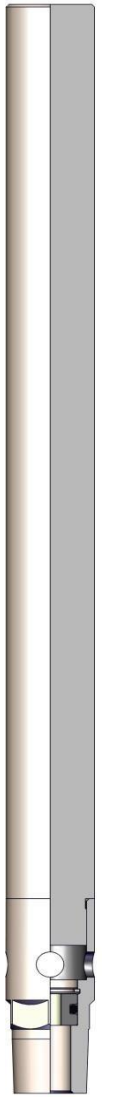
### DESCRIPTION

BOTIL G-Series tubing retrievable Orifice Valves are designed for circulating operations and provide means for communication between the tubing and the tubing/casing annulus. These Valves are used with Conventional Gas Lift Mandrels and Reverse flow check valves (RFCV).

These valves have 1/2"-14 NPT external threaded connections to assemble with RFCV.

### ADVANTAGES

- Flow capacity determined by orifice sizing.
- Various orifice materials (Monel, Tungsten Carbide) available to meet application requirements.
- Orifice Valves are suitable for 1200 PSI & above Surface Injection Pressure.
- Temperature rating of 275° F (Standard Service).
- Valves are Casing pressure operated valve in open position, with 1/2" NPT bottom connection.
- The Floating Seat is replaceable.
- An integral choke controls the flow of gas through the normally opened valve and into the production conduit.



Orifice Valve

ENGINEERING DATA – ORIFICE VALVE				
BOTIL Valve Model	Valve OD (inch)	Gas Lift Mandrel Compatibility	Port size Range (inch)	RFCV Model
GO-40	1.0	(B Series) JR Mandrel	1/8 – 5/16	G-40, GCF-40
GO-20	1.5	(C Series) SR Mandrel	1/8 – 1/2	G-20, GCF-20