SLIDING SLEEVE

BSS-S Profile
BSS-H Profile
The Benoit Sliding Sleeve™ (BSS) is a premium Chrome Alloy flow control valve, designed to provide dependable service, in a wide variety of applications.

The outer body parts are made of Hyper 13 Chrome, and the Inner Sleeve is made of 17-4 PH, to minimize corrosion; and galling when shifting.

Reliable Metal-to-Metal seal connections are used throughout the design, eliminating the need to rely on O-rings or thread compound for pressure containment.

The BSS has been extensively tested to verify all design requirements, and to ensure that published pressure / tensile ratings are supported.

A standard landing nipple profile is incorporated in the Top Sub, for additional application, with a compatible seal bore in the Bottom Sub.

The BSS can be delivered in the “shift-up-to-open” (BSS-U) or “shift-down-to-open” (BSS-D) orientation.

Slimline sleeves are available for applications where special clearance is required.

All Benoit Sliding Sleeves™ are 100% inspected, and tested in the closed position to 5,000 psi, prior to shipping. This is done to verify proper sealing, locating and operation of the sleeve.
SLIDING SLEEVE

Description

This sliding sleeve consists of a ported outer housing with a packing stack on each side of the ports, and an Inner Sleeve with ports. When the inner and outer ports are aligned, communication between the tubing and annulus is created. When the inner and outer ports are isolated from each other by the packing stacks, communication is prevented.

The BSS Sliding Sleeve has a standard landing nipple profile in the Top Sub, and a polished bore in the Bottom Sub. This allows use of a Separation Tool to seal off the tubing below the sliding sleeve and communicate with the annulus thru the ports of the sliding sleeve. There is also a Packoff Tool which can be used to seal off the ports, should the packing ever leak. The landing nipple profile is available for flow control devices, when the flow ports are closed.

The BSS Sliding Sleeve can be configured to open by shifting up BSS-U, or as a BSS-D, to open by shifting down. The BSS-U & BSS-D sleeves can also be configured with a Standard (POS 2) Inner Sleeve for use with an industry standard shifting tool, or with a Selective (POS 1) Inner Sleeve for use with a Selective 1 shifting tool. The Selective shifting tool will shift only the Selective sliding sleeve. The Standard shifting tool will shift both Standard (POS 2) and Selective (POS 1) sliding sleeves.

The BSS can be placed anywhere in the tubing string where communication with the annulus is desired. It can be run into the well open or closed, and can be shifted using standard wireline techniques or coiled tubing. Any number of sliding sleeves can be run in a well.

Sliding Sleeve Uses

a. Circulate kill fluids.
b. Circulate inhibitors.
c. Selectively produce zones.
d. Utilize for center set gas lift valves.
e. Displace tubing or annular fluids after the christmas tree is installed during a well completion.
f. Utilize the landing nipple to set any subsurface flow control device.
g. Used in gravel pack operations.

Features of the Benoit Sliding Sleeve™

a. Landing nipple profile in Top Sub, above the Inner Sleeve.
b. The Standard - OD is approximately the same as the associated BTS™ connection.
c. Where applicable, the Slimline – OD is approximately the same as the Special Clearance connection.
d. Metal to metal seals on all threaded connections. O-rings are eliminated.
e. External parts are Hyper 13Cr-110, Internal Sleeve is 17-4PH H-1150D.
f. A NACE version can be produced with 13Cr-80yld or carbon steel at 80yld to the same dimensions, at reduced mechanical properties (tensile, burst, collapse). A NACE version can be produced to the same dimensions, at similar mechanical properties for a Nickel Alloy version (Inc 718, 925, etc.). The 13CR 80 yld or low alloy steel NACE version would use the standard 17-4 Internal Sleeve. The Nickel Alloy NACE version would use the same Nickel Alloy for the sleeve.
g. Packing is non-elastomeric, spring energized, resistant to most environments, and reliable to 350 degrees F. Testing has been performed opening and closing at 1500 psi differential for 25 shifts. This has proven the equalizing port design and the proprietary seal design.
h. To minimize galling in multiple shift applications, the Upper Sub undergoes special processing. The same parts can be assembled to produce a sleeve which shifts up to open or down to open. The sliding sleeve can easily be converted from one orientation to the other.
i. The Inner Sleeve can be a Standard (POS 2) or Selective (POS 1).
j. Shifting is performed using an industry standard “B” shifting tool for the Standard sliding sleeves.
k. Flow through the Body ports and Inner Sleeve flow slots is greater than through the packing bore.
l. Can be shifted by wireline or coiled tubing.
m. Recommended 200 psi differential overbalanced for shifting.
n. Shift Confirmation, Separation, and Packoff tools are available.
o. Slimline and Standard OD versions are available.
p. Ends may be threaded with various, customer-specified oilfield threads (box x pin or pin x pin).
## TYPES OF SLIDING SLEEVE

<table>
<thead>
<tr>
<th>SIZE</th>
<th>O.D.</th>
<th>PROFILE</th>
<th>INNER SLEEVE</th>
<th>SHIFTING TOOL</th>
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<td>2.198”</td>
<td>1.625 “S”</td>
<td>STD.</td>
<td>“B”</td>
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## SHIFTING TOOLS

### “B” SHIFTING

![“B” shifting tool](image)

- **TOP SUB**
- **"B" or "B-1" KEYS**
- **LOWER KEY RETAINER**
- **BODY**

### “FLO-THRU” SHIFTING TOOL

![“FLO-THRU” shifting tool](image)

- **END SUB**
- **NUT**
- **COLLET**
- **CORE**
- **PERFORATED SUB**
Advantages of Sliding Sleeve Assemblies

1. Sliding sleeves made up into assemblies at Benoit, minimizes potential handling damage to a critical down-hole element.
2. Pup joints, top and bottom become handling areas for make-up, eliminating wrenching at the wrong areas at location.
3. Make-up is with “soft touch jaws”.
4. Drifting, shifting, and testing the assembly, prior to shipping; ensures integrity and function.
# BENOT SLIDING SLEEVE™ (BSS) "S" PROFILE TECH DATA

**MATERIAL SPEC.**  
Body - HYP. 13CR-110  
Inner Sleeve - 17-4 PH H-1150D  
Packing - Proprietary PTFE & PEEK Compounds  

**SHIFTING SPECIFICATIONS**  
Standard (POS 2) uses standard B or BO shifting tools  
Selective (POS 1) uses special shifting tool keys  
BSS-U opens by shifting inner sleeve UP  
BSS-D opens by shifting inner sleeve DOWN

<table>
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<tr>
<th>SIZE</th>
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<th>DISTANCE</th>
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**BENOIT SLIDING SLEEVE™ (BSS)
"H" PROFILE TECH DATA**

**MATERIAL SPEC.**
Body - 13CR-110  
Inner Sleeve - 17-4 PH H-1150D  
Packing - Proprietary PTFE & PEEK Compounds

**SHIFTING SPECIFICATIONS**
Standard (POS 2) uses standard B or BO shifting tools  
Selective (POS 1) uses special shifting tool keys  
BSS-U opens by shifting inner sleeve UP  
BSS-D opens by shifting inner sleeve DOWN

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Mike McWhorter

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