

AUTOCHOKE drilling choke

FEATURES

- Patented sliding shuttle/sleeve design
- Triple tungsten carbide wear sleeves
- No-leak shut-in seals
- High-capacity 3-in (76-mm) choke bore
- Long life
- Rated for H₂S service
- Chrome-plated internal bores
- Plated and stainless external surfaces

BENEFITS

- Maintains casing pressure
- Automatically adjusts fluid flow
- Sensitive and precise control
- Easy to maintain
- Improved flow characteristics
- Allows internal inspection in only five minutes
- More durable than needle valve or rotating disc chokes

APPLICATIONS

- MPD
- Underbalanced drilling (UBD)
- Well control
- H₂S Service
- Controlling kicks and killing wells
- Frac flow back
- Available in 3,000, 10,000 and 15,000 psi models
- Equivalent Circulating Density (ECD) drilling

The M-I SWACO AUTOCHOKE⁺ drilling choke provides easier, more precise well pressure control, and serves as the only true pressure-balanced choke in the market.

It reduces risk of formation breakdown or secondary bubbles during well control and drilling operations, assuring faster, safer kick control and implementation of managed pressure drilling (MPD) practices. The AUTOCHOKE unit regulates pressure automatically under all conditions. Choke operators no longer have to fight the controls during transition operations, such as mud pump start-up or shut-down, making or breaking connections, or when mud and gas are flowing alternately through the choke.



The AUTOCHOKE unit also makes stripping pipe simpler and safer by maintaining casing pressure. As drill pipe is lowered into the hole, an equal volume of fluid is automatically displaced through the choke.

Features

- **Patented** sliding shuttle/sleeve design automatically adjusts fluid flow to regulate well, casing and drill pipe pressures.
- **Triple**, tungsten-carbide wear sleeves provide downstream choke bore protection.
- **No-leak shut-in seals** (metal-to-metal and Teflon-to-metal).
- **High-capacity**, 3-in. (76-mm) choke bore.
- **Long-life** for severe service operations, tungsten-carbide static-trim, reversible dynamic trim, hard-faced (stellite) shuttle assembly and internal removable-body sleeve preventing valve-body erosion.
- **Rated for H₂S service.**
- **Chrome-plated** internal bores for corrosion resistance
- **Simple** seal replacement
- **Electronic** position indicator, computer compatible
- **Pre-set maximum pressure capability**
- **Control console** includes digital pump stroke counters with rate meter, stop watch and clock

Benefits

- Easy, predictable standpipe pressure control
- No-leak shut-in
- Precision control for stripping pipe into the hole; for MPD and UBD techniques when controlling backpressures; of bottomhole pressure during well control operations, MPD and UBD; reduces lost circulation, gas intrusion, fluid costs, production damage and blowouts
- Self-cleaning orifice reduces plugging
- Easy-to-maintain internal components
- Tungsten carbide or stellite-coated internal wear parts are all replaceable and more durable than needle-valve chokes
- Improved flow characteristics at throttle point and through choke bore
- Simple, eight-bolt design allows internal inspection in only five minutes

Equipment Description

Choke

- 3.06-in (78 mm) API inlet and outlet flanges
- 10.5 in (267 mm) from inlet flange face to outlet flange centerline x 15 in (381 mm) from outlet face flange to inlet flange centerline for 10,000 psi choke; 13.5 in x 16.75 in for 15,000 psi choke.
- Temperature rating: -20 to 250° F (-29 to 121° C)
- Bore size: 3 in (76 mm)
- Manufactured in accordance with API 6A 17th edition PSL3, Temperature Class P to U, Material Class EE and NACE MR-01-75
- Patented

Control console

- Stainless steel
- Drill pipe and casing pressure gauges
- Hydraulic oil pump control regulator
- Hydraulic oil set point gauge
- Digital pump stroke rate counter
- Hand-operated hydraulic backup pump

Console display

- Rig supply air pressure
- Choke valve position from 0 to 100%
- Drill pipe pressure
- Casing pressure
- Air pressure to hydraulic pump
- Hydraulic pressure to choke
- Pump stroke rate and count
- Includes hoses and cable for choke, console and rig air supply.

How It Works

The unique design of the AUTOCHOKE unit incorporates a sliding shuttle which is connected to a dynamic-trim sleeve. This shuttle assembly (shown in green) slides back and forth into a matching static-trim sleeve, forming a circular orifice, controlling the flow of fluid or gas from the well. The hydraulic set-point pressure, applied to the back side of the shuttle assembly, is adjusted by the set-point pressure regulator and is measured by the hydraulic set-point gauge located on the choke control panel. Casing pressure is applied to the front side of the shuttle assembly.

Fully Closed.

When the choke is completely closed for positive choke manifold testing, a no-leak condition is maintained by both a metal-to-metal and a Teflon-to-metal seal.

Opening.

Either an increase in casing pressure or a decrease in hydraulic set-point pressure causes the shuttle assembly to move, increasing the size of the orifice. This allows fluid or gas to flow from the well, decreasing the casing pressure until it equals the hydraulic set-point pressure.

Closing.

Either a decrease in casing pressure or an increase in hydraulic set-point pressure causes the shuttle assembly to move, decreasing the size of the orifice. This reduces fluid or gas flow from the well, increasing the casing pressure until it equals the hydraulic set-point pressure.

Standard Operating Position

In this position, the dynamic-trim face is barely past the static-trim face, automatically controlling the casing pressure of the well. As casing pressure changes, the shuttle assembly adjusts to balance the pressure on both sides of the shuttle.

Passing Debris

Debris that plugs the orifice increases the casing pressure. This causes the shuttle assembly to move and increases the size of the orifice, allowing the debris to be discharged while maintaining good pressure control. The choke is designed to accommodate considerable buildup in the housing before a manual clean-out operation is required. These features are ideal for maintaining desired casing pressures during UBD operations.

Fully Open.

The only time the choke should be in this position is to test the readiness of the choke or when a large piece of debris is trapped in the cho

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