The Powerstroke™ Drilling Jar has raised the industry standard for drilling jars. The Powerstroke is a double acting hydraulic jar with infinitely variable trip loads up to the maximum rating of the tool. Only a minimal load is required in both the up and down jarring directions, which is crucial when drilling directional, horizontal, and extended reach wellsbores. Every aspect of its rugged design is engineered to withstand the rigors and long hours of today’s demanding drilling and fishing operations.

Both the up and down impact surfaces are located internally to the PowerStroke, and by isolating them from the wellbore fluid provides reliable and consistent operation.

The NOV Downhole PowerStroke will satisfy all of your demanding drilling jar requirements, providing control, power, and flexibility for extended drilling periods.

The PowerStroke has an extra long stroke to allow the operator to deliver exceptional impact and impulse forces during jarring operations.

**ADVANTAGES**

**Powerful:** The PowerStroke generates superior jar impact and impulse forces to successfully recover from a stuck pipe condition.

**Control:** The PowerStroke provides the operator complete control of the jar impact and impulse by manipulating the drillstring direction, intensity, and frequency. It does not require applied torque to vary jar forces, this allows directional drilling assemblies to maintain orientation.

**Reliable:** The PowerStroke utilizes the Bowen® patented, field proven, self cleaning metering system to ensure consistent performance irrelevant of bottom hole temperatures, wellbore fluids, and/or heat generated from extended jarring operations.

**Rugged:** The PowerStroke has exceptional tensile and torsional strength ratings to meet the needs of today’s drilling and fishing operations.

**Versatile:** The PowerStroke operates in all of today’s wellbore configurations ranging from vertical to directional to extended reach horizontal.

**Precise:** Sealed and lubricated splines provide full torque transmission and long life in harsh wellbore environments.

**FEATURES**

**Safety:** This safety enhancing and time saving device locks the Powerstroke in the open position via a mechanical latch actuated by the absence of hydrostatic pressure. The Safety Lock is located internally to the Powerstroke; therefore, eliminating the Mandrel Clamp during rig up/down operation.

**Handling:** The Flex Sub possesses an engineered location for Elevator placement to eliminate the need for a Lift Sub when handling the Powerstroke.

**Length:** The Powerstroke’s overall length equals that of conventional drillpipe for ease and safe placement within the Derrick and/or Mouse Hole.

**Connections:** The PowerStroke is easily adapted to any BHA by simply changing out the Flex Sub and Bottom Sub to the desired connection.

**Manufacturing:** All jars are manufactured to I.S.O. 9001 specifications utilizing materials of outstanding quality.

**Jar Placement Program:** The National Oilwell Varco Jar Placement Program ensures proper placement of the jar in the Bottom Hole Assembly to promote optimal jar performance and extend tool life. The Drilling and Fishing Jar Placement Programs and training are available to customers free of charge.

**OPTIONAL EQUIPMENT**

**Down Stroke Variable Load Latch:** This time saving device mechanically locks the PowerStroke in the open position eliminating the need to continually bleed through the down stroke when the drill bit is picked off bottom. Exceeding the latch load returns the PowerStroke’s double-acting hydraulic jar functionality. The Down Stroke Variable Load Latch is fully adjustable up to the maximum load for the lock assembly.

**Safety Lock** (Patent Pending): This safety enhancing and time saving device locks the PowerStroke in the open position via an internal mechanical latch actuated by the absence of hydrostatic pressure. The Safety Lock is located internally to the PowerStroke; therefore eliminating the Mandrel Clamp during rig up/down operations.

The Down Stroke Variable Load Latch and Safety Lock are currently available for 64 - 6½ inch PowerStroke Drilling Jars. Additional sizes are currently under development.

The PowerStroke has been independently function tested at Rogaland Research Test Facility in Stavanger, Norway. Data is available upon request.
The Track A Tool System

**Technical Specifications**

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* Torsional Yield Strength rating is based on the yield of the body connections independent of tool joint connections.

**TRACK-A-TOOL PROGRAM™**

National Oilwell Varco created the Track-A-Tool Program™ for rental, lease and asset management of its entire fleet of tools. The program tracks inventory and assembly/component usage history. This provides quality control for National Oilwell Varco products.

- Track-A-Tool specifically monitors:
- Hours used in last job
- Total hours used
- Rework/repairs made
- Elapsed time between repairs
- Location of tool
- Status of tool

The Track-A-Tool Program™ is an effective equipment management system and provides customers real-time information on National Oilwell Varco tools.

**JAR PLACEMENT PROGRAM**

**Drilling**
The Drilling Jar Placement Program™ is suitable for straight, directional and horizontal hole analysis. The effectiveness of jarring depends not only on the jar design, but also on:

- Placement of the jar in the drillstring
- Bottom Hole Assembly design
- Hole conditions

Proper placement of the drilling jar in the Bottom Hole Assembly can affect the magnitude of impact at the stuck point by a factor of 4. Because the analysis of the jarring mechanics is complex, a computer program is required to precisely determine optimum jar placement.

**Fishing**
The Fishing Jar Placement Program™ is also available to assure precision in determining your fishing jar placement alternatives. It functions exclusively with Bowen® fishing tool products.

† Both the Drilling and Fishing Jar Placement Programs and training are available to customers free of charge.

**The Importance of the Stress Wave Theory**
The energy of jarring comes from the spring effect of the drill string when it is either stretched or compressed. When the jar trips, the sudden release of energy does not instantaneously go to the stuck point. Rather, the energy is transmitted by stress waves, which travel at the speed of sound in metal. This energy transmission is further complicated by additional factors.

**The Impact Impulse Factor**
To be effective, the jarring force (impact load) must exceed the sticking force. How far the stuck object moves depends on the duration of the impact load. The combined effect of impact load and duration is called impulse. The placement program optimizes jar placement within the Bottom Hole Assembly to ensure long life and safe operation.

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* Image provided for illustration purposes.*