LEVIATHAN™

AUTO FLOW VALVE

Penguin
Well Completion Systems

www.penguinpetro.com
www.leviathantool.com

AUTO FLOW VALVE

The Auto flow Valve (AFV) is situated immediately above the ESP to direct free flowing well fluids into the tubing, bypassing the ESP stages and preventing choking. On ESP start-up, fluid flow activates the valve, sealing the annulus and allowing fluid to be pumped to surface. On ESP shut-down the valve resets, diverting the fluid column to the annulus and preventing backflow through. This protects the ESP in all operating stages resulting in extended run life.

BENEFITS & FEATURES

Metal-to-metal sealing shuttle

Integrated dampening mechanism to protect sealing surfaces during sudden ESP start-up

Maximised flow to prevent restriction of production fluids

The annular port area is greater than the Tubing Area, maximising flow through the tool. All flow areas inside the tool are optimised with paths designed to minimise pressure drop and lessen the effects of erosion.

Multiple bore and connection sizes to suit a range of completion designs

Increased production from flowing wells by bypassing the restriction of the ESP & by avoiding pressure drop through dormant ESP

Eliminates bearing damage and scale build up

Protects the pump from solids fall-back

Increases ESP Run life

Non-intervention operation as no control lines or wire-line intervention is required during normal operation

AISI 4140 and 13Cr options

5000psi Max Working Pressure

APPLICATIONS

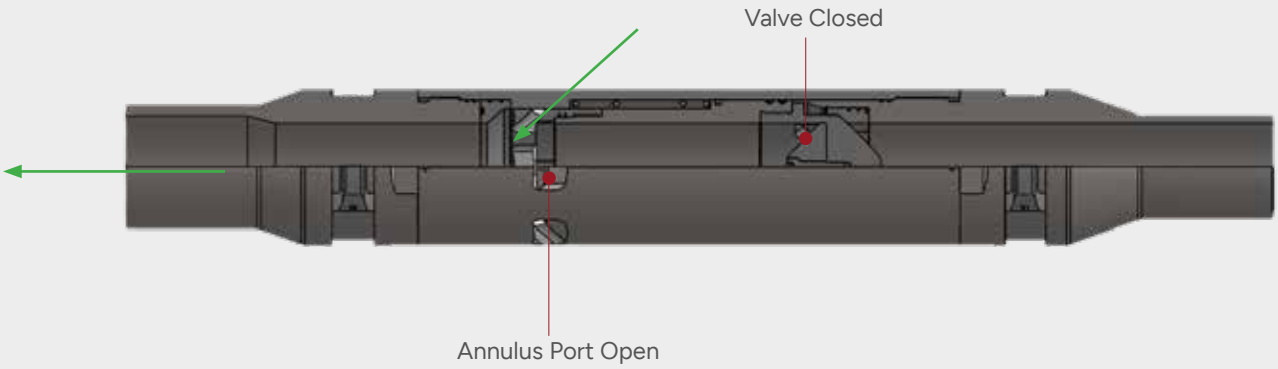
Installed as part of the tubing above the ESP

Flowing wells where an ESP is installed

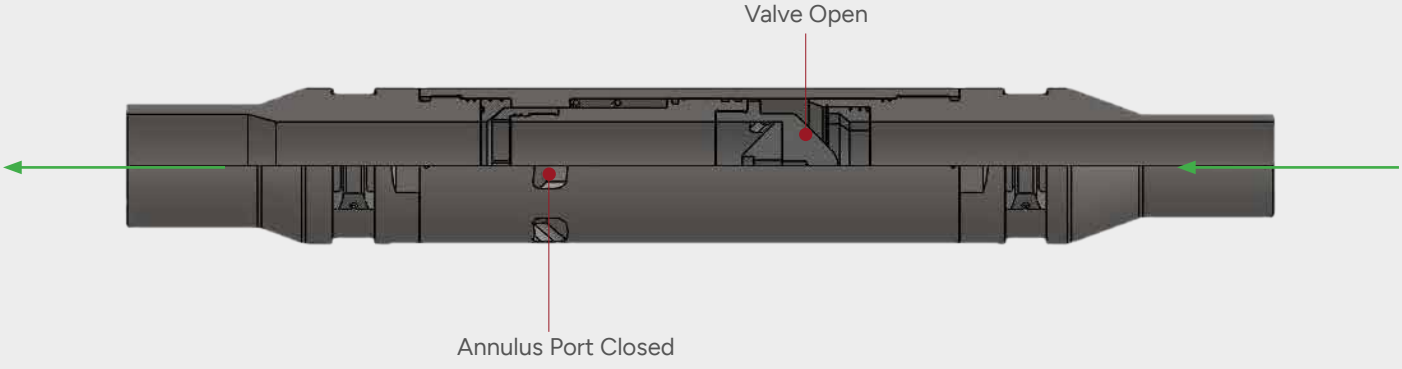
Available in multiple configurations to suit tubing size and flow

WORKING OF THE AUTO FLOW VALVE (AFV)

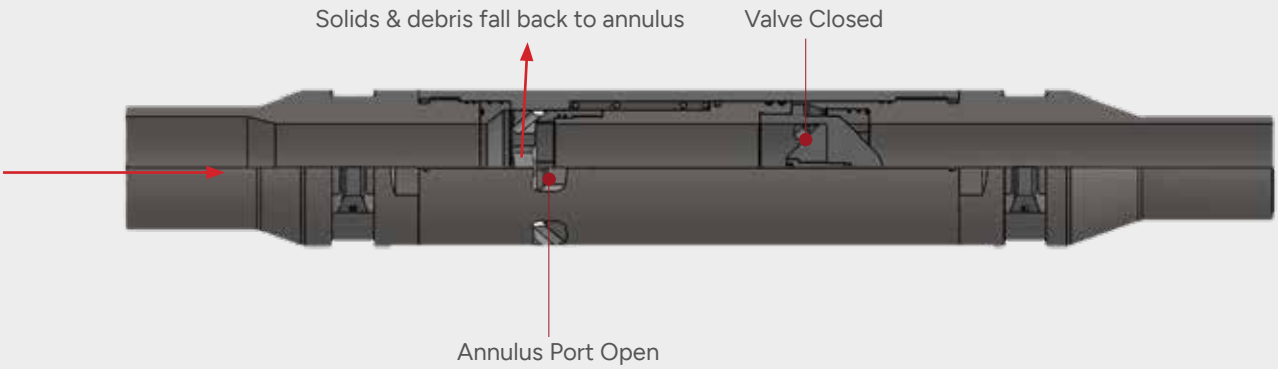
When the ESP is off, the Auto Flow Valve allows well fluids from the annulus to flow freely into the production tubing through designated annulus ports. At this stage, the internal valve mechanism remains closed, preventing fluid from entering the pump section. This design is crucial as it eliminates fluid accumulation inside the ESP, which could lead to bearing damage, scale deposition, and sediment build-up over time. By ensuring a clear and unobstructed flow path, the AFV helps maintain optimal well performance even when the ESP is inactive



Upon ESP activation, the pressure beneath the AFV shuttle mechanism increases, causing the shuttle to move upward and seal off the annulus flow ports. With these ports closed, the well fluids are directed exclusively upward through the production tubing, ensuring efficient fluid movement to the surface. This transition occurs automatically in response to ESP operation, without requiring manual intervention. The ability of the AFV to seamlessly switch between open and closed states contributes to stable and controlled production flow



On ESP trip or shutdown, the AFV plays a crucial role in protecting the pump from backflow damage. As soon as the ESP stops the AFV's internal valve closes immediately, cutting off communication between the ESP and the wellbore fluids. The fluid and suspended solids in the production tubing are instantly expelled into the annulus preventing them from settling inside the ESP. This mechanism prevents back-spinning of the ESP, which can cause severe mechanical damage to the pump and motor. Additionally, by flushing out solids into the annulus the AFV reduces the risk of clogging and scale build-up, making ESP restarts smoother and more reliable.



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