

## NOVA-10-B

### Barrier Series single-point-injection venturi orifice gas lift valve

#### APPLICATIONS

- Tubing or annular flow
- Continuous-flow gas lift production
- High-performance gas lift installations

#### BENEFITS

- Enhances safety and wellbore integrity
- Reduces downtime with reliable, robust performance
- Increases production through optimized flow and gas lift efficiency
- Uniformly operates over a series of injection pressures to increase production

#### FEATURES

- Field-proven design and operation
- Qualification to API 19G2 V1 standard
- Corrosion resistance through nickel alloy construction
- Premium specification nonmetallic PTFE-based seal stack
- Computer-generated injection gas flow profile stabilizes gas injection to increase production
- Barrier-qualified reverse-flow check valve system that provides robust seal between tubing and casing annulus
- Compatibility with Camco\* gas lift and subsurface safety systems' standard and select sidepocket mandrels

NOVA-10-B Barrier Series single-point-injection venturi orifice gas lift valves are used for continuous-flow gas lift production applications. Based on field-proven Camco systems technology, these 1-in-OD retrievable valves feature a barrier-qualified, integral reverse flow check valve.

NOVA-10-B valves have an exclusive dynamically tested flow profile to promote a constant-flow gas injection rate. This profile produces maximum gas passage with minimal differential across the valve. The NOVA\* gas lift valve flow regime eliminates most effects of tubing pressure on the gas injection rate and stabilizes the gas injection pressure. Stable injection rates can result in more stable tubing pressure, increased production, and reduced operating expenses.

The barrier gas lift valve's design is based on Schlumberger traditional unloading and operating gas lift valves, which incorporate a high-specification, metal-to-metal back check sealing module to meet strict quality, leak-rate, and performance standards. The check design incorporates enhanced geometry to minimize erosion while maintaining dart stability during high-rate operations. This increased performance and reliability enable the barrier gas lift valves to be installed as a well barrier element.

NOVA-10-B valves replace traditional operating orifice valves in operations with inherently unstable injection rates caused by the effect of tubing pressure. Even slight variations in the tubing flow regime can lead to wide fluctuations in tubing pressure and can result in unsteady injection rates, instability, and slugging. Traditional square-edged orifice valves require a pressure drop of approximately 50% to achieve critical gas flow, and, in most cases, operating with this much pressure loss is not practical. These valves achieve critical flow with a pressure drop of 10% or less. Within the critical flow regime, the injection rate is constant because the tubing pressure does not affect the injection volume. Stabilizing the injection pressure can lead to reduced maintenance costs and improved productivity and profit. This stabilization is achieved through innovative engineering and a field-proven design.

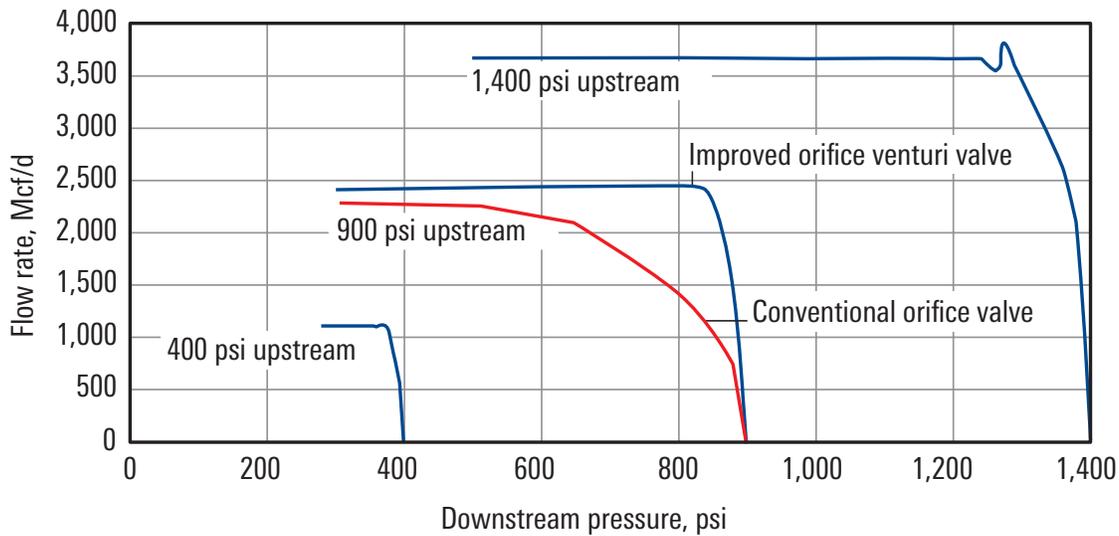
#### Operation

The NOVA-10-B valve uses a nozzle venturi orifice with a barrier-qualified check valve for continuous flow operations. It is installed in a side pocket mandrel. Injection fluid or gas enters through the valve entry ports and then flows through the nozzle venturi orifice. Injection pressure moves the check valve off the seat, enabling gas to enter the production conduit.



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A representative performance curve shows that NOVA-10-B valves achieve critical flow with a pressure drop of 10% or less, while conventional orifice valves require an approximately 40% drop.

## NOVA-10-B Valve Specifications

|  |   |
|--|---|
| OD (not including latch), in [mm]                    | 1 [25.4]                                    |
| Length (not including latch), in [mm]                | 12.784 [330.2]                              |
| Max. valve pressure rating, psi [MPa]                | 10,000 [68.9]                               |
| Max. valve operating temperature rating, degF [degC] | 350 [177]                                   |
| Orifice size range, in [mm]                          | $\frac{1}{8}$ to $\frac{3}{8}$ [3.2 to 7.9] |

## Materials

|                          |   |
|--------------------------|---|
| Body parts               | MONEL® 400 and K-500, Inconel® 925 and 718                                |
| O-ring seals             | Aflas® with PEEK® backups   |
| Seat                     | Tungsten carbide  |
| Seal stack               | PTFE seal stack with energizing rings and carbon-filled PEEK backup rings |
| Back check dart and seat | Stellite®   |

## Secondary accessories

|               |  |
|---------------|--|
| Latch         | BK-2 series                            |
| Running tool  | JK                                     |
| Pulling tool  | 1¼-in JDC                              |
| Kickover tool | OK series                              |
| Mandrel types | K series (KBMG, KBMM, KBMM-R, and KBG) |

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