

Extended Water Injection Regulation Module (TRGV-X)

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Modular Arrangement of Extended Range Regulators with Multiple Reductors for Water Injection Control in Selective Strings with Mandrels

The **TRGV-X module (Tandem Regulator Injection Valves eXtended)** for the regulation control of water injection in fields under secondary recovery of reservoirs with multiple zones that use regulating valves and mandrels was developed and patented by Ecopetrol and JPT. This module is designed for the Ecopetrol-JPT valve (TRGV-E), allowing for greater length and diameter, thereby extending the system's lifespan and increasing the injection capacity to 4500 BWPD per zone.

The modular system allows for the stabilization, optimization, and increased efficiency of water injection in mature fields and during secondary recovery.

The device allows for the control of water injection based on multiple fixed orifice regulators in tandem, including a damper. It enables the control of the maximum volume of water injected per zone according to the specific differential pressure, utilizing selection tables derived from testing and advanced modeling.

The system is modular and serves as a direct replacement for variable regulators in the field, optimizing investment and reducing service and operational costs.

The system is a national technology used by Ecopetrol and is supported continuously by JPT Consulting and Services.



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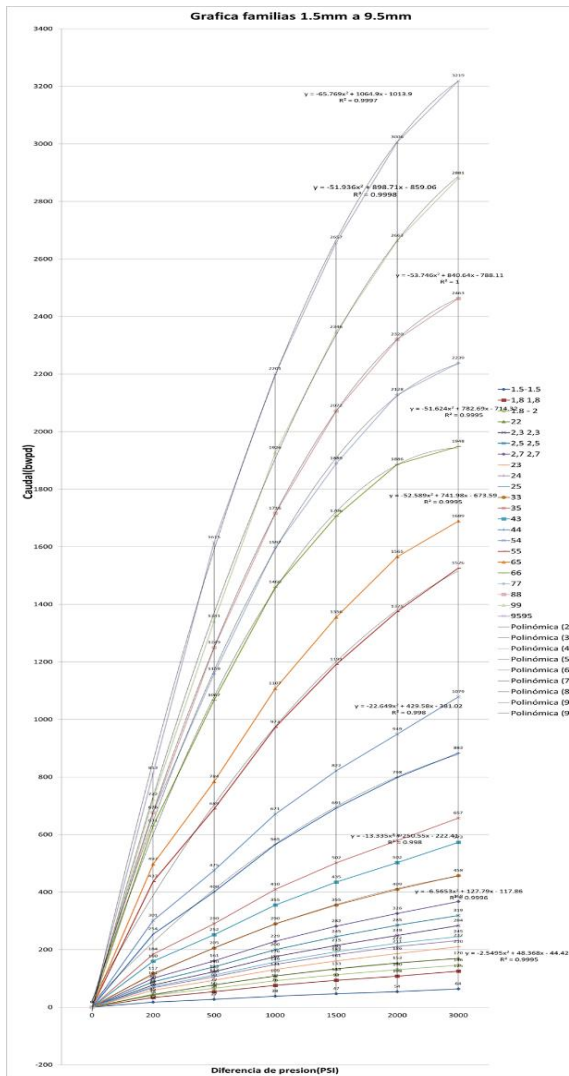
Applications

- Control and regulation of water injection in mature fields with multiple reservoirs.
- Stabilization of the injection in each zone and well, reducing the energy used.
- Longer and larger diameter reducers for controlling higher flow rates.

Advantages and Benefits

- Optimization of efficiency and stability in injection, achieving the maximum volume per zone in a stable manner.
- Modular design that allows for the upgrading, optimization, and replacement of reducers.
- Proprietary technology and local technical support.

Technical Specifications



| General Technical Specifications TRGV-X | |
|-----------------------------------------|----------------------------------------------------------------------|
| Parameter | Specifications and Comments |
| Valve Diameter | 1.675 in valve OD / TRGV-S: L-9 in; OD-1.3 in |
| Material | SST ANSI 316 |
| Max. Operating Temp. | 400°F - determined by O-ring |
| Maximum Flow Rate | 3300 BWPD per zone/mandrel |
| Pressure Range | 0 psi to 10,000 psi |
| Maximum Wear | 1% for 10,000 hours at 1,000 BWPD |
| Reducer Orifices | 1.5, 1.8, 2.0, 2.3, 2.5, 2.7, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 9.5 |
| Safety | Intrinsically Safe |

