Surface Polymer and Water Injection Control Module

Linear Pressure Regulator Module for the control of polymer and water injection at surface using parallel tandem regulators (TLPR / TRGV-U)

The Linear Pressure Regulation Device for surface polymer and water injection is designed to control injection across multiple wells with different characteristics using a single surface pump (TLPR).

It employs the patented tandem regulator system developed by Ecopetrol and JPT (TRGV-U) to adjust each well's injection rate in the network according to differential pressure and the specific requirements of each well.

The unit includes several parallel regulators (three as standard) with control valves that allow quick and easy flow-rate changes in the field.

It also features pressure sensors at the inlet and outlet to confirm regulation conditions, as well as test points.

Additional sensors for capacitance, conductivity, and fluid temperature can be installed to continuously monitor the polymer or water's stability and detect any changes.

The regulator module has two control stages:

1. The first stage provides gradual conditioning of pressure and flow.
2. The second stage precisely controls the flow while minimizing polymer degradation.

The regulator system is constructed from stainless steel to ensure minimal friction and polymer damage; alternatively, it can be manufactured in carbon steel to reduce cost.

This low-cost system, compared with conventional designs, is supported by design and planning curves that allow prediction of polymer degradation based on flow rate and differential pressure.

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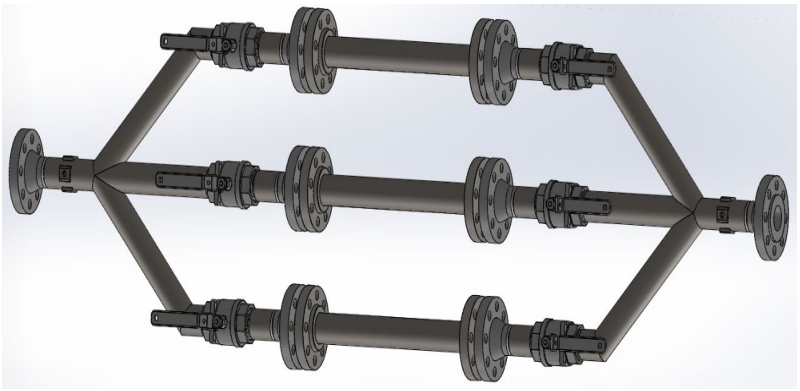

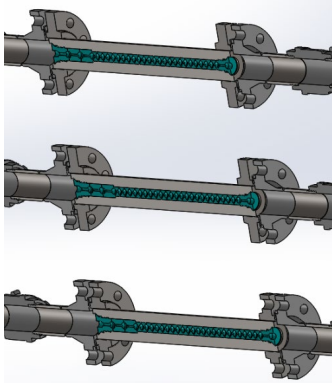

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Applications

- Control and regulation of water and polymer injection in mature fields where multiple wells are connected to the same injection pump.
- The multiple parallel regulators enable fast and safe adjustments to the injected fluid flow.
- The device is capable of handling typical surface pressure differentials from 500 to 1000 psi and flow rates up to 3000 BFPD, depending on site conditions.
- Enables continuous pressure and fluid parameter monitoring.

Advantages and Benefits

- Enhanced efficiency and stability of injection, achieving the maximum stable injection volume per well, which translates into long-term production increases.
- Simplified construction using cost-optimized steel; multiple parallel regulators improve operational efficiency.
- Modular design allows upgrading, optimization, and replacement of regulators and components to suit specific field conditions.
- User-friendly system with straightforward regulator selection, simple operation, and easy field installation.

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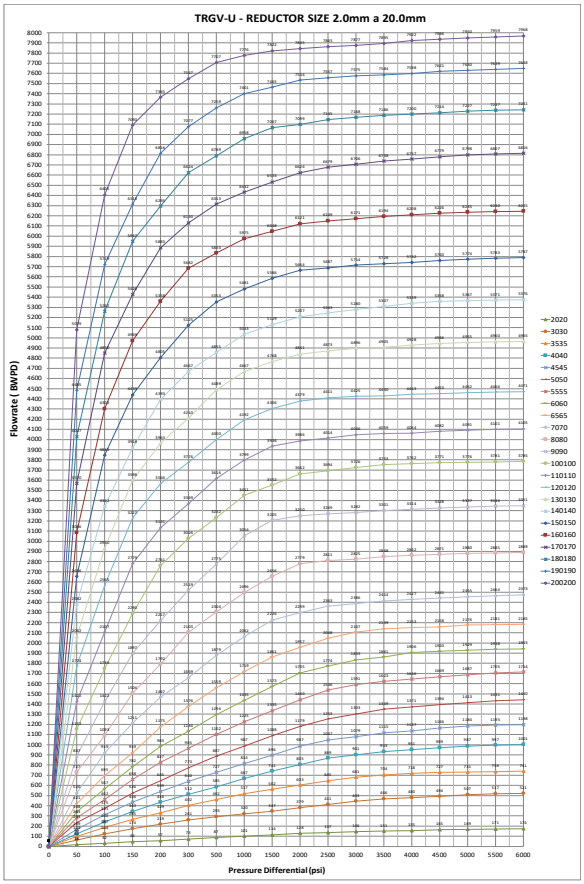
Technical Specifications and Selection



Especificaciones Técnicas Generales	
Parámetro	**Especificaciones y comentarios**
Diámetro de Tuberia y Dispositivo Modular	2.0 inches estándar - 3.0 inches extendido
Material	SST ANSI 316 para reguladores - Tuberia al carbon o acero inoxidable dependiendo de requerimientos del cliente
Máxima Temperatura de Operación Recomendada	350dF condiciones estandar para los sensores - 500dF en condiciones extremas
Maxima Presion Diferencial de Operación Recomendada	1500psi condicionada por las bridas de inyeccion utilizadas y la presion de bomba
Maximo Caudal de Operación Recomendado	5000BWPD para cada modulo en agua, 2000BFPD en el caso de polimeros manteniendo el daño por debajo de 10%
Maximo Daño o Degradacion del Polimero	Para una presion diferencial de inyeccion de 500psi y un caudal de 1000BFPD se estima un daño maximo menor al 10%
Desgaste Maximo	1% por 10.000 horas a 1000 BWPD
Sellos	El sistema utiliza unicamente Oring para sello interno y roscas NPT para sello externo
Conexiones	El dispositivo utiliza bridas para las conexiones
Seguridad	Intrinsicamente Segura