



# FloFuse

## Rate limiting control device

FloFuse autonomously limits flow of fluids into and from high permeability zones to ensure effective flow distribution in fractured or highly heterogeneous reservoirs.

FloFuse is a biased open valve which enables water injection or production at normal distributed rates but chokes once a trigger rate is exceeded. In the choked or fused position, a high flow restriction is applied reducing the injection or production rate in that zone. The normal distributed rates and trigger rate are engineered for optimum performance in each application. The valve remains dynamically reactive and will re-open if distributed flow can be achieved.

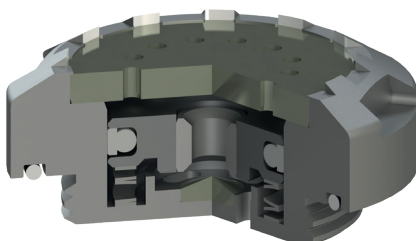
The FloFuse device is deployed as part of the lower completion or retrofitted into an existing well, mounted within a sub or integrated with sand screens. The lower completion is segmented into multiple zones with one or more FloFuse per zone, dependant on required injection rates.

### FloFuse Injection

Distribution of injected fluids is critical for achieving effective oil sweep or chemical treatment. The presence of highly permeable zones or fractures prevent effective fluid distribution leading to lower recovery factors and premature water breakthrough in production wells.

### FloFuse Production

FloFuse Production has been designed to limit the liquid rate from a high fracture section in the reservoir. A high flowrate of water will compress the disc to fuse and choke the flow. The normal distributed rates and trigger rate are engineered for optimum performance in each application. The valve remains dynamically reactive and will re-open if distributed flow can be achieved.



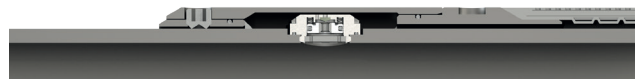
FloFuse Production

### Features

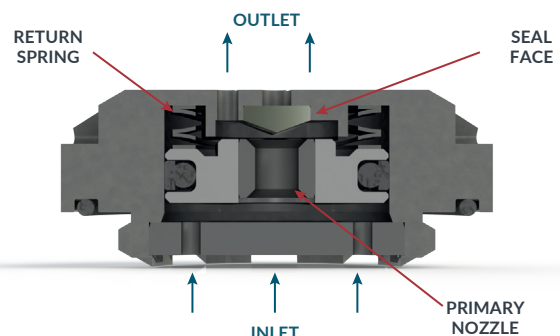
- Primary nozzle configured for either distributed injection or production
- Fused nozzle configured for limiting injection into fractures or production
- Biased open feature to reset the valve
- Field adjustable design

### Benefits

- Ensures uniform injection distribution along the well
- Restricts injection to fractures or high permeability zones
- Improves sweep efficiency in the reservoir
- Delays water breakthrough to producer wells
- Improved placement of acid treatments

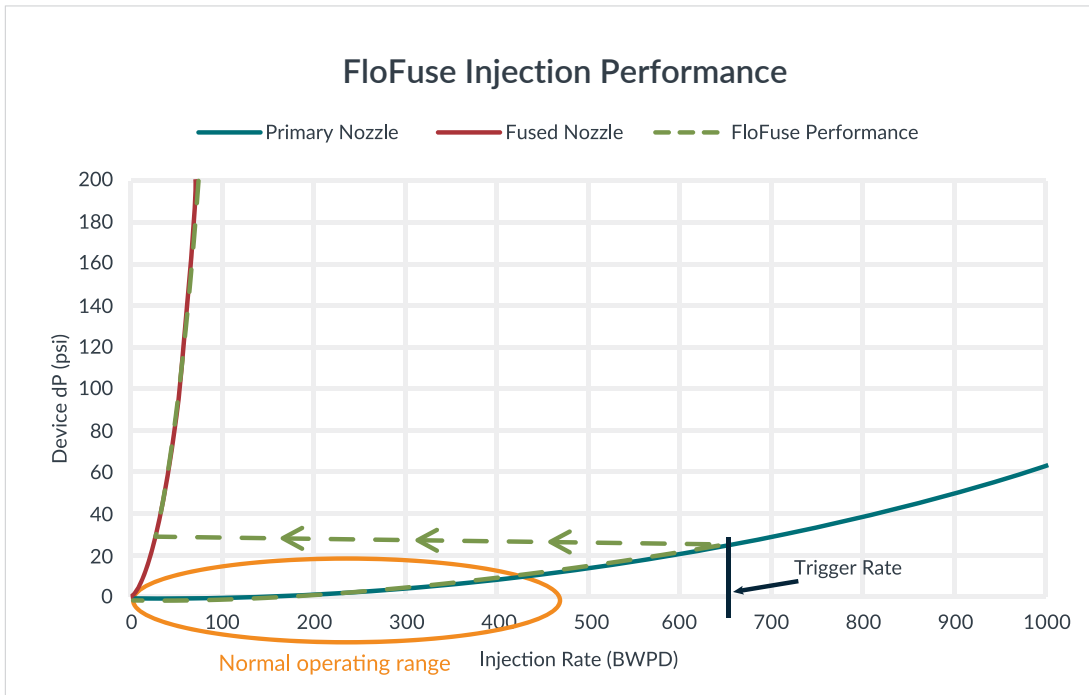


FloFuse mounted in screen



FloFuse Injection





Under normal operating conditions, the pressure drop across the completion is defined by the primary nozzle (blue curve). The presence of a fracture or high permeability area in one zone will cause the flow into that zone to increase. If the trigger flow rate is exceeded, the primary nozzle will switch to secondary and reduce the flow area of the fused nozzle (red curve). This will cause an increased pressure drop across the completion, reducing the flow to that zone.

If the permeability is stable, these conditions will persist. However, if diverting flow to other zones causes fracturing or stimulation, further zones may be choked. Once a sufficient number of zones have been fractured or stimulated, conditions for distributed flow are re-established and the FloFuse primary nozzle will re-open.

