

# RFID-Operated Inflow/Outflow Control Device

Manage inflow or outflow profiles across the horizontal reservoir

## Applications

- ICDs are used to regulate and manage inflow or outflow profiles across the horizontal reservoir. Set at regular intervals, each ICD will permit only a fixed “volume” of fluid to pass through a series of fixed nozzles. Flow above the fixed volume serves to create a back pressure at the tool, thus equalizing flow through the next “easiest” path, by design the adjacent ICD. This pattern is repeated over the whole horizontal sections’ drainage area, effectively promoting an equalization of inflow or outflow through each ICD by volume, thus a more uniform flow pattern over the reservoir drainage area is achieved. The fundamental step change RFID operated ICDs provide, is the ability to run the lower completion with all ICDs closed and then, at depth, sequentially open with no intervention.

## Features and Benefits

- Remote intervention-less operation eliminates the need for wash pipe, intervention services and crew, improving health, safety and environment concerns whilst saving operating costs.
- Facilitates the ability to run the reservoir completion closed. The lower completion becomes the reservoir barrier and fluid loss device omitting the need for an intermediate completion.
- Increase the percentage of the total hydrocarbon produced.
- Improves drainage of unwanted fluids.
- Provides sand control via the Weatherford FloReg™ Inflow Control Device (ICD) available with various screen options.
- Promotes even distribution across reservoir section.
- Facilitates staged start-up and well clean up from toe to heel.
- Sequential remote opening via radio frequency identification (RFID), pressure modulation and/or timer.
- Onboard clean hydraulic reservoir built in as standard, is debris tolerant, providing operational reliability.
- Set up in the factory to customer requirements minimizing non-productive time.
- Simple, user friendly, transferable operation provides operational efficiency.
- Robust, reliable, straightforward design.
- Mechanical contingency built in as standard.
- Reverts to a standard mechanical sliding sleeve on completion of remote operations.



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# RFID-Operated Inflow/Outflow Control Device

## Tool Description

The Weatherford RFID-operated Inflow/Outflow Control Device combines Weatherford's FloReg ICD technology with RFID technology to provide an intervention-less well management device which represents a revolutionary method for providing uniform inflow/outflow distribution, reducing water or gas production providing efficient reservoir drainage and improved sand control. The ICDs are run closed, eliminating the need for wash pipe, intervention, wires, or control lines thereby delivering value in terms of reduced completion time and risk.

The ICDs are pre-programmed to client specific applications. The ICDs are opened as per the operator's preferred logic by either circulating RFID tags, frequency modulated pressure signature, timers, or a combination of the actuation options.

A series of ICD's provide a controlled pressure drop along the horizontal reservoir section via the pre-arranged flow area management of the FloReg sub assembly. The ICDs equalize the wells inflow/outflow profile. The correct application of ICD technology can delay or minimize the onset of early water and gas coning optimizing reservoir management and improving hydrocarbon recovery.

Primarily designed for lower completion applications, the ICD has been designed with debris, mud solids and cement in mind. The internal operating mechanism is contained out with the flow path. The tool does not rely on any debris-sensitive springs, check valves or complex piston arrangements during operation. The reliability is not compromised by the need for any pre-charged or well sensitive piston chambers.

## Specifications

Size in. (mm)	Max. OD in. (mm)	Min. ID in. (mm)	Pressure Rating psi (MPa)	Absolute Pressure Rating psi (MPa)	Temperature °F (°C)
4.50 (114.3)	5.625 (142.9)	3.437 (88.9)	7,500 (51.7)	10,000 (68.9)	39 to 302 (4 to 150)
5.50 (139.7)	8.00 (203.2)	4.56 (115.8)	7,500 (51.7)	10,000 (103.4)	39 to 302 (4 to 150)

