Halliburton’s EquiFlow® Autonomous Inflow Control Device (AICD) is a step above all other inflow control tools because it allows for the most efficient recovery of oil in steam-assisted gravity drainage (SAGD) producers.

EquiFlow AICD is the market leader for autonomous ICDs and provides the highest reliability for the life of the well. Like all AICDs, it has no control lines, but it is unique in that it works without any moving parts and has no electronics or elastomers.

The EquiFlow AICD has been flow tested with steam, varying oils, and water. It has proven reliability in the hot temperatures of the SAGD environment.

EquiFlow AICD produces heavier, more viscous fluids, offering SAGD producers two additional benefits.

- Flow is encouraged from high oil and cold zones. As these zones flow at higher rates, heat moves in that direction maximizing the utilization of the well.

- When a steam breakthrough occurs, the EquiFlow AICD has shown 40% less steam flow over a passive nozzle ICD. At the same flow rate, the pressure drop of steam would be more than six times higher than oil flow.

### EquiFlow® AICD Technology

<table>
<thead>
<tr>
<th>Basepipe OD</th>
<th>3 1/2-in.</th>
<th>4 1/2-in.</th>
<th>5 1/2-in.</th>
<th>6 5/8-in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AICD OD</td>
<td>4.67-in.</td>
<td>5.67-in.</td>
<td>6.67-in.</td>
<td>7.83-in.</td>
</tr>
<tr>
<td>AICD Assembly Length</td>
<td>10.50-in.</td>
<td>10.50-in.</td>
<td>10.50-in.</td>
<td>10.50-in.</td>
</tr>
<tr>
<td>Maximum Number of Inserts Per AICD Housing</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Standard Metallurgy*</td>
<td>316L</td>
<td>316L</td>
<td>316L</td>
<td>316L</td>
</tr>
<tr>
<td>Standard Temperature Rating</td>
<td>520°F (271°C)</td>
<td>520°F (271°C)</td>
<td>520°F (271°C)</td>
<td>520°F (271°C)</td>
</tr>
</tbody>
</table>

* Tungsten carbide AICD inserts

### What Makes an ICD Truly Autonomous?

Simply saying an ICD (inflow control device) is autonomous doesn't mean it's true. Putting nozzles in series do not make an ICD autonomous, it must do more. To be autonomous, the flow path inside the tool must actually change. This can be done by moving parts or fluidics, but if the fluid path does not change, then it is NOT autonomous.

Autonomous ICD has the ability to respond to changing well conditions without any action by the operator. When unwanted fluids reach the wellbore, the local autonomous ICD changes the way the fluid is moving inside. This results in a greater restriction to flow while other zones continue production with a low restriction.
**Liquid Flow**

Oil-water emulsion flows with hot and cold zones within the well. Without flow control, hotter zones are produced at higher rates while colder zones are slowed. EquiFlow ICDs help maintain a constant flux regardless of fluid property. The fluidic diode EquiFlow AICD promotes production from cold and high oil zones, maximizing well conformance.

- **Hot zone, oil flow**
- **Normal zone, oil flow**
- **Cold zone, oil flow**

![Without Flow Control](image1)
![ICD](image2)
![EquiFlow® AICD](image3)

**Steam Breakthrough**

Steam breakthrough case shown. Without any flow control, steam flow can dominate the zone. Based on a mass flow rate, passive EquiFlow ICDs can reduce rate from the steam flow. The fluidic diode EquiFlow AICD can reduce flow rate in the steam breakthrough zone by 35-40% when compared with ICDs.

- **Steam breakthrough**
- **Normal zone, oil flow**

![Without Flow Control](image4)
![ICD](image5)
![EquiFlow® AICD](image6)

Halliburton’s suite of flow control devices for SAGD wells offers the industry leading solutions to maximize production efficiency and improve operators steam-oil ratio (SOR). EquiFlow OptiSteam flow control device helps optimize steam flow in SAGD injection wells.

For more information, contact your local Halliburton representative or email us at completions@halliburton.com.

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