



BECH Products, the next generation “smart” well completion tools

WHAT IF IT WORKS™

Providing improved reservoir drainage, improved injection, and greatly improved proppant and sand placement.

We have the three new products:

- ✦ BECH-AFD (autonomous flow control device) as described in the May 2010 issue of the SPE magazine JPT
- ✦ BECH-FRAC
- ✦ BECH-FAFD

BECH-AFD (Autonomous Flow-control Device)

ICD's, (inflow control devices), have been incorporated into well completions for years. They are passive chokes set at surface prior to installation. Pressure drop will occur over time, which can greatly diminish the effectiveness of ICD's.

“Smart” ICD's with improved value and functionality

*Please note from SPE paper 124154 by Liang-Biao Ouyang with Chevron: “Often the well characteristics change from initial flow input used to select ICD; hence, **an ICD with automatic adjustment capability to compensate for change in well inflow condition is desired**”.*

This is exactly the function that we have implemented in the BECH-AFD, autonomous flow-regulating device: it is self-regulating and installed as an integrated part of the ICD completion tools and requires no lines to surface.

See video of BECH-AFD compared to standard type ICD, plus other information from Dr. Aadnoy about the use of such technologies.

Key features, BECH-AFD (autonomous flow-control valve):

- ✦ Automatically adjust flow or injection rate to desired setting, to accommodate changing reservoir pressure, as well as individual changes in reservoir pressure at various locations throughout reservoir
- ✦ Improves efficiency and value of ICD installations
- ✦ Can be used in horizontal, as well as vertical wellbores
- ✦ Can be used to control inflow from multilateral wellbore sections
- ✦ Can be designed to be retrofitted into existing completion

AFD background:

Dr. Bernt Aadnoy, professor at the University of Stavanger, invented the BECH autonomous flow control valve. Bernt has published a number of SPE papers and has also authored the SPE book *Advanced Drilling and Well Technology*.

He has performed in-depth investigation and evaluation of ICD's, and has found several shortcomings in the technologies offered today. From this, he came up with the patented method of incorporating an autonomous flow control valve (AFD) in the downstream location of the chokes. This solution, called the Rygervalue initially, provides significant advantages when reservoir pressure and/or pressure between the various reservoir locations along a horizontal wellbore, changes by depletion or injection.

See [YouTube](#) or [video](#) at bottom of this web page, where Dr. Aadnoy explains the function of the his valve design.

BECH-FRAC (Frac sleeve)

BECH-FRAC is a new multi-position frac sleeve that increases production by keeping the proppant in the fractures to hold them open. Often we hear that fractures in the shale formations close quickly which contributes to rapid decline in production rates. The BECH-FRAC will help reduce that problem.

Enhance fracture and flow-back efficiency, improving reservoir drainage

Key features, BECH-FRAC:

- ✘ Separate outflow and inflow ports, that allows placement of proppants/sand into fractures while preventing flowback of this when producing well
 - Prevent loss of proppants/sand when flowing well
 - Minimize fracture collapse due to loss of proppants/sand
 - Remove need for resin-coated proppants?
 - Minimizes proppants/sand fill in horizontal borehole, reducing clean out cost and improving well intervention successes
- ✘ The valve can as an option incorporate AFD functions into wells that are stimulated using "frac sleeves"
- ✘ Introduce also the additional option to incorporate the BECH autonomous flow regulating valve
- ✘ Ability to close off flow through valve, by well intervention
- ✘ Can be adapted to frac sleeves from supplier of your choice

BECH-FAFD ("Smart" frac sleeve)

Our BECH-FAFD is a combination of above of the BECH-AFD and BECH-FRAC.

Game changing combination for shale area well completions

Key features, BECH-FAFD:

- ✘ Introduce the ability to install AFD's in unconventional resource (oil/gas) wells that are fractured with proppants/sand
- ✘ Introduce an improved reservoir drainage
- ✘ Improved water unloading from the individual stimulated zones to improve gas production
- ✘ Can be closed by intervention to shut of gas or water inflow

Patents pending.

Additional reading:

The following papers, including several from SPE, relate to ICD's and provide good information regarding history, function, and a detailed description of the autonomous flow device:

- * SPE paper [122824](#), Analysis of inflow control devices, by Bernt S. Aadnoy et al. Featured in the May 2010 issue of the JPT magazine, page 52.
- * [A short note on inflow performance related to ICD's and Facts and Fictions about Inflow Control Devices](#), by Bernt S. Aadnoy
- * [A new inflow control device, the Rygervalue](#), by Bernt S. Aadnoy
- * SPE paper [124154](#), Practical consideration of an inflow control device application for reducing water production, by Liang-Biao Ouyang
- * SPE paper [124677](#), Understanding the roles of inflow-control devices in optimizing horizontal-well performance, by Preston Fernandez, Zhuoyi Li and D. Zhu

HANSEN Energy Solutions LLC and two external partners have established the company BECH Wellbore Flow Control AS in Norway, where HANSEN is responsible for the BECH business. This company owns the IP described on this web page.

Contact us with your challenges!

