# Diagnostic Fracture Injection Tests Execution, Interpretation and Integration to Improve Reservoir Characterization

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**Introduction**

Historically diagnostic pumping events were mostly used to fine tune our fracture design on location, like calibrate perforation and near wellbore frictions, measure frac fluid efficiency and possible pressure dependant leakoff.

Nowadays with high focus on tight and unconventional reservoirs where applying buildup techniques to measure reservoir properties and evaluate hydraulic fracture effectiveness is unpractical due to closure time requirements, the application of Diagnostic Fracture Injection Tests (DFIT) became very popular. Therefore it is very important that we properly understand how these tests should be applied, its limitations and how to run the interpretation to get the most possible out of them.

We should keep in mind that one critical step we must take before running any test, is to define what information we are looking for. Based on this, we will be able design and plan for the proper test.

**Afterwards**, you will have learnt:

* Plan and Execute a DFIT Test
* Do a DFIT Interpretation
* Understand Information Limitations
* Integration and Usage of Results.

## Bibliography to be used

SPE - 60291.Adapting High Permeability Leakoff Analysis to Low Permeability Sands for Estimating Reservoir Engineering Parameters

SPE-93419 After-Closure Analysis to Determine Formation Permeability, Reservoir Pressure and Residual Fracture Properties

SPE-107877 Holistic Fracture Diagnostic

## Detailed agenda

**Introduction**

Type of Diagnostic Tests

What type of information are we looking for?

Selection of the most appropriate one based on information requirements

**Diagnostic Fracture Injection Test (DFIT)**

 Objective

 What Information can we get?

 Main Considerations

 Operational Overview

 Subpresurized and Overpresurized Reservoirs

Analysis Techniques

 Understanding G Function

 Flow Mechanisms Identification

 Estimating Stress Anisotropy

Estimating Pore Pressure and Transmissibility

G Time – BCA - ACA

**Getting Involved with Analysis Tools**

**Other Pressure Decline Analysis and Usage**

**Data Integration – Examples Review**

 Open Hole Logs

 Minimum Horizontal Stress, Lab Data, Pore Pressure

 Pressure History Match – DFIT and Fracture

 Validate Minimum Horizontal Stress, Permeability, Pore Pressure

 Production History Match

 Validated Matrix Perm, Pore Pressure, Secondary Perm and SRV