AWES

Advanced Well Equipment
Standards Group

AWES Recommended Practice Inflow Control Devices (ICDs)

AWES Recommended Practice: 3362-78

Issue Date: 5th April 2017

OTM Consulting Ltd

Table Content

Thanks to the following companies for their contribution to this document:

Absolute Completion Technologies
Baker Hughes
C-Fer Technologies
Chevron
ConocoPhillips
DEA Deutsche Erdoel AG
ExxonMobil
Halliburton
Nexen
Petrobras
Saudi Aramco
Schlumberger
Shell
Silverwell
South-West Research Institute
Statoil
Stress Engineering
Superior Energy
Tendeka
Weatherford

Foreword

AWES (Advanced Well Equipment Standards) is a global industry JIP formed under the guidance of OTM, a consulting firm based in Epsom, England. Invitation to this group has been extended to members of various branches of the oil and gas industry including oil and gas exploration and production companies, service companies and equipment vendors.

The main task of this technical committee is to prepare an international recommended practice based on the statement of requirements of the end users of said ICD equipment. This committee and the resultant RP will not be designed to hamper innovation of equipment developed by suppliers and vendors. Instead the focus has been dedicated to the qualification testing criteria of said equipment as per mutually agreeable conditions.

This document is only valid if it has been verified to be the latest revision.

Introduction

This Recommended Practice (RP) has been developed by users and suppliers of ICDs intended for use in the petroleum and natural gas industry worldwide. This RP is intended to give requirements and information to both parties in testing, qualification and quality grades of ICDs. Furthermore, this RP addresses supplier/manufacturer requirements which set the minimum requirements with which suppliers/manufacturers shall comply to claim conformity with this recommended practice.

This RP has been structured to allow for grades of increased requirements in performance validation. These grades allow the user/purchaser to select the grade required for a specific application for a chosen ICD device.

The three quality grades provide the user/purchaser the choice of requirements to meet a specific preference or application. Quality grade Q3 is the minimum grade of product quality offered by this recommended practice. Quality grade Q2 provides additional inspection and verification steps, and quality grade Q1 is the highest grade provided. Additional quality requirements may be specified by the user/purchaser as supplemental requirements.

Five RP design validation grades (V2 to V6) for each flow direction (i.e., production and injection) provide the user/purchaser the choice of requirements to meet a specific preference or application. Design validation grade V6 is the minimum grade and represents equipment whereby the validation method has been defined by the supplier/manufacturer. The complexity and severity of the validation testing increases as the grade number decreases.

Users of this RP should be aware that requirements above those outlined in this RP may be needed for individual applications. This RP is not intended to inhibit a supplier/manufacturer from offering, or the user/purchaser from accepting, alternative equipment or engineering solutions. This may be particularly applicable where there is innovative or developing technology. Where an alternative is offered, the supplier/manufacturer should identify any variations from this RP to the user.

1. Scope

This RP defines test requirements and procedures for qualifying inflow control devices* (ICDs) for both production and injection as defined herein for use in the petroleum and natural gas industry.

ICD devices included in this recommended practice:

- Conventional Inflow Control Devices (ICDs); such as nozzles, orifices, tubes, helical channels, etc., either singular or multiple (in series or in parallel)
- Autonomous Inflow Control Devices (AICDs); such as fluidic diode, RCP valve, AICV, etc., when the given test procedure is considered applicable

Devices not included in this recommended practice:

- Interval Control Valves (ICVs); surface controlled
- Flow Control Valves (FCVs)
- Sliding sleeves; on/off or multi-position devices**
- Any downhole adjustable device
- Openhole zonal isolation devices

Products covered by this document shall, when tested, include the device installed on/in base pipe as intended for field use but excluding screens which are covered by ISO 17824. The following tests are addressed in this document:

- Flow performance (ΔP vs Q)
- Erosion of the ICD device
- Plugging of the ICD device
- Mechanical integrity of the ICD device

Corrosion is not included in this RP.

---

*Inflow Control Device (ICD) includes the following: Flow Control Device (FCD), Outflow Control Device (OCD)

**Note: for any sliding sleeve device (SSD) that contains one or more ICDs, this RP applies to the device in ICD mode(s) but not to the functionality of the sleeve—which is covered in a separate recommended practice. (API 19AC)