AWES

Advanced Well Equipment
Standards Group

AWES Recommended Practice For Encapsulation

AWES 3362 PR ENCAP

Issue date: 27th July 2020

OTM Consulting Ltd

Contents

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

Arkema
Baker Hughes
Chevron
Core Laboratories Canada Ltd.
Daikin America
Halliburton
Mid-South Control Line
Prysmian Group
RSCC
Sandvik
Schlumberger
Shinda (Tangshan) Creative Oil & Gas Equipment Co
Solvay Advanced Polymers
Southwest Research Institute

1. Foreword

AWES (Advanced Well Equipment Standards) is a global industry workgroup formed under the guidance of OTM Consulting. 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 polymer encapsulations. This committee and the resultant recommended practice will not be designed to hamper innovation of equipment developed by suppliers/manufacturers. Instead, the focus has been dedicated to standardizing 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.

2. Introduction

This recommended practice has been developed by end-users (purchasers) and suppliers (manufacturers) of downhole polymer encapsulations that are intended for use in the petroleum and natural gas industry worldwide. This recommended practice is intended to provide recommendations, guidelines and information regarding qualification testing performed on the encapsulation polymers to validate their use as encapsulation material on control line (CL), TEC, and TEF products in the wellbore environment.

The consideration of a manufacturer is at the discretion and determination of the end-user, normally on the basis of documentation provided by the manufacturer as required in this standard. Further that the manufacturer has sufficient insight and experience in the manufacture of such materials and able to supply stable quality encapsulated products to meet given specifications. It is also recommended that the end-user consult with the suppliers of the encapsulation polymers to ensure the polymer type and grade are appropriate for the given application and believed could meet the end-users expectations in the intended environment. The end-user has final responsibility for ensuring the selected encapsulated product is capable of meeting all performance requirements for its intended service application.

Users of this recommended practice should be aware that additional requirements above those outlined in this recommended practice may be needed for individual applications. It is the responsibility of the end-user to provide all necessary information about intended service conditions and environment.

This recommended practice 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.

5. Scope

This recommended practice defines test requirements and procedures to evaluate polymeric materials used as encapsulations on Control Lines (CL), SSSV Lines, Chemical Injections Lines (CIL), TEC, TEPC, TEF, and other cable/tube like components for use in the petroleum and natural gas completions industry.

5.1 Primary Purposes of Encapsulation

- Protection of underlying components from mechanical damage
    - Impact forces
    - Nicks/scratches
- Packaging of underlying components
- Consolidation of components to minimize need for extra offshore spooling units and crews
- Isolation of underlying components from metal to metal contact (clamp and coupling stock)
- Reduce possible stress risers that may contribute to fatigue cracking
- Align and orientate product in the clamp

5.2 Products

Downhole encapsulation used on CLs, SSSV's, CIL, TEC, TEF, and other cable/tube like components.

5.3 Materials

All polymeric materials used for encapsulation.

5.4 Environment & Life Cycle

The applicability for the use of a polymer as an encapsulation material will depend on how it performs at each stage of the encapsulation's life cycle. Each stage has its own function and unique challenges, with the acceptable performance characteristics varying across each stage. This document will attempt to identify the critical characteristics at each stage and then define (or refer) to tests which can be used to evaluate polymeric materials as an encapsulation throughout its lifecycle.

The defined life cycle stages are:

- Stage 1: Storage, Transportation, and Handling
- Stage 2: Installation (Run in Hole)
- Stage 3: In Well
- Stage 4: Retirement / Retrieval

It is the responsibility of the end user to define the required life cycle stages of the encapsulation material for its intended application. It is understood that for some applications, the encapsulation may only need to perform during certain defined life cycle stages, and not others. For such applications, at a minimum, the encapsulation material must meet all requirements for the life cycle stages it is required to perform.