AWES

Advanced Well Equipment
Standards Group

AWES Recommended Practice For Screening and Selection of Degradable Materials

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OTM Consulting

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Foreword

AWES (Advanced Well Equipment Standards) JIP 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, raw material suppliers, and equipment vendors.

The main task of this technical committee is to prepare an international Recommended Practice (RP) for screening and selection of degradable materials. This committee and the resultant RP 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.

Introduction

This RP has been developed by users/purchasers and suppliers/manufacturers of degradable materials that are intended for use in the petroleum and natural gas industry worldwide. This RP is intended to provide requirements and information to both parties regarding qualification testing performed to validate the material specification.

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 materials or 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.

1. Scope

This Recommended Practice (RP) provides testing procedures for determining and reporting the properties of degradable solid materials for use in temporary structural/functional applications within the petroleum and natural gas industry. It covers degradable polymers and metals including standardized mechanical and rate of degradation (ROD) testing. It is not intended to be used to predict performance in service conditions. Nor does it cover degradable materials in the form of gels, powders, lost circulation materials (LCM), fluid diverters, fluid loss control pills, or the testing of individual constituents used in the manufacture of solid degradable materials.

2. Normative References

ASTM D1182-54, Method of Test for Apparent Density and Bulk Factor of Granular Thermoplastic

B557-15, Standard Test Methods for Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products

ASTM, D638-14, Standard Test Method for Tensile Properties of Plastics

ASTM D3039 Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials

ASTM E9-19 Standard Test Methods of Compression Testing of Metallic Materials at Room Temperature

ASTM D695-15, Standard Test Method for Compressive Properties of Rigid Plastics

ASTM D575-91(2018) Standard Test Methods for Rubber Properties in Compression

ASTM D6641, Standard Test Method for Compressive Properties of Polymer Matrix Composite Materials Using a Combined Loading Compression (CLC) Test Fixture

ASTM D395B, Standard Test Methods for Rubber Property—Compression Set

ASTM D624, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers

ASTM D790, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

ASTM G1, Standard Practice for Preparing, Cleaning, and Evaluating Corrosion Test Specimens

ASTM D792-13, Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement

ASTM E18, Standard Test Methods for Rockwell Hardness of Metallic Materials

ASTM E10, Standard Test Method for Brinell Hardness of Metallic Materials

ASTM D785-03, Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials

ASTM 2240, Standard Test Method for Rubber Property—Durometer Hardness

ASTM D3418, Standard Test Method for Transition Temperatures and Enthalpies of Fusion and Crystallization of Polymers by Differential Scanning Calorimetry

ASTM D1429-13, Standard Test Methods for Specific Gravity of Water and Brine

ASTM D412-16 Vulcanized Thermoset Rubber and Thermoplastic Elastomers

ASTM D470, Standard Test Methods for Crosslinked Insulations and Jackets for Wire and Cable

ASTM D1938, Standard Test Method for Tear-Propagation Resistance (Trouser Tear) of Plastic Film and Thin Sheeting by a Single-Tear Method

ASTM E1640, Standard Test Method for Assignment of the Glass Transition Temperature By Dynamic Mechanical Analysis

ASTM D7264, Standard Test Method for Flexural Properties of Polymer Matrix Composite Materials