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IEEE Recommended Practice for Specifying Electric Submersible Pump Cable—Polypropylene Insulation

IEEE Industry Applications Society

Sponsored by the
Petroleum and Chemical Industry Committee

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IEEE Recommended Practice for Specifying Electric Submersible Pump Cable—Polypropylene Insulation

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Approved 6 March 2013

IEEE-SA Standards Board

Abstract: Minimum requirements for the design, construction, manufacturing, testing, purchasing, and application of electric submersible pump cable are presented. The cable is round or flat, with polypropylene rubber insulation, nitrile or polyethylene jacket, and armor. These cables are for voltages not exceeding 3 kV or 5 kV (phase to phase) and conductor temperatures not exceeding 96 ºC (205 ºF) maximum for nitrile or a maximum minimum of –10 ºC (14 ºF) minimum. Conductors, insulation, assembly and with or without jacket, armor, requirements for testing by the manufacturer, and cable ampacity are all covered in the document.

Keywords: ampacity ratings, assembly, cable construction, cable testing, electric submersible pump, ESP cable, field cable testing, IEEE 1019™, submersible pump cable, testing polypropylene

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Introduction

This introduction is not part of IEEE Std 1019-2013, IEEE Recommended Practice for Specifying Electric Submersible Pump Cable—Polypropylene Insulation.

This recommended practice, under the jurisdiction of the Petroleum and Chemical Industry Committee of the IEEE Industry Applications Society, presents the minimum requirements for the construction, manufacturing, purchasing, and application of electric submersible pump cable. The configuration of the cable is either round or flat, with polypropylene insulation, with a nitrile jacket, and armor.

Anyone desiring to use this recommended practice may do so. It is presented as minimum criteria for construction of this class of submersible cable. It is not intended to restrict innovation or to limit development of improvements in cable design. Every effort has been made to assure the accuracy and reliability of the data contained herein; however, the committee makes no representation, warranty, or guarantee in connection with the publication of this specification and hereby expressly disclaims any liability or responsibility for loss or damage resulting from its use; for any violation of any federal, state, or municipal regulation with which it may conflict; or for the infringement of any patent resulting from the use of this document.

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1. Overview

1.1 Scope

This recommended practice establishes requirements for three-conductor round-and-flat-type oil-well cable used in supplying three-phase ac electric power to submersible pump motors. The major cable components are copper conductors, polypropylene insulation, polymeric jacket, and galvanized metallic armor.

1.2 Specification and standards

Cables meeting the requirements of this recommended practice should be rated for voltages not exceeding 3 kV or 5 kV (phase to phase).

Conductor operating temperatures for cables should not exceed 96 °C (205 °F). Use of cable above rated temperature can cause premature deterioration of the insulation. Low-temperature handling below –10 °C (14 °F) may cause cracking of the insulation or jacket.

Cable purchased under the recommendation of this recommended practice, unless otherwise specified herein, should meet the requirements of ASTM A90, ASTM B3, ASTM B8, ASTM B33, ASTM B189,