Electrical and Electronic Components for Use in Downhole Completion Equipment

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1 Scope

This specification provides the requirements for electrical/electronic components and assemblies used in downhole completion equipment as they are defined herein for use in the petroleum and natural gas industries.

Electrical/electronic components and assemblies related to equipment covered under API specifications such as API 11D1, API 14A, API 19AC, API 19CI, API 19ICV, API 19G1, API 19G2 and API 19V are included. This specification is intended to be complimentary to other API specifications. When other API specifications require that any included electrical/electronic components or assemblies meet the requirements of this specification, the requirements defined in this specification are in addition to any other requirements specified by these other API specifications. Included are the minimum requirements for a functional specification, design verification, design validation of performance ratings, manufacturing quality assurance, functional acceptance testing, shipping, handling, and storage.

This specification covers electrical/electronic downhole completions equipment and assemblies including:

— Sensing devices such as permanent downhole and wireless gauge systems, position sensors.

— Actuation devices intended for use in applications such as safety valves, interval control valves, chemical injection valves, gas lift valves, built-in setting devices.

— In-well control devices used for control of a single device or consolidation of multiple gauge/sensing, or actuation devices.

— Telemetry devices.

— Electrical energy storage devices (including batteries). Any non-electrical storage devices such as springs, gases, hydraulic devices are not in scope of this specification.

— Other downhole equipment containing electrical/electronic components, as applicable, such as wireless couplers (inductive, capacitive), solenoids, motors, relays, transducers.

Testing/equipment not covered by this specification are:

— Electric submersible pumps (ESP).

— Optical downhole gauges where electrical/electronic components are above the tubing hanger.

— Perforating tools.

— Service tools and electrical/electronic systems used during deployment/recovery and logging such as measurement-while-drilling (MWD) systems.

— Through-tubing setting or service tools.

— Well head and other related equipment.

— Subsea control systems.

— Tubing encased conductor (TEC), tubing encased fiber (TEF), associated mechanical splices, mechanical connectors (dry-mates, in-well wet-mates) and clamps.