TAPE ADHESION TEST SYSTEM

BACKGROUND

[0001] Electrical wire conductors may be insulated using various materials and techniques, depending on the desired application. Magnet wire refers to an insulated wire conductor suitable for making electromagnetic coils as used in electric motor windings, generators, and solenoids, for example. In subsurface applications, such as electric submersible pumps (ESP's) for the oil and gas industries, robust wire insulation may be created by wrapping the wire conductor being made into magnet wire within an insulating tape that is wound helically around the wire.

[0002] The National Electrical Manufactures Association (NEMA) publishes "Magnet Wire (MW) 1000," which describes ASTM and NEMA standards for magnet wire manufacturing and testing methods. MW 1000 is the standards publication for general requirements, product specifications, and test procedures for magnet wire. Currently there are no methods or standards that quantify the bond strength of the tape insulation on the wire.

SUMMARY OF INVENTION

[0002a] According to a first aspect of the present application, there is provided a tape adhesion test system, comprising: means for securing a first layer of tape, wherein the first layer of tape is adhered to a wire conductor through an adhesive bond; means for applying a pulling force to a second layer of tape adhered to the first layer of tape through an adhesive bond; and means for measuring the pulling force when one or more adhesive bonds break.

[0002b] According to a second aspect of the present application, there is provided a test fixture, comprising: chucks for securing each end of a tape-wrapped wire; a clamp for applying a pulling force to an outer layer of tape of the tape-wrapped wire; a recorder for storing a pulling force value when an adhesive bond between the outer layer of tape and an inner layer of tape separates.

[0002c] According to a third aspect of the present application, there is provided a method, comprising: placing a sample of a tape-wrapped wire into a rotatable chuck; attaching a pull tester to an outer layer of tape adhered to an inner layer of tape of the tape-wrapped wire; increasing a pull force of the pull tester until the wire begins to spin; measuring the pull force when the wire begins to spin to determine an adhesive bond strength between the outer layer of tape and the inner layer of tape.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] The detailed description is set forth with reference to the accompanying figures. In the figures, the left-most digit(s) of a reference number identifies the figure in which the reference number first appears. The same numbers are used throughout the figures to reference like features and components.