SUBJECT 984A

# OUTLINE OF INVESTIGATION

# FOR

# COMPATIBILITY OF INSULATING MATERIALS AND REFRIGERANT/OIL

# FOR USE IN HERMETIC REFRIGERANT MOTOR-COMPRESSORS

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## FOREWORD

A. This Outline of Investigation contains basic requirements for products covered by Underwriters Laboratories Inc. (UL) under its Follow-Up Service for this category within the limitations given below and in the Scope section of this Outline of Investigation. They are subject to revision as further experience and investigation may show is necessary or desirable.

B. The observance of these requirements by a manufacturer is one of the conditions of the continued coverage of the manufacturer's product.

C. A product which complies with the text of this Outline of Investigation will not necessarily be judged to comply with the Outline of Investigation if, when examined and tested, it is found to have other features which impair the level of safety contemplated by these requirements.

D. A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this Outline of Investigation, and that involves a risk of fire or of electric shock or injury to persons shall be evaluated using appropriate additional component and end-product requirements to maintain the level of safety as originally anticipated by the intent of this Outline of Investigation. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this Outline of Investigation does not comply with this Outline of Investigation. Revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this Outline of Investigation.

E. UL, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of UL represent its professional judgement given with due consideration to the necessary limitations of practical operation and state of the art at the time the Outline of Investigation is processed. UL shall not be responsible to anyone for the use of or reliance upon this Outline of Investigation by anyone. UL shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Outline of Investigation.

F. Many tests required by the Outline of Investigations of UL are inherently hazardous and adequate safeguards for personnel and property shall be employed in conducting such tests.

## INTRODUCTION

### 1 Scope

1.1 These requirements cover an alternative compatibility test. The test requirements contained in this outline may be performed to evaluate the compatibility of an alternative refrigerant and/or oil with electrical insulating materials and systems used within the compressor-motor enclosure.

### 2 General

### 2.1 Undated references

2.1.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

### 2.2 Units of measurement

2.2.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

## PERFORMANCE

### 3 General

3.1 Film or film and fiber coated magnet wire, motor ground insulation and other motor insulation system parts, such as lead connection blocks, tapes, lead wire, splice insulation, tie cords, phase barriers, thermal protector coverings, tubing, varnish, etc. employed in the previously evaluated insulating system may be tested. Motor-compressors, motorettes or coilettes along with other material to represent the system for this testing may also be used. The use of other test methods judged equivalent by the certification organization that contain specific pass/fail criteria may also be considered.

### 4 Samples

4.1 Two twisted pairs of film or film and fiber coated magnet wire made in accordance with Standard Test Method for Thermal Endurance of Film-Insulated Round Magnet Wire, ASTM D2307, or two straight lengths of fibrous-covered magnet wire, whichever is applicable, are to be tested.

*Exception: At the manufacturers option, six samples may be tested.*

4.2 If twisted pairs of film or film and fiber coated magnet wire are not used, two motorettes or coilettes are to be tested. Motorettes are to be prepared as described in IEEE 117, Standard Test Procedure for Evaluation of Systems of Insulating Materials for Random Wound AC Electric Machinery. Form wound motorettes constructed to IEEE 117 shall be used for evaluating insulation systems rated over 600 V. Coilettes are to include a typical slot assembly fabricated from two metal plates bolted together. The slot section of the motorette or coilette shall be fabricated from steel sheets, such as AISI 1010 cold-rolled steel or other motor-steel sheets. The assembled slot portion shall contain two coils approximately 15 to 20 turns each, insulated from ground by slot cells, insulated from each other by phase insulation if used in the motor application, and held in place with slot wedges. Form wound motorettes shall use rectangular wire with 5 turns per coil. Each coil shall be wound with two parallel wires so that turn-to-turn tests may be made. Film or film and fiber coated magnet wire, representative of motor construction, No. 18 AWG (0.82 $mm^2$), is to be used for coil construction. Minor modifications of the motorette or coilette assemblies can be made to simulate intended uses.