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APPROVAL REPORT

APPROVAL EXAM OF PYRO-SAFE FLAMMOTECT-A ABLATIVE FLAME RETARDANT CABLE COATING

Prepared for:

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Vertriebsgesellschaft mbH
International
Glüsinger Straße 86
21217 Seevetal
Germany

Project ID: 3037058
Class: 3971
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Authorized by:

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FM APPROVALS

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from

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I INTRODUCTION

1.1 svt BRANDSCHUTZ Vertriebsgesellschaft mbH International requested an examination of their PYRO-SAFE FLAMMOTECT-A Ablative flame retardant cable coating to determine if it meets the Approval requirements of FM Approvals. The coating can be applied by brush, roller, or airless spray to prevent the propagation of fire along electrical cables to protect the functionality of the cables. It is applied at a minimum dry coating thickness of 1.6 mm (1/16 in.).

1.2 The PYRO-SAFE FLAMMOTECT-A Ablative product is a fire retardant, asbestos-free, flexible cable coating. The coating is white in appearance before and after drying.

1.3 As the product contains water, precautions should be taken to ensure that any storage, transportation or application of the material is done at temperatures above freezing and in accordance with the manufacturer's instructions.

1.4 The coating is intended to prevent flame spread in conductors when exposed to a moderate fire source that might occur from arcs or sparks falling or occurring in the cable tray, or from fire exposure of combustible trash or foreign material around the cable(s) in grouped or in a single or layered tray condition. The coating is not intended to maintain cable protection under severe and extended fire exposure conditions.

1.5 When applied according to the manufacturer's instructions, the protective coating does not of itself require electrical de-rating.

1.6 This Report may be reproduced only in its entirety and without modification.

1.7 **Standard:**

Title	Class Number	Date
Draft Approval Standard – Flame Retardant Coating for Grouped Electrical Cables	3971	March, 1990

1.8 **Listings:** This coating meets the Class 3971 requirements and will appear in the Approval Guide, an online source of FM Approvals under the heading "Fire Protective Coatings for Grouped Electrical Cables" as follows:

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PYRO-SAFE FLAMMOTECT-A Ablative cable coating. Minimum dry coating thickness is 1.6 mm (1/16 in.).

1.9 Twenty meters (20 m) (65 ft) of 2/0 AWG, Cu, 600V, cable was supplied from svt BRANDSCHUTZ Vertriebsgesellschaft mbH International to FM Approvals. The coating and all test cable preparation was conducted by svt BRANDSCHUTZ Vertriebsgesellschaft mbH International and the finished cable samples were sent to FM Approvals for testing.

II DESCRIPTION

2.1 Surfaces to be coated with the PYRO-SAFE FLAMMOTECT-A Ablative coating must be clean and free from oil, grease, and dirt prior to cable coating application.

2.2 The most effective application of this coating is by airless equipment or brush. The coating dries to the touch in minimum 4 hours and cures thoroughly in minimum 4 days, depending on cable temperature, ambient temperature, and relative humidity. Minimum required thickness for dry coating is 1.6 mm (1/16 in.).

2.3 After curing, the coating remains sufficiently pliable so that individual cables may be removed from a grouping if necessary; and the damaged portion of the protective coating may be repaired by spraying another application of the coating. The coating has good adhesive properties and will stick readily to vertical and overhead surfaces. When exposed to flame, it does not melt or drip, but merely ablates.

III EXAMINATION AND TESTS

3.1 Parallel Panel

3.1.1 Four strips of PYRO-SAFE FLAMMOTECT-A Ablative cable coating, 457 mm (18 in.) long, 76 mm (3 in.) wide and 1.6 mm (1/16 in.) thick were prepared and conditioned at room temperature. Two specimens were clamped vertically and parallel 13 mm (½ in.) apart to expose 432 mm (17 in.) from the free (lower) end. A Bunsen burner with a 51 mm (2 in.) total flame height with a 25 mm (1 in.) inner core is positioned vertically under the free end of one specimen for a two minute period with the flame cone just touching the specimen. Examination at the end of the fire exposure period showed that no flames impinged above the 76 mm (3 in.) gauge mark. There was some disintegration of the specimen below the 76 mm (3 in.) gauge mark when handled by squeezing lightly between the thumb and two fingers.

3.1.2 The test outlined in paragraph 3.1.1 was repeated with the second set of specimens and the results were similar. These test results satisfy Approval requirements which allow no degradation of specimen above the 76 mm (3 in.) gauge mark and no scorching or burning above the 305 mm (12 in.) gauge mark. The results of these tests were satisfactory.

3.2 Di-Electric Strength

3.2.1 Seven (7) 0.9 m (3 ft) long samples of 2/0, 600 V, 90°C, jacketed, 285 ampere rated (National Electrical Code) copper cables were given a high potential check of 1000 V, plus 200 percent of rated voltage for one minute. The cables were wrapped tightly in aluminum foil and the potential applied between the foil and the copper conductor and any leakage current in milliamps was recorded for each cable sample. Cable samples were coated with the PYRO-SAFE FLAMMOTECT-A Ablative coating according to the manufacturer's instructions and, after the recommended curing time, this high potential test was repeated to ensure no change or damage occurred to the cable insulation prior or during coating. (This test is also repeated after the fire tests described below as a means of determining any coating breakdown). The average milliamp value for all three samples was 0.15mA. This satisfies the Approval requirement that leakage current shall not exceed 5.0 milliamps when measured between the conductor and the outer jacket during this high potential test. The results of these tests were satisfactory.

3.3 Ampacity

3.3.1 For the Ampacity test, a cable coated with the PYRO-SAFE FLAMMOTECT-A Ablative coating was supplied with a 28 AWG chromel-alumel theromocouple imbedded between the coating and cable jacket. This cable assembly was subjected to its rated current carrying capacity of 285A (according to the National Electrical Code) until the temperature indicated by the thermocouple stabilized at 43°C (109°F). This temperature is below the 90°C (194°F) maximum temperature rating of the cable jacket material. No electrical de-rating is necessary when PYRO-SAFE FLAMMOTECT-A Ablative coating is applied to the cable according to the manufacturer's recommendations. The results of this test was satisfactory.

3.4 Salt Water

3.4.1 A 0.9 m (3 ft) length of cable coated with PYRO-SAFE FLAMMOTECT-A Ablative coating was subjected to a saltwater test consisting of 8 hours submerged alternating with 16 hours drying in a 24 hours span in a 1 percent saltwater solution over a 30 day period with the water temperature at 66°C (150°F). At the end of this period, the sample was allowed to dry for 36 hours. There was no disintegration or deterioration of the coating. The cable sample was then subject to the fire test described in paragraph 3.6 and the required Di-Electric Strength, described in paragraph 3.2; the results of this test was satisfactory.

3.5 Aging

3.5.1 Two 0.9 m (3 ft) lengths of cable coated with PYRO-SAFE FLAMMOTECT-A Ablative coating were subjected to alternating temperatures of 71°C (160°F) and -40°C (-40°F) for 24 hours over a two week duration. At the end of this accelerated aging test period, the cables were subjected to the fire test described in paragraph 3.6 and the Di-Electric strength test, described in paragraph 3.2. After cooling, the charred and scorched area exposed to the burner flame was measured and found to be 76 to 102 mm (3 to 4 in.) in length. The results of these tests were satisfactory.

3.6 Fire Exposure

3.6.1 Three 3 ft (0.9 m) long cables coated with the PYRO-SAFE FLAMMOTECT-A Ablative coating were individually heated electrically with 150 percent of rated current (285A) until the copper conductor reached a stabilized temperature of 43°C (109°F). A flame from a Meker gas burner was adjusted to give an overall flame height of 127 mm (5 in.) with a 76 mm (3 in.) inner cone (natural gas) and applied to the horizontally positioned cable for two minutes with the tip of the inner cone touching the bottom of the coated cable. At the end of a two minute flame exposure, there was simultaneous burner flame cutoff and electrical shutdown. All flaming extinguished immediately. After cooling, the charred and scorched area exposed to the burner flame was measured and found to be 52 to 76 mm (2 to 3 in.) in length. This satisfies Approval requirements that burning shall not continue longer than one minute after flame cutoff and the burned (exposed area) shall not exceed 228 mm (9 in.) in length.

3.6.2 Results on the second and third cables exposed to the test described in paragraph 3.6.1 were similar. These three cables were then given a repeat of the Di-Electric Strength test described in paragraph 3.2. The results of these tests were satisfactory.

3.7 Inspection

3.7.1 Using the three cables from the Fire Exposure tests, the area exposed to the fire were stripped back exposing the cable jacket. Per paragraph 3.2, Di-electric Strength test was conduct on the three samples. The results of these tests were satisfactory.

IV MARKINGS

4.1 The PYRO-SAFE FLAMMOTECT-A Ablative cable coating is available in 12.5 kg (27.5 lbs) plastic buckets and 310 ml (10.5 oz) cartridges. The product name, batch number, product code number and the Approval Mark of FM Approvals are stenciled on the bucket. Application instructions are sent with each product shipment.

4.2 Markings denoting Approval by FM Approvals shall be applied by the manufacturer only within and on the premises of manufacturing locations that are under the FM Approvals Facilities and Procedures Audit program.

4.3 The manufacturer agrees that use of the FM Approvals name or Approval Mark is subject to the conditions and limitations of the Approval by FM Approvals. Such conditions and limitations must be included in all references to Approval by FM Approvals

V FACILITIES AND PROCEDURES AUDIT

svt BRANDSCHUTZ Vertriebsgesellschaft mbH International manufacturing location in Seevetal, Germany is subject to periodic audit inspections to determine that the quality and uniformity of the materials have been maintained and will provide the same level of performance as originally Approved. The facilities and quality control procedures in place have been found to be satisfactory to manufacture product identical to that examined and as described in this report.

VI MANUFACTURER'S RESPONSIBILITIES

6.1 To assure compliance with his procedures in the field, the manufacturer shall supply to the installer such necessary instruction or assistance required to produce the desired performance achieved in the analysis.

6.2 The manufacturer shall notify FM Approvals of any planned change in the Approved product, prior to general sale or distribution, using Form 797, Approved Product Revision Report.

VII DOCUMENTATION

The following document describes the Product and is filed under project #3037058.

Document Title	Submitted Date
F & PA Audit Manual	March, 2010

VIII CONCLUSION

8.1 The PYRO-SAFE FLAMMOTECT-A Ablative cable coating as described in Section II, meets draft Standard 3971 Approval requirements.

8.2 Since a duly signed Master Agreement is on file for this customer, Approval is effective as of the date of this report.

8.3 Continued Approval will depend on satisfactory field experience and periodic Facilities and Procedures Audit.

TESTING SUPERVISED BY: J. A. Nunes

ORIGINAL TEST DATA: Project Data Record 3037058

ATTACHMENTS: None

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