

AC 150/5370-10

CHANGE 14

DATE 8/4/81

ADVISORY CIRCULAR

CHANGE



DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration
Washington, D.C.

Subject: Change 14 to STANDARDS FOR SPECIFYING CONSTRUCTION OF AIRPORTS--
New Acceptance Criteria Information

1. PURPOSE. Item P-606, Adhesive Compounds, Two-Component, for Sealing Wire and Lights in Pavement, has been revised to provide additional requirements when using this material with bituminous concrete pavement.

The Change number and date of changed material are carried at the top of each page. The changed material is indicated in the margins by asterisks.

PAGE CONTROL CHART

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| 379-384 | 7/25/80 | 379-384 | 8/4/81 |

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ITEM P-606 ADHESIVE COMPOUNDS, TWO-COMPONENT, FOR
SEALING WIRE AND LIGHTS IN PAVEMENT

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1. DESCRIPTION

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1.1 This specification covers two types of material; a liquid
suitable for sealing electrical wire in saw cuts in pavement and
for sealing light fixtures or bases in pavement, and a paste
suitable for embedding light fixtures in the pavement. Both
types of material are two-component filled formulas with the
characteristics specified in paragraph 606-2.4. Materials
supplied for use with bituminous concrete pavements must be
formulated so they are compatible with the bituminous concrete.

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If the material is to be used on bituminous concrete
pavements and it is not formulated for this use, cracking
and separation of the material from sawed wireway kerfs and
around light fixtures may occur.

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2. EQUIPMENT AND MATERIALS

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2.1 CURING. When prewarmed to 77 degrees F (25 degrees C),
mixed, and placed in accordance with manufacturer's directions,
the materials shall cure at temperatures of 45 degrees F (7.2
degrees C) or above without the application of external heat.

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2.2 STORAGE. The adhesive components shall not be stored at
temperatures over 86 degrees F (30 degrees C).

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2.3 CAUTION. Installation and use shall be in accordance with
the manufacturer's recommended procedures. Avoid prolonged or
repeated contact with skin. In case of contact, wash with soap
and flush with water. If taken internally, call doctor. Keep
away from heat or flame. Avoid vapor. Use in well-ventilated
areas. Keep in cool place. Keep away from children.

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2.4 CHARACTERISTICS. When mixed and cured in accordance with
the manufacturer's directions, the materials shall have the
following properties:

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| Physical or elec- trical property | : | Minimum | : | Maximum | : | ASTM | |
|--|---|---------------------|---|---------|---|--------|------|
| | : | | : | | : | method | |
| Tensile | : | | : | | : | | 56 |
| * Portland Cement Concrete... | : | 1,000 psi | : | | : | D-638 | 57 |
| | : | (70 kg/sq. cm) | : | | : | | 58 |
| Bituminous Concrete..... | : | 500 psi | : | | : | | 59 |
| | : | (35 kg/sq.cm) | : | | : | | 60 |
| Elongation | : | | : | | : | | 61 |
| * Portland Cement Concrete... | : | 8%, # | : | | : | D-638 | 62 |
| Bituminous Concrete..... | : | 50% | : | | : | D-638 | 63 |
| Coef. of cub. exp. | : | | : | | : | | 64 * |
| cu. cm/cu. cm/degree C.... | : | 0.00090 | : | 0.00120 | : | D-1168 | 65 |
| Coef. of lin. exp. | : | | : | | : | | 66 |
| cm/cm/degree C..... | : | 0.00030 | : | 0.00040 | : | D-1168 | 67 * |
| Dielectric strength, | : | | : | | : | | 68 |
| short time test..... | : | 350 Volts/mil. | : | | : | D-149 | 69 |
| Arc resistance..... | : | 125 secs. | : | | : | D-495 | 70 |
| Adhesion to steel | : | 1,000 psi | : | | : | | 71 |
| | : | (70 kg/sq. cm) | : | | : | | 72 |
| Adhesion to portland | : | | : | | : | | 73 |
| cement concrete..... | : | 200 psi | : | | : | | 74 |
| | : | (14 kg/sq. cm) | : | | : | | 75 |
| Adhesion to asphalt | : | | : | | : | | 76 |
| concrete..... | : | (no test available) | : | | : | | 77 |
| # 20% or more (without filler) for formulations to be supplied for areas subject to freezing. | | | | | | | 78 |
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| | | | | | | | 80 |
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| | | | | | | | 83 |
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3. SAMPLING, INSPECTION, AND TEST PROCEDURES

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3.1 TENSILE PROPERTIES. Tests for tensile strength and
elongation shall be conducted in accordance with ASTM D-638.

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3.2 EXPANSION. Tests for coefficients of linear and cubical
expansion shall be conducted in accordance with ASTM D-1168,
Method B, except that mercury shall be used instead of glycerine.
The test specimen(s) shall be mixed in the proportions specified
by the manufacturer, and cured in a glass tube approximately 2
inches (5 cm) long by 3/8 inch (1 cm) in diameter. The interior
of the tube shall be precoated with a silicone mold release
agent. The hardened sample shall be removed from the tube and
aged at room temperature for 1 week before conducting the test.
The test temperature range shall be from 35 degrees F (1.6
degrees C) to 140 degrees F (60 degrees C).

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3.3 TEST FOR DIELECTRIC STRENGTH. Test for dielectric strength shall be conducted in accordance with ASTM D-149 for sealing compounds to be furnished for sealing electrical wires in pavement.

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3.4 TEST FOR ARC RESISTANCE. Test for arc resistance shall be conducted in accordance with ASTM D-495 for sealing compounds to be furnished for sealing electrical wires in pavement.

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3.5 TEST FOR ADHESION TO STEEL. The ends of two smooth, clean, steel specimens of convenient size (1 inch by 1 inch by 6 inches (2.5 by 2.5 by 7.5 cm) would be satisfactory) are bonded together with adhesive mixture and allowed to cure at room temperature for a period of time to meet formulation requirements and then tested to failure on a Riehle (or similar) tensile tester. The thickness of adhesive to be tested shall be 1/4 inch (60 mm).

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3.6 ADHESION TO PORTLAND CEMENT CONCRETE.

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(a) Concrete Test Block Preparation. The aggregate grading shall be as shown in Table 1.

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The coarse aggregate shall consist of crushed rock having a minimum of 75% of the particles with at least one fractured face and having a water absorption of not more than 1.5%. The fine aggregate shall consist of crushed sand manufactured from the same parent rock as the coarse aggregate. The concrete shall have a water-cement ratio of 5.5 gallons (21 l) of water per bag of cement, a cement factor of 6, plus or minus 0.5, bags of cement per cubic yard (0.76 cu m) of concrete, and a slump of 2 1/2 inches, plus or minus 1/2 inch (6 cm plus or minus 1 cm). The ratio of fine aggregate to total aggregate shall be approximately 40% by solid volume. The air content shall be 5.0%, plus or minus 0.5%, and it shall be obtained by the addition to the batch of an air-entraining admixture such as vinsol resin. The mold shall be of metal and shall be provided with a metal base plate. Means shall be provided for securing the base plate to the mold. The assembled mold and base plate shall be watertight and shall be oiled with mineral oil before use. The inside measurement of the mold shall be such that several 1-inch by 2-inch by 3-inch (2.5 by 5.0 by 7.5 cm) test blocks can be cut from the specimen with a concrete saw having a diamond blade. The concrete shall be prepared and cured in accordance with ASTM C-192.

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Table 1.--Aggregate for Bond Test Blocks

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| Type | Sieve size | Percent passing |
|-----------------------|-----------------------|-----------------|
| Coarse aggregate..... | 3/4 inch (19.0 mm) | 97 to 100 |
| | 1/2 inch (12.5 mm) | 63 to 69 |
| | 3/8 inch (9.5 mm) | 30 to 36 |
| | No. 4 (4.75 mm) | 0 to 3 |
| Fine aggregate..... | No. 4 (4.75 mm) | 100 |
| | No. 8 (2.36 mm) | 82 to 88 |
| | No. 16 (1.18 mm) | 60 to 70 |
| | No. 30 (600 micro-m) | 40 to 50 |
| | No. 50 (300 micro-m) | 16 to 26 |
| | No. 100 (150 micro-m) | 5 to 9 |

(b) Bond Test. Prior to use, oven-dry the test blocks to constant weight at a temperature of 220 to 230 degrees F (104 to 110 degrees C), cool to room temperature, 73.4 plus or minus 3 degrees F (23 plus or minus 1.6 degrees C), in a desiccator, and clean the surface of the blocks of film or powder by vigorous brushing with a stiff-bristled fiber brush. Two test blocks shall be bonded together on the 1-inch by 3-inch (2.5 by 7.5 cm) sawed face with the adhesive mixture and allowed to cure at room temperature for a period of time to meet formulation requirements and then tested to failure in a Riehle (or similar) tensile tester. The thickness of the adhesive to be tested shall be 1/4 inch (6 mm).

3.7 COMPATIBILITY WITH ASPHALT CONCRETE. Test for compatibility with asphalt in accordance with ASTM D-3407.

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3.8 ADHESIVE COMPOUNDS - CONTRACTOR'S RESPONSIBILITY. The Contractor shall furnish the vendor's certified test reports for each batch of material delivered to the project. The report shall certify that the material meets specification requirements and is suitable for use with [portland cement concrete] [bituminous concrete] pavements. The report shall be delivered to the Engineer before permission is granted for use of the material. In addition the Contractor shall obtain a statement from the supplier or manufacturer which guarantees the material for one year. The supplier or manufacturer shall furnish evidence that the material has performed satisfactorily on other projects.

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3.9 APPLICATION. Adhesive shall be applied on a dry, clean surface, free of grease, dust, and other loose particles. The method of mixing and application shall be in strict accordance with the manufacturer's recommendations.

Installation methods such as surface preparation, mixing ratios, and pot life are as important to satisfactory performance as the properties of the material itself. Therefore, the Engineer may wish to require a manufacturer's representative to be present during the initial installation of the material to ensure the installation procedures are in accordance with the manufacturer's directions.

4. METHOD OF MEASUREMENT

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4.1 The adhesive compound shall be measured by the [pound (kg)] [gallon (l)] of adhesive as specified, in place, complete and accepted. When required in the installation of an in-runway lighting system or portion thereof, no measurement will be made for direct payment of adhesive, as the cost of furnishing and installing shall be considered as a subsidiary obligation in the completion of the installation.

5. BASIS OF PAYMENT

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5.1 Payment shall be made, where applicable, at the contract unit price per [pound (kg)] [gallon (l)] for the adhesive. This price shall be full compensation for furnishing all materials, and for all preparation, delivering, and application of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

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Item P-606-5.1 Adhesive Compound - per [pound (kg).] [gallon (l).]

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6. TESTING REQUIREMENTS

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ASTM C-192 Making and Curing Concrete Compression and Flexure Test Specimens in the Laboratory.

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ASTM D-149 Tests for Dielectric Breakdown Voltage and Dielectric Strength of Electrical Insulating Materials at Commercial Power Frequencies.

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|---------------------------|--|-------------------|
| <u>ASTM D-495</u> | <u>T</u> est for High-Voltage, <u>L</u> ow-Current, <u>A</u> rc Resistance of Solid Electrical Insulating Materials. | 291 291 291 |
| <u>ASTM D-638</u> | <u>T</u> est for Tensile Properties of Plastics. | 294 |
| <u>ASTM D-1168</u> | <u>T</u> esting Hydrocarbon Waxes Used for Electrical Insulation. | 297 297 |
| <u>ASTM D-3407</u> | <u>J</u> oint Sealants, <u>H</u> ot-Poured, <u>F</u> or Concrete and Asphalt Pavements. | 302 302 |
| + + END OF ITEM P-606 + + | | 303.3 |