SECTION 76 – ADHESIVE COMPOUNDS, TWO-COMPONENT FOR SEALING WIRE AND LIGHTS IN PAVEMENT (FAA P-606)

74-1 GENERAL

The Contractor shall perform all work required by the plans and specifications for materials to seal wire and lights in pavement in accordance with the Standard Specifications, except as specified otherwise in FAA Specification Item P-606, as included and modified hereafter, and as shown on the Plans.

For conduits installed in existing concrete, contractor shall provide 6" deep by 4" wide saw kerf in existing pavement including ½" by ½" by 3" solid steel bar, placed 5'-0" on center, for conduit support and a 3/4" wide spring steel cap conduit retainer every 5' minimum.

Conduit to be installed in saw kerf shall be 2" rigid galvanized steel conduit, hot dipped galvanized inside and out and conforming to the requirements of Underwriters Laboratories Standard 6, 514B, and 1242.

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

DESCRIPTION

606-1.1. *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.*

EQUIPMENT AND MATERIALS

606-2.1 CURING*. When prewarmed to 77°F (25°C), mixed, and placed in accordance with manufacturer's directions, the materials shall cure at temperatures of 45°F (7°C) or above without the application of external heat.*

606-2.2 STORAGE*. The adhesive components shall not be stored at temperatures over 86°F (30°C).*

606-2.3 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.

***606-2.4 CHARACTERISTICS**. When mixed and cured in accordance with the manufacturer's directions, the materials shall have the following properties shown in Table 1.*

SAMPLING, INSPECTION, AND TEST PROCEDURES

***606-3.1 TENSILE PROPERTIES.** Tests for tensile strength and elongation shall be conducted in accordance with ASTM D 638.*

***606-3.2 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 tub approximately 2 inches long by 3/8 inch 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°F (2°C) to 140°F (60°C).*

***606-3.3 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.*

Table 1
PROPERTY REQUIREMENTS

Physical or Electrical Property	*Minimum*	*Maximum*	*ASTM Method*
Tensile			
Portland Cement Concrete	*1,000 psi*		*D 638*
Bituminous Concrete	*500 psi*		
Elongation			
Portland Cement Concrete	*8%[a]*		*D 638*
Bituminous Concrete	*50%*		*D 638*
Coef. Of cub. exp. cu. Cm/cu. cm/degree C	*0.00090*	*0.00120*	*D 1168*
Coef. Of lin. Exp. cm/cm/degree C	*0.00030*	*0.00040*	*D 1168*
Dielectric strength, short time test	*350 volts/mil.*		*D 149*

Arc resistance	*125 secs.*		*D 495*
Adhesion to steel	*1,000 psi*		
Adhesion to portland cement concrete	*200 psi*		
Adhesion to asphalt concrete	*(no test available)*		
**20% or more (without filler) for formulations to be supplied for areas subject to freezing.*			

606-3.4 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.*

606-3.5 TEST FOR ADHESION TO STEEL. *The ends of two smooth, clean, steel specimens of convenient size (1 inch by 1 inch by 6 inches would be satisfactory) when 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.*

606-3.6 ADHESION TO PORTLAND CEMENT CONCRETE

a. Concrete Test Block Preparation. *The aggregate grading shall be as shown in Table 2.*

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 of water per bag of cement, a cement factor of 6, plus or minus 0.5, bags of cement per cubic yard of concrete, and a slump of 2-1/2 inches, plus or minus 1/2 inch. 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 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.

TABLE 2. AGGREGATE FOR BOND TEST BLOCKS

Table 2 AGGREGATE FOR BOND TEST BLOCKS		
Type	***Sieve Size***	***Percent Passing***
Coarse Aggregate	*3/4 inch*	*97 to 100*
	1/2 inch	*63 to 69*
	3/8 inch	*30 to 36*
	No. 4	*0 to 3*
Fine Aggregate	*No. 4*	*100*
	No. 8	*82 to 88*
	No. 16	*60 to 70*
	No. 30	*40 to 50*
	No. 50	*16 to 26*
	No. 100	*5 to 9*

b. Bond Test. *Prior to use, oven-dry the test blocks to constant weight at a temperature of 220 to 230°F (104°C to 110°C), cool to room temperature, 73.4 plus or minus 3°F (23°C plus or minus 1.6°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 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.*

606-3.7 COMPATIBILITY WITH ASPHALT CONCRETE. *Test for compatibility with asphalt in accordance with ASTM D 5329.*

606-3.8 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. 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 that guarantees the material for one year. The supplier or manufacturer shall furnish evidence that the material has performed satisfactorily on other projects.*

606-3.9 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.*

METHOD OF MEASUREMENT

606-4.1 *See Section 74-2.*

BASIS OF PAYMENT

606-5.1 *See Section 74-3.*

TESTING REQUIREMENTS

ASTM C 192	*Making and Curing Concrete Compression and Flexure Test Specimens in the Laboratory.*
ASTM D 149	*Tests for Dielectric Breakdown Voltage and Dielectric Strength of Electrical Insulating Materials at Commercial Power Frequencies.*
ASTM D 495	*Test for High-Voltage, Low-Current, Dry Arc Resistance of Solid Electrical Insulation Materials*
ASTM D 638	*Test for Tensile Properties of Plastics*
ASTM D 1168	*Test for Hydrocarbon Waxes Used for Electrical Insulation*
ASTM D 5329	*Joint Sealants, Hot-poured, for Concrete and Asphalt Pavements*

END OF ITEM P-606

74-2 METHOD OF MEASUREMENT

Conduit installed in saw kerf shall be measured by the number of linear feet (meters) of rigid metal conduit installed in saw kerf, ready for operation, and accepted as satisfactory.

The cost of all saw cutting, backfill, steel support blocks, steel spring clips, adhesive compounds, two-component for sealing wire in pavement, dewatering and restoration of surrounding pavement shall be included in the unit price bid for the work.

No separate measurement of adhesive compounds, two-component for sealing wire and lights in pavement as described herein shall be made but it shall be considered incidental to associated electrical bid items.

74-3 BASIS OF PAYMENT

Payment will be made at the contract unit price for rigid metal conduit installed in saw kerf installed by the Contractor and accepted by the Engineer. This price shall be full compensation for furnishing all materials and for all preparation and installation of these materials, and for all labor, equipment, tools, and incidentals, including ground rods and ground connectors and trench marking tape, necessary to complete this item.

No separate payment will be made for constructing the item under construction sequencing restrictions, including limited access or nighttime work areas.

Saw cutting, backfill, steel support blocks, steel spring clips, adhesive compounds, two-component for sealing wire and lights in pavement, dewatering and restoration of surrounding pavement will not be measured for payment but will be considered incidental to the associated bid item.

END OF SECTION 76

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