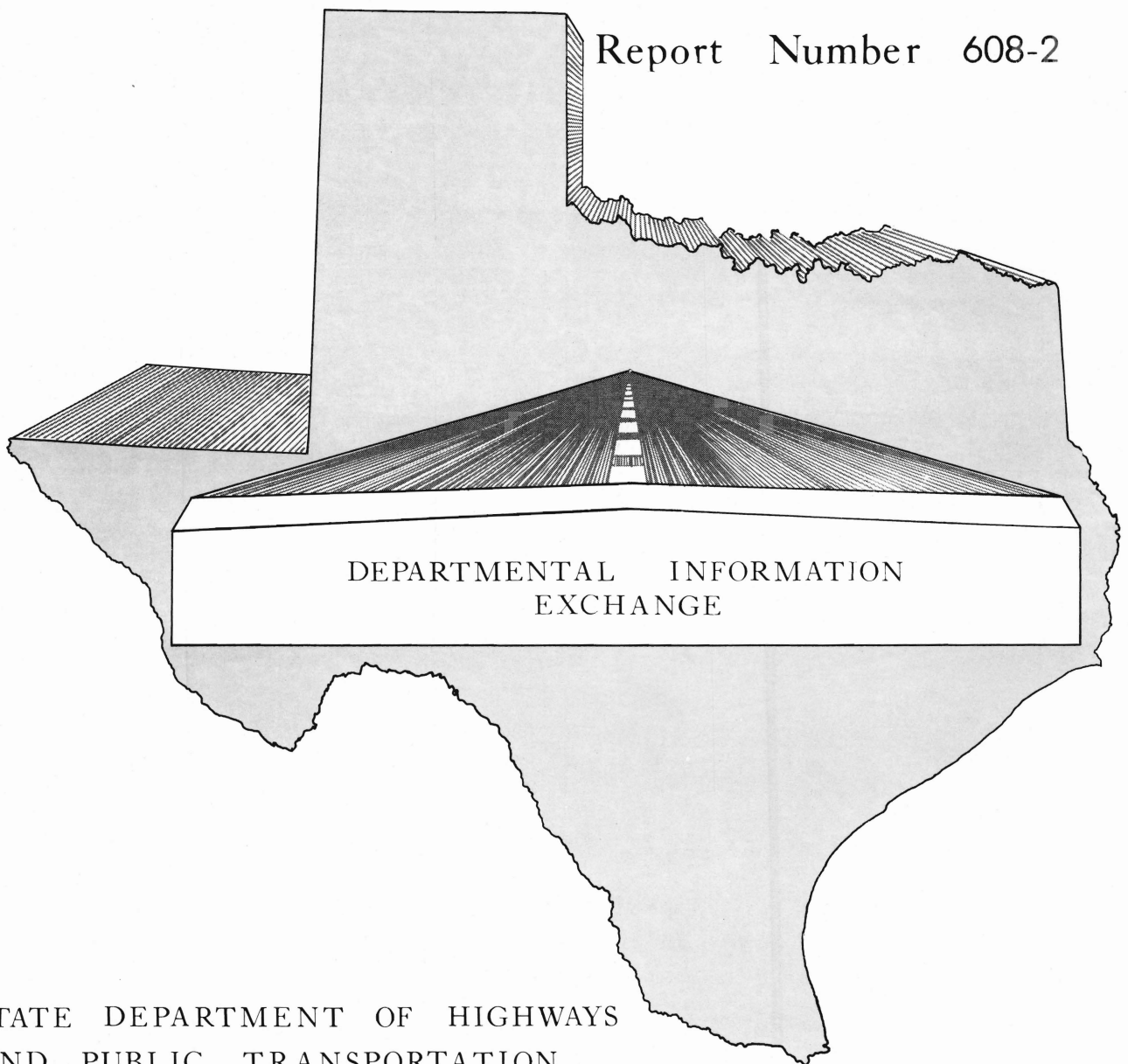


# EXPERIMENTAL PROJECTS

UNDERSEALS TO RETARD REFLECTIVE  
CRACKING OF ASPHALTIC PAVEMENTS:  
SHORT TERM EVALUATION OF  
ROADGLAS & ROADBOND.

Report Number 608-2



STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION

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16. Abstract  This initial report outlines the specifications and procedures used in placing Owens/Corning Roadglas® with Roadbond® as an underseal to prevent reflective cracking in a resurfacing job on SH 146 in Baytown, Texas, from Republic Street to west of Ferry Road. The report delineates how compaction problems related to the fiberglass underseal were overcome. Initial performance of the fiberglass joint underseal system was felt to be satisfactory, with no distress appearing within a month of application.					
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Furthermore, the use of brand names in this report is for informational purposes only and does not constitute advertisement or sanction of a particular product by the State of Texas.

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UNDERSEALS TO RETARD REFLECTIVE CRACKING OF ASPHALTIC PAVEMENTS:

SHORT TERM EVALUATION OF ROADGLAS AND ROADBOND

PROJECT: CSB 389-3-24, Etc.  
SH 146  
Harris County  
Item 3032, Fabric Underseal (24" Wide)

On July 7, 1983, a contract was awarded to APAC-Texas, Inc. to resurface SH 146 in Baytown, Texas, from South of Republic Street to west of Ferry Road. This project consisted of asphaltic concrete pavement repair, base repair, concrete pavement repair, joint cleaning and sealing, some asphaltic concrete 1" level-up, and a 1-1/2" asphaltic concrete surface overlay. One phase of this work involved applying a 24" wide fiberglass fabric underseal to transverse and longitudinal joints in the original concrete pavement. These joints had reflectively cracked and caused other deterioration in an existing 1" asphaltic pavement overlay composed of lightweight aggregate and local sands. This report covers the construction methods used, problems encountered, and an initial evaluation of the fabric underseal performances.

The Contractor's subcontractor, Coastal Concrete Sawing, elected to use an Owens-Corning developed product called "RoadGlas" and "RoadBond"; which was the material that Special Specification Item 3032, Fabric Underseal, was developed around. However, the material available did not meet the specified tensile strength requirements and there was no other product available at the time. Therefore, working in close cooperation with File D-9 and the material supplier, we developed a Special Provision to Special Specification Item 3032, Fabric Underseal, which modified the fabric tensile strength requirements and test procedures. It also redefined testing, sampling, and packaging requirements for the asphaltic polymer as well as modifying the opening to traffic procedures. This Special Provision was incorporated into the contract by Field Change No. 1.

The sequence of work used by the contractor was to first clean and seal the transverse and longitudinal joints throughout the job. The subcontractor used a shop-built double-jacketed melter equipped with a pump and wand to apply the asphaltic polymer. The polymer was applied in a ribbon and squeegeed over the underseal area at a temperature of 375 degrees F after the area had been cleaned using high pressure air and brooming as needed. The layer of fiberglass was then placed and straightened; another polymer application was squeegeed on top. The subcontractor used a seven man crew with various hand tools in addition to an air compressor and melter. He coordinated the work to stay immediately ahead of the asphalt tacking operation.

The fabric underseal on this job was placed beginning in October, 1983, and the initial placing operations were in the pavement repair sections scattered throughout the job in October and November, 1983. In December, 1983, asphaltic concrete surfacing was started on the six-lane divided section of the job. During this phase of work the fabric underseal was placed directly on the existing asphaltic concrete roadway surface and the asphalt overlay was placed over the undersealed section as soon as curing was complete. During this phase,

a problem developed in that a pronounced bump was produced by the rolling operation over the fabric undersealed joints. The rolling pattern used was a standard one of the two passes, forward and back, by a three-wheel static roller; two passes, forward and back, by a static tandem steel wheel roller and a pneumatic roller last to remove the roller marks. The bump was made when the wave of material pushed up by the lead wheel of the tandem roller hit the fabric underseal. This wave was normal over the conventional tacked sections of roadway; but when it hit the asphaltic polymer of the fabric undersealed sections, the polymer would stop the mat movement from the bottom and cause a diagonal shear within the mat. This shear was shown by road cores taken in the bumped areas. Several adjustments to the rolling pattern were tried, but only when the contractor failed to achieve minimum road density was a satisfactory riding surface produced.

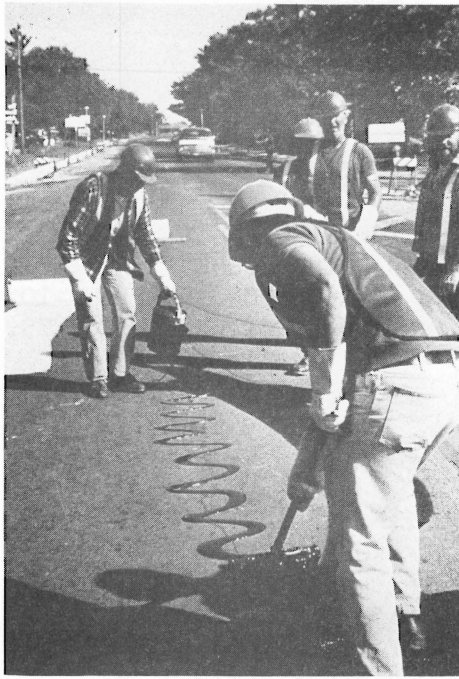
After a conference between the State personnel, the contractors, and the fabric manufacturer, the following construction procedure modifications were tried:

1. Raising the asphaltic cement content.
2. Raising the mix temperature.
3. Placing the asphaltic concrete as soon after the fabric underseal as possible (30 minutes).
4. Using a vibratory tandem steel wheel for the initial rolling as soon as possible (two passes; vibrating forward and static back).
5. Then using a 25-Ton Pneumatic roller immediately behind the breakdown roller (numerous passes until roller marks were removed).

These revised procedures were intended to allow compaction of the mat while it was still flexible enough to move across the edge of the fabric underseal. These procedures were tried early in January, 1984, and produced a satisfactory riding surface while achieving the required road density.

Weather conditions prevented work until March, 1983; and the fabric underseal item was completed by April 1, 1984. Initial performance of the fiberglass joint underseal system is satisfactory, with no additional distress appearing within a month of application.

APPLYING ROADGLAS



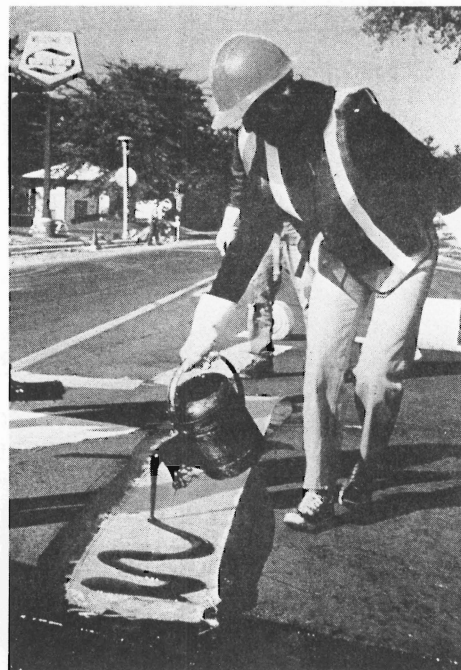
Step 1



Step 2



Step 3



Step 4

(Courtesy of Owens-Corning Fiberglas Corp.)

SPECIAL SPECIFICATION

ITEM 3032

FABRIC UNDERSEAL

1. DESCRIPTION.

THIS WORK SHALL CONSIST OF PREPARING AND TREATING AN EXISTING PAVED SURFACE WITH BITUMINOUS MATERIAL AND REINFORCEMENT FABRIC IN ACCORDANCE WITH THESE SPECIFICATIONS AND AS SHOWN ON THE PLANS TO PREVENT REFLECTIVE CRACKING OF TRANSVERSE AND LONGITUDINAL JOINTS.

2. MATERIALS.

A. BITUMINOUS MATERIAL.

BITUMINOUS MATERIAL SHALL CONSIST OF AN ASPHALTIC POLYMER CONFORMING TO THE FOLLOWING PHYSICAL PROPERTIES:

PENETRATION @ 77F 100G 5 SEC., ASTM D 5-73	40-82
SOFTENING POINT, ASTM D 36-76	155 DEGREES (MIN.)
380 DEGREES F. VISCOSITY, ASTM D 3236	1000-1800 CPS
LOW TEMPERATURE FLEXIBILITY MODIFIED VERMONT DOT	0 DEGREES F. (MAX.)

B. REINFORCEMENT MATERIALS.

REINFORCEMENT MATERIAL SHALL CONSIST OF A GLASS FIBER WOVEN FABRIC CONFORMING TO THE FOLLOWING PHYSICAL PROPERTIES:

TENSILE STRENGTH ASTM D 1682-64, METHOD 2-C-E	1000 LB./IN. WIDTH (MIN.)
WEIGHT, OZ. PER SQ. YD.	21.6 (MIN.) 26.3 (MAX.)

C. BITUMINOUS MATERIAL AND REINFORCEMENT.

REINFORCEMENT MATERIAL COATED WITH THE BITUMINOUS MATERIAL SHALL CONFORM TO THE FOLLOWING:

TENSILE STRENGTH ASTM D 1682-64, METHOD 2-C-E	1200 LB./IN. WIDTH (MIN.)
--	------------------------------



D. PACKAGING REQUIREMENTS.

THE FABRIC SHALL BE PACKAGED IN STANDARD WIDTH ROLLS AS FOLLOWS: 3 ROLLS OF 12-INCH FABRIC PER BOX; 2 ROLLS OF 18-INCH FABRIC PER BOX; 2 ROLLS OF 24-INCH FABRIC PER BOX; ONE ROLL OF 44-INCH FABRIC PER BOX.

E. IDENTIFICATION REQUIREMENTS.

EACH BOX SHALL BE LABELED OR TAGGED IN SUCH A MANNER THAT THE INFORMATION FOR SAMPLE IDENTIFICATION AND OTHER QUALITY CONTROL PURPOSES CAN BE READ FROM THE LABEL WITHOUT OPENING THE BOX. EACH BOX SHALL BE IDENTIFIED BY THE MANUFACTURER AS TO JOB NUMBER, LOOM NUMBER, PRODUCTION DATE AND SHIFT, TARE WEIGHT OF PACKAGING MATERIALS, WIDTH OF WOVEN FIELD OF FABRIC AND NET WEIGHT OF FABRIC.

F. SAMPLING REQUIREMENTS.

EACH BOX MAY BE SUBJECT TO A FABRIC-WEIGHT DETERMINATION ON A PER-BOX BASIS. IN ADDITION, INDIVIDUAL TEST SAMPLES SHALL BE CUT FROM AT LEAST ONE ROLL SELECTED AT RANDOM FROM EACH 100 BOXES OR FRACTION THEREOF REPRESENTING EACH SHIPMENT. INDIVIDUAL SAMPLES SHALL BE NO LESS THAN THREE FEET IN LENGTH BY FULL-ROLL WIDTH.

G. BASIS FOR REJECTION.

SHOULD ANY INDIVIDUAL BOX FAIL TO MEET THE FABRIC-WEIGHT REQUIREMENT AS DETERMINED BY PARAGRAPH F. ABOVE, THEN THAT BOX IS SUBJECT TO REJECTION. SHOULD ANY INDIVIDUAL SAMPLE SELECTED AT RANDOM FROM 100 BOXES (OR FRACTION THEREOF) FAIL TO MEET ANY SPECIFICATION REQUIREMENT, THEN THAT BOX SHALL BE REJECTED AND TWO ADDITIONAL SAMPLES SHALL BE TAKEN, ONE FROM EACH OF TWO OTHER ADDITIONAL BOXES SELECTED AT RANDOM FROM THE SAME 100-BOX LOT (OR FRACTION THEREOF). IF EITHER OF THESE TWO ADDITIONAL SAMPLES FAIL TO COMPLY WITH ANY PORTION OF THE SPECIFICATION, THEN THE ENTIRE QUANTITY OF BOXES REPRESENTED BY THAT SAMPLE SHALL BE REJECTED.

3. EQUIPMENT AND APPLICATION.

A. EQUIPMENT.

EQUIPMENT SHALL CONSIST OF SUITABLE SWEEPERS, HAND BROOMS, AIR COMPRESSOR, POURING BUCKETS, RUBBER-EDGED SQUEEGEES, CUTTING KNIVES, AND MELTING KETTLE. ALL HAND TOOLS SHALL BE IN A CLEAN CONDITION. MELTING KETTLES SHALL BE (1) DOUBLE JACKETED (RECOMMENDED), OR (2) SINGLE JACKETED, PROPANE HEATED WITH TEMPERATURE CONTROLLING THERMOSTAT:

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3-83

(1) DOUBLE JACKETED MELTERS:

SET THERMOSTAT AT 375 DEGREES F.  
KETTLE MAY BE RAPIDLY HEATED TO DESIRED TEMPERATURE.  
DO NOT PERMIT TEMPERATURE TO EXCEED 400 DEGREES F.

(2) SINGLE JACKETED MELTERS (PROPANE HEATED ONLY):

SET THERMOSTAT AT 375 DEGREES F.  
KEEP FLAME LOW UNTIL MOLTEN BINDER COVERS HEATED BOTTOM OF  
KETTLE TO AT LEAST 3 OR 4 INCHES. MODERATE HEAT MAY THEN  
BE APPLIED TO REACH AND MAINTAIN 375 DEGREES F. + 25  
DEGREES F. DO NOT PERMIT TEMPERATURE TO EXCEED 400 DEGREES  
F.

OIL OR KEROSENE FIRED, SINGLE JACKETED KETTLES DO NOT  
PERMIT PROPER HEAT CONTROL AND SHOULD NOT BE USED UNDER  
ANY CIRCUMSTANCES.

B. APPLICATION OF MATERIALS.

THE BITUMINOUS MATERIAL, HEATED TO A TEMPERATURE WITHIN THE  
SPECIFIED RANGE, SHALL BE APPLIED BY MEANS OF A POURING BUCKET  
AND SQUEEGEE. THE MATERIAL SHALL BE APPLIED WITH SUFFICIENT  
UNIFORMITY TO PREVENT RIDGING OR STREAKING AND SHALL EXTEND A  
MINIMUM OF ONE INCH BEYOND ALL EDGES OF THE REINFORCEMENT  
FABRIC. IMMEDIATELY FOLLOWING THE APPLICATION OF THE  
BITUMINOUS MATERIAL, REINFORCEMENT FABRIC SHALL BE PLACED ON  
THE HOT BITUMINOUS MATERIAL. OVERLAP BY MINIMUM OF ONE INCH  
ADJOINING REINFORCEMENT STRIPS. WRINKLES IN REINFORCEMENT  
STRIPS SHALL BE AVOIDED. ADDITIONAL BITUMINOUS MATERIAL SHALL  
BE SQUEEGEED ON TOP OF THE REINFORCEMENT FABRIC. APPLICATION  
OF BITUMINOUS MATERIAL SHALL EXTEND A MINIMUM OF ONE INCH  
BEYOND ALL EDGES OF THE REINFORCEMENT FABRIC. APPLICATION  
RATE OF THE BITUMINOUS MATERIAL CONSISTING OF TWO COATS SHALL  
AVERAGE 0.10 GALLON PER LINEAR FOOT WHEN USED WITH 12-INCH  
FABRIC, 0.125 GALLON PER LINEAR FOOT WHEN USED WITH 18-INCH  
FABRIC AND 0.15 GALLON PER LINEAR FOOT WHEN USED WITH 24-INCH  
FABRIC. WHEN PROPER THICKNESS IS ACHIEVED, REINFORCEMENT  
FABRIC SHALL BE COMPLETELY COATED WITH NO VOIDS AND WEAVE  
PATTERN OF REINFORCEMENT FABRIC SHOULD BE DETECTABLE THROUGH  
THE TOP COAT OF BITUMINOUS MATERIAL.

4. WEATHER LIMITATIONS.

NO MATERIAL SHALL BE APPLIED WHEN THE AIR TEMPERATURE IS BELOW 60  
F AND IS FALLING, BUT MAY BE APPLIED WHEN THE AIR TEMPERATURE IS  
ABOVE 50 F AND IS RISING. NO MATERIALS SHALL BE APPLIED WHILE THE  
PAVED SURFACE IS WET. CARE SHALL BE TAKEN TO INSURE PAVEMENT IS  
THOROUGHLY DRY BEFORE WORK BEGINS. WORK SHALL BE SUSPENDED IF  
THESE CONDITIONS EXIST.

5. OPENING TO TRAFFIC.

REPAIRS WILL BE OPENED ONLY TO CONSTRUCTION TRAFFIC AFTER A 30 MINUTE MINIMUM SET TIME AND WILL BE OVERLAID PRIOR TO OPENING TO GENERAL TRAFFIC.

6. MEASUREMENT.

FABRIC UNDERSEAL WILL BE MEASURED AS THE ACUTAL NUMBER OF LINEAR FEET OF REINFORCEMENT MATERIAL COMPLETE IN PLACE MEASURED ALONG THE CENTERLINE OF LONGITUDINAL OR TRANSVERSE JOINT.

7. PAYMENT.

THE WORK PERFORMED AND MATERIALS FURNISHED AS PRESCRIBED BY THIS ITEM, AND MEASURED AS PROVIDED UNDER "MEASUREMENT", WILL BE PAID FOR AT THE UNIT PRICES BID FOR "FABRIC UNDERSEAL", OF THE WIDTH SPECIFIED, WHICH PRICE SHALL BE FULL COMPENSATION FOR CLEANING AND PREPARING THE EXISTING PAVEMENT; FOR FURNISHING, PREPARING, HAULING, AND PLACING ALL MATERIALS, INCLUDING BITUMINOUS MATERIAL; FOR ALL FREIGHT INVOLVED; FOR ALL MANIPULATIONS; FOR ALL LABOR, TOOLS, EQUIPMENT AND INCIDENTALS NECESSARY TO COMPLETE THE WORK.

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3-83

Project CSB 389-3-24 Etc.  
Control 389-3-24 Etc.  
SH 146  
Harris County

SPECIAL PROVISION  
TO  
SPECIAL SPECIFICATION

ITEM 3032

FABRIC UNDERSEAL

FOR THIS PROJECT SPECIAL SPECIFICATION ITEM 3032, FABRIC UNDERSEAL IS HEREBY AMENDED WITH RESPECT TO THE CLAUSES CITED BELOW AND NO OTHER CLAUSES OR REQUIREMENTS OF THIS ITEM ARE WAIVED OR CHANGED HEREBY,

ARTICLE 2 IS VOIDED AND REPLACED BY THE FOLLOWING:

2. MATERIALS.

A. BITUMINOUS MATERIAL.

BITUMINOUS MATERIAL SHALL CONSIST OF AN ASPHALTIC POLYMER CONFORMING TO THE FOLLOWING PHYSICAL PROPERTIES:

PENETRATION @ 77F 100 G 5 SEC., TEX-505-C	35-82
SOFTENING POINT, ASTM D 2398	155 DEGREES (MIN.)
380 DEGREES F. VISCOSITY, ASTM D 3236	1000-1800 CPS
LOW TEMPERATURE FLEXIBILITY (TESTING IN ACCORDANCE WITH PROCEDURE SHOWN BELOW)	0 DEGREES F. (MAX.)

LOW TEMPERATURE FLEXIBILITY TEST

CAST A SAMPLE 1.5 INCHES BY 9.0 INCHES BY 0.125 PLUS OR MINUS 0.01 INCH ON 0.003 INCH ALUMINUM FOIL. ALLOW TO COOL IN AIR AT 75 PLUS OR MINUS 5 F FOR ONE HOUR. THEN CONDITION THE SAMPLE AND A ONE-INCH MANDREL AT THE DESIRED TEST TEMPERATURE FOR ONE HOUR. BEND THE SAMPLE THROUGH AN ARC OF 180 DEGREES OVER THE ONE-INCH MANDREL IN APPROXIMATELY TWO SECONDS TIME. WITH THE FOIL NEXT TO THE MANDREL WHEN THE BEND IS MADE, IMMEDIATELY AFTER BENDING, EXAMINE THE SAMPLE FOR CRACKING, FLAKING OR LOSS OF ADHESION--THE PRESENCE OF WHICH CONSTITUTES FAILURE.

**B. REINFORCEMENT MATERIALS.**

REINFORCEMENT MATERIAL SHALL CONSIST OF A GLASS FIBER WOVEN FABRIC CONFORMING TO THE CONSTRUCTION REQUIREMENTS FOR TYPE 3 FABRIC, AS SHOWN IN TABLE 1, ASTM D 2150. THE FABRIC SHALL COMPLY WITH THE FOLLOWING ADDITIONAL REQUIREMENTS:

	<u>MINIMUM</u>	<u>MAXIMUM</u>
WEIGHT, OZ. PER SQ. YD.-----	21.6	26.3
TENSILE STRENGTH OF INDIVIDUAL ROVINGS:		
AVERAGE OF 5 ROVINGS, AT LEAST TWO FROM EACH PRINCIPLE DIRECTION, POUNDS,-----	175	
MINIMUM TENSILE STRENGTH OF ANY INDIVIDUAL ROVING, POUNDS-----	125	

**PROCEDURE FOR TESTING INDIVIDUAL ROVINGS:**

INDIVIDUAL ROVINGS SHALL BE CAREFULLY REMOVED FROM A SECTION OF FABRIC AT LEAST ONE FOOT SQUARE, PLACED ON RELEASE PAPER OR POLYETHYLENE SHEET AND HELD IN PLACE BY TAPE NEAR THE ENDS OF THE ROVINGS. A SUITABLE EPOXY SHALL BE APPLIED ON EACH ROVING TO FORM A DISK APPROXIMATELY 1/8 INCH THICK AND ONE INCH IN DIAMETER. THE LENGTH OF ROVING BETWEEN THE DISKS SHALL BE 3 PLUS OR MINUS 1/4 INCH. THE PURPOSE OF THE EPOXY IS TO ENCAPSULATE THE ROVING AND PROVIDE A SURFACE FOR INSERTION IN TENSILE MACHINE JAWS WITHOUT DAMAGING THE GLASS ROVING. THE EPOXY SHALL BE ALLOWED TO CURE AT LEAST 24 HOURS AT 70 TO 80 F. EXCESS ROVING BETWEEN THE TAPE AND THE DISKS SHALL BE CUT OFF AND THE SPECIMENS REMOVED FROM THE RELEASE PAPER OR PLASTIC. EXAMINE THE SPECIMENS TO INSURE THAT THE ROVING IS COMPLETELY ENCAPSULATED.

THE PREPARED SPECIMENS SHALL THEN BE TESTED FOR TENSILE STRENGTH USING EQUIPMENT DESCRIBED IN ASTM D 1682. A CONSTANT RATE OF EXTENSION OF 1/2 TO 1 INCH PER MINUTE SHALL BE USED.

**C. PACKAGING REQUIREMENTS.**

- (1) THE FABRIC SHALL BE PACKAGED IN STANDARD WIDTH ROLLS AS FOLLOWS: 3 ROLLS OF 12-INCH FABRIC PER BOX; 2 ROLLS OF 18-INCH FABRIC PER BOX; 2 ROLLS OF 24-INCH FABRIC PER BOX; ONE ROLL OF 44-INCH FABRIC PER BOX.
- (2) THE BITUMINOUS MATERIAL SHALL BE PACKED IN 11" X 11" X 14" BOXES. THE BITUMINOUS MATERIAL SHALL BE PROTECTED FROM THE BOX BY A POLYPROPYLENE BAG.

D. IDENTIFICATION REQUIREMENTS.

- (1) EACH BOX SHALL BE LABELED OR TAGGED IN SUCH A MANNER THAT THE INFORMATION FOR SAMPLE IDENTIFICATION AND OTHER QUALITY CONTROL PURPOSES CAN BE READ FROM THE LABEL WITHOUT OPENING THE BOX. EACH BOX SHALL BE IDENTIFIED BY THE MANUFACTURER AS TO JOB NUMBER, LOOM NUMBER, PRODUCTION DATE AND SHIFT, TARE WEIGHT OF PACKAGING MATERIALS, WIDTH AND LENGTH OF FABRIC ON EACH ROLL AND NET WEIGHT OF FABRIC.
- (2) EACH BOX OF BITUMINOUS MATERIAL SHALL BE LABELED WITH NOMINAL GROSS WEIGHT, NOMINAL TARE WEIGHT, NOMINAL NET WEIGHT AND LOT OR BATCH NUMBER.

E. SAMPLING REQUIREMENTS.

- (1) EACH BOX MAY BE SUBJECT TO A FABRIC-WEIGHT DETERMINATION ON A PER-BOX BASIS. IN ADDITION, INDIVIDUAL TEST SAMPLES SHALL BE CUT FROM AT LEAST ONE ROLL SELECTED AT RANDOM FROM EACH 100 BOXES OR FRACTION THEREOF REPRESENTING EACH SHIPMENT. INDIVIDUAL SAMPLES SHALL BE NO LESS THAN THREE FEET IN LENGTH BY FULL-ROLL WIDTH.
- (2) EACH BOX OF BITUMINOUS MATERIAL SHALL BE SUBJECT TO A PROPERTY DETERMINATION ON A PER BOX BASIS. IN ADDITION, INDIVIDUAL BOXES SHALL BE SELECTED AT RANDOM FROM EACH TRUCKLOAD (700 BOXES) OR FRACTION THEREOF REPRESENTING EACH SHIPMENT OF MATERIAL.

F. BASIS FOR REJECTION.

- (1) SHOULD ANY INDIVIDUAL BOX FAIL TO MEET THE FABRIC-WEIGHT REQUIREMENT AS DETERMINED BY SUBARTICLE E. ABOVE, THEN THAT BOX IS SUBJECT TO REJECTION. SHOULD ANY INDIVIDUAL SAMPLE SELECTED AT RANDOM FROM 100 BOXES (OR FRACTION THEREOF) FAIL TO MEET ANY SPECIFICATION REQUIREMENT, THEN THAT BOX SHALL BE REJECTED AND TWO ADDITIONAL SAMPLES SHALL BE TAKEN, ONE FROM EACH OF TWO OTHER ADDITIONAL BOXES SELECTED AT RANDOM FROM THE SAME 100-BOX LOT (OR FRACTION THEREOF). IF EITHER OF THESE TWO ADDITIONAL SAMPLES FAIL TO COMPLY WITH ANY PORTION OF THE SPECIFICATION, THEN THE ENTIRE QUANTITY OF BOXES REPRESENTED BY THAT SAMPLE SHALL BE REJECTED.
- (2) SHOULD ANY INDIVIDUAL SAMPLE OF BITUMINOUS MATERIAL SELECTED AT RANDOM FROM 700 BOXES OR FRACTION THEREOF FAIL TO MEET ANY PROPERTY SPECIFICATION REQUIREMENT THEN THAT BOX SHALL BE REJECTED AND TWO ADDITIONAL SAMPLES SHALL BE TAKEN, ONE FROM EACH OF TWO OTHER ADDITIONAL BOXES SELECTED AT RANDOM FROM THE SAME 700 BOX LOT OR FRACTION THEREOF. IF EITHER OF THESE TWO ADDITIONAL SAMPLES FAIL TO COMPLY WITH ANY PORTION OF THE PROPERTY SPECIFICATION THEN THE ENTIRE QUANTITY OF BOXES REPRESENTED BY THAT SAMPLE SHALL BE REJECTED.

ARTICLE 3.A.(2) IS VOIDED AND REPLACED BY THE FOLLOWING:

(2) SINGLE JACKETED MELTERS (PROPANE HEATED ONLY):  
SET THERMOSTAT AT 375 DEGREES F.  
KEEP FLAME LOW UNTIL MOLTEN BINDER COVERS HEATED BOTTOM OF  
KETTLE TO AT LEAST 3 OR 4 INCHES. MODERATE HEAT MAY THEN  
BE APPLIED TO REACH AND MAINTAIN 375 DEGREES F. PLUS OR  
MINUS 25 DEGREES F. DO NOT PERMIT TEMPERATURE TO EXCEED  
400 DEGREES F.

OIL OR KEROSENE FIRED, SINGLE JACKETED KETTLES DO NOT  
PERMIT PROPER HEAT CONTROL AND SHOULD NOT BE USED UNDER  
ANY CIRCUMSTANCES.

ARTICLE 5. IS VOIDED AND REPLACED BY THE FOLLOWING:

5. OPENING TO TRAFFIC.

REPAIRS WILL BE OPENED ONLY TO CONSTRUCTION TRAFFIC AFTER A 30  
MINUTE MINIMUM SET TIME AND WILL BE OVERLAID PRIOR TO OPENING TO  
GENERAL TRAFFIC WITH THE FOLLOWING LIMITATIONS.

<u>TYPE OF SURFACE</u>	<u>WHICHEVER COMES FIRST</u>	
	<u>MAX. VEHICLE REPETITIONS+</u>	<u>MAX. TIME</u>
BITUMINOUS CONCRETE	100,000	10 DAYS
PORTLAND CEMENT CONCRETE	50,000	5 DAYS
GROUND OR MILLED PAVEMENT	-0-	3 DAYS

+INCULDING UP TO 25% TRUCKS.

OVERLAY MUST BE INSTALLED BEFORE EITHER THE MAXIMUM VEHICLE  
REPETITIONS OR THE MAXIMUM TIME IS REACHED.