SPECIFICATIONS
FOR
RUNWAY CRACK
SEALING AND
REMARKING RUNWAY

LUMPKIN COUNTY-WIMPYS AIRPORT

GDOT Project No. APXXX-XXXX-XX(XXX)*
PID T007762
*Number will be provided when assigned

Lumpkin County Engineering
1642 Red Oak Flats Rd.
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INDEX

DIVISION 1- TECHNICAL SPECIFICATIONS

DIVISION 2 - GDOT – SPECIFICATIONS

DIVISION 3 - FAA – SPECIFICATIONS

DIVISION 1 – TECHNICAL SPECIFICATIONS

SECTION 00001

TECHNICAL SPECIFICATIONS

All items of work shall be in accordance with the Federal Aviation Administration Standard Specifications for Airports and Special provisions except as modified in this Section, or in accordance with Georgia Standard Specifications of Transportation Systems, 2021 Edition and special provisions. All materials used shall be in accordance with FAA specifications, or Georgia Department of Transportation, State of Georgia, standard specifications construction of transportation systems, 2021 edition except for electrical items of work which shall be in accordance with applicable FAA specifications.

END OF SECTION 00001

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General Provisions and Supplementary Conditions, Specifications sections in this manual and applicable Advisory Circular 150/5370-10G Standards for Specifying Construction of Airports or State of Georgia, Department of Transportation Standard Specification sections, as specified, apply to work of this section.

B. Related Requirements specified in other sections of the specifications:

Restrictions on use of site, safety requirements and work within Air Operations Areas are specified in Section 01030-Airport Project Procedures (Construction Safety Plan.)

1.02 PROJECT IDENTIFICATION:

A. **RUNWAY CRACK SEALING AND REMARKING RUNWAY**

1.03 WORK COVERED BY CONTRACT DOCUMENTS:

A. Indicate the work of the Contract and related requirements and conditions that have an impact on the project. Related requirements and conditions that are indicated on the Contract Documents include, but are not necessarily limited to the following:

Engineering design.

B. Division 1 - General Requirements of the contract specifications is an integral part of the Contract Documents of the Contract.

1.04 SUMMARY BY REFERENCES:

A. Work of the Contract can be summarized by references to the Contract, General Provisions, Supplementary Conditions, Specification Sections, Drawings, addenda and modifications to the contract documents issued subsequent to the initial printing of this project manual and including but not necessarily limited to printed material referenced by any of these. It is recognized that work of the Contract is also unavoidably affected or influenced by governing regulations, natural phenomenon including weather conditions and other forces outside the contract documents.

END OF SECTION 01010

SECTION 01030

AIRPORT PROJECT PROCEDURES
(Construction Safety Phasing Plan)

Part 1 GENERAL

1.01 INTRODUCTION:

A. This project involves Contractor operations within active Airport Operational Areas (A.O.A.). The Airport will conduct normal aircraft operations (subject to certain restrictions which shall be called out in this section) during the course of this project. Therefore, in order to provide for the security and safety of Airport users and the Contractor's forces, as well as to minimize interruptions to aircraft operations, the Contractor shall limit his work within the areas as designated on the plans and conduct his operations as set forth in the specifications.

THE CONTRACTOR AND ALL PERSONNEL SHALL NOT ENTER OR CROSS THE ACTIVE RUNWAYS OR TAXIWAYS WHEN THEY ARE NOT CLOSED OR WITHOUT SPECIFIC APPROVAL OF THE AIRPORT MANAGER. ANY PERSON IN VIOLATION OF A RUNWAY/TAXIWAY INTRUSION OF THE OPERATIONAL RUNWAY AREAS MAY BE CAUSE FOR DISMISSAL FROM THE PROJECT.

1.02 REFERENCED STANDARDS:

A. U.S. Department of Transportation, Federal Aviation Administration Advisory Circulars AC No. 150/5370-2G and AC No. 150-/5340-1K will be used as guidelines to assistin maintaining operational safety during construction activities. These documents also refer to other applicable Advisory Circulars.

B. Controlling Requirements: The purpose of this Construction Safety Plan is to describe the procedures, rules and requirements to be followed during construction of this project. The material set forth in this section is based upon Department of Transportation, Federal Aviation Administration Advisory Circular 150/5370-2G, Operational Safety on Airports During Construction, dated December 13, 2017, and its references and current changes. The requirements stated in the Advisory Circular, its references and current changes are minimum standards for the project. This section amends the requirements of the referenced standards. In case of a conflict between the referenced standards and this specification the more stringent requirement shall govern.

1.03 CONTRACTOR'S RESPONSIBILITY:

A. It remains the Contractor's responsibility to adhere to all safety regulations of the Specification, the Advisory Circular, its references and changes and to all other Advisory material pertaining to operational safety of airports, especially during periods on construction activity. The Contractor will be responsible for coordinating and controlling all construction activities in full compliance with the requirements of the referenced FAA Advisory Circulars and this Safety Plan.

B. Contractor shall designate an individual in his organization responsible for all construction safety including implementation of the specific requirements of this safety plan. The individual shall instruct all Contractors' employees in the requirements of this

safety plan and of construction safety in general. This individual shall also be responsible for insuring that all subcontractors have an understanding of the safety requirements.

1.04 MODIFICATIONS TO THE PLAN:

A. Changes to the requirements of the specification will only be allowed if approved by Owner.

1.05 UNAUTHORIZED CROSSINGS OF ACTIVE AIRFIELD OPERATION AREAS:

A. This safety plan requires that Contractor control the operation of his employees, equipment and Subcontractors, and that all work areas within the airfield operations area have a responsible person with a radio in constant radio contact with the airport UNICOM.

1.06 CONSTRUCTION SAFETY REQUIREMENTS:

A. 1. Protection of Utilities: The Contractor shall be responsible for field marking and protecting all utilities within the construction limits.

2. Storage of Equipment, Vehicles, and Materials: All equipment, vehicles, and materials must be stored in the designated storage or staging area or in areas acceptable to the Engineer.

3. Construction Methods Limitation: No open flames or burning will be allowed on the airport property without prior approval.

4. Safety and Accident Protection: The Contractor shall comply with all applicable federal, state, and local laws, ordinances, and regulations governing safety, health, and sanitation, and shall provide barricades, and shall take any other needed actions, on his own responsibility that are reasonably necessary to protect the life and health of employees on the job and the safety of the airport users, and to protect moving and parked aircraft and other property in connection with the performance of the work covered by the plans and specifications.

1.07 CONTRACTOR USE OF PREMISES :

A. Use of the Site: Confine operations at the site to the areas designated on the Drawings. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting the work as stated on this Safety Plan while engaged in project construction.

B. Keep existing drives, entrances, and air operations areas designated to remain open, clear and available to the Owner, his employees and the public at all times. Do not use these areas for parking or storage of materials.

C. Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated. If additional storage is necessary, obtain Engineer's approval.

D. Lock automotive types vehicles, such as passenger cars and trucks, and other mechanized or motorized construction equipment, when parked and unattended, so as to prevent unauthorized use. Do not leave such vehicles or equipment unattended with

the motor running or the ignition key in place.

E. RESTRICTED AREAS

Due to the necessity to accomplish construction in areas on and adjacent to the runways and taxiways, the construction equipment, vehicles, and men are authorized to operate without interruption within the project limits.

Construction activities within these areas shall only be performed at times when the runway or taxiways are closed to aircraft.

Construction within a restricted area shall be performed in such a manner that, at the end of the closure period, the runway and taxiway areas with be clear of debris.

1.08 MOTORIZED VEHICLES AND EQUIPMENT:

A. Construction equipment and vehicles not engaged in construction during non-working hours will be parked at the Contractor's staging area indicated on the Contract Drawings.

1.09 OTHER SAFETY AND SECURITY MEASURES:

A. All areas of construction will be off-limits to personnel not involved in construction work or operations of the Airport.

1.10 COMMUNICATIONS (GENERAL):

A. All communications relating to the construction work on this project will pass through the Engineer's site representative. Engineer's site representative must be furnished the Contractor's representative's telephone number where he can be contacted on a 24 hour basis. Contractor's representative shall be available on a 24-hour basis.

B. Radio Communication Requirements:

The foreman of each work crew operating adjacent to or within active aircraft operating areas shall be equipped with a VHF two-way radio capable of communicating with the UNICOM frequency. The Contractor shall furnish the radios. The radio frequency of the airport UNICOM is 122.7.

PART 2 EXECUTION:

2.01 GENERAL OPERATIONAL CONDITIONS AND RESTRICTIONS:

A. The contractor cannot work within (250 feet of the runway centerline or near any active taxiways or taxi lanes. Airport operations shall not be impacted by the work of the contractor. No runways or taxiways will be closed. Contractor can work next to the apron area as long as the airport operator agrees and that adequate clearance between the equipment or materials and any part of an aircraft using the apron. Appropriate NOTAMS shall be issued by airport management prior to the operation.

B. The contractor must get permission from the Engineer prior to use of construction equipment over 20 feet in height.

2.02 MEASUREMENT AND PAYMENT:

A. There will be no separate measurement and payment for work specified in this Section.

END OF SECTION 01030

SECTION 01600

MATERIAL AND EQUIPMENT

1.01 GENERAL:

A. All material and equipment (products) incorporated into the work shall:

1. Conform to applicable specifications and standards.
2. Comply with size, make, type and quality specified, or as specifically approved in writing by the Engineer.
3. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

B. Related requirements in other parts of the project manual:

1. Conditions of the Contract.

C. Standardization

1. Unless otherwise approved by the Engineer, items of a similar type and function shall be furnished by one manufacturer to standardize on matters and to avoid a division of responsibility among several manufacturers.

1.02 PRODUCT SUBSTITUTIONS AND OPTIONS:

A. Products List

1. Contractor shall submit a complete list of products to be incorporated into the work (with the name of the installing contractor) at the Preconstruction conference required by these specifications.

B. Contractor's Options

1. For products specified only by reference standard, select any product meeting that standard.
2. For products specified by naming several products, select any one of the products named, which complies with the specifications.

C. Product Specifications

1. Contractor shall submit, at the Preconstruction Conference, all requests for product substitutions. No requests for substitutions will be accepted from manufacturers or suppliers.
2. Submit a separate written request for each product, supported with complete data, with drawings and samples as appropriate, including:

    a. Comparison of the qualities of the proposed substitution with that specified.
    b. Changes required in other elements of the work because of the substitution.

c. Effect on the construction schedule.
d. Cost data comparing the proposed substitution with the product specified.
e. Any required license fees or royalties.

3. Engineer shall be the judge of the equality and acceptability of the proposed substitution.
4. If Engineer determines the proposed substitute product is not "equal" to the specified product, the Contractor must provide the specified product.
5. No further requests for substitutions will be considered after Preconstruction Conference.

D. Contractor's Representation

1. A request for a substitution constitutes a representation that Contractor;

a. Has investigated the proposed product and determined that it is equal to or superior in all respects to that specified.
b. Will provide the same warranties for the substitution as for the product specified.
c. Waives all claims for additional costs, under his responsibility, which may subsequently become apparent.

E. Engineer will review requests for substitutions with reasonable promptness and notify Contractor, in writing, of the decision to accept or reject the requested substitution.

1.03 MANUFACTURER'S INSTRUCTIONS:

A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, Contractor shall obtain and distribute copies of such instructions to parties involved in the installation, including copies to Engineer.

1. Maintain one set of complete instructions at the job site during installation and until completion.

B. Handle, install, connect, clean, condition, and adjust products in strict accord with such instructions and in conformity with specified requirements.

1. Should job conditions or specified requirements conflict with manufacturer's instruction, consult with Engineer for further instructions.

2. Do not proceed with work without clear instructions.

C. Perform work in accord with manufacturer's instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

1.04 TRANSPORTATION AND HANDLING:

A. Contractor shall arrange deliveries of products in accord with construction schedules, coordinate to avoid conflict with work and conditions at the site.

1. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.

2. Immediately on delivery, inspect shipments to assure compliance with requirements of contract documents and approved submittals, and those products are properly protected and undamaged.

B. Provide equipment and personnel to handle products by methods to prevent soiling or damage of products or packaging.

1.05 STORAGE AND PROTECTION:

A. Store products in accord with manufacturer's instructions, with seals and labels intact and legible.

1. Store products subject to damage by the elements in weather tight enclosures.
2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.

B. Exterior storage

1. Store fabricated products above the ground, on blocking or skids, prevent soiling or staining. Cover products which are subject to deterioration with impervious sheet coverings, provide adequate ventilation to avoid condensation.
2. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.

C. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration

D. Protection after installation

1. Provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove when no longer needed.

END OF SECTION 01600

SECTION 01700

CONTRACT CLOSEOUT

1.01 GENERAL:

A. Comply with requirements stated in conditions of the contract and in specifications for administrative procedures in closing out the work.

B. Related requirements in other parts of the Project Manual:
   1. Fiscal provisions, legal submittals and additional administrative requirements: Conditions of the contract.

C. Related Requirements Specified in Other Sections:
   1. Closeout submittals required of trades: The respective sections of specifications.

1.02 SUBSTANTIAL COMPLETION:

A. The conditions and procedures for inspection; and Contractor's, Engineer's and Owner's responsibilities pertaining to Substantial Completion are as specified in Section 50 of the General Conditions.

1.03 FINAL INSPECTION:

A. Shall be in accordance with conditions and procedures outlined in the General Provisions.

B. When Engineer finds that the work is acceptable under the Contract Documents, he will request required Contractor's Closeout Submittals.

1.04 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER:

A. Evidence of payment and release of liens: To requirements of General and Supplementary Conditions.

B. Certificates of Insurance for products and completed operations.

C. Evidence of compliance with requirements of governing authorities:
   1. Certificates of Inspection

END OF SECTION 01700

SECTION 01710

CLEANING AND DISPOSAL

PART 1 GENERAL:

1.01 DESCRIPTION:

A. Contractor shall execute cleaning during progress of the work and at completion of the work, as required by General Provisions.

1.02 DISPOSAL REQUIREMENTS:

A. Conduct cleaning and disposal operations to comply with all local, state and federal codes, ordinances, regulations, and anti-pollution laws.

B. Disposal of waste soil materials may be onsite or off-site at approved locations, at Contractor's option.

C. Contractor shall be responsible for arranging for and obtaining off-site disposal areas, including payment for all costs associated with such disposal.

PART 2 EXECUTION:

2.01 CLEANING:

A. Execute periodic cleaning to keep the Work, the site and adjacent properties free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations.

B. Provide on-site containers for the collection of waste materials, debris and rubbish.

C. Remove waste materials, debris and rubbish from the site periodically and dispose of at approved locations.

END OF SECTION 01710

DIVISION 2 - GDOT – SPECIFICATIONS

Section 108.08

Failure or Delay in Completing Work on Time

Time is an essential element of the Contract, and any delay in the prosecution of the work may inconvenience the public, obstruct traffic, or interfere with business. In addition to the aforementioned inconveniences, any delay in completion of the work will always increase the cost of engineering. For this reason, it is important that the work be pressed vigorously to completion. Should the Contractor or, in case of default, the Surety fail to complete the work within the time stipulated in the Contract or within such extra time that may be allowed, charges shall be assessed against any money due or that may become due the Contractor in accordance with the following schedule:

Schedule of Deductions for Each Day of Overrun in Contract Time			
Original Contract Amount		Daily Charges	
From More Than	To and Including	Available Day	Calendar Day or Completion Date
$0	$2,000,000	$298	$213
$2,000,000	$4,000,000	$893	$638
$4,000,000	$7,000,000	$1,636	$1,169
$7,000,000	$12,000,000	$2,826	$2,019
$12,000,000	$20,000,000	$4,759	$3,399
$20,000,000	$30,000,000	$7,436	$5,311
$30,000,000	$40,000,000	$8,328	$5,949
$40,000,000	$50,000,000	$10,707	$7,648
$50,000,000		$11,897	$8,498

A. Liquidated Damages

The amount of such charges is hereby agreed upon as fixed liquidated damages due the Department after the expiration of the time for completion specified in the Contract. The Contractor and his Surety shall be liable for liquidated damages in excess of the amount due the Contractor on the final payment. These fixed liquidated damages are not established as a penalty but are calculated and agreed upon in advance by the Department and the Contractor due the uncertainty and impossibility of making a determination as to the actual and consequential damages which are incurred by the Department, the State, and the general public as a result of the failure on the part of the Contractor to complete the work on time.

1. Deduction from Partial Payments: Liquidated damages, as they accrue, will be deducted from periodic partial payments.

2. Deduction from Final Payment: The full amount of liquidated damages will be deducted from final payment to the Contractor and/or its Surety.

3. No Liquidated Damages Charged for Delay by the Department: In case of default of the Contract and the subsequent completion of the work by the Department as hereinafter provided, the Contractor and his Surety shall be liable for the liquidated damages under the Contract, but no liquidated damages shall be chargeable for any delay in the final completion of the work by the Department due to any unreasonable action,

negligence, omission, or delay of the Department. In any suit for the collection of or involving the assessment of liquidated damages, the reasonableness of the amount shall be presumed. The liquidated damages referred to herein are intended to be and are cumulative and shall be in addition to every other remedy now or hereafter enforceable at law, in equity, by statute, or under the Contract.

B. No Waiver of Department's Rights
Permitting the Contractor to continue and finish The Work or any part of it after the expiration of the time allowed for completion or after any extension of time, shall not operate as a waiver of the rights of the Department under the Contract.

Section 407

Asphalt-Rubber Joint and Crack Seal

407.1 General Description

This work includes filling (Type M) or sealing (Type S) joints and cracks in existing pavements with rubber asphalt mixtures. A polymer-modified asphalt rubber (PMAR) blend may be used in lieu of both Type M and Type S.

407.1.01 Definitions

Type M: Used to fill joints and cracks in Portland cement concrete or asphaltic concrete pavements when required by the plans before placing an overlay.

Type S: Used to seal joints and cracks in Portland cement concrete and asphaltic concrete pavements and shoulders when not placing an overlay.

407.1.02 Related References

A. Standard Specifications

Section 820—Asphalt Cement

B. Referenced Documents

AASHTO T51

ASTM D 4

ASTM D 36

ASTM D 5329

ASTM D 7173

GDT-2

SOP 22

QPL 92

407.1.03 Submittals

Provide a Certificate of Analysis certifying each lot of premixed material meets the requirements of this specification and submit the test results of each lot for each project. Ensure each sealant lot is delivered in containers with the manufacturer's name or trademark and lot number plainly marked. When instructed by the Engineer, furnish premixed samples and samples of the individual components of premixed material as follows:

• At least 20 lbs. (10 kg) of rubber representative of each lot

• At least 5 gal (18 L) of asphalt containing additives as proportioned

• Proportional quantities of mixing aids or additives not included above

• Packaged premixed sealant material weighing no more than 30 lbs. (14 kg)

407.2 Materials

Ensure the sealant material is a premixed, asphalt-rubber sealant mixture evaluated in accordance with SOP 22 and listed on QPLs 92-A, 92-B and/or 92-C. Ensure the mixture is a blend of asphalt cement, aromatic extender oil(s), and recycled or reclaimed tire crumb rubber with rubber contents meeting the requirements specified in Table 2. The blending will be conducted in a closely controlled manufacturing process as detailed in the manufacturer's submitted Quality Control Plan. Produce a mixture with the following properties:

A. Workability

The mixture pours readily and penetrates a 1/4 in. (6 mm) pavement joint or crack to a depth of at least 1 in. (25 mm) when the application temperature of the fully reacted mixture is 350 ºF (177 ºC) and the air temperature is 35 ºF (2 ºC) or higher.

The mixture, when placed in conventional field installation equipment, readily melts to a pumping consistency after being heated to 400 °F (204 °C) for 2 hours maximum. The mixture remains in a pumping consistency when the temperature of the field installation equipment is reduced to the normal operating temperature range of 300 ºF to 350 ºF (149 ºC to 177 ºC).

B. Curing

The mixture contains no water or volatile solvents and cures immediately when cooled to a sufficient viscosity to prevent tracking caused by traffic**.**

C. Softening Point, Flexibility and Rubber Content.

When a fully reacted mixture sample of asphalt-rubber has been heated at 350 ºF (177 ºC) for one hour, or when a PMAR blend has been heated at 380 ºF (194 ºC) for one hour, ensure it passes the following laboratory tests:

1. Softening Point

The minimum softening point by ring and ball described in ASTM D 36 is as follows:

Type S 135 ºF (57 ºC)

2. Flexibility

Bend a 1/8 in. (3 mm) thick x 1 in. (25 mm) wide x 6 in. (150 mm) long mixture specimen after conditioning to 10 ºF (-12 ºC) at a minimum bending rate of 9 degrees per second (10 seconds maximum for a 90º bend) over a 1 in. (25 mm) diameter mandrel without cracking.

3. Rubber Content %

Type S minimum rubber content 15% minimum.

D. Separation

Test the PMAR blend for phase separation by pouring two representative samples of the mixture into aluminum tubes measuring 1 in. (25 mm) in diameter and 5-1/2 in. (140 mm) long as described in ASTM D 7173. Cure the samples at 325 ºF (163 ºC) for 48 hours. Take samples from the top and bottom of each tube and determine softening point as described in ASTM D 36. Average the test results from the top and bottom samples. If there is 4 percent or more difference between the average test result and either of the top or bottom test results, reject the mixture due to separation.

E. Adhesion

When cooled, the mixture bonds strongly to both asphalt and concrete pavement surfaces. The mixture contains no materials chemically reactive with these surfaces to reduce the short-term and long-term adhesion bonds.

F. Acceptable Recycled or Reclaimed Tire Crumb Rubber

Before the rubber is added, ensure the asphalt cement used in the mixture conforms to the requirements of Section 820.2.01, PG 58-22 or PG 64-22.

Ensure the recycled, reclaimed tire crumb rubber used in the mixture meets the following requirements:

• Obtained from used pneumatic tires (such as automobile, truck, bus, etc.)—not solid tires and non-tire rubber sources

• Produced from an ambient or cryogenic grinding process (crushes, tears, factures or grinds, the used rubber tires and produces rubber particles with a ragged, sponge-like surface). Tire buffings are prohibited.

• Contains recycled, vulcanized crumb rubber and/or reclaimed (devulcanized) rubber

• Contains at least 25 percent natural rubber by weight of the total rubber portion of the mixture

• Contains no more than 0.1 percent fabric

• Free of wire and other contaminating materials, except up to four percent calcium carbonate or talc to prevent rubber particles from sticking

• Contains no rubber particles greater than 1/4 in. (6 mm) long

• Meets the following gradation requirements:

TABLE 3 – RECYCLED OR RECLAIMED TIRE CRUMB RUBBER GRADATION

Sieve Size	Percent Passing
No. 10 (2.0 mm)	100%
No. 16 (1.18 mm)	95 to 100%
No. 30 (600 µm)	40 to 80%
No. 80 (180 µm)	0 to 5%

G. Polymer-modified Asphalt Rubber

If a PMAR blend is used, ensure it meets the following additional requirements:

TABLE 4 – POLYMER-MODIFIED ASPHALT RUBBER PROPERTIES (PMAR)

PROPERTY	SPECIFICATION LIMITS
Cone Penetration, 77 ºF (25 ºC) (ASTM D 5329)	30 - 60 dmm
Resilience, 77 ºF (25 ºC), % Recovery (ASTM D 5329)	30% minimum
Ductility, 77 ºF (25 ºC), 50 mm/minute (ASSHTO T-51)	300 mm minimum
Asphalt Compatibility (ASTM D 5329)	Pass
Bitumen Content (ASTM D 4)	60 – 70 %
Tensile Adhesion (ASTM D 5329)	350 % minimum
Rotational Viscosity (Brookfield), No. 5 spindle, 20 RPM, 400 ºF (205 ºC)	3,000 – 15,000 cp
Rubber Content % (GDT-2)	12% minimum

407.2.01 Delivery, Storage, and Handling

Package the premixed sealant material in units weighing no more than 30 lbs. (14 kg) with a maximum of two 30 lb. (14 kg) units per shipping container. Ensure the plastic film used to package the units melts at normal application temperatures when placed in the installation equipment.

407.3 Construction Requirements

407.3.01 Personnel

General Provisions 101 through 150.

407.3.02 Equipment

A. Field Installation Equipment

Use field installation equipment that produces or maintains specified temperatures, even if filled to capacity.

Ensure the equipment produces or maintains a homogenous mixture of asphalt and rubber at a uniform temperature without hot or cool spots or rubber and asphalt segregation in the mixture.

B. Crack Filling Equipment

Ensure the equipment for filling the joints and cracks directs the sealant into the crack. Seal large cracks from the bottom up. Provide squeegees as necessary.

C. Air Compressor(s)

Ensure the air compressors are satisfactory to the Engineer.

407.3.03 Preparation

A. Joint and Crack Preparation

Use compressed air to thoroughly clean the joints and cracks to be sealed.

Clean the pavement surface and check the joints and cracks to ensure they are free of vegetation, dirt, dust, moisture, and other foreign material.

407.3.04 Fabrication

General Provisions 101 through 150.

407.3.05 Construction

A. Restrictions

Do not seal joints and cracks if:

• The joint or crack surface to be treated is not thoroughly dry.

• Rain is imminent.

• The air temperature is below 35 ºF (2 ºC).

B. Procedure

Follow this procedure to seal joints and cracks:

1. Place the prepackaged sealant mixture in the field installation equipment.

2. Heat the sealant mixture for the proper time and temperature to provide a full reaction between the asphalt and rubber.

3. Apply the mixture at the specified application temperature according to the manufacturer's recommendations or the laboratory's approval.

4. Carefully fill the joint or cracks, slightly overfull. Strike off the excess with a V-shaped squeegee to feather the sealant out to a width of approximately 2 in. (50 mm).

407.3.06 Quality Acceptance

If the packaged units are bonded or stuck together or to the shipping container, or if packaging staples or fasteners cause sealant contamination, the material may be rejected as determined by the Engineer.

The manufacturer must meet the requirements of this Specification and furnish evidence of successful field installation and performance under similar environmental and project conditions.

407.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

407.4 Measurement

Joints and cracks will be measured by the linear foot (meter) by surface measure.

407.4.01 Limits

General Provisions 101 through 150.

407.5 Payment

Joints and cracks sealed according to the plans and this specification will be paid for at the Contract Unit Price bid.

Payment is full compensation for furnishing all materials and performing the work.

Payment will be made under:

Item No. 407 Asphalt-rubber joint and crack seal, type “S”: Per linear foot

END OF SECTION 407

SECTION 656

REMOVAL OF PAVEMENT MARKINGS

656.1 General Description
This work includes removing existing traffic stripes or markings according to Plans or as designated by the Engineer.

656.1.01 Definitions General Provisions 101 through 150.

656.1.02 Related References
A. Standard Specifications
Section 107—Legal Regulations and Responsibility to the Public
Section 150—Traffic Control
Section 804—Abrasives for Blast Cleaning

B. Referenced Documents General Provisions 101 through 150.

656.1.03 Submittals General Provisions 101 through 150.

656.2 Materials General Provisions 101 through 150.

656.2.01 Delivery, Storage, and Handling General Provisions 101 through 150.

656.3 Construction Requirements

656.3.01 Personnel General Provisions 101 through 150.

656.3.02 Equipment General Provisions 101 through 150.

656.3.03 Preparation General Provisions 101 through 150.

656.3.04 Fabrication General Provisions 101 through 150.

656.3.05 Construction
Remove pavement markings before changing the traffic pattern. This Specification does not relieve the Contractor of the responsibilities in Section 150 or Subsection 107.07. Utilize blasting, such as sand blasting or water blasting, grinding, or other approved methods to completely remove pavement markings without materially damaging the pavement surface or texture. Repair (at the Contractor's expense) damage to the pavement or other surface from removing the markings. Use repair methods acceptable to the Engineer.
A. Blast Cleaning Do not allow sand and other debris to accumulate and interfere with drainage or create a traffic hazard.

1. When blast cleaning within 10 ft (3 m) of a lane occupied by public traffic, immediately remove residue and dust when the sand hits the pavement surface.
2. Use a vacuum attachment operating simultaneously with blast cleaning, or use other methods approved by the Engineer.
3. Ensure that sand for blast cleaning conforms to Section 804.

656.3.06 Quality Acceptance General Provisions 101 through 150.

656.3.07 Contractor Warranty and Maintenance General Provisions 101 through 150.

656.4 Measurement Removal of existing pavement markings is measured by the linear foot (meter), linear mile (kilometer), gross linear foot (meter), gross linear mile (kilometer), or square yard (meter) of the designated width and the type of stripe. Where removal of traffic markings will be paid for by the square yard (meter), the actual number of square yards (meters) removed will be paid for. The space between the stripes or letters will be included in the overall measurement. Removal of words in existing traffic markings is measured per each word removed.

656.4.01 Limits General Provisions 101 through 150.

656.5 Payment When shown as a Pay Item on the Plans, payment for removing pavement markings will be at the Contract Unit Price for the Unit. Payment is full compensation for furnishing materials, labor, equipment, and traffic control necessary to perform the work.

Payment will be made under:

Item No. 656	Removing of Pavement Markings	Per Square Yard

Updated 04/18/2013

END OF SECTION 656

DIVISION 3- FAA- SPECIFICATIONS

Item C-105 Mobilization

105-1 Description. This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, material and supplies to and from the project site for work on the project except as provided in the contract as separate pay items.

105-2 Mobilization limit. Mobilization shall be limited to 10 percent of the total project cost.

105-3 Posted notices. Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster "Equal Employment Opportunity is the Law" in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL "Notice to All Employees" Poster; and Applicable Davis-Bacon Wage Rate Determination. These notices must remain posted until final acceptance of the work by the Owner.

105-4 Engineer/RPR field office. An Engineer/RPR field office is not required.

METHOD OF MEASUREMENT

105-1 Basis of measurement and payment. Based upon the contract lump sum price for "Mobilization" partial payments will be allowed as follows:

a. With first pay request, 25%.

b. When 25% or more of the original contract is earned, an additional 25%.

c. When 50% or more of the original contract is earned, an additional 40%.

d. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by Section 90, paragraph 90-11, *Contractor Final Project Documentation*, the final 10%.

BASIS OF PAYMENT

105-2 Payment will be made under:

Item C-105	Mobilization	-	per lump sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Office of Federal Contract Compliance Programs (OFCCP)

Executive Order 11246, as amended

EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster

END OF ITEM C-105

SPECIAL PROVISION, SECTION P-620

RUNWAY AND TAXIWAY MARKING

Add the following to **Marking Materials:**

620-2.2
c. Microbicide. All Waterborne paint shall contain a microbicide that provides microbial efficacy for a period of no less than 3 years. The microbicide shall be blended homogeneously with the paint under high-speed dispersion during production by the supplier/manufacturer. The final homogenous blend of microbicide treated paint shall conform to the same viscosity stability standards as specified in TT-P-1952F.

a. Dow (formally Rohm and Hass) Rocima 63 microbicide (or other approved equivalent) shall be added at a rate of 10 pounds per 100 gallons of paint.
b. Other products may be available that meet or exceed these specifications.

Add the following to **Preparation of Surface:**

620-3.3 The Engineer shall be given 24-hour notice prior to the commencement of painting operations to ensure adequate cleaning measures have been performed.

Replace Section 620-3-3. b) with the following for **Preparation of Surface:**

b. Preparation of pavement to remove existing markings. Existing pavement markings shall be removed by rotary grinding, water blasting, or by other methods approved by the RPR minimizing damage to the pavement surface. The removal area may need to be larger than the area of the markings to eliminate ghost markings.

Add the following to **Method of Measurement:**

620-4.1f The quantity of runway and taxiway markings to be paid for shall be the number of square feet of painting**, including reflective material and microbicide for white paint** performed in accordance with the specifications and accepted by the Engineer.

620-4.1g The quantity of runway and taxiway markings to be paid for shall be the number of square feet of painting**, including reflective material and microbicide for yellow paint** performed in accordance with the specifications and accepted by the Engineer.

Add the following to **Basis of Payment:**

620-5.5f Payment shall be made at the respective contract **price per square foot of painting, including reflective material and microbicide for white paint.** This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and

incidentals necessary to complete the item.

620-5.5g Payment shall be made at the respective contract **price per square foot of painting, including reflective material and microbicide for yellow paint.** This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.

END OF **SPECIAL PROVISION, SECTION P-620**

SECTION P-620

RUNWAY AND TAXIWAY MARKING

DESCRIPTION

620-1.1 This item shall consist of the preparation and painting of numbers, markings, and stripes on the surface of runways, taxiways, and aprons, in accordance with these specifications and at the locations shown on the plans, or as directed by the Resident Project Representative (RPR). The terms “paint” and “marking material” as well as “painting” and “application of markings” are interchangeable throughout this specification.

MATERIALS

620-2.1 Materials acceptance. The Contractor shall furnish manufacturer’s certified test reports for materials shipped to the project. The certified test reports shall include a statement that the materials meet the specification requirements. This certification along with a copy of the paint manufacturer’s surface preparation; marking materials, including adhesion, flow promoting and/or floatation additive; and application requirements must be submitted and approved by the Resident Project Representative (RPR) prior to the initial application of markings. The reports can be used for material acceptance or the RPR may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the RPR upon arrival of a shipment of materials to the site. All material shall arrive in sealed containers that are easily quantifiable for inspection by the RPR.

620-2.2 Marking materials.

Table 1. Marking Materials

Paint[1]				Glass Beads[2]	
Type	**Color**	**Fed Std. 595 Number**	**Application Rate Maximum**	**Type**	**Application Rate Minimum**
III	White	37925	90 ft^2/gal	III	10 lb/gal
III	Yellow	33538 or 33655	90 ft^2/gal	III	10 lb/gal
III	Black	37038	90 ft^2/gal	N/A	0 lb/gal

[1] See paragraph 620-2.2a

[2] See paragraph 620-2.2b

a. Paint. Paint shall be **waterborne** in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595. **As shown in the table above.**

Waterborne. Paint shall meet the requirements of Federal Specification TT-P-1952F, **Type III**. The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis. The acrylic resin used for Type III shall be 100% cross linking acrylic as evidenced by infrared peaks at wavelengths 1568, 1624, and 1672 cm-l with intensities equal to those produced by an acrylic resin known to be 100% cross linking.

b. Reflective media. Glass beads for white and yellow paint shall meet the requirements for Federal Specification TT-B-1325D **Type III**.

Glass beads shall be treated with all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment.
Glass beads shall not be used in black and green paint.

Federal Specification TT-B-1325D, Type III. Initial readings typically yield 600 mcd/m²/lux on white markings and 300 mcd/m²/lux on yellow markings at installation and once in service, the reflectance values are approximately the same as Type I beads.

CONSTRUCTION METHODS

620-3.1 Weather limitations. Painting shall only be performed when the surface is dry, and the ambient temperature and the pavement surface temperature meet the manufacturer's recommendations in accordance with paragraph 620-2.1. Painting operations shall be discontinued when the ambient or surface temperatures does not meet the manufacturer's recommendations. Markings shall not be applied when the wind speed exceeds 10 mph unless windscreens are used to shroud the material guns. Markings shall not be applied when weather conditions are forecasts to not be within the manufacturers' recommendations for application and dry time.

620-3.2 Equipment. Equipment shall include the apparatus necessary to properly clean the existing surface, a mechanical marking machine, a bead dispensing machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job.

The mechanical marker shall be an atomizing spray-type or airless type marking machine with automatic glass bead dispensers suitable for application of traffic paint. It shall produce an even and uniform film thickness and appearance of both paint and glass beads at the required coverage and shall apply markings of uniform cross-sections and clear-cut edges without running or spattering and without over spray. The marking equipment for both paint and beads shall be calibrated daily.

620-3.3 Preparation of surfaces. Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other contaminates that would reduce the bond between the paint and the pavement. Use of any chemicals or impact abrasives during surface preparation shall be approved in advance by the RPR. After the cleaning operations, sweeping, blowing, or rinsing with pressurized water shall be performed to ensure the surface is clean and free of grit or other debris left from the cleaning process.

a. Preparation of new pavement surfaces. The area to be painted shall be cleaned by broom, blower, water blasting, or by other methods approved by the RPR to remove all contaminants, including PCC curing compounds, minimizing damage to the pavement surface.

b. Preparation of pavement to remove existing markings. Existing pavement markings shall be removed by water blasting, or by other methods approved by the RPR minimizing damage to the pavement surface. The removal area may need to be larger than the area of the markings to eliminate ghost markings..

c. Preparation of pavement markings prior to remarking. Prior to remarking existing markings, loose existing markings must be removed minimizing damage to the pavement surface, with a method approved by the RPR. After removal, the surface shall be cleaned of all residue or debris.

Prior to the application of markings, the Contractor shall certify in writing that the surface is dry and free from dirt, grease, oil, laitance, or other foreign material that would prevent the bond of the paint to the pavement or existing markings. This certification along with a copy of the paint manufactures application and surface preparation requirements must be submitted to the RPR prior to the initial application of markings.

620-3.4 Layout of markings. The proposed markings shall be laid out in advance of the paint application. The locations of markings to receive glass beads shall be shown on the plans.

620-3.5 Application. A period of **thirty (30)** days shall elapse between placement of surface course or seal coat and application of the permanent paint markings. Paint shall be applied at the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the RPR.

The edges of the markings shall not vary from a straight line more than 1/2 inch (12 mm) in 50 feet (15 m), and marking dimensions and spacing shall be within the following tolerances:

Marking Dimensions and Spacing Tolerance

Dimension and Spacing	Tolerance
36 inch (910 mm) or less	±1/2 inch (12 mm)
greater than 36 inch to 6 feet (910 mm to 1.85 m)	±1 inch (25 mm)
greater than 6 feet to 60 feet (1.85 m to 18.3 m)	±2 inch (50 mm)
greater than 60 feet (18.3 m)	±3 inch (76 mm)

The paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at the rate shown in Table 1. The addition of thinner will not be permitted.

Glass beads shall be distributed upon the marked areas at the locations shown on the plans to receive glass beads immediately after application of the paint. A dispenser shall be furnished that is properly designed for attachment to the marking machine and suitable for dispensing

glass beads. Glass beads shall be applied at the rate shown in Table 1. Glass beads shall not be applied to black paint or green paint. Glass beads shall adhere to the cured paint or all marking operations shall cease until corrections are made. Different bead types shall not be mixed. Regular monitoring of glass bead embedment and distribution should be performed.

620-3.6 Application--preformed thermoplastic airport pavement markings.
Preformed thermoplastic pavement markings not used.

620-3.7 Control strip. Prior to the full application of airfield markings, the Contractor shall prepare a control strip in the presence of the RPR. The Contractor shall demonstrate the surface preparation method and all striping equipment to be used on the project. The marking equipment must achieve the prescribed application rate of paint and population of glass beads (per Table 1) that are properly embedded and evenly distributed across the full width of the marking. Prior to acceptance of the control strip, markings must be evaluated during darkness to ensure a uniform appearance.

620-3.8 Retro-reflectance. Reflectance shall be measured with a portable retro-reflectometer meeting ASTM E1710 (or equivalent). A total of 6 reading shall be taken over a 6 square foot area with 3 readings taken from each direction. The average shall be equal to or above the minimum levels of all readings which are within 30% of each other.

Minimum Retro-Reflectance Values

Material	**Retro-reflectance mcd/m^2/lux**		
	White	**Yellow**	**Red**
Initial Type I	300	175	35
Initial Type III	600	300	35
Initial Thermoplastic	225	100	35
All materials, remark when less than[1]	100	75	10

[1] 'Prior to remarking determine if removal of contaminants on markings will restore retro-reflectance

620-3.9 Protection and cleanup. After application of the markings, all markings shall be protected from damage until dry. All surfaces shall be protected from excess moisture and/or rain and from disfiguration by spatter, splashes, spillage, or drippings. The Contractor shall remove from the work area all debris, waste, loose reflective media, and by-products generated by the surface preparation and application operations to the satisfaction of the RPR. The Contractor shall dispose of these wastes in strict compliance with all applicable state, local, and federal environmental statutes and regulations.

METHOD OF MEASUREMENT

620-4.1a The quantity of surface preparation shall be measured by the number of square feet (square meters) for each type of surface preparation specified in paragraph 620-3.3**.**
620-4.1b The quantity of markings shall be paid for shall be measured by the number of square feet (square meters) of painting, including reflective material and microbicide**.**

620-4.1c The quantity of reflective media shall be paid for by the number of pounds of reflective

media.
620-4.1d Temporary markings not required.

BASIS OF PAYMENT

620-5.1 This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item complete in place and accepted by the RPR in accordance with these specifications.
620-5.1a Payment for surface preparation shall be made at the contract price for the number of square feet (square meters) for each type of surface preparation specified in paragraph 620-3.3.
620-5.2b Payment for markings shall be made at the contract price for the number of square feet (square meters) of painting and the number of pounds (km) of reflective media**.**
620-5.3c Payment for reflective media shall be made at the contract unit price for the number of pounds (km) of reflective media**.**
620-5.4d Temporary markings are not required.

Payment will be made under:

Item P-620-5.1	Runway and Taxiway Marking, Type II (Yellow), including Reflective Material (Type III, Gradation A) and Microbicide – per square foot
Item P-620-5.2	Runway and Taxiway Marking, Type II (White), including Reflective Material (Type III, Gradation A) and Microbicide – per square foot
Item P-620-5.3	Runway and Taxiway Marking, Type II (Black), including Microbicide – per square foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D476 Standard Classification for Dry Pigmentary Titanium Dioxide Products

ASTM D968 Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive

ASTM D1652 Standard Test Method for Epoxy Content of Epoxy Resins

ASTM D2074 Standard Test Method for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method

ASTM D2240 Standard Test Method for Rubber Property - Durometer Hardness

ASTM D7585 Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments

ASTM E303 Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester

ASTM E1710 Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer

ASTM E2302 Standard Test Method for Measurement of the Luminance Coefficient Under Diffuse Illumination of Pavement Marking Materials Using a Portable Reflectometer

ASTM G154 Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

Code of Federal Regulations (CFR)

40 CFR Part 60, Appendix A-7, Method 24
Determination of volatile matter content, water content, density, volume solids, and weight solids of surface coatings

29 CFR Part 1910.1200 Hazard Communication

Federal Specifications (FED SPEC)

FED SPEC TT-B-1325D Beads (Glass Spheres) Retro-Reflective

FED SPEC TT-P-1952F Paint, Traffic and Airfield Marking, Waterborne

FED STD 595 Colors used in Government Procurement

Commercial Item Description

A-A-2886B Paint, Traffic, Solvent Based

Advisory Circulars (AC)

AC 150/5340-1 Standards for Airport Markings

AC 150/5320-12 Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces

END OF SECTION P-620