



U.S. Department
of Transportation

Federal Aviation
Administration

Advisory Circular

Subject: Standards for Specifying
Construction of Airports

Date: 7/21/2014

AC No: 150/5370-10G

Initiated by: AAS-100

Change:

- 1. Purpose.** The standards contained in this advisory circular (AC) relate to materials and methods used for the construction on airports. Items covered in this AC include general provisions, earthwork, flexible base courses, rigid base courses, flexible surface courses, rigid pavement, fencing, drainage, turf, and lighting installation.
- 2. Application.** The Federal Aviation Administration (FAA) recommends the guidelines and specifications in this AC for materials and methods used in the construction on airports. In general, use of this AC is not mandatory. However, use of this AC is mandatory for all projects funded with federal grant monies through the Airport Improvement Program (AIP) and with revenue from the Passenger Facility Charge (PFC) Program. See Grant Assurance No. 34, Policies, Standards, and Specifications, and PFC Assurance No. 9, Standards and Specifications.
- 3. Developing Project Specifications.** The standards in this AC may be used to develop construction specifications for an individual project or for a particular State.

For individual projects, the standards must not be made a part of a contract merely by reference and pertinent portions of the specifications must be copied into the contract documents. For State specifications, the standards should be developed into specifications for a particular State. On approval by the FAA, these State specifications may be incorporated in construction contracts by reference.

Modifications to standards requests contained in this AC must meet the requirements of Order 5300.1, Modifications to Agency Airport Design, Construction, and Equipment Standards.

When preparing construction contracts for AIP or PFC projects or for grant obligated airports, the user should review the contract provisions, found at the FAA's Procurement and Contracting Under AIP Airports website <http://www.faa.gov/airports/aip/procurement/>, to obtain the mandatory provisions (wage, labor, Disadvantaged Business Enterprises (DBE), Equal Employment Opportunity (EEO), etc.) that must be included in the contract proposals. Additional contract clauses may be required to comply with local and state laws relating to advertising, awarding, and administering construction contracts.

- 4. Changes, additions and deletions to the FAA Standard Specifications.** Directions to the Engineer are contained in the AC Engineer Notes (shown between lines of asterisks). These notes explain the options available to the Engineer when preparing a specification, and the appropriate changes and additions that must be made. Where numbers, words, phrases or sentences are enclosed in brackets [___], a choice or modification must be made. Where blank spaces [___] occur in sentences, the appropriate data must be inserted. Where entire paragraphs are not applicable, they should be deleted. Additional sentences may be added if necessary, however they may not modify the construction standards in this AC. The final project specifications should not include the Engineer Notes. No other changes to the

Reprint

P-601 Fuel-Resistant Hot Mix Asphalt (HMA) Pavement

specification may be made unless the Engineer has received the approval of the FAA following the process described in paragraph 3 for modifications to standards.

5. Cancellation. This AC cancels AC 150/5370-10F, Standards for Specifying Construction of Airports, dated September 30, 2011.

6. Principal changes. This AC contains the following changes:

- Extensive technical and editorial edits have been made throughout the document.
- Deleted “Notice to Users” and moved information to the title page under Paragraph 3, Developing Project Specifications, and Paragraph 4, Changes, additions and deletions to the FAA Standard Specifications.
- Updated references to the ACs and industry standards including ASTM International (formerly known as the American Society for Testing and Materials (ASTM)), American Association of State Highway and Transportation Officials (AASHTO), Asphalt Institute (AI), etc.
- Added new paragraphs to Section 90: Paragraph 90-10, Construction Warranty; and Paragraph 90-11, Project Closeout.
- Deleted Section 120 Nuclear Gauges and incorporated guidance in specifications.
- Added Gyratory Method has been added to Items P-401 and P-403.
- Added new sections and items:
 - Section 105, Mobilization
 - Item P-601, Fuel-Resistant Hot Mix Asphalt (HMA) Pavement
 - Item P-608, Emulsified Asphalt Seal Coat
 - Item P-629, Thermoplastic Coal Tar Emulsion Surface Treatments
 - Item F-164, Wildlife Exclusion Fence
- Deleted the following items:
 - Item P-402, Porous Friction Course (Central Plant Hot Mix)
 - Item T-907, Tilling
 - Item L-102, Hazard Beacons

7. Metrics. Throughout this AC, customary English units will be used followed with “soft” (rounded) conversion to metric units. The English units shall govern. One unit of measure should be selected and shown in the final specification.

8. Comments or suggestions. Send comments or suggestions for improving this AC to:

Manager, Airport Engineering Division
Federal Aviation Administration
ATTN: AAS-100
800 Independence Avenue SW
Washington DC 20591

Part 7 – Miscellaneous

Item P-601 Fuel-Resistant Hot Mix Asphalt (HMA) Pavement

DESCRIPTION

601-1.1 This item shall consist of surface courses composed of mineral aggregate, fuel-resistant asphalt binder, and additives mixed in a central mixing plant and placed as a hot mix asphalt pavement in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. This mix is to be used only as a surface course. The purpose of this fuel-resistant HMA is to provide a fuel-resistant surface where pavements are subjected to fuel spills. The minimum course thickness shall be one inch (25mm) and the maximum course thickness shall not exceed two inches (50 mm).

MATERIALS

601-2.1 Aggregate. Aggregates shall consist of crushed stone, crushed gravel, or crushed slag with or without natural sand or other inert finely divided mineral aggregate. The portion of combined materials retained on the No. 4 (2.36 mm) sieve is coarse aggregate. The portion of combined materials passing the No. 4 (2.36 mm) sieve and retained on the No. 200 (0.075 mm) sieve is fine aggregate, and the portion passing the No. 200 (0.075 mm) sieve is mineral filler.

a. Coarse aggregate. Coarse aggregate shall consist of sound, tough, durable particles, free from adherent films of matter that would prevent thorough coating and bonding with the bituminous material and be free from organic matter and other deleterious substances. The percentage of wear shall not be greater than 40% when tested in accordance with ASTM C131. The sodium sulfate soundness loss shall not exceed 10%, or the magnesium sulfate soundness loss shall not exceed 13%, after five cycles, when tested in accordance with ASTM C88.

Aggregate shall contain at least 70% by weight of individual pieces having two or more fractured faces and 85% by weight having at least one fractured face. The area of each face shall be equal to at least 75% of the smallest midsection area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces. Fractured faces shall be achieved by crushing.

The aggregate shall not contain more than a total of 8%, by weight, of flat particles, elongated particles, and flat and elongated particles, when tested in accordance with ASTM D4791 with a value of 5:1.

b. Fine aggregate. Fine aggregate shall consist of clean, sound, durable, angular shaped particles produced by crushing stone, slag, or gravel that meets the requirements for wear and soundness specified for coarse aggregate. The aggregate particles shall be free from coatings of clay, silt, or other objectionable matter and shall contain no clay balls. The fine aggregate, including any blended material for the fine aggregate, shall have a plasticity index of not more than six (6) and a liquid limit of not more than 25 when tested in accordance with ASTM D4318. Natural (non-manufactured) sand may be used to obtain the gradation of the aggregate blend or to improve the workability of the mix. The amount of sand to be added will be adjusted to produce mixtures conforming to requirements of this specification. The fine aggregates shall not contain more than 20% natural sand by weight of total aggregates.

The aggregate shall have sand equivalent values of 35 or greater when tested in accordance with ASTM D2419.

c. Sampling. ASTM D75 shall be used in sampling coarse and fine aggregate, and ASTM C183 shall be used in sampling mineral filler.

601-2.2 Mineral filler. If filler, in addition to that naturally present in the aggregate, is necessary, it shall meet the requirements of ASTM D242.

601-2.3 Asphalt binder. Asphalt binder shall conform to the following requirements of ASTM D6373 for performance grade (PG) 82-22 with the changes annotated below:

- The original asphalt binder shall be tested according to ASTM D6084. Elastic Recovery at 25°C and shall be a minimum of 85%.
- The original asphalt binder shall be tested according to ASTM D7173 and meet the maximum temperature difference of 40°F (4°C) when using the ASTM D36 Ring-and-Ball apparatus.
- The HMA specimens prepared with the PG 82-22 asphalt binder must also meet the fuel resistance requirements in Table 1 when tested in accordance with paragraph 601-3.3. After passing the requirements of Table 1, the grade of the asphalt binder shall be identified as PG 82-22FR.

The Contractor shall furnish vendor's certified test reports for each lot of bituminous material shipped to the project. The vendor's certified test report for the bituminous material can be used for acceptance or tested independently by the Engineer.

601-2.4 Preliminary material acceptance. Prior to delivery of materials to the job site, the Contractor shall submit certified test reports to the Engineer for the following materials:

a. Coarse Aggregate.

- (1) Percent of wear.
- (2) Soundness.
- (3) Unit weight of slag.

b. Fine Aggregate.

- (1) Liquid limit.
- (2) Plasticity index.
- (3) Sand equivalent.

c. Mineral Filler.

d. Bituminous Material. The certification(s) shall show the appropriate ASTM test(s) for each material, the test results, and a statement that the material meets the specification requirement.

The Engineer may request samples for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

COMPOSITION

601-3.1 Composition of mixture. The bituminous plant mix shall be composed of a mixture of well-graded aggregate, filler and anti-strip agent if required, and bituminous material.

The several aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF).

Table 2. Aggregate Bituminous Pavement

Sieve Size	12.5 mm mix* % passing by weight
1/2 inch (12 mm)	100
3/8 inch (9 mm)	79-99
No. 4 (4.75 mm)	58-78
No. 8 (2.36 mm)	39-59
No. 16 (1.18 mm)	26-46
No. 30 (0.60 mm)	19-35
No. 50 (0.30 mm)	12-24
No. 100 (0.15 mm)	7-17
No. 200 (0.075 mm)	3-6
Asphalt Percent	
Stone or gravel	5.5-8.0
Slag	7.0-10.5

*This mix is to be used only as a surface course. The minimum coarse thickness shall be one inch (25mm) and the maximum coarse thickness shall not exceed 2 inches (50 mm).

The aggregate gradations shown are based on aggregates of uniform specific gravity. The percentages passing the various sieves shall be corrected when aggregates of varying specific gravities are used, as indicated in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition.

601-3.3 Testing requirement for HMA resistance to fuel. Procedures for testing HMA resistance to fuel shall be as follows:

- a. Prepare three test specimens in accordance with the Mix Design requirements at optimum binder content and $2.5 \pm 0.7\%$ air voids.
- b. Determine the percent air voids in each specimen, if any do not meet the requirements above discard and replace them. Dry the specimens under a fan at room temperature $68^{\circ}\text{F} - 80^{\circ}\text{F}$ ($20^{\circ}\text{C} - 27^{\circ}\text{C}$) for a minimum of 24 hours.
- c. Totally immerse the sample in kerosene* at room temperature $68^{\circ}\text{F} - 80^{\circ}\text{F}$ ($20^{\circ}\text{C} - 27^{\circ}\text{C}$) for 2.0 minutes. (Suspending the sample with metal insect screen in a one gallon (4 liters) paint can has been found to be satisfactory.)
- d. After submersing for 2.0 minutes ± 30 sec, remove the sample and immediately surface dry it with a clean paper towel. Then immediately determine the weight in air to the nearest 0.1 grams. Report this as weight "A" (weight before).
- e. Resubmerge the sample in kerosene for 24 hours.
- f. After 24 hours ± 10 minutes carefully remove the sample from the kerosene and suspension container and place it on an absorptive cloth or paper towel. Dry the specimen under a fan at room temperature for 24 hours.

* Kerosene shall meet the requirements of Federal Specification VV-K-211.

g. After drying for 24 hours \pm 10 minutes weigh the sample in air to the nearest 0.1 grams. Report this as weight "B" (weight after immersion).

h. Calculations:

$$\% \text{ of weight loss by fuel immersion} = (A - B / A) \times 100$$

Where: A = Weight before

B = Weight after

Note: Plant production tolerances for air voids are 2.5% \pm 0.7% and flow requirements for this material are waived.

601-3.4 Recycled asphalt concrete. No reclaimed asphalt pavement (RAP) shall be permitted in this mix.

601-3.5 Test section. ~~Prior to full production, the Contractor shall~~ prepare and place a quantity of bituminous mixture according to the job mix formula. The amount of mixture should be sufficient to construct a test section 300 feet (90 m) long and 30 feet (9 m) wide placed in two lanes, with a longitudinal cold joint, and shall be of the same depth specified for the construction of the course which it represents. A cold joint is an exposed construction joint at least four (4) hours old or whose mat has cooled to less than 160°F (70°C). The underlying grade or pavement structure upon which the test section is to be constructed shall be the same as the remainder of the course represented by the test section. The equipment used in construction of the test section shall be the same type and weight to be used on the remainder of the course represented by the test section.

Three random samples shall be taken at the p

lant and tested for stability and air voids in accordance with paragraph 601-5.1a(2). Two random samples of mixture shall be taken at the plant and tested for aggregate gradation and asphalt content in accordance with paragraphs 601-6.3a and 3b and evaluated in accordance with paragraphs 601-6.5a and 5b. Three randomly selected cores shall be taken from the finished pavement mat, and three from the longitudinal joint, and tested in accordance with paragraph 601-5.1b(4). Random sampling shall be in accordance with procedures contained in ASTM D3665.

Mat density and air voids shall be evaluated in accordance with paragraph 601-5.2b(1). Stability shall be evaluated in accordance with paragraph 601-5.2b(2). Joint density shall be evaluated in accordance with paragraph 601-5.2b(3).

Voids in the mineral aggregate (VMA), for each plant sample, shall be computed in accordance with procedures contained in Asphalt Institute MS-2 Mix Design Manual, 7th Edition. The test section shall be considered acceptable if (1) stability, mat density, air voids, and joint density are 90% or more within limits, (2) gradation and asphalt content are within the action limits specified in paragraph 601-6.5a, and (3) the voids in the mineral aggregate is in accordance with Table 1, paragraph 601-3.2.