# Request for Proposal (RFP) – P-401 MIXTURES: AGGREGATE GRADATION BANDS

Re: P-401 MIXTURES: AGGREGATE GRADATION BANDS RFP – AIRPORT ASPHALT PAVEMENT TECHNOLOGY PROGRAM (AAPTP)

## I. BACKGROUND

As airfield traffic increases in volume, weight, and tire pressure, it is critical to ensure that asphalt pavements perform, meeting or exceeding their expected service life. Currently, the Federal Aviation Administration (FAA) has requirements for asphalt mixture gradations in Table 2 of the P-401 specification. The latest adjustments to the FAA Gradation 1, Gradation 2, and Gradation 3 bands were made in revision 10H of Advisory Circular 150/5370. The latest revision to the gradation bands changed the percent passing requirements to match the asphalt mixture gradation requirements in the Department of Defense United Facilities Guide Specifications which are provided in Section 32.12.15.13.

**Table 2. Aggregate - Asphalt Pavements**

| Sieve Size | Percentage by Weight Passing Sieves | | |
|---|---|---|---|
| | Gradation 1 | Gradation 2 | Gradation 3[1] |
| 1 inch (25.0 mm) | 100 | -- | -- |
| 3/4 inch (19.0 mm) | 90-100 | 100 | -- |
| 1/2 inch (12.5 mm) | 68-88 | 90-100 | 100 |
| 3/8 inch (9.5 mm) | 60-82 | 72-88 | 90-100 |
| No. 4 (4.75 mm) | 45-67 | 53-73 | 58-78 |
| No. 8 (2.36 mm) | 32-54 | 38-60 | 40-60 |
| No. 16 (1.18 mm) | 22-44 | 26-48 | 28-48 |
| No. 30 (600 µm) | 15-35 | 18-38 | 18-38 |
| No. 50 (300 µm) | 9-25 | 11-27 | 11-27 |
| No. 100 (150 µm) | 6-18 | 6-18 | 6-18 |
| No. 200 (75 µm) | 3-6 | 3-6 | 3-6 |
| Minimum Voids in Mineral Aggregate (VMA) | 14.0 | 15.0 | 16.0 |
| Asphalt percent by total weight of mixture: | | | |
| Stone or gravel | 4.5-7.0 | 5.0-7.5 | 5.5-8.0 |
| Slag | 5.0-7.5 | 6.5-9.5 | 7.0-10.5 |
| Recommended Minimum Construction Lift Thickness | 3 inch | 2 inch | 1 1/2 inch |

[1] Gradation 3 is intended for leveling courses. FAA approval is required for use in other locations.

ASPHALT.
AMERICA RIDES ON US.

6406 IVY LANE, STE. 350
GREENBELT, MD 20770

Toll Free 888.468.6499
Phone 301.731.4748
Fax 301.731.4621

AsphaltPavement.org
NAPA@AsphaltPavement.org

While the latest adjustment mainly shifted the gradation bands finer, the allowable ranges remain more restrictive than control points for similar Nominal Maximum Aggregate Size mixes within the Superpave Mix Design methodologies.

| Sieve Size | Percentage by Weight Passing Sieves | | |
|---|---|---|---|
| | 19.0mm | 12.5mm | 9.5mm |
| 1 inch (25.0mm) | 100 | | |
| 3/4 inch (19.0mm) | 90 - 100 | 100 | |
| 1/2 inch (12.5mm) | 90 max. | 90 - 100 | 100 |
| 3/8 inch (9.5mm) | | 90 max. | 90 - 100 |
| No. 4 (4.75mm) | | | 90 max. |
| No.8 (2.36mm) | 23 - 49 | 28 - 58 | 32 - 67 |
| No.16 (1.18mm) | | | |
| No.30 (600µm) | | | |
| No.50 (300µm) | | | |
| No.100 (150µm) | | | |
| No.200 (75µm) | 2.0 - 8.0 | 2.0 - 10.0 | 2.0 - 10.0 |

As the evolution of asphalt mixture design continues to advance, the opportunity to engineer asphalt mixtures to meet facility demands is paramount. Ensuring the gradation bands requirements are allowing asphalt mix designers to produce the best performing, most economical, and lowest carbon footprint solutions will safeguard airfield pavements into the future.

## II. OBJECTIVE

The outcome of this project will be to ensure that the FAA has recommended gradation band requirements based on how mixture gradation is related to lab mix performance. The recommended gradation band requirements should be the least restrictive allowable while maintaining the performance expectation for P-401 specified FAA mixtures. The recommended gradation band adjustments are not expected to impact other P-401 mixture property requirements. The research findings may include necessary adjustments to mix property requirements beyond gradation provided those adjustments will not negatively impact asphalt mixture performance. The recommended gradation band requirements should focus on critical sieves and provide ranges that allow mix designers to use the most cost effective and environmentally friendly resources possible without pavement quality concerns related to mixture gradation. The project will develop resources for mix designers to evaluate mixture gradation and the impacts on mixture performance within the recommended gradation bands. A process and procedure that ensures asphalt mixture performance, but allows for modification of aggregate gradation requirements on a regional basis will be included with the new gradation band requirements.

## III. PROJECT SCOPE

The project will establish recommended gradation bands for Gradation 1, Gradation 2, and Gradation 3 for FAA mixtures accounting for laboratory mixture performance

modes of rutting, top-down cracking, low-temperature cracking, and moisture susceptibility. The study will develop the new aggregate gradation requirement recommendations with the goal of providing the least restrictive gradation bands possible while maintaining the mixture performance expected by the FAA. The project will develop an experimental plan which will include a sufficient number of mixtures to cover all regions of the United States as well as different types of aggregates, and the traffic and size ranges of airfield facilities that utilize the FAA P-401 specified pavements.

## IV. PROJECT REQUIREMENTS

The proposal will include a project schedule which identifies completion of all key activities as well as completion of the following project deliverables:

- Virtual Project Kick-Off Meeting
- Quarterly Progress Reports & Virtual Meetings
- Technical Report
- Draft Specification(s) and Engineer Notes
- Webinar Detailing Project Findings

Project final products must be 508 compliant.

**AVAILABLE FUNDS:** $1,000,000

**CONTRACT PERIOD:** 24 Months

## V. PROPOSAL SUBMISSION

Submissions should include the project team, budget, and project schedule in the proposal. Proposals should be a maximum of 15 pages (not including the title page, budget, project team CVs, and project schedule), with minimum 11pt font, standard margins, and in adobe PDF file format. Proposals should be sent via email to Brett Williams, Director of Engineering & Technical Support, at bwilliams@asphaltpavement.org by October 21, 2022. Please include the Re: P-401 MIXTURES: AGGREGATE GRADATION BANDS RFP -- AIRPORT ASPHALT PAVEMENT TECHNOLOGY PROGRAM (AAPTP) in the subject line of your email.