| | |
|---|---|
| Black text – from standard FAA spec | Blue text – additions to FAA standard spec |
| ~~Strikeout text~~ – deletions from FAA standard spec | Red text – notes to the Engineer/won't appear in spec |

## I. DESCRIPTION

A. GRANULAR SUBBASE
1. on prepared subgrade
2. To dimensions, lines and grades, on plans

B. MATERIAL MAY BE:
1. P-154 Aggregate Subbase
2. Processed Miscellaneous Base (PMB)

## II. FAA ITEM P-154

A. MATERIALS
1. Hard, durable
2. May be mixed or blended with fines
3. Capable of being compacted into dense, stable subbase
4. Free of organics, lumps, excessive foreign material
5. Pit-run acceptable if spec is met.
6. Quality Requirements
   a) Gradation per Table 1:

**TABLE 1 GRADATION REQUIREMENTS**

| SIEVE DESIGNATION (SQUARE OPENINGS) PER ASTM C 136 AND ASTM D 422 | PERCENTAGE BY WEIGHT PASSING SIEVES |
|---|---|
| 3 inch (75.0 mm) | 100 |
| No. 10 (2.0 mm) | 20-100 |
| No. 40 (0.450 mm) | 5-60 |
| No. 200 (0.075 mm) | 0-8 |

   b) Other Requirements:
      (1) Atterberg limits:
         (a) For Portion passing No. 40:
            (i) LL not more than 25
            (ii) PI not more than 6
            (iii) as tested by ASTM D 4318
      (2) Max material finer than 0.02 mm: 3%
7. Testing Frequencies:
   a) Particle size distribution:
      (1) Preliminary
      (2) Once per day during construction

B. CONSTRUCTION METHODS
1. General
   a) Subbase to be shaped and compacted within specified tolerances
   b) If not sufficiently stable, Contractor shall add fine-grained material to bind.
      (1) Shall be sufficient so that subbase stable under construction traffic.
      (2) Addition shall not increase soil constants above the limits specified
2. Operation in Pits

a) Operations in pits at Contractor's expense.
b) Product from pits shall be uniform and in conformance with this section.

3. Preparing Underlying Course
   a) Engineer to approve condition of underlying course prior to placing subbase
4. To protect drainage begin placement at crown, or high side of pavement structure
5. Materials Acceptance in Existing Condition
   a) May be obtained from pits, stockpiles or crushing plant
   b) Intent is that no further mixing will be required on grade.
   c) Shall be placed on grade in:
      (1) uniform condition
      (2) containing approximately correct moisture
         (a) minor moisture deficiency/excess can be correctly be sprinkling/aeration.
      (3) conforming to gradation, quality and consistency requirements
      (4) not requiring further mixing
   d) Final operation to be blading/dragging to obtain
      (1) uniform surface
      (2) true to line and grade

6. Plant Mixing
   a) General
      (1) If necessary to mix materials, shall be done at:
         (a) central plant
         (b) traveling mixing plant
      (2) Mixed with proper amount of water
      (3) Transport to grade without undue loss of moisture
   b) [OPTIONAL: Mixed in Place
      (1) If mixing in place approved, ~~Engineer to designate relative components~~ Contractor to determine proportions necessary to meet spec.
      (2) Deposit material on grade, followed by binder or filler
      (3) As many layers ~~as the Engineer may direct~~ as the Contractor deems necessary to meet the requirements of this section.
      (4) Mix with necessary equipment until thoroughly mixed
         (a) Correct segregated areas
         (b) Add necessary moisture ~~as directed by the Engineer.~~
      (5) Shape and compact to meet:
         (a) density requirements
         (b) thickness
         (c) grade]
7. General Methods for Placing
   a) Construct in layers
      (1) 3" to 8 " in thickness
      (2) deposit and spread evenly
         (a) uniform thickness
         (b) uniform width
      (3) Spread no more than 2,000 square yards ahead of rolling.
         (a) Sprinkling to be kept within this limit
   b) If multiple layers required, requirements herein shall apply similarly to each layer.
   c) Caution shall be exercised to prevent incorporation of subgrade, shoulder, foreign material
8. Finishing and Compacting

a) After spreading, thoroughly compact by rolling and sprinkling, if necessary.
b) Provide sufficient rollers to compact material to specified density.
c) Compact to:
    (1) 100% maximum density in accordance with:
        (a) If more than 30% retained on ¾ sieve:
            (i) AASHTO T-99
            (ii) AASHTO T-180
        (b) ASTM D 1557 (>60,00# aircraft)
        (c) ASTM D 698 (< 60,000 # aircraft)
    (2) In place density per:
        (a) ASTM D 1556
        (b) ASTM D2922
    (3) At moisture content within +/- 2% optimum
        (a) If material is too free-draining to retain optimum moisture, may make field-determination of proper compaction moisture content.
    (4) Testing frequency:
        (a) Before and after compaction
        (b) Every 1,000 cubic yards
    (5) If nuclear density gauges allowed, refer to Section [ ] of these Specifications, Nuclear Gauges.
d) If soft, yielding, undulations > ½ inch in 16 feet:
    (1) loosen surface
    (2) refill and recompact
e) Areas inaccessible to rollers may be compacted with mechanical/hand tampers.
f) When sprinkling, do to allow manner/quantity of free water to reach underlying course.

9. Surface Test – After compaction test for:
    a) Smoothness
        (1) ½ inch in 16-ft
        (2) parallel and perpendicular to centerline
    b) Accuracy of grade and crown
    c) Scarify, reshape, recompact if not accepted
10. Thickness.
    a) Determine by:
        (1) depth tests or cores
            (a) Every 500 square yards or less
            (b) Deficiency more than ½ inch:
                (i) Correct by scarify, rework, recompact
            (c) Contractor to repair core holes at his own expense.
        (2) Survey
11. Protection
    a) Subbase work not allowed on:
        (1) wet subgrade
        (2) frozen subgrade
12. Maintenance
    a) Contractor shall maintain completed sections with standard motor graders rollers until:
        (1) accepted
        (2) next course ready to be placed

## III. PROCESSED MISCELLANEOUS BASE (PMB)

A. GENERAL
1. In lieu of P-154 if approved by the Engineer
2. PMB material shall conform to Greenbook Section 200-2.5 – Processed Miscellaneous Base.
3. Construction methods shall be as per P-154, above.
4. When noted in the plans as acceptable, PMB may be:
   a) Contractor-provided
   b) Contractor-produced from job-site demolition products
      (1) may be produced on site from crushing [concrete][and][or][and/or][asphalt] pavement.
      (2) See Section 14 – Removals
      (3) Crushing paid under Section [ ] of these specifications, Removals.

B. [OPTIONAL: PMB FOR HAUL ROADS:
1. Contractor to stake alignment which eliminates conflicts with:
   a) lights
   b) signs
   c) drainage structures
   d) other airfield structures and utilities
2. Alignment to be approved by the Engineer prior to placement of PMB
3. Contractor to maintain haul roads throughout project.]

## IV. SUBMITTAL REQUIREMENTS

A. MATERIAL QUALITY

## V. METHOD OF MEASUREMENT

A. P-154 OR PMB
1. Per [Cubic Yard] or [Square Yard] placed of type specified – placed, compacted and accepted
2. Cubic yard quantity measured in final position based on either:
   a) depth tests/cores - 1 test per 500 sq yds
      (1) Thickness tests more than ½ inch in excess of plan thickness shall be computed and paid as plan thickness + ½ inch.
   b) Average end area method – computed to nearest 0.01 ft.
3. Subbase quantities not to be included in other excavation quantities.

## VI. BASIS OF PAYMENT

A. PAID AT CONTRACT UNIT PRICE UNDER ITEM NUMBER:
1. 25.1 Granular Subbase P-154 - per [cubic yard][square yard]
2. 25.2 Processed Miscellaneous Base (PMB) - per [cubic yard][square yard]
3. Includes all: material, preparation, hauling, placing, labor, equipment, tools, incidentals
4. Crushing on-site materials for PMB paid under Section [ ] of these specifications, Removals.
5. No separate payment for work in areas of night or limited-time construction area.

## VII. TESTING REQUIREMENTS

A. ASTM C 136 SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES
B. ASTM D 422 PARTICLE SIZE ANALYSIS OF SOILS

C. ASTM D 698 MOISTURE-DENSITY RELATIONS OF SOILS AND SOIL-AGGREGATE MIXTURES USING 5.5 LB (2.49 KG) RAMMER AND 12-IN (305 MM) DROP
D. ASTM D 1556 DENSITY OF SOIL IN PLACE BY THE SAND-CONE METHOD
E. ASTM D 1557 TEST FOR LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING MODIFIED EFFORT
F. ASTM D 2922 DENSITY OF SOIL IN PLACE BY THE NUCLEAR DENSITY METHOD
G. ASTM D 4318 LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS

**VIII. END OF SECTION 25**