

Item 8007

Flexible Base (Materials)



1. DESCRIPTION

Provide flexible base materials of uniform quality that meet the requirements of the specifications.

2. MATERIALS

Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications. Notify the Engineer of the proposed material sources and of changes to material sources. The Engineer may sample and test project materials at any time before compaction throughout the duration of the project to assure specification compliance. Use [Tex-100-E](#) material definitions.

- 2.1. **Aggregate.** Furnish aggregate of the type and grade shown on the plans and meeting the requirements of Table 1. Each source must meet Table 1 requirements for liquid limit, plasticity index, and wet ball mill for the grade specified. Do not use additives, such as but not limited to lime, cement, or fly ash to modify aggregates to meet the requirements of Table 1 unless shown on the plans.

Table 1
Material Requirements

Property	Test Method	Grade 1-2	Grade 3	Grade 4 ₂	Grade 5
Sampling	Tex-400-A				
Master gradation sieve size (cumulative % retained)	Tex-110-E			As shown on the plans	
2-1/2"		0	0		0
1-3/4"		0-10	0-10		0-5
7/8"		10-35	-		10-35
3/8"		30-65	-		35-65
#4		45-75	45-75		45-75
#40		65-90	50-85		70-90
Liquid Limit, % Max	Tex-104-E	40	40	As shown on the plans	35
Plasticity Index, Max ₁	Tex-106-E	10	12	As shown on the plans	10
Plasticity index, Min ₁		As shown on the plans	As shown on the plans	As shown on the plans	As shown on the plans
Wet ball mill, % Max	Tex-116-E	40	-	As shown on the plans	40
Wet ball mill, % Max increase passing the #40 sieve		20	-	As shown on the plans	20
Min compressive strength, psi	Tex-117-E			As shown on the plans	
lateral pressure 0 psi		35	-		-
lateral pressure 3 psi		-	-		90
lateral pressure 15 psi		175	-		175

- Determine plastic index in accordance with [Tex-107-E](#) (linear shrinkage) when liquid limit is unattainable as defined in [Tex-104-E](#).
- Grade 4 may be further designated as Grade 4A, Grade 4B, etc.

- 2.1.1. **Material Tolerances.** The Engineer may accept material if no more than 1 of the 5 most recent gradation tests has an individual sieve outside the specified limits of the gradation.
- When target grading is required by the plans, no single failing test may exceed the master grading by more than 5 percentage points on sieves No. 4 and larger or 3 percentage points on sieves smaller than No. 4.
- The Engineer may accept material if no more than 1 of the 5 most recent plasticity index tests is outside the specified limit. No single failing test may exceed the allowable limit by more than 2 points.
- 2.1.2. **Material Types.** Do not use fillers or binders unless approved. Furnish the type specified on the plans in accordance with the following:
- 2.1.2.1 **Type A.** Crushed stone produced and graded from oversize quarried aggregate that originates from a single, naturally occurring source. Do not use gravel or multiple sources.
- 2.1.2.2. **Type B.** Crushed or uncrushed gravel. Blending of 2 or more sources is allowed.
- 2.1.2.3. **Type C.** Crushed gravel with a minimum of 60% of the particles retained on a No. 4 sieve with 2 or more crushed faces as determined by [Tex-460-A](#), Part I. Blending of 2 or more sources is allowed.
- 2.1.2.4. **Type D.** Type A material or crushed concrete. Crushed concrete containing gravel will be considered Type D material. Crushed concrete must meet the requirements in Section 8247.2.1.3.2., "Recycled Material (Including Crushed Concrete) Requirements," and be managed in a way to provide for uniform quality. The Engineer may require separate dedicated stockpiles to verify compliance.
- 2.1.2.5. **Type E.** Caliche, iron ore or as otherwise shown on the plans.
- 2.1.3. **Recycled Material.** Reclaimed asphalt pavement (RAP) and other recycled materials may be used when shown on the plans. Request approval to blend 2 or more sources of recycled materials.
- 2.1.3.1. **Limits on Percentage.** Do not exceed 20% RAP by weight, when RAP is allowed, unless otherwise shown on the plans. The percentage limitations for other recycled materials will be as shown on the plans.
- 2.1.3.2. **Recycled Material (Including Crushed Concrete) Requirements.**
- 2.1.3.2.1. **Contractor-Furnished Recycled Materials.** Provide recycled materials, other than RAP, that have a maximum sulfate content of 3,000 ppm when tested in accordance with [Tex-145-E](#). When the Contractor furnishes the recycled materials, including crushed concrete, the final product will be subject to the requirements of Table 1 for the grade specified. Certify compliance with [DMS-11000](#), "Evaluating and Using Nonhazardous Recyclable Materials Guidelines," for Contractor furnished recycled materials. In addition, recycled materials must be free from reinforcing steel and other objectionable material and have at most 1.5% deleterious material when tested in accordance with

[Tex-413-A](#). For RAP, do not exceed a maximum percent loss from decantation of 5.0% when tested in accordance with [Tex-406-A](#). Test RAP without removing the asphalt.

- 2.1.3.2.2. **Allowed Recycled Materials.** When the Department allows the use of recycled materials or allows the Contractor to furnish recycled materials, the final blended product is subject to the requirements of Table 1 and the plans.
- 2.1.3.3. **Recycled Material Sources.** The use of Contractor-owned recycled materials is allowed when shown on the plans. Contractor-owned surplus recycled materials remain the property of the Contractor. Remove Contractor-owned recycled materials from the project and dispose of them in accordance with federal, state, and local regulations before project acceptance. Do not intermingle Contractor-owned recycled material with Department-owned recycled material unless approved.
- 2.2. **Material Sources.** Expose the vertical faces of all strata of material proposed for use when non-commercial sources are used. Secure and process the material by successive vertical cuts extending through all exposed strata, when directed.
- 2.3. **Certification.** Personnel certified by the Department-approved soils and base certification program must conduct all sampling and laboratory testing required by the following:
- Section 2.1, "Aggregate," and
 - Section 2.1.3.2, "Recycled Material (Including Crushed Concrete) Requirements."
- Supply the Engineer with a list of certified personnel and copies of their current certificates before any sampling and laboratory testing is performed and when personnel changes are made. At any time during the project, the Engineer may perform production tests as deemed necessary in accordance with Item 5, "Control of the Work."
- 2.4. **Reporting and Responsibilities.** Use Department-provided templates to record and calculate all test data. Obtain the current version of the templates at <http://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/forms/site-manager.html> or from the Engineer. The Engineer and the supplier will provide any available test results to the other party when requested. Record and electronically submit all test results and pertinent information on Department-provided templates.
- 2.5. **Sampling.** The Engineer will sample flexible base from stockpiles located at the production site in accordance with [Tex-400-A](#), Section 5.3. The Engineer will label the containers sampled for the Engineer, supplier, and the Materials & Tests Division (MTD) referee laboratory. Witness the sampling and take immediate possession of the sample containers labeled for the supplier. The Engineer will maintain custody of the samples labeled for the Engineer and MTD until testing and reporting is completed.

2.6

Referee Testing. MTD is the referee laboratory. The supplier may request referee testing when the Engineer's test results fail to meet any of the material requirements listed in Table 1. Make the request via email within 5 working days after receiving test results from the Engineer. Submit test reports signed and sealed by a licensed professional engineer from a commercial laboratory listed on the Department's Material Producer List (MPL) of laboratories approved to perform compaction and triaxial compression testing located at <http://ftp.dot.state.tx.us/pub/txdot-info/cmd/mpl/complabs.pdf>. Submit completed test reports electronically on Department-provided templates in their original format. The referee laboratory will report test results to the Engineer within the allowable number of working days listed in Table 2 from the time the referee laboratory receives the samples. It is at the discretion of the Engineer or the referee laboratory to deny a referee request upon review of the test reports provided by the supplier.

Table 2
Number of Allowable Working Days to Report Referee Test Results

Material Property	Test Method	Working Days
Gradation	Tex-110-E, Part I	5
Liquid Limit (Multi-Point Method)	Tex-104-E, Part I	5
Plasticity Index	Tex-106-E	5
Wet Ball Mill Value	Tex-116-E, Parts I and II	5
Wet Ball Mill, % Increase passing #40 sieve		
Compressive Strength ¹	Tex-117-E, Part II	6
Compressive Strength ²	Tex-117-E	12

1. Moisture-Density curve provided by the District
2. Moisture-Density curve determined by the referee laboratory

3. EQUIPMENT

Provide machinery, tools, and equipment necessary for proper execution of the work.

4. MEASUREMENT

Flexible base will be measured as follows:

- **Flexible Base (Site Delivery).** The ton or any cubic yard method.
- **Flexible Base (Vehicle Pickup).** The ton or cubic yard in vehicle method.

- 4.1 **Cubic Yard in Vehicle.** By the cubic yard in vehicles of uniform capacity at the point of delivery.
- 4.2 **Cubic Yard in Drop Off.** By the cubic yard in the final drop off position by the method of average end areas. The Department will stockpile materials for measurement.
- 4.3 **Ton.** By the ton of dry weight in vehicles as delivered or picked up. The dry weight is determined by deducting the weight by deducting the moisture in the material at the time of the weighing from the gross weight of the material. The Engineer will determine the moisture content in the material in accordance with Tex-103-E from samples taken at the time of weighing.

When material is measured in trucks, the weight of the material will be determined on certified scales, or the Contractor must provide a set of standard platform truck scales at a location approved by the Engineer. Scales must conform to the requirements of Item 520, "Weighing and Measuring Equipment."

5. **PAYMENT**

The materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for the types shown below.

- 5.1 **Flexible Base (Site Delivery).** Payment will be made for the type and grade specified. For cubic yard measurement, "In Vehicle" or "Drop Off" will be specified. This price is full compensation for furnishing materials, assistance provided in sampling, loading, hauling, delivery of materials, furnishing scales and labor for weighing and measuring, and equipment, labor, tools, and incidentals. If bid codes in the estimate indicate location numbers, each location will be shown in the plans.
- 5.2 **Flexible Base (Vehicle Pickup).** Payment will be made for the type and grade specified. For cubic yard measurement, "In Vehicle" is required. This price is full compensation for furnishing materials, assistance provided in sampling, loading, furnishing scales and labor for weighing and measuring, and equipment, labor, tools, and incidentals.