



HYDRATED CFB BYPRODUCT AGGREGATE BASE COURSE

107.1 DESCRIPTION:

The work specified in this specification consists of the construction of a base course composed of hydrated Circulating Fluidized Bed (CFB) byproduct aggregate material called EZBase. It shall be constructed on the prepared subgrade, in accordance with these specifications and in conformity with the lines, grades, notes and typical cross sections shown in the plans.

107.2 MATERIALS:

Material shall consist of EZBase. The Contractor may use more than one source of base material on a single Contract provided that a single source is used throughout the entire width and depth of a section of base. Obtain approval from the Engineer before placing material from more than one source. Place material to ensure total thickness single source integrity at any station location of the base. The producer shall perform and maintain documentation of the following tests. This documentation shall be made available at any time by request:

Available Lime Index (ALI) per ASTM C25, Section 28. Testing performed on the EZBase shall demonstrate no less than 10% available lime (wet weight basis).

Free Moisture per ASTM C 566 (AASHTO T255). In addition, a modified oven temperature shall be used with this test, 140° F (60° C) in lieu of the standard 230±9° F (110±5° C). Note: CEM Smart System5 microwave moisture content gauge may also be used for QA/QC testing of truck samples obtained at the EZBase processing facility.

Atterburg Limits (ASTM D4318, AASHTO T-89 and T-90). The material shall be classified as non-plastic.

Limerock Bearing Ratio (FM 5-515). The material shall have an average LBR of not less than 100, with no individual LBR test result less than 90.

Modified Proctor Moisture Density Relationship (ASTM D-1557, AASHTO T-180). Again, it is noted that the oven temperature shall be maintained at or below 140° F (60° C) in lieu of the standard 230±9° F (110±5° C) for the determination of moisture content.

The Available Lime Index (ALI), Atterberg limits, Limestone bearing ratio, and the Modified Proctor moisture density relationship will be performed monthly by the producer. The material tested will be obtained from a random sample taken from normal new production material.

107.3 CONTRACTOR TRAINING:

EZBase has unique characteristics when compared to traditional construction base materials. Contractor training and/or certification are required prior to applying the material. Such training will be provided at no cost to the contractor during a mandatory pre-construction conference.

107.4 BEST MANAGEMENT PRACTICES (BMP):

Best Management Practices (BMP) are referred to throughout this specification. The human health and environmental impact of EZBase has been determined to be similar to that of traditional construction materials. Standard BMP's for construction should be utilized. The National Pollutant Elimination Discharge System (NPDES) is the appropriate resource for BMP's. Florida Department of Environmental Protection (FDEP) NPDES rules applicable to construction may be referenced on-line at <http://www.dep.state.fl.us/water/stormwater/npdes/>

107.5 ENVIRONMENTAL CONSIDERATIONS:

EZBase is to be separated from ground and surface waters. A six inch (6") separation from the seasonal high water table is recommended. Standard BMP's shall be used to minimize release of fugitive dust or stormwater runoff from staged or uncompacted material. Measures should also be taken to minimize deposition of material into ditches or swales when spreading or from staged material.

107.6 HEALTH CONSIDERATIONS:

BMP's should also be utilized to avoid excessive inhalation of dust or continuous contact with skin.

107.7 EQUIPMENT:

Use mechanical aggregate spreaders, equipped with a device that strikes off the EZBase into a uniform thickness and is capable of producing even distribution. For crossovers, intersections, ramp areas, roadway widths of 20 feet or less, main roadway areas when forms are used, and any other areas where the use of a mechanical spreader is not practicable, the Contractor may spread the EZBase using bulldozers or blade graders.

107.8 TRANSPORTING MATERIAL:

EZBase shall be transported in sufficiently tarped vehicles to minimize release of fugitive dust. When practicable, transport the EZBase to its point of use, over base previously placed and dump it on the end of the preceding spread. Hauling and dumping on the subgrade will be permitted only when the Engineer deems these operations will not be detrimental to the subgrade.

107.9 STOCKPILING/STAGING MATERIAL:

EZBase is specified to be used “on-demand” and not stockpiled. Staged material should be at a sufficient quantity to support the project and not stockpiled for extended periods of time. Staged material that has remained untouched for over four weeks should be removed and replaced when needed.

107.10 SPREADING MATERIAL:

107.10.1 METHOD OF SPREADING:

The material shall be spread uniformly, with equipment as previously specified. All segregated areas shall be removed and replaced with properly graded material.

107.10.2 NUMBER OF COURSES:

When the specified compacted thickness of the base is greater than six (6) inches, construct the base in multiple courses of equal thickness. Individual courses shall not be less than three (3) inches. The thickness of the first course may be increased to bear the weight of the construction equipment without disturbing the subgrade.

107.10.3 BASE FOR SHOULDER PAVEMENT:

In abnormal conditions and when deemed permissible by the Engineer, all operations of constructing base for shoulder construction at any particular location shall be done prior to the placing of the final course of pavement on the traveled roadway. In the construction of base on the shoulders, the Contractor shall assure that the dumping of the material shall be at such points and in such a manner, that no significant material is allowed on the adjacent pavement, to scar or contaminate the pavement surface. Any material which is deposited on the surface course for any reason shall be immediately swept off.

107.11 COMPACTING AND FINISHING BASE:

107.11.1 GENERAL

EZBase should not be used to displace water on the job site as this practice may negatively affect the curing process and performance properties. Material should be compacted as it is applied. Uncompacted material should not be subjected to water. If the EZBase becomes submerged during construction, such as inside curb/gutter, the excess water shall be removed and the base material shall be dry before continuing construction. EZBase will perform without difficulty in light to moderate rain while being installed. However, it is suggested that the installation be rescheduled if heavy rain is expected during the planned installation time.

Spread the EZBase uniformly. Remove all segregated areas of fine or coarse material and replace them with properly graded material.

When the specified compacted thickness of the base is greater than 6 inches, construct the base in multiple courses of equal thickness. Individual courses shall not be less than 3 inches. The thickness of the first course may be increased to bear the weight of the construction equipment without disturbing the subgrade.

If, through field tests, the Contractor can demonstrate that the compaction equipment can achieve density for the full depth of a thicker lift, and if approved by the Engineer, the base may be constructed in successive courses of not more than 8 inches compacted thickness.

The Engineer will base approval on results of a test section constructed using the Contractor's specified compaction effort. Notify the Engineer prior to beginning construction of a test section.

107.11.2 SINGLE-COURSE BASE:

After spreading, scarify the entire surface, then shape the base to produce the required grade and cross-section, free of scabs and laminations, after compaction.

107.11.3 MULTIPLE-COURSE BASE:

Clean the first course of foreign material, then blade and bring it to a surface cross-section approximately parallel to the finished base. Before spreading any material for the upper courses, allow the Engineer to make density tests for the lower courses to determine that the required compaction has been obtained. After spreading the material for the top

course, scarify finish and shape its surface to produce the required grade and cross-section, free of scabs and laminations, after compaction.

107.11.4 **MOISTURE CONTENT:**

When the material does not have the proper moisture content to ensure the required density, wet or dry it as required. When adding water, uniformly mix it in to the full depth of the course that is being compacted. During wetting or drying operations, manipulate, as a unit, the entire width and depth of the course that is being compacted. Note: field moisture content must be calibrated to and verified with the moisture content determined in the laboratory in accordance with ASTM C 566 (AASHTO T255) and using a modified oven temperature of no more than 140° F (60° C) in lieu of the standard 230±9° F (110±5° C).

107.12 DENSITY REQUIREMENTS:

As soon as proper conditions of moisture are attained, the material shall be compacted to a density not less than 96% of the maximum dry density as determined by AASHTO T180. In-place density may be performed in accordance with ASTM D 2922. In-place moisture content shall be tested using Florida DOT Method FM-5-507, "Determination of Moisture Content by Means of a Calcium Carbide Gas Pressure Moisture Tester (Speedy Moisture Method), or other alternative methods approved by the Engineer. Note: field moisture content must be calibrated to and verified with the moisture content determined in the laboratory in accordance with ASTM C 566 (AASHTO T255) and using a modified oven temperature of no more than 140° F (60° C) in lieu of the standard 230±9° F (110±5° C). The minimum density which will be acceptable at any location outside the traveled roadway (such as intersections, crossovers, turnouts, etc.) shall be 93% of such maximum. Base for shoulder pavement shall be compacted to a density not less than 93% of the maximum density determined by AASHTO T180.

107.13 DENSITY TEST:

At least three density determinations shall be made on each day's final compaction operations on each course, and the density determinations shall be made at more frequent intervals if deemed necessary by the Engineer. During the final compacting operations, if blading of any areas is necessary to obtain the true grade and cross section, the compacting operations for such areas shall be completed prior to making the density tests on the finished base.

107.13 FINISHED PROJECT:

At the close of the project all staged material and any material that has deposited in areas outside the base application should be removed and properly stored for future projects.

107.14 CORRECTION OF DEFECTS:

107.14.1 CONTAMINATION OF BASE MATERIAL:

If, at any time, the subgrade material becomes mixed with the base course material, dig out and remove the mixture, and reshape and compact the subgrade. Then replace the materials removed with clean base material, and shape and compact as specified above.

107.14.2 CRACKS AND CHECKS:

If cracks or checks appear in the base before or after priming, and it's of the Engineer's opinion these would impair the structural efficiency of the base, the Contractor shall remove the cracks or checks by re-scarifying, reshaping, adding base material where necessary, and re-compacting as specified above.

107.14.3 COMPACTION OF WIDENING STRIPS:

For hydrated CFB byproduct aggregate base widening strips, where the trench width is not sufficient to permit the use of standard compaction equipment, compaction levels shall be to the extent directed by the Engineer and shall be obtained by compactors, trench rollers, or other rolling equipment approved by the Engineer. If so required by the Engineer in order to obtain adequate compaction, the hauling trucks or other pneumatic-tired rolling equipment may be used to aid in the compaction operations. Use of loaded hauling trucks shall not be allowed until the widened section has reached the elevation of the existing pavement surface.

107.15 TESTING SURFACE:

The finished surface of the base course shall be checked with a template cut to the required crown with a fifteen (15) foot straight-edge laid parallel to the center line of the road. All irregularities greater than ¼ inch shall be corrected by scarifying and removing or adding material as required, after which the entire area shall be re-compacted as specified hereinbefore. In the testing of the surface, the measurements will not be taken in small holes caused by individual pieces of material having been pulled out by the grader.

107.16 PRIMING AND MAINTAINING:

107.16.1 PRIMING:

An asphaltic primer, as approved by the Engineer shall be applied to the top surface of the base. The prime coat shall be applied only when the base meets the specified density requirements and the moisture content in the top half of the base does not exceed 90% of the optimum moisture of the base material. At the time of priming, the base shall be firm, unyielding and in such condition that no undue distortion will occur.

107.16.2 MAINTAINING:

The Contractor will be responsible for assuring that the true crown and template are maintained, with no rutting or other distortion, and that the base meets all the requirements at the time the surface course is applied.

107.17 THICKNESS REQUIREMENTS:

107.17.1 MEASUREMENTS:

Thickness of the base shall be measured at intervals of no more than 200 feet. Measurements shall be taken at various points on the cross section, through holes no less than three (3) inches in diameter.

107.17.2 AREAS REQUIRING CORRECTION:

Where the compacted base is deficient by more than 1/4 inch from the thickness called for in the Plans, the contractor shall correct such areas by scarifying and adding material. The base shall be scarified and material added to a distance of 100 feet in each direction from the edge of the deficient area. The affected areas shall then be brought to the required state of compaction and to the required thickness and cross section.

107.18 AUTHORIZED VARIABLE THICKNESS BASE:

Where the base is constructed to a compacted thickness other than the normal thickness as on a typical section in the Plans; as called for on the Plans or ordered by the Engineer for providing transitions to connecting pavements; the volume of such authorized variable thickness compacted base shall be calculated from authorized lines and grades, or by other methods selected by the Engineer, and shall be converted to equivalent square yards of normal thickness base for payment.

107.19 BASIS OF PAYMENT:

The quantity of hydrated EZBase, determined as provided above, shall be paid for at the contract unit price per square yard for hydrated CFB byproduct aggregate base course, completed and accepted. Such price and payment shall be full compensation for all work specified in this Section, including correcting all defective surface and deficient thickness. The cost of removing cracks and checks, including additional hydrated EZBase required for such crack elimination, shall not be paid for separately but shall be included in the contract unit price per square yard for the base.