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USACE / NAVFAC / AFCEC / NASA **UFGS-32 11 36.13 (April 2006)**

Preparing Activity: NAVFAC **Replacing without change UFGS-02712 (August 2004)**

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated April 2014
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DIVISION 32 - EXTERIOR IMPROVEMENTS

SECTION 32 11 36.13

LEAN CONCRETE BASE COURSE

04/06

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SECTION 32 11 36.13

LEAN CONCRETE BASE COURSE
04/06

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NOTE: This guide specification covers the requirements for econocrete base course for portland cement concrete pavement.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable items(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).
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NOTE: Econocrete is composed of a lean concrete mix and is not recommended for use in flexible pavement structures. Some paragraphs may need to be supplemented or modified to meet the project requirements. The extent of the work to be accomplished should be indicated on the project drawings or included in the project specifications.
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NOTE: On the drawings, show:

1. Paving Plan, showing horizontal dimensions; locations with respect to existing structures; and new and existing ground contours.

2. Sections of pavement structures showing thicknesses and details.

3. Location and character of all joints.

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PART 1 GENERAL

1.1 REFERENCES

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NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)

ACI 304R	(2000; R 2009) Guide for Measuring, Mixing, Transporting, and Placing Concrete
ACI 305R	(2010) Guide to Hot Weather Concreting
ACI 306R	(2010) Guide to Cold Weather Concreting

ASTM INTERNATIONAL (ASTM)

ASTM C136	(2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C138/C138M	(2013a) Standard Test Method for Density ("Unit Weight"), Yield, and Air Content (Gravimetric) of Concrete
ASTM C143/C143M	(2012) Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150/C150M	(2012) Standard Specification for Portland Cement
ASTM C171	(2007) Standard Specification for Sheet Materials for Curing Concrete

ASTM C172/C172M	(2010) Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173/C173M	(2012) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C174/C174M	(2013) Standard Test Method for Measuring Thickness of Concrete Elements Using Drilled Concrete Cores
ASTM C192/C192M	(2013a) Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM C231/C231M	(2010) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260/C260M	(2010a) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	(2011) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C31/C31M	(2012) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33/C33M	(2013) Standard Specification for Concrete Aggregates
ASTM C39/C39M	(2014) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C42/C42M	(2013) Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C494/C494M	(2013) Standard Specification for Chemical Admixtures for Concrete
ASTM C595/C595M	(2013) Standard Specification for Blended Hydraulic Cements
ASTM C618	(2012a) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C94/C94M	(2014) Standard Specification for Ready-Mixed Concrete
ASTM C989/C989M	(2013) Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM D75/D75M	(2013) Standard Practice for Sampling Aggregates

1.2 SUBMITTALS

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NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project.

The Guide Specification technical editors have designated those items that require Government approval, due to their complexity or criticality, with a "G". Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item, if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.
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Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.][for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-05 Design Data

Mix design

At least 30 days prior to mixing and placing econocrete, submit design mix for approval. Furnish a complete list of materials including type, brand, source and amount of cement, pozzolan, ground granulated blast-furnace slag, admixtures, applicable reference specifications, and results of 28-day compressive strength test of the econocrete. Compressive strength test specimens shall be prepared in accordance with ASTM C192/C192M and tested in accordance with ASTM C39/C39M.

SD-06 Test Reports

Mix design review

Aggregate tests

Concrete slump tests

Air content tests

Temperature

Yield

Surface

Base course thickness tests

Compressive strength tests

Submit testing results as required in paragraph entitled "Field Quality Control."

SD-07 Certificates

Ready-mixed concrete plant identification

Batch ticket information

Cement

Aggregates

Admixtures

Curing materials

1.3 DELIVERY

Do not deliver econocrete until ready for placement.

1.4 STORAGE

1.4.1 Cement, Aggregate, and Admixture Materials

Store in conformance with recommendations of ACI 304R.

1.4.2 Curing Compounds and Bond Breaker

Inspect materials for contamination and damage. Unload and store with a minimum of handling.

1.5 QUALITY ASSURANCE

1.5.1 Required Information

Submit name and location of the ready-mixed concrete plant. Submit batch ticket information as specified in ASTM C94/C94M.

1.5.2 Required Review

Before econocrete is placed at the job site, submit a mix design review

accomplished by a Government-approved independent commercial engineering testing laboratory. Include cement factor, standard deviation used in the design of the mix, water-cement ratio (by weight), percentage of fine aggregate to total aggregate by weight, weight in kilograms pounds of saturated surface-dry aggregates (fine and coarse) per sack of cement, volume of admixtures and yield for one cubic meter one cubic yard of concrete.

PART 2 PRODUCTS

2.1 MIX DESIGN

The mix design shall be as specified herein under "Submittals" and conform to the following.

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NOTE: Specify an upper limit on compressive strength when reflective cracking is a concern.
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a. 28-day compressive strength MPa psi: 8.27 1200 minimum.

b. Cement factor kg per cubic meter lbs. per cubic yard: 120 200 minimum.

The minimum cement factor indicated is for concrete durability only and shall be increased as necessary to meet minimum compressive strength requirements.

****
NOTE: Specify 7 percent minimum air content where econocrete is exposed to freeze-thaw cycle.
****

c. Air content (percent by volume): [4] [7] minimum.

d. Water-cement ratio: [.6] [_____] maximum.

e. Slump: 25 mm one inch minimum to 75 mm 3 inches maximum for fixed form; 38 mm 1 1/2 inch maximum for slip-forming.

2.2 MATERIALS

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NOTE: Allowable types of cement are:

ASTM C150/C150M Portland	ASTM C595/C595M Blended	Use
Type I	Type IP or IS	For general use in construction.

ASTM C150/C150M Portland	ASTM C595/C595M Blended	Use
Type II	Type IP(MS) or Type IS (MS)	For general use in construction where concrete is exposed to moderate sulfate action or where moderate heat of hydration is required. ASTM C595/C595M (blended hydraulic cements): add the suffix MS or MH where either moderate sulfate resistance moderate heat of hydration, respectively, is required.
Type III		For use when high early strength is required.
Type IV		For use when low heat of hydration is required.
Type V		For use when high sulfate resistances is required.
Require cement to meet low alkali requirements of ASTM C150/C150M, Table 1A, when using potential alkali-reactive aggregates.		

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2.2.1 Cement

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NOTE: Do not use ASTM C595/C595M blended hydraulic cements on WESTNAVFACENGCOM airfield pavement projects without consulting WESTNAVFACENGCOM Code 411.
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ASTM C150/C150M, Type(s) [I] [II] [I or II] [Type III, for high early strength concrete] [_____]. [ASTM C595/C595M, Type IS or IP.]

2.2.2 Water

Fresh, clean and potable.

2.2.3 Aggregates

Stone or gravel, crushed or uncrushed, [or crushed portland cement concrete pavement]. The fine aggregate shall be that naturally contained in the aggregate material or may be sand. The aggregates shall consist of hard, durable particles, free from objectionable matter.

2.2.3.1 Gradation

The aggregate shall conform to any one of the gradations shown in Table 1

when tested in accordance with ASTM C136, except the gradation may be modified to suit [locally available aggregate] [recycled portland cement concrete pavement], provided the strength requirements are met.

TABLE 1 - AGGREGATE GRADATION - ECONOCRETE BASE COURSE

	Percentage by Weight Passing Sieves		
Sieve Sizes	A	B	C
50 mm 2 in.	100	---	---
37.5 mm 1 1/2 in.	---	100	---
25.0 mm 1 in.	55-85	70-95	100
19.0 mm 3/4 in.	50-80	55-85	70-100
4.75 mm No. 4	30-60	30-60	35-65
425 micrometers No. 40	10-30	10-30	15-30
75 micrometers No. 200	0-15	0-15	0-15

2.2.3.2 Deleterious Substances

Aggregates shall not contain any substance which may be deleteriously reactive with the alkalies in the cement, except as permitted in ASTM C33/C33M.

2.2.4 Admixtures

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NOTE: Admixtures are used in concrete to improve the concrete or to provide sound concrete under conditions where it would be burdensome to do so without use of an admixture. The following information is applicable.

1. Air entraining agents. Air entrainment should be specified for all concrete, particularly that exposed to freezing and thawing and sulfates and for seawater exposed concrete. Air entrainment improves the workability of plastic concrete.

2. Retarders. Retarding admixtures act to slow the hardening of concrete in hot weather. Generally, retarders should be permitted, when not specified, if the Contractor desires to use it.

3. Water reducers. Water reducing admixtures are used to improve the quality of concrete, obtain specified strength at lower water-cement ratios or to increase the slump of a given mixture without increase in water content. Generally, water reducing admixtures should be permitted, when not specified, if the Contractor desires to use them.

4. Accelerators. Calcium chloride and non-calcium chloride types are available. When added to the concrete acts to accelerate the hardening of concrete in cold weather. Calcium chloride accelerators should not be permitted for seawater exposed concrete, reinforced concrete and in concrete in contact with aluminum or other non-ferrous materials.

5. Pozzolans. Due to EPA guidelines, the designer must allow the use of fly ash, either in blended cements or as an admixture, as an optional material unless it can be shown that use of fly ash is technically inappropriate. Pozzolans are used to replace or augment cement in concrete mixes. In general, less cement may be used to achieve the required strength although the time required to reach the required strength may be longer than for a totally portland cement concrete mix. Use Class F for sulfate resistant concrete. Do not use fly ash as a substitute for portland cement on WESTNAVFACENGCOM airfield pavement projects without consulting WESTNAVFACENGCOM Code 411.

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Where not shown or specified, admixtures may be used subject to written approval of the Contracting Officer.

2.2.4.1 Air-Entraining Admixtures

ASTM C260/C260M.

2.2.4.2 Retarding Admixtures

ASTM C494/C494M, Type B or D.

2.2.4.3 Water-Reducing Admixtures

ASTM C494/C494M, Type A, D, E, F, or G.

2.2.4.4 Accelerating Admixtures

ASTM C494/C494M, Type C.

2.2.4.5 Pozzolans

Class N, F, or C ASTM C618, except that the maximum allowable loss on ignition shall be 6 percent for Classes N and F.

2.2.4.6 Ground Granulated Blast-Furnace Slag

ASTM C989/C989M, Grade 120.

2.2.5 Curing Materials

2.2.5.1 Waterproof Paper

ASTM C171, white color.

2.2.5.2 Polyethylene Sheeting

ASTM C171, white color.

2.2.5.3 Polyethylene-Coated Burlap

ASTM C171.

2.2.5.4 Liquid Membrane-Forming Compound

ASTM C309, white-pigmented Type 2, Class B, or clear or translucent Type 1-D, Class B with white fugitive dye.

2.2.6 Bond Breaker

Liquid membrane-forming curing compound as specified.

PART 3 EXECUTION

3.1 PREPARATION

Before placing econocrete, compact underlying surface to within 12 mm 0.04 foot of finish grade and elevations shown. Wet underlying material in advance of placing econocrete to ensure a firm, moist condition at time econocrete is placed. Do not permit equipment, other than econocrete delivery or paving equipment on prepared underlying material. In cold weather, protect underlying material from frost. Do not use chemicals to eliminate frost.

3.2 FIXED FORMS

Set forms for full bearing on foundation for entire length and width and in alignment with edge of base course. Support forms during entire operation of placing, compaction, and finishing. Maximum vertical and horizontal deviation of form, including joints, shall not exceed 6 mm 0.02 foot from a 3.65 m 12 foot straightedge. Provide stake sockets and interlocking devices that will prevent movement of the form.

3.3 JOINTS

Shall be located as required to provide a minimum of 150 mm 6 inches from joints in overlying course.

3.4 MEASURING, MIXING, AND TRANSPORTING ECONOCRETE

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NOTE: Include bracketed sentence except for projects at MCB Camp Pendleton.
****

ASTM C94/C94M, except as modified herein. Provide batch ticket information for each load of econocrete. Begin mixing within 30 minutes after the cement has been added to the aggregates. Place econocrete within 90 minutes of either addition of mixing water to cement and aggregates or addition of cement to aggregates if the air temperature is less than 29.5 degrees C 85 degrees F. [Reduce placement time to 60 minutes if the air temperature is greater than 29.5 degrees C 85 degrees F.] Additional water may be added, provided that both the specified maximum slump and

water-cement ratio are not exceeded.

3.5 PLACING ECONOCRETE

3.5.1 General

Econocrete placement will not be permitted when weather conditions prevent proper placement and consolidation. Maintain drainage ditches, gutters and side drains to drain the subgrade during the construction of the base. Place econocrete in one continuous operation for the full width and depth of the section between transverse joints with slip form or fixed form equipment.

3.5.2 Econocrete Placement

Deposit econocrete in its final location within time limits specified hereinbefore and before initial set. Deposit in a manner that will require a minimum of rehandling. Work incidental to handling and placing of econocrete shall be done in a manner that will not damage the underlying surface. Place econocrete continuously at a uniform rate without unscheduled stops except for equipment failure or other emergencies. Avoid contamination of plastic econocrete with foreign material on construction equipment or workman's footwear. Econocrete spread by hand shall be done with shovels and not with rakes.

3.5.3 Consolidation

Consolidate immediately after spreading with internal vibrators and vibrating screeds as needed.

3.5.4 Cold Weather

Provide and maintain 10 degrees C 50 degrees F minimum econocrete temperature. Do not place econocrete when the ambient temperature is below 4.5 degrees C 40 degrees F. Cover econocrete and provide with a source of heat sufficient to maintain 10 degrees C 50 degrees F minimum while curing. Adhere to practices recommended in ACI 306R.

3.5.5 Hot Weather

Econocrete temperature from initial mixing through final cure shall not exceed 32 degrees C 90 degrees F. Cool ingredients before mixing, or substitute chip ice for part of required mixing water or use other suitable means to control econocrete temperature to prevent rapid drying of newly placed econocrete. Shade the fresh econocrete and start curing as soon as the surface is sufficiently hard to permit curing without damage. Adhere to practices recommended in ACI 305R.

3.5.6 Protection Against Rain

Halt mixing and batching operations and cover unhardened econocrete surface. Length of base to be protected shall extend back to a point where rain is not indenting base surface. [When slipform construction is used, install side forms in areas of base where edge cannot otherwise be protected to prevent edge erosion.] After rain ceases, install side forms as required to prevent excessive edge slump, and remove protective covering without delay. Remove remaining water without using cement. Refinish or replace areas damaged by rain.

3.6 FINISHING

Start finishing operations immediately after consolidation. Use finishing machine, except that hand finishing may be used in emergencies and for econocrete in inaccessible locations or of such shapes that machine finishing is impracticable. Finish base surface on both sides of a joint to the same grade. Make as many finish trips over each area of base and at such intervals as necessary to retain coarse aggregate near finished surface, and produce a smooth surface true to grade and crown. Excessive operation over an area, which results in an excess of mortar and water being brought to the surface, will not be permitted.

3.6.1 Surface Correction and Testing

After finishing is completed but while econocrete is still plastic, use straightedges to eliminate minor irregularities and score marks. Use straightedges 3 m 10 feet in length and operated from sides of base and from bridges. Check surface for trueness with straightedge held in successive positions parallel and at right angles to centerline of pavement. Advance straightedge along pavement in successive stages of not more than one-half the length of the straightedge. Immediately fill depressions with freshly mixed econocrete, strike off, consolidate, and refinish. Strike off and refinish projections above required elevation. Continue straightedge testing and finishing until entire surface of econocrete is free of defects and meets specified requirements.

3.6.2 Surface Finish

Apply a uniform, smooth surface finish to econocrete base. Textured surface will not be allowed.

3.7 CURING AND PROTECTION

Protect econocrete from injurious action by sun, rain, flowing water, frost, or mechanical injury. At completion of finishing and at the time econocrete surface has hardened enough to prevent the surface being marred by the curing material, cure by one or more of the following methods. Use fresh water for curing. Keep base moist and at a temperature above 0 degree C 32 degrees F, for a full curing period of 7 days. Protect base from damage during removal of form work and from injury resulting from storage or transportation of materials and equipment during construction. Protect exposed vertical faces of econocrete with curing compound or by other suitable means.

3.7.1 Moist Curing

Wet econocrete surface with a fine spray of water and cover with waterproof paper, polyethylene-coated burlap, or polyethylene sheeting. Thoroughly saturate polyethylene-coated burlap with water before placing. Select size of sheets that are at least 300 mm one foot longer than necessary to cover the entire width and edges of base. Place sheets with light-colored side up. Overlap adjacent sheets not less than 300 mm 12 inches with the lapped edges securely weighted down or the sheets lapped 150 mm 6 inches and cemented or tapered to form a continuous cover and a closed joint. Weight cover down to prevent displacement or billowing from winds. Fold coverings down over the exposed edges and secure with a continuous bank of earth or other approved means. Use covers in good condition when placed and immediately repair tears and holes they occur during the 7-day curing period.

3.7.2 Liquid Membrane-Forming Compound Curing

Apply compound immediately after surface loses its water sheen and has a dull appearance. Mechanically agitate curing compound during use. Apply at a maximum rate of 5.0 square meters per liter 200 square feet per gallon of compound. If compound lacks a uniform continuous, coherent films, or exhibits checks, cracks, peels, or pinholes, apply an additional coat of compound to areas where film is defective. Have readily available impervious sheet curing for use to protect freshly placed econocrete in the event conditions occur to prevent correct application of compound at the proper time. Re-spray surfaces with curing compound after rainfall. Apply at same rate required above.

3.7.3 Protection of Treated Surfaces

Protect econocrete surfaces from foot and vehicular traffic and other sources of abrasion for a minimum of 72 hours. Maintain continuity of applied curing method for the entire curing period.

3.8 BOND BREAKER

Prior to placement of overlying portland cement concrete pavement, the surface of the econocrete base shall be coated with a bond breaker to prevent bonding to the overlay pavement. Bond breaker shall consist of a double application of liquid membrane-forming curing compound. Each application shall be at the rates specified for curing. The first application may be the econocrete curing application. The second application shall be placed no more than 24 hours prior to placement of the overlying course.

3.9 FIELD QUALITY CONTROL

3.9.1 Sampling

3.9.1.1 Aggregates

Sample aggregates prior to delivery to the batch plant. During econocrete placement sample aggregates for each [500] [_____] metric tons [500] [_____] tons. Use sampling methods in accordance with ASTM D75/D75M. Identify each sample for conformance tests. When test results indicate that the aggregates consistently meet the specified gradation requirements, the rate of sampling may be reduced if approved by the Contracting Officer.

3.9.1.2 Econocrete

Obtain samples of plastic econocrete in accordance with ASTM C172/C172M. Quality Control samples may be taken at the econocrete batch plant; however, samples for verification of econocrete strength and slump for submittal to the Government shall be taken at the job site as the econocrete is delivered. From each sample, mold the required number of cylinders for each group of test specimens.

3.9.2 Testing

3.9.2.1 Aggregate Tests

Without delay perform gradation tests on each sample. Make other aggregate tests on initial source samples, and repeat tests whenever there is a

change of source.

3.9.2.2 Econocrete Testing

Perform tests with aggregates and cement to be used in the project. During the course of construction, if there is a deficiency in strength of the econocrete produced, perform additional tests at the Contractor's expense and make adjustments in the mix, as required to obtain the specified strength.

a. Slump: Test consistency of econocrete slump in accordance with ASTM C143/C143M. Determine consistency of econocrete at the start of each day's placement and for each group of cylinder test specimens.

b. Air content: Determine air content at the start of econocrete placement and for each group of cylinder test specimens. Record results with test specimens. Determine air content in accordance with ASTM C173/C173M or ASTM C231/C231M.

c. Temperature tests: Determine temperature of plastic econocrete in-place during hot and cold weather periods, at frequent intervals, until uniform and acceptable temperature control is established as specified.

d. Yield tests: Perform yield tests in accordance with ASTM C138/C138M, twice per day on econocrete, and whenever materials or mix proportions are changed.

e. Surface tests: After curing, test the surface of the pavement with a straightedge or device which will reveal irregularities in the econocrete surface. Remove and replace the econocrete, mechanically grind the econocrete surface, or correct the surface as approved, of any portion of the pavement in a longitudinal or transverse direction which shows irregularities greater than 0.6 mm in 300 mm 1/4 inch in 10 feet.

f. Test of base course thickness: The Contractor shall obtain 100 mm 4 inch diameter core samples to determine the in place thickness of the econocrete base course. Cores shall be obtained in accordance with ASTM C42/C42M. The cores shall be removed from the pavement at varying intervals but in no case shall there be less than one core for each [1670] [_____] square meters [2000] [_____] square yards. Repair the core holes with non-shrink grout. A tolerance in base course thickness of 13 mm 1/2 inch will be permitted for any individual core; however, the average length of cores must be at least the base course thickness shown. When determining the average, cores with a length of more than 13 mm 1/2 inch greater than the specified base thickness shall be assigned a length of the specified thickness plus 13 mm 1/2 inch. If the measured base course thickness is less than that shown on the drawings by more than 13 mm 1/2 inch, the deficient areas shall be removed and replaced with econocrete of the specified strength, quality and thickness at no additional cost to the Government. When a core indicates unsatisfactory thickness, the limits of the base course to be removed and replaced shall be determined as follows: One core shall be taken every 4.5 m 15 feet of the lane in question in both directions from the unsatisfactory core until satisfactory thickness is indicated; base course shall be removed and replaced for the full width of the lane where a core indicated unsatisfactory thickness. Length of cores shall be determined in accordance with ASTM C174/C174M. Copies of each

of the reports of corings shall be submitted, in triplicate, to the Contracting Officer and shall include the following information.

(1) Date econocrete represented by core was placed.

(2) Date core was taken.

(3) Location of core - lane number, station number.

(4) Length of core.

(5) Condition of core - appearance, concrete texture, honeycombed.

(6) Disposition of core - In Contracting Officer or Contractor possession.

g. Compressive strength tests: ASTM C39/C39M. Make three test cylinders for each set of tests in accordance with ASTM C31/C31M. Test one cylinder at 7 days for information only and two at 28 days. Sample sets shall be taken not less than once a day, nor less than once for each [380] [_____] cubic meters [500] [_____] cubic yards of econocrete. Strength test result shall be the average of two cylinders from the same econocrete sample tested at 28 days. If any 28-day strength test result is less than the specified minimum strength, or any individual cylinder strength result falls below the specified minimum strength by more than 690 kPa 100 psi, take a minimum of three ASTM C42/C42M core samples from the in-place work represented by the low test results and test. Econocrete represented by core tests shall be considered adequate if the average of three cores falls within the specified strength limits and if no single core varies from the specified strength limits by more than 690 kPa 100 psi. Locations represented by erratic core tests shall be retested. Remove econocrete not meeting specified strength and provide new acceptable econocrete. Repair core holes with non shrink grout.

-- End of Section --