



DEPARTMENT OF THE ARMY

AFGHANISTAN ENGINEER DISTRICT
U.S. ARMY CORPS OF ENGINEERS
KABUL, AFGHANISTAN
APO, AE 09356

REPLY TO
ATTENTION OF:

CEAEN

20 DECEMBER 09

LABORATORY INSPECTION AND CERTIFICATION FOR THE ZURMAT MATERIAL TESTING LABORATORIES

This letter confirms the completion of inspection and certification for the Zurmat Material Testing Laboratories at the following locations in Afghanistan: Gardez, Jalalabad, Kabul, and Mazar-e-Sharif.

These laboratories should now be considered as certified for use by the Afghanistan Engineer District (AED), U.S. Army Corps of Engineers (USACE), for the construction materials tests listed in Tables 1 through 7 (attached). This certification will be included with records that are maintained at the AED Headquarters in Kabul, Afghanistan. Retaining certification will require yearly inspections by the AED. This certification is also contingent upon the continued employment of Hamid Amiri, Chief Executive, and Badri Zaman Badar, Operations Manager. Without the oversight of these gentlemen, the laboratories will require recertification. Also, if any laboratories are moved to a new location, the AED will need to be notified.

The inspection and certification process for the Zurmat laboratories adhered to procedures outlined by the Materials Testing Center (MTC), which is located at the Geotechnical and Structures Laboratory (GSL), U.S. Army Engineer Research and Development Center (ERDC) in Vicksburg, Mississippi, USA. The MTC is the USACE-authorized agency for certifying laboratories for use in quality control testing for USACE construction projects. To facilitate construction in Afghanistan, the AED has authorized this author to conduct laboratory certifications with strict adherence to MTC protocol. Qualifications of this author for conducting these certifications include: 13 years of laboratory research experience with the GSL, ERDC, 13 years of teaching US government-sponsored classes on construction materials, and eight years of teaching university-level construction materials classes.

Reed B. Freeman, PhD, PE
Chief, Quality Assurance Branch
Afghanistan Engineer District – North
U.S. Army Corps of Engineers

Certified Material Test Procedures Include:

Soils (19 test procedures)
Aggregate (23 test procedures)
Cement, Grout, Mortar, and Concrete (33 test procedures)
Asphalt Cement and Asphalt Concrete (31 test procedures)
Bricks, Stone, and Concrete Masonry Units (4 test procedures)
Advanced Soils Testing (5 test procedures)
Steel (4 test procedures)

Attachment (5 pages)

Zurmat Construction Company Certified Laboratory Tests

Table 1. Soils

Test Method	Test Procedure Title
ASTM D 421	Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants
ASTM D 422	Particle-Size Analysis of Soils
ASTM D 427	Shrinkage Factors of Soils by the Mercury Method
ASTM D 558	Moisture-Density Relations of Soil-Cement Mixtures
ASTM D 698	Laboratory Compaction Characteristics of Soil Using Standard Effort
ASTM D 854	Specific Gravity of Soil Solids by Water Pycnometer
ASTM D 1140	Amount of Material in Soils Finer than the No. 200 (75-um) Sieve
ASTM D 1556	Density and Unit Weight of Soil in Place by the Sand Cone Method
ASTM D 1557	Laboratory Compaction Characteristics of Soil Using Modified Effort
ASTM D 1883	CBR (California Bearing Ratio) of Laboratory-Compacted Soils
ASTM D 2166	Unconfined Compressive Strength of Cohesive Soil
ASTM D 2216	Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D 2487	Classification of Soils for Engineering Purposes
ASTM D 2488	Description and Identification of Soils (Visual-Manual Procedure)
ASTM D 4318	Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 4718	Correction of Unit Weight and Water Content for Soils Containing Oversize Particles
ASTM D 6951	Use of the Dynamic Cone Penetrometer in Shallow Pavement Applications
AASHTO T 92	Determining the Shrinkage Factors of Soils
AASHTO T 224	Correction for Coarse Particles in the Soil Compaction Test

Table 2. Aggregates

Test Method	Test Procedure Title
ASTM C 29	Unit Weight and Voids in Aggregate
ASTM C 40*	Organic Impurities in Fine Aggregates for Concrete
ASTM C 70	Surface Moisture in Fine Aggregate
ASTM C 88	Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C 117	Material Finer than 75 um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 127	Specific Gravity and Absorption of Coarse Aggregate
ASTM C 128	Specific Gravity and Absorption of Fine Aggregate
ASTM C 131	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	Sieve Analysis of Fine and Coarse Aggregates
ASTM C 142	Clay Lumps and Friable Particles in Aggregates
ASTM C 289*	Potential Alkali-Silica Reactivity of Aggregates (Chemical Method)
ASTM C 295*	Petrographic Examination of Aggregates for Concrete
ASTM C 535	Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 566	Total Moisture Content
ASTM C 702	Reducing Samples of Aggregate to Testing Size
ASTM D 75	Sampling Aggregates
ASTM D 2419	Sand Equivalent of Soils and Fine Aggregate
ASTM D 4791	Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D 4944	Field Determination of Water (Moisture) Content of Soil by the Calcium Carbide Gas Pressure Tester
ASTM D 5821	Determining the Percentage of Fractured Particles in Coarse Aggregate
CRD-C 171	Standard Test Method for Determining Percentage of Crushed Particles in Aggregate
BS 812 Section 105.1	Testing Aggregates. Methods for Determination of Particle Shape. Flakiness Index.
BS 812 Section 105.2	Testing Aggregates. Methods for Determination of Particle Shape. Elongation Index for Coarse Aggregate.
* tests performed in Pakistan	

Table 3. Cement, Grout, Mortar, and Concrete

Test Method	Test Procedure Title
ASTM C 31	Making and Curing Test Specimens in the Field
ASTM C 39	Compressive Strength of Cylindrical Specimens
ASTM C 42	Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C 78	Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
ASTM C 109	Compressive Strength of Hydraulic Cement Mortars
ASTM C 114*	Chemical Analysis of Hydraulic Cement
ASTM C 138	Unit Weight and Air Content by Gravimetric
ASTM C 143	Slump of Hydraulic-Cement Concrete
ASTM C 151*	Autoclave Expansion of Hydraulic Cement
ASTM C 172	Sampling Freshly Mixed Concrete
ASTM C 174	Measuring Thickness of Concrete Elements Using Drilled Concrete Cores
ASTM C 185	Air Content of Hydraulic Cement Mortar
ASTM C 187	Normal Consistency of Hydraulic Cement
ASTM C 188	Density of Hydraulic Cement
ASTM C 191	Time of Setting of Hydraulic Cement by Vicat Needle
ASTM C 192	Making and Curing Test Specimens in the Laboratory
ASTM C 204	Fineness of Hydraulic Cement by Air-Permeability Apparatus
ASTM C 231	Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 232	Bleeding of Concrete
ASTM C 359	Early Stiffening of Hydraulic Cement (Mortar Method)
ASTM C 430	Fineness of Hydraulic Cement by the 45-um (No. 325) Sieve
ASTM C 451	Early Stiffening of Hydraulic Cement (Paste Method)
ASTM C 511	Moist Cabinets, Moist Rooms, Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes
ASTM C 567	Determining Density of Structural Lightweight Concrete
ASTM C 617	Capping Cylindrical Concrete Specimens
ASTM C 642	Density, Absorption, and Voids in Hardened Concrete
ASTM C 805	Rebound Number of Hardened Concrete
ASTM C 856*	Petrographic Examination of Hardened Concrete
ASTM C 1064	Temperature of Freshly Mixed Portland Cement Concrete
ASTM C 1074	Estimating Concrete Strength by the Maturity Method
ASTM C 1084*	Portland-Cement Content of Hardened Hydraulic-Cement Concrete
ASTM C 160	Mixing Water Used in the Production of Hydraulic Cement Concrete
AASHTO T 26	Quality of Water to be Used in Concrete
* tests performed in Pakistan	

Table 4. Asphalt Cement and Asphalt Concrete

Test Method	Test Procedure Title
ASTM D 5	Penetration of Bituminous Materials
ASTM D 36	Softening Point of Bitumen (Ring-and-Ball Apparatus)
ASTM D 70	Density of Semi-Solid Bituminous Materials (Pycnometer Method)
ASTM D 92	Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester
ASTM D 95*	Water in Petroleum Products and Bituminous Materials by Distillation
ASTM D 113*	Ductility of Bituminous Materials
ASTM D 139*	Float Test for Bituminous Materials
ASTM D 140	Sampling Bituminous Materials
ASTM D 242	Mineral Filler for Bituminous Paving Mixtures
ASTM D 402*	Distillation of Cutback Asphaltic (Bituminous) Products
ASTM D 979	Sampling Bituminous Paving Mixtures
ASTM D 1074	Compressive Strength of Bituminous Mixtures ¹
ASTM D 1754*	Effects of Heat and Air on Asphaltic Materials (Thin-Film Oven Test)
ASTM D 2041	Theoretical Maximum Specific Gravity and Density of Bituminous Pavement Mixtures
ASTM D 2042	Solubility of Asphalt Materials in Trichloroethylene
ASTM D 2170*	Kinematic Viscosity of Asphalts (Bitumens)
ASTM D 2171*	Viscosity of Asphalts by Vacuum Capillary Viscometer
ASTM D 2172	Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D 2489	Estimating Degree of Particle Coating of Bituminous-Aggregate Mixtures
ASTM D 2726	Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D 3203	Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D 3549	Thickness or Height of Compacted Bituminous Paving Mixture Specimens
ASTM D 5361	Sampling Compacted Bituminous Mixtures for Laboratory Testing
ASTM D 5444	Mechanical Size Analysis of Extracted Aggregate
ASTM D 6926	Preparation of Bituminous Specimens Using Marshall Apparatus
ASTM D 6927	Marshall Stability and Flow of Bituminous Mixtures
CRD-C 649	Standard Test Method for Unit Weight, Marshall Stability, and Flow of Bituminous Mixtures
CRD-C 650	Standard Method for Density and Percent Voids of Compacted Bituminous Paving Mixtures
CRD-C 652	Standard Test Method for Measurement of Reduction in Marshall Stability of Bituminous Mixtures Caused by Immersion in Water

Table 4. (Continued)

AASHTO T 182	Coating and Stripping of Bitumen-Aggregate Mixtures
AASHTO T 230	Determining Degree of Pavement Compaction of Bituminous Aggregate Mixtures
* tests performed in Pakistan	

Table 5. Bricks, Stone, and Concrete Masonry Units

Test Method	Test Procedure Title
ASTM C 67	Sampling and Testing Brick and Structural Clay Tile
ASTM C 140	Sampling and Testing Concrete Masonry Units and Related Units
ASTM C 170	Compressive Strength of Dimension Stone
ASTM C 1552	Practice for Capping Concrete Masonry Units, Related Units, and Masonry Prisms for Compression Testing

Table 6. Advanced Soils Testing

Test Method	Test Procedure Title
ASTM D 1196	Nonrepetitive Static Plate Load Tests of Soils and Flexible Pavement Components, for Use in Evaluation and Design of Airport and Highway Pavements
ASTM D 1586	Penetration Test and Split-Barrel Sampling of Soils
ASTM D 2434*	Permeability of Granular Soils (Constant Head)
ASTM D 3080*	Direct Shear Test of Soils Under Consolidated Drained Conditions
ASTM D 4767*	Consolidated Undrained Triaxial Compression Test for Cohesive Soils
* tests performed in Pakistan	

Table 7. Steel

Test Method	Test Procedure Title
ASTM A 370	Test Methods and Definitions for Mechanical Testing of Steel Products
ASTM A 615	Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM E 8	Tension Testing of Metallic Materials
AASHTO T 285	Bend Test for Bars for Concrete Reinforcement