



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE CIVIL ENGINEER SUPPORT AGENCY

13 December 2011

FROM: HQ AFCESA/CEO
139 Barnes Drive, Suite 1
Tyndall AFB FL 32403-5319

SUBJECT: Engineering Technical Letter (ETL) 11-4: Airfield Pavement Drainage Layers

1. Purpose. This ETL adopts Unified Facilities Criteria (UFC) 3-230-06A, *Subsurface Drainage*, for use by the U.S. Air Force. This ETL also provides supplemental guidance on where drainage layers are required and ways to improve design, construction, and maintenance of airfield pavement drainage layers.

2. Application. Requirements in this ETL apply to entities responsible for airfield design and construction.

2.1. Authority: Air Force policy directive (AFPD) 32-10, *Air Force Installations and Facilities*

2.2. Effective Date: Immediately

2.3. Intended Users:

- Major command (MAJCOM) pavement engineers
- Base civil engineers (BCE)
- U.S. Army Corps of Engineers (USACE) and Navy Facilities Engineering Command (NAVFAC) offices responsible for design and construction of airfields.
- Army, Navy, and Marine Corps units, construction contractors, and any other organizations performing airfield construction and maintenance for the Department of Defense (DOD).

2.4. Coordination: MAJCOM pavement engineers

3. References.

3.1. Department of Defense (DOD):

- Unified Facilities Criteria (UFC) 3-230-06A, *Subsurface Drainage*, http://www.wbdg.org/ccb/DOD/UFC/ufc_3_230_06a.pdf

4. Acronyms:

ETL	- Engineering Technical Letter
MAJCOM	- major command
UFC	- Unified Facilities Criteria

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5. Requirements.

5.1. UFC 3-230-06A design criteria provide satisfactory drainage layer performance if properly constructed and maintained. Provisions in the UFC should be followed to ensure that the material properties, drainage layer thickness, length and slope of the drainage path, water collection systems, and other design considerations meet the design requirements.

5.2. Drainage layers are required on Air Force primary pavements, except as noted in paragraphs 5.2.1 and 5.2.2. Primary pavements are mission-essential pavements such as runways, parallel taxiways, main parking aprons, arm-disarm pads, alert aircraft pavements, and overruns (when used as a taxiway or for take-off roll). Drainage layers can be used on other pavements if determined to be beneficial by lifecycle analyses.

5.2.1. Drainage layers are not required at bases in non-frost areas where the subgrade permeability is greater than 6 meters per day (20 feet per day).

5.2.2. Drainage layers are not required for flexible pavements in non-frost areas where the total thickness of pavement above the subgrade is 203 millimeters (8 inches) or less.

5.3. Construction of pavement drainage layers should be closely monitored to ensure that they will be functional after construction. Any construction error that can cause flow restrictions compromises the effectiveness of the drainage system and must be addressed immediately.

5.3.1. Issues regarding improper construction could include, but are not limited to, incorrect placement of outlet pipes, inverted slopes of collector and drainage pipes, absence of headwalls in outlet structures, and use of improper aggregate gradations. These issues must be avoided in all circumstances.

5.3.2. Changes to design during construction must consider the impact on the overall system. Any change to the original design of the drainage system should be reviewed and approved by the designer. Furthermore, this type of action should be closely monitored, and quality control / quality assurance (QC/QA) procedures must be in place and followed to ensure construction practices provide the intended product.

5.4. A routine maintenance program should be implemented for pavement drainage systems on airfields. Maintenance should include clearing all soil and vegetation from the flow path to prevent clogging. System components to be monitored include storm drain manholes, junction boxes, and outlet structures.

5.5. As-built data and drawings must be available for future construction and rehabilitation projects. Furthermore, this data must be consulted for every

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SPECIAL INTEREST ORGANIZATIONS

Information Handling Services (1)
15 Inverness Way East
Englewood, CO 80150

Construction Criteria Database (1)
National Institute of Bldg Sciences
Washington, DC 20005