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USACE / NAVFAC / AFCESA / NASA UFGS-32 01 16.17 (August 2008)  
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Preparing Activity: USACE Superseding  
UFGS-32 01 16.17 (April 2006)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated January 2009

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### SECTION 32 01 16.17

#### COLD MILLING OF BITUMINOUS PAVEMENTS 08/08

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NOTE: This guide specification covers the requirements for cold milling of bituminous pavement for airfields, roads, streets, parking areas, and other general applications.

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 and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR).

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## PART 1 GENERAL

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NOTE: This guide specification can be used to specify cold milling alone on structurally sound pavements for surface texturing to increase skid resistance of a worn pavement, or for pavement removal to restore roadway geometry. Cold milling can also be used in conjunction with asphalt overlays produced from hot or cold recycling of the milled material or from virgin materials to provide structural improvement to distressed pavements.

On the project drawings, show:

1. Location and extent of pavement.

2. Required elevation of finish surface of new pavement.

3. Section indicating in mm (inches) the depth that existing pavement has to be removed.

4. Location of existing manholes, valve boxes and utility lines.

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#### 1.1 UNIT PRICES

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NOTE: Delete these paragraphs when lump-sum bidding is used.

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##### 1.1.1 Measurement

The quantity of milled pavement will be the number of square meters yards completed and accepted as determined by the Contracting Officer. Determine the number of square meters yards of milled pavement by measuring the length and width of the milled surface within the specified work area. Measurement to determine the area shall be to the closest mm inch for width and the closest meter foot for length.

##### 1.1.2 Payment

Payment will be to the nearest square meter yard. No payment will be made for milling outside the specified area of work.

#### 1.2 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.

ASTM INTERNATIONAL (ASTM)

ASTM C 136

(2006) Standard Test Method for Sieve  
Analysis of Fine and Coarse Aggregates

1.3 SYSTEM DESCRIPTION

Maintain in a satisfactory working condition equipment, tools, and machines used in the performance of the work.

1.3.1 Cold-Milling Machine

Provide a cold-milling machine which is self-propelled, capable of milling the pavement to a specified depth and smoothness and of establishing grade control; with means of controlling transverse slope and dust produced during the pavement milling operation. The machine shall have the ability to [windrow the millings or cuttings] [remove the millings or cuttings from the pavement and load them into a truck]. The milling machine shall not cause damage to any part of the pavement structure that is not to be removed.

1.3.2 Cleaning Equipment

Provide cleaning equipment suitable for removing and cleaning loose material from the pavement surface.

1.3.3 Straightedge

Furnish and maintain at the site, in good condition, one 3.66 meter 12 foot straightedge or other suitable device for each milling machine, for testing the finished surface. Make straightedge available for Government use. Straightedges shall be constructed of aluminum or other lightweight metal, with blades of box or box-girder cross section with flat bottom reinforced to insure rigidity and accuracy. Straightedges shall have handles to facilitate movement on the pavement.

1.4 QUALITY ASSURANCE

1.4.1 Grade

Conform the finished milled surfaces to the lines, grades, and cross sections indicated. The finished milled-pavement surfaces shall vary not more than [0] [6] mm [0] [1/4] inch from the established plan grade line and elevation. Finished surfaces at a juncture with other pavements shall coincide with the finished surfaces of the abutting pavements. The deviations from the plan grade line and elevation will not be permitted in areas of pavements where closer conformance with planned grade and elevation is required for the proper functioning of appurtenant structures involved.

1.4.2 Surface Smoothness

Finished surfaces shall not deviate from the testing edge of a straightedge more than 6 mm 1/4 inch in the transverse or longitudinal direction.

1.4.3 Traffic Control

Provide all necessary traffic controls during milling operations.

## 1.5 ENVIRONMENTAL REQUIREMENTS

Milling shall not be performed when there is accumulation of snow or ice on the pavement surface.

## PART 2 PRODUCTS (Not Applicable)

## PART 3 EXECUTION

### 3.1 PREPARATION OF SURFACE

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NOTE: This paragraph will only be used when the milled material is to be recycled; otherwise paragraph will be deleted and succeeding paragraphs will be renumbered accordingly.  
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Clean the pavement surface of excessive dirt, clay, or other foreign material immediately prior to milling the pavement.

### 3.2 MILLING OPERATION

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NOTE: When recycling of the milled pavement is not to be included as part of the project, the last sentence in this paragraph will be deleted; paragraph PREPARATION OF SURFACE will also be deleted and all subsequent paragraphs will be renumbered accordingly.

When the milled material (cutting) is to be cold recycled, the maximum size of the cuttings should be equal to or less than one-half of the recycled pavement thickness. Generally, the maximum size for a single 100 mm (4 inch) lift of pavement will be 50 mm (2 inches) or less. For hot recycling the recommended maximum size of the milled material is 50 mm (2 inches).

If design does not include removal of base course material and it is desired not to disturb the base course then the following may be included in this paragraph:

Conduct cold-milling operation to ensure that only bituminous pavement is removed and base course is not disturbed. Leave in place a layer of bituminous pavement, 6 to 13 mm (1/4 to 1/2 inch) thick, over the undisturbed base course.

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A minimum of seven days notice is required, prior to start work, for the Contracting Officer to coordinate the milling operation with other activities at the site. Make sufficient passes so that the designated area is milled to the grades and cross sections indicated. The milling shall proceed with care and in depth increments that will not damage the pavement below the designated finished grade. Repair or replace, as directed, items damaged during milling such as manholes, valve boxes, utility lines,

pavement that is torn, cracked, gouged, broken, or undercut. The milled material shall be [windrowed] [removed from the pavement and loaded into trucks]. Removed material shall have a minimum of [95] [100] percent by weight passing a [\_\_\_\_\_] sieve when tested in accordance with ASTM C 136.

### 3.3 GRADE AND SURFACE-SMOOTHNESS TESTING

#### 3.3.1 Grade-Conformance Tests

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NOTE: For pavements in aircraft traffic areas such as airfield runways and taxiways, lines of levels to determine elevation of the milled pavement will be run longitudinally and transversely at intervals not exceeding 8 meters (25 feet). When removing a uniform thickness of pavement, grade conforming tests are generally not necessary.  
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Test the finished milled surface of the pavement for conformance with the plan-grade requirements and for acceptance by the Contracting Officer by running lines of levels at intervals of [7.5] [\_\_\_\_\_] meters [25] [\_\_\_\_\_] feet longitudinally and [7.5] [\_\_\_\_\_] meters [25] [\_\_\_\_\_] feet transversely to determine the elevation of the completed pavement. Correct variations from the designated grade line and elevation in excess of the plan-grade requirements as directed. Skin patching for correcting low areas will not be permitted. Remove and replace the deficient low area. Remove sufficient material to allow at least 25 mm 1 inch of asphalt concrete to be placed.

#### 3.3.2 Surface-Smoothness Tests

After completion of the final milling, the finished milled surface will be tested by the Government with a straightedge. Other approved devices may be used, provided that when satisfactorily and properly operated, such devices reveal all surface irregularities exceeding the tolerances specified. Correct surface irregularities that depart from the testing edge by more than 6 mm 1/4 inch. Skin patching for correcting low areas will not be permitted. Remove and replace the deficient low area. Remove sufficient material to allow at least 25 mm 1 inch of asphalt concrete to be placed.

### 3.4 REMOVAL OF MILLED MATERIAL

Material that is removed shall [be placed in the disposal area as specified] [be placed into traveling mixing plant for cold-mix recycling] [be transported to central plant for hot-mix or cold-mix recycling] [be stockpiled as specified and in such a manner to prevent segregation or contamination] [become the property of the Contractor and removed from the site].

-- End of Section --