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USACE / NAVFAC / AFCEA / NASA UFGS-09 64 29 (October 2006)  
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Preparing Activity: USACE Superseding  
UFGS-09 64 29 (July 2006)

## UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated April 2009

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10/06

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### SECTION 09 64 29

#### WOOD STRIP FLOORING 10/06

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NOTE: This guide specification covers the requirements for wood strip flooring for gymnasiums, handball and squash courts, and other special purpose 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).

This guide specification includes tailoring options for Navy, gymnasium floors, handball court floor & walls, and squash court walls. Selection or deselection of a tailoring option will include or exclude that option in the section, but editing the resulting section to fit the project is still required.

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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.

ASTM INTERNATIONAL (ASTM)

ASTM E 2129 (2005) Standard Practice for Data Collection for Sustainability Assessment of Building Products

FOREST STEWARDSHIP COUNCIL (FSC)

FSC STD 01 001 (2000) Principles and Criteria for Forest Stewardship

MAPLE FLOORING MANUFACTURERS ASSOCIATION (MFMA)

MFMA GS (1999) Guide Specifications for Maple Flooring Systems

NOFMA: THE WOOD FLOORING MANUFACTURERS ASSOCIATION (NOFMA)

NOFMA Grading Rules (1999) Official Flooring Grading Rules

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED (2002; R 2005) Leadership in Energy and Environmental Design(tm) Green Building Rating System for New Construction (LEED-NC)

## 1.2 SYSTEM DESCRIPTION

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NOTE: Wood strip flooring is very sensitive to ambient humidity conditions since all wood flooring will expand and contract as relative humidity varies. In order to keep the flooring manufacturer's warranty valid after installation, the areas in which the wood floors are installed must be adequately ventilated with natural or mechanical air circulation at all times during the

life of the flooring.

If prior experience at the site indicates that relative humidity during sustained heating periods will fall below 35 percent, the office in charge of building maintenance should provide equipment to introduce moisture into the floored area when required; conversely, if relative humidity increases to 50 percent or higher at any time, measures should be taken to dry the floored area, including turning on the heat.

At sites with humidity problems, the maintenance of the flooring may require: 1) The design of a localized HVAC system to also react to and automatically control ambient humidity conditions through the life of the flooring; or 2) Continuous monitoring of relative humidity with on the spot corrective actions, as needed, without altering the HVAC system. These alternatives could be very expensive or impractical. The designer, in the absence of local experience, should coordinate with local manufacturers to specify compatible floorings which have performed well locally; that is, the designer should check gymnasiums in the area when building a gymnasium floor; the same for handball courts, etc. Of course, the designer has the option of purchasing commercially available floating or sleeper systems specifically designed to reduce the possibility of buckling and cupping brought on by moisture buildup or specifying other types of flooring when a cost analysis (including all HVAC variations) indicates that wood strip flooring is not economical.

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This specification is written to allow the Contractor to build wood strip floorings for gymnasiums, handball and squash courts, and other special purpose applications but does not preclude the installation of competitive, manufacturer standard, integrated systems.

#### 1.2.1 Sustainable Design Requirements

##### 1.2.1.1 Local/Regional Materials

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NOTE: Using local materials can help minimize transportation impacts, including fossil fuel consumption, air pollution, and labor. Using materials harvested and manufactured within a 800 km (500 mile) radius from the project site contributes to the following LEED credit: MR5. Coordinate with Section 01 33 29 LEED(tm) DOCUMENTATION. Use second option if Contractor is choosing local materials in accordance with Section 01 33 29 LEED(tm) DOCUMENTATION. Use second option for USACE projects. Army projects Will include option only if pursuing this LEED credit.

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[Use materials or products extracted, harvested, or recovered, as well as manufactured, within a [800] [\_\_\_\_\_] km [500] [\_\_\_\_\_] mile radius from the project site, if available from a minimum of three sources.] [See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total local material requirements. Flooring materials may be locally available.]

#### 1.2.1.2 Environmental Data

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NOTE: ASTM E 2129 provides for detailed documentation of the sustainability aspects of products used in the project. This level of detail may be useful to the Contractor, Government, building occupants, or the public in assessing the sustainability of these products.  
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[Submit Table 1 of ASTM E 2129 for the following products: [\_\_\_\_].]

#### 1.2.2 Forest Stewardship Council (FSC) Certification

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NOTE: Use of FSC-certified wood contributes to the following LEED credit: MR7. Coordinate with Section 01 33 29 LEED(tm) DOCUMENTATION.  
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Use FSC-certified wood where specified. Provide letter of certification signed by lumber supplier. Indicate compliance with FSC STD 01 001 and identify certifying organization. Submit FSC certification numbers; identify each certified product on a line-item basis. Submit copies of invoices bearing the FSC certification numbers.

#### 1.3 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. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" 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 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.] [information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

#### SD-02 Shop Drawings

Squash and Handball Court Walls[; G][; G, [\_\_\_\_\_]]

Expansion joint details.

#### SD-03 Product Data

[ Local/Regional Materials; (LEED)

Documentation indicating distance between manufacturing facility and the project site. Indicate distance of raw material origin from the project site. Indicate relative dollar value of local/regional materials to total dollar value of products included in project.]

[Environmental Data]

[Bamboo; (LEED)

Documentation indicating type of biobased material in product and biobased content. Indicate relative dollar value of biobased content products to total dollar value of products included in project. Submit documentation indicating relative dollar value of rapidly renewable materials to total dollar value of products included in project.]

#### Installation

Manufacturer's descriptive data and installation instructions.

#### SD-04 Samples

##### Strip Flooring

Two samples of each type of strip flooring.

#### SD-07 Certificates

Forest Stewardship Council (FSC) Certification; (LEED)

#### 1.4 DELIVERY, STORAGE, AND HANDLING

Deliver materials to the site in original unopened packages, bundles or containers and with all labels intact. Store flooring in fully covered, well ventilated areas protected from extreme changes in temperature and humidity. Flooring shall be maintained at an average moisture content of 6 to 9 percent. Temperature and humidity in the storage area shall closely approximate the temperature and humidity of the rooms in which the flooring is to be installed.

#### 1.5 ENVIRONMENTAL REQUIREMENTS

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NOTE: The values stated in the guide specification for moisture content of the flooring and for the humidity and temperature of the space where the flooring will be installed are those which are generally suitable. When local experience has proven that values differing from those included in the guide specification are necessary because of geographical location or seasonal weather conditions, appropriate values will be substituted for the values stated in the guide specification.

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Provide permanent heating and air conditioning, installed and working, in rooms where wood flooring is to be installed or adequate arrangements for ventilation and temperature controls. The temperature shall be maintained at 14 to 27 degrees C 55 to 80 degrees F and the humidity shall be maintained [at [40] [\_\_\_\_\_] percent] [as recommended by the manufacturer] starting not less than 3 days prior to beginning the installation of flooring and continuing throughout the remainder of the contract period.

#### 1.6 SCHEDULING

Strip flooring work shall be scheduled after any other work which would raise the moisture content of the flooring or damage the finished surface of the flooring.

### PART 2 PRODUCTS

#### 2.1 STRIP FLOORING

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NOTE: Designer will select appropriate species and will permit maximum competition wherever possible; however, gymnasiums will be limited to hard maple. Flooring of 25 mm (33/32 inch) thickness should be considered when floors will be subjected to hard service and frequent sanding.

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##### 2.1.1 General Requirements

Strip flooring shall be [19] [26] mm [3/4] [33/32] inch thick by 55 mm 2-1/4 inch face width, kiln dried, continuous tongue and groove and of standard lengths. Beech and birch shall be second grade in accordance with NOFMA Grading Rules[ and FSC-certified]. Hard maple shall be second and better in accordance with MFMA GS [and FSC-certified]. Red and white oak



shall be select grade in accordance with **NOFMA Grading Rules** [and FSC-certified]. Strip flooring shall be marked with the trademark of the grading agency.

#### [2.1.2 **Bamboo**

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**NOTE: Use of rapidly renewable biobased materials like bamboo contributes to the following LEED credit: MR6. Include submittal if pursuing this LEED credit, and coordinate with Section 01 33 29 LEED DOCUMENTATION.**  
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Bamboo flooring shall be laminated, tongue-and-groove plank flooring, [16 to 19 mm 5/8 to 3/4 inch thick, 2- or 3-ply, flat grain with horizontal laminations] [13 mm 1/2 inch thick with vertical laminations].

#### ]2.2 **NAILS**

Provide nails in accordance with strip flooring manufacturer's recommendations.

#### 2.3 **RESILIENT PADS**

Resilient pads shall be pneumatic rubber, PVC, or polyurethane resilient mounts to fit the selected floor system.

#### 2.4 **WALL BASE**

Wall base shall be wood molding or vented cove with premolded outside corners and mitered inside corners.

#### 2.5 **MOISTURE BARRIER**

Moisture barrier shall be 0.15 mm 6 mil minimum thickness polyethylene.

#### 2.6 **CLIPS, ANCHOR CHANNELS AND INSULATION**

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**NOTE: Include this paragraph when channel anchorage system is specified. Channel anchorage system will be included as an option to wood nailers for gymnasium floors.**  
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Galvanized steel clips for steel channel anchorage systems shall be in accordance with steel channel anchorage system manufacturer's recommendations. Clips shall be designed to provide holding at least equal to the nailing specified and shall function without splitting the assembled boards or otherwise reducing the performance of the floor. Anchor channels shall be as recommended by the flooring manufacturer. Anchor channels shall be galvanized, complete with all pads, anchors and other components required for channel installation. Underfloor insulation shall be asphalt impregnated fiberboard or closed-cell polyethylene foam. Comply with EPA requirements in accordance with Section 01 62 35 RECYCLED / RECOVERED MATERIALS.

## PART 3 EXECUTION

### 3.1 SURFACE CONDITIONS

Concrete slab shall be level, steel troweled to a tolerance of 3 mm 1/8 inch plus or minus in a 3 m 10 foot radius. Slab surface shall be clean, dry, and approved prior to start of installation. The slab shall be depressed as required by the floor specified.

### 3.2 INSTALLATION

Install flooring in accordance with the approved installation instructions of the manufacturer. Wood nailers are specified in Section 06 10 00 ROUGH CARPENTRY. Unless otherwise approved, flooring shall be laid parallel to the length of the area to be floored. Strips shall be laid [with close joints, snugly driven up but providing for absorption of a small amount of expansion] [to allow for intermediate expansion in accordance with humidity conditions expected during the life of the of the flooring]. End joints shall be so alternated that there will be at least two boards between end joints in the same plane and at least 150 mm 6 inches between end joints in adjacent boards. Space for expansion shall be left along perimeter walls and around fixed projections through the floor surface. Unless otherwise shown or permitted by the approved installation instructions, expansion space shall be 5 mm per meter 1/16 inch per foot of distance between opposite walls, with one half the space provided at each wall and with a minimum space of 25 mm 1 inch at each wall.

#### 3.2.1 Gymnasium Floors

##### 3.2.1.1 Wood Sleepers

For wood sleeper supported floors, the slab shall be vapor-sealed with a two-ply membrane and hot-poured, steep-slope asphalt to a minimum depth of 6 mm 1/4 inch above bottom of sleepers. Anchored, treated wood sleepers shall be spaced at 400 mm 16 inches on center with wood or plywood subfloor or, if required by design considerations, wood sleepers at 300 mm 12 inches on centers without subfloor and with 26 mm 33/32 inch thick flooring. Space between rows of wood sleepers shall be left vacant. Expansion joints shall be 50 mm 2 inches maximum.

##### 3.2.1.2 Steel Channels

Galvanized steel channel system shall be placed on manufacturer's standard grooved foam or grooved resilient insulation board. Expansion joints shall be in accordance with manufacturer's recommendations.

#### 3.2.2 Handball Court Floor and Walls

Strip flooring used for floors and walls in handball courts shall be laid out to provide an overall light appearance; contrast from one board to the next shall be gradual in order to avoid dark streaks.

##### 3.2.3 Squash and Handball Court Walls

Maximum space for expansion shall be 50 mm 2 inches at each wall. Expansion joints over 25 mm 1 inch and expansion joints for steel channel-strip flooring application shall be detailed and the drawings, showing the method of covering, submitted for approval.

#### 3.2.3.1 Wood Supports

Anchored wood supports shall be used to keep the treated wood sleepers shimmed away from the wall to provide ventilation. Wood sleepers shall be spaced at 400 mm 16 inches on center. Exterior grade plywood 15 mm 5/8 inch thick, with two coats of aluminum enamel on the back side in accordance with Section 06 10 00 ROUGH CARPENTRY, shall be used for vapor seal and sound deadener.

#### 3.2.3.2 Steel Supports

Anchored, galvanized, steel channel supports shall be used with steel channel system; steel channels shall be spaced at 300 mm 12 inches on center. The space between the supporting wall and the back of the finished wall shall be filled to within 300 mm 12 inches of the ceiling with an approved hot-poured, steep-slope asphalt as the construction of the wall progresses. As an option to the asphalt-backed wall construction when 26 mm 33/32 inch thick flooring is used, the wall shall be vapor sealed with a 0.15 mm 6 mil thickness of polyethylene sheeting prior to application to steel channels and the space between the supporting wall and the back of the finished wall shall be filled with insulation as used for the floor.

### 3.3 SANDING

Sand flooring to a smooth, even, uniform finish without burns. A minimum of three sanding cuts, each with a finer sandpaper, shall be made. Use a heavy drum-type sander for floors, except a disc-type sander is permitted for the final cut on strip flooring. Either the first pass or the second pass of the drum-type sander shall be at an angle of 45 degrees to the grain; other passes of the drum-type sander shall be in the direction of the grain of strip flooring. Finish edges not reached by the sander with an edger or by hand methods. Perform the final sanding at a time and in a manner that will permit application of the first seal coat as specified in Section 09 90 00 PAINTS AND COATINGS to be completed within 8 hours after completion of sanding. Leave the flooring clean and ready to receive the finishing materials.

### 3.4 PROTECTION

Protect flooring from damage from the time of installation until final acceptance.

-- End of Section --