**UNIFIED FACILITIES GUIDE SPECIFICATIONS**

**References are in agreement with UMRL dated July 2023**
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**08/16, CHG 2: 11/18**

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|---|---|
| **USACE / NAVFAC / AFCEC / NASA** | **UFGS-09 64 29 (August 2016)** |
| | **Change 2 - 11/18** |
| | **----------** |
| **Preparing Activity: USACE** | **Superseding** |
| | **UFGS-09 64 29 (August 2010)** |

**UNIFIED FACILITIES GUIDE SPECIFICATIONS**

**References are in agreement with UMRL dated July 2023**

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SECTION 09 64 29

WOOD STRIP AND PLANK FLOORING
**08/16, CHG 2: 11/18**

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

**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 item(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).**

**********

PART 1 GENERAL

1.1 SUMMARY

**********

**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.**

**********

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 REFERENCES

**********

**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 Reference Identifier (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.**
**********

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 FOREST FOUNDATION (AFF)

| | |
|---|---|
| ATFS STANDARDS | (2015) American Tree Farm System Standards of Sustainability 2015-2020 |

ASTM INTERNATIONAL (ASTM)

| | |
|---|---|
| ASTM D41/D41M | (2011; R 2016) Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing |

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH)

| | |
|---|---|
| CDPH SECTION 01350 | (2017; Version 1.2) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers |

CSA GROUP (CSA)

| | |
|---|---|
| CSA Z809-08 | (R2013) Sustainable Forest Management |

FOREST STEWARDSHIP COUNCIL (FSC)

| | |
|---|---|
| FSC STD 01 001 | (2015) Principles and Criteria for Forest Stewardship |

MAPLE FLOORING MANUFACTURERS ASSOCIATION (MFMA)

| | |
|---|---|
| MFMA GS | (1999) Guide Specifications for Maple Flooring Systems |

NATIONAL WOOD FLOORING ASSOCIATION (NWFA) (formerly NOFMA)

| | |
|---|---|
| NOFMA Grading Rules | (1999) Official Flooring Grading Rules |

PROGRAMME FOR ENDORSEMENT OF FOREST CERTIFICATION (PEFC)

| | |
|---|---|
| PEFC ST 2002:2013 | (2015) PEFC International Standard Chain of Custody of Forest Based Products Requirements |

RESILIENT FLOOR COVERING INSTITUTE (RFCI)

| | |
|---|---|
| FLOORSCORE | FLOORSCORE IAQ Certification |

SCIENTIFIC CERTIFICATION SYSTEMS (SCS)

| | |
|---|---|
| SCS | SCS Global Services (SCS) Indoor Advantage |

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)

| | |
|---|---|
| SCAQMD Rule 1113 | (2016) Architectural Coatings |
| SCAQMD Rule 1168 | (2017) Adhesive and Sealant Applications |

SUSTAINABLE FOREST INITIATIVE (SFI)

| | |
|---|---|
| SFI 2015-2019 | (2015) Standards, Rules for Label Use, Procedures and Guidance |

UNDERWRITERS LABORATORIES (UL)

| | |
|---|---|
| UL 2818 | (2022) GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings |

## 1.3 SUBMITTALS

**********

**NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified 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 Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters 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.**

**The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.**

**Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.**

**********

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When

used, a code following the "G" classification 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[, [_____]]

Strip Flooring; G[, [_____]]

SD-03 Product Data

Strip Flooring

Recycled Content for Wood Strip and Plank Flooring; S

Bamboo

Indoor Air Quality for Asphalt Primer; S

Indoor Air Quality for Asphalt Mastic; S

Biobased Content for Bamboo Flooring; S

Installation

SD-04 Samples

Strip And Plank Flooring

SD-07 Certificates

Certified Sustainably Harvested Wood Strip and Plank Flooring; S

Indoor Air Quality for Wood Strip and Plank Flooring; S

Indoor Air Quality for Bamboo Flooring; S

Indoor Air Quality for Resilient Pads; S

1.4 CERTIFICATIONS

**********

**NOTE: Use certified sustainably harvested wood where suitable for application and cost effective. Sustainably Harvested Wood is a product which comes from a third-party Forestry Certification Program and thus carries certain characteristics: 1) Protection of biodiversity, species at risk and wildlife habitat, sustainable harvest levels, protection of water quality, and prompt regeneration (e.g., replanting and reforestation); 2) Third-party certification audits performed by accredited certification bodies; 3) Publicly available certification audit summaries; 4) Multi-stakeholder involvement in a standards development process; 5) Complaints and appeals process.**

**Verify suitability, availability within the region,**

**cost effectiveness and adequate competition before specifying these sustainably harvested wood certifications - if these conditions are verified for the project locale, include the following section. For projects pursuing LEED, delete certifications other than FSC; for all other projects pursuing third-party certification allow the entire list of third party certifications.**
**********

[1.4.1 Certified Sustainably Harvested Wood

Provide wood certified as sustainably harvested by FSC STD 01 001[, ATFS STANDARDS, CSA Z809-08, SFI 2015-2019, or other third party program certified by PEFC ST 2002:2013]. Provide a letter of Certification of Sustainably Harvested Wood signed by the wood supplier. Identify certifying organization and their third party program name and indicate compliance with chain-of-custody program requirements. Submit sustainable wood certification data; identify each certified product on a line item basis. Submit copies of invoices bearing certification numbers.

]1.4.2 Indoor Air Quality Certifications

Submit required indoor air quality certifications in one submittal package.
**********
**NOTE: Include this subparagraph requiring low VOC content products when product will be located in offices or classrooms.**
**********

[1.4.2.1 Floor Covering Materials

Provide wood strip and plank flooring, bamboo flooring, and resilient pad products certified to meet indoor air quality requirements by FLOORSCORE, UL 2818 (GreenGuard) Gold, SCS Global Services Indoor Advantage Gold or provide certification or validation by other third-party program that products meet the requirements of this Section. Provide current product certification documentation from certification body. When product does not have certification, provide validation that product meets the indoor air quality product requirements cited herein.

]1.5 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. Maintain flooring at an average moisture content of 6 to 9 percent. Temperature and humidity in the storage area must closely approximate the temperature and humidity of the rooms in which the flooring is to be installed.

1.6 ENVIRONMENTAL REQUIREMENTS

**********
**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.**
**********

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. Maintain the temperature at 14 to 27 degrees C 55 to 80 degrees F and maintain the humidity [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.

## 1.7 SCHEDULING

Schedule strip and plank flooring work 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

**********
**NOTE: Designer will select appropriate species and will permit maximum competition wherever possible; however, gymnasiums will be limited to hard maple. Flooring of 26 mm 33/32 inch) thickness should be considered when floors will be subjected to hard service and frequent sanding.**
**********

### 2.1.1 General Requirements

**********
**NOTE: Use certified sustainably harvested wood where suitable for application and cost effective. Designer must verify suitability, availability within the region, cost effectiveness, and adequate competition before specifying this certification.**

**NOTE: Use materials with recycled content where appropriate for use. Verify suitability, availability within the region, cost effectiveness and adequate competition (including verification of bracketed percentages included in this guide specification) before specifying product recycled content requirements.**

**Research shows the product is available from US national manufacturers above the minimum recycled content percentages shown below. Some manufacturers and regions have higher percentages. Based on research, insert desired minimum percentages into the empty set of brackets.**

**Include last bracketed sentences requiring certification or validation for indoor air quality when product will be located in offices or classrooms.**

**In termite-prone areas, wood flooring should be termite treated. Verify with manufacturer for availability and effect on finishes.**

**********

Strip and plank flooring must 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. [Provide certified sustainably harvested wood strip and plank flooring. ] Beech and birch must be second grade in accordance with NOFMA Grading Rules. Hard maple must be second and better in accordance with MFMA GS. Red and white oak must be select grade in accordance with NOFMA Grading Rules. Provide wood products with no added urea-formaldehyde resins. Strip flooring must be marked with the trademark of the grading agency. Submit two samples of each type of strip and plank flooring. [Wood Strip Flooring must contain a minimum of [90][_____] percent reclaimed, salvaged, and recycled wood. Provide data identifying percentage of recycled content for wood strip and plank flooring.][ Provide a product treated for resistance to termite damage.][

Provide flooring product meeting emissions requirements of CDPH SECTION 01350. Provide certification or validation of indoor air quality for wood strip and plank flooring.]

[2.1.2 Bamboo

**********

**NOTE: Use of materials, such as bamboo, with bio-based content is required where suitable for application and cost effective. Verify availability within the region, cost effectiveness and adequate competition before specifying product bio-based content requirements. A resource that can be used to identify products with bio-based content is the "Catalog" tab within the USDA's "Biopreferred" website at http://www.biopreferred.gov. The bio-based content percentage listed is the required threshold within the USDA Biopreferred program. Use of other products which meet all requirements of this specification and contain bio-based content is also acceptable."**

**Include last bracketed sentences requiring certification or validation for indoor air quality when product will be located in offices or classrooms.**

**In termite-prone areas, bamboo flooring should be termite treated. Verify with manufacturer for availability and effect on finishes.**

**********

Bamboo flooring must 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]. Provide

bamboo products with minimum 91 percent bio-based content. Submit data identifying percentage of biobased content for bamboo flooring.[ Provide a product treated for resistance to termite damage.][

Provide flooring product meeting emissions requirements of CDPH SECTION 01350. Provide certification or validation of indoor air quality for bamboo flooring.]

]2.2 NAILS

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

2.3 RESILIENT PADS

**********
**NOTE: Include last bracketed sentences requiring certification or validation for indoor air quality when product will be located in offices or classrooms.**
**********

Resilient pads must be pneumatic rubber, PVC, or polyurethane resilient mounts to fit the selected floor system. [Provide product meeting emissions requirements of CDPH SECTION 01350. Provide certification or validation of indoor air quality for resilient pads.]

2.4 WALL BASE

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

2.5 MOISTURE BARRIER

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

2.6 CLIPS, ANCHOR CHANNELS AND INSULATION

**********
**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.**
**********

Galvanized steel clips for steel channel anchorage systems must be in accordance with steel channel anchorage system manufacturer's recommendations. Clips must be designed to provide holding at least equal to the nailing specified and must function without splitting the assembled boards or otherwise reducing the performance of the floor. Anchor channels must be as recommended by the flooring manufacturer. Anchor channels must be galvanized, complete with all pads, anchors and other components required for channel installation. Underfloor insulation must be asphalt impregnated fiberboard or closed-cell polyethylene foam.

2.7 ASPHALT PRIMER

ASTM D41/D41M. Provide asphalt primer product meeting either emissions requirements of CDPH SECTION 01350 (limit requirements for either office

or classroom spaces regardless of space type) or VOC content requirements of SCAQMD Rule 1113. Provide validation of indoor air quality for asphalt primer.

## 2.8 ASPHALT MASTIC

As recommended by the flooring manufacturer. Provide asphalt mastic products meeting either emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) or VOC content requirements of SCAQMD Rule 1168. Provide validation of indoor air quality for asphalt mastic.

# PART 3 EXECUTION

## 3.1 SURFACE CONDITIONS

Concrete slab must 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 must be clean, dry, and approved prior to start of installation. The slab must be depressed as required by the floor specified.

## 3.2 INSTALLATION

Install flooring in accordance with the approved installation instructions of the manufacturer. Submit manufacturer's descriptive data and installation instructions. Wood nailers are specified in Section 06 10 00 ROUGH CARPENTRY. Unless otherwise approved, flooring must be laid parallel to the length of the area to be floored. Strips must 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 flooring]. End joints must 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 must 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 must 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.

Do not install building construction materials that show visual evidence of biological growth.

### 3.2.1 Gymnasium Floors

#### 3.2.1.1 Wood Sleepers

For wood sleeper supported floors, the slab must 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 must 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 must be left vacant. Expansion joints must be 50 mm 2 inches maximum.

#### 3.2.1.2 Steel Channels

Galvanized steel channel system must be placed on manufacturer's standard

grooved foam or grooved resilient insulation board. Expansion joints must 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 must be laid out to provide an overall light appearance; contrast from one board to the next must be gradual in order to avoid dark streaks.

### 3.2.3 Squash and Handball Court Walls

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

#### 3.2.3.1 Wood Supports

Anchored wood supports must be used to keep the treated wood sleepers shimmed away from the wall to provide ventilation. Wood sleepers must 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, must be used for vapor seal and sound deadener.

#### 3.2.3.2 Steel Supports

Anchored, galvanized, steel channel supports must be used with steel channel system; steel channels must be spaced at 300 mm 12 inches on center. The space between the supporting wall and the back of the finished wall must 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 must 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 must be filled with insulation as used for the floor.

## 3.3 SANDING

Sand flooring to a smooth, even, uniform finish without burns. Make a minimum of three sanding cuts, each with a finer sandpaper. 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 must be at an angle of 45 degrees to the grain; other passes of the drum-type sander must 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 --