



WMU Design Guidelines Instructions: These guidelines are to be used by the Design Professional to inform the design process and outline WMU-specific desires for University projects. Text appearing in blue indicates a WMU design guideline which must be met for all campus projects unless approved in writing by the University. Blue text that is struck out indicates products or practices that are **not** acceptable, and shall not be included unless similarly approved. Any text remaining in black is to be edited by the Design Professional as part of the normal specifications-writing process. Guidelines language shall be included in the project specifications and their intent incorporated into the drawings.

SECTION 09 3013 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Ceramic mosaic tile.
2. Quarry tile.
3. Pressed floor tile.
4. Porcelain tile.
5. Glazed wall tile.
6. Stone thresholds.
7. Tile backing panels.
8. Waterproof membrane **[for thinset applications]**.
9. Crack isolation membrane.
10. Metal edge strips.

1.2 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."
- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **[Project site]** **<Insert location>**.
 1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.



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1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

Designer Note: For projects seeking LEED certification, include sustainable design submittals as required.

B. Sustainable Design Submittals:

1. <Double click to insert sustainable design text for adhesives.>
2. <Double click to insert sustainable design text for low-emitting sealers.>

C. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

1. Provide detailed drawings of all tile patterns on floors and walls. Include pattern, tile type, tile sizes and dimensions.

D. Samples for Initial Selection: For tile, grout, and accessories involving color selection.

E. Samples for Verification: Full-size units of each type and composition of tile and for each color and finish required.

1. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least [**12 inches square**] [**36 inches square**] **<Insert size>**, but not fewer than four tiles. Use grout of type and in color or colors approved for completed Work.
3. Full-size units of each type of trim and accessory [**for each color and finish required**].
4. Stone thresholds in 6-inch lengths.
5. Metal edge strips in 6-inch lengths.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

C. Product Certificates: For each type of product.

D. Product Test Reports: For tile-setting and -grouting products [**and certified porcelain tile**].

1.6 MAINTENANCE MATERIAL SUBMITTALS

Designer Note: The amount of attic stock is determined on a project-by-project basis. This needs to be discussed with WMU during the design phases of the project, including where the extra materials will be stored.



- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Tile and Trim Units: [Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.]
 - a. <Insert, in separate subparagraphs, tile-type designation or description and quantity required for each category of tile for which extra material is required>.
 - 2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Installer is [a five-star member of the National Tile Contractors Association] [or] [a Trowel of Excellence member of the Tile Contractors' Association of America].
 - 2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
 - 3. Installer employs [Ceramic Tile Education Foundation Certified Installers] [or] [installers recognized by the U.S. Department of Labor as Journeyman Tile Layers].
- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockup of [each type of] floor tile installation.
 - 2. Build mockup of [each type of] wall tile installation.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.



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PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Tile: Obtain **[tile of each type and color or finish] [tile of each type] [tile of each color or finish] [tile]** from single source or producer.
 - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.
 - 1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
 - 2. Obtain **[waterproof membrane] [and] [crack isolation membrane]**, except for sheet products, from manufacturer of setting and grouting materials.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:
 - 1. Stone thresholds.
 - 2. Waterproof membrane.
 - 3. Crack isolation membrane.
 - 4. Cementitious backer units.
 - 5. Metal edge strips.

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard grade requirements **[unless otherwise indicated]**.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
 - 1. Where tile is indicated for installation **[in swimming pools] [on exteriors] [or] [in wet areas]**, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.



2.3 TILE PRODUCTS

A. Ceramic Tile Type [CT-#>]: Factory-mounted [unglazed] [glazed] ceramic mosaic tile.

1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
2. Composition: [Porcelain] [Impervious natural clay or porcelain] [Vitreous or impervious natural clay or porcelain].
3. Certification: Porcelain tile certified by the Porcelain Tile Certification Agency.
4. Module Size: [1 by 1 inch] [1 by 2 inches] [2 by 2 inches] <Insert dimensions>.
5. Thickness: 1/4 inch.
6. Face: [Plain] [Pattern of design indicated,] with cushion edges.
7. Surface: [Smooth, without] [Slip resistant, with] abrasive admixture.
8. Dynamic Coefficient of Friction: Not less than 0.42.
9. Finish: [Bright, opaque] [Bright, clear] [Mat, opaque] [Mat, clear] [Semimat, opaque] [Semimat, clear] [Vellum, opaque] [Vellum, clear] [Crystalline] <Insert description> glaze.
10. Tile Color and Pattern: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and pattern>.
11. Grout Color: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color>.
12. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable [and matching characteristics of adjoining flat tile]. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base Cove: Cove, module size [1 by 1 inch] [2 by 1 inch] <Insert dimensions>.
 - b. Base Cap for Portland Cement Mortar Installations: Bead (bullnose), module size [1 by 1 inch] [2 by 1 inch] <Insert dimensions>.
 - c. Base Cap for Thinset Mortar Installations: Surface bullnose, module size [1 by 1 inch] [2 by 1 inch] [2 by 2 inches] <Insert dimensions>.
 - d. Wainscot Cap for Portland Cement Mortar Installations: Bead (bullnose), module size [1 by 1 inch] [2 by 1 inch] <Insert dimensions>.
 - e. Wainscot Cap for Thinset Mortar Installations: Surface bullnose, module size [1 by 1 inch] [2 by 1 inch] [2 by 2 inches] <Insert dimensions>.
 - f. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.
 - g. External Corners for Portland Cement Mortar Installations: Bead (bullnose), module size [1 by 1 inch] [2 by 1 inch] <Insert dimensions>.
 - h. External Corners for Thinset Mortar Installations: Surface bullnose, module size [1 by 1 inch] [2 by 1 inch] [2 by 2 inches] <Insert dimensions>.
 - i. Internal Corners: Cove, module size [1 by 1 inch] [2 by 1 inch] <Insert dimensions>.
 - j. Internal Corners: Field-buttet square corners. For coved base and cap, use angle pieces designed to fit with stretcher shapes.
 - k. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide reduction in thickness from 1/2 to 1/4 inch across nominal 4-inch dimension.

B. Ceramic Tile Type [CT-#>]: [Unglazed] [Glazed] square-edged quarry tile.

1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
2. Face Size: [3 by 3 inches] [4 by 4 inches] [6 by 3 inches] [6 by 6 inches] [8 by 3-7/8 inches] [8 by 8 inches] <Insert dimensions>.



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3. Thickness: [3/8 inch] [1/2 inch] [3/4 inch].
4. Wearing Surface: [Nonabrasive, smooth] [Abrasive aggregate embedded in surface] <Insert description>.
5. Dynamic Coefficient of Friction: Not less than 0.42.
6. Finish: [Bright, opaque] [Bright, clear] [Mat, opaque] [Mat, clear] [Semimat, opaque] [Semimat, clear] [Vellum, opaque] [Vellum, clear] [Crystalline] <Insert description> glaze.
7. Tile Color and Pattern: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and pattern>.
8. Grout Color: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color>.
9. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable [and matching characteristics of adjoining flat tile]. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base: Coved [with surface bullnose top edge], face size [6 by 6 inches] [8 by 3-7/8 inches] <Insert dimensions>.
 - b. Wainscot Cap: Surface bullnose, face size [6 by 6 inches] [8 by 3-7/8 inches] <Insert dimensions>.
 - c. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.

C. Ceramic Tile Type [CT-<#>]: [Unglazed] [Glazed] pressed floor tile.

1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
2. Composition: [Impervious natural clay or porcelain] [Vitreous or impervious natural clay or porcelain] [Natural clay or porcelain].
3. Face Size: [3 by 3 inches] [4 by 4 inches] [6 by 6 inches] [7-3/4 by 3-7/8 inches] [7-7/8 by 7-7/8 inches] [11-13/16 by 11-13/16 inches] [165 by 333 mm] [200 by 250 mm] [250 by 250 mm] [333 by 333 mm] [400 by 400 mm] <Insert dimensions>.
4. Face Size Variation: [Calibrated or rectified] [Rectified].
5. Thickness: [1/4 inch] [3/8 inch] [1/2 inch].
6. Face: [Plain with square or cushion edges] [Plain with square edges] [Plain with cushion edges] [Pattern of design indicated, with square or cushion edges] [As indicated].
7. Dynamic Coefficient of Friction: Not less than 0.42.
8. Glaze: [Bright, opaque] [Bright, clear] [Mat, opaque] [Mat, clear] [Semimat, opaque] [Semimat, clear] [Vellum, opaque] [Vellum, clear] [Crystalline] <Insert description>.
9. Tile Color and Pattern: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and pattern>.
10. Grout Color: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color>.
11. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable [and matching characteristics of adjoining flat tile]. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base Cove: Cove, module size [same as adjoining flat tile] <Insert size>.
 - b. Base Cap for Portland Cement Mortar Installations: Bead (bullnose), module size [same as adjoining flat tile] <Insert size>.
 - c. Base Cap for Thinset Mortar Installations: Surface bullnose, module size [same as adjoining flat tile] <Insert size>.



- d. Wainscot Cap for Portland Cement Mortar Installations: Bead (bullnose), module size **[same as adjoining flat tile]** <Insert size>.
 - e. Wainscot Cap for Thinset Mortar Installations: Surface bullnose, module size **[same as adjoining flat tile]** <Insert size>.
 - f. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.
 - g. External Corners for Portland Cement Mortar Installations: Bead (bullnose), module size **[same as adjoining flat tile]** <Insert size>.
 - h. External Corners for Thinset Mortar Installations: Surface bullnose, module size **[same as adjoining flat tile]** <Insert size>.
 - i. Internal Corners: Cove, module size **[same as adjoining flat tile]** <Insert size>.
 - j. Internal Corners: Field-buttet square corners. For coved base and cap, use angle pieces designed to fit with stretcher shapes.
 - k. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide reduction in thickness from 1/2 to 1/4 inch across nominal 4-inch dimension.
- D. Ceramic Tile Type [CT-<#>]: **[Unglazed]** **[Glazed]** porcelain tile.
1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
 2. Certification: Tile certified by the Porcelain Tile Certification Agency.
 3. Face Size: **[3 by 3 inches]** **[4 by 4 inches]** **[6 by 6 inches]** **[7-3/4 by 3-7/8 inches]** **[7-7/8 by 7-7/8 inches]** **[11-13/16 by 11-13/16 inches]** **[165 by 333 mm]** **[200 by 250 mm]** **[250 by 250 mm]** **[333 by 333 mm]** **[400 by 400 mm]** <Insert dimensions>.
 4. Face Size Variation: Rectified.
 5. Thickness: **[1/4 inch]** **[3/8 inch]** **[1/2 inch]**.
 6. Face: **[Plain with square or cushion edges]** **[Plain with square edges]** **[Plain with cushion edges]** **[Polished with square edges]** **[As indicated]**.
 7. Dynamic Coefficient of Friction: Not less than 0.42.
 8. Tile Color, Glaze, and Pattern: **[As indicated by manufacturer's designations]** **[Match Architect's sample]** **[As selected by Architect from manufacturer's full range]** <Insert color, glaze, and pattern>.
 9. Grout Color: **[As indicated by manufacturer's designations]** **[Match Architect's sample]** **[As selected by Architect from manufacturer's full range]** <Insert color>.
 10. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable **[and matching characteristics of adjoining flat tile]**. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base Cap: Surface bullnose, module size **[same as adjoining flat tile]** <Insert size>.
 - b. Wainscot Cap: Surface bullnose, module size **[same as adjoining flat tile]** <Insert size>.
 - c. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.
 - d. External Corners: Surface bullnose, module size **[same as adjoining flat tile]** <Insert size>.
 - e. Internal Corners: Field-buttet square corners.
 - f. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide reduction in thickness from 1/2 to 1/4 inch across nominal 4-inch dimension.



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- E. Ceramic Tile Type [CT-<#>]: Glazed wall tile.
1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
 2. Module Size: [4-1/4 by 4-1/4 inches] [6 by 4-1/4 inches] [6 by 6 inches] [200 by 200 mm] [250 by 250 mm] [200 by 300 mm] <Insert dimensions>.
 3. Face Size Variation: Rectified.
 4. Thickness: 5/16 inch.
 5. Face: [Plain with modified square edges or cushion edges] [Plain with modified square edges] [Plain with cushion edges] [Pattern of design indicated, with manufacturer's standard edges].
 6. Finish: [Bright, opaque] [Bright, clear] [Mat, opaque] [Mat, clear] [Semimat, opaque] [Semimat, clear] [Vellum, opaque] [Vellum, clear] [Crystalline] <Insert description> glaze.
 7. Tile Color and Pattern: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and pattern>.
 8. Grout Color: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color>.
 9. Mounting: Factory, back mounted.
 10. Mounting: PregROUTED sheets of tiles are factory assembled and grouted with manufacturer's standard white silicone rubber.
 11. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable [and matching characteristics of adjoining flat tile]. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base for Portland Cement Mortar Installations: Coved, module size [4-1/4 by 4-1/4 inches] [6 by 6 inches] [6 by 3-3/4 inches] <Insert dimensions>.
 - b. Base for Thinset Mortar Installations: Straight, module size [4-1/4 by 4-1/4 inches] [6 by 6 inches] [6 by 2 inches] <Insert dimensions>.
 - c. Wainscot Cap for Portland Cement Mortar Installations: Bullnose cap, module size [4-1/4 by 4-1/4 inches] [6 by 6 inches] [6 by 2 inches] <Insert dimensions>.
 - d. Wainscot Cap for Thinset Mortar Installations: Surface bullnose, module size [4-1/4 by 4-1/4 inches] [6 by 6 inches] [6 by 2 inches] <Insert dimensions>.
 - e. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.
 - f. External Corners for Portland Cement Mortar Installations: Bullnose shape with radius of at least 3/4 inch unless otherwise indicated.
 - g. External Corners for Thinset Mortar Installations: Surface bullnose, same size as adjoining flat tile.
 - h. Internal Corners: Field-butted square corners. For coved base and cap use angle pieces designed to fit with stretcher shapes.
- F. Accessories: Provide vitreous china accessories of type and size indicated, suitable for installing by same method as used for adjoining wall tile.
1. One soap holder [with grab handle] for each shower and tub indicated.
 2. One paper holder at each water closet.
 3. Color and Finish: [Match adjoining glazed wall tile] [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] [White, bright glaze] <Insert color and finish>.



2.4 THRESHOLDS

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
 - 1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 4/2 1/4 inch or less above adjacent floor surface.
- B. Granite Thresholds: ASTM C615/C615M, with **[polished] [honed] <Insert finish>** finish.
 - 1. Description: Uniform, **[fine] [medium]**-grained, **[white] [gray] [black] <Insert color>** stone without veining.
 - 2. Description: Match Architect's sample.
 - 3. Description: Provide **[one of]** the following:
 - a. **<Insert, in separate subparagraphs, name of variety and producer, distributor, or importer>**.
- C. Marble Thresholds: ASTM C503/C503M, with a minimum abrasion resistance of **[10] [12]** according to ASTM C1353 or ASTM C241/C241M and with honed finish.
 - 1. Description: Uniform, fine- to medium-grained white stone with gray veining.
 - 2. Description: Match Architect's sample.
 - 3. Description: Provide **[one of]** the following:
 - a. **<Insert, in separate subparagraphs, name of variety and producer, distributor, or importer>**.
- D. Slate Thresholds: ASTM C629/C629M, Classification **[I Exterior] [II Interior]**, with fine, even grain and honed finish.
 - 1. Description: Uniform, **[black] [blue-black] [gray] [blue-gray] [green] <Insert color>** stone **[and unfading]**.
 - 2. Description: Match Architect's sample.
 - 3. Description: Provide **[one of]** the following:
 - a. **<Insert, in separate subparagraphs, name of variety and producer, distributor, or importer>**.

2.5 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 or ASTM C1325, Type A, in maximum lengths available to minimize end-to-end butt joints.
 - 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
 - 2. Thickness: **[1/4 inch] [1/2 inch] [5/8 inch] [As indicated]**.
- B. Fiber-Cement Backer Board: ASTM C1288, in maximum lengths available to minimize end-to-end butt joints.
 - 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>



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2. Thickness: [1/4 inch] [1/2 inch] [As indicated].

2.6 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product, **[selected from the following,]** that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Chlorinated Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric.
 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
 2. Nominal Thickness: 0.030 inch.
 3. Nominal Thickness: 0.040 inch.
- C. PVC Sheet: PVC heat-fused on both sides to facings of nonwoven polyester.
 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
 2. Nominal Thickness: 0.025 inch.
 3. Nominal Thickness: 0.040 inch.
- D. Polyethylene Sheet: Polyethylene faced on both sides with fleece webbing; 0.008-inch nominal thickness.
 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- E. Fabric-Reinforced, Modified-Bituminous Sheet: Self-adhering, SBS-modified-bituminous sheet with fabric reinforcement facing; 0.040-inch nominal thickness.
 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- F. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement.
 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- G. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.
 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- H. Latex-Portland Cement Waterproof Mortar: Flexible, waterproof mortar consisting of cement-based mix and latex additive.
 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- I. Waterproofing and Tile-Setting Adhesive: One-part, fluid-applied product intended for use as both waterproofing and tile-setting adhesive in a two-step process.
 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
 2. <Double click to insert sustainable design text for VOC content of adhesive.>
 3. <Double click to insert sustainable design text for adhesives.>



2.7 CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard product, **[selected from the following,]** that complies with ANSI A118.12 for **[standard performance]** **[high performance]** and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Chlorinated Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric; 0.030-inch nominal thickness.
 - 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- C. PVC Sheet: PVC heat-fused on both sides to facings of nonwoven polyester; 0.040-inch nominal thickness.
 - 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- D. Polyethylene Sheet: Polyethylene faced on both sides with fleece webbing; 0.008-inch nominal thickness.
 - 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- E. Corrugated Polyethylene: Corrugated polyethylene with dovetail-shaped corrugations and with anchoring webbing on the underside; 3/16-inch nominal thickness.
 - 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- F. Fabric-Reinforced, Modified-Bituminous Sheet: Self-adhering, modified-bituminous sheet with fabric reinforcement facing; 0.040-inch nominal thickness.
 - 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- G. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and fabric reinforcement.
 - 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- H. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.
 - 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- I. Latex-Portland Cement Crack-Resistant Mortar: Flexible mortar consisting of cement-based mix and latex additive.
 - 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- J. Crack Isolation Membrane and Tile-Setting Adhesive: One-part, fluid-applied product intended for use as both a crack isolation membrane and tile-setting adhesive in a two-step process.
 - 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
 - 2. <Double click to insert sustainable design text for VOC content of adhesive.>
 - 3. <Double click to insert sustainable design text for adhesives.>



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2.8 SETTING MATERIALS

- A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.
1. Cleavage Membrane: Asphalt felt, ASTM D226/D226M, Type I (No. 15); or polyethylene sheeting, ASTM D4397, 4.0 mils thick.
 2. Reinforcing Wire Fabric: Galvanized, welded-wire fabric, 2 by 2 inches by 0.062-inch diameter; comply with ASTM A185/A185M and ASTM A82/A82M, except for minimum wire size.
 3. Expanded Metal Lath: Diamond-mesh lath complying with ASTM C847.
 - a. Base Metal and Finish for Interior Applications: Uncoated or zinc-coated (galvanized) steel sheet, with uncoated steel sheet painted after fabrication into lath.
 - b. Base Metal and Finish for Exterior Applications: Zinc-coated (galvanized) steel sheet.
 - c. Configuration over Studs and Furring: Flat.
 - d. Configuration over Solid Surfaces: Self-furring.
 - e. Weight: **[2.5 lb/sq. yd.] [3.4 lb/sq. yd.]**.
 4. Latex Additive: **[Manufacturer's standard] [acrylic resin] [or] [styrene-butadiene-rubber]** water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.
- B. Standard Dry-Set Mortar (Thinset): ANSI A118.1.
1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
 2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.1.
- C. Modified Dry-Set Mortar (Thinset): ANSI A118.4.
1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 3. Provide prepackaged, dry-mortar mix combined with **[acrylic resin] [or] [styrene-butadiene-rubber]** liquid-latex additive at Project site.
 4. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.
- D. Medium-Bed, Modified Dry-Set Mortar: Comply with requirements in ANSI A118.4. Provide product that is approved by manufacturer for application thickness of **[5/8 inch]** <Insert thickness>.
1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 3. Provide prepackaged, dry-mortar mix combined with **[acrylic resin] [or] [styrene-butadiene-rubber]** liquid-latex additive at Project site.



- E. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.
1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 3. Provide prepackaged, dry-mortar mix combined with **[acrylic resin] [or] [styrene-butadiene-rubber]** liquid-latex additive at Project site.
 4. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.15.
- F. EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar (Thinset): ANSI A118.11.
1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 3. Provide prepackaged, dry-mortar mix combined with **[acrylic resin] [or] [styrene-butadiene-rubber]** liquid-latex additive at Project site.
- G. Water-Cleanable, Tile-Setting Epoxy: ANSI A118.3.
1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
 2. [<Double click to insert sustainable design text for VOC content of adhesive.>](#)
 3. [<Double click to insert sustainable design text for adhesives.>](#)
 4. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F, respectively, and certified by manufacturer for intended use.
- H. Organic Adhesive: ANSI A136.1, Type I.
1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
 2. [<Double click to insert sustainable design text for VOC content of adhesive.>](#)
 3. [<Double click to insert sustainable design text for adhesives.>](#)

2.9 GROUT MATERIALS

Designer Note: Use of epoxy grout is preferred in all campus applications unless tile type prohibits use. Use of white or near white grouts are not acceptable.

- A. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.
- B. Standard Cement Grout: ANSI A118.6.
1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
- C. High-Performance Tile Grout: ANSI A118.7.
1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
 2. Polymer Type: Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.
 3. Polymer Type: **[Acrylic resin] [or] [styrene-butadiene rubber]** in liquid-latex form for addition to prepackaged dry-grout mix.



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- D. Water-Cleanable Epoxy Grout: ANSI A118.3, **[with a VOC content of 65 g/L or less]**.
 - 1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
 - 2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F, respectively, and certified by manufacturer for intended use.
- E. Grout for Pregrouted Tile Sheets: Same product used in factory to pregrout tile sheets.

2.10 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Vapor-Retarder Membrane: Polyethylene sheeting, ASTM D4397, 4.0 mils thick.

Designer Note: WMU prefers Schluter Systems metal edge strips at all tile transitions (including vertical-to-vertical, horizontal-to-vertical and end-of-tile applications). Rubber transition strips are not favored.

- C. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; **[half-hard brass] [white zinc alloy] [nickel silver] [stainless-steel, ASTM A666, 300 Series]** exposed-edge material.
 - 1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
- D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- E. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.
 - 1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
 - 2. [<Double click to insert sustainable design text for floor treatment products.>](#)

2.11 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.



PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that concrete substrates for tile floors installed with **[adhesives] [bonded mortar bed] [or] [thinset mortar]** comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 - 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 - 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with **[adhesives] [or] [thinset mortar]** with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 CERAMIC TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.



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1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
 - a. Exterior tile floors.
 - b. Tile floors in wet areas.
 - c. Tile swimming pool decks.
 - d. Tile floors in laundries.
 - e. Tile floors consisting of tiles 8 by 8 inches or larger.
 - f. Tile floors consisting of rib-backed tiles.

- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

- E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.

- F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

- G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 1. Ceramic Mosaic Tile: **[1/16 inch] [1/8 inch]**.
 2. Quarry Tile: **[1/4 inch] [3/8 inch]**.
 3. Pressed Floor Tile: **[1/4 inch] [3/8 inch]**.
 4. Glazed Wall Tile: **[1/16 inch] [1/8 inch]**.
 5. Porcelain Tile: **[1/4 inch] [3/8 inch]**.

- H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

- I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.



2. Do not bridge expansion joints with flooring materials.
 - J. For seams that occur at doorways, seam shall be centered under the door in its closed position.
 - K. Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.
 1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in **[modified dry-set] [improved modified dry-set]** mortar (thinset).
 2. Do not extend **[cleavage membrane] [waterproofing] [or] [crack isolation membrane]** under thresholds set in **[standard dry-set] [modified dry-set] [or] [improved modified dry-set]** mortar. Fill joints between such thresholds and adjoining tile set on **[cleavage membrane] [waterproofing] [or] [crack isolation membrane]** with elastomeric sealant.
 - L. Metal Edge Strips: Install **[at locations indicated] [where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile] [where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated]**.
 - M. Comply with manufacturer's recommended instructions for finishing the floor.
 - N. Floor Sealer: Apply floor sealer to **[cementitious]** grout joints **[in tile floors]** according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- 3.4 TILE BACKING PANEL INSTALLATION
- A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. **[Use modified dry-set mortar for bonding material unless otherwise directed in manufacturer's written instructions.]**
- 3.5 WATERPROOFING INSTALLATION
- A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
 - B. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.
- 3.6 CRACK ISOLATION MEMBRANE INSTALLATION
- A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
 - B. Allow crack isolation membrane to cure before installing tile or setting materials over it.



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3.7 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. **Cleaning, General:** Comply with manufacturer's written instructions for cleaning floor tile.
- C. **Cleaning:** On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.8 PROTECTION

- A. **Protection, General:** Comply with manufacturer's written instructions for protecting floor tile.
- B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.9 EXTERIOR CERAMIC TILE INSTALLATION SCHEDULE (not included in WMU Design Standards)

3.10 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE (not included in WMU Design Standards)

END OF SECTION 09 3013