Chapter 4-9: Finishes

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4-9.01 Work Included

This discussion will include only the finishes and materials most commonly used for Caltrans buildings. Most materials will require submittals to show color, finish, and quality as called out in the project plans and *Special Provisions*. Installation shall follow manufacturer's recommendations per the authorized submittals.

Not all projects will require the work included under Construction Specifications Institute (CSI) Division 9, *Finishes*. The following finishes, however, will always be included under CSI Division 9 and include Portland cement plaster; textured waterproof coating; gypsum wallboard; ceramic and quarry tile; resilient base; vinyl composition tile; resilient sheet flooring; rubber stair treads; carpeting; painting; vinyl wall covering; fiberglass-reinforced plastic panels; acoustic ceiling tile; suspended ceilings; and pre-finished, vinyl-covered wallboard.

All of the different requirements for the different types of finishes will be included under the applicable special provisions for that work. There are many choices made with respect to finishes, and the authorized submittals will help to provide clarification. Within the authorized submittals, the product data bulletins will be an invaluable source of information to learn the unique conditions for all of the various materials and products.

Review any Standard Special Provisions (SSPs) from Section 99[1], *Building Construction,* Division 9, *Finishes*, that have been included in the project *Special Provisions*, since much of the information therein typically will not be repeated in the following sections of this chapter.

4-9.02 Tips and Suggestions to Prepare for Inspection of Finishes

1. The *Special Provisions* will cover numerous different types of finishes for the project.
2. Although the CSI format covers all the finishes included in a project, the following is limited to the finishes normally found in Caltrans buildings. The work will include metal framing (nonstructural studs); suspension systems for ceilings; acoustical suspension systems; furring and lathing; gypsum plaster; Portland cement plaster; plaster fabrications (such as precast corbels and cornices); gypsum board drywall, including tape, texture, and finish; ceramic tile, quarry tile, terrazzo, acoustic ceilings, vinyl composition tile (VCT) and sheet vinyl flooring; carpeting; vinyl wall coverings; acoustic insulation; sealants; sound barriers; and

[1] Caltrans internal use only

all painting. Framing and substrate, although not considered finish work, are included in this section.

3. The majority of the required finishes will be found on the “Finish Schedule” in the architectural section of the project plans. The “Floor Plan” sheets within the project plans will note each room or space with a room number. This includes spaces such as hallways, bathrooms, equipment bays, break rooms, and offices. With that unique number for each room, refer to the Finish Schedule and determine the finishes that will apply to that specific room. The Finish Schedules, when read from left to right, will show the number of the space or room identification, room or space name, several finishes from which the floor finish for that room will be selected, several base materials from which the base material for that room will be identified, followed by separate columns to identify the various materials selected respectively for the North, East, South, and West walls. Finishes for the ceiling are normally shown last, and then the ceiling height and space for any comments or notes. There will also be a Key associated with the Finish Schedule and a unique aspect of the finish identified by each number. The materials selected for each segment of the room will then be marked in the appropriate column under the finish headings across the top of the list, and then the type of finish or other information will be addressed so that the finish can be tied back to the Key.
4. A “Color Schedule” is also provided and can be found in the architectural section of the project plans, usually adjacent to the room Finish Schedule. The Color Schedule will list the various elements with groupings for interior and exterior substrates, along with a manufacturer and the corresponding color or material provision for each material.
5. The finishes for doors and door frames will be indicated on the “Door Schedule”. The column for the doors will indicate both the material and the type of finish. The column for the frame will indicate the type of material and the type of finish. The Color Schedule will also indicate the paint manufacturer and color for the components, per the Door Schedule.
6. The project *Special Provisions* must be addressed to determine the number of coats of material to be applied. The “Paint Schedule” is arranged so that each type of material (such as concrete and masonry) will be numerically identified systems. The system for each of those individual materials will then identify the type of material and number of coats to be applied, and the respective type of material represented. For instance, materials that require a prime coat will be identified as requiring a prime coat. It will show “1” or “2” indicating the number of coats of primer to be applied. It will then give matching material for the prime coat, such as concrete or masonry primer. Finish coats will be listed in a similar fashion, with one or two coats indicated and the respective material such as acrylic or enamel.

7. Refer to the authorized submittals for paint materials wherein each primer and finish coat will have a specific material identified and authorized. The product data sheet (included in the authorized submittals for paint materials) for the various finishes is one of the more important tools to help you understand the conditions applicable for the painting.
8. The product data sheet will advise on the preparation required for the materials to be painted. In the case of structural steel or fabricated steel, it will even tell you the quality of cleaning required of the steel before it can be painted. In most instances, the product data sheet will refer to industry standards, such as ASTM or the American Institute of Steel Construction (AISC), which can be accessed to determine any unique conditions included in the *Special Provisions* for cleaning and preparation.
9. The product data sheet will also advise on the environmental conditions, for both temperature and humidity, under which the respective paint products can be applied. It will also advise on the temperature conditions which must be maintained for a given period of time and prior to the application of the paint. The product data sheet will also advise on the subsequent coats and types of materials that are compatible for each primer.
10. The product data sheet for the painting will provide information to assist the inspection and evaluation of the quality of the finishes being applied to the project.
11. It is necessary to refer to both the interior elevations and exterior elevations of the architectural section of the project plans for any other special finishes required for the project.

4-9.03 Where to Find Information

4-9.03A Architectural Floor Plan

The floor plan will include a room name and room number for every room on the plan. Those room numbers and names can then be found on the Finish Schedule within the architectural section of the project plans, and all the finishes for that room, including the floor materials, base finishes for all of the walls, ceilings, and special comments, will be displayed on their own finish schedule.

4-9.03B Room Finish Schedule

This will include all the finishes required for each room identified by room name and number for items such as the floor, base, walls, and ceilings, as noted above (see Figure 4-9.1).

4-9.03C Color and Finish Notes or Schedule

These will be found on the “Finish Schedule” sheet and in the comments section of this sheet. These comments and notes will normally be divided into interior and exterior schedules.

4-9.03D Exterior Elevations

These will indicate special materials and/or finishes for various components of the building; these will need to be reviewed closely to cross-reference the notes on the exterior elevations with the notes on the Exterior Finish and Color Schedule (see Figure 4-9.2 and Figure 4-9.5).

4-9.03E Interior Elevations

These interior elevations will be listed room by room and wall elevation by wall elevation. The unique conditions of the finishes must again be closely coordinated with the Interior Color and Finish Schedule (See Figures 4-9.3 and 4-9.4).

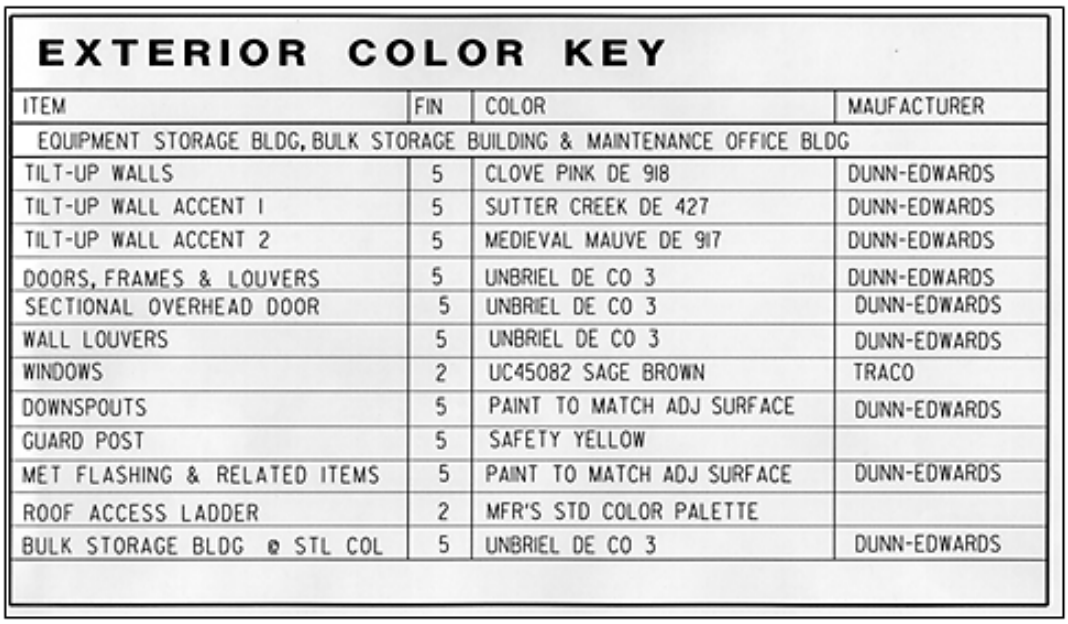
4-9.03F Special Provisions

The project *Special Provisions* will provide any other unique information that might be required for any of the finishes.

FINISH SCHEDULE

MATERIAL FINISHES			FLOOR					BASE				WALLS											
												NORTH					EAST						
1. UNFINISHED CLEAN 2. WATER REPELLANT COATING 3. SEALER /HARDENER 4. PAINT SYSTEM 5. MANUFACTURER'S FINISH			203x203 CERAMIC TILE	CARPET	305x305 POR. CER. TILE	RESILIENT VINYL TILE	CONCRETE	152 CERAMIC TILE	102 RUBBER BASE	152 RUBBER BASE	NONE	108x108 CERAMIC TILE	15.875 GYP. BD. TYPE "X"	12.7 PLYWOOD	FRPP		108x108 CERAMIC TILE	15.875 GYP. BD. TYPE "X"	12.7 PLYWOOD	FRPP		108x108 CERAMIC TILE	15.875 GYP. BD. TYPE "X"
	RM NO	ROOM NAME																					
REGION OFFICE	101	HVAC					3		1				4					4					4
	102	SUPERVISOR 1		1					1				4					4					4
	103	ELECTRICAL CLOSET				1			1				4					4					4
	104	SUPERVISOR 2		1					1				4					4					4
	105	MEN	1					1					4				1	4				1	
	106	WOMEN	1					1				1					1	4					4
	107	CORRIDOR			1				1				4					4					4
	108	RECORDS STORAGE		1					1				4					4					4

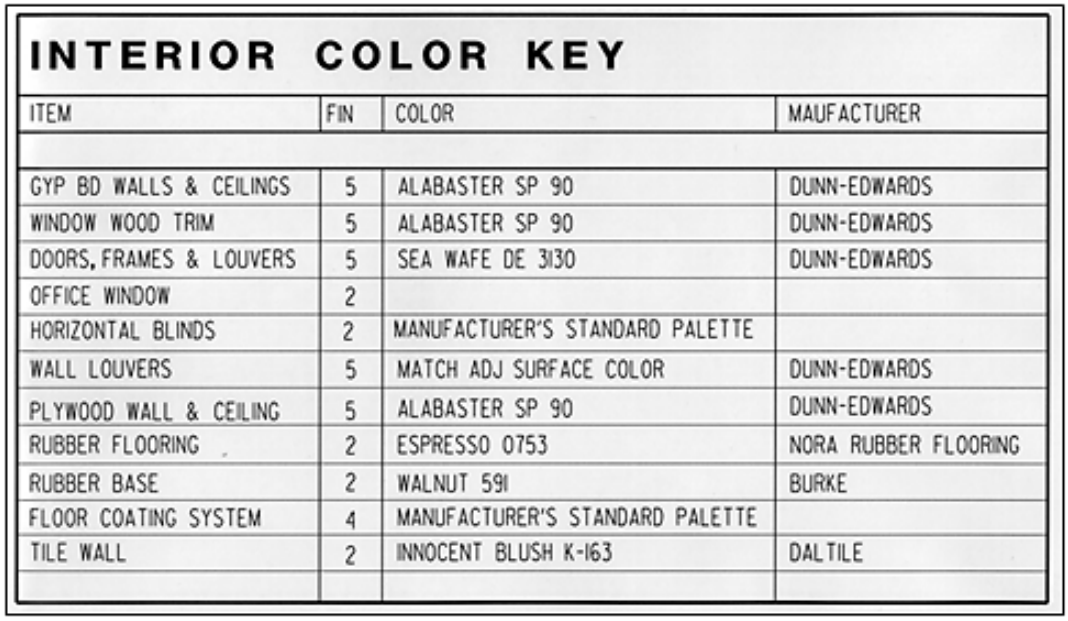
Figure 4-9.1. Partial Finish Schedule Shown Is Taken from Architectural Plans



EXTERIOR COLOR KEY

ITEM	FIN	COLOR	MAUFACTURER
EQUIPMENT STORAGE BLDG, BULK STORAGE BUILDING & MAINTENANCE OFFICE BLDG			
TILT-UP WALLS	5	CLOVE PINK DE 918	DUNN-EDWARDS
TILT-UP WALL ACCENT 1	5	SUTTER CREEK DE 427	DUNN-EDWARDS
TILT-UP WALL ACCENT 2	5	MEDIEVAL MAUVE DE 917	DUNN-EDWARDS
DOORS, FRAMES & LOUVERS	5	UNBRIEL DE CO 3	DUNN-EDWARDS
SECTIONAL OVERHEAD DOOR	5	UNBRIEL DE CO 3	DUNN-EDWARDS
WALL LOUVERS	5	UNBRIEL DE CO 3	DUNN-EDWARDS
WINDOWS	2	UC45082 SAGE BROWN	TRACO
DOWNSPOUTS	5	PAINT TO MATCH ADJ SURFACE	DUNN-EDWARDS
GUARD POST	5	SAFETY YELLOW	
MET FLASHING & RELATED ITEMS	5	PAINT TO MATCH ADJ SURFACE	DUNN-EDWARDS
ROOF ACCESS LADDER	2	MFR'S STD COLOR PALETTE	
BULK STORAGE BLDG @ STL COL	5	UNBRIEL DE CO 3	DUNN-EDWARDS

Figure 4-9.2. Color Key from Architectural Plan
(Usually Found on the Finish Schedule Sheet)



INTERIOR COLOR KEY

ITEM	FIN	COLOR	MAUFACTURER
GYP BD WALLS & CEILINGS	5	ALABASTER SP 90	DUNN-EDWARDS
WINDOW WOOD TRIM	5	ALABASTER SP 90	DUNN-EDWARDS
DOORS, FRAMES & LOUVERS	5	SEA WAFE DE 3130	DUNN-EDWARDS
OFFICE WINDOW	2		
HORIZONTAL BLINDS	2	MANUFACTURER'S STANDARD PALETTE	
WALL LOUVERS	5	MATCH ADJ SURFACE COLOR	DUNN-EDWARDS
PLYWOOD WALL & CEILING	5	ALABASTER SP 90	DUNN-EDWARDS
RUBBER FLOORING	2	ESPRESSO 0753	NORA RUBBER FLOORING
RUBBER BASE	2	WALNUT 591	BURKE
FLOOR COATING SYSTEM	4	MANUFACTURER'S STANDARD PALETTE	
TILE WALL	2	INNOCENT BLUSH K-163	DALTILE

Figure 4-9.3. Partial Interior Color Key – also Found on the Finish Schedule Sheet

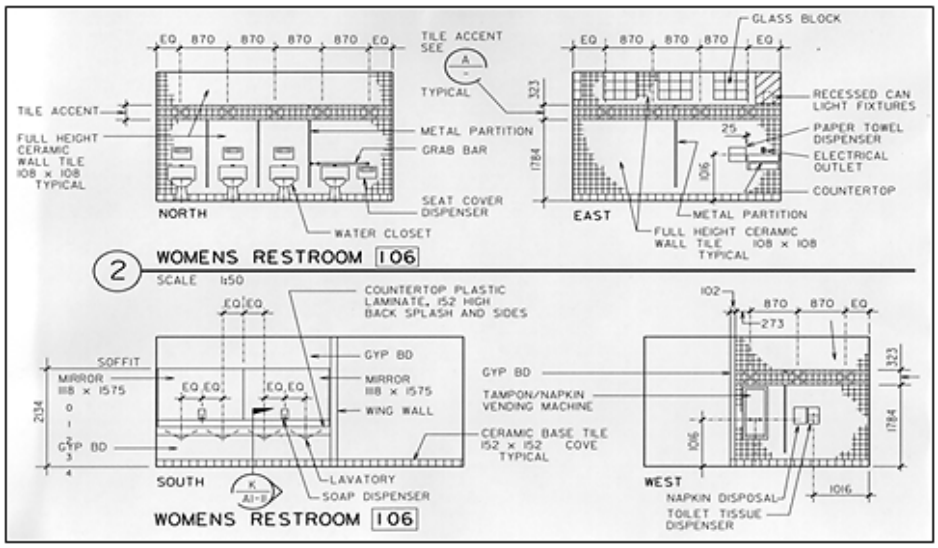


Figure 4-9.4. Typical Interior Elevations [normally including all 4 walls of every room]

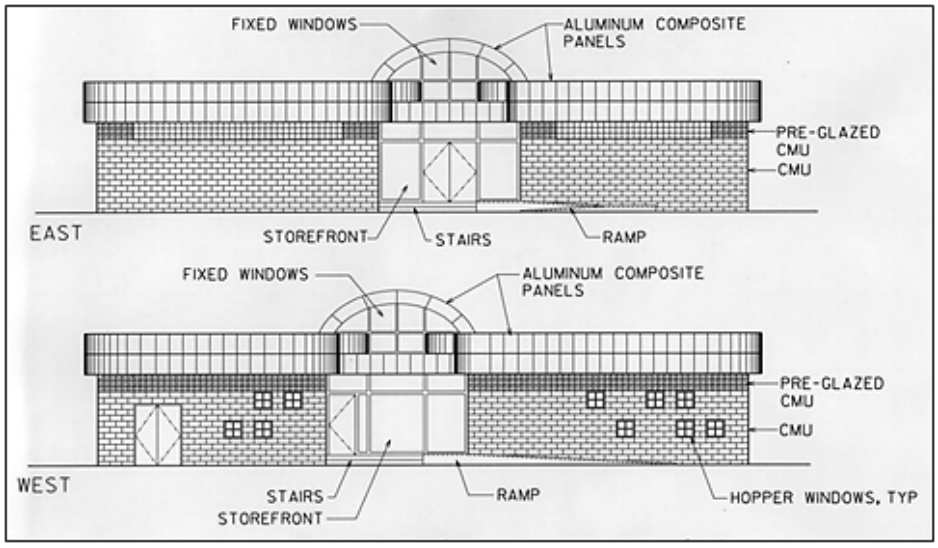


Figure 4-9.5. External Elevation

4-9.04 Portland Cement Plaster

This work consists of installing lath and applying Portland cement plaster. Plaster shall be three-coat work. The total thickness of plaster shall be 3/4 inch unless otherwise shown on the plans. The color and the surface finish shall be as shown on the plans.

Integral color will be required only for the finish coat.

Metal lath, beads, screeds, control joints, and vent screens shall be installed rigidly in place. Lath must be used when plaster is the final finish for gypsum board, plywood, or similar backing; it may be omitted when used over concrete or masonry block walls.

4-9.04A Furring and Lathing

On areas of walls between or adjacent to a shear wall, confirm with the contract documents that the sheathing used for furring is of the specified grade, thickness, number of plies, and the glue type.

Confirm the nailing or fastening of the sheathing to the frame system or furring conforms with the project plans and *Special Provisions*.

An asphalt-impregnated felt is used to provide the moisture barrier between the exterior stucco or plaster and the exterior wall sheathing. Confirm that the material conforms to the authorized submittals.

Material is delivered in rolls and will be installed in a horizontal plane starting at the bottom of the wall. Each row of membrane is lapped as required over the row below to provide a shingle effect; this allows the moisture to run completely down the wall, behind the stucco, without penetrating the barrier.

Confirm the sheathing is fastened in accordance with the authorized submittals.

The assembled lathing system must be inspected before the first coat of stucco is applied. Review the authorized submittals to determine the fastening method to attach the lath to the furring or subframe system. Also, review and confirm the type of lath authorized for use on the project.

Weep screeds and grounds are required at the base of all exterior plastered walls. Weep screeds and plaster grounds should be installed above ground level to allow moisture to weep out from behind the plaster or stucco. The specific elevation of the weep screeds should be clearly noted on the project plans. Grounds and weep screeds will be required for the termination of the stucco at all openings.

The location for expansion joints will be shown on the architectural Elevation sheets and are installed to control and minimize the cracking of the stucco and plaster. Check all corner beads, expansion joints, vent screens, casings, trim, and other accessories to verify that they are securely anchored to the lath and to the framing system. Also confirm that the fasteners for the lath are located at the specified spacing. Note that the fasteners also provide a shim to hold the lath off the base of the framing system or wall sheathing to allow for the plaster material to be embedded through the lath for proper mass and thickness.

Confirm with the contract documents that the lap of all lath joints is as specified and that the lath is tied or secured at the spacing required.

4-9.04B Plaster (Stucco)

Check that the plaster materials mix proportions and equipment are in accordance with the authorized submittals.

Confirm the temperature and weather conditions are within the specified minimums. Stucco or plaster is normally applied in three coats. The first coat is a scratch coat. It is intended to provide a base for the subsequent coats and should generally fill a void between the face of the lath and the sheathing's moisture barrier. The surface of the scratch coat will be raked with a tool to provide deep grooves in the material to ensure bond and adhesion of the subsequent plaster coat. The surface of the scratch coat can be uneven and is not intended to provide a uniform plane or surface. The surface of the scratch coat will also be well below the finish screed line.

A minimum of 48 hours of cure time between the installation of the scratch coat and the second coat, which is called the brown coat, is recommended. Check the *Special Provisions* for project-specified cure time.

The brown coat is then applied and is filled out to the vertical surface of the screeds and grounds. The brown coat should provide a uniform vertical and horizontal plane and surface. The finish of the brown coat is normally floated to provide a sand-like finish.

Review the *Special Provisions* to determine the curing time for the brown coat. It will normally be two weeks or more to allow the brown coat to completely cure and for any major cracks to develop. The *Special Provisions* should require a minimum time for the brown coat to be kept wet for proper curing. This requires complete soaking of the entire surface at least twice a day. In warmer weather, it may require more applications to keep it wet.

Major shrinkage cracks are normally specified to be repaired prior to the application of the third coat, which is called the finish coat or color coat. A repair of the major shrinkage cracks is often accomplished by applying a nylon-reinforced tape material, adhered with an authorized bonding agent adhesive. Review the product data bulletins, authorized submittals, and the special provisions to become familiar with the methods specified for repairing shrinkage cracks.

The finish coat is then applied. This coat will be a much finer granular material and will usually contain an integral color. The finish coat is applied with hawk and trowel in the same manner that the brown coat and scratch have been applied; however, the finish coat will be very thin, in comparison to the thickness of the other two coats. The finish coat will be uniformly spread and floated to provide a smooth plane of the finished stucco surface.

4-9.05 Textured Waterproof Coating

Textured waterproof coating is an important step in building construction. This coating protects against water damage, enhances aesthetics, and helps with overall durability of the structure. The barrier created is useful for preventing damage and extending the life of the building by protecting against moisture and harsh weather conditions; see Figure 4-9.6 for an illustration.



Figure 4-9.6. Textured Waterproofing Coating

4-9.06 Gypsum Drywall/Wallboard

This work will include the installation of the gypsum drywall/wallboard, taping of the joints and fastener heads, and the application of the finish texture (see Figure 4-9.7). Where assembly fire ratings are indicated on the plans, construction shall provide the fire resistance in accordance with the applicable standards in the Fire Resistance Design Manual published by the Gypsum Association. Wallboard backing for use in restroom and shower areas shall be water-resistant gypsum backing board.

Gypsum wallboard may be specified as either 1/2-inch or 5/8-inch thick, water-resistant or plain, insulated or non-insulated, and fire-resistant or non-fire-resistant. Fire-resistant gypsum board has a special core that is identified as type X and has a minimum thickness of 5/8 inch. After placing all sheets of the gypsum board, the joints and corners are filled with finishing compound and taped. Upon delivery, boards shall be fully protected from weather and direct sunlight exposure. Wallboard panels to be installed on ceilings and soffits shall be installed with the long dimension of the panels perpendicular to the framing members. Adhesives shall not be used for securing wallboard to framing members. Gypsum wallboard panels shown on the plans for shear wall sheathing or for fire-resistive assemblies shall be fastened to all framing members.

Gypsum wallboards used as backing boards for the tile or rigid sheet wall covering or wainscoting shall be water resistant.

Prior to installation of wallboard, confirm that the framing was checked for alignment, all walls are plumb, and that all fasteners are in place, as specified. Confirm the installation of all backing/blocking required for the attachment, hanging, or supporting of fixtures, furnishings, accessories, or equipment to be installed or attached to the walls.

Check the authorized submittals to determine the spacing of the fasteners, both for the perimeter edges and along intermediate supports (“the field”), along with the requirements for blocking, if necessary, at the joints.

Confirm the proper hangers have been installed to support the ceiling suspension system and that the wall channels have been securely anchored. If tie wire has been specified, confirm the gauge and the method of wrapping the ties conform to the special provisions.

Verify that all conduit systems, receptacles, drops for telephone communication and data, and any other raceways designed to be installed in the wall have been installed, inspected, and accepted.

Confirm that all water, waste, and vent piping, as well as all hangers, chairs, or supports for fixtures and equipment have been installed and authorized per contract documents.

The drywall is normally installed on the lids or ceilings first. Drywall sheets should run with long dimensions perpendicular to the ceiling suspension framing. Transverse wallboard joints should be staggered.

Confirm fasteners are set at the proper spacing for both the perimeter and the field. The head of the fasteners should slightly depress or dimple the paper finish on the drywall but should not be sunk to a depth that causes the paper to be torn.

Be sure that fire-rated (Type X) wallboard is installed where required.

The drywall installed on walls will normally be laid with the long direction perpendicular to the studs. The drywall should be installed with the first sheet installed with a factory edge up against the ceiling drywall.

The second sheet of drywall is normally installed at the bottom of the wall with drywall shimmed or a gauge used to set and hold the sheet up about 1/2 inch off the floor. This is to prevent moisture from the concrete floor from wicking up into the gypsum drywall.

The drywall is then cut to fit the space between the bottom of the top sheet and the top of the bottom sheet, at the mid-height of the wall.

J-metal corner bead (J-bead) and other accessories are installed after the wallboard has been hung. Confirm that the beads and trim metals are set true, plumb, or level in a true vertical and horizontal plane and fastened as specified.

The drywall is taped in three operations. The first coat is normally installed with the taping gun called a bazooka. This applies the drywall tape from a roll and lays it in the corners or flat across the joints in the ceilings and the walls.

The tape is then covered with drywall mud and embedded with a drywall knife, with the excess drywall mud feathered out on either side of the joint.

The first coat of drywall mud is allowed to dry or cure before the second coat is applied. Refer to the authorized submittals and the special provisions to determine the conditions for drying and any time requirements for the drywall mud before the second coat can be applied.

The nail heads also receive the first coat of taping mud. There is no tape required over the heads of the fasteners. The mud is applied with a drywall knife. The initial coat of drywall mud is applied over all the corner bead, J-metal, and other accessories and feathered out uniformly to provide a uniform plane between the surface of the drywall and the corner bead, J-metal, or accessory metal.

A second coat of drywall mud is also applied over the nail heads, and a second coat of drywall mud is applied to all the corner beads, J-metal, and other metal accessories. All joints are feathered out to provide a uniform plane between the drywall surface and the corner bead, J-metal, or accessory.

The second mud coat is normally applied with a mud box, which spreads a uniform coat of drywall mud over the previously taped joints. The mud is then leveled and feathered out on either side of the joint with a large drywall knife, which will normally leave a 12- to 16-inch-wide feathered joint. Curing time is again required for drying of this coat. Please refer to the special provisions to determine the conditions for drying and any time requirements before the final mud coat can be applied.

The second coat is sanded with a light sanding block to ensure that all ridges and imperfections are removed before the application of the third and final coat of drywall mud.

The third coat of mud is then applied to all the joints and nail heads to provide a smooth, uniform surface ready for the final wall texture material or paint. A final coat of mud is also applied at all the corner beads, J-metal, and accessory metal.

After the final coat is dried, the final wall texture is applied as specified. The texture can be anything from a smooth finish, which is considered level 5, a heavy Spanish lace, stipple, knockdown, or other more rustic or non-uniform surface finish. The smooth wall (level 5) is usually not required for a Caltrans project. Normally, a stipple or knockdown medium texture is applied. This texture is applied with an air-powered spray gun to splatter drywall mud on the wall. The wet mud is then knocked down with a wide, broad knife to provide the specified texture finish.

A sample of the proposed texture is normally submitted for review and approval. The final wall texture should match that sample.

The taping application is usually messy and will require scraping and cleaning of the floors after the final texture has been applied (see Figure 4-9.7). This is normally completed by the drywall crews. They will also remove masking tape, paper, and other protection installed over the windows, doors, and accessories to keep them clean. They should leave all surfaces and the entire area cleaned and ready for the painters.



Figure 4-9.7. Gypsum Board After Taping

4-9.07 Ceramic and Quarry Tile

Ceramic tile shall include glazed wall tile, patterned porcelain tile, matte porcelain tile, textured porcelain tile, polished porcelain tile, trim tile, setting materials, and grout, as well as any other materials required for a complete installation.



Figure 4-9.8. Ceramic Tile

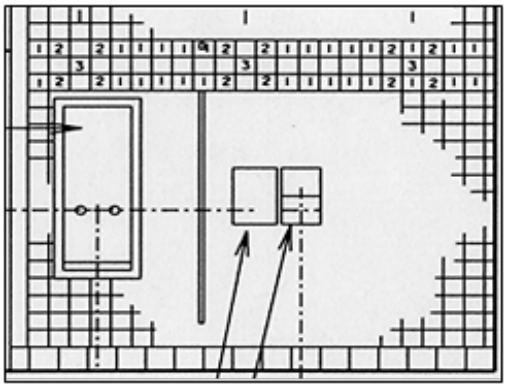


Figure 4-9.9. Tile Schedule



Figure 4-9.10. Ceramic Floor and Base

Ceramic wall tile is typically used in restroom and shower areas (see Figure 4-9.8). Porcelain tile is typically used on floors for durability (see Figure 4-9.10). If the specified tile is not inherently slip-resistant, the designer may instead select smaller tiles (such as 1 by 1 inch) to improve traction. Quarry tile is typically used at exterior locations. Tile color and size are shown on the plans (see Figure 4-9.9) and specifications; details may be included on the "Finish Schedule" sheet. Tile work shall extend into recesses and under or behind equipment and fixtures. The typical wall backing is water-resistant gypsum board. Cementitious backer board is used in tiled shower areas. Cement mortar used for floors shall not be less than 1-1/4 inch in thickness and 3/4 inch for walls. The concrete subfloor is sloped when placed to conform to the grade of the finished tile floor. Tile shall be installed according to the manufacturer's instructions and be well bonded to the substrate.

Cracked, chipped, broken, or otherwise defective tile shall be removed and replaced. Tiles and packaged materials shall be delivered to the jobsite in sealed, unbroken, unopened containers with the labels intact. Verify that the subfloor is recessed adequately to receive the full tile assembly. The finished elevation of the tile floor shall be flush with the adjacent floor surfaces.

4-9.07A Wall Tile

Confirm the proper moisture-proof backing materials are in place. A cementitious backing board, such as HardieBacker board (cement backerboard), is specified to be installed as backing for the ceramic tile, wainscot, or walls. If the walls are specified to be mud-set, lath may be required to be installed before the mud-set materials are placed. Review the *Special Provisions* to determine the system specified. Thin-set wall materials are usually specified.

Verify that all wall tiles are set with straight and true joints and in a uniform plane. Be sure the trim pieces are installed in accordance with the authorized submittals.

4-9.07B Floor Tile

The wall tile is normally set and finished before the mud-set for the floor tile has been installed. Most Caltrans' projects will specify a mud-set tile for the floors. This is normally accomplished with the concrete floors being recessed in the areas specified to receive ceramic tile.

After the wall tiles have been set, the tile subcontractor will prepare a cement-sand mixture with small amounts of water and will physically place the dry pack and screed the material on the floor to the final elevations. The floor is now ready for the installation of ceramic tile. Refer to the authorized submittals to familiarize yourself with the proportions of materials needed for the dry pack base.

Check the slopes and finish of the dry pack to verify they are set at the proper elevations to provide drainage to the floor drains per the project plans. Also check that the surfaces in the area where fixtures will be mounted onto the floor are level. Next, check the tile to confirm that the color, size, pattern, shapes, and manufacturer are as shown on the authorized submittals and authorized samples. The type and color of grout, including set time, should also be checked against the authorized submittals and samples. Next, all joints should be straight and true and in the uniform plane. Tile corners should be flush with adjacent tile, and the material should be set with the proper authorized bonding materials.

Check the thresholds to confirm the finished tiles will match and are per the dimensions required in the project plans.

4-9.08 Detectable Warning Surface (ADA Warning Surface)

Reserved.

4-9.09 Resilient Base

Resilient base shall be the manufacturer's best grade, rubber or vinyl base (see Figure 4-9.11), with pre-molded internal and external corner pieces. The height and color of the base must be as shown on the plans. Bases shall be firmly and completely attached to walls with adhesive and be accurately scribed to trim, molding, and cabinets. The adhesive shall be as recommended by the manufacturer.



Figure 4-9.11. Box of Resilient Base Material and Installed Base Material

4-9.10 Resilient Flooring

Refer to the *Special Provisions* and the authorized submittals to confirm the size, thickness, pattern, and color for the materials. Check the materials delivered against the authorized color samples and the authorized submittals.

Confirm that the slabs to receive resilient flooring are cleaned and prepared, free of cracks, holes, trowel marks, and other defects.

Ensure that all patches to correct defects have been ground smooth and are dry, cured, and hard per the manufacturer's requirements.

Refer to the *Special Provisions* to determine if moisture testing of the slab is required before installation of resilient flooring. If so, confirm the moisture tests and verify that they are within the acceptable ranges specified.

The adhesive for the laying of the resilient flooring should be spread at the rate and in accordance with the manufacturer's recommendation in the authorized submittals. Finished materials will be rolled with a roller to ensure uniform adhesion. The top-set base will be applied after the flooring materials have been placed. Preformed corners and end stops should be used for the top-set base. Verify that the flooring materials are flush with the electrical floor receptacles, cover plates, cleanouts, and other facilities installed in the floors. Check the *Special Provisions* and the authorized submittals to determine if special cleaning and waxing are required after the resilient flooring has been installed.

4-9.10A Vinyl Composition Tile

Vinyl composition tile shall consist of vinyl composition tile, edging strips, floor wax, and the tile manufacturer's recommended primers and adhesives.

Vinyl composition tile is semi-flexible, 3/32-inch-thick, 12-by-12-inch tile (see Figure 4-9.12), with color as shown on plans. Before placing adhesives, surfaces to receive vinyl composition tile shall be made free of localized depressions or bumps. The surface must be clean and thoroughly dry. Tile is laid to a true, straight, smooth, and even surface in accordance with the manufacturer's instructions.



Figure 4-9.12. Vinyl Composition Tile

4-9.10B Resilient Sheet Flooring

Resilient sheet flooring (see Figure 4-9.13) shall also include cove molding, metal caps, edging strips, floor wax, and flooring manufacturer's recommended primers and adhesives.

Resilient sheet flooring shall be flexible vinyl sheets not less than 0.085 inches thick. The surfaces to receive resilient sheet flooring shall be thoroughly dry and free of paint, oil, grease, mortar, plaster droppings, scaly surfaces, or other irregularities and shall be broom clean.

All surfaces to receive resilient sheet flooring shall be free of localized depressions and/or bumps.



Figure 4-9.13. Resilient Sheet Flooring

4-9.10C Rubber Stair Treads

Rubber stair treads have a nominal thickness of 1/8 inch and have two continuous, flush abrasive strips. The top and bottom tread's abrasive strips shall have a contrasting color. Stair treads must be installed in accordance with the manufacturer's instructions.

4-9.10D Carpeting

This work shall consist of furnishing and installing carpeting, carpet cushion, adhesives, and accessories. Carpeting and carpeting materials shall be rated by the manufacturer as suitable for heavy pedestrian traffic and as suitable for use under chairs with casters.

Carpeting is sometimes used in offices or state-owned houses, mostly at maintenance stations. In addition to being rated for heavy pedestrian traffic, the color and type of carpeting shall be as shown on the plans and specifications (see Figure 4-9.14).



Figure 4-9.14. Carpeting and Base

Install carpeting and carpeting cushion in accordance with manufacturer's recommendations. New concrete shall be cured for 30 days and free of material that would interfere with adhesives. Materials shall be produced by a single manufacturer for each type of carpet. Materials shall be delivered to the jobsite in original factory wrappings and containers, clearly labeled with identification of manufacturer, brand name, quality or grade, fire hazard classification, and lot number. Materials shall be stored in original undamaged packages and containers inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity. After completion of work, not less than 2 percent of each type and color of carpet, as well as usable scraps, shall be delivered to the Engineer at the jobsite.

Before installation, confirm that all floors have been patched to repair cracks and other defects and ensure a uniform horizontal subbase to which the carpet will be applied. A commercial-grade carpet, without pad, is normally specified for Caltrans projects. Confirm that the materials delivered conform to the authorized submittals and that the colors and patterns match the authorized samples.

Confirm that the materials are laid in the same direction to provide a uniform grain of the carpet. Check the seams to verify they are made in accordance with the manufacturer's authorized submittals. Confirm the areas have been cleaned after the carpet installation has been finished.

4-9.10D(1) Carpet (Rolled)

This section outlines the required procedures for installing carpeting. As always, check the project plans and *Special Provisions* for unique requirements. Work begins with measures to protect newly installed carpet. Contractors must keep the surface free from damage or heavy traffic for 24 hours and maintain protective methods until final acceptance.

The preparation subsection describes the condition of surfaces prior to installation. Floors must be level, clean, and free of substances that would interfere with adhesion. Concrete must be fully cured, free of curing compounds, and sealed if dusting is present. Temperature and humidity conditions for both materials and installation spaces must be controlled for several days before, during, and after installation.

The installation requirements cover primer/sealer applications, placement of carpet cushion, and the laying of carpet itself. Cushion must be installed in long, continuous lengths with tight seams and no air pockets. Carpet installation must follow manufacturer instructions, including seam preparation, adhesive application, pattern alignment, and rolling the carpet with a 50-pound roller to ensure full adhesion.

Cleaning requirements mandate removal of debris, vacuuming with a commercial beater-type machine, and corrective action for spots or adhesive residue. Any defects that cannot be cleaned must be corrected by replacing the affected carpet. Protruding yarns must be trimmed neatly.

Finally, extra materials equal to at least two percent of each carpet and cushion type, plus usable scraps, must be provided to the Engineer after the work is complete.

4-9.10D(2) Carpet Tile

Reserved.

4-9.11 Paints And Coatings

First, confirm that all areas to be painted, such as doors, door frames, walls, and access panels, have been properly prepared and primed, and are ready for the application of specified painting materials. All surfaces should be sanded, holes repaired, and any defects corrected to allow a smooth and uniform finished product.

Confirm that the Contractor has provided for protection (masking) of all windows, doors, equipment, or other items that are factory finished, and that do not specify to receive field paint.

Check that the paint is applied in the type, number of coats, and in the proper dry film thicknesses as required by the project plans and the *Special Provisions*.

A wood door should receive the first paint or seal coats for all surfaces of the door at the same time.

Confirm that all paint has been uniformly applied without paint runs, sags, or other imperfections to the finished product.

Extra paint shall be provided by the Contractor for future use for maintenance as specified by the *Special Provisions*. Always verify that items received on site for application match the authorized color sample prior to allowing application.

4-9.11A Painting

This work shall consist of preparing surfaces to receive coatings, as described in the previous section, along with furnishing and applying coatings. The coatings specified in this section are in addition to any factory finishes, shop priming, or surface treatment specified elsewhere in accordance with the schedules shown on the plans and the specifications.

Color samples are to be submitted for each color shown on the plans. Color samples for stains shall be submitted on wood of the same type as will receive the stain.

Surfaces to be coated at the jobsite shall be authorized by the Engineer prior to the application of coatings. Coatings shall not be applied when the air temperature is below 50 degrees F or above 90 degrees F, or when the relative humidity exceeds 75 percent. Continuous ventilation shall be provided during applications of the coatings. Coatings shall be applied in accordance with the manufacturer’s recommendations and the specifications to achieve the dry film thickness specified.

4-9.11B Porcelain Enamel Panels

Porcelain enamel panels are often used on the exterior of the buildings (see Figures 4-9.15 and 4-9.16) – usually as fascia or column coverings as pictured below. Porcelain enameled panels are chosen because they can be fabricated to almost any shape required. They are difficult and time-consuming to install, as they have many joints which are butted together, and these joints must be properly caulked.



Figure 4-9.15. Porcelain Enamel Panels



Figure 4-9.16. Porcelain Enamel Panels

4-9.12 Vinyl Wallcovering

Paste shall be as recommended by the wall covering manufacturer. Surfaces to receive vinyl wall covering shall be smooth, clean, and free of irregularities. Cracks, holes, and depressions shall be filled, and bumps shall be removed. Fillers shall be compatible with the wall covering and paste to be used.

4-9.13 Fiberglass Reinforced Plastic Panels

This work shall consist of furnishing and installing fiberglass reinforced plastic (FRP) panels and trim molding.

FRP panels and trim shall follow the manufacturer's recommendation for installation, with color and location as shown on plans. Trim molding shall be nailed through the flange into solid wood backing. All nails shall be concealed by FRP panels in the completed installation (see Figure 4-9.17).



Figure 4-9.17. Fiber Reinforced Plastic Panels

4-9.14 Ceilings

4-9.14A Acoustical Treatment

Confirm the delivered materials match the style, pattern, and selected color of the authorized samples.

Confirm the hangers meet the specified gauge and that spacing conforms to the *Special Provisions.* Review the seismic bracing details to ensure that construction conforms. Observe the installation to confirm it is installed in a level and uniform plane in relation to the surface it is applied to. Confirm the additional hangers required for support of any ceiling-supported lights or heating, ventilation, and cooling (HVAC) fixtures have been installed.

If fire-rated materials are required, confirm that they are provided, and the system is installed in accordance with the authorized submittals. Confirm that access to equipment located above the ceiling is available once the acoustic tile has been placed.

Access doors should be provided, where necessary, to ensure access to junction boxes and other devices for which the code requires access.

Confirm sound attenuation and sound isolation elements are installed above the ceiling in accordance with the authorized submittals.

Electrical fixtures, HVAC equipment, and diffusers should be installed in the ceiling prior to the installation of the acoustic tile board.

Insulation is occasionally required to be installed on top of the acoustic panels. Refer to the details within the project plans to determine the requirement for any ceiling-supported insulation.

4-9.14B Acoustic Ceiling Tile

Acoustic tile shall be 12-by-12 by 5/8-inch thick, square edges, non-directional natural fissured texture, and with a factory-applied washable, off-white vinyl latex finish.

Verify adhesives and installation are in accordance with the manufacturer's recommendation. In general, installation room temperature must be between 55 and 95 degrees F.

4-9.14C Suspended Ceilings

Suspended ceilings shall consist of lay-in acoustical ceiling panels and an exposed grid suspension system. Listed fire-rated assemblies shall be installed where shown on the plans. Verify installation as per manufacturer's instructions. The suspension system shall be designed to support the anticipated design weight as described below. Acoustical panels may have acoustical batts on top of each tile to hinder sound transmission from room to room.

Acoustical panels shall be factory-produced lay-in panels as shown on the plans with factory-applied washable off-white latex finish.

Upon completion of the suspended ceiling work, one unopened carton of each size of acoustical panels used on the project shall be delivered to the Engineer.

4-9.14C(1) Design

The suspension system shall be designed to support the weight of ceiling panels, lighting fixtures, air terminals, service assemblies, and any other items not mentioned, which are supported by the suspended ceiling system (See Figure 4-9.18).

The deflection of any component of the suspension system shall not exceed 1/360 of the span.

The suspension system shall be designed for seismic restraint.



Figure 4-9.18. Suspended Ceiling Grid

4-9.15 Pre-finished Vinyl Covered Wallboard

This product is normally specified on larger office-type structures for Caltrans. If required, it will be included on the Finish Schedules, finish interior elevations, and a specification will be provided in the *Special Provisions*.

4-9.16 Metal Framing (Non-Load-Bearing/Non-Structural)

Cold-formed metal framing used in non-load-bearing assemblies–such as suspended ceiling systems and interior partition walls–is typically fabricated from C-shaped sections and metal studs. This section outlines inspection preparation requirements, including verification of framing alignment, member fastening, substrate readiness, and compliance with specified finish-system tolerances.

Confirm that the size and gauge of the metal stud and track materials are as specified and per the authorized submittals. The center-to-center spacing of the studs will be indicated in the architectural section of the project plans. They are normally not listed in the structural section of the project plans because they are non-load bearing and are non-structural.

Although the studs are friction fit in the track, the authorized submittals may require self-drilling screws through the track, into the stud at both the top and the bottom. Refer to the authorized submittals for confirmation of the manufacturer’s recommendations.

Confirm that the studs are set plumb, provisions are made for the required horizontal blocking, and that backing is placed in the wall for the support of items such as countertops, cabinets, handrails, grab bars, and other wall-mounted materials. Wall-hung plumbing fixtures will normally call for carriers or hangers to be set in the wall.

Within the project plans, there will be details that normally call for double studs, or a stud and a door buck (when the frame of a door with a header and jamb sections are connected as a single assembly), at each door and window opening.

Confirm such things as the gauge, spacing, fasteners for runners and carriers, furring channels, hangers, and wire size for suspended ceiling systems are per the contract documents.

Metal furring, which may be required for drywalled walls and ceilings, and furred-out walls and ceilings, will be shown in the metal framing details of the project plans.

Suspended ceiling systems will normally call for a channel or track to be attached to the adjacent wall material, as required, to land the suspended ceiling framing – this element would be coplanar with the grid suspension system. It also provides a nailer (drywall backing) to which the edges of the drywall ceiling can be attached.