B. Tolerances apply to concrete dimensions only, not to positioning of vertical reinforcing steel, dowels, or embedded items.

C. Establish and maintain in an undisturbed condition and until final completion and acceptance of project, sufficient control points and bench marks to be used for reference purposes to check tolerances.

D. Regardless of tolerances listed allow no portion of building to extend beyond legal boundary of project.

1.03 SUBMITTALS

A. Sealed and signed statement from Professional Engineer that he is experienced in the design of formwork and to the best of his knowledge he has designed the formwork, shoring and reshoring in accordance with the recommendations of ACI 347 and these specifications.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Form facing materials: As indicated under description of finishes required in section 03350.

2.02 FABRICATION OF FORMS

A. Make forms sufficiently tight to prevent loss of cement fines. Place 1/2" chamfer strips in corners of forms to produce beveled edges on permanently exposed surfaces. Interior corners on such surfaces and edges of formed joints will not require beveling.

B. To maintain specified finish tolerances, camber formwork to compensate for anticipated deflections.

C. Provide positive means of adjustment (wedges or jacks) of shores and struts and take up all settlement during concrete placing operation. Securely brace forms against lateral deflection.

D. Provide temporary openings at base of column and wall forms and at other points where necessary to facilitate cleaning and observation immediately before concrete is placed.

E. Form accessories to be partially or wholly embedded in concrete, such as ties and hangers, shall be of a commercially manufactured type. Do not use nonfabricated wire. Use form ties constructed so that ends or end fasteners can be removed without causing appreciable spalling of concrete faces. After ends

or end fasteners of form ties have been removed, embedded portion of ties shall terminate not less than 2 diameters or twice minimum dimension of tie from formed faces of concrete to be permanently exposed to view, but in no case less than 3/4". When formed face of concrete is not to be permanently exposed to view, form ties may be cut off flush with formed surfaces. Use ties with 3/4" dia. cones on both ends for water retaining structures.

F. At construction joints, contact surface of form sheathing for flush surfaces exposed to view shall overlap hardened concrete in previous placement minimum 1". Hold forms against hardened concrete to prevent offsets or loss of mortar at construction joint and to maintain a true surface.

G. Fasten wedges (used for final adjustment of forms prior to concrete placement) in position after final check.

H. Anchor formwork to shores or other supporting surfaces of members so that upward or lateral movement of any part of formwork system is prevented during concrete placement.

PART 3 - EXECUTION

3.01 PREPARATION OF FORM SURFACES

A. Clean all form surfaces and embedded materials of mortar, grout and foreign material before concrete is placed.

B. Unless otherwise specified or approved, treat surfaces of forms as follows:

1. Before placing of reinforcing steel or concrete, cover surfaces of forms with an approved coating material that will effectively prevent absorption of moisture and prevent bond with concrete, and not stain concrete. A field applied form release agent or sealer of approved type or a factory applied nonabsorptive liner may be used.

2. Do not allow excess form coating material to stand in puddles in forms nor in contact with hardened concrete against which fresh concrete is to be placed.

3. Apply surface retarder agents in accordance to Section 03350 - Concrete Finishing and Repair of Surface Defects.

3.02 REMOVAL OF FORMS

A. When repair of surface defects or finishing is required at an early age, remove forms as soon as concrete has hardened sufficiently to resist damage from removal operations.

B. Remove top forms for wall openings as soon as concrete has attained sufficient stiffness to prevent sagging. Perform needed repairs or treatment required on such sloping surfaces at once, followed by specified curing.

C. Loosen wood forms for wall openings as soon as this can be accomplished without damage to concrete.

D. Formwork for columns, walls, sides of beams, and other parts not supporting weight of concrete may be removed as soon as concrete has hardened sufficiently to resist damage from removal.

E. Where no reshoring is planned, leave forms and shoring, used to support weight of concrete in beams, slabs and other concrete members, in place until concrete has attained its specified strength. Where reshoring is planned, supporting formwork may be removed when concrete has reached 70 percent of specified strength, provided reshoring is installed immediately.

F. When shores and other vertical supports are so arranged that non-load-carrying form-facing material may be removed without loosening or disturbing shores and supports, facing material may be removed at an earlier age as permitted.

3.03 REMOVAL STRENGTH

A. When removal of formwork is based on concrete reaching a specified strength, concrete shall be presumed to have reached this strength when either of following conditions has been met.

1. When test cylinders, field cured along with concrete they represent, have reached specified strength.

2. When concrete has been as specified for same length of time as age at test of laboratory-cured cylinders which reached specified strength. Determine length of time concrete has been cured in structure by cumulative number of days or fractions thereof, not necessarily consecutive, during which temperature of air in contact with concrete is above 50 degF and concrete has been damp or sealed from evaporation and loss of moisture.

END OF SECTION

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. General

1. Furnish all labor, materials, tools, equipment and services for all concrete reinforcement as indicated, in accord with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See Division 1 for General Requirements.

5. See Section 03000 for general requirements for concrete work.

1.02 QUALITY ASSURANCE

A. Bars used for concrete reinforcement shall meet the following requirements for fabricating tolerances:

1. Sheared length: plus or minus 1".

2. Depth of truss bars: plus 0, minus 1/2"

3. Overall dimensions of stirrups, ties, and spirals: plus or minus 1/2".

4. All other bends: plus or minus 1".

B. Place bars to following tolerances:

1. Clear distance to formed surfaces: plus or minus 1/4".

2. Minimum spacing between bars: 1/4".

3. Top bars in slabs and beams:

a. Members 8" deep or less: plus or minus 1/4".

b. Members between 8" and 2' deep: plus or minus 1/2".

c. Members more than 2' deep: plus or minus 1".

4. Crosswise of members: spaced evenly within 2".

5. Lengthwise of members: plus or minus 2".

C. Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If moved more than one bar diameter, or enough to exceed above tolerances, resulting arrangement of bars subject to review and approval.

D. Welding standards: American Welding Society (AWS) D1.4-79 Structural Welding Code-Reinforcing Steel.

1.03 SUBMITTALS

A. Shop drawings: Do not submit shop drawings for review unless reinforcing is changed from Contract Documents.

1. Shop drawings, showing dimensions and locations of reinforcing steel accessories, in sufficient detail to permit installation of reinforcing without reference to Contract drawings.

a. Details of concrete reinforcement and accessories not shown on Contract Documents must be in accord with ACI 315.

B. Project data:

1. Certified mill test reports for all reinforcing.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Acceptable manufacturers:

1. Materials listed.

a. Base: As noted.

B. Reinforcing General: Grade 60 KSI and Grade 40 KSI, see structural drawings for rebar size related to the grade conforming to ASTM A615-82(S1) - Standard

Specifications for Deformed and Plain Billet - Steel Bars for Concrete Reinforcement including Supplementary Requirements on structural sheet S1.1, of construction drawings.

C. Welded Reinforcing: All reinforcing to be welded shall conform to ASTM A706-82a unless the "Cadwelding" Procedure is used. ICBO Report NO. 1693.

D. Protecting reinforcing: Where indicated provide reinforcing protection.

E. Welded wire fabric: Flatsheets; conform to gage and mesh size of plain or deformed wire indicated, and ASTM A185, except that welded intersections shall be spaced not farther apart than 12" in direction of principal reinforcement.

F. Smooth dowel bars for construction joints: Conform to ASTM A306, Grade 60. Where indicated, provide a metal dowel cap at one end of dowel to permit longitudinal movement of dowel within concrete section. Provide for movement which equals joint width plus 1/2" Unless otherwise indicated, use 5/8" diameter dowels spaced 18" o.c..

G. Wire: Cold-drawn steel wire for concrete reinforcement, ASTM A82-79.

PART 3 - EXECUTION

3.01 WELDING

A. Perform all welding of reinforcing steel in conformance with AWS D1.4.

B. Have each welder place an approved identification mark near each completed weld.

C. Cut out welds determined to be defective and reweld and retest at no additional cost to Owner.

3.02 WELDING TESTING

A. A licensed deputy inspector shall be required for field inspection of all "Full penetration" welds.

3.03 PLACING REINFORCEMENT

A. Provide minimum concrete covering for reinforcement as follows:

1. Concrete deposited against earth: 3".

2. Formed surfaces exposed to weather or in contact with earth; 2" for reinforcing bars No. 6 or larger; 1 1/2" for reinforcing bars less than No. 6.

3. Interior surfaces: 1-1/2" for beams, girders, and columns; 3/4" for slabs, walls and joists with No. 11 bars or smaller, and 1-1/2" with No. 14 and No. 18 bars.

B. Assure that all reinforcement, at time concrete is placed, is free of materials that may adversely affect or reduce bond. Reinforcement with rust, mill scale or a combination of both will be accepted as being satisfactory without cleaning or brushing provided dimensions and weights, including heights of deformations, or a cleaned sample is not less than required by applicable ASTM.

C. Support all reinforcement and fasten together to prevent displacement by construction loads or placing of concrete beyond tolerances indicated. On ground, provide supporting concrete blocks or other approved method. Over formwork, use concrete, metal, plastic or other approved bar chairs and spacers. Where concrete surface will be exposed to weather in finished structure, furnish all accessories within 1/2" of concrete surface of noncorrosive material or protect against corrosion.

D. Overlap welded wire fabric reinforcement wherever successive mats are continuous, in such a way that overlap measured between outermost cross wires of each fabric sheet is not less than spacing of cross wires plus 2". Support as required for reinforcing bars. Do not "lift" into place during concrete placement.

E. Offset vertical bars in columns at least one bar diameter at lapped splices. To insure proper placement, furnish templates for all column vertical bars and dowels.

F. All splices not specifically indicated shall be subject to approval. Mechanical connectors for reinforcing bars may be used subject to approval.

G. Unless permitted by Architect do not bend reinforcement after bedding in hardened concrete.

H. Do not tack weld reinforcing.

END OF SECTION

Riverside County – Volunteers in Medicine Clinic
82-915 Avenue 48
Indio, CA.
Project #0901.00

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 DESCRIPTION

A. General:

1. Furnish all labor, materials, tools, equipment, and services for all concrete materials and proportioning as indicated, in accord with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See Division 1 for General Requirements.

5. See Section 03000 for general requirements for concrete work.

1.02 QUALITY ASSURANCE

A. Materials standards:

1. ASTM C33-90: Concrete Aggregates.

2. ASTM C94-90: Ready-mixed Concrete.

3. ASTM C150-89: Portland cement.

4. ASTM C260-86: Air-Entraining Admixtures for Concrete.

5. ASTM C494-86: Chemical Admixtures for Concrete.

B. Testing standards:

1. ASTM C39-86: Compressive Strength of Cylindrical Concrete Specimens.

2. ASTM C109-90: Test for Compressive strength of Hydraulic Cement Mortars.

3. ASTM C138-81: Test for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete.

4. ASTM C143-90: Test for Slump of Portland Cement Concrete.

5. ASTM C173-78: Test for Air content of Freshly Mixed Concrete by the Volumetric Method.

6. ASTM C192-90: Making and Curing Concrete Test Specimens in the Laboratory.

7. ASTM C231-89: Test for Air Content of Freshly Mixed Concrete by the Pressure Method.

8. ASTM C157-89: Drying shrinkage test.

C. Proportioning standards:

1. ACI 211.1-81: Standard Practice for Selecting Proportions for Normal and Heavy weight Concrete.

1.03 SUBMITTALS

A. Related Sections

1. Section 01010, Special Conditions, paragraph 1.13.

2. Section 01400, General Testing Procedures.

3. Section 01340, Shop Drawings, Product Data, Samples and Project Data

B. Product data:

1. Mix design: To be submitted to Architect for review prior to any concrete being poured. Different mix designs shall be prepared for the various concrete conditions and shall include foundation work. See Section 03000-1.04.

a. Proportioning of all materials.

b. Mill certificates for cement.

c. Slump.

d. Air entrainment.

e. 7 and 28 day compression test results.

f. Unit weights of fresh and dry lightweight concrete.

g. Sieve analysis and source of fine and coarse aggregates.

h. Test for aggregate organic impurities.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cement: Portland cement, ASTM C150 Type I or II, low alkali. Cement used shall correspond to that upon which selection of concrete proportions was based.

B. Admixtures: When required or permitted, conform to appropriate specifications listed below; admixtures used shall be of same composition as used in establishing required concrete proportions.

1. Air-entraining admixtures: ASTM C260.

2. Water-reducing, retarding, and accelerating admixtures: ASTM C494. Use water-reducing, retarding, or accelerating admixtures that are all manufaturered by the same company.

3. Pozzolanic admixtures: ASTM C618. **Use no more than 15% by weight.**

4. Do not use admixtures containing calcium chloride.

C. Water: Potable. **Water to cement ratio shall not exceed .50.**

D. Aggregates:

1. Normal weight concrete: ASTM C33.

2. Any suitable individual grading of coarse aggregates for normal weight concrete may be used provided the "Grading of Combined Aggregates" shown in the following table are obtained:

GRADING OF COMBINED AGGREGATES

Sieve Number of Size in Inches	1-1/2" Max.	1" Max.	3/4" Max.
Passing a 2"	--	--	--
Passing a 1-1/2"	95-100	--	--
Passing a 1"	75-90	90-100	--

Passing a 3/4"	55-77	70-90	90-100
Passing a 3/8"	40-55	45-65	60-80
Passing a No. 4	30-40	31-47	40-60
Passing a No. 8	22-35	23-40	30-45
Passing a No. 16	16-30	17-35	20-35
Passing a No. 30	10-20	10-23	13-23
Passing a No. 50	2-8	2-10	5-15
Passing a No. 100	0-4	0-3	0-5

PART 3 - EXECUTION

3.01 STORAGE OF MATERIALS

A. Store cement in weather tight buildings, bins, or silos which will exclude moisture and contaminants.

B. Arrange aggregate stockpiles and use in a manner to avoid excessive segregation and to prevent contamination with other materials or with other sizes of like aggregates. To insure that this condition is met, perform any test for determining conformance to requirements for cleanliness and grading on samples secured from aggregates at point of batching. Do not use frozen or partially frozen aggregates.

C. Allow natural or manufactured sand to drain until it has reached a relatively uniform moisture content before use.

D. Store admixtures in manner to avoid contamination, evaporation, or damage. For those used in form of suspensions or non-stable solutions, provide agitating equipment to assure uniform distribution of ingredients. Protect liquid admixtures from freezing and temperature changes which would adversely affect their characteristics.

3.02 PROPORTIONING

A. General: Use concrete of specified quality capable of being placed without excessive segregation and, when cured, of developing all characteristics required.

B. Strength: Specified strength and type of concrete for each use in structure(s) shall be as noted on drawings.

C. Durability:

1. Entrain air in concrete of normal weight to within air content limits of following Table as measured in accord with ASTM C231, ASTM C173, or ASTM C138.

TOTAL AIR CONTENT FOR VARIOUS SIZES OF COARSE AGGREGATE FOR NORMAL WEIGHT CONCRETE

Nominal maximum size of coarse aggregate	Size No.	Total air content, percent by volume
3/8"	8	6-10
1/2"	7	5-9
3/4"	67	4-8
1"	57	3.5-6.5
1-1/2"	467	3-6
2"	357	2.5-5.5
3"	----	1.5-4.5

D. Slump: Proportion and produce concrete to have a slump of 5" maximum. Concrete of lower than usual slump may be used provided it is properly placed and consolidated. Determine slump per ASTM C143.

E. Maximum size of coarse aggregate: Nominal maximum size of aggregate; not more than one-fifth of narrowest dimension between sides of forms, one-third of depth of slabs, nor three-fourths of minimum clear spacing between reinforcing bars. These limitations may be waived if, in judgment of Architect, workability and methods of consolidation are such that concrete can be placed without honeycomb or voids. Maximum coarse aggregate sizes:

1. Footings: 1-1/2"

2. Foundation walls, slab on grade: 1"

3. Structural slabs, joists, beams, girders, or columns: 1"

F. Admixture: Use admixtures in accord with manufacturer's instructions.

G. Water to Cement Ratio: **Shall not exceed .50.**

H. Fly Ash Content: **Shall not exceed 15% by weight.**

3.03 SELECTION OF PROPORTIONS

A. General: Proportion ingredients to produce a mixture which will work readily into corners and angles of forms and around reinforcement by methods of placing and consolidation employed on work, but without permitting materials to segregate or excessive free water to collect on surface. Proportion ingredients to produce proper placeability, durability, strength, and other required properties.

1. Comply with following MINIMUM cement contents:

SPECIFIED STRENGTH (psi)	MINIMUM CEMENT CONTENT (sacks/cy)	WEIGHT (Lb/Cy)
2000	5	470
2500	5	470
3000	5-1/2	517
3500	6	564
4000	6-1/2	611
4500	7	658
5000	7-1/2	705

END OF SECTION

SECTION 03310

CONCRETE MIXING, PLACING, JOINTING AND CURING

PART 1 - GENERAL

1.01 DESCRIPTION

A. General

1. Furnish all labor, materials, tools, equipment and services for all concrete mixing, placing, jointing and curing as indicated, in accord with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See Division 1 for General Requirements.

5. See Section 03000 for general requirements for concrete work.

1.02 QUALITY ASSURANCE

A. Materials standards:

1. ASTM C171-86: Sheet Materials for Curing Concrete.

2. ASTM C309-89: Liquid Membrane-Forming Compounds for Curing Concrete.

3. ASTM D1751-83: Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

4. ASTM D1752-84: Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Concrete.

B. Production standards:

1. ASTM C94-90: Ready-mixed concrete.

2. ACI 305R-77: Hot Weather Concreting.

3. ACI 306R-78: Cold Weather Concreting.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concrete materials and proportioning: See Section 03300.

B. Expansion joint filler, premolded: Type required, conforming to ASTM D1751 or D1752.

C. Waterstops: Manufactured from virgin polyvinyl chloride not containing any scrap or reclaimed material or pigment. Properties of polyvinyl chloride compound shall comply with Corp. of Engineers Spec. CRD-C572. Burke, or acceptable substitute.

1. Provide in maximum practicable length to minimize end joints.

2. Butt splice joints at intersections and at ends of pieces in accord with manufacturer's instructions. Make joints to develop effective water tightness fully equal to that of continuous waterstop material, to permanently develop not less than 50 percent of mechanical strength of parent section, and permanently retain flexibility.

D. Curing compound: ASTM C309. Where concrete floors are to be left exposed use the following:

1. L & M Construction Chemicals "Dress & Seal".

2. Sonneborn "Kure-N-Seal".

3. W.R. Meadows "CS-309".

4. Protex "Acryseal".

E. Curing material, sheet: ASTM C171.

F. Moisture barrier: Polyethylene sheet not less than 6 mils thick. See Section 07110-2.01.

2.02 MIXING AND PRODUCTION OF CONCRETE - READY-MIXED CONCRETE

A. Batch, mix and transport ready-mixed concrete in accord with ASTM C94. Plant equipment and facilities shall conform to "Check List for Certification of Ready Mixed Concrete Production Facilities" of the National Ready Mixed Concrete Association, 900 Spring Street, Silver Spring, MD 20910.

B. Mix Designs:

1. Mix designs shall be prepared by a Registered California Professional Engineer which fulfill the specified requirements for strength, aggregate size and workability of concrete.

2. Coarse and fine aggregates for pump mixes shall comply with ASTM C-33. Sand must contain adequate fines, with fifteen to thirty percent passing the No. 50 screen, five to ten percent passing the 100-mesh and a fineness modulus between 2.40 and 3.00.

3. Air-entraining or water-reducing admixture shall be used in all concrete which is placed by pumping methods.

2.03 MIXING AND PRODUCTION OF CONCRETE - SITE-MIXED

A. Batching:

1. Use scales for weighing concrete ingredients accurate within plus/minus 0.4 percent of their total capacities. Make standard test weights available to permit checking scale accuracy.

2. Operate batching equipment so that concrete ingredients are consistently measured within following tolerances:

Cement	plus/minus 1 percent
Water	plus/minus 1 percent
Aggregates	plus/minus 2 percent
Admixtures	plus/minus 3 percent

3. Charge each batch into mixer so some water will enter in advance of cement and aggregates. Allow water to flow for a period which may extend to end of first 25 percent of specified mixing time. Provide controls to prevent batched ingredients from entering mixer before previous batch has been completely discharged.

B. Mixing:

1. Mix concrete in a batch mixer capable to thoroughly combining aggregates, cement, and water into a uniform mass within specified mixing time, and of discharging concrete without harmful segregation. Use mixer bearing a manufacturer's rating plate indicating capacity and recommended revolutions per minute. Operate in accord therewith.

2. Use mixers with a rated capacity of 1 cu. yd. or larger conforming to requirements of Plant Mixer Manufacturers Division (1970) of Concrete

Plant Manufacturers Bureau, 9000 Spring Street, Silver Spring, MD 20901.

3. Except as provided below, mix batches of 1 cu. yd. or less, not less than 1 minute. Increase mixing time 15 seconds for each additional cu. yd. or fraction thereof.

4. Shorter mixing time may be permitted provided performance tests made in accord with ASTM C94 indicate that time is sufficient to produce uniform concrete.

5. Provide controls to insure that batch cannot be discharged until required mixing time has elapsed. At least three-quarters of required mixing time shall take place after last mixing water has been added.

6. Keep interior of mixer free of accumulations that will interfere with mixing action. Replace mixer blades when they have lost 10 percent of their original height.

2.04 MIXING - CONTROL OF ADMIXTURES

A. Charge air-entraining admixtures and other chemical admixtures into mixer as solutions. Measure by means of an approved mechanical dispensing device. Liquid added shall be considered a part of mixing water. Admixtures that cannot be added in solution may be weighed or measured by volume if so recommended by manufacturer.

B. If two or more admixtures are used, add them separately to avoid possible interaction that might interfere with efficiency of either admixture, or adversely affect concrete.

C. Complete addition of retarding admixtures within 1 minute after addition of water to cement has been completed, or prior to beginning of last three-quarters of required mixing, whichever occurs first.

2.05 MIXING - TEMPERING AND CONTROL OF MIXING WATER

A. Mix concrete only in quantities for immediate use. Discard concrete which has set.

B. When concrete arrives at project with slump below that suitable for placing, water may be added only if neither maximum permissible water-cement ratio nor maximum slump is exceeded. Incorporate water by additional mixing equal to at least half of total mixing required.

2.06 MIXING - WEATHER CONDITIONS

A. Cold weather: Comply with ACI 306.

1. In cold weather, temperature of concrete when delivered at site shall conform to following limitation:

Min. Concrete Temperature
(Degrees F)

Air Temperature (deg F)	For Sections w/least dim. less than 12"	For Sections w/least dim. 12" or greater
30 to 45	60	50
0 to 30	65	55
below 0	70	60

2. If water or aggregate is heated above 100 degF, combined water with aggregate in mixer before cement is added. Do not mix cement with water or with mixtures of water and aggregate having a temperature greater than 100 degF.

B. Hot weather: Comply with ACI 305. Cool ingredients before mixing, or add flake ice or well-crushed ice of a size that will melt completely during mixing for all or part of mixing water if, due to high temperature, low slump, flash set or cold joints are encountered.

PART 3 - EXECUTION

3.01 PREPARATION BEFORE PLACING

A. Remove hardened concrete and foreign materials from inner surfaces of conveying equipment.

B. Complete formwork, remove snow, ice and water, secure reinforcement in place, position expansion joint material, anchors, and other embedded items and have entire preparation approved.

C. Sprinkle semiporous subgrades to eliminate suction and seal porous subgrades in an approved manner.

3.02 PROTECTION

A. Unless adequate protection is provided and approval is obtained, do not place concrete during rain.

B. Do not allow rainwater to increase mixing water nor to damage surface finish.

C. When temperature of surrounding air is expected to be below 40 degF during placing or within 24 hours thereafter, temperature of plastic concrete, as placed, shall be no lower than 55 degF for sections less than 12" in any dimension nor 50 degF for any other sections. Temperature of concrete as placed shall not be so high as to cause difficulty from loss of slump, flash set, or cold joints and should not exceed 90 degF. When temperature of concrete exceeds 90 degF use precautionary measures approved by Architect. When temperature of steel is greater than 120 degF spray steel forms and reinforcement with water just prior to placing concrete.

3.03 CONVEYING

A. Handle concrete from mixer to place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of ingredients and assure that required quality of concrete is maintained.

B. Use truck mixers, agitators, and nonagitating units conforming to ASTM C94.

C. Use horizontal belt conveyors or mount at a slope which will not cause excessive segregation or loss of ingredients. Protect concrete against undue drying or rise in temperature. Use an approved arrangement at discharge end to prevent segregation. Do not allow mortar to adhere to return length of belt. Discharge long runs into a hopper or through a baffle.

D. Use approved trunks or chutes where drop exceeds 6 ft.

E. Pumping equipment shall be of conventional concrete pump with adequate pumping capacity and sufficient pipeline diameter for the maximum size aggregate in concrete. Loss of slump in pumping equipment shall not exceed 2". Do not convey concrete through pipe made of aluminum or aluminum alloy. **By definition, a conventional concrete pump does not include "grout pump," and a "grout pump" will not be allowed to convey concrete**.

F. Pneumatic conveying equipment shall be of suitable kind with adequate pumping capacity. Control pneumatic placement so that segregation is not apparent in discharged concrete. Loss of slump in pneumatic conveying equipment shall not exceed two inches.

3.04 DEPOSITING

A. General: Deposit concrete continuously or in layers of such thickness that no concrete is deposited on concrete which has hardened sufficiently to cause formation of seams or planes of weakness within section. If a section cannot be placed continuously, locate construction joints as indicated. If not indicated, not over 20 ft. o.c.. Place at such a rate that concrete which is being integrated with

fresh concrete is still plastic. Do not deposit concrete which has partially hardened or has been contaminated by foreign materials. Remove temporary spreaders in forms when concrete placing has reached an elevation rendering their service unnecessary. They may remain embedded in concrete only if made of metal or concrete and if prior approval has been obtained.

B. Do not start placing of concrete in supported elements until concrete previously placed in columns and walls is no longer plastic and has been in place at least two hours.

C. Deposit concrete as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. Do not subject concrete to any procedure which will cause segregation.

D. Consolidation. Consolidate all concrete by vibration, so that concrete is thoroughly worked around reinforcement, around embedded items and into corners of forms eliminating all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. Use internal vibrators having minimum frequency of 8000 vibrations per minute to consolidate concrete effectively. Do not use vibrators to transport concrete within forms. Insert vibrators and withdraw at points approximately 18" apart. At each insertion allow duration sufficient to consolidate concrete but not sufficient to cause segregation; generally from 5 to 15 sec. Keep a spare vibrator on job site during all concrete placing operations. Where concrete is to have an as-cast finish, bring a full surface of mortar against form by vibration process, supplemented if necessary by spading, to work coarse aggregate back from formed surface.

3.05 JOINTS AND EMBEDDED ITEMS

A. Construction joints: Locate joints not indicated so as to least impair strength of structure, subject to Architect approval.

1. In general, locate near middle of spans of slabs, beams, and girders unless a beam intersects a girder at this point, in which case, offset joint in girder a distance equal to twice width of beam. Locate joints in walls and columns at underside of floors, slabs, beams, or girders, 1-1/2" minimum above tops of footings and at tops of floor slabs. Place beams, girders, brackets, column capitals, haunches, and drop panels at same time as slabs. Make joints perpendicular to main reinforcement.

2. Continue all reinforcement across joints. Provide inclined dowels as directed by Architect. Surface of concrete shall be roughened to 1/4" amplitude in all joints in walls and between walls and slabs or footings not earlier than 5 days after initial pour or by an approved method that will assure equal bond such as a thorough hose washing of the surface not less than two or more than four hours after the concrete is placed (depending on setting time).

3. Clean surface of concrete at all joints thoroughly and remove all laitance prior to placing adjoining concrete.

4. When required or permitted, obtain bond by one of following methods:

   a. Use of an approved adhesive.

   b. Use of an approved chemical retarder which delays but does not prevent setting of surface mortar. Remove retarded mortar within 24 hr. after placing to produce a clean exposed aggregate bonding surface.

B. Expansion joints: Do not permit reinforcement or other embedded metal items bonded to concrete (except dowels in floors bonded on only one side of joints) to extend continuously through any expansion joints as indicated. If not indicated, locate not over 15 ft. on center.

C. Place all sleeves, inserts, anchors, and embedded items required for adjoining work or for its support, prior to concrete placement.

1. Give all contractors whose work is related to concrete, or supported by it, ample notice and opportunity to introduce and/or furnish embedded items before concrete placement.

2. Position expansion joint material, waterstops, and other embedded items accurately and support against displacement. Fill voids in sleeves, inserts and anchor slots temporarily with readily removable material to prevent entry of concrete.

3.06 BONDING OF JOINTS

A. When specified, prepare surface of joints in accord with one of methods specified under joints and embedded items.

B. Dampen (but do not saturate) hardened concrete of construction joints and of joints between footings and walls or columns, between walls or columns and beams or floors they support, joints in unexposed walls and all others not mentioned below, immediately prior to placing of fresh concrete.

C. Dampen (but do not saturate) hardened concrete of joints in exposed work; joints in middle of beams, girders, joists, and slabs; and joints in work designed to contain liquids. Thoroughly cover with a coat of cement grout of similar proportions to mortar in concrete. Use grout as thick as possible on vertical surfaces and at least 1/2" thick on horizontal surfaces. Place fresh concrete before grout has attained its initial set.

D. Prepare joints receiving an adhesive and apply adhesive in accord with manufacturer's recommendations prior to placing of fresh concrete.

E. Prepare surfaces of joints which have been treated with a chemical retarder in accord with manufacturer's recommendations prior to placing of fresh concrete.

3.07 SLABS - PREPARATION OF SUBGRADE FOR SLABS ON GROUND

A. Subgrade shall be well drained and of adequate and uniform load bearing nature. Keep in-place density of subgrade soils at least to minimum indicated.

B. Place vapor barrier over compacted subgrade. See Section 07110-3.01.

C. Place 2" thick layer of clean mortar sand over vapor barrier per foundation details.

D. If temperature inside a building where concrete is to be placed is below freezing, raise temperature and maintain above 50 degF long enough to remove all frost from subgrade.

3.08 SLABS - EDGE FORMS AND SCREEDS

A. Set edge forms and intermediate screed strips accurately to produce designated elevations and contours of finished surface. Unless properly cambered, edge forms and intermediate screeds shall be accurately set high to compensate for deflections of supporting systems due to weight of the fresh concrete. Extra concrete (increased thicknesses) as necessary to produce finished surfaces within specified tolerances at the designated elevations and contours shall be provided at no additional cost to the Owner. Make sufficiently strong to support vibrating screeds or roller pipe screeds, if nature of finish specified requires use of such equipment. Align concrete surfaces to contours of screed strips by use of strike-off templates or approved compacting type screeds.

B. When formwork is cambered, set screeds to like camber to maintain proper concrete thickness.

3.09 SLAB - PLACEMENT

A. Carefully coordinate mixing and placing with finishing. Do not place concrete on subgrade or forms more rapidly than it can be spread, straightedged, and darbied or bull floated. Perform these operations before bleeding water has an opportunity to collect on surface.

B. To obtain good surfaces and avoid cold joints, plan size of finishing crews with due regard to effects of concrete temperature and atmospheric conditions on rate of hardening of concrete. If construction joints become necessary, construct as required under joints and embedded items.

C. Jointing: Locate joints in slabs on grade as indicated. If saw-cut joints are required or permitted, time the cutting properly with set of concrete: start cutting as soon as concrete has hardened sufficiently to prevent aggregates being dislodged by saw. Complete before shrinkage stresses become sufficient to produce cracking.

D. Consolidation: Thoroughly consolidate concrete in slabs. Obtain consolidation of slabs with vibrating screeds, roller pipe screeds, internal vibrators, or other approved means.

3.10 SLAB FINISHING (SEE SECTION 03350)

3.11 CURING AND PROTECTION

A. General: Beginning immediately after placement, prevent concrete from premature drying, hot or cold temperatures, and mechanical injury, and maintain with minimal moisture loss at relatively constant temperature for period necessary for hydration and hardening of concrete. Materials and methods of curing subject to approval.

B. Preservation of moisture:

1. For concrete surfaces not in contact with forms, apply one of following procedures immediately after completion of placement and finishing:

   a. Ponding or continuous sprinkling.

   b. Application of absorptive mats or fabric kept continuously wet.

   c. Application of sand kept continuously wet.

   d. Continuous application of mist spray (not exceeding 150 degF).

   e. Application of sheet curing materials.

   f. Application of other moisture-retaining covering as approved.

   g. Application of curing compound. Apply in accord with recommendations of manufacturer immediately after any water sheen which may develop after finishing has disappeared. Do not use on any surface against which additional concrete or other material is to be bonded, or adhesively applied, unless it is proven that curing compound will not prevent bond, or unless positive measures are taken to remove it completely from areas to receive bonded applications.

2. Minimize moisture loss from surfaces placed against wooden forms or metal forms exposed to heating by sun by keeping forms wet until they can be safely removed. After form removal cure concrete until end of time prescribed.

3. Continue curing concrete for at least 7 days. If tests made of cylinders, kept adjacent to structure and cured by same methods, show average compressive strength has reached 70% of specified strength, (fc'), moisture retention methods may be terminated. If one of curing procedures indicated above is used initially, it may be replaced by one of the other procedures indicated any time after concrete is 1 day old, provided concrete is not permitted to become surface dry during transition.

C. Temperature, wind, and humidity:

1. Cold weather: When mean daily outdoor temperature is less than 40 degF maintain temperature of concrete between 50 and 70 degF for required curing period. When necessary make arrangements for heating, covering, insulation, or housing concrete work adequate to maintain required temperature without injury. Do not use combustion heaters during first 24 hours unless precautions are taken to prevent exhaust gases which contain carbon dioxide.

2. Hot weather: When necessary make provision for windbreaks, shading, fog spraying, sprinkling, ponding, or wet covering with a light colored material. Take such protective measures as quickly as concrete hardening and finishing operations will allow.

3. Rate of temperature change: Keep changes in temperature of air immediately adjacent to concrete during and immediately following curing period as uniform as possible. Do not exceed 5 degF in any 1 hour or 50 degF in any 24 hour period.

D. Protection from mechanical injury: During curing period, protect concrete from damaging mechanical disturbances, such as load stresses, heavy shock, and excessive vibration. Protect all finished concrete surfaces from damage by construction equipment, materials, or methods, and by rain or running water. Do not load self-supporting structures in such a way as to overstress concrete.

E. Protection of slabs-on-grade from frost: Interior slabs exposed to freezing temperatures shall be adequately protected so that frost does not develop in the supporting subgrade.

END OF SECTION

SECTION 03350

CONCRETE FINISHING AND REPAIR OF SURFACE DEFECTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. General:

1. Furnish all labor, materials, tools, equipment, and services for all concrete finishing and repair of surface defects as indicated, in accord with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See Division 1 for General Requirements.

5. See Section 03000 for general requirements for concrete work.

1.02 QUALITY ASSURANCE

A. When finishing is required to match sample furnished to Contractor, make a sample finish on an area at least 4' x 4' in an inconspicuous location designated by Architect before proceeding with finish in specified location.

B. Finishing tolerances: Horizontal finishes will be accepted provided:

1. Applicable specification requirements are satisfied.

2. Water does not pond in areas sloped to drain.

3. Gap between a 10 ft. straight edge placed anywhere and the finished surface do not exceed:

Class A tolerance ----------1/8"
Class B tolerance ----------1/4"
Class C tolerance ----------1/2"

4. Accumulated deviation from intended true plane of finished surface does not exceed 1/2".

5. Accuracy of floor finish does not adversely affect installation and operation of movable equipment, floor supported items or items fitted to floor (doors, tracks, etc.).

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 FINISHING - GENERAL (EXCEPT SLABS)

A. After removal of forms, repair and give surfaces of concrete the finishes indicated.

B. Unspecified finish: If finish is not designated, use following finishes as applicable:

1. All unpainted concrete surfaces not exposed to public view: Rough form finish.

2. All unpainted concrete surfaces exposed to public view: Smooth form finish.

3. All concrete surfaces to receive paint: Grout cleaned and rubbed finish.

4. Unformed surfaces (except slabs): As indicated.

3.02 REPAIR OF SURFACE DEFECTS

A. Repair surface defects immediately after form removal.

B. Repair defective areas: Remove all honeycombed and other defective concrete down to sound concrete. Chip if necessary to make edges perpendicular to surface or slightly undercut. No feather edges will be permitted. Dampen area to be patched and an area at least 6" wide surrounding it to prevent absorption of water from patching mortar. Prepare a bonding grout of approximately 1 part cement to 1 part fine sand passing a No. 30 mesh sieve. Mix to consistency of thick cream, and then brush into surface.

C. Make patching mixture of same materials and of approximately same proportions as used for concrete except omit coarse aggregate. Mortar shall consist of not more than 1 part cement to 2-1/2 parts sand by damp loose volume. Mix white and gray portland cement to produce a color matching color of surrounding concrete, as determined by a trial patch. Add no more mixing water than necessary for handling and placing. Mix patching mortar in advance and allow to stand with frequent manipulation, without addition of water, until it has reached stiffest consistency that will permit placing.

D. After surface water has evaporated from area to be patched, brush bond coat into surface. When bond coat begins to lose water sheen, apply patching mortar. Thoroughly consolidate mortar into place and strike off so as to leave patch slightly higher that surrounding surface. To permit initial shrinkage, leave undisturbed for at least 1 hr. before final finish. Keep patched area damp for 7 days. Do not use metal tools in finishing a patch which will be exposed.

E. Fill and finish tie holes: Clean and thoroughly dampen tie holes; fill solid with patching mortar. Round tie holes less than 1/4" diameter x 1-1/2" deep in rough form finished surfaces need not be filled.

F. Proprietary materials: If permitted or required, proprietary compounds for adhesion or as patching ingredients may be used in lieu of or in addition to foregoing patching procedures. Use such compounds in accord with manufacturer's recommendations.

3.03 ROUGH FORM FINISH (ALL CONCEALED SPACES)

A. Rough form finish: No selected form facing materials are specified for rough form finish surfaces. Patch defects. Chip or ruboff fins exceeding 1/4" in height. Otherwise, leave surfaces with texture imparted by forms.

3.04 SMOOTH FORM FINISH (EXPOSED SURFACES AS NOTED)

A. Smooth form finish: Use form facing material to produce a smooth, hard, uniform texture on concrete. It may be plastic coated plywood, metal, plastic liners, or other approved material capable of producing desired finish. Arrange facing material orderly and symmetrical, with number of seams kept to practical minimum. Support by studs or other backing capable of preventing excessive deflection. Do not use material with raised grain, patches, or other defects which will impair texture of concrete surface.

B. Patch tie holes and defects. Remove all fins completely.

C. When surface texture is impaired and form joints misaligned by more than 1/8", grind, bushhammer, or correct affected concrete as directed by Architect. Slurry grout areas evidencing minor mortar leakage as a defective area. When in opinion of Architect, workmanship is less than acceptable standard for a smooth form finish, provide one of rubbed finishes indicated at not additional cost to owner.

3.05 RUBBED FINISHES - GENERAL

A. Produce rubbed finishes on concrete with a smooth form finish. Where smooth rubbed finish is to be applied, remove forms and perform necessary patching as soon after placement as possible without jeopardizing structure.

3.06 RUBBED FINISH - GROUT CLEANED (ALL EXPOSED EXTERIOR SURFACES)

A. Grout cleaned finish: Undertake no cleaning operations until all contiguous surfaces are completed and accessible. Mix 1 part portland cement and 1-1/2 parts fine sand with sufficient water to produce a grout having consistency of thick paint. Mix white and gray portland cement to match color of surrounding concrete, as determined by a trial patch. Wet surface of concrete sufficiently to prevent absorption of water from grout and apply grout uniformly. Immediately after applying grout, scrub surface vigorously with a cork float or stone to coat surface and fill all air bubbles and holes. While grout is still plastic, remove all excess grout by working surface with a rubber float, sack, or other means. After surface whitens from drying, rub vigorously with clean burlap. Keep finish damp for at least 36 hrs. after final rubbing.

3.07 FINISHING OF RELATED UNFORMED SURFACES (EXCEPT SLABS)

A. Strike smooth tops of walls or buttresses, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces after concrete is placed.

B. Float to a texture reasonably consistent with that of formed surfaces.

C. Continue final treatment on formed surfaces uniformly across unformed surfaces.

3.08 SLAB FINISHING - GENERAL

A. Place slabs to tolerances specified and per finish indicated.

B. Unspecified slab finish: When type of finish is not indicated, use following finish as applicable:

1. Surfaces intended to receive bonded applied cementitious applications: Scratched finish.

2. Surfaces intended to receive waterproofing membranes, or sand bed for tile: floated finish.

3. Floors to receive floor coverings: Troweled finish.

4. Sidewalks, and garage floors: Troweled finish.

3.09 SCRATCHED SLAB FINISH

A. After concrete has been placed, consolidated, struck off, and leveled to a Class C tolerance, roughen surface with stiff brushes or rakes before final set.

3.10 FLOATED SLAB FINISH

A. After concrete has been placed, consolidated, struck off, and leveled, do not work further until ready for floating. Begin floating when water sheen has disappeared and surface has stiffened sufficiently to permit operation. During or after first floating check planeness of entire surface with a 10 ' straightedge applied at not less than two different angles. Cut down all high spots and fill all low spots during this procedure to produce a surface within Class B tolerance throughout. Refloat slab immediately to a uniform sandy texture.

3.11 TROWELED SLAB FINISH

A. First float-finish surface. Next power trowel, and finally hand trowel. First troweling after power floating shall produce a smooth surface which is relatively free of defects but which may still show some trowel marks. Perform additional trowelings by hand after surface has hardened sufficiently. Final trowel when a ringing sound is produced as trowel is moved over surface. Thoroughly consolidate surface by hand troweling. Leave finished surface essentially free of trowel marks, uniform in texture and appearance and plane to a Class A tolerance. On surfaces intended to receive floor coverings, grind off any defects which would show through floor covering.

B. Provide troweled slab texture as noted on the Drawings and provide sample for approval of Architect.

3.12 BROOM FINISH

A. Immediately after concrete has received float finish, give it a coarse transverse scored texture by drawing a broom across surface. Provide sample finish for Architect approval prior to application.

B. See drawings for locations of broom finishes.

3.13 EXPOSED AGGREGATE FINISHES

A. Exposed aggregate finishes are achieved by one of the two accepted methods: following the chemical retardation of surface set.

1. Abrasive blasting (commonly known as sandblasting).

2. Chemical retardation of surface set.

B. Abrasive Blasting

1. This type of finish is classified under the following four headings: brush blast, light abrasive blast, medium exposed aggregate, and heavy exposed aggregate.

a. Brush Blast

A brush blast is a little more than a uniform scourcleaning that lightly textures the surface skin of the concrete. Seldom does a particle of coarse aggregate show as a result of this light surface removal. The objective is to remove minor surface variations. To the touch, the surface feels similar to a fine sandpaper.

A brush-blast surface seldom appears uniform at close inspection and should be viewed at a distance for evenness. The concrete mix, like that used with an as-cast surface is to be a uniformly graded mix as the color is largely determined by the cement. However, there is more secondary influence from the fine aggregate in this type of finish. It is sometimes satisfactory to use a concrete pump but only if the mix is not changed to facilitate pumping.

Forming requirements are as stringent as those required for as-cast finishes. Forms must be tight, with a uniform surface that avoids telegraphing surface variations. Form butt joints should not be taped because the imprint of the tape will be important that concrete placement and compaction for this type of finish be done correctly because any segregation or variation in the mix at the concrete surface will be visible. The best placing techniques should be used.

Brush blasting can be done at almost any time after seven days of the concrete casting. Although some projects have been successfully brush blasted at the end of construction it has ordinarily been advantageous to set up a schedule of time limits so that the constructor knows how much variation in timing is safe without affecting the uniformity of the surface.

b. Light Abrasive Blasting

Light abrasive blasting removes the surface skin sufficiently to expose the coarse particles of the fine aggregate as well as a few particles of the coarse aggregate. The surface is flat with little texture. After exposure, the fine aggregate exerts the primary effect on the color of the surface and the effect of both the cement and coarse aggregate are secondary. Conventional mix design methods can be used, except that at least ten percent more coarse aggregate is recommended. Slumps should be three inches plus or minus one-half inch. Tight, impervious forms should be used, although slight surface deformations like those occurring after sealing of joints with tape will usually be blasted

away. Although blasting can be done at almost any time for this type of finish, a delay of seven or more days after casting is recommended. Blasting prior to 45 days is also recommended.

c. Medium Exposed Aggregate

Medium abrasive blasting exposes the coarse aggregate to the extent that it projects from the mortar of the concrete. The coarse aggregate is required to be uniformly distributed over the surface to produce an acceptable result. The concrete mix should be designed with a higher than normal coarse aggregate factor to minimize the probability of uneven distribution. While a concrete sand gradation can usually be used, it is advantageous in some cases to use a masonry or industrial sand for the fine aggregate where most of the particles pass a Number 8 sieve. Slump should not exceed three inches, and two inches is often desirable. The coarse aggregate should be a hard material, because soft aggregate might be eroded at the same rate as the mortar during abrasive quality and materials. Although forms with a high reuse factor such as steel, fiberglass-reinforced plastic and high-density plywood are usually preferable, good results have been achieved using a B-B plywood form, not oiled, with a good two-coat application of form sealer. Taping or rubberized caulking and gasketing of plywood butt joints has produced successful forming results with this type of finish. Abrasive blasting should be done prior to seven days after casting.

d. Heavy Exposed Aggregate

Heavy exposed aggregate finishing erodes the surface to the extent that the coarse aggregate projects out considerably from the matrix. Approximately 80 percent of the visible surface should be coarse aggregate. A normal concrete mix even with a slightly higher coarse aggregate factor is not acceptable. In this type of finish, a lack of uniform aggregate distribution and any significant separation between coarse aggregate particles is highly undesirable architecturally. Therefore, a special mix design with a high coarse aggregate factor is essential. Gap grading is usually desirable and a careful graduation of both coarse and fine aggregate is important.

Methods that utilize dry preplacement of coarse aggregate followed by in-place grouting can be used for finishes that require larger graded materials such as 3/4 inch to 1-1/2 inch maximum size graded coarse aggregate and larger. They are not appropriate for smaller coarse aggregate sizes.

For coarse aggregate gradations of less than one inch maximum size, gap grading is most appropriate. Gap-graded mixes with coarse aggregate larger than one inch maximum are extremely difficult to place because the larger particles seldom move from their original position even with heavy vibrator effort, and they are more prone to segregate in the mixer truck. The gap-graded mix is frequently a zero-slump concrete and is seldom used at slumps higher than two inches. The mix must be deposited by bottom drop buckets with steep slopes on both sides. High frequency type vibration equipment is essential to properly place and consolidate the lifts of concrete. Although the quality of the form does not have to be equal to that indicated for the lighter blasted surfaces, the form surface should not absorb moisture, nor should the joints permit leakage as these changes will cause hard, dark areas on the concrete. Release agent discoloration can be removed by increasing the blasting intensity or degree. Vertical form faces should be removed within 24 hours after casting and the concrete immediately abrasive blasted.

2. Provide 4' x 4' sample of finishes specified on drawings for Architect's review and approval prior to proceeding with final blasting.

C. Chemical Retardation of Surface Set

Surface retarders applied to forms or directly to slabs react to delay the surface skin of the concrete from setting normally.

1. Composition and Materials

An approved retarder is a coating which, when applied directly to the concrete surface immediately after finishing, or directly to the forms prior to pouring, delays but does not prevent final hardening of the surface. It requires care and attention to produce an excellent job. The depth of the retarded-set concrete surface will be approximately 3/16" with minor variations caused by differences in troweling, retarded coverage, time interval before revealing, or temperature. The retarder contains a dye which aids in the removal of the specified depth of surface material for aggregate exposure.

2. Manufacturers

"Lithotex Top Surface Retarder" as manufactured by L.M. Scofield; "Heat-Cote Blue or Yellow" as manufactured by Preco Industries (800-645-1237); or acceptable alternate.

3. Concrete Mix Design (Submit mix design for review)

An extremely coarse mix containing the greatest possible percentage of the selected coarse aggregate and a minimum amount of mixing water should be used in the concrete being placed. Water-reducing and air-entraining admixtures may be used, but not calcium chloride nor other accelerants.

4. Preparatory Work

The concrete should be placed and consolidated so as to fill completely all spaces in the forms. Tamping is not permitted because the coarse aggregate must remain near the surface for later exposure. Either a wood float or steel trowel finish should be applied, depending on the depth of aggregate exposure desired, the former permitting about 3/16" and the latter, 1/8".

5. Application

For horizontal slab surfaces, as soon as final floating or troweling has been completed, the retarder is thoroughly mixed and strained and then sprayed evenly over the surface full strength with a Hudson-type sprayer. If overspray on adjacent work must be avoided, a brush or roller may be used. If a continually high temperature is expected or a deep reveal is desired, the surface may be covered with plastic sheeting or curing paper until the retarder is removed. For vertical surfaces, apply the retarder evenly over the inside surfaces of all forms, being sure to follow the manufacturer's specifications for application.

6. Aggregate Reveal and Curing

The retarder must be removed between 8 and 20 hours after placement with a coarse-fibered or rust-resistant-wire scrub brush and jet of water. If the concrete is colored or when a clear sealer is to be used, the surface should be covered after aggregate reveal with new, nonstaining, curing paper. For other exposed-aggregate concrete, either water or a liquid membrane-type curing compound may also be used.

7. Surface Sealing

If efflorescence or alkali-staining is evident after the concrete has cured and a clear sealer is to be applied, exposed-aggregate surfaces should be lightly washed with a mild muratic acid solution (usually a 10:1 dilution), thoroughly rinsed with water, cleaned with a diluted approved Floor Cleaner, rinsed again and dried thoroughly. Two coats of an approved Clear Sealer are then applied to the thoroughly dry surface in accordance with the manufacturer's specifications.

8. Samples

Provide 4' x 4' sample panel of specified aggregate finish for Architect's review and approval.

3.14 COLORED CONCRETE

A. Integrally colored concrete shall contain color admixture as provided by "Davis Colors" or "L.M. Scofield", in strict accord with manufacturer's recommendations. Color, as indicated on plans.

3.15 SLAB HARDENER

A. Apply chemical hardener floor treatment after finishing operation to all interior floor slabs which are exposed in finished work and elsewhere as indicated.

B. Apply chemical hardener in accord with manufacturer's printed instructions, and after complete curing and drying of concrete surface. After final coat of chemical hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

C. Chemical hardener: Colorless, aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent, containing not less than 2 lbs. fluosilicate per gallon. Provide materials which do not react with, inhibit, or otherwise interfere with adhesives and bonding of future floor finishes. Approved products and manufacturers are as follows:

"Chem-Hard" by L & M Construction Chemicals
"Saniseal" by Master Builders Co.
"Lapidolith" by Sonneborn-Contech
"Lithoplate" by Protex Industries

D. Do not place liquid floor hardener on floor areas scheduled to receive synthetic matrix terrazzo, or setting beds for tile, terrazzo and like items.

3.16 REPAIR OF REJECTED HORIZONTAL FINISHES

A. Unacceptable horizontal finishes shall be replaced or corrected provided strength and appearance are not adversely affected. High spots may be removed by grinding and/or low spots filled with a patching compound or other remedial measures performed or permitted.

END OF SECTION

DIVISION 4
MASONRY

SECTION 04050

COLD AND HOT WEATHER PROTECTION

PART 1 - GENERAL

1.01 DESCRIPTION

A. General:

1. Furnish all labor, materials, tools, equipment, and services for cold and/or hot weather protection as indicated, in accord with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See Division 1 for General Requirements.

B. Related work specified elsewhere:

1. Cold-weather protection for concrete: Division 3.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 GENERAL

A. Do not use frozen or ice coated materials.

B. At end of each day or at shutdown, cover tops of all walls not enclosed or sheltered. Protect in accord with this section and requirements of other sections on masonry construction.

C. Remove and replace frozen or damaged masonry to satisfaction of Architect.

3.02 TEMPORARY FACILITIES

A. Construct and maintain temporary protection required to permit continuous and orderly progress of work.

B. Provide and maintain heat sufficient to assure temperature above 32 degF within protected areas.

C. Provide temporary lighting at levels to permit work to be correctly performed.

3.03 PROCEDURES - COLD WEATHER PROTECTION

A. Air temperatures: 32 to 40 degF:

1. Heat mixing water or aggregate to produce mortar temperatures between 40 and 120 degF.

B. Air temperature: 25 to 32 degF:

1. Heat mixing water or aggregate to produce mortar temperatures between 40 and 120 degF.

2. Maintain mortar temperatures above freezing.

C. Air temperature: 20 to 25 degF:

1. Heat mixing water or aggregate to produce mortar temperatures between 40 and 120 degF.

2. Maintain mortar temperatures above freezing, until used.

3. Provide heat on both sides of walls under construction.

4. Provide windbreaks or shelters when wind is in excess of 15 MPH.

D. Air temperature: Below 20 degF:

1. Heat mixing water or aggregate to produce mortar temperatures between 40 and 120 degF.

2. Maintain mortar temperatures above freezing, until used.

3. Maintain temperature of units until laid at not less than 25 degF.

4. Maintain air temperature on each side of wall above freezing.

E. Air temperature after installation: 32 to 40 degF:

1. Protect from rain or snow for not less than 24 hours by covering with weather-resistive membrane.

F. Air temperature after installation: 25 to 32 degF:

1. Completely cover with weather-resistive membrane for not less than 24 hours.

G. Air temperature after installation: 20 to 25 degF:

1. Completely protect with insulating blankets for not less than 24 hours or provide other protection approved by Architect.

H. Air temperature after installation: Below 20 degF:

1. Maintain above 32 degF for 24 hours.

2. Do not allow rapid drop in temperature after removal of heat.

3.04 PROCEDURES - HOT WEATHER PROTECTION

A. If temperature of water or aggregate exceeds 100 degF combine water with aggregate in mixer before cement is added. Do not mix cement with water or with mixtures of water and aggregate having a temperature exceeding 100 degF.

Hot Weather: Cool ingredients before mixing, or add flake ice or well-crushed ice of a size that will melt completely during mixing for all or part of mixing water.

1. Store sand, masonry units, and mixing equipment in shaded areas.
2. Make certain that sand is moist. Sprinkle sand pile if needed to maintain moisture.
3. Dampen high absorption brick.
4. Dampen mortar boards and cover mortar boxes.
5. Construct wind breaks protecting construction areas.
6. Self secure masonry wall by covering with plastic at the end of the day, or fog mortar joints after they achieve initial set to compensate for evaporation.

END OF SECTION

SECTION 04100

MORTAR AND MASONRY GROUT

PART 1 - GENERAL

1.01 DESCRIPTION

A. General:

1. Furnish all labor, materials, tools, equipment, and services for all mortar and masonry grout for all masonry construction as indicated, in accord with provisions of Contract Documents.

2. Completely coordinate with work of all others trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

1.02 QUALITY ASSURANCE

A. Materials standards: ASTM and CBC Standards indicated.

B. Mortar testing:

1. As required in Section 01400 - General Testing Procedures

2. Tests of field mixed mortar shall also conform to CBC Standard 24-22.

3. Retest when initial test fails.

C. Grout testing:

1. As required in Section 01400 - General Testing Procedures.

2. Perform all tests specified in ASTM C476.

3. Tests of field mixed grout shall also conform to CBC Standard 24-22.

4. Retest when initial test fails.

1.03 SUBMITTALS (SEE SECTION 01340)

A. Design mix reports for each type of mortar and grout used. Include description of contents and proportions, and results of tests specified in paragraph "Quality Assurance". See Section 01400 - General Testing Procedures.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Portland cement: ASTM C150, Type I.

1. No air entrainment.
2. Natural gray color when used with all unexposed masonry units.
3. Colored mortar shall be used as noted on the drawings.
4. Maximum percent of alkalis: 0.60 in accord with Table 1A.

B. Hydrated lime: ASTM C207, Type S.

C. Mortar aggregate: ASTM C144.

D. Grout: ASTM C476.

E. Water: Potable.

2.02 MIXES

A. Mortar mix:

1. Proportions: 1 part portland cement, 1/4 part to 1/2 part lime, and 3-1/2 to 4 parts sand by volume.
2. Minimum compressible strength: 1800 PSI.
3. Do not use masonry cement.
4. Mix materials minimum of 3 minutes.
5. Adjust consistency to satisfaction of mason.
6. Use no anti-freeze additives.
7. Mortar colors shall match color of integral colored concrete block. Colors shall be “Davis” mortar colors or acceptable substitution.

B. Grout mixes: Comply with ASTM C476, Table 2.

1. Use no anti-freeze additives.

2. Mix materials minimum of 5 minutes.

3. Minimum compressive strength: 2000 PSI.

4. When using a "grout pump" to convey grout, use mix which contains plasticizer to aid in movement.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with requirements specified for materials being set or grouted.

B. If mortar begins to stiffen within 2-1/2 hours, it may be retempered by adding water and remixing.

C. Do not use mortar after it has begun to set.

D. Use grout within 2 hours after initial mixing. Use no grout after it has begun to set.

E. Use coarse grout in spaces with least dimension over 2".

END OF SECTION

SECTION 04220

CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.01 DESCRIPTION

A. General:

1. Furnish all labor, materials, tools, equipment, and services for all concrete unit masonry construction as indicated, in accord with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See Division 1 for General Requirements.

B. Related work specified elsewhere:

1. Mortar and Masonry Grout: Section 04100.

2. Masonry cleaning: section 04510.

3. Design criteria: CBC, latest adopted edition.

1.02 QUALITY ASSURANCE

A. Tolerances:

1. From plumb, in lines and surfaces of columns, walls and arises:

   a. In 10 ft.: 1 in 100.

   b. In 40 ft. or more: 1 in 800.

2. From plumb, for external corners, control joints and other conspicuous lines:

   a. In any story or 20 ft. maximum: 1 in 200.

   b. In 40 ft. or more: 1 in 800.

3. From level or grades:

   a. In any bay or 20 ft. maximum: 1 in 200

   b. In 40 ft. or more: 1 in 800

4. Linear building lines from established position in plan and related portion of columns, walls, and partitions:

   a. In any bay or 20 ft. maximum: 1 in 100.

   b. In 40 ft. or more: 1 in 600.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver units on pallets with tight covers or deliver in cubes and store on dunnage.

B. Protect all materials from elements.

1.04 JOB CONDITIONS

A Protect against weather, when work is not in progress.

B. Cover top of walls with waterproof membrane, extend at least 4 ft. down both sides of walls and anchor in place.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concrete masonry units: (Unexposed concrete block) - Modular block units, standard grey color, ASTM C90, latest edition, Grade N, Type I, and C145, and CBC Standard 24-4, Grade N.

1. Sizes and shapes as indicated or required for conditions.

2. Face shell and web thickness: Table 3.

3. Moisture content: Table 1.

4. Fire resistive units: U/L rated.

5. Provide concrete blocks of same materials, texture and quality.

6. Do not use chipped, cracked, spalled, or imperfect units.

B. Horizontal joint reinforcing: See Section 03200, and drawings.

C. Vertical reinforcing bars: As indicated on drawings and specified in Section 03200.

D. Mortar: See Section 04100.

E. Sealants: As specified in Section 07900.

PART 3 - EXECUTION

3.01 PREPARATION PRIOR TO INSTALLATION

A. Verify suitability of substrate to accept work.

B. Verify that anchors and flashings are correct.

C. Installation constitutes acceptance of substrate and responsibility for performance.

3.02 INSTALLATION - GENERAL

A. Build walls to thickness indicated.

B. Build in flashing, reinforcing, weeps and related items.

C. Perform all cutting with masonry saws.

D. Cut as required to provide pattern indicated.

E. Install in running bond, unless otherwise noted on drawings.

F. Avoid use of less than half size units, except to form radii.

G. Do not install damaged units.

3.03 LAYING AND TOOLING

A. Lay out walls in advance for uniform and accurate spacing of bond patterns and joints. Properly locate openings, movement type joints, returns and offsets.

B. Lay masonry units with completely filled bed and head joints.

1. Butter ends with sufficient mortar to fill head joints and shove into place.

2. Do not slush head joints.

C. Maintain nominal 3/8" joint widths.

1. Masonry walls to receive plaster.

   a. Do not tool joints. Rub all joints flush with surface of block units in order to receive plaster coat.

2. Masonry walls exposed to be painted.

   a. Tool all joints in a concave pattern.

3. Masonry walls with integral colored masonry units.

   a. Precision masonry units.

      1) Tool all joints in a concave pattern.

   b. Split-faced masonry units.

      1) Do not tool joints. Rub all joints flush with surface.

D. During tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar.

E. Point-up all joints at corners, openings and adjacent work to provide neat, uniform appearance.

F. Remove masonry disturbed after laying.

   1. Clean and re-lay in fresh mortar.

   2. Do not pound units to fit.

   3. If adjustments are required, remove units, clean, and reset in fresh mortar.

G. Where work is stopped and later resumed, rack back 1/2 masonry unit length in each course.

   1. Remove loose units and mortar prior to laying fresh masonry.

H. As work progresses, build-in items indicated and specified.

   1. Fill in solidly with mortar around built-in items.

   2. Grout-fill space between metal frames and masonry.

3.04 REINFORCING AND FILLING

A. Fill all cells with grout: consolidate grout by puddling or mechanical vibrations.

B. Where vertical reinforcing is required, place and inspect it prior to filling operation.

C. Place in maximum 4 ft. lifts.

D. Leave lifts minimum 1-1/2", maximum 2" below top of course to form key with next lift.

E. Reinforce masonry openings same as for concrete openings.

F. At intersecting load-bearing walls provide rigid steel anchors 24" on center vertically, embed ends in grout filled cells.

3.05 CONTROL JOINTS AND SEALANTS

A. Provide vertical expansions, control and isolation joints where indicated.

1. Where not indicated, provide at maximum 30 ft. on center.

2. Rake out all mortar.

3. Locate control joints at points of natural weakness in masonry.

B. See Section 07900 for sealant installation requirements.

1. Seal joints between concrete masonry unit and metal frames or other dissimilar materials.

2. Seal expansion and control joints.

3.06 REPAIR, POINTING, AND CLEANING

A. Remove and replace loose, stained, or damaged units.

1. Provide new units to match.

2. Install in fresh mortar.

3. Point to eliminate evidence of replacement.

B. Clean in accord with Section 04510.

END OF SECTION

SECTION 04510

MASONRY CLEANING

PART 1 - GENERAL

1.01 DESCRIPTION

A. General:

1. Furnish all labor, materials, tools, equipment, and services for all masonry, exterior tile pavers, stone, and glass block cleaning, as indicated, in accord with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items necessary for a sound, secure and complete installation.

4. See Division 1 for General Requirements.

1.02 JOB CONDITIONS

A. Protect adjacent surfaces and materials from damage due to cleaning operations.

1.03 SUBMITTALS

A. Data: Submit manufacturer's technical data and installation instructions.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cleaning solution: Detergent type. Pro So Co., Sure Klean No. 600 Detergent Masonry Cleaner.

1. To be used on all exposed exterior tile pavers, masonry, and stone.

B. Cleaning solution: Pro So Co., Vana Trol.

1. To be used on all Glass Block.

C. Other manufacturers desiring approval comply with Section 01640.

2.02 LIMITATIONS

A. Cleaning should not be performed on wall or paver surfaces in which the ambient air temperature falls below 40 degrees F.

B. High-pressure pre-wetting and rinsing is not recommended for all masonry or stone surfaces and may cause damage. Where a high-pressure sprayer is used, the masonry wall shall be allowed to cure for 14 days prior to washing. High-pressure application of the cleaning solution shall not be permitted.

2.03 DURING CONSTRUCTION

A. Proper care should be taken during construction to keep the wall or floor free of mortar and grout smears. Grout left on the wall for even short periods of time become difficult to remove. Use a soft bristle brush immediately after tooling to remove excessive mortar. Avoid cleaning motions that press the mortar and grout into the face.

B. Cover the wall or floor at the end of each working day. Failure to prevent moisture from entering the wall or floor may result in efflorescence and other leaching problems.

C. Protect the wall or floor from dirt and mortar splatter.

D. Store all glass block, masonry, tile, and stone above the ground to protect from soil contamination.

PART 3 - EXECUTION

3.01 PREPARATION

A. Carefully check masonry, stone, tile, and glass block surfaces.

B. If necessary point with mortar.

C. Allow 4 days before start of cleaning.

D. Remove excess mortar using wooden paddles and scrapers.

E. Provide protection from adjacent areas which are not to be cleaned.

3.02 CLEANING

A. The cleaning operation should be undertaken within 2 to 4 weeks from masonry/stone/glass block/tile construction. Cleaning before the wall or flooring has properly cured may weaken the masonry/stone/glass block/tile. Prolonged curing prior to cleaning may create more permanent stains which may become difficult to remove.

B. Test a small area of wall/floor in an inconspicuous location using the cleaning mixture specified. A 16 sq. foot area may be sufficient. Where field panels are required, they should be cleaned using the product and procedures specified for the project. This can alert the owners representative and contractor of any adverse reactions prior to cleaning the wall/floor. Allow the test area to dry for one week prior to evaluating the effectiveness of the solution. The Architect shall evaluate and approve the test area prior to cleaning the remainder of the wall/floor. If the cleaning procedure is not effective, contact the manufacturer of the cleaner for further recommendations.

C. Mask or protect metal, glass, wood and other materials that may be adversely effected by the cleaning solution.

D. Saturate the area of wall/floor to be cleaned and the area directly below. This will prevent absorption of the dissolved particles into the masonry or stone.

E. Using a soft-fibered brush or a low pressure spray, apply the cleaning solution. **DO NOT USE HIGH PRESSURE SPRAY.** Allow the solution to remain on the wall for 1 to 3 minutes. Immediately reapply cleaning solution and remove heavy buildups of mortar and grout. **DO NOT ALLOW THE CLEANING SOLUTION TO DRY ON THE MASONRY, TILE, GLASS BLOCK, OR STONE.**

F. Rinse thoroughly with clean water. Remove all cleaning solution from the area cleaned and any rundown. Failure to remove all cleaning solution may result in streaking, staining and scumming.

3.03 COVERAGE

A. 600 Detergent: Dilute one part concentrate to 6 to 12 parts water.

B. Vana Trol: Dilute one part concentrate to 4 to 8 parts water.

C. The test panel will help to identify the actual coverage rate required.

3.04 PRECAUTIONS

A. Masonry cleaners are acidic and should be handled with caution. Applicators should wear goggles, rubber gloves, suits, etc. to avoid contact with the skin.

END OF SECTION

DIVISION 5
METALS

SECTION 05120

STRUCTURAL STEEL

PART 1 - GENERAL

1.01 DESCRIPTION

A. General:

1. Furnish all labor, materials, tools, equipment, and services for all structural steel as indicated, in accord with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See Division 1 for General Requirements.

1.02 QUALITY ASSURANCE

A. References:

1. American Institute of Steel Construction (AISC):

   a. Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings (referred to herein as AISC Specification).

   b. Code of Standard Practice for Steel Buildings and Bridges (referred to as AISC Code of Standard Practice). Only those sections referred to are a part of this specification.

   c. Quality Certification Program.

2. American Welding Society AWS D1.1, Structural Welding Code - Steel (referred to as AWS Code).

3. Research Council on Riveted and Bolted Structural Joints Specification for Structural Joints Using ASTM A325 or A490 bolts (referred to as Specification for Structural Joints).

4. Structural Steel Painting Council (SSPC): Standards indicated.

B. Qualifications:

1. Steel fabricator:

a. Must be a City of Los Angeles Certified steel fabricator.

2. Steel erector: Minimum 10 years experience in erection of structural steel.

C. Source quality control:

1. Provide access and facilities for Architect shop and field inspections.

2. Replace or make acceptable repair to rejected work.

D. Previous acceptance of any material or finished members by Architect shall not prevent its rejection at later date if it does not comply with specifications.

E. Tolerances:

1. For fabrication: See AISC Code of Standard Practice.

2. Frame placement, after assembly and before welding or tightening:

a. Deviation from plumb, level and alignment: 1 in 500, maximum.

b. Displacement of centerlines of columns: 1/4" maximum, each side of centerline.

c. Displacement of centerlines of exterior columns: 1/8", maximum, each side of centerline.

F. Inspection: All field full penetration welds require inspection by a licensed California deputy inspector. The Contractor shall coordinate obtaining an inspector by contacting a local testing laboratory. The Architect shall approve the selection of the inspector and all costs shall be billed directly to the Owner, with invoices addressed to the Architect. See Section 01400 - General Testing Procedures.

1.03 SUBMITTALS (SEE SECTION 01340)

A. Shop Drawings:

1. Show all details including cuts, copes, connections, holes and welds. Indicate all shop and field welds using AWS symbols. Indicate connections where high strength bolts are required.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Handle and store steel members above ground on platforms, skids or other supports.

B. Keep members free of dirt, grease and other foreign material and protect against corrosion.

PART 2 - PRODUCTS

2.01 MATERIAL

A. Steel, structural shapes and plate: ASTM A36.

B. Bolts, nuts and washers, high strength: ASTM A325 and ASTM A490.

1. Provide washers for all nuts.

C. Pipe, round: ASTM A53, Grade B.

D. Tubing, structural: ASTM A500, A501 or A618 (46 KSI, minimum).

E. Bolts and nuts, unfinished: ASTM A307, Grade A, typical unless noted otherwise on the drawings.

F. Washers, plain: ANSI B18.22.1, Type B.

G. Washers, beveled: ANSI B27.4.

H. Anchor bolts, except high strength: Section 1(C) of ASTM A307.

I. Anchor bolts, high strength: ASTM A687, with A325 nuts and load-indicator washers unless noted otherwise on the drawings.

J. Welding electrodes:

1. Shielded metal - arc: AWS A5.1 or AWS A5.5, E70XX.

2. Submerged-arc: AWS A5.17 or A5.23, E7X-EXXX.

3. Gas metal-arc: AWS A5.18, E70S-X or E70U-1.

4. Flux cored-arc: AWS A5.20, E70T-X (except 2, 3, 10, GS).

K. Headed studs and deformed bar anchors:

1. Studs: ASTM A108 cold drawn bar, complying with AWS Code, 4.23.

a. Uniform diameter.

b. Heads: Concentric and normal to shaft.

c. Weld end: Chamfered and solid flux.

2. Deformed anchor bars: ASTM A496, cold drawn wire.

a. Straight, unless otherwise indicated.

b. Solid flux.

3. Automatic end welded studs shall be Nelson Granular flux filled shear connector or anchor stud or acceptable alternate. Studs shall be manufactured of C-1015 cold rolled steel which conforms to ASTM A-108-58-T.

4. After welding, free from any substance which would interfere with function as anchor or bond to deformed anchor bars.

5. Acceptable manufacturers: Erico/Jones Stud Welding Div., Dayton, OH; TRW, Inc./Nelson Div., Lorain, OH; and Omark Industries, Inc./KSM Fastening Systems Div., Moorestown, NJ.

6. Other manufacturers desiring approval comply with Section 01640.

L. Grout: Dry pack; 1 part Portland cement, 2-1/2 parts sand, and no more water than needed to make grout cohesive when squeezed in hand.

1. Portland cement: ASTM C150, Type I or II.

2. Sand: Graded as follows:

a. Passing No. 8 sieve: 95-100%.

b. Passing No. 16 sieve: 65-90%.

c. Passing No. 50 sieve: 10-30%.

d. Passing No. 100 sieve: 3-10%.

2.02 FABRICATION - WELDING

A. All welding, techniques of welding employed, appearance and quality of welds, and methods used to correct defective work shall comply with AWS Code, and requirements indicated.

B. Test and qualify welding operators and tackers in compliance with AWS Code for position and type of welding to which they will be assigned.

C. Qualify joint welding procedures or test in accord with AWS qualification procedures.

D. Before start of welding work, meet with welders to review and verify procedures.

E. Comply with AWS Code to minimize shrinkage and distortion stress.

F. Where groove welds have back-up plates, make first 3 passes with 1/8" round electrodes.

G. Use back-up plates in accord with AWS Code, extending minimum of 1" either side of joint. Remove extended back-up plates after completion of welding and acceptance of welded joint.

H. Make flange welds before making web welds.

I. For manual shielded metal-arc welding: Comply with Article 4.6 of AWS Code.

J. Low hydrogen electrodes: Dry and store electrodes in compliance with AWS Code.

K. Do not perform welding when ambient temperature is lower than 0 degF, or where surfaces are wet or exposed to rain, snow, or high wind, or when welders are exposed to inclement conditions.

L. Before starting welding:

1. Carefully plumb and align members in compliance with AISC Code of Standard Practice.

2. Preheat base metal to temperature stated in Table 4.2 of AWS Code.

   a. When no preheat temperature is given in Table 4.2 and base metal is below 32 degF, preheat base metal to at least 70 degF.

   b. Maintain temperature during welding.

   c. Preheat shall bring surface of all base metal within distance from point of welding equal to thickness of thicker part being welded or 3", whichever is greater, to specified preheat temperature.

   d. Maintain this temperature during welding.

3. Fully tighten bolts.

4. Assembly and surface preparation shall comply with section 3 of AWS Code.

5. Each welder shall use identifying mark at welds where he has worked.

M. The Automatic End Welded Stud:

Studs shall be automatically end welded in accordance with the manufacturer's recommendations in such a manner as to provide complete fusion between the end of the stud and the plate. There should be no porosity or evidence of lack of fusion between the welded end of the stud and the plate. The stud shall decrease in length during welding approximately 1/8" for 5/8" and under, and 3/16" for over 5/8" diameter. Welding shall be done only by qualified welders.

2.03 FABRICATION

A. Comply with requirements of AISC specification with modifications and additional requirements specified herein.

B. Fabricate and assemble material in shop to greatest extent possible.

C. Make connections as indicated.

1. Shop connections may be bolted or welded.

2. Bolt field connections unless shown otherwise.

3. Use A325 bolt, friction type connections where indicated.

D. One sided or other types of eccentric connections not indicated, will not be permitted without prior approval.

E. Weld in accord with paragraph "Fabrication - Welding".

F. Bevels for field welds may be flame cut provided such cutting is done automatically. Leave free of burrs and slag.

G. Accurately mill bearing ends of columns.

H. Camber beams to amounts indicated on drawings, otherwise fabricate in accord with AISC Code, Section 1.19.1. Fabricate and erect beams without specified camber in accord with AISC Code, Section 1.19.3.

I. Cut, drill, or punch holes at right angles to surface of metal.

1. Do not make or enlarge holes by burning.

2. Make holes clean cut, without torn or ragged edges.

3. Remove outside burrs resulting from drilling or reaming operations with tool making 1/16" bevel.

4. Provide holes in members to permit connection of work of other trades.

J. Make allowances for draw in of all tension bracing.

K. Make splices only where indicated.

L. Headed stud type shear connectors and rebar anchors: Automatically end welded in accord with the AWS code.

1. When headed stud type shear connectors are to be field applied, clean top surface of beam flanges in shop to remove oil, scale, rust, dirt and other material injurious to satisfactory welding.

M. Studs and deformed bar anchors: Automatically end welded in accord with the AWS Code.

1. Fillet welding or headed studs and deformed anchors is not allowed.

2. Do not weld studs when temperature is below 0 degF or surface is wet with rain or snow.

3. Quality control: Weld minimum of 2 studs at start of each production period to determine proper generator, control unit, and stud welder settings.

a. These studs shall be capable of being bent 45 degrees from vertical without weld failure.

b. If, after welding, visual inspection reveals that sound weld or full 360 degree fillet has not been obtained for a particular stud, that stud shall be struck with hammer and bent approximately 15 degrees off perpendicular to the nearest end of the beam.

c. Studs meeting this test shall be considered acceptable and shall be repositioned in perpendicular position.

d. Studs failing under this test shall be replaced.

e. When the temperature is below 32 degF one stud in each 100 shall be tested after cooling.

2.04 SHOP PREPARATION - SURFACES NOT TO BE COATED

A. Do not coat following surfaces:

1. Machined surfaces, surfaces adjacent to field welds, contact surfaces of bolt connections, and top flanges of beams to receive shear connectors.

2. All other members for which no coating is specified.

B. Clean thoroughly before shipping: remove loose mill scale, rust, dirt, oil and grease.

2.05 SHOP COATING - GALVANIZED

A. Galvanize the following members:

1. Members set in, or in contact with, exterior surface material, including:

a. Embedded items in exterior surfaces.

2. Other members indicated.

B. Clean thoroughly before galvanizing.

C. Galvanize in accord with ASTM A123.

2.06 SHOP COATING - PRIMER FOR EXTERIOR FINISH PAINT

A. Apply primer for exterior finish paint to following surfaces.

1. Steel exposed permanently to weather and not galvanized.

B. Primer for exterior finish paint: Tnemec 37 series Chem-Prime.

C. Clean in accord with SSPC-SP6, Commercial Blast Cleaning.

D. Apply in accord with paint manufacturer's instructions.

1. Apply minimum 2.5 mils, dry film thickness.

2.07 SHOP COATING - PRIMER FOR INTERIOR FINISH PAINT OR INTERIOR CONCEALED STRUCTURAL MEMBERS

A. Apply primer to following surfaces not receiving other coating:

1. Surfaces exposed on interior.

2. Surfaces buried in framing.

B. Primer for interior finish paint or concealed steel members: Fast dry alkyd primer, Glidden 5210; or equivalent product of Pratt & Lambert, Sherwin-Williams, PPG, Fuller-O'Brien, or Tnemec.

C. Clean thoroughly before priming; remove mill scale, rust, dirt, oil and grease in accord with SSPC - SP3.

D. Apply in accord with paint manufacturer's instructions.

1. Apply in minimum 1.5 mils, dry film thickness.

PART 3 - EXECUTION

3.01 GENERAL

A. Take into consideration that full structural capacity of many structural members is not realized until structural assembly is complete; that is, until slabs, decks and diagonal bracing are installed.

B. Use temporary bracing to take care of all loads to which structure may be subjected, including erection equipment and its operation.

1. Keep bracing in place as long as required for safety.

2. As erection progresses, securely fasten work to take care of all dead load, wind and erection stresses.

3. Remove temporary bracing after completion of work.

3.02 ERECTION

A. Erect structural steel in compliance with AISC.

B. Set base and bearing plates accurately and grout immediately as indicated.

1. Use metal wedges, shims or setting nuts as required.

2. Pack grout solidly between plate and bearing surface.

C. Clean bearing and contact surfaces before assembly.

D. Install A325F bolts with washers. Install and tighten in accord with Section 5 of Specifications for Structural Joints.

E. Field weld as specified in paragraph "Welding".

F. Do not use gas cutting to correct fabrication errors on any major members.

1. Gas cutting on minor members may be permitted when members are not loaded, and only after approval by Architect.

G. Tighten and leave in place erection bolts used in welded construction.

H. Provide beveled washers to give full bearing to bolt head or nut where bolts are to be used on surfaces having slopes greater than 1 in 20 with a plan normal to bolt axis.

I. After bolts are tightened, upset threads of A307 unfinished bolts to prevent nuts from backing off.

J. After installation, touch up all damaged or abraded areas of primed steel using same material used for shop priming.

1. Clean field welds, bolted connections and abraded areas before touching up.

END OF SECTION

SECTION 05500

METAL FABRICATIONS

PART 1 - GENERAL

1.01 DESCRIPTION

A. General:

1. Furnish all labor, materials, tools, equipment, and services for all miscellaneous metal fabrications as indicated, in accord with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See Division 1 for General Requirements.

B. Related Work Specified Elsewhere:

1. Painting - Section 09900.

1.02 QUALITY ASSURANCE

A. Materials and operations standards:

1. AHDGA, American Hot Dip Galvanizers Association.

2. AISC, American Institute of Steel Construction.

3. ASTM, American Society for Testing and Materials.

4. AWS, American Welding Society

5. NAAMM, National Association of Architectural Metals Manufacturers.

B. Submittals:

1. Shop Drawings: Provide drawings drawn to scale of installation and layout of proposed fabrications.

2. Data: Submit data and cut sheets on prefabricated items.

1.03 JOB CONDITIONS

A. Provide sleeves, embedded anchors and other built-in items in time for installation, or pay costs of cutting-in items later, and grouting.

B. Verify field conditions prior to fabrication.

1.04 DESIGN CRITERIA

A. CBC, latest edition.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Acceptable manufacturers:

1. Metal manufactured items: As noted for individual items.

2. Other manufacturers desiring approval comply with Section 01640.

B. Structural steel: ASTM A36.

C. Bolts: ASTM A307.

D. Steel pipe: ASTM A53.

E. Galvanizing: ASTM A123, A386, or A525.

F. Stainless steel: ASTM A484 or A276, Type 302.

G. Anchorage devices, masonry: Expansion shields F.S.FF-S-0325.

1. Lead expansion shields for machine screws and bolts 1/4" and smaller: Head-out embedded nut type, single unit class, Group I, Type 1, Class 1.

2. For machine screws and bolts larger than 1/4": Group I, Type 1, Class 2.

3. Bolt anchor expansion shields for lag bolts: Zinc-alloy, long shield anchors class, Group II, Type 1, Class 1.

4. Bolt anchor expansion shields for bolts: Closed-end bottom bearing class, Group II, Type 2, Class 1.

H. Fasteners: Zinc-coated where built into exterior walls. Select fasteners for type, grade and class required.

1. Bolts and Nuts: Regular hexagon head ASTM A307, Grade A.

2. Lag Bolts: Square head type, F.S.FF-B-561.

3. Machine Screws: Cadmium plated steel, F.S.FF-S-92.

4. Plain Washers: Round, carbon steel, F.S.FF-W-92.

5. Lock Washers: Helical spring carbon steel, F.S.FF-W-84.

I. Primer: Modified Alkyd paint, low VOC.

1. Use Tnemec Series V10 (99 Red) or primer compatible with finish coats of paint.

2. Coordinate metal primer with finish paint requirements specified in Section 09900.

J. Galvanizing repair paint: High zinc dust content paint for regalvanizing welds in galvanized steel.

1. DOD-P-21035.

2. Z.R.C. by ZRC Co.

K. Dissimilar metal protection coating: Tnemec Tnem-Tar series 46H-413 or equal.

L. Grout, non-shrink: Por-Rock; Sika Dur Hi-Mod Gel.

2.02 FABRICATION

A. Form to shapes indicated with straight lines, sharp angles, smooth curves. If radiused expansion joints are required, factory form radius and then pour in elastomer.

B. Drill or punch holes with smooth edges for temporary field connections and attachment of work by other trades.

C. Weld permanent shop connections. All welds continuous fillet type. Grind welds that will be exposed smooth.

D. Conceal fastenings where practicable.

E. Fabricate work in shop in a large assemblies as practicable.

1. Meet requirements specified under Structural Steel for fabricating items of structural nature or use.

2. Qualify welding processes and welding operators in accord with AWS.

2.03 SHOP PRIMING

A. Galvanize all items set in, or on, exterior surface, where noted on drawings.

B. Apply shop primer to all ferrous metal not indicated to be set in or receive concrete.

1. Apply 2 shop coats to metals that will be inaccessible after erection.

2. Do not prime stainless steel, aluminum, copper, brass, or bronze unless specifically indicated.

C. Remove scale, rust and other deleterious materials before applying shop primer.

1. Clean off rust and loose mill scale in accord with SSPC SP-2, SP-3, or SSPC SP-7.

2. Remove contaminants in accord with SSPC SP-1.

D. Immediately after surface preparation, prime in accord with manufacturer's instructions.

1. Provide uniform dry film thickness of 1.0 mil.

2. Use methods which will result in full coverage of all exposed surfaces.

E. Whenever dissimilar metals come in contact with each other, or metal or aluminum is anchored to or in contact with masonry, provide dissimilar metal protection coating.

F. Retouch any scraped, abraded, and unprimed surfaces.

1. Use primer specified for shop coats.

2. This priming does not count as a coat for finish painting.

2.04 METAL FABRICATIONS

A. Supply all miscellaneous metal items required to complete construction and installation.

B. Anchorage accessories: Including anchorage items required to secure wood to metal, wood to masonry, metals to masonry, metal to metal, or metal to other items.

D. Anchors, embedded: ASTM A36 steel.

1. Size and shape as indicated.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify suitability of substrate to accept installation.

B. Installation constitutes acceptance of responsibility for performance.

3.02 INSTALLATION

A. Set work level, true to line, plumb.

B. Shim and grout as necessary.

C. Weld field connections and grind smooth.

D. Where practical, conceal fastenings.

E. Secure metal to wood with lag screws, of adequate size, with appropriate washers.

F. Secure metal to concrete with embedded anchors, setting compounds, caulking and sleeves, or setting grout.

1. Use expansion bolts, toggle bolts, or screws for light duty service.

G. Meet structural requirements for erecting items of structural nature.

H. Do not field splice fabricated items unless size requires splicing. Weld all splices.

I. Provide each fabricated item complete with attachment devices as required to install.

END OF SECTION

SECTION 05515

LADDERS AND RUNGS

PART 1: GENERAL

1.01 RELATED DOCUMENTS

A. Drawing and general provisions of Contract including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 SUMMARY

A. Provide all material, labor, equipment and services and perform all operations necessary or required for the work of this section, in accordance with the Drawings and Specifications.

B. Related work specified elsewhere includes but is not limited to:

1. Painting in Section 09900.

1.03 PERFORMANCE REQUIREMENTS

A. Ladder Rungs: Be capable of withstanding a concentrated 1,000 pound load without deformation.

B. Handrail: Be capable of withstanding a load of 200 pounds applied in any direction at any point on the rail.

1.04 REFERENCES

A. AA – Aluminum Association.

B. ASTM B 209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

C. ASTM B 221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

D. OSHA 1910.27 – Fixed Ladders.

1.05 SUBMITTALS

A. Submit under provision of Division 1.

B. Product Data: Manufacturer's data sheets on each product.

C. Shop Drawings:

1. Detail fabrication and erection of each ladder indicated. Included plans, elevations, sections, and details of metal fabrications and their connections.
2. Provide templates for anchors and bolts specified for installation under other Sections.
3. Provide reaction loads for each hanger and bracket.

D. Qualification Data:

1. Refer to Quality Assurance provisions for submittal requirements evidencing experience, certifications and resources.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in producing aluminum metal ladders similar to those indicated for this Project.

1. Record of successful in-service performance.
2. Sufficient production capacity to produce required units.
3. Professional engineering competent in design and structural analysis to fabricate ladders in compliance with industry standards and local codes.

B. Installer Qualifications: Competent and experienced firm capable of selecting fasteners and installing ladders to attain designed operational and structural performance.

C. Product Qualification: Product design shall comply with OSHA 1910.27 minimum standards for ladders.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

1.08 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions by field measurement before fabrication.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, indicate established dimensions on shop drawing submittal and proceed with fabrication.

1.09 WARRANTY

A. Manufacturer has responsibility for an extended Corrective Period for work of this Section for a period of 5 years from date of Substantial Completion against all the conditions indicated below, and when notified in writing from Owner, manufacturer shall promptly and without inconvenience and cost to Owner correct said deficiencies.

1. Defects in materials and workmanship.
2. Deterioration of material and surface performance below minimum OSHA standards as certified by independent third party testing laboratory. Ordinary wear and tear, unusual abuse or neglect excepted.
3. Within the warranty period, the manufacturer shall, at its option, repair, replace, or refund the purchase price of defective ladder.

B. Manufacturer shall be notified immediately of defective products, and be given a reasonable opportunity to inspect the goods prior to return. Manufacturer will not assume responsibility, or compensation, for unauthorized repairs or labor. Manufacturer makes no other warranty, expressed or implied, to the merchantability, fitness for a particular purpose, design, sale, installation, or use, of the ladder; and shall not be liable for incidental or consequential damages, losses of or expenses, resulting from the use of ladder products.

PART 2: PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

A. O'Keeffe's, Inc.; 325 Newhall St., San Francisco, CA 94124. ASD. Toll Free Tel: (888) 653-3333. Tel: (415) 822-4222. Fax: (415) 822-5222.

B. The Bilco Company – California Representative: Specialty Building Components, (562) 821-0170.

C. Requests for substitutions will be considered in accordance with provisions of Division 1.

2.02 APPLICATIONS/SCOPE

A. Fixed Access Ladder:

1. Heavy Duty Tubular Rail.

a. Model 500-10 as manufactured by O'Keeffe's Inc.

B. Ladder Up:

1. Heavy Duty Ladder up safety post.

a. Model LU-1, steel, black enamel, as manufactured by The Bilco Company. Installed on the fixed ladder.

2.03 FINISHES

A. Ladder: Mill finish, as extruded.

B. Ladder Up Safety Post: Steel, black enamel finish.

2.04 MATERIALS

A. Aluminum Sheet: Alloy 5005-H34 to comply with ASTM B209.

B. Aluminum Extrusions: Alloy 6063-T6 to comply with ASTM B221.

2.05 FABRICATION

A. Rungs: Not less than 1-1/4 inches (32-mm) in section and 18-3/8 inches (467-mm) long, formed from tubular aluminum extrusions. Squared and deeply serrated on all sides.

1. Rungs shall withstand a 1,000 pound (454 kg) load without deformation or failure.

B. Channel Side Rails: Not less than 1/8 inch (3-mm) wall thickness by 3 inches (76-mm) wide.

PART 3: EXECUTION

3.01 PREPARATIONS

A. Coordination: Coordinate anchorages with all other related and adjacent work. Installation shall not start until the construction has progressed to the point that weather conditions and remaining construction operations will not damage stair installation.

B. Verifications: Verify that dimensions are correct and that substrate is in proper condition for stair installation. Do not proceed to install until all necessary corrections have been made.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction.

3.03 CLEAN

A. Leave work areas clean and free of debris.

END OF SECTION

DIVISION 6
WOOD AND PLASTICS

SECTION 06100

ROUGH CARPENTRY

PART 1 - GENERAL

1.01 DESCRIPTION

A. General:

1. Furnish all labor, materials, tools, equipment and services for rough carpentry as indicated, in accord with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See General Conditions and Supplementary Conditions for additional general requirements.

1.02 MEASUREMENTS

A. Verify all dimensions shown on Drawings by taking field measurements; proper fit and attachment of all parts is required. Before commencing work, check all lines and levels indicated on other work that has been completed. Should there by any discrepancies, immediately report in writing to Architect. In event of failure to do so, Contractor shall be responsible for correction of any errors.

1.03 COORDINATION

A. Coordinate work with other trades (Electrical, Mechanical, Plumbing, etc.) and do all cutting and patching required to accommodate their work. Protect adjacent work from damage.

1.04 DELIVERY AND STORAGE

A. Deliver and store lumber off ground and cover for protection.

1.05 GENERAL REQUIREMENTS

A. Provide each piece of lumber or plywood used for structural framing, graded and marked with grade and trade mark of an accepted lumber grading organization, except that a certificate of grade for such a grading organization may be

accepted in lieu of grade and trade marks when approved by Architect. Trade Mark of manufacturer shall also appear on each piece.

B. Grading Rules: Conform with all applicable requirements of American Lumber Standards "Simplified Practice Recommendation R-16" and to grading rules of manufacturer's Association under whose rules the lumber is produced.

C. Reference Standards: Conform with all requirements of U.S. Department of Commerce "Commercial Standards", and American Wood Preserver's" Association Standards" as they apply.

1.06 ROUGH CARPENTRY WORK SHALL INCLUDE, BUT NOT BE LIMITED TO:

A. Rough Carpentry

1. Structural and non-structural framing.
2. Wall and roof sheathing.
3. Preservative treatment of wood members where required.
4. Miscellaneous furring and stripping for wall finishes.
5. Miscellaneous blocking and canting for roofing systems and related metal flashings.
6. Blocking and canting for roof mounted items.
7. Behind wall wood blocking for support of bathroom accessories and other built-in items.

B. Exterior Finish Carpentry Work

1. Boxing of structural work.
2. Brackets.
3. Enclosing soffit spaces.
4. Soffits and fascias.
5. Moldings or other miscellaneous trim where required.
6. Preservative treatment where required.

PART 2 - PRODUCT

2.01 LUMBER SPECIES AND MATERIALS

A. Framing Lumber: Douglas Fir-Larch, graded as per standard Grading and Dressing Rules #16 of West Coast Lumber Inspection Bureau or Western Wood Products Association and Grade Market. All lumber shall be air dried to a maximum moisture content of 19% before use. All framing lumber: Stress-Grade. All sides surfaced. Grades as indicated on plans.

B. Plywood: Shall be graded as per US Department of Commerce Product Standard PS-1-83, with each sheet grade stamped. All plywood shall be Structural 1, or CD, Douglas Fir-Larch, exterior glue, thickness as noted on drawings.

C. Radiant Barrier Plywood: "Plytanium Plywood" thermostatic radiant barrier sheathing as manufactured by Georgia-Pacific or approved substitution. Radiant barrier sheathing includes a highly reflective aluminum foil on one side. Plywood shall be graded as per US Department of Commerce Product Standard PS-1-83, with each sheet grade stamped. All plywood shall be Structural 1, or CD, Douglas Fir-Larch, exterior glue, thickness as noted on drawings.

2.02 WOOD PRESERVATIVE TREATMENT

A. All wood sill-plates and ledgers in direct contact with concrete or masonry which is within 2-feet of grade shall be pressure treated with Pentachlorophenol oil in accord with the CBC, latest edition in force. All cut surfaces shall be treated with two coats of the original preservative. All sill plates shall be set in a continuous mastic bed.

2.03 CONNECTING HARDWARE

A. Furnish and install all connecting hardware indicated on Drawings, specified herein or required to complete the work.

B. Materials

1. Nails: Common wire, galvanized for exterior work. Predrill where necessary to avoid splitting of wood.

2. Screws: Standard domestic manufacturer. Bright steel and galvanized for exterior use. Brass, bronze, aluminum or stainless when used to fasten items made of those metals. For attaching interior trim and finish to drywall partitions, use Type "S", self-drilling, selftapping anodized steel drywall screws of appropriate lengths.

3. Bolts: Machine bolts (or carriage bolts if indicated on Drawings) of structural grade steel with hexagonal nuts and sizes indicated. Install washers with all bolts.

4. Lag Screws, Shear Plates, Split Ring Connectors: As per National Forest Products Association, "National Design Spec. for Stress-Grade Lumber and its Fastenings". All lags shall be turned into place and not driven. Holes for threads shall be 3/4 of shank diameter. Install washers w/lags.

5. Framing Anchors, Joist Hangers, Etc.: As made by Simpson Company, or acceptable substitute. Sizes and types as indicated on drawings.

6. Power-Driven Inserts: "Hilti," or acceptable substitute. Install as per manufacturer's directions.

7. Miscellaneous Clips, Steel Assemblies: As per ASTM A-36.

2.04 PREFABRICATED WOOD JOIST

A. TJI, by Trus Joist Corporation. Sizes and spacing as indicated on plans.

B. All hangers, stiffeners, bridging, bracing to be supplied by Manufacturer.

C. Trus Joist shall prepare and submit Shop Drawings and calculations for Architect's review, per Section 01340. (Shop drawings and calculations shall be submitted for Building Department review and approval through the Architect.)

D. Comply with requirements of Section 01640 for substitutions.

2.05 GLUE-LAMINATED BEAMS - SEE SECTION 06180

PART 3 - EXECUTION

3.01 EXECUTION

A. Erect wood framing, furring, stripping and nailing members true to lines and levels. Do not deviate from true alignment more than 1/4 inch.

B. Space members at 16 or 24 inches on center per plans.

C. Construct members of continuous pieces of longest possible lengths.

D. Construct and erect required built-up beams, lintels, diaphragm beams as required per plans.

E. Double wall framing members at openings over 100 square inches. Space short members above and below openings in same manner as for walls.

F. Provide double joist headers at joist ends and around ceiling openings.

G. Coordinate installation of joists and beams to miss recessed lights and HVAC registers located on reflected ceiling plans.

3.02 SHEATHING AND SUBFLOORING

A. Place roof and wall sheathing with end joints staggered. Secure sheets over firm bearing. Maintain minimum 1/16 inch and maximum 1/8 inch spacing between joints of sheets on walls. Place perpendicular to framing members.

B. Radiant Barrier plywood sheathing shall be placed with the aluminum foil side facing down toward the attic space. Installation of radiant barrier plywood shall be in strict accordance with manufacturer's installation instructions.

C. Place subflooring with end joints staggered. Secure sheets over firm bearing. Maintain surface flatness of maximum 1/8 inch in 10 ft. or more.

3.03 STRUCTURAL MEMBERS

A. Structural members shall not be cut, notched or drilled except as shown or noted on drawings.

END OF SECTION

SECTION 06180

GLUE LAMINATED BEAMS

PART 1 - GENERAL

1.01 DESCRIPTION

A. General:

1. Furnish all labor, materials, tools, equipment and services from glue laminated beams as indicated, in accord with provisions of contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See General Conditions and Supplementary Conditions for additional general requirements.

B. Work Included:

1. Glue laminated beams.

2. Steel hardware and attachment brackets, anchor bolts, anchor plates.

1.02 SHOP DRAWINGS AND SUBMITTALS

A. Submit Shop Drawings and secure approvals before beginning fabrication, as per GENERAL CONDITIONS and Section 01340.

B. Submit Certificate of Inspection of each beam.

C. Submit sample of exposed beam finish as described in paragraph 2.01-F.

1.03 STANDARDS AND INSPECTIONS

A. Materials and fabrication shall comply with the following UBC Standards: 25-10, 25-11, 25-19, 25-20, 25-23.

B. Manufacturer shall be AITC Licensed in accordance with USPS 56-73 and AITC 200. On arrival at the site, each beam shall be accompanied by a certificate of inspection or identified by a certified inspector's hammer mark. A certificate of

inspection for each beam shall be supplied to the Architect and City Building Department.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All lumber shall be Douglas Fir - Larch.

B. Beams shall have an 'f' value of 2400 psi, combination V-8.

C. Moisture content at time of fabrication shall be in the range of 7-10%.

D. Adhesive shall be "wet use". (Exterior Glue)

E. All concealed members shall be Industrial Grade.

F. All exposed members shall be Premium Grade. Premium Grade glued laminated timbers shall be sealed with a clear penetrating sealer at the factory. All exposed timbers shall be finished in a medium sandblasted finish after erected in place. A sample shall be prepared for the Architect's approval. (See Section 09900 - Painting).

G. Manufacturer shall be Standard Structures, or acceptable substitution.

2.02 SEALING AND PROTECTION

A. Members shall be individually wrapped and shall be carefully handled to prevent any marring or discoloration. Wrappings shall remain in place, or be replaced at connections, until the members are set in place.

B. After end trimming, seal with clear penetrating sealer in accordance with AITC requirements.

PART 3 - EXECUTION

3.01 SEE REQUIREMENTS IN SECTION 06100 - ROUGH CARPENTRY

END OF SECTION

SECTION 06200

FINISH CARPENTRY

PART 1 - GENERAL

1.01 DESCRIPTION

A. General:

1. Furnish all labor, materials, tools, equipment and services for finish carpentry as indicated, in accord with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See General Conditions and Supplementary Conditions for additional general requirements.

1.02 WORK SPECIFIED IN THIS SECTION

A. Installation of all miscellaneous exterior and interior wood trim, ceiling and/or, soffit paneling, closet shelves and poles, door frames and stops, garage door paneling and millwork, light well and/or skylight eggcrate soffits, and all wood trellises.

B. Installation of wall bases, metal and wood doors, finish hardware, joint sealers.

C. Installation of bathroom accessories (towel bars, tissue holders, etc.).

1.03 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Rough Carpentry - Section 06100.

B. Joint Sealers - Section 07915.

C. Metal Doors and Frames - Section 08100.

D. Wood Doors and Frames - Section 08210.

E. Finish Hardware - Section 08710.

F. Glazing - Section 08800.

G. Painting - Section 09900.

H. Toilet and Bath Accessories- Section 10800

I. Plastic Signs- Section 10441

J. Fire Extinguishers, Cabinets and Accessories- Section 10522

K. Residential Equipment- Section 11450

1.04 CODES AND STANDARDS

A. CBC, latest adopted edition.

B. WIC - Woodworking Institute of California

1.05 QUALITY ASSURANCE

A. All millwork shall be manufactured in compliance with W.I.C. standards "Manual of Millwork" latest edition, "Custom Grade" as specified herein or indicated on the drawings.

B. Before delivery to the project job site, the millwork shall be W.I.C. certified in compliance fully meeting all the requirements of grade or grades specified.

1.06 SUBMITTALS

A. Submit shop drawings and product data in accordance to the General Conditions and Section 01340.

B. Shop drawings shall bear the W.I.C. Certified Compliance Label on the first page of the drawings.

C. Submit samples of each species of finish wood 8" x 10" minimum and other miscellaneous items required to provide a complete product as indicated on the drawings.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials when the project is ready for installation. A clean storage area is required in compliance with W.I.C. Bulletin 419-B as recommended care and storage of architectural millwork to be furnished to the General Contractor for the spaces required.

B. Do not store millwork outside following fabrication and prior to installation.

C. Exercise care in off-loading items to prevent damage, chipping, splitting and breaking.

D. Any damage shall be subject to rejection and/or repair prior to installation.

PART 2 - PRODUCTS

2.01 FINISH LUMBER AND MILLWORK

A. Architectural millwork specified herein shall comply with Section 26 of WIC "Manual of Millwork" for exterior and interior applications as indicated on the drawings.

B. Lumber surfaces visible after fabrication shall comply with grade rules for species of natural sound lumber, free of decay, shake, pitch, wane and warp.

1. Exterior configurations and usage.

ITEM	WIC GRADE	INTENDED FINISH
a. Garage Door: Cedar - clear heart grade (1 x 6 T&G V-joint)	Custom	Semi-transparent stain over light sandblasted finish.
b. Ceilings: Bamboo – 3 ¾" x 75 ½" long X 5/8" thick T and G planking Vertical carbonized (amber) w/ microbevel edge manufactured By Green Wood Products.	Custom	Prefinished with clear sealer.

2. Interior configurations and usage.

ITEM	WIC GRADE	INTENDED FINISH
a. Door Jambs & Stops: Poplar, "B" or better	Custom	Painted over smooth surface (see Section 09900)
b. Ceilings: Bamboo – 3 ¾" x 75 ½" long X 5/8" thick T and G planking Vertical carbonized (amber) w/ microbevel edge manufactured By Green Wood Products.	Custom	Prefinished with clear sealer.

2.02 INTERIOR TRIM HARDWARE

A. Fry Reglet Corp., aluminum alloy. See Section 09250 – Gypsum Board.

B. Configurations and locations as indicated on the drawings.

2.03 ACCESSORY MATERIALS

A. Nails, spikes, staples: Common, except as otherwise indicated. Galvanized for exterior usage, high humidity within conditioned spaces, and treated wood; plain finish for other interior locations; size and type to suit application.

B. Lag Screws: FS FF-B-561.

C. Machine Bolts: ASTM A307.

D. Wood Preservative: Wolmanizing treatment at least two weeks prior to site delivery.

2.04 LAMINATED PLASTIC REVEALS AND BASE MATERIAL

A. Fabricate in as long lengths as possible, minimizing joints except to miter joints at 90 degree turn above door. Use laminate plastic "touch up" color to match color of laminated plastic at all joints.

B. Scribe all pieces where necessary to achieve edge-to-edge fill with material.

C. Use proper adhesives in installing material. Provide smooth finish surface to adhere to.

D. Provide laminated plastic in colors, configurations and locations shown on drawings.

2.05 ADHESIVES

A. Type II or III adhesive shall be used in compliance with applicable sections of W.I.C. "Manual of Millwork" to be applied where required and per manufacturer's recommendations.

PART 3 - EXECUTION

3.01 SELECTION OF LUMBER

A. Carefully select all members so that defects will not interfere with proper nailing or making proper connections, and not impair finished appearances where to be exposed.

3.02 GENERAL FABRICATION

A. Manufacture, mill, fabricate, assemble and finish all millwork by skilled mechanics, using approved standard methods of manufacture and workmanship all in compliance with W.I.C. standards, custom grade.

B. Conceal means of fastening where other than glue joinery is employed. Use fine casing nails, carefully set without tool marks.

3.03 INSTALLATION AND GENERAL WORKMANSHIP

A. All items of this section shall be custom grade as defined in W.I.C. "Manual of Millwork". Exposed wood/millwork shall be concealed fastened, surfaces to be

sanded and free from tool marks or similar blemishes. Hand sand in the building after erection, until all defects are entirely removed. Any material showing machinery, sandpaper or other defacing marks will be rejected. Neatly and accurately scribe in place wherever required, maintaining full width end members. Miter all exterior angles. Cope interior angles of molded parts. All color of adjoining finishes shall be selected to match and harmonize. Provide a neat, tight joint where work of this section adjoins other work.

B. Installer shall be competent, experienced craftsman to complete the installation of all items specified and detailed in a first class workmanship manner as defined in Section 26 - W.I.C. "Manual of Millwork".

1. Miscellaneous exterior and interior trim per detailed configuration.

2. Wall, ceiling and soffit paneling including panel trim hardware with concealed fasteners to furring and substrates.

3. Miscellaneous trims and millwork, securely concealed anchoring as detailed, scribed and butt jointed.

4. Wood doors shall be installed with minimum clearance of 1/8" at head, jambs, and pair of doors. All finish hardware to be installed under this section.

3.04 CLEANUP

A. Upon completion of the installation of this section, installer shall clean the specified work, pencil or ink marks, and broom clean the areas of work of this section, disposing of all debris from the building and site.

END OF SECTION

SECTION 06410

ARCHITECTURAL CABINETWORK

PART 1 - GENERAL

1.01 DESCRIPTION

A. General:

1. Furnish all labor, materials, tools, equipment, and services for all architectural cabinetwork as indicated, in accord with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See Division 1 for General Requirements.

5. See cabinet elevations for design details.

B. See drawings for types of countertops required.

C. Definitions:

1. Exposed surfaces: All surfaces visible when doors and drawers are closed, inside of doors, visible surfaces in open cabinets or behind glass doors, and:

   a. Door and drawer fronts, and their edges.

   b. Exposed end.

   c. Face frame (if used).

   d. Interior of open cabinets.

   e. Toe strip not to be covered by separate base.

   f. Wall mounted adjustable shelves.

   g. Bottom of wall case over 4 ft. above floors.

   h. Top of wall and tall cases below 6 ft. above floor.

2. Concealed surfaces: Surfaces not visible after installation, and:

a. Web frames.

b. Dust panels.

3. Semi-exposed surfaces: All other surfaces not exposed or concealed.

1.02 QUALITY ASSURANCE

A. Construction details, fastening, tolerances and workmanship: latest edition of manual of Millwork of Woodworking Institute of California (W.I.C.), Premium grade standards, with exceptions indicated.

1. Before delivery to the jobsite, the millwork supplier shall issue a Certified Compliance Letter indicating the millwork products he will furnish for this job and certifying that they will fully meet all the requirements of the W.I.C. grade standards specified. Submit copies to the Architect for compliance.

1.03 SUBMITTALS (SEE SECTION 01340)

A. Shop Drawings:

1. Complete details of construction and elevations of all cabinets.

2. The Shop Drawings for the casework shall indicate the grade or grades specified, and that they meet the W.I.C. standards specified.

B. Samples:

1. 12" x 12" size of each wood veneer or plastic laminate depicting the finished pattern, finish, and color selection specified.

2. Furnish full size sample for approval of Architect, of finished base cabinet unit in a laminated plastic finish, 24" wide, minimum, with one drawer, door and shelf, complete with hardware.

1.04 JOB CONDITIONS

A. Verify dimensions at site.

B. Verify locations of items furnished in other sections.

C. If necessary to vary from arrangement indicated, make such variations only after review and acceptance by Architect.

D. Delivery and Storage: Strictly adhere to requirements of Section 26 and W.I.C. Technical Bulletin 419-R "Recommended Care and Storage of Architectural Millwork."

PART 2 - PRODUCTS

2.01 GENERAL

A. Cabinets are to include all cabinet hardware, horizontal top and bottom edging, pulls, accessories, and special features as designed and shown on drawings. The cabinet contractor shall include all cabinets, etc., including installation, freight, handling charges, and taxes, delivered to the job site. (Turnkey installation). Any and all damaged cabinets, accessories, etc., either during shipment, storage, or installation will be replaced and/or repaired at no additional cost to the Owner. The General Contractor shall be responsible for the coordination of the installation of these cabinets.

B. Custom Cabinetwork: Custom, shop or factory built casework, complete with all hardware, accessories, countertops and bases, in sizes and configurations indicated. Contractor to include all charges for sales tax, freight, storage, installation and all materials. Materials to comply with Premium Grade.

1. Style: Flush overlay, with square cornered doors and drawer fronts overlapping and concealing face frames and case fronts with minimum reveal, or reveals, noted on drawings.

2. Laminated Plastic Cabinets: Provide laminated plastic faced cabinets, per selected colors provided by Architect. See Cabinet plans for locations.

2.02 MATERIALS

A. Acceptable manufacturers:

1. Plastic laminate:

a. Base: Ralph Wilson Plastics, Co. (Wilsonart) and Arborite.

2. Melamine plastic overlay panel products (Cabinet liners):

a. Base: Flakeboard; Olon Industries Inc.; Roseburg; or Uniboard.

3. Cabinet Hardware: (See Section 06412 – Cabinet and Drawer Hardware)

a. Base: Blum. (No substitutions allowed)

4. Cabinet Pulls:

   a. "Mockett" satin chrome finish, model no. DP 143 (7-1/32" long) located per cabinet plan.

5. Other manufacturers desiring approval comply with Section 00440.

B. Plastic laminate: NEMA LD3-1975 high pressure laminate, finish as selected by Architect.

1. All exposed and semi-exposed surfaces: 0.020" minimum thickness.

2. Provide backer sheet on each plastic laminated item: 0.020" in thickness.

3. Colors as noted on plans.

4. Color of laminate on edges: Same as surface of the item.

5. See "Fabrication-Case Components" for components requiring plastic laminate finish.

C. Plastic overlay: Thermally fused melamine (TFM); Resin impregnated paper overlay hot press cured onto substrates; with backer/balance sheet.

1. Conform to NEMA LQ-1-1977 requirements for "General Purpose" decorative board (not "Light Duty" liner type).

2. Satin finish, opaque color.

3. Resin: Melamine. Polyester or phenolic resin may be used on concealed surfaces.

4. Color: White.

5. Substrates: As indicated below: see "Fabrication-Case Components" for components requiring plastic overlay finish.

D. Particleboard: ANSI A208-1, mat-formed, 45 PCF density.

1. Grade M-3i: Modules of rupture: 2176 PSI min.; modulus of elasticity: 362,000 PSI, min.

2. ASTM E84 flame spread; 25 max.; fuel contributed: 25 max.; smoke developed: 75 max.

3. Formaldehyde Emission Limits: No greater than .18 ppm.

4. Flakeboard - "Duraflake"; Roseburg – "Ultrablend"; Sierrapine – "Encore".

E. Fiberboard: ANSI A208.2, medium density wood fiberboard 48 PCF density, minimum.

1. Grade 130: Modules of rupture: 3130 PSI min.; modulus of elasticity: 313,000 PSI, min.

2. ASTM E84 flame spread; 25 max.; fuel contributed: 25 max.; smoke developed: 75 max.

3. Formaldehyde Emission Limits: No greater than .21 ppm.

4. Flakeboard - "Premier"; Roseburg – "Synergite"; Sierrapine – "Arreis".

F. Hardboard: ANSI A135.4, tempered, smooth on both sides.

G. Plywood: PSI-74, softwood plywood, AA grade.

H. Subcountertop core: Veneer core, spruce faced plywood.

I. Hardwood: Solid, S4S; ASTM E84 flame spread: 75 max.

J. The laminated plastic shall be securely glued to the core with Type I adhesive applied as recommended by the adhesive manufacturer. In addition to meeting the requirements of Type I, the adhesive shall meet the Heat Resistant Test Requirements set forth in the Glossary.

2.03 HARDWARE (See Section 06412 – Cabinet and Drawer Hardware)

A. Locks: Heavy duty institutional pin tumbler type; latch or cam suitable for application; National Lock M2-0106 series.

1. Provide 2 keys for each lock.

B. Shelf supports (drilled hole type):

1. Holes drilled at 32 mm. o.c.

2. Shelf clips: Polished chrome; designed to engage securely in holes.

2.04 FABRICATION-CASE COMPONENTS

A. Finishes for cabinets:

1. All exposed and semi-exposed surfaces:

a. Plastic Laminate.

2. Edges and backs of doors, drawer fronts edges and backs:

a. Plastic Laminate.

3. All other interior cabinet faces to be melamine cabinet liner.

B. Case body members (except backs not exposed): Minimum 3/4" thick particleboard.

1. Base unit top: Use either full sub-top or web frame.

2. Web frames: solid lumber with glued mortise and tenon joints.

3. Provide drawer lock rails at all drawers.

4. Provide backs on all cabinets.

C. Unexposed case back: Minimum ¾" thick particleboard.

D. Interior Shelves: Minimum 3/4" thick particleboard; 1" thick over 36" between supports. Particleboard to be finished with melamine cabinet liner, all exposed faces and edges.

E. Doors:

1. Plastic Laminate Faced – ¾" particle board.

F. Drawers:

1. Plastic Laminate Faced:

a. Fronts: 3/4" thick particleboard.

a. Sub-front (if used), sides and back: Minimum 1/2" thick, particleboard with melamine cabinet liner finishes.

c. Bottom: Minimum 1/2" thick, particleboard with melamine cabinet liner finishes. If bottom is over 18" wide, provide intermediate reinforcing rails.

G. Case base: Separate or integral.

H. Small compartment dividers and dust panels: 1/4" thick prefinished Baltic Birch plywood.

I. Filler panels and scribe pieces:

a. Particleboard with plastic laminate as required to fit standard size units to space.

2.05 FABRICATION

A. Case body: All joints glued.

1. Top and bottom (and fixed horizontals):

   Lock-jointed, dadoed or rabbetted into ends/dividers; and screwed; or doweled at approximately 2-1/2" OC.

2. Back: Dadoed or rabbetted into top sides and bottom.

3. Fixed small compartment dividers: Dadoed.

B. Drawers (with sub-front): All joints glued.

1. All corners: Dovetailed or doweled; or front corners dovetailed and back corners lock-jointed; or sides dadoed for front and back and all joints nailed, stapled or screwed.

2. Bottom: Dadoed into all 4 sides.

3. Front: Screwed onto sub-front.

4. Top edges of drawer box rounded.

C. Drawers (without sub-front): All joints glued.

1. Front corners dovetailed or doweled.

2. Back corners: Dovetailed, doweled, or lock-jointed; or sides dadoed for back and corner nailed or screwed.

3. Bottom: Dadoed into all 4 sides.

4. Top edges of drawer sides and back rounded.

D. Use no blocking or fasteners in exposed or semi-exposed locations.

2.06 CASE CONFIGURATION

A. Similar reveal (3/32") at all sides, top and bottom of doors and drawer fronts, and between doors and drawer fronts in same unit, except where noted on drawings.

B. Double door units: No vertical rail or divider between doors unless called for or unless locks are called for.

C. Toe space: 4" high (5" for tile floors) by approximately 3" deep; provide on front of each base unit unless otherwise noted on drawings.

D. Subcountertop: Set flush with face of frame to allow for quartz solid surfaces where specified.

E. Mounting of Cabinet Pulls:

1. Drawers: See drawings.

2. Swinging doors: See drawings.

F. Adjustable shelves: Use drilled hole supports.

1. Depth: 1/4" less than inside cabinet depth.

2. Width: 1/8", maximum, less than inside cabinet width.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine conditions under which products are to be installed.

B. Installation constitutes acceptance of responsibility for performance.

3.02 INSTALLATION

A. Use manufacturer's printed instructions or drawings in all cases where items or details are not indicated.

B. Provide all trim, fillers, closures, stands, supports, sleeves, collars, escutcheons, ferrules, brackets, braces or other miscellaneous items required for complete installation.

C. Provide all built in lighting specified on drawings. Coordinate with electrical contractor for connections and switching.

3.03 ADJUST AND CLEAN

A. Repair all damage done to premises, and remove all debris left by this installation.

B. Test and adjust for satisfactory operation.

C. Adjust hinges so doors hang straight.

END OF SECTION

SECTION 06412

CABINET AND DRAWER HARDWARE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Hinge systems.

B. Drawer runner systems.

1.02 RELATED SECTIONS

A. Section 06410 – Architectural Cabinetwork.

1.03 SUBMITTALS

A. Submit under provisions of Section 01340.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Installation methods.

C. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.04 REFERENCES

A. ANSI/BHMA - Meets Grade 1 requirements for cycle life, static load and self-closing performance.

1.05 QUALITY ASSURANCE

A. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by Architect.

2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.

3. Refinish mock-up area as required to produce acceptable work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.07 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Approved Manufacturer: Blum, Inc., which is located at: 7733 Old Plank Rd., Stanley, NC 28164. Toll Free: 800-438-6788. Phone: 704-827-1345. Fax: 704-827-0799. Web: www.blum.com E-mail: sales.us@blum.com

B. Requests for substitutions will be considered in accordance with provisions of Section 00440.

2.02 CONCEALED HINGES

A. Approved Product: Blum Clip Top Concealed Hinges.

1. Model Numbers: 973A series.
2. Cabinet Construction: Panel (frameless).
    a. Flush Overlay.
3. Hinge Type: (Where applicable)
    a. Straight-arm.
    b. Angled.
4. Closing: Self closing.
5. Dampening System: Self-regulates the closing speed of the hinge.

a. Approved Product: Blumotion 973A.

6. Mounting: Screw-on.

7. Angle:

   a. 110 degree.

8. Suitable for Door Type:

   a. Thick door - twin.

9. Hinges per Door:

   a. Two, min.

10. Cover Caps:

    a. Nickel plated steel with Blum logo.

2.03 DRAWER RUNNER SYSTEMS

A. Approved Product: Blum Tandem Plus Blumotion concealed runners for wood drawers.

1. Model Number: Tandem Plus Blumotion 562H full extension runner.

2. Model Number: Tandem Plus Blumotion 568 heavy duty full extension runner.

3. Model Number: Tandem Plus Blumotion 568H heavy duty full extension runner.

4. Cabinet Construction: Panel (frameless) with the following drawer type:

   a. Flush Overlay.

   b. Roll-out shelf/tray.

   c. Space corner.

   d. Deep.

5. Runner Type:

   a. Full extension with Blumotion.

b. Heavy duty full extension with Blumotion for all pot drawers.

6. Closing: Self closing.

7. Dampening System: Self-regulates the closing speed of the drawer.

   a. Approved Product: Blumotion.

8. Mounting: Screw-on.

9. Drawer Length:

   a. 21 inches (533 mm).

10. Drawer Side Thickness:

    a. Up to 5/8 inch (16 mm).

11. Drawer Weight Capacity:

    a. 75 pounds dynamic/100 pounds static (34/45 kg).

12. Locking Device: One right and one left required per drawer.

    a. Standard.

    b. Depth adjustable locking device (inset).

    c. Positive stop.

13. Materials:

    a. Vertical mount.

    b. Zinc coated steel runners and brackets.

    c. Synthetic rollers.

    d. Zinc die cast locking devices.

    e. Plastic end caps.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify

Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.04 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 06651

SOLID SURFACE FABRICATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following vertical solid surface product types:

1. Wall Cladding in Rooms 303, 304, 305, and 306.

B. Related Sections include the following:

1. Division 1 Section "LEED Requirements" for additional LEED requirements.

2. Section 09110 – Metal Wall Framing for Blocking.

3. Section 16140 – Wiring Devices.

1.03 DEFINITION

A. Solid surface is defined as nonporous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment.

1.04 SUBMITTALS

A. Product data:

1. For each type of product indicated.

2. Product data for the following:

a. Chemical-resistant tops

B. Shop drawings:

1. Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.

a. Show full-size details, edge details, thermoforming requirements, attachments, etc.

b. Show locations and sizes of furring, blocking, including concealed blocking and reinforcement specified in other Sections.

c. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, waste receptacle and other items installed in solid surface.

C. Samples:

1. For each type of product indicated.

a. Submit minimum 6-inch by 6-inch sample in specified gloss.

b. Cut sample and seam together for representation of inconspicuous seam (edge seams and Tongue and Groove joints)

c. Indicate full range of color and pattern variation.

2. Approved samples will be retained as a standard for work.

D. Product data:

1. Indicate product description, fabrication information and compliance with specified performance requirements.

E. Maintenance data:

1. Submit manufacturer's care and maintenance data, including repair and cleaning instructions.

a. Maintenance kit for finishes shall be submitted.

2. Include in project closeout documents.

1.05 QUALITY ASSURANCE

A. Qualifications:

1. Shop that employs skilled workers who custom fabricate products similar to those required for this project and whose products have a record of successful in-service performance.

B. Fabricator/installer qualifications:

1. Work of this section shall be by a certified fabricator/installer, certified in writing by the manufacturer.

C. Applicable standards:

1. Standards of the following, as referenced herein:

    a. American National Standards Institute (ANSI)

    b. American Society for Testing and Materials (ASTM)

    c. National Electrical Manufacturers Association (NEMA)

    d. NSF International

2. Fire test response characteristics:

    a. Provide with the following Class A (Class I) surface burning characteristics as determined by testing identical products per UL 723 (ASTM E84) or another testing and inspecting agency acceptable to authorities having jurisdiction:

        1) Flame Spread Index: 25 or less.

        2) Smoke Developed Index: 450 or less.

D. Drawings shall:

1. Be produced in 1/2-inch scale for all fabricated items.

E. Job mock-up:

1. Prior to fabrication of architectural millwork, erect sample unit to further verify selections made under sample submittals and to demonstrate the quality of materials and execution.

2. Build the mock-up to comply with the contract documents and install in a location as directed by the architect.

3. Notify the architect two weeks in advance of the date of when the mock-up will be delivered.

4. Should mock-up not be approved, re-fabricate and reinstall until approval is secured.

    a. Remove rejected units from project site.

5. After approval, the mock-up may become a part of the project.

6. This mock-up, once approved, shall serve as a standard for judging quality of all completed units of work.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver no components to project site until areas are ready for installation.

B. Store components indoors prior to installation.

C. Handle materials to prevent damage to finished surfaces.

1. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.07 WARRANTY

A. Provide manufacturer's warranty against defects in materials.

1. Warranty shall provide material and labor to repair or replace defective materials.

2. Damage caused by physical or chemical abuse or damage from excessive heat will not be warranted.

3. Warranty shall be transferable to subsequent owner for remainder of warranty period.

B. Manufacturer's warranty period:

1. Ten years from date of substantial completion.

1.08 MAINTENANCE

A. Provide maintenance requirements as specified by the manufacturer.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers:

1. Subject to compliance with requirements, provide products by the following:

a. Corian® surfaces from the DuPont company (basis of design).

2.02 MATERIALS

A. Solid polymer components

1. Cast, nonporous, filled polymer, not coated, laminated or of composite construction with through body colors meeting ANSI Z124.3 or ANSI

Z124.6, having minimum physical and performance properties specified.

2. Superficial damage to a depth of 0.010 inch (.25 mm) shall be repairable by sanding and/or polishing.

B. Thickness:

1. 1/2 inch

C. Edge treatment:

1. No exposed edges.

2. Mounting:

a. Use 100% silicone bonding adhesive to walls.

E. Performance characteristics:

Property	**Typical Result**	**Test**
Tensile Strength	6,000 psi	ASTM D 638
Tensile Modulus	1.5×10^{-6} psi	ASTM D 638
Tensile Elongation	0.4% min.	ASTM D 638
Flexural Strength	10,000 psi	ASTM D 790
Flexural Modulus	1.2×10^{-6} psi	ASTM D 790
Hardness	>85 Rockwell "M" Scale	ASTM D 785
Thermal Expansion	3.02×10^{-5} in./in./°C	ASTM D 696
	(1.80×10^{-5} in./in./°F)	
Gloss (60° Gardner)	5–75 (matte—highly polished)	ANSI Z124
Light Resistance	(Xenon Arc) No effect	LD 3-2000
		Method 3.3
Fungus and Bacteria Resistance	Does not support microbial growth	ASTM 21&G22
Boiling Water Resistance	No visible change	LD 3-2000
		Method 3.5
High Temperature Resistance	No change	LD 3-2000

		Method 3.6
Izod Impact	0.28 ft.-lbs. /in. of notch	ASTM D 256
(Notched Specimen)		(Method A)
Ball Impact	No fracture—1/2 lb. ball:	LD 3-2000
Resistance: Sheets	1/4" slab—36" drop	Method 3.8
	1/2" slab—144" drop	
Weatherability	ΔE^*_{94}<5 in 1,000 hrs.	ASTM G 155
Specific Gravity †	1.7	
Water Absorption	Long-term	ASTM D 570
	0.4% (3/4")	
	0.6% (1/2")	
	0.8% (1/4")	
Toxicity	99 (solid colors)	Pittsburgh
Flammability	All colors	ASTM E 84,
	(Class I and Class A)	NFPA 255 &
		UL 723
Flame Spread Index	<25	
Smoke Developed Index	<25	

† Approximate weight per square foot: 1/2" (12.3 mm) 4.4 lbs.

2.03 ACCESSORIES

A. Joint adhesive:

1. Use 100% silicone adhesive to create inconspicuous, nonporous hardseamed joints.

B. Sealant:

1. Manufacturer's standard mildew-resistant, FDA-compliant, NSF 51-compliant (food zone — any type), UL-listed silicone sealant in colors matching components.

2.04 FACTORY FABRICATION

A. Shop assembly

1. Fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer's printed instructions and technical bulletins.

2. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints.

    a. All horizontal joints shall be tongue and groove joints in accordance with DuPont Surfaces Technical Bulletin for Commercial Interior Surface Installations.

3. Provide factory cutouts for electrical devices and accessories as indicated on the drawings.

4. Rout and finish component edges with clean, sharp returns.

    a. Rout cutouts, radii and contours to template.

    b. Smooth edges.

    c. Repair or reject defective and inaccurate work.

2.05 FINISHES

A. Select from the manufacturer's standard color chart.

1. Color:

    a. Linen

B. Finish:

1. Provide surfaces with a uniform finish.

a. Matte finish, gloss range of 5–20.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.

1. Provide product in the largest pieces available.

2. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work.

    a. Exposed joints/seams shall not be allowed.

3. Cut and finish component edges with clean, sharp returns.

4. Rout radii and contours to template.

5. Align adjacent wall panels form hardseams to comply with manufacturer's written recommendations using adhesive in color to match panel.

6. Carefully dress joints smooth, remove surface scratches and clean entire surface.

3.03 REPAIR

A. Repair or replace damaged work which cannot be repaired to architect's satisfaction.

3.04 CLEANING AND PROTECTION

A. Keep components clean during installation.

B. Remove adhesives, sealants and other stains.

END OF SECTION

DIVISION 7
THERMAL AND MOISTURE PROTECTION

SECTION 07110

SHEET MEMBRANE WATERPROOFING

PART 1 - GENERAL

1.01 DESCRIPTION

A. General:

1. Furnish all labor, materials, tools, equipment, and services for all areas within the building area, in accord with provisions of Contract Documents.

   a. All under slab vapor barriers.

   b. All vertical or horizontal waterproofing surfaces, including below grade walls and planter walls.

   c. All shower pan membranes.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See Division 1 for General Requirements.

1.02 JOB CONDITIONS

A. Install after substrate construction and penetrating work has been completed, and all defective work is corrected.

B. All surfaces shall be properly prepared to receive waterproofing in accordance with manufacturer's recommendations. All concrete shall be properly cured and dried.

C. All components of the waterproofing system must comply with applicable State of California Volatile Organic Compound (VOC) regulations.

1.03 SUBMITTALS (See Section 01340)

A. Project data:

1. Guarantee
2. Manufacturer's specifications and installation instructions

3. Certificate of application qualifications

B. Samples of each material specified.

1.04 GUARANTEE

A. Provide written guarantee signed jointly by applicator and manufacturer.

B. Guarantee installation and product for a period of 10 years from date of acceptance by Owner.

C. Guarantee waterproof integrity of installation, adhesion to substrate and surface degradation.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Acceptable manufacturers:

1. Vapor barrier:

a. Base: Visqueen, Griffolyn, or acceptable equal substitution.

2. Waterproofing Systems:

a. Base: Bituthene System 4000 as manufactured by W.R. Grace and Co.

3. Shower Pan Membranes:

a. Base: Nobel Company (800) 878-5788 www.nobelcompany.com

4. Other manufacturers desiring approval comply with Section 01640.

B. Vapor barrier: Polyethylene film.

1. 6 Mil thick, Griffolyn type-65 3-ply laminated manufactured by Reef Industries.

2. Black color.

3. Vapor transmission not exceeding 0.15 perm.

C. Vapor barrier tape: Polyethylene tape.

1. 4" (100 mm) wide.

2. Griff Tape – Black (#60-0003) manufactured by Reef Industries.

D. Waterproofing System:

1. Bituthene System 4000 Waterproofing Membrane; A self-adhesive, cold-applied, composite sheet (1.4mm) product consisting of a cross-laminated high density polyethylene film (.1mm). The rubberized asphalt is specifically formulated to adhere to substrates conditioned with water based surface conditioner.

2. Bituthene System 4000 Surface Conditioner: Specifically formulated to prepare concrete surfaces for Bituthene System 4000.

3. Bituthene Mastic: A rubberized trowel grade asphalt-based mastic.

4. Bituthene Liquid Membrane: A two-component, 100% solids, cold-applied trowel grade asphalt modified urethane.

5. Bituthene Hydroproduct 2 Drainage Composite: Nominal 10mm thick drainage core, a high performance geotextile, and a high strength backing film.

6. Bitustik: A preformed two-sided, self-adhering bituminous rubber compound in tape form. (See Section 07620) for related use.

E. Shower Pan Membranes:

1. Pre-slope Material:

a. "Pro-Slope" with a weep hole protector as manufactured by Noble Company. Composite material consisting of low density EPS with reinforced cutting template on one side. EPS tapered to produce slope of ¼ inch per foot to weep holes in shower receptor drain.

2. Waterproof Membrane:

a. "Chloraloy" (CPE) Chlorinated Polyethylene Sheet Membrane as manufactured by Noble Company. Nominal thickness of 40 mils with water transmission rate of .044 perms minimum per ASTM E96, procedure E. Meets ASTM D 4068 and listed with IAPMO.

F. Shower Accessories:

1. Shower Niches:

a. Rectangular or square recessed pre-formed shower niches as manufactured by Nobel Company.

1) Square recessed niche – Model # 301.

2) Rectangular niche – Model #314.

PART 3 - EXECUTION

3.01 INSTALLATION (UNDER SLAB BARRIER)

A. Place continuous vapor barrier over finished sub-grade (finish pad elevation). Place 2" thick compacted, clean mortar sand over vapor barrier.

1. Lap vapor barrier 6" at ends and edges of sheets and seal with vapor barrier tape.

2. Extend to extremities of area.

B. Protect vapor barriers so that work of other trades does not puncture, damage or deteriorate vapor barrier.

C. Repair all punctures, tears and other damage using vapor barrier tape, prior to placing concrete.

D. Coordinate with Division 2 and 3 requirements and construction.

E. Trim off excess material after slab is placed.

3.02 INSTALLATION (WATERPROOFING SYSTEM)

A. All concrete shall be properly cured and dried (minimum 7 days for normal structural concrete and 14 days for lightweight structural concrete). Never apply Bituthene System 4000 over insulating concrete.

B. All surfaces to receive waterproofing shall be structurally sound and free of voids, spalled areas, loose aggregate, grease, oil, wax, dust, dirt, and debris, described in the Bituthene General Waterproofing Specification.

C. Bituthene System 4000 Surface Conditioner Application:

1. The Surface Conditioner is supplied ready to use and can be applied using a pump type air sprayer with fan tip nozzle.

2. Apply Surface Conditioner at a rate of 300 sq. ft. / gallon.

3. Allow Surface Conditioner to dry completely prior to Waterproofing Membrane application. The Surface Conditioner is considered dry when the substrate returns to its original color. Allow a minimum of one hour drying time.

4. If conditioned areas are not covered that day, recondition only if significant dust or dirt accumulate.

D. Foundation Walls and Vertical Surfaces

1. Membrane Installation:

Apply Waterproofing Membrane vertically in lengths of eight feet or less. On higher walls apply two or more lengths of membrane with the upper length overlapping the lower length by at least 2-1/2". Roll entire membrane completely and firmly with a hand roller as soon as possible.

2. Sealing Edges:

Seal all vertical and horizontal terminations with Bituthene Mastic or Liquid Membrane.

3. Formation of Seams:

All edges and end laps must be overlapped at least 2-1/2". Patch misaligned or inadequately lapped seams with Waterproofing Membrane. Seal the edges of all patches with a troweling of Bituthene Mastic or Liquid Membrane.

4. Formation of Corners:

Prepare inside corners by installing a 3/4" fillet of Liquid Membrane. Extend Liquid Membrane 6" in each direction from the corner.

Outside corners must be free of sharp edges. Prepare outside corners by installing a 12" wide strip of Waterproofing Membrane centered on the corner.

Install Waterproofing Membrane over treated inside and outside corners.

5. Protection:

Bituthene Hydroproduct 2 Drainage Composite shall be installed to extend from the perimeter discharge pipe to a point ± 6" below the anticipated finish grade line.

E. Horizontal Surfaces

1. Membrane Installation:

The Waterproofing Membrane shall be applied to the conditioned surface starting at the low point. Successive sheets should overlap preceding ones by 2-1/2". Roll entire membrane as soon as possible.

2. Testing:

Testing shall be accomplished by flooding entire waterproofed area with a minimum of 2" of water.

3.03 INSTALLATION (SHOWER PAN MEMBRANES)

A. Inspection of substrate surfaces:

1. Examine substrates, drains and clamping devices to verify they are ready to receive the membrane with no deficiency that could result in a potential defective installation. Surface area to be clean, reasonably smooth and free of cracks, holes or sharp projections.

C. Installation of Membrane:

1. Install membrane in strict accordance with manufacturer's printed instructions. Install membrane with products or methods approved in writing by manufacturer when joining, sealing, fastening, or adhering sheet membrane.

D. Field quality control water test:

1. Upon completion of work, plug drain or dam areas and fill with water. After 24 hours, inspect for leakage. Make necessary adjustments to stop leakage and re-test until watertight.

2. Protect membrane after installation from pedestrian traffic and prolonged exposure to sunlight.

END OF SECTION

SECTION 07210

BUILDING INSULATION

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

A. The General Conditions, Supplementary Conditions, and Division 1 – General Requirements apply.

1.02 SECTION INCLUDES

A. Formaldehyde-free fiberglass thermal and sound control insulation made with non-toxic acrylic thermosetting resin.

B. Weather Barrier Material

1.03 RELATED SECTIONS

A. Section 07200 – Roof Deck Insulation.

B. Division 15 - Mechanical: Duct insulation, and pipe insulation.

1.04 REFERENCES

A. ASTM International Inc. (ASTM):

1. ASTM C165 - Test Method for Measuring Compressive Properties of Thermal Insulations.

2. ASTM C411 - Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.

3. ASTM C612 - Specification for Mineral Fiber Block and Board Thermal Insulation.

4. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2001.

5. ASTM C764 - Specification for Mineral Fiber Loose-Fill Thermal Insulation.

6. ASTM C1015 - Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation.

7. ASTM C1104 - Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.

8. ASTM C1304 - Standard Test Method for Assessing the Odor Emission of Thermal Insulation Materials.

9. ASTM C1320 - Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation.

10. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.

11. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2001.

12. ASTM E96 - Test Methods for Water Vapor Transmission of Materials.

13. ASTM E119, - Test Methods for Fire Tests of Building Construction and Materials.

14. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C; 1999.

15. ASTM E970 - Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source.

16. ASTM E-1677-95 – Standard Specification for an Air Retarder (AR) Material or System for Low-Rise Framed Building Walls.

17. ASTM D-779 – Dry Indicator Method, Water Penetration Resistance.

18. ASTM D-5733-9 – Trapezoidal Test.

1.05 SUBMITTALS

A. Submit under provisions of Section 01340.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Test data showing compliance of products with specified requirements.

2. Preparation instructions and recommendations.

3. Storage and handling requirements and recommendations.

4. Installation methods.

5. Test results showing performance characteristics equaling or exceeding those specified.

1.06 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of building insulation through one source.

B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

6. Surface-Burning Characteristics: ASTM E84.

7. Fire-Resistance Ratings: ASTM E119.

8. Combustion Characteristics: ASTM E136.

1.07 DELIVERY, STORAGE AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Insulation Manufacturer:

1. Knauf Insulation, One Knauf Drive, Shelbyville, IN 46176; Toll free Tel: 800-825-4434; Fax: 317-398-3675; www.knaufinsulation.com.

B. Acceptable Weather Protection Wrap Manufacturer: Fiberweb, Inc., 70 Old Hickory Blvd., Old Hickory, TN 37138, Tel: (800) 284-2780, www.typar.com.

C. Requests for substitutions will be considered in accordance with Section 01600.

2.02 INSULATING MATERIALS - GENERAL

A. General: Provide insulating materials that comply with requirements and with referenced standards.

1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.

B. Recycled Content:

2. Provide insulating materials with post-consumer recycled content constituting a minimum of five (5) percent of cost of materials used for project or post-consumer recycled content plus one-half of pre-consumer recycled content constituting a minimum of 10 percent of cost of materials used for project.

2.03 FORMALDEHYDE-FREE INSULATING MATERIALS

A. Formaldehyde-Free Unfaced Glass-Fiber Batt Insulation: "EcoBatt" Formaldehyde-Free Unfaced Batts; ASTM C665, Type I, Class A, non-combustible when tested in accordance with ASTM E136; with maximum flame-spread and smoke-developed indices of 25 and 50, respectively; and of the following properties:

3. Thermal Resistance (R-Value): (5 ½" thick) R21 (High Density) in all exterior walls and (12" thick) R38 in all roof/ceiling assemblies.

4. Combustion Characteristics: Passes ASTM E136.

5. Critical Radiant Flux: ASTM E970, greater than 0.11 Btu/sq ft s (0.12 W/cm sq).

6. Water Vapor Sorption: ASTM C1104, 5 percent or less.

7. Odor Emission: Passes ASTM C1304.

8. Corrosiveness: Passes ASTM C665.

9. Fungi Resistance: Passes ASTM C1338.

10. Recycled Content: Certified by Scientific Certification Systems to contain minimum of 18 percent post-consumer and seven (7) percent pre-consumer recycled glass product, on average of manufacturer's products.

11. Thickness: 6" for all exterior walls and 12" for all roof/ceiling assemblies.

B. Acoustical Batt Insulation: "EcoBatt" Glass fiber insulation complying with ASTM C665; non-combustible when tested in accordance with ASTM E136: Knauf Quiet Therm.

1. Size: Maximum sizes available to avoid jointing to greatest extent possible.

2. Stud Walls and Rafter Spaces: Maximum thicknesses to fit wall thickness and rafter depths.

3. Facing: None, unfaced; ASTM C665, Type 1, Class A.

a. Surface Burning Characteristics: Maximum flame spread of 25, developed smoke developed of 50, when tested in accordance with ASTM E84.

b. Noise Reduction Coefficient: 1.00, when tested on 2" samples in accordance with ASTM C423.

4. Facing: Kraft paper faced; ASTM C665, Type II, Class C; extra wide stapling flanges.

5. VOC Emission: Low VOC emission certified by GreenGuard Environmental Institute.

2.04 INSULATION ACCESSORIES

A. Tape: Self-adhesive vapor retarder tape with flame spread index of 25 or less, smoke developed index of 50 or less.

2.05 WEATHER PROTECTION HOUSE WRAP

A. Water Resistant Barrier.

1. Spun-bonded Polypropylene Weather Membrane with a microporous coating, non-woven, non-perforated.

2. Performance characteristics:

a. Gurley Hill TAPP T-460 > 2500.

b. Water Transmission > 5 perms and < 20 perms as tested by ASTM E-96-90, Method A.

c. Water penetration resistance of 865 cm on hydrostatic head in accordance with AATCC-127.

d. Trapezoidal Test of 30/33 in accordance with ASTM D-5733-9.

e. Air-ins < :021/S-M @75PA.

f. Dry Indicator Method STM D-779 = to 24 hour rating.

g. Flame Spread Index = 0.

h. Smoke Developed Index = 30.

3. Base product:

a. Typar Weather-Protection Membrane by BBA Fiberweb.

B. Sealing Tape/Fasteners.

1. Approved tape products:

a. Typar Contractor Tape, by BBA Fiberwed.

2. Sealants:

a. Elastomeric polymer based, Butyl rubber, rubber based, meeting ASTM C920 evaluation.

3. Fasteners for wood studs, plywood, insulating sheathing board, or exterior gypsum board:

a. Plastic cap nails or plastic cap staples.

4. Fasteners for steel framing members:

a. Rust resistant screws with washers.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean substrates of substances harmful to insulations or weather protection system, including removing projections capable of puncturing weather protection system or of interfering with insulation attachment.

3.03 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice and snow.

C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Water-Piping Coordination: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

E. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.

3.04 INSTALLATION OF GENERAL BUILDING INSULATION

A. Seal joints between closed-cell (non-breathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

B. Install glass-fiber blankets in cavities formed by framing members according to the following requirements:

1. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.

2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.

C. For wood-framed construction, install mineral-fiber blankets in accordance with ASTM C1320 and as follows:

1. With faced blankets having stapling flanges, secure insulation by friction fit inset or face stapling flanges to sides of framing members.

2. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to produce airtight installation after concealing finish material is in place.

D. Acoustical Insulation Installation: Install insulation where indicated in sound rated assemblies. Maintain acoustical rating of assembly.

E. Between Open Trusses: Secure with 16 or 18 GA wire running perpendicular to the insulation spaced at 24" o.c.

F. Board Insulation Installation: Install insulation where indicated:

1. Cut and friction fit insulation between vertical or z-shaped framing.

2. Alternatively install insulation on impaling pins or with suitable adhesives.

3. Place pins 3 to 5 inches (76-127 mm) from edges of insulation.

3.05 INSTALLATION OF WEATHER PROTECTION SYSTEM

A. General: Extend weather protection membrane to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend weather protection membrane to cover miscellaneous voids in insulated substrates.

B. Seal vertical and horizontal joints of weather protection membrane over framing or plywood sheathing by lapping not less than two wall studs horizontally and 12" vertically. Fasten weather protection membrane to framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches (406 mm) oc.

C. Seal overlapping joints in weather protection membrane with adhesives or tape according to weather protection membrane manufacturer's instructions. Seal butt joints and fastener penetrations with weather protection membrane tape. Locate all joints over framing members or other solid substrates.

D. Firmly attach weather protection membrane to substrates with mechanical fasteners or adhesives as recommended by weather protection membrane manufacturer.

E. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating weather protection membrane with weather protection membrane tape to create an airtight seal between penetrating objects and weather protection membrane.

F. Repair any tears or punctures in weather protection membrane immediately before concealment by other work. Cover with weather protection membrane tape or another layer of weather protection membrane.

3.06 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

SECTION 07546

COATED FOAMED ROOFING

PART 1 - GENERAL

1.01 DESCRIPTION

A. This specification covers the preparation and application to roof surfaces of a monolithic, spray applied rigid urethane foam and roof coating which shall be a composite roof system.

B. This system shall provide an insulative value and shall provide a waterproof weather barrier possessing adhesion and physical bond strength to substrate. This system shall maintain hydraulic stability without age-hardening or slump.

C. The applicator shall furnish all labor, materials and equipment and perform all operations required as specified. The plans and specifications do not necessarily include all minor details. The Contractor shall provide labor and material customarily included in work of the same general nature to give a first class complete job.

D. The Contractor shall, at all times, keep the premises free from accumulation of waste material or rubbish, maintain work area in a neat, orderly manner, and leave the premises in a broom clean condition at the completion of all work.

E. Installation of foam roofing system shall be by a qualified licensed foam roofing contractor, approved by the manufacturer to install his roofing materials, and shall be in strict accordance with the manufacturer's specifications and recommendations.

1.02 WORK INCLUDED UNDER THIS SECTION

A. The principal items of work included in this section are:

1. Urethane Foam
2. Fluid Applied Membrane
3. Granules

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Sheet Metal Flashing and Trim – Section 07620.

B. Roof vent flashing provided and installed under mechanical and electrical work.

C. Roof drains and downspouts.

1.04 QUALITY ASSURANCE

A. Manufacturer: For the purpose of defining quality of the work and materials in this section.

1. For the work intended, the URETHANE FOAM AND FLUID APPLIED COATING shall have been tested and classified by Underwriter's Laboratories, Inc. as a roof deck composite in accordance with U.L. 790.

2. In addition, the sprayed URETHANE FOAM shall have a nominal "in place" density of 3.0 P.C.F. and be classified and listed by U.L. as Class A, 75 (max.) Flame Spread, in accordance with U.L. 723 (ASTM E-84).

B. Applicator: Application shall be by a properly qualified applicator with basic knowledge of these products and who has contacted the manufacturers for proper application procedures. Applicator should have a minimum of 5 years experience in installation of these systems.

1.05 SUBMITTALS (SEE SECTION 01340)

A. Manufacturer's Data: Within 30 days after signing of contract, this Contractor shall submit 5 copies of application instructions and precautions, and manufacturer-contractor warranty. Such submittals, once approved and accepted, shall become a part of this Specification Section.

B. Materials or formulation types other than that specified shall be submitted to the Architect for approval not later than ten (10) days prior to bid date. Request shall be accompanied with notarized certification and test data delineating physical properties, coated urethane foam sample and warranty. Certification shall state that all tests have been conducted according to this specification.

C. Samples: Submit three samples of the proposed coating system applied on urethane foam. Samples shall be 2" x 4" in size.

D. Certification of Manufacturer: Submit on corporate letter head, a letter from the manufacturer of the foam and coating stating that the applicator of this product is an approved applicator.

1.06 PRODUCT HANDLING AND STORAGE

A. Products shall be delivered in manufacturer's original sealed containers, with seals and labels intact.

B. Store materials in an enclosed space protected from weather and out of the direct rays of the sun.

C. Do not ship or store materials unless protection against freezing (32 degrees F) is available.

1.07 INSPECTION AFFIDAVIT AND WARRANTY

A. Install work in strict accordance with the manufacturer's directions for conditions involved. After all surfaces have been prepared to receive foam, a manufacturer's representative shall verify that surfaces meet requirements of the specifications. Spray foam manufacturer shall visit job site and take core samples to verify foam density and quality and verify that specifications are being met.

B. Warranty: contractor shall supply the manufacturer's standard 5 year warranty on coating material and a 5 year warranty from the Contractor covering labor. The Contractor shall provide copies of all field inspection reports from the manufacturer of the coating to conform to the requirements to receive the warranty.

C. After the protective coating has been applied an authorized representative of the coating manufacturer shall verify that the coating thickness is as called for in the contract documents. These thickness tests shall be taken a minimum of one every 1000 sq. ft. or at random locations as selected by the Architect. Verification shall be forwarded to the Architect.

D. If deficiencies are found in application, the Contractor shall repair the work to the full satisfaction of the manufacturer's representative and Architect before proceeding with next phase of work.

E. Upon satisfactory completion of the application, the manufacturer shall inspect the total installation and advise the Architect and Contractor of any deficiencies as it relates to the total system for corrective measures. Contractor shall correct all deficiencies before warranty is to be issued.

1.08 INSURANCE

This Contractor shall carry the proper fire insurance coverage due to the use and application of a flammable material. Certificates of insurance covering such possible fire damage shall be submitted to the Architect for approval prior to commencing any foam application. Certificates shall be submitted along with other submittal documents.

1.09 REBATES (SEE SECTION 01340 FOR SUBMITTALS)

The Roofing Contractor shall include in the scope of the work the obtaining of all documents required for the processing and obtaining of all rebates with the City of Palm Desert, State of California, and Southern California Edison, as well as all federal and

state tax credits that may qualify due to the "cool roof" designation of this roofing system. The roofing contractor shall submit all documentation to the General Contractor who shall submit all documentation the Architect for review and signature by the Owner. Final Payment to the Roofing Contractor shall not be made until all rebates and tax credit documentation has been completed and submitted to the Owner.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS

A. Manufacturers: The following materials shall all be supplied by one manufacturer. Approved manufacturers are: RTC (Resin Technology Corporation) ICC-ESR # 2132.

B. Substitutions: No substitutions during bidding. Substitutions will be considered after bidding in accordance with section 01640.

2.02 MATERIALS:

A. Primers: They will include the following:

Substrate	Primer
Galvanized Steel	Wash Primer
Plywood or Wood	"Acryprime"

B. Sprayed Polyurethane Foam: RTC #RT2035- 2.5/3.0. Material shall be a two-component liquid applied sprayable type polyurethane foam. Application shall result in a high quality rigid urethane foam roofing: 3.0 lb. core density conforming to ASTM D-1622 Class B label over combustible decks. 1" minimum thickness, with additional thicknesses and slopes as noted on Drawings.

MINIMUM PHYSICAL PROPERTIES OF THE FOAM

PROPERTY	TEST UNIT	VALUE	TEST METHOD
Nominal Density	lbs./cu.ft.	3.0	ASTM D1622
Compressive Strength - Parallel	psi	45	ASTM F1621
Tensile Strength - Parallel	psi	55	ASTM D1623
Shear Strength - Perpendicular	psi	45	ASTM C273
K Factor (aged)		0.169	ASTM C177

Water Absorption	gm/cc	0.017	ASTM D2842
Water Vapor Transmission	Perms	1.9	ASTM C355
Flammability	Flame Spread	30	ASTM E84
Closed Cell Content		90% Min.	ASTM D1940

C. Fluid Applied Membrane: The fluid applied membrane shall be a 100% acrylic elastomer coating. The product shall be Permax 108 as manufactured by Henry Company (Resin Technology Co.), Ontario, California with the following typical physical properties:

Physical Properties	**Test Method**	**Value**
Solids (by volume)	Calculated	60%
Tensile Strength	ASTM D-6083	273 ± 100
Elongation To Break	ASTM D-6083	240 ± 100
Permeance	ASTM D-1653	6.0 perms.
Emittance (Bright White)	ASTM C-1371	.89
Emittance (With White Granules 35 lbs/sq)		.94
Reflectance (Bright White)	ASTM C-1549	85% ± 1%
Reflectance (With White Granules 35 lbs/sq)		73% ± 1%
Cool Roof Council Rating (Bright White Color)		CRCR # 0620-0022a
a. Solar Reflectance		.86
b. Thermal Emittance		.90
Cool Roof Council Rating (Bright White Granules)		CRCR # 0620-0026
a. Solar Reflectance		.74
b. Thermal Emittance		.94
Accelerated Weathering	ASTM D-822	8000 hours
Flammability	UL 790 Combustible Deck Non-Combustible Deck	 Class B Class A
	ASTM E-108 Combustible Deck Non-Combustible Deck	 Class B Class A

D. Granules: #12 Grade calcite rock granules; white color; specific gravity of 2.7; pH level of 9.0; and a density of 180 lbs/cu.ft.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION - GENERAL

A. Any roof deck that is to receive sprayed urethane foam shall be securely fastened to the building structure.

B. Remove any contaminants that will interfere with total adhesion of sprayed urethane foam to the substrate. Surface shall be free of loose particles, rust, scale, grease, dirt, latience, paint or other contaminants.

C. A dry surface is one that is free of visible moisture and that when tested with a moisture meter registers a reading of less than ten percent.

D. No foam shall be sprayed on a roof deck if the deck temperature is within five (5) degrees of the dew-point.

E. Sprayed foam shall not be applied on a roof deck surface having a measured temperature less than 50 degrees F.

F. All surfaces not to receive foam such as wall, air conditioners and other roof mounted equipment are to be carefully masked with tape and paper to avoid overspraying of these surfaces with foam and coating. All coating is to be terminated in clean straight lines.

G. All new edge metal or flashings shall be installed at the surface preparation stage.

3.02 PRIMING OF SURFACES

A. All roof surfaces shall be primed with 1/2 gallon per 100 square feet of primer.

3.03 APPLICATION

A. Sprayed Polyurethane Foam

1. All equipment for the application of polyurethane foam shall be specifically designed for the metering of two component polyurethane foam systems. The system shall be airless and shall have both primary and hose heaters.

2. Wind velocity shall not exceed 10 miles per hour.

3. Application of spray foam shall not proceed if ambient temperature is less than 50 degrees F.

4. Spray foam is not to be applied over moist substrates or where rain or inclement weather is imminent.

5. The polyurethane foam shall be applied to a minimum (1") one inch thickness. Refer to drawings for additional foam thickness.

6. Only as much area as can be brought to final thickness should be attempted in a day. Phasing of the foam is strictly forbidden. (Phasing is foam application on one day and coming back the next day or thereafter and applying another layer of foam. The procedure often leads to the development of blisters in the future.) If additional foam must be added after the 24 hour period, the existing foam must be primed with a catalyzed urethane primer and a minimum of one half inch of foam in a single pass can be applied.

7. The foam shall be free of bumps, pinholes, and ridges. The surface shall exhibit a smooth or orange peel surface texture. Popcorn or tree bark surfaces shall be deemed unacceptable.

8. The foam thickness shall be checked every 500 square feet prior to coating application.

9. Filleting of foam to parapet walls, vents, skylight, roof mounted equipment, etc., shall provide a relatively smooth transition to the roof deck, shall be of uniform cross-section thickness and shall meet all other foam surface texture requirements. Utilize power grinder at all transition areas to provide for smooth transition to drains, and at parapet edges.

D. Fluid Applied Membrane:

1. After polyurethane foam has been applied, the roof coating shall be sprayed onto the foam utilizing airless equipment. Edges of flat roof should be precoated in a "picture framing" fashion.

2. Refer to Manufacturer's Application Instructions and Precautions data sheet for specific details on:

   a. Mixing

   b. Recommended spray equipment

   c. Spray techniques

   d. Cold and hot temperature precautions during application

3. Coating shall be applied in three separate coats to insure uniform coverage and a pinhole-free continuous film. The base coat shall be of contrasting colors to the top coat. The initial base coat shall be 10 mils in

thickness and the second base coat shall be 10 mils in thickness. The top coat shall be applied at a rate of 1.5 gallons per 100 square feet. The total thickness shall be 32 mils. While the top coat is still wet, 35 lbs. per 100 square feet of roofing granules shall be broadcast into the wet coating. The coating and granules shall be of a bright white color.

4. All foam is to be coated. Coating shall be extended up and over all foam on vent pipes and terminated a minimum of 2 inches above the foam creating a self-terminating flashing.

5. Contractor shall leave at job site 4 -1 gal. containers of coating (brush grade).

6. The General Contractor shall be responsible for requiring that other trades do not damage roof foam or coating during or after the final coating is applied. Should any damage occur to the foam or coating through the fault of any other trades, the General Contractor shall see that it is repaired properly at no extra cost to the Owner.

3.04 CLEAN-UP

A. During progress of work covered by this Section, roofing applicator shall keep his work and other areas affected, free of overspray and debris caused by the work of this Section.

B. At completion of Work herein specified, remove from the site all debris caused by the roofing application, clean all adjacent surfaces of foam and coating overspray and leave the work area in an acceptable condition.

END OF SECTION

SECTION 07601
ROOFING PROTECTION BOARD

PART 1 – GENERAL

1.01 DESCRIPTION

A. General:

1. Furnish all labor, materials, tools, equipment, and services for roofing protection board under polyurethane foam roofing systems as indicated, in accord with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, and appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See Division 1 for General Requirements.

B. Related work specified elsewhere:

1. Rough Carpentry – Section 06100.

2. Coated Foam Roofing Membrane – Section 07545.

3. Sheet Metal Flashing and Trim – Section 07620.

1.02 SUBMITTALS

A. Product data: Submit manufacturer's descriptive literature indicating material composition, thickness, sizes and fire resistance.

B. Certification: Submit manufacturer's written certification that product meets specified fire-resistance requirements.

1.03 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the jobsite with manufacturer's identification intact. The protective plastic shipping covers used to wrap gypsum panel products for rail shipment are intended to provide temporary protection from moisture exposure during transit only and are not intended to provide protection during storage after delivery. Remove the plastic shipping covers immediately upon receipt of delivery. Roof protection boards also may be wrapped in temporary factory-applied plastic packaging (plastic wrap) that must be removed upon receipt. Failure to remove the plastic shipping covers and plastic wrap may result in entrapment of condensation or moisture, which may cause application problems.

B. Provide other suitable, breathable weather protection for storage to keep roof protection board products dry. Outside storage must be off the ground and protected by a breathable waterproof covering. Provide means for air circulation around and under stored bundles of roof protection boards. Roof protection boards must be roofed the same day as installed. Roof protection boards must be kept dry before, during and after application. If protection boards have been exposed to elevated job site moisture, allow protection boards to dry before using.

1.04 LIMITATIONS

A. Roof protection boards are designed to act with a properly designed roof system.

B. Roof protection board products may have temporary factory-applied packaging (plastic wrap) that must be removed upon receipt to prevent accumulation or entrapment of condensation or moisture which may cause application problems. Provide other suitable breathable weather protection for storage to keep products dry.

C. Panels must be kept dry before, during and after installation. Avoid moisture accumulation through entrapped condensation. Apply only as many roof protection boards as can be covered by a roof membrane system in the same day.

D. Protection board edges and ends should be butted in typical installations. However long, uninterrupted runs of 1/4" roof protection board may require slight gapping due to higher surface temperature gain.

E. Accumulation of water due to leaks or condensation in or on roof protection boards must be avoided during and after construction. Avoid overuse of non-vented, direct-fired heaters during winter months. Avoid application of roof protection boards during rains, heavy fogs and any other conditions that may deposit moisture on the surface.

F. When applying solvent-based adhesives or primers, allow sufficient time for the solvent to flash off to avoid damage to roofing components.

G. Maximum flute span is 2-5/8" for 1/4" products.

H. Roof protection boards should not be subjected to abnormal or excessive loads or foot traffic such as on plaza decks or under steel wheeled equipment that may fracture or damage the panels. Provide suitable roofing system protection when required.

I. Confirm any priming requirements of roof protection board with roof membrane manufacturer.

PART 2 - PRODUCTS

2.01 ROOF PROTECTION BOARDS

A. Roof Protection boards:

1. Acceptable product: G-P Gypsum Corporation 1/4" Dens Deck Roof Protection board, 1/2" Dens Deck Roof Protection board.

2. Composition: Nonstructural, glass mat faced gypsum panel with water-resistant core.

3. Size: Nominal 4' x 8', 4' x 4'. Edges: Square.

4. Thickness: 1/4" or 1/2" Dens Deck Roof Protection board. See drawings and details for exact thickness to be used.

5. Fire Resistance:

   a. Flame spread 0, smoke developed 0, when tested in accordance with ASTM E 84. Noncombustible when tested in accordance with ASTM E 136.

   b. Code alternate to 15 minute thermal barrier as tested to UL 1256.

2.02 MISCELLANEOUS MATERIALS

A. Manufacturer approved flat bottom plates and fasteners: Provide size and type in accordance with manufacturer's requirements and roof membrane manufacturer's written recommendations.

B. Adhesives: As recommended by roof system manufacturer.

PART 3 - EXECUTION

3.01 GENERAL

A. Provide roof protection boards where indicated on drawings using attachment system specified.

B. Use maximum lengths possible to minimize number of joints. Apply directly over plywood sheathing as noted in details. Stagger end joints of adjacent lengths of roof protection boards. Ends and edges are typically butted.

C. Use appropriate adhesives or corrosion-resistant fasteners.

3.02 ROOF PROTECTION BOARD INSTALLATION

A. Adhered Systems: As recommended by roof system and adhesive manufacturers.

B. Mechanically Attached Systems: Install per manufacturer's guidelines for wind uplift resistance.

3.03 PARAPET (WALL) FRAMING AND FASTENING

A. If plywood sheathing is not used against roof parapets as backing for underlayment, use ½" thick roof protection board, however, maximum parapet framing space for 1/2" roof protection board products is 16" o.c. If plywood backing is used, ¼" thick underlayment can be used.

B. Fasten a maximum 8" o.c. around the perimeter and 8" o.c. on framing members in the field of the panel.

END OF SECTION

SECTION 07620

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.01 DESCRIPTION

A. General:

1. Furnish all labor, materials, tools, equipment, and services for all sheet metal flashing and trim work not specifically included in work of other section, as indicated, in accord with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See Division 1 for General Requirements.

B. Related work specifically elsewhere:

1. Coated Foamed Roofing -- Section 07545.

2. Mechanical sheet metal work – Section 15655.

3. Sheet Metal Roofing – Section 07610.

1.02 QUALITY STANDARDS

A. Reference standards: as noted for individual items.

1. ANSI/ASTM Standards.

2. SMACNA architectural sheet metal manual.

1.03 SUBMITTALS (SEE SECTION 01340)

A. Project data:

1. Guarantee.
2. Material data from manufacturers.

1.04 JOB CONDITIONS

A. Coordinate work with roofing.

B. Provide all components necessary to create watertight junctures between roofing and sheet metal work.

1.05 GUARANTEE

A. Furnish 5 year guarantee on sheet metal work, signed jointly by Contractor and sheet metal installer.

1. Agree to repair or replace work which leaks water, deteriorates excessively or otherwise fails to perform as water tight flashing.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Acceptable manufacturers:

1. Sheet metal flashings:

a. Base: 24 gauge, "bonderized" zinc coated metal with a thin layer of zinc phosphate on the surface conforming to ASTM A653. Bonderized metal is solderable and ready to be painted.

2. Sheet metal fascias and screens:

a. Base: 18 gauge "Jetcoat/Galvannealed" metal to meet ASTM A653. Metal is galvanized heat treated after coating to produce zinc-iron alloy and eliminate the spangle. Coating weights are A40 and A60.

3. Other manufacturers desiring approval comply with Section 01640.

B. Fasteners: Non-ferrous fasteners of same material as sheet metal which will not rust, corrode or react.

1. Self-tapping screws shall be "TEKS" manufactured by Elco Industries.

C. Retainer clips: 16 ga. galvanized or stainless.

D. Solder: ASTM B32 or B486, as applicable to materials joined.

1. Use rosin flux for other materials.

E. Dissimilar metal protection: Alkali resistant bituminous paint, Tnemec Tneme Tar 413.

2.02 FABRICATION - SHEET METAL

A. Fabricate true and sharp to profiles and sizes indicated.

1. Shop fabricate items to maximum extent possible.

B. Back priming:

1. All "Jetcoat/Galvannealed" metal shall be back primed prior to installation. See Section 09900 – Painting.

PART 3 - EXECUTION

3.01 INSPECTION AND PREPARATION

A. Verify suitability of substrates to accept work.

B. Installation constitutes acceptance of responsibility for performance.

3.02 INSTALLATION - SHEET METAL

A. Provide items to be built into other construction to Contractor in time to allow their installation.

B. If such items are not provided in time for installation, sheet metal fabricator cut in and install.

C. Fabricate and install in accord with details and recommendations of SMACNA.

D. Set shop fabricated and welded interior and exterior preformed corners and intersections.

E. Solder to achieve weathertight joints and required details; do not solder slip joints.

F. Set top edges of flashings into reglets as indicated.

G. Fasten materials at recommended intervals.

H. Caulk joints with 2 beads of sealant on each overlap; see Section 07915.

I. Turn down cap flashing over base flashings 4".

J. Form flashings to provide spring action with exposed edges hemmed or folded to create tight junctures.

K. Provide dissimilar metals and materials protection where dissimilar metals come in contact, or where sheet metal contacts mortar.

L. Provide all miscellaneous sheet metal items not specifically covered elsewhere, as indicated or required to provide a weathertight installation.

3.03 CLEAN-UP

A. Upon completion of work, repair all damaged areas.

B. Clean stains and debris.

C. Remove any protective coverings.

D. Leave work broom clean.

END OF SECTION

SECTION 07720

ROOF HATCHES

PART 1 - GENERAL

1.01 DESCRIPTION

A. General:

1. Furnish all labor, materials, tools, equipment, and services for roof hatches and safety posts and accessories, as indicated, in accord with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See Division 1 for General Requirements.

B. Related work specified in Section 02800 - Fountains; ladders - Section 05500 - Metal fabrications; Section 07545 - coated Foamed Roofing.

1.02 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver in time to allow installation.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Acceptable manufacturers:

1. Roof hatches and safety posts:

a. The Bilco Company, B.L. Wilcox & Associates, Whittier, CA, (310) 693-2787, (714) 522-5382.

2. Other manufacturers desiring approval comply with Section 01640.

2.02 ROOF HATCHES

A. The Bilco Company. Cover shall be with a 3" beaded flange and formed reinforcing members welded to support a minimum live load of 40 lb/sf.

Insulation shall be glass fiber 1" thick, fully covered and protected by a metal liner. Curb shall be 12" in height and shall be with a 3-1/2" flange with holes provided for securing to the roof deck. Curb shall be equipped with an integral metal capflashing of the same gauge and material as the curb, fully welded at the corners for weather tightness. Capflashing shall be equipped with the Bilclip™ flashing system, including stamped tabs and PakRope. Insulation on the exterior of the curb shall be rigid fiberboard 1" in thickness. Scuttle shall be completely assembled with heavy pintle hinges, positive snap latch with turn handles and padlock hasps inside and outside and a mechanically retained thermoplastic rubber gasket. Compression spring operators enclosed in telescopic tubes shall be provided for smooth, easy and controlled door operation throughout the entire arc of opening and closing. Operation shall not be affected by temperature. Cover shall be equipped with an automatic hold-open arm complete with red vinyl grip handle to permit easy release. All hardware shall be zinc plated and chromate sealed. Installation shall be in accordance with manufacturer's instructions.

B. Roof hatch, Type S, Model S-50, 3'-0" x 2'-6", 100 lbs.

1. Cover: Aluminum, 11 ga.
2. Metal Liner: Aluminum, 18 ga.
3. Curb: Aluminum, 11 ga.
4. Cover release: One-hand control of the cover to its closed and latched position.
5. Factory finish: Mill finish.
6. Located at Gate House roof.
7. Provide safety post to ladder access below hatch.
8. By others: Provide water proof membrane at Bilclip/PakRope.

C. Roof hatch, Type E, Model E-20, 3'-0" x 3'-0", 223 lbs.

1. Cover: Galvanized steel, 14 ga.
2. Metal Liner: Galvanized steel, 22 ga.
3. Curb: Galvanized steel, 14 ga.
4. Factory finish: Paint bond; red oxide primer.
5. Located at Fountain equipment vault.
6. Provide safety post to ladder access below hatch.
7. By others: Provide waterproof membrane at Bilclip/PakRope.

2.03 SAFETY POST

Install on fixed ladder access below hatch covers, Model 1 LadderUp safety posts as manufactured by the Bilco Company. Device shall be manufactured of high strength steel with telescoping tubular section that locks automatically when fully extended. Upward and downward movement shall be controlled by a stainless steel spring balancing mechanism. Finish shall be black enamel. Unit shall be completely

assembled with fasteners for securing to the ladder rungs in accordance with the manufacturer's instructions. Shipping weight 24 lbs. each.

PART 3 - EXECUTION

3.01 Furnish and install where indicated on plans metal roof scuttle per manufacturer's instructions by qualified workmen.

A. Gate House roof hatch is to be attached to wood framed structure.

B. Fountain Vault roof hatch is to be attached to concrete shaft above landscape planter.

3.02 GUARANTEE

Manufacturer shall guarantee against defects in material or workmanship for a period of five years.

3.03 CLEAN-UP

END OF SECTION