5. CONCRETE REINFORCING MATERIALS:

A. Reinforcing Bars: ASTM A615, Grade 60 with deformations conforming to ASTM A305. Bars shall be free of excessive rust, scale, grease, paint, or other coatings which adversely affect bond.

B. Tie and Stirrup Steel: ASTM A615, Grade 60.

C. Steel Wire: ASTM A82, plain, cold-drawn steel.

D. Welded Wire Fabric: ASTM A185, welded steel wire fabric with gauge as shown on drawings.

E. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars in place. Use wire bar type supports complying with CRSI recommendations.

6. CONCRETE MATERIALS:

A. Portland Cement: ASTM C150, Type 1 as manufactured by Dixie, Lonestar, Marquette, Signal Mountain or approved equal. Use one brand of cement throughout project.

B. Fly Ash: ASTM C618, Class C.

C. Aggregrates: ASTM C33, and herein specified. Provide aggregates from a single source for exposed concrete.

(1) Local aggregrates not complying with ASTM C33, but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used.

D. Water: Potable.

E. Air-Entraining Admixture: ASTM C260.

(1) Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"MB VR Standard" by Master Builders.

F. Water-Reducing Admixture: ASTM C494, Type A.

(1) Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Eucon WR-75" by Euclid Chemical Co.
"Pozzolith 322N" by Master Builders.
"Plastocrete 161" by Sika Chemical Corp.
"PSI-90N" by Gifford-Hill.

G. Water-Reducing, Accelerator Admixture: ASTM C494, Type C or E.

(1) Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"PSI-HE" by Gifford-Hill.
"Accelguard 80" by Euclid Chemical Co.
"Pozzolith 122-HE" by Master Builders.
"Daraset" by W.R. Grace.

H. Water-Reducing, Retarding Admixture: ASTM C494, Type D.

(1) Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Pozzolith 300-R" by Master Builders.
"Eucon Retarder 75" by Euclid Chemical Co.
"Daratard" by W.R. Grace.
"Plastiment" by Sika Chemical Co.

I. Calcium Chloride:

(1) Calcium chloride shall not be permitted under any circumstances or conditions.

7. RELATED MATERIALS:

A. Moisture Barrier: Provide moisture barrier cover over prepared base material polyethylene sheet not less than 6 mils thick.

B. Non-Shrink Grout: CRD-C 621, Type D, non-metallic, factory pre-mixed grout.

(1) Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Masterflow 713" by Master Builders.
"Sonogrout" by Sonneborn-Contech.
"Euco-NS" by Euclid Chemical Co.
"Five Star Grout" by U.S. Grout Co.
"Duragrout" by L & M Construction Chemical Co.

C. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M182, Class 2.

D. Moisture-Retaining Cover: ASTM C171.

(1) Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

Waterproof paper.
Polyethylene film.
Polyethylene-coated burlap.

E. Liquid Membrane-Forming Curing Compound: ASTM C309, Type 1, Class A or B.

(1) Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Floor Coat" by The Euclid Chemical Corp.
"Clear Seal 800" by W.R. Grace.
"Dress and Seal" by L & M Construction Chemical Co.
"Sealco 800" by Gillford-Hill.
"MB-429" by Master Builders.
"Klearseal" by Setcon Industries.
"Kure N Seal 800" by Sonneborn-Contech.

F. Bonding Compound: Polyvinyl acetate, rewettable type.

(1) Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Daraweld C" by W.R. Grace.
"Euco Weld" by Euclid Chemical Co.
"Everbond" by L & M Construction Chemical Co.
"Sonocrete" by Sonneborn-Contech.
"Weldcrete" by Larson Products.

G. Epoxy Adhesive: 100% solids, two component material suitable for use on dry or damp surfaces.

(1) Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Euco Epoxy" by Euclid Chemical Co.
"Sikadur Hi-Mod" by Sika Chemical Corp.
"Thiopoxy" by W.R. Grace.

8. PROPORTIONING AND CONCRETE MIX DESIGN:

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. The concrete mix design shall be at Contractor's expense.

B. Written Reports: Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrte production until mixes have been reviewed by Architect.

C. Design Mixes: Design mixes to provide normal weight concrete with the following properties, or as indicated on the drawings.

(1) 3,500 psi at 28-day compressive strength with 400 lbs. min. per cu. yd. Portland Cement, 80 lbs. max. per cu. yd. Fly Ash.

D. Adjustments to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant. This shall be done at no additional cost to Owner and as accepted by Architect.

E. Concrete Admixtures:

(1) Use water-reducing admixture in all concrete.

(2) Use accelerating admixture in concrete slabe placed at ambient temperatures below 50 degrees F.

(3) Use air-entraining admixture in exterior exposed concrete, unless otherwise indicted. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having air content within the following limits.

4% to 6% for maximum 1-1/2" aggregate.
5% to 7% for maximum 1" aggregate.
6% to 8% for maximum 3/4" aggregate.

F. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows.

(1) Ramps and Sloping Surfaces: Not more than 3".

(2) Other Concrete: Not less than 2" and not more than 4".

9. CONCRETE MIXING:

A. Job-Site Mixing: Mix materials for concrete in appropriate drum type batch machine mixer. For mixers of one cu. yd., or smaller capacity, continue mixing at least 1-1/2" minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than one cu. yd., increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cu. yd. or fraction thereof. Jobsite mixing shall be allowed for minor applications only.

B. Ready-Mix Concrete: Comply with requirements of ASTM C94, and as herein specified.

(1) Maximum of 2 gallons of water per cu. yd. may be added to the batch for material of insufficient slump.

(2) During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 may be required.

(3) When air temperature is between 85 degrees F and 90 degrees F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

10. PLACING CONCRETE FORMS:

A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position. Deisgn and construction of formwork is the responsibility of the Contractor.

B. Construct forms complying with ACI 347, to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

C. Fabricate forms for easy removal without hammering or prying against concrete surfaces.

D. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete.

E. Chamfer: Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

F. Form Ties: Factory-fabricated, adjustable-length, removable or snapoff metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.

G. Form Coating: Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

11. REMOVAL OF CONCRETE FORMS:

A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, may not be removed in less than 7 days and until concrete has attained 85 percent of design minimum compressive strength at 28-days. Determine potential compressive strength of in-place concrete by testing cured specimens representative of concrete location or members.

12. RE-USE OF CONCRETE FORMS:

A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces, except as acceptable to Architect.

13. PLACING REINFORCEMENT:

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.

B. Bar Cleaning: Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrte placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers as required.

D. Bending: Bend reinforcing bars cold. Do not heat bars with a torch.

E. Welding: Weld rebar only if specifically permitted by Structural Engineer. Accomplish welding per AWS "Recommended Practices for Welding Reinforcing Stee, Metal Inserts, and Connections in Reinforced Concrete Construction".

F. Wire Fabric: Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh (6" minimum) and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

14. JOINTS IN CONCRETE:

A. Construction Joints: Locate and install construction joints, which are not shown on drawings, so as not to impair strength and appearance of the structure, as acceptable to Architect.

(1) Provide keyways at least 1-1/2" deep in construction joints in walls, slabs and between walls and footings. Industry accepted bulkheads designed for this purpose may be used for slabe.

(2) Place construction joints perpendicular to the main reinforcement. Continue reinforcement across construction joints.

B. Isolation Joint in Slab-on-Ground: Construct isolation joints in slabs on ground at points of contact between slabs on ground and vertical surfaces, such as columns, walls, and elsewhere as indicated.

C. Contraction (Control) Joints in Slab-on-Ground: Construct control joints in slabs on ground to form panels or patterns as shown. Use metal performed keyway joints or saw cuts to 1/4 of slab depth, unless otherwise indicated.

(1) Install metal keyway joints per manufcturer's instructions and as shown on drawings.

(2) If contractionn joints are formed by saw cutting, saw as soon as possible after slab finishing without dislodging aggregate.

15. INSTALLATION OF EMBEDDED ITEMS:

A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete.

B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface.

16. PLACEMENT OF CONCRETE:

A. General: Comply with ACI 304, and as herein specified.

(1) Place concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formaton of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

B. Placing Concrete in Forms: Deposit concrete in forms in horizontial layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

C. Vibration of Concrete: Consolidate place concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.

(1) Do not use vibrators to transport concrete inside forms. Place vibrators to rapidly penetrate placed layer at least 6" into preceding layer. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix. Consolidate concrete during placing operations to that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

D. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed. Bring slab surface to correct level with straightedge and strikeoff.

E. Cold weather Placing: Protect concrete work from freezing or low temperatures, in compliance with ACI 306 and as herein specified.

(1) When air temperature has fallen to or is expected to fall below 40 degrees F, uniformly heat water and aggregates before mixing to obtain a concrete temperature of not less than 50 degrees F, and not more than 80 degrees F at point of placement.

(2) Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

(3) Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

F. Hot weather Placing: During hot weather, place concrete in compliance with ACI 305 and as herein specified.

(1) Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F. Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing.

(2) Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.

(3) Wet forms thoroughly before placing concrete during hot weather. Use water-reducing retarding admixtures (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

17. FINISH OF FORMED SURFACES:

A. Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.

B. Smooth Form Finish: For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smooth.

C. Smooth Rubbed Finish: Provide smooth rubbed finish to scheduled concrete surfaces, which have received smooth form finish treatment, not later than one day after form removal.

(1) Moisten concrete surfaces and rub with caraborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.

D. Related Unformed Surfaces: At tops of walls, horizontal offset surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless noted otherwise.

18. FINISH OF MONOLITHIC SLABS:

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile and other bonded applied cementitious finish flooring material, and as otherwise indicated.

(1) After placing slabs, plane surface to a tolerance not exceeding 1/4" in 2' when tested with a 2' straightedge. Slope surfaces uniformly to drains where required. After leveling, roughen surface befor final set, with stiff brushes, brooms or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces ro receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.

(1) After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to a tolerance not exceeding 5/16" in 10' when tested with a 10' straight edge. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish: Apply trowel finish to monolithic slab surfces to be exposed to view, and slab surfaces to be covered with resilient flooring, paint or other thinfilm finish coating system.

(1) After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 3/16" in 10' when tested with a 10' straightedge. Grind smooth surface defects which would telegraph through applied floor covering system.

D. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete slabs, steps and ramps, and as indicated.

(1) Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route.

19. CONCRETE CURING AND PROTECTION:

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Curing Unformed Surfaces: Cure unformed flat surfaces by application of the specified curing compound or moisture-cover curing.

C. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

(1) Start curing as soon as free water has disappeared from concrete surface after placing and finishing. Continue curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

D. Curing Methods: Perform curing of concrete by moist curing, by moisture retaining cover curing, by membrane curing and by combinations thereof, as herein specified.

(1) Provide moist curing by the following methods:

(a) Keep concrete surface continuously wet by covering with water.

(b) Continuous water-fog spray.

(c) Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

(2) Provide moisture-cover curing as follows:

(a) Cover concrete surfces with moisture-retaining cover from curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproofing tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

(b) Provide curing compound to slabs as follows. Aply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

(c) Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, waterproofing, dampproofing, membrane roofing, painting, and other coatings for finish materials, unless otherwise acceptable to Architect. Use moisture-cover curing for these surfaces.

20. MISCELLANEOUS CONCRETE ITEMS:

A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

D. Non-Shrink Grout: All column base plates and equipment bases shall be grouted with the specified non-shrink grout.

21. CONCRETE SURFACE REPAIRS:

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect.

(1) Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete

surface. Thoroughly clean, dampen with water and brush-coat the area to be patched with the specified bonding compound. Place patching mortar after bonding compound has dried.

(2) Correct High Areas in unformed surfaces such as slabe by grinding, after concrete has cured at least 14 days.

(3) Correct Low Areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.

B. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and exposing reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete, apply bonding compound and allow bonding compound to dry. Mix patching concrete of same materials to provide ocncrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.

C. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loost particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

D. Use epoxy-based adhesive and/or mortar for structural repairs, where directed by Architect.

22. QUALITY CONTROL TESTING DURING CONSTRUCTION:

A. General: Testing agencies shall meet the requirements of "Standard Recommended Practice for Inspection and Testing Agencies for Contrect, Steel, and Bituminous Materials as Used in Construction", ASTM E329.

B. Materials and operations shall be tested and inspected as work progresses. Failure to detect defective work shall not prevent rejection when defect is discovered, nor shall it obligate the Owner for final acceptance.

C. The following Testing Services shall be performed by the designated agency and shall be paid by the Contractor:

(1) Sampling Fresh Concrete: ASTM C172, except modified for slump to comply with ASTM C94.

(2) Slump: ASTM C143 with one test for each concrete load at point of discharge, and one test for each set of compressive strength test specimens.

(3) Air Content: ASTM C173, volumetric method for lightweight concrete, ASTM C231 pressure method for normal weight concrete with one test for each set of compressive strength test specimens.

(4) Concrete Temperatures: Test hourly when air temperature is 40 degrees F and below, and when 80 degrees F and above, and each time a set of compression test specimens are made.

(5) Compressive Stength Tests: ASTM C39 with one set for each 50 cu. yds. or fraction thereof, of each concrete class placed in any one day or for each 5,000 sq. ft. of surface area placed; one field cured and one laboratory cured specimen tested at 7 days, one field cured and one laboratory cured specimen tested at 28 days, and one laboratory cured specimen retained in reserve for later testing if required.

(a) When total quantity of a given class of concrete is less than 50 cu. yds., strength test may be waived by Architect if, in his judgment, adequate evidence of satisfactory strength is provided.

D. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive test results equal or exceed specified compressive strength, and no individual strength test falls below specified compressive strength by mor than 500 psi.

(1) When strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

E. To facilitate testing and inspection, Contractor shall:

(1) Furnish labor to assist testing agency in obtaining and handling samples at the jobsite.

(2) Advise testing agency in advance of operations to allow for the assignment of testing personnel.

(3) Provide and maintain, for the use of the testing agency, adequate facilities for proper curing of concrete test specimens on the project site in accordance with ASTM C31.

F. Test Results: Results will be reported in writing to Architect, Structural Engineer, and Contractor on same day that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials. Furnish compressive breaking strength and type of break for both 7-day tests and 28-day tests.

G. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strength and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed. Contractor shall paly for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

21. CLEANING:

A. Precautions shall be taken against the staining from flooding or dripping of brick, concrete or other in-place work. All forms and masonry bulkheads shall be tightly closed against leakage before any concrete is placed.

B. Wherever overflows or drippings fall upon work same shall be removed immediately and thoroughly washed off with a stiff brush and drenching of clear water.

SECTION 05520 - MISCELLANEOUS METALS

1. SCOPE:

A. This Section includes all labor, materials, equipment and related items necessary to complete the installation of all new miscellaneous metal items as shown on the drawilngs and specified herein.

2. QUALITY ASSURANCE:

A. Qualifications of Manufacturer: Use products in the work of this Section produced by manufacturers regularly engaged in manufacturer of similar items with a 5 year successful fistory acceptable to the Architect.

3. SUBMITTALS:

A. Shop drawings shall comply with Section 01300.

B. Manufacturers Data: Submit manufacturers printed specifications and literature showing the construction of the specific miscellaneous metal fabrications used on this project.

4. MATERIALS:

A. Steel: All miscellaneous steel sections shall be standard, cold-rolled sections conforming the ASTM A36 or ASTM A7. Fabricated items requiring welding shall in cases be made from ASTM A36 steel.

5. DELIVERY AND STORAGE:

A. Deliver and store materials in dry, protected areas. Protect from rusting and other damage. Remove any damaged items from site and replace at no cost to the Owner.

6. FABRICATION:

A. General: Standard commercial products, conforming to requirements of Drawings and Specifications may be used, subject to approval of Architect. Bolt together with proper sized bolts, Nuts shall be drawn tight and end threads upset. Screws, bolts and washers shall be standard construction and provided as necessary for connections.

B. Anchors: Build anchors and other connecting members required to connect into concrete as work progresses to avoid unnecessary cutting and drilling in the field.

C. Execute all work using skilled workers only. Use only certified welders. Do only such work at the site as cannot reasonable bae performed in the shop. Make cuts, bends, punching and drilled accurate, neat and properly located. Brind and file smooth all parts exposed to view. Leave exposed surfaces free of all fabrication marks. Make members true to length to allow assembly with no fillers.

D. Welding; All welding shall be per AWS Specifications. Apply Galvaweld or equal to any surfaces welded after galvanizing.

E. Standards: Fabrication of all structural steel shapes shall conform to ASTM Standards.

F. Templates and Patterns: Furnish all necessary templates and patterns required by other trades. Supervise and be responsible for proper location and installation of built-in items. Deliver any items of this section required to be embedded in concrete, or built into partitions and other locations to respective Contractors. Provide holes and connections for work of other trades and make necessary connections.

G. Shop Assembly: When possible, fit and shop assemble, ready for erection with shop and field connections riveted, welded or attached with screws, countersunk and finished flush where exposed.

H. Galvanizing: Galvanize all ferrous metal exposed to exterior, unless otherwise noted. All units galvanized shall be fabricated into the largest practicable sections before galvanizing.

(1) Hot-dip galvanize any structural steel shapes, plates, bars and other minor assemblies per ASTM A-123.

(2) Any small structural steel, cast steel articles and hardware such as bolts, nuts and washers per ASTM A-153.

7. INSTALLATION OF MISCELLANEOUS METAL:

A. Install all items specified herein true, square, plumb and accurately fitted.

B. All bolted connections shall bae torgued per ASTM Standards.

8. SHOP PRIMING:

A. Shop coat any un-galvanized ferrous metal with primer.

B. Surface Preparation: After inspection and before shipping, clean steelwork to be painted. Remove loose rust, loose mill scale, and spatter, slag or flux deposits. Clean steel lin accordance with Steel Structures Painting Council (SSPC) as follows: SP-3 "Power Tool Cleaning".

C. Shop Priming: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide a uniform dry film thickness of not less than 2 mils. Use painting methods which result in full coverage of joints, corners, edges and exposed surfaces.

9. CLEAN UP:

A. On completion of work, remove all excess material, equipment, debris and cuttings from job site.

B. Leave all adjacent areas of work clean and free of damage from this work. Clean and remove any damage and restore surfaces to original.

SECTION 06100 - ROUGH CARPENTRY

1. SCOPE:

The Section includes the furnishing and installation of all rough carpentry, framing, blocking, etc. including all labor, material, equipment and related accessories necessary to complete the work of the rough carpentry as shown on the drawings and specified herein.

2. MEASUREMENTS:

A. Contractor shall verify all dimensions shown on drawings by taking field dimensions. Proper fit and attachment of all parts is required.

B. Before starting work, check all lines and levels indicated and such other work as has been completed.

C. Should there be any discrepancies, immediately report in writing to the Architect. In the event of failure to do so, the Contractor assumes full responsibility for correction of any errors.

3. COORDINATION:

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

4. DELIVERY AND STORAGE:

A. Deliver and store lumber on sills and cover for protection. Ensure ventilation and drainage, and protect against weather and damage.

B. Keep all materials clearly identified, with all grade marks legible. Keep all damaged material clearly identified and separted for replacement. Store so as to pevent inadvertant use. Protect all installed work and materials of all other trades.

5. GENERAL REQUIREMENTS:

A. All lumber used structurally shall be graded and marked with grade and trade mark of a lumber grading organization approved by Architect, except that a certification of grade from 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. Each piece of plywood used structurally shall carry the APA, American Plywood Association trade mark.

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

D. Reference Standards: Conform with all requirements of U.S. Department of Commerce, Products Standards, and the AWPA, American Wood Preservers Association Standards, as they apply.

6. CONNECTORS AND CONNECTIONS:

A. Nails: Bright common wire nails, galvanized for exterior use. Sub-drill where necessary to avoid splitting of wood.

B. Bolts: Drill bolt holes 1/32" larger than bolt diameter. Use square plate or malleable iron washer under heads/nuts where they bear against wood. Re-tighten bolts immediately prior to concealing with finish work. Re-tighten exposed bolts immediately prior to final inspection.

C. Lag Screws: Sub-drill, use square plate or malleable iron washers under lag screw heads when they bear on wood.

D. Wood Connectors/Clips: Joist hangers, truss hip/jack hangers, seismic anchors and other required hangers shall be as manufactured by Simpson Strong-Tie Connectors or equal. Contractor shall furnish literature to Architect for approval.

7. LUMBER SPECIES AND MATERIALS:

A. Framing Lumber: Douglas Fir, graded as per Standard Grading & Dressing Rules of Western Wood Products Association and grade markd as per American Lumber Standard PS-20. All framing lumber shall be stress-grade with all sides surfaced S4S. Sizes shown are nominal with actual sizes conforming to American Lumber Standard PS-20.

B. Lumber Grades: Lumber shall meet or exceed the following grades.

(1) Framing, Blocking, Joists and Plates: Construction grade (1200 f), #2KD.

(2) Exterior Plywood: US Product Standard PS-1, APA Grade C-D, plugged, sanded and with exterior glue. Thickness as shown on drawings.

(3) Interior Plywood: US Product Standard PS-1, APA Grade B-C, plugged, sanded and with interior glue. Thickness as shown on drawings.

8. WOOD PRESERVATIVE TREATMENT:

A. Location: All wood sill plates and ledgers in direct contact with concrete or masonry shall be pressure treated with pentachlorophenol in oil in accordance with Uniform Building Code Standard 25-12.

B. Treated Lumber: All lumber and timber designated treated on the drawings shall be pressure treated with waterbourne salts as called for above and shall conform to American Wood Preservatives Association Standard C-2 for above ground. Each piece of lumber or timber shall bear the quality mark **"LP-2"** as evidence of conformance to this specification.

9. INSTALLATION OF WOOD BLOCKING AND PLYWOOD:

A. Fastening: Install all wood blocking as detailed on drawings, except as noted herein.

(1) Wood blocking shall be securely attached to either masonry, concrete or wood with fasteners or anchors as called for on drawings, at a maximum spacing of 48" o.c. All wood blocking material wider than 6" shall have the anchor bolts/nails staggered.

(2) End Attachment: Spike/nail all wood blocking together where the ends meet.

B. Plywood Clips: Provide "H-Clips" at each sheet of plywood to separate and hold plywood level and apart. Provide a minimum of 4 clips (24" o.c.) along the long edge of the plywood sheet.

10. CLEAN UP:

A. Upon completion of the wood blocking as indicated on the drawings, remove all excess scrap, fasteners, equipment and tools from the area of work.

B. Ensure that all adjacent areas have not been damaged. If so, Contractor shall repair back to original state.

SECTION 06133 - POST AND FRAME WOOD BUILDING

1. SCOPE:

A. The work to be performed shall include all labor, materials equipment and transportation necessary for constructing the building shown on the drawings or as specified herein. This shall include all lumber, metals, carpeentry, trusses, as required to construct the building shell, unless specified otherwise.

B. Each Contractor shall be responsible for all materials, whether furnished by himself or a subcontractor, and storage of same.

C. Upon completion of work, the Contractor shall be responsible for removing all debris and unused material from the site.

2. BUILDING STORAGE:

A. The specifications herein shall be considered minimum standards to be met by each Contractor or Bidder.

B. The Drawings and Specifications furnished are to indicate the intent of the Architect as to the type of building construction desired; the dimensions on the floor plan and the building height dimension shown shall not be changed without approval by the Architect.

C. The types of building structure shall be as set forth in the following specifications. The Architect shall deem appropiate that all suppliers, Contractors having similiar buildings or materials shall be required to get prior approval from the Architect prior to bidding. Those Bidders conforming to these Specifications shall not be required to bet prior approval. In all cases of question as to the compatability or similiarity, the Architect shall have final authority.

3. TREATED TIMBER COLUMNS:

A. Laminated Wood Columns: The structural nail laminated timber shall be No. 1 or better Southern Yellow Pine, kiln dried to 19% moisture content. The area in contact with the ground shall be pressure treated with a wood preservative to a retention of .8 pounds per cubic foor and kiln dried after treating to 19% maximum moisture content. The wood preservative shall be Chromated Copper Arsenate Type III, Oxide type, or equal as listed in Federal Specification TT-W-571J. The preservative shall penetrate 100% of the sapwood. A letter of certification from the wood preserver shall be furnished which certifies the .8 pcf preservative retention for a 0 to .75" assay zone.

B. Solid Wood Columns: The structural treated posts shall be No. 2 or better Southern Yellow Pine, kiln dried to 19% moisture content, and shall be pressure treated to a retention of .5 pounds of pentachorophenol per cubic foot for all posts coming in contact with earth.

C. Column Equals: Either one of the above columns is acceptable and shall be used without reservation on this project.

D. Column Size: All columns shall be sized by manufacturer. They shall be sized by a structural engineer for the appropiate wind, snow and structural loads. The entire structural shell along with the trusses shall be stamped by a licensed, registered engineer in the State of Kentucky. The sizes of all columns shall be subject to approval by the Architect, if found to change the wall configurations. The Architect and Engineer shall work together in sizing the columns so as not to change the overall layout of the building walls, yet not compromising the structural integrity of the building.

4. **WOOD TRUSS DESIGN SPECIFICATIONS:**

A. All lumber used in the design of wood trusses must be kiln dried and graded in accordance with the current grading rules. Design stresses allowed are those listed in the current editions of respective lumber association's grading rules.

B. The design of wood members must be in accordance with the formulas published in the 1977 edition of the National Design Specification for Wood Construction.

C. Light metal toothed connector plates and joint design must conform to specifications as set out in the 1978 edition of TRUSS PLATE INSTITUTE'S Design Specification for Metal Plate Connected Wood Trusses TPI-78.

C. Truss members and joints must be designed in accordance with TPI-78. All turss designs must be accompanied by complete and accurate shop drawings, and the engineering analysis and design data containing the following information:

(1) Slope or depth, span and spacing of the trusses.
(2) Heel bearing width.
(3) Design total load of 40# psf and broken down as follows:
    (a) Top chord live load.
    (b) Top chord dead load.
    (c) Bottom chord live load.
    (d) Bottom chord dead load.
    (e) Concentrated loads and their points.
(4) Adjustment to lumber and plate design values for conditions of use.
(5) Engineering analysis showing the determination of both axial forces and bending moments for each member.
(6) Each reaction force.
(7) Plate type, thickness of gauge, size, basic plate design value, the dimensioned location of each plate and a design analysis of each joint showing that proper plates have been used.
(8) Lumber size, species and grade for each member.

5. **FRAMING LUMBER:**

A. Roof Purlins: Roof purlins shall be 2"x4" nominal dimensions, Douglas Fir #2 with extreme fiber in bending of 1,450 psi and a modulas of elasticity of 1,700,000. Moisture content shall be a maximum of 19%. Roof purlins shall be spaced upright on the trusses at 20" on center.

B. Truss Bracing: Continuous 2"x4" nominal dimension, shall be placed at the bottom chord of the truss as shown on the drawings and shop drawings. Lumber shall be standard grade or better.

C. Miscellaneous Lumber: All other lumber used as X-bracing, trim boards, blocking or bracing shall be standard grade or better. All lumber shall be free of warping, twisting or splitting.

6. **ROOFING PANELS:**

A. Roofing panels shall be coated, galvanized steel sheets, with a G90 zinc coating (ASTM A-525). Minimum thickness of the galvanized steel shall be .019". The topside of the panel shall have a baked plastisol (Plasticized PVC) topcoat over .2 mil of primer, for a total minimum coating thickness of 4 mils. The panel's bottom side shall have a two coat baked finish, with a total nomimal thickness of .5 mil.

B. All maunfacturers shall meet the above specifications for the roofing panels.

7. **WALL PANELS:**

A. Wall panels shall be coated, galvanized steel sheets, with a G90 zinc coating (ASTM A-525). Minimum thickness of the galvanized steel shall be .019". The topside of the panel shall have a baked fluoropolymer (Kynar 500) topcoat over .2 mil of primer, for a total nominal paint thickness of 1 mil. The panel's bottom side shall have a two coat baked finish, with a total nominal thickness of .5 mil.

B. All manufacturer shall meet the above specifications for the wall panels.

8. **TRIM:**

A. Trim for corners, gables, base and fascia shall be die-formed from the same quality material as roofing/wall panels.

9. **COLOR FOR ROOFING, WALL PANELS AND TRIM:**

A. All colors for roofing panels, wall panels and trim pieces shall be selected by Architect from standard color charts.

10. **ATTIC VENTILATION:**

A. The entire length of the ridge shall receive a commerical vent-a-ridge. A 4½" area shall be left between the two roof panels covered by the vent-a-ridge. Provide filler strip at the vent-a-ridge system the entire length of the ridge. The vent-a-ridge shall be equal to Morton T#139 with T#122 filler strip.

B. Provide for ventilation of the lower roof where it meets the vertical wall panels. Details and shop drawings shall be provided showing the proposed ventilation system to the Architect for approval.

11. **GUARANTEE:**

A. The Contractor shall supply a warranty to the Owner which shall provide that the Contractor will:

(1) Fifty (50) year Warranty: Building manufacturer will repair of replace preservative-treated columns or preservative-treated lumber, if the lumber fails due to decay or insect attack. Additionally, manufacturer shall repair of replace any roof or walls panels damaged by snow load.

(2) Twenty (20) year Warranty:

(a) Building manufacturer will repaint any roof or wall panels which the paint has separated from the panels due to checking or peeling.
(b) Building manufacturer will repaint panels on which under conditions of normal weathering chalking or color change has occurred in excess of the following numbers:

(1) Roof Panels (Plastisol): Chalking, ASTM D659, 8 and Color Change, ASTM D2244, 5.
(2) Wall Panels (Knyar 500): Chalking, ASTM D659, 4 and Color Change, ASTM D2244, 8.

(c) Building manufcturer will repaint any Kynar 500 painted wall panels or Plastisol painted roof panels on which due to polluntants in the atmosphere corrosion has occurred resultion in red rust.

(3) Five (5) year Warranty:

(a) Building manufacturer will repair any roof leaks due to defects in materials or workmanship.
(b) Building manufacturer will repair or replace the building framework, roof or wall panels if directly damaged by wind load.

(4) One (1) year Warranty: Building manufacturer will repair other building parts that prove to be defective due to materials or workmanship.

12. MANUFACTURERS REQUIREMENTS:

A. All pole building manufacturers must meet or exceed the enclosed specifications. These specificatons are written to reference a standard of quality, but it is expected that they be complyed with and not merely used to deviate from slightly, they must be met regardless.

SECTION 06200 - FINISH CARPENTRY

1. SCOPE:

A. This Section includes all labor, material, equipment and related items necessary to complete the installation of hollow metal doors and frames, finish hardware, chalk and tack boards, toilet accessories, lockers, telephone and electrical backboards as shown on the drawings and specified herein.

2. QUALITY ASSURANCE:

A. The Work included in this Section shall conform to locally accepted standards.

B. Qualifications of Installers: All work shall be performed by persons fully experienced in carpentry and all related installation procedures.

3. MATERIALS:

A. Electrical and Telephone Backboards: 3|4" thick exterior grade, Douglas Fir Veneer, Grade A|D.

4. EXECUTION:

A. Installation of Finish Carpentry:

(1) Conform to requirements indicated and to Industry accepted standards.

B. Installation of Hollow Metal Work:

(1) Conform installation work to submittals approved under Section 08111 and manufacturer's instructions.
(2) Install frames plumb, straight, in correct alignment, rigidly connected to walls and building structure.
(3) Erect in proper sequence with other trades to prevent delays and within the tolerances specified or shown in the approved submittals.

C. Installation of Finish Hardware:

(1) Install hardware suplied under Section 08710, excluding only hardware specified to be installed at the factory or under other sections.
(2) Drill pilot holes for screws, hammer driving of screws is not allowed.
(3) After installation and fitting, remove finish hardware items on surfaces to be painted, except prime coat items. Repack in original containers, and perform final installation, testing, and adjustment after finish painting is completed.
(4) Adjust hinges to swing smoothly but not loosely, without sticking or hingebound conditions.
(5) Adjust other hardware for correct operation.

D. Installation of Chalk and Tack Boards:

(1) Install per approved shop drawings. Heights shall be as shown on drawings, or as directed by Architect.

E. Installation of Wood Doors:

(1) Install in accordance with approved submittals.
(2) Fit doors to frames as required to maintain a 1|8" to 3|16" uniform gap between door and frame.

F. Installation of Specialties and Lockers:

(1) Install in accordance with approved submittals and contract drawings as detailed.

5. CLEAN UP:

A. At the completion of the finish carpentry clean all surfaces removing all glue, marks, scrapes, paint scratches, etc. and leave surface in acceptable conditions.

B. Remove all unused containers, materials and supplies, and leave area clean.

SECTION 06220 - PLASTIC LAMINATE MILLWORK

1. SCOPE:

A. This Section includes all labor, material, equipment and related items necessary to complete the installation of the plastic laminated millwork as shown on the drawings and specified herein.

2. QUALITY ASSURANCE:

A. Qualifications of Manufacturer: All materials, unless noted otherwise, shall be furnished by a manufacturer with not less than 5 years experience in manufacturing similar products.

B. Qualifications of Installed: All work shall be performed by a Contractor with a minimum of 5 years experience installing similar products.

3. GENERAL REQUIREMENTS:

A. Contractor has the option to furnish factory constructed plastic laminate casework as an equal for custom shop built plastic laminate millwork herein specified.

B. Single Source Responsibility: Provide casework with tops manufactured or furnished by same laminated plastic casework manufacturer for single responsibility.

C. Protection: Protect finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

4. SUBMITTALS:

A. Shop Drawings:

(1) Comply with Section 01300.
(2) Submit shop drawings for all casework showing plans, elevations, ends, cross-sections, service run spaces, location and type of service fixtures.
(3) Show details and location of anchorage and fitting to floors, walls, and base. Include layout of units with relation to surrounding walls, doors, window, and other building components.
(4) Coordinate shop drawings with other work involved.

B. Samples:

(1) Submit 6"x6" samples of specified finishes, including top material. Samples will be reviewed by Architect for color, texture, and pattern only. Compliance with other specified requirements is exclusive responsibility of Contractor.

(a) Submit one full-size sample of finished base cabinet unit complete with hardware, doors and drawers, without finish top.

(b) Submit one full-size sample of finished wall-mounted cabinet unit complete with hardward, doors, and adjustable shelves.
(c) Furnish both hinged and sliding door samples if in project.

5. MATERIALS:

A. Contractor shall furnish custom built plastic laminate millwork from one of the following list, or approved equal.

(1) Custom Shops: Providence Cabinet Shop, Clarksville, TN.
Reynolds & Doyle, Paducah, KY.
S & H Cabinets
Robbe Loth Casework Products

(2) Factory Built: LSI Corporation
Trimline, TMI
Stevens Cabinets, Inc.
Case Systems

B. Plastic Laminate Manufacturers: Furnish plastic laminate from one of the following list, or approved equal.

(1) Formica
(2) Nevamar
(3) Wilson Art

C. Exposed Materials: Shall be 45# density particle board laminated with thermofused melamine laminate, high pressure bonded under 320 psi and temperature of 300 degrees F. Surfacing shall perform as tested under standard of NEMA tests LQI-3.01 through LQI-3.10. Colors to be selected from manufacturer's standard colors.

D. Semi-Exposed Materials: Shall be light putty gray in color and must be laminated with same high pressure laminate as exposed surfaces and to the same standards.

E. Concealed Members:

(1) Solid Plywood Lumber: Any species, with no defects affecting strength or utility.
(2) Particle Board: ANSI A208.1, minimum 40 lbs./cu. ft. density, Grade 1-M-2 or better.
(3) Balanced Construction: Where laminated members are used, balanced construction shall be used. Laminate shall be on both sides of core material.

F. Hinges: European style, 35 mm mortise, self closing, 110 degree opening as manufactured by Grass, Blume or equal.

G. Pulls: European style wire pull, 3-1/2" centers.

H. Edge Banding: Vertical grade plastic laminate, heat fused to cabinet member.

I. Extension Drawer Slides: Steel slides with ball bearing nylon rollers, slides shall have a 100# load rating.

J. Drawer and Cupboard Locks: (If indicated on drawings) Cylinder type, 5-disc tumbler and dead bolt, with round cylinder only exposed.

K. Cabinet Base Molding: Extruded 4" vinyl base with color by Architect. Provide on all exposed sides and fronts of floor-mounted cabinets.

L. Adjustable Shelf Supports: BHMA B84072, wrought steel, mortised mounted.

M. Counter Tops: Construct counter tops by laminating plastic products over 3/4" plywood. Particle board is not permitted for counter top use. Plywood grade shall be B/D or better with exterior glue. All edges shall be square. Pre-moulded post formed tops are not permitted. All tops shall be back sealed.

N. Plastic Laminate: Provide plastic laminate sheet complying with NEWA LD-3. Use general purpose grade 0.050" thick for flat tops. Shop-bonded with fully waterproof bond glue to 3/4" thick sub-top hardwood faced plywood, medium density overlaid plywood, or phenolic resin bonded particle board, except particle board is not permitted for counter tops. Smooth sand surfaces to which plastic laminate is to be bonded. Apply standard phenolic backing sheet to back of panels. Build up exposed edges of tope to 1-1/2" thickness (or as shown on plans). Self-edge exposed edges of top, splash, and openings with same plastic laminate used for tops.

(1) Use "Solid Color" Laminate equal to Wilson Art "Solicor" at all counter tops.

O. Millwork General Requirements:

(1) Fabricate to dimensions, profiles and details as shown.
(2) Assemble units in the shop in as large components as practicable to minimize field jointing.
(3) Install hardware uniformly and precisely after final finishing is complete. Set hinges snug and flat in mortises unless otherwise indicated. Turn screws to flat seat. Adjust and align hardware so that moving parts operate freely and contact points meet accurately. Allow for final field adjustment after installation.

6. INSTALLATION OF MILLWORK:

A. Install plumb, level, true and straight with no distortions. Shim as required using concealed shims.

B. Where required, assemble units into one integral unit with joints flush, tight and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16".

C. Field Jointing: Where practicable, make in same manner as factory jointing using dowels, splines, adhesvies, and fasteners recommended by manufacturer. Locate field ljoints as shown on accepted shop drawings, factory prepared so there is no job site processing of top and edge surfaces.

D. Install in a precise manner in accordance with manufacturer's directions. Turn screws to a flat seat, do not drive. Adjust moving parts to operate freely without excessive bind.

E. After installation, carefully dress joints smooth, remove any surface scratches, clean and polish entire surface.

F. Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by supplier.

G. Repair or remove and replace defective work as directed upon completion of installation.

H. Provide the follwing accessories as required:

(1) Holes and cutouts as required for mechanical and electrical service fixtures. Provide rubber grommets at holes for wiring.
(2) Provide scribe mouldings for closures at junctions of top, curb and splash with walls as recommended by manufacturer for materials involved. Use chemical resistant, permanently elastic sealing compounds where required.

7. PROTECTION AND CLEAN UP:

A. Clean shop-finished surfaces, touch-up as required, and remove or refinish damaged or soiled areas, as accecptable to the Architect.

B. Remove all unused materials, tools, glues, equipment, etc. and leave area clean and acceptable to the Architect.

C. Protection: Advise contractor of procedures and precautions for protection of materials and installed casework from damage by work of other trades.

SECTION 07150 - DAMPPROOFING AND WATERPROOFING

1. SCOPE:

A. This Section includes all labor, material, equipment and related items necessary to complete the dampproofing of the exterior face of masonry cavity walls and under concrete slabs, etc. as shown on the drawings and specified herein.

2. SUBMITTALS:

A. Submit product data and installation instructions for each item specified in this section.

3. MATERIALS:

A. Underslab Vapor Barrier: Shall be 0.006 thick polyethylene visqueen plastic.

B. Masonry Dampproofing: Emulsified asphalt coating shall be Sonneborn "Hydrocide 600"; Karnak "Karnak 83 Fibrated Dampproofing"; Pacific Polymers "Elasto-Tex Wall Coating", or approved equal.

4. INSTALLATION OF DAMPPROOFING:

A. Underslab Vapor Barrier:

(1) Underslab vapor barrier shall be installed in accordance with manufacturer's instructions immediately prior to pouring concrete slab.

(2) Turn vapor barrier up at all masonry walls, both interior and exterior and secure expansion material over vapor barrier.

(3) Lap all seams 6" and seal overlaps with mastic as directed by manufacturer.

B. Masonry Dampproofing:

(1) Surface to receive emulsified asphalt coating shall be clean, smooth, and free of voids, cracks, or sharp projections.

(2) No dampproofing shall be applied during wet weather or when rain is forecast for the next 24 hours.

(3) All exposed surfaces shall be completely covered with 2 coats of emulsion applied by spray. Each coat shall be thoroughly and evenly applied so that all surfaces have a uniform black appearance. The second coat shall be applied at right angles to the first, and a full 24 hours shall elapse between coats. The finish application shall consist of not less than 2 gallons per 100 square feet of surface.

5. CLEAN UP:

A. Upon completion of the dampproofing, remove all empty product buckets, equipment and leave the area clean.

SECTION 07212 - RIGID INSULATION

1. SCOPE:

A. This Section includes all labor, material, equipment and related items necessary to complete the underslab rigid insulation as shown on the drawings and specified herein.

2. SUBMITTALS:

A. Shop Drawings: Shall comply with section 01300.

B. Product Data: Submit product data and installation instructions for each item specified in this section.

C. Samples: Submit 6"x6" samples of each product for review by Architect.

3. MATERIALS:

A. Underslab Rigid Insulation: Styrofoam square-edge, 2" thick with thermal resistand Aged R-value per inch @ 75 degree F mean temperature, per ASTM C518 of 5.0 per inch. Compressive strength per ASTM D1621 of 25 lbs/square inch.

4. INSTALLATION:

A. Underslab rigid insulation shall be installed continuous at all perimeter exterior walls to the depth as shown on the drawings, or a minimum of 24" below bottom of concrete floor slab.

5. CLEAN UP:

A. Upon completion of the underslab exterior wall insulation, remove all unused materials and cleanup area. Repair damage to any adjacent surfaces.

SECTION 07213 - BATT AND BLANKET INSULATION

1. SCOPE:

A. This Section includes all labor, material, equipment and related items necessary to complete the batt and blanket insulation as shown on the drawings and as specified herein.

2. SUBMITTALS:

A. Shop Drawings: Shall comply with Section 01300.

B. Product Data: Submit product data and installation instructions for each item specified and installed on this project.

C. Samples: Submit a sample of all insulation products used.

3. MATERIALS:

A. Covered Batt Insulation: Batt insulation which is covered by gypsum board or other approved materials shall conform to ASTM C665, Type II, Class C as manufactured by Owens Corning. Thickness and R-value shall be as noted on plans, but shall not have less than the following R-values: (Kraft-Faced)

(1) Ceiling: 12" thickness (R-38) cellulose insulation.
(2) Wall Construction: 3½" thickness (R-13) or 6¼" thickness (R-19).

B. Exposed Batt Insulation: Batt insulation which is exposed shall conform to ASTM C665, Type III, Class A, FPK-Faced as manufactured by Owens Corning. (Rated Foil-Faced)

4. INSTALLATION:

A. Install fiberglass blanket insulation in locations as shown on the drawings by loosely placing the insulation between framing members. Do not compress insulation, but make tight fitting joints.

B. Install with facing toward the interior of the building.

C. Staple edges of insulaiton out onto the framing members and not into the wall depth, thus providing a continuing barrier.

D. Where the covering for kraft-faced insulation stops, and insulation is continued exposed, use rated foil-faced insulation. All exposed insulation shall be rated foil-faced type.

5. CLEAN UP:

A. Upon completion of the insulation of the walls/ceilings, remove all unused materials and clean up area. Repair any damage to adjacent surfaces.

SECTION 07900 - JOINT SEALANTS

1. SCOPE:

A. This Section includes all labor, material, equipment and related items necessary to complete the installation of the joint sealants as shown on the drawings and specified herein.

2. QUALITY ASSURANCE:

A. Qualifications of Manufacturer: Use products in the work of this Section produced by manufacturers regularly engaged in manufacturing of these products or similiar products with a history of successful production acceptable to the Architect.

B. Qualifications of Installer: Use skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

3. SUBMITTALS:

A. Shop Drawings: Comply with provisions of Section 01300.

B. Manufacturers Data: Submit manufacturers printed specifications and literature showing the construction and composition of the specific sealant to be used on the project.

C. Color: Submit manufacturers standard color samples to the Architect including all standard colors available.

4. MATERIALS:

A. Joint Sealants: Joint sealant shall be a one-part, gun grade, urethane composition as manufactured by one of the following companies as listed below. Other manufacturers with products equal to the following properties listed below will be accepted.

Tensile Strength:	ASTM D412, 200 psi
Ultimate Elongation:	ASTM D412, 1000 percent
Hardness-Shore A:	Shore Durometer, 30-36
Low Temp Flexibility:	ASTM D746, -40 degrees F
Service Temp Range:	-40 degrees F to 180 degrees F

B. Manufacturers: Sonneborn Sonolastic NP-1; Schnee-Morehead #S-M 7100; or Protective Treatments #7130. Equal manufacturers per above.

C. Backer Rod: Equal to extruded closed-cell polyethylene foam as manufactured by Sonneborn Building Products.

D. Bond Breaker: Shall be polyethelene tape or aluminum foil strips.

E. Concrete Joint Sealer: Shall be equal to Sonolastic SL1, one-part self-leveling polyurethane as manufacturer by Sonneborn Building Products.

5. **PREPARATION OF JOINTS:**

A. Joint Preparation: Joint surfaces must be structurally sound, dry, clean, free of dirt, moisture, loose particles, oil, grease, tar, paint, wax, rust and other release agents.

B. Wet Conditions: Under no conditions shall sealant be installed in joints which are damp or wet.

C. Backer Rod: At all masonry control joints, install foam backer rod to maintain a suitable width/depth ratio as recommended by the manufacturer. Minimum joint width shall be 1/4" and minimum joint depth is 1/4".

D. Bond Breaker: Joints having a depth of 1/4"-3/8" shall have a bond breaker applied to the back of the joint. Joints deeper than 3/8" shall require a backer rod per item C.

6. **APPLICATION OF JOINT SEALANTS:**

A. Joint Preparation: Follow all conditions of the "Preparation of Joints".

B. Application: Shall be by cartridge gun or air-pressure equipment. All caulking and sealant installation must be performed when temperatures are above 40 degrees F in order to avoid moist joints.

C. Tooling: Joints must be tooled immediately to ensure maximum adhesion and a smooth concave joint appearance.

D. Joint Width/Depth Ratio: Shall be as obtained from the manufacturer, but in no case shall these guidelines be exceeded.

Joint Width, 1/4"-1/2" - Joint Depth, 1/4"
Joint Width, 1/2"-1" - Joint Depth, 1/4"-1/2"

E. Backing Material: Where the joint is not deep enough for a backer rod, apply a polyethylene strip of bond breaking material to the back edge of the joint.

F. Joint Curing Time: Curing time varies with temperature and humidity, but under normal conditions (75 degrees F and 50% relative humidity), the sealant will have a heavy skim overnight or within 24 hours. The sealant will be functional in 3 days with a full cure in about one week.

7. **CLEAN UP:**

A. Excess Material: Immediately after use and before the sealant has cured, clean up any overages with xylene. Any cured sealant can be removed by cutting with a sharp edged tool.

B. Remove all unused materials and tools from the project and leave all surfaces clean.

SECTION 08111 - STANDARD STEEL DOORS AND FRAMES

1. SCOPE:

A. This Section includes all labor, material, equipment and related items necessary to complete the installation of the steel doors and frames as shown on the drawings and specified herein.

2. QUALITY ASSURANCE:

A. Qualifications of Manufacturer: Use only products in the work of this Section produced by manufacturers regularly engaged in manufacturing of these products with a history of successful production acceptable to the Architect.

3. SUBMITTALS:

A. Shop drawings shall comply with Section 01300.

B. Manufacturers Data: Submit manufacturers printed specification and literature showing the construction and materials of the steel doors and frames used on this project.

4. GENERAL REQUIREMENTS:

A. Tolerances: Provide door and frame assemblies having a maximum gap of 1/8" gap between top and side edges of door face and frame after installation, and maximum of 1/4" clearance above the finished floor, except as otherwise required by floor finish material.

B. UL Laboratory Requirements: Provide labeled openings conforming to manufacturer's standard procedures filled with and approved by UL. Provide required UL labels on doors and frames as shown on drawings.

C. SDI Specifications: Provide doors and frames complying with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as specified herein.

D. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided finish items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.

E. Steel Door and Frame Storage: Store doors and frames at building site under cover. Place units on wood sills at least 4" high, or otherwise store on floors in a manner that will prevent rust and damage. Avoid use of non-vented plastic or canvas shelters which could create a humidity chamber. If cardboard wrapper on doors becomes wet, remove carton immediately. Provide 1/4" spaces between stacked doors to provide air circulation.

5. MATERIALS:

A. Manufacturers of Hollow Metal: Furnish hollow metal products as manufactured by one of the following manufacturers:

(1) Amweld Building Products
(2) Atlas Metal Products
(3) Americal Steel Products, Inc.
(4) CECO Corporation
(5) Curries Manufacturing, Inc.
(6) Fenestra
(7) Republic
(8) Steel Craft

B. Hot Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A569 and ASTM A568.

C. Cold Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A366 and ASTM A568.

D. Supports and Anchors: Fabricate of not less than 18 gage galvanized sheet steel.

E. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls, complying with ASTM A153, Class C or D as applicable.

G. Primer: Rust-inhibitive enamel or paint, either air drying or baking, suitable as a base for specified finish paints.

H. Borrowed Light Frames: Borrowed light frames be 16 gage for interior use and 14 gage for exterior use.

I. Interior Hollow Metal Doors:

(1) Flush panel, seamless type with minimum 16 gage steel 1-piece face panels, all parts welded and finished flush and smooth. Reinforce face panels with internal welded steel stiffeners, or bond to a plastic-treated honeycomb core or a foamed plastic core. Do not use foamed plastic in labeled doors.
(2) Fill hollow core doors with mineral wool or equivalent material to eliminate all metallic ring. Provide flush top edges for all exterior doors. Reinforce the top, bottom, and both edges according to manufacturer's standards. Finish both face panels and all edges smooth and free of seams and distortion.

J. Exterior Hollow Metal Doors:

(1) Per Interior Hollow Metal Doors with the following additions:

(a) Galvanizing: Provide galvanized doors at all exterior locations.
(b) Insulation: Provide polystyrene insulated core doors at all exterior locations, unless noted otherwise.

K. Hollow Metal Frames:

(1) Form stops integral with frames. Reinforce heads over 42" wide with a full length 12 gage channel. Provide steel plaster guards back of cutouts for hinges or mortised hardware for frames to be installed in concrete, masonry, or plaster. Fabricate frames of 14 gage or heavier gage steel where required by UL label requirements.

(a) Standard hollow metal frames to be 16 gage for interior use.
(b) Standard hollow metal frames to be 14 gage for exterior use.
(c) Fabricate all frames with welded mitered corners.
(d) Form exterior frames from hot-dip galvanized steel.
(e) Provide 3 silencer drills per jamb for all door frames, except those having weatherstripping.

(2) Frame Anchors: Manufacturer's standard "T" anchor, 3 per jamb minimum.

(3) Hardware Preparation: Prepare, reinforce, mortise, drill, and tap doors and frames according to templates supplied by hardware supplier, reinforcing as standard with door and frame manufacturer except minimum 10 gage steel behind butts and 12 gage steel for mortised or surface-applied hardware. Conform to ANSI A115 Series as applicable to the hardware in Section 08710 unless otherwise indicated.

L. Finishes: For hollow metal items not otherwise specified, clean metal surfaces and chemically treat for paint adhesion. Paint inaccessible surfaces befor assembling. Sand exposed surfaces of hollow metal and accessories and make smooth with mineral filler as required. Apply a baked-on coat of manufacturer's standard rust inhibitive primer, including all concealed surfaces of door drames and anchors. Provide galvanized anchors where installed in concrete or masonry.

6. EXECUTION:

A. All standard steel doors, frames and accessories shall be installed in accordance with the approved shop drawings.

B. Fire rated frames shall be installed in accordance with NFPA Standard #80.

C. Placement in Masonry Walls: Place steel frames as a sequence of the masonry work. Set frames at proper location in the wall, square, plumb and true temporarily brace and lay masonry to frames. Install anchors, minimum of 3 per jamb, as masonry work progresses. Grout all frames solid with mortar unless noted otherwise.

D. Door Installation: Fit hollow metal doors accurately in frames. Adjust as required to obatain equal space between frame and door edge. Touch up prime coat of paint as required.

E. Final Adjustment: Check and readjust finish hardware items, leaving steel doors and frames undamaged and in proper operating condition.

SECTION 08330 - OVERHEAD COILING DOORS

1. SCOPE:

A. This Section includes all labor, material, equipment asnd related items necessary to complete the installation of the overhead coiling door as shown on the drawings and specified herein.

2. SUBMITTALS:

A. Submit product data and installation instructions for each item specified in this section.

3. MATERIALS:

A. Manufacturer: Shall be equal to Cornell, Cookson, Overhead Door Company, coiling overhead coiling door.

(1) Face mounted, push up type with locking ability.
(2) Curtain shall be galvanized steel slats, hot-dipped, zinc coated.
(3) Brackets shall be not less than 1/4" steel plate.
(4) Guides shall be 3/16" thick with expansion slots for mounting.
(5) Hood shall be galvanized 24 gauge steel.

4. INSTALLATION:

A. Install door per manufacturers instructions.

B. General Contractor shall provide all necessary and required blocking for attachment and securing to structure.

C. Door shall be installed in a manner so as to maintain water-tightness and security.

5. CLEAN UP:

A. Upon completion of the installation, contractor shall remove all tools and materials used for installation.

SECTION 08710 - FINISHING HARDWARE

1. SCOPE:

A. This Section includes all labor, material, equipment and related items necessary to complete the installation of the finishing hardward as shown on the drawings and called out herein.

2. QUALITY ASSURANCE:

A. Qualifications of Manufacturer: Use products in the work of this Section produced by manufacturers regularly engaged in manufacturer of similar items with a history of successful production acceptable to the Architect.

B. Qualifications of Installers: Use skilled workmen who are throughly trained, and experienced in the necessary crafts and who are completely familiar with the specific requirements and methods needed for proper performance of the work of this Section.

3. SUBMITTALS:

A. Comply with provisions of Section 01300.

B. Manufacturers data: Shop drawings for each type of hardware showing components, arrangements, dimensions, finishes, knobs, keying and functions shall be submitted to the Architect for approval prior to manufacture.

C. Samples: Samples (if requested) of each type and finish of hardware shall be furnished for approval by Architect prior to fabrication.

D. Shop Drawings: Shall include catalog cuts on ALL individual hardware items, including miscellaneous hardware.

4. MATERIAL AND FINISHES:

A. Certifications: The locksets shall meet the following certifications:

(1) ANSI A156.13, Grade 1 Operation, Grade 3 Security.
(2) ANSI/ASTM F476-76, Grade 20.

B. Exposed Trim: Knobs shall be heavy duty wrought type. Escutcheons shall be forged brass, or cast bronze and stainless steel. Roses shall be 2-1/8" wrought. Deadbolts shall have a minimum 1" throw stainless steel bolt. Backset shall be 2-3/4".

C. Hardware Materials:

(1) Interior Hinges:	Plate steel
(2) Exterior Hinges:	Bronze
(3) Knobs:	.080" Heavy wrought steel
(4) Roses:	.070" Heavy wrought steel
(5) Push/Pulls:	Stainless steel
(6) Kickplates:	Stainless steel

(7)	Closers:	Iron cylinders
(8)	Thresholds:	Aluminum
(9)	Weatherstrips:	Aluminum
(10)	Exit Devices:	Stainless Steel

D. Finishes for Materials:

(1)	Knobs and Roses:	US26D
(2)	Push/Pulls:	US32D
(3)	Door Closers:	US26D
(4)	Kickplates:	US32D
(5)	Hinges:	US26D
(6)	Thesholds:	Anodized Aluminum
(7)	Exit Devices:	Stainless Steel

E. Keys and Keying: All locksets and cylinders shall be Grand Mastered Keyed into a new Grand Master Key System. Furnish three (3) change keys per lockset or cylinder. Provide six (6) master keys per group and three (3) grand master keys. Keys shall be properly taggaed and identified and delivered to the Architect or Owner (with transmittal), as directed.

(1) Construction Keys: Provide a construction master key for use during building construction and provide twelve (12) construction master keys, distributed by Contractor as deemed appropiate.

5. MANUFACTURER BRANDS:

A. The selections listed are intended to indicate the standard of quality and the type of hardware required. The catalog numbers listed in these specifications and hardware schedule are from the catalog of the first named manufacturer, with equivalent items of other named manufacturers being acceptable. NO SUBSTITUTIONS or equals will be permitted unless requested and approved by the Architect.

(1)	Butt Hinges:	Hager, Stanley or McKinney.
(2)	Lock and Latchsets:	Schlage, Corbin, Yale, Russwin, Sargent.
(3)	Overhead Closers:	LCN, Corbin, Yale, Sargent, Russwin.
(4)	Exit Devices:	Von Duprin (NO SUBSTITUTIONS)
(5)	Push and Pulls:	Hager, Trimco, Baldwin or Ives.
(6)	Stops and Misc:	Hager, Trimco, Baldwin or Ives.
(7)	Thresholds and Weatherstrip:	National Buard, Zero, Reese.

6. HARDWARE DESCRIPTIONS:

A. Butt Hinges: Furnish three (3) butt hinges for each door up to 90" high and not over 44" wide; four (4) for each door over 90" high and over 44" wide. For exterior doors furnish dull wrought bronze hinges, and interior hinges to be plate steel. Ball bearing (BB) hinges shall be as scheduled, but always on doors with closers. Furnish non-removable pins (NRP) on all exterior doors. Hinge size shall be $4\frac{1}{2}$"x$4\frac{1}{2}$" and shall be equal to Hager 1279, 1191, BB1279 or BB1191.

B. Locks and Latchsets: Cylindrical locks and latches shall be Heavy Duty type with levers and roses. All parts, such as spindles or any othser member that actuates retractors, shall be an integral part of factory assembly, not in the field. Latch bolt shall be sinter brass with nylon insert and

shall have a 3/4" throw. Deadbolts shall have a 1" throw. Knobs or levers, If wrought metal, shall have reinforcing wrought metal liner, .040" thick with an outer shell of .040" metal. Knobs, roses and levers shall be secured without screws. Locksets shall be equal to Schlage L Series.

C. Overhead Closers: Door closers shall have fully hydraulic, full rack and pinion action with high strength cast iron cylinder. Spring power of each closer shall be adjustable from size 2 to 6, with opening force to have a minimum setting of 8 pounds. Interior closers shall have a minimum setting of 5 pounds. Closers shall have separate adjustments for latch speec, general speed, back check and delayed action (if specified). Back check shall cushion opening swing in advance of 90 degrees for any standard mounting. All closers and accessories shall be non-handed and with a potential for application in all standard mountings. Closers shall be installed with shoe and parallel arm where possible. All closers shall have covers. Closers shall shall have cush-n-stop arm having a solid top in the closer with an optional hold-open. Closers shall be equal to LCN 4040.

D. Exit Devices: Exit devices shall either be rim or vertical rod devices, as indicated on hardware schedule. Single doors shall always be rim type with the vertical rod device being used if no removable mullion is shown. Exit devices shall have dogging capacity. Exit devices shall be 99 Series with (NO SUBSTITUTION).

7. HANDICAP AND LABELED DOOR REQUIRMENTS:

A. Finish hardware for all doors shall comply in all respects to the State and National Handicap Codes (ANSI). Hardware for doors to electrical rooms, janitors closets, mechanical rooms, etc. shall be equipped with tactile warnings as required. Doors equipped with door closers shall be installed to meet maximum opening force requirements. Threshold height and hardware mounting heights shall be as noted in the ANSI Code.

B. Finish hardware for all labeled fire doors must comply in all respects to the Nationsl Board of Fire Underwriters; requirements for hardware for the class of fire door called for on the drawings. All closers, closer arms and latching devices must bear visible evidence of U.L. approval. Hardware shall comply with the requirements of NFPA 80 and NFPA 101.

8. INSTALLATION:

A. Identification: Hardware items shall be individually packaged and shall be complete with necessary screws, key instructions and any required templates. Each individual container shall be marked with a corresponding item number from the Hardware Schedule to identify the contents and defining its location in the work.

B. Contractor shall receive, store and provide protection for finish hardware. Hardware damaged during the installation or during the construction prior to substantial completion and final acceptance by the owner, shall be replaced at the contractor's expense.

C. Door Closers: Door closers shall be installed to door with thru-bolts.

D. Install hardware in accurate conformity with manufacturer's templates, particularly with respect to measurement of door control devices from jambs.

E. Pull plates shall be thru-bolted with bolt heads concealed behind push plates.

E. Adjustment: Check locks and latches for correct hand and correct operation of specified lock functions. Adjust all spring-loaded devices for operation against wind conditions; friction from door coordinators, and the like; conformity with manufacturer's design intent.

SECTION 08800 - GLASS AND GLAZING

1. SCOPE:

A. This Section includes all labor, material, equipment and related items necessary to complete the installation of the glass and glazing as called for herein and on the drawings.

2. QUALITY ASSURANCE:

A. Qualificatoins of Manufacturer: Products in this work shall be produced by manufacturers regularly engaged in manufacturer of similar items with a history of successful production acceptable to the Architect.

B. Qualifications of Installer: Use skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the work.

C. Manuals: Comply with FMGA Glazing Manual and Sealant Manual.

3. SUBMITTALS:

A. Comply with provisions of Section 01340.

B. Submit manufacturers shop drawings and/or catalogue cuts of each type of glass/glazing furnished on this project to Architect for approval.

C. Submit samples of each type of glass/glazing to Architect for approval.

4. MATERIALS:

A. Specifications are based on PPG products. Equal products by others will be acceptable if determined by the Architect to conform with design requirements. Approved equal manufacturers are PPG Industries, AFG Industries, LOF Company and TGP Products.

B. Sizes and Tinting: Fabricate glass to thickness and size indicated with edge clearances and tolerances complying with recommendations of glass manufacturer. Tinting to be as scheduled or if not scheduled, required for all exterior glass and clear for interioir glass unless noted otherwise.

C. Glazing gaskets: Neoprene with type and profile as required to grip/hold the glass and seat in the frame.

D. Sealants and Caulking: Shall be as recommended by the glass manufacturer.

E. Glass Products: Comply with current industry standards.

(1) Fire Rated Glass: Shall be TGP Firelite Plus 5/16" laminated glazing standard grade with fire rating as shown on drawings.

(2) Standard Float Glass: 1/4" clear PPG solex (tempered where shown).

(3) Insulated Float Glass: 1" total thickness with 1/4" clear interior and 1/4"bronze tinted PPG solex. Spacer and sealing material shall be manufacturer's standard

(4) Tempered Glass: Furnish tempered where called for on drawings and as required by current building codes.

(5) Warranty Period: Glass, glazing and insulating seals shall come with a five (5) year warranty, and shall be replaced upon failure.

5. EXECUTION:

A. Comply with FGMA standards and instructions of manufacturer of glass, glazing sealants and gaskets, to achieve air-tight and water-tight performance.

B. Obtain field measurements for all openings.

C. Protect glass from edge damage during handling and installation. Inspect glass during installation and discard pieces with damage that would affect glass performance.

D. Install glazing units in full bed of polyurethane caulking or as recommended by the manufacturer.

E. Cleaning of Glass: Wash glass on both sides not more than 4 days prior to date scheduled for inspection. Use only products as approved by manufacturer.

SECTION 09250 - GYPSUM WALLBOARD

1. SCOPE:

A. This Section includes all labor, material, equipment and related items necessary to complete the installation of the gypsum wallboard and accessories as shown on the drawings and specified herein.

2. QUALITY ASSURANCE:

A. Qualifications of Manufacturer: Use products in the work of this Section produced by manufacturers regularly engaged in manufacturing of these products or similiar products with a history of successful production acceptable to the Architect.

B. Qualifications of Installer: Use skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

3. REFERENCED STANDARDS:

A. Comply with all applicable requirements of Gypsum Association, GA-216 "Recommended Specifications for the Application and Finishing of Gypsum Board", except where more strigent requirements are called for herein, in local codes, or by wallboard manufacturer.

B. Fire-Rated systems shall comply with the following standards.

(1) Underwriters Laboratories UL, "Fire Resistance Index".
(2) Gypsum Association GA, "Fire Resistance Design Manual".
(3) Drywall Industry Trust Fund "Portfolio of Textures".

4. SUBMITTALS:

A. Shop Drawings: Comply with provisions of Section 01300.

B. Manufacturers Data:

(1) Complete materials list of all items proposed to be furnished and installed under this Section.
(2) Manufacturers specifications and all other data required to demonstrate compliance with the specified stipulations.
(3) Manufacturers recommended installation procedures.

C. Samples: Submit 12"x12" finished sample of each finish or texture if required by the Architect. Other accessories shall be submitted if required.

5. ENVIRONMENTAL CONDITIONS:

A. Temperature: During cold weather in areas receiving wallboard installation, maintain temperature range between 55-70 degrees F for 24 hours before, during and after gypsum wallboard and joint treatment application.

B. Ventilation:

(1) Provide ventilation during and following adhesives and joint treatment applications.
(2) Use temporary air circulators in all areas lacking natural ventilation.
(3) Under slow drying conditions, allow additional drying time between coats of joint treatment.
(4) Protect installed materials from drafts during hot, dry weather.
(5) Protect adjacent surfaces against damage and stains from the materials.

6. PRODUCT HANDLING:

A. Delivery: Deliver materials to the project site with manufacturer's labels intact and legible. Handle materials with care to prevent damage. Deliver fire rated materials bearing testing agency label and required fire classification numbers.

B. Storage: Store materials inside undercover, stacked flat, off floor. Stack wallboard so that long lengths are not over short lengths. Store adhesives in dry areas and provide protection from freezing at all times.

C. Replacement: In the event of damage, immediately make all repairs and replace all necessary materials for approval by Architect and at no additional cost to the Owner.

D. Protection: Use all means necessary to protect materials of this Section before, during, and after installation and to protect installed work and materials of all other trades.

7. MATERIALS:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

(1) American Gypsum Company
(2) Flinkote Products, Genstar Building Materials Company
(3) Georgia-Pacific Company
(4) Gold Bond Building Products Div., National Gypsum Company
(5) United States Gypsum Company

B. Gypsum Wallboard: Comply with Federal Spec. SS-L-30C, Type III, Class 1, Style 3, tapered-edge and of Grade and Form as specified below. Supply wallboard in 48" widths and in lengths that result in a minimum of joints.

(1) Regular Gypsum Wallboard: ASTM C36-70, Grade R, Form A, 5/8" or 1/2" thick for single layer application.

(2) Fire-Retardant Gypsum Wallboard: Grade X, Form A, 5/8" thick for single layer application.

(3) Water Resistant Gypsum Wallboard: Grade R, Form A, 5/8" or 1/2" thick for single layer application. Use in wet areas such as toilets, kitchens, janitor's closets, etc.

C. Fasteners: Type S x 1-1/4" self-tapping screws for attachment to metal and Type S x 2" for attachment to wood.

D. Tape: ASTM C475-70, Type II, 2-1/16" perforated tape.

E. Joint Compound: ASTM C475, Type 1, ready mixed, all purpose joint compound.

F. Trim Accsssories: Provide manufacturers standard metal trim accessories, of beaded type with face flanges for concealment in joint compound except where semi-finishing or exposed type is indicated. Provide 7/8" corner bead, L-type edge trim beads, U-type of J-type trim beads, special L-kerf-type edge trim beads, and one piece control/expansion beads.

G. Standard Drywall Studs: 25 gauge galvanized steel drywall studs and stud tracks.

H. Drywall Furring Channels: 25 gauge galvanized steel.

I. Cold Formed Steel Studs and Tracks: 20 gauge galvanized steel studs. Provide one 20 gauge stud along each door jamb and across the door head for stiffening.

J. Access Doors: Larson's L-DWA, exruded aluminum frame, 14 gauge galvanized steel panel, concealed continuous hinge and flush mounted screwdriver operated cam latch. Equal manufacturers will be accepted.

K. Other Materials: Any and all other materials, not specifically described, but required for a complete and operable installation of the work of this Section, shall be new, first quality of their respective kinds, and subject to the approval of the Architect.

8. SURFACE CONDITIONS:

A. Inspection: Prior to installation of the work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence. Verify that gypsum drywall may be installed in strict accordance with all pertinent codes and regulations, the manufacturers recommendations as approved by the Architect, and the original design.

B. Discrepancies: Do not install gypsum drywall until all unsatisfactory conditions have been corrected.

9. GYPSUM WALLBOARD INSTALLATION:

A. General: Install the gypsum wallboard with the separate boards in moderate contact but not forced into place. At internal and external corners, conceal the cut edges of the board by the overlapping converd edges of the abutting boards. Stagger the boards so that corners of any four boards will not meet at a common point except in vertical corners.

B. Ceilings: Install the gypsum wallboard to ceilings with the long dimension of the wallboard at right angles to the supporting members, except that wallboard may be installed with the long dimension paralled to supporting members that are spaced 16" on center when attachment members are provided at end joints.

C. Walls: Install the gypsum wallboard to studs at right angles to the furring or framing members. Make end joints, where required, over furring or framing members.

D. Attachment: Drive the specified screws with clutch-controlled power screwdriver, spacing the screws 12" on center at ceilings and 16" on center at walls, except that where framing members are spaced 24" apart on walls, screw spacing shall be 12" on center.

E. Access Doors: After coordination with all items installed in ceiling or wall, install the specified access doors where required, anchoring firmly into position for long life under hard use and aligning properly to achieve an installation flush with the finished gypsum drywall surface.

F. Isolation: Isolate drywall work from abutting structural and masonry work. Provide edge trim and acoustical sealant as recommended by manufacturer.

G. Water-Resistant Board: Install water-resistant backing board where indicated, to receive ceramic tile and similar rigid applied finished at all toilet rooms and similar "wet" areas.

10. **JOINT INSTALLATION:**

A. General: Inspect all areas to be joint treated, ascertaining that the gypsum wallboard fits snugly against supporting framework.

B. In areas where joint treatment and compound finishing will be performed, maintain a temperature of not less than 55 degrees F for 24 hours prior to commencing treatment, for the entire period of treatment, and until joint and finishing compounds have dried.

C. Apply the joint treatment and finishing compound by machine or hand tool. Provide a minimum drying time of 24 hours between coats, with additional drying time in poorly ventilated areas.

D. Embedding Compound: Apply to gypsum wallboard joints and fastener head in a thin uniform layer. Spread the compound not less than 3" wide at joints, center the reinforcing tape in the joint, and embed the tape in the compound. Then spread a thin layer of compound over the tape. After this treatment has dried, apply a second coat of embedding compound to joints and fastener heads, spreading in a thin uniform coat to not less than 6" wide at joints, and feather edged. When thoroughly dry, sandpaper to eliminate ridges and high points.

E. Finishing Compound: After embedding compound is thoroughly dry and has been completely sanded, apply a coat of finishing compound to all joints and fastener heads. Feather the finishing compound to not less than 12" wide. When thoroughly dry, sandpaper to obtain uniformly smooth surfaces, taking all necessary care to not scuff the paper surface of the wallboard.

F. Install compound in 3 coats (plus prefill of cracks where recommended by manufacturer). Sand after last 2 coats.

G. Treat joints and fastener heads, cut edges and penetrations in water-resistant backing board to comply with water-resistant joind compound manufacturers direction.

H. Expansion Joints: Install expansion joints vertically above each side of door openings for walls longer than 20'-0". Provide additional expansion joints in walls and/or ceilings with dimensions greater than 30'-0", and as called for in the Gypsum Construction Handbook.

I. Joint Repair: Do not repair ridging until condition has been fully developed, approximately 6 months after installation or one heating season. Sand ridges to reinforcing tape without cutting through tape. Fill concave areas on both sides or ridge with topping compound. After fill is dry, blend in topping compound over repaired area.

11. CORNER INSTALLATION:

A. Internal Corners: Treat as specified for joints, except that the reinforcing tape shall be folded lengthwise through the middle and fitted neatly into the corner.

B. External Corners: Install a corner bead fitting neatly over the corner and secured with the same type fasteners used for applying the wallboard, spacing the fasteners 6" on center. After the cornerpiece has been secured into position, treat the corner with joint compound and reinforcing tape as specified for joints, feathering the joint compound out from 8"-10" on each side of the corner.

12. CLEAN UP:

A. Upon completion of drywall finishing and after final sanding, clean all surfaces and equipment of compound splatter and vacuum all sanding dust.