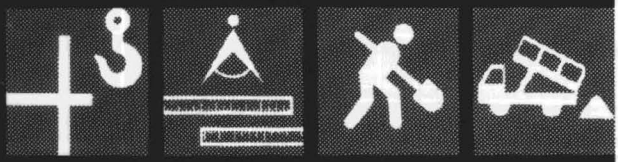
CEMP-CE Engineer Pamphlet 415-1-261 Volume 3	Department of the Army U.S. Army Corps of Engineers Washington, DC 20314-1000	EP 415-1-261 Volume 2 1 August 92
	Construction ARCHECTURAL AND STRUCTURAL FEATURES IN BUILDING CONSTRUCTION	
	Distribution Restriction Statement Approved for public release; distribution is unlimited.	

US Army Corps
of Engineers

EP 415-1-261
Volume 3
August 1992

Quality Assurance Representative's Guide



Architectural and Structural Features in Building Construction

DEPARMENT OF THE ARMY EP 415-1-261
U.S. ARMY CORPS OF ENGINEERS
CEMP-CE Washington, D.C. 20314

Pamphlet 1 August 1992
No. 415—1—261

Construction
QUALITY ASSURANCE REPRESENTATIVES GUIDE
FOREWORD

This guide is one of four volumes reprinted with revisions from guides first published in 1964. The reason for their existence and continuance is to provide construction personnel, those with either quality control or quality assurance responsibilities, a reliable checklist type reference for each phase of construction.

Quality Assurance (QA) Representatives will find the information fundamental and appropriate to their role of controlling and assuring quality in accordance with the plans and specifications. The guide will, therefore, become a valuable reference to supplement the project plans and specifications. The contents will also help refresh the nemory of experience, training, and good old common sense. The use of knowledge with appropriate responsibility and authority will result in decisions and decisive actions so necessary for successful quality assurance. The objective is to produce quality products for our customers throughout the world.

FOR THE COMMANDER:

MILTON HUNTER
Colonel, Corps of Engineers
Chief of Staff

This Volume 3 of EP 415-1-261 supersedes Volume 3, EP 415-1-261, 30 Dec 82

TABLE OF CONTENTS

CHAPTER NUMBER		PAGE
3A	CONCRETE FOR STRUCTURES	3A-l
3B	PRECAST CONCRETE AND CAST-IN PLACE ROOF SYSTEMS	3B-1
4	MASONRY	4-1
5A	STRUCTURAL STEEL	5A-1
5B	WELDING	5B-1
5C	STEEL ROOF DECKING	5C-1
6	CARPENTRY	6-1
7A	DAMPPROOFING AND WATERPROOFING	7A-1
7B	BUILDING INSULATION	7B-1
7C	CONFIGURED ROOFING AND SIDING	7C-l
7D	ROOFING AND INSULATION	70-1
7E	FLASHING AND SHEET METAL	7E-1
7F	CALMING AND SEALANTS	7F-1
8A	METAL DOORS AND FRAMES	8A-1
8B	WOOD DOORS	8B-1
8C	METAL AND WOOD WINDOWS	8C-1
8D	HARDWARE	8D-1
8E	GLAZING	8E-1
9A	METAL FRAMING AND FURRING, LATH AND PLASTER STUCCO	9A-1
9B	GYPSUM WALLBOARD (GWB)	9B-1
9C	TERRAZZO; CERAMIC AND QUARRY TILE	9C-1
9D	ACOUSTICAL TREATMENT	90-1
9E	WOOD FLOORING	9E-1

CHAPTER NUMBER		PAGE
9F	RESILIENT FLOORING	9F-1
9G	PAINTING	9G-1
9H	WALL COVERING	9H-1
10A	TOILET PARTITIONS AND ACCESSORIES	10A-1
10B	RAISED FLOOR SYSTEMS	10B-1
10C	WARDROBES	10C-1
12A	CABINETS AND CASEWORK	12A-1
12B	BLINDS, CURTAINS AND SHADES	12B-1

Chapters numbered in the guides contain the same subject information as the numbered divisions in the specifications for both military and civil works construction projects. They are identified by specific volume as follows:

Chapter Number	Volume 1	Subject
1		General Requirements
2		Sitework: earthwork, underground utilities, paving, plantings, and railroads
	Volume 2	Sitework (continued):
2		piles, levees, dams, relief wells, drilling, lock and dam gates, penstocks, revetments, dredging, jetty, break-water, and groin construction
	Volume 3	
3		Concrete
4		Masonry
5		Metals
6		Wood and Plastics
7		Thermal & Moisture
8		Doors & Windows
9		Finishes
10		Accessories & Raised Floors
12		Furnishing & Casework
	Volume 4	
13		Special Construction
14		Conveying systems
15		Mechanical
16		Electrical

CHAPTER 3A

CONCRETE FOR STRUCTURES

INDEX

Pars.	Title	Page
3A-01	GENERAL	3A-1
3A-02	RECORDS	3A-l
3A-03	MATERIALS	3A-l
	a. Sources	3A-1
	b. Storage and Handling	3A-2
	c. Forms	3A-2
	d. Miscellaneous Material	3A-3
3A-04	BATCHING AND MIXING	3A-4
	a. Equipment	3A-4
	b. Batching and Mixing Operations	3A-5
3A-05	PRE—PLACEMENT INSPECTION	3A-6
	a. Sample Concrete Panel	3A-6
	b. Footings and Foundations	3A-6
	c. Slabs on Grade	3A-6
	d. Forms	3A-7
	e. Joints	3A-8
	f. Reinforcement	3A-9
	g. Embedded Items	3A-9
	h. Miscellaneous Preparations	3A—10
3A-06	CONVEYING AND PLACING	3A-10
	a. Equipment	3A-10
	b. Operations	3A-11
3A-07	REMOVAL OF FORMS	3A-12
	a. Inspection Practice	3A-12
	b. Method of Removal	3A-12
3A-08	FINISHING	3A—12
	a. Formed Surfaces	3A—12
	b. Unformed Surfaces	3A-13
	c. Smooth Finish	3A-13
	d. Rubbed Finish	3A-14
	e. Monolithic Finish	3A-14
3A-09	CURING, PROTECTION AND FINISHING OF JOINTS	3A-14
	a. General	3A-14
	b. Curing	3A-15
	c. Finishing of Joints	3A-15
	d. Protection	3A-15

Para.	Title	Page
3A-10	LIGHTWEIGHT CONCRETES	3A-16
	a. General	3A-16
	b. Lightweight Structural	3A-16
	c. Lightweight Roof Fill	3A-16
	d. Lightweight Including Portland Cement	3A-17
	e. Lightweight Including Asphaltic	3A-17

CHAPTER 3A

CONCRETE FOR STRUCTURES

3A-01. GENERAL

a. This chapter covers commonly encountered concrete work other than concrete paving, which is covered in chapter 2D. Specialized procedures such as pumpcrete, pressure grouting, shotcrete, pre—placed aggregate concrete, etc. are not covered.

b. QA Representatives are cautioned that contract requirements for concrete for a given job are contained in the drawings and specifications prepared for that job. Also, that contract requirements may change from job to job. There are many differences between the requirements for concrete for Civil Works construction and concrete for military construction, and between the requirements for concrete for large jobs and concrete for small jobs. This guide information will assist QC/QA representatives in preparation for the work phase and in the inspection process together with the knowledgeable application of the specification requirements for the individual job.

3A-02. RECORDS

a. In general, the records to be kept will be prescribed by the District. Some modifications of the records—keeping system may be in order because of conditions distinctive to a given project, but no such modifications should be made without the full knowledge and approval of your supervisor.

b. Check with your supervisor and be sure that you know what records you will be required to keep and that you fully understand the preparation of the various forms involved.

c. Enter the required information accurately, completely and promptly in these records.

3A-03. MATERIALS

a. Sources

(1) At the Preparatory Phase Meeting, before starting concrete work, check:

(a) Has contractor given advance notice of source of materials?

(b) Have samples been furnished?

(c) Have mixes been established?

(d) Have tests been completed on air-entraining agent? On curing compound? Concrete placement conditions may be such as to require admixture other than air-entraining agent or calcium chloride. Has this admixture been tested and approved? Reduction of cement content for basic design nix is not permitted.

(e) Have shop drawings for steel reinforcement and embedded items been approved?

(f) Does the aggregate meet the contract requirements?

(g) Has cement been tested? (If required)

(2) Check as work proceeds. Are test reports, mill certificates and other certificates of compliance on hand for all materials being used?

(3) Is cement the type specified?

b. Storage and Handling

(1) Cement

(a) Is cement transported from the mill to the mixing plant in weathertight containers?

(b) If intermediate storage is involved, is cement adequately protected from exposure to moisture during intermediate storage and in loading and unloading operations?

(c) Is storage at mixing plant weathertight and properly ventilated?

(d) Is sufficient storage capacity available?

(e) Is oldest cement used first?

(f) Has over—age cement, if any, been tested?

(g) If concrete supplier has other customers, are adequate precautions taken to see that cement tested and approved for your job by the Bureau of Standards or the Waterways Experiment Station is not being used in concrete delivered to others? That untested cement is not being used in concrete delivered to your job?

(h) Have arrangements been made to secure all cement from one manufacturer?

(i) Is the cement being used in the same sequence as it is being delivered?

(2) Where Pozzolan is used, be sure bin dividers are leakproof to assure no contamination of cement, permit use of Pozzolan of only one type and from one source with approved design mix. Double wall dividers will provide a positive method of avoiding contamination. Do not permit use of Pozzolan that is contaminated or damaged.

c. Forms

(1) General

(a) Use specified wood or metal prefabricated or jobsite fabricated units.

(b) Check fit-up and bracing to prevent deflection from line and grade.

(c) Check if forms are readily removable, as required.

(2) For concealed surfaces the concrete forms must be tight and sound.

(3) For exposed surfaces the forms will be:

(a) Made of like—new plywood or equivalent material in 4 by 5 foot sections.

(b) Same for form lining. Linings shall have solid backing.

(c) Round column forms shall be prefabricated seamless type.

(d) Check form panel sizes when joints must be located for architectural alignment.

(4) Metal forms retained—in—place for slabs:

(a) Factory fabricated units are required.

(b) Check shop drawings information on deflection against specified maximum deflection.

(c) Are forms hot—dip galvanized?

(d) Are forms ventilated type as required for lightweight concrete?

(5) Pan-form units for slabs.

(a) Is type of material approved? Use either prefabricated steel, hardboard or fiber-glass of specified thickness.

(b) Check for damaged units which would effect finished appearance of exposed ceilings.

(6) Form ties

(a) Must be removable or snap-off metal tie.

(b) Check for device which will leave a conical hole 1-inch deep at least 3/8-inch but not more than 1-inch in diameter into the concrete from its surfaces.

(c) Snap tie break-back from concrete surface will be at least 1-inch when surface is exposed, painted or given other treatments.

(7) Chamfering

(a) Check for corner molding in the form at exposed corners.

(b) A chamfer strip must be used unless another shape is required.

d. Miscellaneous Material

(1) Have the necessary materials such as inserts, slots, clips, anchor bolts, etc. been approved and are they on the job site prior to starting the concrete placement?

(2) Has contractor received approval on materials he will use for capillary water barrier, vapor barrier, water proofing, reinforcing steel, expansion joint material, joint sealer, forming, curing, etc.?

(3) Stockpiles

(a) Are aggregate stockpile areas graded, drained and stabilized so that contamination will not occur?

(b) Are aggregate stockpiles separated so that intermixing does not occur? Are they built up to avoid segregation and contamination?

(c) Are aggregates conveyed from stockpiles to batching equipment by means which will avoid segregation and intermixing? Do not allow use of bulldozers or similar equipment.

(4) Water — Is the supply of water for mixing and curing protected against contamination?

(5) Admixtures

(a) Is air—entraining admixture protected against freezing during storage?

(b) Has over-age admixture, if any, been retested?

(c) Check accuracy of dispenser and correct dispersion of admixture.

3A-04. BATCHING AND MIXING

a. Equipment

(1) Are batch truck compartment free of leaks, with bulkheads high enough to prevent overflow?

(2) Do compartment gates and water valves close tightly?

(3) Are contractor-furnished test weights on hand?

(4) Check all scales and measuring devices.

(5) Are these checks repeated periodically, as frequently as necessary to insure that delivery of materials from the batching equipment is kept within the specified limits of accuracy?

(6) Are automatic cut-off devices adjusted so that accuracy of batching is kept within the specified limits?

(7) Check recording devices to see that the recorded weights are the same as the scale settings. (These should be checked at least daily--more frequent checking and adjustment may be necessary to keep this equipment recording accurately)

(8) Check batch sizes so that mixers will not be loaded beyond manufacturer*s rated capacity.

(9) Is plant equipped with all required interlocks, in operating condition?

(10) Is dispenser for air-entraining agent arranged so that the agent is batched with the water? (Specifications may provide that the admixture shall be batched with the sand only in the case where the water is batched on the trucks. When the water is batched at a central batching plant, batch the admixture with the water. The fact that truck mixers may be used to mix and transport the concrete will not relieve the contractor from the requirement for batching the admixture with the water.) If admixture other than air—entraining agent is approved, ensure that the admixture is introduced separately into a portion of the mixing water.

(11) Check multiple-batch trucks used for dry batching. Are compartments of ample size and are gates tight so that there is no overflow or leakage between compartments? (Check when truck body is raised to highest dumping position.)

(12) Is mixing drum watertight?

(13) Are mixing drum and discharge chute clean and free of hardened concrete?

(14) Check mixing blade wear.

(15) Do water valves operate easily and shut of f tight?

(16) Check revolution counter provided on each truck mixer.

(17) Ia mixer equipped with discharge lock, adjusted so that required mixing time elapses? (Note that specified mixing times are minimum, and that additional mixing may be required if necessary to produce complete, uniform mixing.)

(18) Check mixer drum rotation speed as designated by the manufacturer.

b. Batching and Mixing Operations

(1) Check mixing time.

(2) Continually check for assurance of complete control over batching and mixing. Check volumes of material used in mix, mixing time, and other controlling features.

(3) Check moisture content of aggregates frequently. Adjust batch weights in accordance with variation in moisture content.

(4) Check gradations of aggregates frequently.

(5) Check visually the freshly mixed concrete (constant observation is desirable if inspection personnel are available) to see that uniformity is maintained.

(a) Any marked change from normal consistency or appearance indicates something wrong with batching or the mixing, and the concrete should not be accepted for placement.

(b) Record rejected batches carefully, with reasons for rejection, and report promptly to your supervisor.

(6) Check slump and entrained air contents as often as necessary to provide record data prescribed by District or job policy, and oftener if necessary to confirm visual checks.

3A-05. PRE-PLACEMENT INSPECTION

Check all of the following prior to each placement——placing should not be permitted to start until all are satisfactory.

a. Sample Concrete Panel

(1) Approved panel will be representative of quality required, including:

(a) Formed surfaces and joints

(b) Type of form ties

(c) Patching, including color match

(d) Smooth finish or special treatment

(e) Structural joints and flashing treatment

(2) Erect with job mix design before structural formwork begins. Designate a protected location.

(3) Reject if unaccepted/approve in writing with minor correction noted, as applicable.

(4) Use in Preparatory and Initial Phase Meetings.

b. Footings and Foundations

(1) Have location, dimensions and grade been checked? Use grade stakes in unformed footings. Don*t forget to pull stakes out after screeding.

(2) Has fill and/or capillary water barrier been compacted to specified density? Fill is prohibited to remedy over—excavation; thicken the footing/foundation.

(3) Are foundation excavations free from frost, ice or mud; moist as required but free from standing or running water?

(4) Has waterproof paper or polyethylene covering been applied to dry or pervious soils?

(5) Have precautions been taken to keep soil from contaminating concrete placed in unformed footing trenches?

(6) Is the ambient temperature in the permissible range?

c. Slabs on Grade

(1) Check for a capillary water barrier.

(2) Runs for electric conduit and piping systems must be located below the slab.

(3) Mud slab may be required as a working surface.

(4) Is the vapor barrier membrane of specified thickness? Is it sealed with tape at laps and penetrations?

(5) Are control joints layed-out am required so the maximum area of placement is not exceeded?

(6) Are isolation joints provided at columns?

d. Forms

(1) Line and Grade

Start with the footings and check for conformance.

(2) Joints

Check the face of forms for tightness to prevent loss of grout.

(3) Re-Used Formwork

Check for patching or plugging of all holes. Finish on the concrete will be no better than the face of the forms against which the concrete is placed.

(4) Materials and Procedures

Check to make sure that the form materials proposed will produce the specified end product. Also make sure that forming method and procedures will take place.

(5) Stud Spacing

The spacing should be uniform and such that no discernible deflection of the sheathing will take place.

(6) Walers

(a) Is spacing of walers staggered so as not to occur all in the same panel?

(b) Are splices in walers staggered so as not to occur all in the same panel?

(c) Is a continuous plate provided across tops of form panels or is there a waler located close enough to maintain good alignment at top of form?

(7) Tie-Rods and Spaces

(a) Is spacing sufficient to support load and maintain alignment? Are installed ties the specified type that can be withdrawn or broken off to leave no metal closer than the specified minimum distance from the concrete surface?

(b) Remember to remove temporary spacers from inside of forms as concrete is placed. Tie wire retrievers may be necessary on spacers beyond reach.

(8) Braces

(a) Has sufficient number been provided to maintain vertical alignment?

(b) See that all braces are at an angle of 45 degrees or less (interior) with the horizontal at the base of the brace.

(c) If a series of braces originate from the same anchor point, are the braces tied together vertically half way between anchor form?

(9) Shores

Check that they are tied off in four directions at enough points to prevent bending or movement. After leveling the forms, have the shore wedges been nailed in position?

(10) Nailing

Check that enough nails have been used to hold each board or panel of the form of sheathing tight against studs or joists.

(11) Final checks

(a) Have forms been oiled, wetted or sealed as required? Check to see that surplus oil has been removed from forms and that there is no oil on steel reinforcement, contruction joints or other surfaces where bond is required. Are forms clean prior to placing concrete?

(b) Check forms for movement which may occur during placing operation. Have measuring devices or reference lines been set up?

(c) Are all required chamfer strips and grade strips accurately aligned and securely fastened and protected?

(d) Have necessary clean—outs been provided for in the bottom of the forms? Are forms clean of debris?

e. Joints

(1) Are all joints (expansion, contraction, construction) located as shown on contract drawings or as otherwise approved? The criteria governing the location of joints not shown on the contract drawings are beyond the scope of this guide. The specification limits the area for slabs on grade and the length for walls which can be placed continuously without joints. Check these limits against the placement plan.

(2) Have construction joints at fresh concrete been prepared as required? Check requirements for air—water cutting, wet sand—blasting, roughening, wetting, etc.

(3) The location of bulkheads for construction joints in structural members, much as columns, beams or slabs, should be checked with your supervisor.

(4) Have the insert type contraction joints bean coated with approved materials to break bond?

(5) Has preformed filler been installed and securely fastened in expansion joint locations?

(6) Are expansion joints free from irregularities or debris which would interfere with free movement?

(7) Check all joints which are intended to allow for expansion or contraction. No reinforcement or other fixed metal will be continuous through the joint.

(8) Are water—stops firmly secured in Correct location, undamaged and spliced properly?

(9) If contractor has the option of sawing contraction joints after the concrete has set, and intends to exercise this option, have positive arrangements been made to have the locations of the joints laid out accurately, and to have approved sawing equipment and qualified operating personnel available at the proper time?

(10) Have the horizontal construction joints at fresh concrete been cleaned and dampened just prior to next placement?

f. Reinforcement

(1) Is all reinforcement positioned in accordance with approved shop drawings? Check bar diameters, bar lengths, lengths of splices, bar-to-bar spacing and clearances. Face tie wire ends away from forms.

(2) Watch for specialty items such as wall intersection bars, and additional bars around corners and at openings.

(3) Has reinforcement been cleaned of all loose, flaky, rust and scale, dried concrete, oil, grease or other foreign material which would reduce or prevent bond?

(4) Is reinforcement tied and supported securely so that displacement will not occur during concrete placement?

(5) Are reinforcement spacers, ties, plastic covered chairs, and supports as specified or approved?

(6) Precast concrete supports with tie wires will be used against the ground. Check for the specified clearance.

(7) Dowels will be positioned before concrete placement and not “stuck in” or positioned after placement.

g. Embedded Items

(1) Unless otherwise provided or approved, embedded items are to be fixed firmly in correct location before the concrete is placed and are to be embedded by placing the concrete around them. “Boxing out” to permit subsequent “grouting in” of embedded items will not be permitted unless specifically called for by the drawings, specifications or special approval.

(2) In case of a conflict in locations of embedded items with steel reinforcement, the relocation of embedded items or cutting, bending, addition, displacement or ommission of steel reinforcement will only be permitted with the approval of your supervisor.

(3) Are all embedded items in place? Check mechanical and electrical drawings and approved shop drawings for mechanical and electrical equipment, for requirements for anchor slots end bolts, piping, sleeves, conduits, boxes, reglets, etc. which do not often appear on architectural and structural drawings.

(4) Are embedded items protected against damage during or subsequent to placement of concrete? Examples: Bolt threads and

machine or polished surface covered; light metal sleeves or boxes braced internally; open pipes or conduits capped or plugged.

(5) It is often helpful to use a checklist when checking for embedded items. A sleeve placement drawing is a good idea and many projects require its preparation to avoid errors.

h. Miscellaneous preparations

(1) Have satisfactory arrangements been made to get concrete into all parts of the placement without segregation, loss of ingredients, formation of air pockets or cold joints? Check for vertical drops in excess of permissible limit. Do not permit running" of concrete by means of the vibrator. Check for placement within the maximum time allowed after mixing. This time varies with ambient temperature.

(a) Is conveying equipment (i.e. crane, buggies, truck mixers, pumpcrete pipe, etc.) capable of reaching all parts of the placement?

(b) Are temporary form openings, tramies, chutes, conveyors or other special equipment provided as necessary and approved?

(c) Are "pockets" vented so that air will not be trapped?

(2) Are sufficient personnel available?

(3) Are all necessary tools on hand and in working conditions? Check especially: vibrators, including a standby vibrator and finishing tools.

(4) Have arrangements been made, and is all necessary equipment on hand and in working order to provide curing and protection including cold weather protection if needed?

(5) Are safe access and footing provided by means of ladders, platforms, walkways and stagings conforming to Safety and Health Requirements. EM 385-1-1?

(6) Review the testing plans to be made at the concrete plant and placement area during placement operation.

(7) The rate of placing the concrete will be directly dependent upon the adequacy of the preparations. If it is evident that the preparatory work will not insure placement of each batch of concrete within the specified time after mixing, and at such a rate as to prevent the formation of cold joints, the placement shall not be permitted to start.

(8) Has the contractor made arrangements to make cylinders or beams to test the strength of the concrete at least once a day, and have provisions been made to properly make, handle, and cure the specimens? Is equipment and manpower available for slump tests and air tests?

3A-06. CONVEYING AND PLACING

a. Equipment

(1) Is equipment clean and operable?

(2) Is pump and hose adequate and of required capacity and material?

(3) Are there the required screeds and strike-offs and is a 10-foot straight—edge available to check finish slab tolerances?

b. Operations

(1) Check requirements pertaining to placing fresh concrete on concrete which has set. It may be required that the old surface be covered by a layer of fresh mortar, or that the old surface receive a slush coat of neat cement grout followed by specified topping.

(2) Is the time between completion of mixing and placement in final position in the form within the time allowed by the specifications? Is the concrete temperature at placement within the specified limits?

(3) Check method of placement during handling of concrete to prevent segregation. Check height concrete is allowed to drop freely, and method used to guide concrete into place.

(4) Is concrete placed rapidly enough to avoid formation of cold joints?

(5) Chutes, except for truck—mixer equipment, are not permitted for use in conveying concrete.

(6) Are layers of concrete maintained approximately horizontal and not exceeding specified thickness?

(7) Are form ties and supports checked frequently and adjusted as necessary to prevent or correct movement of the form?

(8) Is rate of placement within safe limits, such that forms will not be over—stressed by too-rapid rise of fluid concrete?

(9) Is each layer of concrete vibrated until fully consolidated?

(a) Insert vibrators vertically, through the full depth of each layer, at uniformly spaced points so circles of visible influence of the vibrators overlap.

(b) Do not allow vibration to be overdone to the extent of promoting segregation, and remember that vibrators are not to be used to transport concrete in the forms.

(10) The use of form vibrators is prohibited by some specifications and permitted by others, subject to specific approval. Do not allow their use except as approved.

(11) Check use of hand compaction tools insofar as practicable to assist in obtaining smooth, dense surfaces. Use hand compaction or vibrating screeds to consolidate thin slabs. Unless high slump concrete is specifically designed and approved, such as for thin, reinforcement walls, all concrete must be consolidated by hand compaction tools or vibrator.

(12) Do not allow excessive working of the concrete surface in completing a lift. Allow only enough to completely embed the coarse aggregate.

(13) When pump delivery is used, concrete six must be designed accordingly.

3A-07. REMOVAL OF FORMS

a. Inspection Practice

(1) Is care being taken to assure that concrete is sufficiently hard and strong before removal of forms? Check specifications for minimum time and strength teat requirements.

(2) Check to see that forms used for curing are left in place until expiration of required curing period. Forms shall be maintained “snug” against concrete surfaces at all times while using as curing means.

(3) For best patching results, forms should be removed as soon as practical and patching should immediately be accomplished so that patches cure with parent concrete. Specifications usually limit the time for fin removal and patching to first 24 hours after form removal.

(4) Check to determine that form removal operation does not injure the concrete.

(5) Are you certain that all wood forms are being removed, especially in hidden places?

b. Method of Removal

(1) Is spelling of concrete being avoided during the form removal operation? Use methods which will avoid spelling, chipping and gouging.

(2) Form removal can be extremely hazardous. See that this operation is performed in a safe manner.

3A-08. FINISHING

a. Formed Surfaces

(1) Check the type of finish required.

(2) Has the contractor constructed and received approval of sample panels to show the surface finishes required? Note that the placing of concrete represented by each sample is not to proceed until sample panel has been approved.

(3) Repairing of defective areas and removal of fins, form marks and holes are required to be done immediately upon removal of forms.

(4) Check the cleaning of areas to be patched. Have honeycomb and rock pockets been cut back to solid material? Has loose material been removed?

(5) Check the requirements for the treatment of areas containing defective concrete.

(6) Check for complete curing of patched areas.

(7) Check surface for specified smoothness tolerances. Require rough areas and high spots to be ground smooth.

b. Unformed Surfaces

(1) Check the type of finish required.

(2) The working of the concrete surface should be the minimum that is necessary to produce mortar which is just sufficient for finishing.

(3) Insure that the screed runs are set to grade.

(4) Check to see that floating is started as soon as the screeded surface has stiffened sufficiently to permit floating without drawing excessive mortar to the surface. (There should be no free water on the surface at the start of floating. Dusting with cement or other material to dry the surface or to enrich the mortar will not be permitted.)

(5) Troweling, if required, should be done as soon as the floated surface has hardened sufficiently to prevent drawing more mortar to the surface, but while the surface is still workable.

(6) Check to see that marks left on the surface by edging tools are erased by floating, troweling or other means to produce a finish matching that of the adjacent surface.

(7) Insure that the screed run supports are removed to proper depth, if they are metal, and in their entirety, if wood is used.

(8) Make sure the screed run voids are filled with good concrete and compacted.

(9) Straight-edge the plastic concrete after filling screed runs, just prior to initial floating.

(10) Check the surface for required smoothness tolerance.

c. Smooth Finish for Formed Surfaces

(1) Check the contract specifications for areas requiring a smooth finish.

(2) Make certain that cement grouting operation is not delayed, thus allowing the grout to age with the concrete.

(3) Has the contractor planned his operations whereby he can completely finish areas to natural breaks in the finished surface each day?

(4) Has the proper mixture of cements (regular and white) been used in the grout mixture to blend with color of the finished surface?

(5) Is grout being applied so as to fill all pits, voids, and surface holes solidly?

(6) Is the excess grout being scraped off at the proper time with a trowel and is the flush surface then cleaned to remove any visible grout film?

(7) Is curing being planned so as not to allow grout to become dry during the setting period?

(8) Has any loose dry grout been left on the surface? All surface grout must be removed with the trowel edge in the scraping operation.

d. Rubbed Finish

(1) Check for exterior exposed-to—view areas requiring rubbed finish. This may be specified as an architectural finish.

(2) Rubbed finish is performed after the surface has received a smooth finish. Rubbed finish is rubbed with carborundum stones and water.

(3) Check to see that no mortar or grout is being used during rubbing, and that all grout which has worked loose during rubbing is removed.

(4) Check to see that the rubbing operation removes all form marks and similar blemishes.

e. Monolithic Finish for Unformed Surfaces

(1) The ordinary finish for floors and roof slabs is the monolithic finish.

(2) Make sure that all coarse aggregate has been forced away from the surface before screeding and straight—edging begins.

(3) The timeliness of the floating and of the troweling is important. Make sure the surface is floated as soon as it will bear the weight of a man without deep imprint, and that it is troweled as soon as the moisture which was worked up from the floating operation has disappeared. Do not allow the addition of water or of dry cement.

(4) Check to see that the surface is steel—troweled to a smooth, even impervious finish, free from trowel marks.

(5) Check the requirement for the number of steel-trowelings.

(6) The specifications may require a separate concrete wearing course such as for industrial use, with the rough slab terminated below finish grade. Check for the specification requirements for the wearing course design mix, placement and finishing.

(7) Do not permit use of trowels cleaned in form oil, silicone, or similar bond-breaking materials unless such materials have been removed from trowel.

(8) Trowel-in abrasive aggregate at required locations for the non-slip finish.

3A-09. CURING. PROTECTION. AND FINISHING OF JOINTS

a. General

(1) Check the details of permissible methods and the number of days required for curing. Curing is the treatment given the concrete to insure that adequate moisture is available for hydration of the cement, with consequent gain in the strength and durability of the concrete.

(2) Protection is the treatment given the concrete to insure that neither its appearance nor its strength is impaired by running water, premature or excessive loading, blows,freezing, excessive heat, excessive temperature differentials within the concrete, etc.

b. Curing

(1) Is the approved curing medium being properly applied immediately after placing and/or finishing?

(2) Prevent use of membrane compound on concrete that is to receive paint, tile, roofing, hardner, etc, unless the curing compound is approved for this use. (See specs)

(3) Where moist curing is being used, is it continuous-not intermittent?

(4) Are wood forms which are left in place kept wet for the duration of the curing period?

(5) When waterproof paper or other approved covering is used, are laps and edges sealed? Is paper in full contact with surfaces being cured?

(6) Check when curing compound is used for adequate mixing and uniform coverage.

(7) Is the sprayed membrane:

(a) Continuous for full coverage and without discontinuities which will permit loss of moisture?

(b) Reapplied if subjected to heavy rainfall within 3 hours after application, or when damaged by subsequent construction operations at any time during the curing period?

(c) Protected, to avoid damage from pedestrian and vehicular traffic or any other cause which would disrupt the continuity of the membrane?

(d) Do not allow surfaces to dry. If concrete is surface dry, require moistener with fine spray of water before spraying with membrane.

(a) Are joints to receive sealant plugged to prevent coating with membrane curing compound?

c. Finishing of Joints

(1) Observe joints for proper dimensions.

(2) Make sure that the joints are clean and dry prior to sealing.

(3) Inspect the sealing of the joints. See that the joint is completely filled with sealer to finish flush with the surface and that all unsightly applications are corrected.

d. Protection

(1) Are precautions taken to protect surfaces from rain,snow or flowing water until they have set sufficiently to resist damage?

(2) Determine requirements governing the time to remove forms and supports, and obtain instructions from your supervisor as to special conditions which may govern, such as strength of control specimens, special approval for earlier removal, or special requirements for deferring removal.

(3) Is adequate covering provided to protect concrete from damage by other construction activities? (Special attention must be given to corners, edges and projections which are not only especially susceptible to damage but are also most difficult to repair satisfactorily)

(4) Is loading controlled so that new concrete is not stressed beyond its strength? Examples: Backfilling against new walls; storage of materials on new floors.

(5) Check for coverings and heating equipment in cold weather as necessary to maintain temperatures. Temporary combustible coverings, including tarps, must be secured clear of heating equipment. Use of low density fibre board, insulation with combustible covers or vapor barriers must be prohibited. Heater fuel storage and arrangements for refueling should be carefully checked.

(6) Are min-max thermometers used to determine actual temperatures and to assure that temperatures for concrete protection are within required range?

(7) Check the removal of protection. Do not permit concrete to be subjected to sudden extreme change in temperature. A 25 degree F. differential in temperature between the concrete and the surrounding air is considered as the maximum.

3A-10. LIGHTWEIGHT CONCRETES

a. General

(1) Design mix required. Check aggregate manufacturers requirements in the approved submittal information.

(2) Check the special tests required for unit weights fresh and dry, for density control.

(3) Check for special mixing cycle and placing requirements.

b. Lightweight Structural

(1) Mostly the same procedures apply as for normal weight concrete.

(2) The aggregate manufacturer*s qualified representative may be required at the worksite to assist in adjusting procedures to obtain the specified product.

(3) Check for the required control tests.

c. Lightweight Roof Fill

(1) This is used only over structural concrete decks. Check Chapter 3B for lightweight cast-in-place roof deck systems.

(2) Check for light steel trowel finish and curing as for normal weight concrete.

d. Lightweight Insulating Portland Cement Fill

(1) Check for required thickness and density to produce specified thermal “U” value.

(2) Is edge vented at perimeter of slabs?

(3) Are ventilating expansion joints provided at specified intervals? At edges and junctions with vertical surfaces and penetrations?

(4) Check required curing; membrane curing compound is prohibited.

(5) Check air-dry density test specimens for loss of weight sufficient to begin roofing.

e. Lightweight Insulating Asphaltic Fill

(1) Workmen and supervisor trained and experienced in this material are required.

(2) Check the manufacturer*s written instructions and see that all procedures are complied with.

(3) Check for primed structural concrete deck and prime coat of asphalt at cold joints before continuing hot mix lay down.

(4) Check for “U” value density and required compaction to maintain that density. Make required density tests.

(5) check for required vented nailers.

CHAPTER 4

MASONRY

INDEX

Para.	Title	Page
4-01	GENERAL	4-1
4-02	SAMPLES	4-1
4-03	SAMPLE PANELS	4-1
4-04	TESTS	4-1
	a. Concrete Masonry Units	4-1
	b. Tests for Mortar	4-2
4-05	MATERIALS	4-2
	a. General	
	b. Anchors, ties and Joint Reinforcement	4-3
	c. Brick	4-3
	d. Portland Cement, Masonry Cement and Lime	4-4
	e. Concrete Brick, Split Block and Concrete Masonry Units	4-4
	f. Coping Tile	4-4
	g. Fireclay and Refractory Brick	4-4
	h. Flue Lining	4-5
	i. Insulation	4-5
	j. Mortar Materials	4-5
	k. Precast Concrete Trim	4-5
	1. Pre-faced Concrete Masonry Units	4-6
	m. Reinforcing Bars	4-6
	n. Stonework	4-6
	o. Structural Clay Facing Units	4-6
4-06	ERECTION	4-7
	a. Protection	4-7
	b. Erection Procedures	4-7
	c. Batching and Use of Mortar	4-10
	d. Brick	4-11
	e. Concrete Masonry Units	4-11
	f. Structural Clay Facing Units	4-12
	g. Cavity Wall Construction	4-13
	h. Composite Wall Construction	4-13
	i. Chimneys and Fireplaces	4-13
	j. Anchors, Ties and Joint Reinforcement	4-14
	k. Cleaning of Masonry	4-14
4-07	REINFORCED MASONRY	4-15

Para.	Title	Page
4-08	POINTING AND CLEANING	
	a. Pointing	4-16
	b. Cleaning	4-16

CHAPTER 4

MASONRY

4-01. GENERAL

This chapter covers brick, concrete masonry units, splitface block, tile, stone, and other masonry construction.

4—02. SAMPLES

Have samples of all materials and certificates of compliance been submitted?

a. Check progress schedule for dates materials are needed.

b. Is contractor submitting samples early enough to avoid delay in construction?

c. Are the reference specifications available to you?

4-03. SAMPLE PANELS

a. Have sample panels been erected?

b. Are they located so as to be close enough to structure to provide ready access for comparison purposes? Do not permit sample panels to be incorporated in the structure. Only approved materials will be used in sample panels.

c. Have precautions been taken to prevent damage to sample panels?

d. Masonry construction shall not begin until the sample panel for the work has been approved. It is a good idea to record this approval, making note of minor deficiencies and other comments for clear understanding. All embedded items, a control joint and other features will be included in the panel.

e. Check masonry against sample panel. The materials,workmanship and finished appearance must be the same.

f. Each sample panel will be cleaned to demonstrate effectiveness of the cleaning solution proposed for the work.

4-04. TESTS

The following listed tests will be required in most contracts; other tests may be specified in some contracts. (For all tests, the QA Rep*s responsibility is the same - to ascertain that the tests have been performed and that results are satisfactory before allowing the use or installation of materials.)

a. Concrete Masonry Units (CMU)

(1) Drying — Shrinkage Test

(a) Specifications limit shrinkage of units

(b) The design of control joint reinforcing was based on the specified limit of shrinkage.

(c) This test determines if the shrinkage of units to he used is within the specified limits.

(d) Test Results must he submitted for approval by specified time.

(2) Air — Dry Condition Test

(a) CMU passing this test have a proper moisture content and will not shrink excessively from loss of moisture to the air.

(b) The QA Rep will require that the specified number of representative samples are delivered to the laboratory from each lot. (One day*s delivery is considered a "lot" for average job.)

(c) Samples must be sealed in lab-furnished, air—tight containers if testing lab is not in the immediate vicinity of—the job site.

b. Tests for Mortar

(1) Contractor is required to have mortar proportions established and tested by an approved laboratory for each type mortar specified.

(2) A certified copy of the lab-established proportions and test results must he submitted for approval before masonry can be erected.

(3) Check for approved mix proportions and check batching accordingly. (For additional checklist on batching of mortar, see “Erection”.)

(4) No change in proportioning or source of materials will be allowed without additional tests and approval.

4-05. MATERIALS

a. General

(1) Do materials on site match the approved samples for:

(a) Color or range of colors?

(b) Texture?

(c) Grade? (SN grade brick always used below grade)

(d) See that steel door and window frames are on the site before masonry is erected, since they must be anchored in the masonry.

(2) Are sizes and defects within permissible tolerances?

(a) Obtain copies of referenced Federal, ASTM or other materials specification; tolerances are spelled out.

(b) Use these tolerances as basis for accepting or rejecting units.

(c) Typical defects to look for are: chips, cracks, checks, crazing, crawling, pop outs, and warped or misshapen units.

(3) Are storage facilities adequate?

(a) Are units stored off ground and completely covered?

(b) Are Coverings waterproof; such as tarps, polyethylene sheeting or other waterproof material?

(c) Are coverings secured in place? Are coverings being re—secured at end of each day and whenever rain or snow threatens?

b. Anchors. Ties and Joint Reinforcement

(1) Do materials on site match the approved samples?

(2) Is non-ferrous metal required or must the steel he galvanized?

(3) On wall and partition intersection ties, check both specifications and plans for specific details as to type, size, shape and material.

(4) Check for omission of anchorage, especially at doors, windows, and other wall openings.

(5) The bent ends of anchors must be set into masonry cells filled full with mortar.

(6) Cavity-wall Ties

(a) With hollow masonry in either wythe, i.e., in either or both the face and backup masonry, rectangular wire ties are required. (A wythe is defined as a vertical tier or layer of brickwork or masonry.)

(b) Is length such that end anchorage occurs in specified face-shell-mortar beds?

(c) Are ties crimped for moisture drip at center of cavity space (after insulation) so no moisture will pass?

(d) Is the 1/16 inch wire either zinc-coated or copperclad steel?

(7) Joint Reinforcement

(a) Is wire zinc coated and do the different coating weights comply with specifications?

(b) Are cross-wires spaced as specified for smooth and for deformed longitudinal wire?

(c) Is specified gauge wire being used?

(d) Is configuration acceptable with number of longitudinal wires, with box ties?

c. Brick

(1) Has certificate of compliance been received?

(2) Do color range and texture match approved samples?

(3) Have broken, cracked, chipped, warped, spalled, oversized and undersized units been rejected?

Obtain copy of ASTM C—26, C-216 or other referenced specification and base acceptance or rejection on tolerances contained therein. Is the efflorescence test required?

d. Portland Cement. Masonry Cement and Lime

(1) Check shipment containers to be sure materials received are as specified and tested.

(2) If containers are broken or damaged, reject cements or lime.

(3) Pay particular attention to sack or bag type containers for evidence of dampening, hardening or setting up cement or lime. Cement or lime that has become lumpy or semi hardened must he rejected.

(4) Any other evidence that material does not meet specifications is cause for investigation and possible rejection.

e. Concrete Brick, Split Block and Concrete Masonry Units (CMU)

(1) Have Certification of compliance or certified Laboratory Test Reports been received?

(2) Have units passed the required tests for drying shrinkage and Air Dry Condition? Air—Dry Condition tests are made on units selected from the worksite stockpile.

(3) Are all units to be used in any one structure of the same appearance (especially texture)? Have all units been cured by the same process?

(4) Have sizes of units been spot-checked? No overall dimension (width, height or length) shall differ more than the deviation allowed from the specified standard dimensions. (Standard dimensions of units are the manufacturers* designated dimensions.

(5) Do specifications state location where bullnose units are required? (Present guide specifications state locations.)

f. Coping Tile

(1) Do tiles overhang parapet on both sides to provide for drip?

(2) Are drip grooves provided?

(3) Are flashings installed, as detailed, under copings?

g. Fireclay and Refractory Brick

(1) Should be compact, of homogeneous structure free from checks, cracks, voids or soft centers.

(2) Do the units carry the required rating or is there a testing agency and statement of results of test required?

(3) The sizes and allowable tolerances for firebrick for these special brick shall be in accordance with applicable ASTM as follows:

(a) Dimension 4 inches and over shall not vary more than + 2% from that specified.

(b) Dimensions under 4 inches shall not vary more than 3% from that specified.

(c) The standard shown in the ASTM shall be for Low Duty Refractory Brick.

h. Flue Linings

(1) Is size of flue lining as specified or shown?

(2) Does thimble size match size of boiler breeching or smoke pipe?

(3) Is the hard-burned fire clay or shale free from blisters and warping?

i. Insulation

(1) Either loose—fill or board type insulation is specified; loose-fill in CMU cells or board inside the cavity.

(2) Loose-fill type must be treated for water repellency.

(3) Board type must be closed cell plastic treated for fire resistance.

(4) Limit board insulation installed to allow a 1-inch air space in cavity walls.

j. Mortar Materials

(1) Be certain that materials delivered to site are as specified, tested and approved. Check that only one brand of one type of cement and aggregate from only one source is used. Do not allow careless mixing procedures including variations in mortar proportions. Variation from above tend to produce variations in color of mortar when dry. These variations in color are more noticeable in glazed structural facing unit wainscots.

(2) Type N masonry will be used for all non-reinforced masonry unless otherwise specified. Pointing mortar has smaller size aggregate and a waterproofing additive. Check your specifications for usage.

k. Precast Concrete Trim

(1) Has certificate of compliance been received and does unit pass absorption test?

(2) Have sills been cast with washes and drip grooves?

(3) Are lintel units labeled to show top of each unit?

(4) Is there a joint in sill at every mullion?

(5) Inspect for crazing; pour water over precast trim; if present, crazing will be apparent. Evidence of excessive crazing is cause for rejection. Dusting, spalling and/or use of surface coatings is also cause for rejection.

(6) Have units weighing over 80 lbs. been provided with built—in loops of galvanized wire?

l. Pre—faced Concrete Masonry Units

(Usually a contractor*s option for glazed structural clay facing—tile—units for base.)

(1) Have certificates and all required current test results been furnished for units?

(2) Check units for bond between facing and concrete masonry units. Facing must turn over edges and ends for 3/8-inch in 1/18—inch thickness.

(3) Check unit for chips, cracks, crazes, blisters, crawling, holes and other imperfections detracting from appearance.

(4) Check dimension, tolerances and requirements.

m. Reinforcing Bars

(1) Are shape, spacing and size of bars as detailed?

(2) Are bars free from scaly rust, oil, grease and grout splashes?

(3) Are splices the same length as specified in “Concrete for Building Construction?”

n. Stonework

(1) Do specifications require shop drawings for stonework?

(2) If shop drawings are not required, it is particularly important that a sample panel be erected and approved by all concerned before starting stonework.

(3) Reject stone with stains, cracks, chips or seams.

(4) Check all work against shop drawings and/or sample panels.

(5) Check anchors, clamps and dowels for specified type of materials, size, shape spacing and proper installation.

o. Structural Clay Facing Units

(1) Are the units of the proper finish, texture and color range?

(2) Are bodies of units free from cracks or strength-impairing defects?

(3) Are finished faces covered with ceramic glaze of uniform quality, free from defects which would detract from appearance WHEN VIEWED FROM A DISTANCE OF FIVE (5) FEET?

(4) Obtain copy of ASTM C-126 or other referenced specification and base acceptance or rejection on tolerances contained therein.

(5) Have units been checked for non-staining properties?

4—06. ERECTION

a. Protection

(1) Is ambient (surrounding) temperature at or above the minimum temperature specified?

(a) For temperature below the minimum temperature specified, contractor shall submit for approval a written proposal of methods of protecting masonry against cold weather.

(b) Frozen materials shall not be installed or built upon.

(c) Work becoming frozen after installation shall be removed and replaced.

(d) Keep in mind that mortar must be kept continuously above freezing for at least 48 hours after units are laid, never less than 40 hours. A copy of the IMIAWC (International Masonry Industry All-Weather Council) publications on Cold Weather Masonry construction should be available.

(2) Waterproof covering are required for top of unfinished walls, including the cavity spaces. Water entry through the top of unfinished walls contribute to effloresence stain on the face of finish wall surfaces.

(a) Use waterproof building paper, canvas, polyethylene sheeting and similar materials; not loose planks.

(b) Tie or weight in place; not just draped.

(c) Are coverings provided at the end of each work day?

(d) Are coverings provided whenever inclement weather occurs?

(e) Protect tops of complete walls from entrance of water, frost and snow until roof is in place and tight.

(3) Backfill adjacent to masonry walls

(a) Is parging required and applied to exterior concrete masonry walls below grade for basement spaces at least 3 days before backfilling against it?

(b) Carry backfill up evenly in specified lift thickness on both sides of walls.

(c) For masonry walls in basements and crawl spaces, it is best to wait until floor slab or framing is in place before placing exterior backfill. Temporary bracing may be required.

b. Erection Procedures

(1) Check masonry dimensions against existing foundations and structural framing.

(a) The two must coincide.

(b) Bring any discrepancies to the attention of your supervisor immediately.

(c) Has tie—in to reinforced concrete structural frame been provided for?

(2) Check vertical coursing against dimensional wall heights. Would a minor change in joint width eliminate a fractional course?

(3) Check horizontal layout by either a dry—run or by tape.

(a) Is layout accurate to avoid fractional length units?

(b) Are openings located so units are of same length against both jambs? (Occasionally, openings can be slightly adjusted.)

(c) Check for conflicts between openings and partitions or equipment locations.

(d) Check that minor adjustments are made in width of head joints to keep bond plumb.

(4) Check control joints for type and location.

(a) When control joints in concrete masonry units, concrete brick and split—block are spaced more than 30 feet apart for exterior walls and more than 38 feet apart for interior walls, notify your supervisor. This is the maximum permitted with joint reinforcement in each masonry course.

(b) Control joints should be located at jambs of openings rather than a couple of feet away from opening.

(c) With control joint at jamb, is bond barrier provided under lintel bed joint? Is bond barrier made of 16—ounce sheet copper?

(d) Joint reinforcement does not pass through control joints.

(e) A good idea for control joint alignment is to carry a 3/8-inch wood strip at that head joint during erection.

(f) Check drawings for control joints that pass through bond beams. Usually every third control joint cuts the bond beam, the others are dummy joints.

(5) Is contractor erecting leads at corners and jambs?

(a) Is contractor using a story-pole to establish coursing in leads?

(b) Do not allow complete dependence on string lines between the leads. Use story pole to check coursing between the leads.

(c) Are masons using levels to check plumbness and face alignment?

(6) Is cutting of CMU and tile being done by power masonry saw? Are CMU being wet cut? If so, they must be surface dry when used in the wall.

(7) Are all joints in similar walls being finished with same size tools?

(8) Are masons waiting for initial set of mortar before tooling joints? (At the end of each work day, either the mason must stop laying masonry prior to quitting time to allow mortar to take initial set before tooling, or a mason must be kept on overtime to perform the tooling after the initial set has taken place.) A good rule to follow on the job is that mortar be "thumb-print" hard when tooling is done.

(9) If units are moved after mortar takes initial set, remove and replace them, using fresh mortar.

(10) Has excess mortar been removed from faces of units and joints before setting up?

(11) Are flashings installed in base courses, Under sills and copings and over lintels and bond beams? See sheet metal chapter for guidance on flashing.

(12) Is joint reinforcing called for? Continuously around building? Under sills? Over lintels?

(13) Are bond beams called for? At floor levels? Under sill? At or above lintel level? At top of wall? At intermediate locations?

(14) Does brick pattern call for header courses? Full or dummy?

(15) Cavity or composite construction may be laid up together so that the inner and outer wythes level off at all bed joints where ties or joint reinforcing occur.

(16) Are steel strap anchors installed across chase walls as stiffeners at wall mounted fixtures, two above and two below each fixture?

(17) Are Weep holes required wherever thru—wall flashing is used, such as at base of cavity walls, over lintels, over bond beams?

(18) Door and Window Frames

(a) Are the specified numbers of anchors provided for each jamb?

(b) Have hollow door frames been filled solid with mortar?

(c) Is hollow masonry at jambs filled with mortar for em-bedment of anchors?

(d) Check dimensions of approved sash and sills. Will they fit in the masonry opening?

(19) Embedded Items

(a) Check mechanical and electrical drawings for equipment, piping, wiring and conduit locations. Shop drawings with the location of sleeves is very useful.

(b) Sleeves and equipment will be built in as masonry is erected, not cut in afterwards.

(c) All cutting and fitting of masonry around equipment pipe lines, etc. shall be done by masons.

(d) Set flush type electric boxes so that bottom of boxes are at bed joints. This may mean a slight adjustment to given height for some boxes.

(20) Calked or Sealed Joints

(a) Are control joints being raked out uniformly and to the proper depth? Rake out 3/4-inch on exterior and 1/4 or 1/2-inch (square end CMU) on interior.

(b) Check requirements for brick expansion joints.

(c) Are wash—surface joints in precast sills being raked out?

(d) Is calking being accomplished around framed openings as required?

(e) Usually interior CMU control joints are raked out but not calked. Use No. 1 calking compound where required. Use No. 1 or No. 2 sealant on exterior.

(21) Toothing is allowed only with contracting officer approval.

(22) Incomplete walls, not capable of self-support, will be temporarily braced against wind pressure.

(23) Check masonry abutting steel and other rigid construction. provision for expansion and contraction must be detailed.

c. Batching and Use of Mortar

(1) Is mortar accurately proportioned?

(a) Check for use of approved laboratory established proportions. Type N mortar is usually required.

(b) Contractor must provide an accurate volume measuring device, such as a box of one cubic foot volume.

(c) Check proportioning at least once a week and whenever mortar tenders are changed.

(2) Mechanical mixers should be used on all but smallest jobs.

(3) Special mix and materials are required for pointing mortar and firebrick.

(4) Is mortar being used up within specified time limits?

(a) Time limit is 2 1/2 hours.

(b) Stiffened mortar can be retempered within that time limit but mortar beginning to set must be discarded.

d. Brick

(1) Has clay or shale brick been tested for rate of absorption?

(a) Test will be performed by approved laboratory.

(b) Brick will be wetted as indicated by test results.

(c) At time of laying, brick will be damp but with no visible water film on exterior surfaces.

(2) Is brick being shoved into place?

(a) Joints should be filled solidly when and as the brick is laid.

(b) Either the "end buttering" or "pick and dip" method is acceptable.

(c) Unfilled head joints is a repetitive deficiency and if not corrected results in leaky walls. "Slushing" to fill head joints, after brick is laid, is not acceptable.

(d) Check to assure that mortar bond is not broken between newly laid units and their mortar joints.

(3) Is space between brick facing and backup masonry, in solid walls, completely filled with mortar?

(4) Are structural header courses or metal ties installed between face and backup masonry?

(a) Are side joints filled with mortar for entire length of header brick?

(b) Are metal ties of specified material, shape, size and at proper spacing?

(5) Are all exposed joints of uniform width? A tolerance is given in the specifications?

e. Concrete Masonry Units (CMU)

(1) Are starting courses and other specified courses full-bedded in mortar under both face—shells and webs?

(2) Are all other courses, face—shell bedded only?

(3) Are all units laid up with a full head joint for face-shell thickness?

(4) Are units checked just prior to installation for chips, cracks, and defective units?

(5) Are joints of uniform width and finished appearance?

(6) Are all cuts being made by wet masonry saw?

(7) Are sizes of units such that difference between vertical faces does not exceed 1/8 inch? (This applies to exposed-to-view and painted masonry in habitable rooms and spaces.)

(8) Is felt paper provided on three sides of mortar key in control joints?

(9) Are the special control joint and metal—sash jamb CMU available in both full and half sizes?

(10) Are bond beams constructed entirely of special "U"-shaped bond beam block? If 10 inch concrete masonry walls are specified, check to see if 10 inch bond beam block is available in your area. If not, notify your supervisor.

(11) Is reinforcing continuous, including bent corner bars, for full length of bond beam?

(12) Is vertical cell reinforcing in place and the cells filled full with concrete?

(13) Are all lintels of depth specified and with minimum of 8-inch bearing? Bearing shall be greater for openings over 8 feet. See your details on the drawings.

(14) Are intersecting partition anchors being installed as exterior walls are erected?

(15) Are ties provided in masonry furring for securing facing units?

(16) Has interior face of exterior walls been dampproofed? Check prior to installing furring for plaster or gypsum board.

(17) Are cuts for electric boxes and panels and other built-in items being made by masonry saws and sized so plate or frame will completely cover them?

(18) Is there a specification that electrical conduit be concealed in 4-inch, exposed, block partitions?

(a) It is all but impossible to construct proper appearing masonry under these conditions.

(b) Bring immediately to the attention of your supervisor.

f. Structural Clay Facing Units

(1) Facing tile shall be layed with full bed and head joints.

(2) Layout will be planned to avoid using pieces shorter than 4-inches.

(3) Base units only may be 2-face; other courses two unit construction in walls with facing unit finish both sides.

(4) Glazed Tile Wainscots — Use the number of full courses that will come nearest to specified height. If more than 2″ below specified height, add another full course.

(5) Joints in glazed tile shall be not less then 3/16 inch nor more than 1/4 inch in width.

(6) Joints in showers and kitchens shall be raked back and filled with pointing mortar.

(7) Faces of tile will be cleaned with damp rag as work progresses.

g. Cavity Wall Construction

(1) Is cavity drainage provided by a step in the foundation wall so that exterior wythe is below finish floor elevations, a mortar wash fill at base of cavity with weep holes, or by means of flashing?

(2) Or are thru—Wall flashing and weep-holes provided at base of wall and also over lintels, bond and spandrel beams?

(a) Are Weep-holes at specified spacing?

(b) Are flashings continuous with water—tight joint?

(3) Are cavities being kept clean?

(a) Is wood strip set across ties to catch mortar droppings?

(b) Is excess mortar, squeezed out of joints, cut off flush on cavity faces?

(4) Are box type wire ties, minimum width 4 inches, being used? These ties may be an integral part of joint reinforcing wire, if required. If installed separately, do not place both in same bed joints.

(a) Is length of box ties proper to provide anchorage in face—shell mortar beds?

(b) Are box tie drips located within the air space of cavity?

(c) Is spacing of ties as specified?

(d) Have additional rows of ties been installed at jambs of openings, at either side of control joints, and at corners?

(a) Are solid masonry returns at jambs of opening detailed rather than extra ties?

h. Composite Wall Construction

(1) The collar joint between wythes shall be completely filled with mortar or grout.

(2) Is anchorage provided between wythes, either with ties or continuous type joint reinforcement?

i. Chimneys and Fireplaces

(1) Is flue—lining being carried up integral with masonry?

(2) Is space between masonry and flue lining filled solid with mortar? If there is more than one flue in the chimney, have masonry wythes (partitions) been installed between flues?

(3) Is thimble sized and located to meet approved smoke pipe?

(4) Is fireplace throat and smoke chamber free of obstructions?

(5) Are damper, lintel angle and ash cleanout installed?

(6) Are required number of metal ties installed for bonding face and fire brick?

j. Anchors, Ties and Joint Reinforcement

(1) Anchors and ties will be installed as the work progresses

(2) For the flexible ties between structural steel columns and masonry walls — Is clearance space also provided between column and masonry to allow for differential movement?

(3) Cells of CMU will be filled with mortar where anchors and ties occur.

(4) Is joint reinforcing installed with mortar above and below it?

(5) Are sections of joint reinforcing lapped the specified amount? Required lap is greater for smooth wire than for deformed wire.

(6) Check for the required use of preformed joint reinforcing around corners and at intersecting walls. The specified ties are required in addition to joint reinforcing when masonry bond is not provided.

k. Cleaning of Masonry

(1) A little care during the laying of masonry, including removing mortar droppings, careful tooling of joints and daily dry brushing, will keep the cleaning operations to a minimum.

(2) A cleaning solution is specified for brick, however, the selection of detergent shall be verified by checking the sample panel for discoloration or stain before proceeding. (Remember that the sample panel was cleaned after erection.)

(3) Make cleaning operation one of last phases of job. Do not start before mortar is thoroughly set and cured.

(4) Remove large particles of mortar with putty before washing.

(5) Stain or discoloration remaining on brick after cleaning shall be removed with a 6 percent solution of muriatic acid applied with stiff fiber brushes. When acid is used goggles, gloves and other personnel protective equipment must be provided and used. Scaffold and boatswain*s chair ropes must be carefully protected.

(a) Soak area to be cleaned with plenty of water before applying acid.

(b) The brickwork below the area being cleaned should be kept thoroughly soaked with water.

(c) Clean only 10 to 20 square feet at a time for each man.

(d) Scrub the brick, not the mortar joints.

(e) Wash the wall thoroughly with plenty of water immediately after scrubbing with acid.

(6) Concrete Masonry Units

(a) Remove excess mortar from joints and faces of units.

(b) Brush all dust and foreign matter from faces of walls.

(c) Never use the acid wash on concrete masonry.

(d) If tooling has not produced uniform joints, it may be necessary to rub them with carborundum stones.

(e) Re-point joints as necessary for watertightness and appearance.

(7) Glazed Structural Tile and Prefaced Masonry

(a) Masons should remove mortar smears from face of tile with clean damp rags, immediately after laying.

(b) Upon completion of walls, wash all surfaces of tile with soap powder and clean water, using stiff fiber brushes.

(c) Remove hard lumps of mortar with wooden paddles.

(d) Metal cleaning tools, metal brushes and acid solution should not be used.

(e) Re-point joints as necessary for watertightness and appearance.

4-07. REINFORCED MASONRY

a. Reinforced masonry construction uses different terms and methods not found in the material just presented. The QA/QO Reps must become well informed on this material before the Preparatory Phase Meeting.

b. Following are some of the common terms:

(1) Reinforced masonry uses embedded reinforcement, such that the materials act together in the wall to resist lateral forces.

(2) Reinforced composite masonry consists of solid facing units bonded to reinforced hollow masonry backing. The collar joint is filled with mortar or grout.

(3) Reinforced solid unit masonry also consists of two wythes separated by a collar joint. Both wythes are built of solid units and the collar joint is reinforced and filled with grout.

(4) High lift grouting is the method used to fill masonry with grout in lifts from 2 feet to 4 feet high. Masonry clean-outs are required for this method.

(5) Low lift grouting includes lifts up to 2 feet and does not require cleanouts.

(6) Vertical grout barriers are used to limit horizontal flow of grout to 25 feet for each high lift grout pour. Construct grout barriers with solid masonry units.

(7) Caging devices and centering clips are embedded in masonry to position vertical reinforcing either in collar joints or in the cells of hollow masonry.

(8) Grout holes are provided in overhead construction such as slabs and spandrel beams, aligned with reinforcing in masonry below. Grout holes must be at least 4 inch diameter or 3 by 4 inch in horizontal dimension.

c. Check for special tests and requirements for samples, certificates, certified test reports, shop drawings and for the installation of the special materials in the sample panel.

d. Check for the proper grout mix depending on usage.

e. A low alkali cement is usually used in reinforced masonry to reduce chances for efflorescense. Masonry cement usually is not permitted.

f. Watch for additional tolerances specified for masonry layup.

4-08. POINTING AND CLEANING

a. Pointing

Has the construction been checked for defects and have defects been repaired? Remember the pointing of joints requires re—tooling.

b. Cleaning

Has all masonry been carefully and thoroughly cleaned as required? Efflorescence shall be removed following the masonry manufacturer*s recommended methods.

CHAPTER 5A

STRUCTURAL STEEL

INDEX

Para.	Title	Page
5A-01	GENERAL	5A-l
5A-02	PREPARATORY INSPECTION	5A-l
5A-03	SHOP DRAWINGS	5A-l
5A-04	STEEL ON THE JOB SITE	5A-2
	a. Sizes and Shapes	5A-2
	b. Alignment and Damage	5A-2
	c. New Steel	5A-2
	d. Shop Connections	5A-2
	e. Shop Painting	5A-2
	f. Storage and Handling	5A-3
5A-05	CONTRACTORS EQUIPMENT	5A-3
5A-06	FOUNDATIONS ALIGNMENT	5A-3
5A-07	ANCHOR BOLTS	5A-3
5A-08	STEEL ERECTION	5A-4
	a. Base Plates	5A-4
	b. Alignment	5A-4
	c. Guys and Supports	5A-4
	d. Field Connections	5A-5
	e. Inserts and Attachments	5A-7
	f. Final Painting	5A-7
	g. Open Web Steel Joists	5A-7
5A-09	STEEL TANKS	5A-8

CHAPTER 5A

STRUCTURAL STEEL

5A-01. GENERAL

a. This chapter covers structural steel including steel for buildings, hangars, bridges, etc. Welding is covered only generally, since it is more thoroughly covered in the chapter entitled Welding. Structural steel lock and dam gate erection is not included in this chapter, but is covered in Chapters 22K & 22L. Make sure that you have in hand the following:

(1) American Institute of Steel Construction (AISC) Publications: Specification for the Design, Fabrication and Erection of Structural Steel for Buildings (Nov 1, 1978) with Commentary. Specification for Structural Joints Using ASTM A325 or A490 Bolts (Feb 4, 1976; Errata Jul 1, 1976)

5A-02. PREPARATORY INSPECTION

a. Receive and review shop drawings

b. Coordinate with other trades

c. Check mill test reports

d. Check welder certificates for appropriateness and expiration

e. Check to see if weld procedure is qualified or if using AWS pre-qualified welds

f. Check for high strength bolting requirements

(1) Type

(2) Size

(3) Bolt tightening methods.

g. Check painting requirements

h. Check for erection procedure and handling requirements.

5A-03. SHOP DRAWINGS

a. All critical connections are to be shown on the contract drawings and must be fabricated in accordance with the contract drawings. Connections not shown on contract drawings are to be detailed in accordance with AISC.

b. Approved shop drawings must be on hand prior to the start of steel erection.

c. particular attention should be given to requirements and arrangement of temporary bolting and bracing, guy lines and fastenings.

5A-04. STEEL ON THE JOB SITE

Upon arrival of the structural steel and prior to erection, the steel should be checked for the following items:

a. Sizes and Shapes

(1) Check every member against the shop drawings for correct size, shape, and weight.

(2) Check sizes and type of bolts, rivets, washers and welds as well as hole diameters.

(3) Watch for beams made up of welded plates being substituted for a rolled beam.

b. Alignment and Damage

(1) Members must be free of kinks, bends or other damage.

(2) Check the specifications for allowable tolerances.

(3) No straightening of bent or misaligned members should be allowed in the field except as approved by the Contracting Officer.

c. New Steel

(1) Check that the steel furnished is new.

(2) Look for such tell-tale evidence as old rivet and bolt holes which may have been filled with weld material, ground smooth, and painted over.

(3) Check that furnished steel is domestic and not of foreign manufacture.

d. Shop Fabrication

(1) Has the steel been inspected in the shop by a Government inspector or other authorized inspectors acting for the Government?

(a) If no shop inspection, then all shop connections must be inspected in the field with the same care required for field connections.

(b) Steel inspected in the shop should be examined upon arrival at the job site to determine if damage has been incurred during transportation or if errors and faulty workmanship may have gone undetected during shop inspection.

(2) Check if column ends, scheduled to be milled, have been milled. Check to determine whether cap and base plates on columns have been welded as required.

(3) Shop connections, are discussed in the Field Connection paragraph.

e. Shop Painting

(1) Inspect shop painting for holidays, abraded areas and loose mill scale or rust, making sure that all defects are satisfactorily corrected immediately.

(2) Check the specifications to determine if contact surfaces for joints to be connected with high tensile bolts are not to be painted. Contact surfaces for friction type connections must be free of paint. Check the AISC for treatment permitted.

(3) Normally paint will not be permitted on steel embedded in concrete and steel surfaces to be field welded or on which fire proofing is spray applied.

f. Storage and Handling

(1) Steel should be stored neatly off the traveled ways and not scattered all over the site.

(2) Require steel members to be blocked off the ground to avoid corrosion and to aid inspection. For prolonged storage,the steel should be properly protected against the elements.

(3) When unloading or during erection of long flexible steel members or trusses, require the contractor to use a double choker or double sling so as not to overstress the member by picking it up at only one point.

(4) Handling of steel should be such as to prevent distortion or damage during unloading and storage.

(5) Check for adequate connections in partly fabricated units. When not completely welded in the shop, the units should be bolted to prevent damage in shipment and handling.

5A-05. CONTRACTOR*S EQUIPMENT

a. Check cranes to insure that they have been inspected,tested and are of adequate capacity for the intended loads at the most critical position and boom radius required by the operation to be performed.

b. Check to insure that the cables are new or are in good condition, not frayed or worn, and that necessary safety stops are installed. The provisions for steel handling and erection as well as equipment inspection in the Safety and Health Requirements Manual should be carefully reviewed.

5A-06. FOUNDATIONS ALIGNMENT

a. Physical dimensions of foundations should be checked against the contract drawings.

b. Check footings for spacing, elevations and size.

5A- 07. ANCHOR BOLTS

a. Prior to the erection of structural steel, the anchor bolt settings should be checked for accuracy of layout.

b. Check to insure that sufficient length of bolt is protruding above the concrete to allow full engagement by the nut.

c. Chipping of concrete and bending of anchor bolts to fit bearing plates is not permitted.

5A-08. STEEL ERECTION

a. Base-plates

(1) See that temporary connections necessary to hold all steel in proper position are provided before permanent welds are accurately fitted, aligned, plumbed, and leveled.

(2) Check that top of concrete is clear of dirt or foreign material and laitance.

(3) Check that base plate is set at proper line and level or slope, as required for alignment of frame, and firmly anchored down over metal wedges, shims and/or setting nuts. The space between top of concrete and bottom of base plate should be a minimum of 1/24 base plate width.

(4) Shims should be steel plates of varying thicknesses and not nuts or odd pieces of metal.

(5) The frame must be plumbed and properly guyed before making final adjustments to setting. Setting shims and wedges should he snugly fitted so they cannot be easily dislodged.

(6) Check that the dry-pack bedding mortar between top of concrete and bottom of bearing-plate is properly rammed and completely placed.

(7) Check that provision is made for proper curing of exposed edge of mortar bedding.

(8) Shims and wedges should remain in place. Parts projecting beyond edge of bearing-plates should be cut off.

(9) Separate setting plates are not permitted.

b. Alignment

(1) Check that all steel members are accurately fitted, leveled, plumbed, and guyed and adequate temporary connections made before permanent riveted, welded, or bolted connections are completed.

(2) Do not permit rough handling of material, such as heavy pounding with sledges.

(3) Driftpins may be used only to bring together the several parts; they should not be used in such a manner as to distort or damage the metal.

(4) Do not permit the use of a gas-cutting torch for correcting fabrication errors on any major member in the structural framing. Its use will be permitted on minor members when the member is not under stress and then only with the approval of the Resident Engineer.

c. Guys and Supports

(1) Check guys and supports for size and condition, adequacy of anchorage and suitability of anchorage points.

(2) Guy-lines must be taut.

(3) Check that contact between guy—lines or braces and erection equipment is avoided.

(4) Procedures which might cause back-guys to break during plumbing—up or erection operations should not be permitted.

d. Field Connections

(1) Bolting, General

(a) Check type, length and size of bolt, size and type of washers, and size of hole.

(b) Check to assure all bolt heads and nuts are resting squarely against the metal, and that bolts have been drawn adequately tight.

(c) Check for the requirements for upset threads or lockwashers and for compliance with these requirements.

(d) Check for alignment of holes. Poor matching of holes should be cause for rejection of the members. Burning to correct misalignment should not be permitted.

(2) High-strength Bolted Connection

(a) The A325 high-strength bolt may be identified by three radial marks on the head and three long indented marks on the nut. The A490 bolt head is marked "A490" and the nut is marked either "2H" or "DH". The bolt is used with a washer on the side of the element that is turned, except for A325 bolts when turn-of—nut tightening method is used. The inspector should make sure that ordinary washers and nuts are not being used and he should have available AISC Pamphlet "Specification For Structural Joints Using ASTM A325 or A490 Bolts". Recommendations on inspection in the pamphlet should be followed.

(b) Some of the items to check in a high-tensile, bolted connection are as follows:

1. Unless noted otherwise in the specifications, contact surfaces of a high-tension - bolted connection should show only the normal tight mill scale and should be free of dirt, oil, loose scale, burrs, pits, and other defects that would prevent the solid seating of the parts.

2. Paint is permitted in bearing-type connections. Check the AISC. specification for surface treatments permitted in friction type connections. The drawings will usually define these connections.

3. The contractor should provide the means and should calibrate twice a day all wrenches to be used for calibrated wrench tightening method.

4. Check required bolt tension by use of a torque wrench furnished by the contractor. All high-strength bolts need not be checked. Normally 5 to 10 percent of the bolts should be checked. Since AISC specifies bolt tightening in terms of bolt tension, it is necessary that the torque wrench be calibrated using a device which will indicate actual bolt tension.

5. An acceptable and preferred method of torquing high strength bolt is the “turn of nut" method described in the AISC. pamphlet "Structural Joints using ASTM A325 or A490 Bolts”. Be familiar with this method.

6. The AISC specification permits the use of direct tension indicators (indicator washers) providing the correct indication of tension has been achieved. In other words, the tension required must be determined by testing with a torque wrench.

7. High strength bolts cannot be reused.

(3) Unfinished Bolted Connections

(a) Check to see if specifications require that bolts be dipped in red lead paint before installation.

(b) Check that the same number of threads are exposed in any one connection and that the correct length of bolt is used.

(c) Check for the contractors use of an approved welding procedure prior to the commencement of welding.

(4) Turned Bolts

Turned or rivet bolts in reamed holes have the same value as rivets. The same checks should be made for turned bolts as for other bolts.

(5) Ribbed Bolts

The ribbed bolt is the equivalent of a rivet and is used without a washer. The same checks should be made for ribbed bolts as for other bolts.

(6) Welded Connections

Some of the items to check in a welded connection areas follows:

(a) Check on the qualifications of the welders and for qualified procedures in accordance with Section 5 of the Structural Welding Code, AWS Dl.l.

(b) Check to see that all of the welds called for on the approved shop drawings have actually been made, and that they are accurately located and of the specified sizes. Check to see that shop non—destructive tests (Radiographing, Magnifluxing) required by the specifications have been performed and location for the tests are known.

(c) Check finished welds for size, length and standards of workmanship with respect to contour and appearance of the weld surface, surface defects, craters, undercutting, overlapping edges of welds, cracks, etc. Unacceptable welds should be removed, rewelded, and re-examined promptly.

(d) Weld location is important; placing weld in the wrong location may be just as serious as omitting the welds altogether.

(a) Over-welding either in size or length of welds is to be discouraged since such practices may introduce distortions.

(f) Surfaces to be welded should be free from loose scale,slag, rust, grease, paint, and any other foreign material,except that mill scale which withstands rigorous wire brushing may remain.

(g) Joint surfaces to be welded should be free from fins and tears.

(h) Field welding requires similar checks to shop welding and in addition, the inspector must be aware of minimum ambient temperature in weld vicinity of zero degrees F. (-\18\C) and of the preheat requirements.

e. Inserts and Attachments

(1) Structural steel should not be cut for passage of conduits, pipes, etc. unless shown on the approved shop drawings.

(2) The burning of holes for attachment of supports should not be permitted.

f. Final Painting

(1) prior to final painting, the steel should be cleaned of all foreign matter and the prime coat touched up, including rivets, bolts, areas welded, etc.

(2) Final coats of paint should be applied prior to surfaces being made inaccessible by masonry, roofing, etc.

(3) Remember that steel to be encased in concrete or on which fireproofing is spray applied is not to be painted unless otherwise specifically required.

g. Open Web Steel Joists

(1) Check to see if holes in bearing plate at one end have been slotted, where specified.

(2) As soon as joists are in place, all bridging should be completely installed and the joists permanently fastened into place before the application of any loads.

(3) Question conditions which provide excessive concentrated loads not so indicated on structural drawings, including loads not located at panel points. Your supervisor should investigate.

(4) The ends of all bridging lines terminating at walls or beams should be anchored thereto at plane of top and bottom chords as noted on the drawings or as specified.

(5) See that the principal tension members are the full length of joist without splicing or jointing.

(6) Check the anchorage of the joist to its supports.

(7) Do not allow the burning or enlargement of holes in the joist.

(8) Check to see that all rust, scale, weld flux, slag and spatter has been removed and joist is clean before it is painted. Check specifications to determine if steel joists over crawl spaces are to have asphalt paint.

5A-09. STEEL TANKS

a. Field inspection of steel tank materials will be made upon delivery, as for structural steel.

b. Foundation pads, anchor bolts, or other supports should be checked before erection of tank starts.

c. Surfaces to be welded should be free from loose scale,slag, heavy rust, grease, paint and any other foreign material excepting tightly adherent mill scale. Surfaces shall also be smooth, uniform and free from fins, tears, and other defects which adversely affect proper welding.

d. Damage to shop coat of paint both inside and outside of assembled tank should be touched up with specified paint prior to final painting.

e. Ladders and safety cages should be checked for rough or sharp edges, loose rungs, clearances, etc.

f. Field painting should not be permitted until all water,dirt, grease, etc., are removed and the tank surfaces are dry.

CHAPTER 5B

WELDING

INDEX

Para.	Title	Page
5-01	GENERAL	5B-1
5-02	GENERAL REQUIREMENTS	5B-1
5-03	DETAIL REQUIREMENTS	5B-2
5-04	INSPECTION PROCEDURE	5B-2
	a. General	5B-2
	b. Specific	5B-2

CHAPTER 5B

WELDING

5B-01. GENERAL

a. This chapter covers welding and the inspectors* duties in the inspection of welding. Data and information presented herein apply to structural, piping and plate materials; to all types of ferrous and non-ferrous materials; and to welding processes, gas or electric, associated with Corps of Engineers* contracts.

b. It is recognized that welding is a specialized subject. The checklist items that follow will assist the general inspector in his duties; make him aware of possible poor quality workmanship, and show the need for promptly requesting technical assistance from a qualified welding specialist on questionable items.

c. The general inspector should have a complete, basic knowledge of welding methods, practices, and procedures. His inspection of welding should assure that quality welding is being obtained.

d. Welding and cutting is still the greatest single cause of fire on construction projects. Large fire losses are very common. The continuous occurrence of small fires and the presence of charred combustible material is indisputable evidence of improper and uncontrolled welding procedures and operations. Prior to approval of welding operations, combustible material must be removed or adequately protected. Combustible material such as low density fiber board, bituminous and plastic products, saturated products including vapor barriers, flammable liquids and vapors including paints, varnishes, petroleum, and other materials with high flame spread characteristics if ignited cannot be controlled by first aid fire fighting equipment. Fire prevention and control must be a primary consideration on all welding operations.

e. Since there is no craft designation of “welder” in the construction industry, all crafts perform the welding on their own work. This condition makes it difficult to get skilled welders on a project, and rigid qualifications are necessary.

5B-02. GENERAL REQUIREMENTS

Prior to welding:

a. Check whether welding procedure specifications have been submitted and approved. You should have in hand the approved procedure specifications, in the format required by Appendix E., AWS D1.1. This specification guides your checking of material, process, position, rod specification and classification, Number of passes, current polarity, and other information needed by you.

b. Check welder certification. It must be submitted and approved prior to welding. The identifying mark that each welder will be using to identify his work should be checked against his certification. The certification must state that he is qualified

to weld as the procedure dictates. His qualification test result, represented by the certification, must be available from the contractor.

5B-03. DETAIL REQUIREMENTS

Welding Sequence and Procedure Drawings:

a. Check for excessive distortion. Lay welds in a prearranged pattern.

b. Check approved shop drawings against contract drawings,noting discrepancies and advising supervisor.

c. Check weld symbols. Interpret correctly.

d. Check placement of welds in designated sequence. Do not permit deviations.

5B-04. INSPECTION PROCEDURE

a. General

(1) Be sure that a copy of the American Welding Society "Structural Welding Code" (AWS) D1.1 is available for your use. you should become familiar with Section 6, Inspection, which has been completely rewritten in the 1980 Code.

(2) Insure that the approved welding procedure is adhered to.

b. Specific

(1) Process

(a) Identify welding process used, i.e.,gas welding or metal arc welding.

(b) Check welding procedure specification for agreement as to correct process to be used.

(c) Carefully inspect the welding of the metals. Watch for burns.

(2) Base Metal

Check mill reports to see that necessary approval action has been taken on material prior to job fabrication.

(3) Filler Metal

(a) Look at container or color coding of electrodes (welding rods) for classification.

(b) Reject all coated electrodes that have been wet or on which the coating has been damaged.

(c) Low hydrogen covered electrodes require special handling, drying and storage. Read paragraph 4.5 of the AWS Structural Welding Code.

(d) Check diameter of electrodes.

(4) Position — Ensure that no welder is welding in any position other than that for which he has been qualified.

(5) Preparation of Base Metal — Observe the joint preparation prior to welding.

(a) See that method of cutting bevel ensures parallel surfaces.

(b) Do not allow torch cutting unless special permission has been received.

(c) Inspect surfaces for removal of all dirt, grease,loose scale, slag, or rust.

(d) Examine weld joint for root opening, bevel angle, root face, and groove face.

(e) Verify alignment of material.

(f) Determine allowable tolerances.

(6) Nature of Current (Arc Welding Only)

(a) Check polarity if D.C. current is being used. Either straight polarity or reversed polarity may be used, depending on material welded and electrode used. Check approved welding procedure.

1. Check positive and negative leads at welding machine.

2. Use plates 1 and 2 to identify type of polarity (pages 5B-7 and 5B-8)

(b) Check frequency shown on nameplate if alternating current welders are used.

1. Does it agree with frequency shown on approved welding procedure schedule?

2. Require identical frequencies.

(7) Size of Welding Tips (Gas Welding Only). Check tip size.

(8) Nature of Flame (Gas Welding Only)

(a) Check flame adjustments.

(b) Check welder*s adjustment for application (reducing,oxidizing or neutral).

(9) Method of Welding (Gas Welding Only) . Check method of welding to be used (forehand or backhand)

(10) welding Technique.

Check actual technique being used.

(a) Examine current and voltage-dial readings at which pointers have been set on welding machine. Require measurement by instruments.

(b) Identify number of passes or heads placed.

(c) Determine diameter size of electrode used for each pass of weld material placed.

(d) Ensure that all welds are quality welds, that techniques are such that there is no excessive weld pileups or spatter, no irregular weld contours, no undercut or no off—center welds.

(11) Cleaning - See that all slag or flux is removed before laying down the next successive weld bead.

(12) Defects - Check welding against method noted on welding procedure specifications.

(a) Insure that defects are ground, chipped or chiselled back to sound metal with no irregular edges or areas of stress concentration.

(b) Observe that metal is not rolled over a defect.

(c) Inspect for surface cracks in critical areas by magnetic particle tasting.

(13) Peening - Check degree of peening permitted and the suggested or approved types of tests.

(14) Treatment of Underside of Weld Groove - Check detail and sketches noted on welding procedure specifications.

(15) Preheating

(a) Check requirements.

(b) Check methods of control.

(16) Check to see that all weld flux, slag and spatter is completely removed.

(17) Be sure each welder identifies his work by stamping his mark near each weld.

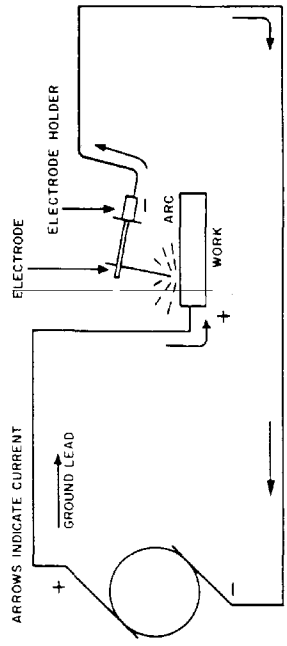
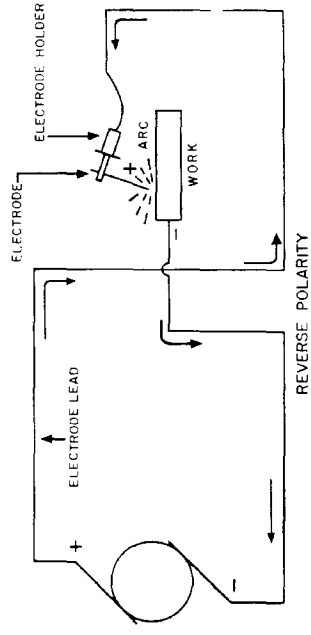

ELECTRODE
ELECTRODE HOLDER
ARC
WORK
STRAIGHT POLARITY
ARROWS INDICATE CURRENT
GROUND LEAD
+
-
+
-

PLATE I


ELECTRODE HOLDER
ELECTRODE
ARC
WORK
ELECTRODE LEAD
REVERSE POLARITY
+
-
+
-

CHAPTER 5C

STEEL ROOF DECKING

INDEX

Para.	Title	Page
5C-01	GENERAL	5C-l
5C-02	SUBMITTALS	5C-l
5C-03	STORAGE	5C-l
5C-04	INSTALLATION PROCEDURES	5C-1

CHAPTER 5C

STEEL ROOF DECKING

5C-01. GENERAL

For permanent construction, except family housing, steel roof decking with board-type insulation or underlayment is most commonly used as the roof deck system. Steel roof decking is usually formed in U, shapes with various depth and rib spacing profiles from 22 gage (0.0295) sheets. Steel decking is delivered either galvanized or with manufacturers standard shop coat paint. Fire resistance ratings for steel roof decking assemblies are discussed in Chapter 7D, ROOFING. Steel forms remaining in place for lightweight concrete roof decks are discussed in Chapter 3A, CONCRETE FOR STRUCTURES.

5C-02. SUBMITTALS

a. Since you must use the shop drawings in your quality assurance duties check them for completeness and accuracy and determine that there are no conflicts with the plans and specifications.

b. Check to see that the design computations for the structural deck have been received and approved. The Steel Deck Institute (SDI) certification of design may substitute for the actual design computations.

c. The above items, any samples required and the installation procedures will be available before the preparatory inspection held by the QC person.

50-03. STORAGE

a. Check material for damage on delivery.

b. Check for ventilated storage and units shall be elevated at one end. Touch up abraded surfaces.

5C-04. INSTALLATION PROCEDURES

a. You should have a copy of the SDI Design Manual for Floor Decks and Roof Decks. This information together with that in the contract specification should be reviewed.

b. For welded attachment check on welder qualification. Welder should demonstrate satisfactory welds before beginning actual installation.

c. Special tools are used with screw type fasteners. Tools and operators shall be checked for safety compliance.

d. Screw type fasteners are not permitted in high wind velocity areas of seismic zones or greater.

e. Spacing of fastners should be shown on shop drawings. Check this with SDI manual spacing.

f. Check for damaged units or accessories. Deck units are minimum 22 gage (0.0295 inch) thickness. Most accessories require increased thickness. Check the specifications.

g. Burn holes from weld fastening is cause for rejection. On occasions, holes have even been burned into supporting bar joists.

h. Welded areas shall be painted. Use same type as for actual shop coat. Use high zinc dust paint for touch up on galvanized surfaces.

i. Check holes and openings in the deck for required reinforcing members. These details should be on the shop drawings.

j. Closure plates may be required at tops of interior walls and partitions.

CHAPTER 6A

CARPENTRY

INDEX

Para.	Title	Page
6A-01	GENERAL	6A-1
6A-02	SHOP DRAWINGS AND SAMPLES	6A-l
6A-03	LUMBER	6A-2
	a. Species and Grade	6A-2
	b. Grade Stamp	6A-2
	c. Defects	6A-2
	d. Moisture Content	6A-2
	e. Storage	6A-3
	f. Preservative Treatment	6A-3
6A-04	FRAMING	6A-4
	a. General	6A-4
	b. Framing Details	6A-4
	c. Anchorage to Concrete and Masonry	6A-4
	d. Framing Floors, Ceilings and Roofs 6A-4	
	e. Wall and Partition framing	6A-5
	f. Sheathing and Planking	6A-6
	g. Sub-Flooring and Underlayment	6A-7
	h. Furring Strips	6A-7
6A-05	EXTERIOR FINISH	6A-7
6A-06	INTERIOR FINISH	6A-8
6A-07	MILLWORK 6A-9	

CHAPTER 6A

CARPENTRY

6A-01.. GENERAL

This chapter provides a list of items to check during inspection of work performed under the Carpentry section of typical contracts. The items in this chapter can be used by the inspector as a basis around which to build his own inspection checklist. The list will vary with the materials specified and with the complexity of the particular contract.

6A-02. SHOP DRAWINGS AND SAMPLES

a. Check each contract for items requiring submission and approval of shop drawings. Items requiring shop drawings will vary with the contract.

b. Items commonly requiring shop drawings include:

(1) Exterior doors and frames. See Chapter 8.

(2) Window frames and non-stock windows. See Chapter 8.

(3) Completely assembled windows.

(A) Interior wood finish, when so specified.

(5) Finish stair work.

(6) All cabinet work.

(7) Roof trusses.

(8) Prefabricated items.

c. Remind contractor that shop drawings must be submitted and approved prior to fabrication or delivery of materials. Remember that only certain shop drawings required CO approval and the others are submitted by the contractor for information only. The action required will be given on the submittal register. See that the appropriate action has been taken.

(1) Check that all shop drawings have been submitted prior to installation or use of the item.

(2) Check all work for conformance with the approved shop drawings.

d. Remind contractor that all specified samples are required to be submitted and approved prior to delivery of materials to the site.

(1) All approved samples received by the inspection forces should be tagged as to type of use and location and stored in a readily accessible area of the field office.

(2) Check materials delivered to site against the approved samples; they shall be identical.

6A-03. LUMBER

a. Species and Grade

Check the species and grade against that specified for each use. This information should be in the "SPECIES AND GRADE TABLE" in the specifications.

b. Grade Stamp

(1) Check both finish and structural lumber for grade stamp.

(2) Stamp or mark shall agree with the rule or standard under which the material is produced.

c. Defects

(1) Check defects against the appropriate grading rules found in the appropriate inspection agency publication.

(2) Obtain copies of the grading rules and check lumber for:

(a) Tolerance of dimensions.

(b) Imperfections in excess of those allowable, as regards:

1. Checks, splits, shake, pockets.

2. Decay.

3. Grain structure.

4. Knots.

5. Percentage of hardwood or sapwood.

6. Wane (presence of bark or lack of wood).

7. Warp, crook, bow, cup.

Full definitions of the above properties or defects and other grading considerations are included in most of the grading rules handbooks.

d. Moisture Content

Check the specifications for the allowable moisture content of lumber at time of delivery and when installed.

(1) Moisture content can be readily checked in the field with a moisture meter.

(2) Moisture content can be checked in a laboratory by the oven drying process.

(3) Rules referred to in Pars 6A-03 c(1) . Whichever contains the more stringent moisture content requirements shall apply. Lumber up to 2-inch thickness, treated with a waterborne preservative, will have a moisture content not to exceed 19 percent. Lumber over 2-inch thickness including treated lumber,

will have a moisture content not to exceed 25 percent. Roof planking maximum is 15 percent.

(4) Exterior and interior finish lumber and flooring shall have not more than 12 percent moisture at time of delivery and when installed.

e. Storage

(1) Boards and Dimension Lumber

(a) Lumber stored off of ground in properly drained area?

(b) Covering adequate and ventilated to prevent increase in moisture content?

(c) Lumber stacked to prevent warp?

(2) Finish Lumber, Flooring and Mill Work

(a) May be stored at the site only in weathertight sheds and at the risk of the contractor.

(b) Should not be brought into building until plaster is dry and windows and doors are installed or temporary enclosures provided. If during heating season, either permanent or temporary heating should be provided.

f. Preservative Treatment

(1) An affidavit may be required on preservative treatment wood, stating retention, paintability, drying time, surface deposit and moisture content. A proper grade marking identification in accordance with AWPB standards is required for all pressure treated lumber.

(2) Lumber with waterborne treatment will also be marked "Dry" indicating a moisture content within the standards.

(3) When bottoms of floor framing and sub-flooring are 24″ or less from earth, they shall be pressure treated.

(4) Exterior wood steps, platforms and railings shall be pressure treated.

(5) Wood members set in concrete shall be pressure treated.

(6) Wood shall be pressure treated when used for:

(a) Nailers at eave or rake of roof.

(b) Wood sleepers.

(c) Furring strips attached to interior face of exterior walls. All furring used below grade.

(7) Creosote pressure treated wood is limited in use for material in contact with soil or water.

(8) Use only waterborne pressure treated wood in contact with built-up roofing materials.

(9) Check specifications for requirement of pressure preservative treatment on exterior millwork.

(10) Check to be sure that cut surfaces are brush coated with the same preservative treatment.

6A-04. FRAMING

a. General

(1) Check framing for accuracy of line, level, fabrication and fitting. Exterior wall studs should be checked for plumbness and alignment before exterior masonry work is begun.

(2) Check connection and method of rigidly securing all members. Use NFPA*s "Manual for House Nailing" for recommended nailing schedule.

(3) Carefully check for first class workmanship as compared with applicable requirements of the American Institute of Timber Constriction Publication.

(4) Do not permit the arbitrary cutting or notching of framing members.

(5) Require the framing of all openings.

(6) Check to see that a 2 inch space is maintained between chimney and timber and 4 inches between fireplace backwall and timber.

(7) Check for the leveling of timber on masonry and concrete with slate or steel shims and do not allow the use of shims on wood or metal bearings.

b. Framing Details — Check with specifications and contract and/or shop drawings.

c. Anchorage to Concrete and Masonry

(1) Is anchorage provided near the end of each section of sill or nailer as well as at the specified spacing?

(2) Are ends of every fourth joist anchored as specified?

(3) Are joists which parallel masonry walls anchored every eight feet? Are anchors extended over and fastened to three joists?

(4) Are anchors provided for window frames and door bucks?

(5) Are anchors provided for wood sleepers?

(6) Are anchors provided for plates on concrete floors?

(7) Are anchors provided for end studs of partitions abutting masonry?

d. Framing Floors, Ceilings and Roofs

(1) Are joists spaced as detailed or specified?

(2) Check that a minimum of 4-inch bearing is provided.

(3) Check “built-in” joists for fire cut.

(4) Are bridging and blocking installed where shown or specified?

(5) Is nailing of lower ends of cross bridging left until after sheathing or sub-flooring and partition framing is in place?

(6) Check sizes of openings through joists. Is doubling up of headers and trimmers required?

(7) Check for joist hangers where framed into headers and girders.

(3) Are joists lapped over bearing and spiked or bolted together?

(9) Are 2X4*s framed between joists or sleepers for support of cut ends of diagonal sub-flooring?

(10) Check for ventilation between sleepers by notching the end blocking described in (9) above.

(11) Where joist bear on bottom flange of steel beams, are metal ties carried across beam on every fourth joist?

(12) Are joists doubled up under partitions which run parallel with the joists?

(13) Are bolt heads which are countersunk below surface of nailers actually fastened to the top of steel beams or bar joists?

(14) Are structural members framed for the passage of pipes or ducts?

(15) Structural members shall not be cut, notched, or bored more than one-fourth their depth without adequate and approved reinforcing.

(16) Check installation of roof nailers (vented and non-vented) , cants, and roof framing for fascias, eaves, cornices, etc. Check size, shape (groove area in vented nailers, and anchorage.

e. Wall and Partition Framing

(1) Check stud spacing. Is it as detailed or specified?

(2) Are top plates doubled up for bearing walls and bearing partitions?

(3) Check for horizontal blocking.

(4) Check specifications. Is solid bearing specified for all edges and ends of gypsum board, plywood, fiber board and similar sheet materials? If so, check for continuous blocking between studs, joists and/or furring.

(5) See that nailing of studs to plates is sufficient to prevent twisting.

(6) Is diagonal wind bracing called for?

(7) Is solid blocking provided for the hanging of fixtures, handrails, cabinets, base board or wall hung heaters and similar items?

(8) Check doubling of studs at openings.

(9) Headers.

(a) Are headers for narrow openings composed of two studs set on edge?

(b) Are headers for wide openings constructed as detailed on the drawings?

(c) Check bearing of header members on studs at both ends.

(10) Soundproof partitions

(a) Are split plates called for?

(b) Are studs staggered as specified?

(c) Is insulation woven in between studs as specified? Fastened only to every other stud?

(11) Alignment of studs

(a) Studs shall be selected to provide true plans surfaces.

(b) Alignment should not vary more than 1/8-inch from the plane of the faces.

(c) Check after installation, for crook, bow, twist, oversized knots and other imperfections over and above previous inspections. Unsuitable material shall be repaired or removed and replaced as required by the specifications.

(d) For wood, dry-wall or any sheet panel surfacing, it is especially important to check every stud for plumbness and minimum crook or bow.

(e) Method of repair shall be restricted to an occasional stud and under no circumstances shall two or more adjacent studs be kerfed and scabbed.

f. Sheathing and Planking

(1) Check sheathing or planks against specification requirements for type of material, thickness, width, and length.

(2) Are sizes and lengths of nails or fasteners as specified?

(3) Check whether horizontal or diagonal application is required.

(4) Do end joints occur only over framing members, and are boards accurately sawed? Sheathing will extend over top and bottom plates.

(5) Is specified sheathing paper being installed as soon as practical after sheathing installation?

(6) Check fastening to every bearing for specified number of nails at specified spacing.

(7) Check plywood sheathing for type, grade, and thickness required.

(8) Check for required space at plywood joints.

(9) Wood Sheathing

(a) Are all courses driven up tight?

(b) Are joints staggered with at least two boards between joints?

(10) Is 1/8—inch expansion allowance made at edges and ends of fiberboard sheathing?

(11) Joint edges of gypsum/board sheathing shall be in light contact.

(12) Four-foot wide gypsum/board and fiberboard will be installed vertically. Also, check for diagonal wind bracing requirement.

g. Sub-Flooring and Underlayment

(1) Installation is similar to sheathing. Provide space for 1/4-inch clearance at walls.

(2) Be sure that underlayment joints are offset from parallel sub-flooring joints.

(3) When combination sub-floor is used support all joints except tongued and grooved edges.

(4) Surfaces, including joints and fastener locations,shall be smooth for finish flooring.

h. Furring Strips

(1) Provide “a true even plane for finish material.”

(2) The true plane cannot be achieved by nailing furring directly to framing members and then applying finish.

(3) Check with straight edge and/or stringline.

(4) Shim between furring and framing as necessary to produce a “true even plane.” This is necessary on walls as well as ceilings.

(5) Furring strips are “wood nailers” and are required to have pressure preservative treatment when fastened to the inside face of exterior masonry or concrete and when located below grade.

6A-05. EXTERIOR FINISH

a. Determine material type, grade, and length of boards to be used, and condition of material.

b. Pre-finished siding shall be sealed and finished exactly as specified. Check the certification for exceptions.

c. Inspect for excessive bowing, warping, or damages of such items as trim and siding.

d. Check for workmanship such as sawing, fitting, appearance and location of splicing, coping, shouldering, mitering, excess splices, etc.

e. Fastening of pine—finished siding shall be exactly as directed by the siding manufacturer.

f. Are end joints of siding made at supports?

g. Check trim installation for specified nailing, joining,fitting and calking for water-resistance.

h. Has preservative treatment been provided as specified?

i. Are exposed nails set and putty stopped?

j. Are door— and window—trim and moldings in single lengths?

k. Are joints of built—up members staggered?

1. Are joints in exterior millwork constructed so as to be weather tight?

a. For wood shingles, check to assure that:

(1) Starter courses doubled.

(2) Weather exposure, as specified.

(3) Nailing is 1″ above butt line of the next course.

(4) Joints are kept offset from the previous course.

n. Examine specifications for application of wood shingles. OCE guide does not allow direct nailing on 5/16″ plywood.

o. Check for priming of all sides and edges of exterior wood work. This applies especially to the backside of fascia, soffits, and trim.

6A-06. INTERIOR FINISH

a. Ensure the correct quality of each piece of material used.

b. Are grounds provided to which to nail trim?

c. Are exposed surfaces sanded smooth?

d. Are backs of trim, to be installed against wood or plaster, hollow?

e. Are joints tight, sawed and fitted accurately, and made to conceal shrinkage?

f. Are finish nails used to secure trim set for putty stopping?

g. Are door- and window-trim, pilasters. newels and posts of single lengths?

h. Are bases set in place after floor is laid?

i. For wood finish flooring, is shoe mold nailed to base only?

6A-07. MILLWORK

a. General - Check millwork upon arrival at jobsite against specifications and details of shop drawings and/or contract drawings. Closely check workmanship.

b. Is preservative treatment required for any components, especially those to be in contact with concrete or masonry?

c. Check for water—repellent preservative requirements.

d. Inspect condition of materials, warps, splits, and damages.

e. Ensure that back—priming has been accomplished where specified.

f. Have anchors been provided as specified or detailed?

g. Are fastenings the type, size and spacing specified, or shown?

CHAPTER 7A

DAMPPROOFING AND WATERPROOFING

INDEX

Para.	Title	Page
7A-01	SUBMITTALS	7A-l
7A-02	SURFACE PREPARATIONS	7A-l
	a. Cleanliness and Smoothness	7A-l
	b. Dryness	7A-l
7A-03	DAMPPROOFING	7A-l
	a. Plans and Specifi-cations	7A-1
	b. Application	7A-l
7A-04	WATERPROOFING	7A-2
	a. General	7A-2
	b. Application — Bituminous System	7A-2
	c. Application - Bentonite System	7A-2
	d. Application - Metal Oxide Waterproofing	7A-3

CHAPTER 7A

DAMPPROOFING AND WATERPROOFING

7A-01. SUBMITTALS

a. Required certificates of compliance and material manufacturers installation instructions must be approved before scheduling the preparatory inspection.

b. Specifications may permit either asphalt or coal tar pitch materials and either cold or hot application methods. The contractor*s submittal will indicate his selection.

7A-02. SURFACE PREPARATIONS

a. Cleanliness and Smoothness

(1) Concrete and masonry surfaces shall be pointed flush.

(2) Has all excess mortar or concrete been removed from surfaces to be dampproofed or waterproofed?

(3) Have rough or high spots been ground smooth?

(4) Is surface free from all foreign matter including sand, soil, and dust?

b. Dryness

Check dryness of the surface to be coated. Bitumen must fully adhere to surface. Use hot bitumen foaming and strip test to determine dryness if in doubt.

7A-03. DAMPPROOFING

a. Plans and Specifications

Check both plans and specifications carefully for extent of dampproofing. There is a tendency to short-change on the height of dampproofing on exterior of walls below grade.

b. Application

(1) See that the ambient temperature is above 40^{0}F.

(2) Always apply dampproofing before furring on interior of walls.

(3) Check for application of approved prime coat for both tar and asphalt dampproofing systems, and for asphalt waterproofing system. Check temperatures of materials.

(4) Check coating for breaks after a surface has been dampproofed.

(a) Check surface air voids in monolithic concrete.

(b) Reseal all voids not sealed by original application.

(c) Hot or cold system each requires two coatings.

7A-04. WATERPROOFING

a. General

(1) Check the requirement for primer.

(2) See that the ambient temperature is above 400.

b. Application - Bituminous System

(1) The felt or fabric plies and pitch or asphalt waterproofing are applied in the same manner as for built-up roofing.

(2) Hot bitumen vapors are flammable, open flame and other sources of ignition are prohibited in enclosed areas. Adequate ventilation must be provided. In addition vapors from tar products are toxic and irritating. Adequate personal protective measures must be taken. Asphalt and tar kettles are not to be permitted in enclosed structures. Kettle temperature must be thermostatically controlled.

(3) Carefully check the application of felt, especially at all locations requiring the two additional fabric reinforcing plies.

(4) Carefully check the installation of flashing and the lapping and mopping of waterproofing into flashing and around items passing through the waterproofing.

(5) Check the application of the waterproofing for exact conformance with the specification regarding:

(a) Weight of moppings and final coating.

(b) Bitumen manufacturer*s recommended application temperature.

(c) Brooming in of the membrane.

(d) Required nailers on vertical surfaces.

(e) Flashing receiver at top of wall to eliminate exposed joint.

(f) Requirement for reinforcing at control joints.

(6) Make sure that all waterstops, flashings, etc. have been correctly installed to provide a watertight job.

(7) See that membranes are always protected from damage. Check the requirement for protection board to be installed where backfill is to be placed. Check for:

(a) Type of board required.

(b) Method of bonding board to waterproofing.

c. Application - Bentonite System

(1) Submittal must have all of the information required. Examine the printed application instructions closely.

(2) Manufacturers written proof of performance must also be received.

d. Application - Metallic Oxide Waterproofing

(1) Test area

(a) Selection of test location is important for a workmanship demonstration.

(b) Access required until all waterproofing is complete.

(2) Special surface preparation.

(a) Roughen concrete surfaces.

(b) Patching shall be as specified. Roughen patched areas.

(c) Check patching at construction joints.

(d) Check calking at penetrations.

(e) Check for required continuous grooves at intersections.

(3) Two coat application required.

(4) Check for adequate curing.

(5) Protection of waterproofing.

(a) Check grout mix formula for each coating.

(b) Finish of the top coating will be to receive specified finish material.

(c) Seven day curing as with concrete.

CHAPTER 7B

BUILDING INSULATION

INDEX

Para.	Title	Page
7B-01	SUBMITTALS	7B-1
7B-02	MATERIALS	7B-l
7B-03	INSTALLATION	7B-1

CHAPTER 7B

BUILDING INSULATION

7B-01. SUBMITTALS

a. Has the contractor received approval of the insulation material both as to composition and thickness? Does it meet the “U” or “R” value requirements?

b. Has the vapor barrier and method of installation been approved?

c. Do you have the approved samples?

7B-02. MATERIALS

a. Are the materials supplied as approved?

b. Are the materials stored in a dry, protected environment? No wet or damp insulation shall be incorporated into the work.

7B-03. INSTALLATION

a. Check vapor barrier. It must be installed on the "warm in winter" side of the wall or ceiling.

b. Roof insulation must be protected from moisture by being covered with roofing immediately after being placed. It must never be left unprotected overnight. Check Chapter 70 for more about roof insulation.

c. Building insulation should be installed only after the building is closed in from weather, and construction has advanced to the point where no damage will result to either the insulation or vapor barrier. Vapor barriers are often damaged by other trades after installation. This should be closely monitored, since other trades are not aware of the critical nature of these damages.

(1) Secure edges of batts or blankets to supporting members.

(2) Fill all areas at tops against frames, jambs, and headers, etc., for a continuous seal against air infiltration. Install insulation around cold side of electric boxes, ducts, pipes, vents, etc.

(3) Lap and seal edges and ends of vapor barrier or use separate sheet membrane vapor barrier.

(4) Check loose fill insulation for required thickness after application.

(5) Information on insulation for masonry walls is in Chapter 4.

(6) Information on perimeter insulation is in Chapter 3A.

CHAPTER 7C

CONFIGURATED ROOFING AND SIDING

INDEX

Para.	Title	Page
7C-01	SHOP DRAWINGS AND SAMPLES	7C-1
	a. Material Approval	7C-1
	b. On-Site Checking of Materials	7C-1
7C-02	STORAGE AND PROTECTION	7C-1
	a. Storage	7C-1
	b. Protection	7C-1
7C-03	INSTALLATION	7C-1
	a. Fastening	7C-1
	b. Application	7C-2
	c. Asbestos - Cement Sheets	7C-2

CHAPTER 7C

CONFIGURATED ROOFING AND SIDING

7C-01. SHOP DRAWINGS AND SAMPLES

a. Material Approval

(1) Has the contractor received approval of layout drawings and material certification for the galvanized or the aluminum coated steel; the aluminum or the factory color finished metal or the asbestos cement corrugated sheets, sealant, fasteners, special shapes and accessories?

(2) Design calculations shall also be submitted for approval.

(3) Check for certified test results on factory color finish. Is a high-performance finish specified?

(4) Does sheet configuration (depth) match-up with roof slope?

b. On-Site Checking of Materials

Approved shop drawings, samples, and installation instructions will continually be used to check against contractor*s operation.

7C-02. STORAGE AND PROTECTION

a. Storage

(1) Inspect bundles on arrival at the jobsite. Check galvanized and aluminum for white rust. This condition is cause for rejection.

(2) See that materials are properly stacked and protected from traffic and weather.

(3) See that material is stacked in a manner that will provide drainage and prevent abuse.

b. Protection

(1) Material will be handled in a manner that will avoid breaks, cracks, chips or other defects.

(2) Check material while being handled at the site for any defects and reject defective material.

7C-03. INSTALLATION

a. Fastening

(1) Check the sealant for color, type, and method of application. Sealant is required at all joints of roof sheets and should be specified for side laps of wall sheets in locations where wind-driven rain is common.

(2) Check fastener for type, size and spacing.

(3) Use aluminum fasteners with aluminum sheets.

(4) Check for washers. There is usually a requirement for lead, neoprene, or metal—capped neoprene washers.

(5) Fasteners must be driven normal to the surface and with sufficient depth to seat the washer.

(6) What correction is permitted if any for misplaced drill holes in roofing or siding sheets?

b. Application

(1) Check length of end laps. Lay side laps away from the prevailing wind.

(2) Check for proper drilling and cutting.

(3) See that all accessories and special shapes are provided in conformance with shop drawings as necessary to make a complete and watertight installation.

(4) Check for molded closure strips.

(5) Expansion joints should be provided as detailed.

(6) Is specified insulation used? Blanket or board type? Is application in accordance with manufacturer*s instruction? Will thickness satisfy “U” value required?

(7) Is a rigid steel or plywood wall liner or wainscot used? Check for configuration, attachment and finish. Is the plywood treated for fire resistance?

c. Asbestos - Cement Sheets

(1) Check for latest safety and health requirement for cutting and drilling asbestos.

(2) Is vacuum required? Is water jet required?

CHAPTER 7D

ROOFING AND INSULATION

INDEX

Para.	Title	Page
7D-01	INSULATION FOR BUILT-UP ROOFING	7D-1
	a. Preparatory Inspection	7D-1
	b. Material	7D-1
	c. Preparation of the Roof Deck	7D-2
	d. Application of Vapor Barrier	7D-2
	e. Wood Nailers and Vents	7D-3
	f. Application of Insulation	7D-3
7D-02	BUILT-UP ROOFING	7D-4
	a. Preparatory Inspection	7D-4
	b. Material	7D-4
	c. Preparation of the Roof Deck	7D-4
	d. Application of Roofing	7D-5
7D-03	FLASHINGS	7D-6
	a. Preparatory Inspection	7D-6
	b. Material	7D-6
	c. Base Flashing	7D-7
	d. Strip Flashing	7D-7
7D-04	ROOF WALKWAYS AND LADDERS	7D-7
	a. Wood walkways	7D-7
	b. Composition Type Walkways	7D-7
	c. Precast Concrete Walkways	7D-7
	d. Ladders	7D-7
7D-05	SINGLE PLY ROOFING	7D-8
	a. Submittals	7D-8
	b. Materials	7D-8
	c. Application of Roofing	7D-8
70-06	FLUID-APPLIED ROOFING	7D-9
	a. Submittals	7D-9
	b. Materials	7D-9
	c. Application of Urethane Insulation	7D-9
	d. Application of Coatings	7D-9
7D-07	STRIP SHINGLE ROOFING	7D-10
	a. Preparation for Installation	7D-10
	b. Installation	7D-10

CHAPTER 7D

ROOFING AND INSULATION

7D-01. INSULATION FOR BUILT-UP ROOFING

a. Preparatory Inspection

(l) This inspection is held before work begins. Information concerning the applicable materials, methods and schedule of installation is exchanged. The roof deck is inspected for readiness.

(2) Since roofing must be installed with the insulation, all matters relating to the built-up roofing and flashings are discussed.

(3) All requirements must be clearly understood before work can begin.

b. Material

(1) See that approved materials are being used.

(a) Check for use of proper type asphalt for roof slope involved. Label information must include the Equiviscous Temperature (EVT).

(b) The insulation must be approved thickness, type, and treated or faced as required. Remember that two layers of insulation are required.

(c) Have insulation thickness computations been submitted and approved?

(d) Check roof slope. Both insulation and vapor barrier must be mechanically fastened when slope is more than ½-inch per foot. Check fastened types required and approved.

(e) What type vapor barrier membrane will be used? Contractor may select from four types.

(f) Are wood nailers treated? Use only waterborne pressure treated wood.

(2) There are special requirements over steel decks.

(a) Check for use of urethane insulation on steel deck. Urethane cannot be used directly on steel decks. Use composite board with a Factory Mutual Research Corp, Class I rating.

(b) If isocyanurate is selected by the contractor, a Class I rating is required on steel decks.

(c) Is adhesive for use on steel deck fire rated?

(d) See above paragraph (1)(d) and plan detail for fastening nailers to steel decks.

(e) On acoustic type steel decks check for an applied vapor barrier.

(f) Check insulation board for square edges.

(g) Check for tapered insulation. Fitup is extremely important for smooth surfaces.

c. Preparation of the Roof Deck

(1) See that the entire section of roof—deck construction is complete before vapor barrier and insulation application begins.

(2) Inspect the roof for being dry, smooth, firm, and dirt—free and free of projections and foreign materials. Check metal roof decks for holes, rust, or repair of paint coat—especially where deck has been welded.

(3) Note preparation and safety protection around roof openings.

(4) Run dryness test on the concrete deck.

(5) Protect roof drain and vent intake during roofing operations. Check for proper drainage at other times.

(6) Check the insulating concrete deck for dryness by weighing the deck sample for 50 percent moisture loss. This is necessary although base sheet is laid dry.

d. Application of Vapor Barrier

(1) Are weather conditions favorable?

(2) Has concrete deck been primed?

(3) Is bitumen kettle safely located? Fire extinguisher? Does kettle have an operable thermometer?

(4) Kettleman must be attending the kettle at all times when bitumen is heated.

(5) Check for asphalt temperature within 25^{0} of EVT at point of application.

(6) Are joints in precast decks covered as required?

(7) Check for solid mopping and brooming for the 2 ply, 15 pound felt over concrete.

(8) Are fasteners for base sheet type vapor barrier the approved type for gypsum deck? For insulating concrete deck? Check fastened materials for specified fastening.

(9) Ensure that felts are maintained at a minimum temperature of 50^{0}F. for not less than 24 hours prior to laying.

(10) Note ambient temperature prior to placing of vapor barrier.

(11) Does vapor barrier seal edge of insulation at openings? Do not seal with vapor barrier if edge of insulation is vented.

(12) Check for felt edge envelope formed with vapor barrier where insulation is vented. Install envelope in steep asphalt or bituminous cement at roof edges.

(13) Inspect the vapor harrier to assure that it provides a complete seal over the deck. See that method of brooming assures complete adhesion to deck, assures complete adhesion between plies, and eliminates air pockets.

e. Wood Nailers and Vents

(1) Nailers flush with the deck will he used with nailable insulation.

(a) On slopes more than ½—inch per foot nail vapor barrier to nailers.

(b) Nail first layer insulation.

(c) Nailers are installed as concrete is cast. Install parallel to the slope of the roof.

(d) Check for flush nailers to fasten flashings for roofing applied to the deck.

(2) Use surface mounted nailers at edges of insulation. Slot nailers for venting insulation; except on steel decks.

(3) Non-nailable insulation needs surface mounted nailers, parallel to the slope, when slope is more than ½—inch per foot.

(4) Check nailable securement requirements.

(5) Use 1-inch thick nailers on edge behind base flashings.

f. Application of Insulation

(1) On slopes up to ½—inch per foot.

(a) Check for solid moppings of hot bitumen over vapor barrier or directly to concrete deck.

(h) Limit bitumen to 12-15 pound per square on steel deck flutes. Use steep slope (Type III) asphalt.

(2) On slopes more than ½-inch per foot.

(a) Check for fastener requirements or,

(b) Use treated surface nailers between insulation section, parallel to slope.

(c) Is nailer thickness same as insulation?

(3) Use only dry insulation. Have wet insulation been removed from the work site?

(4) Plan must be to cover all insulation on same day applied with full roofing system.

(5) Apply insulation in at least two layers.

(6) Stagger joints between layers.

(7) Lay top layer so that continuous insulation joint is parallel to the roof slope. Be sure this joint is not over flute openings of steel decks.

(8) Lay units with close joints. Be sure that no voids are built in by damaged boards or open joints.

(9) Remember the water cut—offs to protect insulation edges at end of work day. Remember to remove cut—offs at beginning of next work day. Check for wet insulation.

(10) Underlayment supports roofing on steel decks not requiring insulation. Same application as for insulation. Use insulation manufacturer*s recommended thickness.

7D-02. BUILT-UP ROOFING

a. Preparatory Inspection

(1) The quality control inspector for the contractor is responsible for this inspection meeting. The roofing applicator and Government Inspection representatives must attend and participate.

(2) Check the agenda. The insulation, roofing and sheetmetal phases should be held together as all this work must be coordinated.

(3) Discuss types of machines which will be used on the roof. The deck and installed materials cannot be subject to damage.

b. Material

(l) Use only asphalt felts with hot asphalt or coal tar felts with hot cool tar.

(2) Check for labels on all materials. Labels must identify specified and approved materials.

(3) Contractor must prove specified material without proper labels. Test if necessary.

(4) Check surface treatment materials.

(5) Are the type IV glass—fibered felts specified in cold climatic locations.

c. Preparation of the Roof Deck

(1) See paragraph 7D-01 c.

(2) Bitumen kettle is not allowed on the roof deck.

(3) Do not overload deck. Remember that all material must be protected from weather.

(4) The system of roofing application should provide for free drainage at all temporary terminations.

(5) Remember the dryness test for concrete decks. Remember the air-dry density test for insulating concrete decks.

d. Application of Roofing

(1) Check felt temperature from storage.

(2) Check bitumen temperature control to prevent overheating.

(3) Check hot asphalt supply system for specified EVT at point of use. A maximum of 25^0 F variation from EVT is permitted. No more at anytime.

(4) Are ambient weather conditions suitable? Temperature at least 40^0F? Too windy? Threat of rain?

(5) Note the method of laying the felt that is immediately behind the mopping of bitumen and assure that the felt is broomed-in so that the layer will be free of air pockets, wrinkles, and buckles.

(6) Check the requirements for and the installation of base sheet. This is the only occasion when hot coal-tar could be applied to an asphalt base sheet.

(7) Are cant strips installed as required?

(8) Are all felts at specified lap? Four plies go down together.

(9) Systems on wet decks use a base sheet. Then the three plies go down together.

(10) Is roofing run to top of cant?

(11) Check for two extra plies of felt at eaves and rakes for envelope bitumen stop. Check for application to deck or insulation in steep slope asphalt or bituminous cement. Use only organic or asbestos felts for these envelopes.

(12) For fiberglass felt system the edge envelopes must be separately placed. Fiberglass felts can*t be used.

(13) Check aggregates to be used for surfacing:

(a) Has aggregate been sampled and approved for use?

(b) Is aggregate dry and free from dust, sand, loam, and other foreign material?

(c) Is stone waterworn and free from sharp, flat and angular pieces?

(d) Is slag crushed, blast-furnace slag?)If you cannot tell visually, check certificate of compliance.)

(e) Is aggregate spread while bitumen is still hot? Is it thoroughly and evenly embedded in hot bitumen? Have aggregates and bitumen been applied at the specified weights per unit area?

(f) Check for the removal of loose aggregate. Are there base spots?

(g) Check method of transporting and storing aggregate on roof to assure that felt and flashing has not been damaged and to prevent excessive loading of roof in localized areas.

(14) Cap sheet may be specified instead of the flood coat and aggregate surface. Check for special requirements. Cap sheet should be rolled into hot asphalt to prevent blistering.

(15) Use a glaze coating of hot bitumen when rain is about to occur.

(16) Glaze coat is only an emergency treatment.

(17) Check to see that the roof drains have been set at proper location and elevation, that they are properly flashed and that they are clean and provided with gratings when roofing is completed.

(18) Are roofing samples being taken? Check sample immediately for free water, bitumen skips and weight. Record results and replace sample unless a deficiency exists. Sample may be replaced depending on nature of deficiency provided a firm understanding can be reached prior to replacement.

(19) If finished or unfinished roof sections are used for traffic, be sure that roofing is protected. Are temporary plywood runways needed?

(20) Check for felt fastenings requirements on roof slopes more than 1/2-inch per foot, Do not use coal—tar on these slopes.

7D-03. FLASHINGS

a. Preparatory Inspection

(1) Shop drawings for sheet metal roof flashings will be discussed at this inspection. See Chapter 7E of this guide for details.

(2) Flashings in this paragraph include the felt strip flashings and plastic base flashings and their requirements will be clearly understood.

(3) Will flashing work be coordinated with roofing?

(4) Check for same day installation to completely waterproof the roofing area begun each day.

(5) A copy of the roofing felt manufacturer*s published flashing recommendations is required.

(6) Check for flashings at all projections through roofing.

b. Material

(1) Check that the asbestos flashing sheet has a built-in reinforcing fabric. This is required even though not in manufacturer*s recommendations.

(2) Where the glass fiber system is to be installed, use the mineral (glass fibered) cap sheet. See label for conformance to SS-R-630, Class 3.

(3) Check label on bituminous cement for asphalt base Type I, per SS-C-153.

c. Base Flashing

(1) Check for selection of 2-ply or 3-ply system.

(2) Be sure the manufacturer*s published recommendations are available and used.

(3) Check installation for loose plies. Embed all sheetsfully into adhesive and press into position.

(4) Are plies mechanically fastened at top of vertical leg?

(5) Check for felt strip over horizontal joint with roofing.

d. Strip Flashing

(1) Two ply strip flashing required.

(2) Check for solid coatings of bituminous cement.

(3) Install strip flashings before surfacing treatment, over all horizontal edges of sheetmetal such as gravel stops, roof drain and pipe flashing flanges, metal base flashings,etc.

7D-04. ROOF WALKWAYS AND LADDERS

a. Wood Walkways

(1) Check for waterborne pressure treated wood.

(2) Are cut edges being treated?

(3) Are pads of premolded filler strips being used beneath wood bases? Locate these before roofing surface treatment.

b. Composition Type Walkways

(1) Is material of specified thickness?

(2) Is material pressed into hot bitumen over top roofing ply?

(3) Is space provided between sections for drainage.

c. Precast Concrete Walkways

Check the requirements for size, location and spacing. He sure roofing surface is clean. Precast concrete units are usually set loose over the waterproofed surface.

d. Ladders

(1) Are ladders located with walkways?

(2) If ladders are anchored into roofing, check for relocation to sidewalls.

7D-05. SINGLE PLY ROOFING

Although there are over eight different generic types of single ply roofing materials, and many more systems, only the EPDM (Ethylene Propylene Diene Monomer) type is specified for CE use. This is a synthetic rubber material. The following deals with systems using that material.

a. Submittals

(1) Check for receipt of the certificate attesting to material compliance. Remember the certificate must be signed by an officer of the manufacturer*s firm.

(2) The following must be received and approved before roofing can begin:

(a) Manufacturer*s installation instructions.

(b) Samples of the membrane, joint cement and sealant.

(c) Layout drawings and all flashing details.

b. Materials

(1) Check the EPDM material labels closely for spec and certificate compliance.

(2) Check storage site for temperature and weather protection. Adhesives and sealants are especially sensitive to these conditions.

(3) Ballast for surface covering must be clean and well graded.

(4) Check treatment for wood nailers and rants. Same as for built-up roofing.

c. Application of Roofing

(1) A preparatory inspection must be held before roofing begins.

(2) Roof deck must be in same condition as for built-proofing. This includes a positive air-dry density test for insulating concrete roof deck.

(3) Check manufacturer*s instructions.

(4) Are the laps joints between sheets of EPDM at least 3—inches wide?

(5) Are laps made to shed water?

(6) Check special treatment at expansion joints for drainage and waterproofing.

(7) Check for perimeter nailers and adequate fastening of the membrane.

(8) Have all joints been carefully inspected before concealing with ballast?

(9) Flashings must be installed same day as roofing membrane to waterproof area covered.

(10) Remember cutoffs at end of day or when rain is imminent.

(11) See Paragraph 7D-01 for board insulation and vapor barrier checklists. Board insulation may be loose laid instead of usual adhesion method for built-up roofing. Check the specs.

7D-06. FLUID APPLIED ROOFING

The system given in the specs includes spray-applied urethane foam insulation applied to broom finish concrete roof decks. Two coats of spray-applied silicone rubber cover the urethane.

a. Submittals

(1) Check applicator*s experience for satisfactory performance.

(2) Check for manufacturer*s application instructions and material certificates of compliance.

(3) Have samples been examined?

(4) Does roofing system meet the Underwriters Laboratories UL 790 test for fire resistance?

(5) Has insulation thickness computation been approved?

b. Materials

(1) Check labels for compliance.

(2) Is there enough coating material to cover all areas to specified dry film thickness?

c. Application of Urethane Insulation

(1) Check the complete plan of application during the preparatory inspection.

(2) Has equipment been calibrated? At the beginning? Daily? More frequently as required?

(3) Is thickness as determined for “U” value?

(4) Lap-in layers.

(5) Check surface smoothness and slope for drainage.

d. Application of Coatings

(1) Protective coating must be applied same day to the urethane foam.

(2) Check dry film thickness.

(3) Finish coating must be free of pinholes?

(4) Check for sheet elastomeric base flashings.

(5) Is a granule finish required? Are walkways included? It is extremely important that walkways be provided where traffic is expected as this system is extremely susceptible to damage.

7D-07. STRIP SHINGLE ROOFING

a. Preparation for Installation

(1) Have the required samples been submitted and approved? Do shingles on site match the approved samples? Are they labeled as U.L. approved? Are they wind resistant type?

(2) Is roof clean, dry, and otherwise ready for roofing? Check to cover knot holes and splits with sheetmetal plates.

(3) Are flashings installed or on hand to be installed concurrently with roofing?

(4) Check for proper installation of under layment and metal edge drips. Edge drip strips are installed over the underlayment.

(5) Check slope as double layer underlayment is required on slopes to 4-inch per foot.

(6) Check for special requirements if in cold climate where ice forms at building eaves. Either a sheet metal eave flashing or layer of bituminous cement should be required.

b. Installation

(1) Check starter course of shingles, at the eaves. Is it a double or triple layer of shingles? Does this starter course extend 3/4 inch beyond eave line to form a drip?

(2) Check alignment of layers and rows of shingles. Start rows at center of roof for spans over 30 feet and lay to chalk lines or other guide for a neat job.

(3) Check exposure of shingles on hips and ridges. Are all nails concealed?

(4) Check that each shingle tab is cemented in place with bituminous cement with a contact area of at least 1 square inch. Check self-sealing type shingles.

(5) Self-sealing shingles are usually required and the manufacturer*s warranty furnished by the contractor provides insurance against unit blow-off. The contractor shall be responsible for replacement of blown-off or damaged shingles.

CHAPTER 7E

FLASHING AND SHEET METAL

INDEX

Para.	Title	Page
7E-01	PREPARATION FOR INSPECTION OF SHEET METAL WORK	7E-1
	a. Shop Drawings and Samples	7E-1
	b. Stiffness	7E-1
	c. Expansion Joints	
	d. Dissimilar Materials	7E-1
7E-02	INSTALLATION	7E-1
	a. Fastening	7E-1
	b. Gravel Stop - Fascia	7E-2
	c. Metal Base Flashing	7E-2
	d. Cap Flashings	7E-2
	e. Through-wall Flashing	7E-3
	f. Valley Flashing	7E-3
	g. Stepped Base Flashing	7E-3
	h. Edge Strip	7E-3
	i. Louvers	7E-4
	j. Reglets	7E-4
	k. Gutters	7E-4
	l. Downspouts	7E-4
	m. Parapet Covers	7E-5
	n. Miscellaneous	7E-5

CHAPTER 7E

FLASHING AND SHEET METAL

7E-01. PREPARATION FOR INSPECTION OF SHEET METAL WORK

a. Shop Drawings and Samples

(1) Do the construction and the installation comply with requirements in the plans and specifications for: Shape? Joining? Fastening?

(2) Factory fabricated internal and external corners should be shown or indicated.

(3) Do the materials match the approved samples?

(4) Compare detail information with specification tables "Weights, Thicknesses and Gages" and "Joints."

(5) Remember that metal base flashings must detail wood nailers for fastening the roof flange.

b. Stiffness — Are exposed edges of all flashings folded back a full ½ inch?

c. Expansion joints — Examine specifications for spacing of these joints in all sheet metal work. Check plan, specifications and shop drawing for design of the expansion joints.

(1) Note the specification table for joints and spacing of expansion joints.

(2) Inspect the location of joints with respect to corners, end spacing and locations such as gutters and such items as midpoints from downspouts.

(3) Check drawings for details of expansion joints. See if space has been allowed for expansion.

d. Dissimilar Materials

(1) Evaluate the entire job to see that all dissimilar metal materials in contact, which may support galvanic action, have been isolated from each other. Some typical examples to watch for are:

(a) Copper and aluminum flashings in contact with each other, or with ferrous material.

(b) Copper, stainless steel and aluminum flashings fastened with ferrous material.

(c) Aluminum bases set on pressure treated wood.

(2) Determine specification requirement for method of isolating dissimilar materials.

7E-02. INSTALLATION

a. Fastening: Check requirements for:

(1) Attachment by direct nailing or cleating, for spacing, and for location. Are screw shank nails required?

(2) Soldering, welding, bolting, riveting, etc.

(3) Check detail on drawing for fastening or securing ends or edges in concrete or masonry construction.

b. Gravel Stop — Fascia

(1) Has 6-inch wide nailer been provided for attaching flange to roof deck?

(2) Check flange for 4-inch width applied in bituminous cement over roofing felt.

(3) Are screw shank nails of compatible material? Are nails driven within 1—inch of edge at 3-inches on center?

(4) Mop two plies of roofing felt, one 9 inches wide and one 12 inches wide, over inner flange. This is a strip flashing.

(5) Check for continuous cleat anchoring lower edge of fascia. Not required for fascia membering into gutters.

(6) Do butt joints have the ½—inch separation? Are the joint cover plates also set in bituminous cement?

(7) Design of extruded aluminum gravel stop—fascia is verified by approved shop drawing. Same for the manufacturer's installation method.

c. Metal Base Flashing

(1) Is base flashing installation same day as roofing installation?

(2) Check for flat locked and soldered or sealed joints.

(3) Check the location of lapped expansion joints.

(4) Is roof flange set in bituminous cement? Is vertical leg long enough for at least 3-inch lap with cap flashing?

(5) See that roof flange is covered with two plies of felt strip flashing after nailing at three inches on center.

(6) Corners, interior and exterior: Are they factory fabricated?

d. Cap Flashings

(1) Cap flashing system will be either the separate cap in reglet or a two-piece combination (cap in receiver) unit.

(2) Check the fabrication shown on the shop drawing for:

(a) Vertical location above finished roof surface.

(b) Shape for drainage away from anchorage point.

(c) Shape for pressure fit against base flashing.

(3) Is lower edge of flashing folded back ½ inch?

(4) Check for 3-inch lap joints for cap and for receiver sections.

(5) Corners, interior and exterior: Are they factory fabricated?

e. Through-wall Flashing

(1) Carefully check for locations requiring through-wall flashing. All should be shown on the shop drawing.

(2) Assure that the flashing is being installed in the middle of the mortar joint. Assure that it extends to within ½ inch of face of wall.

(3) Check the design and installation requirement for the various locations of metal flashing, such as: above the roof line, below the roof line in cavities more than 3/4-inch wide, at lintels and sills.

(4) There are actually seven different flashing materials which can be used in cavities less than 3/4-inch wide.

(5) Is each sill flashing one piece and does it extend at least 4 inches beyond the ends of each sill?

(6) Check for the smooth copper slip joint in the bed joint at the end of lintels adjacent to control joint.

(7) Is the metal through-wall factory deformed for bond with mortar?

(8) Do joints between sections of lightweight flashing consist of at least 3-inch laps with sealant?

(9) Check anchor holes such as for parapet cap anchors to see that they are completely filled with plastic cement at the flashing course.

f. Valley Flashing

(1) Check installation for coverage and lap beneath roof covering.

(2) Check cleating operation for adequate anchoring.

g. Stepped Base Flashing

(1) Check for neat installation with a separate flashing section for each shingle course.

(2) Are sections sized to lap 3 inches and run 4 inches each way?

(3) Are cap flashings used? If not, the stepped sections must be fitted beneath siding.

h. Edge Strip

(1) The strips are provided continuously at bottom edge of fascia and act as a drip and continuous cleat.

(2) Check fastening to supporting construction and fascia.

(3) Check for the required washers, which are electrolytically compatible, to hold the strips away from vented gravel stops.

i. Louvers

(1) Check fabrication for first class workmanship. Check for compatible fasteners.

(2) Check louvers after installation for water tightness against a driving rain.

(3) Examine specifications for requirement for such items as insect or bird screen, movable shutters, etc.

(4) Additional information is provided in Chapter 15.

j. Reglets

(1) Make sure that polyvinyl chloride reglets are used with aluminum cap flashings.

(2) Check the setting of reglets in concrete and masonry to assure a method of firm and secure anchorage at the required elevations.

(3) Check the contractor*s proposed provision for anchoring the cap in reglets. Also check the actual firmness of the flashing as installed.

(4) Is the receiver of the two—piece combination unit used as planned instead of the reglet? Eliminate flat spots. Be sure receiver slopes from face of wall.

k. Gutters

(1) Recheck approved gutters, for type, shape, general design, and layout. Make sure that the continuous cleat or bracket supports permit freedom of movement. Make sure back of gutter is higher than front.

(2) Check slope of gutter to provide drainage to outlets.

(3) Check brackets and spacers for size, type, location and spacing.

(4) Check basket strainers for gutter openings into downspouts.

(5) Do expansion joints limit runs with the specified distances? Are these joints at highpoints? Do joint covers have diverters?

l. Downspouts

(1) Check downspouts for being factory fabricated and corrugated longitudinally in approximately 10, lengths.

(2) Check for the requirement for specials, such as downspout leaders, scuppers, overflow scuppers, conductor heads, etc. (See the Architectural Sheet Metal Manual by SMACCMA)

(3) Check to see that the downspouts are plumb, that they clear the wall by at least 1 inch and that they are firmly secured with 1-inch-wide straps; one strap anchor located at the top of each downspout section.

(4) Downspout sections are telescoped together except that the leader downspout joint is riveted.

(5) Check downspouts terminating in drainage line. They should be neatly fitted and secured with a Portland cement mortar cap.

m. Parapet Covers

(1) Does shop drawing show anchorage and joints?

(a) Both sides must be cleated at lower edge.

(b) Flat lock joints are required between all sections.

(2) Is top of cover sloped for drainage?

n. Miscellaneous

(1) Check for miscellaneous sheet metal items, especially those shown on the plan but omitted from the specifications. (See the Architectural Sheet Metal Manual by SMACCMA.)

(2) Check those items which have been included in the specifications. Check items such as snow guards, splash pans, radiator—recess linings, perimeter insulation covers, etc., for type required, for fabrication, and for method of installation. Shop drawings are required.

CHAPTER 7F

CALKING AND SEALANTS

INDEX

Para.	Title	Page
7F-01	CALKING AND SEALANTS	7F-l
	a. Submittals	7F-1
	b. Material	7F-l
	c. Area Requiring Calking or Sealants	
	d. Preparing	7F-l
	e. Application	7F-1

CHAPTER 7F

CALKING AND SEALANTS

7F-01. CALKING

a. Submittals

(1) Are the certified laboratory test reports acceptable?

(2) Is the descriptive data approved?

(3) Have the samples been approved? Will testing be necessary? Are the colors as required?

b. Material

(1) Check grade, color, and the other required label information and compare with samples and test reports.

(2) Check storage protection, exposure temperatures and shelf life limits.

c. Area Requiring Calking or Sealants

Joint symbols and details are shown on the drawings. The contractor will indicate in his submittals where each type and color will be used. Joints must be constructed as detailed.

d. Preparation

(1) Check to assure that material used is from batch tested.

(2) Have grooves of adequate depth been provided, and are they clean? This includes removal of the temporary protective coating.

(3) Has the required primer been coated over the surface to receive calking? Has the test been made on sample surfaces?

(4) Has the backstop or bond-preventative material been installed?

(5) Check for masking tape to protect adjacent surfaces.

e. Application

(1) Make certain that the workmen have the proper type of gun.

(2) See that grooves are the indicated shape. Proper depth, regulated by the inserted backing material, is very important to joint performance.

(3) See that appearance is uniform and relatively smooth.

(4) Do not allow smears of calking. A coating of sealer must be applied to the calking bead.

(5) Calking compound (TT-C-598) is normally not used on the exterior.

(6) Sealant No. 3 (TT-S-1657) is not used where it would be contacted by pedestrian traffic.

CHAPTER 8A

METAL DOORS AND FRAMES

INDEX

Para.	Title	Page
	SUBMITTALS	8A-1
8A-01	a. Shop Drawings	8A-1
	b. Certificates	8A-1
	c. Manufacturer*s Instructions	8A-1
	d. Experience Statement	8A-1
8A-02	MATERIALS	8A-1
	a. General	8A-1
	b. Finish	8A-2
	c. Glazing	8A-2
	d. Weather Stripping	8A-2
	e. Hardware	8A-2
	f. Screens	8A-2
8A-03	STORAGE	8A-3
8A-04	INSTALLATION	8A-3
	a. General	8A-3
	b. Aluminum Combination Doors	8A-3
	c. Aluminum Hinged Doors	8A-3
	d. Aluminum Sliding Glass Doors	8A-4
	e. Steel Hinged Doors	8A-4
	f. Steel Overhead Doors	8A-4
	g. Steel Rolling Doors	8A-5
	h. Steel Sliding Doors	8A-5
	i. Accordion Doors	8A-5
	j. Fire-Rated Doors	8A-5
	k. Cold Storage Doors	8A-6
	l. Vault Doors	8A-6
8A-05	ELECTRIC OPERATORS	8A-6
	a. General	8A-6
	b. Installation	8A-7

CHAPTER 8A

METAL DOORS AND FRAMES

8A-01. SUBMITTALS

a. Shop Drawings

(1) Check for complete submittal, including material type size, finish, assembly, anchorage, connections, etc.

(2) A door schedule should be inclosed.

(3) Check for specials as fire-rating hardware reinforcement, noncombustible insulation as required.

b. Certificates

(1) Does certificate indicate compliance with specification requirements?

(2) You will expect a special certificate of inspection for oversized fire-rated doors and for fire-rated doors without UL Label.

c. Manufacturer*s Instructions

Check for submittal, approval and use at installation. Catalogue cuts may also he required to complete the instructions.

d. Experience Statement

Specifications may require this, especially for cold storage door manufacturer.

8A-02. MATERIALS

a. General

(1) Doors and frames usually have specific gauge or thickness specifications.

(2) Check paragraph 8A-04, INSTALLATION, for items pertaining to specific type door and frame.

(3) Check workmanship of joints and connections.

(4) Check for closed top, finished flush and sealed, on exterior doors.

(5) Are pierced louvers permitted? Louvers must be non-removable from lock side of doors.

(6) Will door frame be set before masonry begins? Toothing masonry for later installation of metal frames is prohibited?

(7) Check for frame anchors in accordance with requirements.

(8) Are guards provided at the hinge and strike areas to prevent filling with mortar as frames are installed? Is hardware reinforcement built-in doors and frames?

(9) Are special frames provided for the special doors? Soundproof? Lightproof? Lead lined?

b. Finish

(1) Is aluminum finish ?as specified? Mill? Satin? Anodic? Enameled?

(2) Shop coat required on steel? Or is it galvanized (G90) with phosphate treatment?

(3) Abraded surfaces of protective coatings must be recoated when found.

(4) Is factory supplied hardware finish as specified?

c. Glazing

(1) Sliding glass doors require safety glass. Check for etched (permanent) label in lower corner of glass.

(2) Check AAMA 402.9 for required glass thickness.

(3) Both lites of double glazed sliding doors must be safety glass.

(4) Are glazed peepholes required and provided in vestibule doors of cold storage facilities?

(5) Are removable or snap-on glazing beads specified? Does type and removal meet Steel Door Institute specifications?

d. Weather Stripping

(1) Exterior doors require weather stripping.

(2) Check type material. The elastomeric materials are required for door heads and jambs and spring metal is prohibited. Check specification for door bottom weather stripping.

(3) See “cold storage doors” paragraph for gasket seals.

a. Hardware

(1) Check for aluminum or stainless steel hardware on sliding glass doors. This includes compatible fasteners.

(2) Accordion doors required anodized aluminum or chrome plated brass hardware.

(3) Check Chapter 8D for other information on hardware.

f. Screens

(1) Check type screen. Is bronze, aluminum or plastic-coated fiberous glass specified?

(2) Are splines removable and reusable?

(3) Check frame size and stiffness for compliance.

(4) Do the door louvers require insect screening?

8A-03. STORAGE

a. Units should be checked on arrival for damage, missing items, and comparison with samples and shop drawings.

b. Reorder to replace damaged units.

c. Use off-ground storage, protected from the weather.

d. According doors must be stored in a clean and dry space.

8A-04. INSTALLATION

a. General

(l) Set door frames before erection of surrounding masonry. Toothing-out at missing frames is not permitted.

(2) Check frame anchorage at floor.

(3) Leave spreader in place till wall is erected and frame anchored-in.

(4) Fill hollow metal frames with concrete, mortar or plaster, as appropriate, for stiffening.

(5) Check for double stud at jambs in frame walls.

(6) Leave required groove for sealant bead at exterior door frames. Other special doors require sealant.

(7) Operate units to determine fit.

(8) Are silencers installed in frames?

(9) Check fire-rated door frames immediately for required labels.

(10) Use shop drawings and manufacturer*s instruction to verify installation.

b. Aluminum Combination Doors

(1) Is a residential quality door being used for heavy traffic? If so, can a change be made now?

(2) Check frame anchorage and use of compatible fasteners.

(3) Check fit and adjust as required for weatherproofness.

c. Aluminum Hinged Doors

(1) These doors are usually glazed with stile and rail construction for entrance ways.

(2) Be sure to make a timely check on back-priming for concealed surfaces against dissimilar materials.

(3) Protect finish surfaces from damage, mortar stain, etc., with adequate protection.

(4) Check weather stripping for tight fit.

d. Aluminum Sliding Glass Doors

(1) Safety glass is required.

(2) Is aluminum finish as specified?

(3) Check for back-priming aluminum surfaces in contact with dissimilar materials.

(4) Check for weather stripping at full perimeter and meeting rail. Adjust fit for weatherproofness.

(5) Are fasteners aluminum or stainless steel?

(6) Make a final check with requirements in AAMA publication 402.9. Check for AAMA quality certification label.

a. Steel Hinged Doors

(1) Do the fire-rated doors have required labels?

(2) Do all exterior doors have thresholds and weather stripping?

(3) Check top off exterior doors for sealed and flush cap to prevent water entry into doors.

(4) Make a final check of installation in accordance with the following information:

"The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames, and Builders Hardware" by the Door and Hardware Institute (DHI).

"Standard Steel Doors and Frames", No. 100-078 by the SDI.

f. Steel Overhead Doors

(1) Are exterior doors insulated? Fully weather stripped? Is insulation required to be non-combustible type? Does it meet "U" value requirement?

(2) These doors are for commercial application and have specific requirements for wind resistance and deflection. Do they comply?

(3) Is guide and track adjustment correct for proper operation.

(4) Are safety and limit switches operating properly?

(5) Is the pilot door insulated? Weather stripped? Does it have safety stop for electric operator?

g. Steel Rolling Doors

(1) These doors have interlocking slats. Are end locks provided as required? Are windlocks provided as required?

(2) Check all features of installation and operation with shop drawings and manufacturer*s instructions.

h. Steel Sliding Doors

(1) Are face panels at least 14 gauge?

(2) Are operating cables and counter weights enclosed to 7 foot height.

(3) Is specified operating force sufficient for manual operation.

(4) Are safety features operable for electric power driven doors?

i. Accordion Doors

(1) Check concealed supporting construction for adequacy. Use shop drawings, catalog cuts and manufacturer*s instructions.

(2) Track sections shall be at least 6 feet long, minimum 14 gage aluminum or 16 gage steel.

(3) Check tract alignment, especially at joints.

(4) Metal soffit is required at ceiling when track is recessed type.

(5) Check for ball bearing carrier wheels.

(6) Check panels (door) for label indicating flame spread rating not more than 25.

(7) Check fit at bottom seal when closed.

(8) Check speed, bottom seal retraction and safety shutoff of electrically operated door.

j. Fire-Rated Doors

(1) Check door schedule for location of fire-rated doors.

(2) Check for appropriate label on edge of door and on door frame. Labels shall be permanently affixed.

(3) Remember that each oversized fire-rated door will have a certificate of inspection instead of the label. Check National Fire Protection Association (NFPA) Standards No. 80 and 8OA for certification requirements.

(4) Labeled door frames will have non-removable anchors for attachment to wall construction.

(5) Check f or positive closure and latching devices. Hardware for fire-rated doors is discussed in Chapter 80.

k. Cold Storage Doors

(1) Doors shall arrive factory assembled with templates for all attachment.

(2) Check door frame anchorage and wireway for the recessed electric heater cable on freezer doors and exterior doors.

(3) Heaters shall be thermostatically controlled.

(4) Check armor plating for type material, gage and finish.

(5) Check for heavy duty hardware in specified material and finish.

(6) Check door latch for safety release from inside box.

(7) Is a door closer or padlock required?

(8) Are gasket seals effective? Are the number of seals per door as required.

(9) Is door construction vapor tight?

(10) Are sliding dour hangers adjustable? Check floor guides for location and adjustment for adequate gasket seal.

(11) Hinge type door shall arrive factory-mounted in its frame for erection in an assembled and rigidly anchored sub—frame.

(12) Vestibule doors shall have reinforcing at doors and jambs as required, including specified wheel guards and bumpers.

(13) Check for heavy—duty steel supports for vestibule doors. Check for full closure.

l. Vault Doors

(1) Check for the safety release device on the interior side of the door.

(2) Arms vaults require two security doors.

(3) Check fire resistance classification for compliance.

8A-05. ELECTRIC OPERATORS

a. General

(1) Check submittal for compliance with requirements, as:

(a) Totally enclosed motor,

(b) Required operating mechanism, emergency release, auxiliary operators etc.,

(2) Safety device at bottom edge of door.

b. Installation

(1) Check for conflicting items in the way of tracks, operating devices and door extension.

(2) Check weather stripping for tight seal at operator closure limit.

(3) Does operator perform as required?

CHAPTER 8B

WOOD DOORS AND FRAMES

INDEX

Para.	Title	Page
8B-01	SUBMITTALS	8B-1
	a. Shop Drawings	8B-1
	b. Certificates	8B-1
8B-02	MATERIALS	8B-1
	a. General	8B-1
	b. Exterior Doors	8B-1
	c. Interior Doors	8B-1
	d. Defects and Warp	8B-2
	e. Storage	8B-2
88-03	INSTALLATION	8B-2
	a. Rough Opening	8B-2
	b. Framed Opening	8B-2
	c. Fitting and Hanging	8B-2

CHAPTER 8B

WOOD DOORS AND FRAMES

8B-01. SUBMITTALS

a. Shop Drawings

(1) Check for the door schedule which should include location, dimensions, and a full description of door type with required marked identification.

(2) All of the different type door elevations and specials, including weather stripping and thresholds, must be a hewn.

(3) Show wood blocks as required for locks, louvers, etc.

b. Certificates

(1) Certificates of compliance are required for doors which do not bare identifying marks.

(2) This requirement includes cold storage doors and frames.

(3) Check for certification requirements for the wood overhead doors.

8B-02. MATERIALS

a. General

(1) Standards of the National Woodwork Manufacturers Association (NWMA) are used for the specific requirements of wood door quality. You must have the applicable publications to adequately check the doors upon arrival.

(2) Check for identifying marks required.

(3) Check condition, including factory finish or prime coat. Are edges sealed?

(4) Is wood species and grade as required?

b. Exterior Doors (TYPE I)

(1) Check for water-repellent preservative treatment.

(2) Are flush doors solid wood block core?

(3) Is glue bond exterior type and will it withstand the NWMA bond test?

c. Interior Doors (TYPE II)

(1) Is adhesive used with natural finish doors of the nonstaining variety?

(2) Panel or flush type?

d. Defects and Warp

(1) Check quality of doors against the table of characteristics in the NWMA standard.

)2) Reject doors of inferior quality.

(3) Warp shall not exceed 1/4-inch for standard size doors. Check NWMA applicable standard.

e. Storage

(1) After initial check for quality and fit protect doors from damage and extremes in temperature and humidity.

(2) Stash doors upright to avoid damaging face finish.

8B-03. INSTALLATION

a. Rough Opening

(l) Observe limits so that dimensions do not exceed those for framed openings by more than specified amounts.

(2) Check anchorage of rough buck. Is treated wood required? Are cut edges sealed?

b. Framed Openings

(l) Check for blocking as required.

(2) Plumb?

c. Fitting and Hanging

(1) Are required clearances provided? Usual clearances required are:

Head	1/8-inch
Sides	1/8-inch
Bottom	1/2-inch
	(1/4-inch over thresholds)

(2) Is lock edge of door beveled?

(3) Be sure that cut edges of doors are resealed.

(4) Check weather stripping on exterior doors. Surface mounted is best type as it is adjustable but spring type may still be required at heads and jambs.

(5) Check weather stripping for anchorage, compatible fasteners and proper adjustment.

(6) Check hardware chapter for special type thresholds.

(7) Check butts for size and shape.

CHAPTER 8C

METAL AND WOOD WINDOWS

INDEX

Para.	Title	Page
8C-01	SUBMITTALS	8C-1
	a. Shop Drawings	8C-1
	b. Certificates/Labels	8C-1
8C-02	MATERIALS	8C-1
	a. Screens	8C-1
	b. Storm Windows	8C-1
	c. Metal Prime Windows	8C-2
	d. Hood Prime Windows	8C-2
	e. Environmental Control Windows	8C-3
8C-03	INSTALLATION	8C-3

CHAPTER 8C

METAL AND WOOD WINDOWS

8C-01. SUBMITTALS

a. Shop Drawings

(1) Check for specifics on each different type window, as:

(a) Thickness and dimensions

(b) Weather stripping

(c) Hardware

(d) Finish/factory priming

(e) Fasteners, anchorage and their compatibility with adjoining materials.

(2) Check for the window schedule and compare it with the schedule on the drawings.

(3) Calculations for anchorage of environmental control windows.

b. Certificates/Labels

(1) Certified test reports on air and water infiltration thermal conductivity, condensation resistance and load tests must be provided for environmental control windows.

(2) An Architectural Aluminum Manufacturing Association (AAMA) quality certification label on aluminum windows and storm windows may replace the certificate.

(3) Performance certification labels on wood windows indicate they must comply with ANSI A200.l provisions and requirements. Do they?

8C-02. MATERIALS

a. Screens

(1) Check steel screens against Steel Window Institute (SWI) specifications.

(2) Check aluminum screens against ANSI A134.l requirements.

(3) Look for screens on buildings which don*t have combination storm—screen units.

b. Storm Windows

(1) Must comply with provisions and requirements of ANSI A134 .3.

(2) Check for vertical or horizontal sliding operation.

(3) Is factory painted finish as specified or is aluminum mill finish?

(4) Check for separation or isolation between steel prime windows and aluminum storm windows.

(5) Check for compatible fasteners. Those fasteners exposed must be aluminum or non-magnetic stainless steel.

c. Metal Prime Windows

(1) Aluminum

(a) Must comply with ANSI A134.1.

(b) Check for certificate on minimum condensation factor when double glazed. See AAMA 1502.6 for this requirement.

(c) Check A-A2 of A134.1 for awning windows. Awning windows are hinged at the top.

(d) For basement windows and other fixed windows check P-A2.

(e) Check C-A2 for casement windows.

(f) Check DH-A2 for double and single-hung type.

(g) Horizontal-sliding windows refer to HS-A2.

(h) Projected windows are similar to awning windows but have a different specification, P-A2. All sash or projected windows do not open as with awning type.

(i) Check TH-A2 for top-hinged windows.

(j) Vertically-pivoted windows refer to VP-A2.

(k) Check window finish for factory painted or anodized treatment. Check anodizing for quality and color.

(1) Temporary protective coating on aluminum must nut be used on surfaces to receive sealants.

(2) Steel

(a) Check SWI specification for all types; including basement, casement, projected, classroom, security windows and others.

(b) Check for protective finish; either factory prime coat of paint on steel or over hot-galvanized steel.

d. Wood Prime Windows

(1) Check ANSI A200.1 for general and specific requirements.

(2) Windows will usually be single or double-hung type, although awning, casement or horizontal-sliding type may be specified.

(3) Wood windows shall be factory primed for finish painting.

(4) Check for extra hardware such as sash lifts, sash lock or latch and sash pulls.

e. Environmental Control Windows

(1) These are special aluminum windows which have a thermal- break in the frame and are double glazed with a slat-type venetian blind between the glass panes.

(2) Check thermal-break for ½-inch minimum separation. Barrier at break shall be weatherproof neoprene, rigid vinyl or polyurethane.

(3) Unit shall arrive fully assembled and glazed.

(4) Check normal operation and key controlled operations required.

(5) Check required finish. 8C-03 INSTALLATION

a. Anchors as specified shall be of compatible material for metal windows.

b. Protect aluminum window surfaces in contact with dissimilar materials as required in AAMA 302.9 provisions.

c. Check for unit alignment and plumbness.

d. Check operation and require adjustments as necessary.

e. Check for removal of temporary protective coating from aluminum on surfaces to receive sealant.

f. Check for required performance certification labels (wood windows) and quality certification labels (aluminum windows)

g. Window cleaning anchors may be required. Watch for:

(1) Specified anchor material.

(2) Frame reinforcement at anchors and additional window anchorage.

(3) Check requirement in ANSI A39.1.

h. Check AAMA 1302.5 for forced—entry resistant windows.

CHAPTER 8D

HARDWARE

INDEX

Para.	Title	Page
8D-01	MATERIAL	8D-1
	a. Submittals	8D-1
	b. Delivery of Material	8D-1
8D-02	APPLICATION	8D-2
	a. General	8D-2
	b. Installation Checks	8D-2
80-02	PRISON-LOCKING DEVICES	8D-3

CHAPTER 8D

HARDWARE

8D-01. MATERIAL

a. Submittals

(1) Make sure that the contractor obtains an early approval of hardware schedule and samples. An approvals list is also required. Hardware templates must be provided to door and frame manufacturers.

(2) Double-check the schedule to assure that you understand it and that no openings have been omitted.

(3) Check for required certificates and test reports as per approval list.

(4) Be alert to hardware and keying requirements on such items as:

(a) Roof scuttles

(b) Sliding, rolling and lift doors

(c) Refrigerator and other mechanical equipment doors

(d) Screens and doors

(5) Hardware items which need close observation because they are often overlooked are such items as astragals, silencers, coordinators, holders, stops, and thresholds.

(6) Hardware finishes are identified in Builders Hardware Manufacturers Association (BHMA) Standard 1301. Check for required finish and base metal. Watch for restrictions on use of aluminum.

b. Delivery of Material

(1) Material will be received in manufacturer*s original packages.

(2) Packages should not be opened until time for attaching to door.

(3) Examine items for the utilization of the correct materials at scheduled locations.

(4) Check the keying. A keying schedule is required and keys must be tagged or otherwise identified with the door for which the lock is intended.

(5) Are all keys stamped as required?

(6) Check for security of master key.

8D-02. APPLICATION

a. General

(1) Check for quality workmanship and the proper installation of each item of hardware.

(a) Compare installation with manufacturers instructions.

(b) Determine the proper installation height and location.

(c) Examine the method of fastening. Evaluate for durability and rigidity.

(2) Make sure that the proper size and type of hardware is being installed on each door. Use the hardware schedule for this check.

b. Installation Checks

(1) Observe whether there are non-removable pins in hinges installed on out-swinging exterior doors and on doors to secure areas which swing into corridors.

(2) Check for non-ferrous fasteners on hardware exposed no the weather.

(3) Check for tamper proof fasteners as required on surface mounted hardware.

(4) Ensure the use of proper closers and brackets. Note the installation of closer for adequate clearance. Closers on exterior should not be mounted exposed to the weather.

(5) Look for the omission of stops and silencers. Watch for installations which will allow hardware to swing into parts of the structure or into other hardware. Each door requires a hardware stop.

(6) Check for the matching of hardware finishes in each area.

(7) See that each item of hardware functions properly after installation.

(8) Check for installation of thresholds where scheduled.

(9) There are special requirements for mortise-type locks and trim. Check your specifications.

(10) Locksets for lead-shielded doors shall be lead-lined the factory. Thickness shall be not less than the door lead thickness.

(11) Door pulls shall be thru-bolted type.

(12) Check for proper listing or label on hardware and detection devices for labeled fire-rated doors.

(13) Is hardware on labeled doors properly installed?

(14) Check for required kick plates when push plates are installed.

(15) Is the key cabinet at a suitable location?

(16) Be alert for the separate and distinctive requirements for locksets on barracks sleeping room doors.

(17) You will need the American National Standards Institute (ANSI) specific standard to fully check hardware items in question.

8D-03 PRISON-LOCKING DEVICES

a. Because of specific and complex requirements it is important that:

(1) All required shop drawings, catalog cuts, descriptive literature and samples be available and closely examined.

(2) Use the above as guidance during inspection of the installations.

(3) Check for submittal and approval of working model of the gang-locking device.

b. Check for the specific number and type fasteners for hardware. Some fasteners may require welding of the recessed heads.

c. Do all keys control their specific function? For keyed-alike locks?

d. Arrange to witness and validate required field tests.

CHAPTER 8E

GLAZING

INDEX

Para.	Title	Page
8E-01	SUBMITTALS	8E-1
	a. Descriptive Data	8E-l
	b. Certificates	8E-l
	c. Guarantee	8E-l
	d. Control Tower Glass	8E-1
8E-02	MATERIALS	8E-1
	a. General	8E-1
	b. Acrylic Plastic	8E-l
	c. Glass	8E-1
	d. Glazing and Sealing Compound	8E-1
	e. Mirrors	8E-l
8E-03	INSTALLATION	8E-2

CHAPTER 8E

GLAZING

8E-01. SUBMITTALS

a. Descriptive Data

(1) Manufacturers descriptive data is required.

(2) Also see that manufacturers installation instructions are provided and used for site installed units; especially for insulating, laminated, one-way and control tower glass.

(3) Also cleaning instructions for acrylic plastic glazing.

b. Certificates. Certificates or labels with specified identification are required. Safety glass is required to have etched marking of identification at a corner of each pane.

c. Guarantee. Check for 10 year guarantee on insulating glass units.

d. Control Tower Glass. Warranty, certification and test reports are required. Each pane of each unit must have manufacturer*s mark permanently affixed.

8E-02. MATERIALS

a. General

(1) Check thickness. Units to be clear and smooth on both sides.

(2) Check for manufacturers recommended backstop and sealant.

(3) Is glazing tape proper type and size? Use gray color tape.

c. Glass

(1) Check all types required from primary, figured, heat—absorbing, light-reducing, wire glass, insulating, laminated, one-way vision, tempered and heat-strengthened glass.

(2) Does wire glass in fire-rated doors comply with NFPA No. 80 requirements?

d. Glazing and Sealing Compounds

(1) Check the Flat Glass Marketing Association (FGMA) Glazing Manual for recommended types.

(2) Use aluminum color for glazing units of aluminum (natural color) material.

(3) Use gray or neutral color otherwise and for painted materials.

e. Mirrors. Check items with Federal Specifications DD-M-000411 for size thickness and required coatings and varnish sealer coats.

8E-03. INSTALLATION

a. Check for required sealant primed with sealant manufacturers instructions.

b. Double prime wood and ferrous metal rabbets and beads before glazing.

c. Double strength glass (1/8-inch thick) required in opening up to and including 21 square feet.

d. Don*t unpack acrylic plastic until ready to glaze.

e. Check for required shims, separators, etc., in accordance with drawing sand manufacturers instructions.

f. Are exposed fasteners for glazing corrosion—resistant type?

g. Check for removal of acrylic plastic protective cover immediately after installation. Manufacturer may recommend this requirement.

h. Check mirror frame, fasteners, anchorage and location.

i. When in doubt about hazardous glaring locations check the publication contents of the Consumer Product Safety Commission publication 16 CFR 1201, titled, Safety Standard for Architectural Glazing Materials.

CHAPTER 9A

METAL FRAMING AND FURRING, LATH AND PLASTER (STUCCO)

INDEX

Para.	Title	Page
9A-01	GENERAL 9A-1	
	a. References	9A-1
	b. Framing and Furring	9A-1
	c. Lathing	9A-1
	d. Plastering	9A-1
	e. Stucco	9A-1
	f. Veneer Plaster	9A-1
9A-02	SUBMITTALS	9A-1
	a. Samples	9A-1
	b. Shop Drawings	9A-1
	c. Certifications	9A-2
	d. Material List	9A-2
9A-03	MATERIALS	9A-2
	a. Ceiling Framing and Furring	9A-2
	b. Wall Framing and Furring	9A-2
	c. Lath	9A-2
	d. Plaster	9A-3
	e. Accessories	9A-3
	f. Stucco	9A-3
	g. Veneer Plaster	9A-3
9A-04	STORAGE 9A-3	
9A-05	PREPARATION	9A-4
	a. For Framing and Furring	9A-4
	b. For Lathing	9A-4
	c. For Plastering and Stucco	9A-4
	d. For Openings	9A-5
	e. For Testing	9A-5
9A-06	INSTALLATION AND APPLICATION	9A-5
	a. Ceiling Framing and Furring	9A-5
	b. Wall Framing and Furring	9A-6
	c. Lathing	9A-6
	d. Openings	9A-7
	e. Accessories	9A-7
	f. Gypsum Base Coats	9A-8
	g. Gypsum Finish Coat	9A-8

h.	Portland Cement Plaster	9A-9
i.	Stucco	9A-9
j.	Veneer Plaster	9A-9

CHAPTER 9A

METAL FRAMING AND FURRING,

LATH AND PLASTER (STUCCO)

9A-01. GENERAL

a. References, you should be familiar with the reference publications for materials. Most are ASTM*s, American Society for Testing and Materials, and their contents must be checked to determine approval and usage of materials. Needed references for installation include the following American National Standards Institute (ANSI) publications:

A42.l Gypsum Plastering
A42.2 Portland Cement Plastering (Stucco)
A42.3 Lathing and Furring for Portland Cement Plaster (Stucco)
A42.4 Interior Lathing and Furring

b. Framing and Furring. Steel framing includes formed (18 gage) and truss type studs for walls and 1-1/2 inch channels for ceilings. Furring is 3/4 inch channels or 18 gage hat shaped channels for walls and ceilings. Information is provided on both the restrained and the unrestrained type ceilings.

c. Lathing. Both metal and gypsum lath are included. Metal lath is expanded, welded or woven; gypsum lath is solidor perforated type. Perforated gypsum lath cannot be used on ceilings.

d. Plastering. There are many gypsum and portland cement plaster materials included herein. The mix ingredients and proportions, number of coats and type substrate are major factors in plastering. Portland cement plaster is not applied to gypsum lath.

e. Stucco. A portland cement, sand and lime mix used in exterior work. The ANSI A42.2 and A42.3 sections on proportioning and mixing and on application and curing must be reviewed.

f. Veneer Plaster. A hard, plaster finish provided over gypsum wallboard (GWB). A thin layer of specially formulated gypsum plaster is applied over GWB manufactured with an absorption face paper for bonding. Reinforcing mesh tape is applied over the joints in the installed GWB.

9A-02. SUBMITTALS

a. Samples. Check for samples required. They usually include a section of each type of lath and accessory, such as casing and corner beads. A stucco panel showing the finish texture and color should be required.

b. Shop Drawing. Installation drawings for ceiling framing and details of the additional supports at ceiling and wall openings are usually required. Drawings for stucco work should include all details and information on mix proportions and thickness of coats.

c. Certification. Required for bonding compound, in the form of a certified test report complying with provisions in MIL-B-19235, as modified in the MATERIALS section of the project specification.

d. Material List. A complete list of all materials and the intended use, specifically located, is required.

9A-03. MATERIALS

Ferrous steel items are either shop coated with protective paint or galvanized. Stainless steel tie wire may be required in ceiling framing. Most stucco accessories will be either zinc or rigid vinyl. Check stucco materials under Paragraph: Stucco.

a. Ceiling Framing and Furring.

(1) Hangers use 8 gage galvanized steel wire or steel strap.

(2) Framing is usually 1-1/2 inch steel channel.

(3) Furring is either 3/4 inch steel channel or 25 gage hat-shaped sheet—metal channel.

(4) Tie wire is 16 gage. Stainless steel wire may be required.

b. Wall Framing and Furring.

(1) Studs may be either 18 gage, sheet-metal type or the truss type formed with 7 gage wire. Stud width is shown on the drawings.

(2) Furring is usually 3/4 inch channel or 25 gage hat-shaped sheet-metal channel.

(3) Furring brackets for attachment to concrete or masonry are 20 gage with a serrated edge for anchoring tie wire used to attach furring members.

(4) Runners are 24 gage for attaching studs and furring to floors and ceilings.

(5) Tie wire is 18 gage and clips used instead of tie wire must be 8 gage. Stainless steel tie wire may be required.

c. Lath.

(1) Metal lath is either expanded type, cut and expanded from steel sheets, or made with welded or woven wire. Lath made from wire must have an integral paper backing to help hold the plaster until it sets.

(2) Gypsum lath is usually 16 by 48 inches and ½ inch thick for use on framing or furring. Larger sections, available for solid type partitions, extend from floor to ceiling height. Gypsum lath can be supplied perforated for use only in walls.

(3) The options for type of lath and weight (for metal) or thickness (for gypsum) depends on the spacing of the framing or furring to which the lath is directly attached.

d. Plaster.

(1) Gypsum - basecoats - are prepared with bagged and labeled gypsum mixed with aggregates in the proportions given in the specifications. Sand or a light weight aggregate, either perlite or vermiculite, may be used. Check for required type aggregate in fire-rated partitions and ceilings. Check for special gypsum for plaster applied by machine method.

(2) Gypsum - finish coat - use one of the following types:

Lime putty made from special finishing hydrated lime and gypsum gaging plaster.

Ready mix gypsum finishing plaster.

High strength gypsum special gaging plaster and lime for a hard, high strength finish.

Keene*s cement for a hard-finish uses 1/4 part hydrated lime to one part Keenes by weight.

(3) Portland cement plaster is proportioned as specified using portland cement, sand and lime.

e. Accessories.

(1) The various items must be checked with the approved sample for thickness or gage, flange width and configuration.

(2) All steel items are galvanized except that cornerite and strip lath may be given a protective paint coating at the factory in lieu of galvanized finish.

f. Stucco.

(1) Lath reinforcement is usually welded or woven wire placed on wood or metal framing. Waterproof paper is required either integral with the lath or by separate application. Separate paper application requires separately applied wirebacking. Lath should be spaced at least 1/4 inch out from supports for embedment.

(2) Stucco mix includes portland cement and sand with not more than 10 percent special finishing lime, by weight of cement, added as the plasticizing agent.

(3) Stucco finish coat with integral color will require a mill mix material to which only water is added at the jobsite.

(4) Accessories, except for cornerite and striplath, shall be either zinc or rigid vinyl.

g. Veneer Plaster. A mill mixed gypsum plaster formulated for veneer plaster use over GWB.

9A-04. STORAGE

a. Labeled materials will be checked for compliance with the specifications upon delivery. Material not in compliance or unidentified will be rejected.

b. Containers will be sealed.

c. Store materials in a dry and protected location to prevent dampness and deterioration.

d. Shade gypsum lath and veneer plaster base from direct sunlight. Sunlight will deteriorate the absorptive paper face.

9A-05 PREPARATION

a. For Framing and Furring.

(1) Is ceiling to be suspended from the structure or directly attached?

(2) Is furring required for direct attachment? How will furring be plumbed?

(3) How will suspended ceiling be leveled? By water tube? By instrument?

(4) Is wall framing long enough or high enough to require horizontal stiffeners?

(5) Does layout provide for extra framing and furring at control joints?

(6) Check the framing details for openings.

b. For Lathing.

(1) Is lath material proper design and weight for the spacing interval of framing or furring?

(2) Is metal lath application on walls set for required top to bottom laydown?

(3) Is gypsum lath application planned for staggered joint in alternate courses?

(4) Is stainless steel tie wire required? Is it available?

(5) Will self—furring metal lath be used over solid substrate?

c. For Plastering and Stucco.

(1) Has lath and accessories been checked for secure fastening?

(2) Are accessory grounds and screeds set to give required plaster thickness?

(3) For direct application are the concrete and masonry surfaces clean and bondable? Are control joint beads set and secured over control joints in the concrete and masonry?

(4) Check plaster mixing equipment, batching method and cleaning procedures.

(5) Is temperature at least 55 degrees F and will ventilation be adequate for drying plaster?

(6) Are required heating devices placed to exclude direct heat on plastered surfaces? Fans and baffles may be required.

(7) Portland cement plaster must be damp cured. Is the planned curing method satisfactory?

(8) Are all building openings closed?

d. For Openings.

(1) Are the required extra supports and framing installed at ceiling openings such as for recessed light fixtures and access panels?

(2) Are the metal door frames back-plastered? In lieu of back- plastering, column clips will be used to tie the double studs together. See OPENINGS paragraph of the specifications.

(3) Is striplath required at corners of openings to reinforce against plaster corner cracking?

e. For Testing.

(1) Are accurate thermometers available?

(2) Stainless steel tie wire and zinc accessories for stucco should be non-magnetic. Is a magnet available for testing?

(3) Measure the depth of grounds and screeds from face of lath to determine plaster thickness. Will it be the specified thickness?

(4) Is a slump cone available to test machine applied plaster? The slump of plaster is limited to between 2-1/2 and 3 inches when tested in a 6 inch high plaster slump cone.

9A-06. INSTALLATION AND APPLICATION

a. Ceiling Framing and Furring

(1) Check hanger wire or strap spacing. Must be 42 inches in each direction or a combination of 48 and 36 inches, the 48 inches being along the framing (runner) channel.

(2) Hangers must be plumb. Hangers at the perimeter must be within 6 inches of walls.

(3) Check for runner and furring channel clearance at walls of unrestrained ceilings.

(4) Check channels for specified splice interlock and lap. Splice location shall be staggered in adjacent members. Take two wire loops with each splice tie.

(5) Are saddle ties correctly made?

(6) Finish each tie with three loops or three twists, as appropriate.

(7) Check wire tieing procedure; wire ends must be flattened so they will not protrude near or through plaster surface.

b. Wall Framing and Furring

(1) Check Chapter 6A, CARPENTRY, for wood framing checklist.

(2) Check floor and ceiling runner anchorage. Runners shall be attached to furring members of continuous ceilings.

(3) Require specified number of fasteners at runner-stud connections.

(4) Check for additional studs at each side of doorways and at corners and intersecting walls.

(5) Wall stiffeners are provided with the 3/4 inch channel or the 1-1/2 inch channel, installed horizontally within the stud space. Check your specifications for location of these stiffeners.

(6) Check furred walls for:

direction; horizontal or vertical furring
furring bracket locations
furring brackets anchorage
fastening furring to brackets
floor and ceiling runner attachment

(7) Check the specifications for farming requirements for solid plaster partitions.

(8) Is a separate furring or framing member installed on each side of control joint beads?

c. Lathing.

(1) Type lath selected shall be compatible with the interval of spacing of the framing or furring to which the lath is directly attached.

(2) Attach lath with long edge across supports.

(3) Fasten metal lath at 6-inch intervals at supports and 9-inch intervals at laps. Fasten gypsum lath at 5-inch intervals.

(4) Lap width depends on type metal lath used. Check your specifications for lap width.

(5) Make end laps of metal lath at supports.

(6) Lath on unrestrained ceilings shall terminate in casing beads. Do not attach casing bead to the wall.

(7) Metal lath at restrained ceilings shall turn down at least 6 inches on walls or cornerite shall be used.

(8) Check for cornerite on gypsum lath at the ceiling-wall intersection of restrained ceilings.

(9) Metal lath on walls shall be applied from top of wall so that lower course laps upper course except paper backed lath is installed bottom to top of wall.

(10) Check for metal lath orientation for maximum mechanical bond. Expanded metal lath on walls shall feel rough when wiped from top to bottom of wall.

(11) Turn lath through corners for 6 inches or install cornerite. Attach only to underlying lath.

(12) Check for strip-lath, oriented diagonally, at each corner of openings. Attach only to underlying lath.

(13) Cut lath at control joints. Control joint will bridge lath opening with each wing attached to cut end of lath.

d. Openings.

(1) Check for strip-lath at the corners of openings which are 12 inches or greater in any dimension.

(2) Fasten strip-lath diagonally to plaster base Without fastening to framing or furring.

(3) Openings shall be framed with finish frames and plaster stops or with casing beads.

(4) Check for additional hanger, framing and furring supports for ceiling openings. Check the approved shop drawing for details.

(5) Hollow steel frames in walls require back-plastering. Form grooves in this plaster to receive installed lath.

(6) A substitute for back-plastering is tieing each set of double studs together with at least 4 sets of column clips. Fasten frame securely to double stud sets.

(7) Check for the runner channel section used as a header at the top of openings. Turn runner ends to member into jamb studs.

(8) Don*t forget the channel stiffener embedded in the wall, above the head of each opening.

(9) Check for a separate knee brace extending from each jamb studs are not anchored to structural supports.

e. Accessories.

(1) Check accessories for alignment, either level or plumb.

(2) Check beads, screeds, grounds and frames for required depth to develop the specified thickness of plaster.

(3) Fasten accessories at 12-inch intervals to the plaster base.

(4) Corner joints to exposed items shall be mitered. Butt joints shall be joined with splice plates.

(5) Each corner bead shall be installed as a one-piece unit. Is the bull-nose bead required? Is a built-in corner guard required?

(6) Use the casing bead to separate plaster at abutting dissimilar materials; also at the perimeter of restrained ceilings.

(7) Check the detail for correct application of control joint bead. Lath is cut to enable the joint to work and prevent nearby cracking.

f. Gypsum Base Coats.

(1) Accurate proportioning by volume is required. Check the table in the specifications.

(2) Check water content of machine applied plaster with a slump test.

(3) Will there be two or three separate coats (including the finish coat)? Three coats are required on metal lath.

(4) Each base coat is approximately 1/4 inch thick. The single coat in two-coat plaster (including the finish coat) is 1/8 inch in the same operation to increase base coat thickness to 3/8 inch.

(5) Check for bond with a solid base such as smooth finish concrete. A bonding compound application may be required.

(6) Check the specifications for plaster application sequence in solid partitions.

g. Gypsum Finish Coat.

(1) Finish coat mix proportions are given by weight.

(2) Check for required finish coat material given in the finish schedule on the drawings.

(3) If regular gypsum finish is indicated either lime-putty or prepared gypsum may be used, except that prepared gypsum finish can not be used over lightweight (perlite or vermiculite aggregated) base coats.

(4) Check the specifications or Keen*s—cement finish proportions and mixing sequence.

(5) The special, high strength gypsum finish must be checked at the mixer location. It is extremely difficult to determine high strength finish in place.

(6) Do not apply high strength gypsum or Keen*s-cement over lightweight aggregate base coats.

(7) Dampen the base coat surface immediately before applying the finish coat.

(8) Normal tolerance in finish surface is 1/16 inch in ten feet. This is reflected in adequate screed control and workmanship in troweling the finish coat to true, smooth surfaces.

(9) Finish coat thickness is:

MINIMUM 1/16 inch
MAXIMUM 1/8 inch

h. Portland Cement Plaster.

(1) Do use Portland cement plaster over gypsum plaster or over gypsum lath.

(2) Check for curing set-up before plastering begins. It is important that all coats be moist cured to control shrinkage.

(3) Check for a requirement for groove joints on approximately 4-foot centers through the finish coat to control shrinkage crackling.

(4) The foregoing groove joints will be in addition to normal control joint spacing on not mere than 12-foot centers.

i. Stucco.

(1) Stucco is Portland cement plaster mix applied to the exterior of building walls.

(2) Check screeds, grounds and frames to produce 7/8-inch thick stucco measured from face of lath.

(3) Check planned sequence of operation for continuous application to natural break lines such as openings, corners and control joints.

(4) Dampen masonry and concrete surfaces immediately before applying stucco.

(5) Check during provisions before stucco application begins. Continuous moist curing is most important.

(6) Finish coat must also be shaded from direct rays of the sun while curing.

(7) Remember that stucco accessories such as casing beads, corner beads, control joints and base screeds must be zinc or rigid vinyl material. Where these items are specified in galvanized steel, check with your supervisor for a change.

(8) Check finish texture and color for a match with the approved sample panel.

j. Veneer Plaster.

(1) Plaster base is the same size and shape as gypsum wallboard. This board has an absorption face paper for bonding the veneer plaster coats.

(2) Check the specifications for the one or the two—coat system.

(3) Cover all joints with mesh reinforcing tape. Do not overlap tape at joint intersections. Fasten tape with staples; see the system manufacturer*s instructions.

(4) A pretreatment at joints may be required before full surface application of plaster. Check manufacturer*s instructions.

(5) Plastering requirements are generally the same as regular plaster, however, temperature and ventilation requirements must be closely monitored. Veneer plaster is more sensitive to drafts and sudden changes in temperature.

(6) Check veneer plaster for thickness between 1/16 and 3/32 inch.

CHAPTER 9B

GYPSUM WALLBOARD (GWB)

INDEX

Para.	Title	Page
9B-01	GENERAL	
	a. References	9B-1
	b. Framing	9B-1
9B-02	MATERIALS	
	a. Adhesives	9B-1
	b. Fasteners and Hangers	9B-1
	c. Framing	9B-l
	d. Furring	9B-2
	e. Trim	9B-2
	f. Storage	9B-2
98-03	INSTALLATION	
	a. Waterproofing	9B-2
	b. Ceiling Framing and Furring	9B-3
	c. Wall Framing and Furring	9B-3
	d. Framed Openings	9B-4
	e. Application	9B-5
	f. Joint Treatment	9B-5
	g. Control Joints	9B-5

CHAPTER 9B

GYPSUM WALLBOARD (GWB)

9B-01. GENERAL

a. References. Of all the indicated references, the GA-216 is most important. This is the Gypsum Association*s "Recommended Specifications for the Application and Finishing of Gypsum Board". Be sure to read Paragraphs 5 and 18.

b. Framing. Generally, either wood or steel members are used. A rule of thumb f or guidance with wood is that the stud or furring face should not vary more than 1/8 inch from the plane of the faces of adjacent members. (Latest GA specification says 1/4 inch and that is too great a tolerance for good workmanship.)

9B-02. MATERIALS.

a. Adhesives.

(1) Check joint treatment compound. Is it quick dry (1 day) or slow dry (3 day) for the complete, three coat system?

(2) Be sure that fastening adhesive is recommended by the wallboard manufacturer for intended use.

(3) Don*t use fastening adhesive to attach wallboard in fire rated construction.

b. Fasteners and Hangers.

(1) Use only the special nail with annular rings. Nail length must be 3/4 inch longer than wallboard thickness. Too long is as harmful as too short.

(2) Use screws at least 1-1/8 inch long in wood and 1 inch long in steel members. The Type S screw is used with 25 gage steel studs and Type W is used with wood. Type S screws have drill points.

(3) Use a pan head (flat and without shoulder) screw for attaching steel stud in steel runner.

(4) Check for 9 gage galvanized hanger wire an d16 gage galvanized tie wire. Exception to tie wire is that 13 gage is used to splice furring and to tie studs, used as furring, to main channels.

c. Framing.

(1) Check Chapter 6A. CARPENTRY, for wood grade stamps, moisture, and type preservative treatment, when required. Erection is also given.

(2) Studs and runner channels are 25 gage. Studs have knockouts or holes for utility lines. Cuts made in studs for any purpose must have adjacent area reinforced. Check drawings for stud width required.

(3) Use full length studs. Do not permit splicing steel studs.

(4) Steel members have a light weight “electro” galvanized finish.

d. Furring.

(1) Check Chapter 6A for wood furring requirements.

(2) Hat—shaped steel furring is generally used. For long spans (over 4 feet) the steel stud is used as furring.

(3) Main member supporting is the 1—1/2 inch steel channel.

e. Trim.

(1) All steel trim is galvanized; such as the corner bead, casing bead, edge bead and control joint.

(2) Zinc metal beads may be required for special use or location. Check your spaces.

f. Storage.

(1) Weatherproof storage is required for all materials used.

(2) Pre-mixed adhesives also have temperature restrictions. Check the container label.

(3) Stack GWB flat to prevent sagging. Don*t permit use of damaged board.

98-03. INSTALLATION

a. Waterproofing.

(1) Check for specification requirement for water resistant type board. This specially treated board is used as a tile base.

(2) Caulk openings for pipes, etc. flush with specified waterproof material.

(3) Don*t use water resistant board on ceilings.

(4) Don*t use a vapor barrier behind water resistant board.

(5) Where regular gypsum wallboard needs waterproofing, check for the following:

(a) Waterproof coating at cut edges; at edge and for 4 inches on each surface from cut edge.

(b) Waterproof coating over fastener heads.

(c) Coating at edge of board adjacent to shower or tub base.

Remember that framing spacing should be less and more fasteners required in wallboard used for tile base. Check your specifications.

b. Ceiling Framing and Furring.

(1) Wood

(a) Check alignment of members.

(b) Blocking is required to support ends of GWB with fasteners. All GWB edges must be supported.

(c) Level-]up furring as required. Make joints over framing members.

(2) Steel Framing

(a) For attached ceilings: GWB is not attached directly to framing. See steel furring.

(b) Suspended ceilings

1. Check main runner channel spacing. Four foot is maximum spacing with hat-shaped furring.

2. Are wire hangers plumb?

3. Space parallel runners not more than 6 inches from walls.

4) Check for 12-inch lap at interlocking splices. Tie each end of each splice with 16 gage wire.

(3) Steel Furring

(a) Attach hat-shaped furring to framing with saddle ties.

(b) Maximum furring spacing is 16 inches on center.

(c) Space parallel furring member not more than 2 inches from wall.

(d) For spans greater than 4 feet, use studs as furring. Check the specifications for stud size and spacer required to spread stud at each tied connection to framing.

(e) Check for splice ties and staggering the lap in adjacent members. Splice lap in 8 inches.

c. Wall Framing and Furring.

(1) Wood framing and furring or walls and partitions shall be erected as prescribed in Chapter 6A, CARPENTRY.

(2) Check surface alignment of wood framing and require correction when smoothness tolerance is exceeded.

(3) Check for required blocking at:

(a) End joints of GWB.

(b) At openings in GWB.

(c) Attached fixtures, door bumpers, chair rails, curtain rails, etc.

(4) Steel framing

(a) Check alignment of floor and ceiling runner channels.

(b) Support or runner channel at top of wall must be secure. Check specifications for details.

(c) Screw-attachment of studs to runners requires two screws at each end. One on either aide of runner—stud joint before GWB is applied.

(d) Spacing of studs is usually 16 inches on center. Where 24-inch spacing is permitted, the GWB fastener interval is reduced and more fasteners are required.

(5) Steel furring

(a) Use saddle ties at the intersections with steel frame. Maximum furring span is feet.

(b) Shim for plumb alignment over concrete and masonry. Attachment is through. flanges of hat-shape furring at 24 inches on center on alternate flanges.

d. Framed Openings

(1) At ceiling openings which cut furring — use an additional runner to support furrings, each side of opening.

(2) Ceiling openings with cut framing - install additional hangers and framing to support furring.

(3) Wall openings:

(a) Check specifications for double stud requirement at unframed openings.

(b) Runner channel is used as header at top of opening. Cut channel 24 inches longer than opening width and turn ends to member into jamb studs.

(c) Check for required knee braces at jamb studs of unsupported walls.

e. Application

(1) Check preparation. Building must be weathertight before beginning GWB application.

(2) Horizontal application on walls or ceilings is when GWB tapered edges lay across (perpendicular to) attachment members.

(3) For vertical application, the tapered edges lay along (parallel to) attachment members.

(4) Check for ceiling application ahead of wall application, except that suspended ceilings are placed after wall finish.

(5) At the initial inspection, problems related to cutting, fitting, and fastener spacing and overdriving must be corrected.

(a) Smooth, cut edges are required for nest fitting joints.

(b) Plan application method for least length of end joints, Stagger end joints. Stagger end joints except in vertical application on walls.

(c) Joints on opposite sides of the same wall should not occur on same framing member.

(d) Eliminate the practice of overdriving nails or screws. Power screwdriver clutch may need adjustment to correct for overdriven screws.

(6) Check GA-216 fur fastener interval and spacing requirements.

(7) Remember that vertical application requires fastener attachment at the ends of GWB sheets.

(8) For fire-rated construction, check the attachment method required in the fire—rated system. See the specifics in the description of the system in the UL Fire Resistance Directory*.

(9) Attachment fasteners shall be:

(a) Driven into ceilings beginning from the center of each GWB sheet and progressing outward.

(b) Driven into walls beginning from the top of sheets.

(10) There are restrictions to the use of foil-backed GWB. Check GA-216. For thermal effectiveness, leave at least a 3/4 inch space behind foil surface.

f. Joint Treatment

(1) Minimum temperature required is 50 degrees F. Beginning from 48 hours before treatment and until adhesive has dried.

(2) Check type adhesive used. Is it the fast drying type?

(3) Require the person mixing adhesive powder to wear a respirator.

(4) Check for three coats of adhesive at joints and fastener heads. Taper as required.

(5) Don*t permit sanding the paper cover of GWB. This raises the nap of the paper which will create “high” spots in paint finish.

g. Control Joints

(1) Check for control joint requirement. These should be shown on the drawings to divide large areas of GWB surface.

(2) Install a separate attachment member for each wing of the control joint bead.

CHAPTER 9C

TERRAZZO; CERAMIC AND QUARRY TILE

INDEX

Para.	Title	Page
9C-01	GENERAL	
	a. References	9C-1
	b. Submittals	9C-1
9C-02	MATERIALS	
	a. Bonded Terrazzo	9C-1
	b. Resinous Terrazzo	9C-1
	c. Conductive Resinous Terrazzo	9C-2
	d. Industrial Resinous Terrazzo	9C-2
	e. Sparkproof Industrial Resinous Terrazzo	9C-2
	f. Ceramic Tile	9C-2
	g. Quarry Tile	9C-2
	h. Mortar for Tile Setting	9C-2
	i. Adhesive for Tile Setting	9C-2
	j. Grout	9C-2
	k. Metal Lath	9C-2
	l. Reinforcing Wire Fabric	9C-2
	m. Terrazzo Accessories	9C-3
	(1) Aggregate	
	(2) Divider Strips	
	(3) Control and Expansion Joint Strips	
	(4) Primer, Binder, and Filler	
	(5) Grout	
	(6) Curing Materials	
	(7) Cleaner and Sealer	
9C-03	PREPARATION	
	a. Storage	9C-3
	b. Temperature	9C-3
	c. Substrate	9C-3
	d. Tests	9C-4
9C-04	INSTALLATION	
	a. Bonded Terrazzo	9C-4
	b. Resinous Terrazzo	9C-4
	c. Ceramic Tile	9C-5
	d. Quarry Tile	9C-5
9C-05	ACCEPTANCE TESTING	9C-5

CHAPTER 9C

TERRAZZO; CERAMIC AND QUARRY TILE

9C-01 GENERAL

a. References

(1) As noted from the INDEX, there is a variety of terrazzo materials which are described in the MATERIALS paragraph. Likewise, the various methods and materials for setting and grouting ceramic and quarry tiles are given.

(2) You should have the references describing tile installation available to determine and check the required methods for acceptable work. Most are American National Standards Institute (ANSI) publications.

(3) The latest issue of common use references should be in the field office library. Your request for other needed publications should be made well in advance of the preparatory inspection meeting.

(4) Check Chapter 9A for the lath and plaster requirements for the wet wall base for ceramic tile.

(5) When a thin (1/8 inch) mortar bed such as dry-set or resinous material is planned for tile, the substrate must be within required smoothness tolerances.

(6) The National Terrazzo and Mosaic Association (NTMA) specification is needed for terrazzo floors as there will be direct references to this specification in the project specifications.

b. Submittals

(1) Samples shall be received as required in the colors and patterns given in the finish schedule on the drawings.

(2) Bonded terrazzo application requires certificates of compliance for conductive and resinous mortars and grout.

(3) Resinous terrazzos require certified teat reports, manufacturers descriptive and application data and maintenance literature.

(4) Check for shop drawings which show layout of all accessories.

(5) Check the applicator contractor*s qualifications as required by the specifications.

9C—02. MATERIALS

a. Bonded Terrazzo. This is portland cement base material with a total thickness of 1-3/4 inches — 1-1/4 inch underbed and a ½ inch topping.

b. Resinous Terrazzo. A thin (about 1/4 inch) resinous base material which is applied to finished, hard rock concrete.

The resinous flooring system specified could be one of the following:

Epoxy
Polyacrylate
Polyester
Synthetic Latex Mastic or Resin Emulsion

c. Conductive Resinous Terrazzo. Same as above except six includes acetylene carbon black powder to impart conductance. Matrix is black color. Thickness is 1/4 or 3/8 inch depending on resin system selected. Check your specifications.

d. Industrial Resinous Terrazzo. Same as for resinous terrazzo. The resin system specified will depend on exposure conditions. These systems are intended for floors of biological laboratories and similar hard wear areas.

e. Sparkproof Industrial Resinous Terrazzo. Similar to conductive resinous terrazzo except that formulation is intended for hard use areas in explosive or volatile flammable liquid atmospheres.

f. Ceramic Tile. Standard grade per Tile Council of America (TCA) standard specification. Check for required glazed or unglazed finish surface.

g. Quarry Tile. Check grade per TCA standard specification. Also whether smooth or abraded unglazed surface finish is required.

h. Mortar for Tile Setting. The following may be specified:

(1) Plastic mortar bad of sand and portland cement mix. See ANSI A108.1.

(2) Dry-set mortar of pre-mixed material, water added; for use over cured mortar (plaster) bed or required concrete or masonry. See ANSI A108.5

(3) Resinous; either epoxy or furan material for special use areas. Check the finish schedule.

i. Adhesive for Tile Setting. A pre-mixed material conforming to ANSI A108.4 and used in dry areas over gypsum wallboard.

j. Grout

(1) Pre-mixed using white portland cement for ceramic tile. May be job mixed with gray cement for quarry tile.

(2) Pre-mixed, either epoxy or furan resin, for special use areas.

k. Metal Lath. Use to reinforce the setting bed for wall tile. Expanded metal lath weighing 3.4 pounds per square yard.

l. Reinforcing Wire Fabric. Use to reinforce the concrete fill, when required, for floor setting bed. Either 2 by 2 inch, 16 gage, or 1-1/2 inch, 16 and 13 gage wire.

m. Terrazo Accessories

(1) Aggregate. Check for blend of chips (1/8-1/4) in accordance with NTMA No. 1 requirements. Marble chips usually specified except that granite chips may be specified to increase stain and acid resistance.

(2) Divider Strips. May be brass, white zinc alloy or plastic. (Brass and plastic may react with resinous materials.) Check your specifications for material and gauge thickness.

(3) Control and Expansion Joint Strips. Special "sandwich" shapes for use at joint locations in the substrate. A neoprene filler material, or a temporary filler removed for sealant, is part of the preformed joint material. Check NTMA Specifications for details.

(4) Primer, Binder and Filler. Materials required in resinous terrazzo mix as recommended by the binder manufacturer.

(5) Grout. As required and recommended by the manufacturer of the resin.

(6) Curing Materials. Portland cement terrazzo cured with wet sand, waterproof sheet or liquid membrane curing compound.

(7) Cleaner and Sealer. As recommended for terrazzo by the material manufacturer. Sealer is a penetrating type.

9C-03. PREPARATION

a. Storage Check container labels on arrival for matching information with that submitted in manufacturer*s data. Storage must be in a protected location to prevent freezing.

b. Temperature. Check your specifications. Minimums may be 50 degrees F or 60 degrees F, depending on system specified.

c. Substrate.

(1) Check Chapter 9A for cement plaster application for wall tile.

(2) Plaster finish will depend on tile setting method; rough finish for bond with plastic mortar bed and trowel finish to required tolerances for dry-set mortar bed.

(3) Check for adequate curing of plaster.

(4) Check for use of curing compound on the concrete base. It must be completely removed for proper bond.

(5) Correct defects in concrete. Allowable smoothness tolerance is 1/8 inch in 10 feet to receive the dry-set and thin-set systems. Has concrete aged for required period of time?

(6) Check surface finish. It may be trowel, light broom or float finish, depending on terrazzo system to be applied.

(7) For tile, the substrate must be within 2 inches of finish floor elevation. If not, a reinforced concrete fill is required.

(8) Check the specifications for concrete fill mix proportions and reinforcement laps.

(9) Discontinue reinforcement fabric at control and expansion joints.

(10) Check the shop drawing for grounding grid in conductive finish floors.

(11) Check underbed for low-slump mix for portland cement bonded terrazzo system.

(12) Check divider strip layout for terrazzo from approved shop drawings. (Don*t use "T* strips over joints in the substrate.)

(13) Are you ready for installation?

d. Tests. Certified test reports with required results for the resinous flooring system should have been received and reviewed.

9C-04. INSTALLATION

a. Bonded Terrazzo.

(1) Check mix proportions and color. Will the topping thickness be the required minimum? Make a final check on divider strip depth.

(2) Nest cement paste is required directly over underbed surfaces.

(3) Do the specifications require seeding with aggregate chips? Rolling until excess water is removed? Trowel finish using divider strips as screeds?

(4) Check curing requirements.

(5) Finishing process is described in the specifications for rough grinding, grouting, curing and fine grinding.

(6) A smooth, level surface with a minimum of swirl marks should be the result of a first class finish.

(7) Check the cleaning and sealing and protection required.

b. Resinous Terrazzo.

(1) Requirements are given in the data submitted by the manufacturer.

(2) Are divider strips at indicated location and depth to produce required thickness for these thin-set floor finishes?

(3) Check preparation of cast-in-place cove base, where required.

(4) Are the control and expansion strips placed exactly at the same joint locations in the substrate?

(5) Check the mixing and placing instructions of the resin manufacturer for actual conformance with work to be performed.

(6) The sequence of grinding, grouting, curing and finish grinding is important for quality work. See that these steps are accomplished in turn.

c. Ceramic Tile.

(1) Install wall tile before floor tile.

(2) Check for symetrical layout such that no tile course is less than one—half tile width.

(3) Tile wainscot height shall be to nearest full course dimension.

(4) Check for required caps, corners and other trimmer tile. Check for accessories.

(5) Where resinous grout is scheduled, rake joints clean and check grout manufacturer*s instructions for neutralizing joints and application of grout.

(6) Contractor must sequence tile setting so that mortar bed does not set or dry before laying tile.

(7) Check for required conductive dry—set mortar. See ANSI A118.2.

(8) Check size and height of marble thresholds. Fully grouted head joints at ends shall be not more than 1/4 inch wide.

(9) Check for required control joints in walls and floors. Tile control joints shall be installed exactly over these type joints in the substrate material.

(10) Clean and protect finished work as specified.

d. Quarry Tile

(1) Check quarry tile layout for alignment and joint width.

(2) Check for abrasive surface finish. See the finish schedule.

(3) Resinous mortar and grout shall be mixed and applied in accordance with manufacturer*s instructions.

9C-05. ACCEPTANCE TESTING

a. Conductive tile and terrazzo will be tested in accordance with provisions in National Fire Protection Association (NFPA) Standard No. 56A.

b. The resistance test determines conductivity. A qualified technician shall perform the tests. Written test results will be furnished.

c. Spark resistance tests and conditions are described in the specifications. Written test results will be furnished.

CHAPTER 9D

ACOUSTICAL TREATMENT

INDEX

Para.	Title	Page
9D-01	GENERAL	
	a. References	9D-1
	b. Submittals	9D-1
9D-02	MATERIALS	
	a. Acoustical Units	9D-1
	b. Grid Systems	9D-1
	c. Storage	9D-2
9D-03	PREPARATION	9D-2
9D-04	INSTRUCTION	9D-2

CHAPTER 9D

ACOUSTICAL TREATMENT

9D-01. GENERAL

a. References

(1) This new chapter covers acoustical treatment in suspended ceilings. Although these systems are relatively simple to install, there are many details which require your attention.

(a) Check the suspension system requirements in ASTM C636.

(b) There are many submittal requirements to check at the preparatory inspection. See Paragraph b.

(c) Temperature and humidity limits must be maintained to avoid warping the fiberous type ceiling tiles.

(d) Check the requirements and locations for systems required to have a sound transmission class (STO) and a fire resistive rating.

b. Submittals

(1) Check for ceiling manufacturer*s installation instructions. These will not conflict with information in C636.

(2) Sample tiles are required.

(3) A shop drawing with details of the suspension system must be approved; a reflected ceiling plan, when possible.

(4) Certified test reports or approved test data will be necessary for special systems for sound transmission and fire resistance. Be sure ceiling openings are occupied by approved lighting fixtures, etc.

9D-02. MATERIALS

a. Acoustical Units

(1) Has the tile proposed been approved?

(2) Should you have that responsibility, a copy of SS-S-118 will be necessary to check out the requirements and compare with descriptive data and label information.

b. Grid Systems

(1) Approver must compare system to C635. System must conform to those requirements.

(2) Use approved shop drawing to check system installation. The 12 gage galvanized hanger wire is the minimum size permitted.

c. Storage

(1) Check labels upon arrival and special labels as applicable.

(2) For last 24 hours the system materials must be at same conditions as during installation. Maximum 75 percent relative humidity and temperature between 60 and 80 degrees F.

9D-03. PREPARATION

a. Make a final check for interferences and resolve or report them to your supervisor.

b. Temperature and humidity conditions in the installation areas most be as given above.

c. Check hanger wire structural attachments. They cannot be attached to steel deck.

d. Check for required access panels.

90-04. INSTRUCTION

a. Hanger wires shall be hung plumb. When an angle or splay is necessary because of obstruction, and additional hanger will be used to compensate.

b. Check hangers for clearance from duct and pipe insulation.

c. Wire hangers with kinks must be replaced.

d. Supports cannot be attached to steel deck.

e. Check perimeter molding for required attachment to walls. Springs are required between tile edge and molding except at lay—in systems.

f. Check the special construction requirements for main member splices, tile hold down clips, etc.

g. Are access panels properly located and identified.

h. Check the level surface of ceiling for conformance to tolerances in C636.

i. Extra support hangers may be required, such as at heavy light fixtures, to eliminate detection beyond tolerances permitted.

j. Replace damaged or dirty tile as required.

CHAPTER 9E

WOOD FLOORING

INDEX

Para.	Title	Page
9E-01	GENERAL	
	a. References	9E-1
	b. Submittals	9E-1
9E-02	MATERIALS	
	a. Strip Flooring	9E-1
	b. Parquet Flooring	9E-1
	o. Block Industrial Flooring	9E-1
	d. Primer and Adhesive	9E-2
	e. Filler	9E-2
	f. Wood Sleepers and Nails	9E-2
	g. Steel Channels and Clips	9E-2
	h. Storage	9E-2
9E-03	PREPARATION	9E-2
9E-04	INSTALLATION	
	a. Strip Flooring	9E-3
	b. Parquet Flooring	9E-3
	c. Block Industrial Flooring	9E-3
	d. Sanding and Sealing	9E-4

CHAPTER 9E

WOOD FLOORING

9E-01. GENERAL

a. References

(1) Grade markings must be checked and grading, too. You will need the publication describing grading rules. Check the specification for the publication title.

(2) Wood block flooring requirements are found in ASTM D1031.

(3) Be aware of special requirements for wood flooring for gymnasiums and hand ball courts.

b. Submittals

(1) Samples of the proposed flooring are needed for approval.

(2) It is Important that the floor manufacturer*s installation instructions are received, approved and used.

9E-02. MATERIALS

a. Strip Flooring

(1) Optional wood species may be listed for contractor*s selection.

(2) Check thickness as it may be 3/4 — inch up to 33/32 - inch.

(3) Check grade on the trademark.

b. Parquet Flooring

(1) Slat-block flooring is available in a variety of patterns. Check the finish schedule. These pre-assembled units are made with solid wood slats.

(2) Solid-block flooring is 9-inch squares of pre-assembled strip flooring material.

(3) Check the trademark grade for conformance. Check the grading rules should there be any doubt of the quality.

(4) Flooring may be pre-finished or unfinished. Check the specifications.

c. Block Industrial Flooring

(1) Beveled corners are usually specified for our use. Bevel extends through full thickness.

(2) Contractors may select wood specie or, or heavy use, upland oak will be required.

(3) Check for required preservative treatment stamp on bundles.

d. Primer and Adhesive

(1) Used for installation over concrete and the type material will be as recommended by the flooring manufacturer.

(2) Check storage requirements on container labels.

e. Filler

(1) Manufacturer*s recommended filler is applied to completed industrial block flooring.

(2) Asphaltic filler of steep-slope asphalt may be required for gymnasium and hand ball courts.

(3) Check for a polyethylene sheet vapor seal or water proofing membrane in lieu of the filler. Insulation board may also be required.

f. Wood Sleepers and Nails

(1) Check for preservative treatment. Specific type treatment and maximum moisture content must be enforced.

(2) Check specie and grade required.

g. Steel Channels and Clips

(1) Manufacturers system may use steel channels and clips to attach flooring to sub-floor.

(2) Check system for required pads beneath the anchor channels.

(3) Steel components must be galvanized.

(4) Insulation between channels will be either asphalt impregnated fiberboard or closed cell polyethylene foam.

h. Storage

(1) Accept only unopened and correctly labeled packages.

(2) Check for storage in a dry ventilated location.

(3) Check for flooring moisture content between 6 and 9 percent.

9E-03. PREPARATION

a. Building must be completely enclosed.

b. Flooring installation must be phased after other operations are completed.

c. Building temperature must be between 65 and 80 degrees F, before, during and after floor installation. Check your requirements as the maximum temperature for certain systems may be 72 degrees F.

d. Correct concrete sub-floor defects and remove residue from curing compounds and sealers before adhesive application. Check for concrete drying requirements before flooring installation can begin.

e. Check joints or sleepers for level plane surfaces before installing sub-flooring and underlayment.

f. Check Chapter 6A for sub-flooring and underlayment installation.

g. Check for loose sub-flooring and raised nails.

h. Where boards are used for sub-flooring, check for cupping. Replacement must be required where additional nailing will not correct the problem. Is diagonal installation required?

i. Review specifications for waterproofing or vapor barrier provisions.

9E-04. INSTALLATION

a. Strip Flooring

(1) Check for layout; perimeter space for expansion and for laying strips parallel to length of room area.

(2) Check anchor channel or sleeper fastening for rigidity. Check for spacing of cushion pads.

(3) Check for 6 — inch minimum stagger at end joints at adjacent strips.

(4) Separate end joints in the same plane with at least two rows of strip-flooring.

(5) Check for required size nail or clip. Does nail have a deformed shank? Nails shall be countersunk. Check nail spacing and use at least 2 nails per strip section.

(6) Fit-up shall be close and snug. Follow manufacturers specific installation instructions.

(7) Check for and enforce the special color matching requirements for installing flooring on walls of handball courts.

b. Parquet Flooring

(1) Is a checkerboard layout required? Check for perimeter space for expansion.

(2) Prepare for and spread adhesive in accordance with the flooring manufacturers installation instructions.

c. Block Industrial Flooring

(1) A special requirement is storage within the area of installation for at least 7 days before application begins. Check for specific temperatures and humidity conditions required.

(2) Manufacturer*s specific instructions for primer, adhesive and block application must be enforced.

(3) Check for alignment in parallel rows or courses. Break joints in adjacent courses as in masonry layup.

(4) Check for expansion space at perimeter and at all obstructions such as columns.

d. Sanding and Sealing

(1) sanding passes shall be as specified and by skilled mechanics for smooth and uniform surfaces and without sanding marks or shiners.

(2) Check schedule of sanding such that required sealer coat is applied within 8 hours after final sanding pass. This is important to prevent moisture absorption which will cause the grain of the wood to rise.

(3) Dry clean floor surfaces thoroughly, including all shoe and boot marks, immediately before sealing.

(4) Block industrial flooring requires at least two coats of filler applied in accordance with the flooring manufacturer*s instructions.

(5) Check for required protection. The correction of damaged floors is only second best. Prevent damage with adequate protection.

(6) Check carefully on the operations of subcontractors or the Using Service where equipment such as refrigerators, washing machines, cooking stoves, kitchen cabinets and similar equipment is being installed after installation of finish flooring. These items shall be lifted into place, not dragged!

CHAPTER 9F

RESILIENT FLOORING

INDEX

Para.	Title	Page
9F-01	GENERAL	
	a. References	9F-1
	b. Submittals	9F-1
9F-02	MATERIALS	
	a. Conductive Vinyl	9F-1
	b. Vinyl Composition	9F-1
	c. Sheet Vinyl	9F-1
	d. Adhesives	9F-1
	e. Wall Base	9F-1
	f. Storage	9F-1
9F-03	PREPARATION	9F-1
9F-04	INSTALLATION	9F-2
9F-05	CLEANING AND PROTECTION	9F-2

CHAPTER 9F

RESILIENT FLOORING

9F-01. GENERAL

a. References

(1) The flooring manufacturer*s installation instructions must be submitted. You will need to know these instructions.

(2) A special conductivity test is required for the conductive vinyl tile installation. The test is described in NFPA Standard No. 56A.

b. Submittals

(1) Check for receipt of floor manufacturer*s installation instructions. The cleaning and maintenance instructions are also required.

(2) Are flooring samples approved? Use these to check for approved colors of delivered flooring.

(3) Test reports or certificates of compliance, as applicable, are required.

9F-02 . MATERIALS

a. Conductive Vinyl. Use either 12 by 12 or 36 by 36 inch tile. Must be layed in conductive epoxy cement.

b. Vinyl Composition.

(1) Tile can be either 3/32 or 1/8 inch thick. Check your specifications and the tile with a thickness gage.

(2) Check pattern color distribution. They must continue through tile thickness.

(3) Same tile lot number, as stamped on containers, must be used in same area.

c. Sheet Vinyl. Check the referenced Federal Specifications. A 72-inch minimum width is required.

d. Adhesives. Use only the tile manufacturer*s recommended material.

e. Wall Base. Check finish schedule for color. Check height and thickness for conformance.

f. Storage. Require a clean and dry location with temperature above 70 degrees F for two days before installation.

9F-03. PREPARATION

a. Is concrete floor ready for installation? Check for the following at the preparatory inspection:

(1) Has area for flooring been above 70 degrees F for two days prior to inspection or before application?

(2) Is concrete surface clean and level (except for required slopes)?

(3) Are all defects and damage repaired?

(4) Make dryness test as described in the specification.

(5) Is all other work complete?

b. The adhesive may not bond where certain curing compounds were used on the concrete surface.

(1) Wax base compound must be completely removed before adhesive is applied.

(2) The CE specified curing compound, i.e. Federal Specification TT-C-800, Type I or II, Class 1 with fugitive dye, is acceptable over concrete for adhesive application.

c. All types of curing compound must be completely removed before applying conductive epoxy cement for conductive vinyl tile flooring.

d. Spills must be completely cleaned and checked for compatability with the adhesive.

e. If lightweight concrete (less than 90 pcf density) , is a topping required?

f. For wood substrate, check joints and fasteners for smoothness.

9F-04. INSTALLATION

a. Check manufacturer*s instructions. Require installation as instructed.

b. Check layout at initial inspection. Perimeter tile must be not less than one-half full size tile.

c. Check for excessive use of adhesive. Use of too much will squeeze up at joints.

d. Check sheet flooring for trapped air bubbles at substrate. Roller must be used from center, outward to edges.

e. Check wall base for adhesion. preformed corners may be required by the specifications.

9F-05. CLEANING AND PROTECTION

a. Clean as required.

(1) Dry clean vinyl and vinyl composition floors immediately after installation.

(2) Wash clean and rinse after five days per manufacturer*s instructions.

b. Polish as specified.

c. Protect all flooring surfaces with a covering of heavy duty building paper until just before turnover to the Using Service. Install ‘Boardwalks” as necessary.

CHAPTER 9G

PAINTING

INDEX

Para.	Title	Page
9G-01	GENERAL	
	a. References	9G-1
	b. Safety	9G-1
9G-02	SUBMITTALS	
	a. Certificates	9G-1
	b. Manufacturer*s Instructions	9G-1
	c. Samples	9G-1
9G-03	MATERIALS	9G-2
	a. General	9G-2
	b. Cement Emulsion Filler Coat	9G-2
	c. Solvent-Thinned Filler Coat	9G-2
	d. Vinyl-Wash Coat	9G-2
	e. Vinyl System	9G-2
	f. Fungicide	9G-2
	g. Mixing and Thinning	9G-3
9G-04	SURFACE PREPARATION	9G-3
	a. General	9G-3
	b. For Cement-Emulsion Filler	9G-3
	c. For primers	9G-3
	d. For Washable Paint Systems	9G-4
	e. Plaster	9G-4
	f. Wood	9G-4
9G-05	APPLICATION	9G-4
	a. Temperature	9G-4
	b. Methods	9G-5
	c. Coverage and Thickness	9G-5
	d. Natural Finish	9G-6

CHAPTER 9G

PAINTING

9G-01. GENERAL

a. References. Should you have to examine the test reports, the referenced publications for those type paints and coatings must be used to:

(1) Compare and determine conformance.

(2) Decide to approve or reject the material.

(3) Request additional sampling and testing.

b. Safety

(1) Check the requirements for storage of paints, brushes, rags; ventilation in confined spaces; and protection when spray painting.

(2) Check working platforms, scaffolds, swing stages for protective devices.

(3) Detail information is in the ‘Safety and Health Requirements” Manual.

90-02. SUBMITTALS

a. Certificates. Check for the certificate attesting to not more than 0.06 percent lead in any and all materials provided. (Except for lead-base primers to be used in concealed locations.)

b. Manufacturers* Instructions are required for:

(1) Textured coatings.

(2) Epoxy

(3) polyurethane

(4) Liquid glaze

c. Samples

(1) Be sure material is well mixed before sample is drawn.

(2) Mark quart samples and include represented quantity and batch number.

(3) Sample each type representing more than 25 gallons.

(4) Store samples at specified temperature range for future testing or:

(a) Send to a laboratory for immediate testing for samples representing 50 or more gallons.

(b) Decide to send for test where sample represents 25 to 50 gallons for use.

(c) Use an approved test report representing material not sampled.

(d) Check for approved proprietary brands substituted for specified type in quantities not exceeding 25 gallons.

(5) Are the sample panels representing each type liquid glaze coating approved? Check for specified coating thickness.

(6) A sample finished room may be required. It will be important to observe paint application and the finishes to determine acceptance.

9G-03 MATERIALS

a. General

(1) Check containers for proper labeling and storage.

(2) Examine material in damaged containers for possible rejection.

(3) The 5 gallon container is maximum size for pigmented paints.

(4) Water-thinned paints must be kept at above freezing temperature.

b. Cement—Emulsion Filler Coat

(1) Use either acrylic or polyvinyl acetate (PVA) exterior emulsion; do not intermix or interchange.

(2) Check the dry ingredients, i.e., cement and sand for specification compliance.

(3) Mixing of the five ingredients is done just prior to application.

c. Solvent-Thinned Filler Coat. Comes pre—mixed for immediate use. Check Federal Specification TT-F-1098.

d. Vinyl Wash Coat. Two component. Must be mixed at job-site. Check Mil. Specification DOD-P-15328. For use as prime coat on painted, galvanized steel or non-ferrous surfaces.

e. Vinyl System

(1) Uses Steel Structures Paint Council Specification SSPC-Paint 9-64 material.

(2) Used to protect ferrous metal surfaces exposed in severe chemical or salt atmospheres.

(3) Do not use over conventional paint, including primed metal surfaces.

f. Fungicide

(1) Additive into paint at paint manufacturer.

(2) Check for labeling end don*t accept an “overstamp” unless validated by manufacturer.

(3) For all paint coats where specified.

(4) Check for specified use over pipe insulation.

(5) Check for use over painted formboard ceilings.

g. Mixing and Thinning.

(1) Check for complete mixing by observing consistency and color.

(2) Are base coats tinted?

(3) Job mix must be in accordance with manufacturer*s instructions.

(4) Check pre-mix and mixing cycle for cement—emulsion fill coats.

(5) Is vinyl wash coat used same day it is mixed?

(6) Maximum thinning is one pint per gallon of paint; immediately before application and at application temperature.

(7) Don*t intermix different type paints or different manufacturers paint.

90-04. SURFACE PREPARATION

a. General

(1) Check for protection of unpainted adjacent surfaces.

(2) Are ferrous metal surfaces, including fastener heads, primed before coating with water-thinned paints?

(3) Check for oil and grease. Remove same from surface with a low toxicity solvent.

(4) Concrete, stucco and masonry must age for 3D days before beginning painting.

(5) Is masonry clean of mortar gobs and fins?

b. For Cement-Emulsion Filler

(1) Check for uniformly damp masonry surface immediately before painting.

(2) No standing water permitted.

c. For Primers

(1) Check ferrous metal and remove all rust and loose mill scale. Solvent clean before priming.

(2) Galvanized surfaces must be solvent cleaned and a vinyl wash coat applied within 24 hours before priming.

(3) Painted non-ferrous metals receive same treatment as galvanized metal.

(4) Check for immediate cleaning and priming of abraded shop coating.

d. For Washable Paint Systems

(1) Check the specified paint system to determine preparation.

(2) Finish coating may be enamel semi-gloss or gloss type or the epoxy, polyurethane over masonry surfaces.

(3) Check manufacturer*s instructions for base coat preparation for epoxy, polyurethane and liquid glaze coatings.

(4) Check for acid etch treatment to concrete for the epoxy and polyurethane systems.

(5) Check for use of solvent-thinned filler as preparation for enamel undercoats, epoxy or polyurethane over masonry surfaces.

(6) Seal plaster and gypsum board with latex paint coat before proceeding with enamel, epoxy or polyurethane washable paint systems.

e. Plaster

(1) Must satisfy two requirements:

(a) Age for at least 30 days.

(b) Contain not more than 5 percent moisture.

(2) Use a moisture peter with plaster calibration and use probe in low visibility locations.

f. Wood

(1) Check for treatment of knots and other breaks that bleed pitch.

(2) Have nails and other fasteners been set in finish surfaces in preparation for primer? Touch-up is still required even in the wood was previously primed.

(3) Sand smooth the finish wood surfaces of millwork.

(4) Remember to seal wood adjacent to surfaces about to receive water-thinned paints.

(5) Check moisture content of wood before painting. A maximum of 12 percent is permitted for painting. Use a moisture meter.

9G-05. APPLICATION

a. Temperature

(1) Check the different requirements for ambient temperature such as:

(a) A 50 to 90 degree F range for applying water-thinned paints.

(b) A 45 to 95 degree F for most other paints. Note that liquid glaze, epoxy and polyurethane manufacturers may have other temperature requirements.

(2) Check for minimum humidity during polyurethane application, Usually is 3 percent minimum.

b. Methods

(1) Permit use of brush, roller or spray except:

(a) Stiff-bristle type brush application required for cement—emulsion filler coat.

(b) Brush out solvent-thinned filler cost then squeegee off the excess when tacky.

(c) Brush on the first coating on metal surfaces.

(d) Brush on solvent-type stains.

(e) Check for textured coating manufacturer*s special application instructions.

(2) Check coverage for uniformity in texture and color. Remember the base coats must be tinted.

(3) Your system for checking color, number of coats and quality should be worked out with your supervisor in advance.

(4) Be especially alert for uniformity of coating appearance. Touch up may be required for suction spots on porous surfaces.

(5) Check for coverage in hard to reach locations.

(6) Check for dryness before applying additional coats or removing required temporary heat. Different type paints have different dryness characteristics but, generally, if a finger rub does not mar the painted surface, the paint coat is dry.

c. Coverage and Thickness

(1) Refer to manufacturer*s instructions for epoxy, polyurethane and liquid glaze coatings.

(2) Check coating thickness for liquid glaze. Required base coats is 5 mile minimum and the top or glaze coat is 3 mile minimum, Use a thickness gage suitable to the surface coated to make these checks.

(3) Film thicknesses are specified for paint on ferrous metal surfaces. Spot check these thicknesses for primer coat and total system with a thickness gage.

(4) Vinyl-wash coat film thickness requirements are usually specified.

(5) Check painting applicator for uniform coverage. The paint being used must be mixed frequently to maintain consistency and color.

d. Natural Finish

(1) Check exterior wood surfaces to be stained. Rough surface requires about double the amount of stain.

(2) Check varnished surfaces for smoothness. Sand smooth after each coat of varnish.

(3) Use wood filler coat for smooth surfacing open grain wood such as oak.

(4) Check putty on wood filler color tinting to match natural finish.

CHAPTER 9H

WALL COVERING

INDEX

Para.	Title	Page
9H-01	SUBMITTALS	9H-1
9H-02	MATERIALS	9H-1
9H-03	PREPARATION	9H-1
9H-04	INSTALLATION	9H-2

CHAPTER 9H

WALL COVERING

9H-01. SUBMITTALS

a. Check for sample color and pattern in accordance with finish schedule requirements on the drawings.

b. Additional information required from the wall covering manufacturer is as follows:

Installation instructions.
Descriptive data
Cleaning instructions.
Maintenance data.

9H-02. MATERIALS

a. Wall covering shall conform to Federal Standard CCC-W-408, Type and protective film as specified.

b. Is wall covering weight as specified? Type indicates weight, as Type I, 7 oz/sy; Type II, 13 oz/sy or Type III, 22 oz/sy.

c. Is a factory applied polyvinyl fluoride protective film required?

d. Is primer and adhesive mildew resistant? Check the container labels.

e. Check material type and design of wainscot cap.

f. Are exterior corner guards required?

g. Store well covering flat in a dry location at temperature of not less than 50 F.

9H-03. PREPARATION

a. Wall surfaces of GWB and plaster shall be clean and dry. Check plaster for not more than 5 percent moisture content before application. Check with a moisture meter.

b. Surface shall be within specified smoothness tolerance.

c. Become familiar with wall covering manufacturer*s surface preparation requirements, which usually include the following:

GWB joint and fastener treatment.
Sanding rough and glossy surfaces.
Coating of primer sealer.

d. Is the minimum temperature of 50 F satisfied in areas to receive wall covering?

9H-04. INSTALLATION

a. Apply as directed in wall covering manufacturer*s instructions.

b. Use material in exact order as cut from the roll. Look for special instructions.

c. When wall cutting (double-cut) procedure is used to match joints, do not cut substrate.

d. Do not make joints closer than 6 inches to corners.

e. Extend wall covering at least ½ inch behind base, trim, electric plates, etc.

f. Check pattern and color for match. Should variations occur, corrective action is required.

g. Finished surfaces shall be free of air pockets, wrinkles, open joints, tears or other defects.

CHAPTER 10A

TOILET PARTITIONS AND ACCESSORIES

INDEX

Para.	Title	Page
10A-01	SUBMITTALS	10A-1
	a. Shop Drawings	10A-1
	b. Samples	10A-1
10A-02	MATERIALS	10A-2
	a. Partitions	10A-2
	b. Accessories	10A-2
10A-03	INSTALLATION AND APPLICATION	10A-2

CHAPTER 10A

TOILET PARTITIONS AND ACCESSORIES

10A-01. SUBMITTALS

a. Shop Drawings

(1) Toilet partition shop drawings must be approved. Check partitions on arrival and compare features with those shown on the shop drawings. Especially compare the following:

Gages of metal
Reinforcing for accessories
Fitting
Anchoring
Hardware Finish

(2) Style of partition shall be as specified:

Style A - floor supported
Style B - ceiling hung
Style C - overhead braced

(3) Check screens for adequate anchorage requirements.

b. Samples

(1) Accessory samples must be submitted and approved. Check accessories on delivery and compare to approved samples. A listing of accessories follows:

Facial Tissue Dispenser
Grab Bar
Medicine Cabinet
Glass Mirror
Metal Mirror
Paper Towel Dispenser
Sanitary Napkin Dispenser
Shower Curtain
Shower Curtain Rod
Soap Dispenser
Soap Holder
Glass Shelf
Metal Shelf
Soap and Grab Bar Combination
Towel Bar
Towel Pin
Toilet Tissue Dispenser
Toothbrush and Tumbler Holder
Waste Receptacle

(2) Descriptive data should accompany each accessory sample.

10A-02. MATERIALS

a. Partitions. For verification of type, style, quality, size, etc., the requirements in Federal Specification RR-P-1352 must be checked. Also check for partition and screen panel reinforcement where accessory attachment is required.

b. Accessories. Check the specification and Federal Specification WW-P-541 for detailed description of accessories.

10A-03. INSTALLATION AND APPLICATION

a. Check for damaged units and reject those not repairable.

b. Metal fasteners and fittings shall be of the same or compatible metal. Check for required stainless steel fasteners.

c. Check for rigid anchorage and plumb and level attachment.

d. Check for required through-bolting.

e. Are exposed fasteners of tamper-proof design?

f. Check the mounting height for accessories which should be shown on the room detail elevation on the drawings.

g. Check the partition door clearance and for adjustment to 30 degree open in the unlatched position.

CHAPTER 10B

RAISED FLOORS

INDEX

Para.	Title	Page
10B-01	SUBMITTALS	10B-1
	a. Descriptive Data	10B-1
	b. Shop Drawings	10B-1
	c. Samples	10B-1
	d. Design Calculations	10B-1
	e. Certificate	10B-1
10B-02	MATERIALS	10B-1
	a. Types	10B-1
	b. Floor Panels	10B-1
	c. Steps and Ramps	10B-2
	d. Hand Rails	10B-2
10B-03	INSTALLATION	10B-2
	a. Preparation	10B-2
	b. Framing	10B-2
	c. Floor Panels	10B-2
	d. Finish Flooring	10B-3
	e. Grounding	10B-3
10B-04	TESTING	10B-3
10B-05	PROTECTION	10B-3
10B-06	SPARE PARTS	10B-3

CHAPTER 10B

RAISED FLOORS

10B-01. SUBMITTALS

a. Descriptive Data. Check for receipt of floor manufacturers data, including installation, cleaning and maintenance instructions.

b. Shop Drawings.

(1) Check for approved shop drawings which should include the following:

Layout and elevations for the system
Component materials in detail
Grounding
Shop coating and finishes

(2) Installation methods may also be included on the shop drawings.

c. Samples. A floor panel with the finish flooring and samples of manufacturer*s standard colors of flooring are required.

d. Design Calculations. Either calculations or certified test reports for floor loading, air leakage, grounding and bond strength of adhesive used for pedestals and for finish flooring are required for approval.

e. Certificate. Check for receipt of the manufacturer*s certificate, signed by an officer of the company, indicating compliance with the contract requirements.

10B-02. MATERIALS

a. Types

(1) Extruded aluminum frame

(2) Zinc-coated steel frame

b. Floor Panels

(1) Die-cast aluminum

(2) Die-cast steel with baked enamel finish

(3) Combination: Wood core of particleboard encapsulated in steel or aluminum. Flame spread rating of 25 or less is required.

(4) Finish floor may be resilient tile of plastic laminate. Check the requirements as conductive vinyl tile may be required.

(5) Check for rubber or vinyl cove base specified. Molded external and internal corners may be required.

c. Steps and Ramps

(1) Check the shop drawings for materials, sizes and details.

(2) Are the non-slip traffic surfaces located as required?

d. Hand Rails

(1) Check the shop drawings for details.

(2) Rails and standards will be anodized, satin finish aluminum tubing.

10B-03. INSTALLATION

a. Preparation

(1) Are the shop drawings and installation instructions available?

(2) Concrete sub-floor oust be clean before beginning and cleaned again after installation of the floor system

(3) Is sub-floor to be painted? Check for the presence of curing compound or other bond-breaker. Be sure surface is clean and unpainted before adhesive applications for pedestal bases.

(4) Check for required temperature and humidity conditions for installation.

b. Framing

(1) Check pedestal alignment and elevation. Finish floor smoothness tolerance rust be not sore than 1/16-inch in 10 feet.

(2) Is the pedestal base anchored with mechanical fasteners? Don’t attach fasteners until base adhesive has set. Check adhesive container label for set time.

(3) Check stringer interlock; or panel interlock at pedestals when stringers are not required.

(4) Check for installation of required auxiliary framing wherever panels are cut or terminated.

(5) Coating damage and abrasions must be repaired when discovered.

c. Floor Panels

(1) Check for required interlock and fit.

(2) Check for level installation. Check for smoothness without projecting edges and rocking panels.

(3) Wood core panels which are cut must be covered with metal skin at the cut edges.

(4) All cutouts for electric conductors and cables must be bushed and closed as detailed.

(5) Floor panels shall be removable except for perimeter panels and cut panels which must be anchored to framing. At least two lifting devices for removing panels shall be provided.

d. Finish Flooring

(1) Check for loose flooring material.

(2) Plug cracks and voids before application of cove base.

a. Grounding Check for continuous grounding of all metal parts of raised floor.

10B-04 TESTING

a. You should be available to witness the electrical resistance test.

b. Check for humidity and temperature conditions within the ranges required for the test.

c. Obtain a copy of the National Fire Protection Association (NFPA) Standard No. 56A and become familiar with the test requirements and the modifications given in the raised floor specification. Required test values are given in the specification.

d. Require a written report of the test results.

10B-05 PROTECTION

a. Clean the finish floor in accordance with the flooring manufacturer*s instructions.

b. Be alert for restrictions to cleaners permitted for conductive flooring

c. All damaged materials must be replaced with new so insist on adequate protection for the finished floor, using paper, fiberboard and/or plywood, as necessary.

10C-06 SPARE PARTS

a. Check the specifications for the number of required lifting devices to remove floor panels.

b. Check for required spare floor panels.

c. Check for required spare pedestal assemblies and stringers.

CHAPTER 10C

WARDROBES

INDEX

Para.	Title	Page
10C-01	SUBMITTALS	10C-1
	a. Shop Drawings	10C-1
	b. Sample	10C-1
	c. Test Results	10C-1
10C-02	MATERIALS	10C-1
	a. Hardware	10C-1
	b. Steel Wardrobe	10C-1
	c. Wood Wardrobe	10C-2
	d. Delivery and Storage	10C-2
10C-03	ASSEMBLY & INSTALLATION	10C-2

CHAPTER 10C

WARDROBES

10C-01. SUBMITTALS

a. Shop Drawings

(1) Check the details in the shop drawings against specification requirements and details in the contract drawings. Be especially alert for:

Hardware type and finish
Material size and thickness
Adequate fastening and reinforcement
Finish coatings

(2) Wood wardrobes must conform to provisions in Architectural Woodwork Institute (AWI) references in the specifications. You and the person responsible for shop drawing approval and sample inspection should have access to these references.

b. Sample

(1) Examination and approval of the sample wardrobe is the most important action for this work phase. Although you may not have approval responsibility, you should become familiar with all features of the sample.

(2) Approval should be in writing, citing the variations which are acceptable and those which are unacceptable, or the request should be made for a new, revised sample.

(3) The approved sample remains the standard of workmanship and material for all wardrobes and will be identifiable when installed in the project.

c. Test Results. The results of static load tests described in the specifications are requested in writing. Tests should be made and witnessed at the site, as required for validation.

10C-02. MATERIALS

a. Hardware. Check material, function and finish. Check for secure fastening and tamperproof hinges and latching mechanism.

b. Steel Wardrobe

(1) Check for specified metal gage. Use U.S. Standard Gage for sheet steel.

(2) Check welds for required size, quality and interval. Welds exposed on the exterior shall be ground smooth.

(3) Mechanical fasteners cannot be exposed on the exterior of wardrobes. Exposed fasteners for hardware should be tamperproof type.

(4) Check for double-wall type doors; for sound deadening insulation; and for required reinforcement.

c. Wood Wardrobe

(1) Check the AWI Standards and Specifications for material, quality of workmanship and finishing provisions.

(2) Wood strips for closures shall match wardrobe finish.

(3) At least one coating for the finish shall be shop applied to seal surfaces and edges.

d. Delivery and Storage

(1) Check at delivery for damage.

(2) Chest units shall be prefabricated at the manufacturer*s shop.

(3) Adequate protection and ventilation shall be provided to prevent damage in storage.

10C-03. ASSEMBLY AND INSTALLATION

a. Assembly and installation shall be controlled to prevent damage to building finishes and to wardrobes.

b. Secure wardrobes to floors, walls or adjacent units with number and location of fasteners as specified. Use washers with fasteners.

c. Check operation of drawers, doors and hardware. Require adjustment as necessary.

d. Interferences with light switches, receptacles, heating and ventilating units and grilles, etc., should have been eliminated at rough-in phase for those items.

e. Where sliding doors are permitted and used, check for jump-proof hardware and secure bottom retainers.

CHAPTER 12A

BLINDS, CURTAINS AND SHADES

INDEX

Para.	Title	Page
12A-01	GENERAL	12A-1
12A-02	MATERIAL	12A-1
12A-03	INSTALLATION	12A-1

CHAPTER 12A

BLINDS. CURTAINS AND SHADES

12A-01. GENERAL

a. Approval action on shop drawings and manufacturer*s descriptive data will require a check on provisions in the listed Federal Specifications; latest issue of each should be referenced in the project specifications.

Venetian Blinds	AA-V-00200
Curtains	CCC-C-525
Shades	DDD-S-251

b. Proper fit is the responsibility of the contractor. Measurements should be taken after trim work is complete.

12A-02. MATERIAL

a. Check sample for required operation, smooth traverse, rotation and access to clean window glass.

b. There are special requirements for audiovisual and lightproof items. Check the operation through light traps.

c. Cloth curtains will have straight, French seams. A French seam is described as a seam stitched first on the right side and then turned in and stitched on the wrong side so that the raw edges are enclosed in the seam.

12A-03. INSTALLATION

a. Check approved shop drawing for installation requirements.

b. Check for complete finishing, including all painting before beginning installation.

c. Is the item centered and level with the covered opening?

d. Are holddown brackets required?

e. Are audiovisual and lightproof items, including the light traps, closely fitted to prevent outside light from infiltrating the room?

CHAPTER 12B

CABINETS AND CASEWORK

INDEX

Para.	Title	Page
12B-01	GENERAL	12B-1
12B-02	MATERIALS	12B-1
	a. Metal	12B-1
	b. Wood	12B-1
	c. Hardware	12B-2
	d. Countertop and Backsplash	12B-2
	e. Delivery and Storage	12B-2
12B-03	INSTALLATION	12B-2

CHAPTER 12B

CABINETS AND CASEWORK

12B-01. GENERAL

a. Shop drawings are required. Check for approval and necessary information which should include the following:

Plan and elevation details
Lay out
Gage of metal, thickness of wood
Mounting and anchorage
Hardware type and finish
Reinforcing for hardware

b. Check American National Standards Institute (ANSI) Standard A161.1 for kitchen cabinets and A156.9 for cabinet hardware.

c. Check Military Specification NIL-C 20709 for medical and dental casework.

d. Check for receipt of required samples and the approval action. This should be in writing, informing the contractor of the action, i.e. , approval with or without comments.

e. A certificate indicating casework material compliance with specific requirements in the specification will be required.

12B-02 MATERIALS

a. Metal.

(1) As stated, metal casework shall conform in all respects to provisions in MIL-C-20709. Person responsible for approval action will need to review this military specification.

(2) Casework is usually made of carbon steel with a baked enamel finish. Check your specifications as stainless steel may be required.

(3) Cabinets are made of carbon steel with baked enamel finish.

(4) Check for good workmanship in fit-up and fastenings. Exposed welds are to be ground smooth.

(5) Should a workmanship question occur, check the quality of the approved sample.

b. Wood.

(1) Casework shall be finished with plastic laminate over plywood or particleboard. Check for delamination at edges and joints.

(2) Cabinets shall be natural or paint finish or hardwood plywood.

(3) Check cabinet construction, reinforcing and finish by comparison with the approved sample cabinet.

(4) Check for drawer stops.

c. Hardware.

(1) Cabinet hardware shall be stainless steel or chromium-plated brass, as specified.

(2) Check for thru-bolted hardware attached to units with particleboard core.

(3) Drawer guides shall be firmly and adequately fastened to framework.

d. Countertop and Backsplash.

(1) Check items with approved sample.

(2) Laminate material shall comply with the LD3 Standard of the National Electrical Manufacturers Association (NEMA)

e. Delivery and Storage

(1) Check for damage at delivery and reject unrepairable units or items.

(2) Store units in a protected location to prevent damage.

12B-03. INSTALLATION

a. Precautions shall be taken to prevention of damage to room finishes during installation of casework and cabinets.

b. Check alignment for level and plumb installation.

c. Anchors and fasteners shall be at the required interval and locations specified. Spot check fastening and anchor effectiveness.

d. Check for door and drawer alignment and acceptable operation.

☆U.S. GOVERNMENT PRINTING OFFICE : 1992 O - 330-984