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PREPARED FOR THE
UNITED STATES DEPARTMENT OF ENERGY
UNDER CONTRACT NUMBER EY-76-C-06-1857

Document No.

HWS-6935

Date

Copy No.

8-11-60

Title

GENERAL CONSTRUCTION, REACTOR BUILDING AND HEAT
EXCHANGER BUILDING SUPERSTRUCTURE, BUILDINGS
105N AND 109N, TECHNICAL SECTIONS

Author

BURNS & ROE, INC.

Subject Index

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SECTION II-1

MASONRY

1. SCOPE

Masonry shall be constructed as shown on the drawings and in conformity with these specifications.

2. APPLICABLE PUBLICATIONS

The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

a. Federal Specification

HH-F-341a	Filler, Expansion Joint, Preformed; Non-Extruding and Resilient types. (for concrete)
QQ-S-632	Steel Bar, Reinforcing, (for) Concrete.
SS-B-663	Brick, Concrete
SS-C-192b	Cements, Portland

b. American Society for Testing Materials Standards

A 82-58T	Cold-Drawn Steel Wire for Concrete Reinforcement
A 116-57	Zinc-Coated (Galvanized) Iron or Steel Farm-Field and Railroad Right- of-way Wire Fencing.
A 153-59	Zinc-Coating (Hot-Dip) on Iron and Steel Hardware.
A 305-56T	Minimum Requirements for the Deformations of Deformed Steel Bars for Concrete Reinforcement.
C 33-59	Concrete Aggregates.

C 55-55	Concrete Building Brick.
C 67-57	Methods of Sampling and Testing Brick.
C 90-59	Hollow Load-Bearing Concrete Masonry Units.
C 91-59	Masonry Cement.
C 129-59	Hollow Non-Load Bearing Concrete Masonry Units.
C 140-56	Sampling and Testing Concrete Masonry Units.
C 266-58T	Method of Test for Time of Setting of Hydraulic Cement by Gillmore Needles.
C 270-59T	Mortar for Unit Masonry.
C 331-59T	Lightweight Aggregates for Concrete Masonry Units.

c. Facing Tile Institute

Specification for Glazed and Unglazed Structural Facing Tile - November 1959.

3. MATERIALS

3.1 Aggregate used in the manufacture of concrete masonry units, concrete brick and split block shall conform to ASTM Standard C 33 or C 331, as modified hereinafter. Grading of aggregate as stipulated in Section 7 in ASTM Standard C 33 and testing of lightweight aggregates for drying shrinkage as stipulated in Section 6 (a) in ASTM Standard C 331 will not be required. Lightweight aggregates shall comply with the following when tested for stain-producing iron compounds:

3.1.1 When determined by visual classification method, the iron stain deposited on the filter paper shall not exceed the "light stain" classification.

3.1.2 When determined by chemical analysis method and reported as Fe_2O_3 , the iron stain deposited on the filter paper from a 200-gram sample shall not exceed 1.2 mg. Fe_2O_3 .

3.2 Anchors and joint reinforcement shall be of standard manufacture except as otherwise specified herein, and shall be zinc-coated ferrous metal of the types noted below. Zinc coating of anchors shall conform to ASTM Standard A 153, Class B-1, B-2 and B-3 as required. Zinc coating of wire for joint reinforcement shall conform to ASTM Standard A 116, Class 1.

3.2.1 Rigid steel anchors for anchorage of interior walls and partitions shall be 1 by 1/4 inch with ends turned up not less than 3 inches.

3.2.2 Channels for anchoring masonry walls at exterior metal walls are specified in the Section, MISCELLANEOUS METALWORK of these specifications.

3.2.3 Joint reinforcement shall be fabricated from steel wire conforming to ASTM Standard A 82, zinc-coated before fabrication. Longitudinal wires shall be deformed and shall be not lighter than 3/16 inch in nominal diameter. Cross wires shall be not lighter than 0.1483 inch in nominal diameter (9 gage). The distance between contacts of cross wires with longitudinal wires measured between contacts on each longitudinal wire shall not exceed 16 inches. The

spacing of the longitudinal wires in joint reinforcement shall be 1-1/2 inches less than the nominal width of the block. Cross wires may be placed between and in the same plane as deformed longitudinal wires. The over-all thickness where cross bars are welded to longitudinal bars shall not exceed 7/32 inch. Joint reinforcement shall be provided in flat sections ranging from 10 to 20 or more feet in length. Reinforcement in rolls will not be permitted.

3.2.4 Dovetail-type anchors for use with embedded slots or inserts shall be of sheet steel not lighter than 0.0598 inch in nominal thickness (16 gage) by 1-inch-wide flat anchors. Dovetail slots and inserts are specified under the STRUCTURAL CONCRETE section.

3.3 Portland Cement shall conform to Federal Specification SS-C-192.

3.4 Concrete brick and split block shall conform to ASTM Standard C 55, as hereinafter modified. Concrete brick and split block units which have been subjected during manufacture to a saturated steam pressure of not less than 135 pounds per square inch for not less than 5 hours may be used as soon as cooled. Units which have not been subjected to such steam pressure shall be cured not less than 28 days before delivery. Units shall be delivered to the job site in an air-dry condition.

3.4.1 Concrete brick used for shielding purposes in the 105-N Building shall conform to Federal Specification SS-B-663, Grade H and shall have a density of not less than 145 pounds per cubic foot.

3.5 Concrete masonry units shall be manufactured of shale aggregate and shall be of modular dimensions where available, and shall include

all closers, headers, and special shapes and sizes required to complete the work/as shown on the drawings. Units shall be sound and free from cracks, chipped edges or other defects that would interfere with their proper setting or impair the strength, appearance or durability of the construction. Units shall be free of any matter that will stain paint or corrode metal. Concrete masonry units which have been subjected during manufacture to a saturated-steam pressure of not less than 135 pounds per square inch for not less than 5 hours may be used as soon as cooled. Units which have not been subjected to such steam pressure shall be cured not less than 28 days before delivery. Units shall be delivered to the job site in an air-dry condition.

3.5.1 Load-bearing concrete masonry units shall conform to ASTM Standard C 90, as modified herein. At the option of the Subcontractor, units for interior walls may be either grade A or grade B. Units with face shell thickness under 1-1/4 inches and over 3/4 inch, with average minimum compressive strength of 1000 pounds per square inch and without any absorption requirement, may be used in lieu of grade B units.

3.5.2 Non-load-bearing concrete masonry units conforming to ASTM Standard C 129, as modified herein, shall be used in interior non-load-bearing walls and partitions, or load-bearing units specified above may be used.

3.5.3 Concrete masonry units for fire-rated interior walls and partitions shall be units with not less than 75 percent of the gross area

solid. If required to meet the fire-resistance rating hereinafter specified, the cores of hollow units shall be solidly filled with concrete grout. The walls and partitions, as erected in the locations specified below for the 109-N Building shall have a fire-resistive rating of not less than two hours. Masonry walls requiring filled cores in the 105-N Building are specified on Drawing H-1-27666.

- a. Enclosing stairs No. 3, 4, 5 and 6 at El. (-) 16'-0".
- b. Enclosing stairs No. 2 and 3 at El. 0'-0".
- c. Wall on column line "J" between columns 69.1 and 71.
- d. Elevator shaft from El. 0'-0" to underside of roof slab.

3.6 Glazed facing tile in the 105-N Building shall conform to the specifications of the Facing Tile Institute for Glazed and Unglazed Structural Facing Tile of select quality, Grade SS. The nominal face size shall be 8 inches by 16 inches in accordance with the 8W series, and shall have a nominal thickness of 4 inches. Color of facing tile shall be white. Glazed tile units shall have vertical cores.

3.6.1 Mortar for glazed facing tile shall consist of 1 part of Portland cement, 4 parts of sand passing a No. 16 sieve, 1/2 part of lime putty and Ammonium Stearate paste equal to 2 percent of the weight of the cement. Lime putty may be prepared from either hydrated lime or quicklime.

3.6.2 Pointing mortar for glazed facing tile shall be Hydroment Joint Filler manufactured by the Upco Company, Cleveland, Ohio, or approved equal.

3.7 Mortar shall comply with the property specification for type M mortar as set forth in ASTM Standard C 270; except that, when tested

for water retention in accordance with ASTM Standard C 91, mortar made of the same materials, in the same proportions as used in the work and mixed to an initial flow of 125 to 140 percent, shall have a flow after suction of 75 percent or more of that immediately after mixing; and except that, when tested for compressive strength in accordance with ASTM Standard C 91, mortar shall be made of the same materials and in the same proportions as used in the work. Certified copies of laboratory-established proportions and tests shall be furnished to evidence that mortar used in the work meets the requirements of the property specification as modified herein. No change in the laboratory-established proportions shall be made nor shall materials with different physical or chemical characteristics be utilized in mortar used in the work unless additional evidence that such mortar meets the requirements of the property specification as specified herein is furnished.

3.8 Reinforcing steel bars and rods shall conform to Federal Specification QQ-S-632, Type II, grade C, D, E, or G. Deformations shall conform to ASTM Standard A 305.

3.9 Caulking compound for sealing around masonry panels in the 105-N Building walls shall be a Thiokol type sealing compound and shall be light gray in color. Compound shall be "Pro-Seal" caulking compound as manufactured by Coast Paint and Chemical Corp., Los Angeles, California, or approved equal. Pro-Seal Primer No. 991 shall be used to prepare joints for Pro-Seal caulking compound.

3.10 Expansion joint material for use in masonry walls of the 105-N Building shall be asphalt-impregnated fiber board conforming to the requirements of Federal Specification HH-F-341. Expansion joint material shall be "Flexcell", 1/2-inch thickness, manufactured by The Celotex Corporation, Chicago, Illinois, or approved equal.

4. HANDLING AND STORAGE

Masonry materials shall be stored in an approved manner that will protect them from contact with soil and exposure to the elements.

5. SAMPLES

The following samples of materials proposed for use shall be submitted for approval before materials represented by the samples are delivered to the project site.

5.1 Anchors: Two of each type proposed for use.

5.2 Joint reinforcement: One piece of each type of reinforcement 18 inches in length showing at least two cross joints.

6. CERTIFICATES

Certificates shall be furnished prior to delivery of the certified material to the project site. Each certificate shall be signed by an authorized officer of the manufacturing company and shall contain the name and address of the Subcontractor, the project location, and the quantity and date (or dates) of shipment or delivery to which the certificate applies. Concrete masonry units, glazed facing tile, concrete brick and split block shall be certified for compliance with all specification requirements. Aggregate for concrete masonry units

shall be certified for compliance with specification requirements for nonstaining and popout properties.

7. TESTS FOR AIR-DRY CONDITION

Upon delivery of concrete masonry units, concrete brick or split block to the project site, representative samples shall be selected from stockpiles and tested for air-dry condition. Sampling and testing will be performed by others.

7.1 Air-dry condition is defined as the moisture condition of a concrete masonry unit, concrete brick or split block in a state of equilibrium with a relative humidity of not greater than 50 percent, or not greater than the average relative humidity at the project site as determined by the nearest U.S. Weather Bureau station from the total of annual observations recorded for the month in which the unit is delivered, whichever is the higher. A tolerance of 5 percent relative humidity above that specified will be allowed when the average relative humidity of the outside air during the 15 calendar days immediately preceding the date of delivery is above the relative humidity specified. The maximum permissible moisture content shall be 20 percent of total absorption.

8. TESTS FOR MORTAR

Tests for mortar and establishing the proportions of mortar for use on the work shall be done by commercial testing laboratory.

9. ERECTION

9.1 General: Masonry shall not be erected when the ambient temperature is below 35 F except when specifically authorized in writing.

No frozen work shall be built upon. No brick or other unit having a film of water or frost on its surface shall be laid in the walls. Masonry shall be protected from freezing for 48 hours after being laid. Masonry shall be laid plumb, true to line, with level courses accurately spaced and with each course breaking joints with the course next below. Each unit shall be adjusted to its final position in the wall while mortar is still soft and plastic. Any unit which is disturbed after mortar has stiffened shall be removed and relaid with fresh mortar. Bond pattern shall be kept plumb throughout. Corners and reveals shall be plumb and true. Chases and raked-out joints shall be kept free from mortar or other debris. Spaces around metal door frames and other built-in items shall be solidly filled with mortar. Anchors, wall plugs, accessories and other items required to be built in with masonry shall be built in as the masonry work progresses. Cutting and fitting of masonry required to accommodate the work of others shall be done with masonry saws. The sizes of any two adjacent units shall be selected within permitted tolerances so that the difference between the vertical faces of such units in exposed-to-view or painted walls or partitions as installed in habitable rooms and spaces shall not exceed 1/8 inch.

9.2 Unfinished work shall be stepped back for joining with new work; toothing may be resorted to only when specifically approved. Before new work is started, all loose mortar shall be removed and the exposed joint shall be thoroughly cleaned.

9.3 Mortar that has stiffened because of chemical reaction (hydration) shall not be used. Except as specified below, mortar shall be used and placed in final position within 2-1/2 hours after mixing where air temperature is 80 F or higher and within 3-1/2 hours after mixing where air temperature is less than 80 F. Mortar not used within these time intervals shall be discarded. When cement or cements used in the mortar have been tested and the observed time of initial set as determined under ASTM Standard C 266 has been ascertained, an optional method of determining the time interval during which the mortar must be placed in final position may be used as follows:

Air Temperature in degrees F	Time interval after mixing
80 or higher-----	Time of initial set minus 1 hr.
less than 80-----	Time of initial set minus 1/2 hr.

Mortar that has stiffened within the time interval, as determined above, because of evaporation of moisture from the mortar, may be retempered to restore workability by adding as much water as is practicable without impairing the workability of the mortar.

9.4 Concrete brick and split block shall not be wetted before laying. Horizontal and vertical joints shall be of the same width except for inconspicuous variations required to maintain the bond.

9.5 Concrete masonry units shall not be wetted before laying. Units shall be set with vertical joints breaking not less than 4 inches over units in the course next below. Mortar joints in modular construction shall be approximately 3/8 inch wide and mortar joints in non-modular construction shall be of the thickness required to lay

up to the nominal dimensions shown on the drawings. Mortar joints in starting courses on slabs shall be full-bedded under both face shells and webs. Other joints shall have full mortar coverage on horizontal and vertical face shells, but mortar shall not extend through the unit on the web edges. Mortar joints on all exposed-to-view interior walls and partitions, shall be tooled slightly concave so that the mortar will be thoroughly compacted and pressed against the edges of the units, except that mortar joints in Toilets and Janitor's Closet shall be flush. Tooling shall not be done until after the mortar has taken its initial set. Units terminating against soffits of beams or slab construction shall be wedged tight with slate or metal wedges after mortar in bed joints has attained its initial set, and the joint packed full with mortar. Each course shall be bonded at corners, and shall be either bonded into adjacent construction or the wall or partition shall be anchored thereto with metal anchors spaced not over 2 feet on centers. Jamb units shall be of shapes and sizes required to bond with wall units and shall be built in where shown on the drawings or required. No cells shall be left open in face surfaces. Masonry-unit walls or partitions in supporting plumbing, heating or other fixtures, voids at door jambs, and other spaces requiring grout fill, shall be full bedded in mortar to prevent leakage and filled solidly with mortar mixed to pouring consistency. The cores in all masonry unit walls between Shops and Offices in the 105-N Building, where indicated on the drawings, shall be filled solidly with Class A con-

concrete, as specified under the STRUCTURAL CONCRETE SECTION, using 3/8-inch maximum size coarse aggregate.

9.5.1 Partitions, except as otherwise shown on the drawings, shall be continuous from floor to underside of slab or beam construction above.

9.5.2 Precast concrete lintels shall consist of Class "A" concrete as specified in the STRUCTURAL CONCRETE section, using 1/2-inch maximum size coarse aggregate reinforced with not less than four No. 5 bars. Lintels may be cast on the site or at the plant. Lintels shall have beds and joints at right angles to the face, with sharp true arrises. Precast lintels shall have an absorption of not more than 8 percent by weight after immersion in water for 48 hours. Unless precast lintels have been subjected during manufacture to a saturated steam pressure of not less than 135 pounds per square inch for not less than 4 hours, the lintels following casting, shall be damp-cured not less than 24 hours or steam-treated and shall then be aged under cover for not less than 28 days. Lintels shall extend at least 8 inches on each side of the opening. Lintels shall be of the depths shown on the drawings. Reinforcing steel shall be continuous throughout the length of the lintel. Splices will not be permitted.

9.5.3 Vertical cells to be filled shall have vertical alignment maintaining a clear, unobstructed, continuous vertical cell measuring not less than 2 by 3 inches. Vertical reinforcement shall be continuous and rigidly secured at top and bottom and at intervals as

necessary to hold in proper position. Splices, where used, shall be 30 diameters in length. Splices shall be held centered in blocks.

9.5.4 Units containing reinforcement shall be solidly filled with class A concrete, as specified under the STRUCTURAL CONCRETE section, using 3/8-inch maximum-size coarse aggregate.

9.6 Glazed facing tile units shall be kept dry at all times. Tile shall be stored on suitable dunnage or pallets and shall not be allowed to rest on the ground. Tile shall be completely covered during storage to prevent absorption of water. Tile shall be laid in a full bed of mortar. Courses shall be kept level throughout. Tile shall be laid in stacked bond pattern with vertical joints accurately lined up. All joints shall be raked out to a minimum depth of 3/8-inch and packed with Hydroment joint filler.

9.7 Pre-molded expansion joint material shall be installed where shown for the 105-N Building, and the masonry-unit walls and concrete brick shall be built up to same in such a manner as to insure a tight fitting mortar joint between the masonry and pre-molded expansion joint material.

9.8 Caulked joints between masonry work and work of other trades shall be provided where called for on the drawings. Caulking shall be done in accordance with the caulking compound manufacturer's recommendations leaving a smooth exposed surface.

10. SHRINKAGE-CRACKING CONTROL

Shrinkage cracking in concrete-masonry unit and concrete-brick and split-block construction shall be controlled by joint reinforcing

and control joints in strict accordance with the details shown on the drawings and as specified hereinafter.

10.1 Joint reinforcement shall be installed where called for on the drawings. Joint reinforcement at openings shall extend not less than 24 inches beyond the end of lintels or to the end of the panel if less than 24 inches. Reinforcement shall be lapped not less than 6 inches, and the lap shall contain at least one cross wire of each piece of reinforcement. Joint reinforcement shall be accurately formed around corners and at wall intersections.

10.2 Control joints shall be provided at the locations shown and shall be constructed by using either special control-joint units or open-end stretcher units. Control joints on exposed-to-view or painted interior walls shall be raked to a depth of 1/4 inch.

11. PAINTING AND CLEANING

Before completion of the work, all defects in joints of exposed interior masonry surfaces shall be raked out, filled with mortar, and retooled. All masonry surfaces shall be left clean, free of mortar daubs, and with tight mortar joints throughout. No nail or other holes will be permitted in finished joints.

12. JAMBS

Three cells of masonry units at door jambs shall be grouted with mortar full height.

SECTION II-2

METAL ROOF AND FLOOR DECKS

1. SCOPE

The work included under this specification consists of furnishing, fabricating, and erecting metal decks for the 105-N Building concrete floor and roof slabs as shown on the approved drawings.

2. APPLICABLE PUBLICATIONS

The following specifications and standards, of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto.

a. FEDERAL SPECIFICATIONS

HH-F-341a	Filler, Expansion-Joint, Preformed; Non-Extruding and Resilient Types.
QQ-I-716 & Am-3	Iron and Steel; Sheet, Zinc coated (galvanized)
TT-P-641b	Primer, Paint; Zinc Dust - Zinc Oxide (for Galvanized surfaces)

b. AMERICAN SOCIETY FOR TESTING MATERIALS

A93-58T	Specification for Zinc-Coated (Galvanized) Iron or Steel Sheets, Coils, and Cut lengths
A245-58T	Specification for Flat-Rolled Carbon Steel Sheets of Structural Quality
A361-58T	Specification for 1.25 oz Class Coating (Pot Yield) Zinc-Coated (Galvanized) Iron or Steel Roofing Sheets

c. HANFORD SPECIFICATIONS

HWS-6524

Structural Concrete, 100-N Area

HWS-6978

Insulating Concrete for Roof Decks and Lightweight Concrete Fill, 105-N and 109-N Buildings.

3. MATERIALS

3.1 The corrugated steel roof and floor decks shall be Granco Steel Products Company "COFAR" or TUF COR" or "STRUCTUR-ACOUSTIC" in accordance with the following specifications, or an approved equal.

3.1.1 The corrugated steel sheets shall have a minimum yield strength of 80,000 psi computed by the 0.1% offset method.

3.1.2 The thickness (gage) of the steel and the pitch and depth of corrugations shall be as shown on the drawings.

3.1.3 The corrugated steel sheets shall be hot-dip galvanized in accordance with ASTM Designation A93 or A361 with not less than 1.25 oz. of zinc per square foot, per face.

3.1.4 The combined form and reinforcing units, "COFAR", shall have temperature reinforcing steel resistance welded to each corrugation of the steel sheets. The size and spacing of the temperature steel shall be as shown on the drawings.

3.1.5 The perforated steel units, "STRUCTUR-ACOUSTIC", for acoustical roofs shall be perforated with approximately 5/32 inch diameter holes with the perforated area equaling approximately 12% of the flat steel area.

3.2 Welding Washers

3.2.1 Anchor Type: Welding washers for corrugated steel units under vermiculite concrete roof decks shall be Granco Steel Products Company "Anchor Type" fabricated from 16 gage uncoated steel or approved equal. Height of washers shall be as shown on the drawings.

3.2.2 Standard Type: Welding washers for corrugated steel units under reinforced concrete roof and floor decks shall be Granco Steel Products Company "Standard Type" fabricated from 16 gage uncoated steel or approved equal.

3.3 Corrugation closure angles shall be 20 gage steel with a galvanized coating. Angle legs shall measure $2\frac{1}{2}$ inches by $\frac{3}{4}$ inch.

3.4 Vent clips for venting insulating concrete roofs shall be 24 gage steel with a galvanized coating and shall conform to the size and design of "TUFCOR" clips manufactured by the Granco Steel Products Company, or approved equal.

3.5 Acoustical Roof Decks

3.5.1 Acoustic board for acoustical roofs shall be semi-rigid glass fiber board as specified in Hanford Specification HWS-6978,

Insulating Concrete for Roof Decks and Lightweight Concrete Fill, 105-N and 109-N Bldgs

3.5.2 Acoustical roof decks with a minimum thickness of 5 inches shall have a minimum noise reduction coefficient (N.R.C.) of 0.75 as specified in Hanford Specification HWS-6978, Insulating Concrete for Roof Decks and Lightweight Concrete Fill, 105-N and 109-N Buildings.

3.6 The Cellular Steel Roof and Floor Deck shall be H. H. Robertson Company Section UKX 12-12 "Q-Deck" and Section FK-18-18 with standard edge

lock, in accordance

with the following specifications or an approved equal.

3.6.1 The steel sheet shall conform to ASTM designation A245.

3.6.2 The cells shall be spaced 6 inches on center.

3.6.3 The steel shall have received, before being formed, a metal protective coating of zinc conforming to Federal Specification QQ-I-716, Class E 1.

3.7 Paint for touching up welds on the steel roof and floor decks shall be zinc dust-zinc oxide conforming to Federal Specification TT-P-641, Type II.

3.8 Filler for sound stops on acoustical roofs shall be preformed expansion joint filler conforming to Federal Specification HH-F-341, Type I, Class A (highly resilient).

3.9 Reinforcing steel and mesh for concrete and vermiculite concrete placed on steel roof and floor decks shall be the size shown on the drawings and shall be as specified in Hanford Specifications HWS-6524, **STRUCTURAL CONCRETE** and HWS-6978, Insulating Concrete for Roof Decks and Lightweight Concrete Fill, 105-N and 109-N Buildings.

3.10 Structural concrete for floor and roof decks shall be as specified in Hanford Specification HWS-6524, **STRUCTURAL CONCRETE**.

3.11 Insulating concrete for roof decks shall be as specified in Hanford Specification HWS-6978, Insulating Concrete for Roof Decks and Lightweight Concrete Fill, 105-N and 109-N Buildings.

4. INSTALLING METAL ROOF AND FLOOR DECKS

4.1 General;

4.1.1 Steel roof and floor decks shall be installed in accordance with the manufacturer's recommended erection instructions, the approved drawings, and these specifications.

4.1.2 Corrugated steel units shall be installed with edge corrugations up and with corrugations perpendicular to supports.

4.1.3 Steel units shall extend a minimum of 1 inch into integrally placed concrete framing members.

4.1.4 Where end laps occur, corrugated steel units shall have a minimum bearing of 2 inches on steel framing members.

4.1.5 Installation of penetrations through steel roof and floor decks shall be as shown on the drawings.

4.1.6 Welding of corrugated steel units to supporting flanges of steel members using welding washers shall be performed carefully to avoid unnecessary burning of steel units. The hole in the washer shall be filled with weld metal approximately flush with top of the washer. Arc length, voltage, and amperage shall be suited to the thickness of the steel units.

4.1.7 All welds shall be cleaned to remove slag, weld spatter, rust and burned coatings and touched up with zinc dust-zinc oxide primer on the same shift welding is done.

4.1.8 Steel units stored prior to installation shall not be in contact with the ground and shall be protected to keep water off the units.

4.2 CORRUGATED STEEL FOR ACOUSTICAL ROOF DECKS

4.2.1 Perforated steel units shall be placed so that ends lap a minimum of 2 inches.

4.2.2 Perforated steel units shall have side laps between adjacent units of one (1) complete corrugation. Side laps shall be pulled tight to provide a neat underside appearance.

4.2.3 Where the drawings specify units lighter than 20 gage, side laps shall be fastened together with plated sheet metal screws at the third points of the span.

4.2.4 Perforated units shall be attached to the supporting top flanges of the structural steel framing by plug welding through Anchor Type Welding washers.

4.2.5 Unless shown otherwise on the drawings, welds at each support shall consist of one at the center of each unit (sheet) and one at each side lap (approx. 15" o.c.).

4.2.6 Sound stops for acoustical roof decks shall be constructed with corrugation closure angles and expansion joint material as shown on the drawings.

4.3 CORRUGATED STEEL FOR VERMICULITE CONCRETE ROOF DECKS

4.3.1 Steel units shall be placed with end laps centered over supports and ends of units shall lap a minimum of 2 inches.

4.3.2 Steel units shall have side laps between adjacent units of one (1) complete corrugation.

4.3.3 Steel units shall be attached to the supporting top flanges of the structural steel framing by plug welding through Anchor Type welding washers.

4.3.4 Unless shown otherwise on the drawings, welds at each end lap shall consist of a weld at the center of the sheet and one at each side lap (approx. 14" o.c.). At intermediate supports, units shall be welded to the support at each side lap (two points approx. 26" o.c.).

4.3.5 Upon completion of welding, vent clips shall be installed for each side lap of each steel unit. Where supporting members are 4'-0" o.c. or less, vent clips shall be at the mid-point of the side lap. Where supporting members are over 4'-0" o.c. two clips shall be installed at third-points of each side lap.

4.4 REINFORCED CORRUGATED STEEL FOR CONCRETE FLOOR AND ROOF DECKS

4.4.1 Steel units shall be placed with ends bearing on steel supporting members a minimum of 2 inches.

4.4.2 Steel units shall be placed with sheet metal corrugation closure angles along the ends of each unit to prevent leakage of water, mortar or concrete. The ends of the corrugated sheets shall butt tightly against the closure angles.

4.4.3 Corrugated steel units shall have side laps between adjacent units of $\frac{1}{2}$ corrugation.

4.4.4 Steel units shall be attached to the supporting top flanges of the structural steel framing by plug welding through Standard Type welding washers.

4.4.5 Unless shown otherwise on the drawings, the ends of each unit shall be welded/ approximately 12" on centers.

4.4.6 Steel units shall be supported by temporary shoring to prevent deflection during concrete placement. One row of supports shall be required for slab spans of 6'-6" to 11'-0", two rows for spans of 11'-0" to 14'-0" and three rows for spans of 14'-0" to 16'-0".

4.5 CELLULAR STEEL FOR CONCRETE FLOOR AND ROOF DECKS

4.5.1 Steel units shall be placed with ends bearing on steel supporting members a minimum of 3 inches.

4.5.2 The ends of each steel unit shall be attached to the structural steel framing by plug welding on approximately 12" centers.

5. INSTALLING ACOUSTIC BOARD FOR ROOF DECKS

Acoustic board for acoustic roof decks shall be placed in accordance with the provisions of Hanford Specification HWS-6978, VERMICULITE INSULATING CONCRETE.

6. PLACING REINFORCING STEEL CONCRETE AND VERMICULITE CONCRETE

Reinforcing steel, steel mesh, concrete, and vermiculite concrete for roof and floor decks shall be placed in accordance with the applicable sections of Hanford Specification HWS-6524, STRUCTURAL CONCRETE, 105-N BUILDING and HWS-6978, VERMICULITE INSULATING CONCRETE.

SECTION II -3
BUILT-UP ROOFING

1. SCOPE

Built-up roofing shall be furnished and installed as shown on drawings and in conformity with these specifications.

2. APPLICABLE SPECIFICATIONS

The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

a. Federal Specifications

R-P-381 & Am-1	Pitch; Coal-Tar (for) Mineral-Surfaced Built-Up Roofing, Waterproofing and Dampproofing.
FF-N-105 & Am-2	Nails, Wire and Staples.
HH-F-191a & Am-2	Felt; Asphalt-Saturated (for) Flashings, Roofings and Waterproofing.
HH-F-201 & Am-1	Felt; Coal-Tar Saturated (for) Roofing and Waterproofing
HH-I-551a & Am-2	Insulation Block and Pipe Covering, Thermal, Cellular Glass.
SS-A-666 & Am-1	Asphalt; for built-up Roofing, Waterproofing, and Dampproofing.
SS-C-153	Cement; Bituminous, Plastic
SS-R-521	Roofing and Shingles; Asphalt-Prepared, Mineral-Surfaced.

b. American Society for Testing Materials Standard

D517-50

Asphalt Plank

3. GENERAL

Tar built-up roofing shall be applied to the roof surfaces indicated on the drawings. Metal flashing shall conform to SHEET METALWORK, GENERAL of this specification. Fascias shall conform to METAL SIDING AND INSULATED METAL WALL PANELS of this specification.

Coal-tar pitch shall be used with coal-tar-saturated felts.

4.- MATERIALS

The following materials shall conform respectively to the specifications and other requirements specified below:

4.1 Coal-Tar Pitch shall conform to Federal Specification R-P-381, Type I, with a softening point within the range of 140 F to 150 F.

4.2 Coal-Tar-Saturated Roofing Felt shall weigh at least 13 pounds per 100 square feet (commonly referred to as "15-pound felt") and shall conform to Federal Specification HH-F-201.

4.3 Asphalt-Saturated Roofing Felt shall conform to Federal Specification HH-F-191, type I, No. 15.

4.4 Roofing cement shall conform to Federal Specification SS-C-153, Type I for base flashings and Type II for roofing.

4.5 Roof Insulation shall conform to Federal Specification HH-I-551, Type I. Insulation shall be "Foamglas" manufactured by Pittsburgh-Corning Corp., Pittsburgh, Pa., or approved equal.

4.6 Roofing Gravel shall consist of hard, rounded stones free from sand, clay, dust or any other foreign matter. Crushed stone or crushed gravel shall not be used. Gravel shall have a size range of 5/8 inch minus to 1/4 inch plus.

4.7 Mineral-Surfaced Roofing shall conform to Federal Specification SS-R-521, type I.

4.8 Nails and Discs: Roofing nails shall conform to Federal Specification FF-N-105 and shall be 10 gage, hot-dipped galvanized roofing nails, 1-1/2 inches long, with heads not less than 3/8 inch in diameter. Tin discs for use with roofing nails shall have a minimum diameter of one inch.

4.9 Asphalt Plank shall conform to ASTM D517. Plank for walkways and pads shall be plain type, 1-inch thick by 8-inches wide and of the lengths indicated on the drawings.

5. STORAGE, HANDLING AND PREPARATION OF MATERIALS

5.1 All materials, including gravel, shall be kept clean and dry during storage and application, and shall be protected from damage.

5.2 Rolls of felt shall be stored in an upright position and shall be protected from damage during storage and application.

5.3 The pitch melting kettle shall be equipped with a built-in thermometer having a minimum range up to 500 F to indicate temperature of the pitch. The melting kettle shall not be placed on the roof.

5.4 Pitch shall not be heated above 375 F. Temperature of pitch when applied shall be not less than 300 F.

5.5 Pitch shall not be adulterated in any way.

5.6 Pitch or roofing cement shall not be allowed to spill or splash on permanently exposed surfaces of structures. Leaky containers shall not be used for handling these materials. If such materials are spilled or spattered on permanently exposed surfaces, the material shall be completely removed to the satisfaction of the Contractor.

5.7 Material handling dollies and other wheeled equipment used on new roofs shall be equipped with low-pressure pneumatic tires, unless otherwise approved.

5.8 Materials and/or equipment shall not be stored on or transported over roofs unless adequate protection is provided.

6. SURFACE PREPARATION

6.1 All surfaces to receive roofing materials shall be completely dry and reasonably smooth, without depressions, and free from dirt, dust, loose material, frost or effects of freezing. Surfaces shall be swept clean prior to applying roofing materials.

6.2 Roofing materials shall not be applied to new concrete, or insulating concrete lightweight aggregate concrete/decks until 21 days after curing is completed.

6.3 New lightweight aggregate^{and insulating}/concrete decks shall have had a minimum of 10 consecutive days of good drying weather immediately before roofing materials are applied. New concrete decks shall have had a minimum of 3 consecutive days of good drying weather immediately before roofing materials are applied.

7. MINIMUM TEMPERATURE FOR APPLYING ROOFING MATERIALS

Roofing materials shall not be applied when the ambient temperature or the temperature of the roof deck is below 40 F.

8. VAPOR BARRIER

Roofs on which insulation is to be applied shall be provided with a vapor barrier consisting of two plies of 15-pound coal-tar-saturated felt installed as hereinafter specified. Hot bitumen used in installing the vapor barrier shall be applied at the rate of not less than 30 pounds of pitch per 100 square feet per solid mopping between plies. Vapor-barrier plies shall be extended/over horizontal or up vertical surfaces not less than 8 inches and, after insulation has been installed, shall be folded over the exposed edges of insulation and mopped in place. Application of vapor-barrier felts shall be in accordance with APPLICATION OF BUILT-UP ROOFING specified hereinafter.

8.1 Where the concrete or insulating concrete is placed on a metal deck the first ply of the vapor barrier shall be spot mopped in accordance with Paragraph 10.1.1. For other concrete decks the first ply shall be solid mopped directly over the concrete.

8.2 Option: In lieu of the 2-ply saturated-felt vapor barrier hereinbefore specified, the Subcontractor may provide a single-ply vapor barrier of approved plasticized polyvinyl chloride sheet not less than 0.004 inch thick laid directly on the deck in a nonflammable, water-resistant adhesive. Both vapor barrier and adhesive shall be

especially prepared for the purpose. Polyvinyl sheet shall be flexible at low temperatures and shall have tensile strength which will resist abrasion and puncturing. Adhesive shall be a tacky liquid bonding material with a chlorinated nontoxic vehicle and shall be readily applied with a squeegee, brush or roller coater and shall remain elastic indefinitely regardless of low temperatures. Holding power of the adhesive shall be not less than 100 pounds per square inch. Installation of the vapor barrier shall be in strict accordance with the manufacturer's directions. Over the top of polyvinyl-sheet vapor barrier, strips of adhesive shall be applied at not greater than 6 inches on centers, over which strips the first layer of insulation is to be applied. Not less than 1 gallon of adhesive per 125 square feet roof surface shall be used for both the solid mopping of the vapor barrier and the strips at 6 inches on centers for the application of insulation.

9. INSULATION

9.1 Thickness: Insulation shall be of the thickness indicated on the drawings.

9.2 Application: Insulation shall be applied in one or more layers as required. Insulation units shall be laid in parallel courses with joints broken, in a mopping of bitumen applied at the rate of approximately 35 pounds of pitch per 100 square feet, per layer of insulation. Adjacent units shall be brought into moderate contact without forcing and shall be cut to fit neatly against adjoining vertical surfaces. Joints in each layer of insulation shall

be staggered with respect to joints in preceding layer. Insulation shall be kept dry at all times and shall be laid just ahead of the roofing. No more insulation shall be laid than can be covered the same day with the specified roofing or can be otherwise protected.

9.3 Water cutoff strips shall be installed at the first insulation joint back from the fascia, at roof penetrations, and as required to provide unit-leak areas, approximately 20 feet square or 400 square feet in area, over the entire roof. Water cutoffs shall be 12-inch wide strips of 15-pound felt mopped solidly along a straight insulation joint. The strips shall have one edge mopped to the vapor barrier and the other edge mopped to the top of the insulation. Strips shall be installed to isolate each unit-leak area.

10. APPLICATION OF BUILT-UP ROOFING

Roof shall be 20-year rating, 4-ply, graveled coal-tar pitch roof containing not less than the following quantities of roofing materials per 100 square feet:

Coal-tar-saturated felt	60 pounds
Coal-tar pitch	180 pounds
Gravel	400 pounds

10.1 Roof shall be applied as follows, or by an approved equal method:

10.1.1 Four plies of 36-inch wide coal-tar-saturated felt shall be laid shingle fashion lapping plies 27-1/2 inches. Felt shall be embedded in a uniform solid mopping of coal-tar pitch applied to the insulation. On poured lightweight aggregate concrete decks felt shall

be spot-mopped to the deck with pitch applied at a minimum rate of 12 pounds per 100 square feet of roof area. Spots of pitch shall be applied in the pattern shown in Figure 1, below:

FIGURE 1 SPOT MOPPING

At edges of roof deck and roof penetrations, pitch shall not be mopped to the insulation closer than 3 inches to the edge. Each ply shall be solidly mopped to the preceding ply and to the insulation with pitch applied at a minimum rate of 25 pounds per 100 square feet. At no place shall felt touch felt. Ends of sheets shall be lapped a minimum of 6 inches. The two bottom plies shall extend 6 inches beyond the edge of the roof and 6 inches over roof penetrations to permit turning back and eventual mopping to top of all built-up plies to seal edges of plies. Two plies of ~~minimum~~ 12-inch wide felt strips shall be set in an 1/8 inch coating of roofing cement 4 inches wide along edges of roof decks before laying built-up plies to provide 6-inch flap for sealing ends of plies. All plies shall be laid at right angles to the slope of the deck starting at the low edge. Water shall flow over, not against, lap edges.

a. Three mopped-in layers of roofing felt shall be provided back of metal base flashing. Layers shall be extended to lap roofing membrane not less than 4 inches.

b. All plies shall be free from buckles, blisters and air pockets.

10.1.2 All exposed felt shall be graveled as specified in Subparagraph 10.1.4 below, on the same day felt is laid. Pitch shall not be applied where flashing or gravel stops are to be installed.

10.1.3 Flashings shall be provided in the angles formed at walls and other vertical surfaces and where required to make the work watertight. Except where metal flashings are indicated or specified, bituminous flashings shall be provided and shall be installed before the top pouring and surfacing aggregate are applied to the roofing. Where indicated, the raggle or groove in which flashings are installed shall be not more than 14 inches nor less than 6 inches above the roof. After installation of the flashing, the raggle or groove shall be pointed full and flush with bituminous plastic cement.

Bituminous base flashings shall consist of three layers of No. 15 saturated rag felt and one layer of SS-R-521 mineral-surfaced roofing cemented together with plastic roofing cement. The three layers of saturated felt and the mineral-surfaced roofing shall be evenly bedded in bituminous plastic cement applied with a trowel, using not less than 50 pounds per 100 square feet per sheet. The first layer of felt shall extend out onto the roofing at least 2

inches, and each succeeding layer shall extend at least 2 inches beyond the preceeding layer. Flashing sheets shall be approximately 5 feet in length and shall be lapped not less than 6 inches with laps staggered in each layer. Mineral-surfaced roofing strips shall be cut from the width of the material and laps shall be made with selvage well cemented.

10.1.4 Metal flashing and gravel stops shall be installed in conformance with Subsection 11, INSTALLATION OF METAL FLASHING AND GRAVEL STOPS.

10.1.5 One flood coat of not less than 75 pounds of pitch per 100 square feet shall be poured, not mopped, over the broom-clean, completely dry felt surface, and not less than 400 pounds of gravel per 100 square feet shall be embedded in the hot pitch. Roofing shall be graveled or glazed prior to stockpiling gravel.

10.1.6 Pitch pockets: After sleeves for pitch pockets specified in Section, SHEET METALWORK, GENERAL of these specifications, have been installed, and before the sleeves are filled, all spaces between members of penetrating the roof surfaces and passing through the sleeve shall be sealed by caulking with oakum and coal tar pitch so as to prevent material used for filling pocket from penetrating through. Upon completion of roofing, the pitch pockets shall be completely filled with hot coal tar pitch conforming to Federal Specification R-P-381.

11. INSTALLATION OF METAL FLASHING AND GRAVEL STOPS

11.1 Metal /roof flashing, and protected metal fascias shall be applied after all built-up roofing plies are in place.

11.2 All roof flanges shall be set in a troweling of roofing cement. Roof flanges of fascia shall be nailed to the wood nailers at 3-inch centers, 3/4-inch from back edge of roof flange. Fascia shall be secured to building as shown on the drawings.

11.3 Joint in fascias shall be lapped 4 inches. Laps shall be sealed over the entire roof flange and fascia stop bead area with roofing cement. All excess roofing cement shall be completely removed from permanently exposed metal surfaces.

11.4 Roof flanges shall be sealed to roof with two plies of tar-saturated felt mopped solidly to roof and flanges with hot pitch. The first ply shall cover approximately half of the flange width and shall extend onto roof 3 inches beyond edge of flange. The second ply shall cover the full width of roof flange and shall extend onto roof 6 inches beyond edge of flange. At roof penetrations, a one-inch cant of roofing cement shall be applied at the intersection of the penetration flashing and the sealing plies.

12. ASPHALT PLANK WALKWAYS AND PADS

12.1 Asphalt plank walkways and pads shall be installed, where shown on the drawings, after all built-up roofing plies are in place, and prior to the application of roofing gravel.

12.2 One layer of saturated and coated asphalt base sheet weighing a minimum of 43 pounds per 100 square feet shall be solidly mopped to the top ply of the roofing felts with hot coal-tar pitch. The asphalt base sheet shall be of a type compatible for use with hot coal-tar pitch. When felt and pitch has cooled to the ambient temperature of the adjoining roof surfaces, a coating of hot asphalt bitumen conforming to Federal Specification SS-A 666, Type II, Grade 1, Class A with 160 to 180 degrees F. melting point shall be applied over the entire top surface of the asphalt base sheet and the asphalt plank set on the hot bitumen and slid into final position.

12.3 Each plank shall be laid across the walkway or pad and butted along long edge. Roofing gravel shall be extended to and butted against the end surfaces of the plank.

SECTION II-4

SHEET METALWORK, GENERAL

1. SCOPE

Sheet metalwork shall be furnished and installed as shown on the drawings and in conformity with these specifications. Sheet metal-work shall include all seismic joint covers at the roof levels, including brass plates and angles, lead sliding strips, brass and neoprene joint covers, base flashing, cap flashing, and all accessories incidental thereto as shown on the drawings and as necessary to provide covers which will permit lateral movement and remain watertight and weathertight under seismic action at right angles to the joint.

2. WORK INCLUDED IN OTHER SECTIONS

Protected metal fascias, soffits, cap flashing and louvers are included in Section, METAL SIDING AND INSULATION AND INSULATED WALL PANELS of this specification.

3. APPLICABLE SPECIFICATIONS

The following specifications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

a. Federal Specifications:

- O-F-506b. - Flux, Soldering; Paste and Liquid.
- QQ-A-359d. - Aluminum Alloy Plate and Sheet, 3003.
- QQ-C-576a. - Copper Plates, Rolled Bars, Sheets and Strips.

- QQ-W-281a. - Nickel-Copper-Alloy (Monel and R-Monel) Bars, Plates, Rods, Sheets, Strips, Wire, Forgings, and Structural and Special Shaped Sections.
- QQ-S-571c. - Solder; Lead Alloy, Tin Lead Alloy, and
& Am-1 Tin Alloy Flux Cored Ribbon and Wire and Solid Form.
- QQ-S-00766b - Steel, Plates, Sheets, and Strips, Corrosion Resisting.
- SS-C-153. - Cement; Bituminous, Plastic.
- TT-C-598. - Compound, Calking; Plastic (for Masonry
& Am-2 and other Structures).

4. GENERAL

Surfaces to which sheet metal is to be applied shall be even, smooth, sound, thoroughly clean and dry, and free from all defects that might affect the application. All cutting, fitting, drilling and other operations in connection with sheet metal required to accommodate the work of other trades shall be performed under this section. All accessories or other items essential to the completeness of the sheet-metal installation, though not specifically shown or specified, shall be provided under this section. All such items, unless otherwise shown on the drawings or specified, shall be of the same kind of material as the item to which applied. Nails, screws and bolts shall be of a composition that will not support galvanic action in the installation. Where sheet metal abuts or members into adjacent materials, the juncture shall be executed in an approved manner. Gage of nonferrous sheet metal shall be Brown and Sharpe (B & S). Contact surfaces of dissimilar metals shall be insulated

from one another to prevent galvanic action by use of lead shields or other nonconductive type of separator or coating.

4.1 Copper sheet metal work shall be in accordance with recommendations of Copper and Brass Research Association.

5. SPECIAL REQUIREMENTS

Except where specific sheet metals are specified, the following sheet metal options are permitted for such installations as flashings, pitchpockets and miscellaneous sheet metal items. The same metal shall be used for all of these installations:

- a. Copper
- b. Aluminum
- c. Corrosion-Resisting Steel
- d. Nickel-Copper Alloy

For optional use of corrosion-resisting steel and nickel-copper alloy see Subsection 18 of this Section.

6. MATERIALS

6.1 Aluminum-Alloy Sheets shall conform to Federal Specification QQ-A-359, Temper H14.

6.2 Calking Compound shall conform to Federal Specification TT-C-598.

6.3 Copper shall conform to Federal Specification QQ-C-576. Except as otherwise specified herein or indicated on the drawings, sheet copper shall be light cold-rolled temper and shall weigh not less than 16 ounces per square foot.

6.4 Corrosion-Resisting Steel shall conform to Federal Specification QQ-S-00766, class 302, finish 2B for sheets and finish 2 for strips.

6.5 Nickel-Copper-Alloy Sheets shall conform to Federal Specification QQ-N-281, except that the sheets shall be hot-rolled, annealed and pickled.

6.6 Plastic Cement shall conform to Federal Specification SS-C-153, Type I or Type II, as required.

6.7 Solder not otherwise specified herein shall conform to Federal Specification QQ-S-571, composition Sn50. Solder for aluminum shall be of a type recommended by the manufacturer of the aluminum.

6.8 Soldering Flux: Flux not otherwise specified herein shall be rosin, except that, for corrosion-resisting steel, nickel-copper alloy, and where conditions of application prohibit use of rosin, flux conforming to Federal Specification O-F-506 shall be used.

7. SAMPLES

The following samples shall be submitted for approval.

<u>ITEM</u>	<u>QUANTITY</u>	<u>SIZE</u>
Calking Compound - - - - -	2	1 qt. can
Nails (each type) - - - - -	1/2 lb	---
Plastic Cement - - - - -	2	1 lb. can
Screws (each type) - - - - -	1/2 lb	---
Sheet Metal (each weight and type) - -	2	12 in. x 12 in.
Solder - - - - -	2 bars	---
Soldering Flux - - - - -	2	2 oz. can

8. SHOP DRAWINGS

Shop drawings shall be submitted for approval. Shop drawings shall be furnished for seismic joint covers assembly, including brass

plates and angles, hard lead sliding strips and brass and neoprene joint covers and other accessories, required for the complete assembly and installation thereof.

9. NAILING

Except as otherwise specified herein or indicated on the drawings, nailing shall be confined to sheet metal having a width of less than 12 inches. Nailing of flashings shall be confined to one edge only. Nails shall be spaced evenly and approximately 3 inches apart. Sleepers and nailing strips are provided under another section of this specification.

10. SOLDERING AND SEAMING

10.1 Soldering

10.1.1 Other than Aluminum: All edges of uncoated sheet metal to be soldered shall be pretinned before soldering is begun. Soldering shall be done slowly with well-heated coppers so as to thoroughly heat the seam and completely sweat the solder through the full width of the seam. The seam shall show not less than one full inch of evenly flowed solder. Edges of corrosion-resisting steel to be soldered shall be treated with a 50 percent solution of hydrochloric acid in water followed, after 5 minutes and without washing, by soldering flux. For all materials, soldering shall follow immediately after application of the flux. Upon completion of soldering, acid shall be neutralized and surfaces thoroughly cleaned.

10.1.2 Aluminum: The soldering of aluminum shall be performed in strict accordance with the recommendations of the aluminum manufacturer.

10.2 Seams shall conform to the following requirements:

- a. Flat lock seams shall finish not less than $3/4$ inch wide.
- b. Soldered lap seams shall finish not less than one inch wide.
- c. Unsoldered plain lap seams shall lap not less than 3 inches.
- d. All seams shall be made in the direction of the flow.

11. WELDING AND BRAZING FOR ALUMINUM

11.1 For Welding

- a. Flux Alcoa No. 22 or approved equal.
- b. For work not alumilited, wire or rod ALCOA No. 43S or approved equal.
- c. For alumilited work, wire or rod A54S.

11.2 For Brazing

- a. Flux ALCOA No. 33 or approved equal.
- b. Brazing wire No. 716 or 718.

12. EXPANSION JOINTS IN SHEET METAL WORK

Expansion joints in sheet metal work shall be provided as shown on the drawings. Unless otherwise specified herein or shown on the drawings expansion joints shall be provided at intervals of not over 24 feet in all continuous runs of copper, and at 10 foot intervals for aluminum.

13. FLASHINGS

Flashings shall be installed at all intersections of roofs with vertical surfaces, at all projections through roofs except at plumbing pipe vents, and elsewhere as shown on the drawings or required to provide watertight protection. Exposed edges of all flashings shall be folded back 1/2 inch to provide stiffness. Except as otherwise specified herein or indicated on the drawings, cap flashings shall be provided over all base flashings. Flashings shall be 16-ounce copper or 0.051-inch-thick aluminum (also see SHEET-METAL OPTIONS, Subsection 18).

13.1 Base Flashings shall extend up vertical surfaces not less than 8 inches and out on the roof, or horizontal surface, not less than 4 inches. Straight runs of base flashings shall be made up in units of approximately 30 feet and connected together with a 3-inch loose-locked slip-type expansion joint filled with plastic cement. Straight runs less than 30 feet, but more than 8 feet long, shall have a similar joint at the center of the run. Straight runs terminating in an internal or external corner of the roof shall be provided with a similar joint located not over 8 feet from the corner. Intermediate joints located between expansion joints shall have locked and soldered seams. The portions of copper in contact with built-up roofing shall be given a coat of approved bituminous paint before the flashing is set in place. Installation of base flashings for built-up roofing shall be coordinated with roofing work.

13.2 Cap Flashings other than protected metal cap flashings shown on the drawings or specified in Section, **METAL SIDING AND INSULATION** and **INSULATED WALL PANELS**, of this specification, shall turn down over base flashings not less than 4 inches. The upper edge of cap flashing inserted in concrete having open type reglets shall be secured with coiled copper strips or lead plugs spaced approximately 12 inches on centers and then calked. The cap flashing shall be formed to provide spring action against the base flashing.

13.3 Pipe Flashings: Pipes and conduits (other than plumbing vents) protruding through the roof shall be flashed and made watertight at the roof with 4-pound sheet lead flashing, consisting of a base flashing extending not less than four inches out on the roof all around the pipe and/or conduits, and up the pipe or conduit approximately 8 inches, terminating in a lock joint connected to a metal hood or cap flashing which shall be clamped to the pipe or conduit with a 1-1/2 inch by 1/8-inch split brass band. At the location of the clamp, the metal hood or cap flashing shall be bedded in white lead to make a waterproof installation.

14. **SEISMIC JOINT COVERS AT ROOF LEVELS** (109-N BUILDING)

14.1 Brass cover plates, angles and shapes shall be of yellow brass of the size and thickness called for on the drawings. Cover plates shall be secured to the wood blocking with #14 (.242") 1-1/2 inch long flat head silicon bronze wood screws spaced a maximum of 6 inches on centers.

14.2 Hard lead sliding strips shall be installed over wood blocking and secured thereto by #14 (.242") 1-1/2 inch long flat head silicon bronze wood screws spaced a maximum of 6 inches on centers.

14.3 Brass and neoprene joint covers shall consist of a resilient neoprene rubber strip joined to #20 gage yellow brass metal edging 4 inches wide with a combination mechanical and adhesive bond. The neoprene strips shall be 1/16 inch thick, and shall have a tensile strength of 1500 psi minimum, elongation of 250 percent minimum and, after bonding, shall have a peel-pull value of 25 pounds per inch minimum at right angles to the brass edging. Joint covers at end joints shall be similar to type 4-2-4 Expand-o-flash except that metal shall be 20 gage yellow brass, manufactured by Lamont and Riley Co., Worcester, Mass., or approved equal. Joint covers shall be secured to the brass cover plates by first applying a polysulfide caulking compound to the full width and length of each brass edging strip. After setting in place, joint covers shall be further secured to the brass cover plates by means of #10 pan head hard brass sheet metal self-tapping screws spaced a maximum of 3 inches on centers in the manner indicated on the drawings.

15. SEISMIC JOINT COVER AT ROOF LEVELS (105-N BUILDING)

15.1 Copper and neoprene joint covers shall consist of a resilient neoprene rubber strip joined to #20 gage copper edging 4 inches wide with a combination mechanical and adhesive bond. The neoprene strips shall be 3/16-inch thick, and shall have a tensile strength of 1500 psi

minimum, elongation of 250 percent minimum and, after bonding, shall have a peel-pull value of 25 pounds per inch minimum at right angles to the copper edging. Joint covers shall be similar to EJ-4-4-4C Expand-o-flash manufactured by Lamont and Riley Co., Worcester, Mass., or approved equal. Joint covers shall be secured to the wood blocking by means of 2-penny barbed copper nails spaced a maximum of 3-inches on centers staggered pattern.

15.2 Extruded neoprene joint filler shall conform to the size and shape shown on the drawings. Joint filler shall be held in place by compression and by means of the extended lip on the upper surface which shall be secured to the concrete surfaces by a continuous application of polysulfide calking compound applied both to the joint filler and the concrete surfaces.

16. PITCH POCKETS

When such items as ladders, handrail standards, supports for mechanical equipment, electrical conduits, structural columns, struts or other supports are imposed on, or protrude through, the roof, pitch pockets shall be provided to obtain a waterproof installation. Pitch pockets shall consist of a sheet metal cup or trough not less than 4 inches high, with flange extending all around and outward from the cup or trough not less than 4 inches. The cup or trough shall have an open bottom. Flanges shall be lapped between roofing sheets as indicated on the drawings. Upon completion of the roofing work, pitch pockets shall be filled with hot coal-tar-pitch. Sheet metal

for pitch pockets shall be 16 ounce copper, or pitch pockets may be any of the sheet metal options permitted in Subsection 5 of this section.

17. MISCELLANEOUS SHEET METALWORK

Sheet-metal items not covered elsewhere in this section shall be as indicated on the drawings and as required to provide a water-tight installation. Joints shall be locked, or lapped and soldered, as applicable.

18. SHEET-METAL OPTIONS

Corrosion-resisting steel or nickel-copper alloy may be substituted for plain copper. Fastenings shall be of the same material as the metal to which they are applied, except that fastenings for nickel-copper alloy shall be nickel-copper alloy or copper base alloy. When used in lieu of plain copper, the corresponding thickness of corrosion-resisting steel and nickel-copper alloy shall be as follows:

<u>Weight of copper</u>	<u>Thickness of steel alloy and nickel alloy</u>
(ounces)	(inch)
16	0.018
20	0.021
24	0.025
32	0.031
40	0.037

SECTION II-5

METAL SIDING AND INSULATION AND INSULATED METAL WALL PANELS

1. SCOPE

Metal siding and insulation and insulated metal wall panels and louvers shall be furnished and erected as shown on the drawings and in conformity with these specifications.

Metal siding and insulated metal wall panels shall include all fascias, soffits of the roof overhangs on the 105-N Building, closers, accessories, fasteners, zee strips, flashing and calking required for complete, weathertight installation. The work shall also include supports for insulation and siding applied on exterior concrete walls. The work shall include furnishing and erecting removable panels to provide access for installation of equipment, and for other purposes, and the provision of all openings through siding and panels shown on the drawings, including drawings for mechanical and electrical installations.

2. APPLICABLE SPECIFICATIONS

The following specifications of the issues listed below but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by references thereto:

a. Federal Specifications:

HH-I-521c
& Am-1

Insulation, Building, Mineral Wool;
Batts, Loose Fill, and Granular Fill.

QQ-I-716
& Am-3

Iron and Steel; Sheet, Zinc-Coated
(Galvanized)

QQ-S-741a
& Am-1

Steel Plates, Shapes and Bars,
Carbon, Structural.

TT-C-598
& Am-2

Compound, Calking; Plastic (for
Masonry and Other Structures).

TT-P-641b

Primer, Paint; Zinc-Dust-Zinc Oxide
(for Galvanized Surfaces).

b. American Iron and Steel Institute:

Light Gauge Steel Design Manual

c. American Society for Testing Materials Standards:

A 245-58T

Flat Hot-Rolled Carbon-Steel Sheets
of Structural Quality.

A 303-58T

Hot-Rolled Carbon-Steel Strip of
Structural Quality.

A 415-58T

Hot-Rolled Carbon-Steel Sheets,
Commercial Quality.

B 117-57T

Salt Spray (fog) Testing.

E 42-57

Operation of Light-and Water-Exposure
Apparatus (Carbon-Arc Type) for
Artificial Weathering Test.

3. MATERIALS

3.1 Siding, and Exterior Sheets of Metal Wall Panels shall be V-beam shape approximately 29 inches in width, depth of V-beam approximately 1-3/4 inches, not less than 20 gauge, in suitable lengths for attachment to girts shown on the drawings, and shall provide continuity over at least two spans plus the required end lap unless otherwise indicated on the drawings. Base metal shall conform to ASTM A 245, A 303 or A415. Metal shall have a protective covering of asbestos felt on both sides adhered to the metal by either the metal adhesive

or the plastic adhesive method, or shall have a protective covering of mineral coated asphalt applied to all surfaces. Felt shall be protected from weather and deterioration by bituminous impregnation and wall panels and soffits shall be finished with factory or field applied color to match the buff sample selected by the Architect-Engineer. Color of fascias will be selected by the Architect-Engineer from colors submitted by the manufacturer.

3.1.1 Metal Adhesive Method shall consist of applying a rust-inhibitive alloy in molten form to both sides of the metal sheets and firmly pressing a layer of unimpregnated asbestos felt into the adhesive on both sides of the sheets. The felt shall be asphalt-impregnated after bonding, and shall be finished in color selected.

3.1.2 Plastic Adhesive Method shall consist of applying a rust-inhibitive resinous material uniformly to both sides of the metal sheets which have previously been given a metallic corrosion-inhibitive treatment. Prior to polymerization of the adhesive, a layer of unimpregnated asbestos felt shall be rolled onto both sides of the sheet, applied under heat and pressure. Felt shall be turned around sides of the sheets and sealed with the same adhesive used above. After curing, asbestos felt shall be thoroughly impregnated with an asphaltic compound, and finished in color selected.

3.1.3 Mineral-Coated-Asphalt-Protected Sheets shall be factory-fabricated products standard with the manufacturer, and shall consist of a sheet-steel core covered on all surfaces with a rust-inhibitive

zinc coating of the manufacturer's standard type. The sheet shall then be heated, and coated with a modified-asphalt adhesive. After the coated sheet has been cured, two separate coats of a weather-resistant and chemical-and-fume-resistant bituminous compound shall be applied. Immediately after the second bituminous coat has been applied, a layer of mineral mica shall be embedded in the coated sheet under heat and pressure. Sheets shall be equally mineral-coated for uniform appearance. Non-uniform-appearing sheets will be rejected.

3.1.4 Finish Color of Sheets: One or both surfaces of sheets shall be given a color coating of synthetic-resin applied at the factory. The minimum thickness of color coatings on the exposure side shall be not less than 0.004 inch when applied over the bituminous protective coating. The thickness of the color coating shall be determined by micrometer measurements of the coating. The color coating shall be separated from the bituminous or felt backing by immersion and washing in a suitable hydrocarbon.

3.2 Flame Hazard Classification: When tested in accordance with the Underwriters' Laboratories Tunnel Test, the protected metal shall conform to the following:

Flame spread	max 45
Fuel contributed	max 15
Smoke developed	max 100 during ten minute test

3.3 Durability: The protected metal shall not be affected by rapid temperature changes and shall not chip or crack in extremely cold weather nor become soft and run in extremely hot weather.

3.4 Miscellaneous structural steel shall conform to the requirements of Federal Specification QQ-S-741, type I or type II, as required, Class 1.

3.5 Formed metal members, including zee's or other shapes required to support the insulation and protected metal siding applied over concrete wall surfaces shall be of galvanized steel or protected metal or steel otherwise protected against corrosion in an approved equivalent manner not thinner than 14-gage.

3.6 Insulation shall be incombustible and moisture resistant. Insulation shall be glass fiber of the thickness indicated on the drawings and as specified herein, and of the density required for the intended application. Insulation shall conform to the requirements of Federal Specification HH-I-521, Type I, Class A. Certification shall be furnished certifying that the insulation, as provided and erected, shall have a "k" value not more than 0.24 Btu per hour per square foot per inch per degree at 50F mean temperature. Insulation shall be installed so as to be firmly held in place, shall be free from voids or sag, and, where necessary to maintain the "U" value, shall be supplemented with handpacked insulation.

4. ERECTION OF SIDING

4.1 Fasteners shall be self-tapping stainless steel screws with neoprene washers, or stainless steel end-welded or shot-set studs.

with stainless steel heads and neoprene washers, spaced not more than 12 inches apart horizontally for fastening to girts and zee's or special shapes, and stainless steel self-tapping screws with neoprene washers spaced not more than 24 inches apart for fastening side laps and intermediate joints together.

4.2 Structural framing members,^{in the 109-N Bldg.,} including vertical and horizontal angles, struts and anchors incidental to the erection of the siding and insulation along the west wall of the building where built out to conceal steel reinforcing bars, shall be provided and erected as part of the siding work, and shall be of the sizes, thicknesses and shapes indicated on the drawings. Structural steel framing connections, parts and accessories shall conform to the Handbook of the American Institute of Steel Construction. All structural members, except for embedded items, shall be shop coated with rust inhibitive paint as specified in Section, PAINTING: PROTECTIVE ON METAL of this specification.

4.3 Formed metal members, including zee's or special shapes incidental to the erection of the siding and insulation where applied directly on concrete wall surfaces shall be provided and erected as part of the siding work. Formed metal members shall be secured to the concrete surfaces by means of galvanized powder driven fasteners spaced a maximum of 2 feet on centers. Powder driven fasteners shall be of the size required to safely sustain the loads imposed by the protected metal siding and insulation.

4.4 Insulation between the protected metal outer sheets and the concrete wall surfaces shall be of the thicknesses indicated on the drawings. The insulating material shall be placed and firmly secured between the horizontal 14-gage formed metal zee's and/or other shapes.

4.5 Flashings, Soffit of Roof Overhangs on the 105-N Building, and all Roof Fascias

, shall be provided and erected as part of the siding work, and shall be of protected metal sheets not thinner than 18 gauge. Flashings provided and installed under this specification shall include flashings around doors and access panels, around openings for passage of piping, conduit and ductwork; corner flashings; and roof fascias. Flashings and fascias shall be fastened with stainless steel self-tapping screws with neoprene washers, spaced not more than 12 inches apart. Flashings shall be sealed, so as to be weathertight, with manufacturer's sealing compound placed between flashing and metal siding.

4.6 Accessories: All closers, fillers and similar items required for a weathertight installation shall be provided and installed. Closers shall suit V-beam corrugations and shall be either premolded neoprene or rubber, or protected metal.

4.7 Siding shall have minimum 2 inch sidelaps. End laps shall be minimum 4 inches. All laps shall be tight and fastened together. Siding shall be applied in regular rectangular pattern with sheets approximately the same length, and with horizontal joints and vertical lap seams in line.

4.8 Calking: All interstices not otherwise sealed shall be calked with calking compound conforming to Federal Specification TT-C-598, Grade I, matching protected metal sheets in color.

4.9 Touch-Up: Field abrasions shall be repaired with compound furnished for the purpose by the sheet manufacturer and touched up with paint applied in two coats to match color of protected metal.

5. INSULATED METAL WALL PANELS

5.1 Design: Insulated metal wall panels, except for those at the Fan Room in the 105-N Building, shall consist of an outer sheet of protected metal with V-beam corrugations to match siding, not less than 1-1/2 inches of insulation, and an inner zinc-coated flat steel sheet with calked interlocked male and female flanges forming vertical ribs, either field or shop assembled into panels extending, wherever possible, over two or more girts. The inner sheet shall be welded or fastened to the girts with self-tapping stainless steel screws or studs. The outer sheet shall be attached to a sub-girt which has been fastened to the ribs of the inner sheet. Sub-girt members shall be spaced not more than 4 feet on centers and shall be located as close as practicable to girts and other supports, to permit transference of wind load to the supporting steel. Outer sheets shall be fastened with self-tapping stainless steel screws or studs with neoprene washers to the sub-girts at horizontal intervals not exceeding 12 inches. Provision shall be made for differential expansion of wall components and of the assembled wall panels. Female lips at

joints of inner sheets shall be factory calked at the ribs with calking compound so as to be vapor tight when erected. Side laps for outer sheets shall be not less than 2 inches. End joints of inner sheets shall be vapor tight. Insulated metal wall panels for the Fan Room in the 105-N Building shall be similar to those specified above, except that the assembly shall be modified to withstand an internal pressure of 0.5 psi positive internal pressure without blowing out the caulking compound. The inner sheet of the wall panel shall be reinforced by means of additional stiffeners designed to prevent distortion of the completed assembly when subjected to the pressure specified above.

5.2 Inner Sheets shall be commercial grade carbon steel, not thinner than 20 gauge, with zinc coat conforming to Federal Specification QQ-I-716, Class D-1 or E-1 coating. All flashings on the interior face of the insulated metal wall panels shall be of galvanized steel conforming to the requirements specified above for the inner sheets.

5.3 Insulation between inner and outer sheets of wall panels shall provide a "U" value for the panel of not more than 0.14, except for fan room of the 105-N Bldg. which shall not be more than 0.19. Insulation shall be incombustible, moisture resistant, and compatible with the enclosing sheets. Insulation shall be glass fiber not less than 1-1/2 inches thick of suitable density for installation and shall conform to the applicable requirements of Federal Specification HH-I-521, Type I, Class A, or other approved incombustible insulation. Certification shall be provided that the insulated metal panels, as provided and

erected, shall have a "U" value not in excess of that specified herein. Insulation shall be installed so as to be firmly held in place, shall be free from voids or sag, and shall be supplemented, where necessary for maintaining "U" value, with handpacked insulating material.

5.4 Fascias, Fastenings, Flashings, Accessories, Laps, Calking and Touchup shall be provided and installed as specified for siding sheets, except that end joints shall be as hereinbefore specified, and closers shall be provided to close the tops and bottoms of all panel runs and all openings so that the interiors of the panels are protected against moisture penetration and insulation displacement.

5.5 Sub Girts shall be of galvanized steel or protected metal or steel otherwise protected against corrosion, not thinner than 18 gauge, manufacturer's standard type.

5.6 Louvers and Bird Screens

5.6.1 Fixed louvers shall conform to the size and design indicated on the drawings, with frames formed to fit the openings. Frame and blades shall be constructed of protected metal to match the siding. Blades shall be accurately fitted and firmly secured. The edges of all louver blades shall be folded or beaded for rigidity. All exterior metal wall louvers shall have frame construction of not less than 18 U.S. gage steel and blades of not lighter than 22 U.S. gage steel.

5.6.2 Bird Screens: All exterior louvered openings shall be provided with bird screens. Bird screens shall be 1/2 inch mesh 0.0403

inch diameter (18 gage) aluminum wire. Aluminum frames shall be provided for aluminum screen cloth. Frames shall be of the removable type.

5.7 Pipe and breaching closure seals are included under Section, MISCELLANEOUS METALWORK of these specifications.

6. TESTS AND TESTING

Protected-metal sheets shall meet the following test requirements:

6.1 Acceptance Tests: Prior to the delivery of the protected metal sheets to the site, the Subcontractor shall furnish certified laboratory test reports showing that the type of sheets being furnished have been tested within the past 12 months and have passed the following tests:

a. Salt-Spray Test: A 10- by 12-inch sample of the protected steel sheets, with a minimum of two raw cut edges, shall withstand a salt-spray test for a minimum of 720 hours in accordance with ASTM Standard B117, exclusive of the scratch requirement in the test. Immediately upon removal of the panel from the test, the covering shall show no signs of cracking, peeling or blistering. Loss of adhesion between the protective coating and base metal or between the coating and the asbestos-felt on the exposure side shall not exceed 50 percent of the surface. Corrosion shall be limited to surface rust with no visible pitting of the basemetal.

b. Impact and Fracture Test: The protected-steel sheets shall withstand an impact and fracture test wherein a 760-gram steel

ball, is dropped through a distance of 7 feet, controlled to strike the crest of a "V" beam corrugation near the center of a 12-inch-square sample of the "V" beam material placed on a flat concrete testing surface. The impact shall not break the coating seal or dislodge or loosen the coating over an area greater than 8 square inches on the exposure side when tested at 0 degrees F. Coating that can be readily removed with a penknife blade will be considered dislodged or loosened.

c. Bending Test: A 4- by 8-inch sample of a 20-gage protected-steel sheet shall be bent 90 degrees around a 1-inch diameter mandrel at 0 degrees F without adversely affecting the sheet. The bend shall be accomplished in 2 seconds. Cracks in the surface coating in excess of 1/32-inch wide shall be cause for rejection of the sheets.

d. Accelerated Weather Test: The protected steel "V" beam sheets shall withstand a weathering test a minimum of 1,000 hours in accordance with ASTM Standard E 42, using type A weathering machine, without cracking, blistering, loss of adhesion of the protective coating, or corrosion of the base metal. Particular attention shall be given to the loss of adhesion in the valleys of the "V" beams.

e. Field Tests: At the discretion of the Contractor, sample sheets will be taken at random from each delivery or from stockpiles on the site at any time during the construction period for tests to check the conformance of the materials with the above acceptance tests and with other requirements specified herein. Failure of the

sample sheets to pass any of the required tests shall be cause for rejection of all sheets represented by the samples.

7. SHOP DRAWINGS

Shop drawings shall be submitted for approval by the Architect-Engineer and shall show arrangement of sheets and panels, method of assembly and erection, louvers, fasteners, fascias, flashings, fillers and closures. All material shall be fabricated and erected in accordance with the approved shop drawings.

8. SAMPLES

Samples of materials proposed for the work included under this specification shall be submitted as follows:

Siding	2 pieces 12 inches long by full width of sheet
Insulation	2 pieces approximately 12 inches x 12 inches of the various thicknesses required
Inner Sheets of Insulated Wall Panels	2 pieces 12 inches long by full width of sheet
Sub-Girt	2 pieces
Fasteners, Closers and Other Accessories	2 of each
Color Sample	2 pieces approximately 12 inches x 12 inches of protected metal, in color selected

9. STORAGE, HANDLING AND REPAIRS

Material shall be carefully handled and stored to prevent damage. Damaged sheets or panels shall be replaced. Antistick process standard with the manufacturer of the protected-steel sheets

shall be used to prevent the sheets from sticking together while in storage or in transit. Where an antistick compound is used, the compound shall be readily removable prior to any field touch-up, or shall be a type that will not adversely affect the adhesion of the coating.

SECTION II-6

DAMPPROOFING

1. SCOPE

Dampproofing shall be applied on foundation walls where shown on the drawings and in conformity with these specifications.

2. APPLICABLE PUBLICATIONS

The following Federal Specifications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by references thereto:

Federal Specifications:

R-P-381	Pitch; Coal Tar (for) Mineral-Surfaced
& Am-1	Built-up Roofing, Waterproofing, and Dampproofing.
SS-A-666	Asphalt; (for) Built-up Roofing,
& Am-1	Waterproofing, and Dampproofing,
SS-A-701	Asphalt-Primer; (for) Roofing and Waterproofing.
TT-C-655	Creosote, Technical, Wood Preservative,
& Am-1	(for) Brush, Spray, or Open-Tank Treatment

3. MATERIALS

Materials shall be delivered in sealed containers bearing the manufacturer's original labels. The following materials shall conform to the respective specifications designated below:

3.1 Asphalt: Federal Specification

SS-A-666, Type III.

3.2 Asphalt Primer: Federal Specification

SS-A-701.

3.3 Coal-Tar Pitch: Federal Specification

R-P-381, type II.

3.4 Creosote Oil: Federal Specification

TT-C-655.

4. CERTIFICATES

Certificates shall be submitted for approval. Each certificate shall be signed by an authorized officer of the manufacturing company and shall contain the name and address of the Subcontractor, the project location, and the quantity and date (or dates) of shipment or delivery to which the certificate applies. Asphalt, asphalt primer, coal-tar pitch and creosote oil shall be certified for compliance with all specification requirements.

5. APPLICATION

5.1 General: Dampproofing shall not be applied when the temperature is below 40 F and falling. The work shall be done by workmen experienced in the application of dampproofing and the Subcontractor shall coordinate dampproofing operations with other phases of the work to prevent staining or damaging finished work. Dampproofing shall extend from the top of the footings to within 4 inches of the finished grade.

5.2 Preparation: Surfaces to receive dampproofing shall be smooth, clean and dry. Holes, joints and cracks shall be pointed flush with mortar and high spots ground level with the surrounding surface. Before dampproofing, surfaces shall be swept clean of all foreign matter and shall be inspected and approved.

5.3 Method of Application: Exterior surfaces to be dampproofed shall be given either a priming coat of creosote oil and two mop coats of hot coal-tar pitch, or a priming coat of asphalt primer and two mop coats of hot asphalt. The mop coats shall be applied uniformly, using not less than 25 pounds per 100 square feet per coat. Pitch or asphalt shall be heated to flow freely, but not to more than 375 F for coal-tar pitch and 400 F for asphalt. The finished surface shall be smooth, lustrous and impervious to moisture. Dull or porous spots shall be recoated.

6. BACKFILLING

Backfilling shall not be started before dampproofing has been completed and approved.

SECTION II - 7

WATERPROOFING, BITUMINOUS-MEMBRANE

1. SCOPE

Bituminous-membrane waterproofing shall be installed where called for on the drawings, and in conformity with these specifications.

2. APPLICABLE SPECIFICATIONS

The following publications, of the issues listed below but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by references thereto:

a. Federal Specifications:

R-P-381 & Am-1	Pitch; Coal-Tar (for) Mineral Surfaced Built-Up Roofing, Waterproofing, and Dampproofing.
HH-F-191a & Am-2	Felt; Asphalt-Saturated (for) Flashings, Roofing and Waterproofing.
HH-F-201 & Am-1	Felt; Coal-Tar-Saturated (for) Roofing and Waterproofing.
SS-A-666 & Am-1	Asphalt; (for) Built-Up Roofing, Waterproofing, and Dampproofing.
SS-A-701	Asphalt-Primer; (for) Roofing and Waterproofing.

3. GENERAL

Waterproofing shall be either asphalt or tar type at the option of the Subcontractor and shall be installed at the locations indicated on the drawings, and shall be 3-ply. Waterproofing shall not be applied when the ambient temperature is 40 F or below. Waterproofing shall be turned up around the walls or partitions enclosing

waterproofed areas for a height of at least 4 inches. Where pipes pass through floor areas to be waterproofed, the waterproofing shall not be installed until after the flashing around the pipes has been installed. Flashing thus installed shall be lapped into the plies of the waterproofing and mopped in thereto in a manner that will insure waterproof joint.

4. MATERIALS

All materials shall be delivered to the site in sealed containers bearing the manufacturer's original labels.

- a. Asphalt shall conform to Federal Specification SS-A-666, type III.
- b. Asphalt primer shall conform to Federal Specification SS-A-701.
- c. Asphalt-Saturated felt shall conform to Federal Specification HH-F-191, type I.
- d. Coal-tar pitch shall conform to Federal Specification R-P-381, type II.
- e. Coal-tar-saturated felt shall conform to Federal Specification HH-F-201, type I.

5. SAMPLES AND DESCRIPTIVE DATA

Before delivery of any material to the site, the following samples shall be submitted for approval.

Asphalt-saturated or coal-tar
saturated felt

3 pieces, size 12 inches x
width of roll

6. PREPARATION OF SURFACES

Surfaces to receive waterproofing shall be clean and dry. All holes, joints, and cracks shall be pointed flush with mortar, and high spots shall be cut off or ground smooth. Before waterproofing is applied, the surfaces to be covered shall be carefully swept to remove all dust and foreign matter, and shall have been inspected and approved.

7. APPLICATION OF WATERPROOFING

For tar-type waterproofing, surfaces shall be coated with a hot mopping of coal-tar pitch into which the required number of plies of coal-tar-saturated felt shall be embedded. For asphalt-type waterproofing, surfaces shall be given a coat of asphalt primer, allowed to dry and then coated with a hot mopping of asphalt into which the required number of plies of asphalt-saturated felt shall be embedded. The pitch or asphalt shall be heated to flow freely, but the pitch shall not be heated above 400 F. or the asphalt above 450 F. The pitch or asphalt coatings shall be hot when the felt is embedded therein. The felt shall be applied free from wrinkles or buckles and shall be completely covered by a coating of pitch or asphalt in such manner as to separate completely each ply from the underlying ply over the entire area. The entire top surface shall then be given a final mopping, using not less than 70 pounds of pitch, or 60 pounds of asphalt, per 100 square feet. Where waterproof membrane on the floor is turned up at walls, at vertical angles in walls, and at any other places where the waterproof membrane may be subjected to a usual

strain, strips consisting of two additional plies of saturated felt and alternate moppings of asphalt or pitch shall be applied. Such strips at floor and wall angles shall be of sufficient width to extend at least 6 inches on the floor and 4 inches up the wall. Strips at vertical corners shall extend at least 5 inches on each side of the corner. Membrane shall be applied by the shingle method, with each strip lapped over the preceding strip 22 inches if 32-inch-wide material is used or 25 inches if 36-inch-wide material is used.

8. PROTECTION

Membranes shall be given protection to prevent injury to the membrane by subsequent building operations.

SECTION II - 8

HOLLOW METALWORK

1. SCOPE

Hollow metalwork shall be furnished and installed as shown on the drawings and in conformity with these specifications.

2. APPLICABLE PUBLICATIONS

The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto:

a. Federal Specifications:

TT-P-636b	Primer Coating, Synthetic, Wood and Ferrous Metal.
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TT-P-641b	Primer, Paint Zinc Dust-Zinc Oxide (for Galvanized Surfaces)
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b. American Society for Testing Materials Standards:

A 386-59	Zinc Coating (Hot-Dip) on Assembled Steel Products.
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c. National Board of Fire Underwriters Publication:

Pamphlet No. 80	Standards for the Protection of Openings in Walls and Partitions Against Fire (Current Issue)
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3. SHOP DRAWINGS

Shop drawings of doors and frames shall be submitted for approval. A schedule showing the location of each door shall be submitted with the shop drawings. Drawings for doors shall indicate elevations of each door type; details of construction; method of assembling sections; location and installation of hardware; size,

shape and thickness of materials; and joints and connections. Shop drawings for door and window frames shall show construction of frame, thickness of metal provisions for receiving hardware, method of reinforcing, type and location of anchors, conditions at openings with various wall thicknesses and materials, and a schedule listing the location in the building for each item.

4. MATERIALS AND WORKMANSHIP

4.1 Steel for frames shall be open-hearth, pickled, cold-rolled and annealed steel and shall have clean, smooth surfaces. Concealed reinforcing members shall be structural shapes of sizes required to prevent permanent distortion of frames by movement of the walls and doors in which the frames are located when subjected to pressure of 20 pounds per square foot. Metal shall be U.S. Standard gages hereinafter specified.

4.2 Steel for doors shall be open hearth, full-pickled, cold-rolled, annealed and patent-leveled furniture steel, free from visible waves or other surface defects. Metal for exterior doors shall be zinc-coated.

4.3 Workmanship: The finished work shall be free from defects, warp or buckle. Returns shall be clean-cut, straight and true. Corner joints shall be coped or mitered, well formed, and in true alignment. Fastenings shall be concealed where practicable. Exposed welds shall be dressed smooth.

5. SHOP FINISH

Steel surfaces shall be thoroughly cleaned, and exposed surfaces shall be filled and ground smooth. Where specified, steel shall be zinc-coated. The coating shall be applied by hot-dipping and shall conform to ASTM Standard A 386 except that the weight of coating shall be not less than 1.25 ounces per square foot of surface. Interior doors and frames shall be given a prime coat conforming to Federal Specification TT-P-636. Exterior doors having zinc-coated surfaces shall be either bonderized and prime coated in accordance with the manufacturer's standard practice or cleaned and prepared as specified for galvanized surfaces in Section PAINTING; GENERAL of this specification, and coated with a primer conforming to Federal Specification TT-P-641, type II.

6. FIELD MEASUREMENTS

All measurements shall be verified at the building site for dimensions, fitting, and attachment of all items directly connected with the door and frame installation.

7. FIRE DOORS

Fire doors shall have door and frame construction and hardware to meet the applicable requirements of the Underwriters' Laboratories, Inc. Certificates of such conformance shall be submitted. The label of the above laboratory will be accepted as evidence of conformance with this requirement. In lieu of such label, written certificates may be submitted from any nationally recognized testing agency

adequately equipped and competent to perform such service, that similar doors have been tested and conform to the standards, including the method of test, of the Underwriters' Laboratories, Inc. Installations, including hardware and operational characteristics, shall be in accordance with NBFU pamphlet No. 80.

8. GENERAL REQUIREMENTS FOR DOORS

8.1 Thickness and Clearance: Doors shall be 1-3/4 inches thick. Door clearances shall be not more than the following: 3/32 inch at jambs and heads, 1/8 inch at meeting stiles of pairs of doors, and 3/16 inch at bottoms.

8.2 Stile Edges: The lock edges of stiles shall be beveled 1/8 inch in 2 inches for doors 1-3/4 inches thick.

8.3 Provisions for Hardware: Doors shall be mortised, reinforced and drilled and tapped to receive template hinges and locks. Bore size for lock cylinders shall be 1-5/32 inch diameter (standard size). Doors to receive surface-applied hardware, except push plates and kick plates, shall be provided with reinforcing only; drilling and tapping shall be done in the field. Reinforcing plates shall be 11-gage for mortised hardware and 14-gage for surface-applied hardware.

8.4 Location of Hardware shall be as follows:

- a. Door knobs, centered 38 inches above floor.
- b. Door pulls, centered 40 inches above floor.
- c. Push plates, centered 45 inches above floor.
- d. Cylinder deadlocks, 52 inches above floor.

- e. Top hinge, top edge 5 inches below head of frame.
- f. Bottom hinge, lower edge 10 inches above floor.
- g. Intermediate hinges, equi-distant from top and bottom hinges.

8.5 Louvers for interior metal doors shall be stationery sight-proof type of manufacturer's stock design. Blades shall be welded or tenoned to frame, and the entire assembly shall be built into the door. Louvers shall be formed of 18-gage steel.

8.6 Moldings around glazed or louvered panels shall be fitted to the panels, and mitered and welded at corners to form a continuous frame around the panel. Moldings on the inside of glass and louvered panels shall be secured with oval-head countersunk machine screws having small heads. Snap-on moldings may be used on the inside of glazed panels.

9. HOLLOW METAL DOORS

9.1 Flush doors shall be constructed of two outer sheets of 16-gage steel with edges welded and finished flush. The outer face sheets shall be reinforced with 20-gage interlocking vertical channels or Z-members spaced not over 6 inches apart and spot-welded to face sheets. Tops and bottoms of doors shall have 16 gauge continuous reinforcing channels welded to face sheets. Sound-insulation fillers of cork, fiberboard, mineral-wool board or asbestos shall be placed full height in spaces between reinforcing channels. Exterior doors shall be constructed of galvanized metal. Weld surfaces shall be zinc-coated by metalizing process. Metal moldings around glazed

openings shall be 20-gage metal. A continuous-truss inner core of sheet metal not lighter than 28 gage may be substituted for the reinforcing specified above providing it is spot-welded to the face sheets every 2-3/4 inches horizontally and vertically over the entire surface of both sides.

10. WEATHERSTRIPPING EXTERIOR SWING DOORS

Where indicated on the drawings, weatherstrips shall be provided at the heads, jambs and sills of exterior metal doors. Weatherstrips at heads and jambs shall be extruded aluminum with neoprene insert and shall be #53-J manufactured by Zero Weather Stripping Co., Inc., New York, N.Y., or approved equal. Weatherstrips at the sills of doors equipped with panic hardware shall consist of a 1/4-inch thick rubber wiper secured to the sill edge with an extruded bronze shield. Both rubber wiper and bronze shield shall have slotted holes to provide for adjustment after installation. Weatherstrips at sills shall be Series No. 770, manufactured by Accurate Metal Weatherstrip Co., Inc., Mount Vernon, New York, or approved equal. Weatherstrips at sills shall be attached to the exterior face of the doors. For doors not equipped with panic hardware weatherstrips at the sills shall be extruded bronze of the interlocking type. Weatherstrips at heads and jambs shall be attached to the door frames. Oval headed bronze screws shall be used for the attachment of weatherstrips to metal doors. Flatheaded counter-sunk bronze screws shall be used

for the attachment of weatherstrips to steel door frames. The spacing of screws shall be such as to assure no buckling or gapping of weatherstrips.

11. CONSTRUCTION OF DOOR FRAMES

11.1 Type: Where indicated on the drawings, openings shall have frames of the combination buck, frame and trim type of the sizes and details indicated on the drawings. Frames shall be full welded units.

11.2 Gage of Metal: Door frames shall be not thinner than 16-gage steel. Reinforcements for hardware shall be not thinner than 10-gage for hinges and 14-gage for locks, strikes and closers.

11.3 Door frames shall have joints continuously welded or secured with spot-welded splice plates. Welds on exposed surfaces shall be dressed flush and smooth and shall present a neat appearance.

11.4 Provisions for Hardware: Door frames shall be prepared at the factory for installation of hardware. Frames shall be mortised, reinforced, drilled and tapped to templates to receive mortised template hinges and lock strikes, and shall have reinforcing plates for surface-applied hardware.

11.5 Location of hardware shall be as hereinbefore specified in Paragraph 8.4 of this section of this specification.

11.6 Head reinforcing: Heads of door frames in masonry partitions less than 8 inches thick shall be reinforced at the factory to support the masonry above. Reinforcing shall consist of not less than two continuous, 2 inch by 2 inch, 10-gage steel angles or equivalent channel welded to the head of the frames.

11.7 Anchors: Not less than three adjustable, corrugated anchors formed of 14-gage steel, spaced not over 24 inches apart, shall be provided on each door jamb. Not less than two adjustable anchors shall be provided on each door head. One 12-gage metal clip angle shall be welded to the bottom of each door jamb member for anchoring to floor construction. Jamb anchors for masonry shall extend not less than 12 inches into masonry joint.

11.8 Fire door frames shall conform to the requirements of the Underwriters' Laboratories, Inc., and certificates of such conformance shall be submitted. The label of the above laboratory will be accepted as evidence of conforming to this requirement. In lieu of such label, written certificates may be submitted from any nationally recognized testing agency adequately equipped and competent to perform such services, certifying that the frames for fire doors have been tested and conform to the standards, including method of test, of the Underwriters' Laboratories, Inc.

11.9 Shipment: Frames shall have temporary steel spreaders welded at the bottoms of frames, or bucks shall be strapped together in pairs, with heads inverted, for bracing during shipment.

11.10 Installation: Door frames shall be installed plumb, straight and true, rigidly secured in place, and braced. Where construction will permit, the spreaders used for bracing frame during shipment shall be left in place and concealed. Spreaders that cannot be concealed shall be left in place until the frames are set and anchored.

Backs of frames in masonry shall be filled solid with mortar as specified herein in the MASONRY section. Door frames shall be anchored to concrete floors with expansion bolts in lead sleeves or by powder-actuated bolts.

12. WINDOW FRAMES

12.1 Fixed type window frames in the Hot water Quality Laboratory shall be of the wrap-around buck, frame and trim type. Frames shall be full welded units. Window frames and mullions shall be not thinner than 16-gage steel. Welds on exposed surfaces shall be dressed flush and smooth and shall present a neat appearance.

12.2 Moldings shall be fitted to the frames, and mitered at corners to form a continuous frame around the glazed opening. Moldings shall be secured with oval-head countersunk machine screws having small heads.

12.3 Anchors: Not less than three adjustable, corrugated anchors formed of 14-gage steel, spaced not over 24 inches apart, shall be provided on each window jamb. Anchors shall extend not less than 12 inches into masonry joint.

12.4 Installation: Window frames shall be installed plumb, straight and true, and rigidly secured in place. Backs of frames in masonry shall be filled solid with mortar as specified herein in the MASONRY section.

13. HARDWARE IN CHANNEL DOOR FRAMES

Channel frames shall be drilled and tapped for attachment of hardware. Hardware locations shall be coordinated with doors, and

drilling and tapping shall be done in the field to match hardware locations on doors.

14. COLUMN CLOSURES

Column closures, where indicated on the drawings, shall be fabricated from 12-gage stretcher leveled steel and formed to the shapes shown. Closures shall extend the full height of the column and the wall. Closures shall be secured to the columns with not less than $3/16$ inch diameter galvanized steel machine bolts spaced a maximum of 2 feet on centers. Closures secured to concrete walls shall be provided with slotted holes and with $3/8$ inch diameter galvanized expansion bolts spaced a maximum of 2 feet on centers. After erection the closures shall be adjusted to provide a sliding joint as indicated on the drawings. As erected the width of the joint shall not exceed $1/32$ inch at any point.

SECTION II-9

MISCELLANEOUS METAL-WORK

1. SCOPE

Miscellaneous metal-work shall be furnished and installed as shown on the drawings and in conformity with these specifications.

2. APPLICABLE SPECIFICATIONS

The following specifications of the issues listed below but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by references thereto:

a. Federal Specifications

FF-B-571a & Am-1	Bolts, Nuts, Studs, and Tap Rivets (and Material for Same)
FF-S-92 & Am-1	Screws, Machine; Slotted or Cross-Recessed
QQ-I-716 & Am-3	Iron and Steel Sheets, Zinc-Coated (Galvanized)
QQ-S-741a & Am-1	Steel Plates, Shapes, & Bars, carbon structural
RR-F-191a	Fencing; Chain-Link Fabric
TT-P-86a & Am-1	Paint; Red-Lead-Base, Ready-Mixed
WW-P-406a	Pipe; Steel (Seamless and Welded) for Ordinary Use
WW-P-441b & Am-1	Pipe; Wrought Iron, Welded, Black or Zinc-coated

b. American Welding Society Code

Arc and Gas Welding in Building Construction

c. American Society for Testing Materials Standards (ASTM)

A 7-58T	Steel for Bridges and Buildings (Tentative)
A 120-57T	Black & Hot-dipped zinc-coated (Galvanized) Pipe
A 123-59	Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed and Forged Steel Shapes, Plates, Bars and Strips
A 153-59	Zinc-Coatings (Hot-Dip) on Iron and Steel Hardware
A 167-58T	Specification for Corrosion-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
A 276-59T	Specification for Hot-Rolled and Cold-Finished Corrosion-Resisting Steel Bars
A 193-59T	Specification for Alloy-Steel Bolting Materials for High Temperature Service (Tentative)
A 194-59T	Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service (Tentative)
A 385- 59	Providing High Quality Zinc-Coatings (Hot-Dip) on Assembled Products
B 210-59T	Specification for Aluminum Alloy Drawn Seamless Tube (Tentative)
B 235-59T	Specification for Aluminum-Alloy Extruded Tubes (Tentative)
B 308-59T	Specification for Aluminum Alloy Standard Structural Shapes, Rolled or Extruded (Tentative)
B 313-59T	Specification for Aluminum-Alloy Round Welded Tubes (Tentative)

d. American Institute of Steel Construction

AISC Specification for the Design Fabrication and Erection of Structural Steel for Buildings, 1949 Revision.

e. Hanford Standard Specifications and Drawings

The date of issue or revision dates for these specifications and drawings are listed in other Contract documents:

HW-4900-S	Standard Specification for Qualifying Welders
HW-4903-S	Standard Specification for Welding Aluminum and Aluminum Alloys
HW-4924-S	Standard Specification for Welding Stainless Steels
AC-2-2	Typical Steel Platform Railing and Steel Bars
AC-2-3	Pipe Handrail - Stairs
AC-2-4a	Steel Ladders
AC-2-4b	Steel Ladder Details
AC-2-4c	Pipe Handhold for Steel Ladders
AC-2-5	Steel Ladder Cage

3. GENERAL

Parts necessary to complete each item shall be included. Dimensions of previously installed work shall be verified before fabrication of connecting work. Gages of sheet iron and steel specified herein are U. S. Standard for sheet and plate. Gages of non-ferrous metals shall be Brown and Sharpe (B & S). Welding shall be continuous along entire line of contact, except where tack welding is permitted. Tack welding will not be permitted on exposed surfaces. Shielding and air lock doors, frames and accessories, and their installation are not included as part of these specifications. These

doors and their installation are included under specifications HWS-6940, HWS-6943 and HWS-6954.

4. SHOP DRAWINGS

Shop drawings shall be submitted for each of the miscellaneous metal items specified herein. The drawings shall show all pertinent details of construction and connection to other work.

5. MATERIALS

5.1 Bolts, Nuts, Studs and Rivets, unless otherwise specified, shall conform to the requirements of Federal Specification FF-B-571. Bolts and nuts for anchor bolts and for use in bolted connections, bolt anchors and other uses for carbon steel miscellaneous metal items in the 105-N Building shall conform to the requirements specified in drawing H-1-27730.

5.2 Miscellaneous Steel not otherwise specified herein shall conform to the requirements of Federal Specification QQ-S-741, type I or type II, as required, class 1.

5.3 Machine Screws shall conform to the requirements of Federal Specification FF-S-92.

5.4 Bolt Anchors for connection of miscellaneous metals to concrete as shown on the drawings shall be Phillips "Red Head", self-drilling concrete anchors, or approved equal. Anchors not shown on the drawings or specified, shall be of standard manufacture and of the type required by the work.

5.5 Iron and Steel Sheets, Zinc-Coated (Galvanized), shall conform to the requirements of Federal Specification QQ-I-716, class D1.

5.6 Steel Pipe shall conform to the requirements of Federal Specification WW-P-406, class 1, black.

5.7 Wrought-iron Pipe shall conform to the requirements of Federal Specification WW-P-441, black pipe.

5.8 Carbon Steel Structural Shapes, Plates and Bars: Except as specified otherwise in these specifications or on the drawings, structural steel shapes, plates and bars for embedded curb angles and anchors, pit covers, liner plates, walkway plates and other floor plates, trench covers, ladders, ladder cages, stair channels, miscellaneous brackets, supports and racks, door frames, door sills, lifting bails and other miscellaneous uses as shown on the drawings, shall be carbon steel conforming to ASTM Designation: A7.

5.9 Aluminum Structural Shapes and Tubing:

5.9.1 Structural aluminum shapes for supports, stair channels and other miscellaneous uses as shown on the drawings shall conform to ASTM Designation: B308, grade GS11A-T6 (6061-T6).

5.9.2 Aluminum tubing for storage basin cannister separators in the 105-N Building, and other miscellaneous uses as shown on the drawings shall conform to ASTM Designation: B210, B235, or B313 of the grade shown on the drawings.

5.10 Expanded metal for supply fan room return air grille in the 105-N Building shall be Penn Metal Co. "3.0 lb Grating", plain (not galvanized) expanded metal grating, or approved equal. Grille shall be shop coated with one coat of the primer specified in item 5.18 of this specification.

5.11 Wire mesh partitions and barriers shall be diamond mesh, woven wire, 1-1/2" mesh, No. 10 wire with channel frames, as manufactured by Pacific Wire Works Co., or approved equal, all parts galvanized after fabrication.

5.12 Aluminum grating for use where specified on the drawings shall be Kerrigan Iron Works, Inc. "Aluminum Pressure-Locked Grating" KPL Type 03, or approved equal.

5.13 Stair Treads and Abrasive Nosings

5.13.1 Aluminum treads shall be Kerrigan Iron Works, Inc. Aluminum Grating Treads with KPL Type 03 grating and abrasive nosing, or approved equal.

5.13.2 Abrasive nosings for treads on concrete stairs and concrete pan type treads shall be cast iron abrasive nosing, Wooster Products Co. Type 104 "Ferrogrit", or approved equal, 4" wide, full width of stair. Nosings shall be of the type which fasten to anchor clips with screws, and not of the type with integrally cast anchors, so that nosings can be removed and replaced, when necessary.

5.14 Doorway guards for use in the 105-N Building shall be ductile cast iron, heavy duty hollow type, Neenah Foundry Co., Type R-4983-C, or approved equal, 24 inches high.

5.15 Pipe Sleeves: Except as shown otherwise on the drawings, pipe sleeves for penetrations through concrete or concrete block shall be standard weight black steel pipe conforming to ASTM Designation: A120.

5.16 Conveyor Tunnel Liner and Appurtenances (105-N Building):

5.16.1 Plates for conveyor tunnel liner shall be stainless steel conforming to ASTM Designation: A167, Grade 3 (type 304) hot rolled, annealed and pickled.

5.16.2 Angles, bars and anchor lugs for conveyor tunnel liner shall be type 304 stainless steel conforming to ASTM Designation: A276, annealed and pickled.

5.16.3 Bolts and nuts for conveyor tunnel liner shall be heavy hexagon series stainless steel conforming to ASTM Designation: A193, Grade B8 or B8F for bolts and ASTM Designation: A194, Grade 8 or 8F for nuts.

5.17 Discharge Port Plates and Appurtenances (105-N Building):

5.17.1 Discharge port plates shall be stainless steel conforming to ASTM Designation: A167, Grade 3 (Type 304), hot rolled, annealed and pickled.

5.17.2 Anchor lugs for discharge port plates shall be Type 304 stainless steel conforming to ASTM Designation: A276, annealed and pickled.

5.18 Paint:

5.18.1 Paint for shop-painting and touch-up of miscellaneous metal steel surfaces shall be red-lead paint conforming to Federal Specification TT-P-86, type II.

5.18.2 Coating for rail welds in railroad rails shall be Koppers Co. "Bitumastic Super Service Black", or approved equal.

5.18.3 Field coat of paint for miscellaneous metal carbon steel surfaces shall be as specified in Section, PAINTING; GENERAL of these specifications.

6. WELDING

6.1 Welding of carbon steel miscellaneous metals shall be in accordance with the AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

6.2 Railroad rails shall be welded by the shielded metal arc process using Incoweld "A" electrodes or by an approved equal process.

6.3 Welding of stainless steel miscellaneous metals shall be in accordance with Hanford Standard Specification HW-4924-S, Welding Stainless Steels. Welding shall be done by welders qualified in accordance with Hanford Standard Specification HW-4900-S, Qualifying Welders.

6.4 Welding of aluminum miscellaneous metals shall be in accordance with Hanford Standard Specification HW-4903-S, Welding Aluminum and Aluminum Alloys, except that filler metal for welding alloy GS11A (6061) shall be ER5356. Welding shall be done by welders qualified in accordance with Hanford Standard Specification HW-4900-S, Qualifying Welders.

7. FABRICATION AND ERECTION

7.1 General: Insofar as possible, work shall be fitted and shop assembled, ready for erection. Work shall be executed in strict accordance with the drawings, details and approved shop drawings. Shop and field connections shall be riveted or welded, unless otherwise shown on the drawings. Rivets, screws and kindred fastenings shall be countersunk into exposed work, and finished flush therewith.

Structural steel framing connections, parts, and accessories, shall conform to the Handbook of the American Institute of Steel Construction. Jointing and intersection of metals shall be accurately made, tightly fitted, made in true planes with adequate fastenings. Bolts shall be tightened and threads nicked to prevent loosening. Holes and connections for connecting work of other trades shall be provided as required or as indicated on the drawings. Contact surfaces of dissimilar metals shall be insulated from one another by such methods and materials as will preclude galvanic corrosion. Exposed welds shall be ground clean and smooth. Fabrication and installation of railroad rails, embedded curb angles and anchors, pit covers, trench covers, liner plates, walkway plates and other floor plates, miscellaneous brackets, supports and racks, lifting bails, bolts, galvanized sheet metal, expanded metal items, wire mesh barriers, grating, stair treads and nosings, doorway guards, pipe sleeves, door frames, door sills, conveyor tunnel liner and appurtenances, and discharge port plates and appurtenances shall be as shown on the drawings.

7.2 Zinc-Coating: Where shown on the drawings or specified herein, metal items requiring galvanizing shall, after fabrication, be given protective zinc-coatings by means of the hot-dip galvanizing process. The weight of the zinc-coating per square foot of actual surface shall conform to the requirements of ASTM Specifications A 123 and A 153, as applicable. Unless otherwise specified herein, no individual specimen shall show less than 1.8 ounces of coating per square

foot. The quality of all zinc-coated items shall conform to the requirements of ASTM Specification A 385.

7.3 Erection: Work shall be made and erected square, plumb, straight and true, accurately fitted, with tight joints and intersections. Riveted parts, where so indicated on the drawings, shall be made with countersunk heads or blind rivets. Work shall be adequately reinforced and anchored in place. Exposed work shall be finished smooth with even, close joints and neat connections. All work shall be set at the locations and levels shown on the drawings.

8. EXPANSION AND TOGGLE BOLTS

Galvanized expansion and/or toggle bolts shall be provided for fastening work in place.

9. ANCHORS AND BOLTS

Anchorage items, including bolts and dowels, shall be provided and installed where indicated on the drawings or where necessary for fastening work in place, and secured in place as the work progresses. Zinc-coated anchors and bolts shall be provided in exterior walls.

10. STEEL PAN STAIRS

10.1 Steel Pan Stairs shall be of the type and construction indicated on the drawings. Stair work shall be of such construction, support and anchorage as to safely sustain a load of 125 pounds per square foot of tread landing and platform area. Stair construction shall be complete with all anchors and any structural members required

in addition to those shown on the drawings. The assembled stair shall form a solid mass free from vibration under loading stress, both vertically and laterally.

10.2 Construction: All work shall be executed and finished in accordance with the approved shop drawings. Joints shall be flush and practically invisible on exposed surfaces. Miters and junctions which cannot be forged or welded shall be made with blind screws from the back. All work shall be set to the established lines and elevations and rigidly fastened in place. At completion, all work shall be checked, adjustments made where required, and left in a safe and satisfactory condition.

10.2.1 Welding: Welding shall be in accordance with the Code for Arc and Gas Welding in Building Construction of the American Welding Society, Code 1, Part A, Structural Steel.

Welds shall be continuous along entire line of contact, except where tack welding is specified. All exposed welds shall be ground smooth.

10.2.2 Finish: Exposed soffits of stair runs shall be finished neatly with all exposed joints close fitting, smooth, and all fastenings concealed where practicable. Projecting bolts shall be cut off close to nuts and peened over. Surfaces shall be left smooth, true, and ready for painting.

10.3 Stringers: Face and wall stringers shall be formed of channel sections, framed in complete units with all joints welded. All

stringers carrying treads and risers shall have 1-1/4-inch x 1-1/4-inch x 3/16-inch angles. The angles shall be mitered for neat appearance. Supporting angles shall be welded or riveted to form a continuous support for treads and risers.

10.3.1 Wall Stringers shall be extended up full flights of stairs, and shall be neatly finished with return ends.

10.4 Risers and Subtreads shall each be one-piece No. 12 gage blue-annealed steel pressed into form shown and detailed on the drawings and recessed for 2-inch concrete fill. Subtreads and risers shall be bolted or welded to the supporting angles on the stringers.

10.5 Intermediate Platforms shall be formed of No. 10 gage steel sheets reinforced on the underside with formed ribs, as detailed.

10.6 Newel Posts shall be constructed of 4-inch square by 3/16-inch thick steel tubing weighing not less than 9.6 pounds per foot. Newel posts shall be installed as indicated on the drawings and shall be provided with cast iron or formed steel caps and drops.

10.7 Handrails: Pipe handrails shall conform to the applicable portions of Subsection 11 of this specification, and shall be secured to the newel posts and masonry walls as indicated on the drawings.

10.8 Nosings: Stair treads and landings shall have 3/8-inch thick cast iron nosing 4-inches wide with 3/4-inch rolled edge front side only, back edge plain vertical. Surface pattern shall be cross hatched with abrasive grains securely embedded in the metal matrix to a depth of not less than one-sixteenth of an inch. Nosing shall be secured to

the tread as detailed on the drawings with 3/8-inch bronze flat-head machine screws spaced in accordance with the manufacturer's standard pattern. Nosings shall be type 104 "Ferrogrit" manufactured by Wooster Products, Inc., Wooster, Ohio, or approved equal.

11. HANDRAILS AND RAILING

Pipe handrails shall be 1-1/4 inch standard weight steel or wrought iron pipe. Posts shall be 1-1/4 inch extra strong steel or wrought iron pipe. Posts and rails/shall be joined by use of socket and pin type fittings, or by welding with all welds ground smooth. Fittings shall be "Nu-Rail", manufactured by Crane Company, Chicago, Illinois, or approved equal. All exterior pipe handrails and posts shall be hot-dip galvanized after fabrication.

11.1 Fabrication and installation of handrails for the 105-N Building shall be in accordance with Hanford Standard AC-2-2 using Type "A" base for concrete, Type "C" base for steel floors or framework and type "D" base for grating.

11.2 Fabrication and installation of stair handrails for the 105-N Building shall be in accordance with Hanford Standard AC-2-3 using the type I, permanent base connection on steel stair stringers.

11.3 Fabrication and installation of removable handrails shall be in accordance with Hanford Standard AC-2-2, with modified base connection as shown on the drawings.

12. METAL THRESHOLDS

Metal thresholds of cast iron shall be installed at exterior doors, top surface made nonslip with abrasive. Where indicated

the drawings, metal thresholds of cast aluminum shall be installed at interior doors, top surface made non-slip with abrasive. Thresholds shall be secured in place with 3/16-inch-diameter countersunk expansion bolts of nonferrous metal. Thresholds at all exterior doors shall be bedded in calking compound. Ends shall be scribed to jambs. Thresholds at elevator doors shall be 3/8-inch thick cast iron, top surface made non-slip with abrasive. Thresholds shall be set prior to placing concrete, and concrete well puddled to provide uniform bearing.

13. CHANNELS AT INSULATED METAL WALL PANELS

Channels used to secure concrete masonry units at interior face of insulated wall panels shall be fabricated from hot-rolled structural shapes and shall be of the size shown on the drawings and secured to the girts with clip angles top and bottom.

14. ACCESS DOORS

Access doors, complete with frames, shall be provided and installed where indicated on the drawings. Doors shall be of the sizes marked on the drawings and shall be Style M, Milcor Access Door, manufactured by Inland Steel Products Company, Milwaukee 1, Wisconsin, or approved equal.

Doors shall be 14-gage steel, and shall be supplied with three concealed hinges and five flush-mounted, screwdriver-operated, metal cam locks. Frames shall be 16-gage steel for mounting in masonry openings.

15. ROLLING STEEL DOORS

15.1 Rolling steel motor operated, chain operated and manually operated doors shall be provided and installed as indicated on the drawings and hereinafter specified. The doors shall be composed of interlocking slats coiling above the opening in a No. 24 U.S. steel gage galvanized sheet steel hood.

15.2 Curtain shall be of interlocking slats, rolled not drawn, formed in easy curves without sharp bends from No. 20 U.S. gage open hearth galvanized steel. Slats shall be of section sufficiently large to give curtain strength to safely resist a wind load of 20 pounds per square foot. Curtain shall be provided with slat lugs as wind locks to engage bars in guides and to lock the curtain against wind pressure. Each alternate slat shall be fitted with malleable endlocks 3/8 inch thick. Bottom bar shall be two angles placed back to back.

15.3 Counterbalance: Curtain shall be coiled on a pipe of sufficient size to carry the door load with a deflection not to exceed .03 inch per foot of opening width, and shall be balanced by helical springs contained in pipe, with all springs anchored to the same tension rod and held in position by the same adjusting wheel accessible from the outside.

15.4 Coil brackets shall be of high test gray iron designed to house ends of the coils.

15.5 Guides shall be built of structural steel angles to form a slot of sufficient depth to retain curtain against wind pressure

specified and shall be provided with anchors for windlocks. Door guides shall be constructed in accordance with the details shown on the drawings, or as approved.

15.6 Gears shall be of best grade gray iron, cast teeth machine moulded from machine-cut patterns. Reduction gears shall be spur type designed with factor of safety of not less than 4, and a reduction ratio individually suited to the door.

15.7 Chain Guard and Operating Chain: The sprocket wheel shall be provided with a guard designed to guide the hand chain and prevent it from jumping the sprocket teeth. Door shall be equipped with a galvanized endless chain and keeper, and a jamb locking device.

15.8 Motor Operation: The control circuit of electrically operated doors shall be closed by means of push buttons and automatic limit switches that will break the circuit at termination of travel.

15.8.1 Motor shall be high starting torque type, raising or lowering curtain at approximately .67 feet per second and provided with thermal overload protection.

15.8.2 Reduction gear of the power unit shall be machine-cut gear completely housed and running in an oil bath.

15.8.3 Emergency Operation: A control for automatically engaging a sprocket and chain and releasing the brake, shall be operable from the floor. A device which shall automatically prevent the motor from operating until emergency sprocket is disengaged shall be provided. Emergency operation shall not affect timing of limit switch.

15.8.4 Control switches shall consist of push button stations marked Open, Close and Stop, in "Nema" type #1 case.

15.8.5 Motor starters shall be magnetic reversing contactors enclosed in "Nema" type #1 case.

15.8.6 Limit Switches: Door movement shall be controlled by limit switches. Limit switches shall be easily adjustable to stop the door at terminal positions and shall be enclosed in a cast iron box.

15.9 Weatherproofing: Doors shall be weatherproofed by means of a bottom bar seal consisting of a neoprene loop suspended between the two bottom bar angles, neoprene guide weathering at the grooves in conjunction with continuous end locks, and a hood baffle to prevent infiltration at top of door. Method of weatherproofing shall be subject to approval.

15.10 Paint: All parts of the door (except mechanism) shall be shop coated with galvanized iron primer in accordance with door manufacturer's standards.

16. PIPE CLOSURE SEALS

Pipe closure seals shall be fabricated of the materials and installed in the manner shown on the drawings and specified herein.

16.1 Steel plate and structural shapes shall conform to the applicable requirements of ASTM Designation A7. Steel plate pipe closures shall be of hollow construction. All joints shall be welded, and all welds ground smooth.

16.2 Aluminized asbestos cloth shall be fabricated of "Asbeston" aluminized asbestos Underwriters' grade cloth 0.025 inches thick and weighing not less than 0.94 pounds per square yard. Cloth shall be weathertight and waterproof, and shall be Style S/6555-ALMF, manufactured by United States Rubber Co., Textile Division, New York, N. Y. or approved equal. Cloth shall be secured to the pipe closure plates and breeching closure frame through neoprene gaskets and flat steel bars with sheet metal screws spaced as indicated on the drawings.

17. FERROUS SEISMIC JOINT COVERS

Seismic joint covers, except at roof levels, shall be fabricated from hot-rolled structural shapes, flat plate and bar stock as shown on the drawings. Angles to be set in concrete floor slabs shall be provided with minimum 1-inch by 1/4-inch by 8-inch long strap anchors spaced a maximum of 2 feet on centers. Angles attached to concrete or masonry walls shall be anchored thereto with 1/2-inch diameter expansion bolts or toggle bolts, respectively, spaced a maximum of 2 feet on centers. Sliding plates and bar stops shall be butt or fillet welded to the angle supports. Seismic joint covers at the roof levels are specified in Section, SHEET METALWORK, GENERAL of these specifications.

18. WELDING CURTAINS

The welding curtains shall be draw type curtains suspended from a continuous track extending the full width of the opening.

18.1 Curtains shall be fabricated of "Asbeston" asbestos Underwriters' grade cloth .072 inches thick and weighing not less than 2.25 pounds per square yard. Cloth shall be Style US 36P10-80, manufactured by United States Rubber Company, Textile Division, New York, N. Y., or approved equal. All raw edges shall be hemmed. The material shall be turned under a minimum of 2-1/2 inches with the raw edge turned in and stitched. Finished hems shall measure a minimum of 2-inches. Grommets shall be provided in the top and placed at the upper corners with intermediate grommets spaced a maximum of 12 inches on centers. Grommets and washers shall be rolled rim brass No. 5 spur grommets and toothed washers.

18.2 Curtain track shall be fabricated of 1/4 gage steel without mechanical joints. Track shall be a box section approximately 2 by 2 inches with raceway wide enough to receive curtain hooks without binding. Track shall be equipped with noiseless rubber or nylon roller wheels 1-1/8 inch in diameter, mounted on heavy duty steel carrier. Wheels and carrier shall be joined by 1/4 inch diameter brass axle fitted to ball bearing race pressed in wheel. A master carrier equipped with 4 wheels shall be provided at the leading edge of the curtain. Each carrier shall be equipped with heavy duty stainless steel swivel eyes. Operating line shall be No. 8 cotton braided line. Angle hangers and clips or ceiling cleats, stud bolts and channels supporting the curtain tracks shall conform to the sizes and details shown on the drawings, and shall be furnished and installed as part of the curtain assembly.

18.3 Shop drawings of the complete welding curtain assembly shall be submitted for approval.

19. ANGLE AND CHANNEL FRAMES

19.1 Angle and channel frames, including exterior door frames and elevator door frames, shall be fabricated from hot-rolled structural shapes and, except as otherwise shown, shall be set flush with masonry and concrete surfaces. The head member shall extend over tops of jamb members and ends of head member shall finish flush with sides of jamb members. Sill member in four-sided frames shall be framed same as head member. Intersections of frame members shall be continuous welded, and exposed welds shall be ground smooth. Except as otherwise shown, door stops shall be 5/8" x 1-1/2" steel bars tap-screwed to the frame on not more than 18-inch centers.

19.2 Angle clips shall be provided at the bottom of each jamb for attachment to concrete floor. When installed in masonry or concrete openings, the jambs shall be provided with 2-inch x 1/8 inch steel anchors on not more than 3 foot centers. Where frames are to be installed in unit masonry walls, anchors shall be adjustable. All other anchors shall be riveted or welded to the frames.

19.3 Frames shall be drilled and tapped for attachment of hardware and shall be slotted for strike cutout. Hardware locations shall be coordinated with doors, and drilling and tapping shall preferably be done in the field to match hardware on doors. Any shop drilling and tapping which does not suit locations of hardware on doors shall be re-located by the Contractor.

19.4 Where Underwriters' requirements are called for on the drawings, door frames shall conform to the applicable Underwriters' requirements.

20. MISCELLANEOUS STEEL ITEMS

Miscellaneous steel angles, embedded angles, curb angles, channels and plates not otherwise specified, shall be fabricated from hot-rolled structural shapes or plate conforming to ASTM Designation A7. Angles and channels shall conform to the sizes indicated on the drawings and, where shown, shall be provided with strap anchors, sized and spaced as indicated for anchoring into concrete or masonry. Steel plate for closures at columns, doors, walls and elsewhere shall be of the sizes and thicknesses shown. Plates shall be secured by welding, bolting or by machine screws. Formed sheet steel closures are specified under Section HOLLOW METALWORK of these specifications.

21. CORNER AND DOORWAY GUARDS

Corner guards at rolling steel doors in the 109-N Building shall be structural shapes conforming to ASTM Designation A7. The guards shall be set in place and secured to the structural frame after erection of all wall siding and insulation or insulated metal wall panels. Doorway guards in the 105-N Building shall be ductile cast iron, heavy duty hollow type, Neenah Foundry Co., Type R-4983-C, 24-inches high, or approved equal. Doorway guards shall be installed at the locations and in the manner indicated on the drawings. Corner and doorway guards shall be field painted prior to erection.

22. STEEL LADDERS AND CAGES

Steel ladders and cages shall be fabricated of steel rails and solid rungs, sized and spaced as indicated on the drawings. Rungs shall be welded to the rails. Anchor bolts shall be built into masonry work as the masonry is erected and shall be placed in concrete work before or during placement. All exterior ladders and cages shall be hot-dip galvanized after fabrication.

22.1 Fabrication of ladders shall be in accordance with Hanford Standards AC-2-4a, AC-2-4b and AC-2-4c. Installation shall be as shown on the drawings.

22.2 Fabrication and installation of ladder cages shall be in accordance with Hanford Standard AC-2-5.

23. WIRE MESH PARTITIONS AND BARRIERS

23.1 Wire mesh partitions and barriers shall be fabricated in accordance with the standards and specifications of the Woven Wire Products Association, and shall be those manufactured by Pacific Wire Works Company, Seattle, Washington, or approved equal. Partitions and barriers shall be of the heights and of the size and design shown on the drawings. Vertical frames shall be not less than 1-1/4 inches by 5/8-inch by 1/8-inch cold-rolled "C" channel stock, with 1/4-inch-diameter bolt holes 12 inches on centers. Horizontal frames shall be not less than 1-inch by 1/2-inch by 1/8-inch cold-rolled "C" channel stock, with all joints mortised and tenoned. Center reinforcing bar shall be 1-inch by 1/2-inch cold-rolled channel tenoned to side frames. Top capping bars shall be 2-1/4-inches by 1-inch cold-rolled

channel with 1/4-inch "U" bolts 2 feet 4 inches on centers. Corner posts shall be 1-1/4-inch by 1-1/4-inch steel angles with 1/4-inch-diameter bolt holes to match partition. Floor sockets shall be cast-iron 2-1/2 inches high and shall have set-screw adjustment. Hinged door frames shall be 1-1/4-inch by 1/2-inch channels with 1-1/4-inch by 1/8-inch flat bar cover three sides, 1-3/8-inch by 3/4-inch by 1/8-inch angle riveted to lock side. Each door shall have 1-1/2 pair butt hinges riveted to both door and transom bar. Each hinged door shall be provided with bronze mortise type cylinder lock operated by key from outside and by recessed knob inside. Locksets shall conform to the requirements specified in Section, **HARDWARE: BUILDERS** of this specification. Sliding door frames shall be 1-1/2-inch by 3/4-inch channels with 1-1/2-inch by 1/8-inch flat bar cover all around. Each sliding door shall have two 4-wheel ball bearing trucks hung in enclosed box track. Sliding doors shall have continuous 12-gage door strike with keeper and box channel guide. Wire mesh shall be of No. 10 gage, woven into 1-1/2-inch diamond mesh, and shall conform to the requirements of Federal Specification RR-F-191. Posts shall be attached to floor by clips and expansion bolts.

23.2 All bolts, hardware, and accessories for a complete installation shall be furnished. All field bracing shall be furnished by the erector.

23.3 Finish: All partitions, barriers, and doors shall receive one baked-on shop coat of semi-gloss enamel. The color shall be as specified in the Finish Schedule shown on the drawings.

24. NOSINGS FOR CONCRETE STAIRS

Nosings for concrete stairs shall be installed where shown on the drawings in accordance with the manufacturer's recommendations except that the screws for attaching to clip anchors shall be greased or coated with a substance to destroy the bond to the concrete and allow removal of the screws.

25. PAINTING

25.1 Cleaning and Shop Painting: Carbon steel surfaces of miscellaneous metal items except contact surfaces, surfaces to be encased in concrete, and galvanized surfaces, shall be degreased with solvent and cleaned of all loose mill scale, rust, weld spatter, slag or flux deposit, oil, dirt and other foreign matter by wire brushing, grinding or sandblasting. After cleaning, the steel shall be given one coat of primer paint specified in item 5.18 of this specification. Paint shall not be applied to surfaces which are damp, wet or frosty. The paint shall be well worked into all joints and crevices. Paint shall not be applied when the ambient temperature or temperature of the metal is below 40 F.

25.2 Inaccessible Surfaces: Surfaces of carbon steel miscellaneous metals which will be inaccessible for painting after installation shall be given two coats of the primer paint specified in item 5.18 of this specification, before installation.

25.3 Touch-Up Painting: Immediately after installation, abraded or damaged areas of prime coat shall be touched-up with the primer paint specified in Section PAINTING: GENERAL of these specifications.

25.4 Welds in Railroad Rails: Completed welds in railroad rails which are to be encased in grout or concrete shall be coated with two coats of the coating specified in item 5.18 of this specification. Coating shall be applied to all parts of the weld to be buried and shall extend three inches on each side of the weld.

26. METAL PANELS

Metal panels for use as partitioning in the 105-N Building shall consist of 18 gauge galvanized fluted steel sheets. Fluted sheets shall be Section 3 or Section 12, manufactured by H. H. Robertson Co., Pittsburgh, Pa., or approved equal. Panels shall be installed in the manner indicated on the drawings and shall be furnished complete with closure strips, angles and neoprene closers. Female lips of all panels shall be factory calked at the ribs with calking compound standard with the manufacturer, so as to be airtight when erected.

SECTION II-10

CARPENTRY

1. SCOPE

Carpentry shall be erected as shown on the drawings and in conformity with these specifications.

2. APPLICABLE SPECIFICATIONS

The following specifications of the issues listed below, but referred to thereafter by basis designation only, form a part of this specification to the extent indicated by references thereto:

a. Federal Specifications:

FF-B-561a	Bolts, Lag
FF-B-571a & Am-1	Bolts; Nuts; Studs; and Tap Rivets (and Material for Same)
FF-N-105 & Am-2	Nails, Wire; and Staples
FF-S-111a	Screws, Wood, Slotted-Head
MM-L-736 & Am-3	Lumber and Timber; Hardwood
MM-L-751c & Am-1	Lumber and Timber; Softwood
TT-W-571c	Wood-Preservative; Recommended Treating Practice
CCC-C-418	Cloth, Coated, Upholstery (Vinyl-Resin Base)

b. Department of Commerce Publications:

RL6-39-53	Lumber - American Lumber Standards for Softwood Lumber
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c. American Society of Testing Materials Standards:

E90-55

Recommended Practice for Laboratory
Measurement of Airborne Sound Trans-
mission Loss of Building Floors and
Walls

3. MATERIALS: LUMBER AND WOODWORK

Lumber shall conform to Federal Specifications MM-L-736 and MM-L-751. Lumber for the various uses shall be one of the species listed for the purpose and of the grade hereinafter indicated.

3.1 Framing and Structural Lumber:

<u>USE</u>	<u>GRADE</u>	<u>SPECIES</u>
Blocking and Nailers (Preservative Treated)	No. 2	Douglas fir, inland and coast
Wood Cant Strips for 105-N Building (Preservative Treated)	Standard	Pine, lodgepole, north- ern white, Norway ponderosa, and southern, Spruce, eastern, Engelmann, Cedar, western red
	Standard (WCLB)	Spruce, sitka

4. MATERIALS OTHER THAN LUMBER

Materials other than lumber shall conform to the specifications and other requirements specified hereinafter:

4.1 Bolts and Nuts shall conform to Federal Specification FF-B-571. Where embedded in concrete they shall be galvanized or cadmium plated.

4.2 Clamps, Expansion Bolts, Expansion Screws, Washers and Anchors shall be of steel or iron and of a standard type and manufacture. Where embedded in concrete they shall be galvanized or cadmium plated.

4.3 Lag Screws shall conform to Federal Specification FF-B-561.

4.4 Nails shall conform to Federal Specification FF-N-105, or shall be drive-screw or spiral type of standard manufacture.

4.5 Wood Preservatives shall conform to the applicable Federal or other specifications referenced in Federal Specification TT-W-571.

4.6 Wood Screws shall conform to Federal Specification FF-S-111.

5. LUMBER

5.1 Grading shall be in accordance with Federal Specifications MM-L-736 and MM-L-751.

5.2 Sizes and Patterns: Lumber shall be surfaced four sides and the dressed sizes of yard and structural lumber shall conform to Department of Commerce Simplified Practice Recommendation R16-39.

5.3 Storage: Lumber delivered to the site shall be piled off the ground in such manner as to insure drainage, ventilation, and protection from the weather.

6. TREATED LUMBER

6.1 Blocking, Nailers and Cant Strips: Woodblocking, nailers and cant strips for fascia, roof openings, and flashing flanges on roofs shall be given a pressure preservative treatment in a closed retort. The treatment shall conform to Federal Specification TT-W-571, and the minimum net retention shall be as specified hereinafter. Any of the following preservatives will be acceptable, at the option of the Subcontractor.

<u>Preservative</u>	<u>Minimum net retention, pounds per cubic ft.</u>
Coal-tar creosote - - - - -	6.0
Pentachlorophenol solution - - - - -	6.0
Wolman salts (Tanalith) - - - - -	Dry Salt .35
Chromated Zinc chloride - - - - -	Dry Salt .75
Chemonite (ammoniacal copper arsenite) - - - -	Dry Salt .30
Chromated zinc arsenate (boliden salt) - - - -	Dry Salt .50

Lumber treated with an oil-borne preservative shall be clean free from surface oil, and seasoned for use in building construction; lumber treated with a water-borne preservative shall be air- or kiln-dried to a moisture content not exceeding 19 percent. Certificates shall be furnished certifying (1) the retention obtained and (2) in the case of material treated with water-borne preservative, the moisture content on delivery to the site. Lumber cut or sawed after treatment shall have the cut surfaces brush-coated with the preservative used in the treatment. A method for determining penetration as described in the manual issued by the American Wood Preservers Association may be used.

7. SHELVING AND HOOK STRIPS

Shelving and hook strips shall be furnished and installed in the locations indicated on the drawings.

7.1 Shelving shall consist of 3/4-inch thick interior-type plywood, grade A-B. An edge strip of solid wood shall be provided on the front

edge of each shelf. Shelves shall be supported on shelf cleats of solid wood.

7.2 Hook strips of solid wood shall be provided under shelves in Janitors' Closets. Cleats used in conjunction with hook strips shall be the same size as the hook strip.

7.3 Solid wood shall be B or better white pine, or approved equal, suitable for painted finish.

8. TEMPORARY ENCLOSURE

Temporary batten doors, complete with hinges and padlocks, shall be provided on exterior door openings.

9. ANCHORS

Anchors shall be installed, where specified herein or shown on the drawings, to anchor carpentry to concrete and steel.

10. ACCORDION DOORS

10.1 General: The accordion-type folding doors in the 105-N Building shall be the standard product of a manufacturer regularly engaged in the production of such doors. Doors shall operate on wheel carriers and overhead track only.

10.2 Frames shall be of metal. Ferrous metal shall be protected against rust by cadmium plating or electrolytic or hot-dip zinc coating. Nonferrous metal shall be extrusions. Gages and thicknesses of metal shall be as required for adequate strength and rigidity. The frame shall be constructed of either a series of metal hinge plates connected by vertical metal rods to provide a horizontal pantograph

action, or shall consist of vertical pantographs located at top and bottom of the door. Doors having horizontal pantograph action and over 7 feet in height and doors having vertical pantographs and over 8 feet in height shall be provided with one or more intermediate pantographs in accordance with manufacturer's standard design practice. The frames shall provide a smooth and positive folding action resulting in an equal extension and collapse of all folds of the door. Fastenings shall be cadmium-plated or hot-dip- or electrolytic-zinc-coated or shall be nonferrous-type.

10.3 Track shall be not less than 18-gage steel, bonderized, with baked-on enamel finish or shall be extruded satin-finish aluminum not less than 0.050 inch in thickness. Track sizes shall be in accordance with manufacturer's standard designs for door width and sizes.

10.4 Wheel carriers shall be provided for door support and shall be spaced a maximum of 24 inches apart. Wheels shall be noiseless type.

10.5 Covering shall be either a combination of laminated fiberboard with outer ply of flame-resistant vinyl-coated fabric and weighing not less than 55 ounces per square yard, or shall be a vinyl-coated fabric weighing not less than 18 ounces per square yard. The vinyl covering shall not chip, craze, peel or crack throughout the life of the door. Color shall be as selected by the Architect-Engineer from the standard color charts of the door manufacturer. The vinyl material shall conform to the requirement for permanent flame resistance as stipulated in Federal Specification CCC-C-418.

10.6 Sound Reduction: Doors shall be of the soundproof type and shall provide a sound attenuation of not less than 30 decibels through the range of test frequencies stipulated in ASTM Standard E 90. Manufacturer's standard sound channel, sweep strips and sound-retardant liners shall be used where necessary to obtain this value.

10.7 Hardware shall be the manufacturer's standard metal pulls, knobs, and locks.

10.8 Installation shall be in strict accordance with the manufacturer's written instructions.

SECTION II-11

SUSPENDED ACOUSTICAL CEILINGS

1. SCOPE

Suspended acoustical ceilings for 105-N Building shall be furnished and erected as shown on the drawings and in conformity with these specifications.

2. SHOP AND ERECTION DRAWINGS

Prior to fabrication or erection, the Subcontractor shall furnish shop drawings and erection drawings for comment or approval of the Architect-Engineer. These drawings shall give all necessary information for the fabrication and erection of the suspended acoustical ceiling system.

3. MATERIALS

3.1 Suspended Ceiling System: Prefabricated suspended ceiling system shall be manufactured by Acoustics Manufacturing Corp. of Detroit, Michigan; Hansopan manufactured by Elof Hansson, Inc., of New York City; Sanacoustic manufactured by Johns Manville or an approved equal in accordance with the following specifications.

3.1.1 Metal pans shall be snap in type, removable at any point in the ceiling, with a continuous bead on all four sides. Metal pans shall be die formed, made of not less than 26 ga steel, 12 inches wide and not over 48 inches long, with a 1/8 inch bevel on all four edges and cross scored to simulate 12 inch by 12 inch units. Perforations shall be full random pattern. Finish shall be baked white enamel.

3.1.2 Tee tracks shall be .025" thick galvanized steel, made especially for retaining metal pans.

3.1.3 Attachment clips and all other metal accessories required for this installation shall be provided in accordance with the manufacturers recommendations. Clips and accessories shall be galvanized.

3.1.4 Metal mouldings to match the finish of metal pans shall be furnished at all vertical surfaces where ceiling abuts walls.

3.1.5 Sound absorbing pads shall be long strand glass fiber material of proper size to be laid in metal pans or mineral wool pads completely wrapped in flame resistant paper. Noise reduction coefficient shall be 0.85 at 1000 cycles per second.

3.1.6 Sound attenuation units shall be a non combustible material. They shall be of such size to snap in under the bead on all four sides of the metal pan being used. Suspended ceiling system with sound attenuation units shall have a minimum attenuation value of 23.0 decibels at 250 cycles per second on a one way transmission of sound.

4. INSTALLATION OF SUSPENDED CEILINGS

4.1 Suspended ceilings shall be fabricated and erected in accordance with the approved drawings, the manufacturer's approved fabrication and erection details and the provisions of these specifications.

4.2 Tee tracks shall be firmly attached to the structure above using clips and suspension rods recommended by the manufacturer for this installation. Tee tracks shall be spaced not over 48 inches on center and shall be levelled.

4.3. Metal pans, sound absorbing pads, and sound attenuation units shall be installed in accordance with the approved manufacturer's instructions and erection drawings.

4.4 Metal pans shall be cut to fit neatly at light fixtures, columns, ducts and other interruptions in the ceiling.

4.5 Metal moulding channels shall be attached to the walls, columns, and other permanent vertical surfaces to form a continuous moulding. At these surfaces the metal pans shall be cut and inserted into the wall moulding. One channel shaped galvanized steel wall moulding spreader for each lineal foot of cut pan shall be used to secure the pan to the wall moulding. The metal pan shall be carefully cut to fit the vertical surfaces.

SECTION II-12

TILE WORK, CERAMIC: FOR FLOORS AND WALLS

1. SCOPE

Ceramic floor and wall tile shall be furnished and installed as shown on the drawings and in conformity with these specifications.

2. APPLICABLE PUBLICATIONS

The following publications of the issues listed below but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

a. Federal Specifications:

QQ-B-101C & Am-2	Bases, Metal; (for) Plaster and Stucco Construction.
RR-F-221b & Am-1	Fencing (Barbed Wire, Woven Wire, and Wire Netting).
SS-A-281b & Am-1	Aggregate; (for) Portland-Cement-Concrete.
SS-C-192b	Cements, Portland.
SS-T-308 & Am-3	Tile, Ceramic; Floor, Wall and Trimmers.
TT-C-598 & Am-2	Compound, Calking; Plastic (for) Masonry and other Structures.

b. U. S. Department of Commerce Commercial Standards:

CS181-52	Water-Resistant Organic Adhesives for Installation of Clay Tile.
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c. U. S. Department of Commerce Simplified Practice Recommendations:

R61-44	Clay Tile for Floors and Walls.
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d. American Society for Testing Materials Standards:

C206-49 Special Finishing Hydrated Lime.

C207-49 Hydrated Lime for Masonry Purposes.

3. GENERAL

Work required under this section of the specifications shall not be performed unless the ambient temperature of the area in which the work occurs is at least 50 degrees F and rising. Ventilation shall be provided to take off fumes.

4. MATERIALS

Manufacturer's original containers, bundles or packages shall be delivered to the project site unopened, with seals unbroken and labels intact, and shall not be opened until inspected.

4.1 Adhesive shall conform to U. S. Department of Commerce Commercial Standard CS181, and containers shall be marked with the hallmark recommended by the Commercial Standard.

4.2 Calking compound shall conform to Federal Specification TT-C-598.

4.3 Lime shall conform to American Society for Testing Materials Standard C206 or C207, type S.

4.4 Portland cement shall conform to Federal Specification SS-C-192, Type I.

4.5 Reinforcement in setting beds shall conform to Federal Specification RR-F-221, type C, 1- or 2-inch mesh wire netting of not lighter than 18-gage wire.

4.6 Sand for setting beds, base coats and grout shall be clean, washed, sharp, durable particles, free from silt, loam, clay, soluble salts and organic impurities, and shall be well-graded from coarse to fine within the limits noted for its specific use, as follows:

<u>Specific use</u>	<u>Percentage, by weight, passing</u>		
	<u>No. 8 sieve</u>	<u>No. 30 sieve</u>	<u>No. 100 sieve</u>
Setting beds, for floors	100	--	Not more than 5.
Base coats, for walls	100	--	Not more than 5.
Grout	--	100	Not more than 5.

4.7 Tile shall conform to Federal Specification SS-T-308 and U. S. Department of Commerce Simplified Practice Recommendation R61, and shall be standard grade. Labels on containers shall be marked to correspond with the marks on the signed "master grade certificate" specified hereinafter. Sizes specified are nominal.

4.7.1 Ceramic mosaic floor tile shall be natural clay tile, type I, Class B, form 3. Tile shall be ceramic mosaic sizes, 1/4 inch thick, with square or cushion edges, and shall be laid in either a 3-unit random mosaic pattern having the small unit not over 1-1/16 by 1-1/16 inches in size, or a 2 or 3 rectangular unit pattern having the large unit not over 2-3/16 by 2-3/16 inches in size. Colors shall be as selected by the Architect-Engineer from samples or brochure from the manufacturer. Tile for use with adhesive method of installation shall be cushion edge, and shall be of one size and one color, sufficiently uniform in thickness to provide a smooth surface.

4.7.2 Glazed ceramic wall tile and trimmers for walls and wainscots shall be approximately 3/8 inch thick. Glazed wall tile shall be type II, 4-1/4 inches in size, and trimmers shall be type III, class E, and shall have matte glazed finish on exposed-to-view surfaces. Stops, returns, trimmers, caps and special shapes shall be provided as required for jambs, recesses, offsets and other conditions so as to provide a complete and neatly finished installation. Colors shall be as selected by the Architect-Engineer from samples or brochure from the manufacturer. Glazed ceramic wall tile for use with adhesive method of installation shall be one size, cushion edge, and sufficiently uniform in thickness to provide a smooth wall and wainscot surface.

4.8 Metal lath shall conform to Federal Specification QQ-B-101, type F expanded metal lath, as hereinafter specified. Type F expanded metal lath shall be cut from copper-bearing steel sheets and coated with rust-inhibiting paint after cutting, or cut from zinc-coated steel sheets, and shall weigh not less than 3.4 pounds per square yard.

4.9 Water shall be clean and free from injurious amounts of oil, acids, soluble salts and organic impurities.

5. SAMPLES

The following samples of materials proposed for use shall be submitted for approval.

a. Duplicate sheets of floor tile, each about 12 inches square, showing colors and patterns of each type, class and form.

b. Duplicate panels of 4 wall tiles, each showing range in shades of each color.

c. Duplicate pieces of trimmers of each color and shape.

6. CERTIFICATES

Certificates executed in triplicate shall be furnished. Each certificate shall be signed by the Subcontractor and an authorized officer of the manufacturing company, and shall contain the name and address of the Subcontractor, the project location, and the quantity and date or dates of shipment or delivery to which the certificate applies. Certificates certifying compliance with specification requirements shall be furnished for the following materials:

a. Adhesive

b. All tile (One "master grade certificate")

7. INSTALLATION OF FLOOR TILE

Floor tile operations in spaces requiring wall tile shall not be started until after the wall tile installation has been completed. Surfaces to receive the various applications of materials shall be clean and free of dirt, dust, oil, grease or other objectionable matter. Setting beds and tile shall be installed with their respective surfaces to true planes, level, or pitched to drains, so that surface of the completed flooring will be at the elevations and grades shown on the drawings. Retempering of mortar will not be permitted. Tile shall be laid out from the center lines of each space outward and adjustments made along walls, partitions and borders, if any, so as to

symmetrize the pattern with a minimum of cut tiles. Joints between tiles shall be of uniform width. Fractional changes in dimensions without varying the uniformity of joint width will be permitted. Tile shall be cut with a cutting tool, and rough edges shall be rubbed smooth. Cut-tile misfits shall be replaced. Tile shall be laid to straightedges. Straightedges shall be set to the lines established and reset at intervals to keep the joints parallel over the entire area.

7.1 Setting beds for ceramic mosaic tile flooring shall be composed by volume of 1 part Portland cement to 5 parts dry sand, or 6 parts damp sand, to which not more than 1/2 percent of hydrated lime by volume of the cement may be added, and shall be mixed with the minimum amount of water necessary to produce a workable mass. Unless otherwise specified herein, only as large an area of setting bed shall be spread at one time as can be covered with tile before the mortar has obtained its initial set. Surplus mortar shall be removed, and the setting beds shall be spread, tamped to force out air pockets, and screeded. The average thickness of setting bed in any room or space shall be 1 inch, but in no case less than 3/4 inch or more than 1-1/4 inches. Waterproofing under setting beds is included in Section, **WATERPROOFING; BITUMINOUS-MEMBRANE** of these specifications and is specified therein.

7.1.1 Setting beds for adhesive installations, in addition to screeding as specified above, shall be steel troweled to smooth, true

surfaces free from irregularities and trowel marks. Setting beds shall be thoroughly damp-cured, and allowed to dry thoroughly before application of adhesive.

7.2 Reinforcement: Each setting bed shall be reinforced with one layer of reinforcement specified in paragraph 4.5 herein, with the uncut edges lapped the width of one mesh and with cut ends and edges lapped not less than 2 inches. Laps shall be tied together with galvanized 18-gage iron or soft-steel wire at intervals of not more than 10 inches along the finished edges and not more than 6 inches along the cut ends and edges. The reinforcement shall be supported and secured in the centers of setting beds, and elsewhere, as necessary to hold the reinforcement flat.

7.3 Ceramic mosaic floor tile shall be laid with joints between sheets the same as the joints between the tiles on the sheets. Ceramic mosaic floor tile shall be installed by one of the following methods.

7.3.1 Conventional method: As soon as the setting bed has set sufficiently to be worked upon, a dust coat of dry Portland cement not more than 1/16 inch thick shall be sprinkled over the surface and lightly worked with a steel trowel. Tile laying shall begin as soon as the moisture, not free water, has penetrated the dust coat. A thin skin coat of neat Portland-cement grout shall be troweled or brushed onto the backs of tiles immediately before each sheet is laid. Tile sheets shall be laid on the freshly prepared setting bed

while the surface is still plastic and the tile then tamped into the mortar to insure solid bedding to the exact slope or level of finished floor surface.

7.3.2 Thin-set adhesive method: Surfaces to receive tile shall be smooth, dry, true and prepared for reception of adhesives used.

a. Organic Adhesive: The surface to receive tile shall be primed if required by the manufacturer of the adhesive and allowed to dry thoroughly before adhesive is applied. A thin coating of adhesive shall be applied over the surface to be tiled, using a notched trowel held at an angle insuring a uniformly spread coating. Thin or bare spots shall be touched up by an additional coating of adhesive. The trowel and quantities of primer, if used, and of adhesive used shall be as recommended by the manufacturer of the adhesive, and the area coated at one time shall be not larger than so recommended. The tile sheets shall be laid with a slight sliding motion so as to completely embed the tiles in the adhesive but not so as to build up adhesive along edges of the tiles. The tiles shall be lightly pressed or tapped, as required, to the exact slope or level of finished floor surface.

b. Thin inorganic bonding coats may be applied in lieu of organic adhesive providing the requirements of Subparagraph 7.3.2a are complied with, and further provided that the prime coat and materials, thicknesses, installations and finishing of such bonding coats are as recommended by the manufacturer of the inorganic bonding coat material.

7.4 Grouting: When installation has hardened sufficiently, the paper, sheets and pasting glue shall be removed by brushing only as much water as necessary onto the paper. Misplaced tiles shall be repositioned and reset, and damaged or defective tile shall be replaced. A thick creamy slurry of neat gray waterproofed Portland cement and a minimum amount of water shall be brushed or squeegeed over the floor until all joints are thoroughly filled. The surfaces of the floor shall be very gently rubbed with a wood block to bring tile surfaces to true planes, excess slurry shall be removed, and the floor shall be rubbed with burlap to clean the tile and finish the joints. Temporary joint-filler strips shall then be removed, and the spaces shall be filled flush with mastic cement.

8. INSTALLATION OF WALL TILE

8.1 Metal Lath: Before scratch or float coats are installed, concrete and/or concrete masonry units shall be covered with type F metal lath. Metal lath may be applied either horizontally or vertically. End laps of metal lath shall be not less than 2 inches and shall occur over supports only. Side laps shall be not less than 1 inch wide. Side and end laps shall be tied with not lighter than 18-gage annealed zinc-coated wire at intervals of not over 6 inches. Type F metal lath shall be secured to concrete masonry units with approved self-furring-type nails and to concrete surfaces with steel cut nails spaced not over 12 inches apart horizontally and vertically.

8.2 Scratch coats for application as foundation coats shall be not less than $1/4$ inch thick and shall be composed by volume of 1 part Portland cement to 4 parts dry sand, or 5 parts damp sand to 20 percent hydrated lime by volume of the cement used, and shall be mixed with the minimum amount of water necessary to produce a workable mass. Mortar for scratch coats shall be used within 1 hour after mixing and retempering will not be permitted. Scratch coats shall be applied in sufficient quantity and with sufficient pressure to cover the entire area and to form good keys, shall be deeply scored or scratched and cross-scratched, and shall be protected and kept moist during the curing period. Scratch coats shall be thoroughly damp-cured, and an interval of not less than 24 nor more than 48 hours will be permitted between application of scratch coats and application of float coats.

8.3 Float coats shall be composed by volume of 1 part Portland cement to $1/2$ part hydrated lime, to 4 parts dry sand, or 5 parts damp sand, mixed with the minimum amount of water necessary to produce a workable mass. Float coats shall be applied in sufficient quantity and with sufficient pressure to cover the entire area and form a good key, shall be brought out flush with temporary screeds or guide strips so placed as to give a true even surface at the proper distance from the finished face of tile, and shall have a finish as required for reception of material used in setting tile.

8.4 Setting tile: Joints shall be straight, level, perpendicular and of even width not exceeding 1/16 inch. Wainscots shall be built of full courses, which may extend to a greater height, but in no case more than 1-1/2 inches lower than the height shown. Vertical joints shall be maintained plumb for the entire height of the tile work. Each tile shall be brought to true level and plane by uniformly applied pressure under a straightedge or rubber-faced block. Tiles that are out of true plane or misplaced shall be removed and reset. Damaged or defective tile shall be replaced. Tile shall be installed by one of the following methods selected by the Subcontractor.

8.4.1 Conventional method: Before setting, tile shall be thoroughly soaked in clean water and drained so that no free moisture remains on the back of tile. Wall tile shall be set by troweling a skim coat of neat Portland cement on the float coat or by applying a skim coat to the back of each tile unit and immediately floating the tile into place.

8.4.2 Thin-set adhesive method: Visible surface moisture shall be removed from the tile before setting. Surfaces to receive tile shall be clean and thoroughly dry before application of adhesive, shall be primed if required by the manufacturer of the adhesive, and the primer shall be allowed to dry thoroughly before adhesive is applied. A thin coating of adhesive shall be applied over the surface to be tiled, using a notched trowel held at an angle insuring a uniformly spread coating of proper thickness. Thin or bare spots shall be touched up

by an additional coating of adhesive. The trowel and quantities of primer, if used, and of adhesive used shall be as recommended by the adhesive manufacturer, and the area coated at one time shall be not larger than that so recommended. Each tile shall be set by pressing firmly into the adhesive, aligning with a slight movement. If improperly set, tiles shall be buttered slightly with adhesive before resetting.

8.5 Grouting: Joints in wall tile, after the edges of tiles have been thoroughly wet, shall be grouted full with a plastic mix of neat, white, waterproofed Portland cement immediately after an area of tile has been set. The joints shall be tooled slightly concave and the excess mortar shall be cut off and wiped from the face of tile. Interstices or depressions in the mortar joints after the grout has been cleaned from the surface shall be roughened at once and filled to the spring line of the cushion edge before the mortar begins to harden. Tile bases or coves shall be solidly backed with mortar. Joints between wall tile and plumbing or other built-in fixtures shall be filled with a light-colored calking compound.

8.6 Curing: Immediately after the grout has had its initial set, tile wall surfaces shall be given a protective coat of noncorrosive soap, or other approved method of protection shall be provided. Joints shall be damp-cured for 72 hours.

9. CLEANING

Upon completion, tile floor and wall surfaces shall be thoroughly cleaned in a manner which will not affect tile surfaces.

10. PROTECTION

The floors shall be covered with building paper before foot traffic is permitted over finished tile floors. Board walkways shall be laid on floors that are to be continuously used as passageways by workmen. Tiled floor areas to bear truck traffic shall have continuous plank runways of required width installed over the building paper. Damaged or defective tiles shall be replaced.

SECTION II - 13

FLOORING: RESILIENT TILE, ASPHALT AND VINYL-ASBESTOS

1. SCOPE

Asphalt and vinyl-asbestos tile flooring and rubber or vinyl base shall be furnished and installed as shown on the drawings and in conformity with these specifications.

2. APPLICABLE SPECIFICATIONS

The following specifications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

a. Federal Specifications:

L-T-751
(GSA-FSS)

Tile, Floor, Vinyl-Plastic

SS-A-128

Adhesive, Asphalt, Cut-Back Type
(for Asphalt Tile).

SS-A-00138
(GSA-FSS)

Adhesive, Asphalt, Water Emulsion
type (for Asphalt Tile).

SS-T-306b
& Am-1

Tile, Floor, Asphalt.

3. GENERAL

Materials shall be stored at a minimum temperature of 75 F for at least 24 hours before installation. In the space where asphalt or vinyl-asbestos tile is being installed, a temperature of at least 75 F shall be maintained from 48 hours before installation until 48 hours after installation. Ventilation shall be provided to take off moisture and volatile fumes. Unless otherwise specified herein,

materials and methods used shall be in strict accordance with the recommendations of the manufacturer of the asphalt or vinyl-asbestos tile. Adhesive shall be suitable for conditions of installation and for the tile, as recommended by the tile manufacturer. Materials shall be delivered to the project site in the manufacturer's original unopened containers with the manufacturer's brand and name clearly marked thereon.

4. MATERIALS

4.1 Asphalt tile shall conform to Federal Specification SS-T-306, and shall be 9 inches square and 3/16 inch thick.

4.2 Vinyl-asbestos tile shall conform to Federal Specification L-T-751, type I, and shall be 9 inches square and 1/8 inch thick.

4.3 Base shall be either rubber with preformed corners or vinyl with preformed or job-formed corners, sufficiently flexible to allow for irregularities in walls and partitions. Base shall be a top-set cove type 4 inches high.

4.4 Primer shall be one of the following types, depending on which type cement is used:

a. Emulsion-type primer consisting of water and emulsion-type cement conforming to Federal Specification SS-A-00138, class 1, mixed to the consistency of heavy paint.

b. Cut-back primer composed of an asphaltic base reduced with a light volatile solvent to a thin liquid weighing approximately 7 pounds per gallon, and made specially for use with asphalt or vinyl-asbestos tile.

4.5 Cement shall be one of the following types unless a specific type is recommended by the manufacturer of the tile used:

a. Emulsion-type cement conforming to Federal Specification SS-A-00138, class I.

b. Cut-back-type cement conforming to Federal Specification SS-A-128.

c. Waterproof cement recommended or supplied by the manufacturer of the rubber or vinyl base.

5. CERTIFICATES AND SAMPLES

Certificates and samples shall be submitted for approval. Certificates of compliance with applicable specifications shall be provided for each of the above materials. Three sample tiles shall be provided for each color.

6. COLOR, LIGHT-REFLECTANCE AND PATTERN

Color, light-reflectance values and patterns of floor tile and base shall be those indicated on the drawings.

7. PREPARATION OF SUBFLOOR

Surfaces to receive tile shall be swept clean and shall be free from moisture, paint, oil and wax. Cracks, rough areas or other surface defects of concrete floors shall be filled with plastic material. Concrete surfaces shall be washed with a water solution of 3 percent phosphoric acid and 2 percent zinc chloride. Tile shall be laid only after the treated surfaces have been permitted to dry for at least 24 hours after the solution has been applied.

8. INSTALLATION OF ASPHALT OR VINYL-ASBESTOS TILE

8.1 Priming Coat shall be of the same type as the cement and shall be applied to concrete floors in the following manner:

a. Emulsion-type primer shall be brushed over the entire surface to be covered with tile. Primer shall be allowed to become thoroughly dry.

b. Cut-back-type primer shall be worked well into the surface of the concrete with stiff brushes or a straight-edged steel trowel using the minimum quantity that will assure covering the surface completely with a nonabsorptive base. Primer shall be allowed to become thoroughly dry.

8.2 Cement shall be either of the emulsion type or cutback type and shall be applied to the floor with a notched steel trowel and allowed to set until the surface is tacky (30 minutes to 3 hours). The notches in the trowel shall be not over 1/16 inch deep and shall be spaced 3/16 inch on centers. The notches shall be maintained at the specified depth, and renewed with a fine triangular file when reduced by wear.

8.3 Tile: When the cement is sufficiently dry, the tile shall be installed in a straight all-over one color pattern. Tile shall be laid in such manner that the entire undersurface will be securely bonded in place. Tile shall be tightly fitted so that each tile is in contact with the surrounding tiles and joints are aligned. The graining in alternate jaspe or marbleized tiles shall be reversed.

9. INSTALLATION OF BASE

9.1 Cement shall be of the waterproof type and shall be applied to the walls with a notched steel trowel, using one gallon of cement to not more than 125 square feet of area. The adhesive shall not be spread so far in advance of the base laying that a scum forms on the surface.

9.2 Base: The base shall be secured to the walls with waterproof cement as specified above. All joints shall be tight and the base throughout its entire length shall have its top and bottom edges in firm contact with the walls and floor.

10. CLEANING

The tile shall be thoroughly cleaned of cement spots, dirt and other soiling and shall be left in a condition satisfactory for waxing. Spots shall be removed by means of a putty knife and steel wool, or by a cloth moistened with a neutral soap of a type approved by the manufacturer of the tile. The use of solvents, wet-mopping and washing are prohibited.

11. WAXING

When resilient flooring materials have been seated and cleaned as hereinbefore specified, the tile surfaces shall be waxed and buffed. Two coats of non-slip wax shall be applied to the tile surfaces and each coat shall be machine buffed. Wax and buffing shall be done in accordance with the tile manufacturers instructions.

12. PROTECTION

. From the time of cleaning and waxing until acceptance, the tile shall be protected by an covering of heavy paper, and by board walks in areas where damage to the floor may occur because of subsequent building operations.

SECTION II-14

METAL PARTITIONS

1. SCOPE

Metal and glass partitions shall be furnished and erected as shown on the drawings and in conformity with these specifications.

2. APPLICABLE SPECIFICATIONS

The following specifications, of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

a. Federal Specifications:

DD-G-451a & Am-1	Glass, Flat and Corrugated, for Glazing, Mirrors, and Other Uses
FF-B-571a & Am-1	Bolts; Nuts; Studs; and Tap-Rivets (and Material for Same)
QQ-S-636 & Am-2	Steel; Carbon (Low-Carbon), Sheets and Strips
SS-W-51a & Am-2	Wallboard; Gypsum

b. Hanford Specifications:

HWS-6562	Inside Electrical
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3. GENERAL

Metal and glass partitions, including hollow metal doors in metal partitions, shall be the type shown on the drawings and herein-after specified. Partitions shall have double mineral board top-fillers from cornice to ceiling. So far as practicable, all panels shall be of the same width. Height of all panels, from floor to

cornice, shall be the same. Except for closures or where special unit widths are required, all units shall be interchangeable.

4. SHOP DRAWINGS

Shop drawings shall be submitted to the Architect-Engineer for comment and approval prior to fabricating material. The shop drawings shall indicate partition arrangement in plan and elevation and shall show complete details of construction including gages of metal, anchors, fastenings, special conditions, special fittings or features, and builders' hardware schedules.

5. DESCRIPTION OF PARTITION SYSTEM

Metal partitions shall be one of the following types, or approved equal:

- 5.1 E. F. Hauserman Company, Type R
- 5.2 Mills Company, Universal
- 5.3 National Steel Partitions Co., Inc., Type SM

6. MATERIALS

6.1 Doors or panel units of like size shall be readily interchangeable. Changes of layout shall be easily, quickly, and economically made with 100 percent salvage. All exposed steel shall be full-pickled, cold-rolled furniture stock free from all defects, pits, scales, buckles or seams conforming to Federal Specification QQ-S-636. Fastenings, bolts and anchors shall conform to Federal Specification FF-B-571.

6.2 The panel unit verticals shall be slotted to receive and accurately position the post cap clips, spaced not more than 24 inches on center on each side of post. The panel unit verticals shall also be provided with a slot at the bottom to provide for concealed fish-wiring.

6.3 Panel units shall be formed with two sheets of 24 gage or heavier steel with a 5/16 inch thick or heavier sheet of mineral wall-board in between. Partition verticals shall be 16 gage rolled steel shape, slotted to receive post cap clips.

6.4 Partition end filler to fixed walls or columns as shown on the drawings shall consist of double steel 20 gage sheets with mineral wool filler. End filler panels shall fit into a wall channel securely fastened to the building wall. Any irregularities behind wall channel shall be sealed with an inorganic compression strip which may be removed without wall damage.

6.5 Top fillers for partitions that extend to ceiling shall be double mineral board fillers, with flush line joints uniformly spaced and shall be readily removable each side. Filler shall be 3/8-inch thick gypsum board with recessed side edges, conforming to Federal Specification SS-W-51.

6.6 Each door frame post shall include 12 gage steel stirrups, securely anchored to the floor to hold door frame in a positive non-swivelling position. Post caps shall be 20 gage rolled steel, shape,

moulded design. Post cap clip shall be 14 gage drive in interlocking type and constructed in such a manner as to hold and space the panel unit verticals in a positive position, and securely hold the post caps. The post cap clips shall be installed individually from each side of the partition to allow continuous lay-in wiring.

6.7 Transom and top rails shall be No. 16 gage rolled steel shapes. Chair rail shall be 12 gage formed steel shape. The bottom member of the transom and top rails shall telescope into the upper members, permitting insertion of glass without use of removable stops.

6.8 Base shall be 20 gage steel, 6 inches high with moulded top and provided with a 2-inch high floor mould adjustable to variations in floor level. Base shall provide for concealed fish-wiring.

6.9 Cornice shall be 18 gage rolled steel shape, approximately 2-3/4 inches high 4-3/4 inches wide. Cornice shall have a double continuous groove to receive and retain double mineral board filler. Top of cornice to be reinforced with spotwelded tie bars spaced not more than 24 inches on centers. Cornice shall be provided with a 12 gage steel, concealed pull-up splice at each field joint to maintain continuous rigidity of the partition and perfect alignment of the cornice joint. Cornice shall provide for concealed wiring. Cornice shall have punchings every 5 inches to locate panel connections, and to permit wiring of concealed reinforcement to any post. The concealed cornice pull-up splice shall have similar punchings.

6.10 Plinths shall be 18 gage steel snap-on type, vertically adjustable to floor level or floor covering variations.

6.11 Doors shall be 1-3/4 inches thick, with no more than 3/32 inch clearance at jambs and head. Doors shall be flush and shall be filled with sound deadening material. Flush doors shall be constructed of two outer sheets of not thinner than 18 gage steel. Doors shall be manufacturer's standard, with glass or packed steel panel in upper lite, as shown on the drawings. Door frames shall be floating type to compensate for adjustment of floor variations after shimming and levelling or partitions. All doors and door frames shall be properly mortised and reinforced for all necessary hardware. Hinge reinforcement for doors and frames shall be 12 gage steel channel, 12 inches long with riveted clinch nuts threaded for screws, door to be mortised and reinforced to permit interchanging of locks for operation. All doors shall have a 1/4 gage reinforcement at the top of the door to receive a concealed or surface door closer. Mounting clips shall be securely welded to the top reinforcement for positioning and supporting the concealed closer, permitting concealed closers to be installed initially or at any future date.

Doors shall be glazed similar to panels without exposed screws or loose glazing stops.

6.12 Sliding doors shall be 1-3/4 inches thick suspended with roller-bearing hangers from continuous overhead track. Track shall be rigidly supported by partition posts. Doors shall be assembled with stiles and rails of 18 gage steel and partition panel units, either glass or steel as shown on the Door Schedule. Stiles and rails to be reinforced for hangers and hardware.

6.13 Hardware design and construction shall be as regularly furnished with the steel partitions, by the partition manufacturer. Hardware shall be in accordance with the Hardware Schedule on the drawings.

6.14 Electrical: The partitions shall be complete with switches, duplex receptacles and flush plates to match hardware finish in accordance with the applicable paragraph of Hanford Specification HWS-6562, INSIDE ELECTRICAL.

Provide cutouts (factory punched in post caps before painting) for electrical devices at the following heights above the finish floor:

Switches	48 inches
Receptacles	
Corridors	18 inches
Offices	36 inches
All other Areas	48 inches
Communications Outlets	48 inches

Where more than one device having the same height occur in the same post, the additional device shall be 6 inches higher.

6.15 Glass for partitions conforming to Federal Specification DD-G-451, shall be furnished by partition manufacturer. Glass shall be double strength Type II, B quality.

Glass shall be bedded in putty and back puttied (non-hardening). Putty shall be colored to match partition panels, and shall not show on exposed surfaces. Glazing shall be secure and with no exposed screws.

7. TOP FILLERS

Top fillers shall be provided of gypsum wallboard with recessed edges at side joints and shall continue the partition to the ceiling. Top fillers shall be constructed of two sheets of wallboard, one on each side of partition, the faces of which shall be in the approximate plane of the partition faces below. A metal ceiling channel shall be installed directly above center line of partition, continuous along ceiling and anchored thereto. Provide 2-inch wood studs at minimum 2-foot centers to ceiling. Wallboard shall be fastened to the wood studs at 8-inch centers with large-head nails driven slightly below the surface. Top filler shall have recessed edges covered with perforated strips, then edges and nail heads filled with spackling mixture and sanded to a true plane. Top filler shall receive one prime and two finish coats of paint in color directed as part of the work included under this section of the specification.

8. ERECTION

All metal partition runs shall be installed on top of the finished flooring. Partitions shall be scribed and neatly fitted to existing building conditions. The partitions shall be erected in a rigid and substantial manner, straight and plumb, with horizontal lines level. Units shall be interlocked and aligned at all joints. Floor fastenings shall be concealed and adjustable to floor level variations.

8.1 Provide reinforcements or through posts to ceiling wherever required to make every run of partition free from lateral movement.

9. FINISH

All exposed metal surfaces of completed partitions shall be finish coated at the factory. All metal surfaces shall be properly degreased, clean and dry, before prime coat is applied. A primer coat consisting of modified alkyd resin properly cured and a finish coat of modified vinyl resin, shall be applied to give uniform color and texture throughout job. Each coat shall be oven baked. Between prime and finish coats, material shall be lightly sanded to reduce high spots. Finish coats shall have an "eggshell" texture. Finish color shall be in accordance with the Finish Schedule, shown on the drawings.

SECTION II - 15

METAL TOILET ENCLOSURES AND PARTITIONS
AND SHOWER CABINETS

1. SCOPE

Flush type metal toilet enclosures and urinal partitions and shower cabinets with baked-enamel finish shall be furnished and installed as shown on the drawings and in conformity with these specifications.

2. APPLICABLE SPECIFICATION

The following Federal Specification of the issue listed below, but referred to thereafter by basic designation only, forms a part of this specification to the extent indicated by reference thereto:

WW-P-541b
& Am-2

Plumbing Fixtures, Land Use.

3. GENERAL

The partition and end panels, pilaster fronts and doors shall be of the flush type, constructed of metal with sound-deadening paper-board cores. The pilaster fronts shall be as shown on the drawings. The work shall include all fastenings, fittings and hardware for a complete installation.

3.1 Shop Drawings shall be submitted for approval. The shop drawings shall show plans, details of construction, gages of metal, hardware, fittings and fastenings.

3.2 Descriptive Data: The shop drawings shall be accompanied by descriptive data and standard color charts in triplicate, and a sample piece of the sheet metal not less than 3 by 5 inches in size. The sample shall show the rust-proofed surface of the base metal on one side and the prime coat and the finish coat of enamel on the other side.

4. SIZES

Toilet enclosures shall be arranged and sized as shown on the drawings.

5. MATERIALS

5.1 Steel: Steel sheets for face plates of panels, pilasters and doors shall be cold-rolled galvanized, bonderized, stretcher-leveled, furniture-stock steel. Strips for edge binding shall be galvanized steel suitable for die-drawing without fracturing the coating. The following thicknesses, expressed in Manufacturer's Standard gage before zinc-coating and fabrication, are the minimum which will be acceptable. Face plates of doors, 22 gage; face plates of enclosure partitions, edge locking strips of doors, partitions and all edge facing strips, 20 gage; edge locking strip of floor-supported pilasters, 18 gage; face plates of urinal partitions and of floor-supported pilasters, 16 gage; concealed hooks and reinforcement for tapping, 14 gage; concealed reinforcement for anchoring device, 12 gage.

5.2 Cores: The cores of doors and panels shall consist of not less than 6 plies of corrugated paperboard interlined and faced with

sheets of chipboard, all thoroughly glued and compressed to a finish thickness of 1 inch. The cores of pilaster fronts shall be of similar construction, using not less than 7 plies of corrugated paperboard compressed to a finished thickness of 1-1/4 inches, or cores may be pads of hexagonal honeycomb expanded to 1 inch maximum cell size, with cell walls of 0/009 caliper kraft paper, 26 pounds per 1000 square feet minimum.

6. CONSTRUCTION

Panels, pilasters and doors shall be constructed of 2 face plates, with formed edges, assembled over and cemented under pressure to the sound-deadening core. The formed edges shall be bound and locked with die-drawn slip-lock binding strips or by welds concealed by slip-lock edge facing strips. The edge strips shall hold the plates with a tension grip, conceal all holes required for fabrication and all cut metal edges, and be mitered and welded at corners with welds ground smooth. The doors shall have reinforced cutouts for hinges and be further strengthened by internal brazing or welding of the locking strips to the formed edges halfway in elevation on each side. Doors and panels shall finish uniformly 1 inch thick; pilasters shall finish uniformly 1-1/4 inches thick, with a plus or minus tolerance of 1/32 inch in both cases. Surfaces shall be smooth and free from wave, warp and buckle. Where machine screws are specified for fastenings, the panels, pilasters and doors shall have concealed tapped reinforcement or rivet nuts with gaskets for the attachment of hardware and accessories.

6.1 Attachment of Panels to Pilasters: Panels shall be fastened to pilasters at not less than 3 points in a manner that will insure a permanently tight tension grip. The fastening shall be by hooks in shear built into the contact edge of the panel, which shall be inserted into vertical openings in the pilaster and forced downward to draw the pilaster and panel together with a tension grip. The assembly shall be secured against loosening and torsion by a wing bracket through-bolted to the panel with sex bolts and fastened on the inside of the pilaster with similarly finished machine screws, or the panels may be anchored to pilasters by 2 stirrup brackets, each through-bolted to the partition with a sex bolt and fastened to pilaster with 2 machine screws providing 1/2-inch clearance between the edge of the panel and the face of the pilaster.

7. PILASTER BASES

Pilaster bases shall be of 0.040-inch-thick wrought brass, polished, nickel-plated and finished in polished chromium plate, or of 0.031-inch-thick corrosion-resisting steel containing at least 18 percent chromium and 8 percent nickel, with electropolished finish. Bases shall be secured in place with screws or concealed clips.

8. BRACKETS

Wall brackets and wing brackets shall be of cast or extruded brass and shall have clamp flanges which shall be fastened to the panels with 3/16-inch chromium finished brass sex bolts. Each wall bracket shall be anchored to the wall with two 1/4-inch bolts of a

type appropriate to the type of wall construction into which they must be fastened. Bolt heads shall be brush-painted with suitable enamel after erection.

9. SUPPORT AND ANCHORAGE OF PILASTERS

Floor-mounted pilasters shall be support independently of the finished floor and shall be fastened to the structural slab by means of a built-in, welded anchoring device designed to transmit the strains of lateral thrust and pull to the structure through two 3/8-inch minimum diameter cadmium-plated stud bolts secured into approved expansion anchorage units having a penetration of not less than 2 inches into structural concrete. Pilasters with wall supports shall have one such stud bolt near the edge that adjoins the door. The anchoring devices shall be readily accessible for leveling, plumbing and tightening the enclosure installations and shall be concealed by the pilaster base hereinbefore specified.

10. FINISH

All exposed metal surfaces not specified to be corrosion-resisting steel or chromium-plated shall be thoroughly cleaned and factory finished by spraying with one coat of a properly formulated synthetic primer followed by one coat of low-gloss synthetic enamel and then oven-baked at a temperature in excess of 275 F for the length of time necessary to cause polymerization at the temperature employed. Finish color enamel/shall be H-1 Pearl Gray as provided by Pricemetal Corp., Belmont, California, or approved equal. Finish color enamel for metal toilet enclosures and partitions for the 105-N Bldg. shall be as shown on the drawings.

11. HARDWARE

Hardware and fastening shall be plain, heavy-pattern, of wrought, extruded or cast brass, unless otherwise specified herein. Enclosure doors shall swing in, and each enclosure shall be fitted with hinges, a throw latch, a combination stop and keeper and a combination hook and bumper. Exposed surfaces of hardware items and the fastenings therefor shall be polished, nickel-plated and finished in polished chromium plate, except parts made of corrosion-resisting steel. Hinges, stops and combination stops and keepers shall have clamp flanges to transmit any strains of door-closing to the pilasters and shall be applied with 3/16-inch sex bolts. Other hardware shall be applied with machine screws. Sex bolts and machine screws shall have one-way right-hand heads or spanner heads. If spanner heads are provided, two tools for their removal shall be supplied.

11.1 Hinges shall be of the spring-tension, gravity or torsion-bar type and shall be adjustable, enabling the door to be brought to rest in any position. On enclosure doors, the hinge shall be adjusted to hold the door open at 30 degrees.

11.1.1 Spring-Tension and Gravity Types: The lower hinge may be encased or concealed within the door and shall have either a concealed ball-bearing roller operating on a corrosion-resisting steel cam or two mating nylon-resin cams aligned by a heavy corrosion-resisting steel pin. The upper hinge shall have a pivot pin scored above and below the point of bearing with the bearing concealed in a supporting

member placed in a cutout near the top of the door. Top pivots of gravity-actuated hinges shall be designed to accommodate the vertical movement of the door. Pivot guide pins and ball-bearing rollers shall be of hardened corrosion-resisting steel. All moving parts shall operate in nylon bearings or graphite-bronze, self-oiling, needle or thrust frictionless bearings. Non-operating, supporting, or encasing members may be die-cast zinc alloy.

11.1.2 Torsion-Bar Type: The upper and lower hinges shall consist of an arrangement which provides a torsion bar attached to oil-impregnated copper-base-alloy bearings operating in corrosion-resisting steel bushings, the working parts encased or concealed within the door. Upper and lower brackets shall be of cast non-ferrous alloy, and of such design that no part of the hinge assembly will extend above or below the door lines.

11.2 Latch shall be either the sliding or throw type, as standard with the manufacturer, and may be either brass or corrosion-resisting steel. The latch shall be mounted on the door midway between the top and bottom edges.

11.3. Combination stop and keeper shall be fitted with a rubber bumper and shall be mounted on the pilaster at a point opposite the latch.

11.4 Combination hook and bumper shall have a minimum projection of 3-1/8 inches and a base not less than 1-1/2 inches in diameter. The hook and bumper shall be mounted approximately 3 inches from the top edge and 6 inches from the swing edge of the door.

11.5 Toilet paper holders shall conform to Federal Specification WW-P-541, type 437. Two toilet paper holders shall be installed for each water closet so that the center of the first fixture is located 2 feet, 4 inches from the rear wall with the second fixture set adjacent to the first fixture in the direction of the door. The top of each fixture shall be 3 feet above the floor. Each brace of fixtures shall be mounted back to back on the partition wherever possible.

12. ERECTION

The material shall be erected in a rigid and substantial manner, straight and plumb, with all horizontal lines level. Partition and end panels shall be installed with a clearance of approximately 1 inch at walls. Wall-end pilasters shall be installed with a clearance for cove base. Panels and pilasters shall be fastened to walls with brackets located near top and bottom, preferably at joints in tile or other wall finish. Doors shall be out of wind. The clearance of vertical edges of doors shall be uniform from top to bottom and shall not exceed 3/16 inch. Hardware shall be adjusted for perfect working order. Touch-up painting to conceal scratches or other imperfections in finish will not be permitted. Units with scratched or marred finish shall be replaced. Finished surfaces shall be cleaned.

13. SHOWER CABINETS

13.1 Shower cabinets shall be Sanymetal Products Co., Inc. "Shower-master" flush type in accordance with the following specifications or an approved equal.

13.2 Walls shall be not less than 76 inches high by 1 inch thick made of two sheets of cold rolled furniture steel assembled over and cemented to a sound-deadening fiberboard filler. Corners and joints shall be smooth with no projecting bolts or screws.

13.3 Receptors shall be 36 inches by 36 inches made of black and white precast terrazo material. Receptor shall have a brass chrome plated drain, with removable waste pipe. Receptor shall have a non-skid surfacing and shall be attached to the cabinet walls in a manner to prevent leaks.

13.4 Fittings shall be chrome-plated brass and shall consist of the following:

13.4.1 Shower control valve shall be a Leonard M-10-C Thermostatic Showermaster with a temperature regulator and built-in volume control and shut-off to shower head as manufactured by the Leonard Valve Co., or an approved equal.

13.4.2 Shower head shall be a Symmons Engineering Co. Multi-Flo No. 4-120 with ball joint and spray level control or approved equal.

13.4.3 A soap dish and curtain rod shall be furnished for each cabinet.

13.5 Filler plates for covering the space between shower cabinets shall be of the same construction as the shower cabinet walls.

13.6 Finish for shower cabinets shall be the same as specified in Paragraph 10 for toilet compartments.

13.7 Installation: Shower cabinets shall be installed as recommended by the manufacturer. Shower cabinets shall be aligned, set plumb and secured in place. Closers, fillers and finish moldings shall be provided as necessary. Plumbing connections shall be made as specified under Section, PLUMBING of this specification.

SECTION II-16

GLASS AND GLAZING

1. SCOPE

Glass and framed mirrors shall be furnished and installed as shown on the drawings and in conformity with these specifications. Glass and glazing in metal partitions, and for doors in metal partitions, is included in Section, METAL PARTITIONS of these specifications.

2. APPLICABLE SPECIFICATIONS

The following specifications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by references thereto:

a. FEDERAL SPECIFICATIONS:

DD-G-451a
& Am-1

Glass, Flat and Corrugated, for
Glazing, Mirrors, and other Uses

DD-M-411
& Am-1

Mirrors, Plate Glass, Framed

TT-P-781a
& Am-1

Putty and Elastic Compound; (for)
Metal-Sash-Glazing

3. MATERIALS

3.1 Glass

3.1.1 Flat glass shall conform to Federal Specification DD-G-451.

3.1.2 Polished plate glass shall be type I, glazing quality. Nominal thickness shall be 1/4 inch.

3.1.3 Wire glass shall be type III a, type of mesh optional, and shall be 1/4 inch thick, clear, polished both sides.

3.1.4 Clear sheet glass shall be type II double strength B quality.

3.2 Plate-glass mirrors shall conform to Federal Specification DD-M-411, grade I, copper-backed, class E, modified for sizes indicated on the drawings. Hanging device shall be vandal-proof type.

3.3 Putty for glass panels shall conform to Federal Specification TT-P-781.

4. GENERAL

The sizes of glass indicated on the drawings are approximate only, and the actual sizes required shall be determined by measuring the frames to receive the glass. Plate-glass mirrors shall be provided for locations indicated on the drawings. All glass and mirrors shall be factory-labeled on each pane, and labels shall not be removed until final approval is obtained. The type of glass to be installed at various locations shall be as follows:

4.1 Polished plate glass shall be used for glazing in the fixed sash in the Hot Water Quality Laboratory.

4.2 Clear sheet glass shall be used for glazing in hollow metal doors and other locations so indicated on the drawings.

4.3 Wire glass shall be used for glazing in all Underwriters' labeled fire doors, and for the vision panels in the elevator doors.

5. INSTALLATION

Glass in metal sash, metal doors and metal partitions shall be secured as specified in sections HOLLOW METALWORK, METAL PARTITIONS, and FREIGHT ELEVATOR, of these specifications.

6. CLEAN-UP

After inspection, any labels, paint smears and spots shall be removed from the glass, and the glass shall be washed clean. Damaged or broken glass shall be removed and replaced.

SECTION II-17

HARDWARE: BUILDERS'

1. SCOPE

Hardware shall be furnished and installed in conformity with these specifications.

2. ITEMS NOT INCLUDED

Hardware for the following items are included under the following specifications:

a. HWS-6940	Shielding and Air Lock Doors
(109-N)
b. HWS-6943	Horizontal Rolling Shielding
Door (109-N)
c. HWS-6954	Confinement and Shielding Doors
(105-N)

3. ITEMS INCLUDED IN OTHER SECTIONS

Hardware for the following items is specified under other sections of the technical specifications:

Metal access doors and panels	Metal toilet stalls
Metal lockers and cabinets	Elevator doors
Metal kitchen unit	Metal work benches
Accordion doors	Wire mesh partitions

4. APPLICABLE SPECIFICATIONS

The following Federal Specifications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification. Unless otherwise indicated herein the type numbers are related to the Federal Specifications:

FF-H-106a & Am-2	Hardware, Builders'; Lock and Door-Trim
FF-H-111a & Am-1	Hardware, Builders'; Shelf and Miscellaneous
FF-H-116c & Am-1	Hinges, Hardware, Builders'
FF-H-121c	Hardware, Builders'; Door-Closing Devices
FF-P-101c	Padlocks

5. GENERAL

Unless otherwise specified herein, hardware shall conform to Federal Specifications FF-H-106, FF-H-111, FF-H-116, FF-H-121 and FF-P-101. All modifications in hardware required by reason of construction characteristics, shall be such as to provide the operative or functional features specified. Hardware on labelled doors shall conform to Underwriter's requirements for the label specified. Hardware for application on metal shall be made to standard templates. Unless otherwise specified herein, knobs and trim shall be brass or bronze. When knobs and trim are specified to be aluminum, the aluminum shall be cast; or may be forged, extruded, or wrought, provided that the forged, extruded, or wrought items or parts thereof are of approximately the same weight or thickness as the commercially equivalent cast items or their parts. All items performing the same functions shall be of the same manufacturer. The following items of hardware may be supplied in aluminum instead of brass or bronze:

Collars, Cylinder, Cast Plates, Key
Knobs, Door
Knobs, Turn

NOTE: Door-trim for the room side of the following spaces shall be supplied in aluminum only:

Toilets, Janitor's Closets and Change Rooms

6. HARDWARE TYPES

6.1 Butt Hinges

6.1.1 Finish: Butts shall have USP finish unless otherwise specified herein.

6.1.2 Pins: Butts for outswinging exterior doors shall be provided with non-removable pins.

6.1.3 Type:

a. Where pressed steel frames are indicated on the drawings, butt hinges shall be full-mortised type for hollow metal doors.

b. Doors 42 inches wide and wider, and doors equipped with overhead type holders, shall have extra-heavy butt hinges of the required type, size and finish.

c. Where channel frames are indicated, butt hinges shall be half-mortise type.

d. Where half-mortise type butt hinges are provided, they shall be the same size (length of pin), quality and material as indicated for full-mortise type butt hinges.

6.1.4 Quantity per Door:

<u>Height of door (inches)</u>	<u>Butts required</u>
Over 60 and not over 90	3
Over 90	4

6.1.5 Sizes:

<u>Door Thickness (inches)</u>	<u>Door width</u>	<u>Butt size (inches)</u>
1-3/4 Interior	3 feet and less	4-1/2 x 4-1/2
1-3/4 Interior	Over 3 feet	5 x 4
1-3/4 In exterior metal walls		5

6.1.6 Option: Where ball bearing hinges are specified herein, approved oilite-bearing type hinges may be provided.

6.2 Door Closers: Unless otherwise specified herein, all closers shall be surface type 3001 standard mounted with clock key regulating valve. Closers other than closers for doors with aluminum trim shall have brown-lacquer finish. Closers for doors with aluminum trim shall have aluminum lacquer finish. Closers shall be sized as follows unless otherwise specified herein:

<u>Door type</u>	<u>Width & thickness</u>	<u>Closer size</u>
Interior doors	3 feet and less	III
Exterior doors	3 feet and less	IV
Exterior doors	Over 3 feet	V

6.3 Door pulls, except for door No. 108, shall be type 450, or approved equal, and shall be cast or wrought aluminum, minimum size 14 in. x 3-1/2 in. Door pull for door No. 108 shall be type 451, or approved equal and shall be wrought bronze approximate size 10 in. x 2-3/4 in.

6.4. Door Stops type 1320E shall be supplied wherever an item of hardware on an open door, or the door itself, might contact a wall or other part of the building construction, including ducts, pipes, and radiators. Where the walltype stop cannot be used to practical advantage, type 1330 or 1330A floor stops, as applicable shall be supplied.

6.5 Extension lever flush bolts shall be type 1045. The bottom bolt shall be provided with dustproof strike type 1048. Flush bolts shall be provided for the inactive leaf of all pairs of doors required to be locked. Strikes located in metal thresholds shall be provided with machine screws.

6.6 Kick plates, ^{for the 109-N Building} /except for door No. 108, shall be type 1226, wrought aluminum. The plates shall have beveled edges and shall be countersunk for screws. Kick plates shall be 10 inches high. Their width shall be 1-1/2 inches less than the width of the door. Kick plate for door No. 108 shall be type 1224, or approved equal, and shall be wrought brass. The plate shall have beveled edges and shall be countersunk for screws. Size shall be the same as that specified above for aluminum kick plates. Kick plates for the 105-N Bldg. shall be provided as specified on the drawings and hardware schedule.

6.7 Locks and Latches: Mortise locks for doors 1-3/4 inches or more in thickness shall have beveled fronts. All locksets shall be of the type hereinafter specified. 1-5/32 inch diameter (standard size) 5 pin lock cylinders will be furnished under a separate contract. Locksets shall be provided with proper reinforcement units.

6.8, Metal thresholds other than those specified in this section of the specifications, will be supplied under section, MISCELLANEOUS METALWORK of these specifications.

6.9 Push plates, except for door No. 108, shall be type 460 or approved equal, and shall be wrought aluminum. Minimum size shall be 14 in. x.3-1/2 in. Push plate for door No. 108 shall be type 465, or approved equal and shall be wrought bronze approximate size 14 in. x 3 in.

7. SAMPLE SCHEDULE AND SAMPLES

A sample schedule listing each of the items of builders' hardware required shall be submitted in the following form:

ITEM NO.:	SPECIFICATION REFERENCE,:	NAME OF ITEM:	MFR'S NAME
	TYPE, OR CATALOG NO.		AND CATALOG
			NO. OF ITEM
			SUPPLIED

Opposite each listed item number, the specification reference, the name of the item and the manufacturer's name and catalog number of the item to be supplied shall be inserted. Where the listed item is not a Federal Specification type, and is not illustrated in the manufacturer's catalog, a cut and description, or shop drawings, shall be submitted with the hardware schedule. In addition to the sample schedule, a sample of each item of builders' hardware, properly tagged and marked for identification, shall be submitted for approval, unless such item has been previously approved by the Office of the.

Chief of Engineers, and is on file in Washington, D.C., in which event the schedule shall include a statement that the items so noted conform in all respects to the OCE-approved samples on file. Following approval of the sample schedule and samples, a permanent schedule of hardware, showing the qualities, types and locations of the various items of builders' hardware required for the project shall be submitted. The permanent schedule shall contain only the catalog numbers of the items appearing on the approved sample schedule.

8. FINISHES

Hardware shall have the following standard finishes:

Aluminum:	US28
Brass:	US4
Bronze:	US10
Steel & Iron:	As hereinbefore specified

9. APPLICATION OF HARDWARE

9.1 Butt Hinges required on doors shall be installed as follows:

- a. Top hinge 5 inches from jamb rabbet to top edge of barrel.
- b. Bottom hinge 10 inches from bottom edge of barrel to finished floor.
- c. Third hinge where required, centered between top and bottom hinges.

9.2 Door pulls, where required, shall be installed so that the middle of the grip will be $\frac{1}{4}$ inches above the finished floor.

9.3 Extension lever flush bolts, where required, shall be installed in the edge of the door and located so that the trip mechanism will be

about 6 feet from the floor for the top bolt, and 12 inches from the floor for the bottom bolt. Strikes located in metal thresholds shall be secured with machine screws.

9.4 Kick plates, where required, shall be installed on the push side of the door.

9.5 Locks and latch strikes, where required, shall be installed on doors and door frames at the same height from the floor throughout the building. The center of door knobs shall be 38 inches above the finished floor.

9.6 Push plates shall be installed so that the bottom of the plate will be 40 inches above the finished floor.

10. SCHEDULES OF HARDWARE

Hardware for doors shall be as follows:

SET NO.

HW-1 ("B" Label Doors)

1-1/2 pair Butts - Type T2107 USP-4-1/2" x 4-1/2"

1 Latchset - Type 86 N-5

1 Door Closer - Type 3001, size III

HW-2 1-1/2 pair Butts - Type T2107 USP - 4-1/2" x 4-1/2"

1 Latchset - Type 86 N-5. Knob to open door out only

1 Door Closer, Type 3001, Size III

HW-3 1-1/2 pair Butts - Type T2107 USP-4-1/2" x 4-1/2"

1 Latchset - Type 86 N-5

- HW-4 1-1/2 pair butts - type T2145 USP-NRP-5"
1 Panic Hardware - Type 810
1 Door Closer - Type 3001 H, size V
1 Corner Bracket - Type R
1 Threshold - Type 833A, Extruded Aluminum
- HW-5 ("A" Label Door)
1-1/2 pair Butts - type T2107 USP-4-1/2" x 4-1/2"
1 Latchset - type 86 N-5 Modified by 3/4 throw latch
1 Door Closer - type 3001, Size III
- HW-6 1-1/2 pair Butts - type T2107 USP-4-1/2" x 4-1/2"
1 Lockset - Type 86 EW-5
1 Door Closer - Type 3001, Size III
- HW-7 1-1/2 pair Butts - Type T2107 USP-4-1/2" x 4-1/2"
1 Latchset - Type 86 N-5
1 Door Closer - Type 3001, Size III
- HW-8 1-1/2 pair Butts - Type T2107 USP- 4-1/2" x 4-1/2"
1 Door Closer - Type 3001, size III
1 Door Pull - Type 450, Aluminum
1 Push Plate - Type 460, Aluminum
1 Kick Plate - Type 1226, Aluminum
- HW-9 4 pair Butts - Type T2149 USP-NRP-5"
1 Lockset - Type 86 A-5
1 Door Closer - Type 3001H, Size V
1 Corner Bracket - Type R

1 Door Holder - Type F1162, Size C, attached to inactive leaf of doors w/thru bolts.

2 Extension Lever Flush Bolts, Type 1045, with Dust Proof Strike, Type 1048

HW-10 4 pair Butts - Type T2145 USP-NRP-5"

1 Lockset - Type 86 B5

2 Door Holders - Type F1162, Size C, one on each leaf attached to door w/thru bolts.

1 Chain Bolt - Type F1021A-6"

1 Foot Bolt - Type F1021B-6" with Dust Proof Strike

HW-11 1-1/2 pair Butts - Type T2145 USP-NRP-5"

1 Lockset - Type 86 J-5

1 Door Closer - Type 3001 H, Size V

1 Corner Bracket - Type R

HW-12 3 pair Butts - Type T2117 USP-4-1/2" x 4-1/2"

1 Lockset - Type 86 EW-5

2 Door Holders - Type F1162, Size C, one on each leaf attached to door w/thru bolts.

2 Extension Lever Flush Bolts, Type 1045, with Dust Proof Strike, type 1048.

HW-13 1-1/2 pair Butts - Type T2107 USP-4-1/2" x 4-1/2"

1 Door Closer - Type 3001, Size III

1 Door Pull - Type 451, wrought bronze

1 Push Plate - Type 465, wrought bronze

1 Kick Plate - Type 1224, wrought brass

HW-14 (Steel Roll-Up) .

1 Padlock - Corbin No. 2863-1/4, with chain

- HW-15 1 Pair Butts - T2102 US10 5" x 4"
1 Latch Set Type 86N-5
1 Door Stop - Type 1330
- HW-16 1-1/2 Pair Butts T2107 USP 4-1/2" x 4-1/2"
1 Lockset Type 86J-5
1 Door Closer Type 3001 Size III Cast Iron
- HW-17 3 Pair Butts T2107 USP 4-1/2" x 4-1/2"
2 Door Closers Type 3001 FP Size V Cast Iron
2 Door Pulls Type 451
2 Push Plates Type 465
2 Kick Plates Type 1224
2 Door Stops Type 1330
- HW-18 3 Pair butts T2145 USP NRP 5"
2 Door closers Type 3001-P Size V Cast Iron
2 Kick Plates Type 1224
1 Removable Mullion Type 811
2 Door Stop & Holder Type 1329E
2 Panic Bolts P&F Corbin 2936 x 76580 US10, or equal
- HW-19 1-1/2 Pair Butts T2145 USP 5"
1 Latchset Type 86N-5
1 Door Stop Type 1330
- HW-20 1-1/2 Pair Butts T2145 USP 5"
1 Lockset Type 86J-5
1 Door Stop Type 1330
- HW-21 1-1/2 Pair Butts T2145 USP NRP 5"
1 Door Closer Type 3001-P Size V Cast Iron
1 Panic Bolt - P&F Corbin 2936 x 76580 US10, or equal

HW-22 3 Pair Butts T2107 USP 4-1/2 x 4-1/2"

1 Latchset Type 86N-5

2 Flush Bolts Type 1045

2 Stops Type 1330

HW-23 3 Pair Butts T2107 USP 4-1/2" x 4-1/2"

1 Lockset Type 86E-5

2 Flush Bolt Type 1145

2 Door Holder Type 1165

HW-24 1 Pair Butts T2102 US10 5" x 4"

1 Lockset Type 86J-5

1 Door Stop Type 1330

HW-25 1-1/2 Pair Butts T2145 USP 5"

1 Latchset Type 86N-5

1 Door Closer Type 3001 Size III Cast Iron

1 Door Stop Type 1330

HW-26 5 Pair Butts T2149 USP 5"

1 Latchset Type 86N-5

1 Flush Bolt Type 1045

1 Chain Bolt Type F1021A

2 Door Stop and Holders Type 1329E

HW-27 3 Pair Butts T2145 USP 5"

1 Latchset Type 86N-5

2 Door Holders Type 1165

2 Flush Bolts Type 1045

HW-28 1-1/2 Pair Butts T2145 USP 4-1/2"

1 Latch Set Type 84-3D8

- HW-29 1 Pair Butts T2102 US10 5" x 4"
- 1 Door Closer Type 3001 Size III Cast Iron
 - 1 Door Pull Type 450
 - 1 Push Plate Type 460
 - 1 Kick Plate Type 1226
 - 1 Door Stop Type 1330
- HW-30 1-1/2 Pair Butts T2145 USP 5"
- 1 Door Closer Type 3001 Size III Cast Iron
 - 1 Panic Bolt P&F Corbin 2936 x 76580 US10, or equal
- HW-31 1-1/2 Pair Butts T2145 USP NRP 5"
- 1 Lockset Type 86J-5
 - 1 Door Closer Type 3001-P Size V Cast Iron
 - 1 Door Stop & holder Type 1329-E
- HW-32 1-1/2 Pair Butts T2145 USP 5"
- 1 Lockset Type 86J-5
 - 1 Door Closer Type 3001-P Size III Cast Iron
 - 1 Door Stop Type 1330
- HW-33 3 Pair Butts T2145 USP NRP 5"
- 1 Lockset Type 86J-5
 - 1 Door Closer Type 3001-P Size V Cast Iron
 - 2 Flush Bolts Type 1045
 - 1 Dust Proof Strike Type 1048
 - 2 Door Stop & Holder Type 1329E
- HW-34 5 Pair Butts T2149 USP NRP 5"
- 1 Lockset Type 86J-5
 - 1 Door Closer Type 3001-P Size VI Cast Iron

1 Flush Bolt Type 1045

1 Chain Bolt Type F1021A

2 Door Stop & Holder Type 1329-E

HW-35 4 Pair Butts T2149 USP 6"

1 Lockset Type 86J-5

1 Door Closer Type 3001 Size V Cast Iron

2 Flush Bolts Type 1045

2 Door Stop Type 1330

HW-36 3 Pair Butts T2145 USP 5"

1 Lockset Type 86J-5

2 Door Holder Type 1165

2 Flush Bolts Type 1045

HW-37 4 Pair Butts T-2149 USP 6"

1 Lockset Type 86J-5

1 Door Closer Type 3001E Size IV Cast Iron

1 Door Holder Type 1165

2 Flush Bolts Type 1045

1 Dust Proof Strike 1048

1 Door Stop Type 1330

SECTION II-18

ACCESSORIES: TOILET, METAL

1. SCOPE

Toilet accessories shall be furnished and installed as shown on the drawings and in conformity with these specifications.

2. WORK NOT INCLUDED

The furnishing and installation of glass mirrors, toilet paper holders, and curtain rods in shower compartments are not included under this section of the specifications.

3. APPLICABLE SPECIFICATIONS

The following specifications and standards, of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by references thereto:

a. Federal Specifications

FF-D-00396c (GSA-FSS)	Dispensers, Soap
QQ-S-766a & Am-1	Steel, Corrosion-Resisting, Plates, Sheets, Strips, and Structural Shapes
WW-F-541b & Am-2	Plumbing Fixtures; (for) Land Use

b. Federal Test Method Standard

No. 151	General Specifications for Inspection of Metals
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4. MATERIALS

4.1 Corrosion-Resisting Steel shall conform to the requirements of

Federal Specification QQ-S-766, class 1, finish best suited for the purpose, thickness as specified hereinafter.

4.2 Forged Brass shall conform to the requirements of Federal Specification WW-P-541, composition C.

5. GENERAL

Accessories shall be of pleasing design and sturdy construction and, except as otherwise specified, shall be constructed of the materials specified herein. Accessories shall be surface-mounted and shall be mounted on back plates when so specified. Accessories installed without back plates shall have concealed fastenings whenever practicable.

6. FINISHES

Except as otherwise specified herein, accessories shall have a polished chromium finish.

6.1 Chromium plating shall be applied over a coating of nickel. On brass, the nickel coating shall be applied either directly to the base metal or over a coating of copper. On steel, the nickel coating shall be applied over a coating of copper. Thickness of coatings shall conform to the requirements of Federal Specification WW-P-541.

6.2 Corrosion-resisting steel shall have a bright polished finish.

6.3 Enamel finish shall be a durable gloss white factory-applied baked enamel finish. Steel shall be bonderized.

7. SHELVES

Shelves shall be 14-gage stainless-steel or chromium-plated brass, 6 inches wide overall, with a 1/4-inch raised rolled edge or

lip on the front and sides of a reverse "V" crimp at the top of a 4-inch-high integral back, secured to the wall with countersunk oval-head stainless steel toggle bolts. The length of each shelf shall be as indicated on the drawings. If stainless steel is used no brackets will be required, as the supports at the back of shelf will be adequate, but if brass is used the shelf shall be supported by brackets of chromium-plated brass or corrosion-resisting steel in addition to the wall attachment at shelf backs.

8. ROBE HOOKS

Robe hooks shall conform to Federal Specification WW-P-541, type 419. One hook, for each shower head, set 66 inches above the floor, shall be provided, adjacent to each shower room.

9. CABINET FOR PAPER TOWELS

Cabinet for folded paper towels shall conform to Federal Specification WW-P-541, type 445. One cabinet shall be installed adjacent to each lavatory, as shown on the drawings. Cabinets shall be "Westowel Cabinets", manufactured by West Disinfecting Co., or approved equal. Color - white.

10. SOAP DISPENSER

Soap dispenser shall be rigid type for dispensing liquid soap, and shall conform to Federal Specification FF-D-003960, type 1. Container shall be metal. Bracket and base attachment shall be extra heavy pattern. Dispensers shall be installed as shown on the drawings. Dispensers shall be American Dispenser Co. No. 1 "Lathurn", or approved equal.

11. SOAP DISHES

Soap dishes shall conform to Federal Specification WW-P-541, type 407. One soap dish shall be installed adjacent to each shower control, where shown on the drawings.

12. GRAB BARS

Continuous grab bars shall be provided in each shower room. Grab bars shall be installed just below the control valves of the shower assemblies. Grab bars shall be of extra heavy gauge 7/8-inch diameter brass tubing with triple chromium plating, solidly fastened in chromium plated die cast posts mounted on back plates. Grab bars shall be similar to type No. 360 manufactured by Hall-Mack Company, Los Angeles, California, or approved equal, except that lengths shall be those shown on the drawings.

13. WASTE RECEPTACLES

13.1 Waste receptacles shall be provided for each of the locker rooms, toilet rooms and rest rooms in both buildings. Waste receptacles shall be West Disinfecting Co., "Round Top" receptacle, 15 inches in diameter by 36 inches high, with self closing door, Style No. R1536, or approved equal.

13.2 One (1) waste receptacle for soiled sanitary napkins shall be provided in Women's Rest Room. Receptacle shall be approximately 11 inches high by 7-5/8 inches wide by 3-3/4 inches deep and shall be U. S. Sanitary Specialties Corp. No. 198 "Useptican", or approved equal.

14. SANITARY NAPKIN DISPENSER

One (1) sanitary napkin dispenser shall be provided in Women's Rest Room. Dispenser shall be West Disinfecting Co. Napkin Dispenser with 5 cent coin slot and coin release, or approved equal. Color: Gray.

15. LAUNDRY BAG HOLDERS

Laundry bag holders shall be fabricated of carbon steel tubing in accordance with Hanford Standard C-4-15. Holders shall be cleaned of weld spatter by grinding and wire brushing and then painted with one coat of steel primer and two coats of gray enamel.

16. INSTALLATION

Surfaces of fastening devices exposed after installation shall have a chromium-plated finish. Exposed screw heads shall be oval. Specified heights above floor are to center of the accessory and are approximate.

SECTION II-19

PAINTING: PROTECTIVE, ON METAL

1. SCOPE

This section covers protective painting on ferrous metals, complete.

2. APPLICABLE SPECIFICATION

The following Federal Specification forms a part of this specification to the extent indicated by the reference thereto:

TT-P-86a
& Am-1

Paint; Red-Lead-Base, Ready-Mixed

3. GENERAL

Unless otherwise specified herein all exterior and interior ferrous metal except reinforcing steel, bolts, rough hardware, and metals with nonferrous coatings shall be shop-coated with red-lead paint conforming to Federal Specification TT-P-86, type II, or a baked-on coat of rust-inhibitive paint of a type standard with the manufacturer, provided such shop coat has proved performance characteristics as specified herein.

4. CLEANING AND PREPARATION OF SURFACES

Surfaces shall be clean before applying paint. All oil, grease, dirt, loose rust, loose mill-scale and other foreign substances shall be removed. The removal of oil and grease shall be accomplished before mechanical cleaning is started, using mineral spirits or other paraffin-free solvents having a flash point higher than 100 degrees F. Clean cloths and clean fluids shall be used to avoid leaving a film of

greasy residue. Mechanical cleaning shall be accomplished by means of emulsions, steam, flame-cleaning, high-speed power wire-brushing, blast-cleaning of other approved methods. The use of chipping tools which produce cuts, burrs and other forms of excessive roughness will not be permitted. Tight mill scale that cannot be removed by applying a sharp knife to any edge and minor amounts of residual rust not removable except by thorough blast-cleaning will be permitted.

5. APPLICATION

The specified shop coat of paint shall be applied by brush. Paint shall be applied under dry and dust-free conditions and, unless otherwise approved, shall not be applied when the temperature is below 40 degrees F. Painting shall be done in a manner so as to produce an even film of uniform thickness. Edges, corners, crevices and joints shall receive special attention to insure that they are thoroughly cleaned and that they receive an adequate thickness of paint.

SECTION II - 20

PAINTING: GENERAL

1. SCOPE:

Paint shall be furnished and applied in conformity with these specifications.

2. WORK INCLUDED

The work covered under this section of the specification includes the preparation, cleaning, priming and painting of the following surfaces:

a. Exterior structural steel framing, including exposed columns, platforms, walkways, stairs, struts, railings, pipe and duct supports and other ferrous metal surfaces on and above the roof surfaces.

b. Other ferrous metal surfaces, including structural steel door frames, doorway bumpers and guards, ladders, ladder cages, and prime coated hardware.

c. Exterior and interior galvanized surfaces of exterior doors.

d. Interior structural steel framing, including columns, beams, girders, girts, gratings, grating treads, platforms, stairs, moment-resisting joints, supports and hangers, floor plates, curb angles, channel and angle frames shall be touched up and given one field coat of paint. Galvanized surfaces, except as otherwise specified shall not be painted.

3. APPLICABLE PUBLICATIONS

The following specifications and standards of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

a. Federal Specifications:

TT-E-489b & Am-1	Enamel; Gloss, Synthetic (for Exterior and Interior Surfaces).
TT-P-31b & Am-1	Paint; Iron-Oxide, Ready-Mixed, Red and Brown.
TT-P-86a & Am-1	Paint; Red-Lead Base, Ready Mixed.
TT-P-641b	Primer, Paint, Zinc Dust-Zinc Oxide (for Galvanized Surfaces).

b. Federal Standard:

Fed. Std. No. 595	Colors
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c. Military Specifications:

MIL-C-15328A	Coating, Pretreatment (Formula 117 for Metals).
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4. GENERAL

The term "paint", as used herein, includes emulsions, enamels, paints, varnishes, and other coatings, organic or inorganic, whether used as prime, intermediate, or finish coats. All colors shall be subject to approval, and shall conform to color chip furnished or selected from Federal Standard Number 595, as specified herein. Surfaces listed in the painting schedule herein shall receive the surface preparation and number of coats prescribed therein.

5. MATERIALS

Paints shall be delivered to the job in unbroken containers which shall show the designated name, formula or specification number, color, manufacturer's directions, and name of manufacturer, all of which shall be plainly legible at the time of use. Pigmented paints shall be provided in containers not larger than 5 gallons.

Materials shall conform to the specifications listed in the painting schedule herein and to the additional requirements specified below. Materials listed in the painting schedule without reference to a specification number and not further described hereinafter shall be products that have had a minimum of 2 years satisfactory field service. Laboratory tests simulating field conditions will not be accepted in lieu of actual field results.

5.1 Vinyl-type wash coat shall conform to Military Specification MIL-C-15328.

6. SAMPLES AND TESTING

All paint proposed for use shall be stored on the project site in sealed and labeled containers, or segregated at the source of supply, sufficiently in advance of need to allow 30 days for testing. Upon notification to the Contractor that the material is at the site or source of supply, a 1 quart sample of each batch shall be obtained by random selection from the sealed containers. Samples will be clearly identified by designated name, specification number, batch number, project contract number, intended use, and quantity involved.

7. CLEANING AND PREPARATION OF SURFACES

7.1 General: Hardware, hardware accessories, and similar items in place and not to be painted shall be removed prior to surface preparation and painting operations or otherwise protected. Items shall be removed if necessary for the complete painting of the items and adjacent surfaces. Following completion of painting of each space, removed items shall be reinstalled. Surfaces to be painted shall be cleaned before applying paint or surface treatments. Oil and grease shall be removed with clean cloths and cleaning solvents prior to mechanical cleaning, except when sandblasting is employed. Cleaning solvents shall be of low toxicity and shall have a flash point in excess of 100°F. Cleaning and painting shall be so programmed that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

7.2 Ferrous surfaces including structural steel items, that have not been shop-coated shall be cleaned and painted with protective paint as specified herein in PAINTING, PROTECTIVE, ON METAL, followed by finish coats as hereinafter specified. Shop-coated metal shall be protected from corrosion before and after installation by treating corroded areas immediately upon detection. Abraded or corroded spots on shop-coated surfaces shall be wire-brushed and touched up with the same material as the shop coat.

7.3 Galvanized surfaces to be painted shall be solvent-cleaned and treated with vinyl-type wash coat as hereinafter specified. Galvanized surfaces not to be painted shall be solvent-cleaned.

8. PAINT APPLICATION

8.1 General: The finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks and variations in color, hiding, texture, and finish. All coats shall be applied so as to produce film of uniform thickness. Edges, corners, crevices, welds, and rivets shall receive a film thickness equivalent to adjacent painted surfaces. Respirators shall be worn by persons engaged or assisting in spray painting. Adjacent areas and installations shall be protected by the use of drop cloths or other approved precautionary measures.

8.2 Storage, mixing, and thinning: At time of application, paint shall show no signs of deterioration. Paint shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Paints of different manufacturers shall not be mixed together. Where necessary to suit conditions of surface, temperature, weather, and method of application, the packaged paint may be thinned immediately prior to application in accordance with the manufacturer's directions, but not in excess of 1 pint of suitable thinner per gallon.

8.2.1 Vinyl-type wash coat shall be mixed by adding 1 volume of acid component to 4 volumes of resin component. The acid component shall be added slowly with constant stirring to the resin component. After mixing, the wash coat shall be used within 8 hours. If additional thinning is required to maintain a wet spray, reduction shall be made with normal butyl alcohol or 99 percent isopropyl alcohol.

8.3 Atmospheric conditions: Paints shall be applied only to the surfaces that are completely free of surface moisture as determined by sight or touch. In no case shall paint be applied to surfaces upon which there is visible frost or ice. While painting is being done, the temperature of the surface to be painted and of the atmosphere in contact therewith shall be maintained at or above 45 F. During periods of inclement weather, painting may be continued by enclosing the surfaces with temporary shelters and applying artificial heat, provided the temperature requirements prescribed above are maintained. Salamanders and open fires will not be permitted.

8.4 Time between surface preparation and painting: Surfaces that have been cleaned, pretreated, and/or otherwise prepared for painting shall be given a coat of the specified first-coat material as soon as practicable after such preparation has been completed, but in any event prior to any deterioration of the prepared surface.

8.5 Method of paint application: Vinyl-type wash coat used on metal surfaces may be applied by brush or spray. On other surfaces, exterior first coats shall be applied by brush, and interior first coats shall be applied by brush or roller; subsequent coats may be applied by brush, spray, or roller. Rollers for applying enamel shall have a short nap. Areas inaccessible to spray painting shall be coated by brushing or other suitable means.

a. Vinyl-type wash coat shall be applied at a coverage rate of 250 to 300 square feet per gallon to give a dry-film thickness of 0.3 to a maximum of 0.5 mil. Care shall be exercised in spray

application to avoid the deposition of dry particles on the surface. A wet spray shall be maintained at all times. Surfaces treated with the wash coat shall be permitted to dry for not less than 1 hour and shall be coated as soon thereafter as possible.

9. SURFACES TO BE PAINTED

9.1 General: The surfaces listed in the painting schedule below shall receive the surface preparation, paints, and number of coats prescribed. Explanatory information for use with the painting schedule is as follows:

a. Surfaces of fabricated and assembled items that are finish-painted by the manufacturer, or specified to be finish-painted under other sections of the specification, are exempted from the following schedule requirements for surface preparation and painting. Shop-primed items including structural steel, posts and rails, exterior galvanized doors, etc., shall be touched-up and finish-painted as required by this section.

b. Painting structural steel: After erection, all structural steel that has not previously been painted and all surfaces that have been abraded during shipment or erection, including scars from welding, shall be touched up with the original paint used for the shop coat. Steel surfaces shall then be given one field coat of iron-oxide paint conforming to Federal Specification TT-P-31.

c. Colors and tints shall match the respective color specimens selected by the Architect-Engineer, and shall conform to Federal

Standard Number 595. All preceding coats shall match approximately the color of the finish coat.

d. Method of surface preparation and pretreatment shown in the schedule is for identification purposes only. Cleaning and pretreatment of surfaces prior to painting shall be accomplished in accordance with the detailed requirements hereinbefore described.

9.2 Painting Schedule:

<u>Surface</u>	<u>Surface preparation and pretreatment</u>	<u>Primer</u>	<u>1st coat</u>	<u>2nd coat</u>
Exterior ferrous surfaces including ladders, ladder cages, prime-coated hardware, etc.	As previously specified.	TT-P-86	TT-E-489 Except semi-gloss.	TT-E-489 Except semi-gloss.
Exterior and interior galvanized metal surfaces of all exterior doors.	Wash with solvents, apply vinyl-type wash coat.	TT-P-641, Type II.	TT-E-489 Except semi-gloss.	TT-E-489 Except semi-gloss.
Exterior structural steel framing on and above roof surfaces.	As previously specified.	TT-P-86	TT-E-489 Except semi-gloss.	TT-E-489 Except semi-gloss.
Interior structural steel framing as previously specified.	Shop primed. Touch-up as specified.	-	TT-P-31	-

10. PAINTING COVERED UNDER OTHER SECTIONS

The following items requiring painting are specified in other sections of this specification.

- (1) Kitchen unit and kitchen equipment in Lunch Rooms.
- (2) Toilet enclosures and partitions, and shower cabinets.
- (3) Wood seats for benches in Locker and Shower Rooms.
- (4) Protected metal siding and insulated metal wall panels.
- (5) Laboratory Equipment.
- (6) Lunch Room tables.
- (7) Metal lockers.
- (8) Metal Cabinets.
- (9) Wire mesh partitions and barriers.
- (10) Locking boxes.
- (11) Storage racks.
- (12) Clothes and coat racks.
- (13) Metal partitions.
- (14) Shop equipment.

11. CLEANING

All cloths and cotton waste that might constitute a fire hazard shall be placed in closed metal containers or destroyed at the end of each day. Upon completion of the work, all staging, scaffolding, and containers shall be removed from the site. Paint spots, oil, or stains upon adjacent surfaces shall be removed.

SECTION II-21
FREIGHT ELEVATOR

1. SCOPE

One (1) freight elevator shall be furnished and installed as shown on the drawings and in conformity with these specifications.

2. TYPE

The elevator shall be an electrically operated hydraulic freight elevator using oil as the fluid medium, single automatic operation as manufactured by Rotary Lift Company, Memphis, Tennessee, or approved equal.

3. GENERAL

3.1 The elevator, including the accessory items listed herein shall be designed, fabricated and installed to meet the design requirements shown on the drawings and hereinafter specified.

3.1.1 In all cases where a device or part of the equipment is herein referred to in the singular number, such reference shall apply to as many devices as are required to complete the installation.

3.1.2 All work shall be performed in accordance with the ASA Elevator Safety Code A17.1-1955 and Supplement A17.1A-1957 published by the American Society of Mechanical Engineers.

3.1.3 Wiring shall conform to the requirements of the National Electric Code, and the wire shall meet IPCEA requirements.

3.1.4 Electric motor and controller shall meet the requirements of the latest applicable NEMA, ASA, and AIEE Standards.

4. SHOP DRAWINGS

Before any work is done, shop drawings indicating design support loads, outlines, platform size and clearances, embedded items, wiring and other items necessary to show the general arrangement of the elevator equipment shall be submitted for approval.

5. WORK NOT INCLUDED

The following work shall be performed under other sections of these specifications.

a. Construction of hoistway, pit, and machine room.

b. Installation of light outlet in the center of the side of the hoistway, as shown on the drawings.

6. TRAVEL

Travel of the car shall be from Basement Floor to Third Floor, stopping at 4 landings and serving 5 openings, with a total rise of 40 ft. 0 inches.

7. CAPACITY AND SPEED

The elevator shall have a net lifting capacity of 10,000 pounds in addition to the weight of the car and appurtenances specified herein. The elevator car shall travel at a minimum speed of 75 feet per minute under full contract load.

8. POWER SUPPLY

The power supply for the elevator will be 440 volts 3 phase 60 cycles, alternating current which will be provided in a fused 200 ampere safety switch in the Machine Room. The lighting supply will be

110 volts, 60 cycles, alternating current which will be provided in a 30 ampere fused safety switch in the Machine Room.

9. CAR PLATFORM AND SLING

The overall dimension of the car platform shall be as shown on the drawings.

9.1 The platform shall have a fabricated frame of formed and structural steel shapes, gusseted and rigidly welded. Flooring shall be non-skid steel floor plate.

9.2 The sling shall consist of heavy steel channel stiles affixed to a steel crosshead and bolster, with bracing members arranged to remove all strain from the car enclosure.

9.3 Steel bumper plates shall be affixed to bottom of bolster channels, and a platen plate with clamps and cap screws shall be furnished for fastening sling to plunger.

9.4 The car sling and platform shall be designed and constructed to comply with loading classification "C" which covers industrial truck loading, consisting of rolling vehicles of industrial type. Eight-tenths of the weight of the vehicle and its live load is assumed to be on one axle. Maximum eccentricity of loading is based upon the entire unit weight off-center laterally one-fourth of the clear platform width, as well as the maximum axle load coming on to the entrance edge of the platform. The maximum unit load shall be 8,000 pounds.

10. CAR ENCLOSURE

The car shall be enclosed on the 2 unused sides to a height of

6 feet-0 inches with #14 gauge steel panels not greater than 36 inches in width, with cutout to receive car operating station.

10.1 A #10 gauge expanded metal top shall be provided over the car, with approved safety hinged section.

10.2 Car enclosure shall be practically flush inside and shall allow a net usable floor area not less than 9'-9" wide by 11'-4" deep, with a clear headroom of 7'-6".

11. MOTORIZED CAR GATES

A vertical rising, power operated, steel mesh gate shall be furnished and installed on the two entrances of the car. Operation of gates shall be as described under hoistway door operation.

12. CAR LIGHT

A light fixture shall be furnished and installed in the elevator car, and shall be connected to a light switch in the car push-button station, and to an outlet provided in the hatchway.

13. CAR GUIDES AND GUIDE SHOES

Guides for the elevator car shall be planed steel elevator guide rails secured to the building structure with steel brackets. The car stile shall be fitted at top and bottom with machined guide shoes of the adjustable swivel type.

14. MOTORIZED HOISTWAY DOORS

A bi-parting, power driven, metal hoistway door shall be furnished and installed at each of the five hoistway openings, for clear opening of 9'-9" wide by the heights indicated on the drawings,

equipped with wire glass vision panel in upper section. Exterior door No. 116 shall be provided with a loft-side lever-bar and a key operated dead lock with key operation from both sides to prevent unauthorized usage unless unlocked by key.

14.1 Hoistway doors and car gates shall be automatic in operation, opening automatically as the car levels into a landing and shall be closed through use of a constant pressure push-button mounted in the car and at each landing. Side tracks shall have a 1/4 inch offset with shoes riding on the tracks attached to the doors which shall bring the doors into metal to metal contact around the periphery of the opening, with a neoprene astragal on the meeting rails. Doors shall be as air-tight as this construction will provide. Operation of the door shall disengage the door from the frame by action of the offset track. Doors shall be given a prime coat of paint at the factory. Door opening frames including jambs, head and sill are included under Section, MISCELLANEOUS METALWORK of these specifications.

14.2 Each door shall be equipped with an electrical and mechanical interlock which shall prevent the operation of the elevator unless all doors are closed, and to prevent the opening of any door unless the car is at the corresponding landing. Safety reversing edges shall be provided on all hoistway doors and car gates.

14.3 Each door shall bear a "B" label of approval of the Underwriters' Laboratories.

15. OPERATION (Single Automatic Pushbutton)

The elevator shall be controlled automatically by means of pushbuttons in the car marked to correspond with the respective landings served, and by single "Call" buttons at each hoistway opening. The momentary pressure of any button shall operate the car, if all car and hoistway doors are closed. The car shall travel without interference to its destination in the direction chosen. After the car has been placed in motion, all other pushbuttons shall become inoperative until the car has reached its designated landing. A time delay, non-interference feature shall be incorporated in the control circuit to allow ample time for opening car and hoistway doors before the car can be dispatched to another landing. An emergency stop switch shall be provided in the car pushbutton station which, in the off position, will render the elevator inoperative, and which will enable attendant or passenger to stop the car at any point during its travel. An alarm bell button shall be provided in the car station and connected to a bell, located as designated, for emergency use. Each landing station shall contain "In-Use" signal lights to indicate that the car is in motion and that it cannot be called until it has completed the registered call at which time the "In-Use" signal light will be extinguished, and the car placed in readiness for answering the next call registered.

15.1 An automatic leveling and releveling device shall be incorporated in the control mechanism to bring the car into landing stops at a

reduced speed, with accuracy of $1/4$ inch plus or minus, and shall maintain landing level as long as the car is within the leveling zone either above or below the landing.

16. ALARM BELL

Alarm bell shall be installed in the location designated. It shall be connected to the button marked "bell" in the car, and shall be connected to operate from the car lighting circuit.

17. CALL BELL

A call bell shall be installed on the car. It shall be connected to the direction buttons in the car and hoistway pushbutton stations, so arranged as to ring when any button (except that corresponding to landing at which elevator may be standing) is pressed, if any gate or door is open.

18. JACK UNIT

The jack unit shall be designed and constructed in accordance with the applicable requirements of Part III of the American Standard Safety Code for Elevators #A17.1. It shall be of sufficient size to lift the gross load the height specified and shall be factory tested to insure adequate strength and freedom from leakage. No brittle material, such as grey cast iron, shall be used in the jack construction.

18.1 The jack unit shall consist of the following parts: A plunger of heavy seamless steel tubing accurately turned and polished. A stop ring shall be electrically welded to the plunger to positively

prevent plunger leaving its casing. An internal babbit-lined guide bearing; packing or seal of suitable design and quality; a drip ring around casing top; and an outer casing made of steel tubing and provided with a pipe connection and air bleeder. Brackets shall be welded to the jack casing for supporting the elevator on pit channels.

18.2 The jack hole is to be provided by the elevator contractor and shall be made sufficiently in advance to prevent delays in the substructure construction and shall be installed in such manner as not to disturb or undermine the building foundations. The outside casing of the elevator jack shall have a preservative coating of "TAPECOAT X" manufactured by the Tapecoat Company, Evanston, Illinois, or approved equal. Covering shall be applied in the field.

19. POWER UNIT (Machine). Approximately 50 Horsepower

The power unit (oil pumping and control mechanism) shall be compactly and neatly designed, with all of the components listed below combined in a self-contained unit: Structural steel outer base with tank supports; oil tight drip pan; inner base for mounting motor-pump assembly; overhead oil reservoir with tight fitting tank cover, oil fill strainer and oil level gauge assembly, and a self-cleaning strainer in the suction line; expanded metal sheave guard; an oil-hydraulic pump; an electric motor; a V-belt drive assembly; and an oil control unit and an electric controller.

19.1 Pump shall be especially designed and manufactured for oil-hydraulic elevator service. It shall be of the rotary positive displacement type, designed for steady discharge with minimum pulsations

to give smooth and quiet operation. Output of pump shall not vary more than 10 percent between no load and full load on the elevator car, and its mechanical efficiency shall be at least 85 percent under full rated load.

19.2 Motor shall be 440 volt, 3 phase especially designed for oil-hydraulic elevator service, shall be of standard manufacture, and of duty rating to comply with specified speeds and loads.

19.3 Drive shall be by multiple V-belts and sheaves of number and size for duty involved.

19.4 Oil control unit shall consist of the following components, all built into a single assembly. A high pressure relief valve, a safety check valve, an automatic unloading up-start valve, an automatic unloading up-stop valve, a lowering valve, a leveling valve, a manual lowering valve, and a tank shut-off valve. All adjustments shall be accessible and shall be made without removing the assembly from the oil line.

19.5 Relief Valve (Hydraulic overload protection) shall be externally adjustable, and shall be capable of by-passing the total oil flow without increasing back pressure more than 10 percent above that required to barely open the valve.

19.6 Safety check valve shall be designed to close quietly without permitting any perceptible reverse flow. It shall be designed to support the elevator on a positive locked column of oil when car is at rest.

19.7 Up-Start Valve shall be externally adjustable, and shall be designed to by-pass oil flow during initial start of the motor-pump assembly. The valve shall close slowly, gradually diverting oil to the jack unit to insure a smooth up start and to relieve load on the motor during starting.

19.8 Up-Stop Valve shall be externally adjustable, and shall be designed to by-pass the oil flow to insure smooth up stops and to compensate for fly-wheel action.

19.9 Lowering Valve and Leveling Valve shall be externally adjustable for drop away speed, lowering speed, leveling speed and stopping speed to insure smooth down starts and stops.

19.10 Manual Lowering Valve shall be designed for manual lowering of the elevator car in event of power failure and for use in servicing adjusting the elevator mechanism.

19.11 Tank Shut-Off Valve shall be designed for isolating oil in the power unit tank to insure ease of servicing and adjusting the elevator mechanism without removing the oil from the tank.

19.12 Self-Cleaning Strainers shall be provided to prevent foreign material from lodging in the control system.

20. ELECTRIC CONTROLLER

Electric controller shall be of the full magnetic type, with ~~silver~~ to silver contacts on all relays and contactors. Thermal overload relays shall be provided to protect the motor against overloading. All components required for performance of the elevator as

specified under "Operation" section herein, shall be neatly mounted and wired with type TA wire and completely enclosed in a cabinet with a mechanically latched door. Control cabinet shall be designed for mounting on power unit, on wall or floor stand. The electric control apparatus shall be completely isolated from the oil reservoir.

20.1 A blow-out proof hydraulic muffler device, designed to reduce hydraulic pulsations, shall be installed in the oil line near the power unit. The power unit assembly shall be mounted on vibration absorbing materials to isolate the unit from the building structure.

21. BUFFERS

Buffers shall be provided and installed in the elevator hoistway pit.

22. WIRING, PIPING, AND OIL

All wiring shall be furnished and installed in the hoistway in accordance with the National Electric Code, to connect the operating buttons and switches to the control board in the power unit. All wiring shall be done in rigid conduit except to movable apparatus which shall be connected by short length of flexible conduit. Wire shall be type RHW complying with IPCEA Standards. All necessary pipe and fittings to connect the power unit to jack unit and oil of the proper grade shall be furnished.

23. MAIN LINE STRAINER

A main line strainer and shut-off cock assembly of the self-cleaning type, equipped with a 60 mesh element, and a magnetic drain

plug, shall be furnished and installed in the oil line. The unit shall be designed for 300 psi working pressure and shall be compact in design with easy access for cleaning.

24. AUTOMATIC GUIDE LUBRICATORS

Lubricators shall be provided and set up at the top of each guide rail and shall consist of a closed metal reservoir having wick oil feeds to the face and sides of the guide rails, and shall feed oil from the reservoir through wipers by capillary attraction.

25. HYDRAULIC FLUID

The hydraulic fluid shall be compatible with the paint, packing, gaskets, diaphragms, fittings, guides, and equipment and shall lubricate metal to metal moving parts in the elevator system. Water-base hydraulic fluids will not be acceptable. The hydraulic fluid for the elevator system shall be a pure phosphate ester fluid.

SPECIAL CONDITIONS

FOR

SECTION II-21 - FREIGHT ELEVATOR

The following covers those items not covered by the Standard Terms and Conditions.

1. PERMITS

All permits, inspection fees, and licenses necessary for the execution of the work shall be secured and paid for by the Subcontractor.

2. OPERATIONAL TEST

Upon completion of the elevator installation the Subcontractor shall make a running speed test with full maximum load on the elevator car to determine whether the elevator equipment, as installed, meets the speed, capacity, and all other requirements of the specifications.

In the event the equipment does not meet all requirements of the specification, the Subcontractor shall promptly remove from the premises all work condemned as failing to conform to the contract, and shall promptly replace and re-execute his own work in accordance with the contract.

3. MAINTENANCE

The Subcontractor shall furnish maintenance and callback service of the equipment provided by him for a period of 3 months after completion of his work. This service shall include regular examinations of the installation by competent and trained employees, and shall include all necessary adjustments, greasing, oiling, cleaning, supplies

and parts to keep the equipment in good operation; except such parts made necessary by misuse, accidents or negligence.

4. TECHNICAL DATA

The following technical data required for design purposes shall be submitted with the shop drawings.

a. Shipping Weight:

- (1) Total _____
- (2) Heaviest piece _____
- (3) Car and platform _____

b. Loads For Design:

- (1) Load on jack unit and pit channels
- (2) Bumper load
- (3) Impact Allowance

c. Motor Data:

- (1) Manufacturer
- (2) Type and Frame No.
- (3) Horsepower
- (4) Volts
- (5) Phase
- (6) Frequency
- (7) Type of Enclosure
- (8) Type of Bearings
- (9) Insulation Class
- (10) Current-full load
- (11) Locked rotor current
- (12) Speed-full load
- (13) Temperature rise over 40 C ambient

SECTION II-22
MISCELLANEOUS EQUIPMENT

1. SCOPE

Miscellaneous equipment shall be furnished and installed as shown on the drawings and in conformity with these specifications.

2. APPLICABLE SPECIFICATIONS

The following Federal Specifications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by references thereto:

AA-L-486d	Locker, Clothing, Steel
AA-S-271a & Am-1	Shelving; Steel, Storage
TT-V-91b & Am-1	Varnish, Shellac
TT-V-121c & Am-1	Varnish, Spar, Water-Resisting

3. GENERAL

Equipment to be supplied under this section of the specifications will not be acceptable unless evidence is submitted that equipment of approximately the same type and design as that proposed has been installed elsewhere and has been operating successfully for at least one year.

3.1 Approval of equipment: Before any equipment is ordered, a complete list in triplicate of equipment to be incorporated in the work, together with the names and addresses of the manufacturers and

their catalog numbers and trade names, and other detailed information, when so directed under the various items, shall be submitted for approval by the Architect-Engineer. Any equipment which is not in accordance with the specification requirements will be rejected. The product of a reputable manufacturer regularly engaged in the commercial production of equipment will not be excluded on the basis of minor differences, provided all essential requirements of this specification relative to materials, capacity, and performance are met.

4. MATERIALS AND WORKMANSHIP

Materials used in the manufacture and installation of the equipment shall be of a high quality throughout and shall be entirely suitable for the intended purpose. Workmanship shall be in accordance with high grade manufacturing practice covering the particular class of equipment and, for installation, first class throughout.

5. SHOP DRAWINGS AND DESCRIPTIVE DATA

5.1 Shop drawings for all items specified herein shall be submitted to the Architect-Engineer for approval. The drawings shall show dimensions and details of construction, installation, and relation to adjoining and related work which will require cutting or close fitting and shall show reinforcement, anchorage, and other work required for complete installation.

6. LABORATORY EQUIPMENT

Laboratory equipment, consisting of laboratory wall tables, sinks, work tables, balance table, balance case, chemical supply

and reagent cabinets, shall be furnished and installed as shown and as hereinafter specified. The units shall be those manufactured by Laboratory Furniture Company, Inc., Mineola, New York, Kewaunee Mfg. Co., Adrian, Michigan, Metalab Equipment Company, Hicksville, New York, or approved equal. Model numbers listed hereinafter, for identification purposes only, are Laboratory Furniture Company, Inc., model numbers.

6.1 Materials:

a. Steel shall be furniture steel, patent levelled cold-rolled, free from scale, rust, etching, deep scratches, ragged edges or other imperfections. Steel for cabinet bodies shall be No. 18 gage throughout; for inside and outside panels of doors, drawers, and drawer bodies No. 20 gage; and for legs and channel members of table units not less than 16 gage. Each piece of laboratory equipment shall be provided with a micro-levelling device. Where legs occur, and elsewhere as required, a shoe covered levelling device shall be fitted thereto. Shoes shall be black moulded rubber, and shall fit snugly over and cover the levelling device.

b. Alberene Stone shall be regular grade, selected for laboratory use and shall be uniform in thickness, color, texture and free from calcite veins and other injurious imperfections. The physical properties shall be as follows: Modulus of rupture 1,800 pounds per square inch, hardness 4.5, and water absorption not more than 0.20 percent by weight.

6.2 Finish on all steel laboratory equipment shall be applied in such manner as to assure constant uniform protection against destructive chemical elements and fumes. Steel shall be thoroughly cleaned, bonderized and factory finished by spraying with one coat of a properly formulated primer followed by one or more coats of a low-gloss enamel and then oven baked at a temperature in excess of 275F for the length of time necessary to cause polymerization at the temperature employed. Finished coating shall be highly resistant to acids, alkalies, solvents, water and abrasion. Unless otherwise directed, the finish color of the units shall be selected from the manufacturer's standard colors.

6.3 Laboratory wall table #1 shall conform to the design indicated on the drawings and shall consist of the following:

Two end cabinets, Model E-477, approximately 47" W. x 35 3/4" H. x 22" D. Each cabinet shall have 2 cupboards with removable shelves, and 2 drawers above.

Two intermediate cabinets, Model C-477, approximately 47" W. x 35 3/4" H. x 22" D. Each cabinet shall have 2 cupboards with removable shelves, and 1 drawer above.

One center cabinet, Model A-477, approximately 47" W. x 35 3/4" H. x 22" D. Cabinet shall have 2 cupboards with removable shelves.

Four drawer units, Model N-357, approximately 35" W. x 8" H. x 22" D.

One end filler approximately 1'-2 1/2" W. x 35 3/4" H. x 22" D. to match E-477 unit.

One Alberene table top approximately 3' 4-1/2" W. x 32' 5-1/2" L. x 1-1/4" T., with cut-out for trough of the sizes shown. Table top shall have a 3/16" drip groove on the under-side 1/2 inch from all exposed edges. Joints, where required, shall be made flush and tight by means of brass slip tongue set in acid proof cement. All exposed surfaces and edges shall be hone finished.

One Alberene trough of the size and length indicated, constructed of not less than 1-1/4 inch thick stone. Bottom and sides shall be tongued and grooved to receive the companion section and joined by bolt and nut construction set in acid-resisting cement. All inside surfaces and top edges shall be honed smooth.

Ten Model WPB4 combination shelf supports and pipe racks, fabricated of cast-iron or steel and finished with baked-enamel to match the base cabinets. Supports shall have removable section to permit the removal of pipe without dismantling shelf.

One Alberene shelf 8" W. x 32'-5-1/2" L. x 1-1/4" T. Exposed surfaces and edges shall be honed smooth.

6.3.1 Sink and single drainboard shall be similar to Model 6075, 2'-0" W. x 4'-10-1/2" L. and of the height required to receive the wall table trough. Sink shall be 24" W. x 30" L. and shall have a minimum depth of 8" below the invert of the wall table trough. Drainboard shall be 30" long. Sink and drainboard shall be constructed of 1-1/4" thick Alberene stone, except that sink bottom shall be 1-1/2 inches thick. Bottoms and sides shall be tongued and grooved

to receive the companion section and joined by bolt and nut construction set in acid-resistant cement. Sink side adjacent to wall table shall be cut-out to receive the trough. Sink bottom shall be drilled to receive the drain, as indicated. All inside surfaces and top edges shall be honed smooth. Sink legs and bracing cross members shall be the same type as that specified for the work tables in sub-paragraph 6.5. Sink shall be provided with one Model 525 combination sink fixture with swinging spout, one cast brass sink strainer with tail piece, similar to Model 216 except 3" size, and one 3" running trap.

6.4 Laboratory wall table #2 shall conform to the design indicated on the drawings and shall consist of the following:

Two end cabinets, Model C-357, approximately 35" W. x 35 3/4" H. x 22" D. Each cabinet shall have 2 cupboards with removable shelves, and drawer above.

One drawer unit, Model NL-597, approximately 59" W. x 35 3/4" H. x 22" D. Unit shall have 3 drawers.

One drawer unit, Model N-477, approximately 49" W. x 8" H. x 22" D.

One Alberene table top approximately 3'-4-1/2" W. x 14'-8" L. x 1-1/4" T., with cut-out for trough of the sizes shown. Table top shall have a 3/16" drip groove on the under-side 1/2 inch from all exposed edges. Joints, where required, shall be made flush and tight by means of brass slip tongue set in acid proof cement. All exposed surfaces and edges shall be hone finished.

One Alberene trough of the size and length indicated, constructed of not less than 1-1/4 inch thick stone. Bottom and sides shall be tongued and grooved to receive the companion section and joined by bolt and nut construction set in acid-resisting cement. All inside surfaces and top edges shall be honed smooth.

Five Model WPB4 combination shelf supports and pipe racks, fabricated of cast-iron or steel and finished with baked-enamel to match the base cabinets. Supports shall have removable section to permit the removal of pipe without dismantling shelf.

One Alberene shelf 8" W. x 14'-8" L. x 1-1/4" T. Exposed surfaces and edges shall be honed smooth.

6.4.1 Sink shall be similar to Model WTS-20, 2'-0" W. x 1'-6" L. and of the height required to receive the wall table trough. Sink shall have a minimum depth of 8" below the invert of the wall table trough. Sink shall be constructed of 1-1/4" thick Alberene stone, except that sink bottom shall be 1-1/2 inches thick. Bottoms and sides shall be tongued and grooved to receive the companion section and joined by bolt and nut construction set in acid-resistant cement. Sink side adjacent to wall table shall be cut-out to receive the trough. Sink bottom shall be drilled to receive the drain, as indicated. All inside surfaces and top edges shall be honed smooth. Sink legs shall be the same type as that specified for the work table in sub-paragraph 6.5. Sink shall be provided with one Model 525 combination sink fixture with swinging spout, one cast brass sink

strainer with tail piece, similar to Model 216 except 3" size, and one 3" running trap.

6.5 Laboratory work tables shall be Model 4603, 2'-6" W. x 5'-0" L. x 3'-1" H. complete with three drawers and 1-1/4 inch thick Alberene stone table top. Table top shall be constructed in the same manner as specified for the wall table. The legs shall be square steel tubing. Upper ends shall be firmly secured with large bolts into corner sockets of the table apron framing. Bracing cross members shall be provided between legs. Bottom of each leg shall have a micro-levelling device welded to the legs. Bottom of each leg shall be fitted with a shoe covered levelling device. Shoes shall be of black moulded rubber, and shall fit snugly over and cover the levelling device. Finish shall be as previously specified.

6.6 One combined unit consisting of the following:

a. One Chemical Cabinet, Model 5830, 4'-0" L. x 7'-0" H. Upper section 12" D., lower section 24" D. including counter. The upper section shall have two full height sliding doors mounted on ball-bearing rollers and glazed with 1/4" thick polished plate glass, and shall be equipped with three adjustable shelves. Shelves shall be of heavy gage sheet steel reinforced on all edges. Doors shall have frames of No. 18 gage sheet steel, boxed metal construction. Glass shall be set in rubber channel gasket. Lower unit shall have eight drawers set in the position indicated on the drawings. Drawers shall operate on ball-bearing rollers. Cabinet shall have a reinforced gusset plate with a microlevelling device in each corner.

b. One Supply Cabinet, Model 5930, 6'-2" L. x 7'-0" H.

Upper section 12" D., lower section 24" D. including counter. The upper section shall have two full height sliding doors mounted on ball-bearing rollers and glazed with 1/4" thick polished plate glass, and shall be equipped with three adjustable shelves. Shelves shall be of heavy gage sheet steel reinforced on all edges. Doors shall have frames of No. 18 gage sheet steel, boxed metal construction. Glass shall be set in rubber channel gasket. Lower unit shall have two cupboards with removable shelves and four drawers set in the position indicated on the drawings. Drawers shall operate on ball-bearing rollers. Cabinet shall have a reinforced gusset plate with a microlevelling device in each corner.

c. One Reagent Cabinet, Model 5401, 8" W. x 4'-0" L.,

x 7'-0" H. Cabinet shall have two full height hinged doors glazed with 1/4" thick polished plate glass and shall be equipped with seven adjustable shelves. Cabinet shall have a reinforcing gusset plate with a microlevelling device in each corner. Shelves shall be of heavy gage sheet steel reinforced on all edges. Glass doors shall have frames of No. 18 gage sheet steel, boxed metal construction. Glass shall be set in rubber channel gasket.

6.7 Balance Table and Balance Case shall conform to the following:

a. Balance Table, Model 5010, 1'-9" W. x 4'-0" L. x 2'-7" H.

complete with one drawer. Top shall be of 1/2" thick polished plate glass supported on a thick felt pad and 2" thick stone sub-top with

raised bevelled edge frame to prevent glass from shifting. The table shall be provided with vibration dampeners to absorb shock and vibration. Table legs and bracing cross members shall be the same type as that specified for the work tables in sub-paragraph 6.5 above.

b. Balance case shall be approximately 1'-6" W. x 3'-0" L. x 2'-6" H. Posts shall be 4'-0" H. Balance case shall be constructed of 16 gage sheet steel sides and top with internal reinforcing as required. A vertical lift sash glazed with 1/4" thick polished plate glass set in rubber gasket and provided with lead or steel counterweights shall be mounted on the face of the balance case.

Finish for both items shall be as previously specified.

7. METAL STORAGE CABINETS

Metal cabinets shall be open front storage cabinets finished in green oven-baked enamel finish. Storage cabinets shall have closed back and sides, and 7 shelves, 2 fixed and 5 adjustable. Cabinets shall be 3 feet wide, 1 foot 6 inches deep and 6 feet 3 inches high, Type 270, manufactured by Penn Metal Corporation of Pennsylvania, Philadelphia, Pa., or approved equal.

7.1 Materials: Materials and construction shall meet requirements of Federal Specification AA-S-271, Type A, Class 2.

8. STEEL WORK BENCHES

Steel work benches shall be approximately 72 inches long, 24 inches wide and 36 inches high, with heavy-gauge steel top, steel lower shelf and steel reinforcing stringer. Each work bench shall have two steel drawers, each mounted on roller bearings. Drawers

shall be approximately 20 inches wide, 20 inches long and 6 inches deep, and shall have one tray and padlock attachment. Work benches shall be "Hallowell" model No. 606-S-636-33, manufactured by Standard Pressed Steel Company, Jenkintown, Pa., or approved equal.

9. LOCKING BOXES

Locking boxes shall be approximately 25 inches wide, 25 inches high and 8 inches deep, fabricated of not thinner than 18 gage sheet metal. Each locking box shall have approximately 30 compartments, each with door and individual pin tumbler or lever tumbler lock and individual key. Boxes shall have gray oven-baked enamel finish, and shall be mounted on the wall with the bottom of the box 4 feet above the finished floor. Locking boxes shall be as manufactured by Peters Metal Fabricating Co., Portland, Oregon, or approved equal.

10. METAL LOCKERS AND LOCKER AND SHOWER ROOM BENCHES

10.1 Metal lockers shall conform to the requirements of Federal Specification AA-L-486. Single tier lockers shall be Type I, size 2 with sloping tops. Double tier lockers shall be Type II, size 2 with sloping tops.

10.1.1 Color shall be selected by the Architect-Engineer from colors standard with the manufacturer.

10.2 Locker and Shower Room Benches

10.2.1 Seats shall consist of edge grain, clear maple or birch, approximately 9-1/2 inches wide by 1-1/4 inch thick by required

length, laminated from strips not over 3 inches wide, supported on metal standards or pedestals.

10.2.2 Standards or pedestals shall be stock type steel pipe standards or steel pedestals, providing firm support and spaced not more than 4 ft.-0 in. on centers. Overall height of standards or pedestals shall be approximately 18 inches. Standards or pedestals shall be attached to seat with screws and anchored to floor with expansion bolts.

10.2.3 Finish: Standards or pedestals shall have corrosion resisting prime coat and enamel to match lockers. Seats shall be finished with one coat shellac, Federal Specification TT-V-91, one coat paste filler, and two coats of spar varnish, Federal Specification TT-V-121, or approved equivalent.

11. KITCHEN UNIT (109-N BUILDING)

Provide and install one (1) self-contained kitchen unit, complete, consisting of electric range, refrigerator, sink and cabinets. Kitchen unit shall be Model No. E-69-RS, as manufactured by Dwyer Products Corporation, Michigan City, Indiana, or approved equal.

11.1 Electric range shall have one (1) top burner (2100 watts), two (2) 1250 watt top burners, one (1) appliance outlet (660 watts), 2 separate oven burners, maximum preheat (4600 watts), for a total connected range load of 9860 watts. Range shall also have 7-position top burner heat selector switches, separate bake or high broil oven burners, automatic oven heat control, signal light, drip pan and

utensil drawer. Range shall be Underwriters' Laboratories and C.S.A. approved, and shall be wired for 120/208 volt, 3 wire, single phase a-c service.

11.2 Electric refrigerator shall have a gross capacity of 7 cubic feet and shall have roll-out shelves on nylon roller bearings, stainless steel freezer with 2 ice cube trays, interior light, push-button door on oversize ball bearing hinges, and seamless acid-resistant porcelain liner.

11.3 Range and sink work top shall be one-piece, seamless, porcelain on 14 gauge steel with 14-1/2 inch by 17-3/4 inch by 6-1/2 inch deep sink bowl. Sink shall have no-splash aerating faucet, 3-1/2 inch drain, crumb strainer, and undersink storage cabinet.

11.4 Upper cabinets shall have a storage volume of 13.8 cubic feet and a shelf-area of 17.3 square feet, with insulated heat deflector, porcelain door fronts, concealed hinges, flush double bottom and porcelain back splash.

11.5 Finish: Kitchen unit shall be finished with the manufacturer's standard gloss or semi-gloss baked enamel and shall be white or of a color selected by the Architect-Engineer from colors standard with the manufacturer. Finish shall be applied in not less than three coats.

11.6 Installation: Kitchen unit shall be installed as recommended by the manufacturer. Cabinets shall be aligned, set plumb and secured in place. Closers and fillers and finish moldings shall be provided as necessary. Sink trim shall be furnished and installed as

specified herein in Section PLUMBING. The stove and refrigerator shall be complete operating units fully wired and furnished with plugs for connection to receptacles.

12. KITCHEN EQUIPMENT (105-N BUILDING)

Kitchen equipment for the Lunch Rooms shall be furnished and installed as shown on drawings H-I-27618 and H-I-27619. The following items manufactured by General Electric Major Appliance Division, Louisville, Kentucky and the Hotpoint Company, Division of General Electric Company, Chicago, Illinois, or approved equal, shall be provided.

- 12.1 Two G.E. Electric Ranges - Model J-301S.
- 12.2 Two Hotpoint Food Warmers - Model HF1.
- 12.3 Three G.E. Base Cabinets - Model KB4234SF,
with one American Standard double sink Model P7016-1-42" in each cabinet.
- 12.4 Four G.E. Base Cabinets - Model KB-2434A.
- 12.5 One each G.E. Base Cabinets Models KB-1828AR and KB-1828AL.
- 12.6 Two G.E. Base Cabinets - Model KB-2434B.
- 12.7 One G.E. Base Cabinet - Model KB-3634B.
- 12.8 Three G.E. Base Cabinets - Model 1834BR.
- 12.9 Two G.E. Base Fillers - Model KB-0034FKK.
- 12.10 Six G.E. Wall Cabinets - Model KW-3618.
- 12.11 Three G.E. Wall Cabinets - Model KW-2430.
- 12.12 Three G.E. Wall Cabinets - Model KW-4230.
- 12.13 Two G.E. Wall Cabinets - Model KW-1830L.

12.14 One G.E. Wall Cabinet - Model KW-3630.

12.15 Countertops and backsplashes of the size and shape shown on the drawings, fabricated of plywood with a laminated covering of "Textolite", manufactured by General Electric Company, or approved equal. Laminate shall be postformed to form a one-piece countertop with backsplash and cap having a smooth surface unbroken by seams or metal bindings. Countertops shall have easy to clean cove and no-drip front edge.

12.16 Finish: Kitchen equipment shall be finished in the same manner as that specified for the kitchen unit in sub-paragraph 11.5 of this section of the specifications.

13. CLOTHES STORAGE RACKS

Clothes storage racks shall be open front racks finished in gray oven-baked enamel. Racks shall be 3 and 4 feet wide as shown on the drawings, 2 feet 6 inches deep and 7 feet 3 inches high. Each rack shall have seven shelves, 2 fixed and 5 adjustable. Racks shall be open front type 270, manufactured by Penn Metal Corporation of Pennsylvania, Philadelphia, Pa., or approved equal.

13.1 Materials: Materials and construction shall meet requirements of Federal Specification AA-S-271, Type A, Class 2.

14. LUNCH TABLES

Lunch tables shall be of the lengths indicated on the drawings by 30 inches wide and 30 inches in height. Tables shall be complete with Formica table top and with plastic covered seats and backs mounted on swing type brackets from each table leg. Tables shall be

No. 314-287, manufactured by The Chicago Hardware Foundry Co., North Chicago, Illinois or approved equal. Color of formica and plastic seat and back covering shall be selected by the Architect-Engineer from colors submitted by the manufacturer. All metal parts shall be finished in gray oven-baked enamel.

15. LUNCH BOX STORAGE RACKS

Lunch box storage racks shall be approximately 36 inches wide, 12 inches deep and 7 feet 3 inches high, Type 169, manufactured by Penn Metal Corporation of Pennsylvania, Philadelphia, Pa., or approved equal. Storage racks shall have seven 36 inch wide bins with closed sides and back. Racks shall be finished in gray oven-baked enamel.

16. CLOTHES RACKS

Clothes racks shall be approximately 4 feet two inches wide, 6 feet 4-1/2 inches high and of the depths shown on the drawings. Racks shall be "Checker" Type HKD-4-48 and HKS-4-48, manufactured by Vogel-Peterson Co., Chicago, Illinois, or approved equal. Racks shall be complete with two hat shelves and 48 coat hooks. Racks shall be finished in gray oven-baked enamel.

17. COAT RACKS

Coat racks shall be approximately 4 feet two inches wide, 6 feet 6-1/2 inches high and 1 foot 4 inches wide. Racks shall be "Checker" Type SF, manufactured by Vogel Peterson Co., Chicago, Illinois, or approved equal. Each rack shall be complete with four hat shelves and 16 coat hangers. Racks shall be finished in gray oven-baked enamel.

18. BULLETIN BOARDS

Bulletin boards shall be approximately 5 feet wide by 3 feet high and shall be furnished complete with No. BC-12 yellow Gold corkboard and Type 3A aluminum trim. Bulletin boards shall be as manufactured by Gotham Chalkboard and Trim Company, Inc., New Rochelle, New York, or approved equal. Bulletin boards shall be surface mounted with concealed fasteners and snap-on trim.

19. MAGAZINE RACKS

Surface mounted magazine racks shall be approximately 18 inches wide, 12 inches high and 3-1/2 inches deep. Racks shall have dull finish stainless steel front and steel sides, bottom and back. Racks shall be as manufactured by Bommer Spring Hinge Co., Inc., Landrum, South Carolina, or approved equal.

20. TOOL CRIB (105-N Building)

Metal cabinets for the tool crib shall be furnished as shown on Drawing H-1-27616. Metal cabinets shall be finished in green-baked enamel finish and shall be as manufactured by Penn. Metal Corporation of Pennsylvania (Philadelphia, Pa.), or approved equal.