SECTION 09680

CARPET

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 SCOPE OF WORK

Furnish all Materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to comply with the Contract Documents, including, but not limited to, these major items:

1. Direct glue down carpet with backing.
2. Metal edge trim and backing for carpet coved wall base if indicated on the drawings.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article of the General Conditions.

1.04 SUBMITTALS

A. Provide product data on specified products, describing physical and performance characteristics: sizes, patterns, colors available, and method of installation.

B. Submit two samples illustrating color and pattern for each carpet material specified if substituting from color board.

C. Submit manufacturer's installation instructions. When approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on this Work.

1.05 OPERATION AND MAINTENANCE DATA

Submit operation and maintenance data maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning and shampooing.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.

B. Maintain minimum 72 degrees F ambient temperature plus/minus 5 degrees with relative humidity not exceeding 65% three days prior to, during, and 72 hours after installation of materials.

1.07 CLOSE-OUT: EXTRA MATERIALS

Provide 5% of carpeting of each color specified.

PART 2 -- PRODUCTS

2.01 CARPET

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

2.02 FLOOR BASE

Manufacturer(s), Type(s), Location(s), Finishes(s), as indicated on drawings.

2.03 FLOORING TRANSITIONS

Manufacturer(s), Type(s), Location(s), Finishes(s), as indicated on drawings.

2.04 OTHER ACCESSORIES

A. Sub-Floor Filler: White premix latex; type recommended by carpet manufacturer.

B. Primers and Adhesives: Waterproof; of types recommended by carpet manufacturer.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Verify that substrate surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft. and are ready to receive work. Have all previous adhesives removed.

D. Verify concrete floors are dry to a maximum moisture content of 7 percent; and exhibit negative alkalinity, carbonization, or dusting. Provide test results to prove compliance prior to initiating installation.

E. Do not proceed until unsatisfactory conditions are corrected.

F. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with sub-floor filler.

B. Apply, trowel, and float filler to leave smooth, flat, hard surface.

C. Prohibit traffic until filler is cured.

D. Vacuum floor surface.

3.03 INSTALLATION

A. Apply carpet and adhesive in accordance with manufacturers' instructions. Direct glue-down.

B. Lay out rolls of carpet.

C. Verify carpet match before cutting to ensure minimal variation between dye lots.

D. Locate seams in area of least traffic. Carpet shall be installed in full lengths wherever possible.

E. Fit seams straight, not crowded or peaked, free of gaps.

F. Lay carpet on floors with run of pile in same direction as anticipated traffic. Lay carpet so that seams perpendicular to a wall do not occur at door openings in that wall.

G. Do not change run of pile in any room where carpet is continuous through a wall opening into another room. Locate change of color or pattern between rooms under door centerline.

H. Cut and fit carpet around interruptions.

I. Fit carpet tight to intersection with vertical surfaces without gaps.

J. All seams shall be beaded and sealed with "seam sealer". The seam sealer shall be applied to the cut edge of the carpet at the level of the carpet backing.

K. No stretching will be permitted.

L. Unroll carpet face up and cut the lengths required with pile-lay runs in the same direction. Check starting wall for squareness and allow for off-square walls. Strike chalk line the entire length of area where seam falls.

M. Place two lengths in proper position for installing; trim salvage, and line up seam edge with chalk line. Lay carpet perfectly flat and tension free.

N. Roll both widths back 3' from seam area the entire length of carpet.

O. Spread adhesive from approximate center towards each end.

P. When sufficient floor area has been covered with adhesive, drop or roll first width into place. Apply coating of edge sealer to seam edge of first width. Follow this procedure on each succeeding width at seam. Drop or roll second width into position and fit the seam in tightly using knee-kicker if necessary. Brush or roll looseness and air bubbles away from seam.

Q. Fold or roll the remaining portion of the first width from the wall. Apply adhesive to the floor and drop or roll carpet into place.

R. Roll or fold back dry portion of second width towards seam; spread adhesive and place carpet 3' from where next seam will fall.

S. Brush or roll out looseness and air bubbles as carpet is put into place. Repeat above procedure on continuing widths. Trim carpet at wall using razor blade knife or suitable wall trimmer.

3.04 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean and vacuum carpet surfaces.

3.05 PROTECTION

A. Prohibit traffic from carpet areas for 24 hours after installation.

B. Cover with non-staining building paper, firmly fastened down to protect floor surfaces.

C. Near completion of the project, remove paper, clean and vacuum carpet.

***** END OF SECTION *****

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SECTION 09720

FABRIC WALL PANELS

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 DESCRIPTION

All of the requirements of the Contract Documents apply to this Section.

1.03 QUALITY ASSURANCE

Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods for proper performance of the work of this Section.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article of the General Conditions.

1.05 SUBMITTALS

A. Comply with pertinent provisions of Article of the General Conditions.

B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Manufacturer's Specifications and other data needed to prove compliance with the specified requirements.

2. Samples of the full range of colors and patterns available from the proposed manufacturer in the specified range; if substituting product / color selected.

3. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures for the Work.

C. Mock-ups:

1. At an area on the site where accepted by the Architect, provide a mock-up panel of the Work of this Section.

a. Make the mock-up panel approximately 4'-0" high by 4'-0" wide and consisting of a minimum of two 2'-0" x 2'-0" panels butted together.

b. Provide one mock-up panel for each color and pattern of vinyl-coated fabric wall covering used on the Work.

c. The mock-ups may be part of the Work, and may be incorporated into the finish work when so accepted by the Architect.

d. Revise as necessary to secure Architect's acceptance.

2. The mock-up panels, when accepted by the Architect, will be used as datum points for comparison with the remainder of the work of this Section for the purpose of acceptance or rejection.

3. If the mock-up panels are not permitted to be part of the finished work, completely demolish and remove them from the job site upon completion and acceptance of the work of this Section.

D. Maintenance Instructions:

1. Furnish a copy of the vinyl-coated fabric manufacturer's maintenance instructions at project's Final Completion.

2. Include recommended cleaning materials and methods of application therefor together with precautions in cleaning materials' use if such are improperly applied.

1.06 PRODUCT HANDLING

A. Deliver pre-finished panels in undamaged condition as packaged by the manufacturer, in sealed, labeled containers.

B. Store panels in a clean, dry storage area off the ground. Maintain storage area temperature above 45° F with normal humidity.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Temperatures:

1. Install pre-finished panels only when normal temperatures and humidity conditions approximate the same conditions that will exist when building is occupied.

2. Maintain areas to receive pre-finished panels at a minimum temperature of 65° F measured at floor level.

3. Maintain minimum temperature for 72 hours before, during, and 48 hours after applications of wall coverings.

B. Ventilation:

1. Provide adequate continuous ventilation as required for the various wall coverings, sealers and adhesives used in the spaces scheduled, but in no case, for a time less than that recommended by the manufacturer for full drying or curing.

1.08 EXTRA STOCK

Deliver to the Owner for use in future modifications or repairs, an extra stock of approximately 2% of each color and pattern of material, and proper adhesive, packaging each type of material separately, distinctly marked, and adequately protected against deterioration.

PART 2 -- PRODUCTS

2.01 PREFINISHED VINYL-COATED FABRIC WALL PANELS

A. Provide pre-finished wall panels consisting of vinyl-coated fabric factory laminated to 1/2" wood fiberboard core with a water base adhesive recommended by the manufacturer, as accepted by the Architect. Colors to be selected by the Architect.

B. Panel shall have the following minimum characteristics:

1. Fabric: Woven, treated

2. Flame Spread: 0-25

3. Smoke Developed: 200 or less

4. Substrate: Perforated non-combustible mineral fiberboard

5. Sound Absorption: NRC .65

6. Insulation: R = 2.00

7. Size: ¾" thick; 30" wide x 9'-0" maximum

C. Edges shall be wrapped. Top edge of panels shall extend to suspend ceiling wall angle.

D. Trim:

1. Provide at all exposed edges and where panels abut doors and windows.

2. Material: As indicated on Drawings.

E. Accepted Manufacturers subject to compliance with these Specifications:

1. As indicated on the Drawings.

2. Accepted substitutions under 01340.

F. Adhesive shall be a heavy-bodied water-soluble adhesive recommended by manufacturer of the accepted fabric.

G. Provide other materials not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the acceptance of the Architect.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Ascertain that substrates are straight within a maximum tolerance of 1/8 inch in 10 feet, and not greater than 1/16 inch in one foot.

D. Do not proceed until unsatisfactory conditions are corrected.

E. Beginning of installation means acceptance of conditions.

3.02 SUBSTRATE PREPARATION

Gypsum wallboard: On gypsum wallboard, apply Mechanical clips per manufacturer's recommendations securing to metal support system. Install base J-molding.

3.03 FABRICATION OF PREFINISHED PANELS

Sequence:

1. Use fabric in consecutive numerical sequence of their manufacture.

2. Place fabric panels sequentially in the exact order they are cut from the roll. Number or tag panels in same sequence for field installation.

3.04 INSTALLATION

Handle the pre-finished panels in strict accordance with the manufacturer's recommendations as accepted by the Architect.

1. Follow the manufacturer's printed instructions for securing mechanical clips to metal support system.

2. Install bottom J-molding securing at 16" o.c.

3. Install the pre-finished panels in same sequence as their manufacturer and prior to installation of plumbing fixtures, casing, bases, and cabinets.

3.05 ADJUSTMENT AND CLEANING

A. Visually inspect to verify that installed fabric is secure, smooth, clean, without wrinkles and Panels are installed with no gaps or uneven alignment at butt joints.

B. Inspect all panels, verifying that precise match has been achieved, and correcting miss-match of color and/or pattern as necessary to secure Architect's acceptance.

***** END OF SECTION *****

SECTION 09900

PAINTING

PART 1 -- GENERAL

1.01 SUMMARY:

A. Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

B. Section Includes: Painting and finishing of all interior and exterior items and surfaces, unless otherwise indicated or listed under exclusions below:

1. Paint all exposed surfaces, except as otherwise indicated, whether or not colors are designated.

2. Include field painting of exposed exterior and interior structural steel, plumbing, mechanical and electrical work, except as indicated below.

3. Paint exterior plaster where indicated on Drawings.

C. Work Included:

1. The intent and requirements of this section is that all work, items and surfaces which are normally painted and finished in a building of this type and quality, shall be so included in this contract, whether or not said work, item or surface is specifically called out and included in the schedules and notes on the drawings, or is, or is not, specifically mentioned in these specifications.

2. All the requirements of Division Zero and Division One apply to this Section.

D. The following general categories of work and items that are included under other Sections, shall not be a part of this section:

1. Shop prime painting of structural and miscellaneous iron or steel.

2. Shop prime painting of hollow metal work.

3. Shop finished work and items.

4. Any drywall or plaster permanently concealed from view.

5. Any factory finished equipment and other materials with a complete factory applied finish.

6. Finish hardware except where primed for paint finish.

7. Any glass, plastics, floor tiles and sheet vinyl coved or vinyl top set bases.

8. Plumbing fixtures: Toilet room accessories.

9. Lighting fixtures except as noted on drawings or specified.

10. Any acoustical surfaces; unless otherwise specified.

D. The Room Finish Schedules indicated on the drawings indicate the location of interior room surfaces to be painted or finished. The indications are general and do not necessarily define the detail requirements. Include all detailed refinements and further instructions as may be given for the required complete finishing of all spaces and rooms.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions, Project Manual Section 00700.

1.03 SUBMITTALS:

A. Product data:

1. Not less than (30) thirty days before beginning work, submit a complete list of materials proposed for use, together with manufacturer's specifications.

2. Paint materials and products shall be subject to the Architect's approval.

B. Color samples:

1. Prepare all color and finishes on samples, 8-1/2" x 11" in size.

2. Samples shall be submitted as requested until required sheen, color and texture is achieved.

3. Prepare wood samples on type and quality of wood specified for use on project.

4. Label and identify each sample as to location and application.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver paint materials in sealed original labeled containers bearing manufacturer's name, type of paint, stock number, color and instructions for reducing or mixing where applicable.

B. Paint materials and equipment

1. Store only acceptable project materials on site.

2. Store in a suitable location.

3. Restrict storage to paint materials and related materials.

4. Comply with health and fire regulations.

1.05 PROJECT CONDITIONS

A. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be applied. Do not apply varnish or paint when temperature is below 55 degrees F. Do not apply exterior paint in damp or rainy weather; ensure that the surface has dried thoroughly before proceeding.

B. Do not apply finish in areas where dust is being generated.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Products specified are as manufactured by the Frazee Paint Company. Paints of other manufacturers to conform to materials listed and are approved by Architect.

B. Materials selected for coating systems for each type surface shall be the product of a single manufacturer.

C. Accessory materials such as turpentine, thinner, linseed oil, putty and shellac shall be of the highest quality and by approved manufacturer.

D. All paints shall be ready-mixed except field-catalyzed coatings. Mix only in metal pails.

E. Finish coats shall not be thinned without Architect's approval.

F. Unsuitability of specified products: Claims concerning unsuitability of any material specified (or the inability to satisfactorily produce the work) will not be entertained, unless such claim is made in writing to the Architect before the work is started.

G. Number of coats scheduled is minimum. Additional coats shall be applied at no additional cost if necessary to completely hide base materials, produce uniform color and provide satisfactory finish result.

H. All submitted paint products shall be in compliance with all current local, state and federal air quality mandates.

2.02 COLORS

A. All colors are to be selected or approved by the Architect and actual color chips shall be supplied to the Contractor for matching. All undercoats shall be tinted to approximate the finish coat.

B. Approval of final colors: Final coat of paint shall not be applied until the Architect has approved colors.

C. The number of colors to be used shall be as determined by the Architect. Architect reserves the right to vary colors throughout the project.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 INSPECTION

A. Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence or quality of work and which cannot be put into acceptable condition through preparatory work. The Contractor shall notify the General Contractor and Architect in writing of any defects or conditions which will prevent a satisfactory installation.

B. Do not proceed with surface preparation or coating application until conditions are suitable.

C. Commencement of installation construed as acceptance of surfaces.

3.03 PREPARATION OF SURFACES

A. All surfaces to receive paint shall be clean, dry, smooth and dust free before application of any materials. Prepare surfaces as follows:

1. WOOD: Sand smooth and remove dust. Fill open joints, cracks, nail holes and other pits or depressions flush and smooth with putty or wood dough after priming. Color putty to match finish paint coat. Touch up knots or sap streaks with shellac or other approved sealer before priming.

2. CONCRETE: Remove all foreign matter, efflorescence and encrustations. Use a stiff fiber brush to remove loose particles. Fill all depressions and remove all fins and projections not inherent in the base material.

3. PRIMED FERROUS METAL: Remove all foreign matter. Touch up abrasions with ferrous metal primer.

4. UNPRIMED FERROUS METAL: Remove all rust, mill scale and foreign matter by wire brushing, scraping, sandblasting or solvent as required to provide a clean, smooth surface.

5. GALVANIZED METAL: Remove all foreign matter and clean entire surface with mineral spirits. Pretreat with phosphoric acid, etch or vinyl wash. Apply primer the same day as pretreatment is applied.

6. GYPSUM BOARD: Remove all foreign matter. Fill all pits flush and smooth with spackle.

7. PLASTER: Fill hairline cracks, small holes and imperfections on plaster surfaces with patching plaster. Smooth off to match adjacent surfaces. Wash and neutralize high alkali surfaces where they occur.

B. Surfaces, which cannot be prepared or painted as specified, shall be immediately brought to the attention of the Architect in writing.

1. Starting of work without such notification will be considered acceptance by the Contractor of surfaces involved.

2. The Contractor shall replace unsatisfactory work caused by improper or defective surfaces as directed by the Architect at no additional cost to the Owner.

3.04 APPLICATION

A. Do not apply initial coating until moisture content of surface is within limitations recommended by the paint manufacturer.

B. Application:

1. Apply paint with suitable brushes, rollers or spraying equipment.

2. Apply stain in accordance with manufacturer's recommendations.

3. Rate of application shall not exceed that as recommended by the paint manufacturer for surface involved.

C. Comply with recommendations of product manufacturer for drying time between succeeding coats.

D. Leave all parts of molding and ornaments clean and true to details with no undue amount of paint in corners and depressions.

E. Make edges of paint adjoining other material or color clean and sharp with no overlapping.

F. Refinish whole wall where portion of finish is not acceptable.

G. All materials shall be applied evenly with proper film thickness and free of runs, sags, skips and other defects. Enamel and varnishes shall be sanded lightly between coats, dusted and cleaned before recoating.

H. Hardware, hardware accessories, plates, lighting fixtures and similar items in place shall be removed prior to painting and replaced upon completion of each space.

I. Heating and other equipment adjacent to walls shall be disconnected, using workmen skilled in appropriate trades, and moved to permit wall surfaces to be painted. Following completion of painting, they shall be expertly replaced and reconnected.

J. Paint visible surfaces behind vents, registers or grilles flat black.

1. Wash exposed metal with solvent then prime and paint as scheduled.

2. Spray paint wherever practical.

K. Do not paint over Underwriters' labels, fusible links or sprinkler heads.

L. Exposed plumbing and mechanical items: Items without factory finish such as conduits, pipes, access panels and items of similar nature shall be finished to match adjacent wall and ceiling surfaces unless otherwise directed.

3.05 CLEAN-UP

Upon completion of the work, the Contractor will remove all equipment, excess material and debris, remove all paint splatters and leave his area in a neat and orderly condition.

3.06 PAINT FINISH SCHEDULE

A. Finish all surfaces in accordance with the following schedule. Catalog names and numbers refer to products as manufactured by the Frazee Paint Company, San Diego, California, except as otherwise specified.

B. EXTERIOR SURFACES

1. Enamel Finishes:

Acrylic Semi-gloss -128 SATIN GLIDE

Acrylic, Non-Blocking Semi-gloss -124 MIRRO GLIDE SG

Acrylic Non-Blocking Gloss: 143 MIRRO GLIDE GL

Gloss - Alkyd Gloss -648 ARO-PLATE GL

2. Wood: Flat: Total dry film thickness shall be no less than 5 mils.

1st Coat: 372 WOOD UNDERCOATER

2nd Coat: 203 DURATEC

3rd Coat: 203 DURATEC

3. Wood: Enamel (Total dry film thickness shall be no less than 5 mils):

1st Coat: 168 PRIME+PLUS

2nd Coat: Enamel as specified

3rd Coat: Enamel as specified

4. Wood: Semi-Transparent Stain (Total dry film thickness shall be no less than 3 mils):

1st Coat: 385 MADERA SEMI-TRANSPARENT STAIN

2nd Coat: 385 MADERA SEMI-TRANSPARENT STAIN

5. Wood: Opaque Stain:

1st Coat: 203 DURATEC

2nd Coat: 209 DURATEC

6. Concrete and Brick: Flat (Total dry film thickness shall be no less than 4.5 mils):

1st Coat: 266 EPOTILT

2nd Coat: 203 DURATEC

3rd Coat: 203 DURATEC

7. Concrete and Brick: Low Luster (Total dry film thickness shall be no less than 4.5 mils):

1st Coat: 266 EPOTILT

2nd Coat: 215 ROYAL SUPREME

3rd Coat: 215 ROYAL SUPREME

8. Concrete Block: Flat:

1st Coat: 262 ACRYLIC BLOCK FILLER

2nd Coat: 203 DURATEC

3rd Coat: 203 DURATEC

9. Concrete Block: Low Luster (Total dry film thickness shall be no less than 8 mils):

1st Coat: 262 ACRYLIC BLOCK FILLER

2nd Coat: 215 ROYAL SUPREME

3rd Coat: 215 ROYAL SUPREME

10. Stucco: Flat (Total dry film thickness shall be no less than 3 mils):

1st Coat: 203 DURATEC

2nd Coat: 203 DURATEC

11. Stucco: Low Luster (Total dry film thickness shall be no less than 3 mils):

1st Coat: 215 ROYAL SUPREME

2nd Coat: 215 ROYAL SUPREME

12. Masonry: Elastomeric (Total dry film thickness shall be no less than 15 mils):

1st Coat: 266 EPOTILT or 262 ACRYLIC BLOCK FILLER (for Concrete Block)

2nd Coat: 216 EMC ELASTO-WALL SMOOTH or218 EMC ELASTO-WALL TEXTURED

3rd Coat: 216 EMC ELASTO-WALL SMOOTH or218 EMC ELASTO-WALL TEXTURED

13. Masonry: Clear Water Repellent: Apply wet on wet

1st Coat: MONOCHEM'S AQUASEAL HEAVY DUTY

2nd Coat: MONOCHEM'S AQUASEAL HEAVY DUTY

14. Iron and Steel: Enamel (Total dry film thickness shall be no less than 4.5 mils):

1st Coat: 661 METAL PRIME

2nd Coat: Enamel as specified

3rd Coat: Enamel as specified

15. Aluminum and Galvanized Metal: Enamel (Total dry film thickness shall be no less than 4.5 mils):

1st Coat: 661 METAL PRIME

2nd Coat: Enamel as specified

3rd Coat: Enamel as specified

16. Iron and Steel: Industrial Gloss (Alkyd) Total dry film thickness shall be no less than 4 mils:

1st Coat: 661 METAL PRIME

2nd Coat: 628 ARO-PLATESG or 648 ARO-PLATE GL

3rd Coat: 628 ARO-PLATE SG or 648 ARO-PLATEGL

17. Aluminum and Galvanized Metal: Industrial Gloss (Total dry film thickness shall be no less than 4 mils):

1st Coat: 661 METAL PRIME

2nd Coat: 628 ARO-PLATE SG or 648 ARO-PLATE GL

3rd Coat: 628 ARO-PLATE SG or 648 ARO-PLATE GL

C. INTERIOR SURFACES

1. Enamel Finishes:

Acrylic Eggshell-022 LO GLO

Acrylic Non-Blocking Low Sheen -126 MIRRO GLIDE LS

Acrylic Semigloss -128 SATIN GLIDE

Acrylic Non-Blocking Semigloss -124 MIRRO GLIDE MIRO GLIDE SG

Alkyd Semigloss-628 AROPLATE SG

Acrylic Non-Blocking Gloss-143 MIRRO GLIDE GL

2. Wood: Enamel (Total dry film thickness shall be no less than 4.5 mils):

1st Coat: 367 FRAFLO

2nd Coat: Enamel as specified

3rd Coat: Enamel as specified

3. Wood: Stained:

1st Coat: 685 WOOD STAIN

2nd Coat: 760 HI SOLIDS WATER WHITE SANDING SEALER

3rd Coat: 729 CLEAR SEMI-GLOSS LACQUER or746 GLOSS LACQUER

4. Wood: Stained, (Non-Yellowing Finish):

1st Coat: 685 WOOD STAIN

2nd Coat: NY550SS CLEAR NON-YELLOWING SANDING SEALER

3rd Coat: NY55020 CLEAR NON-YELLOWING SATIN LACQUER or NY55090 CLEAR NON-YELLOWING GLOSS LACQUER

5. Rough Sawn Wood: Stain, Semi-Transparent:

1st Coat: 385 MADERA SEMI-TRANSPARENT STAIN

2nd Coat: 385 MADERA SEMI-TRANSPARENT STAIN

6. Masonry: Flat (Total dry film thickness shall be no less than 5 mils):

1st Coat: 065 ACRY-PRIME

Plaster: 367 FRAFLO

Block: 262 ACRYLIC BLOCK FILLER

2nd Coat: 002 MAJESTIC or 011 VELVIN

3rd Coat: 002 MAJESTIC or 011 VELVIN

7. Masonry: Enamel (Total dry film thickness shall be no less than 4.5 mils):

1st Coat: 065 ACRY-PRIME

Plaster: 367 FRAFLO

Block: 262 ACRYLIC BLOCK FILLER

2nd Coat: Enamel as specified

3rd Coat: Enamel as specified

8. Gypsum Board: Flat (Total dry film thickness shall be no less than 3 mils):

   1st Coat: 002 MAJESTIC

   2nd Coat: 002 MAJESTIC or 011 VELVIN

   3rd Coat: 011 VELVIN

9. Gypsum Board: Enamel (Total dry film thickness shall be no less than 3.5 mils):

   1st Coat: 061 AQUA SEAL*

   2nd Coat: Enamel as specified

   3rd Coat: Enamel as specified

10. Ferrous Metal: Enamel (Total dry film thickness shall be no less than 4.5 mils):

    1st Coat: 661 METAL PRIME

    2nd Coat: Enamel as specified

    3rd Coat: Enamel as specified

11. Aluminum/Galvanized Metal: Enamel (Total dry film thickness shall be no less than 4.5 mils):

    Pretreat: JASCO PREP & PRIME

    1st Coat: 661 METAL PRIME

    2nd Coat: Enamel as specified

    3rd Coat: Enamel as specified

***** END OF SECTION *****

SECTION 10100

PROJECTION SCREENS

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 SCOPE OF WORK

A. Projection Screen.

B. All accessories and hardware for a complete and proper installation.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions, Project Manual Section 00700.

1.04 SUBMITTALS

Submit manufacturer's installation instructions under pertinent provisions of Article 5 of the General Conditions, Project Manual Section 00700. When approved, these instructions shall become the basis for accepting or rejecting the actual installation of the Work.

PART 2 -- PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Da-lite: Model C manual projection screen.

B. Substitutions under provision of Section 01000.

2.02 FABRICATION

A. 6'-0" x 8'-0" projection screen recess ceiling mounted.

B. Screen Fabric: Flame retardant, mildew resistant fiberglass; glass beaded picture surface with black masking borders. Fabric to be permanently attached to roller.

C. Case: 22 ga. steel case with black enamel finish and end caps.

PART 3 -- EXECUTION

3.01 PREPARATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Verify adequate support of wood encasement by finish carpenter.

C. Correct conditions detrimental to timely and proper complete of the Work.

D. Do not proceed until unsatisfactory conditions are corrected.

E. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

A. Coordinate with other Sections to provide necessary support during the proper sequence of Work.

B. Install in accordance with manufacturer's instructions.

C. Install case and screen level and plumb.

D. Verify smooth operation of all components.

3.03 CLEANING

A. Leave work clean and operating smoothly.

B. Wipe clean case after installation.

C. Clean screen of any marring during installation.

***** END OF SECTION *****

SECTION 10120

TACKBOARDS

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 SCOPE OF WORK

Supply and install all Tackboards, as shown on Drawings and as specified herein.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions, Project Manual Section 00700.

1.04 SUBMITTALS

Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Materials list of items to be provided under this Section.
2. Manufacturer's Specifications and other data needed to prove compliance with the specified requirements.
3. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.05 DELIVERY AND STORAGE

Deliver all manufactured materials in original packages bearing manufacturer's name and brand. Use only one brand of each material throughout job. Store materials off ground and cover against weather. Remove any damaged materials from the site.

1.06 WARRANTY

All panel and baffle materials provided and installed within the manufacturer's standards for installation shall be warranted for a period of one (1) year from date of sale against defects to material or specified performance.

PART 2 – PRODUCTS

2.01 MANUFACTURER & PRODUCT

Furnish: size(s), color(s), pattern(s) and shape(s) as indicated on the drawings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

B. Install the work of this Section in strict accordance with the original design, the accepted Shop Drawings, pertinent requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as accepted by the Architect, anchoring all components firmly into position for long life under hard use.

C. The contractor shall furnish all labor, materials, services and equipment necessary for, and reasonably incidental to, the installation of the manufacturer. Panels as shown on drawings and as specified herein.

D. Coordinate with General Contractor overhead bracing and wall backing and blocking required for all partitions and grab bars.

***** END OF SECTION *****

SECTION 10155

SOLID POLYMER TOILET PARTITIONS

PART 1 -- GENERAL

1.01 DESCRIPTION

A. Work included: Provide plastic toilet partitions where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

1. Floor-supported, overhead-braced partitions.

B. Furnish all labor and materials necessary for the completion of work in this section as shown on the contract drawings and specified herein.

C. Work in this section shall include, but is not limited to:

1. Toilet Compartments.

2. Hardware for toilet compartments and plastic partitions.

3. Shop Drawings and working drawings.

4. Manufacturer's guarantee.

1.02 QUALITY ASSURANCE

Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods for proper performance of the work of this Section.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions, Project Manual Section 00700.

1.04 SUBMITTALS

Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Materials list of items to be provided under this Section.

2. Manufacturer's Specifications and other data needed to prove compliance with the specified requirements.

3. Shop Drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades;

4. Color and pattern charts showing colors and patterns available in the specified products from the proposed manufacturer.

5. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures for the Work.

1.05 WARRANTY

Manufacturer's Warranty

GLOBAL Steel Products Corp. guarantees its plastic against breakage, corrosion, and delamination for 15 years from the date of receipt by the customer. If materials are found defective during that period for the reasons listed above, the materials will be replaced free of charge. No credits or

allowance will be issued for any labor or expenses relating to the replacement of components covered under the warranty plan

PART 2 -- PRODUCTS

2.01 MANUFACTURER

Toilet compartments to be supplied by GLOBAL Steel products Corp., Deer Park, New York, or Architect approved equal.

2.02 MATERIALS

Doors, panels, and pilasters to be 1" thick with homogeneous color throughout, constructed from high-density polyethylene (HDPE) resins that are waterproof, non-absorbent, and have a self-lubricating surface that resists markings from pens, pencils, and other writing instruments.

2.03 CONSTRUCTION

A. Doors, panels, and pilasters to be 1" thick with uniformly machined edges.

B. Doors and panels shall be 58" high and mounted at 12" above the finished floor. Door shall be mounted to the pilasters with a "bank-vault" type die-cast aluminum alloy wraparound hinge.

C. Doors and panels to have an extruded aluminum heat sink strip attached to the lower edge.

D. Pilasters shall be 81-1/2" high and anchored to the panels and walls with 32" long heavy-duty aluminum stirrup brackets, or with (optional) 54" long continuous aluminum bracket. Pilasters shall include a mounting system comprised of at least one 3/8" x 1" steel mounting bar attached to the pilaster in a GLOBAL PLUG LOC arrangement, having 3/8" steel plated bolts secured to 1/8" semi--cylindrical PLUG LOC imbedded within a contoured aperture transversely piercing the core. Each mounting bar shall be secure to the building structure with 3/8" steel-plated studs. A 4-piece shoe shall conceal each floor mounting, having an internal cross section conforming to the pilaster and fabricated from type 304 stainless steel having a #4 finish.

E. Pilasters are overhead braced with an extruded anti-grip aluminum headrail.

2.04 HARDWARE

A. Door Hardware shall be as noted:

1. Heavy-duty "Bank-Vault" hinge shall have gravity-acting cams and are fabricated from a die cast aluminum alloy with a brushed polish chrome-plated finish and wraparound flanges. The cam is constructed from a 3/4" diameter nylon rod and a 3/8" stainless steel pin. Hinges are through-bolted onto doors and pilasters using stainless steel, tamper-resistant through bolts.

2. Aluminum stirrup brackets shall be 2" long made of heavy-duty anodized extruded aluminum (6064-T5 alloy). Stirrup brackets shall be 1/8" thick and mounted with stainless steel, tamper-resistant screws. Panels shall be attached with stainless steel, tamper-resistant through bolts. The attachment of brackets to the adjacent wall construction shall be accomplished with #14 x 2-1/2" stainless steel, tamper-resistant through screws and plastic anchors.

3. Continuous wall brackets are 54" long and made of heavy-duty anodized extruded aluminum (6064-T5 alloy). Continuous wall brackets are pre-drilled with holes spaced every 10" along the full length of the bracket. The bracket thickness shall be 1/8". Wall brackets are mounted with stainless steel, tamper-resistant through bolts. The attachment of brackets to the adjacent wall construction shall be

accomplished with #14 x 2-1/2" stainless steel, tamper-resistant through screws and plastic anchors.

B. Stainless steel pilaster shoes shall be 5-1/2" high constructed from .031 gauge stainless steel. Pilaster shoes are anchored to the pilaster with #14 stainless steel, tamper-resistant screws.

C. Slide latches shall be fabricated from a die cast aluminum alloy with a brushed polish chrome-plated finish and mounted to the floor with stainless steel, tamper-resistant through bolts.

D. Strike and keepers shall be fabricated from a die cast aluminum alloy with a brushed polish chrome-plated finish. Keepers provide for emergency access into the stall by lifting up on the bottom of the door. Strikes and keepers shall be attached to the doors and pilasters with stainless tell through bolts.

E. Headrail shall be made of heavy-duty anodized extruded aluminum (6063-T5 alloy). Headrail is anti-grip and attaches to the top of the pilaster with stainless steel, tamper-resistant screws. Headrail is attached to the adjacent wall with construction with a die cast headrail bracket.

F. Headrail brackets shall be made from a die cast aluminum alloy and shall be attached to the adjacent wall with construction with #14 x 2-1/2" stainless steel, tamper-resistant through screws and plastic anchors.

2.05 OTHER MATERIALS

Provide other materials not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the acceptance of the Architect.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Take complete and accurate measurements of complete toilet and urinal compartment locations.

E. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

B. Install the work of this Section in strict accordance with the original design, the accepted Shop Drawings, pertinent requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as accepted by the Architect, anchoring all components firmly into position for long life under hard use.

C. Adjust doors, except doors to handicapped compartments, to remain at a uniformly open position when unlocked. Handicap compartment doors shall be hung so as to remain closed.

D. Touch-up scratches and abrasions to be completely invisible to the unaided eye from a distance of five feet.

E. Coordinate with General Contractor overhead bracing and wall backing and blocking required for all partitions and grab bars.

1. . All such expenses are to be born by the buyer.

*****END OF SECTION*****

SECTION 10400

IDENTIFYING DEVICES

PART 1 -- GENERAL

1.01 SCOPE OF WORK

A. Molded plastic signs.

B. Aluminum free-standing signs.

C. Aluminum channel letters.

1.02 RELATED WORK

A. Documents affecting this Work include: General Conditions, Special Conditions, and Sections of Division 1 of these Specifications.

B. Reinforced masonry systems: Monument signs.

C. Wood doors.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions, Project Manual Section 00700.

1.04 SUBMITTALS

A. Submit two samples illustrating full size sample sign, of type, style and color specified including method of attachment.

B. Submit manufacturer's installation instructions.

C. Include installation template and hardware.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package signs, labeled in name groups.

B. Store adhesive tape at ambient room temperatures.

1.06 ENVIRONMENTAL REQUIREMENTS

Do not install signs when ambient temperature is below 70 degrees F. Maintain this minimum during and after installation of signs.

PART 2 -- PRODUCTS

2.01 MANUFACTURERS

A. Mohawk Sign Systems: Aluminum & Plastic Signs.

B. A.R.K. Ramos Architectural Signage Systems; Aluminum Channel Letter.

C. Substitutions: Under provisions of Section 01000.

2.02 MATERIALS -- ALUMINUM CHANNEL LETTERS

A. Aluminum letters: 8", 7" and 2", Helvetica Medium.

B. Brackets: PPM-1 bracket sleeved stud.

1. Set in adhesive in masonry.

2. Attach to support in framed wall.

2.03 MATERIALS -- MOLDED PLASTIC SIGNING SYSTEM

A. 1/8" thick ES Plastic. Color to be selected by Architect.

B. Graphics to be vinyl die-cut. 3/4" Helvetica Medium caps.

C. Adhesive mounting.

D. All signs to have 1/2" Radius corners.

E. See Schedule for types.

2.04 MATERIALS -- ALUMINUM FREE-STANDING SIGN

A. Provide 1/8" thick aluminum sign, on 1-3/4" x 1-3/4" x 1/8" x 7' post; black duranodic aluminum tubing and sign.

B. Signs are to be 22" x 17" and 9" x 18" as shown on the Drawings.

C. Letters are to be vinyl die-cut. Test shall conform to access requirements of the CBC.

D. Color to be black anodized with white lettering.

E. Signs are to be sleeve mounted in concrete footings.

F. Signs shall be located per Drawing for Handicap Parking.

2.05 DEDICATION PLAQUE

A. 20" x 24" Bronze Dedication Plaque: text to be determined at a later date.

B. Plaque to have a raised perimeter band, flat-faced classic letters, leatherette (stipple) finish and rosette bolt heads.

C. Exact layout will be prepared by architect, mount in location as directed by architect.

2.06 ACCESSORIES

A. Mounting Hardware: Chrome screws; base sleeve and studs per manufacturer's recommendations.

B. Tape Mount: Double sided tape, permanent adhesive.

C. Adhesive: Silastic adhesive as recommended by manufacturer.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Verify adequate support for Building Signs. Coordinate footings with other trades.

C. Correct conditions detrimental to timely and proper completion of the Work.

D. Do not proceed until unsatisfactory conditions are corrected.

E. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install signs after doors and surfaces are finished, in locations indicated.

1. Furnish and install all anchorage devices required to install the item and its appurtenances complete. Provide anchorage in ample time when required to be built in by other trades.

2. All wall-mounted items shall be securely fastened to solid backing or blocking.

C. Center plastic signs on doors, level.

D. Anchor all components firmly into position for long life under hard use.

E. Clean and polish.

3.03 SCHEDULES

A. Exterior building signs:

1. Handicap signs per CBC requirements and as shown on Drawings.

2. Building letters: "Fill In" and "Fill In". Color to be Bronze anodized.

3. Monument sign: 2" and 7" letters as detailed on both sides of the sign.

B. Interior signs:

1. Handicap restrooms 12" triangle for men and 12" circle for women per Title 24 - mounted on each restroom door.

2. Office and restrooms ES Plastic: 4" x length required -- 7 doors. Text to be determined by Owner. Mount beside each door with the code required Braille designations on the sign. Copy to be in two lines as possible.

*****END OF SECTION*****

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SECTION 10500

METAL LOCKERS

PART I -- GENERAL

1.01 WORK INCLUDED

A. Locker units with hinged doors.

B. Base, top, and filler panels.

C. Hooks, latches, and hardware.

D. Attachment hardware.

1.02 SYSTEM DESCRIPTION

Lockers; Surface mounted and freestanding single and double tier lockers; on concrete base; combination locks.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions, Project Manual Section 00700.

1.04 SUBMITTALS

A. Include locker types, sizes, configurations, and layout of groups of lockers, accessories, and numbering plan.

B. Provide two samples of each color selected on actual base material.

1.05 PROTECTION

Protect locker finishes and adjacent surfaces from damage during installation.

PART 2 -- PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

Lyon - Steel Lockers.

2.02 MATERIALS

Sheet Steel: Structural quality, high-grade, Class 1, mild, cold-rolled, leveled steel; of the following minimum thicknesses:

1. Body and Shelf: 24 gage
2. Doors: 16 gage
3. Door Frames: 16-gauge, formed steel channels.
4. Hinges: 2" minimum; .050" steel, 5-knuckle; 3 on full tier; 2 on double tier.

2.03 ACCESSORIES

Provide each locker with one double prong ceiling hook, three single prong wall hooks metal number plate, rubber bumper, and a hat shelf in single tier lockers.

2.04 FABRICATION

A. Locker Units; 12 inches wide, x 12 inches deep x 72 inches high overall size; double tier. Single tier lockers to be I5 inches deep.

B. Bodies: Formed and flanged with stiffener ribs; electrically spot-welded.

C. Door Frame: Formed channel shape, welded and ground flush, welded to body.

D. Doors: Welded faces; channel reinforced sides, top and bottom with intermediate stiffener ribs. Finish edges smooth.

E. Hinges, Three for doors 42 Inches and higher, two for doors less than 42 inches high. Weld securely to unit body and rivet to unit door.

F. Provide recessed locking handle for combination lock. Locking device supplied by manufacturer.

G. Provide 4-inch high concrete bases at double tiers and above 18" high bench at single tier.

H. Provide end panels, filler panels, and metal tops to close off all openings.

I. Provide ventilation openings at top and bottom of each locker. Six louvers each typical.

J. Finish edges smooth without burrs.

K. Provide number plates.

2.05 FINISHES

A. Clean, degrease, and phosphatize metal; prime and finish with two coats of baked enamel.

B. Color: Color as selected from manufacturer's standard range.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Verify bases and recesses are properly sized and located.

C. Correct conditions detrimental to timely and proper completion of the Work.

D. Do not proceed until unsatisfactory conditions are corrected.

E. Beginning installation means acceptance of conditions.

3.02 INSTALLATION

A. Install lockers secure, plumb, square, and in line. Set on prepared base provided.

B. Anchor lockers with appropriate anchor devices to suit materials encountered.

C. Bolt adjoining locker units together to provide rigid installation.

D. Install end panels, filler panels, tops, and bases to completely close off openings.

3.03 SCHEDULE

A. Full height single tier lockers on concrete base above bench in Rooms T-103 and T-104.

B. Double tier lockers on concrete base recessed in wall In Room W-104.

C. Double tier lockers, free standing on legs in Room N-213.

***** END OF SECTION *****

SECTION 10520

FIRE PROTECTION SPECIALTIES

PART 1 -- GENERAL

1.01 SCOPE OF WORK

A. Provide and install all Fire extinguishers and Cabinets as shown on the documents and as required by the local Fire Marshall.

B. Accessories as required for a complete and proper project.

1.02 QUALITY ASSURANCE

A. Conform to NFPA 10 requirements for extinguishers.

B. Provide fire extinguishers, cabinets, and accessories by single manufacturer.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions, Project Manual Section 00700.

1.04 SUBMITTALS

A. Include physical dimensions, operational features, color and finish, wall-mounting brackets with mounted measurements, anchorage details, rough-in measurements, location, and details.

B. Submit manufacturer's installation instructions.

C. Submit manufacturer's operation and maintenance data.

D. Include test, refill or recharge schedules, procedure, and re-certification requirements.

1.05 ENVIRONMENTAL REQUIREMENTS

Do not install extinguishers when ambient temperatures may cause freezing.

PART 2 -- PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

Larsen's Manufacturing Company.

2.02 EXTINGUISHERS

Multi-Purpose Chemical Type: Larsen's Steel tank, Model MP 5, with pressure gage, and UL Rating 2A-10B:C or approved equal.

2.03 CABINETS

Typical Extinguisher Cabinet:

1. Provide Larsen's 2409-5R Vertical Duo Panel cabinet.
2. Primer finish.

2.04 ACCESSORIES

A. Mounting Hardware: Appropriate to cabinet - see manufacturer's installation instructions.

B. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

2.05 FABRICATION

A. Form body of cabinet with tight inside corners and seams.

B. Pre-drill holes for anchorage.

C. Form perimeter trim and door stiles by welding, filling, and grinding smooth.

D. Hinge doors for 180 degree opening.

E. Glaze doors with resilient channel gasket glazing.

2.06 FINISHES

A. Extinguisher: Red enamel.

B. Cabinet Trim and Door: Primed to be painted to match adjacent surface.

C. Cabinet Interior: Enamel white.

PART 3 -- EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Verify that rough openings for cabinet are correctly sized and located.

C. Correct conditions detrimental to timely and proper completion of the Work.

D. Do not proceed until unsatisfactory conditions are corrected.

E. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

A. Install cabinets plumb and level in wall openings so that there is 54 inches from finished floor to door handle.

B. Secure rigidly in place in accordance with manufacturer's instructions.

***** END OF SECTION *****

SECTION 10800

TOILET AND BATH ACCESSORIES

PART 1 -- GENERAL

1.01 SCOPE OF WORK

All of the requirements of the Contract Documents apply to this Section.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions.

1.03 SUBMITTALS

A. Provide, within 35 days of Notice to Proceed, product data on accessories describing size, finish, details of function, attachment methods.

B. Submit shop drawings, manufacturer's literature and brochures, and catalog cuts, showing complete details of all manufactured and fabricated items. Do not purchase items until the shop drawings have been approved. See Section "Samples and Shop Drawings" for number and manner of submittals.

1.04 KEYING

Supply two (2) keys for each accessory to Owner. Master Key all accessories.

1.05 REGULATORY REQUIREMENTS

Conform to Title 24 and City codes for installing work in conformance with ANSI A117.1.

1.06 SEQUENCING AND SCHEDULING

Coordinate the work of this Section with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

PART 2 -- PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

As indicated on the Drawings.

2.02 MATERIALS

A. Stainless Steel Sheet: ASTM A167, Type 304.

B. Tubing: ASTM A269, stainless steel.

C. Fasteners, Screws, and Bolts: Hot dip galvanized as recommended by manufacturer.

D. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 PRODUCTS

As indicated on the Drawings.

2.04 FACTORY FINISHING

Stainless Steel: No. 4 satin luster finish.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Verify that site conditions are ready to receive work and dimensions are as instructed by the manufacturer.

C. Correct conditions detrimental to timely and proper completion of the Work.

D. Do not proceed until unsatisfactory conditions are corrected.

E. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site at appropriate time for building-in.

B. Provide complete information, diagrams, templates, and instructions for the installation of all items, in sufficient time so that all backing, blocking, framing and formwork can be properly installed, and so that the work of other trades will not be delayed.

C. Verify exact location of accessories for installation.

3.03 INSTALLATION

A. Install the work of this Section in strict accordance with the manufacturer's recommended installation procedures as approved by the Architect, anchoring all components firmly into position for long life under hard use.

1. Furnish and install all anchorage devices required to install the item and its appurtenances complete. Provide anchorage in ample time when required to be built in by other trades.

2. All wall-mounted items shall be securely fastened to solid backing or blocking.

B. Install fixtures, accessories and items in accordance with manufacturer's instructions.

C. Install plumb and level, securely and rigidly anchored to substrate.

***** END OF SECTION *****

SECTION 11027

KNOX BOXES

PART 1 -- GENERAL

1.01 DESCRIPTION

A. Requirements of Division 1 apply to all Work of this Section

B. This Section describes the requirements for furnishing and installing lock boxes. There are three lock boxes. Locate adjacent to Entry Doors, and within the fencing adjacent to vehicular Gates.

1.02 SUBMITTALS

A. Per Article 5 of the General Conditions, Project Manual Section 00700

B. Product Data: Manufacturer's descriptive and technical data and installation details.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions, Project Manual Section 00700

1.04 QUALITY ASSURANCE

A. Coordinate ordering lock boxes with local Fire District.

PART 2 -- PRODUCTS

2.01 LOCK BOXES

A. Approved Manufacturer: Knox Company Model #4400 at Doors. Model #3502 at Gates.

1. Construction: Heavy-duty, high security
2. Door: ⅝-inch solid steel with gasket
3. Size: 9½-inches high x 9½-inches wide x 5-inches deep
4. Mounting: Recessed
5. Finish: Aluminum Finish

B. Fastenings: Non-ferrous, type to suit installation conditions

C. Vehicular Gate Key Control Switch: Knox #3502

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the area and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected

B. Coordinate work with other trades as needed to assure that proper substrate are provided to receive work of this Section.

C. Report all unacceptable surfaces to the Architect and do not tile such surfaces until they are leveled enough to meet above requirements.

3.02 INSTALLATION

A. Install lock boxes at locations indicated in accordance with manufacturer's instructions.

B. Securely fasten in place with sides plumb and level.

C. Exposed surfaces shall be free from scratches, tool marks, and other damage and defects.

***** END OF SECTION *****

SECTION 11450

APPLIANCES

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 SECTION INCLUDES

A. Residential appliances of the following types:

1. Refrigerators and freezers.
2. Cooking appliances.
3. Venting systems.
4. Microwave ovens.
5. Dishwashers.
6. Trash compactors.
7. Waste disposers
8. Clothes care.
9. Water systems.
10. Room air conditioners.
11. Small appliances.

1.03 REFERENCES

A. ANSI A117.1 - Guidelines for Accessible and Useable Buildings and Facilities.

B. EPA - Energy Star Appliances.

C. Public Law 101-336 - Americans with Disabilities Act.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions, Project Manual Section 00700.

1.05 SUBMITTALS

A. Comply with pertinent provisions of Article 5 of the General Conditions, Project Manual Section 00700.

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

1. Model number and selected options for each appliance.
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations.
4. Installation methods.
5. List of maintenance parts.

C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

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

1.06 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with referenced standards and the Americans with Disabilities Act as applicable for fixtures for the disabled.

B. Energy Rating: Provide appliances with the EPA Energy Star label where applicable.

C. Coordinate rough-in requirements with adjacent construction. Coordinate components and fittings to ensure compatible parts are installed.

1.07 DELIVERY, STORAGE, AND HANDLING

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

1.08 PROJECT CONDITIONS

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

1.09 WARRANTY

Provide manufacturer's standard written warranty for each type of appliance specified.

PART 2 -- PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: GE Appliances, which is located at: Appliance Park AP4-109 ; Louisville, KY 40225; Toll Free Tel: 800-626-2000; Tel: 502-452-3346; Fax: 502-452-0620; Email: request info; Web: www.geappliances.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.02 APPLIANCES

A. Refrigerators and Freezers:

1. Top-Freezer Refrigerators: GE Energy Star 17.9 Cu. Ft., model no. GTH18ISX.

2. Compact Refrigerators: GE 4.3 Cu. Ft. Compact Refrigerators, model no.GMR04HAS.

3. Appearance: Stainless steel.

B. Cooking Appliances:

1. Ranges: GE 30" Slide-In Ranges, Electric, with Self-Cleaning oven, model no.JSP42SN

2. Appearance: Stainless Steel

C. Microwave Ovens:

1. Microwave Ovens: GE 1.3 Cu. Ft. Countertop Microwave Oven, model no. JES1344SK.

2. Appearance: Stainless steel.

D. Dishwashers:

1. Dishwashers: GE Tall Tub Built-In Dishwasher, model no. GLDA696MSS.
2. Appearance: Stainless steel.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Do not begin installation until substrates have been properly prepared. Coordinate rough-in with appliance sizes and utility requirements.

C. Correct conditions detrimental to timely and proper completion of the Work.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

E. Do not proceed until unsatisfactory conditions are corrected.

F. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

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

3.03 INSTALLATION

Assemble appliances and trim and install in accordance with manufacturer's instructions and the following:

1. Securely mount to substrate.
2. Install appliances plumb and level and in proper relationship to adjacent construction.
3. Connect appliances to building utility, supply and waste systems as applicable.
4. Test for proper operation and drainage. Adjust until proper operation is achieved.

3.04 PROTECTION

A. Protect installed products until completion of project.

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

3.05 APPLIANCE DATA SHEETS

Refer to the manufacturer's data sheets as attached to this Section for required features and additional requirements.

*****END OF SECTION*****

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SECTION 12500

WINDOW TREATMENT

PART 1 – GENERAL

1.01 SCOPE

Furnish and install Manual Roller Shades (Premium Quality)

1.02 REFERENCES

A. FLAME-RESISTANT MATERIALS SHALL PASS OR EXCEED ONE OR MORE OF THE FOLLOWING TESTS:

- National Fire Protection Association (NFPA) 701 (small scale for horizontal applications)
- Department of Transportation Motor Vehicle Safety Standard 302 Flammability of Interior Materials
- California Administrative Code Title 19
- Federal Standard 191 Method 5903 (used by Port Authority of New York and New Jersey for drapery, curtain, and upholstery material)
- Boston Fire Department Teat BFD IX-1
- New York State Uniform Fire Prevention and Building Code

1.03 SUBMITTALS

A. Product Data: Manufacturer's descriptive literature shall be submitted indicating materials, finishes, construction and installation instructions and verifying that product meets requirements specified. Manufacturer's recommendations for maintenance and cleaning shall be included.

B. Drawings and Diagrams: Wiring diagrams of any motorized components or units, working and assembly drawings shall be supplied as requested.

C. Samples: Responsible contracting officer or agent shall supply one sample shade of each type specified in this contract for approval. Supplied units shall be furnished complete with all required components, mounting and associated hardware, instructions and warranty.

1.04 QUALITY ASSURANCE:

A. Manufacturer, subsidiary or licensed agent shall be approved to supply the products specified, and to honor any claims against product presented in accordance with warranty.

B. Installer or agent shall be qualified to install specified products by prior experience, demonstrated performance and acceptance of requirements of manufacturer, subsidiary, or licensed agent. Installer shall be responsible for an acceptable installation.

C. Provide Manual Roller Shades of only one manufacturer for entire project.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Product shall be delivered to site in manufacturer's original packaging.

B. Product shall be handled and stored to prevent damage to materials, finishes and operating mechanisms.

1.06 JOB CONDITIONS:

A. Prior to shade installation, building shall be enclosed.

B. Interior temperature shall be maintained between 60° F. and 90° F. during and after installation; relative humidity shall not exceed 80%. Wet work shall be complete and dry.

1.07 WARRANTY:

A. Lifetime Limited Warranty. Fabrics warranted for 5 years. Specific product warranties available from manufacturer or its authorized agent.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

A. Hunter Douglas Contract: 12250 Parkway Centre Dr., Poway, CA 92064. Phone: 800-727-8953

Fax: 800-205-9819/ Website: www.hunterdouglascontract.com, or architect approved equivalent.

Contact the following for project assistance and dealer referral @ 800-964-2580: David Cover ext. #827313

B. Product substitutions must be approved by architect minimum of 30 days prior to close of bid.

2.02 MANUAL ROLLER SHADES

A. PRODUCT: Hunter Douglas "Manual Roller Shades"

B. MATERIALS:

1. Fabrics: Inherently anti-static, flame retardant, fade and stain resistant, light filtering, room darkening, & blackout fabrics providing 0% - 15% openness factors. Fabric weights to range between 6.00 oz/sq.yd. – 20.70 oz/sq.yd. containing fiberglass, PVC, polyester, acrylic, vinyl laminates, cotton, & vinyl coatings. Finish selected by architect from manufacturer's available contract colors.

2. Control Systems: Adjustment-free continuous qualified #10 stainless steel ball chain ((90-lb. test)) and pulley clutch operating system allows precise control and ensures a uniform look. Clutch will develop no more than ½ pound drag for ease of lifting. Glass reinforced polyester thermopolymer (PBT) plastic components conform to military specification MIL M-24519 and designed for smooth, trouble-free operation.

3. Roller: Circular-shaped painted extruded aluminum tubes with thicker wall & ribs provide additional strength while locking into place the clutch & end plug. 3" outside diameter extruded tube to have a .090 wall thickness. 2" outside diameter extruded tube to have a .072" wall thickness (1 ½" & 1 1/8" tubes have .055" wall thickness) providing strength & durability.

4. End Plug: Heat stabilized fiber reinforced plastic outside sleeve and center shaft provide bearing surfaces on which the roller rides ensuring smooth, wear resistant operation.

5. Bottom Rod: Extruded aluminum weight in a Sealed Pocket Hem Bar (excluding thicker fabric) for tracking adjustments and provides uniform look.

6. Mounting Hardware: Manufacturer's standard .07" nickel-plated, C1008/1010 cold rolled steel universal brackets including end plug bracket with lock down retainer device.

7. Additional Available Options: Fascia, Top & Bottom Covers, Blockout Systems, Motorization, 3 Clutch Sizes, Fabric Wrapped Hembar, Dual Shades, Coupled Shades, Banded Shades, Extruded Pockets, Reverse Roll.

2.03 FABRICATION

A. Shade measurements shall be accurate to within ± 1/8" or as recommended in writing by manufacturer.

2.04 FABRICS

A. Fabric selection by Architect.

PART 3 - EXECUTION

3.01 INSPECTION:

A. Subcontractor shall be responsible for inspection on site, approval of mounting surfaces, installation conditions and field measurement for this work.

B. Other interacting trades shall receive drawings of shade systems, dimensions, assembly and installation methods from subcontractor upon request.

3.02 INSTALLATION:

A. Installation shall comply with manufacturer's specifications, standards and procedures as detailed on contract drawings.

B. Adequate clearance shall be provided to permit unencumbered operation of shade and hardware.

C. Clean finish installation of dirt and finger marks. Leave work area clean and free of debris.

3.03 DEMONSTRATION:

A. Demonstrate operation method and instruct owner's personnel in the proper operation and maintenance of the blinds.

*****END OF SECTION*****

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SECTION 13850

SECURITY SYSTEM

PART 1 -- GENERAL

1.01 Furnish and install a complete intrusion detection monitoring and control system with the performance criteria detailed in this specification; one in each building. The systems shall be inclusive of all necessary functionality, monitoring and control capability as detailed herein and on accompanying shop drawings.

1.02 The systems shall be completely programmable from any keypad with programming access determined by level of Personal Identification Number (PIN) code. There shall be no need for a removable programming module or PROM burn to accomplish user programming changes.

1.03 The system shall be listed as a Power Limited Device and be listed under the following performance standards.

UL 1610 Central Station Burglar Alarm Units.

UL 1635 Digital Burglar Alarm Communicator System Units.

UL 1023 Household Burglar Alarm System Units.

UL 365 Police Station Connected Burglar Alarm Units and Systems.

UL 609 Local Burglar Alarm Units and Systems.

UL 864 Control Units for Fire Protective Signaling Systems.

UL 985 Household Fire Warning System Units.

NFPA71 Central Station Signaling Systems.

NFPA72A Local Protective Signaling Systems.

NFPA72C Remote Station Protective Signaling Systems.

NFPA72D Proprietary Protective Signaling Systems.

NFPA74 Household Fire Warning Equipment.

CSFM California State Fire Marshal Specifications.

Each system shall be supplied with complete details on all installation criteria necessary to meet all of the above listings.

1.04 The system supplier shall be a company specializing in the manufacture and supply of security, fire and access control systems with at least (5) years of experience and shall have local employees available for support during installation and for final hook-up and acceptance testing. The local manufacturers office shall produce system specific layout and wiring shop drawings for use by the installing contractor.

1.05 WARRANTY

The contractor shall warrant the complete system wiring and equipment to be tree from inherent mechanical and electrical defects for a period of one year from the completed and certified test.

The equipment manufacturer shall make available to the owner a maintenance contract proposal to provide a minimum of two inspections and tests per year.

1.06 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions, Project Manual Section 00700.

PART 2 -- PRODUCTS

2.01 SYSTEM DESCRIPTION

A. Input/Output Capacity

The system shall be capable of monitoring a minimum of 48 individual loops or zones and controlling a minimum of (8) output relays.

B. User/Authorization Level Capacity

The system shall be capable of operation by 100 unique PIN codes with each code being assigned one of 9 User Authorization Levels.

C. Area System

The user of the system shall be capable of selectively arming and disarming any one or more of 8 areas within the system based on the user P.I.N. code used. Each of the 48 loops or zones shall be assignable to any one of the 8 available areas.

D. Keypads

The system shall support a minimum of 8 keypads with Alphanumeric Display. Each keypad shall be capable of arming and disarming any portion of the intrusion detection system based on P.I.N. authorization.

The keypads alphanumeric display shall provide complete prompt messages during all stages of operation and programming of the system and display all relevant operating and test data.

E. Loop Configuration

The system shall have a minimum of 16 Class B loops available in the Command Processor control cabinet and a minimum of 4 Class B loops available at each keypad or loop expander on the system. The system shall have the capacity for a minimum of 8 keypads or loop expanders total but at least one must be a keypad. All Class B loops shall be 2 wire, 22 AWG minimum, supervised by an End-of-Line (EOL) device and shall be able to detect open, normal or short conditions in excess of 200 milliseconds duration.

F. Keypad Communication

Communication between the Command Processor control panel and all keypads and loop expanders shall be multiplexed over a 4 conductor non-shielded cable. This cable shall also provide power to all keypads, loop expanders and other power consuming detection devices.

G. Output Relays

The Command Processor control cabinet shall have, as an integral part of the assembly, (8) output control SPDT form C relays rated 3 amps at 3φVDC or 120 VAC. Each of these relays shall be capable of activation as outlined in this specification.

H. Primary Power

The Command Processor primary power supply shall be a 16 VAC 4OVA Wire-in transformer.

I. Secondary Power

The Command Processor secondary power supply shall be a I2VDC 6AH sealed lead-acid rechargeable battery. The battery shall be protected by an automatic circuit breaker. When initially connected to battery power alone, the Command Processor control panel

shall be protected by a cutoff relay until manually started or primary power is applied, The secondary power shall be float charged at 13.8 VDC at a maximum of 1.2 amps.

J. Battery Supervision

The Command Processor control panel shall supervise the secondary power source by placing a load across the battery. Once every hour while the primary source is available. If the voltage falls below 11.9 VDC a low battery fault shall be detected. If the primary power source is not available, a low battery fault shall be detected any time the voltage falls below 11.9 VDC.

The secondary power supply shall be automatically disconnected from the system when the primary power supply is not available and the secondary power supply drops to 10.0 VDC.

K. Ground Supervision

The Command Processor control panel shall supervise the earth ground connection and annunciate an open circuit condition.

L. Bell Output use during system installation and testing which will silence the bell and when silenced place the bell circuit into a trouble condition. (Requires polarized bell module)

M. Auxiliary Output

The Command Processor control panel shall be capable of supplying a minimum of 1 amp continuous at 10.5 - I5VDC to power keypads, loop expanders, smoke detectors and other power consuming detection devices such as motion detectors. This output shall also be separately fused and the panel shall provide a separate terminal for smoke detectors and disconnect power for 3 seconds during smoke detector reset.

N. Keypad Trouble

If at any time a keypad does not detect polling, the alphanumeric display shall indicate "Service Required". If at any time a keypad detects polling but not its particular address, the alphanumeric display shall indicate "Non-Polled Address".

2.02 LIGHTNING SUPPRESSION

The Command Center control panel primary power source and incoming telephone lines shall be protected from lightning, power surges, voltage spikes and transient or RF interference with a combination of zener overvoltage transient suppressors, R/C filters, ferrite beads and spark gaps. (Requires Lightning Suppressor module.)

2.03 REMOTE COMMUNICATION CAPABILITY

A. Central Station Capability

The system shall be monitored at a Central Monitoring Station using (a Digital Alarm Communicating Transmitter) (dual Digital Alarm Communicating Transmitters) (Multiplex Communication) (Multiplex Communication with Digital Alarm Communicating Transmitter backup). The Digital Alarm Communicating Receiver at the Central Monitoring Station shall be capable of receiving all data as specified in this specification.

NOTE-CONSULT SALES ENGINEERING FOR MULTIPLEX TRANSMISSION.

B. Communicator Program

Single Line Digital Alarm Communicating Transmitter

The system shall be capable of dialing 2 telephone numbers, of 15 digits each using the switched telephone network such that if 2 unsuccessful attempts are made to the first number the system shall automatically switch to the second number and make 2 attempts. If these 2 attempts are unsuccessful the system shall switch between numbers after 2 attempts each, until a successful connection is made or a maximum of 10 try's are

attempted. Once 10 unsuccessful attempts are made the system shall stop dialing. Should another event occur which requires a message to be transmitted the dialing process shall be repeated.

(Option B, Dual Line Digital Alarm Communicating Transmitter)

The system shall be capable of dialing 2 telephone numbers of 15 digits each using 2 separate switch telephone network lines such that if 2 unsuccessful attempts are made on the first line to the first number the system shall make 2 attempts on the first line to the second number. If these 2 attempts are unsuccessful the system shall repeat the sequence using the second line. If all 8 attempts are unsuccessful the system shall make 2 further attempts on the first line to the first number. After the tenth unsuccessful attempt dialing will stop. Should another event occur which requires a message to be transmitted the dialing process shall be repeated.

(Option C, Multiplex Communication)

The system shall be capable of being continuously polled by a compatible receiver system over a leased 3002 type telephone line and identifying itself with its unique account number when polled.

The Command Processor control panel shall be capable of supplying a minimum of 2 amps continuous at 10.5-15.0 VDC to power local sounding devices. This output shall be separately fused.

This output shall be supervised and the system shall detect and annunciate an open circuit, a shorted circuit or a ground on either side of the bell circuit. The system shall incorporate a silence switch for

(Option D, Multiplex Communication With Digital Alarm Communicating Transmitter Backup)

The system shall be capable of being continuously polled by a compatible multiplex receiver system over a leased 3002 type telephone line and identifying itself with its unique account number when polled. When the system has a message to Communicate and a polling request is not received for 150 seconds, or 75 seconds when the message is a fire type, the system shall switch to the Digital Alarm Communicating Transmitter backup and proceed as follows.

The Digital Alarm Communicating Transmitter backup shall be capable of dialing 2 telephone numbers using the switched telephone network such that if 2 unsuccessful attempts are made to the first number the system will automatically switch to the second number and make 2 attempts. If these 2 attempts are unsuccessful the system shall switch between numbers after 2 attempts each until a successful connection is made or 10 try's are attempted. Once 10 unsuccessful attempts are made the system shall not try again. After dialing is complete communication shall switch back to multiplex when a poll is received. Should another event occur which requires a message to be transmitted and polling has not been received, the dialing process shall be repeated.

C. (Option) Automatic Recall Time

(Single and Dual Line DACT and Multiplex with DACT Backup).

The system shall transmit an Automatic Recall Message using the Digital Alarm Communicating Transmitter to test communications, each 24 hours.

D. Communication Failure Output

(Option A, DACT Systems)

Should a Digital Alarm Communicating Transmitter fail to communicate with the Central Monitoring Station receiver on 3 successive attempts an output relay shall be activated

on the Command Processor control panel. This relay output shall be reset when the system is disarmed.

(Option B, Multiplex Systems)

Should a polling signal not be received by the Command Center control panel for a period of 150 seconds an output relay shall be activated. This relay shall be reset when the system is disarmed.

E. (Option) Opening And Closing Reports

The system shall communicate to a compatible receiver each time an area is armed and disarmed and report the area number and name and the user number of the individual operating the system.

F. (Option) Reports To Operator

(Only Available When Opening & Closing Reports Are Chosen)

The system shall require that when opening and closing reports are communicated to a Central Monitoring Station the compatible receiver operator must acknowledge each communication and record same in log.

G. Close Waiting (Option)

When openings and closings are being monitored at a Central Monitoring Station, the system shall wait for an acknowledgment from the Central Monitoring Station before displaying the "System ON" message during arming of the security areas. During the waiting period the display shall read "One Moment" and the exit delay shall be extended during this period.

H. Closing Check (Option)

After temporary or permanent schedules have expired the system shall at one minute past each hour, check to see that all areas of the system are armed. If any area shall be found to be disarmed past the scheduled time, the system shall emit a steady beep and display "Closing Time" at the keypad displays designated to display System Troubles. If the system is not armed within 4 minutes, then a No Closing Report shall be transmitted to the Central Monitoring Station.

I. (Option) Abort Reports

The system shall communicate an alarm abort report to the Central Monitoring Station any time a burglar alarm has been transmitted and the system disarmed while the alarm bell is still sounding.

J. (Option) Loop Restoral Reports

The system shall communicate all loop restorals to the Central Monitoring Station. The report shall include the loop number, name and condition.

K. (Option) Bypass Reports

The system shall communicate all loop bypasses and resets to the Central Monitoring Station. The report shall include the loop number and name and the user number of the individual operating the system.

L. (Option) Schedule Change Reports

The system shall communicate all permanent and temporary schedule changes to the Central Monitoring Station. The report shall include the day, opening time, closing time and the user number making the change.

M. (Option) Code Change Reports

The system shall communicate all code additions and deletions to the Central Monitoring Station. The report shall include the user number added or deleted and the user number making the change.

N. (Option) Door Access Reports

The system shall allow the selection of a door access report from any combination of the 8 keypads in the system. A door access report shall be communicated to the Central Monitoring Station when a door is accessed from a selected keypad. The report will include the user number and the address of the keypad used to access its associated door.

Doors not selected to be reported shall remain accessible through the associated keypad by authorized users. (Must use key-pads with door strike relays.)

O. Power Failure Delay (Option)

The system shall transmit a Power Failure message to the Central Monitoring Station should primary power fail for (0 to 9) hours.

2.04 SYSTEM CAPABILITY

A. Arm Display (Option)

The system shall display the identity of all armed security areas on keypad alphanumeric displays.

B. Opening Code (Option A)

The system shall require a valid user code to disarm security areas.

Opening Code (Option B)

The system shall require a valid user code to disarm security areas outside of temporary or permanent scheduled periods. No user code shall he required to disarm security areas during scheduled period.

C. Closing Code (Option A)

The system shall require a valid user code to arm security areas.

Closing Code (Option B)

The system shall not require a user code to arm security areas.

D. Any Bypass (Option A)

The system shall permit any security loops to be bypassed without a valid user code during the arming sequence.

Any Bypass (Option B)

The system shall require a valid user code to bypass any security loops during arming.

E. Entry Delay

The system shall permit an entry delay time of (0 to 250) seconds on any loops assigned as exit type loops. When an armed exit type loop is activated, a pre-warn tone shall sound and the entry keypad shall display "Enter Code". If a valid user code is not entered prior to the expiration of the entry delay, an alarm will be transmitted.

F. Exit Delay

The system shall permit an exit delay time of (0 to 250) seconds on any loops assigned as exit type loops. This exit delay shall be displayed and counted down on the exit keypads alphanumeric display. If any loop is in an alarm condition at the expiration of the exit delay, the entry delay sequence will commence immediately.

G. Loop Retard Delay (Option)

The system shall allow a loop retard delay of (0 to 250) seconds to he applied to any loop designated as Fire, Supervisory, Auxiliary 1 or Auxiliary 2. This retard delay shall only function in the short condition.

H. Swinger Bypass (Option)

The system shall be able to automatically bypass any loop which trips more than (0 to 7) times within one hour commencing with the first trip. The system shall also transmit a report of automatic bypass to the Central Monitoring Station if Bypass Reports are included as monitored events.

I. Reset Swinger Bypass (Option)

The system shall also be able to automatically reset the swinger bypass when Swinger Bypass has been in effect for an hour without a further trip on the bypassed loop. The system shall also transmit a report of automatic swinger bypass reset to the Central Monitoring Station if bypass reports are included as monitored events.

2.05 OUTPUT CONTROL CAPABILITY

A. Bell Cutoff (Option)

The system shall automatically reset the Bell Output (0 to 99) minutes after the Bell Output has been activated.

B. Bell Test (Option)

The system shall be able to automatically activate the bell output for one second each time the security system is armed.

C. Bell Action

The system shall he able to activate the bell output in the following manner for the loop type specified.

Fire Type	(None) (Pulsed) (Steady)
Burglary Type	(None) (Pulsed) (Steady)
Supervisory Type	(None) (Pulsed) (Steady)
Panic Type	(None) (Pulsed) (Steady)
Emergency Type	(None) (Pulsed) (Steady)
Auxiliary 1 Type	(None) (Pulsed) (Steady)
Auxiliary 2 Type	(None) (Pulsed) (Steady)

D. Cutoff Output (Option)

The system shall allow a single designated output relay to be automatically reset after a period of (0 to 99) minutes. The system will allow this relay to be manually silenced from the keypad.

E. Area Outputs (Option)

The system shall activate an output relay per security area when any security area is placed in the armed condition. (Requires 16 output relay model control panel)

F. Fire Alarm Output (Option)

The system shall activate a specified output relay whenever a fire type loop is placed in the alarm condition. This relay shall be reset when the Fire Reset function is performed and no fire type loops remain in the alarm condition.

G. Fire Trouble Output (Option)

The system shall activate a specified output relay whenever a fire type loop is placed in the trouble condition or when a supervisory type loop is placed in the alarm or trouble condition. The relay shall be turned off when all fire and supervisory type loops are restored.

2.06 USER CAPABILITY

A. (Option) Arm/Disarm

The system shall allow authorized users to arm and disarm the burglary system and display such on the alphanumeric display.

B. Option) Alarm Silence

The system shall allow authorized users to silence the bell output and display such on the alphanumeric display.

C. (Option) Fire Reset

The system shall allow authorized users to reset the smoke detectors and display such on the alphanumeric display.

D. (Option) Door Access

The system shall allow authorized users to activate a door strike associated with each keypad and display such on the alphanumeric display. (Requires keypad with door strike relay.)

E. (Option) Armed Areas

The system shall allow authorized users to display a list of armed areas by number and name On the alphanumeric display.

F. (Option) Outputs On/Off

The system shall allow authorized users to individually turn output relays on and off and display the status of each output relay on the alphanumeric keypad.

G. (Option) Loop Status

The system shall allow authorized users to display the armed, bypassed or alarmed loops on the alphanumeric keypad and check the status of individual loops.

H. (Option) Bypass Loops

The system shall allow authorized users to individually bypass any of the burglary loops on the system and display same on the alphanumeric keypad. These users shall also be able to reset any bypassed loops and the system shall display same on the alphanumeric display. Any bypassed loop shall automatically be reset each time the system 15 disarmed.

I. (Option) System Test

The system shall allow authorized users to test the bell circuit, battery and communications to the central monitoring station and display the results on the alphanumeric display.

J. (Option) User Codes

The system shall allow authorized users to add and delete user codes in the system memory.

K. (Option) Schedules

The system shall allow authorized users to enter, change or delete daily on and off schedules for the output relays, and temporary and permanent opening and closing schedules.

L. (Option) Time

The system shall allow authorized users to display and reset the day of the week and the time of the day in the system memory.

2.07 DISPLAY CAPABILITY

A. (Option) Loop Monitor

The system shall be able to monitor selected burglary loops during disarmed periods and display the loop names when tripped.

B. (Option) System Monitor Trouble

The system shall annunciate and display trouble conditions from the following functions on any or all of the alphanumeric keypads in the system. The functions to be displayed shall be bell circuit, AC power, battery power, bell power fuse, panel tamper, auxiliary power fuse, and ground circuit.

C. (Option) Fire Loops

The system shall annunciate and display fire loop alarms and troubles on any or all of the alphanumeric keypads in the system.

D. (Option) Burglary Loops

The system shall annunciate and display burglary loop alarms and troubles on any or all of the alphanumeric keypads in the system.

E. (Option) Supervisory Loops

The system shall display supervisory loop alarms and troubles on any or all of the alphanumeric keypads in the system.

F. (Option) Panic Loops

The system shall display panic loop alarms and troubles on any or all of the alphanumeric keypads in the system.

G. (Option) Emergency Loops

The system shall display emergency loop alarms and troubles on any or all of the alphanumeric keypads in the system.

H. (Option) Auxiliary 1 Loops

The system shall display auxiliary 1 alarms and troubles on any or all of the alphanumeric keypads in the system.

I. (Option) Auxiliary 2 Loops

The system shall display auxiliary 2 alarms and troubles on any or all of the alphanumeric keypads in the system.

2.08 AREA IDENTIFICATION CAPABILITY

(Area Arming systems Only)

Area Name

Each of the 8 areas within the system shall be identified by a name consisting of up to ten alphanumeric characters. This name shall be used to identify an area when displayed on the alphanumeric keypad.

2.09 LOOP OR ZONE CAPABILITY

A. Loop Name

Each of the loops within the system shall be identified by a name consisting of up to ten alphanumeric characters. This name shall be used to identify a loop when displayed on the alphanumeric keypad.

B. Loop Type

The system shall be able to identity each loop as one of ten different loop types. Each loop type shall have up to eight specifiable characteristics with a default configuration based on loop type.

The system shall allow each individual loop to be configured independently for each of the characteristics related to its selected loop type.

The system shall allow each individual loop to activate one selectable output relay per loop status change and the loop changes that can activate a separate relay each are disarmed opened, disarmed shorted, armed open and armed shorted if available in the selected loop type for that loop. Further, the selected relay shall be either latched activated, pulsed on and off, momentarily activated or follow the status of the loop.

C. Loop Message

The system shall allow the selection of either an alarm, trouble or no message to be displayed on the alphanumeric keypad (and transmitted to the Central Monitoring Station) when a loop condition changes. The selection shall be made separately for disarmed open circuit, disarmed short circuit, armed open circuit and armed short circuit when available for the selected loop type. Each loop shall have a default selection based on the loop type selected.

D. Pre-warn Addresses

The system shall allow the selection of any or all keypads to sound a pre-warning when entry is made through an exit type loop. The system shall at this time also display "Enter Code" on the alphanumeric display on selected keypads.

E. (Option) Retard

The system shall allow any individual fire, supervisory or auxiliary loop to apply a retard period prior to activating an alarm message and if a retard is chosen the system shall allow the annunciation and display of retard activation on any or all alphanumeric keypad displays during the retard period.

2.010 SYSTEM OPERATION

A. User Codes

The system shall allow an authorized user to add a minimum of 100 individual PIN codes to the system and each PIN code shall be assigned to one of 9 authorization levels.

Each PIN code shall be from two to five digits in length (and allow the assigned user to activate and deactivate a predefined combination of the burglary areas within the system)

B. Output Schedules

The system shall allow an authorized user to establish and change a single on-off permanent schedule for each of the output relays for each or the seven days of the week.

C. Burglary System Schedules

The system shall allow an authorized user to establish a permanent opening and closing schedule for each day for the burglar alarm system such that certain users shall not be able to deactivate the alarm system outside of the established schedule. The system

shall also allow an authorized user to establish a temporary opening and closing schedule for each day for the burglar alarm system to operate as a permanent schedule except that this schedule shall be automatically canceled after a single use.

(The system shall also use the established schedules as a reference for the Closing Check function when openings and closings are reported to a central monitoring station.)

2.011 MATERIAL

A Command Processor Control Panel

The Command Processor control panel shall be Simplex Product #

(3002-9001 with 2 output relays.)

(3002-9002 with 8 output relays.)

(3002-9003 with 16 output relays.)

B Security command Keypads

The Security Command keypads shall be Simplex Product #

(3002-9801 Surface Mount)

(3002-9802 Surface Mount with door strike relay)

(3002-9803 Flush Mount)

(3002-9804 Flush Mount with door strike relay)

C (Option) Lightning Suppressor

The Lightning Suppressor shall be Simplex Product #

3009-9817

D (Option) Communication Modules

The Communication Modules shall be Simplex Product #

3002-9813 Single Line DACT

3002-9814 Backup DACT

E (Option) Polarized Bell Module

The Polarized Bell Module shall be Simplex Part #3002-9820.

F (Option) Primary Power Supply

1. The Primary Power Supply shall be Simplex Product # 3009-9816 (Required to support 3 or 4 batteries)
2. The Primary Power Supply shall be Simplex Product # 3009-9815 (Required where Class II transformers are not acceptable)

G Secondary Power Supply

The Secondary Power Supply shall be Simplex Product #3002-9824 (First battery on system) and (1,2 or 3) Simplex Product # 3002-9821 (2nd, 3rd, & 4th batteries on system).

H Detection Devices

The various detection devices connected into the protection loops shall be standard Simplex products to ensure compatibility of performance and power consumption with the specified system.

I Output Devices

The various control devices connected to the system output relays shall be standard Simplex products to ensure compatibility of performance and power consumption with the specified system.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 CODES

The contractor shall provide and install the system in accordance with the plans and specifications, all national and local codes, and the manufacturers installation instructions.

3.03 OTHER WORK

Installation of equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate subcontractor.

3.04 SUPERVISION

The manufacturer shall provide all on-site supervision of the installation, perform a complete functional test of the system and submit a written report to the contractor attesting to the proper operation of the complete system.

3.05 TESTING

The complete system shall be fully tested by the contractor in the presence of the owner's representative, the architect, the consulting engineer, the authority having jurisdiction and the manufacturer. Upon completion of a successful test, the contractor shall so certify in writing to the Owner, architect, manufacturer and general contractor.

3.06 TRAINING

The equipment manufacturer shall provide, as part of this contract, a minimum of (2) hours system programming and operation training to the building owner and consulting engineer.

*****END OF SECTION*****

SECTION 15300

AUTOMATIC FIRE PROTECTION SYSTEM

PART 1 -- GENERAL

1.01 DESCRIPTION

A. Furnish all tools, labor, materials and equipment and perform all operations in connection with the Fire Protection Work, complete as indicated and specified.

B. Work Included:

1. The fire service and automatic fire sprinkler system minimally consists of detector check meters, piping, valves, alarm valve assemblies, fire sprinkler heads, fire department connections, hangers, sway bracing and other equipment herein specified.

2. This specification represents the County's minimum requirements for a complete, proper, approved and operating Fire Protection System. Contractor shall be responsible for a design-build Fire Protection System including compliance with all applicable codes and requirements of the agency having jurisdiction (County of Riverside Fire Dept). Contractor to create required drawings and submit to the agency having jurisdiction for plan check and approval and shall acquire a permit and perform all installation, coordination, inspections and testing, as well as provide all materials and services necessary for a complete, approved and operational Fire Protection System.

3. Other materials, equipment and installation shall be as herein specified.

4. The automatic fire sprinkler system shall be designed and installed complying with NFPA 13 occupancy requirements. Nothing in these Specifications is to be construed to permit work in violation of the Standard.

1.02 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Three (3) copies of operating and maintenance manuals for systems specified in this Section shall be delivered to the Owner.

B. The Contractor shall instruct the Owner's Representative who will operate the system, about the operation and maintenance of the equipment.

C. An affidavit by the Owner's Representative certifying that the above requirements have been complied with shall be submitted to the Architect.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions, Project Manual Section 00700.

PART 2 -- PRODUCTS

2.01 MATERIALS AND EQUIPMENT OF EQUAL MANUFACTURER

In addition to manufacturers specified, the following shall also be considered equal, provided corresponding models meet specification requirements. The equivalent equipment names shall be submitted to the Architect for approval.

1. Detector Check: Hersey.

2. Valves: Mueller, Stockham, Kennedy, Nibco, Jenkins.

3. Fire Dept. Connections: Potter-Roemer, Grinnell, and Sierra.

4. Alarm Valve Assemblies: Grinnell, Viking, Globe.

5. Pressure Gauges: Potter-Roemer, Grinnell.

6. Access Boxes: Brooks, Christy.

7. Sprinkler Heads: FlexHead (800) 829-6975.

8. Pipe Markers: Brady, Standard.

9. Tamper Switch: Potter-Roemer.

10. Flow Switches: Potter-Roemer.

2.02 MATERIALS

A. Piping:

1. In Building: Schedule 40 black pipe with 125# black banded cast iron screwed fittings and couplings. At Contractor's option, piping may be Schedule 40 black steel grooved pipe with Victaulic U.L. listed black grooved fittings and Victaulic No 77 U.L. listed malleable iron couplings with Grade H white gasket. Thin wall steel piping shall not be used.

2. Outside Building - Below Ground: PVC (polyvinyl chloride pipe), Type I, Grade Class 315, SDR 14, 2DD psi working pressure at 73 degrees F meeting ASTM D2241. Pipe shall be U.L. and State Fire Marshal approved and installed in accordance with AWWA C900 PVC plastic fittings and couplings.

B. Pipe Hangers, Supports and Attachments:

1. Pipe Hangers: U.L. listed complying with N.F.P.A. Standard No.13.

2. Pipe Sway Bracing: Complying with N.F.P.A. Standard No.13.

3. Powder actuated tools shall not be used.

4. Steel construction fireproofing damaged by the pipe hanger attachment installation shall be repaired as approved by the Architect.

C. Valves:

1. Building Installed Shut-Off Valves: Mueller A-2073-6, 17511-flanged I.B.B.M., U.L listed gate valve with double disc and O.S.&Y.

2. Post Indicator Valves:

a. Valve: Mueller A-2052-6, 175# flanged I.B.B.M., U.L. listed gate valve with double disc, inside screw, N.R.S. and indicator post flanged.

b. Post Indicator: Mueller A-20801 U.L. listed assembly with cast iron body, telescopic barrel with bottom flanged for bolting to valve indicator post flange, locking device and operating wrench; assembly shall be painted in accordance with the requirements of the Fire Department.

3. Check Valves: Mueller A-212D-6, 175# flanged I.B.B.M., U.L. listed valve with bolted bonnet. Wafer type check valve shall not be used.

4. Globe Valves: Nibco T-211-Y, 200# W.O.G. screwed all bronze valves with screwed bonnet and renewable Teflon disc.

5. Angle Valves: Nibco T-311-Y, 200# W.D.G. screwed all bronze valves with screwed bonnet and renewable Teflon disc.

6. Detector Check Assembly: Hersey Model DDC 11 unit with automatic lever check valves, 3/4" by-pass disc meter and two I.B.B.M., O.S. & Y. flanged gate valves, the entire assembly shall be U.L. listed.

7. Concrete Vault:

   a. Brooks 900 Series size as indicated on the drawings, open bottom vault with 6" thick walls assembled at the site. Asphalt coated inside and out.

   b. Rebar sizes and arrangement shall be as indicated on Brooks Drawing 900-673.

   c. Knockouts shall be provided as required for the piping installation.

   d. Top of vault shall be provided with galvanized armor to receive 3/8" thick galvanized floor plate; floor plate shall be furnished in three sections, shall be provided with lift holes and shall be bolted down.

   e. Vault shall be set with finished gate.

D. Fire Department Connections:

1. Potter-Roemer No.5763 UL Listed cast brass body with drop clappers unit with two (2) 2-112" inlets and one (1) 6" outlet and two (2) chained brass pin plugs. Polished brass plate with the letters "AUTO SPRINKLER" in it. Overall height 24".

E. Alarm Valve Assembly: Potter-Roemer No.6200 Series tamper proof switch. Housing with flow paddle.

F. Accessories:

1. Pressure Gauges: Potter-Roemer No.6240, U.L. listed gauge with 3-1/2" diameter polished brass case and glass protected dial with 0 psi. to 300 psi. pressure range.

2. Access Boxes: Brooks No. 3-RT open bottom concrete box with cast iron frame and cover with the word "SPRINKLERS" cast in cover.

G. Fire Sprinkler Heads:

2.01 FlexHead U.L. listed fusible link type heads with 165 degrees F. ordinary rating, unless otherwise required by the Fire Department or authorities having jurisdiction.

2.02 Rooms with Finished Ceilings: "Duraspeed" recessed plate pendent head; both head and plate furnished in plain finish.

2.03 Attic: "Duraspeed" pendent and upright heads furnished in plain finish.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

A. The Contractor shall do all necessary excavation, shoring and backfilling required for the proper installation of buried pipelines and related material and equipment.

B. The Contractor shall maintain temporary barricades, warning lights, covers, railings and other protection or warning devices while the trenches are open.

C. Piping installation and trench backfilling shall be done promptly after the trenching has been completed in order to keep the trenches open as short a time as possible; however, no backfilling will be permitted until the piping installation has been reviewed by the Fire Department for compliance with the Contract Documents. Piping shall be buried below the freezing line.

D. Upon completion of the work, the Contractor shall remove from the premises all surplus material, rubbish and debris resulting from his operation. The premises shall be left in a clean and neat condition.

E. Pipelines shall be constructed of full-length sections of specified pipe except where length of run is less than full pipe length.

F. Unless otherwise indicated or required, piping shall be concealed in finished portions of the buildings.

G. Unless otherwise hereinafter specified, polished chrome plated cast brass hinged split flanged escutcheons with setscrew shall be provided at all points where pipes pierce finished surfaces.

H. Unless specifically approved by the Architect, piping shall clear beams, columns, and other structural members.

I. Pipe size reductions shall be made with reducing fittings. Unless specifically approved by the Architect, bushings shall not be used.

J. Welding saddles may be used for branch pipes two pipe sizes smaller than main pipe; however, for cross configuration, welding saddles may be used for branch pipes three pipe sizes smaller than main pipe.

K. Close nipples and street elbows shall not be used.

L. A certified welder shall perform pipe welding; a laboratory approved by the Architect shall issue certificate.

M. Fire sprinkler heads shall be located in straight lines parallel to the walls.

N. Fire sprinkler heads shall be located not less than 12 inches from the ceiling T-Bars

O. Concrete paving shall be cut with saw; concrete walls and floors shall be cored.

P. Underground piping shall be installed as follows:

1. Trenches shall be not less than 12 inches wider than the greatest diameter of the pipe.

2. Bottom of the trenches, 36" minimum, shall be excavated to a depth of three inches (3") below the bottom of the piping, and the space shall be filled with three inch (3") deep layer of clean sand which shall be well tamped.

3. Upon installation of the piping, the pipe shall be covered with three-inch (3") deep layer of clean sand, which shall be well tamped.

4. Should it be required to lay pipe on fill, the fill shall be first compacted as specified in Section 02223.

Q. Trench backfilling shall be done as required by Section 02223.

R. Clamps and/or concrete thrust blocks shall be provided at dead ends, bends, tees or other points where separation and/or change of direction might occur in cast iron piping,

or polyvinyl chloride piping. Thrust block sizes shall be sized, using Manville "Transite Ring-Tite" Pressure Pipe Installation Guide Book for Class 150 pipe, 200 psi. pressure and 2,000-lb./sq. ft. soil bearing capacity.

S. Buried valves shall be anchored with two 5/8" inverted U-type bent anchor rods imbedded in concrete

T. Flanged connections below ground shall be made with stainless steel bolts, nuts and washers.

U. Access boxes shall be set flush with finished grade.

V. Main piping shall be flushed in compliance with N.F.P.A. Standard No.24.

W. Pipe flushing and test shall be witnessed by the Fire Department.

X. The Fire Department shall be notified forty-eight (48) hours prior to the schedule flushing and testing.

Y. Shop drawings of the entire automatic fire sprinkler system approved by the Fire Department shall be submitted to the Architect for review prior to the Start of Construction; after the Architect's Review, the shop drawings shall be submitted for approval to the State Fire Marshal. The approved shop drawings shall become an integral part of the Contract Document.

Z. Prior to preparation of the shop drawings, the Contractor shall coordinate his work with work of other sections especially the ductwork and lighting.

AA. The Contractor shall deliver to the Architect record drawings as specified in Section 01700.

3.03 PIPING IDENTIFICATION

A. All exposed piping and all piping above the T-Bar ceiling shall be identified with Brady B-500 vinyl cloth pressure sensitive markers secured in place with 3/4" wide vinyl cloth pressure sensitive tape wrapped around the pipe one complete turn.

B. Pipe markers shall be applied to a dry and clean surface.

C. Pipe markers shall have the words "FIRE SPRINKLER" with white letters on red background.

D. Pipe markers shall be provided not more than three feet (3') from the following:

1. Tee (all three sides)

2. Wall

E. Pipe markers shall be spaced not more than fifteen feet (15') apart measured along the pipe run.

F. Flow direction arrows of the same material and color, as the pipe markers shall be provided downstream of and adjacent to all pipe markers.

G. Pipe markers shall be readily visible to a person standing on the floor in normal access space to the piping.

3.04 TEST

Piping shall be tested hydrostatically under 200 psi. pressure for not less than two (2) hours

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SECTION 15400

PLUMBING

PART 1 -- GENERAL

1.01 SCOPE

Work of this section includes everything necessary and incidental to completing plumbing work, except as herein specifically excluded.

1.02 GENERAL REQUIREMENTS

A. All core drilling, cutting, and patching for the installation of work under this section shall be performed under this section of the specifications. No holes will be allowed in any structural members without the written approval of the Architect.

B. Guarantee: Furnish a written guarantee form as stipulated in section "General Conditions," for a period of one (1) year from date of acceptance of work by the owner.

1. Materials:

a. All material and equipment shall be new and in perfect condition when installed, of the best grade and of the same manufacturer throughout for each class or group of equipment. Materials not identified by name or manufacturer shall be comparable to that specified arid as approved by the Architect. Maintain adequate job protection for all materials, equipment and work of other trades. Store all pipe at least four inches (4") above grade to avoid contact with water and dirt.

b. Unless otherwise directed by the Mechanical Engineer In writing, or specified or indicated, all materials, fixtures and equipment shall be installed in accordance with manufacturer's recommendations and instructions.

c. Plumbing equipment shall bear the manufacturer's label nameplate showing all performance characteristics. All valves, pipe fittings, etc., shall bear the manufacturer's trademark or identifying markings.

d. All materials of similar function or service shall be of one manufacturer.

2. Approval of Materials:

a. Within thirty (30) days after award of the contract, submit to the Architect, ten (10) copies of a complete list of material and equipment Proposed for the job including rating and capacity data, sizes, grade, electrical data, part or catalog number, manufacturer's name, pictures, catalog cuts, etc.

b. Submit with the above list, ten (10) copies of complete shop drawings for all fabricated equipment and ten (10) copies of complete wiring diagrams with descriptions and details.

c. For additional submittal requirements refer to Part 3 Execution: 3.05, C. Execution paragraph 3. No exceptions will be allowed for this requirement.

d. d. Safety Compliance: All materials, equipment and installation shall comply with the requirements of "Occupational Safety and Health Act" (OSHA) Standards.

C. Verification of Dimensions:

1. All indicated dimensions are approximate and are given for estimating purposes only. Before proceeding with the work, this contractor shall carefully check and verify all dimensions, sizes, required clearances and shall assume full responsibility for the fitting of all equipment and materials herein required to other parts of the work and to the work of other trades.

2. The drawings are essentially diagrammatic to the extent that all offsets, bends, special fittings and locations are not exactly located.

3. This contractor shall comply with all contract documents in laying out his work and equipment. He shall coordinate the work of this section with the work of other trades and all job conditions.

4. The installation of valves, thermometers, gauges, cleanouts, water hammer arrestor access doors or other indicating equipment or specialties requiring reading, adjustment, inspection, repairs, removal or replacement shall be conveniently and accessibly located with reference to the finished building.

5. Where wall and ceiling access doors are required for access to plumbing equipment, doors shall be furnished and installed under other sections. Coordinate this requirement with appropriate section of specifications.

D. Rough-In: Rough-in and final connections shall be provided for equipment furnished under other sections and by the owner in accordance with rough-in drawings furnished by others. Future equipment, as noted on the drawings, shall be provided with all required rough-in utilities.

E. Before submitting his bid for the work under this division the contractor shall carefully study all drawings and shall make a careful examination of the premises. He shall determine in advance, the methods of installing and connecting the equipment, the means to be provided for getting the equipment into place and shall make himself thoroughly familiar with all the requirements of the contract. After award of the contract, no subsequent allowances will be made to the contractor due to the failure to comply with the above requirements or any other conditions affecting the installation and completion of the work.

F. Any minor changes in work, which have not been installed, shall be made by this contractor without additional compensation except changes that increase or decrease the size of the materials specified or indicated on the drawings. This contractor shall submit an estimate of the cost, or credit for, such changes he does not consider of a minor nature and shall proceed only upon the written authorization of the Engineer.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions, Project Manual Section 00700.

1.04 SUBMITTALS AND TESTS

Requirements and Submittals

1. Conformation to requirements of Uniform Plumbing Code 1994 Edition, local and/or State codes and/or Ordinances, including the Uniform City and County Building Codes, State County and City Health Department Ordinances, State of California Industrial Accident Commission Safety Orders.

2. Apply and pay for all permits, fees, inspections, examinations and tests required by any legally constituted authorities.

3. Submission of six (6) brochures containing certified manufacturer's drawings and cuts of all equipment and specialties within thirty (30) days after Contract is signed. Partial or incomplete submittals will be rejected and will be returned to Contractor for re-submittal.

a. Submittals shall be in a neat ring binder form and shall contain a complete list, in index form, of the manufacturer's names, cuts of equipment, performance data, catalog numbers and trade names; as required; to properly identify the materials and equipment to be furnished under these specifications.

b. Data submitted for each item shall be properly identified by reference to item number of paragraphs in the specifications and mechanical drawings' equipment schedule designation.

c. Any deviation from item as specified shall be clearly indicated on the submittal and noted as such.

d. These specifications and accompanying drawings specify and illustrate equipment and materials deemed most suitable for the service anticipated. This is not to preclude other products equally as good and efficient. The contractor shall prepare his bid on the basis of the particular equipment and materials specified for the purpose of determining the low bid.

e. The awarding of the contract shall constitute a contractual obligation to furnish the specified equipment and materials.

f. After the execution of the contract, should the contractor desire to substitute equipment other than that specified in the contract documents, such substitution will be considered for one reason only:

g. The equipment proposed for substitution is superior in construction and efficiency to that specified herein.

h. In the event the contractor obtains the Engineer's approval of equipment other than that herein described; he shall, at his own expense, make any changes in the structures, buildings, or piping necessary to accommodate the equipment and shall furnish record drawings to the Engineer.

i. It will be assumed that the cost to the contractor of the equipment proposed to be substituted is less than that of the equipment specified in the contract documents; and, if the substitution is approved, the contract price shall be reduced by an amount equal to the savings.

PART 2 -- PRODUCTS

2.01 PIPING INSTALLATION

A Arranged as shown on the drawings and as required for a complete system.

B Run straight and true to line and as direct as possible.

C Risers shall be plumb. Form right angles on parallel lines with building wall.

D Keep pipes close to walls and partitions, offset only where necessary to follow walls, or as directed.

E Locate groups of pipes parallel to each other. Pipe spacing shall permit application of full insulation and access for servicing valves.

F All piping shall be isolated from other piping, any part of the building, framing, conduit, etc., with one-inch (1") strips of hair, felt, or pipe isolators.

G Risers shall not have couplings in runs from one floor outlet to next.

H All piping shall be concealed in walls or above ceilings unless otherwise noted.

I Street elbows, bushings, and long screw fittings will not be allowed for on-site buildings.

J Cleanouts:

1. Floor cleanouts, as specified (see plans for size), shall be no-hub and installed into pipe where shown on plans. Floor cleanouts shall be accessible in all cases and shall be brought to surface on "WYE" branches.

2. Wall cleanouts, as specified (see plans for size), shall be taper thread plugs and installed into pipe where shown on plans. Wall cleanouts shall be accessible in all cases.

3. All cleanouts shall be provided with removable floor or wall plate as hereinbefore specified.

4. Cleanouts to grade shall be provided with either a traffic rated brass cap or concrete yard box.

K. Install stops on all hot and cold-water fixture supplies, unless integral stops are specified. Supply trim shall have all metal-to-metal connections.

L. Protect open pipe ends. Keep piping free from scale and dirt; protect open ends whenever work is suspended during construction to prevent foreign bodies entering and lodging there; use temporary plugs$_1$ or other approved material for protection.

M. Bending or mitering of pipe to constitute fittings shall not be permitted.

2.02 DOMESTIC HOT AND COLD WATER PIPING SYSTEM

A. Mains, risers, branches, connections of sizes and arrangement as indicated on drawings.

B. Shut-off valves shall be provided in main branches, runs to risers and where indicated on drawings.

C. Piping below grade shall be dipped and wrapped with "Hunt's Process" No. HP#6-F. All field joints and fittings shall be double wrapped with "Scotch Wrap" No. 50. In lieu of wrapping, "X-Tru-Coat" steel pipe shall be considered an approved equal.

D. Joints under concrete slabs, if allowed by local codes, shall be brazed.

2.03 SOIL, WASTE, AND VENT PIPING SYSTEMS (CAST IRON PIPING)

A. Mains, risers, branches and connections of sizes and arrangement as indicated on drawings.

B. Cast iron soil pipe and fittings below grade shall be service weight single-hub type.

1. Shall be no-hub service weight using the "Anaheim Foundry Company," HUSKY Series 4000, heavy duty, all stainless steel (#304) coupling:

a. One and one half (1 1/2"), two inch (2"), three inch (3"), four inch (4"), diameter coupling shall consist of a three inch (3") wide corrugated 304 stainless steel shield in conjunction with four (4) stainless steel clamps mounted in series, secured in place by means of a fixed and "floating" eyelet to allow clamp travel during tightening.

b. For five inch (5"), six inch (6"), eight inch (6'"), and ten inch (10"), shall consist of a four-inch (4") wide corrugated 304 stainless steel shield in conjunction with six (6) stainless steel clamps mounted in series, secured in place by means of a fixed and "floating" eyelet to allow clamp travel during tightening.

c. All HUSKY Series 4000 couplings, or approved equal, shall be installed using a factory preset torque wrench, set to 80 inch-pounds.

C. Above grade piping and vent line shall be service weight cast iron with no-hub joints.

D. Vent piping may be schedule 40 galvanized steel in lieu of item 2.02, C.

E. Cleanouts shall be provided as previously specified and in the following locations:

1. Near bottom of each stack and riser.

2. At every 135-degree change of direction for horizontal line.

3. Every one hundred feet (100') horizontal run.

F. Extend cleanouts to accessible surface. Do not place cleanouts in carpeted floors. In such locations, use wall-type cleanouts.

G. Each fixture and appliance discharging water into sanitary sewer or building sewer lines shall have a seal trap in connection with a complete venting system so gasses pass freely to atmosphere with no pressure for siphon condition on water seal.

H. Vent entire system to atmosphere. Discharge fourteen inches (14") above roof. Join lines together in fewest practical numbers before projecting above roof (see plans for locations). Offset vent lines so they will not pierce roof near an edge or valley.

I. Use torque wrench to obtain proper tension in cinch bands when using hubless cast iron pipe. Butt ends of pipe against centering flange or coupling.

J. Grade all soil and waste lines at one quarter inch (1/4") fall per foot, indirection of flow; unless otherwise noted on plans (see plans for other locations)

2.04 VALVES

A. Provide shut-off valves where indicated and specified; and in the following locations:

1. Risers and main branches at points of take-off from their supply or return mains.

2. Individual equipment units at Inlet and outlet to permit unit removal for repairs without interfering with remainder of system.

B. Locate valves for easy access and operation; where concealed, access doors shall be provided under other sections. Coordinate requirements with General Contractor.

C. Do not locate valves with stems below horizontal.

2.05 CONCEAL PIPING

A. Where indicated or specified, conceal piping in building construction. Install such piping in time so as not to delay work of other trades and to allow ample time for tests and approval; do not cover before test approval is obtained from the Engineer.

B. Run up branches passing through floor or roof into partition; offset above floor close to equipment unit; expose only as much as necessary for final connection.

C. Where furred spaces are indicated, keep pipes as close to structural members as possible so as to require minimum furring. In case of furred beams, obtain approval, from Architect, of resulting headroom clearance before installing pipes.

D. Access panels: Install where shown and over all concealed valves, cleanouts, isolation unions and any concealed equipment which may require access for operation, maintenance and repair. Panel shall be sized for proper service and be not less than twelve Inches by twelve inches (12" x 12"), furnished and installed by this contractor.

2.06 PIPES PIERCING WATERPROOFING

For pipes passing through waterproofed floor or roof, provide sleeves and flashing to maintaining watertight condition. Submit details for approval.

2.07 CHECK FOR INTERFERENCES WITH OTHER TRADES

A. Before installing piping, check architectural, structural, plumbing, electrical and fire protection drawings. Make accurate layout of all piping, including installed elevations. Submit copies of final layout to other trades for coordination with their work so that grouped pipes, conduit, and ducts will not interfere with each other, or with full swing doors and will leave minimum headroom as indicated.

B. Coordination of the mechanical piping is the responsibility of this section.

C. Protect open pipe ends. Keep piping free from scale and dirt. Protect open ends whenever work is suspended during construction to prevent foreign bodies entering and lodging there; use temporary plugs, burlap, or other approved material for protection.

2.08 SUPPORTS, HANGERS, FLASHING, AND SEISMIC RESTRAINT

A. Pipe Support:

1. All piping shall be supported in such a manner that it is securely attached to the structure of the building. Attachment is to be capable of supporting the tributary weight of pipe and contents in any direction. Maximum spacing of support and braces shall be as detailed on drawings.

2. Support horizontal overhead piping with clevis hangers. Upper end of hanger rod shall be supported from a code-approved attachment. See drawings for pipe support details. Submit shop drawings of all piping supports for approval.

3. Piping shall be attached to top chord members only of prefabricated roof or floor trusses. Where plywood web trusses occur, pipe support may be secured to additional web stiffeners as shown on plans.

B. Flashing: Pipes through roof shall be flashed with "Semco" No. 1110-7 steel reinforced boot type, six (6) pound seamless lead flashing with suitable counter flashing sleeve, or as approved by the Architect. Submit shop drawings for approval.

C. Seismic Restraint: All piping and equipment shall be suitably restrained and anchored in both horizontal and vertical directions to withstand seismic forces as required by the State of California. See drawings for details.

2.09 PIPES OVER ELECTRICAL EQUIPMENT

A. Where pipe joints or valves in cold and hot water lines occur within two feet (2'0") in horizontal direction from electrical panels, or equipment, provide a drip pan of size that will afford protection. Submit pan size and construction for approval.

B. Pans shall be 18 GA. GI sheet, edges turned up two and one half inches (2 1/2") all sides, reinforced with galvanized angles or by rolling edge over one quarter of an inch (1/4") diameter galvanized wire.

C. Provide drain with three quarters of an inch (3/4") galvanized flange and galvanized pipe drain to nearest floor sink.

D. Support with galvanized bars or angles, brace to prevent sagging or swaying, as detailed for ductwork.

2.010 PIPE AND FITTING MATERIALS

A. Service Defined: Classification and names of services as used in "Schedule of Pipe and Fitting Materials" herein, shall have the following meaning:

1. Cold Water: Connections from cold water supply outlets provided by Plumbing Contractor to equipment and for makeup.

2. Drains: Drains from expansion or storage tanks to floor drains, drains from air conditioning equipment condensate pans or piping drip pans.

B. Schedule: Unless otherwise specified, pipe and fitting materials shall conform to following schedule:

1. Interpretation of Schedule: Figure "40" and "80" following pipe material in this schedule designate pipe wall thickness, conforming to ASA B36.I0, applicable to sizes one inch (1") to ten inches (10") inclusive. Figure "40" shall mean "standard, "80" shall mean "extra strong" or "extra heavy," in the accepted trade terminology for pipe wall thickness.

a. Fittings shall conform to pipe as to black, galvanized, or C-P finish.

b. Schedule of Pipe and Fitting Materials

Service	Pipe Material Weight	Type of Joints	Pressure Fittings Material	Shut-Off Rating PSI SwP	Valve
Cold Water ABV. Gnd.	Copper L Tube	Soldered	Cast Bronze/ Wrought Copper	125	Ball, Check Butterfly
Cold Water Below Gnd.	Copper K Tube	Soldered	Cast Bronze/ Wrought Copper	125	Ball Butterfly
Hot Water Abv. Gnd.	Copper L Tube	Soldered	Cast Bronze/ Wrought Copper	125	Ball Butterfly
Vent	Service Weight Cast Iron	No-hub Screwed	N/A	N/A	N/A
Waste & Soil	Service Weight Cast Iron	No-hub	N/A	N/A	N/A
Drains	Copper L Tube	Soldered	Bronze	125	
Medical Gas Oxygen	Copper K Tube	Soldered	Cast Bronze/ Wrought Copper	125	Ball
Condensate	Copper L Tube	Soldered	Bronze	125	Butterfly

2.011 ASTM DESIGNATIONS FOR PIPE AND FITTING MATERIALS

A Pipe, as specified in schedule, shall conform to requirements covered by following ASTM designations:

1. Steel 40 or 80: A-53, Grade B.
2. Copper Tube "B": B-75.
3. Copper Tube "K" and "L~: B-88.

4. Cast Iron Waste: A74-80.

B Fittings, as specified in schedule for various services, shall conform to requirements covered by the following ASTM designations:

1. Malleable Iron: A-197.
2. Steel Welding Type: A-234.
3. Bronze, Solder Joint: B-88.
4. Wrought Copper, Solder Joint: ANSI B16.22, B16.18.
5. ABS: D2661-85a & D3311-82

2.012 MANUFACTURERS OF PIPE AND FITTINGS

All pipe and fittings shall be "U.S." manufactured. Pipe manufacturer shall be submitted for approval. The following manufacturers shall be acceptable for materials listed under each group:

1. Steel Pipe
   a. U.S. Steel Co.
   b. Republic Steel
   c. California Steel Industries
   d. Pioneer Pipe of Utah
   e. Kaiser Steel
   f. Bethlehem Steel Co.
   g. National Tube Co.
2. Copper Tubing and Fittings
   a. Muller Brass
   b. Chase
   c. Revere
   d. Cerro
3. Cast Iron Pipe
   a. Alhambra
   b. Anaheim Foundry
   c. U.S. Pipe and Foundry
   d. Universal Cast Iron Manufacturing

2.013 PIPE JOINTS

A. Unless otherwise specified, join pipe as follows:

1. All steel pipe two inches (2") and smaller shall have screwed joints.
2. All steel pipe two and one half inches (2 1/2") and larger shall have welded joints.
3. All copper pipe shall have soldered joints made with 95-5 tin/antimony solder.
4. Galvanized vent pipe shall be screwed "Durham" tarred drainage fittings.
5. All joints in underground and under-floor distribution piping shall be welded, regardless of size.

B. Welding Exceptions: In locations such as risers in shafts or mains in crowded corridors, where welding may be difficult; permission may be given by job inspector or Mechanical Engineer to use screwed joints up to four inch (4") size.

C. Welding Process, Procedure:

1. Where welding is required by work of this section, such work shall only be performed by welders qualified and certified by a recognized, approved agency. Such certification shall bear a date not more than six (6) months prior to date of starting work under this section and shall be submitted and approved by the job inspector and Mechanical Engineer prior to starting work.

2. Pipe welding shall comply with the latest revision of applicable code, ASA Code for Pressure Piping and State requirements. Before welding is performed, contractor shall submit to the Mechanical Engineer evidence of compliance of welding and operator's qualification according to provisions of governing codes. Standard Procedure Specifications and operators qualified by National Certified Pipe Welding Bureau shall be considered as conforming to requirements of these specifications.

3. Use only welding type fittings and welding neck flanges. The following exceptions may be used, only as approved by the Mechanical Engineer:

   a. Join "small" branches into mains with intersection weld, instead of using welding type tee. "Small" shall mean that the branch is one size less than half the size of the main which it intersects as: 1 1/4" branch into 3" main; 1 1/2" branch Into 4" main; 2" branch into 6" main; 4" branch into 10" main.

   b. Use only "Weldolet" of "Threadolet" type of welding fittings for intersection welding of branches to mains.

4. Do not make direct welded connections to valves, expansion joints, strainers, apparatus, and other equipment, which are intended to be removable.

5. Brass piping shall have screwed joints for sizes two inches (2"), flanged for two and one half inches (2 1/2") and larger.

D. Brazing Option: Brazing of threadless brass pipe to bronze fittings with preinserted rings, will be acceptable in place of screwed joints.

1. For brazing joints on threadless brass pipe and copper "B" tube, copper tube type "K" and "L," use brazing alloy, 80% copper, 15% silver, 5% phosphorous, which will flow freely at 1300 °F; Handy and Harmon "Sil-Fos," or approved equal; use flux and brazing method recommended by manufacturer of brazing alloy.

2. Copper tube type "K" and "L" shall have soldered or sweated joints with solder-joint type or copper fittings. Flared joints with flare type bronze fittings may be used where approved for specific service. Solder shall be 95-5 or equal.

3. Do not make brazed or soldered connections to valves, expansion joints, strainers, apparatus, other units, which are intended to be removable.

E. Screwed Joints:

1. For screwed joints use red or white lead and oil, or approved pipe-joint compound; apply only on male threads.

2. Brass pipe shall have screwed joints, for sizes two inches (2") and under; flanged two and one half (2 1/2") and over.

3. Cut pipe, nipples evenly, cut threads clean, remove burrs, ream ends to full inside bore. Cut brass pipe with hacksaw rather than with pipe cutter.

4. Do not use Stulson Wrench for making brass pipe joints tight; such pipe, bearing wrench marks, will not be acceptable and shall be replaced at Contractor's own expense.

F. Joints of Dissimilar Metals: Provide with "EPCO" dielectric valves isolation couplings of same size as pipe.

G. Pipe Preparation:

1. Pipe shall be carefully cleaned before installation. The ends of threaded pipe shall be reamed out full-size with a long taper reamer so as to be partially bell-mouthed and perfectly smooth.

2. All threads on black steel pipe shall be cut with new clean dies, full thickness of the die and so that no more than two (2) threads are left exposed on the pipe when the joint is made up in the fitting or valve.

3. Copper, brass pipe and chromed, polished or painted. Connections from fixtures shall show no tool marks. Install with approved wrenches.

4. Thread lubricant shall be used for all threaded joint make-up and shall be applied to the make thread only. Lubrication shall include threaded cleanout plugs.

2.014 PIPE SLEEVES, ESCUTCHEONS, COVERS

A. Furnish and set sleeves to accommodate pipes passing through foundations, walls, floors, partitions, and roof; provide escutcheons at exposed finished surfaces pierced by pipes.

B. Any pipe passing through a wall of a vertical shaft or through a wall of an occupancy separating or floor shall pass through a 16 GA G.I. sleeve. After pipe has been installed through sleeve, remaining space shall be packed tightly with an inert packing and secured on each side of wall with a 16 GA escutcheon around pipe. Submit shop drawings for approval.

2.015 VALVE TYPES

A. General: For valve location and installation, refer to "Valves" under "Piping Installation herein and the drawings.

B. Valve Requirements: Unless otherwise indicated or specified for particular system or individual equipment, following requirements shall apply:

1. Valves, General: Designed for packing under pressure with valve open or closed.

2. Valves used for throttling of controlling flow: Globe type as indicated. For shut off use butterfly or ball type as indicated.

3. Ball valves on all cold water and hot water piping unless otherwise noted.

4. Valves shall have rating of not less than 125-PSI SWP or as indicated in service schedule.

5. Valve Material: Bronze for sizes two inches (2") and smaller.

6. Valve ends: Screwed for all sizes two inches (2.') and smaller, except copper tube.

7. Valve ends for copper tubes, Type K and L: Solder joint type.

8. Flange valves shal1 have flange drilling to suit joining pipe flanges.

9. Gate valves shall have solid tapered wedge, except whore otherwise specified.

10. Globe type valves shall have renewable composition discs recommended by manufacturer for intended service, or renewable bevel seat and metal disc where so specified.

11. Check valves shall be horizontal swing type with bronze seat and composition or bronze disc as approved; body of same material, pressure rating, screwed or flanged, finish as adjoining globe or gate valve. Check valves in pump discharge lines shall be of the spring-loaded non-slam type as manufactured by "Mission" Duo Check Series 150-S-M-F.

C. Submit complete shop drawings and catalog cuts of all valve types to be used, for review and approval by Mechanical Engineer, prior to installation. No Exceptions.

2.016 VALVE CATALOG NUMBER DESIGNATIONS

A. Valve design, material of components, workmanship, and other features: Equal to "Stockham Valve Company" catalog numbers (unless otherwise noted) for various types of valves listed.

B. Gate Valves:

1. Screwed, bronze, union bonnet, rising stem, 150-PSI SWP; NO. B-120.

2. Screwed, ibbm, non-rising stem, 125-PSI SWP; NO. G 608.

3. Flanged, ibbm, non-rising stem, 125-PSI SWP; NO. G 461.

4. Flanged, ibbm, OS & Y, 125-PSI SWP; NO. G-623.

C. Ball Valves:

1. Screwed two inches (2") and smaller, cast bronze body, 40 PSI WOG, "Apollo 3" Series 82.

2. Valves shall include reinforced Teflon packing ring, thrust seal, body seals and seats.

3. Balls shall be chromium-plated bronze, with full size ports.

4. Quarter turn on-off, adjustable packing gland and internally inserted stem.

5. 2 1/2" and larger: "Powell" 150 PSI, flanged ball valve Fig. 4226T with 316 stainless steel (SS) body and 316 55 ball and stem with Teflon seat.

D. Globe and Angle Valves:

1. Screwed, bronze, composition, 150-PSI SWP; B-22 globe, No. 17 angle.

2. Screwed, bronze, bevel seat and metal disc$_1$ 200P51 SWP, B-37 globe, No. 701 angle.

E. Check Valve, Horizontal Swing Type (not for pump discharge):

1. Screwed, bronze body, bronze disc, 125-PSI SWP; B-319.

2. Flanged, cast iron, bronze disc, 125-PSI SWP; G-931.

F. Cocks

1. One inch (1") and larger, 175 lb. brass, square head, "Powell" Fig. 2201 lubricated type.

2.017 MANUFACTURER OF VALVES

A. Valves: "Stockham," "Crane," "Nibco" or "Potter-Roemer."

B. All valves shall be the product of manufacturer.

C. All valves shall bear name or trademark of manufacturer, working pressure, and direction of flow cast or stamped on valve body.

2.018 PIPE ISOLATION

A. Hangers shall be separated from pipe by means of steel encased hair felt padded isolation.

B. Isolator shall be as manufactured by "Lemco-Trisolators" or "Potter Roemer RP Isolators." Submit shop drawings for approval.

2.019 PIPING IDENTIFICATION

A. Each individual pipeline concealed or exposed shall be labeled for quick and easy identification as to direction of flow and content of materials carried in the pipes by method of stenciling.

B. Labels shall be installed at each valve, special fittings and at all branch take-offs and twenty feet (20'-0") apart on long runs.

C. Samples of all stenciling for flow and content shall be submitted for approval prior to installation.

LETTERS

1. Domestic Hot Water Supply: DHW
2. Domestic Cold Water Supply: DCW
3. Soil: S
4. Waste: W
5. Gravity Condensate: GC

D. Prior to stenciling, all fuel gas piping shall be provided with one coat of primer paint and one coat of yellow paint. Primer arid paint types as selected by the Architect.

2.020 PLUMBING FIXTURES

A. All plumbing fixtures indicated on drawings and/or specifications shall be furnished and installed in accordance with manufacturer's specifications by this contractor.

B. Plumbing fixtures shall be as follows, with connection sizes as indicated in fixture schedule on the plumbing drawings:

1. Water closet WC-1: American Standard "Cadet" 18" high 9468.018 (1.6) gallons per flush, floor mounted, siphon jet, white vitreous china, elongated bowl. 1 1/2" top spud with Sloan Royal 113 flush valve, 1.6 gallons per flush, Church plastic seat model 295C, elongated, open front, with external check hinge, scratch and stain resistant. C.E.C. listed.

2. Water closet WC-2: American Standard "Madera" 2221.018 (1.6) gallons per flush, floor mounted, siphon jet, white vitreous china, elongated bowl. 1 1/2" top spud with Sloan Royal 113 flush valve, 1.6 gallons per flush, Church plastic seat model 295C, elongated, open front, with external check hinge, scratch and stain resistant. C.E.C. listed.

3. Urinal U-1: American Standard "Allbrook" 6541.132 wall hung, white vitreous china. 1 1/4" top spud Sloan royal flush valve 186-1. 1 gallon per flush, J.R. Smith urinal support model 644. C.E.C. listed.

4. Lavatory L-1: American Standard "Lucerne" 0355.027, white vitreous china, wall-hung lavatory with faucet holes on 4" centers. Front overflow, 1 l/2"x 1 1/4" cast brass P-trap with chrome finish. Symmons "Scot" S-60-G-H metering faucet with

4" center set. Rose spray outlet with 0.5 GPM flow rate. Grid strainer. Chicago 1028 angle stops w/ rigid riser. C.E.C. listed.

5. Sink S-1: Elkay Rigidbilt Stainless Steel Scullery Sink, RNSF8358LR 16 GA type 304 stainless steel, Square welded construction 18"x 24"X13 ½" with faucet holes on 8" centers punched for 3 holes. 1 1/2" cast brass L.A. pattern P-trap with chrome finish. Elkay LK-35 chrome basket strainers. Elkay LK499 chrome plate mixing faucet with 10" high gooseneck spout with aerator, BH4 wrist blade handles. Chicago 1003 angle stops w/ rigid riser.

6. Sink S-2: Elkay Stainless Steel Hand Sink, ELV2219 18 GA type 304 stainless steel, backsplash with faucet holes on 4" centers punched for 3 holes. 1 1/2" cast brass L.A. pattern P-trap with chrome finish. Elkay LK-8 chrome grid strainers. Elkay LK411 chrome plate mixing faucet with 11" high gooseneck spout with aerator, BH4 wrist blade handles. Chicago 1003 angle stops w/ rigid riser

7. Drinking Fountain DF-1: Haws model 1010 wall mounted dual bubbler drinking fountain, front push bar operated, 18 GA. type 304 stainless steel with #4 satin finish. Polished chrome plated vandal-resistant bubblers and push bars, self-closing valves, automatic stream regulation. 1/2" IPS screwdriver stops, chrome plated waste strainers, 1 1/4" ips traps and vandal resistant bottom plates.

8. Floor Drain FD-1: J.R. Smith #2005-A-P-PB, 5" square top, 2" outlet, trap primer connection, duco cast iron body with polished bronze grate.

9. Floor Sink FS-I: J.R. Smith #3410-12, 8" square top -medium receptor, no hub, 2" pipe size connection, cast iron flanged receptor, acid resistant coated interior and acid resistant coated grate.

10. Trap Primer TP-I: Precision Plumbing Products, Inc. model "Prime-rite" 1/2" inlet and 1/2" outlet with distribution unit may be located as indicated on drawings or as required by code. UPC listed.

11. Water Hammer Arrestor WHA-I: Precision Plumbing Products, Inc. model "SC-Series" (size as required), installed on all quick closing valves and all valves which close with the flow of fluid, or on headers serving more than one fixture. Provide a 12"x 12" access panel.

12. RD-1: J.R. Smith #1083-C Roof Drain. Duco cast iron body with no-hub fitting, combined flashing clamp, gravel stop and adjustable "Flow Rate Control" assembly and dome.

13. OD-1: J.R. Smith #1080-C Overflow Drain. Duco cast iron body with no-hub fitting, combined flashing clamp, gravel stop and adjustable "Flow Rate Control" assembly and dome. 3 1/2" water dam.

C. Interior exposed pipe, valves, and fixture trim shall be chrome plated.

D. The complete installation of each fixture shall include trap and accessories with accessible stop or control valve in each hot and cold-water branch supply line. Fixture floor connections shall be made with approved brand of cast Iron floor flange, soldered or caulked securely to waste pipe. Make joint between fixture and floor flange tight with approved fixture setting compound or gaskets.

E. Polish chrome finish at completion of project.

F. Install fixtures and fittings as per local codes and manufacturer's instructions.

G. Do not use flexible water piping.

H. Caulking: Fixtures shall be bedded and caulked along joint at walls, counter tops and other intersecting surfaces with "Polysenseal" distributed by "Gladding-McBean" or approved equal.

I. Backing for all fixtures indicated on wall shall be one quarter inch by six inches (1/4" x 6") steel) plate; recessed flush with stud face and extending to next stud beyond fixture on each side. Secure plate top and bottom at each stud and weld three-eighths inch (3/8") steel stud bolts to each stud. See fixture schedule for type of support required. For wood stud installation, secure backing plate to each stud with three-eighths inch by two-inch (3/8" x 2") long lag bolts. Minimum two (2) per stud.

2.021 WATER HAMMER ARRESTORS

A. Piston operated, type K copper barrel, with brass threaded adaptor:

1. The piston shall provide a permanent mechanical barrier between fluid and pre-load air change.

2. The piston shall be equipped with two (2) O-rings, "Parker Specifications" N741-75, temperature rated 40 ^{0}F to 450 ^{0}F. Seal lubricant shall be "Dow Corning" Silicone Compound #111 *FDA* listed as safe for use in potable water systems.

B. Shall be designed to operate under domestic and commercial line pressures. Shall be equal to the pipe diameter at the point of installation.

C. The installation shall be made in the vertical or horizontal positions from the source of lock. Shall be installed in the following locations:

1. All quick closing valves.

2. All valves that close with the flow of fluid.

D. Normal arrestor operating pressure shall be 35 to 250 Psig, with a maximum surge or spike pressure not to exceed 1500 Psig.

E. Arrestor shall be fully guaranteed in writing by manufacturer for the entire life of the system.

F. Shall be as manufactured by "Precision Plumbing Products, Inc.," SC Series. Submit shop drawings for approval by the Mechanical Engineer.

2.022 CLEANOUTS

A. Floor: "J.R.Smith" #4023 or #4043 or "Zurn" #1400-2 or #1440-3, with polished nickel bronze non-skid adjustable round or square top. Use carpet clamping type top with carpet marker in carpeted areas.

B. Dry Wall: "J.R.Smith" #4670 or approved equal by "Zurn" or "Josam;" prime coated steel, face or wall type.

C. All other walls: "J.R.Smith" tl4470 or approved equal by "Zurn" 1470 series with chrome plated cover and screws. Provide "J.R. Smith" #4715 or approved equal where wall thickness is inadequate to conceal cleanout.

D. Submit shop drawings and/or catalog cuts for each type for Mechanical Engineer's approval, prior to installation.

2.023 PIPE INSULATION

General

1. Furnish and install thermal insulation on clean dry surfaces; after testing, inspection, and approval in strict accordance with these specifications, contract documents and manufacturer' 5 recommendations.

2. All insulation and accessory material shall meet the requirements of flame spread not to exceed 25 and smoke developed not to exceed 50, as tested by "Procedure ANSI/ASTM-E-84, NFPA 225 or UL 723.

3. Insulation shall be as manufacture by "Manville" or as approved by the Mechanical Engineer, prior to installation.

4. Installation: By skilled appliers directly in the employ of firms with a minimum of five (5) years successful installation experience, specializing in this type of work.

5. Pipe Hangers shall be installed outside the insulation. This contractor shall insert a section of cellular glass insulation at the support of a length not less than twice pipe diameter.

2.024 EQUIPMENT IDENTIFICATION

Valves

2.01 Numbered brass disc attached to each valve for identification.

2.02 Valve tag shall be stamped to identify type of service and sequence number (i.e.: HW-I). Submit sample valve tag for approval prior to installation.

2.03 Valve directory to be provided with operations and maintenance submittals.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 OPERATING AND MAINTENANCE DATA

Data: Submit to the Architect for approval, prior to acceptance of the installation, complete and at one time. Partial or separate data will not be accepted. Data shall consist of the following-

1. Manufacturer's Literature: Six (6) copies of manufacturer's instructions for operation and maintenance of all equipment, valves, and controls; including replacement parts lists.

2. Written Instruction: Typewritten instruction for operation and maintenance of the system composed of Operation Instructions and Maintenance Instruction. Six (6) copies submitted to the Architect for approval.

3. Operating instructions shall contain a brief description of the system. Adjustments requiring the technical knowledge of the service agency personnel shall not be included in the operating instructions.

4. Maintenance instructions shall list each item (i.e. plumbing fixtures and equipment) requiring inspection, lubrication, or service and describe the performance of such maintenance.

5. Verbal Instructions: Operating personnel shall be instructed in the operation of the systems in accordance with typewritten instructions. No other verbal instructions shall be given.

6. Binders: Four (4) complete sets of the above data in loose-leaf, ring type binders with permanent covers, with identification on inside cover.

3.03 SPECIAL REQUIREMENTS

A. The manufacturer and/or supplier of all equipment shall certify in writing to the owner that this equipment complies with these specifications.

B. All new equipment shall be anchored as required and/or as detailed on drawings.

C. Written Certifications, in a form approved by the Mechanical Engineer, shall be provided by the equipment manufacturer or his authorized representative:

1. That the equipment and its installation was inspected on the job by the manufacturer and that the equipment is in first-class condition throughout, was installed in accordance with manufacturer's requirements and recommendations, and that the installation is approved by the manufacturer.

2. That the equipment is operating in a safe and satisfactory manner and is delivering capacities and performance hereinbefore specified and/or indicated on the drawings.

3. The following shall be certified as described above: All plumbing fixtures and domestic hot water heaters.

D. Damage by Leaks: The contractor shall be responsible for all damage to equipment and premises caused by leaks or breaks in piping or equipment for a period of one (1) year after date of final acceptance.

E. Unless otherwise directed, and/or specified, and/or indicated, all materials and equipment shall be installed in accordance with the manufacturer's recommendations and instructions.

F. Plumbing equipment shall bear the manufacturer's label or nameplate showing performance characteristics. Identifying size or model number shall be given only when not practicable or customary to show otherwise. All valves, pipe, fixtures and fittings shall bear the manufacturer's trademark or identifying markings.

G. All materials of similar class or service shall be of one manufacturer.

H. Plumbing piping layouts as shown on the drawings are subject to modifications, by contractor, without extra cost as required to clear other items of construction. This contractor shall coordinate the work of this section with that of other sections as to avoid interferences by other crafts involved.

I. Contractor shall visit site prior to bidding and fully acquaint himself with all conditions affecting installation of the proposed system. Failure to do so shall not relieve contractor of responsibility of providing complete, operational, and acceptable system.

3.04 COMPLETION

A. When the installation is complete and adjustments specified herein are made, the system shall be operated for a period of one week, during which time it shall be demonstrated to the Mechanical Engineer as being completed and operating in conformance with these specifications.

B. Record as-built drawings showing locations and size of all plumbing piping, fixtures, and equipment as installed shall be kept up-to-date and available for inspection at all times during construction. These shall be signed by the General Contractor and Plumbing Contractor to certify their accuracy and shall be submitted to the owner prior to final acceptance of the work.

***** END OF SECTION *****

SECTION 15600

HEATING. VENTILATING AND AIR CONDITIONING

PART 1 -- GENERAL

1.01 SCOPE

Work of this section includes everything necessary and incidental to completing heating, ventilating, and air conditioning work; except as herein specifically excluded.

1.02 GENERAL REQUIREMENTS

A. All core drilling, cutting, and patching for the installation of work under this section shall be performed under this section of the specifications. No holes will be allowed in any structural members without the written approval of the Architect.

B. Guarantee: Furnish a written guarantee form as stipulated in section "General Conditions," for a period of one (1) year from date of acceptance of work by the owner.

C. Materials:

1. All materials and equipment shall be new and in perfect condition when installed, of the best grade and of the same manufacturer throughout for each class or group of equipment. Materials not identified by name or manufacturer shall be comparable to that specified and as approved by the Architect. Maintain adequate job protection for all materials, equipment and work of other trades. Store all pipe at least four inches (4") above grade to avoid contact with water and dirt.

2. Unless otherwise directed by the Mechanical Engineer in writing, or specified or indicated, all materials, and equipment shall be installed in accordance with manufacturer's recommendations and instructions.

3. Mechanical equipment shall bear the manufacturer's label nameplate showing all performance characteristics. All valves, pipe fittings, etc., shall bear the manufacturer's trademark or identifying markings.

4. All materials of similar function or service shall be of one manufacturer.

D. Approval of Materials:

1. Within thirty (30) days after award of the contract, submit to the Architect, six (6) copies of a complete list of material and equipment proposed for the job including rating and capacity data, sizes, grade, electrical data, part or catalog number, manufacturer's name, pictures, catalog cuts, etc.

2. Submit with the above list, six (6) copies of complete shop drawings for all fabricated equipment and six (6) copies of complete control diagrams with descriptions and details.

3. Safety Compliance: All materials, equipment and installation shall comply with the requirements of "Occupational Safety and Health Act" (OSHA) Standards.

E. Verification of Dimensions:

1. All indicated dimensions are approximate and are given for estimating purposes only. Before proceeding with the work, this contractor shall carefully check and verify all dimensions, sizes, required clearances and shall assume full responsibility for the fitting of all equipment and materials herein required to other parts of the work and to the work of other trades.

2. The drawings are essentially diagrammatic to the extent that all offsets, bends, special fittings and locations are not exactly located.

F. This contractor shall comply with all contract documents in laying out his work and equipment. He shall coordinate the work of this section with the work of other trades and all job conditions.

1. The installation of valves, thermometers, gauges, dampers, duct access doors or other indicating equipment or specialties requiring reading, adjustment, inspection, repairs, removal or replacement shall be conveniently and accessibly located with reference to the finished building.

2. Where wall and ceiling access doors are required for access to mechanical equipment, doors shall be furnished arid installed under other sections. Coordinate this requirement with appropriate section of specifications.

G. Rough-in: Rough-in and final connections shall be provided for equipment furnished under other sections and by the owner in accordance with rough-in drawings furnished by others. Future equipment, as noted on the drawings, shall be provided with all required rough-in utilities.

H. Machinery Guards: All moving parts of machinery, such as shaft couplings, belt drives, etc., shall be adequately covered with removable metal guards to protect personnel from possible injury. Guards shall be furnished by the equipment manufacturer and shall comply with applicable requirements of applicable state agencies and OSHA.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions, Project Manual Section 00700.

1.04 SUBMITTALS AND TESTS

A. Requirements and Submittals:

1. Conformation to requirements of Uniform Mechanical Code-1995 Edition, local and/or State codes and/or Ordinances, including the Uniform City and County Building Codes, State County and City Health Department Ordinances, State of California Industrial Accident Commission Safety Orders.

2. Apply and pay for all permits, fees, inspections, examinations and tests required by any legally constituted authorities.

3. Submission of six (6) brochures containing certified manufacturer's drawings and cuts of all equipment and specialties within thirty (30) days after Contract is signed. Partial or incomplete submittals will be rejected and will be returned to Contractor for re-submittal.

a. Submittals shall be in a neat ring binder form and shall contain a complete list, in index form, of the manufacturer's names, cuts of equipment, performance data, catalog numbers and trade names; as required; to properly identify the materials and equipment to be furnished under these specifications.

b. Data submitted for each item shall be properly identified by reference to item number of paragraphs in the specifications and mechanical drawings' equipment schedule designation.

c. Any deviation from item as specified shall be clearly indicated on the submittal and noted as such.

d. These specifications and accompanying drawings specify and illustrate equipment and materials deemed most suitable for the service anticipated. This is not to preclude other products equally as good and

efficient. The contractor shall prepare his bid on the basis of the particular equipment and materials specified for the purpose of determining the low bid. The awarding of the contract shall constitute a contractual obligation to furnish the specified equipment and materials.

e. After the execution of the contract, should the contractor desire to substitute equipment other than that specified in the contract documents, such substitution will be considered for one reason only: The equipment proposed for substitution is superior in construction and efficiency to that specified herein.

f. In the event the contractor obtains the Engineer's approval of equipment other than that herein described; he shall, at his own expense, make any changes in the structures, buildings, or piping necessary to accommodate the equipment and shall furnish record drawings to the Engineer.

g. It will be assumed that the cost to the contractor of the equipment proposed to be substituted is less than that of the equipment specified in the contract documents; and, if the substitution is approved, the contract price shall be reduced by an amount equal to the savings.

B. AIR SYSTEMS TEST AND BALANCE

1. Work under this section shall include complete and total balancing of all equipment air systems.

2. This contractor shall procure the services of an independent Air Balance and Testing Agency, approved by the Engineer, which specializes in the balancing and testing of heating, ventilating, and air conditioning systems. All work of this agency shall be done under the supervision of a qualified Heating and Ventilating Engineer employed by them. All instruments used by this agency shall be accurately calibrated and maintained in good working order. Should the Contractor refuse of neglect to make tests necessary to satisfy Architects that requirements of Specifications and Drawing are met, such tests may be made by an independent testing company with the Contractor charged for all expenses.

3. Air balance and testing shall not begin until system has been completed and is in full working order. The contractor shall put all heating, ventilating, and air conditioning systems and equipment into full operation and shall continue the operation of same during each working day of testing and balancing.

4. Testing and Balancing: The air balance agency shall perform the following tests and balance systems in accordance with the following requirements:

a. Test and adjust belt drive blower RPM's to design requirements.

b. Test and record each motor full load ampere reading.

c. Make pilot traverse of main supply, return and exhaust ducts and obtain design CFM at fans.

d. Test and record system static pressures, suction and discharge.

e. Adjust main exhaust and return air ducts to proper design CFM.

f. Adjust all zones to proper design CFM, supply and return.

g. Test and adjust each diffuser, grille and register to within +/-5% of design requirements.

5. After balancing, the contractor shall demonstrate to the Mechanical Engineer, that the system is in balance and shall spot-check diffusers and registers at random to ascertain proper air delivery.

6. In preparing balance reports, contractor shall record information as required on ABC test sheets, No's 82020, 82030, 82033, 82035, 82040, 82100, 82101 and others as required.

7. In cooperation with the controls manufacturer's representative, set adjustments of automatically operated dampers to operate as specified, indicated, and/or noted.

8. All diffusers, grilles, and registers shall be adjusted to minimize drafts in all areas. As a part of the work of this contract, the air conditioning contractor shall make any changes in the pulleys, belts and dampers required for correct balance as recommended by the air balance agency.

PART 2 -- PRODUCTS

2.01 SHEET METAL

A. Layout: Drawings are in part diagrammatic and are intended to convey the scope of work and indicate the general arrangement of equipment, ducts and piping. Mechanical trades shall follow these drawings in laying out their work, consult general construction drawings to familiarize themselves with all conditions affecting their work and shall verify spaces in which their work will be installed. Where job conditions require changes in indicated locations and arrangement, make such changes at no additional cost to owner.

B. Description: Includes sheet metal plenums, ductwork, manually operated dampers and equipment connections.

C. Material: All sheet metal shall be fabricated of galvanized steel.

D. Low Pressure Duct Construction: Gauges, transverse joints, spacing of joints and intermediate bracing shall be as tabulated below, in which transverse joints are shown SS for S-stop, DS for drive slip, PS for pocket slip, and BS for bar slip. PS and BS lapped and riveted at corners. Intermediate bracing where shown may be omitted if duct sections of four feet (4'0") or less are used. Maximum spacing of bracing--four feet (4'0")

1. Schedule:

Shape	Size (in.)	Gauge	Transverse Joint	Bracing
Rect.	Up to 12	26	DS, SS	None
Rect.	13 to 18	24	DS, SS	None
Rect.	19 to 30	24	DS, SS	None
Rect.	31 to 42	22	1" PS, or BS	I x I x I-I/8
Rect.	43 to 54	22	1 1/2" standing seam	1.5 x 1.5
Round	Up to 9	24	2" slip	None
Round	9 to 14	24	4" slip	None
Round	14 to 23	22	4" slip	None

2. Alternate Transverse Joint: For rectangular duct sizes nineteen inches (19") and above, in lieu of the joint construction specified in Schedule 1 above, an alternate joint construction in "Ductmate" shall be acceptable. Submit shop drawings for approval.

3. Stiffening: Panels twenty inches (20") and larger shall be cross-broken unless standing seams are used and are spaced closer than thirty-six inches (36").

4. Changes in Direction and Size: Elbows with throat radius 75~ of the dimension of the adjacent duct as otherwise detailed. Ducturns used where indicated. In ducts twenty inches (20") wide or less, use Barber-Coleman ducturns or as approved. Transitions with lengths not shorter than those shown; minimum length of three feet (3'0") where not indicated. Round elbows shall be of 4-piece construction. Same gauge as adjacent duct. Round "Wye" fittings to have 45-degree side take-off tapped into reducing transition. Seal all joints as specified below.

5. Joints: Airtight for the purpose intended. Seal all joints with high pressure, flexible duct sealant with pressure tests to 10" of water column. Sealant shall be as manufactured by "Glenkote" or approved equal. Alternately, ductwork may be sealed with 6 oz canvas strips and Arabol. Pittsburgh lock or double seams excepted. Arabol shall be used full strength with no dilution. Duct tape shall not be used.

6. Supports: Ducts secured against displacement and vibration. Anchor to structural parts of building at intervals not greater than ten feet (10'0") and suspend with hanger straps. All supports shall be per SMACNA Standards. Submit shop drawings for approval.

7. Manual Dampers: Install where shown: manually operated, opposed blade dampers with interlocking edges, fabricated of 18-gauge steel and equipped with locking quadrants and end bearings. Duro Dyne SRH-228 damper regulators shall be installed on dampers in lined duct; SRST-I on wrapped duct, with proper offset for duct insulation. Each damper regulator rod, Duro Dyne model "SB." Submit shop drawings for approval.

8. All round "Wye" fittings shall include a manual volume damper with locking quadrant. Dampers shall be "Duro Dyne" JDS series or equal. Submit shop drawings for approval.

9. Turning vanes shall be double wall type. No exceptions.

10. Turning vanes in ducts twenty inches (20") wide and larger shall be double wall with perforate inner face and packed with fiberglass. Use "Sonoturn" or equal. Submit shop drawings for approval.

11. Register Boxes: Sheer metal register boxes shall be provided for all ceiling diffusers and registers with round duct connections. Register boxes shall be lined with one inch (1") duct liner and be complete with round starter collar, size as indicated on drawings. Submit shop drawing for approval.

12. Flexible ductwork shall be "GlassFlex" AVC-180 or equal, UL-181 Class I air duct, material tested and labeled with a flame and smoke raring of 25/50 or lower. The duct shall have R-4.5 fiberglass insulation and a 0.17 perm vapor barrier. Maximum length shall not exceed five feet (5'0"). Submit shop drawings for approval

13. The contractor shall verify all clearances on job prior to fabricating ductwork. Provide transitions and offsets as required to install the work and coordinate all clearances with other trades.

14. Provide "Duro Dyne" model TH-1 instrument port in each supply and return trunk for each specified system. Submit shop drawings for approval.

2.02 DUCT INSULATION

A. Line all ductwork where specified below with one inch (1") 1.5 PCF density moisture-resistant, fire-resistant, glass, sound absorbing duct liner. Liner shall be cemented to duct with "3M" #EC-104 adhesive. Where widths of ducts or casings exceed twenty inches (20"), both mechanical fasteners eighteen inches (18") on centers and adhesive

shall be used. Exposed edges securely cemented to prevent fraying. Dimensions of ducts are net inside liners. Manufacturer shall be "Manville" Linacoustic R or approved equal. Flame spread not over 25. Smoke developed not over 50. Liner shall meet all of the requirements of NFPA 90A & 90B. Submit shop drawings for approval on method of fastening and material.

1. All supply, return, and exhaust plenums.
2. Line all ductwork from inlet of exhaust fans upstream for a developed length of twenty feet (20'0") from the fan.
3. Line all register boxes with one-inch (1") duct liner.
4. In additional locations where shown on drawings.

B. Wrap all unlined ductwork in uninsulated or unconditioned areas with 1 ½", .75 pcf fire-resistant moisture resistant fiberglass insulation duct wrap. Insulation package shall have a flame spread rating of 25, and a smoke developed factor of 50 and shall meet all of the requirements of NFPA 90A & 90B. Duct wrap insulation shall consist of a blanket of glass fibers factory laminated to a reinforced foil vapor retarder facing with a 2" min. stapling and taping flange on one edge.

1. Duct wrap shall not exceed 25% compression during installation and shall carry an R-value of 4.2 installed.
2. Duct wrap sections shall be tightly butted to adjacent sections with the 2" flap overlapping the adjacent section. All joints to be stapled and taped with pressure sensitive tape matching the insulation facing, FRK backing stock or glass fabric and mastic. Seal all tears, punctures and other penetrations of the duct wrap facing with tape or mastic to provide a vapor-tight system.
3. Insulation shall be as manufactured by "Owens-Corning, or equal in "Manville" or "Armstrong".
4. Duct wrap shall be secured with #16 soft galvanized wire, spaced at twelve-inch centers. . No raw edges exposed will be acceptable.

2.03 CEILING DIFFUSERS AND REGISTERS

A. Performance:

1. Devices shall provide the required air throw and spread with no apparent drafts or excessive air movement within the ventilated or air conditioned area.
2. All air distribution accessories required to effect these conditions shall be provided and installed by this contractor.
3. Diffusers, grilles and registers causing excessive air movement, drafts or objectionable noise shall be replaced at no cost to the owner.

B. Ceiling Diffusers:

1. Diffusers shall be modular, removable core type, with adjustable volume control dampers.
2. Furnish diffusers in a factory applied, baked enamel finish. Color as selected by the Architect.
3. Diffusers shall be as manufactured by "Metalaire" Series 9000 MOD-FLO modular adjustable air diffusers, aluminum construction, or equal in "Anemostat."
4. Verify frame types prior to ordering. Submit Shop Drawings, including color samples, for approval.

5. Provide in the neck at each diffuser at duct takeoff from main duct, an adjustable type air extractor and volume controller. Submit shop drawings for approval.

6. Where air distribution devices are installed in lay-in ceilings, twenty four by twenty four (24" x 24") filler panel shall be provided. For ceiling diffusers larger than 24" x 24" (i.e. 30" x 22"), provide properly sized filler panel.

C. Sidewall Diffusers:

1. Diffusers shall be extruded aluminum linear bar grilles with sizes as shown on plans.

2. Deflection bars shall be 15° in a permanently fixed position.

3. Borders shall be 1" wide.

4. Grille and register sections shall be furnished in one piece up to 6 feet in length.

5. Bar Grille borders shall be mechanically fastened to provide a neat hairline corners.

6. Furnish all grilles with opposed blade dampers.

7. Grilles shall have a natural anodized finish, and shall be as manufactured by Metal*Aire or approved equal in "Anemostat" or "Titus".

D. Return/Exhaust Registers:

1. Registers shall be aluminum construction with key operated, opposed blade, volume Dampers.

2. Furnish all registers with a factory applied, baked enamel finish. Color as selected by the Architect.

3. Registers shall be as manufactured by "MetalAire" Model RH, or equal in "Anemostat."

4. Verify frame types prior to ordering. Submit shop drawings, including color samples, for approval.

5. Where registers are installed in lay-in ceilings, twenty four by twenty four (24" x 24") filler panel shall be provided. For return/exhaust registers larger than 24" x 24" (i.e. 30" x 22"), provide properly sized filler panel.

2.04 PACKAGED ROOF MOUNTED AIR CONDITIONING UNIT (GAS HEAT)

A. General:

1. Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing a scroll or reciprocating compressor for cooling duty and gas combustion for heating duty. Unit shall discharge supply air downward as shown on contract drawings. Units shall be manufactured by Carrier or approved equal. Substitute manufacturers shall meet all ratings on drawings, including SEER, cooling BTUH, and heating AFUE. Any substitute product not meeting any of the stated performance and efficiency ratings on the drawings shall be rejected.

B. Design Standards:

1. Unit shall be rated in accordance with ARI Standards 270 and 360. Designed in accordance with UL Standard 1995.

2. Unit shall be designed to conform to ANSI/ASHRAE 15.

3. Unit shall be UL tested and certified in accordance with ANSI Z21.47 Standards and CSA or CGA certified as a total package.

4. Unit casing shall be capable of withstanding Federal Test Method Standard 141 (Method 6061) 500-hour salt spray test.

C. Setup and Handling:

1. Unit shall be stored and handled per manufacturer's recommendations.

D. Cabinet:

1. Unit cabinet shall be constructed of galvanized steel, bonderized and coated with a pre-painted baked enamel finish.

2. Indoor blower compartment interior cabinet surfaces shall be insulated with a minimum 1/2 in. thick, flexible glass fiber insulation, coated on the air side. Aluminum foil faced glass fiber insulation shall be used in the furnace compartment.

3. Cabinet panels shall be easily removable for servicing.

4. Filters will be accessible through a hinged access panel.

5. Holes shall be provided in the base rails for rigging shackles to facilitate overhead rigging.

6. Unit shall have a factory-installed internal condensate drain trap providing a minimum 3/4-in. connection. Drain shall allow for no standing water accumulation per AHSRAE 62. Substitute manufacturers shall provide proof of compliance with ASHRAE 62.

E. Fans:

1. Indoor Blower (Evaporator Fan):

a. All fans shall be belt driven and include an adjustable- pitch motor pulley.

2. Condenser Fans shall be of the direct driven propeller type with corrosion-resistant blades riveted to corrosion-resistant steel supports. They shall be dynamically balanced and discharge air upwards.

F. Compressor:

1. Hermetic type shall be factory rubber shock mounted and internally spring mounted for vibration isolation.

2. Factory-installed crankcase heater to prevent refrigerant dilution of oil.

G. Coils:

1. Evaporator and condenser coils shall have aluminum plate fins mechanically bonded to seamless copper tubes with all joints brazed.

H. Heating Section:

1. Induced draft combustion type with energy saving direct spark ignition system and redundant main gas valve.

2. The heat exchanger shall be of the tubular section type constructed of minimum of 20-gauge steel coated with a nominal 1.2-mil aluminum-silicone alloy for corrosion resistance.

I. Refrigerant Components:

1. Fixed expansion device with filter driers.

J. Filter Section:

1. FARR 30% disposable 2 inch filter or equal installed separately in RA duct and economizer outside air intake.

K. Controls and Safeties:

1. Unit Controls: Unit shall be complete with self-contained low-voltage control circuit protected by a manually resetable circuit breaker on the 24V side.

   a. Economizer Control

   b. Capacity control

2. Safeties:

   a. Unit shall incorporate a solid-state compressor protector which provides reset capability at the space thermostat, should any of the following safety devices trip and shut off compressor:

      1. Compressor over temperature, over current.

      2. Low-pressure switch.

      3. Freezestat, evaporator coil.

      4. High-pressure switch.

   b. Heating section shall be provided with the following minimum protections:

      1. High temperature limit switch.

      2. Induced draft motor centrifugal switch.

      3. Flame rollout switch (manual reset).

      4. Flame proving controls.

      5. Redundant Gas valve.

3. Operating Characteristics:

   a. Unit shall be capable of starting and running at 115 degrees F ambient outdoor temperature per maximum load criteria of ARI Standard 360.

   b. Compressor with standard controls shall be capable of cooling operation down to 25 degrees F outdoor ambient temperature.

   c. Unit provided with fan time delay to prevent cold air delivery before heat exchanger warms up.

4. Electrical Requirements:

   a. All unit power wiring shall enter unit cabinet at a single location.

L. Special Features:

1. Roof Curb: Formed 18 gauge galvanized steel shipped completely assembled with wood nailer strip, welded corners, and integral 2-in. spring isolation. Minimum curb height shall be 14 inches, including the spring isolation.

M. Integrated Economizer:

1. Integrated, fully modulating type field-installed capable of simultaneous economizer and compressor operation, to provide cooling with outside air.

2. Economizer shall be installed within the unit cabinet and equipped with centrifugal fan powered exhaust fan.

3. Provide FARR 30% disposable filter for OSA filtration.

4. Provide solid-state dual enthalpy control.

2.05 EXHAUST FANS (CEILING MOUNTED)

A. General

1. Fan shall be direct driven, ceiling mounted, with centrifugal blower.

2. See equipment schedule for capacities and duty of each exhaust fan to be provided and plans for layout details.

3. Fans shall be U.L. Listed and all electrical components shall carry the listing and comply with the State of California Electrical Code.

4. Fans shall be as manufactured by "Cook," or approved equal in "Greenheck" or "Penn."

B. Quality Assurance

1. Exhaust fans shall be design certified by AMCA.

2. All fans shall be statically and dynamically balanced.

C. Construction

1. The drive frame, bearing, and motor plates shall be constructed of mild gauge steel.

D. Motors

1. Motors shall be heavy duty, 1750 RPM, open drip-proof, horsepower and voltage as indicated on equipment schedule.

2. Motors shall be equipped with permanently lubricated, sealed ball bearings.

2.06 AUTOMATIC TEMPERATURE CONTROLS

A. Description: A complete system of automatic controls installed to control the equipment, consisting of a system of electronic and/or electric controls to provide the heating, ventilating and air conditioning results specified, as intended, and as shown on the drawings. All controls provided shall be the responsibility of a single manufacturer. The contractor shall furnish and install such additional material, equipment and appurtenances as required to make satisfactory operating Systems.

B. Work Included: The Mechanical Contractor shall be responsible for furnishing all the automatic temperature control devices as shown on the plans. He shall secure the services of the temperature control manufacturer to install all temperature control devices, except those specified as being furnished with other equipment. The temperature control manufacturer shall also-

1. Submit shop drawings of proposed temperature control system showing electrical interlocks with all mechanical equipment, list of materials being furnished, and a detailed description of the control sequence. These shop drawings shall completely show, in detail, all wiring, both control and power, for all heating and air conditioning equipment and systems. Failure to provide complete submittal will result in rejection of the product.

2. Instruct the electrician, sheet metal worker, and pipe fitter on the particular requirements of control devices for which each is responsible.

3. Calibrate all devices and make all final settings and test out control system under actual operating conditions for satisfactory operation.

4. Deliver and hang a copy of the control diagram, material list and control sequence, inclusive, on a permanent type of print, framed behind glass and mounted as directed by the Architect in the field. All control devices on the diagram shall be clearly labeled as to location and function.

5. Contact operating personnel, instruct them on the operation and maintenance of the control system and provide as hereinafter specified.

6. All low voltage wiring shall be furnished and installed by the Mechanical Contractor. Conduit for low voltage wire shall be furnished and installed under the Electrical Section of the specifications.

C. Work Not Included: All line voltage wiring, including conduit shall be under the Electrical Section of the specifications.

2.07 EQUIPMENT IDENTIFICATION

Equipment

1. Stenciled identification for each piece of equipment installed.

2. Equipment identification tags to match plan numbers.

3. Submit equipment stenciling for approval by Mechanical Engineer, prior to installation.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 EQUIPMENT

A. Regulation, Operation and Instruction

1. Lubricate all bearings in accordance with manufacturer's recommendations and instructions.

2. Check operation of all pumps, fans, motors, etc.

3. The services of a qualified technician shall be made available for a continuos period of not less than seventy two (72) hours during business hours, at a time convenient to the owner to place the entire system into operation, supervise its operation, make all tests and adjustments, correct any and all defects and deficiencies and thoroughly instruct the owner's operators in the proper operation and maintenance of the entire system. Furnish complete test reports including all motor currents, static pressures, temperatures, fan speeds, and CFM to the Architect for review by the Mechanical Engineer.

4. Furnish any additional operation, labor, and material that may be required during guarantee period.

5. The contractor shall, during the guarantee period, and as directed by the owner, make any additional tests, adjustments, etc., that may be required and correct any deficiencies arising from the operation of the system.

3.03 OPERATING AND MAINTENANCE DATA

Data: Submit to the Architect for approval, prior to acceptance of the installation, complete and at one time. Partial or separate data will not be accepted. Data shall consist of the following--

1. Manufacturer's Literature: Six (6) copies of manufacturer's instructions for operation and maintenance of all equipment, valves, and controls; including replacement parts lists.

2. Written Instruction: Typewritten instruction for operation and maintenance of the system composed of Operation Instructions and Maintenance Instruction. Six (6) copies submitted to the Architect for approval.

   a. Operating instructions shall contain a brief description of the system. Adjustments requiring the technical knowledge of the service agency personnel shall not be included in the operating instructions.

   b. Maintenance instructions shall list each item (i.e. controls and mechanical equipment) requiring inspection, lubrication, or service and describe the performance of such maintenance.

3. Verbal Instructions: Operating personnel shall be instructed in the operation of the systems in accordance with typewritten instructions. No other verbal instructions shall be given.

4. Binders: Four (4) complete sets of the above data in looseleaf, ring type binders with permanent covers, with identification on inside cover.

3.04 SPECIAL REQUIREMENTS

A. The manufacturer and/or supplier of all equipment shall certify in writing to the owner that this equipment complies with these specifications.

B. All new equipment shall be anchored as required and/or as detailed on drawings.

C. Written Certifications, in a form approved by the Mechanical Engineer shall be provided by the equipment manufacturer or his authorized representative:

   1. That the equipment and its installation was inspected on the job by the manufacturer and that the equipment is in first-class condition throughout, was installed in accordance with manufacturer's requirements and recommendations, and that the installation is approved by the manufacturer.

   2. That the equipment is operating in a safe and satisfactory manner and is delivering capacities and performance hereinbefore specified and/or indicated on the drawings.

D. The following shall be certified as described above: Air-conditioning systems, evaporative coolers, suspended gas heaters, and exhaust fans.

E. Damage by Leaks: The contractor shall be responsible for all damage to equipment and premises caused by leaks or breaks in piping or equipment for a period of one (1) year after date of final acceptance.

F. Unless otherwise directed, and/or specified, and/or indicated, all materials and equipment shall be installed in accordance with the manufacturer's recommendations and instructions.

G. Mechanical equipment shall bear the manufacturer's label or nameplate showing performance characteristics. Identifying size or model number shall be given only when not practicable or customary to show otherwise. All valves, pipe, and fittings shall bear the manufacturer's trademark or identifying markings.

H. All materials of similar class or service shall be of one manufacturer.

I. Duct layout as shown on the drawings is subject to modifications, by contractor, without extra cost as required to clear other items of construction. This contractor shall coordinate the work of this section with that of other sections as to avoid interferences by other crafts involved.

J. Contractor shall visit site prior to bidding and fully acquaint himself with all conditions affecting installation of the proposed system. Failure to do so shall not relieve contractor of responsibility of providing complete, operational, and acceptable system.

3.05 COMPLETION

A. When the installation is complete and adjustments specified herein are made, the system shall be operated for a period of one week, during which time it shall be demonstrated to the Mechanical Engineer as being completed and operating in conformance with these specifications.

B. Record as-built drawings showing locations and size of all pipe and ducts as installed shall be kept up-to-date and available for inspection at all times during construction. These shall be signed by the General Contractor and Heating, Ventilating, and Air Conditioning Contractor to certify their accuracy and shall be submitted to the owner prior to final acceptance of the work.

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SECTION 16000

ELECTRICAL

PART 1-- GENERAL

1.01 SCOPE

A. Provide all labor, materials, and equipment required to complete the electrical work shown on the Drawings and specified herein.

B. A brief outline of these requirements includes, but is not limited to the following:

1. Underground conduits, pullboxes, pads, vaults, etc. for power
2. Electrical distribution equipment including switchgear
3. Complete interior and exterior lighting, power, telephone, and cable television systems including branch circuit distribution as indicated.

1.02 LISTINGS AND CODES.

A. All electrical materials and equipment shall be new and shall be listed by Underwriters Laboratories (UL) and bear their label, or listed and certified by a nationally recognized testing authority where UL does not have a listing. In addition, the materials, equipment, and installation shall comply with the requirements, where applicable, of the latest edition of the following:

1. National Electrical Manufacturers Association (NEMA)
2. American Standard Association (ASA)
3. National Fire Protection Agency (NFPA)
4. American National Standard Institute (ANSI)
5. California Code of Regulation, Title 24 (CCR)
6. National electrical code (NEC)
7. All local and state codes having jurisdiction

B. In cases where the codes have different levels of requirements, the most stringent rule shall apply.

1.03 SHOP DRAWINGS.

A. Contractor shall submit to the architect for approval six (6) sets of a complete list and catalog cuts of all materials he proposes to provide for the electrical systems covered by these drawings. Each electrical item shall be identified by the manufacturer and trade name of the item as well as the description given on the electrical engineers plans. Unless otherwise specifically authorized by the electrical engineer, make all submittals in groups containing all associated items. The electrical engineer may reject partial submittals as not complying with the provisions of this section. No materials shall be delivered to the job until the list has been approved by the engineer. Acceptance or rejection of substitute materials shall be at the discretion of the engineer.

B. Make all submittals in accordance with the general contractor's schedule of shop drawings and far enough in advance of scheduled dates of installation to provide required time for reviews, securing necessary approvals, possible revision and resubmittal, including placing orders and securing delivery.

1.04 LOCATIONS AND ACCESSIBILITY.

Work specified and not clearly defined by the Drawings shall be brought to the attention of the

electrical engineer prior to installation so that it may be installed and arranged in a satisfactory manner.

1.05 TESTING AND ADJUSTMENT.

A. Upon completion of electrical work, adjust and test circuits, lights and other electrical items to insure proper operation of all electrical equipment.

B. Check service voltages under maximum obtainable loads. Equipment, fixtures, and parts found to be in need of correction during such testing shall be immediately repaired or replaced with new equipment and that part of the system shall be retested. Such replacement or repair shall be done at no additional cost to the owner.

C. All failures shall be corrected in a manner satisfactory to the engineer. The contractor shall furnish all necessary costs of retesting equipment and correcting failures.

D. All electrical tests shall be witnessed by an inspector that shall have experience in electrical work, equal to that of an electrician having at least five (5) years experience as an I.B.E.W. journeyman.

1.06 LAYOUT AND INSTALLATION.

Layout and installation of electrical work shall be coordinated with the overall construction schedule and work schedule of various trades, to prevent delay in the completion of the project. Complete Drawings for the entire project shall be available at the job site. It shall be obligatory to thoroughly check these documents before organizing the electrical work schedule or installing material and equipment.

1. The electrical Drawings are diagrammatic in nature and indicate the preferred locations of outlets and equipment, and are to be followed as closely as possible. It is not within the scope of the Drawings to show all bends, offsets, pullboxes, and obstructions and it shall be the responsibility of the contractor to include such in the bid. The Drawings are not intended to be scaled, and the contractor shall refer to the architectural and structural Drawings for dimensions and limitations of the building structure, and to the mechanical Drawings for the location of equipment requiring electrical service and connections.

2. In the event that changes in the indicated locations or arrangements are necessary due to field conditions, such changes shall be made by the contractor without extra costs, providing the change has been approved by the architect before the work has been commenced and no additional materials are required. Contractor shall advise the architect of any required additional costs and have approval of same before proceeding.

1.07 WARRANTY.

The manufacturer=s standard warranty shall in no event be for a period of less than two (2) years from date of initial start-up of the system and shall include repair parts, labor, reasonable travel expense necessary for repairs at the job site, and expendables filters, and other service items made unusable by the defect) used during the course of repair. Running hours shall not be a limiting factor for the system warranty by either the manufacturer or servicing distributor. Submittals received without written warranties as specified will be rejected in their entirety.

1.08 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions, Project Manual Section 00700.

PART 2 -- PRODUCTS

2.01. DISTRIBUTION SERVICE EQUIPMENT AND PANELBOARDS.

A. Panelboards shall as indicated on plans and shall conform to the requirements of the U.L., NEMA standard for panelboards. Fronts shall be finished to resist corrosion with not less than one priming coat and one finishing coat. Exposed parts of trim and doors shall be painted by others after installation. All branch circuit panelboard locks shall be "like keyed" with three keys furnished to owner. Adjacent poles of single pole devices shall be of a different phase with split phase bussing. Circuits shall be numbered from top to bottom with odd numbers on the left and even numbers on the right. The front shall include flush hinged door with lock, covering all breakers.

B. Identification nameplates shall be provided of micarta 1/8" thick, of approved size, with bevelled edges and engraved white letters 1/4" high minimum on black background.

2.02. CONDUITS AND RACEWAYS.

A. All conduits and raceways shall conform to U.L. standards as applicable.

B. Electrical metallic tubing (EMT). No less than 1/2" trade size, 2" maximum trade size. E.M.T. may be used in dry locations only. Shall conform to U.L. standards as applicable.

C. Rigid galvanized steel conduit (RGS). Shall be steel, galvanized or zinc coated full weight, no less than 1/2" trade size. Shall conform to U.L. standards as applicable.

D. Liquid-tight flexible conduit. No less than 1/2" trade size, flexible, galvanized steel core completely encased in a polyvinyl chloride jacket. Shall conform to U.L. standards as applicable.

E. Non-metallic polyvinyl chloride (PVC). No less than 3/4" trade size, schedule #40 unless noted otherwise. Sunlight resistant and rated for 90° c. Conductors. Shall conform to U.L. standards as applicable.

F. Flexible metallic conduit. No less than 1/2" trade size, steel, formed from continuous strip and zinc coated. Shall conform to U.L. standards as applicable.

2.03. FITTINGS. Fittings and outlets for conduit systems shall conform to the following:

A. Fittings for electrical metallic tubing (EMT) for sizes 1/2" through 2" shall be wrench tightened compression type which shall provide pull-on force resistance and electrical continuity as required by U.L. No indenting fittings or adjustable set screw type fittings shall be used.

B. Fittings for rigid galvanized steel conduit (RGS) shall be steel, threaded fittings only. Split and "set screw" type fittings are not acceptable.

C. Fittings for liquid-tight flexible conduit shall be of the compression type with threaded ferrule, sealing ring and suitable for wet locations.

D. Fittings for PVC shall be non-metallic, sunlight resistant, and of the same compound as the conduits which they are being utilized with.

E. Fittings for flexible metallic conduit shall be of the "squeeze" type with either one (1) or two (2) screws, cast or malleable steel, cadmium or zinc coated.

2.04. CONDUCTORS.

A. Conductor sizes are specified by American Wire Gauge (AWG). Conductors shall be copper. Wire sizes #10 and larger shall be stranded conductor. However, control and signal systems may be wired with #14 stranded. Insulation for wiring shall be 600 volt type "THWN", 75° c. Rated for dry or wet locations or type "THHN", 90° c. Rated for dry locations.

B. Conductor sizes shall be as indicated; where sizes are not indicated they shall be as required by code. All wiring shall be color coded for phase identification as follows:

<u>120/208V. 3Phase, 4W.</u>	<u>277/480V. 3Phase, 4W.</u>
Phase A = Black	Phase A = Brown

Phase B = Red	Phase B = Orange
Phase C = Blue	Phase C = Yellow
Neutral = White	Neutral = Grey
Ground = Green	Ground = Green

C. Make splices for conductors #8 and smaller with steel or copper spring insulated wire nuts. Splices for conductors #6 or larger shall be with split bolts or "Kearney's" which when used shall be thoroughly insulated.

D. The green ground wire shown on conduit runs shall run continuous from panel to last outlet. This wire shall be pigtailed in each outlet for connection to box and device so that if the device is removed, the ground will not be interrupted.

2.05. OUTLET BOXES.

Pull boxes shall be sized for the number and size of conductors and conduits entering the box and equipped with plaster/extension rings where required. All boxes shall be labeled to indicate panel and circuit number of conductors contained within. In no case shall any box be less than 4" round or square. Unless specifically noted otherwise, outlet boxes for concealed work shall be galvanized or sherardized, one piece, pressed steel, with knockouts as required.

2.06. PULL BOXES.

Sizes as indicated on the Drawings and per utility company requirements, but in no case of less size or material thickness than required by the governing code in-ground. Pull boxes located in or around vehicular traffic areas shall be provided with traffic rated covers and shall be placed to avoid surface water flow areas. All covers shall be permanently identified as to the type of service contained therein (IE: power, communications, etc.) Above-ground boxes located in damp or wet areas shall be rated NEMA 3R.

2.07. DISCONNECTS.

A. Manual motor starter switches shall be toggle type on/off, as required for control of single and three phase motors and resistance heater loads. Switches shall be side wired and be complete with oversize silver contacts. Shall be U.L. listed as applicable

B. Safety switches shall be heavy-duty industrial type. Switches shall be fused or nonfused as indicated on the Drawings. Enclosures shall be rated either NEMA 1 or NEMA 3R as required by installation. Units shall be quick make, quick break with operating handle which can be padlocked in the "off" position. Finish shall be a standard light gray enamel. Switches shall have affixed to covers, a nameplate indicating what item is controlled by switch.

1. Fuses shall be of correct rating for each installation, and shall be either current limiting or multi-element time delay as required by equipment manufacturers recommendation. Shall be U.L. listed.

A. Sealing of devices in hazardous areas are to be treated per NEC Article 500

2.08. PULL WIRES.

Install an unspliced pull line in all empty conduits. Pull line shall be a 3/16" braided polypropylene line.

2.09. GROUND RODS.

Provide steel centered copper clad ground rods as required per NEC 250. Minimum length shall be 3/4" x 8', driven nearly full length into the earth with no more than 2" left above grade for proper connection to the grounding conductor(s). The resistance of a made electrode must comply with NEC 250-36.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 GENERAL.

Any cutting, patching or finish repair of the work or work of other trades necessary for the installation of the electrical work shall be provided under this section.

3.03 MISCELLANEOUS.

A. Provide trenching, concrete encasement when required, backfilling and compaction for all underground conduits and/or structures. Compaction must meet General Contractor requirements.

B. Provide footings for all post and/or pole-mounted lighting fixtures: concrete shall conform to the applicable sections of this specification and local codes having jurisdiction.

C. Structural and miscellaneous steel used in connection with electrical work and located out-of-doors or in damp locations, shall be galvanized unless noted otherwise. Included are underground pullbox covers, unistrut bracing and similar electrical items.

D. Flashings shall be provided at all points where conduit or other electrical components penetrate the roof. Flashings shall extend a minimum of 5" above the surrounding roof surface with weatherproof mastic applied, to prevent moisture or dust from entering the opening. Flashings shall be delivered to the roofing contractor for installation. The correct location of all such penetrations shall be verified by the contractor.

E. Provide sleeves under walls, concrete footings and foundations. Sleeves shall have an inside diameter of not less than 1" larger than the outside diameter of conduit contained therein.

3.04 CONDUIT.

A. Conduit for line voltage wiring shall be concealed within finished walls, ceilings and under/in floors. Exposed conduits above ceilings and surface mounted in mechanical and service areas shall be installed parallel or perpendicular to the building walls. Right angle turns shall consist of conduit bodies or symmetrical bends. All conduits shall be properly secured with components specifically manufactured for this use. All conduits shall be sized in accordance with fill capacities set forth in NEC Article 348.

B. Electrical metallic tubing (EMT), Do not embed EMT in concrete or below grade. EMT may be used where concealed or where not subject to damage.

C. Rigid galvanized steel conduit (RGS) shall be used in mechanical rooms, where conduit passes through concrete slabs on grade and where subject to physical damage.

D. Flexible metallic conduit shall be used for final connections to all vibrating and mechanical equipment. A code gauge green insulated equipment grounding conductor shall be installed in such conduits. Flexible metallic conduit may be used in length's of less than 6' for connecting fixtures, provided that a code gauge insulated grounding conductor is provided. Liquid-tight flexible conduit shall be used for all damp or wet locations.

E. Polyvinyl chloride conduit (PVC) shall only be used underground at depth per code, unless otherwise noted, below finished grade when not installed under a concrete slab or footing. Provide a code gauge green ground wire in all PVC runs. All underground conduit runs shall terminate with pre-manufactured bell ends at all manholes and pull boxes.

F. Conduit ends shall be cut square and shall be carefully reamed out to full size with a tapered

burring reamer and shouldered to the fittings.

G. Bends in conduit shall be made so that the conduit will not be damaged, and that the internal diameter of the conduit will not be effectively reduced. The radius of the curve of the inner edge shall not be less than shown in table 346-10 of the NEC.

H. Conduit supports shall be provided for all above ground systems. Conduit shall be securely supported and fastened per the NEC and local jurisdiction

I. Conduit shall not run closer than 6" to any hot water pipe, steam pipe, heater flue, or vent.

J. Condulets shall be used where conduit runs must go around outside corners of walls, beams, equipment, etc. All condulet covers shall be accessible.

K. All conduits entering or leaving the building shall be sealed per NEC requirements.

L. All conduits entering the building from a hazardous area must be sealed per NEC Article 500.

3.05 CONDUCTORS AND TERMINATIONS.

A. Wire and cable shall be continuous from outlet to outlet, with the splices only in junction boxes, gutters, equipment or other approved locations.

B. Make splices, joints, taps and connections to equipment with approved solderless lugs sized for the wire or conductor involved.

C. Identify power and lighting feeders with permanent tags at panels, pull boxes and points where conduit run is broken.

D. Installation. Thoroughly clean conduit and wireways to insure all parts are perfectly dry before pulling wires. Use approved wire pulling compound for sizes #2 or larger, and on long runs.

E. Wire or cable bends in junction and/or pullboxes shall be made with a long radius. Bends for cable shall have a radius of not less than 8 times the diameter of the cable. Per N.E.C. Section 300-34.

F. Conductors #12 and smaller shall be provided with eye or forked type compression set connectors when conductors are terminated on a set screw type terminal.

3.06 DEVICE AND JUNCTION BOXES.

A. Concealed outlet boxes shall be accurately placed, flush with the finished surface of wall or ceiling, unless otherwise indicated. They shall be plumb and rigidly fastened to the structure, independent of the conduit, by a bar hanger or strap approved for that particular use.

B. Outlet boxes in furred ceiling shall be rigidly fastened to the supporting structure by an approved bar type hanger or blocking.

C. Control apparatus, outlet boxes, junction and/or pullboxes, and other similar equipment shall be installed and maintained in accessible positions and locations.

D. Wall outlets shall not be wired back-to-back, boxes on opposite sides of a common wall shall be separated by a stud. Provide a minimum of 24" of separation in acoustic and fire rated walls.

E. Cast steel or aluminum outlet boxes shall be used for all surface mounting in damp or wet locations. Boxes shall be complete with threaded hubs and weatherproof covers.

F. Provide multi-gang boxes where required, sectional or gangable boxes shall not be permitted.

3.07 GROUNDING.

All Grounding shall be in accordance with NEC Article 250

3.08 IDENTIFICATION.

A. In addition to nameplates and governing codes for switchboards, panelboards, transformers, etc. The following shall be labeled to indicate function or use.

B. Panelboards shall be provided with a typed circuit directory mounted in a holder on the inside of the cabinet door. Nameplates shall be provided for all circuits in the service distribution and branch distribution boards, motor control centers, lighting control panels, separately mounted starting switches, disconnection switches. Motor control push-button stations, selector switches, transformers, terminal cabinets, telephone cabinets, etc. These nameplates shall have the same identification names as indicated on the plans.

3.09 CONNECTIONS TO EQUIPMENT.

The contractor shall connect all owner, mechanical and plumbing contractor supplied equipment requiring electrical connections throughout the building.

3.010 FINISH.

Panelboards shall be finished prime coat on exposed trim and door. Final finish will be determined by architect and provided by others.

3.011 PROTECTION AND RESPONSIBILITY.

The contractor shall protect all work, materials, and equipment from damage. Provide adequate and proper storage facilities during progress of work and be fully responsible for all injury or damage that may occur from any part of his work function.

3.012 CLEAN-UP.

Upon completion of work, and periodically as required for safety and sanitation, remove all trash and debris resulting from work under this section.

3.013 OPERATION AND MAINTENANCE INSTRUCTIONS.

Fully instruct and demonstrate to the owner's operating personnel the performance, operation and maintenance of equipment. The time allowed for said instruction shall be included as part of these contract documents.

3.014 FINAL REVIEW AND ACCEPTANCE.

Upon stated completion of contract, work shall be subject to review by representatives of owner, architect and engineer for adherence to contract Drawings and specifications. Any changes required to bring work into substantial conformance with Drawings and specifications shall be made by the contractor at no additional cost to the owner.

3.015 RECORD DRAWINGS.

Provide and maintain in good order a complete set of electrical contract prints. All changes shall be clearly recorded on this set of prints. At the end of the project, the contractor shall transfer all changes to one set of transparencies for submission to the architect. Accurate complete electrical contract prints shall be provided by the contractor to the architect when requested and at cost of printing. Upon completion of the work, deliver to the architect one complete set of final prints of the transparencies and the transparencies themselves, with complete installation and changes in the work indicated thereon. All sheets shall be dated and initialed by the contractor as being a correct and accurate record of the installation.

"END OF SECTION"

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SECTION 16721

FIRE ALARM SYSTEMS

PART 1 -- GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes fire alarm systems.

B. This specification represents the County's minimum requirements for a complete, proper, approved and operating Fire Protection System. Contractor shall be responsible for a design-build Fire Protection System including compliance with all applicable codes and requirements of the agency having jurisdiction (County of Riverside Fire Dept). Contractor to create required drawings and submit to the agency having jurisdiction for plan check and approval and shall acquire a permit and perform all installation, coordination, inspections and testing, as well as provide all materials and services necessary for a complete, approved and operational Fire Protection System.

1.03 DEFINITIONS

A. FACP: Fire alarm control panel.

B. LED: Light-emitting diode.

C. NICET: National Institute for Certification in Engineering Technologies.

D. Definitions in NFPA 72, 1999 Edition, apply to fire alarm terms used in this Section.

1.04 SYSTEM DESCRIPTION

Noncoded, analog-addressable system; automatic sensitivity control of certain smoke detectors; and multiplexed signal transmission dedicated to fire alarm service only.

1. Interface with existing fire alarm system.

1.05 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 72, 1999 Edition, CBC, CFC & Titles 19 and 24 CCR.

B. Fire alarm signal initiation shall be by one or more of the following devices:

1. Manual stations.
2. Heat detectors.
3. Flame detectors.
4. Smoke detectors.
5. Verified automatic alarm operation of smoke detectors.

6. Automatic sprinkler system water flow.
7. Fire extinguishing system operation.
8. Fire standpipe system.
9. Duct smoke detectors.
10. Tamper switch
11. Flow switch

C. Fire alarm signal shall initiate the following actions:
1. Alarm notification appliances shall operate continuously.
2. Identify alarm at the FACP and remote annunciators.
3. De-energize electromagnetic door holders.
4. Transmit an alarm signal to the remote alarm receiving station.
5. Unlock electric door locks in designated egress paths.
6. Release fire and smoke doors held open by magnetic door holders.
7. Activate voice/alarm communication system.
8. Switch heating, ventilating, and air-conditioning equipment controls to fire alarm mode.
9. Close smoke dampers in air ducts of system serving zone where alarm was initiated.
10. Record events in the system memory.
11. Record events by the system printer.
12. Sound fire sprinkler bell (as applicable)

D. Supervisory signal initiation shall be by one or more of the following devices or actions:
1. Operation of a fire-protection system valve tamper.

E. System trouble signal initiation shall be by one or more of the following devices or actions:
1. Open circuits, shorts and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.
2. Opening, tampering, or removal of alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at the FACP.
4. Ground or a single break in FACP internal circuits.
5. Abnormal ac voltage at the FACP.
6. A break in standby battery circuitry.
7. Failure of battery charging.
8. Abnormal position of any switch at the FACP or annunciator.
9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
10. Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system.

F. System Trouble and Supervisory Signal Actions: Ring trouble bell and annunciate at the FACP and remote annunciators. Record the event on system printer.

1.06 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions, Project Manual Section 00700.

1.07 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Shop Drawings shall be prepared by persons with the following qualifications:

   a. Trained and certified by manufacturer in fire alarm system design.

   b. Fire alarm certified by NICET, minimum Level III.

2. System Operation Description: Detailed description for this Project, including method of operation and supervision of each type of circuit and sequence of operations for manually and automatically initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are not acceptable.

3. Device Address List: Coordinate with final system programming.

4. System riser diagram with device addresses, conduit sizes, and cable and wire types and sizes.

5. Wiring Diagrams: Power, signal, and control wiring. Include diagrams for equipment and for system with all terminals and interconnections identified. Show wiring color code.

6. Batteries: Size calculations.

7. Duct Smoke Detectors: Performance parameters and installation details for each detector, verifying that each detector is listed for the complete range of air velocity, temperature, and humidity possible when air-handling system is operating.

8. Ductwork Coordination Drawings: Plans, sections, and elevations of ducts, drawn to scale and coordinating the installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, the detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.

9. Voice/Alarm Signaling Service: Equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.

10. Floor Plans: Indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.

11. Voltage Drop Calculations

12. Fire alarm devices system equipment list describing functions and CSFM listing number

C. Qualification Data: For Installer.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For fire alarm system to include in emergency, operation, and maintenance manuals. Comply with NFPA 72, Appendix A, recommendations for Owner's manual. Include abbreviated operating instructions for mounting at the FACP.

F. Submittals to Authorities Having Jurisdiction: In addition to distribution requirements for submittals specified in Division 01 Section "Submittals," make an identical submittal to authorities having jurisdiction. To facilitate review, include copies of annotated Contract Drawings as needed to depict component locations. Resubmit if required to make clarifications or revisions to obtain approval. On receipt of comments from authorities having jurisdiction, submit them to Architect for review.

G. Documentation:

1. Approval and Acceptance: Provide the "Record of Completion" form according to NFPA 72 to Owner, Architect, and authorities having jurisdiction.

2. Record of Completion Documents: Provide the "Permanent Records" according to NFPA 72 to Owner, Architect, and authorities having jurisdiction. Format of the written sequence of operation shall be the optional input/output matrix.

   a. Hard copies on paper to Owner, Architect, and authorities having jurisdiction.

   b. Electronic media may be provided to Architect and authorities having jurisdiction.

1.08 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.09 PROJECT CONDITIONS

Interruption of Existing Fire Alarm Service: Do not interrupt fire alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:

1. Notify Architect no fewer than fourteen days in advance of proposed interruption of fire alarm service.

2. Do not proceed with interruption of fire alarm service without Architect's and Owner's written permission.

1.010 SEQUENCING AND SCHEDULING

A. Existing Fire Alarm Equipment: Maintain fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service and label existing fire alarm equipment "NOT IN SERVICE" until removed from the building.

B. Equipment Removal: After acceptance of the new fire alarm system, remove existing disconnected fire alarm equipment.

1.011 EXTRA MATERIALS

Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but not less than 1 unit.
2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but not less than 1 unit.
3. Smoke, Fire, and Flame Detectors: Quantity equal to 10 percent of amount of each type installed, but not less than 1 unit of each type.
4. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but not less than 1 unit of each type.
5. Keys and Tools: One extra set for access to locked and tamperproofed components.
6. Audible and Visual Notification Appliances: One of each type installed.
7. Fuses: Two of each type installed in the system.

PART 2 -- PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

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

1. FACP and Equipment:
   a. Fire Control Instruments, Inc.; a GE-Honeywell Company.
   b. Or approved equal
2. Wire and Cable:
   a. Belden, West Penn Wire/CDT; a division of Cable Design Technologies.
   b. Or approved equal.
3. Audible and Visual Signals:
   a. Wheelock Inc..
   b. Or approved equal

2.02 EXISTING FIRE ALARM SYSTEM

A. Compatibility with Existing Equipment: Fire alarm system and all components shall operate as an extension of an existing system.

B. Contractor is responsible to provide and install new equipment that will properly interface and operate with the existing Systems 3 FACP by Pyrotronics and meet all requirements of the agency having jurisdiction.

2.03 MANUAL FIRE ALARM BOXES

Description: UL 38 listed; finished in red with molded, raised-letter operating instructions in contrasting color. Station shall show visible indication of operation. Mounted on recessed outlet box; if indicated as surface mounted, provide manufacturer's surface back box.

1. Single-action mechanism, breaking-glass or plastic-rod or pull-lever type. With integral addressable module, arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP.
2. Double-action mechanism requiring two actions to initiate an alarm, breaking-glass or plastic-rod or pull-lever type. With integral addressable module, arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP.
3. Station Reset: Key- or wrench-operated switch.
4. Indoor Protective Shield: Factory-fabricated clear plastic enclosure, hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation.
5. Weatherproof Protective Shield: Factory-fabricated clear plastic enclosure, hinged at the top to permit lifting for access to initiate an alarm.

2.04 SYSTEM SMOKE DETECTORS

A. General Description:

1. UL 268 listed, operating at 24-V dc, nominal.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
3. Multipurpose type, containing the following:
   a. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
   b. Piezoelectric sounder rated at 88 dBA at 10 feet (3 m) according to UL 464.
   c. Heat sensor, combination rate-of-rise and fixed temperature.
4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. Provide terminals in the fixed base for connection of building wiring.
5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type. Indicating detector has operated and power-on status.
7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.
   a. Rate-of-rise temperature characteristic shall be selectable at the FACP for 15 or 20 deg F (8 or 11 deg C) per minute.
   b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at the FACP to operate at 135 or 155 deg F (57 or 68 deg C).

c. Provide multiple levels of detection sensitivity for each sensor.

B. Photoelectric Smoke Detectors:

1. Sensor: LED or infrared light source with matching silicon-cell receiver.

2. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.

C. Duct Smoke Detectors:

1. Photoelectric Smoke Detectors:

a. Sensor: LED or infrared light source with matching silicon-cell receiver.

b. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.

2. UL 268A listed, operating at 24-V dc, nominal.

3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. The fixed base shall be designed for mounting directly to the air duct. Provide terminals in the fixed base for connection to building wiring.

a. Weatherproof Duct Housing Enclosure: UL listed for use with the supplied detector. The enclosure shall comply with NEMA 250 requirements for Type 4X.

5. Self-Restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.

6. Integral Visual-Indicating Light: LED type. Indicating detector has operated and power-on status. Provide remote status and alarm indicator and test station where indicated.

7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.

8. Each sensor shall have multiple levels of detection sensitivity.

9. Sampling Tubes: Design and dimensions as recommended by manufacturer for the specific duct size, air velocity, and installation conditions where applied.

10. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.05 HEAT DETECTORS

A. General: UL 521 listed.

B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F (57 deg C) or rate-of-rise of temperature that exceeds 15 deg F (8 deg C) per minute, unless otherwise indicated.

1. Mounting: Plug-in base, interchangeable with smoke-detector bases.

2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

C. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg F (88 deg C).

1. Mounting: Adapter plate for outlet box mounting or Plug-in base, interchangeable with smoke-detector bases.

2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

D. Continuous Linear Heat-Detector System: Consists of detector cable and control unit.

1. Detector Cable: Rated detection temperature 155 deg F (68 deg C). Listed for "regular" service and a standard environment. Cable includes two steel actuator wires twisted together with spring pressure, wrapped with protective tape, and finished with PVC outer sheath. Each actuator wire is insulated with heat-sensitive material that reacts with heat to allow the cable twist pressure to short circuit wires at the location of elevated temperature.

2. Control Unit: Two-zone or multizone unit as indicated. Provides same system power supply, supervision, and alarm features as specified for the central FACP.

3. Signals to the Central FACP: Any type of local system trouble is reported to the central FACP as a composite "trouble" signal. Alarms on each detection zone are individually reported to the central FACP as separately identified zones.

4. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

2.06 NOTIFICATION APPLIANCES

A. Description: Equipped for mounting as indicated and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly.

2. Revise sound-level values in first four paragraphs below to comply with local interpretations of ADA requirements.

B. Bells: Electric-vibrating, 24-V dc, under-dome type; with provision for housing the operating mechanism behind the bell. Bells shall produce a sound-pressure level of 94 dBA, measured 10 feet (3 m) from the bell. 10-inch (254-mm) size, unless otherwise indicated. Bells are weatherproof where indicated.

C. Chimes, Low-Level Output: Vibrating type, 75-dBA minimum rated output.

D. Chimes, High-Level Output: Vibrating type, 81-dBA minimum rated output.

E. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Horns shall produce a sound-pressure level of 95 dBA, measured 10 feet (3 m) from the horn.

F. Visible Alarm Devices: Xenon strobe lights listed under UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.

1. Rated Light Output: candela as indicated on drawings.

2. Strobe Leads: Factory connected to screw terminals.

2.07 FIREFIGHTERS' TWO-WAY TELEPHONE COMMUNICATION SERVICE

N/A

2.08 REMOTE ANNUNCIATOR

A. Description: Duplicate annunciator functions of the FACP for alarm, supervisory, and trouble indications. Also duplicate manual switching functions of the FACP, including acknowledging, silencing, resetting, and testing.

1. Mounting: Flush cabinet, NEMA 250, Class 1, as applicable.

B. Display Type and Functional Performance: Alphanumeric display same as the FACP. Controls with associated LEDs permit acknowledging, silencing, resetting, and testing functions for alarm, supervisory, and trouble signals identical to those in the FACP.

2.09 ADDRESSABLE INTERFACE DEVICE

A. Description: Microelectronic monitor module listed for use in providing a system address for listed alarm-initiating devices for wired applications with normally open contacts.

B. Integral Relay: Capable of providing a direct signal to the elevator controller to initiate elevator recall and to a circuit-breaker shunt trip for power shutdown.

2.010 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Listed and labeled according to UL 632.

B. Functional Performance: Unit receives an alarm, supervisory, or trouble signal from the FACP, and automatically captures one or two telephone lines and dials a preset number for a remote central station. When contact is made with the central station(s), the signal is transmitted. The unit supervises up to two telephone lines. Where supervising 2 lines, if service on either line is interrupted for longer than 45 seconds, the unit initiates a local trouble signal and transmits a signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. When telephone service is restored, unit automatically reports that event to the central station. If service is lost on both telephone lines, the local trouble signal is initiated.

C. Secondary Power: Integral rechargeable battery and automatic charger. Battery capacity is adequate to comply with NFPA 72 requirements.

D. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

2.011 GUARDS FOR PHYSICAL PROTECTION

Description: Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other device requiring protection.

1. Factory fabricated and furnished by manufacturer of the device.

2. Finish: Paint of color to match the protected device.

2.012 WIRE AND CABLE

A. Wire and cable for fire alarm systems shall be UL listed and labeled as complying with

CEC, Article 760.

B. Signaling Line Circuits: To be compatible with existing FACP. Twisted, shielded pair, No. 14 AWG or as indicated on drawings.

1. Circuit Integrity Cable: Twisted shielded pair, CEC Article 760, Classification CI, for power-limited fire alarm signal service. UL listed as Type FPL, and complying with requirements in UL 1424 and in UL 2196 for a 2-hour rating.

C. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.

1. Low-Voltage Circuits: No. 16 AWG, minimum.

2. Line-Voltage Circuits: No. 12 AWG, minimum.

3. Multiconductor Armored Cable: CEC Type MC, copper conductors, TFN/THHN conductor insulation, copper drain wire, copper armor with outer jacket with red identifier stripe, UL listed for fire alarm and cable tray installation, plenum rated, and complying with requirements in UL 2196 for a 2-hour rating.

PART 3 -- EXECUTION

3.01 EQUIPMENT INSTALLATION

A. Connecting to Existing Equipment: Verify that existing fire alarm system is operational before making changes or connections.

1. Connect new equipment to the existing control panel in the existing part of the building.

2. Connect new equipment to the existing monitoring equipment at the Supervising Station.

3. Expand, modify, and supplement the existing control equipment as necessary to extend the existing control functions to the new points. New components shall be capable of merging with the existing configuration without degrading the performance of either system.

B. Smoke or Heat Detector Spacing:

C. Edit first subparagraph below to indicate how Contractor shall determine detector spacing.

1. Smooth ceiling spacing shall not exceed 30 feet (9 m) and the rating of the detector.

2. Spacing of heat detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas, shall be determined according to Appendix A in NFPA 72.

3. Spacing of heat detectors shall be determined based on guidelines and recommendations in NFPA 72.

4. See Editing Instruction No. 13 in the Evaluations for discussion of placement of smoke detectors with respect to HVAC air inlets and outlets.

D. HVAC: Locate detectors not closer than 3 feet (1 m) from air-supply diffuser or return-air opening.

E. Duct Smoke Detectors: Comply with NFPA 72,NFPA 90A and CMC. Install sampling tubes so they extend the full width of the duct.

F. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.

G. Single-Station Smoke Detectors: Where more than one smoke alarm is installed within a dwelling or suite, they shall be connected so that the operation of any smoke alarm causes the alarm in all smoke alarms to sound.

H. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.

I. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.

J. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling.

K. Device Location-Indicating Lights: Locate in public space near the device they monitor.

L. FACP: Surface mount with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.

M. Annunciator: Install with top of panel not more than 72 inches (1830 mm) above the finished floor.

3.02 WIRING INSTALLATION

A. Install wiring according to the following:

1. NECA 1.
2. TIA/EIA 568-A.
3. CEC

B. Wiring Method: Install wiring in metal raceway according to Division 16 Section "Raceway and Boxes for Electrical Systems."

1. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.

C. Wiring Method:

1. Cables and raceways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
2. Fire-Rated Cables: Use of 2-hour fire-rated fire alarm cables, CEC Types MI and CI, is not permitted.
3. Signaling Line Circuits: Power-limited fire alarm cables shall not be installed in the same cable or raceway as signaling line circuits.

D. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as

recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

E. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

F. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

G. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum 1-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signals from other floors or zones.

H. Wiring to Remote Alarm Transmitting Device: 1-inch (25-mm) conduit between the FACP and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.03 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals according to Division 16 Section "Identification for Electrical Systems."

B. Install instructions frame in a location visible from the FACP.

C. Paint power-supply disconnect switch red and label "FIRE ALARM."

3.04 GROUNDING

Ground the FACP and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to the FACP.

3.05 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Testing Agency: Owner may engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

C. Testing Agency: The contractor shall engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:

D. Perform the following field tests and inspections and prepare test reports:

1. Before requesting final approval of the installation, submit a written statement using the form for Record of Completion shown in NFPA 72.

2. Perform each electrical test and visual and mechanical inspection listed in NFPA 72. Certify compliance with test parameters. All tests shall be conducted under the direct supervision of a NICET technician certified under the Fire Alarm Systems program at Level III.

3. Include the existing system in tests and inspections.

4. Visual Inspection: Conduct a visual inspection before any testing. Use as-built drawings and system documentation for the inspection. Identify improperly located, damaged, or nonfunctional equipment, and correct before beginning tests.

5. Testing: Follow procedure and record results complying with requirements in NFPA 72.

   a. Detectors that are outside their marked sensitivity range shall be replaced.

6. Test and Inspection Records: Prepare according to NFPA 72, including demonstration of sequences of operation by using the matrix-style form in Appendix A in CEC.

3.06 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project outside normal occupancy hours for this purpose.

B. Follow-Up Tests and Inspections: After date of Substantial Completion, test the fire alarm system complying with testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for three monthly, and one quarterly, periods.

C. Work in two paragraphs below is normally the responsibility of Owner. Retain one or both paragraphs if Owner needs additional time for inspections required by NFPA 72.

D. Semiannual Test and Inspection: Six months after date of Substantial Completion, test the fire alarm system complying with the testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

E. Annual Test and Inspection: One year after date of Substantial Completion, test the fire alarm system complying with the testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for monthly, quarterly, semiannual, and annual periods. Use forms developed for initial tests and inspections.

3.07 DEMONSTRATION

Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the fire alarm system, appliances, and devices. Refer to Division 01 Section "Demonstration and Training."

*****END OF SECTION*****