

D. PRODUCTS - HARDWARE:

Hardware shall be Schlage AL- Series. Lever handles to be “Saturn” style, finish to be #613 (US 10B). Function per Door Schedule. **NO SUBSTITUTIONS ACCEPTED ON LOCKSETS.**

E. HARDWARE SUBMITTALS:

Samples: Submit representative samples of all items of finish hardware and finishes for approval of the Architect, upon the Architect’s request. Samples shall show the design, material and finish proposed for use.

Provide samples of the apartment numerals.

Hardware Schedule and Keying Chart Prepare and submit a complete Hardware Schedule for approval of the Architect before any hardware is ordered. After approval of the Hardware Schedule, a key and master key chart shall be submitted to the Architect for the Owner’s approval. No changes shall be made to the approved schedule or chart without the written consent of the Architect.

Templates: Provide hardware templates to the various trades and fabricators requiring them, immediately after receipt of approved Hardware Schedule, to assure accurate setting and finish hardware.

Hardware Packing and Marking: Shall have the required screws, bolts, and fastenings necessary for installation in the same package with the hardware, including keys and instructions. Each package shall be legibly marked and adequately labeled, indicating the part of the work for which it is intended. Each marking shall correspond to the number shown on the approved Hardware schedule. Within each packed lockset, keys shall be tagged and plainly marked on the face of the envelope with the key change number, door designation and all other identifying information as required.

Hardware Protection: All wrapping furnished by the manufacturer on knobs, handles and pulls shall be replaced upon the hardware as soon as it is installed and shall remain thereon until the completion of construction.

Key System: All locks shall be made to a two-step master key system. Two change keys shall be furnished for each lock and three master keys. Master keys shall be given directly to the Owner.

E. HARDWARE SCHEDULE

NOTE: Lever handles required, no knobs allowed.

- 1 **Entrance** - Individual Apartment, Storage Room.
 - a. 3 hinges, non-ferrous; heavy-weight 5 knuckle ball bearing.
 - b. Keyed lockset, entrance function at apartments, keyed lockset, storeroom function at storage rooms.
 - c. At apartment units door knocker/nameplate with door viewer and an additional door viewer for Accessible units.
 - d. Doorstop
 - e. Weather-stripping

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- f. **At** apartment units adjustable oak/aluminum threshold (integral with door), at storage rooms aluminum saddle type threshold.
 - g. Closer at storage rooms.
2. **Interior - Privacy**
- a. 3 hinges standard weight non ferrous - 5 Knuckle with removable pin
 - b. Privacy function.
 - c. Doorstop
 - d. Silencers
3. **Interior Passage**
- a. 3 Hinges standard weight - 5 Knuckle with removable pin
 - b. Passage function.
 - c. Door stop
 - d. Silencers
4. **Interior Bi-fold and By Pass Closet:**
- a. Trackset
 - b. Pulls
 - c. Hinges at Bi-Fold
5. **Interior Mechanical Room Door:**
- a. 3 hinges, non-ferrous; heavy-weight 5 knuckle ball bearing.
 - b. Keyed lockset, storeroom function.
 - c. Doorstop.
 - d. Weather-stripping
 - e. Aluminum saddle type threshold.
 - f. Closer.

G. Finishes

<u>Item</u>	<u>US Symbol</u>	<u>ANSI Symbol</u>
Hinges, Interiors	US 4	606
Hinges, Exterior	US 4	606
Locks, Cylinders	US 4	606
Closers	G	G
stops	US 4	606
Handles	US 4	606

Contractor to submit request for substitution on finishes to Architect for approval.

Hinges: Provide hinges from the same manufacturer that complies with the requirements of this project. Use Hager, BB 1279 at apartment entry and 1279 at other doors. When door closers are used, always provide ball bearing hinges.

Locks/Latches: Listed products are from Schlage.

Door Closers: To be Super Stock Closer for 1460 by LCN, to have hold-open arms delayed action option for handicapped use and adjustable spring power.

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Door Stop: To be IVES brass spring and chain vinyl covered crash stops mounted overhead #I 15-25-1/2" for 3'-0" door. Required on all outswing doors without adjacent wall to mount doorstop.

Door Knocker/Nameplate: Ives Knocker with peephole (door viewer) and nameplate. Style to be approved by Architect.

Adjustable Door Sweep and Weather-Stripping: Slotted aluminum with brush insert. #309 P by Pemko.

Door Stops: Provide wall or floor stop as appropriate for all swing doors. Wall - Ives 60 (3-3/4") or #62 (4-1/2"). Floor - Ives #430

Silencers: Provide 3 rubber silencers compatible with door frame materials. Use Ives: # 20 or # 21.

Door Guards: Provide a door guard at each apartment entry. Use Ives: # 482B.

END OF SECTION

SECTION 08550

WOOD WINDOWS

1. GENERAL;

1.1 REFERENCES: Drawings and general provisions of Contract, including General Conditions and Division 1 specifications, apply to work in this section.

1.2 DESCRIPTION OF WORK: The extent of work shall be as shown on Drawings and called for in these Specifications. Performance shall meet the requirements of these Specification. The work covered by this section of specifications consists of the following:

- A. Furnishing and installing all windows as shown on Drawings, complete with all window hardware, operators and other accessories, including corner flashing pieces.
- B. Furnishing window screens.
- C. Adjusting the windows for smooth and faultless operation.

2. PRODUCTS:

2.1 DOUBLE HUNG WINDOWS shall be Andersen or equal, vinyl clad with extension jambs, nailing fins and insulated clear glazing. Grilles as show on Elevation Drawings. See window schedule. Window color to be white. All operable windows are to have screens with white frames.. Screens are to be packaged independently of windows.

2.2 ALL DIMENSIONS shall be as shown on Drawings or from manufacturer's information.. See details on Drawings.

3. EXECUTION:

3.1 WINDOWS shall be installed **by** workmen experienced in this kind of work. Set window frames plumb, level and square, within clearance limits of the respective openings. Fasten frames securely to the wall framing. Window frames and other installation materials shall be handled carefully at all times and shall be protected from all possible sources of damage such as dampness, dirt, mortar, etc. Units shall be stacked standing on edge on wood strips to prevent contact with ground. Installation of windows shall strictly follow the manufacturer's recommendations.

3.2 CAULK windows as required in other sections and on drawings. Install corner flange closures and caulk as window is installed.

3.3 AFTER the windows are installed, they shall be checked for smooth operation and adjusted as necessary. Install screens. Leave all installed windows and screens clean, tight and weatherproof.

END OF SECTION

SECTION 09250

GYPSUM BOARD

1. GENERAL

1.1 REFERENCES:

A. Drawings and general provisions of Contract, including General Conditions and Division 1 specifications, apply to work in this section.

B. NOTE: Selection of Finish colors and patterns in overall color scheme to be made by Architect. Contractor to notify Architect prior to commencing Gypsum Board work, to allow adequate time for color selections, Owner's approval and material ordering lead time.

1.2 DESCRIPTION OF WORK: The extent of work shall be as shown on Drawings and called for in these Specifications. Performance shall meet the requirements of these Specifications. The work covered by this section of Specifications consists of the following:

- A. Drywall installation as required by Drawings and noted in these Specifications.
- B. Taping and finishing all walls and ceilings, except where other kind of finish is specified.

2. PRODUCTS

2.1 NOTE: GWB types are shown as U.S.G. brand names "Sheetrock" and "Firecode C". Substitutions must have equal U.L. and STC ratings. See Drawings for Specific assembly

2.2 WALLS & CEILINGS: 5/8" thick gypsum board – Sheetrock or Firecode C as indicated on drawings.

3. EXECUTION

3.1 THE DRYWALL CONTRACTOR shall inspect all areas affected by his work to ascertain that all work is complete and has been accepted. Defective installations shall be corrected before finished surfaces are painted or sprayed with acoustical material.

3.2 DRYWALL INSTALLATION. Install drywall as shown on plans, noted in the UL Specifications, and as set forth in U.S.G. Handbook

- A. Spacing for attachment members shall not exceed 24" o.c. for walls and 16" o.c. for ceilings. All drywall shall be screwed with approved drywall screws made specifically for the purpose and of length adequate for wall types. On walls, screws shall not be placed more than 16" apart for 16" o.c. framing or 12" apart for 24" o.c. framing. Screw all edges 12" o.c. maximum.
 - B. The drywall contractor may use a few drywall nails to temporarily secure a sheet of drywall before securing with drywall screws. In this event, the drywall nails must be countersunk prior to taping. Corner beads shall be used on all corners and casing beads used whenever Gypsum Board abuts dissimilar material. Caulking to also be applied at these junctions. At all party and unit/corridor walls, Gypsum Board to be set in caulking (for sound).
 - C. Drywall shall be laid vertically or horizontally. No tapered joints at floor base.
- 3.3 ON SURFACES TO BE PAINTED:** tape and cement all joints and screw locations with three coats of compound, then sand to smooth finish, acceptable to paint.
- 3.4 DURING WORK PROGRESS,** remove all excess materials and debris resulting from operations, which may disrupt the work of other trades, and after completion leave the premises broom clean.

END OF SECTION

SECTION 09650

SHEET FLOORING

1. GENERAL:

1.1 REFERENCES: Drawings and general provisions of Contract, including General Conditions and Division 1 specifications, apply to work in this section.

1.2 DESCRIPTION OF WORK

A. SCOPE: The extent of work shall be as shown on Drawings and called for in these Specifications. Performance shall meet the requirements of these Specifications. The work covered by this section of Specifications consists of the following:

B. Extent of Sheet Flooring as shown on the drawings.

1.3 SUBMITTALS

A. Submittals under this Section shall include:

1. Manufacturers' data and installation instructions on all specified products;
2. Samples of sheet flooring;

2. PRODUCTS:

2.1 SHEET FLOORING: Shall be "Coordinates Plus" Commercial Sheet Flooring by Tarkett – 12' width. Color: By Architect.

2.2 ADHESIVES: shall be as recommended by the manufacturer.

3. EXECUTION:

3.1 INSTALLATION shall be done by skilled craftsmen using the adhesives recommended by the manufacturer and in accordance with the manufacturer's instructions. The flooring contractor shall examine the subfloors and report all defects which have to be corrected before the application of flooring starts. Concrete floors shall be smooth, free of any grooves and depressions, and brushed clean of any foreign matter. Install all resilient flooring with joints tight, floor true, level and even with no bubbles, pops or other visible defects. Cut to and around all permanent fixtures keeping vinyl tight to fixtures. Vinyl also

shall be installed under fixtures such as baseboard heating, and glued tight. Wrap vinyl base around exterior corners.

- 3.2 DURING WORK PROGRESS**, remove all excess materials, extraneous mastic, and debris resulting from operations, which may disrupt the work of other trades. The Contractor shall be responsible for keeping the floors clean, unstained and undamaged until the final completion of the building.

END OF SECTION

SECTION 09680

CARPET

1. GENERAL

1.1 REFERENCES: Drawings and general provisions of Contract, including General Conditions and Division 1 specifications, apply to work in this section.

1.2 DESCRIPTION OF WORK: Installation of carpeting as shown on plans or noted in these Specifications.

1.3 QUALITY ASSURANCE

A. Finished installation shall comply with fire test specified in applicable Building Code.

B. Architect/Engineer shall review first finished space for workmanship. Accepted space shall serve as project standard.

1.4 SUBMITTALS

A. Submittals under this Section shall include:

1. Manufacturer's specifications and installation instructions on all specified products.
2. Samples: one piece, 18" x 18", of each color and type of carpet provided.

B. Deliver to Owner, neatly packaged and labeled, all usable carpet scraps over 2 sq. ft. or 8 in. in least dimensions: 1 percent of each type and color of carpet provided, in 12 ft. wide rolls; and 1 percent of each type of edge strip provided, in standard lengths.

C. Provide written maintenance program.

2. PRODUCTS

2.1 CARPETING shall be as follows:

Carpet C-1

Specifications

Manufacturer:	J&J Commercial
Style Name:	"Assurance" - Dense Cut Pile
Style Number:	3230
Fiber Content:	100% Nylon
Labeled Face Weight:	30.0 ozs/yd ²
Finished Pile Thickness:	.200 inches
Backing:	"Endure" - J&J Commercial Backing System
Color:	By Architect

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Product Data

Pill Test: Pass
Radiant Panel Class 1
Smoke Density: Less than 450 – flaming.
Static: Less than 3.5 kv.
ADA Compliance: Compliant for accessible routes.
CRI indoor air quality testing program product type: 14263678.

Carpet C-2

Specifications

Manufacturer: J&J Commercial
Style Name: “Link” - Dense Patterned Loop
Style Number: 2665
Fiber Content: 100% Nylon
Labeled Face Weight: 26.0 ozs/yd²
Finished Pile Thickness: .111 inches
Backing: “Endure” - J&J Commercial Backing System
Color: XXXXXX

Product Data

Pill Test: Pass
Radiant Panel Class 1
Smoke Density: Less than 450 – flaming.
Static: Less than 3.0 kv.
ADA Compliance: Compliant for accessible routes.
CRI indoor air quality testing program product type: 27425055.

3. EXECUTION:

3.1 JOB CONDITIONS:

- A. Examine Subfloor for dampness, loose material, excessive irregularity, oily or waxy areas impeding adhesion, or other conditions which would prevent proper installation. Verify that no incompatible curing compound has been used on newly-poured concrete. Commencement of work constitutes acceptance of subfloor.
- B. Allow newly-poured concrete to cure (when applicable) as long as possible before installation of carpet, a minimum of 7 days, 28 days preferable. Perform bond and moisture tests in accordance with carpet manufacturer’s instructions, to verify that concrete is sufficiently cured, dried and then sealed.
- C. Broom-clean or vacuum surfaces to receive carpet, before beginning installation. Apply primer-sealer to plywood or concrete sub-floor, if recommended by carpet or adhesive manufacturer.

- D. Before proceeding with complete installation of carpet, install a representative sample area of each type of carpet provided over each type of substrate, to test for compatibility of adhesive to substrate at glue-down installation, and verify general appearance of finished installation. If sample is securely bonded after 72 hours, final installation may proceed.

3.2 INSTALLATION

- A. Field measure each space to receive carpet. Do not scale drawings. Before beginning installation, verify that floor telephone and electrical outlets have been installed.
- B. Install carpet wall to wall unless noted otherwise. Fit carpet neatly into breaks, recesses, closets and alcoves, against bases, around pipes and penetrations, under saddles and thresholds, and around permanent cabinets and equipment. Install rubber edge strip wherever carpet edge does not abut vertical surface, of appropriate configuration to provide smooth transition to adjacent material. Allowable variation from level for finished installation: 1/4 in. from level in any direction when tested with 10 ft. straight-edge.
- C. Seams shall be flat, free from puckering, without twists, free from frayed edges. Coat edges with seam adhesive at glue-down installation, hot-melt tape at cushion, and as recommended by manufacturer. Patterns at seams shall match exactly. Cut raw edges on a slight angle with surface yarns extending outward over backing material so that surface yarns mingle neatly at seams.
- D. Seams shall be in accordance with approved seaming shop drawings and samples. No seams will be accepted perpendicular to openings such as doors, stairs, and entries. Seams at doors shall be centered directly under doors. Seam at corridor change of direction shall follow inner wall line across corridor.
- E. Provide removable cut-out pieces over flush equipment requiring access such as telephone and power outlets. Cut-outs shall be neatly edged and securely held in place with double-edged tape all around.
- F. Remove adhesive spots from carpet immediately with solvent. Trim loose pieces of face yarn with sharp scissors. Upon completion of installation, remove rubbish, selvages, wrapping paper, small scraps, etc., and vacuum with commercial-type vacuum cleaner. Remove soiling, by shampoo if necessary. Cover finished work with kraft paper or polyethylene until Substantial Completion.
- H. At completion of job, remove protective paper, vacuum or shampoo again if required

END OF SECTION

SECTION 09900

PAINTING

1. **GENERAL**

1.1 DESCRIPTION OF WORK

- A. Drawings and general provisions of Contract, including General Conditions and Division 1 specifications, apply to work in this section.
- B. The extent of work shall be as shown on Drawings and called for in these Specifications. Performance shall meet the requirements of these Specifications. The work covered by this section of Specifications consists of the following:
 - 1. Painting or staining all interior and exterior surfaces as called for in the Finish Schedule on Drawings or in these Specifications.
 - 2. Solid-body staining of exterior siding.
 - 3. Painting interior walls, door trim, doors, window trim, etc.
 - 4. Painting all exterior doors as specified.
 - 5. Painting and finishing any other work requiring finishing left unfinished by others.

NOTE: All colors to be selected by Architect. The Contractor shall submit to the Architect, for approval, color samples of stain finishes. See general Note Section 09250.

1.2 SUBMITTALS

- A. Issue submittals in accordance with Section 01300, Submittals.
- B. Submit as follows:
 - 1. Manufacturer's data, application instructions, and color chips on all specified products.
 - 2. Paint schedule covering all surfaces to be painted.
 - 3. Contractor to provide 4' x 8' test panels in finished spaces for up to 3 trials for each required color selection. Test panel colors to be selected by Architect. Final color to be approved by Architect from test panels.

4. Provide as maintenance material, a minimum of one gallon of each type and color of paint used on job, in labeled and well-sealed containers, for future touch-up. Also provide typed list of each type and color of paint used on job, including name of distributor from whom paint may be obtained.

2. PRODUCTS

2.1 General

- A. Paint: Acceptable manufacturers, unless specific manufacturer is noted: California Products Corporation, Benjamin Moors, Pratt & Lambert, Sherwin-Williams, Tnemec.
- B. All products used shall be manufacturer's top quality product for each type of finish specified.

2.2 MATERIALS

- A. Where primer is called for, use primer recommended by manufacturer for particular combination of substrate and finish coat. Where painting over shop-applied primers, verify that finish paint proposed for field application is compatible with shop primers actually used.
- B. All Gypsum Walls and Ceilings to be painted:
 - Walls – One (1) primer coat and two (2) finish coats. Primer - Benjamin Moore Vinyl Latex Primer Sealer, Finish - Benjamin Moore Moorcraft Latex Eggshell.
 - Ceiling – One (1) primer coat and Two (2) finish coats. Primer - Benjamin Moore Vinyl Latex Primer Sealer, Finish - Benjamin Moore Moorcraft Latex Flat.
- C. Interior window sash, exposed softwood woodwork, wood trim and baseboard as noted on Drawings: One (1) coat Primer; two (2) finish coats Semigloss Latex. NOTE: BIN all knots.
- D. Wood Door frames, trim, & miscellaneous interior wood trim: Benjamin Moore Wood Primer and two (2) coats Latex Semigloss. NOTE: BIN all knots.
- E. Molded Doors: Factory Primed & Two (2) coats Latex Semigloss.
- F. Exterior Wood, MDO: One (1) coat primer, two (2) coats Latex Semigloss.
- G. Cedar Shingle Siding: (2) coats acrylic-latex stain; B. Moore –Moorwood vinyl acrylic latex stain #89.

- H. Steel-Clad Door - exterior and interior faces: Two (2) coats exterior enamel over factory primer. Doors shall be laid flat if sprayed. Doors may be rolled or brushed in place, however with no visible brush marks, drips or imperfections.

3. EXECUTION

3.1 JOB CONDITIONS

- A. Store materials in sealed containers. Provide a fire extinguisher in storage room. Remove flammable rags and waste from building at end of day.
- B. Do not perform exterior work in rain or when precipitation is forecast imminently; or in hot, dry, or windy weather which would cause finish to cure too rapidly, or be marred by windstorm dust; or at temperatures below 40 degrees F.
- C. Maintain temperature at interior locations between 50 and 75 degrees F, maximum 80 percent relative humidity, while paint is being applied. Provide adequate ventilation, by mechanical means if necessary, for drying of paint and prevention of condensation and mildew. Do not apply finish in areas in which dust is being generated.
- D. Protect finished surfaces and equipment not being painted with masking tape, canvas dropcloths, polyethylene sheets, etc. Items such as lighting switch covers, fixture canopies, and door handles shall be temporarily removed, carefully stored, and replaced after painting, or carefully covered during painting operations.

3.2 PREPARATION

- A. Preparation of newly-installed materials to receive finish painting is specified under those Sections installing materials. This includes, but is not necessarily limited to: touch-up of damaged shop coats; taping, sealing and sanding of drywall; patching masonry; sanding finish wood; and cleaning off grease, oil, dirt, mildew, factory-applied protective coatings, and other foreign materials.
- B. At wood surfaces to be painted, scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.
- C. Before beginning work under this Section, verify that preparation of substrates under other Sections has been done as specified. Thoroughly remove water, dirt, and dust with clean cloths, brooms, or brushes.

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- A. Apply all materials in accordance with the manufacturer's recommendations.
- B. Apply materials with suitable brushes, rollers, and spraying equipment. Keep application equipment clean, dry, and free from contaminants. Thoroughly stir materials before applying, and periodically during application.
- C. Rate and method of application and drying time between coats shall be strictly in accordance with manufacturer's recommendations.
- D. Touch-up shop applied primers before field painting.
- E. Do not apply first coat until surface is dry to touch. Moisture content of surface shall be within limitations recommended by paint manufacturer.
- F. Leave all parts of moldings and ornaments clean and true to detail, without excessive paint in corners and depressions. Make edges of paint adjoining other materials or colors clean and sharp with no overlapping. Paint surfaces visible through grilles one coat flat black.
- G. Finish coats shall be smooth, free of brush marks, streaks, laps or pile-up of paint, and skipped or missed areas. Refinish whole wall if unacceptable finish is extensive or of such a nature that it cannot be repaired by normal touch-up.
- H. After completion of painting work, remove spilled or spattered paint. Touch-up and repair finishes damaged in any way by work under this Section. Protect finished surfaces.

END OF SECTION

SECTION 10200

POSTAL SPECIALTIES (MAILBOXES)

A. GENERAL :

SCOPE: The extent of work shall be as shown on Drawings and called for in these Specifications. The work under this section of Specifications includes furnishing and installing the items listed as indicated on Drawings.

B. PRODUCTS:

1. Mailboxes: Shall be front loading aluminum cluster box unit with (12) mail boxes, (1) outgoing mail slot, (1) parcel locker. 1" high numbers, locksets and keys as manufactured by Salsbury Industries, Model 33 12 Type II. Or Equal

C. EXECUTION:

Mailboxes shall be anchored to concrete base as shown on manufactures template. Properly secure and align unit as shown in manufacturer's installation guidelines. All work shall be done in first-class manner insuring high-grade finish.

Provide full key set to Owner.

NOTE: The Contractor shall submit drawings on every item specified in this section. There shall be no substitutions with out a written explanation from the subcontractor that the specific item is equal with the item specified by the Architect. All substitutions shall be approved by the Architect and the Owner.

END OF SECTION

SECTION 10800

TOILET AND BATH ACCESSORIES

1. GENERAL

1.1 REFERENCES: Drawings and general provisions of Contract, including General Conditions and Division 1 specifications, apply to work in this section.

1.2 DESCRIPTION OF WORK: The extent of work shall be as shown on Drawings and called for in these Specifications. The work under this section of Specifications includes furnishing and installing the items listed as indicated on Drawings.

2. PRODUCTS: NOTE: All Products, "Or Equal".

2.1 TOWEL BARS AND TOILET PAPER HOLDERS: shall be Nutone Hallmack "Coronado" series, size as shown on Drawings.

2.2 SOAP DISH: shall be integral with sink.

2.3 DOUBLE HOOK FOR BATHROOM DOOR: shall be equal to NuTone HM-682.

2.4 SHOWER CURTAIN ROD: NuTone HM-382. Curtains are not included.

2.5 GRAB BARS: Stainless steel, 1 ¼" diameter, concealed mounting with snap flange, satin finish; Bobrick B-5806 Series, lengths as shown on drawings.

2.6 MEDICINE CABINETS:

ALL APARTMENT UNITS: Surface Mounted Medicine Cabinet: Vienna 155130, 30 x 26 x 5½, with lights by NuTone, #SB23129.

2.7 **NOTE: Blocking for all accessories and grab bars must be provided. See Section 06100 - Rough Carpentry.**

2.8 NOTE: The contractor shall submit shop drawings on every item specified in this section. There shall be no substitutions without a written explanation from the subcontractor that the specified item is equal with the item specified by the architect. All substitutions shall be approved by the Architect and the Owner.

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3. EXECUTION:

- 3.1 All work shall be done by experienced craftsmen in first-class manner and high-grade finish.
- 3.2 **All** installations shall be in accordance with layout shown on plans and in strict conformity with the manufacturer's recommendations and secured into blocking or other framing with screws of adequate length and size to properly support accessories. Grab bars must be able to sustain a 300# direct load pulling down or out on it.

END OF SECTION

SECTION 11450

RESIDENTIAL EQUIPMENT AND KITCHENS

1. GENERAL:

1.1 REFERENCES

- A. Drawings and general provisions on Contract, including General Conditions and Division 1 specifications, apply to work in this section.
- B. Rough Carpentry: Section 06100
- C. Finish Carpentry: Section 06200
- D. Gypsum Drywall: Section 09250

1.2 DESCRIPTION OF WORK

- A. The extent of work shall be as shown on Drawings and called for in these Specifications. The work under this section of Specifications includes furnishing and installing the following items as indicated on Drawings.
- B. Bathroom Vanity Base & Kitchen Cabinets - wall hung and base.
- C. Kitchen cabinet countertops according to layout on drawings.
- D. Bathroom vanity tops.
- D. Refrigerator
- E. Kitchen Ranges
- F. Range Hoods

1.3 SUBMITTALS

- A. Submit manufacturer's product data and installation recommendations for all specified products.
- B. Architect reserves the right to require samples of all products to be submitted. Acceptable samples will be returned and may be used in the work.
- C. Submittals for countertops shall be in accordance with Section 06200, Finish Carpentry.

2. PRODUCTS

2.1 Kitchen Cabinets and Bathroom Vanity Base:

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- A. Shall be of wood construction, with wood finished doors, self closing hinges, adjustable shelves, dual tracks for drawers with nylon guides, solid oak drawer fronts, 5/8" thick five-piece solid maple drawer as manufactured by United Cabinet Corp., Nashville, TN; Kabinart Line. Valley Oak Classic Series. Color – Golden.
- 2.2 Kitchen Cabinet Countertops: to be postform 290 plastic laminate as manufactured by Wilsonart, or equal.
- 2.3 Bathroom Vanity Tops: "Oasis Marble Tops" with built in bowl and soap dish available through F.W. Webb Co., (207) 784 4575. Coordinate with plumber for drilling holes to receive faucet.
- 2.3 Unit Refrigerator shall be Energy Star Compliant, Frigidaire Model #FRT15B3A frostless, refrigerator-freezer.
- 2.4 Unit Kitchen Range to be: Frigidaire Model #FEF352A, 30" free standing electric range.
- 2.5 Unit Kitchen Range Hoods: to be Broan Model #403001, 30" vented hood.
- 2.6 Kitchen Fiberglass Wall Panels: Glass-fiber reinforced plastic, 0.090 in. thick, smooth finish on exposed face. Flame spread rating: Class A. Color: as selected from manufacturer's standard range. Acceptable manufacturers/products: ARP Permaclean, Kemlite Glasbord, Kydex, Nudo Fiber-Lite, Sequentia Structoglas.
3. EXECUTION:
- 3.1 INSTALLATION
- A. All installation shall be done in a quality first-class manner according to Drawings and layouts shown, and shall be according to manufacturer's recommendations.
- B. Kitchen cabinets and vanities: shall be installed by experienced cabinet installers in a craftsman like manner, as though this were really "cabinets". Securely screw cabinets to blocking in the walls. Blocking shall be in place at top and bottom of wall and base cabinets (see Rough Carpentry Sec. 06100), and screws shall be long enough to penetrate blocking 1-1/4" minimum. Cabinets shall be level and plumb. If leveling cabinets puts them visually out of line with other elements (wall line, window sill, door casing, etc.) Architect shall be notified. Countertops shall be tight to the wall and joints caulked. Cabinets shall be tight to each other and in line. All doors and drawers to open freely. Work shall be left clean and right.
- C. Refrigerators and ranges: Shall be set in place properly hooked up and leveled.
- D. Range hoods shall be new secured in place by means of screws hidden from view.

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- E. The contractor shall check and make necessary adjustments to insure that all installed items operate faultlessly.
- F. Touch up any dings, scratches or other marks with color matching original.
- G. Contractor to coordinate installation of items in this Section with that of related mechanical trades: 15000 Plumbing and HVAC; 16000 Electrical.
- H. All work under this SECTION shall be guaranteed to the Owner **IN WRITING** for a period of at least one (1) year. Appliance Warranty and Operation Manuals to be provided *to* Owner with typed listing of appliance # correlated to Apt. #.
- I. Plastic Laminate to be glued to wall where shown on Drawings. Use construction or panel adhesive approved by Architect.

END OF SECTION

SECTION 15010- BASIC MECHANICAL REQUIREMENTS

PART 1: GENERAL

1.01 WORK INCLUDED

- A.** The work of this section consists of furnishing all labor, equipment and materials, and performing all operations necessary to complete heating and ventilation work in accordance with these specifications.
- B.** Work includes, but is not limited to:
1. Fin Tube Radiation
 2. Gas Boiler Unit and all accessories.
 3. Pre-fabricated chimney stacks.
 4. Natural Gas Piping and Accessories.
 5. Hot water heating supply and return piping, pumping, materials, and heating specialties.
 6. New toilet exhaust ventilation system.
 7. Sheetmetal work and materials.
 8. Insulation: Domestic Hot water supply and recirculated domestic hot water piping.
 9. Circular Pumps and Controls.
 10. Domestic water service from 10'-0" outside building wall where indicated on the drawings.
 11. Sanitary building drain to 8'-0" outside building wall where indicated on the drawings.
 12. Hot water, cold water, and recirculating hot water piping and plumbing specialties within building.
 13. Soil, waste, and plumbing vent lines.
 14. Mechanical insulation.
 15. Plumbing fixtures.
 16. Testing.
 17. All other items indicated on the drawings, specified herein, or needed for complete and proper systems' installation.
 18. Sprinkler work in new boiler and storage room off domestic cold water with bronze, quick response upright heads.

1.02 GENERAL CONDITIONS

- A. Related Documents: The General Conditions and other documents of the contract apply to the work specified in this section.
- B. Guarantee: All work executed under this section shall be guaranteed for one (1) year as stated in the General Conditions.
- C. Permits and Laws:
1. Obtain and pay for all required permits, inspections, licenses, etc.
 2. Execute all work to conform to the requirements of all local, state and federal laws, regulations, etc., applicable to the work.
- D. Drawings:
1. The general location of the apparatus and the details of the work are shown on the drawings, which form a part of this specification. Exact locations are to be determined at the building as the work progresses, and shall be subject to the Architect/Engineer's approval.
 2. Anything shown on the drawings and not mentioned in the specifications, or vice versa, shall be furnished as if it were both shown and specified.
 3. It is not intended that the drawings shall show every pipe, fitting, or appliance, but it shall be a requirement to furnish, without additional expense, all material and labor necessary to complete the system in accordance with the best practices of the trade.
- E. Electrical Work:
1. Provide and erect all motors, starters, pilot lights, controllers, limit switches, etc., as herein specified.
 2. All motors furnished shall meet NEMA requirements and shall have an operating temperature of not to exceed 40 degrees C. above ambient temperature and be so marked. Except as noted, all motors shall be of the open dnp-proof type. Motors may be furnished of fully enclosed type if it is the standard equipment.
 - a. Each motor shall be provided with a manual or magnetic starter with overload elements sized for proper protection of the motor in accordance with manufacturer's recommendations. Provide overload protection for each phase conductor. All magnetic starters shall have coil and wiring designed for 120 volt operation.
 - b. Starters shall be as manufactured by Allen-Bradley Company, or approved equal, with NEMA-1 enclosures and be of similar manufacture for all the motors furnished under this section.
 3. Controls: Wiring for controls shall be under this division.
 4. Except as noted, all required line switches, fused switches, etc., and all necessary wiring to properly connect all equipment to motors and switches will be furnished and

installed under Division 16- Electrical section of these specifications,

5. Wiring of oil boiler with disconnect thermal safety switch, etc, shall be under the supervision of the licensed boiler installer.

F. Equipment Requirements:

1. Installation Directions: Obtain manufacturer's printed installation directions to aid in properly executing work on all major pieces of equipment.
2. Objectionable Noise and Vibrations:
 - a. Mechanical and electrical equipment shall operate without objectionable noise or vibration, as determined by the Engineer.
 - b. If such objectionable noise or vibration should be produced and transmitted to occupied portions of the building by apparatus, piping, ducts, or by other part of mechanical and electrical work, make necessary changes and additions, as approved, without extra cost to the Owner.
3. Equipment Design and Installation:
 - a. Uniformity: Unless otherwise specified, equipment or material of same type of classification, used for same purpose shall be the product of same manufacturer.
 - b. Design: Equipment and accessories not specifically described or identified by manufacturer's catalog numbers shall be designed in conformity with **ASHRAE**, ASME, IEEE, AWWA, ANSI, ASTM, ASSE, PDI or other applicable technical standards, suitable for maximum working pressure and shall have neat and finished appearance.
 - c. Installation: Erect equipment in neat and workmanlike manner; align, level and adjust for satisfactory operation; install so that connecting and disconnecting of piping and accessories can be made readily, and so that all parts are easily accessible for inspection, operation, and maintenance and repair. Minor deviation for indicated arrangements may be made as approved.
 - d. Welding: Before any welder performs any welding, submit a copy of the welder's certification as a certified welding mechanic. All welding shall be executed using the best practices of the trade.
4. Site Visit: The Contractor estimating and submitting a bid for the work covered by this section of the specifications shall visit the site, and view conditions as they exist prior to submission of a bid. The submission of a bid shall be taken as evidence that the bidder has examined the existing conditions and has satisfied himself as to the various requirements, obstacles and advantages of performing the work. No subsequent allowances will be made in this respect due to failure of the Contractor to meet the full requirements of these specifications.
5. Protection of Equipment and Materials: Responsibility for care and protection of all materials and mechanical work rests with the Contractor at all times until the entire project has been completed, tested, and the project is accepted.

6. Foundations:
- a. Ceiling Mounting: Where ceiling mounting is indicated or specified, use suspended platform or strap hangers, bracket or shelf, whichever is most suitable for equipment and its location. Construct of structural steel members, steel plates, rods, as required, brace and fasten to building structure or to ensure as approved.
 - b. Structural steel required to support equipment shall be furnished.
7. Shop Drawings: The Contractor shall, after the award of Contract, and before installation, submit for approval shop drawings and Owner's manuals and operating instructions of equipment to be furnished under this Contract. After shop drawings have been given final approval, three (3) copies of shop drawings shall be retained by the Architect/Engineer. The following items of equipment shall be submitted for approval:
- a. New fin tube radiation and accessories.
 - b. Hot water specialties including valves, etc.
 - c. Gas Boiler Unit and Pre-Fabricated Chimney
 - d. Exhaust fans.
 - e. Insulation.
 - f. Circulators and Controls.
 - g. Plumbing fixtures and ~~trim~~.
 - h. Plumbing specialties.
 - i. Plumbing equipment
 - j. Gas Piping and Accessories.
 - k. Other equipment as the Architect/Engineer may require.
8. Substitutions:
- a. The bid shall be based on the materials or products as specified. Whenever in the specifications a particular article is specified by proprietary name, names, or "approved equal", the bidder shall base his bid on one of the above.
 - b. Any materials or products not herein specified, but worthy of consideration shall be so noted in a separate letter attached to his Proposal Form, stating supplier, manufacturer or name and the amount to be added to or deducted from base bid and his reasons for the suggested substitution. He shall also assume the costs necessary for revision in other trades due to this substitution.

A. Regulatory Requirements:

1. Boiler installation shall meet the requirements of the Boiler Rules and Regulations formulated by the Board of Boiler Rules, Boiler Inspection Department, State of Maine.
2. Gas Burner unit installation shall meet the regulations of the State of Maine standards for installation of gas burning equipment.
3. Boiler shall be constructed and stamped in accordance with ASME Code requirements.
4. Safety relief valves shall be ASME stamped.

PART 2: PRODUCTS

2.01 BOILER – BURNER UNIT (HOT WATER - GAS FIRED – CAST IRON TYPE)

- A. General: Provide integral boiler – burner units of cast iron type, as manufactured by H.B. Smith GB 100 Series, or approved equal by Burnham, Peerless.
1. Boiler – burner units shall be rated for not less than the capacities as scheduled on the drawings burning Natural gas.
 2. Unit shall be constructed for 50 psig.
 3. Minimum 82 percent fuel to water efficiency at 100 percent rating
 4. Units shall be Atmospheric Fired draft with breeching sized as recommended by the boiler manufacturer. Provide automatic flue damper to prevent excess draft in boiler when not firing.
- B. Boiler Unit: The boiler unit shall be complete with the following standard equipment and / or accessories:
1. Boiler and burner shall be on 2” concrete base.
 2. Insulated metal jacket of not less than 2” thickness glass fiber insulation. Jacket and all exposed parts shall be neatly painted.
 3. Return fitting and ¾” hose-end (minimum) drain valve piped to drain.
 4. ASME stamped safety relief valves set at 30 psi.
 5. 2-½” minimum diameter water pressure and temperature gauge.
 6. Provide separate low water equal to McDonnell-Miller Electronic Probe type or equal.
- C. Gas Burner: Shall have electric ignitions; with intermittent pilot ignition
1. Gas piping including gas train piping with gas regulator, master solenoid, vent to outside compete with gauges, etc.

2. Control incorporating the following:
 - a. Honeywell electronic programming control to coordinate with burner and code for firing rate.
 - b. Flame failure warning contacts for future tie-in to central alarm.
 3. Operating Controls: Provide Honeywell control as follows, with separate brass well individually connected to tappings on boiler.
 - a. One operating unit control unit (set at 190 degrees F).
 - b. One safety high limit control (set at 205 degrees F).
- D. Other Requirements:
1. All electrical equipment wired in conformance with the Underwriters Laboratories requirement.

2.02 MANUFACTURED STACKS

- A. General: Furnish and install exhaust gas removal system for the Natural Gas fired packaged boiler. Stacks shall be as manufactured by Metalbestos, Metal-Fab, or approved equal.
- B. Main Components and Features:
1. Stacks shall be U.L. approved for Natural Gas fired boiler, equal to Model DF Round to, Type 13 Gas Vent.
 2. Units shall have internal lining of 430 stainless steel corrosive resistant material with aluminized steel outer jacket.
 3. Units shall have 1/2" air insulation between sections.
 4. Provide all accessories for complete installation (roof thimble, roof cap, support tee tie-in, cleanouts, etc.,).
 5. Units shall be sealed pressure tight.

2.03 RADIATION

- A. General: Furnish and install radiation of *sizes*, type and service in locations indicated on the drawings and as scheduled by Sterling, "Petite 7" or approved equal.
- B. Main Components and Features: Provide enclosure as indicated on the drawings complete with cover, brackets, fin pipe, sliding hangers, fittings, end caps, etc.
1. Covers: Finished in manufacturer's baked enamel, color white.
 2. Backs: Full wall back plate.
 3. Hangers: Plastic glide rails shall glide fin pipe for quiet operation or approved equal

system. Maximum spacing between brackets shall be 3'

4. Fin Pipe shall be of aluminum elements and copper tube.
 5. Dampers shall be full length of covers and capable of reducing output by 50%.
- C. Other Requirements:
1. Mounting Heights: All radiation shall be installed as scheduled.

2.04 CEILING EXHAUST FANS

- A. General: Furnish and install where indicated Penn "Zephyr", **Cook**, or approved equal fans.
- B. Main Components and Features: Fans shall be complete, including the following:
1. Acoustically insulated housing.
 2. Chatterproof integral backdraft damper.
 3. Resilient mounted motor.
 4. Vibration isolators.
 5. Cabinet access panels.
 6. Fans shall be located, sized and with capacities as scheduled on drawings.
 7. Each fan shall have ceiling grille
 8. Fan motor shall have thermal overload protection. Provide magnetic (disconnects) starters where required.
- C. Other Requirements: Disconnect furnished with fan. Furnish and install sloped roof caps with backdraft damper where indicated on plans.

2.05 PLUMBING FIXTURES

- A. General: This Contractor shall furnish and install all plumbing fixtures shown on the drawings and as hereinafter scheduled, except where noted in such schedule. Fixtures and fittings hereinafter listed are generally based on American Standard Products. An approved equal type and quality of fixture as manufactured by Kohler Manufacturing Co., Crane, Eljer, Mansfield, or Universal/Rundle are acceptable. Approved equal types and quality of fittings as manufactured by the fixture manufacturer are acceptable.
- B. All piping drops to fixtures shall be anchored solidly.
- C. All fixtures shall be white.
- D. Fixture Schedule:
1. P-1B Water Closet - Barrier Free:
 - a. American Standard "Cadet" #2 168.100, 1.6GPF, pressure assisted, elongated,

siphon jet, vitreous china, flushometer tank type, floor mounted, 17" high rim.
A.D.A. compliant.

- b. McGuire No. 166 angle supply with wheel handle stop, wall flange, all chrome plated.
- c. Church No. 48TL white, elongated, closed front seat with cover.

2. P-1 Watercloset - Regular Height:

- a. American Standard "Cadet" #2292.100, 1.6GPF, pressure assisted, elongated bowl, siphon jet, vitreous china, flushometer tank type, floor mounted, 14-1/8" high rim.
- b. McGuire No. 166 angle supply with wheel handle stop, wall flange, all chrome plated.
- c. Church No. 48TL white, elongated, closed front seat with cover.

3. P-2B Lavatory - Barrier Free Height:

- a. American Standard "Declyn" # 0321.075, 19" x 17", vitreous china, faucet holes on 4" centers, concealed arm support. A.D.A. compliant at 34" rim height.
- b. Faucet: Symmons "Symmetrix" No. S-240-2 centerset, metal wrist blade handles, metal pop-up drain, washerless valve cartridges, all chrome plated. A.D.A. compliant.
- c. McGuire angle wall supplies with wall flange, wheel handle stop and 12" flexible copper risers, all chrome plated.
- d. McGuire #8090 adjustable swivel P-trap, 1-1/4" x 1-1/2", cleanout plug, #2 127 brass nipple to wall with cast escutcheon, all chrome plated.
- e. Provide Truebro, Inc. lavatory pipe insulation kit on supplies, trap and waste.
- f. J.R. Smith, Josam, Zum, or Wade concealed arm carrier to meet building conditions.

4. P-2 Lavatory - Regular and Barrier Free:

- a. Integral countertop lavatory provided by another division of the contract. The plumbing contractor shall be responsible for drilling faucet holes, providing fittings specified below and complete piping.
- b. Faucet: Symmons "Symmetrix" No. S-240-2 centerset, metal lever handles, metal pop-up drain, washerless valve cartridges, all chrome plated.
- c. McGuire No. 167 angle wall supplies with wall flange, wheel handle stop and 12" flexible copper risers, all chrome plated.

- d. McGuire #8090 adjustable swivel P-trap, 1-1/4" x 1-1/2", cleanout plug, #2127 brass nipple to wall with cast escutcheon, all chrome plated.
5. P-3B Kitchen Sink - Barrier Free:
- a. Elkay "Lustertone" model LRAD-2522-60-4, 18 gauge type 302 stainless steel, seamlessly drawn, self-rimming, sound deadened underside, one (1) 21" x 15-3/4" x 6" deep compartment, four (4) faucet holes. **A.D.A.** compliant.
 - b. Faucet: Symmons "Symmetrix" No. S-248-2 8" center deck mount, conventional swing faucet, hose and spray, metal lever handles, washerless valve cartridges, all chrome plated. A.D.A. compliant.
 - c. McGuire #151 crumb cup strainer and tailpiece.
 - d. McGuire No. 2 165 1/2" angle supplies with wheel handle stops, all chrome plated.
 - e. McGuire 8089 adjustable swivel P-trap with cleanout and brass nipple to wall with cast escutcheon, all chrome plated.
 - f. Provide Truebro, Inc. insulation kit on supplies, trap and waste.
6. P-3 Kitchen Sink - Regular:
- a. Elkay "Pacemaker" model PSR-2522-75-4, 25" x 22", 20 gauge type 302 stainless steel, seamlessly drawn, self-rimming, sound deadened on underside, one (1) 7-1/2" deep compartment, four (4) faucet holes.
 - b. Faucet: Symmons "Symmetrix" No. S-248-2 8" center deck mount, conventional swing faucet, hose and spray, metal lever handles, washerless valve cartridges, all chrome plated.
 - c. McGuire #151 crumb cup strainer and tailpiece.
 - d. McGuire No. 2 165 1/2" angle supplies with wheel handle stops, all chrome plated.
 - e. McGuire No. 8089 adjustable swivel P-trap with cleanout and brass nipple to wall with cast escutcheon, all chrome plated.
7. P-4B Roll-In Shower- Barrier Free:
- a. Aqua bath Model C6436BF-FUS 3/4", or approved equal, white, acrylic, molded from a single sheet so as not to have any joints or seams, meeting ANSI 2124.2 backside flame spread of less than 30, **ADA** compliant and NAHB listed, the threshold shall be trimmed to 3/4", inside dimensions of 60" x 36" x 78" and outside dimensions of 64" x 37" x 82-3/4", soap tray molded in the back center 24-3/4" above the floor, factory installed fold up seat 18" above the shower floor in a L-shape, 22-1/2" wide at the back and 15-1/2" wide at the front, one grab bar 31-3/4" x 1-1/2" diameter 2-side wrap with 1-1/2" safety statute clearance secured from the rear with a 3" x 3" x 11" gauge metal mounting plate, two wall brackets installed at 40-3/4" and 70-3/4"

above floor for handheld shower, 1" diameter 18 gauge stainless steel curtain rod, ribbed floor for slip resistance, steel reinforced threshold, self caulking brass drain with stainless steel strainer, and commercial grade white weighted, antibacterial shower curtain with hooks.

- b. Trim: Symmons "Temptrol" model 96-500-B30-L-V-B-X barrier free shower unit, pressure balancing mixing valve with single blade lever handle and adjustable stop screw to limit handle turn, brass valve escutcheon, No. 4-458 lever handle diverter with integral volume control, "Clear-Flo" shower head with arm and flange, wall/hand shower spray with 60" flexible metal hose, in-line vacuum breaker, wall connection and flange, and 30" slide bar for hand shower mounting.
8. P-4 Bathtub - Regular:
- a. Aqua Bath model AB603 ITS or approved equal, white, molded from a single sheet of cross linked, sanitary grade acrylic so as not to have any joints or seams; shall meet ANSI 124.1 and shall use a polyester resin system with chopped glass and flame retardant fillers to provide a backside flame spread of less than 30, shall meet NAHB, inside dimensions of 56-3/4" x 30-3/4" x 79", and outside dimensions of 60" x 31" x 84", contoured flange to accept drywall. Three molded soap dishes, 18" threshold, sloped back rest, towel bar. Complies with ANSI 117.1 and A.D.A. Meets requirements of ANSI 2124.2, ASTM F462 (for slip resistance), HUD UM73A (for fire safety), and ASTM F466 (grab bar).
 - b. Bath Drain: McGuire No. 1221TL concealed trip-lever bath waste with brass overflow and strainer drain, polished chrome finish.
 - c. Trim: Symmons "Temptrol" model S-96-2-B-X tub/shower unit with pressure balancing mixing valve with brass escutcheon, combination integral diverter and volume control, adjustable stop screw to limit handle turn, tub spout, "Clear-Flo" shower head, arm, flange and integral 2.5 GPM flow control.
 - d. Accessories: 60" nominal, 1" diameter, 20 gauge type 304 stainless steel curtain rod and commercial grade vinyl antibacterial shower curtain with hooks.

2.06 IN-LINE CENTRIFUGAL PUMPS

- A. General: Furnish and install an in-line centrifugal pump specifically designed for heating and domestic hot water service as indicated on the drawings and specifications. Pumps shall be equal to Taco series "00" or Bell and Gossett, and Grunfos.
- B. Main components and Features: Pump shall be constructed for 125 psi working pressure with 125 flanges and shall include the following:
 - 1. Seals: Pumps shall be mechanical seals specifically designed for indicated service, rated 220 degrees F at 125 psig continuous operation.
 - 2. Material: For domestic hot water service bronze throughout with non-metallic impeller, hydraulically and dynamically balanced.

3. Motor: Motor of size and with voltage characteristics as scheduled, shall not exceed 3,250rpm, with built-in overhead protection.
4. Operating Characteristics: Pumps shall be non-overloading through entire operating range, with characteristics as scheduled on the drawings.

C. Other Requirements:

1. Supports: Provide additional supports for pumps as required to insure correct installation.
2. Submittals: Provide pump curves for each pump with the shop drawings.
3. Domestic Hot Water Recirculating Pump: Provide a seven day time clock the equal of Paragon 47000 series four pole, 20 amp, T-rated ASTRO and Skip-A-Day feature. Mount clock on wall behind recirculation pump.
4. The Electrical Contractor shall completely wire all pump controls and time clock.
5. Disconnects: Furnish for each pump.
6. Heating Controls: Provide Honeywell T-87F (40° F- 90° F) low voltage thermostat with fixed temperature range stops, relays, transformers, wiring, etc., and as required to provide a complete job.
 - a. Thermostat shall be located as indicated on drawings and shall control respective circulator pump.
 - b. All wiring shall be in accordance with latest edition of National Electric Code and Specification Section 16000.

2.07 INDIRECT FIRED DOMESTIC WATER HEATERS

- A. General: Furnish and install domestic water heaters, Superstor model SS-40. Two (2) heaters are required.
- B. Main Components and Features:
 1. U.L. Seal of Certification with a hydrostatic work pressure of 150 PSIG (Meet U.L. 174.)
 2. Vacuum Breaker.
 3. Type 316L stainless steel water reservoir shell.
 4. 2" thick, CFC-free, water blown polyurethane foam insulation
 5. Plastic outer jacket.
 6. 90110 cupronickel coil heat exchanger, 15 square feet surface area.
 7. Quick-action adjustable immersion-type aquastat and indicator light

8. Reservoir capacity: 40 gallons.
 9. Capacity Required: (With 180 degrees F boiler water flowing at 6 GPM) 2.5 GPM (150 GPH) of Domestic Water from 40 degrees F to 120 degrees F.
- C. Shall meet energy efficiency performance criteria set forth by HUD, ASRAE 90A, BOCA, DOE and all local codes
- D. See drawings for piping arrangement.

2.08 PIPING, FITTINGS, VALVES & MISCELLANEOUS

A. Piping:

1. Seamless scheduled 40 standard weight black steel, ASTM A-106 National Tube *Co.* or equal from Bethlehem, U.S. Steel Corp.
2. Hubless cast iron pipe and fittings conforming to FS WW-P-401; hub and spigot cast iron pipe conforming to ASTM A74.
3. Copper tubing shall be Type "L" rigid copper, ASTM standard specification B88.
4. Schedule 40 rigid PVC plastic pipe and fittings with solvent cement joints conforming to ASTM D-2665.

B. Soil, Waste, and Vent Piping:

1. Underground pipe and fittings shall be service weight, coated cast iron with either lead and oakum or neoprene compression gaskets or PVC as listed below for non-buried pipe.
2. Piping not buried shall be Schedule 40 rigid PVC plastic pipe and fittings made up with solvent cement meeting ASTM D-2665.

C. Domestic Water Piping:

1. **All** hot and cold water piping above finish floor (not buried) shall be hard-drawn type "L" copper tube with cast or wrought fittings and made up with non-lead bearing solder such as "Silver-Brite" or equivalent.
2. All buried hot and cold water piping shall be type "K" soft copper tubing and installed with silver solder joints.
 - a. All hot and cold water piping installed below floor slab shall be insulated with 1/2" thick flexible unicellular insulation as manufactured by Armstrong or an approved equal. All flexible unicellular insulation shall be vapor sealed. Where underslab water piping penetrates above slab, or through foundation walls, flexible unicellular insulation shall extend at least 4" above or beyond concrete.

D. Fittings:

1. Schedule 40 Pipe:

- a. Screwed: 125 lb. best grade cast iron screw pattern with clean-out threads. (150 lb. malleable iron, ASTM B-16.3.)
 - b. Flanged: 150 lb. forged steel, slip-on or welding neck, raised or flat face as applicable.
 - c. Welded: Butt-welded, wrought carbon steel, schedule not less than adjacent pipe.
 - d. Unions: Screwed through 2", 250 lb. S.W.P. malleable iron, bronze to bronze (with brass to brass) seat, "Dart" or equal.
2. Copper Type "L" Pipe:
- a. Cast bronze solder joint pressure fittings (ANSI B 16.18).
 - b. Wrought copper and bronze solder joint pressure fittings (ANSI B 16.22).
- E. Valves shall be as manufactured by Nibco, Jenkins, Crane, Walworth, Fairbanks, or approved equal.
- F. Sleeves and Plates:
1. Pipes passing through masonry or concrete walls and floors shall be provided with sleeves of steel pipe.
 2. Provide steel pipe sleeves or extra heavy cast iron soil pipe sleeves for piping passing through foundations, etc.
 3. Pipes passing thorough partitions and ceiling other than the above shall be provided with minimum 24 gauge galvanized iron tubes with wired or hemmed edges.
 4. Sleeves shall be of ample size to provide for renewal of piping and be securely fastened in floors, walls, etc.
 5. Where exposed piping passes through walls, floors, partitions, cabinet work and ceilings, provide and set chrome-plated brass floor and ceiling plates of approved design with depth to cover sleeve-projection through floor or wall. Ceiling plates are not required on insulated piping.
- G. Hangers and Supports:
1. Piping suspended from overhead shall be supported by approved wrought or malleable iron hangers with adjustable solid mold steel rods except as noted.
 2. Piping smaller than 6" size shall be supported by approved clevis type hangers.
 3. Piping run on side walls or partitions shall be supported by malleable iron brackets, adjustable swivel rings and rod hangers.
 4. Hangers and supports shall be as manufactured by Grinnell Co., Inc. or approved equal.
 5. Pipe supports on copper tubing shall be all copper plated.

2.09 DRAINAGE SPECIALTIES

- A. Traps: Traps of material and design as approved by the State of Maine Plumbing Code shall be furnished and installed at all fixtures and appliances. Trap each fixture separately, and vent each trap. Make off-sets in vent piping with 45 degree angle fittings when possible, pitch horizontal vents toward waste lines, group vents and take through roof as shown. All traps located in finished areas shall be chrome plated.
- B. Cleanouts: Provide cleanouts for soil and waste piping where shown on the drawings and as required by code.
1. Floor Cleanouts: All floor cleanouts in concrete or tile shall be flush with finish floor, round adjustable tops, bronze plug and lead seal, nickel bronze top, flashing flange with flange device, inside caulk. Units shall be Smith Figure 4026 - F-C or equal by Josam, Zurn, Wade or MIFAB.
 2. Wall Cleanouts: All wall cleanouts shall be "tee" fittings with bronze slotted plug with lead seal, stainless steel cover; Smith Figure 4531 or 455 1 or equal by Josam, Zurn, Wade or MIFAB.
- C. Floor Drain Type "B": Smith figure 2220 "Safety-Set," Duco cast iron body and flashing flange, cast iron 8" diameter grate and sediment bucket assembly, bottom outlet. Provide cast iron, deep seal "P" trap.

2.10 WATER SPECIALTIES

- A. General: Furnish and install all hot water specialties as indicated and required for a complete installation. Specialties shall be as manufactured by Bell and Gossett, Sarco, Armstrong, Taco, or Dole.
- B. Main Components and Features:
1. Drain Valves at all low points complete with hose end and caps.
 2. Manual Vents with air chambers at other high points shall be Dole No. **10**, or approved equal, with 1/8" IPS connection, key-operated. Furnish ten keys.
 3. Shut-Off Valves and Balancing Fittings shall be provided at each unit heater. Shut-off valves shall be Sarco series 37, or approved equal. Valves shall be lock-shield construction. Balancing fitting shall be Sarco Type IBC or approved equal combination balancing fitting and tight shut-off valve. NOTE: Valves and balancers shall be located for easy access. Valves and fittings as manufactured by Sarco, Dunham-Bush, or Taco.
 4. Shock Arresters: All domestic water piping shall be protected from water hammer or shock by P.D.I. approved shock-absorbing devices. Install where required according to P.D.I. Standard WH-201.
 5. Expansion Compensators: Furnish and install where necessary to absorb expansion and contraction in copper lines, Flexonics model HB expansion compensators having two-ply phosphor bronze bellows, brass shrouds and end fittings.
 6. Air Separators: Furnish and install air separators for the hot water system equal to Taco or Bell and Gossett of size as indicated on the drawings.

7. Hot Water Expansion: Provide and install on domestic water heaters supply side expansion tanks equal to Amtrol Therm-X-Trol Model "ST" Series with ASME certification. Sized according to manufacturer's recommendations.
8. Pressure Gauges: Trerice #890 Series 3-1/2" stainless steel case dial range 0-100 psi with 1 psi minor graduations gauge. Cocks Trerice Series #865 or #880.
9. Thermometers: Trerice industrial thermometer 9" adjustable angle brass stem A405 with socket and union hub. Temperature range 30 degrees F to 240 degrees F.
10. Furnish and install in the Boiler Room where shown, a continuous pressure type backflow preventor the equal of Watts 9D.

2.11 NATURAL GAS PIPING AND ACCESSORIES

- A. General: Provide all piping and accessories for a complete system.
- B. Main Components and Features: Piping to handle natural gas shall be complete, including the following:
 1. Above Ground and Underground Piping shall be Type K, annealed, seamless copper tube complying with ASTM B88. Underground piping **may** be plastic rated for natural gas service and in accordance with Northern Utilities requirements. Aboveground piping **may** be schedule 40 carbon steel conforming to ASTM A106 with fittings of malleable iron type.
 2. Fittings shall be copper, brass, or bronze with **minimum** 80 percent copper content where exposed to soil.
 3. Valves 1/2" through 2" shall be conventional part, bronze or brass ball, screwed ends, bronze or brass body, teflon seat, lever handle, 400 lb. wog. ball valves.

PART 3: EXECUTION

3.01 PIPING - GENERAL

- A. Provide and erect in a workmanlike manner, all piping shown and required to complete the installation intended. Erect piping to allow sufficient clearance for expansion, application of insulation and finish painting with offsets as required to avoid other work.
- B. Sizes and general arrangement, as well as methods of connecting all piping, valves, equipment, etc., shall be as indicated, or so as to meet the requirements of the Architect/Engineer.
- C. All pipe used is to be new material, and all threads on piping must be full length and clean-cut with inside edges reamed smooth to full inside bore.
- D. In the erection of mains, special care must be used in the support, working into place without springing or forcing.
- E. Make such offsets are shown and required to place the pipes and risers in proper position to avoid other work.

- F. Pipes shall be anchored, guided, etc., where necessary, to prevent vibration or to control expansion.
- G. Install a sufficient number of flanged fittings or unions to facilitate making possible future alterations or repairs. Unions shall be installed at all equipment, traps, fixtures and risers.
- H. Piping shall be erected so as to provide for the easy passage and noiseless circulations of water, steam and condensation under all working conditions.
- I. Provide 1/2" **minimum** size valved draw-offs with hose connection at all low points of the piping systems, apparatus, etc. Copper piping and fittings shall be installed with soldered joints using the following alloy - per ASTM standard B32.
 - 1. 95-5 tin-antimony solder (200 degrees F at 200 psi).
 - 2. All domestic water piping shall be made-up with non-lead bearing solder equivalent to "Silver-Brite".

3.02 PIPING - INSTALLATION FOR WATER SYSTEM

- A. General: Unless otherwise noted, grade supply mains, up in direction of flow, at a **minimum** uniform slope of 1" in 40', and return mains down in direction of flow, at a **minimum** uniform slope of 1" in 40'. Take branch lines off bottom of main, either vertically or at a 45 degree angle as space permits.
- B. Piping: Steel piping shall be used for hot water heating system. At Contractor's option, copper tubing **may** be substituted. All domestic water piping to be copper.
- C. Air Vents: Furnish and install at all high points in piping systems and where indicated and required, manual air vent valves.
 - 1. Manual air vents shall be key operated.
 - 2. Install 6" high air chamber for each vent.
- D. Valving: Furnish and install the following:
 - 1. Drain valves at all low points complete with hose and caps,
 - 2. Provide **and** install manual shut-off valve in supply and tight closing balancing valve in return of each finned pipe circuit and radiation element. Provide and install manual shut-off valves in new main branch lines where indicated.

3.03 PIPING - MISCELLANEOUS MATERIALS

- A. Sleeves and Plates: All sleeves through all floors and through all masonry and all fire walls shall be caulked air tight with high temperature rope and sealed ~~with~~ lead rope (1/2" depth).
- B. Hangers and Supports:
 - 1. All hangers shall be supported from steel beams or steel angles installed between top chord or two bar joists. Provide steel angles are required. No attachments shall be made to the floor construction or the roof deck.

2. All anchors and guides from joist construction shall be supported from steel beams or angle iron and other steelwork provided and installed between three adjoining joists.
3. Support all horizontal piping of steel wrought iron and brass as per following schedule:

<u>Pipe Size</u>	<u>Rod Diameter</u>	<u>Maximum Spacing</u>
Up to 1-1/4" (Incl.)	3/8"	8'0"
1-1/2" and 2"	3/8"	10'0"
2-1/2" and 3"	1/2"	10'0"
4. Provide and set all required hangers, clamps, plates, beams, brackets, anchors, guides, expansion bolts, and ironwork required to support all piping and equipment.

3.04 PIPING - INSULATION

A. General:

1. Provide and install insulation for all surfaces of piping, equipment, and specialties, as indicated and specified.
2. Systems shall be tested and proven tight, and surfaces painted where required before application of insulation.
3. Insulation on all piping systems shall include all valves, fittings, flanges and appurtenances to match the piping insulation jacket, vapor barrier, and finish. Prefabricated "Zeston" or equal fittings will be acceptable.
4. All insulation shall have noncombustible vapor barrier jacket applied in accordance with manufacturer's instructions. Seams shall be concealed where possible. Provide 6" high 20 gauge aluminum protector sleeves on all insulation passing through floor on exposed piping.
5. Labels and trademarks shall be removed.
6. Insulation shall be neatly finished at pipe hangers, pipe anchors, and pipe covering protection saddles as specified for fittings and valves.
7. Materials shall be as manufactured by Johns-Manville, Carey, Armstrong, Owens-Coming or Gustin-Bacon.

B. Piping Systems:

1. The entire domestic hot water piping and heating supply and return piping risers to the second floor shall be completely insulated.
2. All domestic hot water, cold water and recirculating hot water piping shall be completely insulated. Vapor seal all insulation on cold water piping.
3. All piping shall be insulated as follows:
 - a. Generally, piping shall have calcium silicate with ASJ jacket or 7 lb. minimum density glass fiber. Fiberglass 25 with ASJ jacket. Accotherm pipe insulation by Armstrong with ASJ jacket may be used on condensate return piping.

- b. All insulation shall have a flame-spread rating of 25 or less and a smoke developed rating of 50 or less as tested by the ASTM E84 method.

- c. Minimum pipe insulation size:

<u>Pipe</u>	Heating <u>Supply and Return</u>	<u>Hot</u>	Domestic <u>Cold</u>
1" and less	1"	1"	1"
1-1/4" to 2"	1-1/2"	1"	1"

- 4. All piping (domestic and heating) in or under concrete floor slabs shall be continuously insulated with Armflex type flexible insulation **minimum** of 1/2" thick.
- 5. Insulation shall not be applied to the following:
 - a. Screwed unions.
 - b. Valve hand wheels.
 - c. Vents to atmosphere, discharges from safety and relief valves.
 - d. Plumbing fixture supplies (accept as noted in fixture specifications).

3.05 INSTALLATION OF GAS SYSTEM

A. General: Install gas systems complete according to these specifications and drawings.

B. Piping and Equipment:

- 1. General:

- a. Install all piping promptly, capping or plugging all open ends and making pipe generally level and plumb, free from traps, and in a manner to conserve space for other work.
- b. Inspect each piece of pipe, tubing, fittings, and equipment for defects and obstructions. Promptly remove all defective material from the job site.
- c. All risers **and** off-sets shall be substantially supported.
- d. The entire installation should conform to applicable **NFPA** requirements and local and state codes.
- e. All gas copper piping both above and underground shall be enclosed in PVC tubing.
- f. Connect natural gas system to downstream side of gas meter furnished by the gas utility.

2. Joints and Connections:

- a. Smoothly ream all cut pipe.
- b. Pipe joints shall either be made with approved gas tubing fittings or be brazed with a material having a melting point in excess of 1000 degrees F. Brazing alloys shall not contain phosphorus.
- c. All valve connections for steel piping systems shall be of the threaded type.

C. Closing in Uninspected Work:

1. General: Do not cover **up** or enclose work until it has been properly and completely inspected and approved.
2. Noncompliance: Should any of the work be covered up or enclosed prior to all required inspections and approvals, uncover the work as required and, after it has been completed inspected and approved, make all repairs and replacements with such materials as are necessary to the approval of the Architect/Engineer and at no additional cost to the Owner.
3. Underground Piping: Buried piping shall be marked with warning tape in the trench during back filling.

D. Pressure Testing and Inspection:

1. General:
 - a. Prior to acceptance and initial operation, all piping installations shall be inspected and tested to determine that the materials, design, fabrication and installation practices comply with code requirements.
 - b. Inspection shall consist of visual examination, during or after manufacture, fabrication, assembly or pressure tests as appropriate.
 - c. In the event repairs or additions are made following the pressure test, the affected piping shall be retested, except that in the case of minor repairs or additions retest may be omitted, when precautionary measures are taken to assure sound construction.
 - d. Because it is sometimes necessary to divide a piping system into test sections and install test heads and other necessary appurtenances for testing, it is not required that the tie-in sections of pipe be pressure tested. Tie-in connections, however, shall be tested with soap solution after gas has been introduced and the pressure has been increased sufficiently to give some indications should leaks exist.
 - e. The test procedure used shall be capable of disclosing all leaks in the section being tested and shall be selected after giving due consideration to the volumetric content of the section and to its location.
 - f. A piping system may be tested as a complete unit or in sections as the construction progresses. Under no circumstances shall a valve in a line be used as a bulkhead between gas in one section of the piping system and test medium

in an adjacent section, unless two valves are installed in series with a valved "telltale" located between these valves. A valve shall not be subject to the test pressure unless it can be determined that the valve, including the valve closing mechanism, is designed to safely withstand the test pressure.

- g. Regulator and valve assemblies fabricated independently of the piping system in which they are to be installed may be tested with inert gas at the time of fabrication.
 - h. The piping system, after isolation, shall hold the test pressure, of not less than 1-1/2 times the proposed **maximum** working pressure, but not less than **3** psig, for at least eight hours between times of first and last reading of pressure and temperature.
2. Test Medium: The test medium shall be air or inert gas (e.g., nitrogen, carbon dioxide). OXYGEN SHALL NEVER BE USED.
3. Test Preparation:
- a. Expansion joints shall be provided with temporary restraints, if required, for the additional thrust load under test.
 - b. Equipment which is not to be included in the test shall be either disconnected from the piping or isolated by blanks, blind flanges or caps. Flanged joints at which blinds are inserted to blank off other equipment during the test need not be tested.
 - c. When the piping system is connected to equipment or components designed for operating pressures of less than the test pressure, such equipment shall be isolated from the piping system by disconnecting them and capping the outlet(s).
 - d. When the piping system is connected to equipment or components designed for operating pressures equal to or greater than the test pressures, such equipment shall be isolated from the piping system by closing their individual manual shutoff valve(s).
 - e. All testing of piping system shall be done with due regard for the safety of employees and the public during the test. Bulkheads, anchorage and bracing suitably designed to resist test pressures shall be installed if necessary. Prior to testing, the interior of the pipe shall be cleared of all foreign material.
4. Test Pressure Measurement:
- a. Pressure shall be measured with a manometer or an equivalent device so calibrated as to read in increments of not greater than one-tenth pound. The source of pressure shall be isolated before the pressure tests are made.
5. Detection of Leaks and Defects:
- a. The piping system shall withstand the test pressure specified without showing any evidence of leakage or other defects. Any reduction of test pressures as indicated by pressure gages shall be deemed to indicate the presence of a leak unless such reduction can be readily attributed to some other cause.

- b. The leakage shall be located by means of an approved combustible gas detector, soap and water, or an equivalent nonflammable solution, as applicable. Matches, candles, open flames, or other methods which could provide a source of ignition shall not be used. Caution: Since some leak test solutions, including soap and water, may cause corrosion or stress cracking, the piping shall be rinsed with water after testing, unless it has been determined the leak test solution is noncorrosive. When leakage or other defects are located, the affected portion of the piping system shall be repaired or replaced and retested.
6. Test Records: Records shall be made of inspection and all tests performed. These records shall indicate which portions of the piping system conform to this code or were pressure tested.
7. Leakage Check After Gas Turn On:
- a. Before Turning Gas On: Before gas is turned into a system of new gas piping, or back into an existing system after being shut off, the entire system shall be checked to determine that there are no open fittings or ends and that all valves at outlets and equipment are closed.
 - b. Check for Leakage: Immediately after turning on the gas, the piping system shall be checked to ascertain that no gas is escaping. If leakage is indicated, the gas supply shall be shut off until the necessary repairs have been made.
 - c. Placing Equipment in Operation: Gas utilization equipment may be placed in operation after the piping system has been tested and determined to be free of leakage and lines purged.
8. System Purging: After system has been pressure tested and before system operation, purge line in accordance with ANSI B3 1.2.
- E. Cleaning: Prior to acceptance of the buildings, thoroughly clean all exposed portions of the installation removing all labels and all traces of foreign substance, using only a cleaning solution approved by the manufacturer of the item being careful to avoid all damage to finished surfaces.

3.06 SHEET METALWORK AND MATERIALS

- A. General: Furnish and install all required sheet metalwork, including: manual dampers, turning vanes, manual operators, collars, sleeves, baffles, access doors, flexible connections, supports, etc., for the complete installation in accordance with the intent of the drawings and specifications.
- 1. Furnish and install all duct work connected to exhaust fans, kitchen hoods, wall caps, and other equipment furnished under these specifications.
 - 2. Toilet venting shall conform to Maine Plumbing Code.
 - 3. Exhaust ductwork.
- B. Installation: Fabricate and install in accordance with applicable requirements of the ASHRAE Guide and SMACNA Manual. Ductwork shall conform to 2" SMACNA Pressure Class

except where SMACNA requirements are exceeded by these specifications. Ductwork shall be neat, accurate, rigidly constructed and mechanically tight, as well as substantially airtight and shall provide quiet system of air transportation. Offsets of exposed ductwork shall be made on sides opposite to walls and ceilings, unless otherwise shown on the drawings or specified. Sizes, as marked on the drawings, shall be adhered to as closely as possible. The right is reserved to vary the size of ducts and flues to accommodate structural conditions during the progress of the work, without additional cost to the Owner.

C. Materials: Ductwork shall be of galvanized sheet metal or aluminum where indicated. Galvanized sheet metal shall be new copper bearing (or prime grade) galvanized steel sheets of lock-forming quality. Zinc coating that will flake or peel under any forming operation, or laminated sheets will not be allowed.

1. Thickness of metal for rectangular ducts, including elbows and other details, shall be as follows:

Longest Rectangular Dimension of Duct Inches	Thickness of Galvanized Steel USS Gauge	Thickness of Aluminum Alloy Inches
Up thru 12	26	.032

2. Thickness of metal for round ducts, including elbows and other details, shall be as follows:

Duct Diameter Inches	Galvanized Steel USS Gauge	Aluminum Inches
u p thru 10	26	.040

D. Construction: Seams, joints, bracing angles and stiffeners.

1. Longitudinal Seams: Longitudinal joints in ducts not exceeding 60" in either dimension, and ducts exceeding 60" in the larger dimension but not exceed 18" in the smaller dimension, shall be either Pittsburgh lockseams or grooved seams.

2. Round Ducts: The downstream end of each section of round duct shall be crimped and beaded. Assembly shall be made by inserting the crimped end into the upstream end of the adjoining section. The joints shall be fastened in place by three or more sheet metal screws spaced not over eight inches apart.

3. Lock type as described in SMACNA Low Velocity Duct Manual.

E. Duct Turns: Long radius elbows shall be provided, except as indicated hereinafter:

1. Long Radius Elbows shall be constructed with a throat radius equal to not less than the dimension to the duct width in the plane of the duct turn. Where space does not permit the use of a long radius elbow, vaned mitered elbows shall be provided.

F. Flexible Connections: Furnish and install flexible connections between all fans and ducts or casings where required to prevent excessive movement of long ducts and wherever ducts cross building expansion joints. Material shall be fabricated with sewed seam. Connections shall be approximately 4" long and installed with sufficient slack to prevent transmission of vibration.

G. Duct Hangers:

1. Ducts up to and including 36" in width shall be hung by 1" x 1/8" flat straps bent under bottom of duct a **minimum** of 2" and securely fastened to duct.

3.07 CONTROLS

A. General:

1. The Contractor shall provide and install a complete system of electric automatic temperature control as herein specified, including all required thermostats, relays, switches, etc., as indicated and required. Work includes, but is not limited to, the following:
 - a. Thermostats
 - b. Wiring of Control Devices
 - c. Control Devices
 - d. Sequence of Operation

B. Equipment:

1. Room Elements:
 - a. Room thermostats shall have adjustable sensitivity ranges of 35 degrees to 60 degrees with a **minimum** sensitivity of not less than one degree plus or minus, and shall have bi-metal sensitive elements. Thermostats shall be securely attached to a suitable base mounted on the wall or other building surface. Each thermostat shall be located where shown or, if not shown, where it will respond to the average temperature in the room. Thermostats generally shall be mounted 60" above floor and **54"** AFF for *handcap*, and shall not be mounted on outside walls, if other locations are possible. **If** located on outside wall, it shall have an insulated base. Thermostats shall have locked or concealed adjustment devices by means of which the operating points can be adjusted through a range of not less than 10 degrees above and below the operating points specified. Room thermostats shall be provided with thermometers.
2. Transformer: Provide master 120V/24V control transformers of sufficient capacity to provide for all controls. Transformer shall be totally enclosed and UL listed.

C. Execution:

1. Wiring: Under this section provide and install all wiring associated with the temperature control system. Equipment and wiring not provided under Division 16 - Electrical sections shall be furnished and mounted under this section.
 - a. Low voltage wiring (24V) shall be No. 18 minimum.
 - b. *Line* voltage wiring (120V or higher) shall be No. 12 minimum.
 - c. All wiring shall be in accordance to Division 16 - Electrical.

2. Description Operation - Heating Hot Water:
 - a. Fin Tube Radiation: Low voltage (24volts) thermostat shall control respective zone circulating pump.
 - b. Toilet Exhaust Fans: Shall operate from their respective ceiling light switch.

D. Completion:

1. Guarantee: The entire system shall be complete in every respect and guaranteed by the Contractor against original defects in workmanship or materials for a period of one year from date of final certificate, to control all pumps so as to maintain temperature within one degree above or below any desired point. The Contractor shall maintain the equipment in perfect working order for the guarantee period without additional charge.
2. Instruction and Adjustment: On completion of the job, the Contractor shall completely adjust, ready for use, all thermostats, and relays provided under his contract. The Contractor shall provide a complete instruction manual covering the function and operation of all control components on the job and schematic control diagram. This manual shall be furnished to the Owner's operating personnel, and a competent technician shall be provided for instruction purposes. Submit shop drawing for approval before start of installation.

3.08 BOILER INSTALLATION

- A. Wiring shall be under this section from breaker in Boiler Room to all motors and controls.
 1. Wiring shall be type THW copper insulated conductors in EMT, except wiring close to and over boiler and flue shall have high temperature insulated wire, spaced a minimum of 2" from boiler. Minimum size wire shall be No. 12.
 2. All wiring shall be in accordance with requirements of Division 16- Electrical and National Electric Code.
 3. Wiring shall include master emergency switches at each entrance to Boiler Room, relay wired to stop all boilers.
 4. Provide approved thermal switches at ceiling over each boiler to also stop all equipment.
- B. Piping: Provide all required connections, valves, etc. See other sections of this division and the drawings.
 1. Pipe safety relief valve discharge to floor drain.
- C. Boilers shall set on 2" concrete base.
- D. Start-up: The burner shall be started up and adjusted by the manufacturer's representative at the time of supplying temporary heat and at the completion of the work.
- E. Instruction: The manufacturer's representative shall provide the instructions to the Owner's representative as to the proper care and operation.

- F. Guarantee: Contractor shall guarantee the entire installation for a period of one year from the date of final certificate of payment and maintain apparatus in satisfactory operating condition for the period of guarantee without additional cost to the Owner.

3.09 INSTALLATION OF MANUFACTURED STACKS

- A. General: Install stacks complete, including all accessories per Code and manufacturer's recommendations for a complete installation.
- B. Main Components and Features: Provide breeching and stacks with cleanouts for the following equipment:
1. Gas Fired Hot Water Heating Boilers.

3.11 JOB CLOSING

- A. Operating and Performance Tests:
1. Prior to the final inspection perform required tests and submit the test reports and records.
- B. Testing and Adjusting:
1. Testing Piping Systems: All piping shall be tested periodically during the progress of the work. The Contractor shall provide necessary labor, test pump, gauges, meters, other instruments and materials. All tests shall be made in the presence of the Engineer. No joint or section of piping shall be left untested.
 - a. Before testing piping systems, remove or otherwise protect from damage, control devices, air vents, other parts which are not designed to stand test pressures.
 - b. Hydrostatic Pressure: Test hydrostatically, piping to one and one-half times the maximum working pressure, but in no case to less than 75 psig for at least four (4) consecutive hours, during which time pressure shall remain constant without pumping. Subject welded joints to hammer test while under hydrostatic pressure.
 - c. Domestic water piping shall be tested in accordance with the State of Maine Internal Plumbing Rules, Chapter 11, Article H.
 - d. Sanitary piping shall be tested in accordance with State of Maine Internal Plumbing Rules, Chapter 4, Article P.
 - e. Do not paint, cover or conceal piping, including swing joints and the like, before testing and obtaining approval.
- C. Sterilization of Pipes
1. General:
 - a. After preliminary purging of the system, chlorinate the entire new potable water system in accordance with the current recommendations of the American Water Works Association and in accordance with all pertinent codes and regulations.

- b. Chlorinate only when the building is unoccupied.

2. Fluslung:

- a. Upon completion of the sterilization, thoroughly flush the entire potable water system.
- b. When sterilization and flushing are complete, a sample shall be collected from the end of the longest main, or at any other location selected by the Architect/Engineer, and a water analysis test provided. The test must prove the water acceptable or additional disinfecting of system performed. A copy of the test report shall be submitted to the Architect/Engineer.

D. Air System:

- 1. Upon start-up of a system, check fan for the following and record readings as indicated.
 - a. Check fan drives for rotation.
 - b. Determine that motor is not overloaded.
 - c. Make all adjustments necessary to proportion the airflow correctly.
 - d. Submit for approval all initial and final readings as specified.

E. Hot Water Heating System:

- 1. Balancing: Upon start-up of a system, check pump rotation and measure and record rpm, voltage and amperage on each phase leg and verify motor is not overloaded. Make all adjustments to balancing valves necessary to obtain correct system water flow rate. Take final readings and record the following:
 - a. Pump rpm, amperage draw on each phase leg, voltage and suction and discharge pressures.
 - b. Pressure at high point in each system.
 - c. Submit for approval all initial and final readings as specified. Compare measured readings to design quantities and note deviation.
 - d. Record and submit installed heater sizes, rated heater capacities, and motor service factors for all motors.

F. Cleaning:

- 1. After satisfactory completion of pressure tests, before permanently connecting equipment, strainers, and the like, clean equipment thoroughly, blow and flush piping for a sufficient length of time as directed, so that interiors will be free of foreign matter.
- 2. Fill, vent and circulate the system with approved solution in accordance with boiler manufacturer's recommendations, allowing it to reach design or operating

temperatures. After circulating a few hours, the system should be drained completely.

3. The entire system installations including apparatus, motors, etc., shall be left in first-class condition including cleaning, oiling and packing.

G. Instruction and Charts: After completion of the installation work called for in **this** specification, the Contractor and his Subcontractors shall furnish necessary mechanics or engineers for the adjustment and operation of the systems, to the end that the systems may be perfectly adjusted and turned over to the Owner in perfect working order. The Contractor shall further instruct the Owner's authorized representative in the care and operation of the installation, providing all required framed instruction charts, directions, etc.

H. Painting:

1. All exposed ironwork, including steel supports, hangers, etc., shall be painted two (2) coats of machine gray or equal.
2. Painting specifically noted on equipment.

I. Nameplates: Furnish and install DYMO, or approved equal, embossed vinyl-plastic nameplates, with white letters on black background to identify equipment, controls, etc., furnished under this section of the specifications.

END OF SECTION

SECTION 16000 BASIC ELECTRICAL REQUIREMENTS

PART 1: GENERAL

1.01 WORK INCLUDED

- A. In general, the work consists of removing and relocating existing equipment and connecting new equipment associated with the construction of new apartments including power, lighting, and HVAC system, all as indicated on the drawings and specifications, including the following:
1. Furnish and install wiring and connections for new, relocated and rewired lighting fixtures, receptacles, panelboards, signaling, etc.
 2. Provide a new sub-service panel to each apartment unit.
 3. Furnish all labor, materials, equipment, suppliers and perform all operations necessary to complete the secondary grounding work in accordance with drawings and these specifications.
 4. Provide circuit breakers in existing panels as needed. Reuse existing circuit breakers where possible.
 5. Furnish and install fire alarm detection and signal devices. Installation shall comply with NFPA 72 and 72E.
 6. Furnish and install a complete and operable communication and signaling system for each apartment unit as shown on the drawings, wire to existing systems.
 7. Provide new power distribution and meter equipment for multi-tenant metering and connection to existing distribution system.
- B. Unless specifically noted otherwise, all items noted to be furnished, provided, or installed shall be both provided and installed.

1.02 QUALITY ASSURANCE

- A. All wiring shall be in accordance with the latest issue of the National Electrical Code.
- B. The service equipment shall be the grounding point for the conduit, boxes, fittings and metal enclosed equipment used in the building wiring system. Any grounding methods allowed under Article 250 of the National Electrical Code may be used, provided the ground resistance is less than 25 ohms. This resistance shall be tested.
- C. The contractor shall show evidence of having successfully completed at least five similar projects. Installation of each system shall be under the supervision of a factory-authorized organization.
- D. The Contractor shall show evidence, upon request, that he maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system. The Contractor must have a service contract program for the maintenance of the system after the guarantee period.
- E. All electrical equipment shall be approved by the Underwriters' Laboratories, Inc. Each system shall be products of a single manufacturer of established reputation and experience. The Contractor shall be have supplied similar apparatus to comparable installations rendering satisfactory service for at least three years.

- F. The Contractor shall guarantee all equipment and wiring free from inherent mechanical or electrical defects for one year from date of acceptance.
- G. For each system the manufacturer shall furnish “gratis” to the Owner, a one year contract effective from the date of installation, for maintenance and inspection services of the manufacturer’s equipment with a minimum of two inspections during the contract year.
- H. Furnish the services of a competent instructor for not less than one four hour period for instructing personnel in the operation and maintenance of the communication and signaling systems, on the dates requested by the Owner.

1.03 SYSTEM DESCRIPTION

- A. The utility providing service is 208 volt 3 phase four wire.
- B. Provide a 120/208-volt, 1 phase, 3 wire sub-panel to each apartment and boiler room.
- C. Provide new meter stack assembly to match existing. GE and Metermod II

1.04 FIFE ALARM SYSTEM

- A. The Contractor shall furnish and install single station smoke detectors, to be wired, connected and left in first-class operating condition. Fire alarm systems shall generally comply with requirements of NFPA 72 for local building systems except as modified and supplemented by this specification. All units of equipment shall be listed by Underwriter’s Laboratories. All equipment shall be located as shown on the plans and wired in accordance with the manufacturer’s instructions to form a complete and workable emergency system as hereinafter described.

1.05 SUBMITTALS

- A. Submit six (6) copies of manufacturer’s literature.
- B. Certification: Prior to final inspection, deliver to the Owner’s representative four (4) copies of the certification that the material is in accordance with the drawings and specifications and has been properly installed.
- C. In accordance with Section 01340 – Shop Drawings, Product Data and Samples furnish the following:
 - 1. Submit shot drawings which include engineering drawings of the system with specification sheets covering all component parts of the system and interconnection diagrams.
 - 2. Manuals: Submit six (6) complete sets of operating instructions, including operating and maintenance manuals, circuit diagrams, and other information of system components.
- D. Certification: Submit certification of system operating test.

1.06 PROJECT CONDITIONS

- A. Regulatory Requirements: Secure and pay for all permits and certificates as required by local and state laws.

1.07 WARRANTY

- A. The Contractor shall guarantee all equipment and wiring free from inherent mechanical or electrical defects for one year from date of acceptance.

1.08 RELATED WORK

- A. Division 15 – Mechanical

PART 2: PRODUCTS

2.01 MATERIALS

- A. Toggle Switches: 20A, 277V, 1 pole, brown specification grade, mount 4' 0" above finished floor at door entrance.
- B. Receptacles shall be 20 amp duplex units, ivory.
- C. Plates shall be same color as receptacles, nylon.
- D. Boxes shall be steel, minimum 2 ½" deep.
- E. Light Fixtures: The light fixtures shall be as described on the drawings or other approved equal are also acceptable.
- F. Disconnect Switches: Disconnect switches shall be horsepower rated, heavy duty type.
- G. Wiring Materials:
1. Wiring shall be enclosed in electrical rigid galvanized steel, aluminum or intermediate metal conduit sized in accordance with code requirements for the conductors. Electrical metallic tubing may be used where concealed in walls or ceilings.
 - a. Terminations for all conduit shall have insulated bushings or insulated throat connectors in accordance with code requirements.
 - b. All conduits shall be substantially supported with approved clips or hangers spaced not to exceed ten (10) feet on centers. Minimum conduit size shall be ½".
 2. Flexible Metal Conduit shall be used for all connections to motors and vibrating equipment, and shall comply with Federal Spec. WW-C-566.
 3. All wiring shall be type THW, XHHW, or THWN, UL labeled, copper conductors with 600 volt insulation, except as otherwise noted. Minimum size wire shall be No. 12 AWG.
 4. Non-metallic sheathed cable (Type NM) shall be two or three conductor with a ground conductor and an overall covering that is flame-retardant and moisture-resistant. Minimum wire size shall be No. 12 AWG.
 5. Type MC Cable shall have minimum No. 12 AWG type THWN or XHHW insulated copper conductors with an internal bare or insulated copper ground wire.
 6. Fire Alarm Wiring: Wiring shall be in accordance with NEC Article 760, as shown on drawings, and as recommended by the manufacturer of the fire alarm system. All wires shall be color coded.

7. Panelboards

1. Provide standard manufacturer products. All components of panelboards shall be the product and assembly of the same manufacturer. All similar units of all panelboards shall be of the same manufacturer.
2. All panels shall be dead front safety type.
3. All panelboards shall be completely factory assembled with molded case circuit breakers.
4. Panels shall have main breaker or main lugs, bus size, voltage, phase, top or bottom feed, and flush or surface mounting all as scheduled on the drawings.
5. Panelboards shall have the following features:
 - a. Nonreduced size copper or aluminum bus bars and connection straps bolted together and rigidly supported on molded insulators. Bus bar taps shall be arranged for sequence phasing of branch circuit devices.
 - b. Full size neutral bar mounted on insulated supports.
 - c. Ground bar with sufficient terminals for all grounding wires. The ground bar shall be insulated and isolated where called for on the drawings.
 - d. Buses braced for available short circuit current, but not less than 22,000 ampere symmetrical. If the panelboard is within 25 feet of the service entrance, and never less than 10,000 amperes symmetrical.
 - e. All breakers arranged so that it will be possible to substitute a two-pole breaker for two single pole breakers or a three-pole breaker for three single pole breakers when frame size is 100 amperes or less.
 - f. Design interior so that protective devices can be replaced without removing adjacent units, main bus connectors and without drilling or tapping.
 - g. Where designated on panel schedule as "space", include all necessary bussing, device supports and connections. Provide blank cover for each space.
 - h. Provide galvanized steel cabinets to house panelboards. Cabinets for panelboards may be factory primed and suitably treated with a corrosion-resisting paint finish meeting UL standard for outdoor applications.
 - i. Back and sides shall be of one piece formed steel. Cabinets for panelboards may be of formed sheet steel with end and side panels welded, riveted or bolted as required.
 - j. Provide minimum of four interior mounted studs and necessary hardware for in and out adjustment of panel interior.

- k. Fabricate trim of sheet steel consisting of frame with door attached by concealed hinges. Provide flush or surface trim as shown on the drawings.
- l. Surface trim shall have the same width and height as the box.
- m. Provide doors with flush type latch and manufacturer's standard lock.
- n. In making switching devices accessible, doors shall not uncover any live parts.
- o. Provide concealed butt hinges welded to the doors and trims.
- p. Provide keyed alike system for all panelboards.
- q. Provide a directory card, metal holder, and transparent cover. Permanently mount holders on inside of doors.
- r. Circuit breakers in panelboards shall be bolt on type on phase bus bar or branch circuit bar. Molded case circuit breakers shall have automatic, trip free, non-adjustable, inverse time, and instantaneous magnetic trips.

1. Circuit Breakers:

- 1. Circuit breakers to be added to existing panelboards shall match existing circuit breakers.

J. Grounding Conductors:

- 1. Grounding conductors shall be soft-drawn bare copper.
- 2. Insulated Grounding Wires shall be UL and NEC approved types, copper, with THWN or XHHW insulation color, identified green, except where otherwise shown on the drawings or specified.
- 3. Wire shall not be less than shown on the drawings and not less than required by the NEC.

K. Ground Clamps:

- 1. Ground clamps shall be cast bronze or cast copper and shall be UL listed for grounding connections.
- 2. Ground clamps shall be sized for the specific conductor and electrode to be clamped.

L. Grounding Connections: Connections shall be of the exothermic type welding process as manufactured by Cadweld or approved equal.

M. Equipment Grounding Connections: Connections shall be of the compression type solderless connectors.

N. Communication and Signaling Systems:

1. General:

- a. All basic equipment shall be compatible with existing equipment and manufacturer. All equipment for new units shall be new material.

2. Conduit and Wire:
 - a. Wiring shall be in accordance with NEC, as shown on the drawings, and as recommended by the manufacturer. All wires shall be color coded and installed in metal conduit. Conduit fill shall not exceed 40% of the interior cross sectional area. Number and size of conductors shall be as recommended by the system manufacturer. Conduit shall be ½" minimum.
 - b. Wires in junction boxes and cabinets shall be permanently tagged and identified with nylon tags.
3. Terminal Boxes, Junction Boxes and Cabinets shall be galvanized steel in accordance with UL. Junction boxes shall have a volume 40% greater than required by the NEC. Minimum sized wire shall be considered as 14 AWG for calculation purposes.
4. Provide all necessary connectors, terminators, and adapters.

PART 3: EXECUTION

3.01 INSTALLATION

A. General:

1. All work shall be in accordance with the National Electrical Code requirements as amended to date, with the local electrical utility company rules, the Fire Underwriter's requirements, and all local, State and Federal laws and regulations.
2. Conduits shall be of sizes required by the National Electrical Code. Exposed conduits shall be installed with parallel or perpendicular to walls and ceiling, with right angle turns consisting of bends, fittings, or outlet boxes. No wire shall be installed until work, which might cause damage to wires or conduits, has been completed. Conduits shall be thoroughly cleaned of water or other foreign matter before wire is installed.
3. All splices shall be mechanically and electrically perfect, using crimp type wire connectors.
4. Provide all disconnect switches required by the N.E.C.
5. Mount disconnect switches and starters at a height of 48" above finished floor unless otherwise noted.
6. Provide all necessary hardware for mounting motor starters.
7. A typewritten schedule of circuits, approved by the Owner's Representative shall be on the panel directory cards. Three complete copies of all directories, neatly bound, shall be delivered to the Owner's Representative.
8. Revise existing panelboard directories. Furnish new cards as needed.
9. Mount the panelboard so that maximum height of circuit breakers above finished floor shall not exceed 78".
10. Circuit numbers indicated on the drawings are the actual numbers assigned to the circuit in the panelboard and shall not be varied without the consent of the Architect/Engineer.

11. Provide all necessary hardware for mounting panelboard.
 12. Maintain 1-1/2" spacing between snow melting cable and roof surface. Do not anchor supports to roof.
 13. Branch circuit wiring may be non-metallic sheathed cable where concealed and allowed by Code, Type NM. **NOTE:** All romex shall be Properly Supported. (Provide continuous ground wire.)
 14. Feeder circuit wiring shall be in conduit or EMT.
 15. In general, conductors shall be in the same size from the last protective device to the load and shall have an ampacity the same as or greater than the ampacity of the protective device where the wire size is not shown on the drawings. Use the **60** degree **C**. ampacity rating for wire sizes # 14 through # 1. For 120v circuits, home runs longer than 50 feet shall be minimum #10 AWG, longer than 100 feet shall be minimum #8 AWG.
- B. Grounding:
1. The entire electrical system shall be permanently and effectively grounded in accordance with Code requirements.
 2. Connections to junction boxes, equipment frames, etc. shall be bolted.
 3. Conduit Systems:
 - a. Ground all metallic conduit systems.
 - b. Conduit systems shall contain a grounding conductor sized per NEC table 250-95 or as shown on the drawings. Increase conduit size where necessary to accommodate the grounding conductor.
 4. Feeders and Branch Circuits: Install green grounding conductors with all feeders and branch circuits.
 5. Lighting Fixtures: Conduits shall not be used for grounding fixtures. Green equipment grounding conductor must be bonded to all fixtures.
- C. Alterations:
1. The Contractor shall study all drawings and specifications and visit the site and acquaint himself with the existing conditions and the requirements of the Plans and Specifications. No claim will be recognized for extra compensation due to failure of Contractor to familiarize himself with the conditions and extent of the proposed work.
 2. The Electrical Contractor shall execute all alterations, additions, removals, relocations or new work, etc., as indicated or required to provide a complete installation in accordance with the intent of the drawings and specifications.
 3. Reconnect existing circuits to remain. Remove existing equipment to be discontinued.
 4. Any existing work disturbed or damaged by the alterations or new work shall be repaired or replaced to the Engineer's satisfaction.
 5. Equipment relocated or removed and reinstalled shall be cleaned and repaired to first class condition before reinstallation.

- D. Fire Alarm System Installation:
1. Installation shall be in accordance with the NEC Article 760, and the Americans with Disabilities Act (ADA), and as shown on the drawings.
 2. Installation shall be as shown on the drawings and on the manufacturer's wiring diagrams.
- E. Continuity of Services: The Electrical Contractor shall arrange to execute his work at such times and in such locations to provide uninterrupted service to the building or any of its sections. If necessary, temporary power shall be installed to provide for this condition. Authorization for interrupting service shall be obtained in writing from the Owner. Any interruption of normal supply shall be performed during an overtime period to be scheduled with the Owner. Cost for overtime work shall be included in the bid.
- F. Identification: Provide tags on each of all pulled wires giving location of the other end. Provide phenolic nameplates for all panelboards, motor starters, and disconnect switches (except switches located at motors).
- G. Record Drawings: The Contractor shall keep on the job a set of prints showing any changes to the installation. These shall be given to the Engineer at the completion of the work.
- H. Testing and Adjusting:
1. The entire installation shall be free from short circuits and improper grounds. Tests shall be made in the presence of the Engineer's representative.
 2. Each individual lighting circuit shall be tested at the panel, and in testing for insulation resistance to ground, the lighting equipment shall be connected for proper operation. In no case shall the insulation resistance be less than that required by the National Electrical Code. Failures shall be corrected in a manner satisfactory to the Architects and Engineers.
 3. Each system shall be completely tested and shall be adjusted for proper operation as required by the Engineer.
- I. Instruction: Furnish the services of a competent instructor for not less than two four hour periods for instructing personnel in the operation and maintenance of the fire alarm system.
- J. Communication and Signaling Systems:
1. Installation shall be in accordance with the NEC and as shown on the drawings.
 2. The units shall be mounted as shown on the drawings.
 3. All wiring shall be in conduit.
 4. Tests: Provide the services of a competent, factory-trained engineer or technician authorized by the manufacturer of the system equipment to technically supervise and participate during all of the adjustments and tests for the system. Make all adjustments and tests in the presence of the Owner's Representative.
 5. Final Inspection: At the final inspection, a factory-trained representative of the manufacturer of the major equipment shall demonstrate that the systems function

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properly in every respect. The demonstration shall be made in the presence of the Owner's Representative.

END OF SECTION

