4. Condensate Drain Piping:
a. Condensate drain piping shall be galvanized Schedule 40 or Type "M" copper from HVAC equipment on the roof and other equipment unless stated otherwise.
b. Contractor shall furnish and-install 3/4" or 1" copper condensate drains on cooler/freezer evaporator coils; with trap assembly and 2" air gap above drain as shown on the drawings. Freezer condensate piping shall be wrapped with heat tape with a minimum rating of 10 watts per lineal foot for its entire length within the freezer compartment.
5. Indirect Waste Piping: Shall be Type "L" copper with 95/5 sweat solder and wrought copper fittings (see plumbing plan for requirements) unless otherwise indicated.
6. Gas Piping:
a. Gas piping including tap and service shall be included. Coordinate meter location with local authority.
b. Underground gas piping shall be Schedule 40 black steel pipe with long radius steel welding fittings. Protect pipe and fittings with– Trantex wrapping tape applied in accordance with the manufacturer's recommendation. Other type of pipe protection of equivalent quality will be optional with this Contractor. Installation of gas service piping and material shall meet with local gas company's approval.
c. Gas piping above ground shall be Schedule 40 black steel with 125 lb. black malleable iron screwed fittings and supported at intervals not to exceed 8'–0" and at each change in horizontal or vertical direction. Gas piping compound at joints shall be in compliance with NFPA Bulletin No. 54 and local applicable codes and suitable for natural gas service.
d. Gas piping shall supply HVAC units, gas fired water heaters and kitchen equipment if indicated on drawings provided by the Contractor.
e. Moisture traps shall be installed on each piping drop for HVAC units, gas fired water heaters and kitchen equipment.
7. Storm drain leader: Same as soil, waste & vent piping.
8. Insulation
a. All Water Pipes, Rain Leaders and etc, shall be insulated. Piping shall be insulated to prevent excessive heat loss and to prevent condensation and sweating. All piping shall be insulated with at least 1/2" thick foam insulation as manufactured by Armstrong Armaflex or approved equal as indicated on plans and notes. As much of the insulation as possible shall be slipped on to the piping as the piping is being connected in order to avoid cutting the insulation. All butt ends and any necessary longitudinal joints shall be sealed with rubber based adhesive.

7. Fixtures:
a. See drawings for specifications.

8. Flashings:
a. All piping and vents passing through roof shall be flashed watertight with six pound to the square foot lead using sleeve flashing with base extending at least 12 inches in each direction beyond the outside diaphragm of the pipe. Turn sleeve down a minimum of 1–1/2" into top of vent pipe with lead fitting snugly inside of pipe. All gas vent caps shall be fitted with lead fitting snugly inside of pipe. All vent caps shall be vandal proof. Verify approved flashing material and methods with roofing contractor to ensure a complete job. See details on arch. sheets.

9. Cleanouts:
a. See drawings for specifications.

10. Equipment:
a. Water Heaters, Furnished and installed by Plumbing Contractor:
1. Size, capacity, type and manufacturer as indicated by drawings. Various water heaters shall consist of natural gas fired tank type and instantaneous electric tankless fixtures.
2. Gas fired water heaters shall be provided with manufacturer approved CPVC combustion intake/ flue piping complete with pipe fittings, ceiling collar, fire stop, roof flashing, installed in strict accordance with the manufacturer's recommendations.
3. Instantaneous electric water heaters shall have manufacturer installed microprocessing temperature controls, replaceable element cartridge, replaceable inlet filter, installed in strict accordance with the manufacturer's recommendations.
4. The water heaters shall be provided with all temperature and safety controls including ASME and ANSI Z21.22 rated temperature and pressure relief valve, gas pressure regulator (if required), drain valve, expansion tank, etc.
5. Plumber shall make water, gas and relief line connections with cutoff valves and dielectric unions in water and gas lines.
b. Valves, Cocks and Faucets:
1. Unless specifically indicated elsewhere, the valves shall be designed for not less than 125 lbs. working pressure. The valves shall have suitable valve body patterns for connection to the pipe for which they will operate. All valves with rising stems shall have back seats for packing under pressure. Approved equal gate valves and check valves as manufactured by Stockham, Walworth, Lunkenheimer, Scott, Hammond, Crane or Watts will be acceptable.
2. Gate valves shall be Hammond 1B634 split wedge or approved equal.
3. Cutoff valves underneath lavatories, tank type water closets, sanitary sinks and water coolers shall be chrome plated angle stop valves with soft annealed chrome plated copper connection pipes and chrome plated escutcheon plates.
4. Gas Cocks for all Equipment: See drawings for requirements.
5. Water cutoff valve shall be Nibco #S–112 or approved equal bronze solder joint, 125 lb. WOG with rising stems.
6. Exterior hose cocks and valve fixtures to be non–freeze type, supply shut–off valves if indicated on plans.

11. Execution:
a. Piping:
1. All piping shall be run concealed except where shown otherwise on drawings.
2. Valves, traps, cleanouts and other apparatus shall be installed in an inconspicuous location.
3. Soil, waste and vent offsets and house drains shall be installed with a minimum, uniform grade of 1/8" to the foot, unless otherwise indicated or required by local codes.
4. Hot and cold water lines shall be at least 6" apart where piping is parallel.
5. All water lines shall be run overhead and down partition walls unless no wall is provided; then run lines under slab to point of termination. All lines shall be concealed unless noted otherwise on plans.
b. Hangers and Supports:
1. Copper piping shall be supported at intervals not to exceed 7'–0" and at each change in horizontal or vertical direction. Hangers shall be Fee & Mason plastic coated hanger, Fig. 381 or approved equal by Grinnell. Hanger attachment to structure shall be as required.
2. Gas piping shall be supported at intervals not to exceed 8'–0" and at each change in horizontal or vertical direction. Steel pipe hangers shall be Grinnell Fig. 104 or Fee & Mason Fig. 199. Attachment to structure to be as required.
3. Hanger rods shall be standard bolt steel with machine screw threads, 3/8" diameter minimum.
4. All piping underground shall be firmly bedded on the body of the pipe, and bell holes provided at each bell. All piping shall be installed in graded trench. Excavate, backfill and support piping as herein before specified.
c. Plumbing Fixtures:
1. Furnish and install all plumbing fixtures complete with all equipment fittings, trimmings and accessories, as specified.
2. All fixtures shall be Grade A. The name or trade mark of the manufacturer shall be printed or pressed on all closets and lavatories, and a label, which cannot be removed without destroying it, containing the manufacturer's name or trademark and the quality or class of the fixtures, shall be affixed to all fixtures and not removed until after the work has been accepted.
3. Exposed piping to fixtures shall be a product of the fixture manufacturer or approved equal and shall be:
a. Water: Chromium plated iron pipe size red brass.
b. Waste: Chromium plated tubing, except waste connections to kitchen or scullery sinks.
4. Stops as manufactured by the fixture manufacturer, with metal–to–metal seat, shall be provided for all fixtures and equipment. Refer to schedule on drawings for manufacturer's and model numbers used as guide specifications. Numbers as listed represent the complete workable outfits with all brass trim as necessary.
5. Fixtures shall be white unless otherwise noted.
6. Fixtures furnished by this Contractor or by the Owner shall be fitted with necessary water supplies, stops and traps with cleanout plugs under this section of the specifications.
d. Tests:
1. The plumbing system and associated system shall be subject to constant inspection and final approval of the code authorities having jurisdiction. Tests, in addition to those included in this section, required to show code compliance, shall be performed as directed.
2. The soil, waste and vent lines of the sanitary systems shall be subjected to a water pressure test of not less than 10 feet of water head pressure or 54 pounds of air pressure for a duration of not less than 2 hours. During the pressure tests each joint shall be inspected for leaks. The lines shall be tested as an entire system, but all the underground and concealed lines shall be given the above test and approved before the lines are covered.
3. The domestic water piping system shall be subjected to a water pressure test of not less than 150 PSI for duration of not less than 2 hours. The water piping shall be tested as an entire system, but all underground and concealed lines shall be given the above test and approved before the lines are covered.
4. The gas system, from the meter connection and throughout the new work, shall be subjected to an air pressure test of not less than 50 PSI for a duration of not less than 4 hours and at the same time each joint and connection shall be tested by applying soap suds to each joint. The gas piping shall be tested as an entire system, but all underground and concealed lines shall be given the above test and approved before being covered. Further, each exposed joint shall be tested with soapsuds after the gas has been admitted into the system.
5. Should the Contractor refuse or neglect to make any tests necessary to satisfy the Owner, his representative or coding officials, that he has carried out the true intent and meaning of the specifications, the Owner may take such tests and charge the expense thereof to the Contractor.
e. Cleaning and Protection:
1. The Contractor shall remove from the job site all debris and leftover materials for which he is responsible, clean all fixtures and equipment and repair any blemishes in the finish. The Contractor shall be held responsible for replacing fixtures where damage results from failure to provide protection during installation.

2. Flush Out Pipes: After the plumbing piping has been installed, inspected and approved, the piping system shall be flushed to remove any foreign matter from the pipes with chlorine or HTH solution to sanitize the new piping or as required by the local authorities.

f. Maintenance:
1. The Contractor, throughout the guarantee period, shall maintain all parts of the plumbing fixtures and associated equipment. One month after final acceptance of the building by the Owner, the Contractor shall go over all the fixtures and test all working parts and put everything in good working order. All fixtures, including traps, shall be thoroughly cleaned and all parts put in good working order.

SECTION 15550 - SPRINKLER SYSTEM

1.Scope Of Work

a. Work included under this Section consists of providing labor, materials, appliances, equipment, tools, transportation, superintendence and services required to construct and install a sprinkler system as specified, indicated and elsewhere required.
b. The sprinkler system specified herein is required to meet the Local Building Code.
c. Refer to Section 15400, PLUMBING, for piping and check valves.

2.Products

a. Hangers
1. Hangers must meet NFPA approved type for construction used.

b. Sprinklers
1. Sprinklers shall be approved automatic spray sprinklers to comply with NFPA 13. Sprinklers shall be of operating temperature as required by NFPA and the Fire Marshal's Office. Provide approved metal cabinet with number of replacement heads of various types and quantities as required by Insuring Agency.
2. Upright sprinklers with 1/2" discharge orifice in finished areas with exposed ceilings where sprinklers are exposed to the public.
3. Fully recessed sprinklers with color matched)to ceiling surface) pop–off caps and 1/2" discharge orifice in finished areas with lay–in or gyp–board ceilings where sprinklers are exposed to the public.
4. Standard semi–recessed chrome pendant sprinklers with short escutcheon 1/2" discharge orifice in kitchen & service areas.

c. Water Flow Indicator
1. Provide an electric water flow indicator where indicated and/or required by the authorities having jurisdiction. Water flow indicator shall be provided with time delay mechanism, which absorbs fluctuation caused by water surges. Switches shall be wired compatible with solenoid valve installed in domestic water line.

3.Execution

a. Installation
1. Drawings were prepared with intent that all lines clear obstructions as pipes, beams, lights, hangers and similar items. Examine building and plans confirming dimensions before pipe is cut, fabricated and/or installed, to determine if offsets are necessary. Where required, offsets shall be made without additional cost to Owner.
2. Following general scheme shall be employed when locating sprinkler heads unless restricted by Rules and regulating bodies.
3. Unless otherwise indicated, conceal piping in finished portions of building and expose elsewhere. Locate concealed piping in furrings, pipe spaces, chases and above suspended ceilings.
Install exposed piping parallel or perpendicular to walls.
4. Lines at or above ceilings shall be held as high as possible and be run to avoid conflicts. Include fittings and material required to accomplish this result.
5. Provide sleeves for piping passing through floors, ceilings and masonry of concrete walls. Locate, set and anchor sleeves.
6. Provide lintels required to properly complete sprinkler installation.
7. Provide plates on lines passing through floors, ceiling or walls.
8. Hangers must be properly spaced and secured to building structure to adequately support lines.
Support from suspended ceilings and/or similar construction will not be accepted;
9. Devices shall be in accordance with Rules and Regulations of NFPA and Insuring Agency and shall bear their label of approval.
10. Reducing bushings are not permitted in more than one outlet of any tee or any two outlets of any cross. Bushings are not permitted in any elbows or when the reduction in size of the outlet no less than 1/2".
11. Install check valve where indicated on plans.

b. Testing

1. Test systems under normal operating conditions and demonstrate that parts are functioning properly. Conduct tests and secure final certificates of approval. Deliver copies of Certificates to Architect/Engineer & Landlord.
2. Test shall include but not be limited to the following:
a. Two hour, 200 pound hydrostatic test aboveground system.
b. Include cost and run such tests as may be necessary to demonstrate that equipment equals or exceeds capacities specified upon request.
c. Notify Architect/Engineer twenty–four hours before testing.

SECTION 15770 - HEATING, VENTILATING AND AIR CONDITIONING

1.Work Included:

a. Heating, ventilating and air conditioning work required, including hoisting of equipment to the roof and setting it in place, includes, but not necessarily limited to:
1.Package heating, ventilating and air conditioning units (if not existing noted to be reused).
2.Installation of Owner furnished exhaust hood.
3. All HVAC & hood exhaust ducts, dampers, grills, registers and diffusers.
4.Insulation of ducts and piping.
5. Installation of exhaust fans, make–up air fans and gravity vents (ductwork furnished & installed by Contractor),
6. HVAC controls and remote temperature sensors.

b. Gas Connections (if required see drawings): Plumbing Contractor will bring Gas to heating, ventilating and air conditioning and final run to HVAC by Plumbing Contractor.

2.Intent of Drawings:

a.The drawings are diagrammatic to the extent that they do not indicate offsets, bends, special fittings and exact locations.

b.Piping, ductwork, apparatus and equipment shall be installed to avoid obstructions, preserve headroom, keep openings and passageways clear, and make all operating equipment accessible for maintenance.
c. Governing Codes and Standards:
1. Install all work in accordance with the rules and regulations of the Standards of Safety, adopted and approved by the Insurance Underwriters and the latest standards recognized by ASHRAE and SMACNA and in accordance with local code.
2. In case of conflict between said codes and the drawings, the codes shall govern in all cases, however, notify Owner, before making such change.

3. Examinations of Drawings and Site:

a.Before commencing the work, the Contractor shall carefully study the drawings, specifications and site. He shall determine in advance the methods of installing and connecting the apparatus, the means for getting the equipment into place, and shall make himself similar with all of the requirements of the Contract. Equipment shall physically fit the area allocated with ample access for service.

b. The Contractor shall refer any discrepancies to the Engineer for decision before proceeding with the work

4. Submittals:

a.Materials List: The Contractor shall submit, at his expense, three (3) copies of equipment brochures in index form within fifteen (15) days after contract is signed. All equipment and material submittals shall be submitted at one time. The drawings submitted shall bear the stamp of approval of the Contractor as evidence that the drawings have been checked by the Contractor and comply with the requirements of the Contract drawings and specifications.

5. Guarantee:

a. Furnish written certified guarantee, in acceptable form, to the Owner, against defective workmanship, materials, and operating equipment; further, guarantee to rebalance and adjust entire system or any part thereof, as required for perfect operation for a period of at least one (1) year after acceptance, including cost of refrigerant charge. Repair, replace and make satisfactorily operative any and all defective items and, work holding Owner free from any cost and liability in connection therewith for the term of guarantee. The manufacturer shall provide a warranty on his unit compressors for a period of five (5) years.

6. Coordination of Other Trades:

a. The work under this section shall be coordinated with other trades to maintain a rapid and smooth construction progress with a minimum of interference.

7. Painting:

a. Apply one (1) coat of Zinc Chromate, or Rustoleum to bare metal surfaces of supports, etc. color to match unit's color or as directed by Architect or Owner.

8. Clean–up:

a. All equipment and exposed surfaces shall be left smooth and clean. All plate work shall be polished and the entire premises shall be cleaned of unused materials, rubbish, and debris and grease spots.

9. Products:

a. General
1.All Equipment shall be the capacity and type shown on the Equipment Schedule on the drawings and shall be as manufactured by one of the manufacturers designated on that schedule or shall be an equal approved in advance by the Engineer.

b. Sheetmetal Work
1. Sheetmetal: Prime steel sheets, hot dipped galvanized of the following gauges:
a. Up to 12" wide or diameter, #26
b. 13" to 30" wide or diameter, #24
c. 31" to 60" wide or diameter, #22
d. Partitions forming plenum or suction chambers, #18 gauge with 1–1/2" x 1–1/2" x 3/16" galvanized iron angle and rivets for seam connection and stiffening.
e. Exposed round duct shall be spiral single wall round pipe with 1" insulation with formed fittings. Pipe shall be 24–26 ga.
2. Duct Construction:
a. Longitudinal Joints: Pittsburgh corner seams or snap lock.
b. Transverse Joints: Government locks riveted at corners, constructed of metal one gauge heavier than that jointing duct sections. Ducts under 20" may be jointed with transverse capstrips.
c. Supports: Except as otherwise specified, all duct hangers shall be constructed of 3/4" No. 16 galvanized strap, spacing not to exceed eight foot intervals. Where duct hangers exceed six feet in length, provide adequate sway bracing. All vertical ducts shall be supported on angle iron brackets.
d. Elbows: Made for an easy flow of air for minimum friction, inside radius equal to width of duct. Provide elbows with approved duct turns where indicated on plans or where space does not permit required radius.
e. Flexible Connection: At all fans, connections shall be Neoprene coated glass fiber cloth ends which are to be turned into abutting ends of sheet metal or angle iron frames so as to form a gasket to form an air tight joint.
3. Workmanship and construction shall meet and exceed the standards as set forth by SMACNA.

c. Grilles, Registers and Diffusers:
1. Sizes: As indicated on drawings.
2. Supply diffusers: As indicated on drawings.
3.Return Air Registers: As indicated on drawings.

d. Duct Insulation:
1.Insulate all supply, make–up air and return air ducts with foil–faced blanket, see plans for additional information. Insulation surfaces exposed to airstream shall be coated to prevent erosion of glass fibers.
2. Maximum 25 flame spread 50 smoke developed.

10. Execution:

a. Installation of Equipment:
1. General:
a. Install all equipment where indicated on the approved Contract drawings.
b. Avoid interference with structure and the work of other trades; do not cut into load carrying members without the specific approval of the Architect.
c. Temperature control system shall be as shown on the drawings.

b. Acceptance:
1. The system shall not be considered for acceptance until the Mechanical Subcontractor has completed work and demonstrated to the representative of the Owner, proper operation of the system and strict compliance with the specifications, particularly in reference to the following articles of these specifications.
a.Testing
b.Cleaning
c.Instructions and Operating Manuals
d.Training of Operating Personnel
e.As–Built Drawings
f. Guarantee Certificates
g.Start up and Test Document
h.Independent Air Balance Report

c. Air Conditioning Unit Start–up and Test:
1.All air conditioning equipment shall be started and checked by the manufacturer's factory service personnel. The manufacturer shall correct any problems arising with the equipment. The manufacturer shall provide a checklist or report on the operation of the equipment, which shall be forwarded to the Architect.

d. Guarantee:
1.The guarantee provision of this specification requires prompt replacement of all defective workmanship and materials occurring within one year of job acceptance. This includes all work required to remove and replace the defective item and to make all necessary adjustments to restore the entire installation to its original specified operating condition and finish at the time of acceptance.

11. Exhaust Hood and Fan System:

a.Kitchen hoods complete with roof mounting curbs; collars and dampers will be furnished to the job site by the Owner. Kitchen supply exhaust and toilet exhaust fans all complete with roof mounting curbs, collars and dampers will be furnished as part of the General Contract. The Contractor will hang the hoods, set fan curbs and fans, and furnish and install all interconnecting sheet metal ductwork as required by code and per hood manufacturer's cut sheets.

12. Testing, Adjusting and Balancing (TAB):
a.The testing, adjusting and balancing of the air conditioning and hood system will be performed by an independent technical firm employed directly by the Owner and shall not be part of the contract. The Air Conditioning Contractor shall provide and coordinate the services of qualified responsible mechanics and other personnel as required to correct, repair or replace all deficient items or conditions found during the testing and balancing period.
b.Testing, adjusting and balancing firm certified by NBI (National Balancing Institute) to be a part of the Owner supplied vendor services package of the contract. TAB firm to communicate directly with the BJ Project Management Team. TAB firm to generate a site punchlist with photo documentation of any deficiencies found during the course of the inspection. A pre–balance checklist will be sent to the General Contractor Superintendent in order to verify site readiness prior to travel to jobsite and signed by the installing contractor for related trade (i.e., electrical, mechanical, etc.).

DIVISION 16 - ELECTRICAL

SECTION 16050 - GENERAL NOTES AND SPECIFICATION

1. General:

a. Contractor shall provide all necessary materials, labor, tools, transportation, superintendence and related items to install a complete and fully operative interior and exterior electrical system as specified herein, shown on the drawings and elsewhere required.
b. All outlets, fixtures and equipments shall be fully connected to proper sources of power supply and left ready for use.
c. Provide all excavation and tamp–backfill as required to complete work. Correct any settling during guarantee period to Owner's satisfaction.
d. Provide all necessary cutting and patching as required to complete work. Patching shall be done by mechanics skilled at their work. All openings shall be filled and patched to conform to fire regulations.
e. Cooperate with other Trades: Make known to other trades arrangement of electrical work and examine work of other trades to avoid conflicts. Examine drawings of other trades to determine exact equipment locations of power requirements and controls. Examine manufacturers' shop drawings to determine roughing–in requirements.
f. Permits, Fees & Codes. Pay all cost for permits, fees and inspections required by authorized agencies having jurisdiction over electrical work Electrical system shall conform to requirements of the most current National, State and Local Electric Codes, Local authorities and Utility Company.
g. Provide typewritten directories in panel board with clear plastic shield. Provide engraved plastic load nameplates on all disconnect switches, motor starters and control devices.
h. Tests: Entire electrical system shall be fully tested and corrected of any short circuits, open grounds, faulty wiring and incorrect connections.
i. Guarantee: Complete electrical system including all materials, equipment and labor shall be guaranteed for a: period of one year beginning with date of acceptance of building by Owner.
j. Each bidder shall, before submitting a proposal, visit and examine the site in accordance with Division 1 to satisfy himself as to materials and scope of the new construction and any difficulty attending the performance of the work.
k. The submission of a proposal will be construed as evidence that such an examination has been made. Claims made subsequent to the time of submission of the proposal for labor, equipment and material required for difficulties encounter, which could have been foreseen had an examination been made, will not be recognized.
l. Workmanship: Electrical equipment shall be installed in neat, workmanlike manner. Unsightly installations shall be removed or reworked at no additional expense to the Owner.
m. All lighting fixtures, lamps, dimming systems, switchboards and panelboards shall be purchased by the General Contractor and shipped to the job site. Substitutions are not allowed.

SECTION 16121 - BASIC MATERIALS AND METHODS

1. General:

a. Section 16A applies to all works hereunder and shall include conduit, boxes, wire, wiring devices, lighting fixtures and related materials.

2. Conduit:

a. Connections to equipment, which shall be made with three feet flexible liquidtight conduit with liquidtight connectors.
b. Connections to recessed lighting fixtures shall be made with six feet of flexible conduit from a junction box. Locate junction box to prevent relocation of the light fixture.
c. Intermediate grade conduit with threaded fittings shall be provided in slab–on–grade, outside building, burial below grade and in wet locations.
d. All other conduit shall be electric metallic tubing with compression type fittings. Except exterior exposed conduit shall be rigid galvanized conduit.
e. Schedule 40 and schedule 80 PUC conduit may be used as noted on plans.

3. Boxes:

a. Concealed boxes shall be 4–inch square galvanized steel with galvanized extension rings, total depth of not less than 2–1/2 inches.
b. Surface mounted boxes shall be pressed galvanized steel, utility type.
c. Gangable sectional switch boxes are specifically not allowed.

4. Wire & Cable (600V and less):

a. The wire meeting requirements below shall be suitable for secondary power and light circuits and control circuits within the limitations of these specifications.
b. Insulated wire No. 8 AWG and larger shall be stranded.
c. All wire shall be brought to the job in unbroken packages, and shall bear the date of manufacturing and shall not be older than twelve months.
d. Type of wire shall be as follows:
1. Unless otherwise specified or indicated otherwise on drawings, all #12 and #10 wire shall be THHN and all wire #8 and larger shall be THHN–THWN type.
2. Wiring adjacent to heat producing equipment shall be type AVA.
3. No wire smaller than #12 gauge shall be used, except for signal or control systems or where otherwise indicated. Wire shall be copper, 600 volt minimum rating, except for special systems.
4. Unless noted otherwise, all conductors shall be soft drawn copper conforming to the latest ASTM specifications and the latest requirements of NEC. Unless otherwise noted or specified, all insulation shall be rated 600 volt.
5. All wire shall be as manufactured by General Cable Co., Phelps Dodge, Anaconda, or a cable equivalent.
6. All wire shall be installed in conduit and color–coded. All wire shall be 98% conductive copper, rated for maximum of 600 volts.

5. Wire Connectors: Wire connectors for sized #10 AWG and less shall be "Press–Snure", Ideal "Wrap–Cap", T&B "Stakons" or 3M "Scotchlok". Connectors for wire size #8 and larger shall be T&B or Burndy methods using hydraulic presses.

6. Electric Tape shall be Johns–Manville "Dutch–Brand" 3M," Scotch Branch," or Plymouth "Slipknot Brand".

7. Wall switches shall be as follows or approved equal with color as directed by Architect:

a. 20A, SP, 125/277V. Hubbell #1221.
b. 20A, 3W, 125/277V. Hubbell #1223.
c. 20A, 4W, 125/277V. Hubbell #1224.
d. 20A, SP, 125/277V. with pilot light –Hubbell #1221–PL
e. 20A, SP, 125/277V. weatherproof – Hubbell #1281/1795.
f. 20A, SP, 125/277V keyed switch, Hubbell #1221–L

8. Receptacles shall be white, except brown shall be installed to match finishes and shall be as follows or approved equal. Provide other receptacles as indicated on the drawings.

a. 20A, 125V., duplex – Hubbell #5362 (I)
b. 20A, 250V., 2W+G – Hubbell #5461
c. 50A, 250V., 3W+G – Arrow–Hart #5700, Bryant #9630FR or P & S #5950.
d. Ground Fault (20A/125V) – Hubbell #GF.–5362. Provide spring loaded weatherproof while in use covers where indicated.
e. Clock and Sign Hanger – Arrow–Hart #5708, Bryant #2828–CS or Hubbell.

9. Occupancy sensor switches shall be passive infrared.
a. Wall mounted sensors shall be 120/277 volts 0 to 1500 watt for incandescent or fluorescent lighting and shall have off/auto/on switch, photocell with ambient light control adjustable 1 to 1000 fc, 1 to 20 minute adjustable time delay, LED sensing indicator.

10. Plates: Provide faceplates for all devices including wall switches, receptacles, telephone outlets and all wall outlets. Face plates shall be satin finished stainless steel in all food preparation areas, bar, restrooms, offices and commercial grade smooth unbreakable plastic in Lobby/Dining, color to match devices and walls.

11. Lighting fixtures shall be furnished by Contractor as scheduled on drawings except for those indicated to be furnished by Owner. Contractor shall install all lighting fixtures, provide necessary mounting hardware. All recessed lighting fixtures shall be thermally protected as required by Code. Provide mounting hardware for all light fixtures installed in gypsum ceilings and sloped ceilings.

a. Provide all necessary mounting hardware and related items to properly install the lighting fixtures. Fixtures supported in exposed or concealed grid ceilings shall be provided with clips. Fixtures mounted in or on tile ceilings shall be aligned with tiles. Lighting fixtures shall be supported from the building structural members except for exposed grid ceilings where a ceiling supporting wire shall be provided at each fixture corner. Do not use ceiling grid ceiling support wires for strapping or support.

12. Lamps:

a. Contractor shall furnish and install one complete set of lamps for all lighting fixtures Provide label in each fixture indicating size and type of lamp corresponding with schedule on drawing. Size shall be worked "MAXIMUM WATTAGE".
b. Fluorescent lamps shall be standard cool White, energy efficient, manufactured by General Electric Watt Miser II unless noted otherwise.
c. Incandescent lamps shall be inside frosted with 2500 hour lamp life rated 130 volts.

13. Fluorescent ballasts shall be electronic, energy efficient, manufactured by General Electric, Maxi–Miser II. Class "P" or approved equal.

14. Raceway System

a. All wire shall be (installed in a metal raceway and shall be) concealed where possible. Where necessary to expose the wiring the raceway shall be installed as inconspicuously as possible and in straight lines with 90–degree bends, parallel with building lines. Square raceways, ream smooth and make–up tight. Plug ends of raceways furring construction and swab clean before pulling wire or cable. Support raceways from building structure members only with approved fasteners designed for the purpose.
b. Raceway system shall be installed to maintain the maximum headroom with required supports for the load. All anchors, straps and clips shall be the type designed for the purpose installed in accordance with the manufacturers recommendations. Common supports may be used for mechanical and electrical equipment by coordinating the work with all trades.
c. All electrical boxes shall be supported from building structural members independently of the conduit raceways, mechanical systems or suspended ceiling supports. Recessed boxes shall be flush with surrounding surface. All boxes and cabinets shall be protected during construction and shall be cleaned before pulling wire and installing devices.
d. Size of conduit shall not be less than 3/4" and not less than required by the National Electrical Code.

15. Wire: Use only approved type wire–pulling lubricants for wire pulls. Splice wire only in accessible and UL approved junction boxes. Make wire joints mechanically strong before applying the connector and where tape is used, wrap each joint to the thickness of the original insulation. Clean and polish metallic surfaces before installing conductors. Apply pressure type lugs on stranded conductors connected to screw or bolt type connections.

16. Wiring Devices: Unless noted otherwise, receptacles shall be installed 18" above the finished floor, switches shall be 48" and clock hangers 8'–0". Receptacles noted above work counters and cabinets (AC) shall be mounted above the backsplash. Weatherproof receptacle covers shall be weatherproof while in use. Provide a bonding jumper between the box and all receptacles.

17. Equipment Connections: Provide all necessary motor starters (verify hood fans with supplier), disconnect switches, controls, conduit, boxes, wire, etc. and connect complete to each piece of equipment requiring electrical connections indicated on the drawings. Where equipment ratings different from that indicated, consult Owner. Consult with equipment supplier to determine rough–in requirements. Where equipment is noted as future, terminate circuit in junction box and install spring wire nuts on the ends of the conductors.

18. Power and Lighting Panels:
a. Power distribution panel "IFS" shall be Cutler Hammer or equal. The service entrance equipment shall be UL listed and labeled for that application. Bussing shall be aluminum, tin–plated. Brace bussing for 65,000 A.I.C. unless noted otherwise on the contract drawings.
b. Lighting and power panelboards shall be Cutler Hammer, or equal, with locking door and flush trim. Bussing shall be aluminum, with bracing to suit interrupting rating.
c. Breakers shall be individual molded case, bolt–in style, sized as scheduled. Two pole and three pole breakers shall be common trip single pole units with handle ties are not acceptable.
d. Panels shall be wall mounted or curb mounted as shown on plans.
e. Contractor to verify available fault current with utility company for proper panel asymmetrical interrupting ratings. Submit this information with shop drawings and panels, along with letter from Power Company.
f. Meter, C.T. cabinet, service conductors and conduit, transformer, etc., shall be per local utility requirements. Coordinate service installation with local utility company, providing all needed equipment and labor.

19. Dimmers: Furnish as noted on plans. UL listed.

20. Grounding:
a. Equipment Grounding
1. The equipment grounding system shall be such that all metallic structures, enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, portable equipment and other conductive items associated with electrical circuits operate continuously at ground potential and provide a low impedance path for possible ground fault currents.
2. Wireways, switchgear, panelboards and motor control panels shall be provided with an equipment ground bus (including lug or screw terminals) securely bonded to the enclosure. Junction boxes and other enclosures (sizes above 5"x5" shall utilize an equipment ground bus or lug as required to securely bond the equipment ground conductor to the enclosure.
3. All branch circuits for power and light shall include a green insulated grounding conductor. The equipment ground conductor shall be electrically and mechanically continuous from the source of supply to the equipment to be grounded.
4. Lighting fixtures shall be securely connected to the equipment ground conductor.
5. Motors shall be connected to the equipment ground conductor with a conduit grounding bushing and with a bolted solderless lug connection on the metal frame. Bolts, nuts and washers shall be bronze, cadmium plated steel, or other non–corrosive material.
6. All conduit shall be connected to the equipment ground bus by means of a grounding bushing.
7. E.C. shall coordinate with cash register system supplier to clarify any grounding and/or wiring requirements.

b. System Ground
1. The service neutral shall be solidly bonded to the grounding electrode at the service.

c. Installation:
1. All grounding conductors shall be sized as per the latest edition of the National Electrical Code.
2. Ground rods: Ground rods shall be the copper clad steel type and shall be a minimum of 8 feet in length and 3/4 inch in diameter. Ground rods shall be as manufactured by Copperweld Steel Company, or and acceptable equivalent.
3. Grounding electrode conductors shall be stranded copper. Equipment ground wire shall be THW insulated and shall be green in color.
4. Connections to water service shall be made with suitable ground clamp of lug connection ahead of the building meter or cutoff valve. Verify the existence and burial of 10' of copper water pipe ahead of and after the water meter. Otherwise, provide UFER ground per NEC.
5. Connections to ground rods shall be made by a exothermal weld.
6. Grounding cables embedded in the floor shall be made in rigid conduit.
7. Ground rods shall be driven full length diagonally into the earth and have a one (1) foot minimum cover.
8. All conductor connections shall be made up tight to provide continuity of metallic ground
9. Ground wires not in conduit shall be supported every five (5) feet.

d. Test:
1. The Contractor shall run a ground resistance test and if the resistance to ground is greater than 25 ohms, additional ground rods shall be installed. The test shall not be made within five (5) days after a rain.
2. The Contractor shall provide Owner with a copy of the test procedure and results of the test.
3. The ground test shall be measured in the presence of an authorized representative of the Architect. No equipment shall be operated until ground potential is verified.

21. Workmanship:
a. All work shall be performed by workmen skilled in their trades and shall be typical of the best trade practices.

22. Cleaning: All equipment including panelboards, switches, wiring devices, lighting fixtures, wall plates, etc. shall be free of corrosion, dirt, paint splatter or damage of any sort at final acceptance of the Work. Contractor shall clean, repair or replace same as instructed by the Owner before final payment.

SECTION 16163 - SERVICE AND DISTRIBUTION

1. General

a. Scope: Section applies to all works hereunder and shall include service, metering and distribution.
b. Service: The electrical distribution is 120/208 volts, 3 phase, 4 wire 60 cycle or 277/480 volts, 3 phase, 4 wire 60 cycle as noted on drawings. Contractor shall verify service voltage with Utility Company and provide necessary revisions and modifications required. Service enters space underground.
c. Metering: Contractor shall provide modifications necessary metering facilities including meter socket, current transformer cabinet, conduit and other work for metering required by the Local Utility Company.

2. Materials

a. Disconnect Switches: Shall be (heavy–duty type, NEMA HD) fused unless noted otherwise, designed to accept only rejection type fuses and operator interlocked with the door in the "off" position. Switches shall be manufactured by General Electric, Square D or Cutler–Hammer.
b. Fuses: Shall be current limiting with 200,000 amperes interrupting capacity, UL Inc. Class RK1 and shall be dual element, time delay, Class R rejection type. One set of spare fuses shall be provided for each size and mounted in "Spare Fuse Cabinet" located at the service entrance. Fuse identification labels shall be manufactured by Bussman or Shawmut.

3. Execution

Disconnect switches shall be installed 4'–0" above finished floor. All cabinets shall be vacuum cleaned before pulling wire

4. Installation of Equipment and Fixtures
a. Install all equipment and fixtures forming part of the work of this section in –complete accordance with the manufacturer's recommendations and all pertinent codes and regulations. Make all final connections to bar and kitchen equipment.

5. Lamping
a. Lamp all fixtures with lamps of the designed rating and pattern.

6. Testing
General: Upon completion of this portion of the work, furnish all equipment and personnel and conduct all test required to secure approval of the installation from all agencies having jurisdiction.
Criteria: All systems shall test free from short circuits and grounds shall be free from mechanical and electrical defects and shall show an insulation resistance between phase conductors and ground of not less than that required by the National Electrical Code. All systems shall show proper neutral connections.

7. Cleaning Up
a. All equipment and exposed surfaces shall be left smooth and clean. All plate work shall be polished and the entire premises shall be cleaned of unused materials, rubbish, debris and grease spots.

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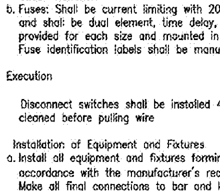

DATE: 1/28/2020
SCALE: AS NOTED
JOB NO.: 19-015-D0T
SHEET SP.1
OF 2 SHEETS