

General and Supplementary Conditions for Mechanical and Electrical Work

GS – 1: GENERAL CONDITIONS

- a) Maintain adequate protection of the work from damage, and protect the Owner's property and the public from injury, or loss, and accept exclusive liability and hold harmless the Owner and Engineer against injuries or claims therefore of all persons and any alleged damage to property in connection with the work. Erect and maintain at all times, as required by the conditions and progress of the work, all necessary safeguards for the protection of the workers and the public.

GS – 2: DEFINITIONS

- a) The terms "Contractor", "The Contractor", or "This Contractor" refers to the Contractor awarded the work or the "Contract".
- b) The term "Owner" refers to agent of the Landlord.
- c) "Wiring" shall be understood to mean wires of cables, with conduit, fittings, boxes, etc., installed complete.
- d) "Piping" shall be understood to mean all pipes, fittings, nipples, valves, and all accessories connected thereto.
- e) "As shown", "as indicated", "as specified", "as scheduled", etc., refers to information on drawings or in the specifications.
- f) "Existing" refers to work, material, or equipment in existence prior to date of these specifications and contractor drawings.
- g) "Remove" refers to material or equipment to be removed from building.
- h) "Relocate" refers to equipment to be relocated as indicated.
- i) "Reused" refers to salvageable components to be utilized.
- j) The words "or equal", "or approved equal", "equal to", refer to substitution of manufacturer not specified which shall receive approval of Owner or Owner's representative in writing.
- k) "Provide" shall mean "furnish and install" or "furnish labor and material required for installation of".
- l) "Directed" shall mean as directed by Owner or Owner's representatives.
- m) "Concealed", where used in connection with insulation and painting of piping, conduit, ducts, and accessories, shall mean that they are hidden from sight as in trenches, chases, furred spaces, pipe shafts, or hung ceilings; also where they are not hidden from sight in partly excavated or crawl spaces.
- n) "Exposed", where used in connection with insulation and painting of piping, conduit, ducts, and accessories, shall mean that they are not concealed as defined above.

GS – 3: INDEMNITY

- a) Provision must be made to insure the "Hold Harmless Agreement" which reads as follows:

1. "The Contractor hereby agrees to indemnify and save harmless the Owner, Building Management, and Engineers from and against all liability claims and demands on account of injury to persons including death resulting there from and damage to property arising out of the performance of these contract documents by the Contractor's property. The Contractor shall, at his or its own expense, defend any and all actions at law brought against the Owner, and the same Owner's representative above and shall pay all attorneys' fees and all expenses, and promptly discharge any judgments arising there from. These conditions shall also apply to any subcontracted operations."
2. The Contractor shall secure and protect the Work and shall bear and be liable for, and shall repair and replace all loss and damage of any kind which may happen to the Work at any time prior to the final completion and acceptance thereof from any cause whatsoever, and the Owner and Engineer will not, in any manner, be answerable or responsible for any loss or damage that shall happen to the Work or any part thereof, not for any materials, equipment, tools, plant, facilities or other things that may be employed therein or placed upon the premises by the Contractor, the latter being solely responsible therefore until the Work has been fully accepted by the Owner.
3. Contractor hereby agrees, to the extent permitted by law, to assume the entire responsibility and liability for and defense of and to pay and indemnify the Owner, any lender providing construction or permanent financing for the Project, and the Engineer (collectively the "Indemnities") against any loss expense or liability and will hold each of them harmless from any pay any loss, damage, cost or expense (including without limitation, judgment, attorney's fees, court costs and the cost of appellate proceedings), which the Indemnities (collectively or individually) incur because of injury to or death of any person or on account of damage to property, including loss of use thereof, or any other claim arising out of, in connection with or as a consequence of the performance of the Work, and/or any act or omission of the Contractor or any of its subcontractor, officers, directors, employees, agents or anyone directly or indirectly employed by Contractor or anyone whose acts Contractor may be liable as it relates to the scope of this Contract. However, nothing herein contained shall require the Contractor to provide indemnification against the proportion of any liability for claims, which are proven to have arisen from the negligence of the party asked to be defended, indemnified or held harmless. Contractor will purchase and maintain such insurance as will protect it from any costs and expenses relating to the foregoing, including, without limitation, contractual Coverage covering the

foregoing indemnity, and shall provide Owner with certificates evidencing same in the form annexed hereto.

GS – 4: INSURANCE TO BE PROVIDED BY CONTRACTOR

- a) The Contractor shall, through agents and in amounts and by companies to be approved by the Owner, obtain, maintain in force during the period covered by the Contract and pay for such insurance as required herein. If the Contractor shall fail to deliver certificates for its insurance or the insurance of its subcontractors to the Owner within forty-eight (48) hours after demand, and in any event, prior to commencement of the Work on the project, the Owner may obtain such insurance for the Contractor and pay premiums thereon, and the contractor shall repay the Owner, on demand, any sum or sums paid therefore, together with interest thereon, or the Owner, may deduct such sum or sums, together with interest therein, from any money due or to become due or to become due to the Contractor under this Contract. As provided below, every policy of insurance required hereunder shall name the Indemnities if so requested in writing thirty (30) days' prior written notice of the cancellation thereof.
- b) Any policy of insurance covering the Contractor's own tools, plant and facilities against loss by physical damage shall include endorsement providing that the Underwriters waive their rights of subrogation against the Owner and the Construction Manager.
- c) The Contractor shall not commence work under this Contract until it has obtained all of the insurance referred to herein and Contractor and/or subcontractor shall be required to maintain the following insurance in amounts not less than those specified below:
 1. Worker's Compensation in accordance with the laws of the State with Jurisdiction.
 2. Employer's Liability insurance
 3. Comprehensive General Liability/Umbrella Liability for:
 - a. Bodily Injury Liability Insurance
 - b. Property Damage Liability
 - c. Comprehensive Automobile Liability
Comprehensive, Owned, Hired, Non-Owned, with limits \$1,000,000.00 combined single limit each occurrence.
 - d. Contractor shall verify that these requirements are acceptable to the Owner. If not, they shall obtain insurance coverage's in accordance with their requirements.
- d) The above insurance shall without liability on the part of the Owner for premiums thereof, include the following:
 1. Endorsement as Additional Insured of:
 - a. Owner, Lender, Engineer and their partners, directors, officers, employees, agents, and representatives; and
 2. Thirty (30) Days Prior Notice of Cancellation to each name insured; and

3. Waiver of Subrogation.

e) The above policies shall be endorsed to contain the following wording verbatim:

1. "Owner is interested in the maintenance of this insurance and it is agreed that this insurance will not be cancelled, materially changed or not renewed without at least a thirty (30) day advance written notice to Owner and the other additional insured's of so requested in writing."

2. "Contractor hereby agrees, to the extent permitted by law, to assume the entire responsibility and liability for and defense of and to pay and indemnify the Owner, and lender providing construction or permanent financing for the Project, and the Engineer (collectively the "Indemnities") against any loss, expense or liability and will hold each of them harmless from any pay any loss, damage, cost of expense (including without limitation, judgment, attorney's fees, court costs, and the cost of appellate proceedings), which the Indemnities (collectively or individually) incur because of injury to or death of any person or on account of damage to property, including loss of use thereof, or any other claim arising out of, in connection with our as a consequence of the performance of the Work, and/or any act or omission of the Contractor or any of its subcontractors, officers, directors, employees, agents, or anyone directly or indirectly employed by Contractor or anyone for whose acts Contractor may be liable as it relates to the scope of this Contract. However, nothing herein contained shall require the Contractor to provide indemnification against the proportion of any liability for claims which are proven to have arisen from the negligence of the party asked to be defended, indemnified or held harmless. Contractor will purchase and maintain such insurance as will protect it from any costs and expenses relating to the foregoing, including, without limitation, contractual coverage covering the forgoing indemnity, and shall provide Owner with certificates evidencing same."

f) Contractor will be required to purchase and maintain such insurance as will protect it for the contractual indemnity of this project.

g) Upon request of the Owner, the Contractor shall add additional insured's at no expense to the Owner.

GS – 5: SUBCONTRACTS

a) Should the Contractor engage a subcontractor, the same conditions applicable to the Contractor under this Contract shall apply to each subcontractor, including, but in no way limited to, this Indemnity.

GS – 6: CANCELLATION, ETC.

a) The Owner is interested in the maintenance of this insurance and it is agreed that this insurance will not be cancelled, materially changed or not

renewed without at least thirty (30) day advance written notice to Owner and the other additional insured's if so requested in writing.

GS – 7: SHUTDOWNS

- a) When installation of a part of any system (plumbing, heating, air conditioning, electrical or otherwise) requires a shutdown of any operating system, connect the partial system only after notification to and with approval of the Owner. Coordinate activities closely with those of Subcontractor's so the operation is restricted to as short an interval as possible and "out of service" time of these facilities is kept to a minimum. Any shutdown of the electrical system will be done out of hours as approved by Owner.
- b) It is imperative that existing systems be maintained in continuous operation during the course of construction; if shutdowns are required to permit the disconnections and removal or reconnection of existing work, or final connection to be made to an existing system, they shall occur only during off-hours and only after power permission has been obtained from Building Management.
- c) The Building Management requires not less than seven day notice for shutdown of any building system.
- d) Where work during any shutdown period involves the draining and refilling of any water, chilled water, or any other piping system such draining and refilling shall be done by the Contractor. All fluids used to refilling should be of the same type and quality as those derived from the system.

GS – 8: CUTTING, ALTERING AND PATCHING

- a) All cutting, chopping, and drilling to be done prior to 8:00 a.m. and after 6:00 p.m.
- b) All holes and openings occurring in the existing floors after equipment, partition, floors, steel work, conduits and pipes are removed or installed shall be closed up with materials similar to the adjacent work.
- c) All repairing, patching, piecing-out, filling-in, restoring and refinishing shall be neatly done by mechanics skilled in their trade to leave same in condition satisfactory to the Engineer.
- d) Core drilling is not permitted, the only time that core drilling is permitted is if the tenant also occupies the space below.

GS – 9: DEMOLITION WORK

- a) The Contractor shall perform all of the demolition work in overtime basis specified in the contract documents, and shall remove from the site all resultant debris and materials which are not to be reused.

GS – 10: SAFETY OF PERSONS AND PROPERTY

- a) Carefully plan the work and see to it that it is executed in an organized orderly and safe manner, Danger and warning signs shall be prominently displayed, and exercise every precaution to offer the fullest protection to

pedestrian traffic in and around the premises, building tenants and their guests, Owner's management and maintenance personnel, and Owner's representatives.

- b) Pay particular attention to fire safety precautions during construction, particularly where welding is required. Storage of flammable and combustible material shall be as directed by the Owner.
- c) Contractor shall conform to construction and building fire regulations as directed by Building Management. In addition to regulations and practices are required by local governing authorities. All requirements of these representatives shall be adhered to at no additional cost to the Owner and the contract.

GS – 11: LAWS, RULES, PERMITS, FEES & REFERENCES

- a) All work and materials shall be in full accordance with the latest rules and regulations of all Municipal Codes and State Laws or regulations and Building Rules and Standards. Nothing in these plans or specifications is to be construed to permit work not conforming to these Codes. In cases where Code requirements differ, the more stringent Code shall take preference.
- b) Give all notices, obtain all required permits, perform all tests, and pay for all Local, State and Federal taxes, fees, royalties and other costs. File all necessary plans and obtain all approvals of all Municipal and State authorities having lawful jurisdiction. Secure and pay any necessary approvals, permits, inspections, etc., and deliver the official records of the granting permits to the Owner. This shall be done without additional cost to the Owner.
- c) Federal Safety and Health Regulations: This Contractor must observe and abide by all requirements of Federal Safety and Health Regulations as established by Congress and known as the "Occupational Safety and Health Act of 1970".

GS: 12 COORDINATION

- a) Closely schedule the work in accordance with the requirements so that work will be installed with minimal disruption to the building occupants and operation procedures.
- b) Carefully check space requirements with existing conditions, the Owner's representative and all affected Contractors to insure that pumps, equipment, ductwork, pipes, conduit, etc. can be delivered to the site, properly stored and installed.
- c) Coordinate the work of the section with existing conditions and the work of other sections. The Contractor shall thoroughly acquaint himself with the work involved, and shall verify at the building all measurements necessary for the proper installation of the work, obtaining the same when necessary from the other Contractors and sections. Contractor shall also be prepared to promptly furnish to other Contractors any information relating to the work of this section necessary for the proper installation of other contracts and shall cooperate to secure the best progress of, and harmony

between, the work of the different contracts and sections in the interests of the installation as a whole. Confer with other Contractors and Engineer for adjacent work to this section and arrange to have visible portions of work fit and harmonize in a manner satisfactory to the Owner's representative.

- d) Examine all existing work or work previously executed by other Contractors which may be associated with the new work of this Contract and report any installation of the new work to the Engineer. Commencement of work will be construed as complete acceptance of the installation conditions.
- e) Check the construction drawings, shop drawings and equipment details of other contracts, trades and sections, noting all interference's, and immediately call to the attention of the Engineer who will make the proper disposition of the same. Work shall be scheduled so as not to interfere with the work of other sections.
- f) Perform the work at such time and in such manner as to minimize interference with building's normal operation. Notify Owner's representatives in advance each time a service outage or interruption will be required for the performance of some phase of the work. Schedule such service outage or interruption only after having received approval of date, hour, and time interval required thereof. Schedule or work as directed shall be followed as closely as possible.

GS – 13: EXECUTION OF WORK

- a) Guarantee that the materials and workmanship supplied under the section and contract will be of the best grade, that the installation will be erected in practical and first-class manner, that it will be complete in operation, nothing being omitted in the way of labor and materials required to make it so, although not specifically shown or mentioned herein and that it will be delivered in well-working order, complete and perfect in every respect with guaranteed service and performance.
- b) Execute the work as fast as reasonably possible. At all times, keep a competent foreman in charge of the work, and facilitate the inspection of the work by the Owner.
- c) Be responsible for the work until its completion and final acceptance and replace any of the same which may be damaged, lost or stolen, without additional cost to the Owner.
- d) Contractor shall arrange for shop drawing production as prepared by piping engineers and
- e) sheet metal draftsman and sketches to be performed in building premises when requested by Engineer.

GS – 14: STORAGE OF CONTRACTORS MATERIALS

- a) Provided any additional protection required, and assume all responsibility for damage of materials of materials. Materials shall be received at the building in locations as approved by the Owner.

GS – 15: USE OF BUILDING ELEVATORS

- a) Usage of service elevators will be permitted as directed by the Owner for movement of materials and equipment to the designated installation areas. Use of these elevators shall be coordinated with the Owner prior to site delivery.
- b) Passenger elevators will not be used.

GS – 16: APPROVED EQUIPMENT AND MATERIALS

- a) Most items of mechanical and electrical equipment and material are noted on the drawings or in the specifications with a manufacturer's name and catalogue number. This designation is used to set the standard for construction, performance, operation and appearance. Products of other manufacturers will be considered and ruled upon by the Engineer. The submission of a substitution implies that the item has all necessary underwriters' Laboratories, Board of Standards and Appeals, New York City MEA, National Electrical Code, New York City Electrical Code and New York City Electrical Advisory Board, etc. approvals. Should the item be found not to have such approval, it shall be replaced by the Contractor at no additional cost to the Owner.
- b) Furnish information as required to demonstrate that the article, material, apparatus, product or process to be used is adequately comparable to that specified in quality, finish, design, efficiency, durability and general appearance, and has been elsewhere demonstrated to be serviceable for the purposes for which it is intended.
- c) Contractor shall set forth the reasons to make the substitution and further state what difference, if any, will be made in the contract price for such substitution, should it be acceptable.

GS – 17: EQUIPMENT AND SYSTEMS DEVIATIONS

- a) Where approved deviations require any redesign of the structure, partitions, foundations, piping, wiring, ductwork, etc., or redesign of any other part of the mechanical, electrical, or architectural layout, all such redesign and all new drawings and detailing required therefore shall be at Contractor's expense for the services which must be performed by the Owner's representatives at no cost to the Owner.
- b) Where approved deviation requires a different quantity and arrangement of piping, wiring, ductwork, conduit, equipment, etc. from that specified or indicated on the drawings, furnish and install any such additional items required by the system, at no additional cost to the Owner.

GS – 18: DRAWINGS AND INFORMATION REQUIRED

- a) Prepare and submit detailed shop drawings for all of the duct work, piping work, or other distribution services described herein, or which required close coordination with other work of this section and/or the work of other sections and existing condition. In case of question, the Engineers will be

the final work as to the requirement for shop drawings for specific areas of work.

- b) Sheet metal shop drawings shall be at a minimum of 3/8" = 1' – 0" scale. These shop drawings shall be used as the coordination drawings for all trades, especially for the sprinkler work, piping installation and major conduit runs.
- c) "Record drawings" showing ductwork piping air outlets, fans, thermostats, etc. shall be submitted to Project Manager at completion of Project. See As-Built Drawings.
- d) The work described in any shop drawing submission shall be carefully checked by this Contractor for all clearances (including those required for maintenance and servicing), field conditions, maintenance of architectural conditions and proper coordination with all contractors on the job. Each submitted shop drawing shall include a certification that all related conditions on the job have been checked and that no conflict exists. No shop drawings submissions shall be without such certification.
- e) Submit to Engineer the electric wiring diagrams, automatic control diagrams and sequence of operation. The wiring diagrams must be complete and coordinated with the equipment actually installed.
- f) All drawings, etc. shall be submitted sufficiently in advance of field requirements to allow ample time for checking and no claim for extension of the project schedule will be granted by reason of failure in this respect. All submittals shall be complete and shall contain all required and detailed information.
- g) Submit manufacturer's data, catalog numbers, or shop drawings for equipment, materials, system components, etc., giving full information as to dimensions and adequacy of such items to meet and verify the requirements of the drawings and specifications.

GS – 19: TEMPORARY LIGHTING AND POWER FOR INSTALLATION

- a) Temporary lighting and power shall be provided under the Electrical section of these specifications by the Electrical Contractor.
- b) Usage of permanent wiring systems and equipment for Contractors' temporary light power requirements is permitted provided the size of the loads applied meets the requirements of New York City Code, and , and methods of use are approved by Owner.
- c) Under the Electrical section, maintain temporary lighting and power system in good working conditions, including the relocation and reinstallation when required to avoid interference with the progress of the work. Install temporary light and power in each room constructed to provide working illumination until permanent lighting is installed and energized.
- d) Temporary power and light shall provide facility for general lighting and portable hand tools and for welding machines.

- e) All work in connection with temporary wiring shall be removed at the completion of work as required or as directed by the Owner under the Electrical section of the Specification.
- f) The temporary light and power circuit connections to the existing distribution system shall be organized in accordance with the main building service shutdowns.

Heating Ventilating and Air Conditioning

HV – PIPE AND PIPE FITTINGS

- a) Uninsulated piping in exposed areas shall be cleaned and painted with rust-proof primer. Finish coat shall be applied in ANSI Standard color.
- b) Except as modified by local governing codes and the Contract Documents, comply with the applicable provisions and recommendations of ANSI, ASTM, ASME, and AWS.
- c) Copper Piping: Silver braze joints for condenser/chilled water service. Soldered joints with 95 – 5 tin / antimony solder for oil condensate and drains.
- d) Piping Installation: Piping shall be installed in neat workmanlike manner.
- e) Pipe Sleeves:
 - 1. Provide for all pipes passing through floors, walls, partitions, concrete beams and girders and sleeves, types as scheduled below, of adequate diameter to allow a minimum of 3/4” clear all around between sleeve and pipe. When piping is required to be insulated, insulation shall pass continuously through the sleeve with 1/2” clearance between insulation and sleeve.
 - 2. Non-Fire Rated Walls & Floor Penetrations: Sleeves shall be Pipe Shields, Inc. “Adjust-To Crete”, or approved equal, 24 gauge minimum galvanized sheet metal as scheduled below. “Adjust-To Crete” figure No. used for reference:

Drywall	#11
Concrete or masonry walls & concrete beams	#100
Concrete floors	#10
Concrete floors with metal under deck (tack well do deck)	#2
 - 3. Fire Rated Wall & Floor Penetrations: All pipes penetration fire walls and floors shall be encased in adjustable or fixed length metal cans, minimum 24 gauge, sized for maximum 1” spacing between insulation and can. Insulation shall consist of 360 waterproof calcium silicate insert sized to extend to a minimum of 1” beyond wall or floor penetration. Calcium silicate insert shall be same thickness as the adjoining pipe insulation. Spacing between shield and can shall be packed on either end with double neoprene coated rope positively fastened.
- f) Hangers, Anchors and Concrete Inserts:

1. Furnish and install suitable and substantial hangers, anchors, inserts and supports for all piping.
2.

<u>Pipe Size</u>	<u>Rod Diameter</u>	<u>Maximum Hanger</u>
<u>Spacing</u>		
1" & Smaller	3/8"	6'
1 – 1/4" to 2"	3/8"	9'
2 – 1/2 to 4"	1/2"	10'
3. No piping shall be hung from other piping, service, or ceiling hangers. In no case shall hangers be supported by means of vertical expansion bolts. Hangers for piping which supports in-line pumps shall be provided with vibration isolators to minimize vibration transmission to building structure.
4. Provide all secondary structural steel members necessary to support pipes in shafts except where provided on structural drawings. The steel shall be
5. adequately tied to the building structure. Detailed drawings of connections and calculations of supporting means shall be submitted.
6. Contractor shall be responsible for determining weight loads of all piping, forces on anchors, expansion joints/loops, etc., and coordination with structural engineer for adequacy of all supports.

HV – 2 INSULATION, PIPING

a) Fire Resistance Rating:

1. All insulation, vapors barriers, adhesives, mastics and related material shall be of non combustible materials to meet Code, and with UL flame spread rating of 25 maximum and smoke developed rating of 50 maximum.
2. Adhesives and mastics ratings shall be based on test of bulk material to meet Code, and a maximum burning in accordance with RS14 – 11, ASTM – E84 Test Methods.

HV – 3 INSULATION, DUCTWORK

a) Scope:

1. Insulation shall be applied to:
 - Supply ductwork
 - Outdoor air ductwork
 - Outdoor air plenums
 - Condenser air intake and discharge
2. Supply ductwork insulation thickness may be reduced on lined ductwork by an amount equal to the lining thickness.
3. Insulate sections of existing ductwork which are disturbed by the work of this project.
4. Insulation shall be installed after pressure tests are completed and accepted.

b) Fire Resistance Rating:

1. All insulation, vapors barriers, adhesives, mastics and related material shall be of non combustible materials to meet Code, and with UL flame spread rating of 25 maximum and smoke developed rating of 50 maximum.
2. Adhesives and mastics ratings shall be based on test of bulk material to meet Code, and a maximum burning in accordance with RS 14 – 11, ASTM – E84 Test Methods.

HV – 4 VIBRATION ISOLATION

- a) All equipment, piping, etc. shall be mounted on or suspended from approved foundations and supports.
- b) The installed vibration isolation systems for each floor or ceiling supported equipment shall have a maximum lateral motion under equipment start-up or shut down conditions of ¼ inch. Motions in excess shall be restrained by approved spring type mountings.

HV – 5 DUCTWORK

- a) Access doors shall be provided in all ductwork for access to fire dampers, air valves, automatic dampers and coils, filters, fans, and other products which require access.
- b) Provide supports and fastenings adequate to insure permanent stability and to insure permanent stability and to effectively resist all applied loads. Where required, provide supplementary steel angles or channels.

HV – 6 FIRE DAMPERS

- a) Provide fire dampers with access doors installed where shown, and as required by all local codes.
- b) Dampers shall meet the requirements of NFPA Bulletin No. 90A, and shall be tested in accordance with UL 555 Test Criteria for Fire, Corrosion and Dust Loading, labeled and listed by Underwriters Laboratories.
- c) Fire dampers shall be installed as detailed on the drawings with retaining angle iron frames, sleeves and breakaway connections.
- d) Dampers must be able to fully close with the operating maximum airflow and pressure present.
- e) Dampers installed horizontally in vertical duct work shall be spring loaded to close without the aid of gravity.

HV – 7 ELECTRIC DUCT HEATERS

- a) Safety devices shall include:
 1. Disc type automatic reset thermal cutout for primary over temperature protection.
 2. Replaceable cut outs in the power lines to de-energized elements if the primary cutout fails.
 3. Pressure Type airflow switch.
- b) Build-in components shall include:
 1. Safety interlocking disconnect switch

2. Disconnecting brake magnetic contractors
3. Transformer with primary fusing per UL
4. Supplementary circuit fuses per NEC

HV – 8 ELECTRIC UNIT HEATERS

- a) Electric unit heater shall be UL listed, horizontal type (unless otherwise shown) with heating and air delivery capacities as scheduled.
- b) Cabinet shall be fabricated of 18 gauge steel. All metal surfaces shall be corrosion resistant and provided with baked enamel finish and protective air inlet louvers.
- c) Mounting bracket shall be provided for ceiling or wall hung application.
- d) Heating elements shall have copper clad steel sheath and aluminum heat transfer fins. Automatic reset thermal over-heat protection shall instantly de-energize in case of thermal overload.
- e) All heaters drawing in excess of 48 amperes shall be provided with factory installed sub-divided circuits of 48 amperes or less.
- f) Motors shall be totally enclosed, continuous heavy-duty all-angle operation, equipped with thermal overload protection.
- g) Fans shall be aluminum, directly connected to fan motor.
- h) Field installable control kits, including low voltage transformers shall be provided. All heaters of 63 amperes or less shall be provided with power disconnect switches (field installed).

HV – 9 WATER DETECTION ALARMS

- a) Four Zone Panel: Remote wall mounted panel to display from one through four dry contact inputs. Four (red) alarm LED's and one (green) system normal LED are to be provided in conjunction with an audible signal. Power at 120 VAC shall be supplied to the panel.
- b) Provide transformer for control circuits which are to be 24 VAC. Panel shall include common alarm Form C relay output (normally open or normally closed contacts). See drawings for Quantities.
- c) Precise Location Water Detection System: Furnish and install, where shown on the Drawings. The system shall be able to quickly detect and digitally display water location (1 foot increments) up to 1,000 feet, as well as sound an audible alarm. System shall include the following components.

HV – 10 AUTOMATIC CONTROLS

- a) Copper Tubing:
 1. Hand annealed copper tubing with soldered fittings conforming to piping work section of this division.
 2. Copper tubing shall be used to piping excess of 20 psig air pressure and for all air pressure when located in MERs or concealed an inaccessible area such as shafts.
- b) Plastic Tubing:

1. Virgin polyethylene tubing tested in accordance with ASTM D 1693 Standards with minimum burst pressure 600 psig and 160 psig minimum working pressure at 72°F.
2. Plastic tubing may be used only for piping with air pressures up to 20 psig maximum and limited to locations in exposed and accessible areas only.

Plumbing

P – 1 OPENINGS AND CHASES

- a) All openings to be done prior to 8:00 a.m. or after 6:00 p.m.
- b) Cutting shall be done with hand tools. No cutting by jackhammer will be permitted.
- c) Core drilling is not permitted. The only time that core drilling is permitted is when the tenant occupies the space below.

P – 2 MATERIALS – GENERAL REQUIREMENTS

- a) All materials shall be new and the best of their respective kinds, suitable for the conditions and duties imposed upon same at the building. Materials shall be approved building standard and be for similar service.

P – 3 DRAINAGE SYSTEM

- a) Waste and vent piping shall be cast iron no-hub drainage pipe and fittings up to and including 4", or galvanized steel up to 2 ½". Piping shall be supported at every five feet and at every change in direction for horizontal piping. Screw plug clean-outs shall be provided at each change of direction in drainage piping.
- b) Indirect waste shall be copper Type "L".

P – 4 WATER PIPING

- a) Piping concealed in hung ceiling or partitions shall be copper type "L" ASTM B – 88 with cast brass fittings and conforming to requirements to USAS B16.18. Joints shall be brazed joints.
- b) Exposed hot and cold water piping shall be standard weight IPS brass pipe, chrome plated.
- c) Riser shut-downs shall be performed at designated times under the Building Manager's supervision and only with approval.

P – 5 HANGERS AND SUPPORTS

- a) All piping shall be substantially supported from the building structure. All hangers, rods and supports shall be specifically approved for use intended. Hangers and supports shall be installed in strict conformity with New York City Building Code requirements.
- b) Where overhead construction does not permit fastening of hanger rods, inserts, etc., in required locations, provide additional steel framing as required and approved.

P – 6 VALVES

- a) Furnish all valves, of Milwaukee Valve mfg. Company, Jenkins Bros. Or other base building approved manufacture as may be required for the proper control of the pipe lines installed under these specifications, so that any fixture, line or piece of apparatus may be cut out for repair without interference or interruption of the
- b) Sweated ends for 2" and under only.
- c) Pressure reducing valves are required for all domestic hot and cold water lines over 80 psi.

P – 7 INSULATION

- a) All new cold and hot water piping, including mains, and branches shall be insulated with 1" glass fiber covering with factory-applied all-service jacket "ASJ", with self-sealing laps, premolded fittings with vapor proof barrier.
- b) Jacket of insulation shall have a flame spread rating of 25 or less, smoke developed rating of 50 or less.
- c) All valves, flanges, etc., in insulated piping shall be covered similar to the fittings. Valve handles shall not be covered.
- d) Covering shall be continuous through walls and floors.

P – 8 PLUMBING FIXTURES AND EQUIPMENT

- a) Fire hose cabinet shall be Potter Roemer, Inc. with hose and valve assembly. (Ownership approval.) Cabinet and hose assembly shall be New York City approved.

P – 9 ESCUTCHEONS AND SLEEVES

- a) Where pipes pass through wall, floors or partitions, suitable 16-gauge galvanized pipe sleeves shall be provided and extend 2" above the top of the finished floor. The spaces between sleeves and pipes shall be tightly caulked.

P – 10 TESTS

- a) When the water the waste piping, etc., installed under this contract has been completed, notify the Engineer and Owner of readiness for inspection and make any and all tests required by authorities.

P – 11 FLASHING

- a) All cleanouts, sleeves, etc., set in membrane waterproofed floor slabs shall have six (6) pound lead flashing furnished and installed. The flashing shall extend eight inches (8") beyond the flashing flange around the entire perimeter of the unit.
- b) Provide 3' – 0" x 3' – 0" 16 oz. Copper flashing or 3 lb. Lead flashing for floor drains in non membrane waterproofed floor.

P – 12 CONDUCT OF OPERATIONS

- a) The building in which work of this contract will be performed in an existing structure and will be occupied during the term of this contract.
- b) Services to and throughout the building shall be maintained. Services may be interrupted only by obtaining permission to do so from the Owner in writing.
- c) All materials and debris removed from construction shall become the property of the Contractor and he shall remove same from the premises as directed.
- d) The work of the Contract shall be progressed in such a manner as to interfere as little as possible with the functioning of the Premises and with the safety and convenience of the occupants, staff, and others employed in and about the premises.
- e) Contractor's attention is directed to the phasing of the work as determined by the Owner and shall schedule all delivery of materials and manpower requirements to expedite the work accordingly.
- f) Routes of ingress and egress to the building and within the building to the site of the work shall be over routes as directed by the Owner's representative.
- g) Delivery of materials and removals of debris shall be arranged for within time limits established by the Owner. The Contractor shall not, except as otherwise agreed to, deliver any materials to the site unless his forces are present and available to receive and unload it.

P – 13 REGULATIONS

- a) The Contractor shall familiarize himself with and comply with building regulations and rules to maintain the safety of the premises and its occupants at all times.

P – 14 CLEANING

- a) The Contractor shall neatly pile, store and protect all materials in locations on the premises where approved and directed. During work operations on the interior of the buildings, all refuse and debris shall be removed and the areas left broom clean.

Sprinkler

SP – 1 GENERAL

- a) The Contractor shall perform work of this Section in accordance with the General and Specific Conditions of these Specifications and the Base Building Standards.
- b) All work and materials shall comply with applicable provisions of the New York City Building Code RS – 17-2, NFPA 13-1998 and B.S. of A 310-90 BCR.

SP – 2 WORK INCLUDED

- a) The installation shall be accomplished by an authorized sprinkler contractor recognized as a fully experienced specialist in the automatic sprinkler systems by the Building Department of the City of New York
- b) The installation shall be made on the basis of items, methods, and requirements of Department of Building of the City of New York. The provisions shall be following total, whether the stipulations listed therein are directed or recommended.
- c) System shall include, but not necessarily be limited to the following:
 - 1. Verification of existing conditions prior to commencement of work.
 - 2. Removal of existing all sprinkler heads and branch piping (as indicated on plans).
 - 3. Connection of new sprinkler heads and branch piping to existing sprinkler system (as indicated on plans).
 - 4. New sprinkler heads of flush concealer and upright, type.
 - 5. All piping hangers supports.
 - 6. Preparation of complete and detailed working drawings with hydraulic calculations.
 - 7. Obtaining all necessary approvals, permits and certificates including filing contractors drawings with hydraulic calculations signed and sealed with the New York City Building Department.
 - 8. Testing shall be on overtime in coordination with Fire Department and Building Management
 - 9. Deactivations of, reactivations of, connections to and/or disconnections from the sprinkler system must be performed by the designated Building sprinkler system contractor.
 - 10. Cutting and patching prior to 8:00 a.m. or after 6:00 p.m.
 - 11. Maintaining a fire watch guard during shut-down of systems and the installation of temporary sprinkler loops with sprinkler heads around floor core areas during construction
- d) Working Plans
 - 1. Before commencement of any work, complete and detailed working plans shall have been submitted and approved by the City of New York and other agencies having jurisdiction thereof. Two certified copies of such approved working plans shall be furnished to the Owner promptly after such approval.

SP – 3 MATERIALS

- a) pipe shall be Schedule 40 black steel with approved standard weight cast iron sprinkler threaded fittings. Drain and test piping shall be galvanized.
- b) Sprinkler Heads
 - 1. Sprinkler heads shall be as Underwriters' Laboratories listed approved of ordinary degree rating except as otherwise noted of 165°F, and shall be cast brass fusible link spray type with 1/2' discharge orifice.

2. New flush type sprinkler heads shall be adjustable Reliable Model G with white cover plate installed at center of tile within a tolerance of $\pm \frac{1}{2}$ inch.
 3. New upright type sprinkler head shall be chrome plated Reliable Model G.
- c) Valves
1. All valves shall be approved by the Underwriters and authorities having jurisdiction.
- d) Hangers: Brackets and Supports
1. Furnish and install hangers, brackets, beam clamps, clips, inserts, and mounting devices to support all piping through floors, walls or partitions in finished areas.
 2. All piping, etc., shall be designed and installed to assure that building structural integrity is not compromised. All suspended equipment must be supported from building steel.
- e) Escutcheons
1. Unless otherwise noted, provide approved typed chrome plated cast brass escutcheons on all exposed piping through floors, walls or partitions in finished areas.
 2. Escutcheons on uninsulated pipes shall be held in place by set screws.
 3. Where sleeve or fitting projects slightly from walls or partitions, provide special deep type escutcheons to cover each case.

SP – 4 ALTERATION WORK

- a) The following general conditions shall apply to all demolition, alteration or construction work:
1. Any work (including, but not limited to, demolition, removals, construction, core drilling and welding) that caused excessive noise audible in occupied spaces outside the premises, excessive vibrations detectable in occupied spaces outside the premises, excessive dust in occupied spaces outside the premises, or otherwise causes inconvenience to other Occupants or disturbs the building operations, must be performed at times other than during Building Hours. "Building Hours" shall mean the hours from 8:00 a.m. to 6:00 p.m. Monday through Friday and on Saturdays from 8:00 a.m. to 1:00 p.m. except on any day observed by the Federal or New York State Governments and the Federal Reserve Board as a legal holiday.
 2. The Building Manager shall be provided with written notice at least 72-hours prior to the commencement of any Occupant's demolition, alteration or construction work. Any work to be performed in areas of the building other than the Occupant's premises shall be performed only at times reasonably approved in advance by the Building Manager. The Occupant shall give the Building

3. Manager at least five business days advance notice of the time it intends to begin performing any such work.
 4. No demolition, alteration or construction work, including, welding or burning operations, shall be performed until after the Building Manager had deactivated the fire safety system in the affected area and has deactivated the sprinkle system in the affected area, and a fire watch has been provided in the affected area. All work to be done after hours.
 5. Prior to demolition, the Occupant shall request the Building Manager to shut off the water supply to the sprinkler system in the area(s) of demolition and the Building Manager shall do so. As soon as the demolition work is completed, the Occupant shall request the Building Manager to reactivate the water supply to the sprinkler system in such areas and the Building Manager shall do so.
 6. Prior to demolition, the Occupant shall disconnect all electric light and power within the project area the extent required by safe and sound construction practices. The Occupant shall provide temporary power and light for the project area to the extent required by safe and sound construction practices.
 7. Public areas such as elevator lobbies, public halls and service halls, shall be protected as directed by the Building Manager.
- b) A fire watch guard with a Certificate of Fitness shall be maintained during all shutdowns.
 - c) Removal of temporary of temporary sprinkle system shall be after all test and approvals.

SP – 5 TESTS

- a) The entire sprinkler system shall be tested as required in the New York City Building Code and as required by all agencies having jurisdiction.
- b) No part of the system to be concealed shall be covered up or closed in until such portions have been tested and approved.
- c) This testing shall include the following:
 1. New wet sprinkler systems
- d) The sprinkler system shall be hydrostatically tested at a pressure of 200 psig, for two hours with no leaks.

SP – 6 GUARANTEE

- a) This Sprinkler Contractor shall submit in writing (triplicate) a guarantee of this sprinkler work in accordance with the standard conditions as established under the AIA rules and regulations.
- b) Such guaranteed shall include replacing same at this Sprinkler Contractor's expense, including all other work disturbed by such repairs and work damaged by defective workmanship and materials under this contract, to the entire satisfaction of the Owner.

Electrical

E – 1 GENERAL

- a) All work in this section is subject to General and Supplementary Conditions of these Specifications.

E – 2

- a) Include all labor, materials and appliances required for the furnishing, installing, and testing, complete and ready for operation in a manner satisfactory to the Owner all herein specified, including in general, the following:
 1. Light and power wiring, conduit and raceway
 2. Lighting fixtures and lamps
 3. Emergency lighting, wiring and conduit
 4. Wiring devices and relays
 5. Grounding
 6. Receiving and setting of equipment
 7. Removals and relocations
 8. Temporary light and power
 9. Cutting, patching and related work
 10. Protective devices, circuit breakers, power and lighting panels
 11. Furnishing and installing new fire alarm speaker's visual alarm strobe lights, etc. Final connection to existing fire alarm system.
 12. Installing and connecting electrical devices in furniture system supplied by others.
 13. Testing
 14. Telephone and data conduit system
 15. As Build Drawings

E – 3 MARKING AND CIRCUIT IDENTIFICATION

- a) All panels, load centers, etc., and the circuits herein, shall be marked. All circuits originating from these identifies sources shall be identified by the Contractor at all disconnect switches, circuit breakers, motor controllers, junction and pull boxes, etc. All electrical runs are to be in EMT or rigid Aluminum allowing only 8 ft. of armored cable (BX) for final connections.

E – 4 ELECTRICAL TESTING

- a) Provide all necessary meters, instruments, temporary wiring and labor to test and adjust all equipment and wiring installed and/or connected under this Contract, including electrical equipment furnished by others, to determine proper polarity, phasing, freedom from grounds and shorts and operation of equipment. All measuring instruments must be properly calibrated.

- b) Whenever any authorities having jurisdiction require that any work be tested or approved, Contractor shall provide proper facilities for access and for inspection.
- c) Check all lighting fixtures and receptacles for proper operation.
- d) Check all system and equipment grounds for proper value of resistance using the Megger ground tester in accordance with manufacturer's standard instruction. Test insulation
- e) resistance of all new and affected existing feeders prior to energizing.

E – 5 PHASE BALANCING

- a) Balance, as equally as possible, the loads connected to each phase of all circuits connected to panel boards.
- b) After all adjustments are made and the premises are fully occupied take current readings on each phase at the feeders to the panel boards using clamp-on ammeter. The readings should be taken for 30 minutes at full load (all fans, pumps, air conditioning units, etc. should run at full capacity) during normal working hours. Submit the readings to the Engineer and to the Building Management for review and approval.

E – 6 SHOP DRAWINGS AND SAMPLES

- a) 1. A complete detailed set of construction drawings for equipment and systems, indicating dimensions, materials of construction and methods of assembly.
- b) Provided Submittals and/or shop drawings on the following equipment, devices, etc.
 - 1. Circuit breakers, disconnects and enclosures
 - 2. Circuit breaker panel boards
 - 3. Grounding devices – all types
 - 4. Safety switches
 - 5. Fuses – all types
 - 6. Wire – all types
 - 7. Wiring connectors and splicing devices
 - 8. conduit and conduit fittings
 - 9. Pull boxes
 - 10. Wiring devices including switches, receptacles, floor boxes
 - 11. Lighting fixtures, lamps and electronic ballasts and battery packs
 - 12. Lighting contractors and remote control switch
 - 13. Time switches
 - 14. Fire Alarm devices and wiring

E – 7 RACEWAYS

- a) Conduit – General
 - 1. Conduit sizes shall be in accordance with New York City Electrical Code.
 - 2. The types of conduits used shall be as described below under “Conduit Types.”

3. Conduit Types:
 - a. EMT – Use for all work concealed in walls and above hung ceiling (3/4" minimum) EMT up to trade size 1 ½ may also be used for work run exposed. Steel compression fittings only.
 - b. Rigid Aluminum – Use for all risers and for exposed runs 2" trade size and larger.
 - c. Greenfield shall be used for lighting fixture tails (1 ½" minimum) and for final connections to motor and transformers. Greenfield may be used as a general wiring method only where it must be fished through existing walls or plaster ceilings. In this case a separate green insulated ground
 - d. wire shall be included with the circuit conductors. Use insulated throat bite-tite connectors with Greenfield.
 - e. IMC – Use for conduit concealed in poured concrete floors.
 - f. Armored cable (BX) may be used for branch circuits only.
 - g. All unused conduits shall be removed back to original source.
4. EMT conduit shall be used to enter circuit breaker panels or disconnect and shall be extended into the ceiling. Threaded aluminum or rigid steel conduit shall be used when power distribution is exposed and is run outside of tenant space.
5. Conduits shall be of such size and shall be so installed that the required conductors may be drawn in without injury or excessive strain.
6. Mechanically join all metal conduit, enclosures, raceways, etc. to form a continuous electric path. Indent fittings are not acceptable. Threaded type fittings only for rigid metallic conduit and IMC. Compression type fittings for EMT. Flexible conduit fittings, compression type secured with wire.
7. Lay out and install all conduit runs so as to avoid proximity to steam and hot water pipes. Do not run conduit within three inches of such pipes except where crossings are unavoidable, then the conduit shall be kept at least 1" from the covering of the pipe crossed.
8. In general run conduit to lighting fixtures concealed; in mechanical equipment rooms, electric closets and fan rooms install conduit exposed.
9. Support riser conduits at each floor level by clamp hangers Kindorf type C-210. Arrange hangers for minimum obstruction of opening when installed in pipe shafts. All conduit openings shall be fire stopped in an acceptable manner. See section on fire stop sealant, elsewhere in these specifications. This paragraph pertains where applicable.

10. When not terminated in a threaded hub, secure conduits entering sheet metal enclosures and outlet boxes in place by two locknuts (one inside and one outside) and terminate each conduit with a bushing. Conduits 1 ¼" trade size and larger shall terminate in a metal insulated grounding bushing bonded to the box or enclosure with a #6 ground wire.
 11. Use flexible metallic conduit from outlet boxes in hung ceiling to lighting fixture housings. The final raceway connection to motors, Transformers and other equipment subject to vibration shall be flexible metallic conduit. Use aluminum flexible conduit with aluminum rigid conduit, and flexible steel conduit with EMT, IMC or galvanized rigid conduit. Flexible conduits 2" trade size and larger shall be provided with an external bonding jumper of #6 AWG bare copper.
 12. Where a flexible raceway is installed in plenums or other indoor locations where exposed to continuous or intermittent moisture, use liquid tight flexible conduit installed in such a manner that liquids tend to run off the surface and not drain toward the fittings. Provide sufficient slack to reduce the effects of vibration.
 13. Where flexible conduit is used as a wiring method, to run wiring to new receptacles in existing GYP-Board walls, provide a separate ground conductor. Bond ground wire to the conduit grounding system at the first junction box.
 14. All empty conduits, except those, which are vertical for their entire length, and except conduits connecting ceiling lighting outlets together, shall have a fish wire.
- b) Concealed Conduit:
1. Install conduit so as not to cut or run through structural members, except by special written permission of the Engineer or where specifically shown on drawings.
 2. Do not run conduits horizontally or crosswise in building type partitions or sidewalls.
 3. Except for branch circuit work install all conduit in hung ceiling on acceptable hangers and inserts. Conduit for branch circuit work and control and instrument wiring shall be supported by clamps or pipe straps supported from the purlins (black iron members supporting the ceiling) where available, or from structural members or from the deck.
 4. In lay-in ceilings install conduit high enough to permit removal of ceiling panels.
- c) Conduit Types:
1. Aluminum
 - a. Aluminum conduit shall conform to ANSI Standard C80.5 and UL Standard #6 for rigid aluminum conduit. Interior of conduit shall have a silicone or as acceptable coating; all threads shall have an

application of Pentrox "A" or other acceptable conductive lubricant.

2. Flexible Metallic

- a. Flexible metallic conduit shall be threadless, continuous, spirally wound and interlocked; aluminum or zinc coated steel conforming to UL Standard #1 for flexible metal conduit.

3. Liquid Tight Flexible Steel

- a. Liquid tight flexible steel conduit shall be similar to flexible metallic except with a PVC jacket. Conduit shall be Anaconda "Sealtite" type UA or as acceptable.
- b. CAUTION: When using liquid tight flexible conduit, wiring must be derated to 60 C ampacities.

4. Electric Metallic Tubing

- a. Electric metallic tubing (EMT) shall be threadless type, steel, conforming to ANSI Standard C80.3 and UL Standard #797, with fused zinc on outside and inside walls with an additional high corrosion-resistant finish coat.

5. Rigid Galvanized Steel Conduit

- a. Rigid full-weight steel pipe galvanized inside and out using the hot-dip method. Conduit shall conform to standards for Rigid Steel Conduit of the Underwriters Laboratory, Inc.
- b. Zinc coating shall be sufficiently well bonded and elastic to prevent flaking or cracking when a sample of finished conduit is bent 90° with a radius of 6 times

d) Conduit Sleeves (where applicable):

1. General

- a. Conduit sleeves shall be installed so that proper position and
- b. alignment will be maintained during construction.

2. Sleeves through Interior Walls and Floors

- a. Sleeves through interior walls and floors shall be minimum of No. 20 gauge galvanized steel, black enameled rigid steel conduit or Schedule 40 black steel pipe. Aluminum conduit shall not be used. Where specific sizes are not indicated on the drawings, sleeves shall be sized to provide on-half (1/2) inch clearance around the outside surface of the item for which they are installed. They shall be cut flush with wall surfaces, and shall extend two inches above finished

- b. floor levels. The space between conduit and sleeves shall be packed with fiberglass or other acceptable non-combustible packing material to prevent passage of air, liquid or fumes from one area to another. Seal with “Duxseal” or other acceptable compound.

E – 8 LIGHT AND POWER MATERIALS

a) Disconnects

1. General

- a. Disconnects shall conform to NEMA and UL Standards, and be installed where indicated and where required by Code. Disconnects shall be horsepower rated units to maximum size listed by UL.
- b. Disconnects shall be located where they are readily accessible and capable of being used without reaching above, around, under, etc., equipment and/or obstruction.

2. Enclosure

- a. In general all switches in indoor, dry locations shall be mounted in NEMA Type 1 enclosures.

b) Electric Closets

- 1. Electric closets shall be kept clear of debris and foreign materials. Contractors shall not use electric closets for storage of materials or equipment. At the completion of the project electric closets shall be left clean to the satisfaction of the Building Office.
- 2. Building approved contractors shall perform all work within base building closets and tie-ins to electrical system.

E – 9 LIGHTING FIXTURES

- a) New lighting fixtures shall comply with or exceed the latest requirements of the New York City Code, and shall bear the label of the Underwriters; Laboratories, Inc. All fluorescent fixtures shall be equipped with electronic ballasts meeting the Ballast Factor and Harmonic Distortion limitations of the Con Edison Apple Rebate Program. All ballasts shall be Class “p” rated. Hybrid ballasts shall not be used.

E - 10 FIRE STOP SEALANT

- a) Provide fire-resistant silicone foam fill to restore fire ratings to all wall or floor or ceiling
- b) penetrations. Foam fill must be UL classified and have a New York City Materials and Equipment Acceptance (MEA) listing for use as wall or floor opening multiple cable system protective material.
- c) All penetrations through fire rated floors and wall shall be sealed to prevent the passage of smoke, fire, toxic gas or water through the penetration either before, during or after a fire. The fire rating of the penetration seal shall be at least that of the floor or wall into which it is installed, so that the original fire rating or the floor or wall is maintained as required by Article 300-21 of the National Electric Code.

- d) No flammable material may be used to line the chase or hole in which the fire stop material is to be installed.
- e) When damming materials are to be left in place after the seal is complete, and then all such materials shall be non-flammable.
- f) The sealant shall be poured into the hole after each cable or pipe has been spread to allow approximately ½" of foam to flow between them. No cable or pipes may be touching each other and thereby allow voids to form in the fire stop.
- g) When plastic cartridges are used for smaller installations, the chemical components of the foam shall be premeasured within the cartridges to insure the proper ratios. For larger installation, where a Chase-Foam Mixing Machine is used, the machine should be present so that only the correct ration of the two chemical components will be delivered without any possibility of error and without the need for constant technical supervision.
- h) The sealant shall remain resilient and pliable to allow for the removal and/or addition of cable without the necessity of drilling holes. It shall adhere to itself perfectly to allow any and all repairs to be made with the same material. It shall allow for vibration, expansion and/or contraction of anything passing through the penetration without affecting the seal, or cracking, crumbling and spalling.
- i) When sealant is injected into penetration, the foam shall expand to surround all the items within the penetration and maintain pressure against the walls of the penetration as well as the pass-through items. The foam shall cure within five minutes and be fire resistant at that time. No heat shall be required to further expand the foam to block the passage of fire and smoke or water.
- j) The foam sealant shall have been subjected to fire exposure in accordance with standard time-temperature curve in the Standard, UL, ASTM E119, and NFPA 2.51. The foam fire-stop shall have also been subjected to the hose stream test in accordance with UL 10B. The foam sealant shall be UL Classified as a Fill, Void or Cavity material for use in Wall or Floor Openings. The foam sealant shall be UL Classified as a Fill, Void or Cavity material for use in Wall or Floor Openings. The foam sealant shall be UL Classified 3M Fire Barrier CP-25.
- k) Coordinate application with physical parameters of openings to be sealed. Provide solid bottoms, and solid covers and try-to-box connectors where wireways or other cable support systems penetrate fire rated walls.

E - 11 CLASS "E" FIRE ALARM SYSTEM MODIFICATIONS

a) General

1. All new initiating devices shall be of the intelligent – addressable type compatible with the building fire alarm system. All existing base building fire alarm devices
2. and components must remain in service until new devices and components are activated and approved by the Property Manager.

Supervision of installation and final test are to be performed at the contractor's expense.

3. The owner warrants to the contractor that all systems are fully operational at the time the contractor commences work. The contractor assumes full liability for damages to equipment that are the result of their work where the procedures and practices of this section are not followed.
4. The contractor shall fully protect all existing equipment and materials from damage when work is performed on or around any installed systems. Each systems shall be reinstalled to the condition found prior to the start of any work by the contractor.
5. No work on any system is to be performed without 48 hours advance written notice to the Building Office.

b) Fire Detection/Protection System

1. Meeting New York City Code requirements for floor coverage must be on-line during non-business hours. (Non-business hours are defined as 4:00 p.m. to 8:00 a.m. Monday through Friday, and all hours Saturday, Sunday, and Holidays)
2. If the above cannot be met, a fire watch must be maintained with 24-hour advance notification to the Building Office that fire detection/protection systems are off-line.

c) Fire Alarm (Modified Class "E" System)

1. Plans and Submittals
 - a. Plans must be filed with and approved by the authority having jurisdiction, and receive the necessary approval from the New York City Building and Fire Department after installation.
2. Filing
 - a. Contractor is required to file all new installations through Building vendor or Fire Alarm Consultant, and/or alterations to the Class "E" system with the Building Department and Fire Department, including but not limited to Form A433R and B – 45
 - b. A copy of the A433R form is to be submitted to the owner's agent prior to start of work.
 - c. Contractor is also asked to submit a copy of the "Request for Inspection" – Form B – 45 to the New York City Fire Department at the completion of the project.
3. Coordination
 - a. No work is to be performed on the Class "E" system in the energized state. Prior to working on the system the Building Office is to be notified in writing 48 hours in advance. Field wiring will be removed from the DGP's prior to work being performed. The following information should be forwarded:
 - Contractor name

- Floor and Tenant of work
- Description of work to be performed
- Time system is to be taken off line, and put back on line

NOTE: If at the end of the day the system is not capable of being put back on line due to wiring problems, the contractor is responsible for all costs associated with getting the system back to its original protection level.

4. Tenant Alterations

- a. All modification/add-ons to existing Class “E” system must utilize compatible peripherals. All devices must be cross-reference with the manufacturer as not to affect the UL system listing.

5. Wiring

- a. All wiring for the Class “E” system should conform to RS – 17 of the New York City Building Code, and the NEC.
- b. Conductors shall be copper throughout. All wiring for peripheral devices (i.e.: smoke, heat, duct, pull station) is to be installed in shielded cable, and be Teflon or its equivalent. It shall have a minimum 600-volt rating, be protected with a sheath and an outer jacket of 24 mil minimum insulation colored fire department red and labeled for its entire length – “Fire Alarm Service”.
- c. All wiring shall be of an approved 200°C Teflon type, however, in areas where wiring is susceptible to damage due to exposure to mechanical damage (e.g., MER, EMR, etc.) the wiring shall be additionally run in rigid steel conduit.
- d. The following wiring should be used as a minimum for the devices listed;
 - Smoke Detection - No. 16 AWG Shielded (1 pair)
 - Warden Stations - No. 16 AWG Shielded (1 pair)
 - Strobe Units - No. 16 AWG Shielded (2 pair)
 - Speakers - No. 14 AWG (1 pair)_
 - Pull Stations - A & B Circuits (10 max per)
 - Water Flow/OS & Y - No. 16 AWG Shielded (1 pair)
 - - A & B Circuits
 - - No. 16 AWG Shielded (1 pair)
 - - No. 16 Shielded (1 pair each)

6. Conduit, Raceway and Fittings

- a. No conduit shall be less than ¾” commercial trade.
- b. All conduit runs shall conform to electrical section of building standards and rules.

7. Equipment Connection to the Base Building Fire Alarm System

- a. Strobe Lights

Fire alarm strobe lights are to be provided and located as required by Code. Strobes are to meet or exceed all photometric and location requirement specified in applicable laws. Strobe lights are to be located at a height of 80" above the finished floor or 6" below the ceiling whichever is lower. Strobes are to be wired with two distinct and supervised signaling circuits and shall be arranged in such a manner as to alternate strobe placement in an "A" – "B" type of arrangement. This arrangement will insure some level of alarm signal in the event of a partial system failure. Where possible, an attempt should be made to place strobe lights and speakers at the same location to simplify wiring.

E – 12 RECORD DRAWINGS (AS-BUILTS)

- a) Concurrent with progress of installation, maintain a set of as-built record drawings, consisting of a reproducible marked set of mylar drawings with additional sketches as required, denoting and dimensioning accurately all changes in elevation, location and size of all items deviating from contract drawings.
- b) Upon completion of work, deliver to Architect one up to date set of these as-built record drawings.
- c) Within three weeks following beneficial occupancy of the project, two sets of "As-Built" drawings and transparencies as well as two sets of maintenance manual, operating manuals and drawings (including shop drawings) of all electrical equipment shall be submitted to the Owner.