October 13<sup>th</sup>, 2022

### **NJSEA Pump Station Generator Replacement**

East Rutherford, New Jersey

Proposal Due Date: November 1st, 2022 @ 12:00PM

### ADDENDUM #2

### **RFI Questions**

- Question: On Page NJSEA-Bid Scope 3, paragraph H calls for the Contractor to remove the existing generators but on Page Bid-3, Item 8 and elsewhere in the specification it states the Owner will remove the existing generators- please clarify. (Bid Specifications prepared by Triad)
  Response: Contractor shall remove the existing generators.
- 2. Question: Please clarify your answer to Question 5 from the original RFI "if possible." Response: The intention is if the details can be worked out, the NJSEA will pay directly to the supplier.
- 3. Question: The existing inertia slab is to be removed according to the specifications, please confirm that a new inertia slab is not required.

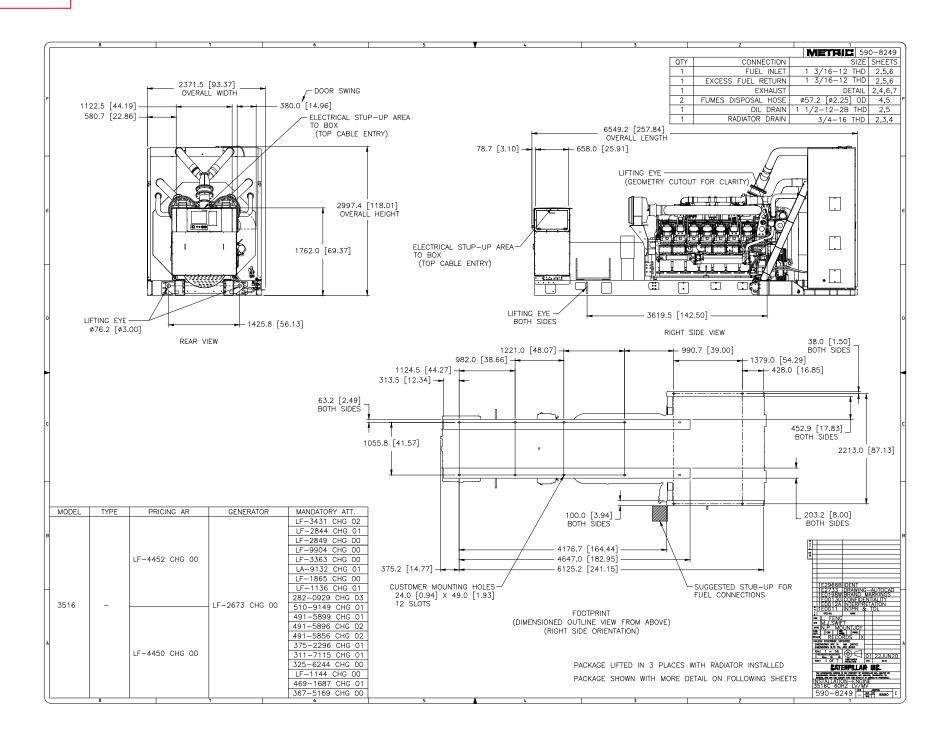
**Response:** The Contractor shall remove the existing inertial pad and install a new vibration isolation system provided with the new generator. The size and type of the new vibration isolation system will be dictated by the new generator purchased for the project. The new vibration isolators shall be shipped loose with the new generator. The Contractor shall ensure that the required vibration isolators (check the type and quantity) are received with the generator. The Contractor shall ensure that vibration isolators are installed as per, (but not limited to), M-002 specifications.

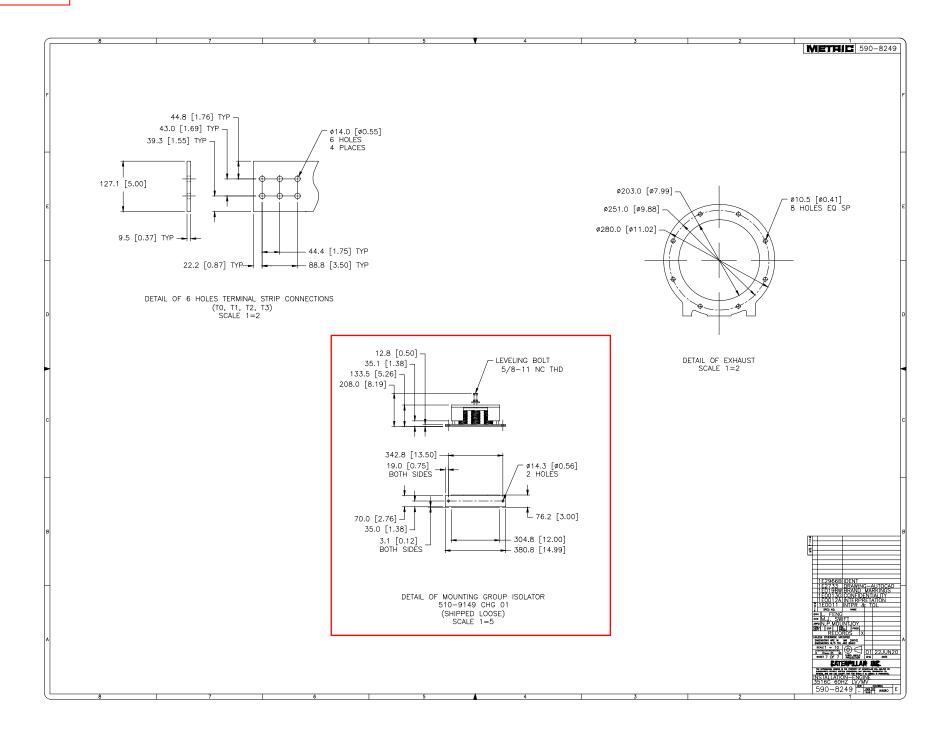
### **Attachments**

- 1. CAT Generator Specs-1 dated June 20, 2022
- 2. CAT Generator Specs-2 dated June 20, 2022
- 3. Mechanical Specifications Drawing M-002 dated April 18, 2022

Include the acknowledgment of this addendum in your proposal submission.		
Company	Name (Print)	Date
Receipt of Addendum #2:	(Signature)	

**End of Addendum #2** 





## MECHANICAL SPECIFICATIONS

## **PART 1- GENERAL**

- A. THE LATEST EDITION OF GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, OR AS REQUIRED BY THE CONSTRUCTION DOCUMENTS AND/OR THE OTHER ENGINEERS DOCUMENTS WHICH ARE PART OF THE CONTRACT.
- B. BIDDERS SHALL VISIT AND CAREFULLY EXAMINE THE AREA AFFECTED BY THIS WORK TO FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS AND THE DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THIS WORK BEFORE SUBMITTING PROPOSALS, SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT, OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ENGINEERS ATTENTION PRIOR TO BID. IF DISCREPANCIES ARE NOT RESOLVED TO CONTRACTORS' SATISFACTION, THEY SHALL BE QUALIFIED IN THEIR BID SUBMISSION.
- C. THIS CONTRACTOR SHALL REVIEW ALL CONSTRUCTION DOCUMENTS ASSOCIATED WITH THIS PROJECT INCLUDING GENERAL CONSTRUCTION, DEMOLITION, ARCHITECTURAL, MECHANICAL, ELECTRICAL, PLUMBING AND SPRINKLER PLANS AND SPECIFICATIONS. ALL WORK REQUIRED IN THE BID WHICH IS INDICATED OR IMPLIED TO BE PERFORMED BY THIS TRADE IN OTHER SECTIONS OF THE WORK SHALL BE INCLUDED IN THEIR BID. IF A CONFLICT OCCURS IN THE BID SPECIFICATIONS AND/OR ON THE DRAWINGS, THE MORE STRINGENT SITUATION SHALL APPLY.
- D. COORDINATE ALL WORK OF THE SECTION WITH EXISTING CONDITIONS AND THE WORK OF OTHER TRADES. 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.
- E. THE SPECIFICATIONS ARE ACCOMPANIED BY DRAWINGS INDICATING THE GENERAL LOCATION OF EQUIPMENT AND CONNECTIONS THERETO. UNLESS SPECIFICALLY DIMENSIONED, LOCATIONS OF EQUIPMENT AND ROUTINGS ARE APPROXIMATE. SCALES ON DRAWINGS ARE INDICATED FOR BIDDING PURPOSES ONLY. DRAWINGS SHALL NOT BE SCALED FOR CONSTRUCTION AND MANUFACTURING DETAILS. CERTAIN SYSTEMS ARE DIAGRAMMATIC AND GIVE THE GENERAL ARRANGEMENT ONLY. NO ADDED COMPENSATION WILL BE PERMITTED FOR VARIATIONS DUE TO FIELD CONDITIONS. EXACT LOCATIONS AND ARRANGEMENTS SHALL BE DETERMINED IN THE FIELD ON THE BASIS OF DETAILS INDICATED ON APPROVED SHOP DRAWINGS, AND SUPPLEMENTARY INFORMATION ISSUED BY THE ENGINEER, AND SHALL PROVIDE FOR OPERATING EFFICIENCY, NEATNESS OF APPEARANCE, AND EASE OF MAINTENANCE.
- F. GUARANTEE:
- THE CONTRACTOR SHALL GUARANTEE AND SERVICE THE ENTIRE INSTALLATION FOR A PERIOD OF ONE YEAR FROM THE DATE OF THE FINAL ACCEPTANCE OF THE INSTALLATION. THE CONTRACTOR SHALL, DURING THE PERIOD OF THE GUARANTEE, REPLACE OR REPAIR AT HIS OWN EXPENSE ANY PIECE OF EQUIPMENT AND/OR MATERIAL WHICH IS FOUND TO BE DEFECTIVE. THE REPLACEMENT OR REPAIR SHALL BE PERFORMED THE SAME DAY OF NOTIFICATION IN AN EMERGENCY FASHION WHEN NOTIFIED BY THE OWNER OR AUTHORIZED REPRESENTATIVE. THE CONTRACTOR SHALL ALSO REPAIR ALL DAMAGE TO SURROUNDING WORK CAUSED BY THE FAILURE, REPAIR OR REPLACEMENT OF DEFECTIVE EQUIPMENT. ALL REFRIGERATION COMPRESSORS SHALL HAVE A FACTORY GUARANTEE INCLUDING PARTS AND LABOR FOR FIVE YEARS TOTAL. THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, BALANCED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS, AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVALS.
- G. EQUIPMENT AND MATERIALS: MOST ITEMS OF MECHANICAL AND ELECTRICAL EQUIPMENT AND MATERIAL ARE NOTED ON THE DRAWINGS OR IN THE SPECIFICATIONS WITH A MANUFACTURER'S NAME AND CATALOG 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, NATIONAL ELECTRICAL CODE, 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
- H. SUBSTITUTIONS: DEVIATIONS FROM CONTRACT DOCUMENTS AND SUBSTITUTION OF MATERIALS OR EQUIPMENT FOR THOSE SPECIFIED SHALL BE REQUESTED INDIVIDUALLY IN WRITING. 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. IF TESTS OR DEMONSTRATIONS ARE REQUIRED BY THE OWNER'S REPRESENTATIVES, THE COST OF SUCH TESTS OR DEMONSTRATIONS SHALL BE BORNE BY THE CONTRACTOR. DESCRIBE REASON FOR CHANGE CONNECTIONS TO ADJACENT MATERIALS, ELECTRICAL SERVICES, SERVICE ACCESS REQUIREMENTS, DIFFERENCES IN OPERATING CHARACTERISTICS OR CYCLES AND ALL OTHER POINTS OF DEVIATION. CONTRACTOR TO ASSUME FULL RESPONSIBILITY FOR SAFETY, COORDINATION WITH OTHER

TRADES, OPERATION AND PERFORMANCE OF ALTERED

SYSTEM.

- I. THIS CONTRACTOR, WHERE APPLICABLE, IS TO OBTAIN A COPY OF THE SITE RULES AND REGULATIONS PRIOR TO BID SUBMISSION. ALL WORK MUST BE INSTALLED IN ACCORDANCE WITH THE BUILDING RULES AND REGULATIONS. DETERMINE REQUIREMENTS AND THE EXTENT OF PREMIUM TIME WORK REQUIRED BY THE SITE, FOR THE PURPOSE OF THE BID ASSUME CRITICAL WORK (E.G., WELDING, BRAISING, SOLDERING, GENERATOR TRANSFER, ETC.) AND CRITICAL SERVICES INTERRUPTIONS ARE TO BE PERFORMED OUTSIDE NORMAL BUSINESS HOURS.
- REMOVAL. TEMPORARY CONNECTIONS AND RELOCATION OF CERTAIN EXISTING WORK WILL BE NECESSARY FOR THE INSTALLATION OF THE NEW SYSTEMS. ALL EXISTING CONDITIONS ARE NOT COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND MAKE ALL NECESSARY CHANGES REQUIRED BASED ON EXISTING CONDITIONS FOR PROPER INSTALLATION OF NEW
- K. ALL NECESSARY CUTTING AND PATCHING IN FLOOR SLABS AND WALLS FOR THE NEW FUEL OIL PIPING AND EQUIPMENT WORK SHALL BE PERFORMED BY THIS CONTRACTOR. PERFORM WORK TO MATCH EXISTING CONDITIONS.
- L. WHERE PIPE AND/OR CONTROLS CONDUITS PENETRATE RATED WALLS, THE SPACE BETWEEN THE INSULATION AND THE WALL SHALL BE CAULKED WITH NON-COMBUSTIBLE MATERIAL IN AN APPROVED MANNER. THE CONTRACTOR SHALL COORDINATE ELEVATIONS WITH EXISTING REMAINING INSTALLATIONS.
- M. ACCESS DOORS IN FINISHED CONSTRUCTION: THE CONTRACTOR SHALL PREPARE A LIST OF ALL ACCESS DOORS (MINIMUM 18"X18") REQUIRED FOR OPERATION AND MAINTENANCE OF ALL CONCEALED EQUIPMENT AND OTHER DEVICES, WHICH SHALL BE SUPPLIED TO THE GENERAL CONTRACTOR FOR INSTALLATION. THE COST TO FURNISH AND INSTALL ACCESS DOORS SHALL BE INCLUDED IN THIS CONTRACTOR'S BID.
- N. NEW DISCHARGE AIR PLENUM SHALL ARRIVE ON THE CONSTRUCTION SITE SEALED AND REMAIN PROTECTED FROM DEBRIS THROUGHOUT CONSTRUCTION PRIOR TO FINAL INSTALLATION. ALL VOLATILE ORGANIC COMPOUND (VOC) LIMITS OF ADHESIVES, SEALANTS AND SEALANT PRIMERS MUST COMPLY WITH CURRENT AIR QUALITY OSHA REQUIREMENTS.
- 1.02 SCOPE OF WORK
- A. PROJECT OBJECTIVES:
- 1. WORK BY E.C., M.C., GC, ETC.:
- DISCONNECT AND REMOVE THE EXISTING GENERATORS. THIS WORK SHALL INCLUDE REMOVING EXISTING EXHAUST AIR LOUVERS AND SHUTTERS ASSOCIATED WITH THE EXISTING GENERATORS AND SEALING THE WALL EXHAUST OPENINGS THAT ARE NOT TO BE RE-USED DURING CONSTRUCTION PHASE.
- THE GENERAL CONTRACTOR SHALL FURNISH AND INSTALL THE NEW POWER GENERATOR IN THE EXISTING SPACE. THE NEW GENERATOR SHALL BE SUPPLIED WITH A NEW DAY TANK BY THE GENERATOR'S VENDOR. REFER TO MECHANICAL EQUIPMENT SCHEDULE FOR MORE DAY TANK INFORMATION.
- 2. WORK BY MECHANICAL CONTRACTOR:
- MECHANICAL CONTRACTOR SHALL REMOVE THE EXISTING OA INTAKE DAMPERS, EXISTING SUPPLY AIR FAN (SF-1), EXISTING GENERATORS' EXHAUST PIPING WITH SILENCERS. SECTIONS OF EXISTING FUEL PIPING, EXISTING DAY TANKS AND THE ASSOCIATED AUXILIARY SYSTEMS. MECHANICAL CONTRACTOR SHALL INSTALL THE NEW DAY TANK (FURNISHED BY THE GENERAL CONTRACTOR AS PART OF THE NEW GENERATOR PACKAGE), DAY TANK CONTROLS, THE NECESSARY SECTIONS OF NEW FUEL OIL PIPING DISTRIBUTION AND AUXILIARY EQUIPMENT. THE NEW WORK SHALL ALSO INCLUDE THE NEW DISCHARGE AIR PLENUM. NEW EXHAUST PIPING WITH A SILENCER.
- ASSOCIATED AUXILIARY INSTALLATIONS. - MECHANICAL CONTRACTOR SHALL INSTALL ALL NECESSARY NEW PIPING CONNECTIONS BETWEEN THE NEW GENERATOR, THE NEW DAY TANK AND THE MAIN FUEL STORAGE TANK TO CONSTRUCT A COMPLETE FUNCTIONAL FUEL SUPPLY SYSTEM FOR THE NEW GENERATOR. REFER TO "PURCHASE AND INSTALLATION" SPECIFICATIONS FOR A NEW INDOOR STANDBY ENGINE/GENERATOR SYSTEM" DOCUMENT FOR MORE INFORMATION. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE NEW JERSEY BUILDING CODE, AND REGULATIONS BY ALL NATIONAL, STATE AND LOCAL AUTHORITIES HAVING JURISDICTION, BUILDING MANAGEMENT REQUIREMENTS, CONSTRUCTION

DOCUMENTATION DRAWINGS AND THESE SPECIFICATIONS.

INSULATION, AND CONTROLS, ACCESSORIES AND THE

- B. THE WORK SHALL INCLUDE ALL LABOR, MATERIALS, EQUIPMENT, HOISTING AND RIGGING, BREAKDOWN AND SETUP OF EQUIPMENT FOR INSTALLATION, SCAFFOLDING, AND SERVICES TO COMPLETE THE INSTALLATION AND PROVIDE THE OWNER WITH A FULLY OPERATIONAL SYSTEM. ANY EQUIPMENT, PARTS, MATERIALS, ACCESSORIES, OR LABOR THAT IS NECESSARY FOR PROPER PERFORMANCE OF THE MECHANICAL WORK, ALTHOUGH NOT SPECIFICALLY MENTIONED HEREIN OR SHOWN ON THE DRAWINGS, SHALL BE FURNISHED AND INSTALLED WITHOUT ADDITIONAL COSTS. WHEN INSTALLATION OF A PART OF ANY SYSTEM (FUEL DISTRIBUTION, 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 AFFECTING THE SITE SHALL BE DONE OUTSIDE OF THE SITE
- OPERATING HOURS AS APPROVED BY OWNER. C. THE SITE MANAGEMENT REQUIRES NOT LESS THAN SEVEN DAYS NOTICE FOR SHUTDOWN OF ANY CRITICAL SITE SYSTEMS.
- D. MAKE AN ACCURATE TAKE-OFF ALL EXISTING EQUIPMENT, AIR PLENUMS, PIPING, LOUVERS, DAMPERS, CONDUITS, PANELBOARDS, WIRING DEVICES, AND OTHER ACCESSORIES BEING REMOVED DURING DEMOLITION AND INCLUDE THE COST FOR DISCONNECTING AND REMOVAL OF STATED EQUIPMENT, ETC. INTO THE BASE BID. REMOVALS SHALL BE AS SPECIFIED AND/OR NOTED AS INDICATED ON THE DRAWINGS. IN CERTAIN CASES, EQUIPMENT OR MATERIALS DESIGNATED FOR REMOVAL SHALL REMAIN THE PROPERTY OF THE OWNER AND SHALL BE TURNED OVER AT LOCATIONS ON THE SITE AS DIRECTED BY THE OWNER.

- E. PLAN INSTALLATION OF NEW WORK AND CONNECTIONS TO EXISTING INSTALLATIONS TO ENSURE MINIMUM INTERFERENCE WITH REGULAR OPERATION OF EXISTING FACILITIES. ALL SYSTEM SHUTDOWNS AFFECTING OTHER AREAS SHALL BE COORDINATED WITH PROJECT MANAGEMENT.
- F. THIS OWNER SHALL PROCURE THE SERVICES OF A THIRD-PARTY INSPECTION COMPANY TO PERFORM ALL SPECIAL INSPECTIONS IN ACCORDANCE WITH THE SITE REQUIREMENTS. SECURE ALL REQUIRED PERMITS AND APPROVALS AND TRANSMIT SAME TO THE OWNER. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FEES.
- THIS CONTRACTOR SHALL INCLUDE AS PART OF THE CONTRACT DEMOLITION, REMOVAL OR RELOCATION OF EXISTING EQUIPMENT, MATERIALS, APPURTENANCES, ETC. AS INDICATED ON THE DRAWINGS OR AS HEREIN SPECIFIED OR REQUIRED. WHERE ALL PIPING, DUCTS, AND OUTLETS ARE REMOVED, INTERRUPTED OR BROKEN, PROVIDE THE REQUIRED RELOCATION, RECONNECTION OR REPLACEMENT TO RESTORE SERVICE TO ALL ITEMS NOT MADE OBSOLETE BY THIS WORK.
- H. ALL EQUIPMENT, MATERIAL, ETC. REMOVED UNDER THIS CONTRACT AND NOT INTENDED FOR FINAL USE IN THE FINAL INSTALLATION SHALL BE IMMEDIATELY REMOVED FROM THE PREMISES AND TURNED OVER TO OR DISPOSED OF, AS DIRECTED BY THE OWNER.
- I. ANY DEMOLITION OR MODIFICATION WORK, AS INDICATED ON THE DRAWINGS AND NOT HEREIN SPECIFIED, OR VICE-VERSA, SHALL BE COMPLETED BY THIS CONTRACTOR AND SHALL BE INCLUDED AS PART OF THE CONTRACT.
- J. THE CONTRACTOR SHALL RELOCATE AND RECONNECT ALL NEW AND EXISTING LINES AND EQUIPMENT INTERFERING WITH NEW INSTALLATION. VERIFY ALL EXISTING CONDUITS AND RELATED APPURTENANCE INSTALLATION HEIGHTS WITH THAT OF THE NEW INSTALLATION, MAINTAINING ACCESS TO ALL EXISTING POINTS OF ACCESS.
- 1.03 SHOP DRAWINGS, EQUIPMENT SUBMISSION, MAINTENANCE
- A. SUBMIT ONE (1) REPRODUCIBLE AND ONE (1) PRINT OF THE SHEET METAL AND PIPING SHOP DRAWINGS, 1/4"=1'-0" OR 3/8"=1'-0" SCALE, CERTIFIED BY ALL TRADES THAT COORDINATION HAS BEEN ESTABLISHED.
- B. SUBMIT THREE (3) COPIES OF ALL SHEET METAL AND PIPING SHOP STANDARDS LEAKAGE TEST CERTIFICATIONS AND CERTIFIED EQUIPMENT CUTS WITH CONSTRUCTION WIRING DIAGRAMS, AND AUTOMATIC TEMPERATURE CONTROL SHOP DRAWINGS INCLUDING CONTROL AND POWER WIRING DIAGRAMS, SEQUENCE OF OPERATIONS AND ALL CUTS OF EQUIPMENT AND DEVICES.
- SUBMIT FOUR (4) BOOK BOUND INSTALLATION, OPERATION AND MAINTENANCE (IOM) MANUALS WHICH SHALL INCLUDE COPIES OF ALL AS-BUILT SHOP DRAWINGS FOLDED AND PLACED INTO BINDER POCKETS, AS-BUILT DRAWINGS IN ELECTRONIC FORMAT. COPIES OF REVIEWED EQUIPMENT CUTS FOR INSTALLED EQUIPMENT, COPIES OF EQUIPMENT START-UP CHECKLISTS, LEAK TESTS, FUEL LINES HYDROSTATIC TESTS AND FUEL TREATMENT CERTIFICATION. CONTRACTOR SHALL INSTRUCT OWNERS PERSONNEL ON THE OPERATION OF ALL NEWLY INSTALLED FUEL SUPPLY SYSTEMS.
- AS WORK PROGRESSES AND FOR DURATION OF THE CONTRACTOR, MAINTAIN A COMPLETE SEPARATE SET OF PRINTS OF CONTRACT DRAWINGS AT THE JOB SITE. RECORD WORK COMPLETED AND ALL CHANGES FROM ORIGINAL CONTRACT DRAWINGS CLEARLY AND ACCURATELY, INCLUDING WORK INSTALLED AS A MODIFICATION OR ADDITION TO THE ORIGINAL DESIGN. RECORD VALVE TAGS AS THEY ARE INSTALLED. FINAL SUBMISSION OF REPRODUCIBLE AS-BUILT DRAWINGS ARE TO BE SIGNED AND CERTIFIED BY INSTALLING CONTRACTOR CONFIRMING THE AS-BUILT CONDITION OF THE WORK. AS-BUILT SHOP DRAWINGS SHALL BE SUBMITTED IN DRAWING AND ELECTRONIC FORMAT (AUTOCAD 2007 MINIMUM).

# PART 2- PRODUCT/APPLICATION

- 2.01 DISCHARGE AIR PLENUM A. PROVIDE A NEW DISCHARGE AIR PLENUM TO CONNECT THE NEW GENERATOR RADIATOR DISCHARGE SIDE TO THE OUTDOOR EXHAUST LOUVER WITH ASSOCIATED SERVICE ACCESS DOORS AND SUPPORTS AND PERFORM LEAK TEST PER LATEST SMACNA STANDARDS AND NFPA 37 REQUIREMENTS. ALL DISCHARGE AIR PLENUM JOINTS SHALL BE SEALED AIRTIGHT WITH APPROVED DUCT SEALANT, SIMILAR TO 3M-900, OR BETTER.
- B. CONTRACTOR SHALL ADHERE TO THE FULL INSIDE CROSS SECTIONAL DISCHARGE AIR PLENUM AREAS SHOWN ON THE DRAWINGS AND PROVIDE ALL TRANSITIONS AS REQUIRED TO MEET FIELD CONDITIONS, ACCOMMODATE EQUIPMENT MAINTENANCE REQUIREMENTS AND COORDINATE WITH ALL TRADES. ALL FIELD CONDITIONS WHICH REQUIRE MODIFIED TRANSITIONS SHALL NOT BE APPROVED WITHOUT PRIOR ENGINEERING REVIEW AND APPROVAL THROUGH SHOP DRAWING SUBMITTAL OR RFI.
- C. NEW DISCHARGE AIR PLENUM SHALL MEET PRESSURE CLASSIFICATION, SEALING REQUIREMENTS AND LEAKAGE TESTING AS LISTED BELOW UNLESS OTHERWISE SPECIFIED OR SHOWN ON THE DRAWINGS:
- 1. 4" CLASS: ALL AIR PLENUMS FROM DISCHARGE OF GFNERATOR'S RADIATOR TO OUTDOOR EXHAUST LOUVERS. SEAL CLASS A, LEAKAGE CLASS 6. PROVIDE TDF FLANGE CONNECTIONS FOR ALL SYSTEM 4" PRESSURE CLASS AND ABOVE.

# F. MATERIALS:

CEMENTED SEAMS.

- 1. SHEETMETAL: HOT-DIPPED GALVANIZED SHEETMETAL WITH G90 COMMERCIAL COATING ACCORDING TO ASTM A653 & A924 FOR ALL DUCTWORK UNLESS OTHERWISE SPECIFIED. 2. FLEXIBLE CONNECTIONS AT FANS SHALL BE NEOPRENE COATED, FLAME RETARDANT GLASS FABRIC (COMPLYING WITH NFPA 90), 30 OZ./SQ, YD. WITH SEWED AND
- G. MOTORIZED DAMPERS LOCATED IN OUTDOOR AIR INTAKES OR EXPOSED TO MOISTURE SHALL CONFORM TO THE FOLLOWING: 1. EXTRUDED ALUMINUM DAMPER FRAME SHALL NOT BE LESS THAN 0.080" (2.03 MM) IN THICKNESS. DAMPER FRAME SHALL BE MIN. 4", WITH DUCT MOUNTING FLANGES ON BOTH SIDES OF FRAME. DAMPER FRAME SHALL HAVE A MIN. 2" (50.8 MM) MOUNTING FLANGE ON THE REAR OF

- THE DAMPER, WHEN INSTALLED AS EXTENDED REAR FLANGE INSTALL TYPE. FRAME TO BE ASSEMBLED USING ZINC-PLATED STEEL MOUNTING FASTENERS. WELDED FRAMES SHALL NOT BE ACCEPTABLE.
- 2. BLADES SHALL BE MAXIMUM 6.4" DEEP EXTRUDED ALUMINUM AIR-FOIL PROFILES WITH A MINIMUM WALL THICKNESS OF 0.06". ALL BLADES SHALL BE SYMMETRICALLY PIVOTED.
- 3. BLADE SEALS SHALL BE EXTRUDED EPDM, SECURED IN AN INTEGRAL SLOT WITHIN THE ALUMINUM BLADE EXTRUSIONS AND SHALL BE MECHANICALLY FASTENED TO PREVENT SHRINKAGE AND MOVEMENT OVER THE LIFE OF THE DAMPER. ADHESIVE OR CLIP-ON TYPE BLADE SEALS WILL NOT BE APPROVED.
- 4. FRAME SEALS SHALL BE EXTRUDED SILICONE, SECURED IN AN INTEGRAL SLOT WITHIN THE ALUMINUM FRAME EXTRUSIONS AND SHALL BE MECHANICALLY FASTENED TO PREVENT SHRINKAGE AND MOVEMENT OVER THE LIFE OF THE DAMPER. METALLIC COMPRESSION TYPE JAMB SEALS WILL NOT BE APPROVED.
- 5. LINKAGE HARDWARE SHALL BE CORROSION-RESISTANT ZINC-PLATED STEEL, INSTALLED TO BE EASILY ACCESSIBLE AFTER INSTALLATION
- REFER TO MECHANICAL EQUIPMENT SCHEDULES FOR THE PROPOSED MOTORIZED DAMPER MANUFACTURER AND MODEL NUMBER SELECTIONS AND FOR ADDITIONAL INFORMATION.

- PROVIDE PIPING WHICH IS SCHEMATICALLY INDICATED AND SIZED ON DRAWINGS. PIPING TO BE INSTALLED TO MEET SPECIFIED HEADROOM OR FIELD CONDITIONS AND SHALL CONFORM TO LATEST ASME CODES FOR FUEL OIL PIPING. PIPE MATERIALS AND FITTING MATERIALS SHALL BE AS PER THE PIPE AND FITTING SCHEDULES SHOWN ON DRAWINGS. ALL NEW INDOOR FUEL PIPING INSTALLATIONS SHALL COMPLY WITH NFPA 37 REQUIREMENTS.
- B. PIPING, FITTINGS, AND ALL PIPE APPURTENANCES SHALL BE SUITABLE FOR THE PRESSURE AND TEMPERATURE OF
- C. PROVIDE DIELECTRIC FITTINGS TO CONNECT DIFFERENT PIPING MATERIALS.
- D. PROVIDE AIR VENTS WITH CAPS AT EACH HIGH POINT AND DRAIN VALVES WITH CAPS AT EACH LOW POINT TO ALLOW FOR FUEL LINES PRIMING AND DRAINING.
- E. SUPPORT PIPING WITH HANGERS EQUIPPED WITH INSULATION SADDLES FROM APPROVED CONCRETE INSERTS, EXPANSION SHIELDS, BEAM CLAMPS, AND/OR SUPPLEMENTARY STEEL ANGLES, PLATES, AND CHANNELS. CONTRACTOR SHALL SUBMIT METHOD OF PIPING SUPPORT SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER FOR REVIEW.
- F. UNIONS WITH REMOVABLE SECTIONS OF PIPING SHALL BE INSTALLED AT ALL EQUIPMENT TO PERMIT EASE OF DISCONNECTION FOR EQUIPMENT SERVICE/REMOVALS WITHOUT DISMANTLING OF MAJOR PORTIONS OF CONNECTED PIPING. G. ALL PIPE SLEEVES SHALL BE SCHEDULE 40 GALVANIZED
- STEEL. ANNULUS BETWEEN PIPE OR PIPE INSULATION AND SLEEVE SHALL BE CAULKED WITH A NON-COMBUSTIBLE MATERIAL TO WITHIN 1/4" OF WALL FACES AND FILLED WITH 2.04 INSULATION REQUIREMENTS CAULKING COMPOUND FOR INTERIOR SLEEVES. EXTERIOR SLEEVES OR WATERPROOF SLEEVES SHALL UTILIZE LINK SEAL (LS) TYPE TO FILL THE ANNULUS.
- H. PROVIDE SECURELY FASTENED LABELING OF ALL PIPING (BOTH EXPOSED AND CONCEALED) IN ACCORDANCE WITH ANSL STANDARDS AND COLOR—CODED AS PER BUILDING MANAGEMENT STANDARDS. LABELING SHOULD BE PROVIDED 20 FEET ON CENTERS AND/OR AT LEAST ONCE IN EACH ENCLOSED SPACE OR ROOM WHERE THE WALLS EXTEND ABOVE THE CEILING.
- I. ALL PIPING SHALL COMPLY WITH THE CURRENT INTERNATIONAL MECHANICAL CODE AND THE PROVISIONS OF THE FOLLOWING:
- 1. ASME B 31.9 "BUILDING SERVICES PIPING" FOR MATERIALS, PRODUCTS AND INSTALLATION. SAFETY VALVES AND PRESSURE VALVES SHALL BEAR THE APPROPRIATE ASME
- 2. ASME "BOILER AND PRESSURE VESSEL CODE", SECTION IX, "WELDING AND BRAZING QUALIFICATION" FOR QUALIFICATIONS FOR WELDING PROCESSES AND OPERATORS.

# J. FUEL OIL PIPING:

- 1. FUEL OIL SUPPLY & RETURN PIPING 3" AND SMALLER TO BE SCHEDULE 40, ASTM A539, BLACK STEEL, THREADED
- 2. FUEL OIL PIPING FITTINGS 3" AND SMALLER TO BE 150# MALLEABLE IRON, THREADED ENDS W/1 BEAD OF WELD TO
- 3. FUEL OIL UNIONS 2-1/2" AND SMALLER TO BE 150#
- MALLEABLE IRON GROUND JOINTS, THREADED. 4. DIELECTRIC UNIONS TO BE THREADED AND CONNECTIONS TO SUIT APPLICATION. UNIONS SHALL BE CONSTRUCTED TO ISOLATE DISSIMILAR METALS, PREVENT GALVANIC ACTION, AND PREVENT CORROSION.
- 5. FUEL OIL PIPING ROUTED OVER AREAS NOT PROTECTED BY FUEL SPILL CONTAINMENT INSTALLATIONS SHALL BE PROTECTED BE A SECONDARY SHELL (DOUBLE WALL PIPING) CAPABLE OF CONTAINING THE LEAKING FUEL. THE SECONDARY SHELL SHALL BE CONSTRUCTED AND INSTALLED TO ALLOW FOR CONTROLLED REMOVAL OF THE COLLECTED FUEL OIL.

# K. PROVIDE VALVE TAGS AND CHARTS:

- 1. EACH VALVE SHALL HAVE A 2 INCH DIAMETER BRASS TAG WITH 1-INCH-HIGH NUMERAL STAMPED THEREON, SECURED TO THE VALVE BY MEANS OF BRASS S HOOK OR BRASS CHAIN. EACH SYSTEM TO HAVE A LETTER DESIGNATION INDICATING SERVICE.
- 2. THE CONTRACTOR SHALL FURNISH AN APPROVED NEATLY DRAWN VALVE CHART. PROPERLY FRAMED. SHOWING THE USE AND LOCATION OF EACH VALVE THAT IS TAGGED.

# M. VALVES AND STRAINERS:

1. VALVES. STRAINERS. ETC., SHALL NOT CONTAIN ASBESTOS AND HAVE THE NAME OF THE MANUFACTURER AND GUARANTEED WORKING PRESSURE CAST OR STAMPED ON BODIES. VALVES OF SIMILAR TYPE SHALL BE BY A SINGLE MANUFACTURER. ALL VALVES AND FIXTURES SHALL BE FIRE-TESTED TO MEET AMERICAN PETROLEUM INSTITUTE (API) STANDARDS 607 & 608, 4-TH EDITION, AND ASME STANDARD B16.34.

- 2. VALVES SHALL HAVE WORKING PRESSURE AND TEMPERATURE RATINGS SAME AS PIPE FITTINGS SPECIFIED FOR THE SERVICE. REGARDLESS OF SERVICE, VALVES SHALL NOT BE DESIGNED FOR LESS THAN 125 PSI WORKING PRESSURE.
- 3. GATE VALVES THROUGH 2-1/2" SHALL BE BRONZE BODY AND TRIM, NON-RISING STEM, INSIDE SCREW, SCREWED BONNET, SOLID WEDGE, BACK SEATING, SCREWED OR SOLDERED ENDS AS MANUFACTURED BY CRANE. JENKINS, NIBCO, MORRISON BROS OR APPROVED EQUAL
- 4. BALL VALVES THROUGH 2-1/2" SHALL BE BRONZE BODY, SILICONE BRONZE BALL, STEEL HANDLE, TEFLON PACKING. SCREWED OR SWEAT ENDS. 1251B. WSP. 400# WOG, AS MANUFACTURED BY MILWAUKEE, APOLLO, WATTS,
- NIBCO, MORRISON BROS OR APPROVED EQUAL 5. RELIEF VALVES - PROVIDE OVER PRESSURE RELIEF VALVE AS AN INTEGRAL PART OF THE FUEL PUMP ASSEMBLY. RELIEF VALVES AS MANUFACTURED BY MORRISON BROS OR APPROVED EQUAL
- 6. STRAINERS THREADED CAST STEEL FOR 150 PSIG WORKING PRESSURE, Y-PATTERN WITH 1/32 INCH STAINLESS STEEL PERFORATED SCREEN, AS
- MANUFACTURED BY MORRISON BROS OR APPROVED EQUAL 7. EMERGENCY ISOLATION VALVES - THREADED CAST STEEL FOR 150 PSIG WORKING PRESSURE, AS MANUFACTURED BY MORRISON BROS OR APPROVED EQUAL.

## P. PIPING TESTING

- 1. PNEUMATICALLY TEST TANKS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UPON ARRIVAL AT THE PROJECT SITE AND AFTER TANK INSTALLATION TO ASSURE TANK INTEGRITY.
- 2. SUBJECT PIPING SYSTEM TO 1.5 TIMES THE MAX. WORKING PRESSURE FOR MIN. 2 HOURS, THE TEST PRESSURE SHALL NOT EXCEED THE MAXIMUM PRESSURE FOR ANY COMPONENT IN THE SYSTEM UNDER THE TEST. INSPECT THE SYSTEM AND TIGHTEN. REPAIR. OR REPLACE LEAKING COMPONENTS AS NECESSARY, REPEAT TEST UNTIL THERE ARE NO MORE LEAKS. FLUSH SYSTEM THOROUGHLY WITH DIESEL FUEL UNTIL ALL MOISTURE OR DEBRIS IS REMOVED AND DIESEL IS CLEAR. FILL SYSTEM WITH CLEAN DIESEL FUEL, CLOSE END VALVES AND ALLOW SYSTEM TO REMAIN FILLED. LEGALLY DISPOSE OF FLUSH DIESEL.
- 3. SECONDARY CONTAINMENT PIPING TEST SEAL SECONDARY CONTAINMENT PIPING TO PRIMARY PIPING AT BOTH ENDS WITH CONCENTRIC TERMINATION FITTINGS AS RECOMMENDED BY THE MANUFACTURER. PROVIDE TEST GAUGE AND PIPE CONNECTION AT THIS POINT FOR PNEUMATIC TESTING. PNEUMATICALLY TEST SYSTEM AT 15 PSI FOR TEN (10) MINUTES, THEN SOAP ALL JOINTS AND CHECK FOR LEAKS. RETEST UNTIL THERE ARE NO LEAKS AND SYSTEM IS PROVEN TIGHT
- 4. NO TESTING SHALL BE CONDUCTED UNTIL PIPE CLEANING AND PRETREATMENT HAS BEEN COMPLETED AND RECORDED
- 5. ALL TESTING SHALL BE COORDINATED BY THE CONTRACTOR AND SHALL BE WITNESSED BY A BUILDING OWNER'S REPRESENTATIVE. ALL SYSTEMS WHICH FAIL THE PRESSURE TESTS SHALL BE FIXED AND RETESTED AT NO EXPENSE TO
- 6. ISOLATE ALL EQUIPMENT WHICH IS TO BE EXCLUDED FROM THE PRESSURE TEST AND PROVIDE ALL TEMPORARY PIPING CONNECTIONS, FITTINGS, VALVES, EQUIPMENT, LABOR, ETC., TO PRESSURE TEST ALL SYSTEMS.

- Q. INSULATION SHALL BE APPLIED TO EXHAUST PIPING AND SILENCER CONSTRUCTED OF MATERIALS AS SPECIFIED HEREIN. INSULATION SHALL HAVE A FLAME SPREAD RATING NOT EXCEEDING 25 AND A SMOKE DEVELOPED INDEX OF 50 OR LESS AND SHALL MEET THE REQUIREMENTS OF ASTM,
- R. WHERE INSULATION IS SPECIFIED FOR PIPING, INSULATE SIMILARLY ALL CONNECTIONS, FLANGES AND FITTINGS AND OTHER PARTS OF THE SYSTEM PREVENT EXCESSIVE HEAT DISSIPATION TO SPACE.
- S. ALL EQUIPMENT, FITTINGS, DEVICES, ETC REQUIRING SERVICING OR INSPECTION SHALL HAVE REMOVABLE INSULATION WHICH CAN BE REPLACED WITHOUT DAMAGE.
- T. ALL LEAK AND PRESSURE TESTS SHALL BE COMPLETED
- PRIOR TO THE INSTALLATION OF ANY INSULATION. U. EXHAUST PIPE INSULATION:
- 1. INSULATION SHALL BE COMPOSED OF 100% TYPE "E" GLASS FIBERS NEEDLED TOGETHER INTO MAT FORM, ENCAPSULATED WITH 304 SS MESH AND COVERED WITH 32 OZ/SG. YD SILICONE FABRIC. IT SHALL BE NON-RESPIRABLE, INCOMBUSTIBLE, ASBESTOS FREE AND SHALL CONTAIN NO RESINOUS OR INORGANIC BINDERS. INSULATION MATERIAL SHALL CONFORM TO ASTM E84, RATED FOR 1200°F TEMPERATURE AND MIN. 2" THICKNESS WITH THERMAL CONDUCTIVITY "K" FACTOR OF 0.60 BTU/INCH/HR./FT2/F AT 700F. INSULATION TO BE PROVIDED WITH REINFORCED FOIL FACED, FLAME RESISTANT, ALUMINUM METAL BARRIER. ALL INSULATION SHALL BE SECURED AND SEAMS SEALED BY TWO-INCH SEALING LIP WITH ADHESIVE AND FASTENED WITH 16 GAUGE RUST RESISTANT WIRE OR FIBERGLASS CORD ON 12" CENTERS. ON VESSELS OVER 24" WIDE, WELDED PINS AND CLIPS SHALL BE USED ON THE UNDERSIDE FOR FASTENING INSULATION. THE INSULATION SHALL LIMIT THE SURFACE TEMPERATURE TO APPROXIMATELY 400°F.
- F. CONNECTIONS: TACKS; TEMPERATURE RESISTANT COLOR MATCHING TAPE.
- G. INSTALLATION, EXAMINATION AND PREPARATION:
- THE SPECIFICATIONS BEFORE APPLYING COVERING MATERIALS. - VERIFY THAT ALL SURFACES ARE CLEAN, DRY AND FREE OF FOREIGN MATERIAL.
- INSTALL MATERIALS IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS, BUILDING CODES AND INDUSTRY STANDARDS. - LOCATE COVER SEAMS IN LEAST VISIBLE LOCATIONS.

- VERIFY THAT ALL PIPING HAS BEEN LEAK TESTED PER

AND INTERRUPTIONS. - FOR PIPES (OTHER THAN EXHAUST) EXPOSED TO ABUSE IN FINISHED SPACES OR EXPOSED TO OUTDOOR SUN AND WIND ACTION, PROVIDE JOHNS MANVILLE ZESTON 2000 PVC JACKET AND FITTING COVERS OR ALUMINUM JACKET. JACKET SEAMS SHALL BE LOCATED ON SIDE OF FITTINGS AND HORIZONTAL PIPE RUNS.

NEATLY FINISH INSULATION AT SUPPORTS, PROTRUSIONS,

# 2.05 SEISMIC RESTRAINTS

A. GENERAL: ALL EQUIPMENT, AND PIPING SHALL BE ADEQUATELY RESTRAINED TO RESIST SEISMIC FORCES. THIS SPECIFICATION IS IN ADDITION TO THE SPECIFIED VIBRATION

ISOLATION FOR THIS PROJECT. RESTRAINT DEVICES SHALL BE DESIGNED AND SELECTED TO MEET SEISMIC REQUIREMENTS AS DEFINED IN THE LATEST ISSUE OF THE STATE AND LOCAL CODE HAVING JURISDICTION.

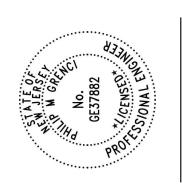
- B. SEISMIC-RESTRAINT PERFORMANCE CRITERIA:
  - PIPING 1" IN DIAMETER EXPOSED IN GENERATOR ROOMS DO NOT REQUIRE SEISMIC RESTRAINT. - PIPING 2 1/2" AND LESS IN ALL OTHER AREAS DO NOT
  - REQUIRE SEISMIC RESTRAINT. - PIPING WITH HANGERS LESS THAN 12" LONG DO NOT REQUIRE SEISMIC RESTRAINT.
- 2. NON-STANDARD PIPING: ALL OTHER PIPING, OTHER THAN LISTED ABOVE REQUIRES SEISMIC RESTRAINT TO BE SELECTED BASED ON THE FOLLOWING REQUIREMENTS: - COMPONENT SEISMIC COEFFICIENT: 0.67.
- PERFORMANCE CRITERIA FACTOR: 1.0. ATTACHED AMPLIFICATION FACTOR: 1.0. - WC = WEIGHT DISTRIBUTED TO EACH HANGER.

### 2.06 VIBRATION ISOLATION SYSTEMS

- A. ALL ROTATING, REVOLVING OR RECIPROCATING EQUIPMENT, INCLUDING PIPING CONNECTIONS TO THIS EQUIPMENT SHALL BE ACOUSTICALLY ISOLATED TO PREVENT THE TRANSMISSION OF OBJECTIONABLE NOISES, SOUND OR VIBRATIONS TO THE OCCUPIED SPACES AND TO THE BUILDING STRUCTURES. ALL VIBRATION ISOLATION PRODUCTS SHALL BE SPECIFICALLY DESIGNED FOR THEIR INTENDED USE.
- B. STATIC DEFLECTION OF ISOLATORS SHALL BE A MINIMUM OF 90% EFFICIENT.
- C. MANUFACTURER OF VIBRATION ISOLATION EQUIPMENT SHALL DETERMINE VIBRATION ISOLATOR SIZES AND LOCATIONS, PROVIDE SUITABLE PIPING AND EQUIPMENT VIBRATION ISOLATION SYSTEMS, GUARANTEE SPECIFIED ISOLATION SYSTEM ATTENUATION AND DEFLECTION, AND PROVIDE INSTALLATION INSTRUCTIONS, DRAWINGS AND FIELD SUPERVISION TO ASSURE PROPER INSTALLATION AND PERFORMANCE

## D. MOUNTING TYPES:

- 1. FLOOR SUPPORTED PIPING ISOLATORS (TYPE SLR). 2. VERTICAL RISER PIPING ANCHOR AND GUIDES (TYPE ADA).
- 3. CEILING SUPPORTED PIPING ISOLATORS (TYPE 30N). E. PROVIDE FLEXIBLE CONNECTIONS BETWEEN FAN OUTLET AND DISCHARGE AIR PLENUM INLET AS PER AIR PLENUM
- SPECIFICATION SECTION. F. FLEXIBLE HOSE CONNECTORS SHALL BE INSTALLED AT INLET AND DISCHARGE CONNECTIONS TO ALL POWERED EQUIPMENT.
- G. SPRING TYPE 30N HANGERS SHALL BE PROVIDED FOR PIPING FOR A DISTANCE OF 50 FEET OR 50 PIPE DIAMETERS, WHICHEVER IS GREATER, UP AND DOWNSTREAM OF ALL POWER-DRIVEN EQUIPMENT. THE HANGER SHALL PROVIDE 1" OF STATIC DEFLECTION FOR PIPES 4" OF OUTSIDE DIAMETER AND LARGER AND 1/2" STATIC DEFLECTION FOR PIPES SMALLER THAN 4" w/ OUTSIDE
- H. VIBRATION ISOLATORS FOR FLOOR OR CEILING SUPPORTED EQUIPMENT SHALL HAVE A MAXIMUM LATERAL MOTION UNDER EQUIPMENT START-UP OR SHUT-DOWN CONDITIONS OF 1/4" AND MOTIONS IN EXCESS SHALL BE RESTRAINED BY SPRING TYPE MOUNTINGS.
- I. VIBRATION ISOLATOR SHALL BE PROVIDED BY MASON INDUSTRIES, VIBRATION ELIMINATOR CO., CONSOLIDATED KINETICS CO., OR APPROVED EQUAL



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