



NEW HAVEN PUBLIC SCHOOLS

## Operations Memorandum

**To:** New Haven Board of Education Finance and Operations Committee  
**From:** Frank Fanelli, Director of Project Management  
**Date:** September 25, 2023  
**Re:** Award of Contract 21890 to Tucker Mechanical to remodel the Beecher School Air Cooled Chiller Unit.

**Answer all questions** and have a representative ready to present the details of each question during the Finance & Operations meeting or this proposal may not be advanced for consideration by the full Board of Education.

Company Information	
Vendor Name:	Tucker Mechanical
Doing Business as: (DBA)	
Vendor Address:	795 Brook Street, Rocky Hill CT 06067
Vendor Contact Name:	
Vendor Contact Email:	
Is the contractor a minority or women owned small business?	
Agreement/Contract Information	
New or Renewal Agreement/Contract?	Contract
Effective Dates: (mm/dd/yy) <small>Multi-yr. require Board of Aldermen approval</small>	From 10/2/2023 To 06/30/2024
Total Amount: <small>If Multi-yr. include yr. to yr. breakdown</small>	\$670,456.00
Funding Source Name: Acct. #:	ARP ESSER III Carryover 2553-6399-56697-0474
Contract #: <small>(Local or State)</small>	21890



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**Key Questions:**

**1. What specific service will the contractor provide:**

Firm with significant experience to remodel the Beecher Magnet School Air-Cooled Chiller Units; located at 10 Jewell St, New Haven, CT.

**2. How was the contractor selected?** *\*Attach appropriate supporting documents*

- Quotes
- Sealed Bid # 21890
- Sole Source # \_\_\_\_\_
- RFP# \_\_\_\_\_
- State Contract #
- Exempt Professional
  - Accountant
  - Actuary
  - Appraiser
  - Architect
  - Artist
  - Dentist
  - Engineer
  - Expert Professional Consultant
  - Land Surveyor
  - Lawyer
  - Physician/Medical Doctor

**3. If the vendor was selected through Solicitation (Bid/RFQ/RFP) process; answer the following:**

**a. Please explain how the vendor was chosen?** *\*Attach Vendor Proposal*

Sealed Bid

**b. Who were the members of the selection committee?** *(Minimum 3 members required)*

N/A – Lowest Bidder



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<b>4. If this is a renewal with a current vendor, has the vendor has met all obligations under the existing agreement/contract?</b>
N/A
<b>5. If this agreement/contract is a Renewal, has the cost increase? If yes, by how much? <small>*Attach Renewal Letters</small></b>
N/A
<b>6. If this new agreement/contract, has cost for service increased from previous years? If yes, by how much?</b>
There is no previous financial comparison for project based work.
<b>7. Is this a service that existing staff could provide? Why or why not?</b>
No, this must be completed by a qualified company that has the necessary equipment and staff to perform such a large scale task.

# Specifications

## Scope of Services – Beecher Chiller

The City of New Haven Public Schools (NHPS) is soliciting proposals from qualified HVAC Contracting firms with significant experience to remodel the Beecher Magnet School Air-Cooled Chiller Units; located at 10 Jewell St, New Haven, CT. The NHPS expects to select and contract with one company to provide the services listed in the scope of work below.

Pricing to include:

All labor and materials

Travel Charges

Mileage Charges

Disposal Charges

5 Year Warranty on all labor and installations

Permits

Misc. Fees

Additionally, all licensing and insurance requirements listed in this RFP must be met. It is the goal of the NHPS to enter into an agreement with a vendor that will provide services efficiently, will accurately bill, and will provide high-quality, flexible customer service to the NHPS. The Vendor will be expected to maintain expert knowledge of this service to ensure the NHPS is receiving the highest quality service at the most affordable rates while Maintaining quality and secure technology (See attached Construction Plans). Awarded Bidder will be responsible for holding the price (Lump Sum) through the entire duration of the project.

For background on NHPS go to: <https://www.nhps.net/>

### Qualifications

Eligible vendors will be those individuals, businesses, and firms that meet the following qualifications:

Proposer must have demonstrated experience and expertise in Connecticut in the past (5) years regarding the types of or similar services as those outlined in the introduction.

Proposers must have a proven track record in providing these types of services for similarly sized municipal governments, preferably in Connecticut.

Proposer must be familiar with, qualified, and properly licensed in the State of Connecticut to perform its obligation under this proposal in compliance with all applicable Federal and State of Connecticut laws and regulations, statutes, and policies.

### Expectations

Vendor is expected to provide industry standard or higher quality services while maintaining a focus on providing a cost-effective service to the NHPS.

Vendor is expected to provide the highest quality customer service to the NHPS, not limited to, but particularly in the areas of reliability and billing.

The selected Company shall work with and cooperate with the Director of Project Management. Rendering services pursuant to this RFP shall be directed to the City of New Haven Finance Department.

#### Scope of Services

This project involves replacing the existing roof-mounted air-cooled chiller with the same make & manufacturer as the existing unit i.e., York/Johnson Controls. The existing chiller is a York/Johnson Controls 260-ton air-cooled chiller.

#### Primary and Secondary Chilled Water Pump and Accessory Replacements

This project involves replacing the existing primary and secondary chilled water pumps along with associated piping, valving, accessories, and controls. The existing 15 HP Bell & Gossett Chiller pumps will be replaced with new pumps of the same capacity.

The existing 25 HP Bell & Gossett Chilled Water System pumps will be replaced with 20 HP pumps.

All the other ancillary equipment including VFDs, motor starters, expansion tanks, air separators, seismic restraints, pipes, valves, fittings, & piping specialties local to the chiller and pumps will also be replaced.

#### BMS Controls

Provide all temperature controls, low voltage control wiring, hardware, software, and accessories necessary to achieve a fully operational chilled water system. BMS controls by "Connecticut Controls Inc.". Controls will be upgraded to a new Tritium N4 control system, update graphics and controllers. The electrical contractor shall provide power wiring.

#### Notes

Electrical support work shall be included for the above-referenced upgrades. Refer to Contract document plans and specifications for details of the mechanical and electrical upgrades.





MECHANICAL (HVAC) SPECIFICATIONS

GENERAL

SCOPE

THE GENERAL SCOPE OF THE HVAC WORK IS TO REMOVE EXISTING SYSTEMS, MODIFY THE EXISTING SYSTEMS, AND PROVIDE NEW SYSTEMS AS INDICATED ON THESE DOCUMENTS

THE WORK TO BE DONE UNDER THIS DIVISION OF THE SPECIFICATIONS INCLUDES THE FURNISHING OF ALL EQUIPMENT, SUPPLIES, LABOR, SUPERVISION AND ALL MATERIALS NOT SPECIFICALLY MENTIONED BUT NECESSARY OR REQUIRED TO PROVIDE COMPLETE AND FULLY OPERATIONAL HVAC SYSTEMS. IT IS THE INTENTION OF THE SPECIFICATIONS AND DRAWINGS TO CALL FOR FINISHED WORK, TESTED AND READY FOR OPERATION.

IT IS THE INTENT THAT ALL MECHANICAL WORK AND MATERIALS NECESSARY TO COMPLETE THE ENTIRE PROJECT IN ACCORDANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS, WHETHER SPECIFICALLY MENTIONED HERE OR NOT, SHALL BE FURNISHED. ALL WORK AND MATERIALS NECESSARY TO FULFILL THIS INTENT SHALL BE SUPPLIED UNDER THE MECHANICAL SPECIFICATIONS WITHOUT ADDITIONAL COST TO THE OWNER.

DEFINITIONS

'FURNISH' OR 'PROVIDE' - TO FURNISH, ERECT, INSTALL AND CONNECT UP COMPLETE AND READY FOR OPERATION PARTICULAR WORK REFERRED TO, UNLESS SPECIFICALLY INDICATED OR SPECIFIED OTHERWISE.

'WORK' - LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND ALL OTHER ITEMS CUSTOMARILY FURNISHED AND/OR REQUIRED FOR PROPER AND COMPLETE INSTALLATION OF WORK.

'EXPOSED' - NOT INSTALLED UNDERGROUND OR 'CONCEALED' AS DEFINED ABOVE.

'INDICATE' OR 'SHOW' - AS INDICATED OR SHOWN ON DRAWINGS OR SPECIFIED WITH SPECIFICATIONS.

'PIPING' - PIPE, FITTINGS, FLANGES, VALVES, CONTROLS, HANGERS, TRAPS, DRAINS, INSULATION AND ITEMS CUSTOMARILY OR REQUIRED IN CONNECTION WITH OR RELATING TO SUCH PIPING.

'SUPPLY' - TO PURCHASE, PRODUCE, ACQUIRE AND DELIVER COMPLETE WITH ALL RELATED ITEMS.

'INSTALL' - TO ERECT, MOUNT AND CONNECT UP COMPLETE WITH ALL RELATED ACCESSORIES.

'NOTED' - AS INDICATED ON DRAWINGS AND/OR SPECIFIED.

CODES, RULES, PERMITS AND FEES

THIS CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES, OBTAIN ALL PERMITS AND PAY ALL STATE AND LOCAL TAXES, FEES AND OTHER COSTS IN CONNECTION WITH HIS WORK; FILE ALL NECESSARY PLANS, PREPARE ALL DOCUMENTS AND OBTAIN ALL NECESSARY APPROVALS OF ALL STATE AND LOCAL DEPARTMENTS HAVING JURISDICTION; OBTAIN ALL REQUIRED CERTIFICATES OF INSPECTION FOR HIS WORK AND DELIVERY OF SAME TO THE OWNER BEFORE REQUEST FOR ACCEPTANCE AND FINAL PAYMENT FOR THE WORK.

THIS CONTRACTOR SHALL INCLUDE IN THE WORK, WITHOUT EXTRA COST TO THE OWNER, ANY LABOR, MATERIALS, SERVICES, APPARATUS, DRAWINGS (IN ADDITION TO CONTRACT DRAWINGS AND DOCUMENTS), IN ORDER TO COMPLY WITH ALL APPLICABLE LAWS, ORDINANCES, RULES AND REGULATIONS WHETHER OR NOT SHOWN ON THE DRAWINGS AND/OR SPECIFIED.

THIS CONTRACTOR SHALL PERFORM AND FILE ALL TESTS IN ACCORDANCE WITH THE CURRENT REGULATIONS OF THE STATE AND LOCAL AUTHORITIES. HE SHALL FURNISH AND INSTALL SIGNS REQUIRED BY THE STATE AND LOCAL AUTHORITIES.

ALL MATERIALS FURNISHED AND ALL WORK INSTALLED SHALL COMPLY WITH THE RULES AND RECOMMENDATIONS OF THE NATIONAL BOARD OF FIRE UNDERWRITERS, WITH ALL REQUIREMENTS OF LOCAL UTILITIES COMPANIES, WITH THE RECOMMENDATIONS OF THE FIRE INSURANCE RATING ORGANIZATION HAVING JURISDICTION.

ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE CURRENT CONNECTICUT STATE BUILDING CODE, INCLUDING THE MOST CURRENTLY ADOPTED CONNECTICUT SUPPLEMENT AND APPLICABLE AMENDMENTS, STATE FIRE SAFETY CODE, NATIONAL BUILDING CODE, (INTERNATIONAL RESIDENTIAL CODE, INTERNATIONAL MECHANICAL CODE.) INTERNATIONAL PLUMBING CODE, N.F.P.A., A.D.A., U.L., NEMA, O.S.H.A. AND WITH ALL REQUIREMENTS OF ALL GOVERNMENTAL DEPARTMENTS HAVING JURISDICTION. REQUIREMENTS OF THE ABOVE SHALL TAKE PRECEDENCE OVER PLANS AND SPECIFICATIONS.

INSURANCE

THE MECHANICAL CONTRACTOR SHALL FURNISH STATUTORY COMPENSATION INSURANCE CERTIFICATES FOR PERSONAL AND PROPERTY DAMAGE DISABILITY/LIABILITY AS REQUIRED BY THE OWNER AND/OR AS HEREBEFORE DESCRIBED.

GUARANTEE AND SERVICE

THE CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE OF THE INSTALLATION. IN ADDITION, THE CONTRACTOR SHALL PROVIDE, FREE OF CHARGE, ONE YEAR'S MAINTENANCE GUARANTEE ON MAINTAINED SERVICE AND ADJUSTMENT OF ALL EQUIPMENT IN THIS CONTRACT.

ALL COMPRESSORS TO HAVE (5) FIVE YEAR EXTENDED WARRANTIES.

DRAWINGS AND INTENT

DRAWINGS ARE INTENDED AS WORKING DRAWINGS FOR GENERAL LAYOUT OF THE VARIOUS HVAC SYSTEMS. HOWEVER, LAYOUT OF EQUIPMENT, ACCESSORIES, SPECIALTIES, DUCTWORK, AND PIPING SYSTEMS ARE DIAGRAMMATICALLY UNLESS SPECIFICALLY DIMENSIONED, AND DO NOT NECESSARILY INDICATE EVERY REQUIRED PIPE, VALVE, FITTINGS, TRAP, ELBOW, TRANSITION, OFFSETS, OR SIMILAR ITEMS REQUIRED FOR A COMPLETE INSTALLATION.

ALL EXISTING CONDITIONS ARE NOT INDICATED ON THE DOCUMENTS AND THOSE SHOWN ARE APPROXIMATIONS. THE CONTRACTOR IS TO VERIFY, IN THE FIELD, ALL EXISTING CONDITIONS.

EXAMINATION OF PREMISES - SPECIAL NOTE: NO CONSIDERATION OR ALLOWANCE WILL BE GRANTED FOR FAILURE TO VISIT SITE, OR ANY ALLEGED MISUNDERSTANDING OF MATERIAL TO BE FURNISHED, OR WORK TO BE DONE; IT BEING THAT TENDER OF PROPOSAL INDICATED WITH ITS AGREEMENT TO ITEMS AND CONDITIONS REFERRED TO HEREIN OR INDICATED ON AFOREMENTIONED DRAWINGS.

MEASUREMENTS

ALL MEASUREMENTS TAKEN AT THE BUILDING SHALL TAKE PRECEDENCE OVER SCALE DIMENSIONS. EVERY PART OF THE PLANS SHALL BE FITTED TO THE ACTUAL CONDITIONS AT THE BUILDING. IF IN CONFLICT WITH SCALE DIMENSIONS, CONTACT ARCHITECT FOR CLARIFICATION.

TEMPORARY SERVICES

THE HVAC CONTRACTOR IS TO COORDINATE WITH THE GENERAL CONTRACTOR, PRIOR TO PERFORMING WORK REQUIRING INTERRUPTION OF EXISTING SERVICES. THE CONTRACTOR SHALL SECURE FROM THE OWNER, APPROVAL OF THE PROPOSED OPERATION.

WORK SHALL BE ARRANGED FOR CONTINUOUS PERFORMANCE WHENEVER POSSIBLE. THE MECHANICAL CONTRACTOR SHALL PROVIDE TEMPORARY SERVICES AND/OR CONNECTIONS WHERE REQUIRED AND/OR SCHEDULE AND PERFORM OVERTIME WORK FOR ANY OPERATION WHICH REQUIRED SHUTDOWN OF THE FACILITIES AT NO ADDITIONAL COST TO THE OWNER.

THE AREA OF CONSTRUCTION AND/OR ADJACENT SPACES MAY BE OCCUPIED DURING THE CONSTRUCTION PERIOD. THE CONTRACTOR IS TO TAKE ALL NECESSARY MEASURES AND PROVIDE ALL MATERIALS TO ENSURE A SAFE ENVIRONMENT FOR THE FACILITY'S OCCUPANTS.

CONTINUITY OF EXISTING SYSTEMS

WHEREVER AN EXISTING SYSTEM IS REMOVED, PARTIALLY REMOVED, OR MODIFIED THE REMAINING SYSTEM IS TO FUNCTION FULLY AS BEFORE.

MAINTAIN CONTINUITY OF THE EXISTING AIR SYSTEMS, HYDRONIC SYSTEMS, AND CONTROL SYSTEMS TO THE AREAS NOT AFFECTED BY THIS ALTERATION.

SCAFFOLDING, RIGGING AND HOISTING

UNLESS OTHERWISE SPECIFIED, CONTRACTOR SHALL FURNISH ALL SCAFFOLDING, RIGGING, HOISTING AND SERVICES NECESSARY FOR ERECTION AND DELIVERY INTO THE PREMISES OF ANY EQUIPMENT AND APPARATUS FURNISHED.

THE CONTRACTOR SHALL REMOVE SAME FROM PREMISES WHEN NO LONGER REQUIRED.

HOUSEKEEPING

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING STOCK OF MATERIALS AND EQUIPMENT STORED ON PREMISES, AT LOCATIONS DESIGNATED FOR SUCH USE, IN A NEAT AND ORDERLY MANNER.

THIS CONTRACTOR SHALL AT ALL TIMES, KEEP THE PREMISES FREE FROM ACCUMULATION OF WASTE MATERIAL OR RUBBISH CAUSED BY HIS EMPLOYEES AT WORK. HE SHALL REMOVE HIS RUBBISH AND SURPLUS MATERIALS FROM THE JOB SITE AT THE END OF EACH WORK DAY AND SHALL LEAVE THE PREMISES AND HIS WORK IN A CLEAN AND ORDERLY CONDITION.

ALL MATERIAL SCHEDULED FOR REMOVAL IS TO BE DISPOSED OF IN A MANNER MEETING ALL FEDERAL, STATE, AND LOCAL REGULATIONS.

PROTECTION OF MATERIALS AND EQUIPMENTS

CLOSE PIPE OPENINGS WITH CAPS OR PLUGS DURING INSTALLATION.

PROVIDE TEMPORARY CLOSURES ON OPEN ENDED DUCTS DURING CONSTRUCTION PERIOD.

TIGHTLY COVER AND PROTECT FIXTURES AND EQUIPMENT AGAINST DIRT, WATER AND CHEMICAL OR MECHANICAL INJURY.

AT COMPLETION OF ALL WORK, FIXTURES, EXPOSED MATERIALS AND EQUIPMENT SHALL BE THOROUGHLY CLEANED.

WORK NOT INCLUDED

- ALL ELECTRICAL WORK
CUTTING AND PATCHING
LINTELS AND STRUCTURAL FRAMING
ALL CONCRETE WORK
ALL PAINTING

THIS CONTRACTOR SHALL FURNISH THE GENERAL CONTRACTOR WITH THE SIZES AND LOCATIONS OF CHASES AND OPENINGS WHICH OCCUR IN WALLS, PARTITIONS, FLOORS, ROOFS, ETC., REQUIRED FOR THE INSTALLATION OF THE WORK CALLED FOR UNDER THIS CONTRACT. THIS WORK WILL BE DONE BY THE GENERAL CONTRACTOR, EXCEPT CUTTING REQUIRED FOR THE INSTALLATION OF HANGERS.

SHOP DRAWINGS

PRIOR TO DELIVERY TO THE JOB SITE, BUT SUFFICIENTLY IN ADVANCE OF REQUIREMENTS NECESSARY TO ALLOW ENGINEER AMPLIFY TIME FOR REVIEW, CONTRACTOR SHALL SUBMIT FOR APPROVAL, FIVE (5) COPIES OF EACH SHOP DRAWING.

INDICATE ON EACH SUBMISSION:

- 1. PROJECT NAME AND LOCATION
2. ARCHITECT AND ENGINEER
3. ITEM IDENTIFICATION
4. APPROVAL STAMP OF PRIME CONTRACTOR

ALL DUCTWORK SHOP DRAWINGS AND COORDINATION DRAWINGS SHALL BE SUBMITTED ON 3/8 IN SCALE DRAWINGS AND SHALL INCLUDE LOCATIONS AND SIZES OF EXISTING EQUIPMENT ALONG WITH NEW WORK. DRAWINGS SHALL INDICATE LOCATIONS OF HANGERS, SUPPORTS, EXPANSION JOINTS, GUIDES, ANCHORS AND ANCHOR LOCATIONS.

COORDINATION DRAWINGS SHALL INDICATE ALL MEP EQUIPMENT, DUCTS AND PIPES AND PERTINENT ARCHITECTURAL ITEMS. MOUNTING HEIGHTS SHALL BE NOTED.

SUBMITTALS

PRIOR TO DELIVERY TO THE JOB SITE, BUT SUFFICIENTLY IN ADVANCE OF REQUIREMENTS NECESSARY TO ALLOW ENGINEER AMPLIFY TIME FOR REVIEW, CONTRACTOR SHALL SUBMIT FOR APPROVAL, FIVE (5) COPIES OF EACH SHOP DRAWING.

INDICATE ON EACH SUBMISSION:

- 1. PROJECT NAME AND LOCATION
2. ARCHITECT AND ENGINEER
3. ITEM IDENTIFICATION
4. APPROVAL STAMP OF PRIME CONTRACTOR

SUBMIT SUBMITTALS ON THE FOLLOWING:
1. PIPING MATERIALS
2. AIR PIPING SPECIALTIES
3. PIPING INSULATIONS
4. AIR CONDITIONING EQUIPMENT, PUMP.
5. CONTROLS
6. HYDRONIC SYSTEMS BALANCING REPORTS

EQUIPMENT DESIGNATION

THE PLANS AND/OR SPECIFICATIONS INDICATE THE NAME, MODEL NUMBER OR TYPE OF EQUIPMENT OR MATERIALS SPECIFIED TO SET THE STANDARD OF THE EQUIPMENT FOR THE PROJECT. THE ENGINEER WILL ENTERTAIN THE USE OF OTHER MANUFACTURER'S EQUIPMENT OF LIKE FUNCTIONS AND EQUAL QUALITY. FINAL ACCEPTANCE OF SUBSTITUTES IS AT THE ENGINEER'S DISCRETION. SHOULD THE BIDDER DESIRE TO USE EQUIPMENT OR MATERIALS OR A MANUFACTURER OTHER THAN THOSE SPECIFIED OR SHOWN, HE SHALL ATTACH A RIDER TO THE BID FORM LISTING THE DEDUCTIONS AND/OR ADDITIONS TO HIS BASE BID.

TOGETHER WITH THE MANUFACTURER'S NAME AND MODEL NUMBERS OF THE EQUIPMENT OR MATERIALS HE PROPOSED TO FURNISH AS "SUBSTITUTES". IF NO SUBSTITUTE INFORMATION IS FURNISHED, IT WILL BE EXPRESSLY UNDERSTOOD THAT ALL EQUIPMENT AND MATERIALS NAMED WILL BE FURNISHED IN FULL ACCORDANCE WITH THE PLANS AND/OR SPECIFICATIONS.

RECORD DRAWINGS

CONTRACTOR SHALL KEEP ACCURATE RECORD OF ALL DEVIATIONS IN WORK AS ACTUALLY INSTALLED FROM WORK INDICATED PAYING PARTICULAR ATTENTION TO DIMENSIONING OUTSIDE UNDERGROUND UTILITY LINES, THEIR OFFSETS AND VALVES.

AT THE CLOSE-OUT OF THE PROJECT THE CONTRACTOR IS TO DELIVER TO THE OWNER TWO SETS OF "AS-BUILT" DRAWINGS COPIES OF ALL APPROVED SHOP DRAWINGS.

OWNER'S INSTRUCTIONS AND SYSTEM OPERATION

THE CONTRACTOR IS TO INSTRUCT THE OWNER, OR HIS REPRESENTATIVE, ON THE OPERATION AND MAINTENANCE PROCEDURES FOR ALL OF THE INSTALLED SYSTEMS AND EQUIPMENT. IN ADDITION TO THE VERBAL INSTRUCTIONS, THESE INSTRUCTIONS SHALL BE WRITTEN IN LAYMAN'S LANGUAGE AND SHALL BE INSERTED IN VINYL-COVERED THREE-RING LOOSE LEAF BINDER. THIS INFORMATION IN BINDER SHALL BE FIRST SENT TO AND APPROVED BY THE ARCHITECT/ENGINEER BEFORE TURNING OVER TO OWNER.

INSTALLATIONS

SLEEVES

THE HVAC CONTRACTOR NO. 22 GA. GALVANIZED IRON SLEEVES EXTENDED THROUGH CONSTRUCTION AT ALL PENETRATIONS THROUGH CEILINGS, WALLS AND PARTITIONS.

FOR INSULATED PIPING THE SLEEVE IS TO BE SIZED TO ALLOW INSULATION TO PASS THROUGH SLEEVE. PROVIDE 1/2 INCH SPACE BETWEEN PIPE AND/OR INSULATION AND SLEEVE.

FIRE SEAL ALL SLEEVES IN ACCORDANCE WITH BUILDING CODE AND APPLICABLE SECTIONS OF THE NFPA.

EXPANSION ANCHORS

SUSPEND HANGERS FROM EXPANSION ANCHORS IN SOLID CONCRETE SLABS SIMILAR TO HLTI HDI. PROVIDE HANGER IN PLACE WITH DOUBLE NUTS.

PROVIDE PROTECTION SHIELDS IN INSULATED PIPING. INSTALL HANGERS OVER INSULATION AND SHIELDS.

WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING HANGER RODS IN REQUIRED LOCATIONS, PROVIDE ADDITIONAL STEEL FRAMING AS REQUIRED AND REVIEWED.

HANGERS AND SUPPORTING

PIPE HANGING AND SUPPORTING - PIPING SHALL NOT BE SUPPORTED BY OTHER PIPING, BUT SHALL BE SUPPORTED WITH PIPE HANGERS SUITABLE FOR THE SIZE OF PIPE AND PROPER STRENGTH AND QUALITY AT PROPER INTERVALS SO THAT THE PIPING CANNOT BE MOVED ACCIDENTALLY FROM THE INSTALLED POSITION OR FOLLOWS:

Table with 2 columns: PROVIDE CLEVIS HANGERS, AT CENTER OF CENTER SPACING (UNLESS OTHERWISE NOTED). Rows include 1/2 inch pipe or tubing (6 FEET), 3/4 inch or 1 inch pipe or tubing (8 FEET), 1-1/4 inch or larger (horizontal) (10 FEET), 1-1/4 inch or larger (vertical) (EVERY FLOOR LEVEL).

VIBRATION AND SEISMIC CONTROL

QUIET OPERATION - ALL WORK SHALL OPERATE UNDER ALL CONDITIONS OF LOAD WITHOUT ANY SOUND OR VIBRATION WHICH IS OBJECTIONABLE IN THE OPINION OF THE ENGINEER. IN CASE OF MOVING MACHINERY, SOUND OR VIBRATION NOTICEABLE OUTSIDE OF ROOM IN WHICH IT IS INSTALLED, OR ANNOYING INSIDE ITS OWN ROOM, WILL BE CONSIDERED OBJECTIONABLE BY THE ENGINEER AND SHALL BE REMEDIED IN APPROVED MANNER BY THE CONTRACTOR AT HIS EXPENSE.

PROVIDE FLEXIBLE PIPE CONNECTIONS AT ALL PIPING CONNECTED TO MOVING EQUIPMENT.

PROVIDE FLEXIBLE DUCT CONNECTIONS AT ALL DUCTWORK CONNECTED TO MOVING EQUIPMENT. FLEXIBLE CONNECTIONS SHALL BE 29 OZ. NEOPRENE COATED FIBERGLASS, 8" WIDE, BURNING PROPERTIES SHALL CONFORM TO NFPA 90A. FASTEN TO DUCTWORK PER MANUFACTURER'S RECOMMENDATIONS. FABRIC SHALL NOT BE STRESSED OTHER THAN BY AIR PRESSURE. ALLOW AT LEAST ONE INCH SLACK TO INSURE THAT NO VIBRATION IS TRANSMITTED.

PROVIDE VIBRATION ISOLATION SPRINGS OR PADS AT MOUNTING AND SUPPORTS FOR ALL EQUIPMENT CAPABLE OF TRANSMITTING VIBRATIONS.

SEISMIC RESTRAINTS

SEISMIC RESTRAINTS DESIGNED AND CONSTRUCTED FOR LATERAL FORCES IN ANY DIRECTION SHALL BE PROVIDED FOR ALL MECHANICAL EQUIPMENT IN ACCORDANCE WITH THE STATE BUILDING CODE.

SEISMIC RESTRAINTS SHALL NOT BE REQUIRED FOR THE FOLLOWING:

- 1. PIPING IN BOILER AND MECHANICAL ROOMS LESS THAN 1-1/4 INCH INSIDE DIAMETER.
2. ALL OTHER PIPING LESS THAN 2-1/2 INCH INSIDE DIAMETER.
3. RECTANGULAR AIR-HANDLING DUCTS LESS THAN 6 SQUARE FEET IN CROSS-SECTIONAL AREA.
4. ROUND AIR-HANDLING DUCTS LESS THAN 28 INCHES IN DIAMETER.
5. ROUND AIR-HANDLING DUCTS 12 INCHES OR LESS IN LENGTH FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE SUPPORT FOR THE HANGER.
6. DUCTS SUSPENDED BY HANGERS 12 INCHES OR LESS IN LENGTH FROM THE TOP OF THE DUCT TO THE BOTTOM OF THE SUPPORT FOR THE HANGER.

SEISMIC RESTRAINT FOR DUCTWORK; PROVIDE REQUIRED BRACING MATERIAL. DUCTWORK SHALL BE SUPPORTED AND BRACED TO RESIST ALL DIRECTIONAL (TRANSVERSE, LONGITUDINAL AND VERTICAL) FORCES EQUAL TO 10 PERCENT OF THE WEIGHT OF THE DUCT SYSTEM.

IDENTIFICATION

ALL IDENTIFICATION LABELING IS TO COMPLY WITH ASME A13.1

ALL PIPING IS TO BE LABELED WITH INDICATIONS OF SERVICE AND DIRECTION OF FLOW. ALL DUCTWORK IS TO BE LABELED WITH INDICATIONS OF SERVICE, DIRECTION OF FLOW AND ASSOCIATED SYSTEM DESIGNATION.

ALL EQUIPMENT IS TO HAVE PERMANENT LABELS INDICATING EQUIPMENT DESIGNATION.

PIPING INSTALLATION

SIZES AND APPROXIMATE LOCATION OF PIPING SYSTEMS ARE SHOWN ON THE DRAWINGS. CHECK CAREFULLY WITH THE ARCHITECTURAL DRAWINGS, DRAWINGS SHOWING WORK OF OTHER TRADES, AND EXISTING FIELD CONDITIONS TO MAKE SURE THAT THERE WILL BE NO CONFLICT BETWEEN THESE TRADES AND THE PIPING SYSTEMS. PIPES SHALL BE OFFSET AS REQUIRED TO CLEAR STRUCTURAL MEMBERS AND EXISTING FIELD CONDITIONS.

PIPING TO BE INSTALLED WITH PROPER PITCH TO LOW POINTS. PROVIDE DRAIN VALVES AT ALL LOW POINTS AND AIR VENTS AT ALL HIGH POINTS OF THE PIPING SYSTEM.

INSTALL PIPING TO ALLOW FOR PIPE EXPANSION.

MATERIALS

DISSIMILAR METALS

WHENEVER DISSIMILAR PIPING MATERIALS ARE CONNECTED THE TWO SHALL BE SEPARATED WITH AN "INSULATION" CONNECTION (DIELECTRIC) FITTING.

PIPE, VALVES & FITTINGS

TYPE BCS, BLACK CARBON STEEL
PIPE 1/8 THROUGH 10 INCHES SHALL BE SCHEDULE 40 BLACK CARBON STEEL.
CONFORMING TO ASTM A53/A53M.
PIPE 12 THROUGH 24 INCHES SHALL BE 0.375-INCH WALL BLACK CARBON STEEL, CONFORMING TO ASTM A53/A53M, TYPE E, GRADE B (ELECTRIC-RESISTANCE WELDED) OR TYPE S (SEAMLESS).
FITTINGS 2 INCHES AND UNDER SHALL BE 150-POUNDS PER SQUARE INCH, GAGE (PSIG) WORKING STEAM PRESSURE (WSP) BANNED BLACK MALLEABLE IRON SCREWED, CONFORMING TO ASTM A197/A197M AND ASME B16.3.
UNIONS 2 INCHES AND UNDER SHALL BE 250 POUNDS PER SQUARE INCH, WSP FEMALE, SCREWED, BLACK MALLEABLE IRON WITH BRASS-TO-IRON SEAT, AND GROUND JOINT, CONFORMING TO ASME B16.39.
FITTINGS 2-1/2 INCHES AND OVER SHALL BE STEEL BUTT WELD, CONFORMING TO ASTM A234/A234M AND ASME B16.9 TO MATCH PIPE WALL THICKNESS.
FLANGES 2-1/2 INCHES AND OVER SHALL BE 150-POUND FORGED-STEEL CONFORMING TO ASME B16.5, WELDING NECK TO MATCH PIPE WALL THICKNESS.

GROOVED PIPE COUPLINGS AND FITTINGS ARE AN ACCEPTABLE CONTRACTOR ALTERNATE TO WELDED AND FLANGED PIPING ONLY FOR ABOVE GROUND, INDOOR CHILLED WATER AND CONDENSER WATER PIPING LOCATED IN THE CHILLER MECHANICAL EQUIPMENT ROOM.

"GROOVED PIPE COUPLINGS AND FITTINGS."

TYPE DPR, COPPER
TYPE CPR-A, COPPER ABOVE GROUND
TUBING 2 INCHES AND UNDER SHALL BE SEAMLESS COPPER TUBING, CONFORMING TO ASTM B88, TYPE L (HARD-DRAWN FOR ALL HORIZONTAL AND ALL EXPOSED VERTICAL LINES, ANNEALED FOR CONCEALED VERTICAL LINES).
FITTINGS 2 INCHES AND UNDER SHALL BE 150-PSIG/WSP WROUGHT-COPPER SOLDER JOINT FITTINGS CONFORMING TO ASME B16.22.

PUMP HOUSING FOR ALL COUPLINGS, FABRICATED IN TWO OR MORE PARTS, OF BLACK, GALVANIZED MALLEABLE IRON CASTINGS. COUPLING GASKET SHALL BE MOLDED SYNTHETIC RUBBER, CONFORMING TO ASTM D 2000. COUPLING BOLTS SHALL BE OVAL-NECK, TRACK-HEAD TYPE, WITH HEXAGONAL HEAVY NUTS CONFORMING TO ASTM A183.
FABRICATE ALL PIPE FITTINGS USED WITH COUPLINGS OF BLACK, UNCALVANIZED MALLEABLE IRON CASTINGS. WHERE A MANUFACTURER'S STANDARD-SIZE MALLEABLE IRON FITTING PATTERN IS NOT AVAILABLE, APPROVED FABRICATED FITTINGS MAY BE USED.
FABRICATE FITTINGS FROM SCHEDULE 40 OR 0.75-INCH WALL ASTM A53/A53M, GRADE B SEAMLESS STEEL PIPE; LONG RADII SEAMLESS WELDING FITTINGS WITH WALL THICKNESS TO MATCH PIPE, CONFORMING TO ASTM A234/A234M AND ASME B16.9.

CHILLED WATER PIPING

TYPE L COPPER TUBING WITH SWEAT FITTINGS WITH 95-5 SOLDER OR STANDARD WEIGHT, SCHEDULE 40, OPEN HEARTH STEEL, NATIONAL OR EQUAL FITTINGS FOR STEEL PIPE SHALL BE AS FOLLOWS: GENERALLY, BUTT WELDING FITTINGS OVER TWO INCHES SHALL BE USED, AND EITHER SOCKET-WELD OR SCREWED FOR TWO INCHES AND UNDER. WELDING FITTINGS SHALL BE STANDARD FORGED STEEL WITH CHAMFERED ENDS. ALL BRANCHES SHALL BE WELDED WITH EITHER WELDOLETE OR TEES, OR MATCH EXISTING MATERIALS.

Table with columns: SPECIALITY, APPLICATION, TYPE, SIZE (INCHES), BODY/SEAT BODY/TRM, CONNECTION, MINIMUM RATING. Includes rows for BALL VALVE, GATE VALVE, GLOBE VALVE, BUTTERFLY VALVE, PLUG VALVE, CHECK VALVE, STRAINER, and PUMP SUCTION.

CHILLED WATER SERVICE
MAXIMUM 150F AND 150 PSIG (1/2"-10"), 125 PSIG (12"-24")
THESE ARE MINIMUM RATINGS FOR ASTM A126, CLASS B AND ASTM B1 AND G2. FOR HIGHER PRESSURES AND TEMPERATURES, ADJUST THESE RATINGS TO INCLUDE STATIC HEAD PLUS 1.1 TIMES THE DESIGN PLUS PUMP SHUTOFF HEAD PRESSURE. FOR ACTUAL MAXIMUM ALLOWABLE VALVE AND STRAINER RATINGS, REFER TO "PRESSURE TEMPERATURE RATINGS-NON-SHOCK" AND "ADJUSTED PRESSURE RATINGS" FOR COPPER TUBE, SOLDERED END VALVES (STRAINERS).
WSP = WORKING STEAM PRESSURE
WSP = WORKING STEAM PRESSURE
WSP = WATER, OIL OR GAS
CLASS = ANSI STANDARD
USE 1/8 INCH DIA. FOR PLATE HEAT EXCHANGER APPLICATION.

CHILLED WATER SUPPLY AND RETURN PIPING
CHILLED WATER PIPING INSULATION
INSULATE WITH RIGID PREFORMED FIBERGLASS WITH AP-T PLUS JACKET, SCHULLER MICRO-LOK OR EQUAL. INSULATION THICKNESS SHALL BE 1" THICK FOR BELOW 1 1/2" OR SMALLER PIPING, 1-1/2" THICK FOR 2" TO 3" PIPING AND 2" THICK FOR PIPING 4" AND LARGER. PROVIDE ZESTON COVERS ON ALL FITTINGS.

VALVES
BALL AND BUTTERFLY VALVES
BALL VALVES SHALL CONFORM TO MSS SP-72 FOR FIGURE 1A, THREE PIECE BODY AND SHALL BE RATED FOR SERVICE AT NOT LESS THAN 175 PSIG AT 200 DEGREES F. VALVE BODIES IN SIZES 2 INCHES AND SMALLER SHALL BE SCREWED-END CONNECTION-TYPE CONSTRUCTED OF CLASS A COPPER ALLOY. VALVE BODIES IN SIZES 2-1/2 INCHES AND LARGER SHALL BE FLANGED-END CONNECTION TYPE, CONSTRUCTED OF CLASS D, E, OR F MATERIAL AS REQUIRED. BALLS AND STEMS OF VALVES 2 INCHES AND SMALLER SHALL BE MANUFACTURER'S STANDARD WITH HARD CHROME PLATING FINISH. BALLS AND STEMS OF VALVES 2-1/2 INCHES AND LARGER SHALL BE MANUFACTURER'S STANDARD CLASS C CORROSION-RESISTANT STEEL ALLOY WITH HARD CHROME PLATING. BALLS OF VALVES 6 INCHES AND LARGER MAY BE CLASS D WITH 900 BRINELL HARD CHROME PLATING. VALVES SHALL BE SUITABLE FOR FLOW FROM EITHER DIRECTION AND SHALL SEAL EQUALLY TIGHT IN EITHER DIRECTION. VALVES WITH BALL SEALS HELD IN PLACE BY SPRING WASHERS ARE NOT ACCEPTABLE. ALL VALVES SHALL HAVE ADJUSTABLE PACKING GLANDS. SEATS AND SEALS SHALL BE TETRAFLUOROETHYLENE.

BUTTERFLY VALVES SHALL CONFORM TO MSS SP-67. VALVES SHALL BE WATER TYPE FOR MOUNTING BETWEEN SPECIFIED FLANGES AND SHALL BE RATED FOR 150-PSIG SHUTOFF AND NONSHOCK WORKING PRESSURE. BODIES SHALL BE CAST FERROUS METAL CONFORMING TO ASTM A126, CLASS B, AND TO ASME B16.1 FOR BODY WALL THICKNESS. SEATS AND SEALS SHALL BE OF THE RESILIENT ELASTOMER TYPE DESIGNED FOR FIELD REMOVAL AND REPLACEMENT. HIGH PERFORMANCE BUTTERFLY VALVES SHALL COMPLY WITH MSS SP-68 AND PROVIDED WITH CARBON STEEL BODY, THREADED LUG WITH REINFORCED TEFLON SEATS, STAINLESS STEEL STEM, OFFSET FROM SEAT PLANE, INSULATION STAND-OFF, AND 316 STAINLESS STEEL DISC. 17-4 STAINLESS STEEL, SEM, BIDIRECTIONAL, AND BEACON INDICATOR ON ALL ACTUATORS (MANUAL AND AUTOMATIC TYPE).

DRAIN, VENT, AND GAGE COCKS
DRAIN, VENT, AND GAGE COCKS SHALL BE T-HEAD OR LEVER HANDLE, GROUND KEY TYPE, WITH WASHER AND SCREW, CONSTRUCTED OF POLISHED ASTM B82 BRONZE, AND RATED 125-PSI WSP. END CONNECTIONS SHALL BE RATED FOR SPECIFIED SERVICE PRESSURE.
PUMP VENT COCKS, AND WHERE SPRAY CONTROL IS REQUIRED, SHALL BE UL UMBRELLA-HOOD TYPE, INSTALLED OF MANUFACTURER'S STANDARD POLISHED BRASS. COCKS SHALL BE 1/2-INCH IPS MALE, END THREADED, AND RATED AT NOT LESS THAN 125 PSI AT 225 DEGREES F.
GATE VALVES (GAV)
GATE VALVES 2 INCHES AND SMALLER SHALL CONFORM TO MSS SP-72. VALVES LOCATED IN TUNNELS, EQUIPMENT ROOMS, FACTORY-ASSEMBLED EQUIPMENT, AND WHERE INDICATED SHALL BE UNION-RING BONNET, SCREWED-END TYPE. MAKE PACKING OF NON-ASBESTOS TYPE MATERIALS. VALVES SHALL BE RISING STEM TYPE.
GATE VALVES 2-1/2 INCHES AND LARGER, SHALL BE TYPE 1, (SOLID WEDGE DISC, TAPERED SEATS, STEAM RATED); CLASS 125 (125-PSI STEAM-WORKING PRESSURE AT 353 DEGREES F SATURATION); AND 200-PSI, WOG (NONSHOCK), CONFORMING TO MSS SP-70 AND TO REQUIREMENTS SPECIFIED HEREIN. VALVES SHALL BE FLANGED, WITH BRONZE TRIM AND OUTSIDE SCREW AND YOKE (OS&Y) CONSTRUCTION. MAKE PACKING OF NON-ASBESTOS TYPE MATERIALS.

GLOBE AND ANGLE VALVES (GLV-ANG)
GLOBE AND ANGLE VALVES 2 INCHES AND SMALLER, SHALL BE 125-POUND, 125-PSI CONFORMING TO MSS SP-85 AND TO REQUIREMENTS SPECIFIED HEREIN. VALVES LOCATED IN TUNNELS, EQUIPMENT ROOMS, FACTORY-ASSEMBLED EQUIPMENT, AND WHERE INDICATED SHALL BE UNION-RING BONNET, SCREWED-END TYPE. DISC SHALL BE FREE TO SWIVEL ON THE STEM IN ALL VALVE SIZES. COMPOSITION SEATING-SURFACE DISC CONSTRUCTION MAY BE SUBSTITUTED FOR ALL METAL-DISC CONSTRUCTION. MAKE PACKING OF NON-ASBESTOS TYPE MATERIALS. DISK AND PACKING SHALL BE SUITABLE FOR PIPE SERVICE INSTALLED.
GLOBE AND ANGLE VALVES 2-1/2 INCHES AND LARGER, SHALL BE CAST IRON WITH BRONZE TRIM. VALVE BODIES SHALL BE CAST IRON CONFORMING TO ASTM A126, CLASS A, AS SPECIFIED FOR CLASS 1 VALVES UNDER MSS SP-70. VALVE ENDS SHALL BE FLANGED IN CONFORMANCE WITH ASME B16.1. VALVE CONSTRUCTION SHALL BE OUTSIDE SCREW AND YOKE (OS&Y) TYPE. MAKE PACKING OF NON-ASBESTOS TYPE MATERIALS.

STANDARD CHECK VALVES (SCV)
STANDARD CHECK VALVES IN SIZES 2 INCHES AND SMALLER SHALL BE 125-PSI SWING CHECK CONFORMING TO MSS SP-71, EXCEPT AS OTHERWISE SPECIFIED. PROVIDE LIFT CHECKS WHERE INDICATED. SWING-CHECK PINS SHALL BE NONFERROUS AND SUITABLY HARD FOR THE SERVICE. DISCS SHALL BE COMPOSITION TYPE. SWING-CHECK ANGLE OF CLOSURE SHALL BE MANUFACTURER'S STANDARD UNLESS A SPECIFIC ANGLE IS NEEDED.
CHECK VALVES IN SIZES 2-1/2 INCHES AND LARGER SHALL BE CAST IRON, BRONZE TRIM, SWING TYPE. VALVE BODIES SHALL BE CAST IRON, CONFORMING TO ASTM A126, CLASS A. VALVE ENDS SHALL BE FLANGED IN CONFORMANCE WITH ASME B16.1. SWING-CHECK PIN SHALL BE AISI TYPE OR APPROVED EQUAL CORROSION-RESISTANT STEEL. ANGLE OF CLOSURE SHALL BE MANUFACTURER'S STANDARD UNLESS A SPECIFIC ANGLE IS NEEDED. VALVES SHALL HAVE BOLTED AND GASKETED COVERS.

PROVIDE CHECK VALVES WITH + POSITIVE-CLOSURE DEVICES AND VALVE ENDS SHALL BE MECHANICAL JOINT OR FLANGED.
NONSLAM CHECK VALVES (NSV)
CHECK VALVES AT PUMP DISCHARGES IN SIZES 2 INCHES AND LARGER SHALL BE NONSLAM OR SILENT-CHECK TYPE CONFORMING TO MSS SP-125. VALVE DISC OR PLATE SHALL CLOSE BEFORE LINE FLOW CAN REVERSE TO ELIMINATE SLAM AND WATER-HAMMER DUE TO CHECK-VALVE CLOSURE. VALVE SHALL BE CLASS 125 RATED FOR 200-PSI MAXIMUM, NONSHOCK PRESSURE AT 150 DEGREES F IN SIZES TO 12 INCHES. VALVES SHALL BE FITTED WITH FLANGES CONFORMING TO ASME B16.1. VALVE BODY MAY BE CAST IRON, CONFORMING TO ASTM A278/A278M, CLASS 40 OR EQUIVALENT STRENGTH DUCTILE IRON. DISKS SHALL BE MANUFACTURER'S STANDARD BRONZE, ALUMINUM BRONZE, OR CORROSION-RESISTANT STEEL. PINS, SPRINGS, AND MISCELLANEOUS TRIM SHALL BE MANUFACTURER'S STANDARD CORROSION-RESISTANT STEEL. DISK AND SHAFT SEALS SHALL BE BUNA-N ELASTOMER TETRAFLUOROETHYLENE.

BALANCING FITTINGS

PROVIDE 'B' & 'G' CIRCUIT SETTER BALANCING FITTINGS ON ALL WATER SYSTEMS WHENEVER REQUIRED FOR BALANCING OF SYSTEMS.

THERMOMETERS

SHALL BE TERREX UNIVERSAL ANGLE TYPE #180732, SOLID LIQUID FILLED, 4 1/4" DIA. SIZE. FURNISH WITH SEPARABLE SOCKET WITH 2" EXTENSION NECK.

FLEXIBLE HOSES

FLEXIBLE PIPE VIBRATION AND PIPE-NOISE ELIMINATORS SHALL BE CONSTRUCTED OF WIRE-REINFORCED, RUBBER-IMPREGNATED CLOTH AND CORD MATERIALS AND SHALL BE FLANGED. FLANGES SHALL BE BACKED WITH FERROUS-METAL BACKING RINGS. SERVICE PRESSURE-RATING SHALL BE MINIMUM 1.5 TIMES ACTUAL SERVICE. SURGE PRESSURE SHALL BE AT 140 DEGREES F. UNIT PIPE LENGTHS, FACE-TO-FACE, SHALL BE NOT LESS THAN THE FOLLOWING: INSIDE DIAMETER UNTIL PIPE LENGTH

TO 2-1/2 INCHES, INCLUSIVE 12 INCHES

3 TO 4 INCHES, INCLUSIVE 18 INCHES

5 TO 12 INCHES, INCLUSIVE 24 INCHES

4 TO 3 INCHES, INCLUSIVE 18 INCHES

4 TO 10 INCHES, INCLUSIVE 24 INCHES





