

SPECIFICATIONS

HEATING, VENTILATING AND AIR CONDITIONING SPECIFICATION

1. SCOPE

THE WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIALS, EQUIPMENT, FACILITIES AND SERVICES NECESSARY AND AS REQUIRED TO COMPLETE ALL THE HEATING VENTILATING AND AIR CONDITIONING WORK AS INDICATED ON THE DRAWINGS, AS DESCRIBED IN THE SPECIFICATION, OR AS REASONABLY INFERABLE FROM THE DRAWINGS AND SPECIFICATIONS. THE WORK SHALL PROVIDE COMPLETE AND OPERATING, SAFE, AND CODE COMPLYING HVAC SYSTEMS THAT INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO:

A. VARIABLE FREQUENCY DRIVES AND MOTORS

B. DUCTWORK OF THE LOW PRESSURE DESIGN AND CONNECTIONS TO OUTLETS.

C. STEAM PIPING, VALVES AND TRAPS.

D. STEAM PRE-HEAT AND RE-HEAT COILS

E. EXHAUST FAN

F. INSULATION, ACOUSTIC LINING AND COVERING.

G. HANGERS, INSERTS, SUPPORTS, ETC.

H. AUTOMATIC TEMPERATURE CONTROLS AND THERMOSTATS.

I. TESTING, ADJUSTING AND BALANCING.

J. AS-BUILT DRAWINGS.

K. SHOP DRAWINGS.

2. GENERAL REQUIREMENTS

A. COMPLY WITH ALL APPLICABLE PROVISIONS OF THE GENERAL CONDITIONS OF THE CONTRACT AND CONSTRUCTION SPECIFICATIONS. THEY SHALL APPLY TO AND BY THEIR MENTION HEREIN BE INCLUDED UNABRIDGED AS PART OF THE FOLLOWING SPECIFICATION ARTICLES.

B. ALL MATERIALS AND WORK, INCLUDING AIR BALANCING AND TESTING SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS OF THE CITY OF NEW YORK BUILDING CODE, THE CURRENT STANDARDS FOR HVAC WORK OF ASHRAE AND SMACNA AND ALL BUILDING REQUIREMENTS AND SPECIFICATIONS.

C. WHERE CODES REQUIRE A VARIATION FROM DRAWINGS AND SPECIFICATIONS, WORK SHALL BE EXECUTED AS REQUIRED TO COMPLY WITH CODE, BUT NOT UNTIL POINT OR POINTS IN QUESTION HAVE BEEN BROUGHT TO THE ATTENTION OF THE ENGINEERS.

D. ALL MATERIALS, EQUIPMENT AND FIXTURES NOT SPECIFICALLY INDICATED EXISTING SHALL BE FURNISHED UNDER THIS SECTION NEW AND UNUSED, BEST OF THEIR RESPECTIVE KINDS, FREE FROM DEFECTS AND APPROVED BY THE AUTHORITIES HAVING JURISDICTION OVER THE WORK.

E. THE SPECIFICATIONS AND DRAWINGS ARE INTENDED TO SERVE JOINTLY AS A BASIS UPON WHICH THE CONTRACTOR SHALL SUBMIT A CONTRACT PRICE FOR THE MATERIAL AND LABOR PROVISIONS.

F. THE CONTRACTOR SHALL PROVIDE ALL ITEMS OF LABOR OR MATERIALS NOT SPECIFICALLY INDICATED, BUT REQUIRED TO COMPLETE THE INTENDED INSTALLATIONS TO INSTALL A COMPLETE AND OPERATING SYSTEM.

G. THE CONTRACTOR SHALL COORDINATE HIS WORK OR ADJUST SAME TO THAT OF ALL OTHER TRADES INVOLVED IN THE CONSTRUCTION TO INCLUDE THE REFLECTED CEILING PLAN, IN ORDER THAT CONFLICTS IN SPACE LOCATIONS DO NOT OCCUR.

H. CONNECT ALL NEW WORK TO EXISTING IN A NEAT AND APPROVED MANNER. RESTORE EXISTING WORK AFTER MAKING SUCH CONNECTION TO PERFECT CONDITION.

I. DRAWINGS ARE DIAGRAMMATIC AND INDICATED GENERAL ARRANGEMENT OF WORK.

J. INSTALL ALL WORK IN SUCH A MANNER SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIRS.

K. ALL WORKMEN EMPLOYED TO PERFORM THE WORK OF THE CONTRACT SHALL BE SKILLED IN THEIR RESPECTIVE TRADES.

L. WHEN CONFLICTS OCCUR IN THE SPECIFICATIONS OR ON THE DRAWINGS, OR BETWEEN EITHER, THE ITEMS OF GREATER QUANTITY OR HIGHER COST SHALL BE PROVIDED.

M. THE WORK UNDER THIS CONTRACT SHALL BE PERFORMED SIMULTANEOUSLY WITH WORK OF OTHER TRADES, SO AS NOT TO DELAY THE OVERALL PROGRESS OF WORK.

N. EACH CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK UNTIL ITS COMPLETION AND FINAL ACCEPTANCE AND SHALL REPLACE ANY OF SAME WHICH MAY BE DAMAGED, LOST OR STOLEN, WITHOUT ADDITIONAL COSTS TO THE OWNER.

O. STORE MATERIALS IN SPACES SO DESIGNATED BY ARCHITECT/OWNER.

P. ALL CUTTING AND PATCHING IN CONNECTION WITH TRADE SHALL BE DONE BY THAT TRADE.

Q. INTERRUPTION OF HEATING, POWER AND AUXILIARY SYSTEMS SHALL BE COORDINATED WITH THE BUILDING AUTHORITIES AND SUCH OUTAGES SHALL OCCUR ONLY DURING PREARRANGED ACCEPTABLE TIMES. THE EXISTING BUILDING SHALL NOT BE LEFT WITHOUT USE OF HEAT, LIGHTING, POWER, ETC., EXCEPT FOR FINAL CONNECTIONS, WHICH SHALL BE PERFORMED AT A TIME CONVENIENT TO AND WITH NO ADDITIONAL EXPENSE TO THE BUILDING AUTHORITIES.

R. CONTRACTOR SHALL VERIFY ALL MEASUREMENTS AT SITE AND BE RESPONSIBLE FOR CORRECTIONS OF SAME.

3. WORK INCLUDED UNDER OTHER SECTIONS OF WORK

A. ITEMS OF WORK WHICH SHALL BE INCLUDED UNDER OTHER SECTIONS OF WORK ARE AS FOLLOWS:

(1) ELECTRICAL WRING FOR POWER, AUTOMATIC, SAFETY AND INTERLOCKING CONTROLS, VARIABLE FREQUENCY DRIVES.

(2) PROVISIONS OF ELECTRICAL DISCONNECT SWITCHES OR FUSES.

4. CODES, PERMITS AND INSPECTIONS

A. ALL WORK SHALL MEET OR EXCEED LATEST REQUIREMENT OF NATIONAL, STATE, COUNTY, MUNICIPAL AND OTHER AUTHORITIES EXERCISING JURISDICTION OF THE WORK OF THIS PROJECT.

B. ANY PORTION OF WORK WHICH IS NOT SUBJECT TO THE APPROVAL OF AN AUTHORITY HAVING JURISDICTION SHALL BE PROVIDED IN ACCORDANCE WITH NATIONAL FIRE PROTECTION ASSOCIATION REQUIREMENTS.

C. CONTRACTOR SHALL PAY ALL FEES, GIVE ALL NOTICES, FILE ALL NECESSARY DRAWINGS AND OBTAIN ALL PERMITS AND CERTIFICATES OF APPROVAL REQUIRED IN CONNECTION WITH ALL WORK UNDER THIS CONTRACT TO INCLUDE, BUT NOT BE LIMITED TO DAR, NYC BUILDING AND FIRE DEPT. HE SHALL COMPLY WITH ALL LOCAL LAWS, ORDINANCES, RULES AND REGULATIONS AND WITH THE NATIONAL & LOCAL ELECTRICAL CODES. THIS CONTRACTOR SHALL PERFORM ALL CONTROLLED INSPECTIONS. CONTRACTOR SHALL GIVE TO OWNER ALL PERMITS AND INSPECTION CERTIFICATES AT THE COMPLETION OF THE WORK. THIS CONTRACTOR SHALL DO ALL WORK REQUIRED BY DIRECTIVE 14 AND TR-1.

5. APPROVALS AND SUBSTITUTIONS

A. IT IS INTENT OF THESE SPECIFICATIONS THAT WHEREVER A MANUFACTURER IS SPECIFIED AND SUBSTITUTIONS ARE MADE, THEY SHALL CONFORM IN ALL RESPECTS TO THE SPECIFIED ITEM. CRITERIA AS DELINEATED FOR EQUIPMENT SHALL BE INTERPRETED AS MINIMUM PERFORMANCE REQUIREMENTS.

B. SUBSTITUTED EQUIPMENT WHERE PERMITTED MUST CONFORM TO SPACE REQUIREMENTS. ANY SUBSTITUTED EQUIPMENT THAT CANNOT MEET SPACE REQUIREMENTS, WHETHER APPROVED OR NOT SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE. ANY SUCH MODIFICATION OR RELATED SYSTEMS CHANGE OR ADDITIONAL DESIGN OR CONSTRUCTION COSTS THAT RESULT FROM SUBSTITUTED EQUIPMENT SHALL BE BORNE BY THE CONTRACTOR.

C. IT SHALL BE MANDATORY FOR EACH CONTRACTOR TO SUBMIT HIS PROPOSAL PRICE BASED ON SPECIFIED MANUFACTURER OR SUPPLIER OF MATERIALS OR SERVICES. IF THE CONTRACTOR DESIRES TO SUBSTITUTE OTHER THAN SPECIFIED, HE SHALL SUBMIT SEPARATE PRICES FOR EACH OF THESE ITEMS FOR ADDITIONS OR DEDUCTIONS TO THE CONTRACT PROPOSAL PRICE; FOR ACCEPTANCE OR REJECTION AT THE TIME WHEN BIDS ARE DUE. AS PART OF HIS PROPOSAL FOR SUBSTITUTION THE CONTRACTOR MUST SUPPLY A TECHNICAL COMPARISON OF THE SUBSTITUTED VS. SPECIFIED ITEM. SHOULD THESE SUBSTITUTIONS BE REJECTED, THE CONTRACTOR SHALL BE OBLIGED TO PROVIDE SPECIFIED MATERIALS AND SERVICES.

6. VERIFYING EXISTING CONDITIONS

A. THE CONTRACTOR SHALL BE HELD TO HAVE VISITED THE PREMISES TO DETERMINE EXISTING CONDITIONS AND COMPARE SAME WITH DRAWINGS AND SPECIFICATIONS. NO ALLOWANCE SHALL BE MADE FOR FAILURE TO COMPLY WITH THESES REQUIREMENTS. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR CONDITIONS FOUND DURING THE COURSE OF THE CONTRACT. A SUBMITTED PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT THE CONTRACTOR HAS SATISFIED HIMSELF OF ALL EXISTING CONDITIONS.

7. REMOVALS AND ALTERATIONS

A. THE CONTRACTOR SHALL REMOVE, RELOCATE, REPLACE, ADJUST, ADAPT, AND MODIFY EXISTING EQUIPMENT AND/OR SYSTEMS AS REQUIRED BY THE DRAWINGS OR SPECIFICATIONS AND AS MAY BE REQUIRED WHEN SUCH WORK IS UNCOVERED AND FOUND TO INTERFERE WITH THE COMPLETION OF WORK IN THIS CONTRACT OR OTHER CONTRACT WORK.

B. ALL REMOVED EQUIPMENT, MATERIAL, AND RUBBISH SHALL BE REMOVED FROM THE PROJECT SITE DAILY AND AS DIRECTED AS NECESSARY TO PROVIDE A SAFE WORKING ENVIRONMENT.

8. SHOP DRAWINGS AND EQUIPMENT SUBMISSIONS

REQUIRED MATERIALS SUBMITTED FOR APPROVAL PRIOR TO ORDERING OR FABRICATION AS FOLLOWS:

A. SHOP DRAWINGS, CUTS AND CATALOG INFORMATION SHOWING IDENTIFICATION, CONSTRUCTION, PERFORMANCE, DIMENSIONS, WEIGHT, ETC. OF ALL EQUIPMENT AND ACCESSORIES FURNISHED UNDER THIS CONTRACT.

B. SHEETMETAL LAYOUTS DRAWN TO SCALE (3/8"). 1 SEPIA AND 2 PRINTS.

C. AUTOMATIC TEMPERATURE CONTROL DIAGRAMS WITH SEQUENCE OF OPERATION AND CATALOG PAGES OF INSTRUMENTS.

D. CERTIFIED EQUIPMENT MANUFACTURER'S DATA (4 COPIES).

E. OPERATING AND MAINTENANCE INSTRUCTIONS.

9. AS-BUILT DRAWINGS

A. THE CONTRACTOR SHALL KEEP AN ACCURATE RECORD OF WORK AS THE JOB PROGRESSES. CONTRACTOR'S SHOP DRAWINGS SHALL BE KEPT TO DATE WITH ALL AS-BUILT CONDITIONS SO THAT AT THE COMPLETION OF THE JOB REPRODUCIBLE MYLAR RECORD SHOP DRAWINGS WILL BE SUPPLIED TO THE OWNER AS A COMPLETE AND ACCURATE RECORD OF ALL WORK AS ACTUALLY INSTALLED.

10. GUARANTEES

A. ALL WORK SHALL BE GUARANTEED TO BE FREE FROM LEAKS OR OTHER DEFECTS. ALL DEFECTIVE MATERIAL OR WORKMANSHIP AS WELL AS DAMAGES TO THE WORK OF ALL TRADES RESULTING FROM SAME SHALL BE REPLACED OR REPAIRED FOR THE DURATION OF THE GUARANTEE PERIOD.

B. THE GUARANTEE PERIOD FOR ALL WORK EXCEPT COMPRESSORS SHALL BE FOR ONE (1) YEAR FROM THE DATE OF ACCEPTANCE, WHICH SHALL BE THE DATE OF FINAL PAYMENT OR THE DATE OF FORMAL NOTICE OF ACCEPTANCE, WHICHEVER IS EARLIER. COMPRESSOR SHALL HAVE A FIVE (5) YEAR WARRANTY.

C. CERTIFICATION SHALL BE SUBMITTED BY THE CONTRACTOR ATTESTING TO THE FACT THAT SPECIFIED PERFORMANCE CRITERIA ARE MET BY ALL EQUIPMENT.

11. ELECTRICAL WRING AND WRING DIAGRAMS

A. ELECTRICAL WRING FOR POWER, SAFETY AND INTERLOCKING CONTROLS FOR MOTORS, MOTOR STARTER AND OTHER ELECTRICAL APPARATUS AND DEVICES SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR UNDER ANOTHER DIVISION OF CONTRACT WORK.

B. THE MECHANICAL CONTRACTOR SHALL PREPARE AND SUBMIT FOR APPROVAL TERMINAL POINT TO TERMINAL POINT, COMPLETELY COORDINATED AND INTEGRATED WRING DIAGRAMS FOR ALL WRING REQUIRING FIELD INSTALLATIONS BY THE ELECTRICAL CONTRACTOR.

C. SPECIFIC WRING DIAGRAMS OF FACTORY INSTALLED EQUIPMENT WRING SHALL ALSO BE SUBMITTED FOR APPROVAL AND FURNISHED TO THE ELECTRICAL CONTRACTOR FOR HIS INSTALLATION REQUIREMENTS AND OTHER USES.

12. DUCTWORK

A. ALL DUCTWORK, AIR CHAMBERS, CASINGS, ENCLOSURES, DAMPERS AND ALL AUXILIARY DEVICES AND WORK NECESSARY TO MAKE THE VARIOUS AIR CONDITIONING AND VENTILATING SYSTEMS COMPLETE AND READY FOR SATISFACTORY OPERATION SHALL BE FURNISHED AND INSTALLED.

B. ALL DUCTS SHALL BE GALVANIZED STEEL, EXCEPT WHERE OTHERWISE SPECIFIED, WITH GAUGES, BRACING AND CONSTRUCTION IN ACCORDANCE WITH THE LATEST SMACNA DUCT MANUAL STANDARDS AND ALL OTHER AUTHORITIES HAVING JURISDICTION.

C. ACCESS DOORS

(1) IN ACCORDANCE WITH SMACNA STANDARDS, WHERE NECESSARY BY CODE AND AS SHOWN ON THE DRAWINGS, PROVIDE DUCTWORK CASING ACCESS DOORS AND FRAMES TO PERMIT INSPECTION, OPERATION AND MAINTENANCE OF ALL CONCEALED CONTROLS: FUSIBLE LINKS, FIRE DAMPERS, SMOKE DAMPERS OR OTHER APPARATUS CONCEALED BEHIND THE SHEETMETAL WORK. ALL SUCH DOORS IN INSULATED SPACE SHALL BE OF THE DOUBLE PANEL INSULATED TYPE OF NOT LESS THAN NO. 20 GAUGE. ACCESS DOORS IN UNINSULATED DUCTS MAY BE OF SINGLE PANEL CONSTRUCTION OF NOT LESS THAN NO. 18 GAUGE, GALVANIZED.

(2) ALL DOORS SHALL HAVE POLYURETHANE GASKETS CEMENTED IN PLACE WITH APPROVED ADHESIVE SO AS TO MAKE THEM AIRTIGHT.

(3) ACCESS DOORS IN DUCTS IN GENERAL NOT TO BE SMALLER THAN 12" X 12" EXCEPT FOR ACCESS DOORS TO FIRE DAMPERS WHICH SHALL DEPEND ON SIZE OF THE FIRE DAMPER.

D. PROVIDE MANUAL DAMPERS IN EACH SPLIT OR TAP CONNECTION TO TRUNK DUCTS FOR BALANCING PURPOSES WHETHER OR NOT SHOWN ON DRAWINGS. EACH DAMPER SHALL BE PROVIDED WITH OPERATOR AND LOCKING DEVICE AND BE OF OPPOSED BLADE TYPE. ALL DAMPERS WHICH ARE NOISY SHALL BE REMOVED, REPAIRED AND REINSTALLED.

E. PROVIDE GALVANIZED SHEET STEEL DUCTWORK FOR THE LOW PRESSURE SYSTEMS IN ACCORDANCE WITH THE REQUIREMENTS STANDARDS OF SMACNA. LOW PRESSURE DUCTWORK SHALL BE CONSTRUCTED AS 2" WG CLASSIFICATION AND SHALL INCLUDE ALL RETURN, EXHAUST AND SUPPLY DUCTWORK OPERATING LESS THAN OR EQUAL TO 2" WATER GAUGE PRESSURE AND/OR WITH VELOCITIES LESS THAN 1800 FT. PER MINUTE, AND SEAL CLASS A.

F. EXCEPT WHERE DIMENSIONS ARE SHOWN TO LOCATE DUCTWORK OR EQUIPMENT, THE DRAWINGS SHOW DUCT SIZE AND ARRANGEMENTS ONLY. EQUIPMENT AND DUCTWORK ARRANGEMENTS SHALL FIT INTO THE SPACE AS INDICATED, AND SHALL ALLOW ADEQUATE CLEARANCES FOR ENTRY, SERVICING AND MAINTENANCE. REVISE DUCT ASPECT RATIOS AS REQUIRED, 4:1 MAXIMUM.

G. INSTALL ALL DUCTS AS HIGH AS POSSIBLE EXCEPT WHERE OTHERWISE INDICATED ON THE DRAWINGS.

H. PROVIDE RISERS, DROPS AND OFFSETS IN DUCT OR FOR A DUCT TO CLEAR BEAMS, COLUMNS, LIGHTS, PIPES AND OTHER OBSTRUCTIONS. LAYOUT SHALL CONFORM TO CEILING HEIGHTS SHOWN ON ARCHITECTURAL DRAWINGS. WHERE CONFLICTS ARISE, THE PROBLEM SHALL BE BROUGHT TO THE ARCHITECT'S ATTENTION BEFORE PROCEEDING.

I. PROVIDE FUSIBLE LINK FIRE DAMPERS AT LOCATION SHOWN ON DRAWINGS AND WHERE NECESSARY TO COMPLY WITH LOCAL OR OTHER AGENCIES OR JURISDICTIONS REQUIRING THEIR INSTALLATIONS AND IN COMPLIANCE WITH THEIR CONSTRUCTION REQUIREMENTS.

J. WHERE DUCTS ARE SHOWN TO BE ACOUSTICALLY LINED, THE SIZES SHOWN ON THE PLANS SHALL BE THE CLEAR INSIDE DIMENSIONS WHEN LINING IS TO BE PROVIDED.

K. CONTRACTOR TO VERIFY ALL DIMENSIONS AND CONDITIONS AT THE JOB AND CONVEY SAME ON HIS SUBMITTED SHOP DRAWINGS.

L. ON ALL DAMPERS LOCATED ABOVE INACCESSIBLE PLASTER OR DRYWALL CEILINGS PROVIDE REMOTE GEAR OPERATORS, YOUNG REGULATOR COMPANY NO. 895 AND NO 1200 GEARS WITH NO. 896 SERIES OPERATORS.

M. PROVIDE TURNING VANES ON ALL RECTANGULAR ELBOWS AND WHERE OTHERWISE SHOWN ON THE DRAWINGS. TURNING VANES SHALL BE DOUBLE THICKNESS TYPE, CONSTRUCTED IN ACCORDANCE WITH SMACNA MANUAL. SUBMIT DETAIL ON INITIAL DUCTWORK SHOP DRAWINGS.

N. WHEN DUCTWORK PENETRATES FULL-HEIGHT PARTITIONS THE OPENING AROUND THE DUCT IS TO BE SEALED WITH INSULATION AND CAULKED.

O. ANY FLEXIBLE DUCT SHALL BE RATED FOR 10" PRESSURE AND COMPLY WITH THE LATEST EDITION OF NFPA 90 FOR PLENUM SPACE AND UL 181 CLASS 1 SERVICE. MAXIMUM LENGTH OF FLEXIBLE SHALL BE 3' -0" MINIMUM LENGTH 1' -6". FLEXIBLE DUCT CONNECTIONS SHALL BE MAKE WITH A TWO-ELEMENT DUCT COMPOSED OF A CORROSION-RESISTANT METAL SUPPORTING SPIRAL AND A VINYL ORGANOSOL-COATED FIBER GLASS FABRIC, MECHANICALLY INTERLOCKED. IT SHALL BE VINTAGE DUCT TYPE 57 AS MANUFACTURED BY THE WIREMOLD COMPANY, OR APPROVED EQUAL.

P. ROUND AND FLAT OVAL DUCTWORK IS IN GENERAL AN ARCHITECTURAL FEATURE OF THE SPACE IN WHICH IT OCCURS. THE DUCTS SHALL BE FABRICATED AND INSTALLED WITHOUT DENTS, BLEMISHES, RAISED OR TORN EDGES AT JOINTS. SCREWS, POP RIVETS AND WELDS WHERE REQUIRED SHALL BE UNOBTRUSIVE. THE CONNECTIONS BETWEEN THE REGISTER AND DUCTWORK SHALL DETAIL FOR REGISTER COLLAR CONNECTION TO ROUND DUCT FOR APPROVAL BY ARCHITECT.

(1) DUCT CONSTRUCTION SHALL BE SPIRAL LOCK SEAM DUCTWORK, PRIME QUALITY GALVANEAL OR ZINC GRIP COATED SHEET STEEL. ALL DUCTWORK SHALL BE 22 USSAG, COMPLETELY AIRTIGHT FREE OF VIBRATION AND BUCKLING.

(2) TRANSVERSE JOINTS SHALL BE BEADED CRIMP JOINTS, SEALED AIRTIGHT WITH SEALING COMPOUND DURING FABRICATION.

(3) FITTINGS SHALL BE THE MANUFACTURED TYPE, OF SAME GAUGE AS DUCT. ALL WELDED CONSTRUCTION.

(4) ALL DUCT PANELS SHALL BE SUPPORTED BY HANGER STRAPS AND BANDING IN ACCORDANCE WITH SMACNA STANDARDS LOW VELOCITY DUCT PLATE NO. 18.

(5) PROVIDE FORMED PRIME-PAINTED STEEL ESCUTCHEON AROUND ORCULAR DUCT WHERE EXPOSED DUCT PASSES THROUGH FINISHED VERTICAL WALL.

(6) PROVIDE FORMED GALVANIZED STEEL, PLASTER RING FOR ORCULAR DUCT PASSING THROUGH PLASTER WALL.

(7) DUCT HANGERS SHALL BE AS DETAILED ON DRAWING. MAXIMUM SPACING BETWEEN HANGERS SHALL BE 5' -6". HANGERS SHALL BE INSTALLED SYMMETRICALLY ON PARALLEL RUNS OF DUCTWORK.

13. DUCT AND EQUIPMENT INSTALLATION

A. PROVIDE DUCT AND EQUIPMENT HANGERS AND SUPPORTS. DO NOT HANG ONE DUCT FROM ANOTHER OR FROM PIPING OR CONDUIT. DO NOT USE PERFORATED BAND IRON, WIRE, OR CHAIN AS HANGERS. DO NOT HANG ANYTHING FROM DUCTWORK.

B. DUCT HANGERS AND SPACING OF SAME SHALL BE AS DETAILED ON THE SHOP DRAWINGS, AND SHALL BE IN ACCORDANCE WITH SMACNA OR BASE BUILDING SPECIFICATION WHICH EVER IS MORE STRINGENT.

C. HANGERS AND SUPPORTS FOR DUCTWORK SHALL BE GALVANIZED STEEL.

D. HANGERS AND SUPPORTS FOR DUCTWORK CONSTRUCTION SHALL BE AS SHOWN IN THE LATEST EDITION OF SMACNA. STRAP HANGERS SHALL NOT BE LESS THAN 1" X 1/8" THICK AND ATTACHED TO SIDE OF DUCT WITH SHEET METAL SCREWS.

E. FURNISH AND ERECT ALL AUXILIARY STRUCTURAL STEEL CHANNELING, ETC., NOT A PART OF BUILDING STRUCTURE, REQUIRED FOR SUPPORT OF DUCTWORK AND EQUIPMENT. ALL SUCH STEEL SHALL CONFORM TO ASTM A36 AND SHALL BE DESIGNED IN ACCORDANCE WITH AISC HANDBOOK.

F. HANGERS FOR EQUIPMENT MUST BE DESIGNED WITH ISOLATION DEVICES AS SCHEDULED.

14. INSTALLATION OF PIPING - GENERAL

A. FURNISH AND INSTALL PIPING SYSTEMS WHICH ARE SCHEMATICALLY INDICATED ON THE DRAWINGS IN CONFORMANCE TO THE LATEST ASA CODE FOR PRESSURE PIPING. PIPING SHALL BE SET UP, SET DOWN OR OFFSET TO MEET SPECIFIED HEADROOM, FIELD CONDITIONS AND COORDINATION BETWEEN TRADES WITHOUT ADDITIONAL COST. ALL CHANGES IN DIRECTION OF PIPING SHALL BE MADE WITH FITTINGS.

B. PROVIDE PROPER PROVISION FOR EXPANSION OR CONTRACTION OF PIPING TO PREVENT STRAIN TO THE APPARATUS CONNECTED THEREWITH AND TO THE BUILDING STRUCTURE.

C. ARRANGE PIPING TO EQUIPMENT TO PERMIT SERVICING OR REMOVALS WITHOUT DISMANTLING PIPING BRANCHES. INCLUDE ISOLATION VALVING FOR QUICK REMOVAL OF EQUIPMENT.

D. FURNISH AND INSTALL AUTOMATIC PRESSURE RELIEF VALVES AND VACUUM BREAKERS TO PROTECT AGAINST PIPE RUPTURE OR SIPHONING ACTIONS. EXTEND DRAINS FROM RELIEF VALVES TO SPILL OVER FLOOR DRAINS.

E. FURNISH AND INSTALL PIPING HANGERS, SUPPORTS, ANCHORS AND GUIDES HAVING A BUILT-IN SAFETY FACTOR OF FIVE (5) IN CONFORMANCE TO THE LATEST ASA CODE FOR PRESSURE PIPING AND SUCH THAT PIPE LINES SHALL NOT CREEP, SAG, OR BUCKLE. ALL HANGER SPECIALTIES SHALL BE FURNISHED WITH ZINC CHROMATE PRIME PAINT FINISH. ALL COPPER PIPE SHALL HAVE COPPER OR COPPER PLATED HANGERS. NO PIPES SHALL BE HUNG FROM OTHER PIPES.

F. ALL PIPING INSTALLED IN FINISHED SPACES (ALL SPACES OTHER THAN MECHANICAL EQUIPMENT ROOM) SHALL BE CONCEALED EXCEPT FOR THE FINAL CONNECTION TO EQUIPMENT.

G. CONDENSATE DRAIN PIPING TO BE COPPER TYPE L, FITTINGS TO BE WROUGHT COPPER, PROVIDE ALL REQUIRED OFFSETS TO ACCOMMODATE FIELD CONDITIONS.

H. INSTALL ALL HORIZONTAL PIPING TO BE SLOPED AS REQUIRED BY ITS SERVICE.

I. WHEN PIPING PENETRATES FULL-HEIGHT PARTITIONS THE OPENING AROUND THE PIPE SHALL BE SEALED WITH INSULATION AND CAULKED.

J. CONDENSATE DRAIN PIPING

(1) UNION SHALL BE GALVANIZED WITH THREADED ENDS AS MANUFACTURED BY DART UNION CO.

K. PROVIDE DI-ELECTRIC UNIONS WHENEVER JOINING STEEL TO COPPER PIPE.

L. LOW PRESSURE STEAM AND CONDENSATE PIPING.

(1) STEAM PIPING SHALL BE SCHEDULE 40 BLACK STEEL WITH 125 PSI SCREWED CAST IRON FITTINGS.

(2) STRAINER SHALL BE 150 PSI DESIGN WITH STAINLESS STEEL BASKET.

(3) STEAM TRAP SHALL BE SARCO TYPE TS-25, OR APPROVED EQUAL.

(4) FLOAT AND THERMOSTATIC TRAPS SHALL HAVE SEMI-STEEL BODIES, HEAVY COPPER OR STAINLESS STEEL FLOATS AND AND STAINLESS STEEL VALVE SEATS AND STEMS. THERMOSTATIC ELEMENTS SHALL BE SUITABLE FOR THE OPERATING PRESSURE.

15. VALVES

A. FURNISH AND INSTALL ALL VALVES NECESSARY FOR THE PROPER OPERATION OF THE SYSTEM. ALL SHUTOFF VALVES SHALL BE FULL LINE SIZE AND SHALL BE GOOD FOR THE WORKING PRESSURES NOTED FOR THE VARIOUS SYSTEMS AS DETERMINED BY THESE DRAWINGS AND THE BASE BUILDING REQUIREMENTS.

B. ALL SHUTOFF VALVES SHALL BE GATE OR BALL VALVES, CLASS 250, UNLESS OTHERWISE NOTED, SPECIFIED OR DETAILED. THROTTLING VALVES, GLOBE/PLUG OR BUTTERFLY VALVES.

2" AND UNDER - SCREWED, ALL BRONZE: UNICON BONNET INSIDE SCREW; RISING STEM; SOLID TAPER WEDGE.

2-1/2" AND LARGER - BUTT WELDED, OR 250 PSI CAST IRON.

VALVES: 2-1/2" AND LARGER - FLANGED OR SCREWED.

2" AND SMALLER - SCREWED.

UP TO 2": BRONZE GATE, JENKINS 270U.

2-1/2": IRON BODY GATE, JENKINS 204 OR 204A.

3" AND LARGER: IRON BODY GATE, JENKINS 204.

C. ALL CHECK VALVES SHALL BE OF THE SWING TYPE WITH SCREWED BONNET, RENEWABLE BRONZE SEAT AND DISC.

16. OPERATING AND MAINTENANCE INSTRUCTIONS

A. AFTER FINAL TESTS AND ADJUSTMENTS, FULLY INSTRUCT OWNER'S OPERATING PERSONNEL IN ALL DETAILS OF OPERATION FOR EQUIPMENT INSTALLED. A SIGNED RECEIPT WHICH SHALL BE OBTAINED FROM THE OWNERS OPERATOR SHALL BE CONSTRUED AS EVIDENCE THAT INSTRUCTIONS WERE SATISFACTORY.

B. FURNISH THREE (3) COPIES OF WRITTEN DESCRIPTIONS OF ALL SYSTEMS COVERING ALL MANUAL OPERATING PROCEDURES, AUTOMATIC CONTROL DESCRIPTIONS AND AUTOMATIC CONTROL TEMPERATURE AND PRESSURE SETTINGS TO INCLUDE BUT NOT BE LIMITED TO: START-UP, SHUTDOWN, SEASONAL CHANGE OVER, NIGHT SETBACK AND EMERGENCY PROCEDURES IN CASE OF EQUIPMENT OR POWER FAILURE. WRITTEN DESCRIPTIONS SHALL INCLUDE: LUBRICATION SCHEDULES, PARTS LIST, PERFORMANCE SERVICES FOR EQUIPMENT, FILTER SIZE/QUANTITY SCHEDULES, ETC. WHEN MANUFACTURER'S STANDARD INSTRUCTIONS ARE UTILIZED, THEY SHALL BE CLEARLY MARKED TO INDICATE APPLICABILITY. INCLUDE A COMPLETE SET OF EQUIPMENT CATALOGUE CUTS IN EACH MANUAL.

17. IDENTIFICATION OF EQUIPMENT AND CONTROLS

A. ALL EQUIPMENT SHALL BE STENOILED OR LABELED WITH LAMACOID PLATED SCREWED THEREON WHICH SHALL INDICATE SYSTEMS SERVED.

B. ALL PIPING SYSTEMS SHALL BE IDENTIFIED AS TO THEIR CONTENTS AND DIRECTION OF FLOW WITH PIPING BANDS PLACED A MAXIMUM OF 30 FEET APART ON STRAIGHT RUNS, AT EACH SIDE OF ALL PENETRATIONS, AND AT ALL VALVE LOCATIONS.

C. ALL VALVES SHALL BE TAGGED WITH 2" BRASS PLATED TAGS AND CHAINS AND VALVE CHART SCHEDULE, FRAMED AND WALL MOUNTED WHERE DIRECTED.

18. SLEEVES AND ESCUTCHEONS FOR PIPING

A. PROVIDE SLEEVES FOR PIPES PASSING THROUGH WALL PARTITIONS AND FLOORS.

B. PIPING THROUGH FLOORS SHALL BE COPPER AND EXTEND 1" PAST FLOOR AND THROUGH INTERIOR WALLS AND PARTITIONS #18 GA. GALVANIZED STEEL. FLUSH TO WALL.

C. SPACE BETWEEN PIPE OR PIPE INSULATION SHALL BE CAULKED WITH INCOMBUSTIBLE ROPE OR MINERAL WOOL TO WITHIN 1/2" OF WALL FACES AND FILLED WITH ACCEPTABLE FIRESAFING SEALANT COMPOUND TO WALL FACES.

D. FURNISH AND INSTALL ESCUTCHEONS ON ALL EXPOSED PIPING THROUGH WALLS OR FLOORS AND HELD IN PLACE WITH SCREWS OR BE INTERNAL SPRING TENSION.

THESE PLANS ARE APPROVED ONLY FOR THE WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

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