SPECIFICATIONS:

1. INTENT OF PROJECT IS FOR NEW MATERIALS AND COMPONENTS TO MATCH EXISTING. ALL MATERIALS SHALL BE APPROVED BY PWM. 2. REVIEW PROTOCOL AND PROCEDURES WITH PWMPRIOR TO COMMENCING WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING PWM PROTOCOL AND PROCEDURES BY ITS

- EMPLOYEES AND SUB-CONTRACTORS.
- 3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS IN THE FIELD PRIOR TO ANY DEMOLITION OR NEW INSTALLATION.
- 4. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MAINE STATE BUILDING CODE AND ANY AND ALL OTHER APPLICABLE FEDERAL, STATE, AND LOCAL ORDINANCES. 5. THE CONTRACTOR SHALL VERIFY SHUTDOWN AND ISOLATION VALVE LOCATIONS. THE CONTRACTOR SHALL COORDINATE ALL SHUTDOWN WORK WITH THE PROJECT COORDINATOR FOR BAE.
- 6. THE CONTRACTOR SHALL VISIT THE SITE, BECOME FAMILIAR WITH THE EXISTING FIELD CONDITIONS, AND MAKE HIS OWN ESTIMATE OF THE DIFFICULTIES IN EXECUTING THE WORK PRIOR TO SUBMITTING ITS BID. NO COMPENSATION WILL BE AWARDED TO THE CONTRACTOR BASED ON A CLAIM OF LACK OF KNOWLEDGE OF EXISTING FIELD CONDITIONS.
- 7. IF DURING THE CONSTRUCTION ANY HAZARDOUS MATERIAL IS FOUND, NOTE, AND PWM WILL PROVIDE THE NECESSARY ABATEMENT. 8. THE CONTRACTOR SHALL REPORT ALL CHANGES IN THE WORK TO PWM. 9. PIPING, DUCTWORK AND EQUIPMENT ARE NOT COMPLETELY DETAILED ON THE DIAGRAMS AND ELEVATIONS PROVIDED ON THE DRAWINGS ARE APPROXIMATE. THE DISTRIBUTION IS INTENDED
- AS A GENERAL ROUTING ONLY, BUT DOES ILLUSTRATE THE DESIRED LOCATION. THE CONTRACTOR SHALL AVOID INTERFERENCES WITH OTHER EQUIPMENT AND THE WORK OF OTHER
- 10. NOT ALL VALVES, INSTRUMENTS AND CONTROLS ARE SHOWN IN THE PLAN VIEWS, INSTALL PIPING AND VALVES AS SHOWN ON PIPING AND INSTRUMENTATION DIAGRAMS AND DETAILS. 11. DUCTWORK, PIPING AND SUPPORTS SHALL NOT INTERFERE WITH EQUIPMENT MAINTENANCE ACCESS OR PULL SPACE.
- 12. DRAWINGS OF REVISED DUCTWORK OR PIPING ARRANGEMENTS SHALL BE SUBMITTED IF ITEMS ARE NOT SHOWN ON THE DRAWINGS. REVISIONS SHALL BE SUBJECT TO REVIEW AND APPROVAL
- BY THE ENGINEER PRIOR TO COMMENCEMENT OF THE CHANGES. 13. MECHANICAL CONTRACTOR SHALL PROVIDE ALL SUPPLEMENTARY STRUCTURAL SUPPORTS, ANGLE IRON, PLATES, ROD, ETC. AS NECESSARY FOR PROPER INSTALLATION OF PIPING,
- 14. CONTRACTOR SHALL BE RESPONSIBLE FOR SIZING SUPPORTS, UNISTRUT RACKS, TRAPEZE STEEL, PIPE SUPPORT COMPONENTS, ETC. 15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL DAMAGE MADE BY ITS FIRM ON NEW OR EXISTING EQUIPMENT INSTALLED OR RELOCATED UNDER THIS CONTRACT. THIS SHALL
- INCLUDE ALL TOUCH-UP PAINTING.
- 16. THE CONTRACTOR SHALL RETURN AS-BUILT DRAWINGS TO PWM
- 17. CONTRACTOR TO PROVIDE ALL MATERIALS NEEDED FOR CONSTRUCTION UNLESS OTHERWISE NOTED OR DIRECTED. 18. DIELECTRIC NIPPLES SHALL BE INSTALLED BETWEEN DISSIMILAR METALS IN SOLDERED AND THREADED PIPING SYSTEMS AND INSULATED FLANGES FOR WELDING SYSTEMS.
- 19. CONTRACTOR TO LABEL ALL NEW PIPING AND DUCTWORK EVERY 10 FEET. LABELING TO INCLUDE DIRECTION OF FLOW AS WELL AS DESCRIPTION OF CONTENTS. LABELING SHALL BE COLOR/SIZE ACCORDING TO OSHA SPECIFICATIONS.
- 20. PRIOR TO CONNECTING TO ANY EXISTING PIPING, CONFIRM TIE-IN LOCATIONS WITH PWM PROJECT MANAGER
- 21. PROVIDE HANGERS, SUPPORTS, AND INSERTS CONFORMING TO:
- 21.1. MSS SP-58
- 21.2. MSS SP-69 21.3. ANSI B31.9
- 21.4. PROVIDE PIPE HANGERS, SUPPORTS, AND ACCESSORIES WHICH: A. PERMIT VERTICAL ADJUSTMENT AFTER INSTALLATION OF PIPING.
- B. ARE DESIGNED FOR SUPPORT OF PIPING AND CONTENTS UNDER ALL CONDITIONS OF OPERATION INCLUDING TESTING.
- C. WILL NOT CRUSH, INDENT, OR OTHERWISE DAMAGE PIPE, PIPE INSULATION, OR JACKETING.
- a. PROVIDE COMPLETE HANGER AND SUPPORT ASSEMBLIES, INCLUDING CLAMPS, RODS, WASHERS, NUTS, TURNBUCKLES, AND LOCKING DEVICES, CONSTRUCTED FOR COMPATIBILITY
- WITH ITEMS SUPPORTED AND SUPPORTING STRUCTURE.
- b. PROVIDE ALL SIMILAR SUPPORT COMPONENTS BY SAME MANUFACTURER. PROVIDE OVERSIZED CLEVIS AND/OR ROLLER HANGERS TO FIT ON OUTSIDE OF INSULATED PIPING.
- d. PROVIDE INSULATION PROTECTORS AT SUPPORT POINTS FOR ALL INSULATED UNJACKETED PIPING. e. SPECIAL REQUIREMENTS: ALL COMPONENTS SHALL BE SUITABLY SIZED FOR THE LOAD SUPPORTED.
- 24. SYSTEM CLEANING AND TESTING PROCEDURES SHALL BE SUBMITTED TO AND APPROVED BY OWNER.
- 25. CONTRACTOR SHALL SEAL ALL WALL AND FLOOR PENETRATIONS TO PROVIDE LEAK TIGHT CLEAN SPACE.

1. THIS PROJECT INCLUDES THE CUT RENOVATION OF THE RENOVATION OF THE TERMINAL AND PWM. THE SCOPE INCLUDES MODIFYING AND RE-WORK OF EXISTING AIR DISTRIBUTION AND FIN TUBE RADIATION.

1. PRODUCT DATA: SUBMIT MANUFACTURERS PRODUCT DATA AND INSTALLATION INSTRUCTIONS FOR EACH MATERIAL AND PRODUCT USED.

2. OPERATION AND MAINTENANCE DATA: SUBMIT MANUFACTURERS OPERATION AND MAINTENANCE DATA, INCLUDING OPERATION INSTRUCTIONS, LIST OF SPARE PARTS AND MAINTENANCE

1. SUBMIT MANUFACTURER'S STANDARD REPLACEMENT WARRANTIES FOR MATERIAL AND EQUIPMENT FURNISHED UNDER THIS SECTION. SUCH WARRANTIES SHALL BE IN ADDITION TO AND NOT IN LIEU OF ALL LIABILITIES WHICH THE MANUFACTURER AND THE HVAC SUBCONTRACTOR MAY HAVE BY LAW OR BY PROVISIONS OF THE CONTRACT DOCUMENTS.

2. ALL MATERIALS, EQUIPMENT AND WORK FURNISHED UNDER THIS SECTION SHALL BE GUARANTEED AGAINST ALL DEFECTS IN MATERIALS AND WORKMANSHIP FOR A MINIMUM PERIOD OF TWO YEAR COMMENCING WITH THE DATE OF SUBSTANTIAL COMPLETION. WHERE INDIVIDUAL EQUIPMENT SECTIONS SPECIFY LONGER WARRANTEES, PROVIDE THE LONGER WARRANTEE. ANY FAILURE DUE TO DEFECTIVE MATERIAL, EQUIPMENT OR WORKMANSHIP WHICH MAY DEVELOP, SHALL BE CORRECTED AT NO EXPENSE TO THE OWNER INCLUDING ALL DAMAGE TO AREAS. MATERIALS AND OTHER SYSTEMS RESULTING FROM SUCH FAILURES.

- IT IS THE INTENTION OF THE SPECIFICATIONS AND DRAWINGS TO CALL FOR COMPLETE, FINISHED WORK, TESTED AND READY FOR CONTINUOUS OPERATION. ANY APPARATUS, APPLIANCE, MATERIAL OR WORK NOT SHOWN ON THE DRAWINGS, BUT MENTIONED IN THE SPECIFICATIONS OR VICE VERSA, OR ANY INCIDENTAL ACCESSORIES NECESSARY TO MAKE THE WORK COMPLETE IN ALL RESPECTS AND READY FOR OPERATION, EVEN IF NOT PARTICULARLY SPECIFIED, SHALL BE PROVIDED BY THE HVAC SUBCONTRACTOR OR HIS/HER SUB SUBCONTRACTORS, WITHOUT ADDITIONAL EXPENSE TO THE OWNER OR CONSTRUCTION MANAGER
- THE DRAWINGS ARE GENERALLY DIAGRAMMATIC. THE LOCATIONS OF ALL ITEMS THAT ARE NOT DEFINITELY FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS MUST BE DETERMINED AT THE SITE AND SHALL HAVE THE APPROVAL OF THE ARCHITECT BEFORE BEING INSTALLED. THE HVAC SUBCONTRACTOR SHALL FOLLOW DRAWINGS, INCLUDING SHOP DRAWINGS, IN LAYING OUT WORK AND SHALL CHECK THE DRAWINGS OF OTHER TRADES TO VERIFY SPACES IN WHICH WORK WILL BE INSTALLED. MAINTAIN MAXIMUM HEADROOM AND SPACE CONDITIONS. WHERE SPACE CONDITIONS APPEAR INADEQUATE, NOTIFY THE ARCHITECT BEFORE PROCEEDING WITH THE INSTALLATION. THE HVAC SUBCONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE REASONABLE MODIFICATIONS IN THE LAYOUT AS NEEDED TO PREVENT CONFLICT WITH WORK OF OTHER TRADES OR FOR PROPER EXECUTION OF THE WORK.
- SIZES OF DUCTS AND PIPES AND ROUTING ARE SHOWN, BUT IT IS NOT INTENDED TO SHOW EVERY OFFSET AND FITTING, NOR EVERY STRUCTURAL DIFFICULTY THAT MAY BE ENCOUNTERED. TO CARRY OUT THE INTENT AND PURPOSE OF THE DRAWINGS, ALL NECESSARY PARTS TO MAKE COMPLETE APPROVED WORKING SYSTEMS READY FOR USE, SHALL BE FURNISHED WITHOUT

01 78 23 - OPERATION AND MAINTENANCE DATA

- . COMMENCE PREPARATION OF THE OPERATING AND MAINTENANCE (O&M) MANUALS IMMEDIATELY UPON RECEIPT OF "APPROVED" OR "APPROVED AS NOTED" SHOP DRAWINGS AND SUBMIT EACH SECTION WITHIN ONE MONTH. THE FINAL SUBMISSION SHALL BE NO LATER THAN TWO MONTHS PRIOR TO THE PROJECTED DATE OF SUBSTANTIAL COMPLETION OF THE PROJECT.
- 2. THE MANUAL SHALL CONSIST OF (3) SETS OF MANUALS AND INCLUDE (3) SETS OF CDS, WHICH SHALL CONTAIN THE SCANNED CONTENT OF THE ENTIRE MANUAL. THE MANUAL SHALL HIGHLIGHT THE ACTUAL EQUIPMENT USED AND NOT BE A MASTER CATALOG OF ALL SIMILAR PRODUCTS OF THE MANUFACTURER.

1. PRIOR TO SUBMISSION OF BID, VISIT THE SITE AND REVIEW THE RELATED CONSTRUCTION DOCUMENTS TO DETERMINE THE CONDITIONS UNDER WHICH THE WORK HAS TO BE PERFORMED. SEND A REPORT. IN WRITING, TO THE DESIGN BUILD CONTRACTOR'S REPRESENTATIVE. NOTING ANY CONDITIONS WHICH MIGHT ADVERSELY AFFECT THE WORK OF THIS SECTION OF THE SPECIFICATIONS.

23 05 29 - SUPPLEMENTARY STEEL, CHANNELS AND SUPPORTS

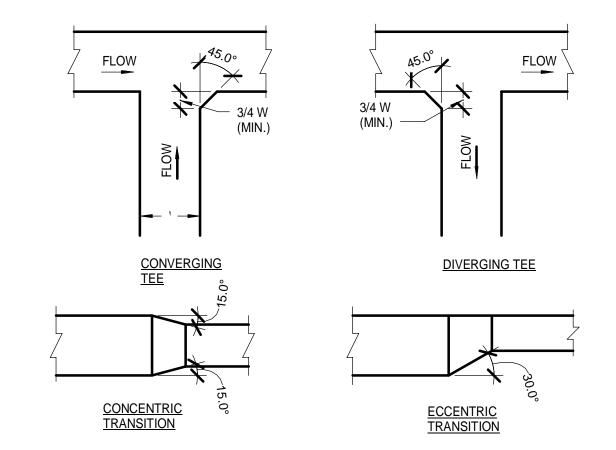
- 1. PROVIDE ALL SUPPLEMENTARY STEEL, FACTORY FABRICATED CHANNELS AND SUPPORTS REQUIRED FOR PROPER INSTALLATION, MOUNTING AND SUPPORT OF ALL EQUIPMENT AND SYSTEMS PROVIDED UNDER THIS SECTION OF THE SPECIFICATION.
- 2. $\,$ SUPPLEMENTARY STEEL AND FACTORY FABRICATED CHANNELS SHALL BE FIRMLY CONNECTED TO BUILDING CONSTRUCTION
- 3. THE TYPE AND SIZE OF THE SUPPORTING CHANNELS AND SUPPLEMENTARY STEEL PROVIDED UNDER THIS SECTION OF THE SPECIFICATIONS SHALL BE DETERMINED BY THE SUBCONTRACTOR AND SHALL BE OF SUFFICIENT STRENGTH AND SIZE TO ALLOW ONLY A MINIMUM DEFLECTION IN CONFORMANCE WITH THE MANUFACTURER'S REQUIREMENTS FOR LOADING.
- 4. ALL SUPPLEMENTARY STEEL AND FACTORY FABRICATED CHANNELS SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER PARALLEL TO THE WALLS, FLOORS AND CEILING CONSTRUCTION. ALL TURNS SHALL BE MADE WITH 90 DEGREE AND 45 DEGREE FITTINGS, AS REQUIRED TO SUIT THE CONSTRUCTION AND INSTALLATION CONDITIONS.
- 5. ALL SUPPLEMENTARY STEEL INCLUDING FACTORY FABRICATED CHANNELS, SUPPORTS AND FITTINGS SHALL BE GALVANIZED STEEL, ALUMINUM, OR STAINLESS STEEL WHERE EXPOSED OR SUBJECT TO RUST PRODUCING ATMOSPHERE AND SHALL BE MANUFACTURED BY UNISTRUT, H-STRUT, POWERSTRUT, ERICO OR APPROVED EQUAL.

23 05 53 - MECHANICAL IDENTIFICATION

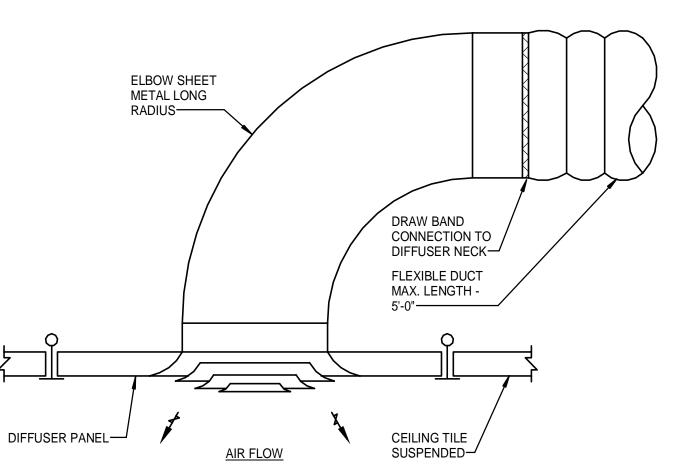
DUCT TRANSITION

- 1. PROVIDE EQUIPMENT IDENTIFICATION TAGS ON ALL NEW MECHANICAL EQUIPMENT. COORDINATE EQUIPMENT IDENTIFICATION NAMES W/ OWNER'S NAMING STANDARDS.

2. LABELING SHALL APPEAR AT INTERVALS OF NOT MORE THAN 20 FEET AND AT LEAST ONCE IN EACH ROOM AND EACH STORY TRAVERSED BY THE PIPING SYSTEM. ALL PIPING SHALL BE CLEARLY IDENTIFIED SPECIFICALLY FOR TYPE OF SERVICE WITH COILED PLASTIC PIPE MARKERS AND FLOW DIRECTION ARROWS. 3. PROVIDE DUCT LABELS ON ALL SUPPLY AND RETURN DUCTWORK.



DIFFUSER CONNECTION DETAIL

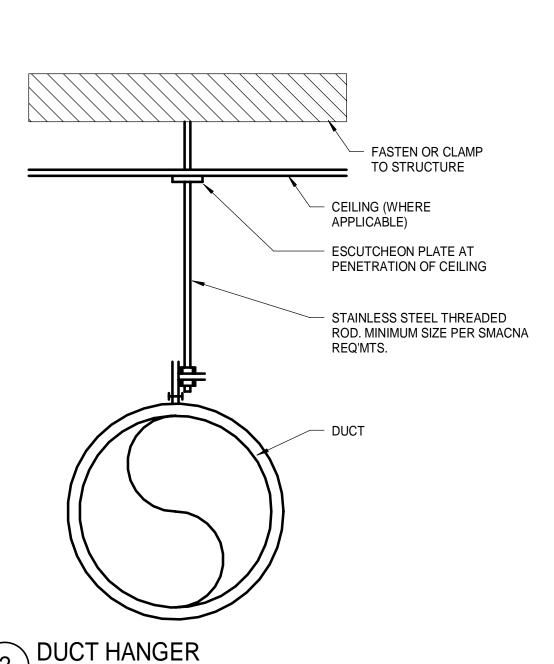


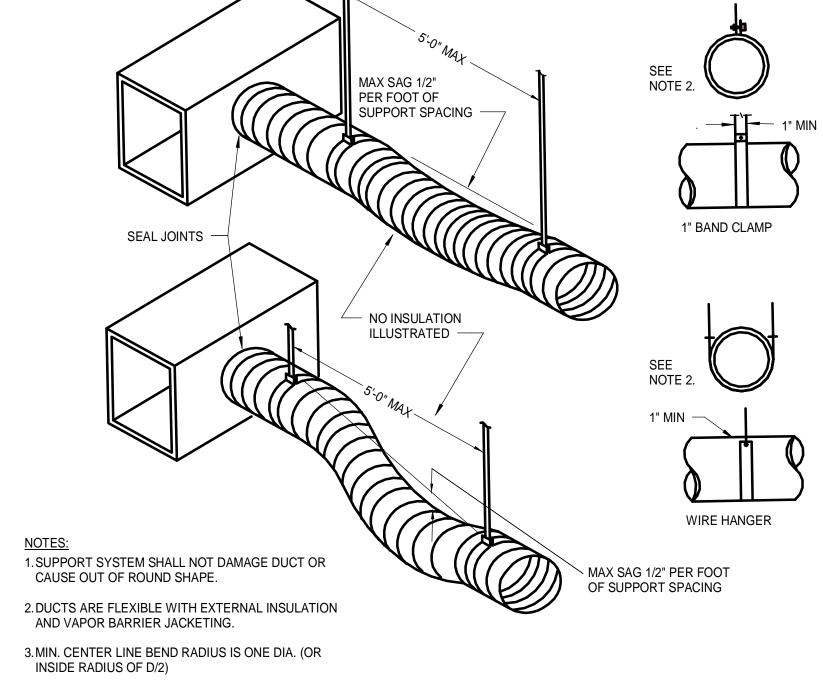
23 07 13 - DUCT INSULATION

- THICKNESS AND MATERIAL SCHEDULE FOR DUCTWORK A. INTERIOR SUPPLY: 1-1/2" FIBERGLASS DUCTWRAP WITH REINFORCED METAL FOIL VAPOR BARRIER. KNAUF ATMOSPHER DUCTWRAP OR EQUAL.
- 2. THERMAL CONDUCTIVITY AT 75°F: 0.23 BTU-INCH/HR/SQ. FT./°F. (ASTM C518-70) A. INSULATION EXTERIOR FACING: FSK VAPOR BARRIER WITH ONE 2" FLANGE.
- B. INSULATION EXTERIOR FACING PERMEABILITY: 0.02 PERM (ASTM E96-66, PROCEDURE A).
- C. MAXIMUM AIR TEMPERATURE: 250 DEGREES F.
- D. INSULATION ATTACHMENT ADHESIVE: FOSTER STIC-SAFE ADHESIVE 85-15. E. FASTENERS: WELD PINS OR NYLON TUFF-WELD STICK CLIP UNITS, BY GOODLOE E. MOORE, OR AN APPROVED EQUAL.\FASTENER ATTACHMENT ADHESIVE: TUFF-BOND QUICK-SET ADHESIVE, BY GOODLOE E. MOORE, OR AN APPROVED EQUAL.
- F. TAPE: REINFORCED FOIL/SCRIM/KRAFT TO MATCH THE FACING, 3" WIDE WITH PRESSURE SENSITIVE ADHESIVE, BY FASSON OR AN APPROVED EQUAL.
- G. ADHESION (PSTC-1): 80 OZ/INCH OF WIDTH. H. SHEAR (PSTC-7): 3000 MINUTES.
- TENSILÈ: 25 LBS./INCH OF WIDTH. J. PRESSURE SENSITIVE TAPE COUNCIL

- GALVANIZED STEEL DUCTS: ASTM A 653/A 653M GALVANIZED STEEL SHEET, FORMING STEEL (FS) DESIGNATION, WITH G90/Z275 ZINC COATING
- 2. FLEXIBLE DUCT: UL181, NFPA 90A/B. SELF EXTINGUISHING, INSULATED SEALED ENDS. FLEXIBLE DUCTWORK SERVING HEPA FILTERS TO BE CLEANROOM GRADE, TCI CHEMDUIT, OR
- 3. HANGER ROD: ASTM A 36/A 36M; STEEL; THREADED BOTH ENDS, THREADED ONE END, OR CONTINUOUSLY THREADED. ROD SHALL BE GALVANIZED OR ELECTROPLATED. 4. HANGER STRAPS: COMPLY WITH SMACNA "HVAC DUCT STANDARDS-METAL AND FLEXIBLE" FOR STEEL SHEAT WIDTH AND THICKNESS AND SHALL BE GALVANIZED SHEET METAL TO MATCH DUCT.
- 5. SEALANT (SUPPLY/RETURN/MAU)
 - A. DUCTMATE PROSEAL OR APPROVED EQUAL.
- B. NON-HARDENING, WATER RESISTANT, FIRE RESISTIVE, COMPATIBLE WITH MATING MATERIALS; LIQUID USED ALONE OR WITH TAPE, OR HEAVY MASTIC. C. WATER BASED WITH A VERY MILD ODOR; UL 723 LISTED. FLAME SPREAD SHALL NOT EXCEED 25 AND SMOKE DEVELOPED RATING SHALL NOT EXCEED 50.
- D. DRY TIME TO TOUCH: 1 HOUR E. DRY TIME - TO CURE: 24 TO 72 HOURS.
- 4. METAL DUCTWORK AND PLENUM FABRICATION
- A. FABRICATE AND SUPPORT IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE, AND AS INDICATED. PROVIDE DUCT MATERIAL, GAGES, REINFORCING, AND SEALING FOR OPERATING PRESSURES INDICATED.
- B. CONSTRUCT T'S, BENDS, AND ELBOWS WITH RADIUS OF NOT LESS THAN 1-1/2 TIMES WIDTH OF DUCT ON CENTERLINE. WHERE NOT POSSIBLE AND WHERE RECTANGULAR ELBOWS MUST BE USED, PROVIDE AIR FOIL TURNING VANES. SQUARE THROAT OR MITRED ELBOWS WITHOUT TURNING VANES ARE PROHIBITED. C. RECTANGULAR BRANCH CONNECTIONS SHALL BE 45-DEGREE ENTRY TYPE.
- D. INCREASE DUCT SIZES GRADUALLY, NOT EXCEEDING 15 DEGREES DIVERGENCE WHEREVER POSSIBLE: MAXIMUM 30 DEGREES DIVERGENCE UPSTREAM OF EQUIPMENT AND 45 DEGREES CONVERGENCE DOWNSTREAM
- ROUND BRANCHES FROM RECTANGULAR MAIN SHALL BE EITHER CONICAL OR BELLMOUTH. SPIN-IN BRANCHES ALLOWED WHERE DUCT PRESSURE CLASS IS 1" OR LOWER. F. PROVIDE STANDARD 45 DEGREE LATERAL WYE TAKEOFFS UNLESS OTHERWISE INDICATED WHERE 90 DEGREE CONICAL TEE CONNECTIONS MAY BE USED.
- 5. SEALING AND CONSTRUCTION SCHEDULES A. SUPPLY AND MAKEUP AIR: GALVANIZED STEEL, 2" WG, SEAL CLASS A.
- 6. DUCTWORK INSTALLATION
 - A. INSTALL AND SEAL METAL AND FLEXIBLE DUCTS IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE. B. PROVIDE OPENINGS IN DUCTWORK WHERE REQUIRED TO ACCOMMODATE THERMOMETERS AND CONTROLLERS. PROVIDE PILOT TUBE OPENINGS WHERE REQUIRED FOR TESTING OF
 - SYSTEMS, COMPLETE WITH METAL CAN WITH SPRING DEVICE OR SCREW TO ENSURE AGAINST AIR LEAKAGE. WHERE OPENINGS ARE PROVIDED IN INSULATED DUCTWORK, INSTALL INSULATION MATERIAL INSIDE A METAL RING. C. LOCATE DUCTS WITH SUFFICIENT SPACE AROUND EQUIPMENT TO ALLOW NORMAL OPERATING AND MAINTENANCE ACTIVITIES

- 1. HEATING HOT WATER PIPING, 2-1/2 INCH & SMALLER: TYPE L COPPER & SOLDER JOINTS.
- A. SHUT OFF SERVICE: 2-1/2" & SMALLER, TWO-PIECE BALL VALVE, 3" & LARGER, BUTTERFLY VALVES





STAIGHT SECTION FLEXIBLE DUCT SUPPORT REQUIRMENTS



SCALE

12/21/17

NOT TO SCALE