NFPA 99 B. SCOPE OF WORK

> 1. PROVIDE ALL REQUIRED PERMITS, LABOR, MATERIAL AND EQUIPMENT REQUIRED TO COMPLETE THE SCOPE OF THE PROJECT SHOWN ON THE DRAWINGS AND READY FOR OCCUPANCY AND USE BY OWNER. THE WORK SHALL INCLUDE BUT IS NOT

a. REMOVAL, RELOCATION AND RE-INSTALLATION OF EXISTING EQUIPMENT AND

 CONNECTIONS TO EXISTING OR NEW EQUIPMENT AND SYSTEMS MODIFICATION OF EXISTING CHILLED OR HOT WATER SYSTEMS, STEAM SYSTEMS, CONDENSATE DRAINAGE, DUCTWORK, TEMPERATURE CONTROLS AND LIFE-SAFETY

d. CUTTING AND PATCHING TO REMOVE EXISTING OR INSTALL NEW WORK.

e. CLEANING AND TESTING.

f. INSTRUCTION TO OWNER'S PERSONNEL.

2. ALL REMOVAL WORK AND DISRUPTIONS OF EXISTING SERVICES SHALL BE COORDINATED AND SCHEDULED IN ADVANCE WITH OWNER'S REPRESENTATIVES.

3. PROVIDE ALL BUILDING PENETRATIONS REQUIRED TO COMPLETE PROJECT. ALL PENETRATIONS TO BE PATCHED AND SEALED TO BE WATERTIGHT. MAINTAIN FIRE RATINGS OF EXISTING STRUCTURE.

4. PROVIDE ALL NECESSARY DUCT, EQUIPMENT AND PIPE SUPPORTS AND MATERIALS REQUIRED FOR INSTALLATION. PER THE REQUIREMENTS OF LOCAL, STATE OR FEDERAL

5. NOT ALL COMPONENTS REQUIRED ARE INDICATED ON THESE DRAWINGS. REFER TO MANUFACTURERS INSTRUCTIONS FOR ADDITIONAL REQUIREMENTS INCLUDING CONNECTION LOCATIONS, TYPES AND SIZES. PROVIDE ISOLATING VALVES AND UNIONS AT ALL EQUIPMENT CONNECTIONS.

C. REQUIRED SHOP DRAWINGS

 INSULATION. AIR DEVICES.

VALVES.

4. DUCTWORK COORDINATION DRAWINGS. CONTROLS.

6. AIR HANDLING EQUIPMENT. THERMOSTATS.

FANS. TERMINAL BOXES.

10. FILTERS 11. FIRE AND SMOKE DAMPERS

D. MAINTENANCE MANUALS

1. PROVIDE MAINTENANCE MANUALS FOR ALL NEW EQUIPMENT CONTAINING ALL OPERATING AND MAINTENANCE DATA, SUBMITTALS, WARRANTEES, DIAGRAMS, AHRI CERTIFICATES, INSPECTION REPORTS AND VALVE LISTS IN A 3 RING BINDER

WITH POCKETS FOR DRAWINGS. PROVIDE OWNER WITH 2 COPIES. 2. PROVIDE AN INDEX INSIDE THE BINDER COVER WITH A LIST OF EACH EQUIPMENT ITEM.

EACH ITEM SHALL BE INDIVIDUALLY TABBED. 3. PROVIDE A LIST OF ALL REQUIRED REGULAR MAINTENANCE ACTIONS.

4. MAINTENANCE LIST SHALL REFERENCE TABULATED ITEM AND SHALL INCLUDE THE TITLE OR PUBLICATION NUMBER FOR THE OPERATION AND MAINTENANCE MANUAL FOR

THAT PARTICULAR MODEL AND TYPE OF PRODUCT.

E. AS-BUILT DRAWINGS

1. THE CONTRACTOR SHALL MAINTAIN AN ACCURATE RECORD OF ALL CHANGES MADE TO THE CONTRACT DOCUMENTS (AS-BUILT).

2. THE CONTRACTOR SHALL PROVIDE THE ENGINEER 2 SETS OF COMPLETED AS-BUILT

3. THE PROJECT WILL NOT BE CONSIDERED COMPLETE UNTIL ACCURATE AS-BUILTS ARE DELIVERED.

F. SUBSTITUTIONS

1. EQUIPMENT AND DESIGN OF SYSTEMS INDICATED ON THE DESIGN DRAWINGS AND WITHIN THESE SPECIFICATIONS SHALL BE CONSIDERED AS "SPECIFIED STANDARD" OF QUALITY. NO SUBSTITUTIONS SHALL BE MADE WITHOUT PRIOR WRITTEN APPROVAL OF THE ENGINEER 10 DAYS PRIOR TO BID DATE.

2. ANY DEVIATION FROM SPECIFIED EQUIPMENT THAT AFFECTS THE ELECTRICAL REQUIREMENTS SHALL BE COORDINATED BY THE MECHANICAL CONTRACTOR AND EQUIPMENT VENDOR WITH THE ELECTRICAL CONTRACTOR PRIOR TO SUBMITTING

G. WIND LOADS

1. ALL EQUIPMENT TO BE MOUNTED OUTSIDE SHALL BE FURNISHED WITH A NOA (NOTICE OF ACCEPTANCE) FOR WINDSTORM OR BE FURNISHED WITH AN ENGINEERED DETAIL GOOD FOR THE LOCAL WIND RATE.

15050 - BASIC MATERIALS AND METHODS

A. ACCESS PANELS – FURNISHED BY MECHANICAL CONTRACTOR, INSTALLED BY GENERAL CONTRACTOR.

1. PROVIDE FOR ACCESS TO ALL SERVICEABLE EQUIPMENT IN WALLS AND CEILINGS. 2. MICOR STYLE M FOR DRYWALL.

3. MICOR STYLE K FOR PLASTER.

4. MINIMUM SIZE 16"x16". 5. NYSTROM, KARP, J.L. INDUSTRIES OR WILLIAMS PAINT.

B. LABELING

1. PROVIDE RIGID PLASTIC EMBOSSED EQUIPMENT NAMETAGS FOR ALL NEW EQUIPMENT AND DISCONNECTS. SETON NAMEPLATE CORPORATION.

2. PAINT ALL MECHANICAL PIPING IN EQUIPMENT ROOMS, BOILER ROOMS AND WHERE EXPOSED OR OUTDOORS. MATCH EXISTING COLOR CODES USED ON SIMILAR SYSTEMS. 3. PROVIDE VALVE TAGS ON ALL NEW AND RELOCATED VALVES. VALVE TAGS SHALL MATCH TAGS USED AT THE EXISTING FACILITY. TAGS TO BE SECURED TO VALVES WITH BRASS CHAINS. PROVIDE UPDATED INFORMATION ON ALL NEW VALVES TO THE EXISTING VALVE CHART.

4. PROVIDE PIPE LABELS ON ALL NEW PIPING. PIPE LABELS TO MATCH SIZE, COLOR AND TYPE USED AT THE EXISTING FACILITY AND COMPLY WITH ANSI A1 3.1. LABELS SHALL BE APPLIED CLOSE TO VALVES, CHANGES IN PIPE DIRECTIONS, BRANCHES, PIPES PASSING THRU WALLS OR FLOORS AND EVERY 20 FEET IN STRAIGHT RUNS OF PIPING AND AT LEAST ONE TIME PER ROOM.

C. FLASHING AND COUNTER FLASHING

1. FURNISH MATERIALS AND COORDINATE INSTALLATION FOR ALL PENETRATIONS OF ROOF BY ALL DUCT AND PIPE.

2. SHEET METAL - 24ga. ASTM A525. 3. SHEET LEAD 6 lbs PER SQ. FT. (WHERE ALLOWED)

4. STAINLESS STEEL 20 ga. 5. SHEET COPPER 24 oz PER SQ. FT. D. MECHANICAL SYSTEMS CLEANING

1. CLEAN AND TOUCH UP ALL FACTORY FINISHES.

2. FLUSH ALL HVAC SYSTEMS BEFORE CONNECTION TO EQUIPMENT. 3. CLEAN ALL CLOSED HVAC SYSTEMS WITH ALKALINE CLEANER CIRCULATED FOR 72

4. PRESSURE TEST ALL MECHANICAL PIPING SYSTEMS.

 a. STEAM SYSTEMS 150 psi FOR SIX HOURS. b. WATER SYSTEMS 150 psi FOR SIX HOURS.

E. CLEANING TESTING AND ADJUSTING

1. THE MECHANICAL CONTRACTOR, AT HIS EXPENSE, SHALL CLEAN, REPAIR, ADJUST CHECK, BALANCE AND PLACE IN SERVICE THE VARIOUS SYSTEMS HEREIN SPECIFIED WITH THEIR RESPECTIVE EQUIPMENT, ACCESSORIES AND PIPING. HE/SHE SHALL FURNISH ALL LABOR, MATERIALS, EQUIPMENT AND TOOLS REQUIRED TO PERFORM TESTS REQUIRED BY THESE SPECIFICATIONS AND BY THE GOVERNING AUTHORITIES.

2. NO WORK SHALL BE COVERED OR CONCEALED UNTIL PROPERLY INSPECTED AND

F. HANGERS AND SUPPORTS

1. PROVIDE ALL NECESSARY DUCTWORK, PIPE SUPPORTS, HANGERS, RODS, CLAMPS AND ATTACHMENTS TO PROPERLY INSTALL AND SUPPORT DUCTWORK, PIPING AND EQUIPMENT FROM THE BUILDING STRUCTURE.

2. PROVIDE ANY ANGLE IRON OR UNISTRUT AND SUSPENSION RODS REQUIRED TO INSTALL EQUIPMENT, PIPING AND DUCTWORK.

3. ALL SUPPORTS EXPOSED TO OUTDOORS SHALL BE CLEANED, PRIMED AND PAINTED TO PREVENT RUSTING. FINISH COLOR AS SELECTED BY OWNER.

4. THE USE OF BALING WIRE OR PERFORATED METAL STRAPPING IS NOT PERMITTED FOR

G. WARRANTY/GUARANTEE

1. THE CONTRACTOR SHALL WARRANTY/GUARANTEE AND MAINTAIN THE STABILITY OF WORK AND MATERIALS AND KEEP SAME IN PERFECT REPAIR AND CONDITION OF THE

2. DEFECTS OF ANY KIND DUE TO THE FAULTY WORK OR MATERIALS APPEARING DURING THE ABOVE MENTIONED PERIOD MUST BE IMMEDIATELY MADE GOOD BY THE CONTRACTOR AT HIS OWN EXPENSE TO THE ENTIRE SATISFACTION OF THE OWNER AND ENGINEER. SUCH RECONSTRUCTION AND REPAIRS SHALL INCLUDE DAMAGE TO THE FINISH OR FURNISHING OF THE BUILDING RESULTING FROM THE ORIGINAL DEFECT OR REPAIR THERETO.

A. DO NOT USE MECHANICALLY COUPLED JOINTS OR T-DRILLED TEES ON HVAC SYSTEMS. B. SCHEDULE 40 ASTM A53 OR A106 GRADE B BLACK STEEL PIPE USED FOR:

CHILLED WATER 2 INCH DIAMETER AND ABOVE.

2. HEATING HOT WATER 2 INCH DIAMETER AND ABOVE.

CONDENSER WATER.

C. SCHEDULE 40 ASTM A53 SEAMLESS BLACK STEEL PIPE USED FOR:

D. SCHEDULE 80 A134 GALVANIZED SEAMLESS BLACK STEEL PIPE USED FOR:

 STEAM CONDENSATE. BOILER BLOW DOWN.

E. TYPE L HARD COPPER PIPE USED FOR:

1. HVAC HEATING HOT WATER UP TO 1 1/2 INCHES IN DIAMETER.

2. HVAC CHILLED WATER UP TO 1 1/2 INCHES IN DIAMETER.

COOLING COIL CONDENSATE PIPING. 4. REFRIGERANT PIPING

F. DUCTILE IRON PIPE USED FOR:

 BURIED CONDENSER WATER PIPING. PVC PIPE IS NOT TO BE USED ON MECHANICAL SYSTEMS.

# 15103 - SLEEVES

A. SLEEVES TO BE 18 GAGE SHEET METAL OR SCHEDULE 40 PIPE. SLEEVE THE

1. MASONRY WALLS SLEEVE ALL PIPE PENETRATIONS.

2. FLOORS SLEEVE ALL HVAC PIPING. EXTEND SLEEVES 1/2 " ABOVE FINISHED FLOOR (2" ABOVE FINISHED FLOORS IN MECHANICAL ROOMS).

3. FIRE RATED DRY WALL PARTITIONS SLEEVE STEAM SUPPLY AND RETURN AND HEATING

4. NON-FIRE RATED PARTITIONS NO SLEEVES REQUIRED. SEAL WALL TO INSULATION.

5. USE U.L. LISTED ASSEMBLY FOR ALL PENETRATIONS THRU RATED CONSTRUCTION.

15242 - VIBRATION ISOLATION

A. ACCEPTABLE MANUFACTURERS:

 MASON INDUSTRIES. KINETICS NOISE CONTROL.

KORFUND. AMBER BOOTH.

B. MASON TYPE SLF CONTROL AIR COMPRESSOR, AHU'S (UNLESS INTERNAL), CENTRIFUGAL FANS.

C. MASON SUPER W RUBBER PAD HVAC PUMPS, CHILLERS, AHU'S (IF INTERNAL).

D. MASON TYPE HS CEILING SUSPENDED FANS AND AHU'S.

E. MASON PC30N CLOSEST 2 HANGERS TO AHU'S, PIPING WITHIN 20 PIPE DIAMETERS

F. INERTIA BASES WHERE SCHEDULED OR SHOWN.

# 15250 - INSULATION

A. INSULATION, ADHESIVES, COATINGS, SEALERS, TAPES, ETC. SHALL HAVE A FLAME SPREAD OF 25 OR LESS AND SMOKE DEVELOPMENT OF 50 OR LESS IN ACCORDANCE WITH ASTM E-84, NFPA 225, UL 723 AND MEET THE REQUIREMENTS OF NFPA 90A. ALL INSULATING R-VALUES TO MEET THE REQUIREMENTS OF THE FLORIDA ENERGY

B. FIBERGLASS PIPE INSULATION, JOHNS MANVILLE MICRO-LOK 850, CERTIANTEED, KNAUF, OWENS CORNING. JACKET: ASJ KRAFT PAPER WITH ALUMINUM FOIL.

1. HEATING HOT WATER 2" AND UNDER - 1 1/2 " THICK.

2. HEATING HOT WATER 2 1/2 " AND OVER 2" THICK. 3. STEAM 4" AND UNDER - 2 1/2" THICK.

4. STEAM OVER 5" - 3 1/2" THICK.

STEAM CONVERTER - 2" THICK. 6. STEAM CONVERTER - 1 1/2 " THICK. C. CELLULAR GLASS PIPE INSULATION, PITTSBURGH CORNING "FOAMGLASS"

1. CHILLED WATER PIPING 2" AND UNDER - 1 1/2 " THICK.

2. CHILLED WATER PIPING OVER 2" - 2" THICK. 3. ALL HVAC PIPING EXPOSED TO WEATHER.

D. FLEXIBLE ELASTOMERIC INSULATION, ARMSTRONG "AP ARMAFLEX", MITCHEL,

1. CONDENSATE DRAINS - 3/4" THICK.

2. REFRIGERATION MACHINE EVAPORATOR - 2 LAYERS - 3/4 " THICK. 3. REFRIGERATION SUCTION LINES: 3/4 " THICK

4. ALL OUTDOOR EXPOSED PIPING INSULATION SHALL BE PAINTED WITH TWO COATS OF ARMAFLEX STANDARD WHITE WB FINISH. PRIOR TO APPLYING THE FINISH, THE INSULATION SHALL BE WIPED CLEAN WITH DENATURED ALCOHOL. THE FINISH SHALL NOT BE TINTED.

5. ALL OUTDOOR EXPOSED PIPING SHALL HAVE THE SEAMS LOCATED ON THE LOWER HALF OF

E. BLANKET TYPE DUCT INSULATION, JOHNS MANVILLE, CERTAINTEED, KNAUF, OWENS CORNING, MINIMUM R=6.0, FOIL FACED KRAFT VAPOR BARRIER

1. ALL SUPPLY, OUTSIDE AIR AND RETURN WHERE CONCEALED FROM VIEW, R-6. F. SEMI RIGID BOARD TYPE DUCT INSULATION 1.51b DENSITY, CERTAINTEED 1B-300,

JOHNS MANVILLE, KNAUF, OWENS CORNING: 1. ALL SUPPLY, RETURN AND OUTSIDE AIR WHERE EXPOSED.

6. CONTACT MANUFACTURER FOR ALTERNATIVE PRODUCTS.

2. MINIMUM DUCT INSULATION THICKNESS AND R VALUES ARE AS FOLLOWS:

a. SUPPLY AND RETURN AIR IN UNCONDITIONED SPACE: 2" (R-6 MIN.) b. SUPPLY AND RETURN AIR IN CONDITIONED INTERIOR SPACE: 1.5" (R-4.2 MIN.)

c. OUTSIDE AIR: 2" (R-6 MIN.)

d. SUPPLY AIR IN CEILING RETURN AIR PLENUM: 1.5" (R-4.2 MIN.) e. RETURN AIR IN CEILING RETURN AIR PLENUM: NOT REQUIRED.

f. DUCTWORK OUTSIDE OF BUILDING: 3" (R-8 MIN.)

A. FOR INTERNALLY LINED RECTANGULAR DUCTS, PROVIDE 1" THICK JOHNS MANVILLE PERMACOTE LINACOUSTIC RC-HP FLEXIBLE DUCT LINER INSULATION OR APPROVED EQUAL. NRC: 0.75, R-VALUE 4.3 (1" THICK). COMPLIES WITH ASTM C1071 TYPE 1, ASHRAE 62. LINER SHALL BE RESISTANT TO DUST AND DIRT AND SHALL NOT SUPPORT MICROBIAL GROWTH.

B. FOR INTERNALLY LINED PLENUMS, PROVIDE 1-1/2" THICK JOHNS MANVILLE LINACOUSTIC R-300 RIGID FIBERGLASS BOARD OR APPROVED EQUAL. NRC: 0.9, R-VALUE: 6.3 (1.5" THICK). COMPLIES WITH ASTM C1071 TYPE II.

## 15890 - SHEETMETAL DUCTWORK

A. ALL DUCT TO BE INSTALLED ACCORDING TO LATEST SMACNA STANDARDS. B. ALL DUCT EXCEPT THAT SPECIFICALLY SHOWN IS TO BE GALVANIZED. RETURN, EXHAUST AND DUCT DOWNSTREAM OF CV BOXES TO BE 0-2" PRESSURE CLASS. SUPPLY DUCT FROM FAN TO CV OR VAV BOX TO BE 4" CLASS.

15910 - SHEETMETAL ACCESSORIES

A. AIR INLETS AND OUTLET.

REFER TO SCHEDULE.

C. ALL SYSTEMS TO BE LEAKAGE TESTED.

2. ALL ALUMINUM CONSTRUCTION. 3. ACCEPTABLE MANUFACTURERS: TITUS, PRICE, METAL-AIRE, CARNES, ANEMOSTAT

B. FIRE DAMPERS

1. FIRE DAMPERS SHALL BE TYPE "B" CURTAIN TYPE, SUITABLE FOR EITHER VERTICAL OR HORIZONTAL INSTALLATION, WITH 20 GAUGE STEEL CHANNEL FRAMES, 24 GAUGE STEEL BLADES AND 18 GAUGE STEEL ENCLOSURE WITH DUCT COLLARS. ALL PARTS

GALVANIZED MILL FINISH. 2. FIRE DAMPERS SHALL BE EQUAL TO RUSKIN TYPE IBD2 FOR WALLS UP TO 2 HOURS. 3. INSTALL IN ACCORDANCE WITH NFPA-90A, TESTED IN ACCORDANCE WITH UL SAFETY

4. FURNISH FIRE DAMPERS AND ACCESS DOORS IN ALL DUCTS PENETRATING

5. USE FOLDING BLADE TYPE "C" IN HIGH VELOCITY ROUND DUCTS. USE FOLDING BLADE

ANY RATED CONSTRUCTION AND WHERE INDICATED ON DRAWINGS.

TYPE FOR SQUARE AND RECTANGULAR DUCTS, AS DETAILED. 6. FIRE DAMPERS SHALL BEAR THE 1 HOUR UNDERWRITER'S LABORATORY UL SAFETY

STANDARD 555, RATED PROTECTION REQUIRED, 165°F FUSIBLE LINK.

7. ACCEPTABLE MANUFACTURERS SHALL BE RUSKIN, AIR BALANCE, GREENHECK, NAILOR.

COMBINATION FIRE/SMOKE DAMPERS 1. TYPE "B" FOR ALL LOCATIONS, WITH ACCESS DOORS. ALL DAMPERS SHALL BE INSTALLED IN ACCORDANCE WITH NFPA-90A AND TESTED IN ACCORDANCE WITH UL

SAFETY STANDARDS 555S. 2. ALL DAMPERS SHALL BEAR THE UL SAFETY STANDARD 555S LABEL FOR THE COMPLETE ASSEMBLY. DAMPERS SHALL BE RATED FOR 11/2 HOUR PROTECTION WITH 165°F FUSIBLE LINK, EQUAL TO RUSKIN FSD-35. MOTOR OPERATOR PNEUMATIC TO MATCH EXISTING OR ELECTRIC VOLTAGE SHALL BE 24 VOLT UNLESS INDICATED ON PLANS. COORDINATE WITH FIRE ALARM CONTROL AND ELECTRICAL CONTRACTORS.

DESIGNER NOTE TO COORDINATE WITH ELECTRICAL TO VERIFY VOLTAGE. 3. UNLESS OTHERWISE REQUIRED BY THE AUTHORITY HAVING JURISDICTION, SLEEVES FOR FIRE DAMPERS AND FIRE SMOKE COMBINATION DAMPERS SHALL BE THE RIGID TYPE OF CONSTRUCTION RECOMMENDED IN SCHEDULE 2 OF SMACNA PUBLICATION FOR "FIRE DAMPER AND HEAT STOP GUIDE FOR AIR HANDLING SYSTEMS". USE 16 GAUGE FOR DUCTS 24" OR LESS IN DIAMETER OR EITHER RECTANGULAR DIMENSION AND 14 FOR DUCTS OVER 24". PROVIDE MINIMUM 18" LONG SLEEVES.

C. FLEXIBLE DUCTWORK

1. TO BE FLEXMASTER TYPE 3, WIREMOLD TYPE WCK OMNIAIR 1200, OR THERMAFLEX. 2. FLEXIBLE DUCTWORK SHALL BE ACOUSTICAL LOW PRESSURE TYPE WITH INTERIOR LINER, METAL HELIX, FIBERGLASS INSULATION WITH AN R VALUE OF 6.0 OR GREATER AND COPOLYMER SEAMLESS OUTSIDE SLEEVE. THE ENTIRE FLEXIBLE DUCT ASSEMBLY SHALL BE LISTED IN ACCORDANCE WITH UL-181 CLASS 1 AIR DUCT MATERIAL. THE MAXIMUM LENGTH OF ANY FLEX DUCT SHALL BE 6'-0". FLEXIBLE DUCTWORK SHALL MEET THE FLORIDA MODEL ENERGY EFFICIENCY CODE. ALL JOINTS AT CONNECTIONS

DUCT, MODEL NI-TL OR APPROVED EQUAL, ETL CLASS 0, MAXIMUM LENGTH USED SHALL BE 6 FT.

TO DIFFUSERS AND DUCTWORK SHALL BE SEALED WITH GLASS, FABRIC AND MASTIC.

3. FLEXIBLE NON-INSULATED DUCT SHALL BE FLEXMASTER ALUMINUM TRIPLE-LOCK METAL

FLEXIBLE INSULATED DUCT FOR SUPPLY AND RETURN AIF

A. FLEXIBLE DUCT: UL 181, CLASS 1, MULTIPLE LAYERS OF ALUMINUM LAMINATE SUPPORTED BY HELICALLY WOUND, SPRING-STEEL WIRE; FIBROUS-GLASS INSULATION; POLYETHYLENE OR ALUMINIZED VAPOR-BARRIER FILM. FLEXMASTER, MASTERDUCT TYPE 5M LOW PRESSURE INSULATED OR EQUAL.

1. PRESSURE RATING: 10-INCH WG POSITIVE AND 1.0-INCH WG NEGATIVE.

MAXIMUM AIR VELOCITY: 4000 FPM.

3. TEMPERATURE RANGE: MINUS 20 TO PLUS 210 DEG F.

4. INSULATION R-VALUE: COMPLY WITH ASHRAE/IESNA 90.1, R-6 MINIMUM.

5. FLAME SPREAD: LESS THAN 25 6. SMOKE DEVELOPED: LESS THAN 50

B. CONNECT FLEXIBLE DUCTS TO METAL DUCTS, DIFFUSERS, OR TAKE-OFFS WITH DRAW BANDS AND PRESSURE SENSITIVE TAPE. C. COMPLY WITH FMC SECTION 603, DUCT CONSTRUCTION AND INSTALLATIO

D. SPLICING OF TWO OR MORE SECTIONS SHALL NOT BE PERMITTED. DO NOT EXCEED CENTERLINE BEND RADIUS OF 1.5 X DIAMETER. TRIM DUCTS TO PROPER LENGTHS AND DO NOT ALLOW DUCTS TO SAG. E. DUCTS SHALL BE SUPPORTED WITH APPROVED HANGERS IN ACCORDANCE WITH THE

REQUIREMENTS OF FMC SECTIONS 603.10.1 THROUGH 603.10.3, OR BY OTHER APPROVED DUCT SUPPORT SYSTEMS DESIGNED IN ACCORDANCE WITH THE FLORIDA BUILDING CODE FLEXIBLE DUCTS SHALL BE CONFIGURED AND SUPPORTED SO AS TO PREVENT THE USE OF EXCESS DUCT MATERIAL, PREVENT DUCT DISLOCATION OR DAMAGE, AND PREVENT CONSTRICTION OF THE DUCT BELOW THE RATED DUCT DIAMETER IN ACCORDANCE WITH 1. DUCTS SHALL BE INSTALLED FULLY EXTENDED. THE TOTAL EXTENDED LENGTH OF DUCT

MATERIAL SHALL NOT EXCEED 5 PERCENT OF THE MINIMUM REQUIRED LENGTH FOR THAT

3. TERMINAL DEVICES SHALL BE SUPPORTED INDEPENDENTLY OF THE FLEXIBLE DUCT. 4. HORIZONTAL DUCT SHALL BE SUPPORTED AT INTERVALS NOT GREATER THAN 5 FEET. DUCT SAG BETWEEN SUPPORTS SHALL NOT EXCEED 1/2 INCH (12.7 MM) PER FOOT OF LENGTH. SUPPORTS SHALL BE PROVIDED WITHIN 1-1/2 FEET OF INTERMEDIATE FITTINGS AND BETWEEN INTERMEDIATE FITTINGS AND BENDS. CEILING JOISTS AND RIGID DUCT OR EQUIPMENT MAY BE CONSIDERED TO BE SUPPORTS

2. BENDS SHALL MAINTAIN A CENTER LINE RADIUS OF NOT LESS THAN ONE DUCT

F. 6. HANGERS, SADDLES AND OTHER SUPPORTS SHALL MEET THE DUCT MANUFACTURER'S RECOMMENDATIONS AND SHALL BE OF SUFFICIENT WIDTH TO PREVENT RESTRICTION OF THE INTERNAL DUCT DIAMETER. IN NO CASE SHALL THE MATERIAL SUPPORTING FLEXIBLE DUCT THAT IS IN DIRECT CONTACT WITH IT BE LESS THAN 1-1/2 INCHES WIDE.

5. VERTICAL DUCT SHALL BE STABILIZED WITH SUPPORT STRAPS AT INTERVALS NOT

E. TERMINAL CONNECTORS

1. GENERAL - CONNECTORS SHALL BE RATED FOR 12" W.G., AND MEET NFPA 90A REQUIREMENTS. DUCT SHALL BE FABRICATED OR ALUMINUM SPIRAL HELIX AND REINFORCED RIP STOP ALUMINUM POLYESTER. PRESSURE DROP SHALL NOT EXCEED 0.6"/100'-0" AT 1000 FPM. WHERE INSULATION IS REQUIRED, FURNISH FACTORY APPLIED FIBERGLASS WITH REINFORCED VAPOR-BARRIER JACKET. INSULATION CONDUCTANCE VALUE SHALL NOT EXCEED 0.23. NON-INSULATED DUCT SHALL BE EQUAL TO FLEXMASTER TYPE 3. INSULATED DUCT SHALL BE EQUAL TO FLEXMASTER 3M.

2. HIGH VELOCITY - MAXIMUM DEVELOPED LENGTH OF CONNECTOR SHALL BE 6'-0". USE

METAL DUCTS AND FITTINGS TO REACH WITHIN 6'-0" WHERE CONNECTORS ARE

ATTACHED TO INSULATED DUCT, FURNISH INSULATED FLEXIBLE DUCT.

2. TYPE: OPPOSED BLADE.

F. BALANCING DAMPERS 1. GENERAL - IN ALL DUCTWORK SYSTEMS, PROVIDE DAMPERS FOR PROPER CONTROL AND BALANCING OF AIR QUANTITIES. CONCEALED DAMPERS TO HAVE CONCEALED DAMPER REGULATOR. ALL COMPONENTS FOR PROPER OPERATION; (i.e. GEARS,

3. MATERIAL: STEEL, 3V TYPE BLADES MOUNTED IN STEEL CHANNEL FRAME. 4. SHAFT: 1/2 " SQUARE ROD OPERATOR WITH END BEARINGS AND GASKET SEAL AT DUCT

PENETRATIONS. TERMINATE SHAFT IN DAMPER FRAME WITH BUSHINGS

5. OPERATOR: LOCKING QUADRANT HANDLE WITH DAMPER POSITION INDICATOR AND

INSULATION STAND OFF MOUNTING BRACKET FOR EXTERNALLY INSULATED DUCTWORK.

G. ACCESS DOORS 1. ACCEPTABLE MANUFACTURERS: RUSKIN, VENCO, NAILOR.

LINKAGES, CABLE, ETC.) SHALL BE INCLUDED.

2. SIZE ACCESS DOOR AS FOLLOWS:

15970 - TEMPERATURE CONTROLS

A. EXTEND EXISTING CONTROL SYSTEM TO NEW EQUIPMENT AND PROVIDE ALL MODIFICATIONS NECESSARY FOR A FULLY FUNCTIONING SYSTEM.

B. AIR HANDLING UNIT AND CONSTANT VOLUME REHEAT BOXES 1. THE EXISTING CONTROL SYSTEM IS TO BE MODIFIED BY THE OWNERS EXISTING

2. AUTOMATIC CONTROL VALVES SHALL BE FULLY PROPORTIONING WITH MODULATING PLUG OR V-PORT INNER GUIDES OR BALL TYPE. THE VALVE SHALL BE QUIET IN OPERATION AND FAIL-SAFE IN THE NORMALLY OPEN POSITION IN THE CONTROL EVENT OF CONTROL FAILURE. CONTROL VALVES SHALL BE SIZED BY THE CONTROL MANUFACTURER AND SHALL BE WARRANTED TO MEET THE HEATING AND COOLING LOADS AS SPECIFIED. CONTROL VALVES SHALL BE SUITABLE FOR THE PRESSURE CONDITIONS AND SHALL CLOSE AGAINST THE DIFFERENTIAL PRESSURE INVOLVED. VALVE OPERATORS SHALL BE OF THE PNEUMATIC OR ELECTRIC 24 VOLT TYPE. BODY PRESSURE RATING AND CONNECTION TYPE (SCREWED FLANGED OR FLANGED)

SHALL CONFORM TO PIPE SCHEDULE ELSEWHERE IN THIS SPECIFICATION.

3. CONTROL CONTRACTOR SHALL PROVIDE ALL WIRING REQUIRED FOR THE CONTROL SYSTEM TO OPERATE. IF THE JOB CONTAINS SMOKE DAMPERS OR CAV/VAV BOXES THEY SHALL ALSO BE WIRED BY T.C.C.

OTHER WALL MOUNTED DEVICES. COORDINATE LOCATION WITH ARCHITECT. 5. PROGRAMMABLE TYPE THERMOSTATS SHALL BE HONEYWELL "7300" SERIES OR AS RECOMMENDED BY EQUIPMENT MANUFACTURER. THERMOSTAT SHALL BE COOLING-HEATING COMBINATION OF STAGES MATCHING THE AIR CONDITIONING

EQUIPMENT, WITH "COOL-AUTO-HEAT-OFF" AND FAN "AUTO-ON-OFF" SELECTOR

SWITCHES. PROVIDE TAMPERPROOF COVER.

4. MOUNT THERMOSTATS 48" A.F.F. ALIGN WITH LIGHT/SWITCHES, DOOR SWINGS AND

15990 - TEST AND BALANCE

A. PROVIDE COMPLETE TEST AND BALANCE OF ALL WATER AND AIR SYSTEMS IN ACCORDANCE WITH NEBB (NATIONAL ENVIRONMENTAL BALANCING BUREAU) OR AABC (ASSOCIATED AIR BALANCE COUNCIL) STANDARDS

B. TEST AND BALANCE FIRM TO BE:

1. CERTIFIED TEST & BALANCE - (561) 961-5068, OR (954) 532-4772.

2. DADE TEST AND BALANCE, INC. - (954) 791-3194.

3. TOTAL DYNAMIC BALANCE - (954) 425-0764. 4. EARL HAGOOD, INC. - (305) 266-7070.

CONTRACTOR SHALL:

PRIOR TO SUBMITTING THE BID, THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND

INFORM THE ARCHITECT AND THE ENGINEER OF ANY DISCREPANCY BETWEEN THESE DOCUMENTS AND

THE EXISTING CONDITIONS AND SHALL INCLUDE IN THE BID TO CORRECT THE SAME AS DIRECTED.

FROM VERIFIABLE EXISTING CONDITIONS DISCOVERED AFTER CONTRACT HAS BEEN AWARDED.

RECORD. ALL CHANGES SHALL BE SUBMITTED FOR REVIEW PRIOR TO INSTALLATION.

NOT FOR BID UNTIL PERMIT HAS BEEN ISSUED.

THE ENGINEER AND THE ARCHITECT, ARE NOT RESPONSIBLE FOR ANY ADDITIONAL COSTS RESULTING

NO CHANGES SHALL BE MADE TO THESE PLANS WITHOUT PRIOR APPROVAL FROM THE ENGINEER OF

OR APPROVED EQUAL.

1. VISIT SITE AT START OF PROJECT AND COORDINATE REQUIRED BALANCING EQUIPMENT AND DAMPERS WITH MECHANICAL CONTRACTOR.

a. MAKE CHANGES TO BELTS, PULLEYS, DAMPERS, VOLUME BOXES, ETC. TO OBTAIN

DESIGN CONDITIONS AS REQUIRED BY TAB PROCEDURES. b. BALANCE SUPPLY, RETURN AND EXHAUST AIR OUTLETS WITHIN 10% OF DESIGN WHILE MAINTAINING REQUIRED PRESSURE RELATIONSHIPS. RECORD DESIGN AND

c. MEASURE AND REPORT FAN RPM, FAN SUCTION PRESSURE, FAN DISCHARGE

ACROSS EACH COIL AND AT EACH SUPPLY DISCHARGE AND RETURN INLET AT UNIT.

PRESSURE, FAN TOTAL PRESSURE AND PRESSURE DROP ACROSS COMPONENTS. DESIGN AND ACTUAL SUPPLY, RETURN, OUTSIDE AND EXHAUST AIR. d. ACTUAL AND DESIGN NAMEPLATE AMPERAGE ON FAN MOTORS.

f. ADJUST FANS FOR LOWEST STATIC PRESSURE REQUIRED TO DELIVER TO OUTLETS AS NOTED IN NEBB OR AABC PROCEDURES. MEASURE SUPPLY AND RETURN ENTERING AND LEAVING TEMPERATURES (DB/WB)

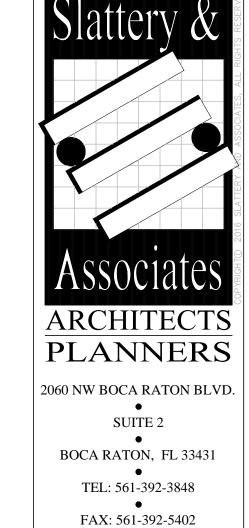
e. PRESSURE DIFFERENTIAL ACROSS DUCT SMOKE DETECTORS.

PROVIDE WRITTEN REPORT AT LEAST ONE WEEK BEFORE FINAL INSPECTION AND A

TECHNICIAN DURING FINAL INSPECTION OF PROJECT

3. CONFIRM OPERATION AND PROPER CALIBRATION OF ALL CONTROLS, THERMOMETERS AND

REVISIONS



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DESIGNED BY: DB/FR/AB PM: KS P/N: 16104

**PERMIT SET: 07/21/16** 

07-21-16 AS NOTED JOB NO. 16104 SHEET

DB/FR/AB

CHECKED

UI/SR/DA/JB

DATE