DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING

SECTION 233410 AIR DISTRIBUTION EQUIPMENT

PART 1 – GENERAL
1.01 GENERAL REQUIREMENTS

A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND OTHER CONDITIONS AND DIVISION 01 – GENERAL REQUIREMENTS SECTIONS, APPLY TO THE WORK SPECIFIED IN THIS SECTION.

1.02 COMPLIANCE

A. AMCA COMPLIANCE – TEST AND RATE AIR DISTRIBUTION EQUIPMENT IN ACCORDANCE WITH AMCA STANDARDS, AND PROVIDE AMCA CERTIFIED RATINGS SEAL.
B. UL COMPLIANCE: PROVIDE ELECTRICAL COMPONENTS OF AIR DISTRIBUTION EQUIPMENT WHICH HAVE BEEN LISTED AND LABELED BY UL.

1.03 SUBMITTALS

A. SUBMIT MANUFACTURER'S TECHNICAL PRODUCT DATA ASSEMBLY– TYPE SHOP DRAWINGS, LADDER–TYPE WIRING DIAGRAMS DIFFERENTIATING BETWEEN PORTIONS OF WIRING THAT ARE FACTORY INSTALLED AND PORTIONS TO BE FILED–INSTALLED, AND MAINTENANCE DATA.

PART 2 – PRODUCTS
2.01 HVAC SYSTEMS

A. PROVIDE EQUIPMENT AS SCHEDULED WITH ALL OPTIONS AS DESCRIBED ON THE MECHANICAL DRAWINGS
B. WHEREVER POSSIBLE, PROVIDE BELT DRIVEN EQUIPMENT AS SCHEDULED OR PROVIDED BY THE MANUFACTURER WITH ALL OPTIONS INCLUDED IN THE SCHEDULES OR REQUIRED TO MEET THE PERFORMANCES NOTED ON THE MECHANICAL DRAWINGS.

PART 3 – EXECUTION
3.01 INSTALLATION

A. UNITS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, INSTRUCTIONS AND DETAILS ON DRAWINGS.
B. ALL EXHAUST FAN SYSTEMS TO HAVE BACK DRAFT OR MOTORIZED DAMPERS IN THE SYSTEM.
C. PROVIDE FLEXIBLE DUCT CONNECTIONS TO ALL FANS.
D. PROVIDE ROOF CURBS FOR ALL ROOF HOODS, ROOF MOUNTED EQUIPMENT AND DUCT PENETRATIONS THRU ROOF.
E. PROVIDE FACTORY AUTHORIZED STARTUP OF ALL EQUIPMENT.

END OF SECTION 233410

SECTION 233113 DUCTWORK

PART 1 – GENERAL
1.01 DESCRIPTION

A. GENERAL REQUIREMENTS: DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL CONDITIONS AND DIVISION 01 – GENERAL REQUIREMENTS SECTIONS, APPLY TO THE WORK SPECIFIED IN THIS SECTION.

1.02 WORK INCLUDED

A. INCLUDE ALL LABOR, MATERIALS, EQUIPMENT TRANSPORTATION AND SERVICES TO FURNISH AND INSTALL COMPLETE ALL DUCTWORK AND RELATED SYSTEMS SPECIFIED HEREIN AND INDICATED ON THE DRAWING.

PART 2 – PRODUCTS
2.01 SHEET METAL WORK

A. FURNISH ALL DUCTWORK AS SHOWN ON PLANS. ALL DUCTWORK CONSTRUCTION SHALL COMPLY WITH SMACNA STANDARDS AND LOCAL MECHANICAL CODE STANDARDS, WHICHEVER IS MORE STRINGENT. DUCT CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE FOLLOWING PRESSURE VELOCITY CLASSIFICATIONS FOUND IN SMACNA HVAC DUCT CONSTRUCTION STANDARDS, THIRD EDITION (2006).
1. DUCTWORK BETWEEN VAV AIR HANDLING UNITS AND TERMINAL BOXES: MAXIMUM +6" W.G. 4,000 G.P.M., VARIABLE AIR VOLUME.
2. DUCTWORK DOWNSTREAM OF TERMINAL BOXES: +2" W.G., 2,500 F.P.M., VARIABLE AIR VOLUME.
3. EXHAUST DUCTWORK (ALL EXHAUST FAN SYSTEMS WHERE DESIGN FAN STATIC IS LISTED AT 1.0" W.G. OR ABOVE): +2" TO –2"W.G., 2,500 F.P.M., CONSTANT VOLUME.
4. RETURN, RELIEF OR EXHAUST DUCTWORK, WHERE FAN DESIGN STATIC IS LISTED BELOW 1.0"W.G.: +1" TO –1"W.G., 2,500 F.P.M. CONSTANT VOLUME.
5. SUPPLY DUCTS NOT LISTED ABOVE: +2" TO –2"W.G., 2,500 F.P.M., CONSTANT VOLUME.
6. TRANSFER DUCTS: +0.5" TO –0.5"W.G., 2,500 F.P.M., CONSTANT VOLUME.
B. PRIOR TO ANY FABRICATING OF SHEET METAL WORK, THE MECHANICAL CONTRACTOR SHALL CAREFULLY MEASURE (AT THE SITE) AVAILABLE SPACE FOR SHEET METAL WORK. HE SHALL PREPARE LARGE SCALE SHOP DRAWINGS OF SHEET METAL WORK SHOWING ALL OTHER ELEMENTS OF THE BUILDING INCLUDING PIPING, STRUCTURAL AND ELECTRICAL SO ALL ARE COORDINATED AND FIT AVAILABLE SPACE. THE SHOP DRAWINGS WILL NOT GO THROUGH A FORMAL SUBMITTAL PROCESS, BUT 2 COPIES SHALL BE GIVEN TO THE ARCHITECT AS EVIDENCE OF THEIR BEING COMPLETED.
C. LONGITUDINAL SEAMS IN DUCTS SHALL BE FLAT, DOUBLE LOCK TYPE. S AND DRIVE TYPE.
D. TRANSVERSE SEAMS SHALL BE OF TYPE AND SPACING AS FOLLOWS:

MAX SIDE	TYPE	SPACING
UP TO 30"	DRIVE SLIP	7'–10"
31" TO 60"	1–1/2" POCKET SLIP	7'–10"
61" AND UP	1–1/2" POCKET SLIP	3'–9"
CROSS BREAK PANELS 18" AND OVER IN WIDTH.		

E. STANDING SEAMS ARE NOT ACCEPTABLE ON ANY DUCTWORK.
F. JOINT LOCKING: THE SLIP JOINT IN POCKET SLIP SEAMS SHALL BE SCREWED USING NOT LESS THAT ONE SCREW PER FACE AND MAXIMUM SPACING OF 2'–0".
G. DAMPERS: PROVIDE DAMPERS AND QUADRANTS IN DUCTWORK AS NECESSARY FOR BALANCING. PROVIDE ONE DAMPER IN THE DUCT LEADING TO EACH SUPPLY AND RETURN/EXHAUST OPENING. DAMPERS SHALL BE LOCATED IN AN ACCESSIBLE LOCATION. DAMPERS SHALL BE FITTED WITH PARKER KALON DAMPER BEARINGS AND PARKER KALON NO 195T QUADRANTS. DAMPERS SHALL BE OF 20 GA. G.I. SINGLE PLATE TYPE WITH EDGES HEMMED. FOR DAMPERS ABOVE "HARD" (GYP BOARD OR NON–ACCESSIBLE) CEILINGS, PROVIDE BOWDEN CABLE CONTROLLER WITH CONCEALED OPERATORS IN NEAREST RETURN GRILLE. SHOW LOCATION OF ALL REMOTE DAMPER OPERATORS & VOLUME DAMPERS ON RECORD DRAWINGS. INCLUDE DRAWING WITH BALANCING REPORT.
ADJUSTABLE SPLITTER DAMPERS TO BE YOUNG REGULATOR 890B.
H. ACCESS DOORS SHALL BE PROVIDED BY THIS CONTRACTOR IN FINISHED WALLS AND CEILINGS WHERE REQUIRED TO REACH MECHANICAL EQUIPMENT, MILCOR OR EQUAL.
I. INSULATED LOW PRESSURE FLEXIBLE DUCT SHALL BE A FACTORY FABRICATED ASSEMBLY CONSISTING OF A ZINC–COATED SPRING STEEL HELIX, NON PERFORATED INNER LINER, WRAPPED WITH A NOMINAL 1" THICK BY 1 LB/CU. FT DENSITY FIBERGLASS INSULATION. THE ASSEMBLY SHALL BE SHEATHED IN A VAPOR BARRIER JACKET, FACTORY SEALED AT BOTH ENDS OF EACH SECTION, THUS ASSURING THE VAPOR RESISTANCE OF EACH SECTION AS WELL AS THE COMPLETED INSTALLATION. THE COMPOSITE ASSEMBLY INCLUDING INSULATION AND VAPOR BARRIER SHALL MEET THE CLASS 1 REQUIREMENTS OF NFPA BULLETIN NO. 90–A AND BE LABELED BY UL WITH A FLAME SPREAD RATING OF 25 OR LESS AND A SMOKE DEVELOPED RATING OF 50 OR UNDER. FLEXIBLE DUCTS SHALL BE INSTALLED IN A FULLY EXTENDED LENGTH REQUIRED TO MAKE THE CONNECTION. WHERE HORIZONTAL SUPPORT IS REQUIRED, FLEXIBLE DUCT SHALL BE SUSPENDED ON A 26" CENTERS WITH A MINIMUM 3/4" WIDE FLAT BANDING MATERIAL. ALL JOINS AND CONNECTIONS SHALL BE MADE WITH 1/2" WIDE POSITIVE LOCKING STEEL STRAPS. INSULATED LOW PRESSURE FLEXIBLE DUCT SHALL BE GREENFLEX TYPE SL–1 OR EQUAL. PROVIDE CONICAL FITTINGS FOR CONNECTION TO TRUCK DU CT. MAXIMUM LENGTH OF FLEX DUCT IS 5 FEET WITH ONE 90 DEGREE BEND.
J. OFFSETS: PROVIDE OFFSETS AND TRANSITIONS AS REQUIRED TO FIT DUCTWORK INTO AVAILABLE SPACE. MAINTAIN EQUIVALENT FREE AREA OF DUCTWORK, AND TRANSITION SHALL BE SMOOTH (LESS THAN 15 DEGREES).

2.02 DUCT LINING

A. JOHNS MANSVILLE 1" THICK 1.5 LB/CU.FT. DENSITY (WHERE CALLED OUT ON DRAWINGS AND WHERE SPECIFIED) LINACOUSTIC R–4 MIN. OR 1.5" THICK 1.5 LB/CU.FT. DENSITY LINACOUSTIC R–5 MIN. WHERE "SOUNDLINED" OR "LINED" DUCT IS CALLED OUT ON DRAWINGS OR SPECIFIED. SECURE WITH GLUE AND CLIPS. SPACE CLIPS A MAXIMUM OF 18"O.C. LINE ALL RECTANGULAR DUCTS (INCLUDES SUPPLY, RETURN, EXHAUST AND TRANSFER DUCTS). THE NET FREE AREA OF THE DUCT DIMENSIONS GIVEN ON THE DRAWINGS SHALL BE MAINTAINED. INCREASE METAL DUCT DIMENSIONS AS NECESSARY TO COMPENSATE FOR ADDITION OF THE LINER.
B. THE DUCT LINER SHALL BE APPLIED WITH 100% COVERAGE OF APPROVED FIRE RESISTANT ADHESIVE. LINER SHALL BE ADDITIONALLY SECURED WITH MECHANICAL FASTENERS ON MAXIMUM 15" CENTERS. FASTENERS SHALL START WITH 2" OF THE LEADING EDGE OF EACH SECTION AND WITHIN 3" OF THE LEADING EDGE OF ALL CROSS JOINTS WITHIN THE DUCT SECTION. ALL EXPOSED EDGES AND THE LEADING EDGE OF ALL CROSS JOINTS OF THE LINER SHALL BE HEAVILY COATED WITH AN APPROVED FIRE RESISTANT ADHESIVE. THE DUCT LINER SHALL BE CUT TO ASSURE SNUG CLOSING CORNER JOINTS, THE BLACK SURFACE OF THE LINER SHALL FACE THE AIR STREAM, TRANSVERSE JOINTS SHALL BE NEATLY BUTTED, AND ANY DAMAGED AREAS SHALL BE HEAVILY COATED WITH AN APPROVED FIRE RESISTANT ADHESIVE.

2.03 BACK DRAFT DAMPERS

A. GENERAL: PROVIDE DAMPERS AT ALL OUTSIDE AIR AND RELIEF DUCTS INTAKE FROM OR EXHAUSTING TO ATMOSPHERE.
B. TYPE:
1. BACK DRAFT DAMPERS ON FAN SYSTEMS SHALL BE GALVANIZED STEEL OR ALUMINUM MULTI–BLADE TYPE. BLADES SHALL HAVE FELT STRIPS RIVETED OR CRIMPED IN PLACE. BLADES SHALL BE JOINED TOGETHER WITH CONNECTION BARS. EACH BLADE SHALL BE RIGIDLY ATTACHED TO A PIVOT ROD. THE ROD SHALL EXTEND INTO OIL–IMPREGNATED BRONZE BUSHINGS, OR ANTIFRICTION BEARINGS, LOCATED IN THE FRAMES. RUSKIN CBD2 OR EQUAL.
2. FABRIC BACK DRAFT DAMPERS ON RELIEF DUCTS SHALL BE CONSTRUCTED TO INDUSTRY STANDARDS.

2.04 LOUVERS

A. FURNISH WONDER METAL MODEL "SDL–4" DRAINABLE FORMED GALVANIZED STEEL STORM–PROOF MULLION NON–MECHANICAL FIXED WALL LOUVERS, OR AIR LOUVERS INC., THE AIROLITE CO., CONSTRUCTION SPECIALTIES INC., RUSKIN, OR INDUSTRIAL LOUVERS INC. EQUIVALENT, OR APPROVED SIZES AND CONFIGURATIONS AS SHOWN COMPLETE WITH FLAT BAR ORNAMENTAL SHAPES WERE SHOWN; REFER TO EXTERIOR BUILDING ELEVATIONS AND LOUVER SCHEDULE, SECTION 22 OF PROJECT MANUAL VOLUME II. PROVIDE WITH BIRD SCREEN AND COLOR AS DESIGNATED BY ARCHITECT.
B. LOUVERS SHALL HAVE BEEN TESTED AND RATED TO HAVE MINIMUM 45% FREE OPENING BASED ON A 4X4 FOOT SIZE LOUVER.
C. FRAME AND BLADES TO BE 16 GAUGE GALVANIZED STEEL.
D. HEADS, SILLS AND JAMBS TO BE ONE PIECE STRUCTURAL MEMBERS AS DETAILED AND SECURELY ANCHOR TO WALL CONSTRUCTION AS APPROVED.
E. SLIDEABLE INTERLOCKED MULLIONS TO HAVE PROVISION TO EXPANSION AND CONTRACTION.
F. FURNISH COMPLETE WITH MANUFACTURER'S STANDARD BIRD SCREEN MOUNTED IN FOLDED "U" TYPE FRAME AND ATTACH TO INSIDE FACE OF LOUVER FRAME WITH STEEL SCREWS AT ACTIVE (OPEN) PORTIONS OF LOUVERS AND WITH 20 GAUGE GALVANIZED STEEL FACED INSULATED "BLANK–OFF" PANELS AT INACTIVE LOUVERS AREAS, COMPLETE WITH PERIMETER GASKET AND FINISHED TO MATCH LOUVER. INSULATION CORE SHALL BE 1 INCH THICK EXTRUDED POLYSTYRENE HAVING A MINIMUM THERMAL RESISTANCE "R" VALUE OF 5.0
G. ALL LOUVERS TO BE FREE OF SCRATCHES AND BLEMISHES AND SHALL BE FINISH PAINTED WITH BAKED–ON ENAMEL POWDER COATING.

2.05 FIRE DAMPERS

A. DYNAMIC FIRE DAMPERS SHALL BE CONSTRUCTED AND TESTED IN ACCORDANCE WITH UL 555. EACH DAMPER SHALL HAVE A 1 1/2 HOUR RATING WITH 165 DEG. F FUSIBLE LINK AND BE LABELED PER UL 555.
B. DYNAMIC COMBINATION FIRE/SMOKE DAMPERS, RUSKIN FSD26, SHALL BE CONSTRUCTED OF MIN. 16 GAUGE GALVANIZED STEEL WITH STAINLESS STEEL BEARINGS, JAMB SEALS AND 450 DEG. F RATED BLADE EDGE SEAL. DAMPERS SHALL BE 1 HR. RATED UNDER UL 555 AND UL 555S. ALL DAMPERS USED UNDER THIS SPECIFICATION MUST BE UL TESTED & QUALIFIED IN THE COMPLETE RANGE OF SIZES USED. A SINGLE DAMPER TESTED WITHIN THIS RANGE IS NOT ACCEPTABLE. LEAKAGE RATING SHALL BE CLASS 11. INCLUDE A UL CLASSIFIED FIRE STAT. FIRESTAT SHALL ELECTRICALLY AND MECHANICALLY LOCK DAMPER CLOSED WHEN DUCT TEMPERATURE EXCEEDS 165 DEG. F. DAMPER MUST BE OPERABLE ABOVE 250 DEG. F. FIRSTAT SHALL BE EQUIPPED WITH TWO DAMPER POSITION INDICATORS FOR REMOTE INTERFACING WITH SMOKE DETECTORS & FIRE ALARM SYSTEM. ALSO PROVIDE INTEGRAL FLOW RATED DUCT SMOKE DETECTORS FOR DUCTED FIRE/SMOKE DAMPERS AND NO–FLOW DUCT SMOKE DETECTORS FOR NON–DUCTED FIRE SMOKE DETECTORS.
C. CEILING FIRE DAMPERS SHALL BE INSTALLED IN ALL CEILING REGISTERS AND GRILLES IN THE RATED CEILING. FIRE DAMPERS CONSIST OF A RADIANT DAMPER IN THE DIFFUSER NECK AND THERMAL INSULATING BLANKET COVERING THE DIFFUSER PAN. THE ENTIRE SYSTEM SHALL BE UL RATED FOR FLOOR/CEILING AND ROOF/CEILING SYSTEM.

PART 3 – EXECUTION
3.01 SHEET METAL WORK

A. PARTITIONS FORMING PLENUMS OR CASINGS SHALL BE #18 GA., WITH GALVANIZED IRON ANGLES AND RIVETS FOR SEAM CONNECTION AND STIFFENING ALL JOINTS AND STANDING SEAMS SHALL BE SEALED WITH APPROVED DUCT SEALANT.
B. CORK GASKETS HALL BE INSTALLED BETWEEN ALL CONNECTIONS OF SHEET METAL TO COIL AND FILTER CASINGS.
C. SHEET METAL CONNECTIONS OF PLENUMS AND AIR CHAMBERS TO WALL AND FLOORS SHALL BE MADE WITH GALVANIZED ANGLES ANCHORED TO WALL OR FLOOR CONSTRUCTION WITH ANCHOR BOLTS WITH SHEET METAL BOLTED OR RIVETED TO ANGLES. MASTIC SEALER SHALL BE INSTALLED AT CONNECTION OF ANGLES TO SHEET METAL TO PROVIDE AIR–TIGHT JOINTS. PROVIDE ACCESS DOORS IN PLENUMS AND CHAMBERS WITH HANDLES OPERATED FROM BOTH SIDES, VENTLOCK NO. 205 OR APPROVED SUBSTITUTE.
D. HINGED ACCESS DOORS IN SHEET METAL DUCT FOR ACCESS TO DAMPERS SHALL BE #18 GA. FRAMED WITH STEEL ANGLE AND HEMMED EDGES.
E. CONNECT ALL GRILLES TO DUCTWORK. PAINT THE INSIDE OF THE DUCT A DULL BLACK AT ALL GRILLES.
F. ALL AIR INLETS AND OUTLETS TO OUTSIDE SHALL HAVE BIRD SCREENS. BACKDRAFT DAMPER SHALL BE PROVIDED WHERE MOTORIZED DAMPER IS NOT INDICATED.
G. ALL DUCTS THROUGH ROOF SHALL BE FLASHED WATER–TIGHT. SEE DETAIL. ALL DUCTS THRU WALLS AND FLOORS/ROOFS SHALL HAVE ANGLE ENCLOSURES.
H. CONNECTIONS OF ALL DUCTS TO ALL EQUIPMENT SHALL BE MADE WITH NEOPRENE.
I. ELBOWS SHALL HAVE AN INSIDE RADIUS EQUAL TO 1/2 THE DUCT WIDTH. RECTANGULAR ELBOWS SHALL HAVE DUCT TURNS, T&B OR APPROVED EQUAL WHERE SHOWN ON DRAWINGS. SQUARE INSIDE ELBOW AND ROUND OUTSIDE ELBOW ARE NOT PERMITTED. DO NOT INSTALL TURNING VANES IN GREASE EXHAUST DUCTWORK.
J. SUPPORTERS SHALL BE GALVANIZED STRAP OR ANGLE IRON HANGERS, ARRANGED TO PREVENT ANY BULGING BENDING OR SAGGING OF DUCTWORK. UNDER NO CONDITION SHALL HANGERS PIERCE THE DUCTS. VERTICAL DUCTS SHALL BE SUPPORTED AT EACH FLOOR WITH 18 GA. FORMED ANGLE.
K. SEAL ALL DUCT JOINTS WITH APPROVED DUCT SEALANT.
L. HANGERS:
1. PROVIDE HANGERS ON ALL DUCTWORK
2. HANGERS FOR CIRCULAR DUCTS AND TUBING: A #18 GAUGE GALVANIZED SHEET STEEL STRAP SHALL BE WRAPPED AROUND THE DUCT AT EACH POINT OF SUPPORT. FOR CONCEALED WORK THIS STRAP SHALL BE BOLTED TO A STRAP HANGER OF SIMILAR GAUGE AND WIDTH, FOR EXPOSED WORK, BOLTED TO A STEEL ROD HANGER IN EACH CASE, ROD HANGER 1/4" SIZE FOR DUCTS UP TO 10" SIZE, 3/8" SIZE FOR LARGER DUCTS. WIDTH OF GALVANIZED STEEL STRAP WRAPPED AROUND THE DUCT SHALL NOT BE LESS THAN 1" IN ANY CASE; WHERE DUCTS ARE IN EXCESS OF 10" IN DIAMETER SHALL BE 2".
3. SPACING OF HANGERS SHALL NOT EXCEED 10'–0" ON CENTERS IN ANY CASE; WHERE DUCTS ARE INSULATED AND ARE IN EXCESS OF 10" IN SIZE, SPACING SHALL NOT EXCEED 8'–0".
M. A MAXIMUM OF 5 FEET LENGTH OF FLEX DUCT WITH ONE 90 DEGREE BEND WILL BE ALLOWED AT CONNECTIONS TO DIFFUSERS, WHERE FLEX DUCT IS SHOWN ON DRAWINGS.
N. PROVIDE FIRE STOP AROUND DUCTWORK AT ALL DUCT PENETRATIONS OF RATED CONSTRUCTION. "FIRE STOP SEALANT" BY DOW CORNING.
O. BACK DRAFT DAMPERS ON RELIEF DUCTS SHALL BE METAL BLADE TYPE.
P. PROVIDE DUCT TRANSITIONS AS REQUIRED TO SOUND TRAPS AND ALL EQUIPMENT CONNECTIONS.
Q. PROVIDE DUCT LINING ON RECTANGULAR DUCTS WHERE INDICATED ON DRAWINGS (SUPPLY, RETURN, EXHAUST AND TRANSFER AIR DUCTS). THE NET FREE AREA OF DUCT DIMENSION GIVEN ON THE DRAWINGS SHALL BE MAINTAINED. INCREASE METAL DUCT DIMENSIONS AS NECESSARY TO COMPENSATE FOR ADDITION OF THE LINER.
R. ALL DUCTWORK, INCLUDING, BUT NOT LIMITED TO DUCT HANGERS, BRACKETS, FITTINGS, AND JOINTS, SHALL BE INSTALLED IN A MANNER WHICH NEITHER REDUCES HEADROOM AND WALKWAY WIDTH NOR PROJECTS ANY SHARP EDGES INTO A CATWALK OR PASSAGE AREA. ANY DUCTWORK WHICH, IN THE OPINION OF THE ARCHITECT, PRESENTS A POSSIBLE HAZARD TO PEOPLE IN THE CATWALK AREA, SHALL BE CHANGED TO AN ACCEPTABLE AND SAFE MANNER. SUCH CHANGES MAY INCLUDE: MOVING THE EQUIPMENT, CHANGING THE CONFIGURATION, AND/OR ADDING PROTECTIVE PADDING TO THE EQUIPMENT.
S. INTAKE MOTOR OPERATED DAMPERS SHALL BE INSTALLED AT THE ENVELOPE OF THE BUILDING.
T. INSTALL FIRE DAMPERS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. PROVIDE MIN. 12X12 ACCESS PANEL IN DUCT AND LABEL "FIRE DAMPER ACCESS" WITH MIN. 1/2" HIGH LETTERS.

SECTION 233713 OUTLETS AND INLETS

PART 1 – GENERAL
1.01 DESCRIPTION

A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND OTHER CONDITIONS AND DIVISION 01 – GENERAL REQUIREMENTS SECTIONS, APPLY TO THE WORK SPECIFIED IN THIS SECTION.

1.02 COMPLIANCE

A. ADC COMPLIANCE: TEST AND RATE REGISTERS, GRILLES AND DIFFUSERS IN ACCORDANCE WITH ADC EQUIPMENT TEST CODE 1062R4, PROVIDE CERTIFIED RATINGS SEAL ON EACH UNIT.
B. AMCA COMPLIANCE: TEST AND RATE LOUVERS, DAMPERS, AND SHUTTERS IN ACCORDANCE WITH AMCA STANDARD 500, PROVIDE CERTIFIED RATINGS SEAL ON EACH UNIT.

1.03 SUBMITTALS

A. SUBMIT MANUFACTURER'S TECHNICAL PRODUCT DATA UNLESS AS SPECIFIED ON DRAWINGS, ASSEMBLY–TYPE SHOP DRAWINGS, AND MAINTENANCE DATA.

PART 2 – PRODUCTS
2.01 CEILING AIR DIFFUSERS

A. GENERAL: EXCEPT AS OTHERWISE INDICATED, PROVIDE MANUFACTURER'S STANDARD CEILING AIR DIFFUSERS WITH FIRE DAMPERS; OF SIZE, SHAPE, CAPACITY AND TYPE INDICATED; CONSTRUCTED OF MATERIALS AND COMPONENTS INDICATED AND AS INDICATED ON DRAWINGS FOR COMPLETE INSTALLATION.
B. CEILING COMPATIBILITY: PROVIDE DIFFUSERS WITH BORDER STYLES THAT ARE COMPATIBLE WITH ADJACENT CEILING SYSTEMS, AND THAT ARE SPECIFICALLY MANUFACTURED TO FIT INTO CEILING MODULE WITH ACCURATE FIT AND ADEQUATE SUPPORT. REFER TO GENERAL CONSTRUCTION DRAWINGS AND SPECIFICATIONS FOR TYPES OF CEILING SYSTEMS WHICH WILL CONTAIN EACH TYPE OF CEILING AIR DIFFUSERS.
C. TYPES: PROVIDE TITUS CEILING DIFFUSERS OF TYPE, CAPACITY, AND WITH ACCESSORIES AND FINISHES AS SCHEDULED.

2.02 REGISTERS AND GRILLES

A. GENERAL: EXCEPT AS OTHERWISE INDICATED, PROVIDE MANUFACTURER'S STANDARD WALL REGISTERS AND GRILLES WITH FIRE DAMPERS; OF SIZE, SHAPE, CAPACITY AND TYPE INDICATED; CONSTRUCTED OF MATERIALS AND COMPONENTS AS INDICATED ON DRAWINGS, AND AS REQUIRED FOR COMPLETE INSTALLATION.
B. PERFORMANCE: PROVIDE WALL REGISTERS AND GRILLES THAT HAVE, AS MINIMUM, TEMPERATURE AND VELOCITY TRAVERSING, THROW AND DROP, AND NOISE CRITERIA RATINGS FOR EACH SIZE DEVICE AS LISTED IN MANUFACTURER'S CURRENT DATA.
C. COMPATIBILITY: PROVIDE REGISTERS AND GRILLES WITH BORDER STYLES THAT ARE COMPATIBLE WITH ADJACENT WALL OR CEILING SYSTEMS, AND THAT ARE SPECIFICALLY MANUFACTURED TO FIT INTO CONSTRUCTION WITH ACCURATE AND SPECIFICATIONS FOR TYPES OF CONSTRUCTION WHICH WILL CONTAIN EACH TYPE OF WALL REGISTER AND GRILLE.
D. TYPES: PROVIDE WALL REGISTERS AND GRILLES OF TYPE, CAPACITY, AND WITH ACCESSORIES AND FINISHES AS SCHEDULED.
E. MANUFACTURERS: TITUS

PART 3 – EXECUTION
3.01 INSTALLATION

A. GENERAL: INSTALL OUTLETS AND INLETS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS AND IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO INSURE THAT PRODUCTS SERVE INTENDED FUNCTIONS. REFER TO INSTALLATION DETAILS, REFERENCED IN PARAGRAPH 2.03A ABOVE.
B. COORDINATE WITH OTHER WORK, INCLUDING DUCTWORK AND DUCT ACCESSORIES, AS NECESSARY TO INTERFACE INSTALLATION OF OUTLETS AND INLETS WITH OTHER WORK.
C. LOCATE CEILING AIR DIFFUSERS, REGISTERS, AND GRILLES, AS INDICATED ON GENERAL CONSTRUCTION "REFLECTED CEILING PLANS" AND INTERIOR ELEVATIONS". UNLESS OTHERWISE INDICATED, LOCATE UNITS IN CENTER OF ACOUSTICAL CEILING MODULES.

END OF SECTION 233713

SECTION 234100 FILTERS

PART 1.00 – GENERAL
1.01 GENERAL REQUIREMENTS

A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND OTHER CONDITIONS AND DIVISION 01 – GENERAL REQUIREMENTS SECTIONS, APPLY TO THE WORK SPECIFIED IN THIS SECTION.

1.02 COMPLIANCE

A. NFPA COMPLIANCE: INSTALL AIR TREATMENT EQUIPMENT IN ACCORDANCE WITH NFPA 90A AND 90B.
B. UL COMPLIANCE: PROVIDE AIR FILTER UNITS WHICH HAVE BEEN LISTED AND LABELED BY UL.
C. ASHRAE COMPLIANCE: TEST AIR FILTER UNITS IN ACCORDANCE WITH ARI 850.

PART 2 – PRODUCTS
2.01 AIR FILTERS

A. EXTENDED SURFACE FILTERS: PROVIDE FACTORY–FABRICATED, DRY, EXTENDED SURFACE FILTERS; WHERE SHOWN, IN SIZES INDICATED. EQUIP WITH UL CLASS 2 FIBROUS MEDIA MATERIAL FORMED INTO 2" DEEP V–SHAPED PLEATS AND HELD BY SELF–SUPPORTING FRAMES. FARR 30/30 OR EQUAL.

2.02 FILTER FRAMES

A. PROVIDE METAL FILTER FRAMES AS DETAILED ON DRAWINGS.

PART 3 – EXECUTION
3.01 INSTALLATION

A. INSTALL AIR FILTERS AND HOLDING DEVICES OF TYPES INDICATED, AND WHERE SHOWN; IN ACCORDANCE WITH AIR FILTER MANUFACTURER'S WRITTEN INSTRUCTIONS AND WITH RECOGNIZED INDUSTRY PRACTICES; TO ENSURE THAT FILTERS COMPLY WITH REQUIREMENTS AND SERVE INTENDED PURPOSES. COMPLY WITH APPLICABLE PORTIONS OF NFPA 70, 90A AND B, PERTAINING TO INSTALLATION OF AIR FILTERS. PROVIDE AS SCHEDULED ON THE DRAWINGS.
B. INSTALL FILTERS IN PROPER POSITION TO PREVENT PASSAGE OF UNFILTERED AIR.
C. PROVIDE CLEAN SET OF FILTERS FOR ALL PIECES OF EQUIPMENT:
1. IMMEDIATELY PRIOR TO AIR BALANCING.
2. WHEN FINAL PUNCHLIST IS DONE.
3. IN ADDITION, FURNISH ONE COMPLETE EXTRA SET OF FILTERS TO OWNER WHEN FINAL PUNCHLIST IS DONE. THREE SETS OF FILTERS ARE REQUIRED (TWO INSTALLED, ONE TURNED OVER TO OWNER). LOCATE EXTRA SET IN MECHANICAL ROOMS WHERE FILTERS ARE LOCATED.
D. FILTERS SHALL BE EASILY CHANGED FROM FRAMES AND SHALL SLIDE FREELY ON TRACKS WITHOUT BINDING. MAINTAIN CLEAR ACCESS IN FRONT OF FILTER ACCESS DOOR TO FULL WIDTH OF THE FILTER.
E. FILTER SECTIONS SHALL HAVE HINGED ACCESS DOORS WITH LATCHES.

END OF SECTION 234100

SECTION 230900 CONTROLS

1. IN ADDITION TO THERMOSTATS AND PNEUMATIC TUBING, PROVIDE ALL CONTROLS, WIRIING, CONDUIT, RELAYS, ETC. TO PROVIDE COMPLETE AND OPERATIONAL CONTROL SYSTEMS. PROVIDE CONNECTION TO LANDLORD BUILDING CONTROL SYSTEM PER LANDLORD TENANT CRITERIA. COORDINATE CAREFULLY WITH LANDLORD CONTROLS SUB–CONTRACTOR.
2. SET HVAC EQUIPMENT THERMOSTATS FOR 73 D.F. COOLING AND 70 D.F. HEATING INITIALLY.

END OF SECTION 230900

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State of Registration MAINE
Firm Registration No. N/A
EEA Project No. 20166538

DRAWN BY: ARC
CHECKED BY: BKK

Digitally Signed
STATE OF MAINE
Michael N. Hart
No. 10507
LICENSED PROFESSIONAL ENGINEER
Michael N Hart, PE (ME)
2017.03.08 15:40:43-06'00'

Reviewed for Code Compliance
Approved with Comments
Approved as Noted
Date: 04/26/17

west elm
Downtown Portland
164 Middle Street
Portland, ME 04101
PROJECT #006-160335.00

ISSUED / REVISED	DATE
PRELIMINARY SET	09/08/16
LL COORDINATION SET	11/08/16
LL/PERMIT SET	11/21/16

SPECIFICATION - MECHANICAL

M-903