

WEST NAVARRE INTERMEDIATE SCHOOL
5 CLASSROOM ADDITION

SECTION 15820 - DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. BACKDRAFT AND PRESSURE RELIEF DAMPERS.
2. MANUAL VOLUME DAMPERS.
3. TURNING VANES.
4. DUCT-MOUNTED ACCESS DOORS.
5. FLEXIBLE CONNECTORS.
6. FLEXIBLE DUCTS.
7. DUCT ACCESSORY HARDWARE.

1.2 ACTION SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT.

1.3 CLOSEOUT SUBMITTALS

A. OPERATION AND MAINTENANCE DATA.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. COMPLY WITH NFPA 90A, "INSTALLATION OF AIR CONDITIONING AND VENTILATING SYSTEMS," AND WITH NFPA 90B, "INSTALLATION OF WARM AIR HEATING AND AIR CONDITIONING SYSTEMS."**
- B. COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" FOR ACCEPTABLE MATERIALS, MATERIAL THICKNESSES, AND DUCT CONSTRUCTION METHODS UNLESS OTHERWISE INDICATED. SHEET METAL MATERIALS SHALL BE FREE OF PITTING, SEAM MARKS, ROLLER MARKS, STAINS, DISCOLORATIONS, AND OTHER IMPERFECTIONS.**

2.2 MATERIALS

- A. GALVANIZED SHEET STEEL: COMPLY WITH ASTM A 653/A 653M.**
1. GALVANIZED COATING DESIGNATION: G90.
 2. EXPOSED-SURFACE FINISH: MILL PHOSPHATIZED.
- B. STAINLESS-STEEL SHEETS: COMPLY WITH ASTM A 480/A 480M, TYPE 304, AND HAVING A NO. 2 FINISH FOR CONCEALED DUCTS AND NO. 2 FINISH FOR EXPOSED DUCTS.**

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- C. ALUMINUM SHEETS: COMPLY WITH ASTM B 209, ALLOY 3003, TEMPER H14; WITH MILL FINISH FOR CONCEALED DUCTS AND STANDARD, 1-SIDE BRIGHT FINISH FOR EXPOSED DUCTS.
- D. EXTRUDED ALUMINUM: COMPLY WITH ASTM B 221, ALLOY 6063, TEMPER T6.
- E. REINFORCEMENT SHAPES AND PLATES: GALVANIZED-STEEL REINFORCEMENT WHERE INSTALLED ON GALVANIZED SHEET METAL DUCTS; COMPATIBLE MATERIALS FOR ALUMINUM AND STAINLESS-STEEL DUCTS.
- F. TIE RODS: GALVANIZED STEEL, 1/4-INCH MINIMUM DIAMETER FOR LENGTHS 36 INCHES OR LESS; 3/8-INCH MINIMUM DIAMETER FOR LENGTHS LONGER THAN 36 INCHES.

2.3 BACKDRAFT AND PRESSURE RELIEF DAMPERS

- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 - 1. AIR BALANCE INC.; A DIVISION OF MESTEK, INC.
 - 2. AMERICAN WARMING AND VENTILATING; A DIVISION OF MESTEK, INC.
 - 3. CESCO PRODUCTS; A DIVISION OF MESTEK, INC.
 - 4. GREENHECK FAN CORPORATION.
 - 5. NAILOR INDUSTRIES INC.
 - 6. NCA MANUFACTURING, INC.
 - 7. RUSKIN COMPANY.
 - 8. VENT PRODUCTS COMPANY, INC.
- B. DESCRIPTION: GRAVITY BALANCED.
- C. FRAME: HAT-SHAPED, 0.05-INCH- THICK, GALVANIZED SHEET STEEL, WITH WELDED CORNERS OR MECHANICALLY ATTACHED AND MOUNTING FLANGE.
- D. BLADES: MULTIPLE SINGLE-PIECE BLADES, CENTER PIVOTED, MAXIMUM 6-INCH WIDTH, 0.050-INCH- THICK ALUMINUM SHEET WITH SEALED EDGES.
- E. BLADE ACTION: PARALLEL.
- F. BLADE SEALS: NEOPRENE, MECHANICALLY LOCKED.
- G. BLADE AXLES:
 - 1. MATERIAL: GALVANIZED STEEL.
 - 2. DIAMETER: 0.20 INCH.
- H. TIE BARS AND BRACKETS: GALVANIZED STEEL.
- I. RETURN SPRING: ADJUSTABLE TENSION.
- J. BEARINGS: STEEL BALL.
- K. ACCESSORIES:
 - 1. ADJUSTMENT DEVICE TO PERMIT SETTING FOR VARYING DIFFERENTIAL STATIC PRESSURE.

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2. COUNTERWEIGHTS AND SPRING-ASSIST KITS FOR VERTICAL AIRFLOW INSTALLATIONS.
3. 90-DEGREE STOPS.

2.4 MANUAL VOLUME DAMPERS

A. STANDARD, STEEL, MANUAL VOLUME DAMPERS:

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 - A. AIR BALANCE INC.; A DIVISION OF MESTEK, INC.
 - B. AMERICAN WARMING AND VENTILATING; A DIVISION OF MESTEK, INC.
 - C. FLEXMASTER U.S.A., INC.
 - D. MCGILL AIRFLOW LLC.
 - E. NAILOR INDUSTRIES INC.
 - F. RUSKIN COMPANY.
2. STANDARD LEAKAGE RATING.
3. SUITABLE FOR HORIZONTAL OR VERTICAL APPLICATIONS.
4. FRAMES:
 - A. FRAME: HAT-SHAPED, 0.094-INCH- THICK, GALVANIZED SHEET STEEL.
 - B. MITERED AND WELDED CORNERS.
 - C. FLANGES FOR ATTACHING TO WALLS AND FLANGELESS FRAMES FOR INSTALLING IN DUCTS.
5. BLADES:
 - A. MULTIPLE OR SINGLE BLADE.
 - B. PARALLEL- OR OPPOSED-BLADE DESIGN.
 - C. STIFFEN DAMPER BLADES FOR STABILITY.
 - D. GALVANIZED-STEEL, 0.064 INCH THICK.
6. BLADE AXLES: GALVANIZED STEEL.
7. BEARINGS:
 - A. OIL-IMPREGNATED BRONZE.
 - B. DAMPERS IN DUCTS WITH PRESSURE CLASSES OF 3-INCH WG OR LESS SHALL HAVE AXLES FULL LENGTH OF DAMPER BLADES AND BEARINGS AT BOTH ENDS OF OPERATING SHAFT.
8. TIE BARS AND BRACKETS: GALVANIZED STEEL.

2.5 TURNING VANES

A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:

1. DUCTMATE INDUSTRIES, INC.
2. DURO DYNE INC.
3. METALAIRE, INC.
4. WARD INDUSTRIES, INC.; A DIVISION OF HART & COOLEY, INC.

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- B. MANUFACTURED TURNING VANES FOR METAL DUCTS: CURVED BLADES OF GALVANIZED SHEET STEEL; SUPPORT WITH BARS PERPENDICULAR TO BLADES SET; SET INTO VANE RUNNERS SUITABLE FOR DUCT MOUNTING.
 - 1. ACOUSTIC TURNING VANES: FABRICATE AIRFOIL-SHAPED ALUMINUM EXTRUSIONS WITH PERFORATED FACES AND FIBROUS-GLASS FILL.
 - C. MANUFACTURED TURNING VANES FOR NONMETAL DUCTS: FABRICATE CURVED BLADES OF RESIN-BONDED FIBERGLASS WITH ACRYLIC POLYMER COATING; SUPPORT WITH BARS PERPENDICULAR TO BLADES SET; SET INTO VANE RUNNERS SUITABLE FOR DUCT MOUNTING.
 - D. GENERAL REQUIREMENTS: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE"; FIGURES 4-3, "VANES AND VANE RUNNERS," AND 4-4, "VANE SUPPORT IN ELBOWS."
 - E. VANE CONSTRUCTION: DOUBLE WALL.
- 2.6 DUCT-MOUNTED ACCESS DOORS
- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 - 1. AMERICAN WARMING AND VENTILATING; A DIVISION OF MESTEK, INC.
 - 2. CESCO PRODUCTS; A DIVISION OF MESTEK, INC.
 - 3. DUCTMATE INDUSTRIES, INC.
 - 4. FLEXMASTER U.S.A., INC.
 - 5. GREENHECK FAN CORPORATION.
 - 6. MCGILL AIRFLOW LLC.
 - 7. NAILOR INDUSTRIES INC.
 - 8. VENTFABRICS, INC.
 - 9. WARD INDUSTRIES, INC.; A DIVISION OF HART & COOLEY, INC.
 - B. DUCT-MOUNTED ACCESS DOORS: FABRICATE ACCESS PANELS ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE"; FIGURES 7-2, "DUCT ACCESS DOORS AND PANELS," AND 7-3, "ACCESS DOORS - ROUND DUCT."
 - 1. DOOR:
 - A. DOUBLE WALL, RECTANGULAR.
 - B. GALVANIZED SHEET METAL WITH INSULATION FILL AND THICKNESS AS INDICATED FOR DUCT PRESSURE CLASS.
 - C. VISION PANEL.
 - D. HINGES AND LATCHES: 1-BY-1-INCH BUTT OR PIANO HINGE AND CAM LATCHES.
 - E. FABRICATE DOORS AIRTIGHT AND SUITABLE FOR DUCT PRESSURE CLASS.
 - 2. FRAME: GALVANIZED SHEET STEEL, WITH BEND-OVER TABS AND FOAM GASKETS.
 - 3. NUMBER OF HINGES AND LOCKS:
 - A. ACCESS DOORS LESS THAN 12 INCHES SQUARE: NO HINGES AND TWO SASH LOCKS.

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- B. ACCESS DOORS UP TO 18 INCHES SQUARE: TWO HINGES AND TWO SASH LOCKS.
- C. ACCESS DOORS UP TO 24 BY 48 INCHES: THREE HINGES AND TWO COMPRESSION LATCHES.
- D. ACCESS DOORS LARGER THAN 24 BY 48 INCHES: FOUR HINGES AND TWO COMPRESSION LATCHES WITH OUTSIDE AND INSIDE HANDLES.

2.7 FLEXIBLE CONNECTORS

- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 - 1. DUCTMATE INDUSTRIES, INC.
 - 2. DURO DYNE INC.
 - 3. VENTFABRICS, INC.
 - 4. WARD INDUSTRIES, INC.; A DIVISION OF HART & COOLEY, INC.
- B. MATERIALS: FLAME-RETARDANT OR NONCOMBUSTIBLE FABRICS.
- C. COATINGS AND ADHESIVES: COMPLY WITH UL 181, CLASS 1.
- D. INDOOR SYSTEM, FLEXIBLE CONNECTOR FABRIC: GLASS FABRIC DOUBLE COATED WITH NEOPRENE.
 - 1. MINIMUM WEIGHT: 26 OZ./SQ. YD..
 - 2. TENSILE STRENGTH: 480 LBF/INCH IN THE WARP AND 360 LBF/INCH IN THE FILLING.
 - 3. SERVICE TEMPERATURE: MINUS 40 TO PLUS 200 DEG F.
- E. OUTDOOR SYSTEM, FLEXIBLE CONNECTOR FABRIC: GLASS FABRIC DOUBLE COATED WITH WEATHERPROOF, SYNTHETIC RUBBER RESISTANT TO UV RAYS AND OZONE.
 - 1. MINIMUM WEIGHT: 24 OZ./SQ. YD..
 - 2. TENSILE STRENGTH: 530 LBF/INCH IN THE WARP AND 440 LBF/INCH IN THE FILLING.
 - 3. SERVICE TEMPERATURE: MINUS 50 TO PLUS 250 DEG F.

2.8 FLEXIBLE DUCTS

- A. BASIS-OF-DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE FLEXMASTER MODEL 6M OR COMPARABLE PRODUCT BY ONE OF THE FOLLOWING:
 - 1. FLEXMASTER U.S.A., INC.
 - 2. MCGILL AIRFLOW LLC.
 - 3. WARD INDUSTRIES, INC.; A DIVISION OF HART & COOLEY, INC.
- B. INSULATED, FLEXIBLE DUCT: UL 181, CLASS 1, ALUMINUM LAMINATE AND POLYESTER FILM WITH LATEX ADHESIVE SUPPORTED BY HELICALLY WOUND, SPRING-STEEL WIRE; FIBROUS-GLASS INSULATION; NYLON FABRIC VAPOR-BARRIER FILM.
 - 1. PRESSURE RATING: 10-INCH WG POSITIVE AND 1.0-INCH WG NEGATIVE.
 - 2. MAXIMUM AIR VELOCITY: 4000 FPM.
 - 3. TEMPERATURE RANGE: MINUS 20 TO PLUS 210 DEG F.

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4. INSULATION R-VALUE: 6.0
5. VAPOR BARRIER PERMEANCE: 0.05 PERM ACCORDING TO ASTM/E96, PROCEDURE A.

C. FLEXIBLE DUCT CONNECTORS:

1. CLAMPS: NYLON STRAP IN SIZES 3 THROUGH 18 INCHES, TO SUIT DUCT SIZE.

2.9 DUCT ACCESSORY HARDWARE

- A. INSTRUMENT TEST HOLES: CAST IRON OR CAST ALUMINUM TO SUIT DUCT MATERIAL, INCLUDING SCREW CAP AND GASKET. SIZE TO ALLOW INSERTION OF PITOT TUBE AND OTHER TESTING INSTRUMENTS AND OF LENGTH TO SUIT DUCT-INSULATION THICKNESS.
- B. ADHESIVES: HIGH STRENGTH, QUICK SETTING, NEOPRENE BASED, WATERPROOF, AND RESISTANT TO GASOLINE AND GREASE.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. INSTALL DUCT ACCESSORIES ACCORDING TO APPLICABLE DETAILS IN SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" FOR METAL DUCTS AND IN NAIMA AH116, "FIBROUS GLASS DUCT CONSTRUCTION STANDARDS," FOR FIBROUS-GLASS DUCTS.
- B. INSTALL DUCT ACCESSORIES OF MATERIALS SUITED TO DUCT MATERIALS; USE GALVANIZED-STEEL ACCESSORIES IN GALVANIZED-STEEL AND FIBROUS-GLASS DUCTS, STAINLESS-STEEL ACCESSORIES IN STAINLESS-STEEL DUCTS, AND ALUMINUM ACCESSORIES IN ALUMINUM DUCTS.
- C. INSTALL BACKDRAFT DAMPERS AT INLET OF EXHAUST FANS OR EXHAUST DUCTS AS CLOSE AS POSSIBLE TO EXHAUST FAN UNLESS OTHERWISE INDICATED.
- D. INSTALL VOLUME DAMPERS AT POINTS ON SUPPLY, RETURN, AND EXHAUST SYSTEMS WHERE BRANCHES EXTEND FROM LARGER DUCTS. WHERE DAMPERS ARE INSTALLED IN DUCTS HAVING DUCT LINER, INSTALL DAMPERS WITH HAT CHANNELS OF SAME DEPTH AS LINER, AND TERMINATE LINER WITH NOSING AT HAT CHANNEL.
 1. INSTALL STEEL VOLUME DAMPERS IN STEEL DUCTS.
 2. INSTALL ALUMINUM VOLUME DAMPERS IN ALUMINUM DUCTS.
- E. SET DAMPERS TO FULLY OPEN POSITION BEFORE TESTING, ADJUSTING, AND BALANCING.
- F. INSTALL TEST HOLES AT FAN INLETS AND OUTLETS AND ELSEWHERE AS INDICATED.
- G. INSTALL DUCT ACCESS DOORS ON SIDES OF DUCTS TO ALLOW FOR INSPECTING, ADJUSTING, AND MAINTAINING ACCESSORIES AND EQUIPMENT AT THE FOLLOWING LOCATIONS:

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1. ON BOTH SIDES OF DUCT COILS.
 2. ADJACENT TO AND CLOSE ENOUGH TO FIRE DAMPERS, TO RESET OR REINSTALL FUSIBLE LINKS. ACCESS DOORS FOR ACCESS TO FIRE DAMPERS HAVING FUSIBLE LINKS SHALL BE PRESSURE RELIEF ACCESS DOORS AND SHALL BE OUTWARD OPERATION FOR ACCESS DOORS INSTALLED UPSTREAM FROM DAMPERS AND INWARD OPERATION FOR ACCESS DOORS INSTALLED DOWNSTREAM FROM DAMPERS.
- H. INSTALL FLEXIBLE CONNECTORS TO CONNECT DUCTS TO EQUIPMENT.
- I. CONNECT DIFFUSERS TO DUCTS WITH MAXIMUM 60-INCH LENGTHS OF FLEXIBLE DUCT CLAMPED OR STRAPPED IN PLACE.
- J. CONNECT FLEXIBLE DUCTS TO METAL DUCTS WITH DRAW BANDS.
- K. INSTALL DUCT TEST HOLES WHERE REQUIRED FOR TESTING AND BALANCING PURPOSES.
- 3.2 FIELD QUALITY CONTROL
- A. TESTS AND INSPECTIONS:
1. OPERATE DAMPERS TO VERIFY FULL RANGE OF MOVEMENT.
 2. INSPECT LOCATIONS OF ACCESS DOORS AND VERIFY THAT PURPOSE OF ACCESS DOOR CAN BE PERFORMED.
 3. INSPECT TURNING VANES FOR PROPER AND SECURE INSTALLATION.

END OF SECTION 15820