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Key Plan: NO SCALE

Client:

NORTHVILLE PUBLIC SCHOOLS

Project:

**COOKE SCHOOL
MISCELLANEOUS
RENOVATIONS**

21200 TAFT RD.
NORTHVILLE, MICHIGAN 48167

Seat:

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**MECHANICAL
SPECIFICATIONS**

Project Number: **312081**

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HVAC:

DIFFUSERS, REGISTERS, AND GRILLES:

SUBMITTALS

PRODUCT DATA: FOR EACH PRODUCT INDICATED, INCLUDE THE FOLLOWING:

DATA SHEET: INDICATE MATERIALS OF CONSTRUCTION, FINISH, AND MOUNTING DETAILS; AND PERFORMANCE DATA INCLUDING THROW AND DROP, STATIC-PRESSURE DROP, AND NOISE RATINGS.

DIFFUSER, REGISTER, AND GRILLE SCHEDULE: INDICATE DRAWING DESIGNATION, ROOM LOCATION, QUANTITY, MODEL NUMBER, SIZE, AND ACCESSORIES FURNISHED.

CEILING-MOUNTED ITEMS INCLUDING LIGHTING FIXTURES, DIFFUSERS, GRILLES, SPEAKERS, SPRINKLERS, ACCESS PANELS, AND SPECIAL MOLDINGS.

DUCT ACCESS PANELS.

PRODUCTS

RECTANGULAR AND SQUARE CEILING DIFFUSERS:

MANUFACTURERS:
CARNES.
HART & COOLY.
KRUEGER.
NAILOR INDUSTRIES.
PRICE INDUSTRIES.
TITUS.
TUTTLE & BAILEY.

MATERIAL: STEEL
FINISH: BAKED ENAMEL, WHITE.
FACE SIZE: SEE DRAWING
FACE STYLE: FOUR CONE
MOUNTING: SNAP IN
PATTERN: ADJUSTABLE
DAMPERS: BUTTERFLY
ACCESSORIES: EQUALING GRID

INSTALL DIFFUSERS, REGISTERS, AND GRILLES LEVEL AND PLUMB.

CEILING-MOUNTED OUTLETS AND INLETS: DRAWINGS INDICATE GENERAL ARRANGEMENT OF DUCTS, FITTINGS, AND ACCESSORIES. AIR OUTLET AND INLET LOCATIONS HAVE BEEN INDICATED TO ACHIEVE DESIGN REQUIREMENTS FOR AIR VOLUME, NOISE CRITERIA, AIRFLOW PATTERN, THROW, AND PRESSURE DROP. MAKE FINAL LOCATIONS WHERE INDICATED, AS MUCH AS PRACTICABLE. FOR UNITS INSTALLED IN LAY-IN CEILING PANELS, LOCATE UNITS IN THE CENTER OF PANEL. WHERE ARCHITECTURAL FEATURES OR OTHER ITEMS CONFLICT WITH INSTALLATION, NOTIFY ARCHITECT FOR A DETERMINATION OF FINAL LOCATION.

INSTALL DIFFUSERS, REGISTERS, AND GRILLES WITH AIRTIGHT CONNECTIONS TO DUCTS AND TO ALLOW SERVICE AND MAINTENANCE OF DAMPERS, AIR EXTRACTORS, AND FIRE DAMPERS.

AFTER INSTALLATION, ADJUST DIFFUSERS, REGISTERS, AND GRILLES TO AIR PATTERNS INDICATED, OR AS DIRECTED, BEFORE STARTING AIR BALANCING.

SHEET METAL NOTES:

BLANK-OFF RETURN DUCTWORK IN AREAS OF WORK THAT CREATES DUST TO PREVENT DEBRIS FROM ENTERING MECHANICAL SYSTEM.

LOW PRESSURE DUCTWORK:

ALL DUCTWORK SHALL BE CONSTRUCTED AND SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE LATEST SMACNA'S ISSUE OF "LOW PRESSURE DUCT CONSTRUCTION STANDARDS". IN ADDITION, ALL JOINTS AND SEAMS SHALL BE SEALED WITH DUCT SEALANT EQUAL TO FOSTER #32-14. APPROVED SEALANT MANUFACTURERS: 3M COMPANY, BENJAMIN FOSTER COMPANY, UNITED SHEET METAL, FLINTKOTE.

ALL ROUND TAKE-OFFS DOWNSTREAM OF TERMINAL UNITS SHALL BE MADE WITH CONICAL TAKE-OFF SPIN-IN FITTINGS TYPE SM-205, WITH FACTORY INSTALLED ADJUSTABLE DAMPER AS MANUFACTURED BY GENERAL ENVIRONMENT CORPORATION, BLENDALE, CALIFORNIA OR EQUAL.

FLEXIBLE CONNECTIONS: AT EACH POINT OF CONNECTION OF DUCTWORK TO FANS, PROVIDE A FLEXIBLE CONNECTION, VENTFABRICS, INC., "VENTGLAS L.A." NOT LESS THAN 12" IN LENGTH AND MADE OF HEAVY GRADE GLASS FABRIC DOUBLE COATED WITH NEOPRENE AND PROVIDED WITH A SUITABLE FRAME AT EACH END ARRANGED FOR BOLTING TO INLET AND OUTLET OF FAN AND DUCTWORK, RESPECTIVELY. AS APPROVED BY THE FIRE MARSHAL AND ANY OTHER LOCAL AUTHORITY HAVING JURISDICTION.

VANES AND DEFLECTORS: ALL ELBOWS AND TURNS SHALL BE MADE WITH A RADIUS NOT LESS THE 1-1/2" TIMES THE DUCT DIAMETER OR WIDTH. WHERE BUILDING CONSTRUCTION DOES NOT PERMIT A LONG RADIUS ELBOW OR TURN OR IF SHOWN ON THE CONTRACT DOCUMENTS, ACOUSTICAL TURNING VANES AND DEFLECTORS SHALL BE PROVIDED.

FLEXIBLE DUCTWORK:

ALL LOW PRESSURE AND HIGH PRESSURE FLEXIBLE DUCT SHALL BE FLEXMASTER USA, INC., TYPE BM INSULATED FLEXIBLE DUCT CONSISTING OF A FACTORY FABRICATED ASSEMBLY OF A TRILAMINATE ALUMINUM FOIL, FIBERGLASS AND POLYESTER. THE FLEXIBLE DUCT SHALL BE UL LISTED 181 CLASS 1 AIR DUCT AND COMPLY WITH NFPA 90A AND 90B AND HAVE A FLAME SPREAD OF NOT OVER 25 AND A SMOKE DEVELOPED OF NOT OVER 50. THE FLEXIBLE DUCT SHALL HAVE A MINIMUM PRESSURE RATING OF 12" WC THROUGH TEMPERATURE RANGE OF -20 DEGREES F. TO +250 DEGREES F.

INSULATION:

INSULATION SHALL BE APPLIED BY EXPERIENCED PIPE COVERERS AS PER BEST TRADE PRACTICE.

PIPING:

ALL ADHESIVES, SEALERS AND COATINGS SHALL BE INCOMBUSTIBLE.

WHERE EXISTING INSULATED PIPING AND SURFACES ARE EXPOSED DUE TO RENOVATIONS, RE-INSULATE EXPOSED SURFACES TO MATCH THE EXISTING INSTALLATION.

APPLY INSULATION TO PIPE LINES AND EQUIPMENT ONLY AFTER TESTING AND INSPECTION, AND ALL SURFACES HAVE BEEN THOROUGHLY CLEANED.

EXPOSED AND CONCEALED: 1" THICK OWENS-CORNING FIBERGLAS ASJ--SSL-II "ONE PIECE" PIPE INSULATION WITH FACTORY APPLIED JACKET WITH SELF-SEALING LAP.

INSULATE EXPOSED DRAIN LINES AND HOT AND COLD WATER SUPPLY LINES BELOW PHYSICALLY HANDICAPPED LAVATORIES AND SINKS PER PHYSICALLY HANDICAPPED CODE REQUIREMENTS.

APPROVED MANUFACTURERS: TRUEBRO "LAVGUARD", PLUMBEX "HANDY SHIELD"

COLOR: WHITE.

DUCT INSULATION - GENERAL:

ALL DUCTWORK SHALL BE THERMALLY INSULATED AS SPECIFIED.

ALL DUCT INSULATION SHALL HAVE A FLAME SPREAD CLASSIFICATION OF 25 OR LESS, A FUEL CONTRIBUTED RATING OF 35 OR LESS AND SMOKE DEVELOPED RATING OF 50 OR LESS, AS RATED BY UNDERWRITERS' LABORATORIES.

BLANKET TYPE (UP TO 1-1/2 LB./CU. FT. INSULATION):

INSULATION WITH ATTACHED FACING SHALL BE SECURED TO THE DUCTS WITH ADHESIVE APPLIED IN 6" BRUSH WIDTHS EVERY 12". THE ADHESIVE SHALL BE RIDGED SLIGHTLY BY USING A SERRATED TROWEL.

INSULATION WITHOUT ATTACHED FACING (PLAIN) SHALL BE SECURED TO THE DUCTS THE SAME AS ABOVE THEN BIND WITH TYING CORD, SPIRAL WRAPPED OR HALF HITCHED.

DUCT FITTINGS SHALL BE INSULATED BY WRAPPING WITH A GLASS FIBER BLANKET. BLANKETS SHALL BE SECURED TO THE DUCT FITTINGS BY INSULATION STAPLES OR JUTE TWINE. THE BLANKET SHALL BE COVERED WITH AN OPEN MESH CLOTH OR GLASS FIBER HEAVILY COATED WITH VAPOR BARRIER ADHESIVE. THE INSULATION THICKNESS SHALL BE EQUAL TO THE THICKNESS OF THE INSULATION ON THE ADJOINING DUCTWORK.

DUCT INSULATION APPLICATION:

THE FOLLOWING DUCTWORK SHALL BE INSULATED AS DESCRIBED HEREIN. REFER TO PREVIOUS PARAGRAPHS FOR RELATED INSULATION MATERIALS, DUCT INSULATION AND FINISH APPLICATIONS.

HEATING AND AIR CONDITIONING SUPPLY AIR DUCTWORK:
OWENS-CORNING FIBERGLAS FACED DUCTWRAP COMMERCIAL GRADE TYPE 100 2"THICK MINIMUM INSTALLED R VALUE 6.0 1 LB./CU. FT. DENSITY WITH FACTORY "FRK" VAPOR BARRIER JACKET OR LAMINATED ALUMINUM FOIL, OPEN MESH GLASS FIBER REINFORCING MESH SCRIM AND FLAMEPROOF KRAFT PAPER.

TESTING AND BALANCING:

GENERAL:

TEST AND ADJUST ALL NEW PIPING SYSTEMS INSTALLED IN THIS PROJECT.

PROVIDE ALL TESTING INSTRUMENTS, GAUGES AND OTHER EQUIPMENT REQUIRED OR NECESSARY FOR TEST.

REPAIR ALL DEFECTS DISCLOSED BY TESTS WITHOUT ADDITIONAL COST TO THE OWNER.

REPEAT TESTS AFTER ANY DEFECTS DISCLOSED ARE REPAIRED OR REPLACED, UNLESS WAIVED BY ARCHITECT.

ARRANGE AND PAY THE COST OF ALL UTILITIES USED ON TESTS.

COMPLETE ALL TESTS BEFORE COVERING IS APPLIED.

ISOLATE ALL PIPING SYSTEM COMPONENTS NOT CONSTRUCTED TO WITHSTAND TEST PRESSURES.

BALANCING:

BALANCE ALL OUTLETS AND TERMINAL BOXES TO WITHIN 10% OF RATED C.F.M IN ACCORDANCE WITH ABC AND NEBB, SUBMIT BALANCING REPORT.

PIPE IDENTIFICATION:

IDENTIFY ALL NEW PIPING INSTALLED IN THIS PROJECT IN ACCORDANCE WITH ANSI A13.1 1981, OSHA, AND OWNER'S STANDARDS.

CONFERENCE ROOM - INDOOR UNIT: AREA 4

MANUFACTURER:
MR. SLIM (MITSUBISHI ELECTRIC)
CARRIER, DIV. OF UNITED TECHNOLOGIES CORP.
TRANE COMPANY (THE).
YORK INTERNATIONAL CORP.; UNITARY PRODUCTS GROUP.

FINISH: FACTORY PAINTED, MANUFACTURER'S STANDARD COLOR.

FAN: CENTRIFUGAL, FACTORY BALANCED, RESILIENT MOUNTED, DIRECT DRIVE.

CONTROLS:
WIRED REMOTE CONTROLLER
COOLING RELAY: TO START CONDENSING UNIT.
BLOWER FAN CONTROL: FAN-ON-AUTOMATIC.

FILTERS: WASHABLE TYPE

EVAPORATOR COIL:
COPPER TUBES MECHANICALLY EXPANDED INTO ALUMINUM FINS. COMPLY WITH ARI 210/ 240, "UNITARY AIR-CONDITIONING AND AIR-SOURCE HEAT PUMP EQUIPMENT."

INCLUDE CONDENSATE DRAIN PAN WITH ACCESSIBLE DRAIN OUTLET.

REFRIGERANT LINE KITS:
ANNEALD-COPPER SUCTION AND LIQUID LINES FACTORY CLEANED, DRIED, PRESSURIZED WITH NITROGEN, AND SEALED.

INSULATE SUCTION LINE WITH MINIMUM 3/8-INCH THICK, FLEXIBLE ELASTOMERIC TUBULAR INSULATION COMPLYING WITH ASTM C 534, TYPE I.

FLARED OR SWEAT ENDS COMPATIBLE WITH COIL AND CONDENSING UNIT CONNECTIONS.

AIR-COOLED CONDENSING UNIT:

MANUFACTURER:
MR. SLIM (MITSUBISHI ELECTRIC)
CARRIER, DIV. OF UNITED TECHNOLOGIES CORP.
TRANE COMPANY (THE).
YORK INTERNATIONAL CORP.; UNITARY PRODUCTS GROUP.

DESCRIPTION: FACTORY ASSEMBLED AND TESTED, AIR COOLED; CONSISTING OF CASING, COMPRESSOR, CONDENSING COIL, CONDENSOR FAN AND MOTOR, AND UNIT CONTROLS.

COMPRESSOR: HERMETIC OR SEMIHERMETIC COMPRESSOR DESIGNED FOR SERVICE WITH CRANKCASE SIGHT GLASS, CRANKCASE HEATER, AND BACKSEATING SERVICE ACCESS VALVES ON SUCTION AND DISCHARGE PORTS.

CONDENSER: SEAMLESS COPPER-TUBE, ALUMINUM-FIN COIL. FACTORY TEST COILS AT 450 PSIG, THEN DEHYDRATE BY DRAWING A VACUUM AND FILL WITH A HOLDING CHARGE OF NITROGEN.

CONDENSER FAN: PROPELLER-TYPE DIRECT DRIVEN WITH PERMANENTLY LUBRICATED BALL-BEARING MOTOR, MOTOR WITH THERMAL-OVERLOAD CUTOFF, DYNAMICALLY AND STATICALLY BALANCED FAN ASSEMBLY.

LOW AMBIENT CONTROL: FACTORY-INSTALLED, FAN-SPEED CONTROL, OR FAN CYCLING CONTROL.

CLASS ROOM AREA 5

UNIT VENTILATORS:
THIS SECTION INCLUDES UNIT VENTILATORS WITH HOT-WATER HEATING COIL.

QUALITY ASSURANCE

ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES, LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100, BY A TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE.
COMPLY WITH AHRJ 440 FOR TESTING AND RATINGS UNITS.
COMPLY WITH ASHRAE 93 FOR TESTING HYDRONIC COILS.
COMPLY WITH NFPA 70 FOR COMPONENTS AND INSTALLATION.

COORDINATION

COORDINATE LAYOUT AND INSTALLATION OF HORIZONTAL UNIT VENTILATORS AND SUSPENSION SYSTEM COMPONENTS WITH OTHER CONSTRUCTION THAT PENETRATES CEILINGS OR IS SUPPORTED BY THEM, INCLUDING LIGHT FIXTURES, HVAC EQUIPMENT, FIRE-SUPPRESSION-SYSTEM COMPONENTS, AND PARTITION ASSEMBLIES. COORDINATE SIZE AND LOCATION OF WALL SLEEVES FOR OUTSIDE-AIR INTAKE AND RELIEF DAMPERS.

EXTRA MATERIALS

FURNISH EXTRA MATERIALS DESCRIBED BELOW THAT MATCH PRODUCTS INSTALLED AND THAT ARE PACKAGED WITH PROTECTIVE COVERING FOR STORAGE AND IDENTIFIED WITH LABELS DESCRIBING CONTENTS. UNIT VENTILATOR FILTERS. FURNISH ONE SET OF SPARE FILTERS FOR EACH FILTER INSTALLED.

UNIT VENTILATOR MANUFACTURERS

ABB AEROVENT INC.
DANAHER-BISH, INC.
MCQUAY INTERNATIONAL.
NESBITT, MESTEK, INC.
TRANE COMPANY (THE)

UNIT VENTILATOR DESCRIPTION:

A VERTICAL, FLOOR-MOUNTING (VVV-I) AND A HORIZONTAL, CEILING-MOUNTING (HV-I) ASSEMBLY INCLUDING CABINET, FILTER, CHASSIS, COIL, FAN, MOTOR AND DRAIN-THROUGH CONFIGURATION WITH THE FOLLOWING:
HEATING COIL.
TEMPERATURE CONTROLS.

MATERIALS

CHASSIS: WELDED, GALVANIZED STEEL WITH FLANGED EDGES AND UNIT-LEVELING BOLTS
COIL SECTION INSULATION: 1-INCH (25-MM) DUCT LINER COMPLYING WITH ASTM C 1071 AND ATTACHED WITH ADHESIVE COMPLYING WITH ASTM C 416.
FIRE-HAZARD CLASSIFICATION: DUCT LINER AND ADHESIVE SHALL HAVE A MAXIMUM FLAME-SPREAD RATING OF 25 AND SMOKE-DEVELOPED RATING OF 50 WHEN TESTED ACCORDING TO ASTM E 84.
CABINET: GALVANIZED STEEL, WITH REMOVABLE PANELS FASTENED WITH TAMPERPROOF FASTENERS.
CABINET FINISH: PHOSPHATIZE COAT WITH BAKED-ON PRIMER AND MANUFACTURER'S STANDARD PAINT, IN COLOR SELECTED BY ARCHITECT, APPLIED TO FACTORY-ASSEMBLED AND -TESTED UNIT VENTILATOR BEFORE SHIPPING.
CABINET TOP: GALVANIZED STEEL, WITH CABINET FINISH.
DISCHARGE AIR: STEEL GRILLE WITH DOUBLE-DEFLECTION ADJUSTABLE BARS IN SURFACE-MOUNTING FRAME.
AIR-OUTLET LOCATION: FRONT.
OUTDOOR GRILLE: TYPES AND SIZES INDICATED WITH THE FOLLOWING FEATURES AND PROVISIONS:

HORIZONTAL WALL INTAKE LOUVER:

CONSTRUCTION: STEEL
1/2-INCH (13-MM) MESH SCREEN ON INTERIOR SIDE OF INTAKE.
DECORATIVE GRILLE ON OUTSIDE OF INTAKE.
FINISH: BAKED-ENAMEL FINISH COLOR AS SELECTED BY ARCHITECT
MIXING DAMPERS: STEEL DAMPER BLADES WITH EDGE AND SIDE SEALS AND NYLON BEARINGS, OPERATED BY FACTORY-MOUNTED ELECTRIC OPERATOR TO PROPORTIONAL OUTSIDE-AIR RETURN AIR.

COILS:

HOT-WATER COIL: COPPER TUBE, WITH MECHANICALLY BONDED ALUMINUM FINS SPACED NO CLOSER THAN 0.1 INCH (2.5 MM) AND RATED FOR A MINIMUM WORKING PRESSURE OF 300 PSIG (2068 KPA) AND A MAXIMUM ENTERING WATER TEMPERATURE OF 215 DEG F (102 DEG C) WITH MANUAL AIR VENT AND DRAIN FLJG.

FAN:

CENTRIFUGAL, WITH FORWARD-CURVED, DOUBLE-WIDTH WHEELS AND FAN SCROLLS MADE OF GALVANIZED STEEL OR THERMOPLASTIC MATERIAL, DIRECTLY CONNECTED TO MOTOR.

FAN MOTORS:

MULTISPEED MOTOR WITH INTEGRAL THERMAL-OVERLOAD PROTECTION AND RESILIENT MOUNTS. CONNECT MOTOR TO CHASSIS WIRING WITH FLJG CONNECTION.

FILTERS:

1-INCH- (25-MM-) THICK, GLASS-FIBER MEDIA.

CONTROL SYSTEMS:

PROVIDE FACTORY-INSTALLED CONTROLS, INCLUDING NECESSARY WIRING AND PIPING, AS FOLLOWS:
PROVIDE OCCUPANT ADJUSTMENT CAPABILITY FOR THE FOLLOWING:
ROOM TEMPERATURE SET POINT.
MINIMUM OUTSIDE-AIR PERCENTAGE
UNOCCUPIED ROOM TEMPERATURE SET POINT.
CONTROLS COMPONENTS SHALL INCLUDE THE FOLLOWING:
WALL MOUNTED ZONE SENSOR ON WALL WITH DIGITAL DISPLAY. THE SENSOR SHALL ALSO INCLUDE OFF/AUTO/HIGH/MEDIUM/LOW SET POINT BUTTONS, ON/CANCEL BUTTONS AND COMMUNICATION JACK.
VENTILATION LOCKOUT RELAY TO CLOSE VENTILATION DAMPER DURING OCCUPIED OPERATION.
DAY-NIGHT CONTROL SWITCH.
DAY-NIGHT CONTROL RELAY FOR REMOTE SIGNAL.

SAFETY DEVICES:

EACH UNIT SHALL HAVE THE FOLLOWING SAFETY DEVICES:
MANUAL DISCONNECT SWITCH.
SPRINGS-LOADED INTERLOCK SWITCH DE-ENERGIZES CONTROL CIRCUIT, FAN, WHEN FRONT PANEL IS REMOVED.
HEAT-DISSIPATION SWITCH KEEPS FANS RUNNING WHEN UNIT DISCHARGE TEMPERATURE RISES ABOVE 100 DEG F (38 DEG C).
OVERCURRENT PROTECTIVE FUSES.
MOTOR AND CONTROL CIRCUIT FUSES.
MOTORS
COMPLY WITH REQUIREMENTS IN DIVISION 15 SECTION "MOTORS".

INSTALLATION:

INSTALL UNIT VENTILATORS LEVEL AND PLUMB.
INSTALL UNIT VENTILATORS TO COMPLY WITH NFPA 90A.
SUSPEND OR SUPPORT HORIZONTAL UNIT VENTILATORS ACCORDING TO DIVISION 15 SECTION "HANGERS AND SUPPORTS."
SUSPEND HORIZONTAL UNIT VENTILATORS FROM STRUCTURE WITH RUBBER-IN-SHEAR VIBRATION ISOLATORS (RUBBER HANGERS). VIBRATION ISOLATORS ARE SPECIFIED IN DIVISION 15 SECTION "MECHANICAL VIBRATION CONTROLS AND SEISMIC RESTRAINTS."
INSTALL WALL-MOUNTING THERMOSTATS AND SWITCH CONTROLS IN ELECTRICAL OUTLET BOXES AT HEIGHTS TO MATCH LIGHTING CONTROLS.