SECTION 23 05 00 – COMMON WORK RESULTS FOR HVAC

PART 1 GENERAL

1.1 SUBMITTALS

A. PRODUCT DATA: SUBMIT VALVES AND GAGES.

PART 2 PRODUCTS

2.1 PIPING

A. REFRIGERANT PIPING: COPPER TUBING, TYPE ACR HARD DRAWN, SILVER BRAZED.

2.2 PIPE HANGERS

A. ALL SERVICES: CLEVIS TYPE CONFORMING TO MSS TYPE 1.

B. UPPER ATTACHMENTS: COMPATIBLE WITH TYPE OF STRUCTURE BEING USED.

PART 3 EXECUTION

3.1 INSTALLATION

A. PROVIDE DIELECTRIC CONNECTIONS WHEREVER JOINTING DISSIMILAR METALS.

B. REAM PIPE AND TUBE ENDS. REMOVE BURRS. BEVEL PLAIN END FERROUS PIPE.

C. INSTALL GLOBE VALVES FOR SHUT OFF APPLICATIONS IN REFRIGERANT PIPING SYSTEMS.

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.1 SUBMITTALS

A. FINAL REPORT: REQUIRED

1.2 REPORT FORMS: AABC NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE FORMS.

1.3 AIR HANDLING SYSTEMS: ADJUST FANS AND AIR DISTRIBUTION OUTLETS AND INLETS AIRFLOWS TO WITHIN PLUS OR MINUS 5 PERCENT OF DESIGN.

SECTION 23 07 00 - HVAC INSULATION

PART 1 GENERAL

1.1 SUBMITTALS

A. PRODUCT DATA: REQUIRED.

B. SAMPLES: NOT REQUIRED

PART 2 PRODUCTS

2.1 PIPE INSULATION

A. GLASS FIBER: RIGID MOLDED, NONCOMBUSTIBLE WITH VAPOR BARRIER JACKET.

B. CELLULAR FOAM: FLEXIBLE, CELLULAR ELASTOMERIC, MOLDED OR SHEET.

C. PIPE INSULATION RATED FOR 0-1000 DEGREES F. WITH A "K" FACTOR OF 0.27 AT A MEAN TEMPERATURE OF 150 DEGREES F. REFER TO SCHEDULE FOR INSULATION REQUIRED THICKNESS.

D. INSULATION SHALL NOT CONTAIN ANY PBDE (POLYBROMINATED DIPHENL ETHERS) FLAME RETARDANTS.

E. JACKETS
1. PVC PLASTIC: ONE PIECE MOLDED TYPE FITTING COVERS AND SHEET MATERIAL, OFF-WHITE COLOR.
2. ALUMINUM JACKET: SHEET, [SMOOTH] [EMBOSSED] FINISH.

2.2 DUCTWORK INSULATION

A. FLEXIBLE GLASS FIBER: FLEXIBLE, NONCOMBUSTIBLE BLANKET WITH VAPOR BARRIER JACKET.

B. RIGID GLASS FIBER: RIGID, NONCOMBUSTIBLE BLANKET WITH VAPOR BARRIER JACKET.

C. JACKETS
1. ALUMINUM JACKET: SHEET, SMOOTH, OR EMBOSSED FINISH.

D. DUCT INSULATION "R" VALUES SHALL BE EQUAL TO OR GREATER THAN REQUIRED BY CODE.

E. INSULATION SHALL NOT CONTAIN ANY PBDE (POLYBROMINATED DIPHENL ETHERS) FLAME RETARDANTS.

PART 3 EXECUTION

3.1 INSTALLATION

A. PIPING INSULATION:
1. PROVIDE COLD PIPES WITH VAPOR BARRIER JACKETS.
2. INSULATE COMPLETE SYSTEM.
3. FOR EXTERIOR APPLICATIONS, PROVIDE OUTDOOR, ALUMINUM, JACKET.

3.2 SCHEDULES

INSULATION

		PIPE SIZE INCH	THICKNESS INCH
A.	PIPING INSULATION:		
1.	CONDENSATE PIPING FROM COOLING	ALL SIZES	0.5
2.	REFRIGERANT SUCTION	ALL SIZES	0.5
3.	REFRIGERANT HOT GAS	ALL SIZES	0.5

		INSULATION THICKNESS INCH
B.	DUCTWORK INSULATION:	
1.	FLEXIBLE GLASS FIBER:	
	SUPPLY DUCTS	1.5
	RETURN DUCTS	1.5

SECTION 23 09 00 – INSTRUMENTATION AND CONTROL FOR HVAC

PART 1 GENERAL

1.1 SYSTEM DESCRIPTION:

A. DESIGN REQUIREMENTS: ELECTRIC SYSTEM INCLUDING CONTROL DEVICES, ACTUATORS, AND ELECTRIC ACCESSORIES.

1.2 SUBMITTALS

A. PRODUCT DATA: REQUIRED.

B. SHOP DRAWINGS: REQUIRED.

PART 2 PRODUCTS

2.1 CONTROL COMPONENTS

A. FURNISH MATERIALS AND EQUIPMENT OF STANDARD COMPONENTS, MANUFACTURED FOR USE IN CONTROL SYSTEMS AND NOT CUSTOM DESIGNED ESPECIALLY FOR THIS PROJECT. FURNISH COMPONENTS TESTED AND PROVEN IN ACTUAL USE.

B. FURNISH PRODUCTS TO ACCOMPLISH SEQUENCES OF OPERATION DESCRIBED IN PART 3 .

C. CONTROL WIRING: WIRING IN ACCORDANCE WITH REQUIREMENTS OF DIVISION 26. MINIMUM WIRE SIZE TO BE 14 GAUGE.

PART 3 EXECUTION

3.1 INSTALLATION

A. AFTER COMPLETION OF INSTALLATION, TEST AND ADJUST CONTROL EQUIPMENT.

B. PROVIDE GUARDS ON THERMOSTATS IN ENTRANCES AND OTHER PUBLIC AREAS.

C. PROVIDE CONDUIT AND ELECTRICAL WIRING IN ACCORDANCE WITH APPROPRIATE REQUIREMENTS OF DIVISION 26.

3.2 SEQUENCES OF OPERATION

A. AIR HANDLING UNIT (AHU-1)
1. OCCUPIED CYCLE: FAN OPERATES CONTINUOUSLY. OUTSIDE AIR DAMPERS ARE OPEN TO THEIR MINIMUM POSITION. ON A RISE IN SPACE TEMPERATURE THE ELECTRIC THERMOSTAT MAINTAINS SPACE TEMPERATURE BY CYCLING UNIT HEATER OFF. ON A CONTINUED RISE IN SPACE TEMPERATURE THE OUTSIDE AIR AND RETURN AIR DAMPERS MODULATE TO MAINTAIN SPACE TEMPERATURE.
2. UNOCCUPIED CYCLE: THE UNIT FAN AND BURNER CYCLE TO MAINTAIN REDUCED SPACE TEMPERATURE.
3. ECONOMIZER SHALL OPERATE BETWEEN OUTDOOR AIR TEMP. 60-45 DEGREES F (ADJUSTABLE).

B. SPLIT SYSTEM HEATING AND COOLING (AHU-2/CU-2, AHU-3/CU-3)
1. UNIT SHALL BE PROVIDED WITH 24V PROGRAMMABLE WALL THERMOSTAT. TO ENERGIZE THE FAN AND COMPRESSOR UPON A CALL FOR COOLING

SECTOION 23 30 00 – HVAC AIR DISTRIBUTION

PART 1 GENERAL

1.1 SUBMITTALS

A. PRODUCT DATA: REQUIRED.

B. SHOP DRAWINGS: NOT REQUIRED.

PART 2 PRODUCTS

2.1 DUCTWORK

A. MATERIALS
1. STEEL DUCTS: GALVANIZED STEEL SHEET; LOCK-FORMING QUALITY.
2. FLEXIBLE DUCTS: FABRIC SUPPORTED BY HELICALLY WOUND SPRING STEEL WIRE OR FLAT STEEL BANDS.

B. METAL DUCTWORK
1. FABRICATE AND SUPPORT IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE.
2. CONSTRUCT T'S, BENDS, AND ELBOWS WITH RADIUS OF 1-1/2 TIMES WIDTH OF DUCT ON CENTER LINE OR PROVIDE TURNING VANES.
3. INCREASE DUCT SIZES GRADUALLY, NOT EXCEEDING 30 DEGREES DIVERGENCE AND 45 DEGREES CONVERGENCE.

C. MANUFACTURED DUCTWORK AND FITTINGS
1. MANUFACTURE IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE. FURNISH DUCT MATERIAL, GAGES, REINFORCING, AND SEALING FOR OPERATING PRESSURES AS INDICATED ON DRAWINGS.

2.2 DUCT ACCESSORIES

A. VOLUME CONTROL DAMPERS
1. FABRICATION: SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE.
2. SINGLE BLADE DAMPERS: FABRICATE FOR DUCT SIZES TO 12 X 30 INCH.
3. QUADRANTS: PROVIDE LOCKING, INDICATING REGULATORS ON DAMPERS.

B. BACKDRAFT DAMPERS: FABRICATE MULTI-BLADE, PARALLEL ACTION GRAVITY BALANCED BACKDRAFT DAMPERS OF GALVANIZED STEEL OR EXTRUDED ALUMINUM, WITH CENTER PIVOTED BLADES LINKED TOGETHER.

C. FLEXIBLE DUCT CONNECTIONS: UL LISTED FIRE-RETARDANT NEOPRENE COATED WOVEN GLASS FIBER FABRIC TO NFPA 90A, APPROXIMATELY 3 INCHES WIDE, CRIMPED INTO METAL EDGING STRIP.

D. DUCT ACCESS DOORS
1. FABRICATE IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE.
2. ACCESS DOORS WITH SHEET METAL SCREW FASTENERS ARE NOT ACCEPTABLE.

2.3 GRILLES, REGISTERS, AND DIFFUSERS

A. MANUFACTURER: PRICE OR SIMILAR BY ANEMOSTAT, TITUS, OR NAILOR-HART.

B. GENERAL: GRILLE, REGISTER, AND DIFFUSER INFORMATION MARK, MODEL NUMBER, TYPE, SIZE, FINISH, AND ACCESSORY ITEMS ARE INDICATED IN SCHEDULE. LOCATIONS, TYPE, CFM, AND DIRECTIONS OF THROW (WHERE APPLICABLE) ARE INDICATED ON DRAWINGS.

C. DEFINITIONS: TERMS USED FOR GRILLES, REGISTERS, AND DIFFUSERS ARE AS FOLLOWS:
1. GRILLES: SAME STYLE AS REGISTERS BUT WITHOUT DAMPER.
2. REGISTERS: ITEMS LABELED AS REGISTERS ARE TO BE FURNISHED WITH OPPOSED BLADE DAMPERS.

D. FINISH: FURNISH GRILLES, REGISTERS AND DIFFUSERS WITH FACTORY APPLIED OFF-WHITE FINISH UNLESS NOTED OTHERWISE.

2.4 CENTRIFUGAL CEILING FANS

A. CENTRIFUGAL FAN UNIT: DIRECT DRIVE WITH GALVANIZED STEEL HOUSING LINED WITH 1/2 INCH ACOUSTIC INSULATION). TOTALLY ENCLOSED FAN COOLED TYPE MOTOR WITH LUBRICATED SEALED BEARINGS, MOTOR MOUNTED ON RUBBER-IN-SHEAR ISOLATORS, OUTLET DUCT COLLAR, GRAVITY BACKDRAFT DAMPER IN DISCHARGE.

B. DISCONNECT SWITCH.

C. MANUFACTURER: LOREN COOK OR SIMILAR BY GREENHECK, ACME, OR TWIN CITY FAN.

PART 3 EXECUTION

3.1 INSTALLATION

A. INSTALL BACKDRAFT DAMPERS ON DISCHARGE OF EXHAUST FANS.

B. CONNECT DIFFUSERS OR TROFFER BOOTS TO LOW PRESSURE DUCTS WITH 5 FEET MAXIMUM LENGTH OF FLEXIBLE DUCT.

C. INSTALL FLEXIBLE CONNECTIONS IMMEDIATELY ADJACENT TO EQUIPMENT IN DUCTS ASSOCIATED WITH FANS AND MOTORIZED EQUIPMENT.

D. INSTALL DUCT ACCESS DOORS FOR INSPECTION AND CLEANING BEFORE AND AFTER FILTERS, COILS, FANS, AUTOMATIC DAMPERS, AND AT FIRE DAMPERS.

E. CHECK LOCATION OF AIR OUTLETS AND INLETS AND MAKE NECESSARY ADJUSTMENTS IN POSITION TO CONFORM WITH ARCHITECTURAL FEATURES, SYMMETRY, AND LIGHTING ARRANGEMENT.

F. PROVIDE BALANCING DAMPERS ON DUCT TAKE-OFF TO DIFFUSERS, AND GRILLES AND REGISTERS.

G. PAINT DUCTWORK VISIBLE BEHIND AIR OUTLETS AND INLETS MATTE BLACK.

SECTION 23 55 00 - FUEL FIRED HEATERS

PART 1 GENERAL

1.1 SUBMITTALS

A. PRODUCT DATA: REQUIRED

B. SHOP DRAWINGS: REQUIRED

PART 2 PRODUCTS

2.1 FORCED AIR FURNACES

A. UNITS: SELF-CONTAINED, PACKAGED, FACTORY ASSEMBLED, PRE-WIRED UNIT CONSISTING OF CABINET, SUPPLY FAN, HEATING ELEMENT, CONTROLS, AIR FILTER, AND ACCESSORIES; WIRED FOR SINGLE POWER CONNECTION WITH CONTROL TRANSFORMER.
1. AIR FLOW CONFIGURATION: UPFLOW
2. HEATING: NATURAL GAS FIRED
3. ELECTRIC REFRIGERATION: REFRIGERANT COOLING COIL AND OUTDOOR PACKAGE CONTAINING COMPRESSOR, CONDENSER COIL AND CONDENSER FAN.
4. ACCESSORIES: CONCENTRIC WALL TERMINATION KIT

B. FURNACE REFRIGERATION PACKAGE
1. EVAPORATOR COIL.
2. AIR COOLED CONDENSER: COIL WITH DIRECT DRIVE PROPELLER FAN, GALVANIZED FAN GUARD, COMPRESSOR LOW AMBIENT KIT..

C. ADJUSTABLE ROOM THERMOSTAT WITH SYSTEM SELECTOR SWITCH AND FAN CONTROL SWITCH.

SECTION 23 70 00 – HEATING, VENTILATING, AND AIR CONDITIONING EQUIPMENT

PART 1 GENERAL

1.1 SUBMITTALS

A. PRODUCT DATA: REQUIRED

B. SHOP DRAWINGS: REQUIRED

C. PROJECT RECORD DOCUMENTS: REQUIRED

PART 2 PRODUCTS

2.1 COMPUTER ROOM AIR CONDITIONING UNITS

A. UNITS: PACKAGED, AIR COOLED, FACTORY ASSEMBLED, PRE-WIRED AND PRE-PIPED UNIT, CONSISTING OF CABINET, FANS, FILTERS, CONTROLS, ASSEMBLED FOR DOWN-FLOW AIR DELIVERY, IN DRAW-THROUGH OR BLOW-THROUGH CONFIGURATION.

B. COMPRESSORS: SEMI-HERMETIC WITH SUCTION GAS COOLED MOTORS, VIBRATION ISOLATORS, THERMAL OVERLOADS, OIL SIGHT GLASS, MANUAL RESET HIGH PRESSURE SWITCH, PUMP DOWN LOW PRESSURE SWITCH, SUCTION LINE STRAINER, REVERSIBLE OIL PUMPS, 1750 RPM [HERMETIC WITH RESILIENT SUSPENSION SYSTEM, OIL STRAINER, CRANKCASE SIGHT GLASS, INTERNAL MOTOR PROTECTION, LOW PRESSURE SWITCH, MANUAL RESET HIGH PRESSURE SWITCH.

C. EVAPORATOR COILS: ALTERNATE ROW CIRCUITS, DIRECT EXPANSION COOLING COILS OF SEAMLESS COPPER TUBES EXPANDED INTO ALUMINUM FINS.

D. CONDENSERS
1. AIR COOLED: CORROSION RESISTANT CABINET, COPPER TUBE, ALUMINUM FIN COILS ARRANGED FOR TWO CIRCUITS, MULTIPLE DIRECT DRIVE PROPELLER FANS WITH PERMANENTLY LUBRICATED BALL BEARING SINGLE PHASE MOTORS WITH INTERNAL OVERLOAD PROTECTION.

E. FILTERS: PLEATED, LOFTED, NON-WOVEN, REINFORCED COTTON FABRIC; SUPPORTED AND BONDED TO WELDED WIRE GRID; ENCLOSED IN CARDBOARD FRAME; 2 INCH NOMINAL THICKNESS; RATED 25-30 PERCENT DUST SPOT EFFICIENCY.

F. CONTROL CABINET: UL LISTED, WITH PIANO HINGED DOOR, GROUNDING LUG, COMBINATION MAGNETIC STARTERS WITH OVERLOAD RELAYS, CIRCUIT BREAKERS AND COVER INTERLOCK; AND FUSIBLE CONTROL CIRCUIT TRANSFORMER.

G. ELECTRONIC CONTROL SYSTEM: SOLID STATE WITH START BUTTON, STOP BUTTON, TEMPORARY LOSS OF POWER INDICATOR, MANUAL RESET CIRCUIT BREAKERS, TEMPERATURE CONTROL, AND MONITOR PANEL.

PART 3 EXECUTION

3.1 INSTALLATION

A. PROVIDE INITIAL START-UP AND SHUT-DOWN DURING FIRST YEAR OF OPERATION, INCLUDING ROUTINE SERVICING AND CHECK-OUT.

B. PIPE DRAIN PAN CONDENSATE WITH "P" TRAP TO DISCHARGE TO SPLASH BLOCK.

C. COVER, SPLICE BOX, COIL CASING, FACTORY MOUNTED DISCONNECT SWITCH, AND CONTROLS. EXPOSED HELICAL COIL OF NICKEL-CHROME RESISTANCE WIRE WITH REFRACTORY CERAMIC SUPPORT BUSHINGS.

D. CONTROL: REMOTELY MOUNTED SPACE THERMOSTAT.

your trusted advisor
consultants
engineers
architects
planners

NO	REVISION	DATE

ISSUED FOR:	CD
ISSUE DATE:	4/10/20
SCALE:	AS NOTED
DESIGNED BY:	PJF / GMS
DRAWN BY:	PJF
CHECKED BY:	PJF

LAKETRAN WICKLIFFE PARK-N-RIDE LOT
29610 LAKELAND BLVD., WICKLIFFE, OH 44092

MECHANICAL SPECIFICATIONS

PROJECT NO.
190065

DISCIPLINE
MECHANICAL

SHEET NAME
M-3

SHEET **46** OF **49**

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