MECHANICAL SPECIFICATIONS

1. GENERAL PROVISIONS:

A. PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, NECESSARY FOR THE COMPLETE INSTALLATION OF THE PLUMBING AND MECHANICAL SYSTEMS OUTLINED.

B. OBTAIN ALL PERMITS, FEES, LICENSES, INSPECTIONS, AND CERTIFICATES OF COMPLIANCE OR APPROVAL AS REQUIRED BY THE AUTHORITIES.

C. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE LAWS, CODES AND REGULATIONS OF THE GOVERNMENTAL BODIES HAVING JURISDICTION OVER THE SITE.

D. ALL TESTING REQUIRED BY AUTHORITIES SHALL BE CONSIDERED PART OF THIS WORK.

E. DURING CONSTRUCTION, ALL FIXTURES, EQUIPMENT, PIPE, DUCT, ETC. SHALL BE COVERED, PLUGGED, OR CAPPED AS REQUIRED TO KEEP CLEAN AND UNDAMAGED. ALL DAMAGED ITEMS SHALL BE RESTORED TO ORIGINAL CONDITION OR REPLACED. ALL PROTECTIVE COVERING SHALL BE REMOVED BEFORE FINAL ACCEPTANCE.

F. PROVIDE ALL NECESSARY CUTTING AND PATCHING OF WALLS, FLOORS, CEILINGS, AND ROOFS AS NECESSARY. PATCH AROUND ALL OPENINGS SHALL MATCH ADJACENT AREA. COORDINATE ALL ROOFING WORK WITH OWNER OR RESPONSIBLE PARTY, SO THAT THE EXISTING ROOFING WARRANTY WILL BE MAINTAINED.

G. CONTRACTOR SHALL GUARANTEE ALL WORK AND MATERIALS AGAINST DEFECTS FOR A PERIOD OF ONE YEAR FROM FINAL ACCEPTANCE.

2. OPERATION AND MAINTENANCE MANUALS:

A. DURING THE COURSE OF CONSTRUCTION, COLLECT AND COMPILE OPERATING INSTRUCTIONS, WIRING DIAGRAMS, CATALOG CUTS, LUBRICATION AND PREVENTIVE MAINTENANCE INSTRUCTIONS, PARTS LISTS, ETC. FOR ALL EQUIPMENT FURNISHED UNDER THIS CONTRACT.

B. ALL LITERATURE AND INSTRUCTIONS SHIPPED WITH THE EQUIPMENT SHALL BE SAVED FOR INCLUSION IN THE OPERATION AND MAINTENANCE MANUALS.

C. ALL LITERATURE LISTED ABOVE AND ALL PAPERS LISTING WARRANTIES, ETC. SHALL BE BOUND IN A 3-RING BINDER AND LABELED WITH THE PROJECT NAME, ADDRESS, ARCHITECT, ENGINEER, CONTRACTORS, ETC.

3. MANUFACTURERS:

A. MANUFACTURERS, MODEL NUMBERS, ETC. INDICATED OR SCHEDULED ON THE DRAWINGS SHALL BE INTERPRETED AS HAVING ESTABLISHED A STANDARD OF QUALITY AND SHALL NOT BE CONSTRUED AS LIMITING COMPETITION. ARTICLES, FIXTURES, ETC. OF EQUAL QUALITY BY MANUFACTURERS SHALL BE ACCEPTABLE, SUBJECT TO STRUCTURAL AND ELECTRICAL CONSTRAINTS OF THE PROJECT DESIGN, UNLESS NOTED OTHERWISE.

4. MOTORS:

A. PROVIDE THERMAL OVERLOAD PROTECTION FOR EACH MOTOR PROVIDED BY THIS WORK.

5. TESTING, BALANCING, AND CLEANING:

A. ALL PIPING SHALL BE TESTED FOR LEAKS BEFORE BEING CONCEALED IN WALL CONSTRUCTION OR COVERED WITH INSULATION.

B. SEWER AND VENT PIPING SHALL BE HYDROSTATICALLY TESTED WITH NO LESS THAN 10 FEET OF HEAD FOR A PERIOD OF NOT LESS THAN 15 MINUTES, PER THE LOCAL PLUMBING CODE, WITH NO LEAKS.

C. DOMESTIC WATER PIPING SHALL BE HYDROSTATICALLY TESTED AT A PRESSURE OF NOT LESS THAN 1-1/2 TIMES THE OPERATING PRESSURE, BUT NOT LESS THAN 60 PSI, FOR A PERIOD OF NOT LESS THAN 2 HOURS, WITH NO LEAKS.

D. NATURAL GAS PIPING SHALL BE PNEUMATICALLY TESTED AT A PRESSURE OF NOT LESS THAN 1-1/2 TIMES THE OPERATING PRESSURE, BUT NOT LESS THAN 50 PSI, FOR A PERIOD OF NOT LESS THAN 2 HOURS, WITH NO LEAKS.

E. DUCTWORK AND PIPING SHALL BE BALANCED BY QUALIFIED INDEPENDENT BALANCING PERSONNEL WHO HAVE PREVIOUS EXPERIENCE WITH BALANCING PROCEDURES AND ARE CERTIFIED BY THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB).

1) BALANCING SHALL INCLUDE THE BALANCING OF THE EQUIPMENT AND AIR DISTRIBUTION SYSTEMS TO PROVIDE DESIGN QUANTITIES INDICATED AND VERIFICATION OF PERFORMANCE OF ALL EQUIPMENT AND AUTOMATIC CONTROLS.

2) WITH IN 30 DAYS OF THE COMPLETION OF THE TESTING AND BALANCING WORK, SUBMIT THE TEST AND BALANCING REPORT BEARING THE SIGNATURE OF THE TEST AND BALANCE ENGINEER. THE REPORTS SHALL BE CERTIFIED PROOF THAT THE SYSTEMS HAVE BEEN TESTED, ADJUSTED, AND BALANCED IN ACCORDANCE WITH THE REFERENCED STANDARDS; ARE AN ACCURATE REPRESENTATION OF HOW THE SYSTEMS HAVE BEEN INSTALLED AND ARE OPERATING. REPORTS SHALL BE BOUND IN A VINYL BINDER AND THE BINDER LABELED OR MAY BE AN ELECTRONIC PDF SUBMITTAL.

F. GREASE DUCT SHALL BE TESTED PRIOR TO USE OR CONCEALMENT OF ANY PORTION OF THE GREASE DUCT SYSTEM. DUCTS SHALL BE CONSIDERED TO BE CONCEALED WHEN INSTALLED IN SHAFTS OR COVERED BY DUCT WRAP INSULATION THAT PREVENTS THE DUCTWORK FROM BEING VISUALLY INSPECTED FROM ALL SIDES. THE PERMIT HOLDER SHALL BE RESPONSIBLE TO PROVIDE THE NECESSARY EQUIPMENT AND PERFORM THE GREASE DUCT LEAKAGE TEST PER NFPA 96 AND ALL LOCAL CODES.

G. BEFORE DOMESTIC WATER PIPING IS PLACED IN SERVICE, ALL DOMESTIC WATER DISTRIBUTION SYSTEMS, INCLUDING THOSE FOR COLD WATER AND HOT WATER SYSTEMS, SHALL BE FLUSHED, STERILIZED AND CHLORINATED IN ACCORDANCE WITH HEALTH DEPARTMENT REGULATIONS. THE SYSTEMS SHALL BE THOROUGHLY FLUSHED OF ALL DIRT AND FOREIGN MATTER, THEN FILLED WITH WATER TREATED WITH 50 PPM OF CHLORINE. DURING THE FILLING PROCESS, VALVES AND FAUCETS SHALL BE OPENED SEVERAL TIMES TO ASSURE TREATMENT OF THE ENTIRE SYSTEM. THE TREATED WATER SHALL BE LEFT IN THE SYSTEM FOR 24 HOURS AFTER WHICH TIME THE SYSTEM SHALL BE FLUSHED; IF THE RESIDUAL CHLORINE IS NOT LESS THAN 10 PPM, THE FLUSHING SHALL BE REPEATED. AFTER STERILIZATION, SAMPLES OF WATER IN THE SYSTEM SHALL BE APPROVED BY THE BOARD OF HEALTH.

6. PIPING:

A. DOMESTIC COLD, HOT, AND HOT WATER RECIRCULATING (ABOVEGROUND).

1) TYPE L HARD DRAWN COPPER TUBING, ASTM B-88.
   a) WROUGHT COPPER SOLDERED FITTINGS, ASTM B75 ALLOY C12200. ANSI B16.22. MSS SP-104.
   b) MECHANICAL PRESS COPPER FITTINGS FOR USE IN PLUMBING OR MECHANICAL APPLICATIONS. ASME B16.22, ASME B16.51, or ASME B16.18. MECHANICAL PRESS COPPER FITTINGS SHALL CONFORM TO IAPMO PS-117 OR ASME B16.51.

2) PEX, HIGH-DENSITY CROSS-LINKED POLYETHYLENE TUBING SHALL BE MANUFACTURED TO THE REQUIREMENTS OF ASTM F876 AND MEET THE STANDARD GRADE HYDROSTATIC PRESSURE RATINGS FROM PLASTIC PIPE INSTITUTE IN ACCORDANCE WITH TR-4/03.
   a) PEX-A AND PEX-B MEETING ANSI/NSF61 AND ANSI/NSF372 STANDARDS FOR POTABLE WATER SAFETY AND LEAD-FREE STANDARDS AND MUST BE MARKED WITH "PW-G", "NSF-61-G" OR OTHER NSF-APPROVED MARKING. ASTM F2023 FOR USE WITH CHLORINATED WATER.
   b) PEX MECHANICAL, CRIMP/INSERT OR EXPANSION FITTINGS INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. PIPE SIZES GIVEN ON THE DRAWINGS ARE NOMINAL COPPER PIPE SIZE, INCREASE PEX PIPING SIZE TO EQUAL OR EXCEED COPPER PIPE INSIDE DIAMETER FOR SUPPLY MAINS.

3) VALVES
   a) GATE VALVE: JOMAR T/S-301 OR EQUAL. NSF 61-8, ANSI B16.20.1, ANSI B16.18
   b) GLOBE VALVE: CRANE #7 OR EQUAL.
   c) BALL VALVE: JOMAR T/S-100C OR EQUAL COMPACT LEAD FREE FORGED BRASS BALL VALVE. UL842, CSA 3371-12 & 3371-92, FM, NSF 61, CALIFORNIA CODE AB1953-NSF61 ANNEX G APPROVED.
   d) BALL VALVE: JOMAR T-100NE OR EQUAL. UL842, FM, CSA, NSF 61-8, MSS SP-110

B. STORM SEWER, SANITARY SEWER, GREASE WASTE, AND VENTS.
(UNDERGROUND, INTERIOR TO THE BUILDING).

1) ABS SCHEDULE 40 CELLULAR CORE (FOAM CORE) PIPE AND DWV FITTING SYSTEM: PIPE AND FITTINGS SHALL BE MANUFACTURED FROM ABS COMPOUND WITH A CELL CLASS OF 42222 FOR PIPE AND 32222 FOR FITTINGS AS PER ASTM D 3965 AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM F 628 FITTINGS SHALL CONFORM TO ASTM D 2661. SOLVENT CEMENTS SHALL CONFORM TO ASTM D 2235.

2) PVC SCHEDULE 40 CELLULAR CORE (FOAM CORE) PIPE AND DWV FITTING SYSTEM: PIPE AND FITTINGS SHALL BE MANUFACTURED FROM PVC COMPOUND WITH A CELL CLASS OF 11432 PER ASTM D 4396 FOR PIPE AND 12454 PER ASTM D 1784 FOR FITTINGS AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM F 891. INJECTION MOLDED FITTINGS SHALL CONFORM TO ASTM D 2665. FABRICATED FITTINGS SHALL CONFORM TO ASTM F 1866. SOLVENT CEMENTS SHALL CONFORM TO ASTM D 2564.

3) PVC SCHEDULE 40 SOLID WALL PIPE AND DWV FITTING SYSTEM: PIPE AND FITTINGS SHALL BE MANUFACTURED FROM PVC COMPOUND WITH A CELL CLASS OF 12454 PER ASTM D 1784 AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM D 1785 AND ASTM D 2665. INJECTION MOLDED FITTINGS SHALL CONFORM TO ASTM D 2665. FABRICATED FITTINGS SHALL CONFORM TO ASTM F 1866. SOLVENT CEMENTS SHALL CONFORM TO ASTM D 2564.

4) HUBLESS CAST IRON SOIL PIPE AND FITTINGS: HUBLESS CAST IRON PIPE AND FITTINGS SHALL BE MANUFACTURED FROM GRAY CAST IRON AND SHALL CONFORM TO ASTM A 888 AND CISPI STANDARD 301. HUBLESS COUPLINGS SHALL CONFORM TO CISPI STANDARD 310 AND BE CERTIFIED BY NSF® INTERNATIONAL.

5) HUB AND SPIGOT CAST IRON SOIL PIPE AND FITTINGS: HUB AND SPIGOT CAST IRON PIPE AND FITTINGS SHALL BE MANUFACTURED FROM GRAY CAST IRON AND SHALL CONFORM TO ASTM A 74.

C. STORM SEWER, SANITARY SEWER, GREASE WASTE, AND VENTS.
(ABOVE GROUND, INTERIOR TO THE BUILDING).

1) ABS SCHEDULE 40 CELLULAR CORE (FOAM CORE) PIPE AND DWV FITTING SYSTEM:
PIPE AND FITTINGS SHALL BE MANUFACTURED FROM ABS COMPOUND WITH A CELL CLASS OF 42222 FOR PIPE AND 32222 FOR FITTINGS AS PER ASTM D 3965 AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM F 628 FITTINGS SHALL CONFORM TO ASTM D 2661. SOLVENT CEMENTS SHALL CONFORM TO ASTM D 2235.

2) PVC SCHEDULE 40 CELLULAR CORE (FOAM CORE) PIPE AND DWV FITTING SYSTEM:
PIPE AND FITTINGS SHALL BE MANUFACTURED FROM PVC COMPOUND WITH A CELL CLASS OF 11432 PER ASTM D 4396 FOR PIPE AND 12454 PER ASTM D 1784 FOR FITTINGS AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM F 891. INJECTION MOLDED FITTINGS SHALL CONFORM TO ASTM D 2665. FABRICATED FITTINGS SHALL CONFORM TO ASTM F 1866. SOLVENT CEMENTS SHALL CONFORM TO ASTM D 2564.

3) PVC SCHEDULE 40 SOLID WALL PIPE AND DWV FITTING SYSTEM:
PIPE AND FITTINGS SHALL BE MANUFACTURED FROM PVC COMPOUND WITH A CELL CLASS OF 12454 PER ASTM D 1784 AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM D 1785 AND ASTM D 2665. INJECTION MOLDED FITTINGS SHALL CONFORM TO ASTM D 2665. FABRICATED FITTINGS SHALL CONFORM TO ASTM F 1866. SOLVENT CEMENTS SHALL CONFORM TO ASTM D 2564.

4) HUBLESS CAST IRON SOIL PIPE AND FITTINGS: HUBLESS CAST IRON PIPE AND FITTINGS SHALL BE MANUFACTURED FROM GRAY CAST IRON AND SHALL CONFORM TO ASTM A 888 AND CISPI STANDARD 301. HUBLESS COUPLINGS SHALL CONFORM TO CISPI STANDARD 310 AND BE CERTIFIED BY NSF® INTERNATIONAL.

5) HUB AND SPIGOT CAST IRON SOIL PIPE AND FITTINGS: HUB AND SPIGOT CAST IRON PIPE AND FITTINGS SHALL BE MANUFACTURED FROM GRAY CAST IRON AND SHALL CONFORM TO ASTM A 74.

MECHANICAL SPECIFICATIONS (CONTINUED)

D. STORM SEWER, SANITARY SEWER, GREASE WASTE, AND VENTS.
(UNDERGROUND, EXTERIOR TO THE BUILDING).

1) ABS SCHEDULE 40 CELLULAR CORE (FOAM CORE) PIPE AND DWV FITTING SYSTEM:
PIPE AND FITTINGS SHALL BE MANUFACTURED FROM ABS COMPOUND WITH A CELL CLASS OF 42222 FOR PIPE AND 32222 FOR FITTINGS AS PER ASTM D 3965 AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM F 2680 FITTINGS SHALL CONFORM TO ASTM D 2680. SOLVENT CEMENTS SHALL CONFORM TO ASTM D 2235.

2) PVC SCHEDULE 40 CELLULAR CORE (FOAM CORE) PIPE AND DWV FITTING SYSTEM:
PIPE AND FITTINGS SHALL BE MANUFACTURED FROM PVC COMPOUND WITH A CELL CLASS OF 11432 PER ASTM D 4396 FOR PIPE AND 12454 PER ASTM D 1784 FOR FITTINGS AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM F 891. INJECTION MOLDED FITTINGS SHALL CONFORM TO ASTM F 794. FABRICATED FITTINGS SHALL CONFORM TO ASTM F 1866. SOLVENT CEMENTS SHALL CONFORM TO ASTM D 2564.

3) PVC SCHEDULE 40 SOLID WALL PIPE AND DWV FITTING SYSTEM:
PIPE AND FITTINGS SHALL BE MANUFACTURED FROM PVC COMPOUND WITH A CELL CLASS OF 12454 PER ASTM D 1784 AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM F 794. FITTINGS SHALL CONFORM TO ASTM F 794. SOLVENT CEMENTS SHALL CONFORM TO ASTM D 2564.

4) HUBLESS CAST IRON SOIL PIPE AND FITTINGS: HUBLESS CAST IRON PIPE AND FITTINGS SHALL BE MANUFACTURED FROM GRAY CAST IRON AND SHALL CONFORM TO ASTM A 888 AND CISPI STANDARD 301. HUBLESS COUPLINGS SHALL CONFORM TO CISPI STANDARD 310 AND BE CERTIFIED BY NSF® INTERNATIONAL.

5) HUB AND SPIGOT CAST IRON SOIL PIPE AND FITTINGS: HUB AND SPIGOT CAST IRON PIPE AND FITTINGS SHALL BE MANUFACTURED FROM GRAY CAST IRON AND SHALL CONFORM TO ASTM A 74.

6) COPPER DWV: DRAINAGE TUBE SHALL CONFORM TO ASTM B306, WROUGHT COPPER FITTINGS, ANSI B-16.29.

7) GALVANIZED STEEL PIPE, WITH MALLEABLE IRON, THREADED FITTINGS, DRAINAGE PATTERN FOR SEWERS SHALL CONFORM TO ASTM A 53.

E. CONDENSATE DRAINS & INDIRECT WASTE (ABOVEGROUND).

1) DWV, WROUGHT COPPER, ANSI B-16.29.
2) POLYVINYLCHLORIDE (PVC) DWV PIPE, SCHEDULE 40, SOLVENT JOINT.

F. REFRIGERANT.

1) ASTM B 280, TYPE ACR, HARD-DRAWN STRAIGHT LENGTHS, AND SOFT-ANNEALED COILS, SEAMLESS COPPER TUBING.
2) WROUGHT COPPER, ANSI B16.22, STREAMLINED PATTERN, FITTINGS. BRAZED JOINTS, AWS A 5.8, CLASSIFICATION BAG-1 (SILVER).
3) TUBING SHALL BE FACTORY CLEANED, READY FOR INSTALLATION, AND HAVE ENDS CAPPED TO PROTECT CLEANLINESS OF PIPE INTERIORS PRIOR TO SHIPPING.
4) SIZE AND INSTALLATION OF PIPE SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

G. NATURAL GAS.

1) BLACK STEEL PIPE, SCHEDULE 40, ASTM A53.
   a) PIPE 2" AND SMALLER; 150 LB. MALLEABLE IRON, THREADED FITTINGS.
   b) PIPE 2" AND SMALLER; VIEGA MEGAPRESS FOR WATER AND GAS. CSA LC4, TSSA/ASME B31 FOR USE WITH ASTM A53 SCHEDULE 40 BLACK IRON PIPE.
   c) PIPE 2-1/2" AND LARGER, WELDED.
   d) PLUG VALVE: ROCKWELL NORDSTROM FIGURE NO. 142 OR 143.
   e) BALL VALVE: JOMAR T-100NE. APPROVALS- UL842, FM, CSA, NSF 61-8, MSS SP-110

2) GAS PIPING PAINTING:
   a) ALL BLACK STEEL GAS PIPING LOCATED EXTERIOR TO THE BAUILDING SHALL BE PRIMED AND PAINTED TO EITHER MATCH ADJACENT EXTERIOR WHERE LOCATED ON OR NEAR EXTERIOR WALL AND PAINTED SAFETY YELLOW WHERE LOCATED ON THE ROOF.

H. ALL PIPE HANGERS AND SUPPORTS SHALL BE STANDARD PRODUCTS OF GRINNELL, FEE AND MASON, OR ELCEN. HANGER SPACING SHALL BE IN ACCORDANCE WITH MSS-SP-69.

I. SLEEVES

1) PROVIDE, SET, AND PROPERLY LOCATE PIPE SLEEVES AS REQUIRED FOR THIS WORK. ALL SLEEVES SHALL BE OF SUFFICIENT SIZE TO PERMIT PIPE MOVEMENT DUE TO EXPANSION AND CONTRACTION AND TO ACCOMMODATE PIPE INSULATION.

2) INTERIOR PARTITIONS: 16 GAGE GALVANIZED STEEL, PACK BETWEEN PIPE AND SLEEVE WITH FIRE SAFING AND CAULK AT EACH END WITH FIRE RESISTANT SEALANT.

3) ROOF: PROSET OR EQUAL, MANUFACTURED PVC SCHEDULE 40 PIPE SLEEVE WITH WATERPROOF SEAL. COORDINATE WITH ROOFING CONTRACTOR AND FLASH AS REQUIRED TO MAINTAIN ROOF WARRANTY.

4) PLUMBING VENTS: FLASH ROOF VENT INTO ROOFING SYSTEM AS REQUIRED BY THE ROOFING CONTRACTOR TO MAINTAIN EXISTING ROOF WARRANTY. ALL PLUMBING VENT TERMINALS SHALL TERMINATE A MINIMUM OF 12" ABOVE ROOF OR EQUAL TO HEIGHT OF PARAPET, WHICHEVER IS GREATER.

J. PROVIDE CHROME PLATED ESCUTCHEONS ON ALL PIPE ENTERING FINISHED AREAS.

7. GAS PIPING LABELING:

A. ALL ELEVATED PRESSURE GAS PIPING SHALL BE LABELED EVERY 40 FEET WITH SIGNS INDICATING "ELEVATED PRESSURE".

8. INSULATION AND DUCT LINING:

A. ALL INSULATIONS AND ACCESSORIES SHALL HAVE A FIRE HAZARD CLASSIFICATION WITH A FLAME SPREAD RATING OF NOT OVER 25, A FUEL CONTRIBUTION RATING OF NOT OVER 50, AND A SMOKE DEVELOPED RATING OF NOT OVER 50, IN ACCORDANCE WITH NFPA.

B. PIPE INSULATION - ABOVE GRADE:

1) THE PIPING INSULATION USED SHALL HAVE A THERMAL CONDUCTIVITY OF 0.27 Btu PER in/hr*sqft*F° OR LESS.

2) FIBERGLASS INSULATION WITH FACTORY APPLIED VAPOR BARRIER, ASJ JACKET, FACTORY APPLIED PRESSURE SEALING LONGITUDE LAP JOINT, NO STAPLES, ZESTON PREMOLDED PVC FITTING COVERS. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

3) FLEXIBLE CLOSED CELL ELASTOMERIC THERMAL INSULATION, UNSLIT OR PRESLIT WITH PRESSURE SENSITIVE ADHESIVE SYSTEM FOR CLOSURE AND VAPOR SEALING, EQUAL TO ARMSTRONG AP ARMAFLEX OR ARMAFLEX 2000.

4) FOR NON CIRCULATING SYSTEMS, THE FIRST 8 FEET OF INLET AND OUTLET PIPING BETWEEN THE TANK AND THE HEAT TRAP (INCLUDING THE HEAT TRAP) MUST BE INSULATED.

5) INSULATION SCHEDULE:

a) DOMESTIC COLD WATER	1/2"
b) DOMESTIC HOT WATER	1-1/2"
c) HOT WATER RECIRCULATING	1-1/2"
d) CONDENSATE DRAINS INSIDE BUILDING	1/2"
e) REFRIGERANT SUCTION	1-1/2" FOR PIPING UP TO 1 1/2"Φ, & 2" FOR PIPING 1-1/2"Φ AND LARGER

C. DUCTWORK: ACOUSTICAL INSULATION.

1) DUCT LINING: 2 LB/CF, THICKNESS AS SCHEDULED, AIR STREAM SIDE COATED, INSTALL PER SMACNA STANDARDS.

a) DUCT LINING SCHEDULE:

(1) RECTANGULAR SUPPLY DUCT	1/2" : THROUGHOUT THE FIRST 10 FEET OF DUCT.
(2) RETURN AIR DUCT (DINING UNITS ONLY)	1/2" : THROUGHOUT THE FIRST 10 FEET OF DUCT.

D. DUCTWORK: THERMAL INSULATION. (WHERE CONCEALED ABOVE CEILING)

1) DUCT COVERING: 3/4 LB/CF, FIBERGLASS BLANKET WITH FACTORY APPLIED VAPOR BARRIER AND FACING, THICKNESS AS SCHEDULED, INSTALLATION IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

a) DUCT COVERING SCHEDULE: MINIMUM R-6

(1) ROUND SUPPLY DUCT (ABOVE CEILING)	2"
(2) RECTANGULAR SUPPLY DUCT (ABOVE CEILING)	2"
(3) RETURN AIR DUCT	2"
(4) OUTDOOR AIR / MAKE-UP AIR DUCT	2"

9. GREASE HOOD AND EXHAUST DUCT:

A. HOOD SHALL BE CONSTRUCTED OF 18 GAUGE STEEL OR 20 GAUGE STAINLESS STEEL IN ACCORDANCE WITH NFPA AND LOCAL CODES.

1) GREASE FILTERS SHALL BE UL LISTED ALUMINUM GREASE EXTRACTORS.

2) PROVIDE A COMPLETE AUTOMATIC WET CHEMICAL FIRE EXTINGUISHING SYSTEM FOR THE HOOD AND DUCT AS REQUIRED BY NFPA AND LOCAL CODES. ALL COOKING EQUIPMENT UNDER THE HOOD SHALL BE INTERLOCKED WITH THE SYSTEM, TO SHUTDOWN IN AN ALARM CONDITION.

a) THE GREASE HOOD FIRE SUPPRESSION SYSTEM SHALL BE EQUAL TO AMEREX KP SERIES PRE-ENGINEERED , WET CHEMICAL, STORED-PRESSURE TYPE WITH A FIXED NOZZLE AGENT DISTRIBUTION SYSTEM. THE SYSTEM SHALL BE UL LISTED AND TESTED TO UL STANDARD 300.

b) THE SYSTEM SHALL UTILIZE AN AGENT EQUAL TO AMEREX KP LIQUID FIRE SUPPRESSANT, A POTASSIUM ACETATE BASED SOLUTION THAT SUPPRESSES COOKING GREASE FIRES, SHALL HAVE A PH OF 9 OR LESS, AND SHALL NOT HARM STAINLESS STEEL SURFACES.

c) THE SYSTEM SHALL BE PROVIDED WITH A MANUAL "DUAL ACTION" TYPE PULL STATION. PULL STATION SHALL BE LOCATED NOT LESS THAN 10 FEET AND A MAXIMUM OF 20 FEET FROM THE GREASE HOOD AND IN THE PATH OF EGRESS. THE MANUAL ACTUATION SHALL REQUIRE A MAXIMUM FORCE OF 40 POUNDS AND A MAXIMUM MOVEMENT OF 14 INCHES TO ACTUATE THE FIRE SUPPRESSION SYSTEM.

d) PROVIDE A GAS SHUT OFF VALVE FOR MOUNTING IN THE GAS PIPE THAT WILL SHUT OFF GAS FLOW TO EQUIPMENT UNDER THE HOOD IN AN ALARM CONDITION. PROVIDE AN ELECTRICAL SWITCH WHICH SHALL BE CAPABLE OF DE-ENERGIZING ALL ELECTRICAL DEVICES AND EQUIPMENT UNDER THE HOOD IN AN ALARM CONDITION.

B. GREASE DUCT SHALL BE CONSTRUCTED OF 16 GAUGE CARBON STEEL OR 18 GAUGE STAINLESS STEEL IN ACCORDANCE WITH NFPA AND LOCAL CODES.

a) JOINTS, SEAMS AND PENETRATIONS OF GREASE DUCTS SHALL BE MADE WITH A CONTINUOUS LIQUID TIGHT WELD OR BRAZE MADE ON THE EXTERNAL SURFACE OF THE DUCT SYSTEM.

b) DUCT JOINTS SHALL BE BUTT JOINTS, WELDED FLANGE JOINTS WITH A MAXIMUM FLANGE DEPTH OF 1/2" OR OVERLAPPING DUCT JOINTS OF EITHER THE TELESCOPING OR BELL TYPE. OVERLAPPING JOINTS SHALL BE INSTALLED TO PREVENT LEDGES AND OBSTRUCTIONS FROM COLLECTING GREASE OR INTERFERING WITH GRAVITY DRAINAGE TO THE INTENDED COLLECTION POINT.

MECHANICAL SPECIFICATIONS (CONTINUED)

c) DUCT TO HOOD CONNECTIONS SHALL BE MADE WITH LISTED AND LABELED DUCT TO HOOD COLLAR CONNECTIONS THAT ARE INSTALLED PER THE TERMS OF THEIR APPROVAL AND PER THE MANUFACTURERS INSTALLATION INSTRUCTIONS.

d) DUCT TO EXHAUST FAN CONNECTIONS SHALL BE FLANGED AND GASKETED AT THE BASE OF THE FAN FOR VERTICAL DISCHARGE FANS, OR SHALL BE FLANGED, GASKETED AND BOLTED TO THE INLET OF THE FAN FOR SIDE INLET UTILITY FANS. GASKET SEALING MATERIALS SHALL BE RATED FOR A MINIMUM CONTINUOUS DUTY TEMPERATURE OF 1,500°F.

C. SINGLE WALL ROUND GREASE DUCT:

1. FURNISH SINGLE-WALL, FACTORY BUILT, GREASE DUCT FOR USE WITH TYPE I KITCHEN HOODS, WHICH CONFORMS TO THE REQUIREMENTS OF NFPA-96. PRODUCTS SHALL BE ETL LISTED TO UL-1978 AND CAN/ULC-S662 FOR VENTING AIR AND GREASE VAPORS FROM COMMERCIAL COOKING OPERATIONS AS DESCRIBED IN NFPA-96.
2. THE DUCT WALL SHALL BE CONSTRUCTED OF .036 AND .047 THICK STAINLESS STEEL AND BE AVAILABLE IN DIAMETERS 8" THROUGH 24".
3. ALL SUPPORTS, FAN ADAPTERS, HOOD CONNECTIONS, FITTINGS AND EXPANSION JOINTS REQUIRED TO INSTALL GREASE DUCT SHALL BE INCLUDED.
4. ROOF PENETRATIONS SHALL COMPLY WITH LISTED CLEARANCE TO COMBUSTIBLES, SEE "CLEARANCE TO COMBUSTIBLES" GUIDE FOR DETAILS. THE GREASE DUCT WILL TERMINATE AT THE FAN ADAPTER PLATE, WILL BE FULLY WELDED TO THE FAN ADAPTER PLATE AND THE FAN ADAPTER PLATE WILL BE FASTENED TO THE CURB USING A SUITABLY SIZED FASTENER PROVIDED BY OTHERS; SEE PAGE 12 OF THE "INSTALLATION, OPERATION AND MAINTENANCE MANUAL" FOR DETAILS.
5. GREASE DUCT JOINTS SHALL BE HELD TOGETHER BY MEANS OF FORMED VEE CLAMPS AND SEALED WITH 3M FIRE BARRIER 2000+. SCREWS USED TO SECURE THE VEE CLAMPS SHALL BE OF THE HEX-HEAD TYPE WITH FLANGED STOPS AND TAPERED "LEAD IN" THREADS FOR EASY STARTING. NUTS SHALL BE RETAINED BY MEANS OF A FREE-FLOATING CAGE TO ALLOW EASY ALIGNMENT.
6. SINGLE-WALL GREASE DUCT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S "INSTALLATION, OPERATION AND MAINTENANCE MANUAL", ETL LISTING AND STATE AND LOCAL CODES.
7. GREASE DUCT INSTALLED OUTSIDE OF THE BUILDING SHALL BE PROTECTED AGAINST ACCIDENTAL DAMAGE OR VANDALISM.
8. SUPPORT VERTICALLY INSTALLED GREASE DUCT FROM THE BUILDING STRUCTURE USING RIGID STRUCTURAL SUPPORTS. ANCHOR SUPPORTS TO THE STRUCTURE BY WELDING OR BOLTING STEEL EXPANSION ANCHORS OR CONCRETE INSERTS. SUPPORT HORIZONTALLY INSTALLED GREASE DUCT FROM THE BUILDING STRUCTURE USING ABOVE METHOD. 1/2" THREADED ROD AND SADDLES MAY ALSO BE USED FOR THE SUPPORT OF HORIZONTAL GREASE DUCT.
9. FANS SHALL BE SUPPORTED INDEPENDENTLY FROM THE GREASE DUCT SECTIONS. PROTECT GREASE DUCT FROM TWISTING OR MOVEMENT CAUSED BY FAN TORQUE OR VIBRATION.

10. PLUMBING:

A. PROVIDE AN APPROVED WATER HAMMER ARRESTOR FOR EACH PLUMBING FIXTURE SUPPLY AS REQUIRED BY FIXTURE MANUFACTURER.

B. ALL EXPOSED PIPE SHALL BE CHROME PLATED BRASS PIPE, NO FERROUS PIPE.

C. PROVIDE CLEANOUTS AT EACH CHANGE OF DIRECTION AND AT 100 FOOT INTERVALS IN STRAIGHT RUNS.

D. PROVIDE ACCESS PANELS FOR ALL CONCEALED VALVES AND TRAPS.

E. CLEANOUTS:

1) VINYL TILE FLOOR: JR SMITH #4140, OR EQUAL.
2) QUARRY TILE FLOOR: JR SMITH #4200, OR EQUAL.
3) CARPETED FLOOR: JR SMITH #4020-Y, OR EQUAL.
4) UNFINISHED FLOOR: JR SMITH #4020, OR EQUAL.
5) WALL: JR SMITH #4472, OR EQUAL, 24" ABOVE THE FLOOR.
6) GRADE: JR SMITH #4256, OR EQUAL, WITH HEAVY DUTY CAST IRON BODY AND COVER.

F. PROVIDE DIELECTRIC UNIONS WITH APPROPRIATE END CONNECTIONS TO MATCH THE PIPE SYSTEM IN WHICH INSTALLED (SCREWED, SOLDERED, OR FLANGED). PROVIDE DIELECTRIC UNIONS ON ALL PIPING CONNECTIONS TO HOT WATER HEATERS AND EXPANSION TANKS.

G. ALL SEWER PIPING LOCATED INSIDE THE BUILDING SHALL BE INSTALLED WITH THE FOLLOWING SLOPES.

1) INSTALL 2-1/2" AND SMALLER PIPE AT 1/4" PER FOOT FALL.
2) INSTALL 3" AND LARGER PIPE AT 1/8" PER FOOT FALL.

H. ALL SEWER PIPING LOCATED EXTERIOR TO THE BUILDING SHALL BE INSTALLED WITH THE FOLLOWING SLOPES.

1) INSTALL 4" AND SMALLER PIPE AT A MINIMUM OF 2% SLOPE.
2) INSTALL 6" AND LARGER PIPE AT A MINIMUM OF 1% SLOPE.
3) INSTALL ALL GREASE WASTE PIPING AT 1/4" PER FOOT FALL.

11. DUCTWORK:

A. ALL DUCTWORK, UNLESS OTHERWISE INDICATED, SHALL BE FABRICATED FROM GALVANIZED SHEET STEEL COMPLYING WITH ASTM A 527, LOCKFORMING QUALITY, WITH G 90 ZINC COATING IN ACCORDANCE WITH ASTM A 525; AND MILL PHOSPHATIZED FOR EXPOSED LOCATIONS.

B. WHERE DUCTWORK IS INDICATED TO BE EXPOSED TO VIEW IN OCCUPIED SPACES, PROVIDE MATERIALS WHICH ARE FREE FROM VISUAL IMPERFECTIONS INCLUDING PITTING, SEAM MARKS, ROLLER MARKS, STAINS AND DISCOLORATIONS, AND OTHER IMPERFECTIONS, INCLUDING THOSE WHICH WOULD IMPAIR PAINTING.

C. DUCTWORK, METAL GAUGES, REINFORCING, ETC. SHALL BE CONSTRUCTED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS," LATEST EDITION FOR A 2 INCH WATER GAUGE STATIC PRESSURE.

1) RECTANGULAR DUCT:

a) ELBOWS, UNLESS INDICATED OTHERWISE SHALL BE CONSTRUCTED WITH CENTERLINE RADIUS OF NOT LESS THAN 1.5 DUCT WIDTH OR SQUARE ELBOW WITH DOUBLE WALL STREAMLINE VANES.

b) RETURN AIR ACOUSTICAL ELBOWS AND SOUND BOOTS SHALL BE A SQUARE ELBOW WITH NO TURNING VANES.

c) SLOPES FOR TRANSITIONS OR OTHER CHANGES IN DIMENSIONS SHALL BE MINIMUM 1 TO 3.

2) ROUND AND OVAL SPIRAL SEAM DUCT:

a) PROVIDE RADIUS TYPE FITTINGS FABRICATED OF MULTIPLE SECTIONS WITH MAXIMUM 15 DEGREE CHANGE OF DIRECTION PER SECTION. UNLESS SPECIFICALLY DETAILED OTHERWISE, USE 45 DEGREE LATERALS FOR BRANCH TAKEOFF CONNECTIONS. WHERE 90 DEGREE BRANCHES ARE INDICATED PROVIDE CONICAL TYPE TEES.

b) SLOPES FOR TRANSITIONS OR OTHER CHANGES IN DIMENSIONS SHALL BE MINIMUM 1 TO 3.

c) AS AN OPTION, PROVIDE FACTORY-FABRICATED DUCT AND FITTINGS, IN LIEU OF SHOP-FABRICATED DUCT AND FITTINGS.

(1) ELBOWS: ONE PIECE CONSTRUCTION FOR 90 DEGREES AND 45 DEGREE ELBOW 14" AND SMALLER. PROVIDE MULTIPLE GORE CONSTRUCTION FOR LARGER DIAMETERS WITH STANDING SEAM CIRCUMFERENTIAL JOINT.

(2) DIVIDED FLOW FITTINGS: 90 DEGREE TEES, CONSTRUCTED WITH SADDLE TAP SPOT WELDED AND BONDED TO DUCT FITTING BODY.

d) ROUND LONGITUDINAL SEAM DUCT. USE FOR RIGID METAL DUCT ON LEAVING SIDE OF DUCT IN CONCEALED LOCATIONS FOR EXTENSION TO FLEX FOR DIFFUSERS, UNLESS OTHERWISE INDICATED.

D. SEAL ALL CONCEALED DUCTWORK JOINTS WITH NON-HARDENING, NON-MIGRATING MASTIC SEALANT, AS RECOMMENDED FOR SEALING SEAMS AND JOINTS IN DUCTWORK. OIL BASE CAULKING AND GLAZING COMPOUNDS SHALL NOT BE ACCEPTABLE.

E. DUCT SIZES SHOWN ON THE DRAWINGS ARE SHEETMETAL SIZES, ALLOWANCE FOR DUCT LINER HAS BEEN MADE WHERE APPLICABLE.

F. INSTALLATION OF METAL DUCTWORK:

1) GENERAL: ASSEMBLE AND INSTALL DUCTWORK IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES WHICH WILL ACHIEVE AIR-TIGHT SYSTEMS (MAXIMUM 5% LEAKAGE), WITH NO OBJECTIONABLE NOISE, AND CAPABLE OF PERFORMING INDICATED SERVICE. INSTALL EACH RUN WITH MINIMUM NUMBER OF JOINTS. ALIGN DUCTWORK ACCURATELY WITH INTERNAL SURFACES SMOOTH. SUPPORT DUCTS RIGIDLY WITH SUITABLE STRAPS, BRACES, HANGERS AND ANCHORS IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS" LATEST EDITION. DUCT HANGERS SHALL BE OF THE TYPE WHICH WILL HOLD DUCTS TRUE-TO-SHAPE AND TO PREVENT BUCKLING. SUPPORT VERTICAL DUCTS AT EVERY FLOOR.

2) AUXILIARY STEEL: PROVIDE AUXILIARY STEEL AS REQUIRED TO ADEQUATELY SUPPORT DUCTWORK.

3) ROUTING: LOCATE DUCTWORK RUNS, EXCEPT AS OTHERWISE INDICATED, VERTICALLY AND HORIZONTALLY AND AVOID DIAGONAL RUNS WHEREVER POSSIBLE. LOCATE RUNS AS INDICATED BY DIAGRAMS, DETAILS AND NOTATIONS OR, IF NOT OTHERWISE INDICATED, RUN DUCTWORK IN SHORTEST ROUTE WHICH DOES NOT OBSTRUCT USABLE SPACE OR BLOCK ACCESS FOR SERVICING BUILDING AND ITS EQUIPMENT. HOLD DUCTS CLOSE TO WALLS, OVERHEAD CONSTRUCTION, COLUMNS, AND OTHER STRUCTURAL AND PERMANENT ENCLOSURE ELEMENTS OF BUILDING. WHEREVER POSSIBLE IN FINISHED AND OCCUPIED SPACES, CONCEAL DUCTWORK FROM VIEW, BY LOCATING IN MECHANICAL SHAFTS, HOLLOW WALL CONSTRUCTION OR ABOVE SUSPENDED CEILINGS. DO NOT ENCASE HORIZONTAL RUNS IN SOLID PARTITIONS, EXCEPT AS SPECIFICALLY SHOWN. COORDINATE LAYOUT WITH SUSPENDED CEILING AND LIGHTING LAYOUTS AND SIMILAR FINISHED WORK.

4) DO NOT ROUTE DUCTWORK THROUGH ELECTRICAL EQUIPMENT SPACES AND ENCLOSURES, UNLESS INDICATED OTHERWISE.

5) PENETRATIONS:

a) WHERE DUCTS PASS THROUGH INTERIOR PARTITIONS OR EXTERIOR WALLS, AND ARE EXPOSED TO VIEW, CONCEAL SPACE BETWEEN OPENING AND DUCT OR DUCT INSULATION WITH SHEET METAL FLANGES OF SAME GAGE AS DUCT. OVERLAP OPENING ON 4 SIDES BY AT LEAST 1-1/2". FASTEN TO DUCT AND WALL.

b) WHERE DUCTS PASS THROUGH FIRE-RATED FLOORS, WALLS, OR PARTITIONS, PROVIDE FIRESTOPPING BETWEEN DUCT AND WALL.

6) COORDINATION: COORDINATE DUCT INSTALLATIONS WITH INSTALLATION OF ACCESSORIES, DAMPERS, COIL FRAMES, EQUIPMENT, CONTROLS, AND OTHER ASSOCIATED WORK OF THE DUCTWORK SYSTEM.

7) INSTALLATION: INSTALL METAL DUCTWORK IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS", LATEST EDITION.

MECHANICAL SPECIFICATIONS (CONTINUED)

G. EQUIPMENT CONNECTIONS:

1) CONNECT METAL DUCTWORK TO EQUIPMENT AS INDICATED, PROVIDE FLEXIBLE CONNECTION FOR EACH DUCTWORK CONNECTION TO EQUIPMENT MOUNTED ON VIBRATION ISOLATORS, AND/OR EQUIPMENT CONTAINING ROTATING MACHINERY. PROVIDE ACCESS DOORS AS REQUIRED.

H. SEAL ALL CONCEALED DUCTWORK JOINTS WITH NON-HARDENING, NON-MIGRATING MASTIC SEALANT, AS RECOMMENDED FOR SEALING SEAMS AND JOINTS IN DUCTWORK. OIL BASE CAULKING AND GLAZING COMPOUNDS SHALL NOT BE ACCEPTABLE. DUCTS SHALL BE SEALED TO THE CLASS LEVEL LISTED BELOW.

	SUPPLY ≤ 2" W.C.	SUPPLY > 2" W.C.	EXHAUST	RETURN
1) UNCONDITIONED SPACES	CLASS B	CLASS A	CLASS C	CLASS B
2) CONDITIONED SPACES (PLENUM)	CLASS C	CLASS B	CLASS B	CLASS C

12. FLEXIBLE DUCT:

A. ATCO #086 (R-6), OR EQUAL.

B. FACTORY APPLIED INSULATION AND VAPOR BARRIER, 1-1/2" THICK.

C. MAXIMUM LENGTH OF 6'-0".

13. FLUES AND ACCESSORIES:

A. FLUE FOR GAS FIRED CONDENSING WATER HEATER SHALL BE AS RECOMMENDED BY THE GAS APPLIANCE MANUFACTURER. FLUES SHALL BE SCHEDULE 40, PVC OR CPVC PIPE PER THE MANUFACTURERS INSTALLATION REQUIREMENTS.

B. PROVIDE MANUFACTURER'S STANDARD ACCESSORY ITEMS INCLUDING BIRD PROOF TOP, STORM COLLAR, ROOF THIMBLE, ETC. AS REQUIRED FOR A COMPLETE INSTALLATION. ROOF THIMBLES THROUGH THE BUILDING ROOF SHALL BE SUITABLE FOR USE WITH THE ROOF PROVIDED.

14. EXHAUST FANS:

A. CENTRIFUGAL TYPE FAN WITH CHARACTERISTICS AND CAPACITY AS SCHEDULED, ELECTRICALLY POWERED, SUITABLE FOR MOUNTING ON ROOF CURB, DIRECT OR BELT DRIVEN, HEAVY GAUGE SPUN-ALUMINUM WEATHERPROOF HOUSINGS OF THE HOODED DOME OR UPBLAST TYPE. PROVIDE PERMANENT SPLIT-CAPACITOR TYPE MOTOR FOR DIRECT DRIVEN FANS, AND CAPACITOR-START, INDUCTION-RUN TYPE MOTOR FOR BELT DRIVEN FANS.

B. CENTRIFUGAL CEILING EXHAUSTERS SHALL BE ELECTRICALLY POWERED CENTRIFUGAL TYPE FAN SUITABLE FOR MOUNTING IN THE CEILING WITH A PERFORATED OFF-WHITE METAL GRILLE WITH A THUMBSCREW ATTACHMENT FOR EASY ACCESS TO FAN HOUSING. UNIT SHALL CONSIST OF A GALVANIZED STEEL HOUSING LINED WITH ACOUSTICAL INSULATION AND SHALL INCLUDE AN INTEGRAL BACKDRAFT DAMPER ON FAN DISCHARGE. MOTOR SHALL BE A PERMANENT SPLIT-CAPACITOR TYPE MOTOR, PERMANENTLY LUBRICATED, WITH THERMAL OVERLOAD PROTECTION. PROVIDE DISCONNECT SWITCH OR OTHER MEANS OF DISCONNECT AT MOTOR IN FAN HOUSING.

15. CONTROL WIRING:

A. ELECTRICAL WIRING AND WIRING CONNECTIONS REQUIRED FOR THE INSTALLATION OF THE TEMPERATURE CONTROL SYSTEM, SHALL BE PROVIDED BY THIS CONTRACTOR, UNLESS SPECIFICALLY SHOWN ON THE ELECTRICAL DRAWINGS OR SPECIFICATIONS.

B. INSTALL CONTROL WIRING, WITHOUT SPLICES BETWEEN TERMINAL POINTS, COLOR CODED. INSTALL IN NEAT WORKMANLIKE MANNER, SECURELY FASTENED. INSTALL IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE AND THE ELECTRICAL SPECIFICATIONS.

1) INSTALL CIRCUITS OVER 25 VOLT WITH COLOR CODED NUMBER 12 WIRE.

2) INSTALL CIRCUITS UNDER 25 VOLT WITH COLOR CODED NUMBER 18 WIRE WITH 0.031 INCH HIGH TEMPERATURE 105 DEGREES F PLASTIC INSULATION ON EACH CONDUCTOR AND PLASTIC SHEATH OVER ALL.

3) INSTALL ELECTRONIC CIRCUITS WITH COLOR CODED NUMBER 22 WIRE WITH 0.023 INCH POLYETHYLENE INSULATION ON EACH CONDUCTOR WITH PLASTIC JACKETED COPPER SHIELD OVER ALL.

4) INSTALL LOW VOLTAGE CIRCUITS, LOCATED IN CONCRETE SLABS AND MASONRY WALLS, OR EXPOSED IN OCCUPIED AREAS, IN ELECTRIC CONDUIT.

5) ALL WIRING IN AREAS USED AS AIR PLENUMS SHALL BE IN ELECTRIC CONDUIT EXCEPT THAT LOW VOLTAGE WIRING MAY BE TEFLON COATED, ALUMINUM SHEATHED CABLE OR OTHER WIRE SPECIFICALLY APPROVED FOR INSTALLATION IN AIR PLENUMS, WHERE ACCEPTABLE BY LOCAL CODES.

6) ALL WIRING IN AREAS NOT USED FOR AIR MOVEMENT SHALL BE IN ELECTRIC METALLIC TUBING EXCEPT LOW VOLTAGE WIRING MAY BE IN APPROVED SIGNAL CABLE WHERE ACCEPTED BY LOCAL CODES.

16. ROOFTOP UNITS:

A. UNIT SHALL BE FACTORY-ASSEMBLED AND TESTED, DESIGNED FOR ROOF INSTALLATION, AND SHALL CONSIST OF COMPRESSOR(S), CONDENSERS, EVAPORATOR COILS, CONDENSER AND EVAPORATOR FANS, CONDENSER FANS TO BE SEQUENCED. REFRIGERATION CONTROLS, GAS FIRED HEAT EXCHANGER, FILTERS, AND DAMPERS. CAPACITIES AND ELECTRICAL CHARACTERISTICS SHALL BE AS SCHEDULED ON THE DRAWINGS.

B. COMPRESSOR(S): UNIT SHALL INCLUDE VIBRATION ISOLATORS AND CRANKCASE HEATER. REFRIGERANT CIRCUIT SHALL INCLUDE A FILTER DRYER, SIGHT GLASS, COMPRESSOR SERVICE VALVES, AND LIQUID LINE SERVICE VALVES.

C. SAFETY CONTROLS SHALL INCLUDE:

a) LOW PRESSURE CUTOUT, MANUAL RESET.
b) HIGH PRESSURE CUTOUT, MANUAL RESET.
c) COMPRESSOR MOTOR OVERLOAD PROTECTION, MANUAL RESET.
d) ANTI-RECYCLING TIMING DEVICE.
e) ADJUSTABLE LOW-AMBIENT LOCKOUT.
f) OIL PRESSURE SWITCH.

D. REFRIGERANT COIL: ALUMINUM FINS BONDED TO SEAMLESS COPPER TUBE BY MEANS OF MECHANICAL EXPANSION. AN EQUALIZING TYPE VERTICAL DISTRIBUTOR SHALL ENSURE EACH COIL CIRCUIT RECEIVES THE SAME AMOUNT OF REFRIGERANT.

E. ECONOMIZER SHALL CONSIST OF RETURN AIR DAMPER, OUTDOOR AIR DAMPER, AND BAROMETRIC RELIEF DAMPER. PROVIDE POWERED EXHAUST FAN WITH MANUFACTURER'S STANDARD CONTROLS FOR UNITS SCHEDULED ON THE DRAWINGS.

F. GAS HEAT: INDIRECT FIRED, GAS HEAT EXCHANGER, AUTOMATIC SPARK IGNITION, MANUFACTURER'S STANDARD GAS TRAIN WITH REGULATOR (IF REQUIRED), AGA APPROVED. VERIFY GAS SERVICE PRESSURE TO INDIVIDUAL ROOFTOP UNITS.

G. ROOFTOP UNITS SHALL BE WIRED TO SHUTDOWN ON A SIGNAL FROM THE SMOKE DETECTORS OR HOOD CONTROL PANEL AND SHALL AUTOMATICALLY RESET WHEN THE SMOKE DETECTORS ARE RESET.

17. SMOKE DETECTORS:

A. UNITS MOUNTED IN THE DUCTWORK SHALL BE A DUCT MOUNTED UL LISTED PHOTO-ELECTRIC SELF-CONTAINED SMOKE DETECTOR WITH HOUSING. UNITS SHALL BE EQUAL TO SIMPLEX #4098-9687. THE SAMPLING TUBE SHALL BE #2098-9804, LENGTH AS REQUIRED FOR DUCT.

B. DUCT DETECTOR REMOTE TEST STATION SHALL BE SIMPLEX #4098-9842 WITH REMOTE ALARM INDICATOR, POWER-ON INDICATOR, TONE-ALERT, TONE-ALERT SILENCE SWITCH, AND TEST/RESET SWITCH.

1) DEVICES SHALL BE MOUNTED IN APPROVED LOCATION AS INDICATED ON THE FLOOR PLANS OR AS DIRECTED BY LOCAL AUTHORITY HAVING JURISDICTION.

C. PROVIDE AND INSTALL A PHOTO-ELECTRIC SMOKE DETECTOR IN THE RETURN AIR DUCT FOR EACH HVAC UNIT AS INDICATED ON THE FLOOR PLANS. DETECTORS ARE TO BE PROVIDED WITH A SUB-BASE CONTAINING AUXILIARY RELAY CONTACTS. RELAY CONTACTS SHALL BE WIRED INTO UNIT CONTROL WIRING, SO AS TO SHUT UNIT DOWN IN THE CASE OF SMOKE DETECTION. PROVIDE ALL CONTROL WIRING. ELECTRICAL CONTRACTOR SHALL PROVIDE 120 VOLT POWER TO EACH DETECTOR.

D. SMOKE DETECTORS SHALL BE INTERLOCKED. IN ALARM CONDITION OF A SINGLE DETECTOR ALL UNITS SHALL SHUT DOWN.

BC PROJECT #: 21858
VIRGINIA PE COA #0407006723

BC ENGINEERS INCORPORATED
5720 Reeder Shawnee, Ks. 66203 (913)262-1772

FREDDY'S FROZEN CUSTARD
1611 RICHMOND ROAD
WILLIAMSBURG, VA.

2/8/2022

ERIK BRADLEY KNUDSEN
Lic. No. 0402054561

DAN WINTER ARCHITECT
1024 EAST
FIRST STREET
WICHITA, KS.
67214
PH. 316-267-7142

MECHANICAL AND PLUMBING SPECIFICATIONS

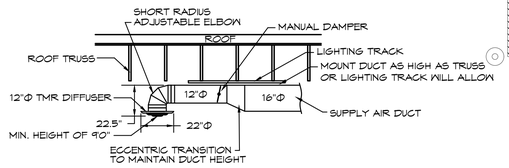
DATE
02/08/2022

DRAWN BY:
SM/MS
CHECKED BY:
BK/EK

SHEET NO.
MP0

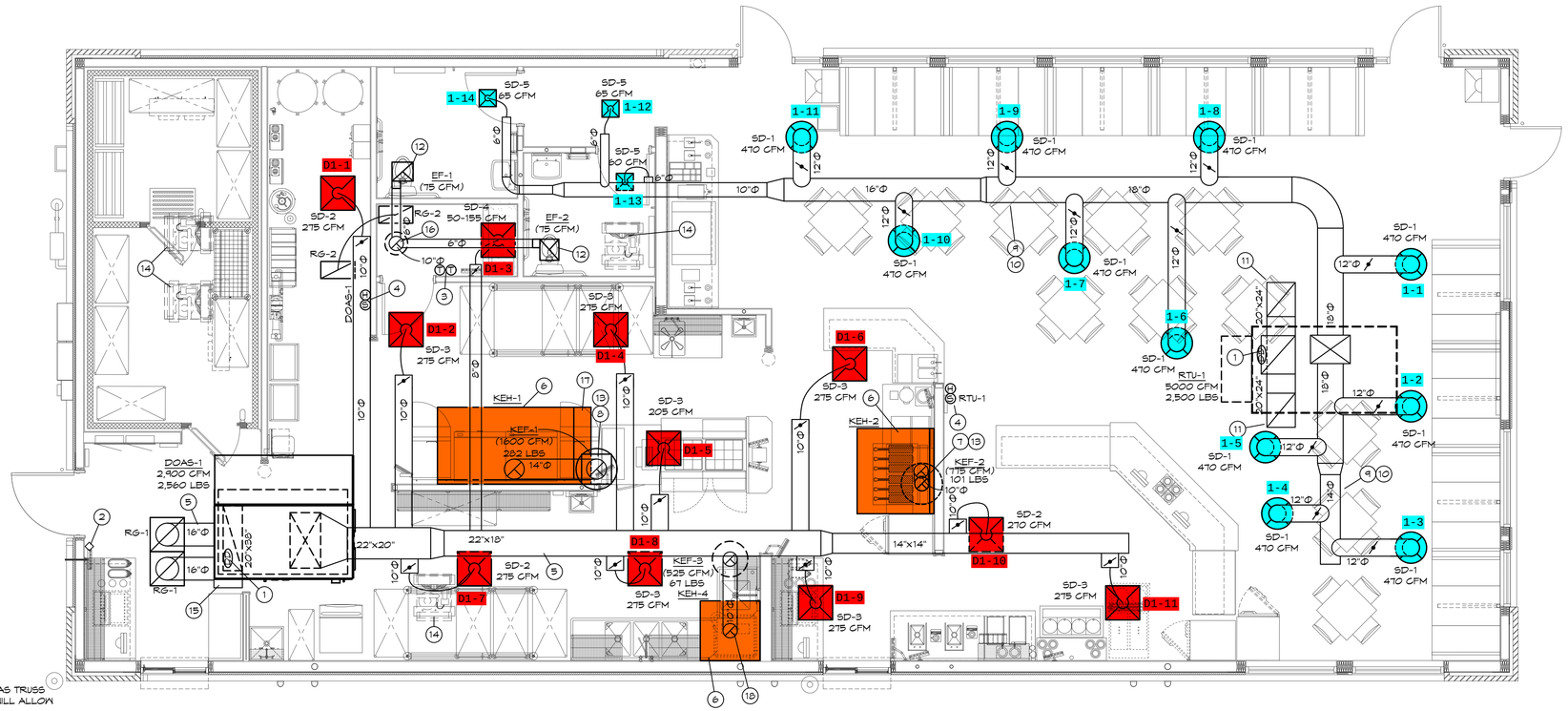
MECHANICAL SYMBOLS

	(SD) NEW SUPPLY DIFFUSER
	(RG) NEW RETURN AIR GRILLE
	EXHAUST GRILLE/FAN
SH	REMOTE TEMPERATURE/HUMIDITY SENSORS
T	THERMOSTAT, MOUNTED AT 48" AFF
SD	DUCT-MOUNTED SMOKE DETECTOR
	NEW DUCTWORK
32"X14"	SIZE OF RECTANGULAR DUCT
6"Φ	SIZE OF ROUND DUCT
	FLEXIBLE DUCTWORK
(3)	FLOOR PLAN NOTE DESIGNATION
S.A.	SUPPLY AIR
R.A.	RETURN AIR
EXH.	EXHAUST AIR
	TRANSITION IN DUCT SIZE
	ELBOW WITH TURNING VANES
	MANUAL VOLUME DAMPER
	MANUAL VOLUME DAMPER
	SUPPLY AIR DUCT UP/DOWN
	RETURN AIR DUCT UP/DOWN
	EXHAUST AIR DUCT UP/DOWN
UP	CHANGE IN ELEVATION UP (UP) DOWN (DN) IN DIRECTION OF FLOW
RTU-1	SCHEDULED MECHANICAL EQUIPMENT



DINING ROOM DIFFUSER DETAIL

SCALE: NONE



MECHANICAL FLOOR PLAN

SCALE: 1/4" = 1'-0"

MECHANICAL PLAN NOTES:

1. LOCATION OF DUCT MOUNTED SMOKE DETECTOR. PROVIDE REMOTE ENUNCIATOR AUDIO/VISUAL. VERIFY LOCATION WITH FIRE MARSHAL PRIOR TO INSTALLATION. REFER TO SPEC SHEET MP0 FOR ADDITIONAL INFORMATION.
2. LOCATION OF MANUAL PULL STATION. INSTALL PER THE MANFUACTURERS REQUIREMENTS. COORDINATE WITH FIRE MARSHALL/AHJ PRIOR TO INSTALLATION.
3. LOCATION OF RTU AND DOAS THERMOSTATS. GC TO LABEL EACH THERMOSTAT.
4. LOCATION OF RTU TEMPERATURE SENSOR MOUNTED 7'-0" AFF.
5. ALL KITCHEN DUCTWORK IS INTENDED TO BE ROUTED THROUGH OR BETWEEN TRUSSES. COORDINATE EXACT ROUTING WITH TRUSSES DURING INSTALLATION.
6. EXHAUST HOOD PROVIDED BY OTHERS. INSTALLED BY THIS CONTRACTOR PER THE MANUFACTURERS INSTRUCTIONS.
7. TRANSITION AND CONNECT 10"Φ GREASE DUCT TO EXHAUST HOOD WITH AS SHOWN. ROUTE DUCT UP AND CONNECT TO EXHAUST FAN. OFFSET AS NECESSARY TO MISS ROOF STRUCTURE, AND TO MAINTAIN 10'-0" CLEARANCE FROM ALL OUTDOOR AIR INTAKES, AND 5'-0" FROM PARAPET WALLS. ALL GREASE DUCT IS TO BE INSTALLED WITH DUCT WRAP AS DETAILED AND PER THE MANUFACTURERS REQUIREMENTS FOR 0" CLEARANCE TO COMBUSTIBLES.
8. TRANSITION AND CONNECT 14"Φ GREASE DUCT TO COLLAR ON EXHAUST HOOD. ROUTE DUCT UP AND CONNECT TO EXHAUST FAN. OFFSET AS NECESSARY TO MISS ROOF STRUCTURE, AND TO MAINTAIN 10'-0" CLEARANCE FROM ALL OUTDOOR AIR INTAKES, AND 5'-0" FROM PARAPET WALLS. REFER TO DETAIL ON SHEET M2. ALL GREASE DUCT IS TO BE INSTALLED WITH DUCT WRAP AND ACCESS DOORS AS DETAILED AND PER THE MANUFACTURERS REQUIREMENTS FOR 0" CLEARANCE TO COMBUSTIBLES.
9. COORDINATE DUCT ROUTING WITH LIGHTING.
10. EXPOSED DUCTWORK SHALL BE OF PAINTLOCK CONSTRUCTION AND PAINTED PER THE DIRECTION OF ARCHITECT.
11. RETURN AIR DUCT LOCATED BETWEEN ROOF TRUSSES. OPEN END OF DUCTWORK TURNED UP TOWARD STRUCTURE WITH A MINIMUM 8" CLEARANCE TO DECK.
12. SUPPORT EXHAUST FAN FROM STRUCTURE AS REQUIRED BY THE MANUFACTURER.
13. GC TO INSTALL CAPTIVE AIRE WBE WINDBAND EXTENSION FOR KEF-1 AND KEF-2 PROVIDED BY KITCHEN EQUIPMENT SUPPLIER.
14. MOUNT CONDENSING UNIT ON ROOF AS DETAILED AND AS REQUIRED BY THE MANUFACTURER. CONNECT REFRIGERANT PIPING AS REQUIRED BY THE MANUFACTURER. SEE ARCHITECTURAL PLANS FOR MOUNTING DETAIL.
15. RETURN DUCT TO BE ROUTED BETWEEN JOISTS, AS HIGH AS STRUCTURE WILL ALLOW.
16. ROUTE 10"Φ EXHAUST DUCT UP THROUGH ROOF TO ROOF CAP. MAINTAIN 10'-0" CLEARANCE TO ALL OUTDOOR AIR INTAKES.
17. HOOD SHALL BE PROVIDED WITH FACTORY PRE-WIRE PACKAGE AND A PRE-ENGINEERED UL-300 FIRE SUPPRESSION SYSTEM. SEE HOOD DRAWINGS FOR DETAILS.

MECHANICAL GENERAL NOTES:

1. COORDINATE ALL WORK WITH OTHER TRADES AND EXISTING CONDITIONS AS REQUIRED TO PROPERLY INSTALL ALL SYSTEMS AS INTENDED, WITHIN THE CONFINES OF THE SPACES AVAILABLE, AND WITHOUT INTERFERENCES.
2. THIS CONTRACTOR SHALL PERFORM ALL WORK INDICATED AND/OR AS REQUIRED FOR THE PROPER INSTALLATION AND OPERATION OF THE MECHANICAL SYSTEMS.
3. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATIONS OF DIFFUSERS.
4. INSTALL ALL DUCT, PIPE, ETC. AS HIGH AS POSSIBLE.
5. DUCT SIZES SHOWN ARE ACTUAL SHEET METAL SIZES AND INCLUDE A 1/2 INCH ALLOWANCE FOR DUCT LINER WHERE APPLICABLE.
6. PROVIDE FLEXIBLE CONNECTION BETWEEN DUCTWORK AND ROOFTOP UNITS, EXHAUST FANS, AND OTHER MOTORIZED EQUIPMENT.
7. NO DUCT SHALL BE ROUTED OVER THE TOP OF ELECTRICAL PANELS.
8. ALL EXPOSED DUCT WORK SHALL BE PAINTED. REFER TO ARCHITECTURAL PLANS FOR DETAILS.

AIR BALANCE SCHEDULE

SUPPLY AIR UNIT	OUTSIDE AIRFLOW (CFM)	RETURN AIRFLOW (CFM)	SUPPLY AIRFLOW (CFM)	OA/SA %	EXHAUST AIR UNIT	EXHAUST AIRFLOW (CFM)
RTU-1	872	4,328	5,000	17.44%	KEF-1	1600
DOAS-1	2,900	0	2,900	100.0%	KEF-2	775
					KEF-3	525
					EF-1, EF-2	150
TOTAL	3,772	4,328	7,900	47.7%	TOTAL	3,050
				RESULTING BUILDING PRESSURIZATION		722 CFM

THE BUILDING HVAC SYSTEM SHALL BE BALANCED BY NATIONAL TAB HIRED BY THE OWNER. CONTACT Dan Hertenstein - National TAB at: 816-215-1593 - DAN@NATIONALTAB.COM

THE RTU SUPPLY FANS SHALL OPERATE IN SINGLE ZONE VAV MODE WITH 2 STAGES OF FAN CONTROL. LOW SPEED SHALL BE USED DURING PERIODS OF LOW COOLING LOAD AND VENTILATION ONLY OPERATION PER 2018 IECC REQUIREMENTS.

THE ECONOMIZER DAMPERS SHALL HAVE TWO POSITIONS DEPENDENT ON THE FAN SPEED TO MAINTAIN CONSTANT OUTDOOR AIR VOLUME AND BUILDING PRESSURE. REFER TO THE BUILDING AIR BALANCE SCHEDULE ON SHEET M2.

THE UNIT SHALL HAVE ITS FRESH AIR HEATING OPTION ENABLED TO HEAT VENTILATION AIR TO A NEUTRAL VALUE DURING COLD WEATHER OPERATION. REFER TO THE MANUFACTURERS PROGRAMMING DOCUMENTATION FOR SETUP INSTRUCTIONS.

OUTDOOR AIR CALCULATIONS

UNIT	Area (sqft)	OCCUPANCY CLASSIFICATION	Occupant Density #/1000 sqft	People outdoor airflow rate in breathing zone, (Rp) cfm/person	Area outdoor airflow rate in breathing zone, (Ra) cfm/sqft	Exhaust airflow rate cfm/sqft	Breathing zone outdoor airflow (Vbz)	Zone air distribution effectiveness (Ez)	Zone outdoor airflow (cfm)
RTU-1	884	Dining rooms	70	7.5	0.18		623	0.8	779
	173	Corridors	0	0	0.06		10	0.8	13
								Total	792

FREDDY'S FROZEN CUSTARD

1611 RICHMOND ROAD
WILLIAMSBURG, VA.

2/8/2022

COMMONWEALTH OF VIRGINIA
ERIK BRADLEY KNUDSEN
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PROFESSIONAL ENGINEER

DAN WINTER ARCHITECT
1024 EAST FIRST STREET
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PH. 316-267-7142

MECHANICAL FLOOR PLAN

DATE
02/08/2022

DRAWN BY:
SM/MS
CHECKED BY:
BK/EK

SHEET NO.
M1

BC ENGINEERS INCORPORATED
5720 Reeder Shawnee, Ks. 66203 (913)262-1772

ROOFTOP UNIT SCHEDULE

MARK	MFGR	MODEL NO.	NOM. TONS	EVAP. CFM	EXT. STATIC P. IN. WG. (NOTE 2)	COOLING				HEATING (GAS)		ELECTRICAL				MINIMUM OUTDOOR AIR (CFM)	TOTAL WEIGHT (LBS)	IEER	FREON	REMARKS
						TOTAL BTUH	SENS. BTUH	AMB.	EVAP. EAT DB/WB	BTUH INPUT	BTUH OUTPUT	VOLT/Φ/HZ	BLOWER MOTOR	MIN. MCA (AMPS)	MIN. MOCP (AMPS)					
RTU-1	TRANE	YHD150G3R	12.5	5,000	1.0	149,000	105,400	105	80/67	250,000	203,000	208/3/60	3 HP	65	90	872	2,500	13.5	R-410a	1,2,3,4,5,6,7

ALTERNATE RTU MANUFACTURER

MARK	MFGR	MODEL NO.	NOM. TONS	EVAP. CFM	EXT. STATIC P. IN. WG. (NOTE 2)	COOLING				HEATING (GAS)		ELECTRICAL				MINIMUM OUTDOOR AIR (CFM)	TOTAL WEIGHT (LBS)	IEER	FREON	NOTES
						TOTAL BTUH	SENS. BTUH	AMB.	EVAP. EAT DB/WB	BTUH INPUT	BTUH OUTPUT	VOLT/Φ/HZ	BLOWER MOTOR	MIN. MCA (AMPS)	MIN. MOCP (AMPS)					
RTU-1	YORK	ZR150N24D	12.5	5,000	1.0	150,000	106,000	105	80/67	240,000	192,000	208/3/60	5 HP	72.8	90	872	1,800	12.9	R-410a	1,2,3,4,5,6,7

NOTES:
1. PROVIDE DIGITAL CONTROLS, OUTDOOR AIR ECONOMIZER WITH DRY BULB CONTROL W/ FDD, BAROMETRIC RELIEF DAMPER, TIME DELAY ON COMPRESSOR RE-START, CRANKCASE HEATER, BAROMETRIC RELIEF DAMPER, HOT GAS REHEAT FOR DEHUMIDIFICATION, DRAIN PAN OVERFLOW SWITCH, FRESH AIR TEMPERING KIT, HINGED ACCESS DOORS, SMOKE DETECTOR MOUNTED IN RETURN, AND STANDARD COOLING DOWN TO 0°F FOR EACH UNIT. OUTDOOR AIR DAMPER TO FULLY CLOSE W/ FAN SHUTDOWN FOR ALL UNITS.
2. EXTERNAL STATIC PRESSURE LISTED REPRESENTS STATIC PRESSURE REQUIRED FOR DUCTWORK AND DIFFUSERS OUTSIDE THE HVAC UNIT COMPLETELY INDEPENDENT OF ANY PRESSURE DROP THROUGH THE HVAC EQUIPMENT INCLUDING BUT NOT LIMITED TO FILTERS, COILS AND ECONOMIZERS. THE FAN AND MOTOR SHALL BE SIZED APPROPRIATELY TO MEET THIS DEFINITION OF EXTERNAL STATIC PRESSURE.
3. PROVIDE COMMERCIAL 7-DAY PROGRAMMABLE HEAT/COOL/AUTO CHANGEOVER THERMOSTAT WITH ECONOMIZER OUTPUT AND REMOTE, TEMPERATURE SENSOR FOR EACH UNIT (HONEYWELL VISION PRO 8000 OR EQUAL), ECONOMIZER/OUTDOOR AIR DAMPER IS TO CLOSE DURING UNOCCUPIED HOURS.
4. PROVIDE 18" HIGH (AT LOWEST POINT) PRE-FABRICATED INSULATED ROOF CURB.
5. PROVIDE HAIL GUARDS FOR EACH UNIT.
6. PROVIDE FACTORY INSTALLED UNIT MOUNTED CIRCUIT BREAKERS.
7. MECHANICAL CONTRACTOR SHOULD CLEAN OR PROVIDE ALL NEW FILTERS ON DAY OF TURNOVER.

ALTERNATE RTU MANUFACTURER'S MAY BE CONSIDERED UPON DESIGN APPROVAL. UNITS TO BE SUBMITTED AND REVIEWED BY DESIGN TEAM PRIOR TO ORDER. STRUCTURAL MODIFICATIONS MAY BE REQUIRED, AT THIS CONTRACTOR'S EXPENSE TO FIT ALTERNATE RTU DROPS.

SEE SHEET M5 FOR OWNER PROVIDED, GENERAL CONTRACTOR INSTALLED DOAS UNIT INFORMATION.

EXHAUST FAN SCHEDULE

MARK	MFGR	MODEL	CFM	EXTERNAL STATIC P. IN. WG.	RPM	ELECTRICAL		FAN TYPE	NOTES
						VOLT/Φ/HZ	PWR		
EF-1	COOK	GC-146	75	0.25	900	120/1/60	30.3 W	CEILING EXH.	1
EF-2	COOK	GC-146	75	0.25	900	120/1/60	30.3 W	CEILING EXH.	1

NOTES: 1. PROVIDE CEILING GRILLE, INTEGRAL BACK DRAFT DAMPER, AND ROOF CAP.

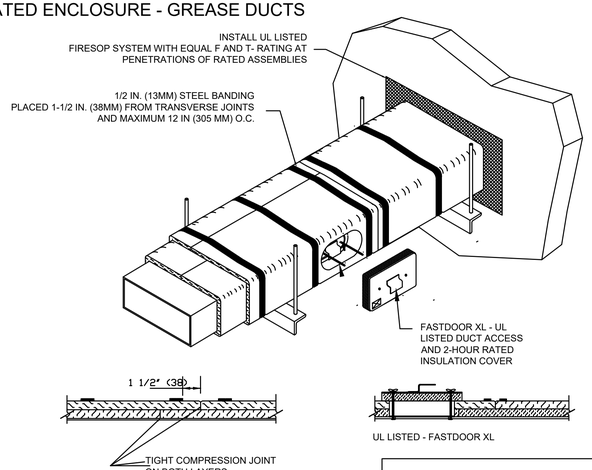
DIFFUSER SCHEDULE

MARK	MFGR	MODEL	NECK SIZE	FACE SIZE	FINISH	REMARKS
SD-1	TITUS	TMR	12"Φ	22"Φ	WHITE	FIELD PREP FOR PAINTING
SD-2	"	TMS/3	10"Φ	24"x24"	"	"
SD-3	"	PAR/3	"	"	"	RETURN - NO DEFLECTOR
SD-4	"	T35Q4	8"Φ	"	"	THERMAL VAV DIFFUSER
SD-5	"	TMS/3	6"Φ	12"x12"	"	WITH O.B. DAMPER AND TRM KIT
RG-1	AMER. LOUVER CO.	STRATUS	20"x20"	24"x24"	"	SEE NOTE 1.
RG-2	TITUS	PAR/3	10"x22"	12"x24"	"	"

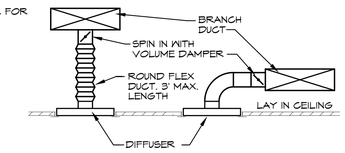
NOTES: 1. RETURN GRILL TO BE PLASTIC FILTER RETURN, FILTER TO BE AMERICAN AIR FILTER (AAF) FRONTLINE GREEN 1", WITH AAF AMERIFRAME SIZE 20x20x1.

FIRE RATED ENCLOSURE - GREASE DUCTS

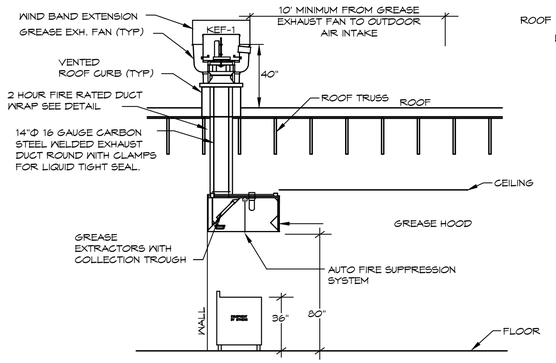
1. THERMAL CERAMICS FIREMASTER FASTWRAP XL IS TESTED TO ASTM E2336 AND UL LISTED PER NHKT.G18 TO PROVIDE ZERO CLEARANCE TO COMBUSTIBLES AND TO PROVIDE A 1- OR 2- HOUR ENCLOSURE. THROUGH PENETRATIONS FIRESTOP SYSTEMS ARE TESTED IN ACCORDANCE WITH ASTM E 814 (UL 1479). ICC-ES APPROVAL PER REPORT ESR 2213 OR ESR 2832.
2. COMPLIANT TO THE FOLLOWING CODES:
   NFPA 96
   INTERNATIONAL MECHANICAL CODES
   UNIFORM MECHANICAL CODE.
   CALIFORNIA MECHANICAL CODE
3. INSULATION APPLIED IN TWO LAYERS WITH TIGHT COMPRESSION JOINT ON BOTH LAYERS AT ALL JOINTS.
4. MINIMUM 16 GAUGE CARBON STEEL (OR 18 GAGE STAINLESS STEEL) RECTANGULAR OR ROUND GREASE EXHAUST DUCT
5. INSTALL UL LISTED AND LIQUID TIGHT THERMAL CERAMICS FASTDOOR XL ACCESS DOORS AT ALL CHANGES IN DIRECTION AND AT MINIMUM EVERY 20 FT ON HORIZONTAL RUNS.
6. SUPPORT HANGER SYSTEMS DO NOT NEED TO BE WRAPPED PROVIDED THE HANGER RODS ARE MINIMUM OF 3/8 IN. DIAMETER AND SUPPORTS ARE MINIMUM 2 X 2 X 1/8 IN. STEEL ANGLE OR SMACNA EQUIVALENT SUPPORT SYSTEM.
7. THERMAL CERAMICS DUCT WRAP SHALL BE INSTALLED DIRECTLY ONTO THE DUCT AND APPLIED FROM THE HOOD CONNECTION TO THE CONNECTION TO THE FAN.
8. THERMAL CERAMICS DUCT ENCLOSURE SYSTEM SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AND UL LISTINGS.



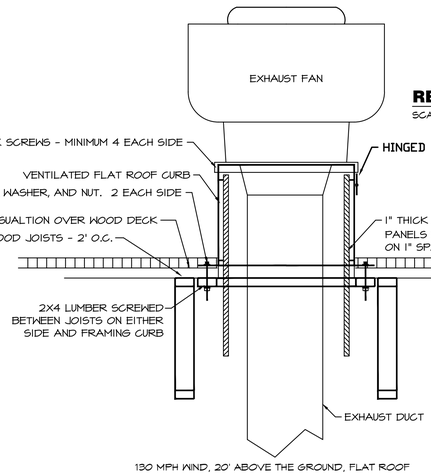
Morgan ThermalCeramics
P.O. Box 923
Augusta, Georgia 30903-0923
Phone: (706) 560-4038



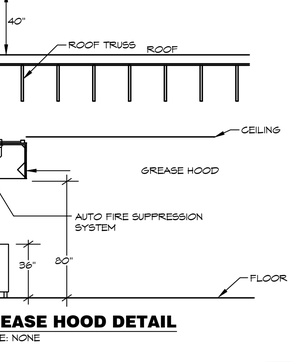
DIFFUSER DETAIL
SCALE: NONE



GREASE HOOD DETAIL
SCALE: NONE



HVHZ FAN MOUNTING DETAIL
SCALE: NONE

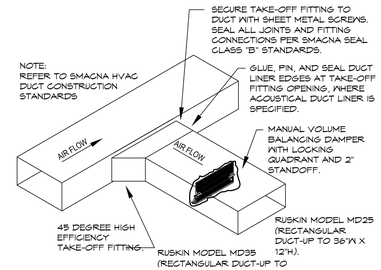


HVHZ ROOF CURB DETAIL (RTU/MAU)
SCALE: NONE

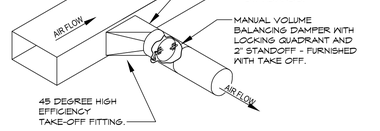
NATIONAL ACCOUNT INFORMATION

FREDDY'S FROZEN CUSTARD HAS NATIONAL ACCOUNT AGREEMENTS FOR ROOF TOP UNITS WITH TRANE.

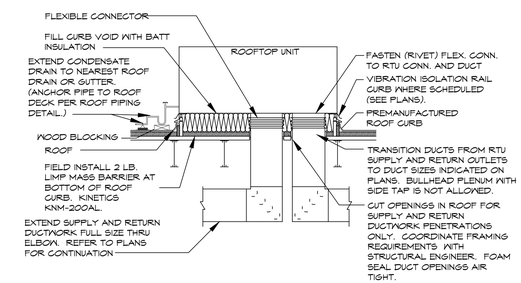
FOR TRANE EQUIPMENT EQUAL TO THE UNITS SPECIFIED CONTACT:
TOM ROOD, TRANE ACCOUNT MANAGER - NATIONAL ACCOUNTS, (800) 729-9115
FREDDYS@TRANE.COM



RECTANGULAR DUCT TAKE OFF DETAIL
SCALE: NONE



ROUND DUCT TAKE OFF DETAIL
SCALE: NONE



DOWNFLOW ROOF TOP UNIT DETAIL
SCALE: NONE

FREDDY'S FROZEN CUSTARD
1611 RICHMOND ROAD
WILLIAMSBURG, VA.

2/8/2022

COMMONWEALTH OF VIRGINIA
ERIK BRADLEY KNUDSEN
Lic. No. 0402054561
PROFESSIONAL ENGINEER

DAN WINTER ARCHITECT
1024 EAST FIRST STREET
WICHITA, KS. 67214
PH. 316-267-7142

MECHANICAL SCHEDULES & DETAILS

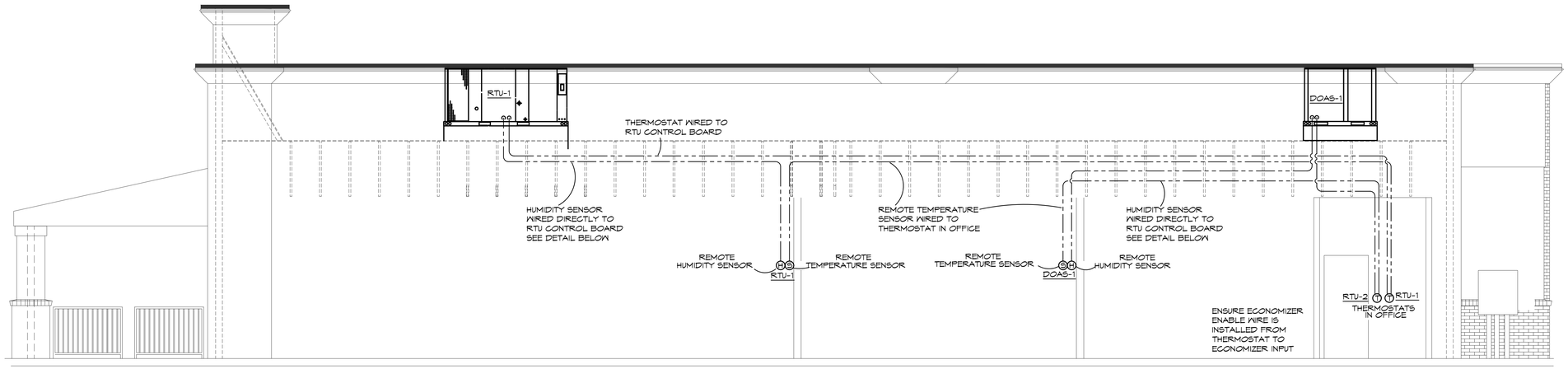
DATE
02/08/2022

DRAWN BY: SM/MS
CHECKED BY: BK/EK

SHEET NO.
M2

BC PROJECT #: 21858
VIRGINIA PE COA #0407006723

BC ENGINEERS INCORPORATED
5720 Reeder Shawnee, Ks. 66203 (913)262-1772



REMOTE TEMPERATURE AND HUMIDITY SENSOR WIRING

ALL LOW VOLTAGE WIRING FOR THE HVAC SYSTEM IS TO BE PROVIDED AND INSTALLED BY THE HVAC CONTRACTOR.

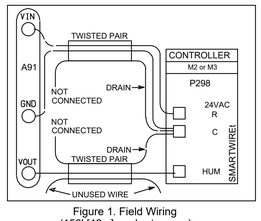


Figure 1. Field Wiring
(150' [46m] or shorter runs)

Wire runs of 150' (46m) or less:
Use two separate shielded cables containing 18AWG minimum, twisted pair conductors with overall shield. Belden type 8760 or 88760 (plenum) or equivalent. Connect both cable shield drain wires as shown in figure 1.

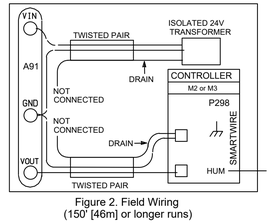
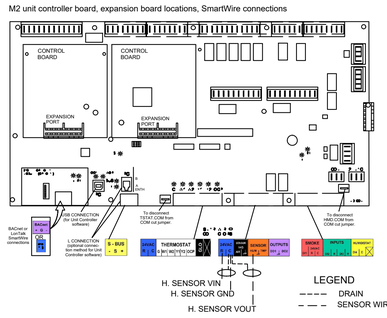


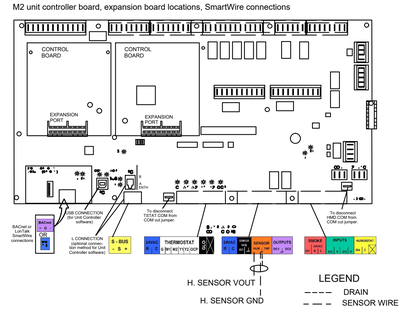
Figure 2. Field Wiring
(150' [46m] or longer runs)

Wire runs over 150 feet (46m):
Use a local, isolated 24VAC transformer such as Lennox cat #18M13 (20VA minimum) to supply power to RH sensor as shown in figure 2. Use one shielded cable containing 20AWG minimum, twisted pair conductors with overall shield. Belden type 8762 or 88760 (plenum) or equivalent.

M2 unit controller board, expansion board locations, SmartWire connections



M2 unit controller board, expansion board locations, SmartWire connections



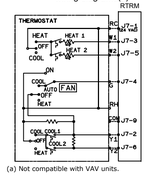
Installation

DC Conductors

Table 11. Zone sensor module wiring

Distance from Unit to Control	Recommended Wire Size
0 - 150 feet	22 gauge
0 - 45.7 m	0.33 mm2
151 - 240 feet	20 gauge
46 - 73.1 m	0.50 mm2
241 -385 feet	18 gauge
73.5 - 117.3 m	0.75 mm2
386 - 610 feet	16 gauge
117.7 - 185.9 m	1.3 mm2
611 - 970 feet	14 gauge
186.2 - 295.7 m	2.0 mm2

Figure 59. ReliaTel™ conventional thermostat field wiring diagrams(a)



(a) Not compatible with VAV units.

Figure 60. ReliaTel™ options module (RTOM board)

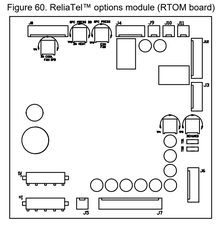
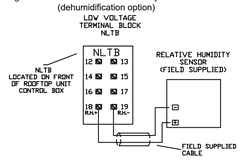


Figure 61. ReliaTel™ relative humidity sensor (dehumidification option)



LENNOX HUMIDITY SENSOR WIRING

FOR GENERAL INFORMATION ONLY.
REFER TO THE MANUFACTURERS INSTALLATION INSTRUCTIONS PROVIDED WITH THE EQUIPMENT FOR EXACT INSTALLATION INSTRUCTIONS AND REQUIREMENTS.

TRANE HUMIDITY SENSOR WIRING

FOR GENERAL INFORMATION ONLY.
REFER TO THE MANUFACTURERS INSTALLATION INSTRUCTIONS PROVIDED WITH THE EQUIPMENT FOR EXACT INSTALLATION INSTRUCTIONS AND REQUIREMENTS.

FREDDY'S FROZEN CUSTARD
1611 RICHMOND ROAD
WILLIAMSBURG, VA.

2/8/2022

COMMONWEALTH OF VIRGINIA
ERIK BRADLEY KNUDSEN
Lic. No. 0402054561
PROFESSIONAL ENGINEER

DAN WINTER ARCHITECT
1024 EAST FIRST STREET
WICHITA, KS. 67214
PH. 316-267-7142

REMOTE TEMPERATURE AND HUMIDITY SENSOR WIRING DETAILS

DATE
02/08/2022

DRAWN BY:
SM/MS
CHECKED BY:
BK/EK

SHEET NO.
M2.1

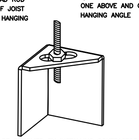
BC PROJECT #: 21858
VIRGINIA PE COA #0407006723

BC ENGINEERS INCORPORATED
5720 Reeder Shawnee, Ks. 66203 (913)262-1772

ND-2 HANGING ANGLE DETAIL

1/2" DIA. ALL THREAD ROD CONNECTED TO ROOF JOIST THROUGH ANOTHER HANGING ANGLE

1/2" DIA. HEAVY DUTY NUT ONE ABOVE AND ONE BELOW HANGING ANGLE



*ROD AND NUTS TO BE SUPPLIED BY INSTALLING CONTRACTOR
HANGING ANGLE IS PRE-PUNCHED AT FACTORY

HANGING ANGLE LOCATIONS

HOOD STYLE	DIM FROM REAR	DIM FROM FRONT (24"H)	DIM FROM FRONT (30"H)
CANOPY ND2	4.166"	2.246"	2.246"
ND2-PSP-F	4.166"	2.246"	2.246"
BACKSHELF BD-2	4.166"	2.246	–
VHB/VHB-G	36"X36"	42"X42"	48"X48"
FRONT/BACK DIMS BY SIZE	2.246"	2.246"	2.246"

CALCULATIONS UTILIZED

EXHAUST CFM=LENGTH OF HOOD X CFM/LIN.FT. (LOAD)

SUPPLY CFM=EXHAUST CFM X PERCENTAGE REQUIRED

TOTAL DUCT AREA=144 X $\frac{\text{CFM}}{\text{FPM}(*)}$

DUCT LENGTH= $\frac{\text{TOTAL DUCT AREA}}{\text{DUCT DEPTH}}$

* CAPTIVE-AIRE DUCT CONNECTION SIZES ARE CALCULATED USING AN EXHAUST VELOCITY OF 1500-1500 FPM AND A SUPPLY VELOCITY OF 300-400 FPM.

BUILDING CODES

CAPTIVE-AIRE HOODS ARE BUILT IN COMPLIANCE WITH:

ETL LISTED #3054804-001 & #3054804-002

STANDARD 710

BUILT IN ACCORDANCE WITH NFPA No. 96

Listed under ETL File number 3054804-001/002

CLEARANCE TO COMBUSTIBLES

CAPTIVE-AIRE HOODS HAVE OPTIONAL CLEARANCE REDUCTION SYSTEMS AVAILABLE AS FOLLOWS:

MATERIAL	CLEARANCE REDUCTION SYSTEM
NON-COMBUSTIBLE	NONE REQUIRED
LIMITED-COMBUSTIBLE	3" UNINSULATED STANDOFF
COMBUSTIBLE	1" INSULATED STANDOFF

GENERAL NOTES

INSTALLATION

1. ALL ELECTRICAL "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY ELECTRICAL CONTRACTORS.
2. ALL PLUMBING "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY PLUMBING CONTRACTORS.
3. HANGING BRACKETS LOCATED AND WELDED AS SHOWN ON PLANS. ALL OTHER HANGER MATERIALS PROVIDED BY INSTALLING CONTRACTORS.
4. ALL CONNECTIONS FROM CAPTIVE-AIRE DUCT PER MECHANICAL CONTRACTOR'S'S PLANS.
5. COOKING EQUIPMENT TO SHUTOFF IN EVENT OF FIRE.
6. EXHAUST FANS TO TURN ON IN EVENT OF FIRE.
7. ALL LIGHTS FIXTURE SHOWN INSTALLED BY CAPTIVE-AIRE ARE FACTORY PREWIRED. INTERCONNECTIONS BETWEEN HOODS AND TO SWITCHES BY ELECTRICAL CONTRACTORS.
8. LAMPS FOR LIGHT FIXTURES BY INSTALLING CONTRACTORS.
9. SEISMIC RESTAINTS ARE RESPONSIBILITY OF INSTALLING CONTRACTOR.
10. INSTALLING CONTRACTORS ASSUME ALL RELATED REPONSIBILITY FOR VERIFICATION OF DIMENSIONAL DATA CONTAINED ON THESE DOCUMENTS FOR ACCURACY, INTEGRATION, AND ADMINISTRATION OF CODE REQUIREMENTS IN EFFECT PRIOR TO ANY RELEASE FOR PRODUCTION OF EQUIPMENT SHOWN.

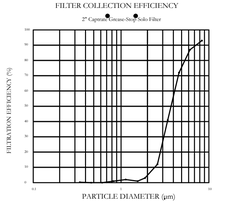
BALANCE

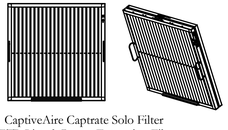
11. KITCHEN HOODS MUST BE BALANCED WITH KITCHEN.
12. KITCHEN SHALL BE NEGATIVE WITH RESPECT TO DINING AREA.
13. RESTAURANT SHALL BE POSITIVE WITH RESPECT TO AMBIENT PRESSURE.

ADDITIONAL

14. WRITTEN HOOD DIMENSIONS HAVE PRECEDENCE OVER SCALE.
15. SIGNED AND "APPROVED" COPIES OF THIS DOCUMENT MUST BE RECEIVED BY THE FACTORY PRIOR TO COMMENCEMENT OF FABRICATION.

FILTER DETAIL





CaptiveAire Captrate Solo Filter
ETL Listed Grease Extracting Filters
Made From 430 Stainless Steel

FOR QUESTIONS, CALL THE:
KANSAS CITY REGIONAL OFFICE
1126 SWIFT STREET, KANSAS CITY, MO 64116
PHONE: (816) 221-8575
FAX: (816) 221-8311

CUSTOMER APPROVAL TO MANUFACTURE:

Approved as Noted ☐
Approved with NO Exception Taken ☐
Revise and Resubmit ☐

SIGNATURE _____

Your Title _____ Date _____

HOOD INFORMATION – JOB#5158876

HOOD NO	TAG	MODEL	MANUFACTURER	LENGTH	MAX COOKING TEMP	TYPE	APPLIANCE DUTY	DESIGN CFM/FT	TOTAL EXH CFM	EXHAUST PLENUM RISER(S) WIDTH	LENG	HEIGHT	DIA	CFM	VEL.	SP	HOOD CONSTRUCTION	HOOD CONFIG END TO END	RDV
1	ITEM 33A	5424 ND-2	CAPTIVEAIRE	8' 0"	450 DEG	I	MEDIUM	200	1600			4"	14"	1600	1497	-0.734"	430 SS WHERE EXPOSED	ALONE	FRONT
2	ITEM 33B	5424 ND-2	CAPTIVEAIRE	5' 0"	450 DEG	I	MEDIUM	155	775			4"	10"	775	1421	-0.436"	430 SS WHERE EXPOSED	ALONE	ALONE
3	DH-1	4224 VHB-G	CAPTIVEAIRE	3' 6"	700 DEG	II	N/A	150	525			4"	10"	525	963	-0.069"	304 SS 100%	ALONE	ALONE

HOOD INFORMATION

HOOD NO	TAG	FILTER(S) TYPE	QTY	HEIGHT	LENGTH	EFFICIENCY @ 7 MICRONS	LIGHT(S) QTY	TYPE	WIRE GUARD	LOCATION	SIZE	UTILITY CABINET(S) FIRE SYSTEM TYPE	FIRE SYSTEM SIZE	ELECTRICAL MODEL #	SWITCHES QUANTITY	FIRE SYSTEM PIPING	HOOD HANGING WEIGHT
1	ITEM 33A	CAPTRATE SOLO FILTER	5	16"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	NO	LEFT	12"x54"x24"			DCV-2011	1 LIGHT 1 FAN	NO	531 LBS
2	ITEM 33B	CAPTRATE SOLO FILTER	3	16"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	NO							NO	328 LBS
3	DH-1						0									NO	161 LBS

HOOD OPTIONS

HOOD NO	TAG	OPTION
1	ITEM 33A	FIELD WRAPPER 18.00" HIGH FRONT, LEFT, RIGHT, BACK.
		LEFT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		RIGHT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		FINISHED BACK - GROUND/POLISH 96.00" LONG.
2	ITEM 33B	FIELD WRAPPER 18.00" HIGH FRONT, LEFT, RIGHT.
		RIGHT END PANEL 54" TOP WIDTH, 54" BOTTOM WIDTH, 45" HIGH 430 SS.
		LEFT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
3	DH-1	FIELD WRAPPER 18.00" HIGH FRONT, LEFT, RIGHT.

SPECIFICATION: CAPTRATE® GREASE-STOP® SOLO FILTER

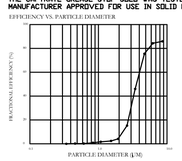
THE CAPTRATE GREASE-STOP SOLO FILTER IS A SINGLE-STAGE FILTER FEATURING A UNIQUE S-BAFFLE DESIGN IN CONJUNCTION WITH A SLOTTED REAR BAFFLE DESIGN, TO DELIVER EXCEPTIONAL FILTRATION EFFICIENCY.

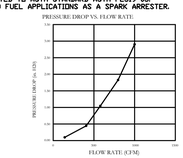
FILTER IS STAINLESS STEEL CONSTRUCTION, AND SIZED TO FIT INTO STANDARD 2-INCH DEEP HOOD CHANNEL(S).

UNITS SHALL INCLUDE STAINLESS STEEL HANDLES AND A FASTENING DEVICE TO SECURE THE TWO COMPONENTS WHEN ASSEMBLED.

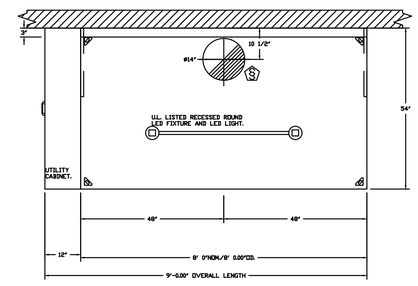
GREASE EXTRACTION EFFICIENCY PERFORMANCE SHALL REMOVE AT LEAST 75% OF GREASE PARTICLES FIVE MICRONS IN SIZE, AND 85% GREASE PARTICLES SEVEN MICRONS IN SIZE AND LARGER, WITH A CORRESPONDING PRESSURE DROP NOT TO EXCEED 1.0 INCHES OF WATER GAUGE.

THE CAPTRATE GREASE-STOP SOLO WAS TESTED TO ASTM STANDARD ASTM F2519-05. MANUFACTURER APPROVED FOR USE IN SOLID FUEL APPLICATIONS AS A SPARK ARRESTER.

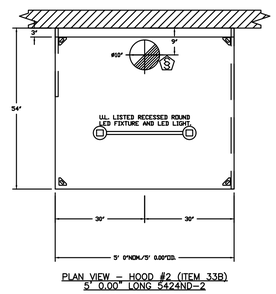




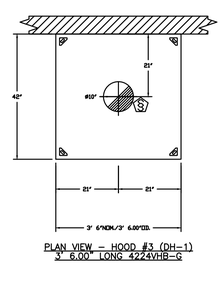
CAPTRATE FILTERS ARE BUILT IN COMPLIANCE WITH.
NFPA #96.
NSF STANDARD #2.
UL STANDARD #1046.
INT. MECH. CODE (IMC).
ULC-S649.



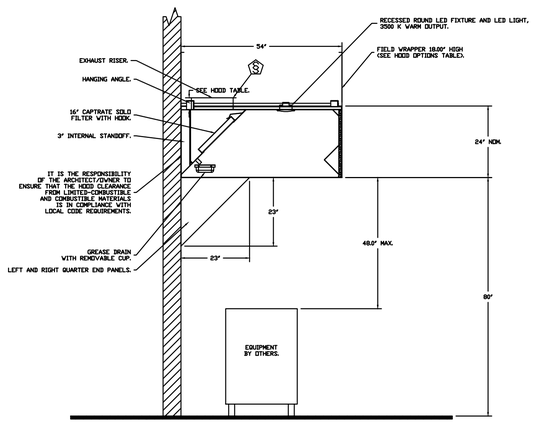
PLAN VIEW – HOOD #1 (ITEM 33A)
8' 0.00" LONG 5424ND-2



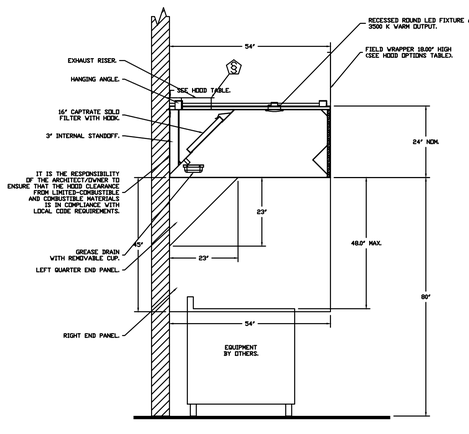
PLAN VIEW – HOOD #2 (ITEM 33B)
5' 0.00" LONG 5424ND-2



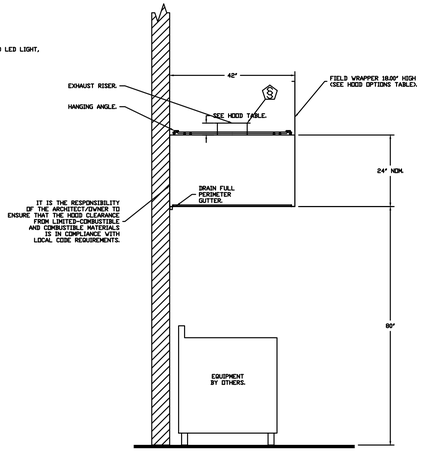
PLAN VIEW – HOOD #3 (DH-1)
3' 6.00" LONG 4224VHB-G



SECTION VIEW – MODEL 5424ND-2
HOOD – #1 (ITEM 33A)



SECTION VIEW – MODEL 5424ND-2
HOOD – #2 (ITEM 33B)



SECTION VIEW – MODEL 4224VHB-G
HOOD – #3 (DH-1)

***** NOTE *****

ALL WALLS AND STRUCTURES THAT COME WITHIN 18" OF HOOD MUST BE METAL STUDS AND SHEETROCK. WOOD STUDS OR ANY OTHER COMBUSTIBLE MATERIAL WITHIN 18" OF HOOD NO ALLOWED.

***** NOTE *****

HOOD MANUFACTURER RECOMMENDS NO RETURNS OR 4-WAY DIFFUSERS WITHIN 10 FEET OF HOOD IN ALL DIRECTION.

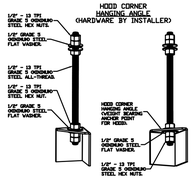
***** NOTE *****

MAKEUP AIR SHALL BE DELIVERED INTO SPACE IN MANNER THAT WILL NOT DISRUPT HOODS ABILITY TO CAPTURE AND CONTAIN.

PATENT NUMBERS

EXHAUST HOODS ND-2/BD-2/SND-2 (CANADA) – CA PATENT 2520435 C.

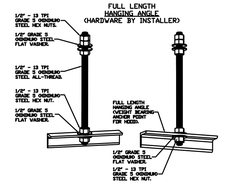
HOOD CORNER HANGING ANGLE (HARDWARE BY INSTALLER)



ASSEMBLY INSTRUCTIONS

HANGING ANGLE MUST BE SUPPORTED WITH 1/2" – 13 TPI GRADE 5 (MINIMUM) ALL-THREAD. SANDWICH HANGING ANGLES AND CEILING ANCHOR POINTS WITH 1/2" GRADE 5 (MINIMUM) STEEL FLAT WASHERS AND 1/2" – 13 TPI GRADE 5 (MINIMUM) HEX NUTS AS SHOWN. MUST USE DOUBLED HEX NUT CONFIGURATION BENEATH HOOD HANGING ANGLES AND ABOVE CEILING ANCHORS. MAINTAIN 1/4" OF EXPOSED THREADS BENEATH BOTTOM HEX NUT. TORQUE ALL HEX NUTS TO 57 FT-LBS.

FULL LENGTH HANGING ANGLE (HARDWARE BY INSTALLER)



ASSEMBLY INSTRUCTIONS

HANGING ANGLE MUST BE SUPPORTED WITH 1/2" – 13 TPI GRADE 5 (MINIMUM) ALL-THREAD. SANDWICH HANGING ANGLES AND CEILING ANCHOR POINTS WITH 1/2" GRADE 5 (MINIMUM) STEEL FLAT WASHERS AND 1/2" – 13 TPI GRADE 5 (MINIMUM) HEX NUTS AS SHOWN. MUST USE DOUBLED HEX NUT CONFIGURATION ABOVE CEILING ANCHORS. SINGLE HEX NUT BENEATH HANGING ANGLE IS ACCEPTABLE FOR FULL LENGTH HANGING ANGLES. MAINTAIN 1/4" OF EXPOSED THREADS BENEATH BOTTOM HEX NUT. TORQUE ALL HEX NUTS TO 57 FT-LBS.

REVISIONS

	DESCRIPTION	DATE:
△		
△		
△		
△		

CAPTIVE-AIRE

HBT Foodservice
104 W 9th St Suite 204, Kansas City, MO. 64105 PHONE: (816) 221-8575 FAX: (816) 221-8311 EMAIL: reg98@captiveaire.com
www.captiveaire.com

Freddy's - Williamsburg, VA
WILLIAMSBURG, VA, 23185

DATE: 11/4/2021

DWG.#: 5158876

DRAWN BY: michael.co

SCALE: 1/2" = 1'-0"

MASTER DRAWING

SHEET NO. 1

FREDDY'S FROZEN CUSTARD
1611 RICHMOND ROAD
WILLIAMSBURG, VA.

2/8/2022

COMMONWEALTH OF VIRGINIA
ERIK BRADLEY KNUDSEN
Lic. No. 0402054561
PROFESSIONAL ENGINEER

DAN WINTER ARCHITECT
1024 EAST FIRST STREET WICHITA, KS. 67214
PH. 316-267-7142

MECHANICAL HOOD PLANS

DATE
02/08/2022

DRAWN BY: SM/MS
CHECKED BY: BK/EK

SHEET NO. M3

BC PROJECT #: 21858
VIRGINIA PE COA #0407006723

BC ENGINEERS INCORPORATED
5720 Reeder Shawnee, Ks. 66203 (913)262-1772

EXHAUST FAN INFORMATION – JOB#5158876

FAN UNIT NO	TAG	QTY	FAN UNIT MODEL #	MANUFACTURER	CFM	ESP	RPM	MOTOR ENCL	HP	BHP	PHASE	VOLT	FLA	DISCHARGE VELOCITY	WEIGHT (LBS)	SONES
1	ITEM 74.1	1	CASRE180D	CAPTIVEAIRE	1600	1.400	1105	DIP,PREMIUM	1.000	0.6270	3	208	3.8	928 FPM	282	13.6
2	ITEM 74.2	1	BU50HFA	CAPTIVEAIRE	775	1.250	1532	TEAO-ECM	0.500	0.3950	1	115	6.3	295 FPM	101	16.6
4	DEF-1	1	BU33HFA	CAPTIVEAIRE	525	0.600	1332	TEAO-ECM	0.333	0.1470	1	115	4.3	260 FPM	67	12

DOAS/RTU FAN SCHEDULE – JOB#5158876

FAN UNIT NO	TAG	QTY	DOAS/RTU MODEL #	MANUFACTURER	BLOWER	RETURN AIR CFM	MAX. OUTSIDE AIR CFM	TOTAL CFM	ESP	HP	BHP	PHASE	VOLT	MCA	MOCP	WEIGHT (LBS)
3	ITEM 74.3	1	CASRTU3-1300-18-20T-DOAS	CAPTIVEAIRE	18P-3	0	2900	2900	0.500	2.000	1.4500	3	208	79.1A	80A	2560

DOAS/RTU COOLING SCHEDULE

FAN UNIT NO	TAG	COMPRESSOR			OUTDOOR FAN				INDOOR COIL		OUTSIDE AIR DB TEMP	OUTSIDE AIR WB TEMP	MIXED AIR DB TEMP	MIXED AIR WB TEMP	LEAVING DB TEMP	LEAVING WB TEMP	LEAVING DP TEMP	TOTAL CAPACITY	SENSIBLE CAPACITY	LATENT CAPACITY	REHEAT LEAVING DB TEMP	REHEAT LEAVING WB TEMP	DESIRED REHEAT CAPACITY	MAX REHEAT CAPACITY	REHEAT LEAVING RELATIVE HUMIDITY	MOISTURE REMOVAL RATE	IEER
		TONNAGE	VOLTAGE	PHASE	MOTOR VOLTAGE	MOTOR #	MOTOR FREQUENCY	MOTOR QTY	ROWS	FACE AREA																	
3	ITEM 74.3	20	190-240	3	200-240	3	60	3	7	11.9 SQFT	84.2°F	78.7°F	84.2°F	78.7°F	54.7°F	51.6°F	49.2°F	264.0 MBH	92.1 MBH	171.9 MBH	70.0°F	57.9°F	49.6 MBH	129.6 MBH	48	154.8 LBS/HR	18.2

DOAS/RTU HEATING SCHEDULE

FAN UNIT NO	TAG	INPUT BTUs	OUTPUT BTUs	TEMP RISE	REQUIRED INPUT GAS PRESSURE	GAS TYPE	BURNER EFFICIENCY(%)
3	ITEM 74.3	278314	222651	65°F	7 IN. W.C. – 14 IN. W.C.	NATURAL	80

FAN OPTIONS

FAN UNIT NO	TAG	QTY	DESCRIPTION
1	ITEM 74.1	1	UTILITY SET GREASE CUP.
		1	RE18 – DISCHARGE EXTENSION ASSEMBLY WITH HARDWARE.
		1	2 YEAR PARTS WARRANTY.
2	ITEM 74.2	1	GREASE BOX.
		1	UPBLAST FAN WHEEL ACCESS PORT.
		1	36" TALL STRAIGHT WIND BAND EXTENSION (3 <SHIPS LOOSE>.
		1	GUY LINE EYE BOLTS – USED FOR 3 GUY LINE TIE OFF POINTS.
		1	ECM WIRING PACKAGE – PWM SIGNAL FROM ECPM03 PREWIRE (TELCD MOTOR), CCW ROTATION.
		1	2 YEAR PARTS WARRANTY.
3	ITEM 74.3	1	INLET PRESSURE GAUGE, 0–35".
		1	MANIFOLD PRESSURE GAUGE, 0 TO 10" WC, 1 FURNACE.
		1	RTU TOTAL CFM MONITORING.
		1	SINGLE POINT ELECTRICAL CONNECTION FOR RTU. 750VA TRANSFORMER USED. IF A NON-DCV PREWIRE CONTROLS THIS UNIT, THE #28, #47, "MA", OR "C2" PREWIRE OPTION MUST BE SELECTED. DOES NOT PROVIDE SUPPLY STARTER IN PREWIRE.
		1	CASLINK BUILDING MONITORING SYSTEM – INTERNET OR CELLULAR CONNECTION REQUIRED.
		1	RTU3 DOWN DISCHARGE.
		1	2" MERV 13 FILTERS FOR RTU3 (QTY. 4).
		1	2" MERV 8 FILTERS FOR RTU3 (QTY. 4).
		1	OVERHEAT STAT.
		1	VFD FACTORY MOUNTED AND WIRED IN RTU COMMERCIAL CONTROL VESTIBULE.
		1	COMMERCIAL SMOKE DETECTOR/ALARM INTERLOCK – ALARM SUPPLIED BY OTHERS.
		1	OCCUPIED SCHEDULING.
		1	RTU3 CURB DUCT HANGER.
		1	CLOGGED FILTER SWITCH – NOTIFICATION ON HMI.
		1	20 TON MODULATING COOLING OPTION, 208/230V. R410A REFRIGERANT, VARIABLE SPEED COMPRESSOR, ECM CONDENSING FANS.
		1	20 TON MODULATING REHEAT OPTION – SPACE DEWPOINT CONTROL.
		1	RTU INTAKE/RETURN DAMPER – SCHEDULED DA PERCENTAGE CONTROL.
		1	RTU3 HAIL GUARD.
		1	RTU3 DOWN RETURN.
		1	VAV PACKAGE W/ 0-10VDC INPUT CONTROL (571 VFD INCLUDED).
		1	5 YEAR ENTIRE UNIT PARTS WARRANTY, 10 YEAR ENTIRE UNIT PARTS WARRANTY WITH REMOTE MONITORING AND CAPTIVEAIRE SERVICE CONTRACT, 25 YEAR STAINLESS STEEL FURNACE PARTS WARRANTY <SEE ADDITIONAL DETAILS>.
4	DEF-1	1	ECM WIRING PACKAGE – EXHAUST – MANUAL OR 0-10VDC REFERENCE SPEED CONTROL –MSC-(TELCD), CCW ROTATION.
		1	SCR-11 BIRD SCREEN.
		1	1 15-20D DAMPER.
		1	2 YEAR PARTS WARRANTY.

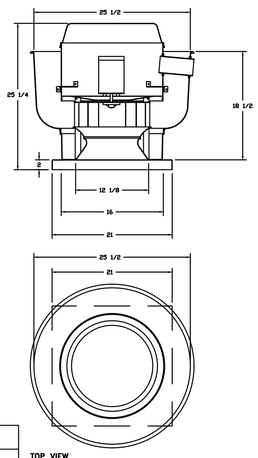
FAN ACCESSORIES

FAN UNIT NO	TAG	EXHAUST			SUPPLY			
		GREASE CUP	GRAVITY DAMPER	WALL MOUNT	SIDE DISCHARGE	GRAVITY DAMPER	MOTORIZED DAMPER	WALL MOUNT
1	ITEM 74.1	YES						
2	ITEM 74.2	YES						
4	DEF-1		YES					

CURB ASSEMBLIES

NO	ON FAN	TAG	WEIGHT	ITEM	SIZE
1	# 1	ITEM 74.1	30 LBS	CURB	26.500"W X 26.500"L X 24.000"H ALONG LENGTH, RIGHT VENTED.
2	# 2	ITEM 74.2	31 LBS	CURB	19.500"W X 19.500"L X 20.000"H ALONG LENGTH, RIGHT VENTED HINGED.
3	# 3	ITEM 74.3	78 LBS	CURB	59.500"W X 91.000"L X 18.000"H ALONG WIDTH, RIGHT INSULATED.
4	# 4	DEF-1	27 LBS	CURB	19.500"W X 19.500"L X 20.000"H ALONG LENGTH, RIGHT VENTED.

FAN #4 BU33HFA – EXHAUST FAN (DEF-1)



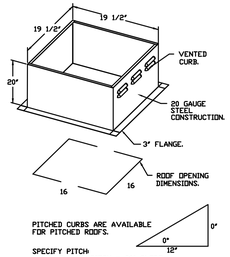
TOP VIEW

FEATURES:

- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS).
- ROOF MOUNTED FANS.
- UL705.
- VARIABLE SPEED CONTROL.
- INTERNAL WIRING.
- THERMAL OVERLOAD PROTECTION (SINGLE PHASE).
- NEMA 3R SAFETY DISCONNECT SWITCH.

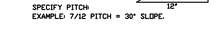
OPTIONS

ECM WIRING PACKAGE – EXHAUST – MANUAL OR 0-10VDC REFERENCE SPEED CONTROL –MSC- (TELCD), CCW ROTATION.
SCR-11 BIRD SCREEN.
1 15-20D DAMPER.
2 YEAR PARTS WARRANTY.

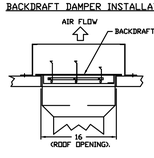


PITCHED CURBS ARE AVAILABLE FOR PITCHED ROOFS.

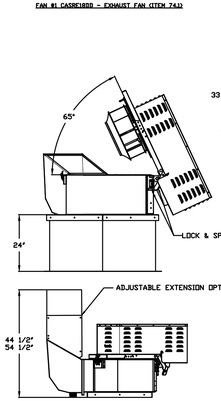
SPECIFY PITCH:
EXAMPLE: 7/12 PITCH = 30° SLOPE.

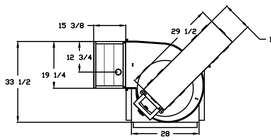


BACKDRAFT DAMPER INSTALLATION

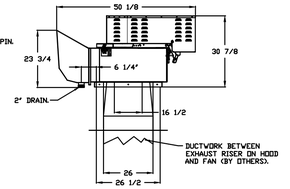


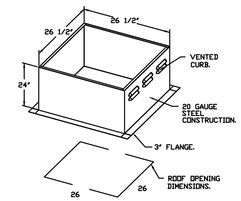
FAN #1 CASRE180D – EXHAUST FAN (ITEM 74.1)





TOP VIEW





PITCHED CURBS ARE AVAILABLE FOR PITCHED ROOFS.

SPECIFY PITCH:
EXAMPLE: 7/12 PITCH = 30° SLOPE.

FEATURES:

- ROOF MOUNTED FANS.
- RESTAURANT MODEL.
- UL762 AND ULC-S645.
- HIGH HEAT OPERATION DIRECT DRIVE 300°F (149°C).
- HEAT SLINGER.
- GREASE CLASSIFICATION TESTING.
- TILT OUT WHEEL.
- LOCKING PIN FOR POWER PACK.
- MOTOR WEATHER COVER.
- INTERLOCKED DISCONNECT SWITCH.
- NEMA 4X SAFETY DISCONNECT SWITCH.

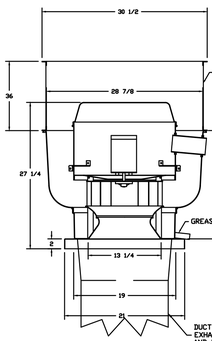
NORMAL TEMPERATURE TEST DIRECT DRIVE
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING AIR AT 300°F (149°C) UNTIL ALL FAN PARTS HAVE REACHED THERMAL EQUILIBRIUM, AND WITHOUT ANY DETERIORATING EFFECTS TO THE FAN WHICH WOULD CAUSE UNSAFE OPERATION.

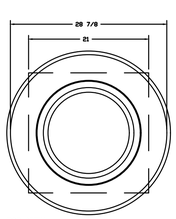
ABNORMAL FLARE-UP TEST BELT & DIRECT DRIVE
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING BURNING GREASE VAPORS AT 600°F (316°C) FOR A PERIOD OF 15 MINUTES WITHOUT THE FAN BECOMING DAMAGED TO ANY EXTENT THAT COULD CAUSE AN UNSAFE CONDITION.

OPTIONS

UTILITY SET GREASE CUP.
RE18 – DISCHARGE EXTENSION ASSEMBLY WITH HARDWARE.
2 YEAR PARTS WARRANTY.

FAN #2 BU50HFA – EXHAUST FAN (ITEM 74.2)





TOP VIEW

FEATURES:

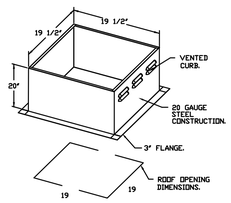
- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS).
- ROOF MOUNTED FANS.
- RESTAURANT MODEL.
- UL705 AND UL762 AND ULC-S645
- VARIABLE SPEED CONTROL.
- INTERNAL WIRING.
- THERMAL OVERLOAD PROTECTION (SINGLE PHASE).
- HIGH HEAT OPERATION 300°F (149°C).
- GREASE CLASSIFICATION TESTING.
- NEMA 3R SAFETY DISCONNECT SWITCH.

NORMAL TEMPERATURE TEST
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING AT 300°F (149°C) UNTIL ALL FAN PARTS HAVE REACHED THERMAL EQUILIBRIUM, AND WITHOUT ANY DETERIORATING EFFECTS TO THE FAN WHICH WOULD CAUSE UNSAFE OPERATION.

ABNORMAL FLARE-UP TEST
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING BURNING GREASE VAPORS AT 600°F (316°C) FOR A PERIOD OF 15 MINUTES WITHOUT THE FAN BECOMING DAMAGED TO ANY EXTENT THAT COULD CAUSE AN UNSAFE CONDITION.

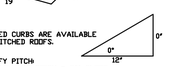
OPTIONS

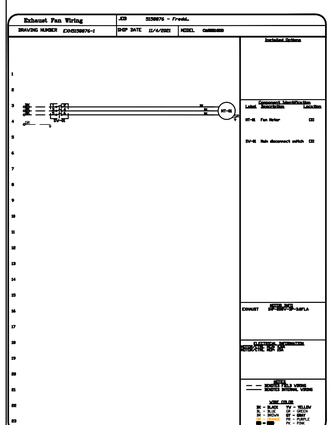
GREASE BOX.
UPBLAST FAN WHEEL ACCESS PORT.
36" TALL STRAIGHT WIND BAND EXTENSION (3 <SHIPS LOOSE>.
GUY LINE EYE BOLTS – USED FOR 3 GUY LINE TIE OFF POINTS.
ECM WIRING PACKAGE – PWM SIGNAL FROM ECPM03 PREWIRE (TELCD MOTOR), CCW ROTATION.
2 YEAR PARTS WARRANTY.

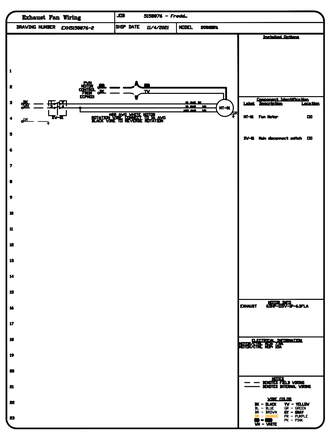


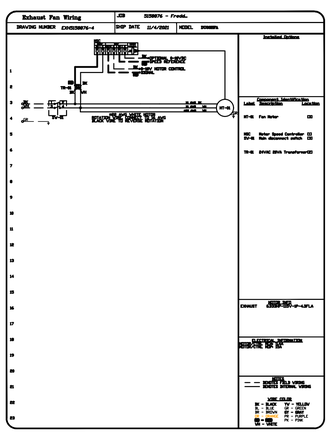
PITCHED CURBS ARE AVAILABLE FOR PITCHED ROOFS.

SPECIFY PITCH:
EXAMPLE: 7/12 PITCH = 30° SLOPE.









REVISIONS	
DESCRIPTION	DATE:

CAPTIVEAIRE
www.captiveaire.com
HBT Foodservice
104 W 9th St Suite 204, Kansas City, MO, 64105 PHONE: (816) 221-8575 FAX: (816) 221-8311 EMAIL: reg98@captiveaire.com
Fredd's – Williamsburg, VA
WILLIAMSBURG, VA, 23185

DATE: 11/4/2021

DWG.#: 5158876

DRAWN BY: michael.co

SCALE: 1/2" = 1'–0"

MASTER DRAWING

SHEET NO. 2

FREDDY'S FROZEN CUSTARD
1611 RICHMOND ROAD
WILLIAMSBURG, VA.

2/8/2022

COMMONWEALTH OF VIRGINIA
ERIK BRADLEY KNUDSEN
Lic. No. 0402054561
PROFESSIONAL ENGINEER

DAN WINTER ARCHITECT
1024 EAST FIRST STREET
WICHITA, KS. 67214
PH. 316-267-7142

MECHANICAL HOOD PLANS

DATE
02/08/2022

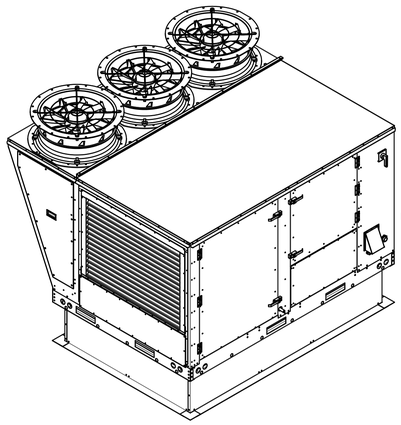
DRAWN BY:
SM/MS

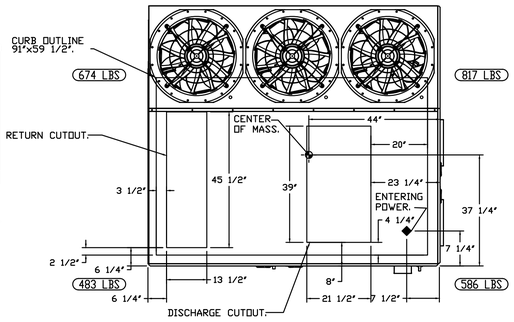
CHECKED BY:
BK/EK

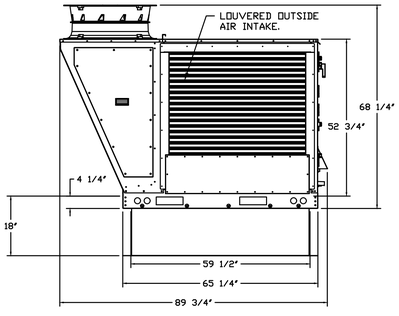
SHEET NO.
M4

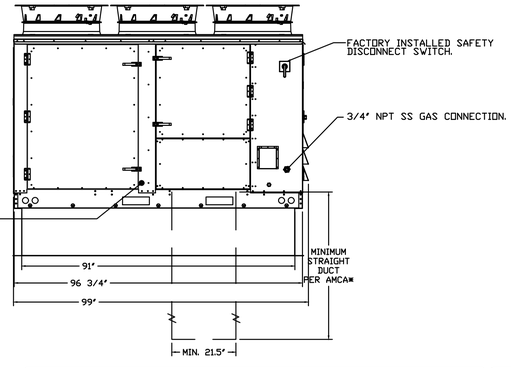
BC PROJECT #: 21858
VIRGINIA PE COA #0407006723

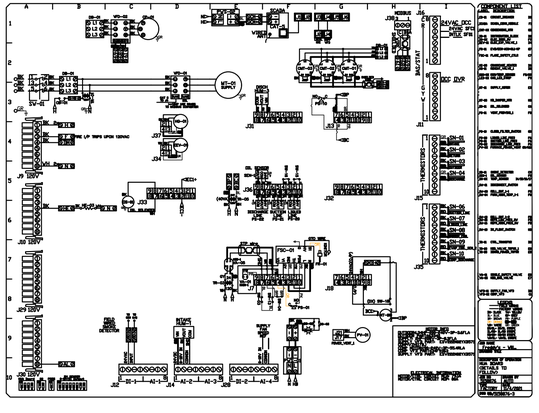
BC ENGINEERS INCORPORATED
5720 Reeder Shawnee, Ks. 66203 (913)262-1772

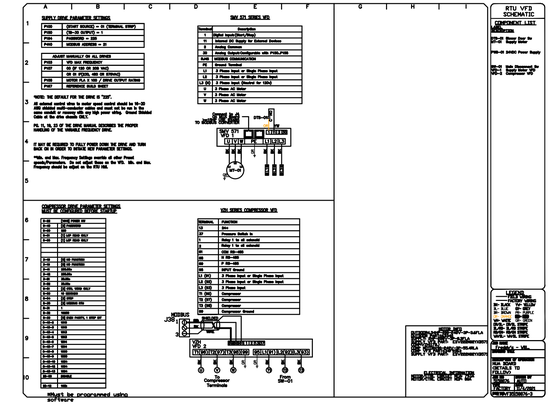


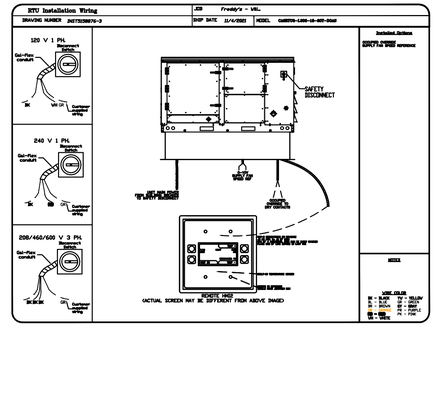












FAN #3 CASRTU3-I.300-18-20T-DOAS - HEATER (ITEM 74.3)

NOTES:

1. DO NOT OBSTRUCT OUTSIDE AIR INLET, OUTSIDE AIR COIL OR OUTSIDE AIR FAN.
2. ⬭ DENOTES CORNER WEIGHT.
3. ROOF OPENING MUST BE 2" SMALLER THAN CURB DIMENSIONS IN BOTH DIRECTIONS.

*NOTE: SUPPLY DUCT MUST BE INSTALLED TO MEET SMACNA STANDARDS. A MINIMUM STRAIGHT DUCT LENGTH MUST BE MAINTAINED DOWNSTREAM OF UNIT DISCHARGE AS OUTLINED IN AMCA PUBLICATION 201. WHEN USING RECTANGULAR DUCTWORK, ELBOWS MUST BE RADIUS THROAT, RADIUS BACK WITH TURNING VANES. FLEXIBLE DUCTWORK AND SQUARE THROAT/SQUARE BACK ELBOWS SHOULD NOT BE USED. ANY TRANSITION AND/OR TURNS IN THE DUCTWORK WILL CAUSE SYSTEM EFFECT. SYSTEM EFFECT WILL DRASTICALLY INCREASE STATIC PRESSURE AND REDUCE AIRFLOW. DO NOT RELY ON UNIT TO SUPPORT DUCT IN ANY WAY. FAILURE TO PROPERLY SIZE DUCTWORK MAY CAUSE SYSTEM EFFECTS AND REDUCE PERFORMANCE OF THE EQUIPMENT.
SUGGESTED STRAIGHT DUCT SIZE IS 21.5" x 39".

OPTIONS

1. INLET PRESSURE GAUGE, 0-35".
2. MANIFOLD PRESSURE GAUGE, 0 TO 10" WC, 1 FURNACE.
3. RTU TOTAL CFM MONITORING.
4. SINGLE POINT ELECTRICAL CONNECTION FOR RTU. 750VA TRANSFORMER USED. IF A NON-DCV PREWIRE CONTROLS THIS UNIT, THE #28, #47, "MA", OR "E2" PREWIRE OPTION MUST BE SELECTED. DOES NOT PROVIDE SUPPLY STARTER IN PREWIRE.
5. CASLINK BUILDING MONITORING SYSTEM - INTERNET OR CELLULAR CONNECTION REQUIRED.
6. RTU3 DOWN DISCHARGE.
7. 2" MERV 13 FILTERS FOR RTU3 (QTY. 4).
8. 2" MERV 8 FILTERS FOR RTU3 (QTY. 4).
9. OVERHEAT STAT.
10. VFD FACTORY MOUNTED AND WIRED IN RTU COMMERCIAL CONTROL VESTIBULE.
11. COMMERCIAL SMOKE DETECTOR/ALARM INTERLOCK - ALARM SUPPLIED BY OTHERS.
12. OCCUPIED SCHEDULING.
13. RTU3 CURB DUCT HANGER.
14. CLOGGED FILTER SWITCH - NOTIFICATION ON HMI.
15. 20 TON MODULATING COOLING OPTION, 208/230V. R410A REFRIGERANT, VARIABLE SPEED COMPRESSOR, ECM CONDENSING FANS.
16. 20 TON MODULATING REHEAT OPTION - SPACE DEWPOINT CONTROL.
17. RTU INTAKE/RETURN DAMPER - SCHEDULED OA PERCENTAGE CONTROL.
18. RTU3 HAIL GUARD.
19. RTU3 DOWN RETURN.
20. VAV PACKAGE W/ 0-10VDC INPUT CONTROL (571 VFD INCLUDED).
21. 5 YEAR ENTIRE UNIT PARTS WARRANTY, 10 YEAR ENTIRE UNIT PARTS WARRANTY WITH REMOTE MONITORING AND CAPTIVEAIRE SERVICE CONTRACT, 25 YEAR STAINLESS STEEL FURNACE PARTS WARRANTY (SEE ADDITIONAL DETAILS).

RTU Installation Wiring

DRAWING NUMBER	INST5158876-3	JOB	Freddy's - Wil...	SHIP DATE	11/4/2021	MODEL	CASRTU3-I.300-18-20T-DOAS

Installed Options
OCCUPIED OVERRIDE
SUPPLY FAN SPEED REFERENCE

NOTES

WIRE COLOR
BK - BLACK
BL - BLUE
BR - BROWN
OR - ORANGE
RD - RED
WH - WHITE
YW - YELLOW
GR - GREEN
GY - GRAY
PR - PURPLE
PK - PINK

REVISIONS	
DESCRIPTION	DATE:
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104 W 9th St Suite 204, Kansas City, MO, 64105 PHONE: (816) 221-8575 FAX: (816) 221-8311 EMAIL: reg98@captiveaire.com

Freddy's - Williamsburg, VA
WILLIAMSBURG, VA, 23185

DATE: 11/4/2021

DWG.#: 5158876

DRAWN BY: michael.co

SCALE: 1/2" = 1'-0"

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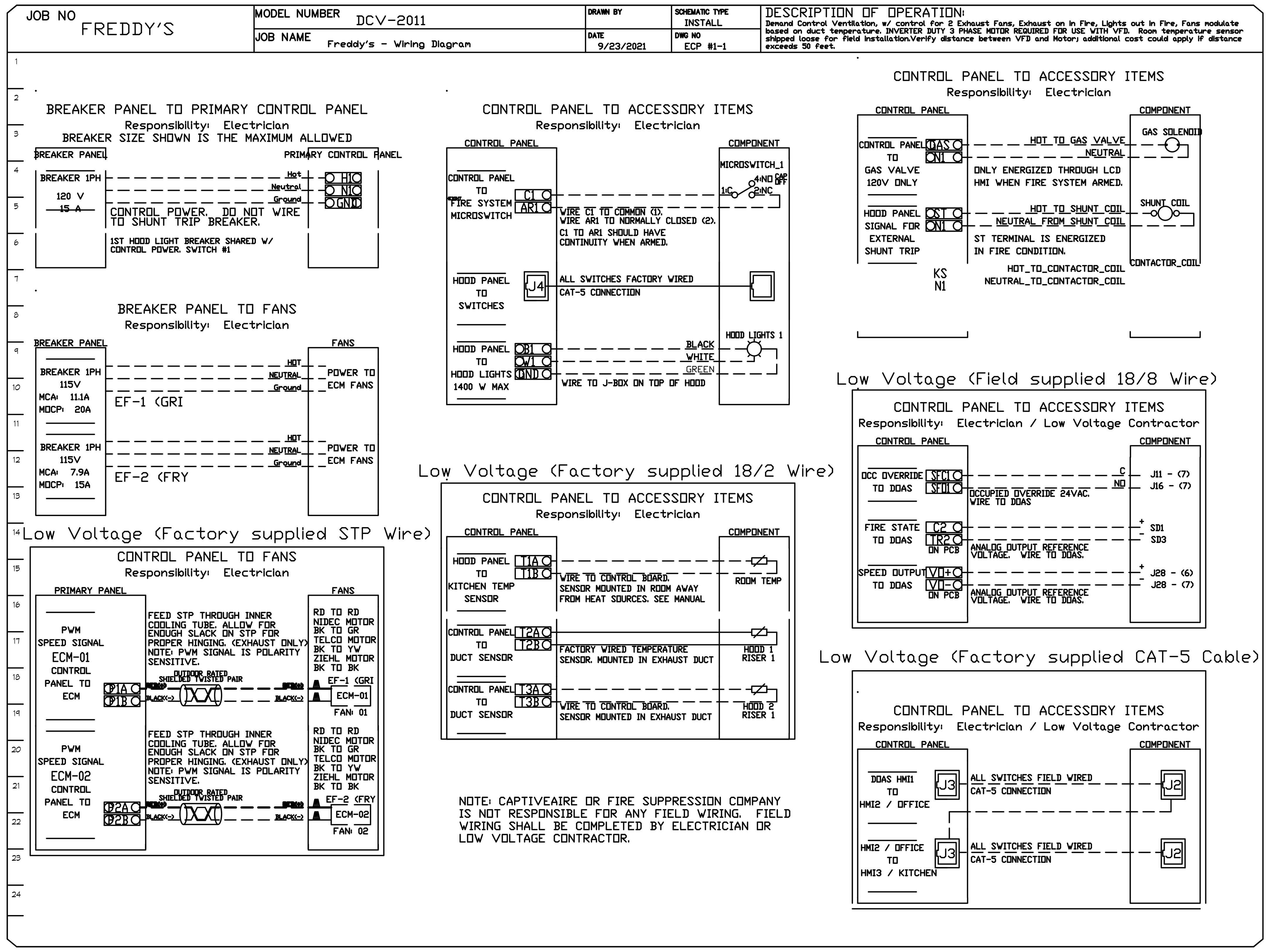
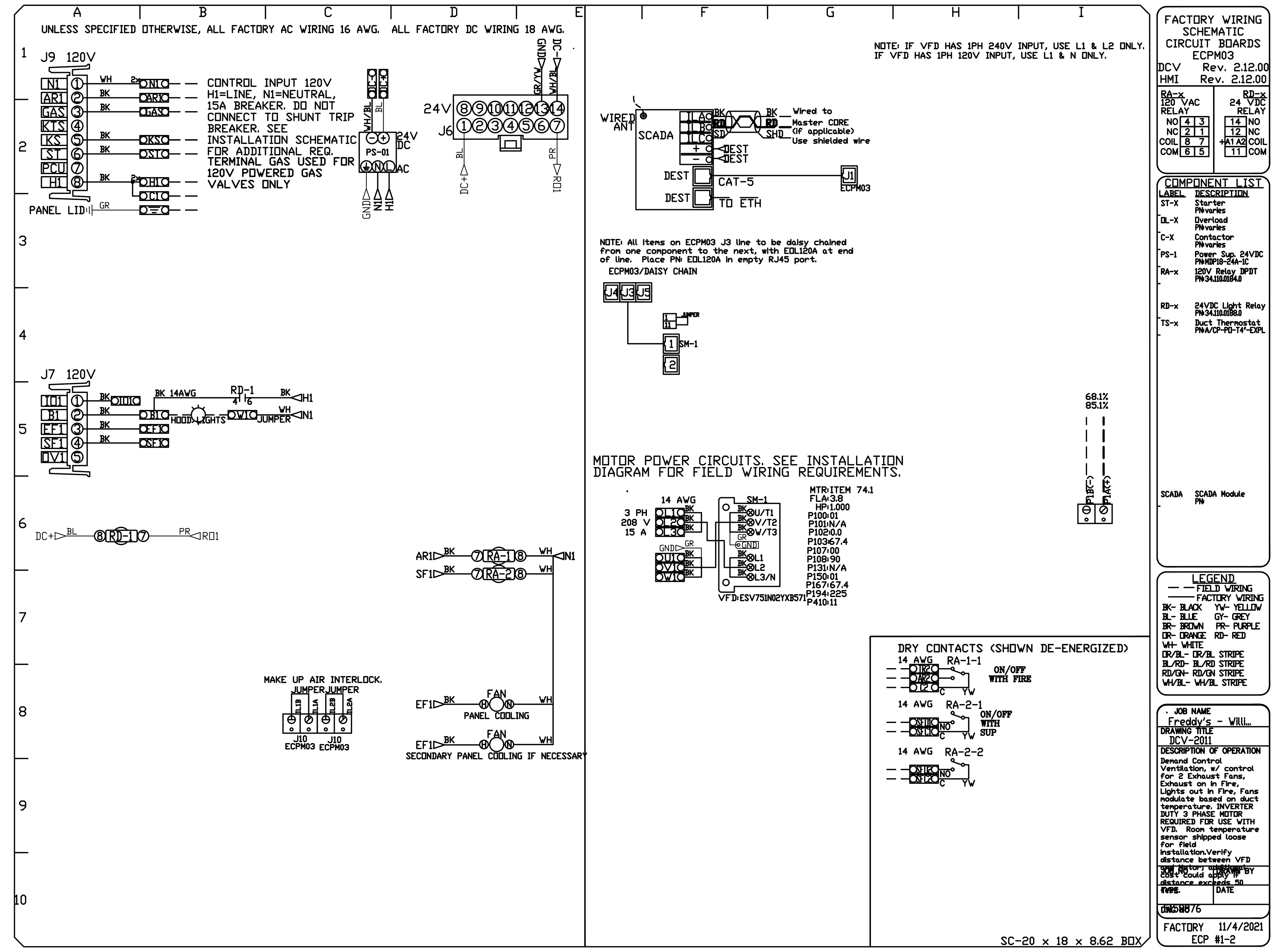
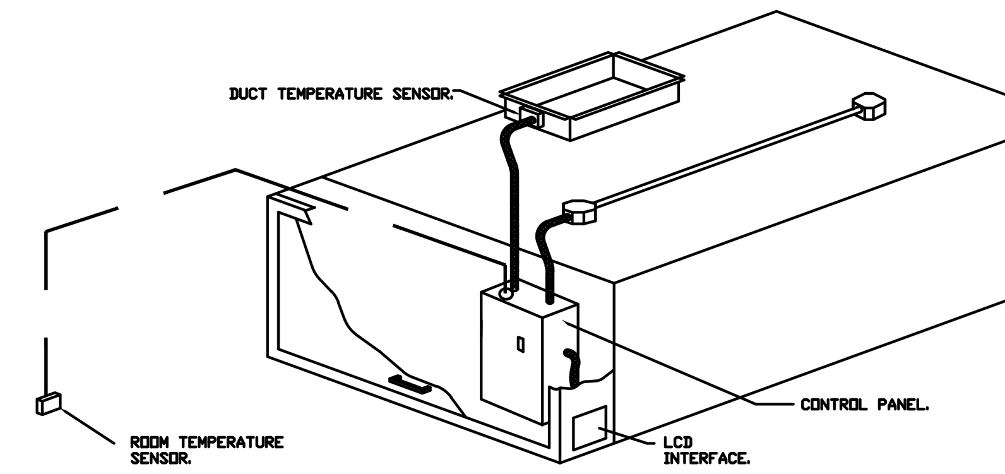
SHEET NO.
M5





DEMAND CONTROL VENTILATION HOOD CONTROL PANEL SPECIFICATIONS:

- CONTROLS SHALL BE LISTED BY ETL (UL 508A) AND SHALL COMPLY WITH DEMAND VENTILATION SYSTEM TURNDOWN REQUIREMENTS OUTLINED IN IECC 403.2.8 (2015).
- THE CONTROL ENCLOSURE SHALL BE NEMA 1 RATED AND LISTED FOR INSTALLATION INSIDE OF THE EXHAUST HOOD UTILITY CABINET. THE CONTROL ENCLOSURE MAY BE CONSTRUCTED OF STAINLESS STEEL OR PAINTED STEEL.
- TEMPERATURE PROBE(S) LOCATED IN THE EXHAUST DUCT RISER(S) SHALL BE CONSTRUCTED OF STAINLESS STEEL.
- A DIGITAL CONTROLLER SHALL BE PROVIDED TO ACTIVATE THE HOOD EXHAUST FANS DYNAMICALLY BASED ON A FIXED DIFFERENTIAL BETWEEN THE AMBIENT AND DUCT TEMPERATURES SENSORS. THIS FUNCTION SHALL MEET THE REQUIREMENTS OF IMC 507.1.1.
- A DIGITAL CONTROLLER SHALL PROVIDE ADJUSTABLE HYSTERESIS SETTINGS TO PREVENT CYCLING OF THE FANS AFTER THE COOKING APPLIANCES HAVE BEEN TURNED OFF AND/OR THE HEAT IN THE EXHAUST SYSTEM IS REDUCED.
- A DIGITAL CONTROLLER SHALL PROVIDE AN ADJUSTABLE MINIMUM FAN RUN-TIME SETTING TO PREVENT FAN CYCLING.
- VARIABLE FREQUENCY DRIVES (VFDS) SHALL BE PROVIDED FOR FANS AS REQUIRED. THE DIGITAL CONTROLLER SHALL MODULATE THE VFDS BETWEEN A MINIMUM SETPOINT AND A MAXIMUM SETPOINT ON DEMAND. THE DUCT TEMPERATURE SENSOR INPUT(S) TO THE DIGITAL CONTROLLER SHALL BE USED TO CALCULATE THE SPEED REFERENCE SIGNAL.
- THE VFD SPEED RANGE OF OPERATION SHALL BE FROM 0% TO 100% FOR THE SYSTEM, WITH THE ACTUAL MINIMUM SPEED SET AS REQUIRED TO MEET MINIMUM VENTILATION REQUIREMENTS.
- AN INTERNAL ALGORITHM TO THE DIGITAL CONTROLLER SHALL MODULATE SUPPLY FAN VFD SPEED PROPORTIONAL TO ALL EXHAUST FANS THAT ARE LOCATED IN THE SAME FAN GROUP AS THE SUPPLY FAN.
- THE SYSTEM SHALL OPERATE IN PREP MODE DURING LIGHT COOKING LOAD OR COOL DOWN MODE WHEN SUFFICIENT HEAT REMAINS UNDERNEATH THE HOOD SYSTEM AFTER COOKING OPERATIONS HAVE COMPLETED. OPERATION DURING EITHER OF THESE PERIODS WILL DISABLE THE SUPPLY FANS AND PROVIDE AN EXHAUST FAN SPEED THAT IS EQUAL TO THE MINIMUM VENTILATION REQUIREMENT.
- A DIGITAL CONTROLLER SHALL DISABLE THE SUPPLY FAN(S), ACTIVATE THE EXHAUST FAN(S), ACTIVATE THE APPLIANCE SHUNT TRIP, AND DISABLE AN ELECTRIC GAS VALVE AUTOMATICALLY WHEN FIRE CONDITION IS DETECTED ON A COVERED HOOD.
- A DIGITAL CONTROLLER SHALL ALLOW FOR EXTERNAL BMS FAN CONTROL VIA DRY CONTACT (EXTERNAL CONTROL SHALL NOT OVERRIDE FAN OPERATION LOGIC AS REQUIRED BY CODE).
- AN LCD INTERFACE SHALL BE PROVIDED WITH THE FOLLOWING FEATURES:
  A. ON/OFF PUSH BUTTON FAN & LIGHT SWITCH ACTIVATION.
  B. INTEGRATED GAS VALVE RESET FOR ELECTRONIC GAS VALVES (NO RESET RELAY REQUIRED).
  C. VFD FAULT DISPLAY WITH AUDIBLE & VISUAL ALARM NOTIFICATION.
  D. DUCT TEMPERATURE SENSOR FAILURE DETECTION WITH AUDIBLE & VISUAL ALARM NOTIFICATION.
  E. MIS-WIRED DUCT TEMPERATURE SENSOR DETECTION WITH AUDIBLE & VISUAL ALARM NOTIFICATION.
  F. A SINGLE LOW VOLTAGE CAT-5 RJ45 WIRING CONNECTION.
  G. AN ENERGY SAVINGS INDICATOR THAT UTILIZES MEASURED KWH FROM THE VFDS.

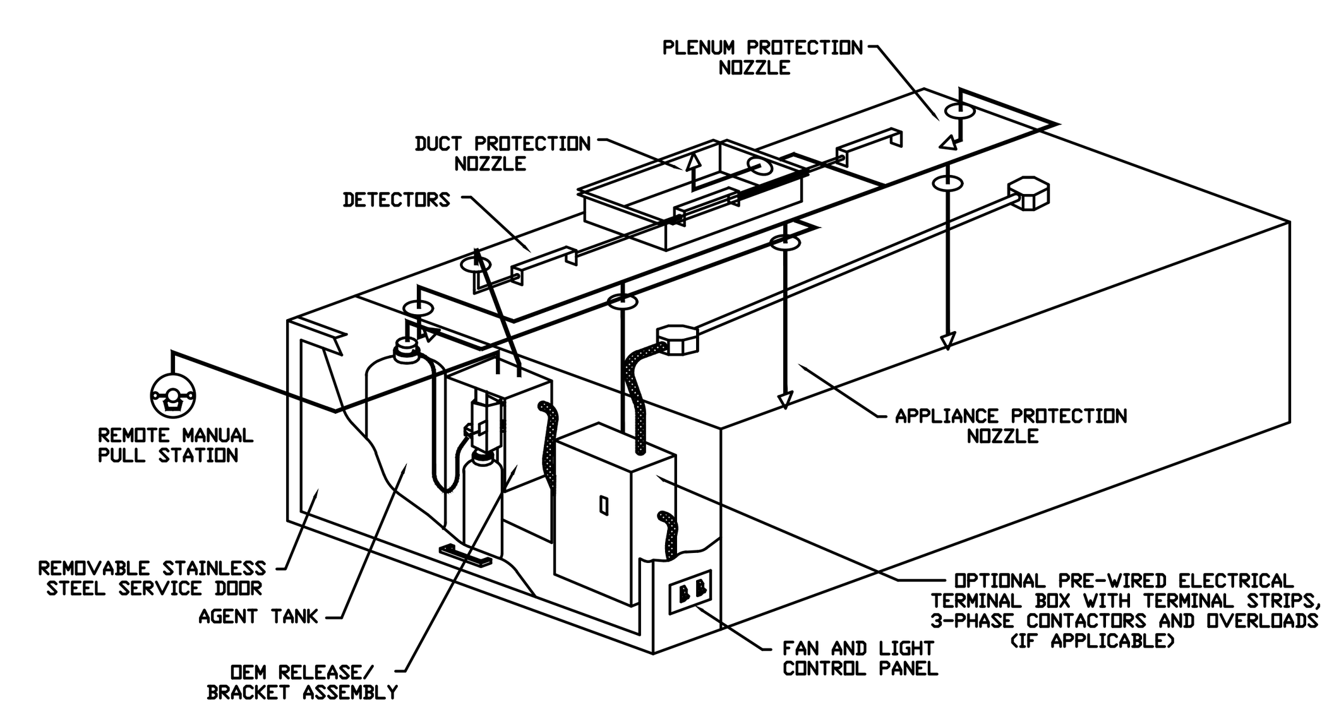


TYPICAL HOOD CONTROL PANEL INSTALLATION

SEQUENCE OF OPERATIONS:

THE HOOD CONTROL PANEL IS CAPABLE OF OPERATING IN ONE OR MORE OF THE FOLLOWING STATES AT ANY GIVEN TIME:

- AUTOMATIC: THE SYSTEM OPERATES BASED ON THE DIFFERENTIAL BETWEEN ROOM TEMPERATURE AND THE TEMPERATURE AT THE HOOD CAVITY OR EXHAUST DUCT COLLAR. FANS ACTIVATE AT A CONFIGURABLE TEMPERATURE DIFFERENTIAL THRESHOLD. DEPENDING ON THE JOB CONFIGURATION EACH FAN ZONE CAN BE CONFIGURED AS STATIC OR DYNAMIC. THESE TERMS REFER TO WHETHER A VARIABLE MOTOR (SUCH AS EC MOTORS OR VFD DRIVEN MOTORS) MODULATE WITH TEMPERATURE. IF THE PANEL IS EQUIPPED WITH VARIABLE SPEED FANS AND THE ZONE IS DEFINED AS 'DYNAMIC', THESE WILL MODULATE WITHIN A USER-DEFINED RANGE BASED ON THE TEMPERATURE DIFFERENTIAL. PANELS EQUIPPED WITH VARIABLE SPEED FANS AND A FAN ZONE DEFINED AS 'STATIC', FANS WILL RUN AT A SET SPEED CALCULATED FOR THE DRIVE. DEMAND CONTROL VENTILATION SYSTEMS ARE CAPABLE OF MODULATING EXHAUST AND MAKE UP AIR FAN SPEEDS PER THE REQUIREMENTS OUTLINED IN IECC 403.2.8.
- MANUAL: THE SYSTEM OPERATES BASED ON HUMAN INPUT FROM AN HMI.
- SCHEDULE: A WEEKLY SCHEDULE CAN BE SET TO RUN FANS FOR A SPECIFIED PERIOD THROUGHOUT THE DAY. THERE ARE THREE OCCUPIED TIMES PER DAY TO ALLOW FOR THE USER TO SET UP A TIME THAT IS SUITABLE TO THEIR NEEDS. ANY TIME THAT IS WITHIN THE DEFINED OCCUPIED TIME, THE SYSTEM WILL RUN AT MODULATION MODE AND FOLLOW THE FAN PROCEDURE ALGORITHM BASED ON TEMPERATURE DURING THIS TIME. DURING UNOCCUPIED TIME, THE SYSTEM WILL HAVE AN EXTRA OFFSET TO PREVENT UNINTENDED ACTIVATION OF THE SYSTEM DURING A TIME WHERE THE SYSTEM IS NOT BEING OCCUPIED.
- OTHER: THE SYSTEM OPERATES BASED ON THE INPUT FROM AN EXTERNAL SOURCE (DDC, BMS OR HARD-WIRED INTERLOCK).
- FIRE: UPON ACTIVATION OF THE HOOD FIRE SUPPRESSION SYSTEM, THE EXHAUST FAN WILL COME ON OR CONTINUE TO TO RUN, THE HOOD MAKEUP AIR WILL SHUTDOWN, AND A SIGNAL WILL BE SENT FOR ACTIVATING THE SHUNT TRIP BREAKER PROVIDED BY THE ELECTRICIAN. FUEL GAS WILL SHUT OFF VIA A MECHANICAL/ELECTRICAL GAS VALVE ACTUATED BY THE HOOD FIRE SUPPRESSION SYSTEM.



TYPICAL ANSUL R-102 SYSTEM LAYOUT

SPECIFICATIONS

THE RESTAURANT FIRE SUPPRESSION SYSTEM SHALL BE THE PRE-ENGINEERED TYPE WITH A FIXED NOZZLE AGENT DISTRIBUTION NETWORK. IT SHALL BE LISTED WITH UNDERWRITERS LABORATORIES, INC. (UL)

THE SYSTEM SHALL BE CAPABLE OF AUTOMATIC DETECTION AND ACTUATION WITH LOCAL OR REMOTE MANUAL ACTUATION. ACCESSORIES SHALL BE AVAILABLE FOR MECHANICAL OR ELECTRICAL GAS LINE SHUT-OFF APPLICATIONS.

THE EXTINGUISHING AGENT SHALL BE A POTASSIUM CARBONATE, POTASSIUM ACETATE-BASED FORMULATION DESIGNED FOR FLAME KNOCKDOWN AND SECUREMENT OF GREASE RELATED FIRES. IT SHALL BE AVAILABLE IN PLASTIC CONTAINERS WITH INSTRUCTIONS FOR LIQUID AGENT HANDLING AND USAGE.

THE REGULATED RELEASE MECHANISM SHALL BE COMPATIBLE WITH A FUSIBLE LINK DETECTION SYSTEM. THE FUSIBLE LINK SHALL BE SELECTED AND INSTALLED ACCORDING TO THE OPERATING TEMPERATURE IN THE VENTILATING SYSTEM. THE FUSIBLE LINK SHALL BE SUPPORTED BY A DETECTOR BRACKET/ LINKAGE ASSEMBLY.

REVISIONS

DESCRIPTION	DATE

HBT Foodservice

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