MECHANICAL SPECIFICATIONS

PROVIDE EQUIPMENT INDICATED ON THE DRAWINGS, AND AS REQUIRED FOR A COMPLETE FUNCTIONING SYSTEM.

DEFINITIONS: FURNISH MEANS TO SUPPLY AND DELIVER TO PROJECT SITE, READY FOR INSTALLATION. INSTALL MEANS TO PLACE IN POSITION AND MAKE CONNECTIONS FOR SERVICE OR USE. PROVIDE MEANS TO FURNISH AND INSTALL, COMPLETE AND READY FOR INTENDED USE.

WARRANTY: PROVIDE LABOR AND MATERIALS TO REPAIR OR REPLACE DEFECTIVE PARTS AND MATERIALS AS REQUIRED FOR ONE YEAR AFTER SUBSTANTIAL COMPLETION OR OWNER ACCEPTANCE OF THE COMPLETED PROJECT. PROVIDE A SEPARATE LINE ITEM DEDUCT AMOUNT ON THE PROPOSAL FORM TO DELETE WARRANTY SERVICE, AT THE OWNER'S OPTION.

COORDINATION: COORDINATE WITH THE WORK OF OTHER TRADES, EQUIPMENT FURNISHED BY OTHERS, REQUIREMENTS OF THE OWNER, AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE.

DUCT DIMENSIONS: UNLESS OTHERWISE NOTED, DUCT DIMENSIONS ON THE DRAWINGS ARE INSIDE CLEAR DIMENSIONS.

SHEETMETAL DUCTWORK: PROVIDE SHEETMETAL DUCTWORK FABRICATED AND INSTALLED IN ACCORDANCE WITH ASHRAE AND SMACNA STANDARDS, FOR 1" W.G. PRESSURE CLASS, SEAL CLASS "A". SHEETMETAL SHALL BE GALVANIZED SHEET STEEL OF LOCK FORMING QUALITY, WITH G90 ZINC COATING. SHEET STEEL SHALL COMPLY WITH ASTM A653 STANDARD SPECIFICATION FOR STEEL SHEETMETAL, ZINC COATED (GALVANIZED) OR ZINC-IRON ALLOY-COATED (GALVANNEALED) BY THE HOT DIP PROCESS, AND A924 STANDARD SPECIFICATION FOR GENERAL REQUIREMENTS FOR SHEET, METALLIC-COATED BY THE HOT DIP PROCESS. ALL ANGLE IRON USED FOR SUPPORT SHALL BE GALVANIZED. CONNECTIONS TO WALLS OR FLOOR SHALL BE AIR TIGHT WITH ANGLE IRON AND CAULKING. SEAL ALL DUCT SEAMS, TRANSVERSE AND LONGITUDINAL, AIR TIGHT. PROVIDE TURNING VANES AT ALL 90° ELBOWS.

ROUND SHEETMETAL DUCT: PROVIDE SPIRAL SEAM (ALL SIZES) OR SNAP LOCK (DUCT SIZES UP TO 10") GALVANIZED STEEL COMPLYING WITH SMACNA STANDARDS. SPIRAL SEAM DUCTWORK SHALL HAVE SMACNA SEAM TYPE RL-1.

FLEXIBLE DUCT: PROVIDE FACTORY ASSEMBLED CLASS 1 AIR DUCT (UL 181) WITH 1" THICK 1 PCF FIBERGLASS INSULATION AND REINFORCED OUTER PROTECTIVE COVER/VAPOR BARRIER. FLEXIBLE DUCT SHALL MEET NFPA 90A WITH FLAME SPREAD UNDER 25, SMOKE DEVELOPED UNDER 50, AND SHALL BE RATED FOR MINIMUM 2" W.G. PRESSURE AND 0 TO 250°F TEMPERATURE. PROVIDE SCREW-OPERATED METAL ADJUSTABLE CLAMPING DEVICES. USE TWIST-LOCK TAP COLLARS AT CONNECTIONS INTO SHEETMETAL DUCTWORK. MAXIMUM EXTENDED LENGTH OF FLEXIBLE DUCT SHALL NOT EXCEED 6 FEET.

EXPOSED DUCTWORK: EXPOSED DUCTWORK SHALL BE CLEANED OF DEBRIS AND OIL, THEN WIPED DOWN WITH VINEGAR OR OTHER SURFACE PREPARING CHEMICAL TO PREPARE DUCT FOR PAINT.

DUCT SEALANT: PROVIDE WATER BASED SYNTHETIC LATEX EMULSION PERMANENTLY FLEXIBLE HIGH VELOCITY DUCT SEALANT, DUCTMATE INDUSTRIES, INC. PRO SEAL OR EQUAL. SEALANT TO BE LOW VOC LEED COMPLIANT CAPABLE OF 15"W.G., NFPA 90A AND 90B APPROVED, UL 181B-M LISTED AND UL 723 CLASSIFIED. INSTALL PER MANUFACTURER INSTRUCTIONS. SEALANT SHALL BE APPROVED FOR PLENUM INSTALLATIONS AND MEET FLAME SPREAD AND SMOKE DEVELOPED RATINGS FOR PLENUM APPLICATIONS.

DUCT INSULATION (ALL MAKE-UP AIR DUCT, ROUND SUPPLY DUCT AND ROUND RETURN DUCT ABOVE CEILING): PROVIDE MINIMUM 1-1/2" THICK BLANKET TYPE FIBERGLASS INSULATION COMPLYING WITH ASTM C-553, TYPE II, WITH FACTORY APPLIED KRAFT BONDED TO ALUMINUM FOIL, REINFORCED WITH FIBERGLASS VAPOR BARRIER/JACKET. JACKET SHALL CONFORM TO ASTM C-1136, TYPE II. INSTALLED R VALUE SHALL BE 4.2 OR HIGHER WITH A 0.75 PCF DENSITY.

DUCT LINER (ALL RECTANGULAR SUPPLY AND RETURN DUCT, AND EXPOSED ROUND DUCT): PROVIDE MINIMUM 1" THICK, 2 PCF DENSITY, LONG TEXTILE FIBER TYPE DUCT LINER, WITH COATING ON THE AIR STREAM SIDE CONFORMING TO NFPA 90A. DUCT LINER SHALL BE SECURED TO DUCT WITH BOTH ADHESIVE AND MECHANICAL FASTENERS. ADHESIVE SHALL BE LEED COMPLIANT LOW VOC AS RECOMMENDED BY DUCT LINER MANUFACTURER, AND SHALL COMPLY WITH ASTM C-916. DUCT LINER FASTENERS SHALL COMPLY WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS", LATEST EDITION. THERMAL CONDUCTIVITY SHALL BE EQUAL TO OR LESS THAN 0.24 AT 75°F.

ROUND VOLUME DAMPERS: PROVIDE MINIMUM 20 GAUGE GALVANIZED STEEL FRAME AND BLADES, MINIMUM 3/8" SQUARE STEEL AXLE, MOLDED SYNTHETIC BEARINGS, WITH LOCKING QUADRANT REGULATOR. REGULATOR SHALL BE POSITIONED WITH SHEETMETAL BRACKET BEYOND DUCT COVERING. WHERE POSITIONING REGULATOR IS NOT ACCESSIBLE, PROVIDE COUPLING AND EXTENSION ROD WITH REGULATOR FOR CEILING OR WALL INSTALLATION, AS REQUIRED.

RECTANGULAR VOLUME DAMPERS: PROVIDE MINIMUM 16 GAUGE GALVANIZED STEEL CHANNEL FRAME, 16 GAUGE GALVANIZED STEEL BLADES, MINIMUM 1/2" HEXAGONAL AXLE, MOLDED SYNTHETIC BEARINGS, WITH 3/8" SQUARE PLATED STEEL CONTROL SHAFT. LINKAGES SHALL BE CONCEALED IN THE FRAME. OPERATING SHAFT SHALL EXTEND BEYOND FRAME AND DUCT TO A LOCKING QUADRANT WITH ADJUSTABLE LEVER. MAXIMUM BLADE WIDTH SHALL NOT EXCEED 6".

DUCT TURNING VANES: PROVIDE FABRICATED TURNING VANES AND VANE RUNNERS, CONSTRUCTED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS". PROVIDE TURNING VANES CONSTRUCTED OF CURVED BLADES, SUPPORTED WITH BARS PERPENDICULAR TO BLADES, AND SET INTO SIDE STRIPS SUITABLE FOR MOUNTING IN DUCTWORK. FOLLOW SMACNA GUIDELINES FOR SPACING SUPPORT, AND CONSTRUCTION. ALL BLADES SHALL BE DOUBLE THICKNESS AIRFOIL TYPE.

FLEXIBLE DUCT CONNECTORS: PROVIDE U.L. LABELED 30 OUNCE NEOPRENE COATED FIBERGLASS FABRIC DUCT CONNECTORS AT DUCT CONNECTIONS TO ALL VIBRATING EQUIPMENT.

DUCT ACCESS DOORS: PROVIDE HINGED ACCESS DOORS IN DUCTWORK WHERE REQUIRED FOR ACCESS TO EQUIPMENT. PROVIDE INSULATED ACCESS DOORS FOR INSULATED DUCTWORK. CONSTRUCT OF SAME OR THICKER GAUGE SHEETMETAL AS DUCT IN WHICH IT IS INSTALLED. PROVIDE FLUSH FRAMES FOR UNINSULATED DUCTS, AND EXTENDED FRAMES FOR EXTERNALLY INSULATED DUCTS. PROVIDE CONTINUOUS HINGE ON ONE SIDE, WITH ONE HANDLE-TYPE LATCH FOR ACCESS DOORS 12" HIGH AND SMALLER, AND TWO HANDLE-TYPE LATCHES FOR LARGER ACCESS DOORS.

GREASE EXHAUST DUCTWORK: PROVIDE FACTORY BUILT DOUBLE WALL GREASE EXHAUST DUCT AS MANUFACTURED BY CAPTIVEAIRE OR APPROVED EQUAL. DUCT SHALL BE ETL LISTED TO UL-1978 AND UL-2221 FOR ZERO CLEARANCE TO COMBUSTIBLES. ALL ELBOWS IN GREASE EXHAUST DUCTWORK SHALL BE RADIUS ELBOWS. NO SQUARE ELBOWS ARE ALLOWED. PROVIDE GREASE DUCT CLEAN-OUT ACCESS DOORS BY DUCT MANUFACTURER AT EVERY CHANGE OF DIRECTION IN DUCT AND/OR EVERY 10 FEET WITH MINIMUM OF 3 FEET OF CLEARANCE IN FRONT OF CLEAN-OUT.

COMPOSITE GREASE DUCT FIRE PROTECTION INSULATION: PROVIDE FLEXIBLE BLANKET-TYPE INSULATION COMPOSED OF FIBER BLANKET ENCAPSULATED IN A ALUMINUM FOIL SCRIM, PROVIDING A NONCOMBUSTIBLE WRAP TO PROVIDE A VAPOR AND DUST BARRIER. DUCT WRAP SYSTEM SHALL HAVE FLAME SPREAD INDEX OF NOT MORE THAN 5 AND SMOKE DEVELOPED INDEX NOT EXCEEDING 5, WHEN TESTED PER ASTM E-84 METHOD. INSULATION AND JACKET SHALL BE RATED FOR OPERATING TEMPERATURES UP TO 2000°F. DUCT WRAP SYSTEM MUST COMPLY WITH ALL FIVE FIRE TESTS OF STANDARD ASTM E2336, GREASE DUCT ENCLOSURE SYSTEM, AND THE DUCT FIRESTOP SYSTEM SHALL BE ASTM E 814 CLASSIFIED. FABRICATE DUCT WRAP ENCLOSURE WITH (2) LAYERS OF DUCT WRAP TO PROVIDE 2-HOUR FIRE RATING. PROVIDE COMPOSITE GREASE DUCT FIRE PROTECTION INSULATION FROM ONE OF THE FOLLOWING: THERMAL CERAMICS FIREMASTER FASTWRAP XL, UNIFRAX FYREWRAP ELITE 1.5.

MECHANICAL EQUIPMENT IDENTIFICATION: PROVIDE ENGRAVED PLASTIC LAMINATE LABEL FOR EACH MAJOR ITEM OF MECHANICAL EQUIPMENT AND EACH OPERATIONAL DEVICE. LETTERS TO BE A MINIMUM OF ½" HIGH. PROVIDE SIGNS TO INFORM OPERATOR OF OPERATIONAL REQUIREMENTS, TO INDICATE SAFETY AND EMERGENCY PRECAUTIONS, AND TO WARN OF HAZARDS AND IMPROPER OPERATION.

TESTING AND BALANCING: TEST AND ADJUST ALL MECHANICAL SYSTEMS AND EQUIPMENT TO ASSURE PROPER BALANCE AND OPERATION. PERFORM TESTS IN ACCORDANCE WITH THE MOST CURRENT NEBB OR AABC, AND ASHRAE STANDARDS. ELIMINATE NOISE AND VIBRATION, AND ASSURE PROPER FUNCTION OF CONTROLS. BALANCING CONTRACTOR SHALL BE AN INDEPENDENT CERTIFIED TEST AND BALANCE CONTRACTOR, WITH NEBB OR AABC CERTIFICATION. SUBMIT COMPLETED AND CERTIFIED TEST AND BALANCE REPORT TO OWNER'S REPRESENTATIVE. BALANCE ALL SYSTEMS TO WITHIN 5% OF AIR FLOWS INDICATED ON THE DRAWINGS, AND REPORT ALL DISCREPANCIES TO HVAC INSTALLER FOR CORRECTION. MARK FINAL BALANCE POSITIONS ON DAMPERS WITH PERMANENT MARKER.

OPERATIONS AND MAINTENANCE MANUALS (O&M): AT COMPLETION OF PROJECT PROVIDE A MINIMUM OF TWO O&M MANUALS IN THREE RING BINDERS TO THE OWNER/TENANT. MANUALS SHALL HAVE TABS LABELED WITH ALL SECTIONS SEPARATED WITH A CLEAR INDEX AT THE FRONT. PROVIDE A WARRANTY LETTER AT THE FRONT OF THE MANUAL STATING DATES OF WARRANTY (START DATE AND END DATE) AND CONTRACTS WITH PHONE NUMBERS FOR WARRANTY WORK. PROVIDE A NARRATIVE OF HOW EACH SYSTEM IS INTENDED TO OPERATE INCLUDING RECOMMENDED SETPOINTS. MANUALS SHALL INCLUDE SUBMITTALS OF ALL EQUIPMENT, SIZE AND OPTIONS SELECTED. PROVIDE ALL BALANCING REPORTS. PROVIDE MANUFACTURER LITERATURE FOR OPERATIONS AND MAINTENANCE FOR ALL THE EQUIPMENT ON THE PROJECT. ALL PERIODIC AND ROUTINE MAINTENANCE SHALL BE CLEARLY IDENTIFIED. PROVIDE A CONTROLS SECTION LISTING SYSTEM OPERATING AND CONTROL INSTRUCTIONS, MAINTENANCE, CALIBRATION, WIRING DIAGRAMS, SCHEMATICS AND CONTROL SEQUENCE DESCRIPTIONS.

SHOP DRAWINGS/SUBMITTALS: SUBMIT ELECTRONIC SUBMITTALS AND SHOP DRAWINGS VIA EMAIL AS PDF ELECTRONIC FILES. PROVIDE SUBMITTALS ON ALL MECHANICAL EQUIPMENT (INCLUDING CONTROLS PACKAGES), AIR DISTRIBUTION DEVICES, DUCTWORK, DAMPERS, AND INSULATION. SUBMITTALS AND SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING INFORMATION:

- PROJECT NAME
- DATE
- NAME AND ADDRESS OF ARCHITECT AND MEP ENGINEER
- NAME OF CONSTRUCTION MANAGER
- NAME OF CONTRACTOR
- NAME OF FIRM OR ENTITY THAT PREPARED SUBMITTAL
- NAMES OF SUBCONTRACTOR, MANUFACTURER, AND SUPPLIER.
- CATEGORY AND TYPE OF SUBMITTAL
- SUBMITTAL PURPOSE AND DESCRIPTION
- MANUFACTURER NAME
- PRODUCT NAME
- DRAWING NUMBER AND DETAIL REFERENCES, AS APPROPRIATE
- INDICATION OF FULL OR PARTIAL SUBMITTAL
- TRANSMITTAL NUMBER
- REMARKS

IDENTIFY DEVIATIONS FROM THE CONTRACT DOCUMENTS ON SHOP DRAWINGS AND SUBMITTALS. FURNISH COPIES OF FINAL SUBMITTALS TO MANUFACTURERS, SUBCONTRACTORS, SUPPLIERS, FABRICATORS, INSTALLERS, AUTHORITIES HAVING JURISDICTION, AND OTHERS AS NECESSARY FOR PERFORMANCE OF CONSTRUCTION ACTIVITIES. SHOW DISTRIBUTION ON TRANSMITTAL FORMS.

SUBMITTALS SHALL INCLUDE (AS APPLICABLE):

- MANUFACTURER'S CATALOG CUTS
- MANUFACTURER'S PRODUCT SPECIFICATIONS
- STATEMENT OF COMPLIANCE WITH SPECIFIED REFERENCED STANDARDS
- TESTING BY RECOGNIZED TESTING AGENCY
- APPLICATION OF TESTING AGENCY LABELS AND SEALS
- WIRING DIAGRAMS SHOWING FACTORY-INSTALLED WIRING
- PERFORMANCE CURVES
- OPERATIONAL RANGE DIAGRAMS
- CLEARANCES REQUIRED TO OTHER CONSTRUCTION, IF NOT INDICATED ON SHOP DRAWINGS.

FULL SIZE SHOP DRAWINGS SHALL INCLUDE (AS APPLICABLE):

- IDENTIFICATION OF PRODUCTS
- SCHEDULES
- COMPLIANCE WITH SPECIFIED STANDARDS
- NOTATION OF COORDINATION REQUIREMENTS
- NOTATION OF DIMENSIONS ESTABLISHED BY FIELD MEASUREMENT
- RELATIONSHIP AND ATTACHMENT TO ADJOINING CONSTRUCTION CLEARLY INDICATED.

MECHANICAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING DUCT SHOP DRAWINGS TO THE ENGINEER FOR REVIEW PRIOR TO FABRICATION AND INSTALLATION.

MECHANICAL SYMBOLS LEGEND

GRILLES/DIFFUSERS:

- SUPPLY DIFFUSER
- SIDEWALL MOUNTED SUPPLY REGISTER
- RETURN GRILLE
- EXHAUST GRILLE

DOUBLE LINE DUCT SYMBOLS:

- NEW SHEET METAL DUCTWORK
- SUPPLY OR OUTSIDE AIR DUCT
- RETURN AIR DUCT
- EXHAUST AIR DUCT
- DUCTWORK TRANSITION
- DUCTWORK TRANSITION – RECTANGULAR TO ROUND
- SUPPLY DUCT ELBOW UP OR DOWN
- RETURN DUCT ELBOW UP OR DOWN
- EXHAUST DUCT ELBOW UP OR DOWN
- DUCT ELBOW WITH FIXED TURNING VANES
- DUCT BRANCH TAKE-OFF
- ROUND SPIN-IN WITH DAMPER
- SQUARE TO ROUND TAP WITH DAMPER
- FLEXIBLE DUCT CONNECTION
- ELECTRIC OPERATED DAMPER (SOV)
- VOLUME DAMPER (VD)
- FLEXIBLE DUCTWORK

EQUIPMENT:

- ROOF MOUNTED EXHAUST FAN
- ROOFTOP UNIT
- MAKE-UP AIR UNIT
- THERMOSTAT – ELECTRIC (T)
- TEMPERATURE SENSOR (TS)
- HUMIDITY SENSOR (H)
- DUCT SMOKE DETECTOR (D)

GENERAL REFERENCES/NOTATIONS:

- CONNECT TO EXISTING
- SQUARE NOTE DESIGNATION (#)
- REVISION DESIGNATION (#)
- MECHANICAL EQUIPMENT DESIGNATION (TYPE / X)
- DIFFUSER DESIGNATION AND CFM (? / CFM)

SYMBOLS LEGEND NOTES:
1. REFER TO SPECIFICATIONS AND PLAN NOTES FOR DETAILED DESCRIPTION OF ALL DEVICES SHOWN IN THIS SCHEDULE, PROVIDED BY THIS CONTRACTOR.

GENERAL NOTES

A. CONTRACTORS AND SUB-CONTRACTORS SHALL CAREFULLY REVIEW THE CONSTRUCTION DOCUMENTS. INFORMATION REGARDING THE COMPLETE WORK IS DISPERSED THROUGHOUT THE DOCUMENT SET AND CANNOT BE ACCURATELY DETERMINED WITHOUT REFERENCE TO THE COMPLETE DOCUMENT SET.

B. COORDINATE WITH THE WORK OF OTHER SECTIONS, EQUIPMENT FURNISHED BY OTHERS, REQUIREMENTS OF THE OWNER, AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE. PROVIDE DUCT RISES AND DROPS AS REQUIRED FOR FIELD INSTALLATION AND TRADE COORDINATION. NOTIFY ARCHITECT OF ANY DISCREPANCIES BEFORE STARTING WORK.

C. DRAWINGS FOR HVAC WORK ARE DIAGRAMMATIC, SHOWING THE GENERAL LOCATION, TYPE, LAYOUT, AND EQUIPMENT REQUIRED. THE DRAWINGS SHALL NOT BE SCALED FOR EXACT MEASUREMENT. REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS. REFER TO MANUFACTURER'S STANDARD INSTALLATION DRAWINGS FOR EQUIPMENT CONNECTIONS AND INSTALLATION REQUIREMENTS. PROVIDE DUCTWORK, CONNECTIONS, ACCESSORIES, OFFSETS, AND MATERIALS NECESSARY FOR A COMPLETE SYSTEM.

D. ALL WORK SHALL COMPLY WITH STATE AND LOCAL CODE REQUIREMENTS AS APPROVED AND AMENDED BY THE GOVERNING CITY. PURCHASE ALL PERMITS ASSOCIATED WITH THE WORK. OBTAIN ALL INSPECTIONS REQUIRED BY CODE.

E. INSTALL EQUIPMENT PER MANUFACTURER'S INSTRUCTIONS AND MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCE.

F. CONTRACT LANDLORD APPROVED ROOFING CONTRACTOR TO FLASH AND SEAL RELATED ROOF PENETRATIONS TO MAINTAIN ROOFING WARRANTY.

G. INSTALL EXHAUST FAN A MINIMUM OF 10 FT FROM INTAKE AIR OPENINGS.

OWNER FURNISHED MAKE-UP AIR UNIT SCHEDULE

MARK (MAU-#)	1	
MANUFACTURER	CAPTIVEAIRE	
MODEL	A1-D 250-15D	
CONFIGURATION	DOWNFLOW	
DRIVE TYPE	DIRECT	
PERFORMANCE		
AIR FLOW (CFM)	1,946	
EXTERNAL STATIC (IN W.C.)	0.35	
FAN SPEED (RPM)	2,138	
DIRECT FIRED HEATER		
FUEL	NATURAL GAS	
MAX. BURNER SIZE (BTU/HR)	250,000	
GAS INPUT (BTU/HR)	105,857	
HEAT OUTPUT (BTU/ HR)	97,388	
ELECTRICAL		
VOLTS/Ø/HZ	208/3/60	
FAN MOTOR HP	2.0	
MCA (AMPS)	7.7	
MOCP (AMPS)	15	
APPROX. WEIGHT (LBS)	700	
ACCESSORIES	1-6	
NOTES	1	

ACCESSORIES:
1) FACTORY MOUNTED AND WIRED NEMA 3R DISCONNECT SWITCH.
2) FACTORY PROVIDED REMOVABLE ACCESS PANELS.
3) FACTORY PROVIDED MOTORIZED INTAKE DAMPER.
4) FACTORY PROVIDED WEATHER HOOD AND BIRDSCREEN ON INLET.
5) UNIT MOUNTED VARIABLE FREQUENCY DRIVE.
6) FACTORY FURNISHED 20" HIGH INSULATED ROOF CURB.

NOTES:
1) REFER TO FOOD SERVICE DRAWINGS FOR ADDITIONAL INFORMATION.

ROOFTOP UNIT SCHEDULE

MARK (RTU- #)	1	2
MANUFACTURER	TRANE	TRANE
MODEL	YSJ150	5 YSJ120
AIR FLOW (CFM)	4,200	3,400
OA FLOW (CFM)	1,220	320
AMBIENT OAT (°F)	110	110
EXTERNAL STATIC (IN. W.C.)	0.75	0.75
DX COOLING COIL		
EAT (°FDB/WB)	80.4/65.6	78.1/63.4
TOTAL (BTU/HR)	145,930	102,430
SENSIBLE (BTU/HR)	115,530	86,070
GAS HEAT		
FUEL	NATURAL GAS	NATURAL GAS
INPUT (BTU/HR)	200,000	150,000
OUTPUT (BTU/HR)	162,000	5 123,000
ELECTRICAL		
VOLTS/Ø/HZ	208/3/60	208/3/60
MOTOR HP	4.7	3.1
UNIT MCA	71	60
MOCP AMPS	90	80
APPROX. WEIGHT (LBS)	1,800	1,500
EER	10.8	11.0
NOTES	5 1-10,12,13	1-12

NOTES:
1) PROVIDE 14" HIGH FACTORY FABRICATED ROOF CURB.
2) PROVIDE WEATHER HOOD WITH BIRD SCREEN AT UNIT INLET.
3) PROVIDE FACTORY MOUNTED AND WIRED DISCONNECT SWITCH.
4) SET MINIMUM OUTSIDE AIR AS SPECIFIED ABOVE. FIELD SET 2 MINIMUM POSITIONS TO MAINTAIN SCHEDULED OUTSIDE AIR FLOW RATE AT SUPPLY FAN MINIMUM AND MAXIMUM SPEEDS. OUTSIDE AIR DAMPER SHALL FULLY CLOSE ON UNIT SHUTDOWN.
5) PROVIDE LOW-LEAK OUTSIDE AIR ECONOMIZER WITH DRY BULB CONTROL AND ECONOMIZER FAULT DETECTION AND DIAGNOSTICS.
6) PROVIDE FACTORY POWERED EXHAUST FOR FIELD INSTALLATION.
7) PROVIDE 5 MINUTE TIME DELAY ON COMPRESSOR RESTART.
8) PROVIDE UNIT WITH LOUVERED HAIL GUARDS.
9) PROVIDE UNIT WITH FACTORY MOUNTED AND WIRED CONDENSATE OVERFLOW SWITCH.
10) PROVIDE UNIT WITH FACTORY MOUNTED AND WIRED VARIABLE FREQUENCY DRIVE FOR 2-SPEED SUPPLY FAN OPERATION.
11) PROVIDE FACTORY MOUNTED, WEATHERPROOF GFCI OUTLET POWERED BY LINE SIDE OF DISCONNECT.
12) PROVIDE UNIT WITH HOT GAS REHEAT DEHUMIDIFICATION SYSTEM.
5 13) PROVIDE UNPOWERED WATERPROOF GFCI RECEPTACLE FOR FIELD WIRING.

EXHAUST AND VENTILATION FAN SCHEDULE

MARK (EF-#)	1	2	
MANUFACTURER	CAPTIVEAIRE	CAPTIVEAIRE	
MODEL	DU180HFA	DU10HFA	
TYPE	UPBLAST	UPBLAST	
DRIVE TYPE	DIRECT	DIRECT	
PERFORMANCE			
AIR FLOW (CFM)	2,344	150	
EXT. STATIC (IN W.C.)	1.25	0.25	
FAN SPEED (RPM)	1,136	1,111	
ELECTRICAL			
VOLTS/Ø/HZ	208/3/60	120/1/60	
FAN MOTOR HP	2	1/10	
APPROX. WEIGHT (LBS)	185	44	
SERVES	HOOD	RESTROOM	
ACCESSORIES	GDC,SC,WP	BD,BS,DS,RC,SC	
NOTES	1-3	1,4	

ACCESSORIES:
BD-BACKDRAFT DAMPER, BS-BIRD SCREEN, DS-DISCONNECT SWITCH, GDC-GREASE DRAIN AND CUP, RC-ROOF CURB, SC-FACTORY MOUNTED AND WIRED SPEED CONTROLLER, WP-NEMA 3R DISCONNECT SWITCH.

NOTES:
1) FAN IS OWNER FURNISHED. REFER TO FOOD SERVICE DRAWINGS FOR ADDITIONAL INFORMATION.
2) VARIABLE FREQUENCY DRIVE IS PROVIDED WITH HOOD CONTROL PANEL.
3) FAN SHALL BE CONTROLLED BY SWITCH AT CAPTIVEAIRE HOOD. INTERLOCK RTU-1 AND RTU-2 TO OPERATE IN OCCUPIED MODE WHILE HOOD EXHAUST FAN IS ENERGIZED.
4) ELECTRICAL CONTRACTOR SHALL INTERLOCK FAN WITH TIME CLOCK TO RUN DURING ALL OCCUPIED HOURS.

AIR BALANCE SCHEDULE

	RTU-1	RTU-2	EF-1	EF-2	MAU-1	TOTALS
OUTSIDE AIR FLOW (CFM)	1,220	320	0	0	1,946	3,486
RETURN AIR FLOW (CFM)	2,980	3,080	0	0	0	6,060
SUPPLY AIR FLOW (CFM)	4,200	3,400	0	0	1,946	9,546
EXHAUST AIR FLOW (CFM)	0	0	2,344	150	0	2,494
BUILDING PRESSURE (CFM)	1,220	320	-2,344	-150	1,946	992
RESULTING BUILDING PRESSURIZATION (CFM)						992

GRILLE, REGISTER, AND DIFFUSER SCHEDULE

MARK	A	B	C	D	E	F
MANUFACTURER	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS
MODEL	TMS-AA	300FL	S300FS	TMS-AA	355FL	355FL
TYPE	SQUARE CONE DIFFUSER	LOUVERED SUPPLY REGISTER	SPIRAL DUCT SUPPLY REGISTER	SQUARE CONE DIFFUSER	LOUVERED RETURN GRILLE	LOUVERED EXHAUST GRILLE
NECK SIZE (L"XW")	SEE PLAN	10"X10"	18"X6"	SEE PLAN	22"X22"	10"X10"
FACE SIZE (L"XW")	24"X24"	12"X12"	20"X10"	12"X12"	24"X24"	12"X12"
FRAME TYPE	LAY-IN	SURFACE	DUCT MOUNT	LAY-IN	LAY-IN	LAY-IN
FINISH	PER ARCHITECT	PER ARCHITECT	PER ARCHITECT	PER ARCHITECT	PER ARCHITECT	PER ARCHITECT
NOISE CRITERIA LEVEL	<30	<30	<30	<30	<30	<30
ACCESSORIES		OBD	OBD	OBD, TRM		OBD,STR,TRM

ACCESSORIES:
OBD-OPPOSED BLADE DAMPER, STR-SQUARE TO ROUND TRANSITION, TRM-RAPID MOUNT SHEETROCK FRAME.

2018 INTERNATIONAL MECHANICAL CODE TABLE 403.3.1.1 VENTILATION SUMMARY

OCCUPANCY CATEGORY	PEOPLE OUTDOOR AIR RATE - (Rp) (CFM/PERSON)	AREA OUTDOOR AIR RATE - (Ra) (CFM/SQ.FT.)	OCCUPANCY DENSITY P/1,000 SQ.FT.	OCCUPANCY CLASSIFICATION P/1,000 SQ.FT.	CALCULATED OCCUPANCY DENSITY	ZONE OCCUPANCY OVERRIDE	PEOPLE EXPECTED TO OCCUPY THE ZONE - (Pz)	Rp*Pz	Ra*Az	AREA - (Az) SQ.FT.	ZONE AIR DISTRIBUTION EFFECTIVENESS - Ez	BREATHING ZONE OUTDOOR AIRFLOW - (Vbz) CFM	ZONE OUTDOOR AIRFLOW (Voz) Voz=Vbz/Ez	ZONE PRIMARY AIRFLOW (Vpz)	PRIMARY OUTDOOR AIR FRACTION (Zp) Zp=Voz/Vpz	OCCUPANT DIVERSITY RATIO (D)	UNCORRECTED OUTDOOR AIR INTAKE (Vou) CFM	SYSTEM VENTILATION EFFICIENCY Ev	CORRECTED OUTDOOR AIRFLOW (Vot) CFM	PROVIDED OUTDOOR AIRFLOW CFM
RTU-1																				
Dining	7.5	0.18	70	DINING	101	—	101	759	260	1445	0.8	1019	1273	4100	0.31		1019		1213	
Restrooms	—	—	—	TOILET	—	—	—	—	—	88	0.8	—	—	100	—		—		—	
	SYSTEM POPULATION INCLUDING DIVERSITY (Ps) =						101							MAX. Zp =	0.31	1.00	1019	0.84	1213	1220
RTU-2																				
Kitchen	7.5	0.12	20	KITCHEN	19	—	19	142	113	945	0.8	255	319	3400	0.09		255		319	
	SYSTEM POPULATION INCLUDING DIVERSITY (Ps) =						19							MAX. Zp =	0.09	1.00	255	0.80	319	320

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4010 W UNIVERSITY DR. STE 400,
MCKINNEY, TX 75022, UNITED STATES

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REVISIONS / ISSUES

△		DESCRIPTION
	08/04/22	PERMIT SET
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3	01/10/23	TDLR COMMENTS
4	02/02/23	FINISH CHANGES
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7	12/11/23	CAVA COMMENTS
8	02/15/24	PLAN AMENDMENT

IFC SET

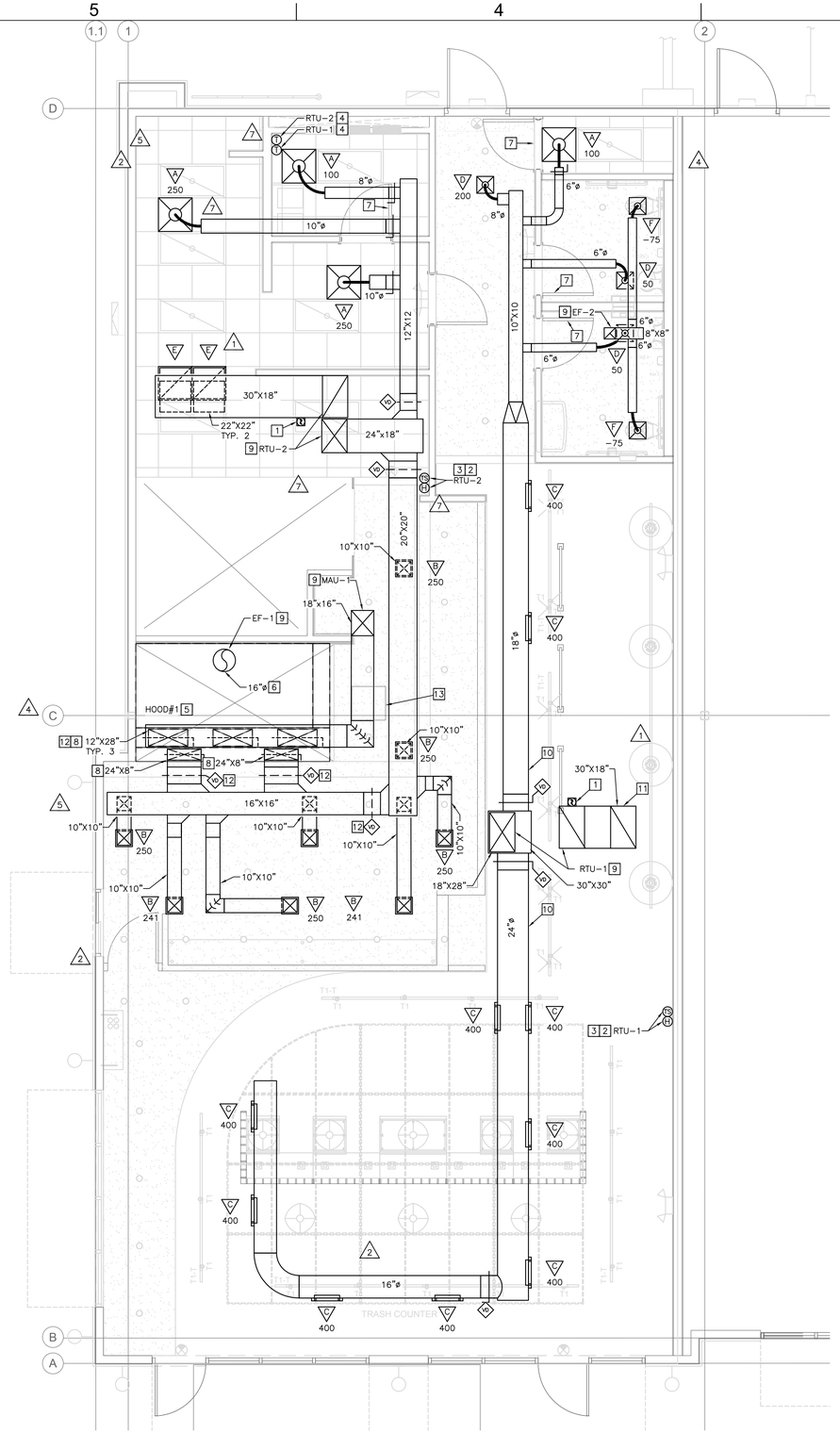
STATE OF TEXAS
ROBERT A. HARRIS
116504
LICENSED
PROFESSIONAL ENGINEER
02/16/2024

FIELD VERIFICATION:
The Contractor shall verify all figured dimensions and conditions at the project site and notify Zebra Projects, INC. of any dimensional errors, omissions or discrepancies before beginning or fabricating any work. Do not scale these drawings.

SHEET NAME:
MECHANICAL SPECIFICATIONS, SCHEDULES, AND LEGEND

DATE: 12-11-23
PROJECT NO.: 35030
DRAWN: JPA
SCALE: AS NOTED

SHEET NO.:
M000



01 MECHANICAL PLAN

1/4" = 1'-0"

MECHANICAL KEY NOTES

1. DUCT MOUNTED SMOKE DETECTOR FURNISHED BY FIRE ALARM CONTRACTOR AND INSTALLED IN DUCT BY MECHANICAL CONTRACTOR. INTERLOCK WIRING BETWEEN FIRE ALARM SYSTEM RELAY AND ROOFTOP UNIT SHUTDOWN CONTACT SHALL BE PROVIDED BY MECHANICAL CONTRACTOR. ALL OTHER WIRING BY FIRE ALARM CONTRACTOR. UPON DETECTION OF SMOKE, ROOFTOP UNIT SHALL SHUT DOWN UPON SIGNAL FROM FIRE ALARM SYSTEM. COORDINATE INSTALLATION LOCATION WITH ACCESS REQUIREMENTS.
2. PROVIDE HUMIDITY SENSOR. MOUNT SENSOR 48" ABOVE FINISHED FLOOR. HUMIDITY SENSOR SHALL OPERATE REFRIGERATION SYSTEM AND INITIATE HOT GAS REHEAT AS REQUIRED TO MAINTAIN SPACE HUMIDITY AT 55% RH.
3. PROVIDE REMOTE TEMPERATURE SENSOR COMPATIBLE WITH THERMOSTAT. MOUNT SENSOR 48" ABOVE FINISHED FLOOR.
4. PROVIDE HONEYWELL WI-FI VISION PRO 8000 TOUCHSCREEN 7-DAY PROGRAMMABLE THERMOSTAT WITH AUTO-CHANGEOVER AND AUTOMATIC START CAPABILITY. MOUNT THERMOSTAT 48" ABOVE FINISHED FLOOR. COORDINATE FINAL INSTALLATION LOCATION OF THERMOSTAT WITH OWNER'S REPRESENTATIVE.
5. INSTALL OWNER FURNISHED TYPE I GREASE EXHAUST HOOD. SUPPORT HOOD PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE TRAPEZE HANGERS FOR ALL THREAD SUPPORT UNDER DUCTWORK AS REQUIRED. REFER TO HOOD DRAWINGS IN FOOD SERVICE SET FOR HOOD SPECIFICATION AND ADDITIONAL INFORMATION INCLUDING BALANCE OF MAKEUP AND CONDITIONED SUPPLY AIR TO HOOD.
6. INSTALL OWNER FURNISHED UL-2221 LISTED DOUBLE-WALL GREASE DUCT EQUAL TO CAPTIVEAIRE SYSTEMS MODEL DW-3R OR 3Z ROUND 20 GAUGE 430 STAINLESS INNER DUCT INSULATED WITH A 24 GAUGE 430 STAINLESS OUTER SHELL FROM HOOD COLLAR EXHAUST FAN ON ROOF. INSTALL EXHAUST DUCT PER MANUFACTURER'S INSTRUCTIONS. PROVIDE CLEANOUTS AT EVERY CHANGE OF DIRECTION IN THE DUCT AND/OR EVERY 10 FEET WITH MINIMUM OF 3 FEET OF CLEARANCE IN FRONT OF CLEAN-OUT. COORDINATE ROUTING OF DUCTWORK WITH OWNER'S CAPTIVEAIRE REPRESENTATIVE.
7. UNDERCUT DOOR 1" FOR TRANSFER AIR.
8. REFER TO HOOD DRAWINGS FOR BALANCE OF MAKEUP AND CONDITIONED SUPPLY AIR TO HOODS.
9. DUCT UP TO EQUIPMENT ON ROOF. REFER TO SHEET M200 FOR EQUIPMENT LOCATION. COORDINATE DUCT LOCATIONS AND SIZING WITH STRUCTURE PRIOR TO BID.
10. INSTALL DUCTWORK AS HIGH AS POSSIBLE ABOVE FINISHED FLOOR.
11. ELBOW END OF RETURN DUCT UP 4".
12. PROVIDE YOUNG REGULATOR MODEL 830ACC RECTANGULAR CABLE CONTROLLED OPPOSED BLADE BALANCING DAMPER, MODEL 270-301EZ BOWDEN CABLE CONTROL KIT, AND BCW CONTROL WIRE AND CASINGS. COORDINATE INSTALLATION LOCATION WITH ARCHITECT AND MOUNT CABLE CONTROLLER IN CEILING IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
13. CEILING ACCESS PANEL. REFER TO ARCHITECTURAL DRAWINGS FOR MORE INFORMATION. ENSURE DUCTWORK IS ROUTED HIGH ENOUGH ABOVE ACCESS PANEL AS TO NOT HINDER ACCESS TO ITEMS ABOVE CEILING.

HVAC COMMISSIONING

GENERAL CONTRACTOR SHALL HIRE A THIRD PARTY REGISTERED DESIGN PROFESSIONAL OR APPROVED AGENCY TO DEVELOP A COMMISSIONING PLAN THAT SHALL INCLUDE THE FOLLOWING ITEMS:

1. NARRATIVE DESCRIPTION OF ACTIVITIES THAT WILL BE ACCOMPLISHED DURING EACH PHASE OF COMMISSIONING, INCLUDING PERSONNEL INTENDED TO ACCOMPLISH EACH OF ACTIVITY.
2. LISTING OF SPECIFIC EQUIPMENT, APPLIANCES OR SYSTEMS TO BE TESTED AND DESCRIPTION OF TESTS TO BE PERFORMED.
3. FUNCTIONS TO BE TESTED, INCLUDING, BUT NOT LIMITED TO CALIBRATIONS AND ECONOMIZER CONTROLS.
4. CONDITIONS UNDER WHICH TEST WILL BE PERFORMED. AT MINIMUM, TESTING SHALL AFFIRM WINTER AND SUMMER DESIGN CONDITIONS AND FULL OUTSIDE AIR CONDITIONS.
5. MEASURABLE CRITERIA FOR PERFORMANCE.

A PRELIMINARY REPORT OF COMMISSIONING TEST PROCEDURES AND RESULTS SHALL BE COMPLETED AND CERTIFIED BY REGISTERED DESIGN PROFESSIONAL OR APPROVED AGENCY IN ACCORDANCE WITH REQUIREMENTS OF SECTION C408.2 OF THE 2018 INTERNATIONAL ENERGY CONSERVATION CODE AND PROVIDED TO PROJECT OWNER. A COPY OF THE REPORT SHALL BE MADE AVAILABLE TO CODE OFFICIAL IF REQUESTED.

FINAL COMMISSIONING REPORT SHALL BE DUE TO PROJECT OWNER WITHIN 90 DAYS OF RECEIPT OF CERTIFICATE OF OCCUPANCY.

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MECHANICAL PLAN

DATE: 12-11-23
PROJECT NO.: 35030
DRAWN: JPA
SCALE: AS NOTED

SHEET NO.:
M100

01 MECHANICAL PLAN-ROOF
1/4" = 1'-0"

MECHANICAL KEY NOTES

1. PROVIDE ROOFTOP UNIT AND CURB. COORDINATE UNIT WITH STRUCTURE. SHIM UNIT AND CURB LEVEL FOR PROPER CONDENSATE DRAINAGE. PROVIDE FLEXIBLE CONNECTORS ON SUPPLY AND RETURN AIR DUCT CONNECTIONS. TRANSITION TO DUCT SIZES SHOWN ON SHEET M100.
2. INSTALL OWNER FURNISHED MAKEUP AIR UNIT AND ROOF CURB. SHIM UNIT AND CURB LEVEL. PROVIDE FLEXIBLE CONNECTOR ON SUPPLY AIR DUCT CONNECTION. TRANSITION TO DUCT SIZES SHOWN ON SHEET M100.
3. INSTALL OWNER FURNISHED ROOF MOUNTED GREASE EXHAUST FAN AND CURB.
4. MAINTAIN A MINIMUM 10'–0" CLEARANCE FROM EXHAUST DISCHARGE TO OUTSIDE AIR INTAKES.
5. INSTALL OWNER FURNISHED ROOF MOUNTED EXHAUST FAN AND CURB.
6. INSTALL OWNER FURNISHED CONDENSING UNIT FOR WALK IN COOLER. MOUNT IN ACCORDANCE WITH ALL MANUFACTURER REQUIREMENTS. SEE FOOD SERVICE DRAWINGS FOR MORE INFORMATION.

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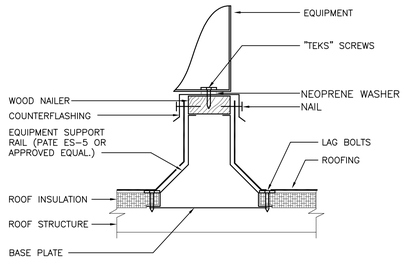
MECHANICAL PLAN - ROOF

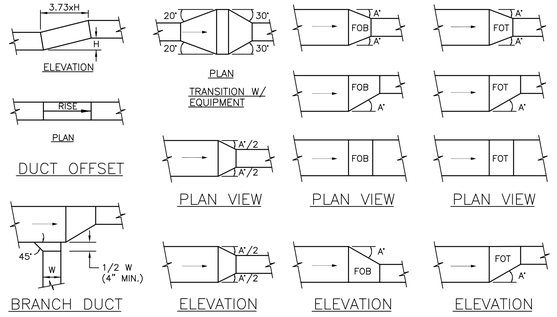
DATE: 12-11-23
PROJECT NO.: 35030
DRAWN: JPA
SCALE: AS NOTED

SHEET NO.:
M200



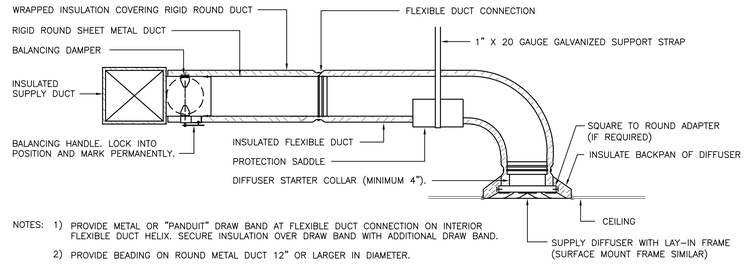
NOTES: 1) PROVIDE TWO ROOF RAILS FOR EACH UNIT.

07 EQUIPMENT SUPPORT RAIL DETAIL
NOT TO SCALE



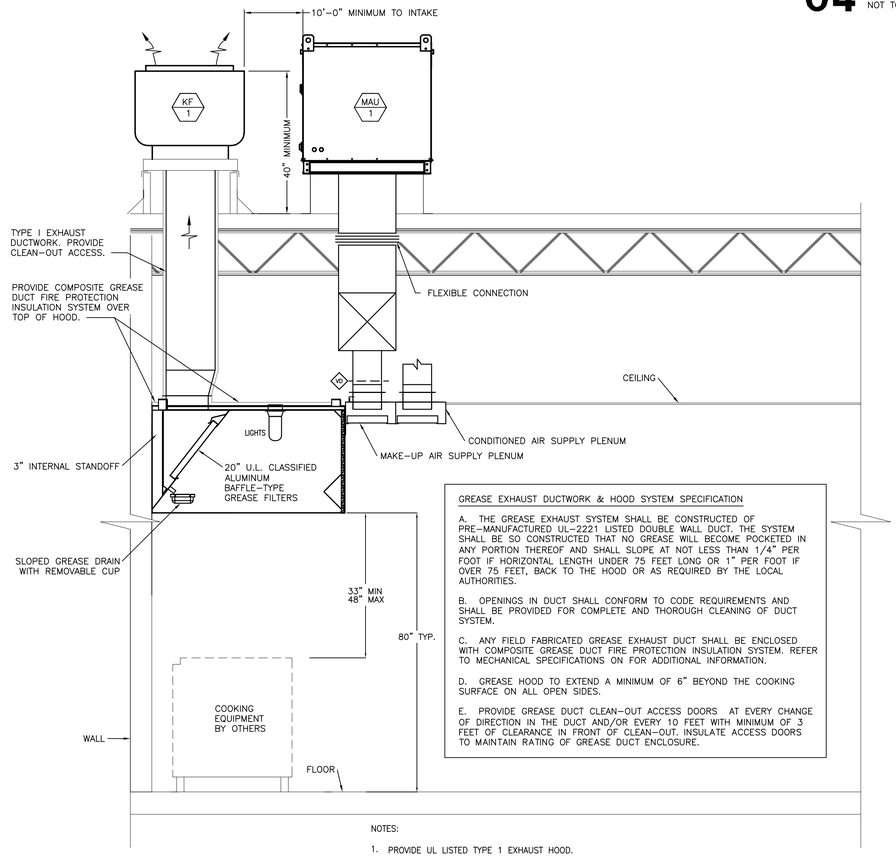
NOTES: 1) ANGLE A = 30° WHEN AIR FLOWS IN DIRECTION OF ARROW (SUPPLY AIR).
2) ANGLE A = 20° WHEN AIR FLOWS IN OPPOSITE DIRECTION OF ARROW (RETURN OR EXHAUST).

04 LOW VELOCITY DUCT FITTINGS DETAIL
NOT TO SCALE



NOTES:
1) PROVIDE METAL OR "PANDUIT" DRAW BAND AT FLEXIBLE DUCT CONNECTION ON INTERIOR FLEXIBLE DUCT HELIX. SECURE INSULATION OVER DRAW BAND WITH ADDITIONAL DRAW BAND.
2) PROVIDE BEADING ON ROUND METAL DUCT 12" OR LARGER IN DIAMETER.
3) PROVIDE MINIMUM 4" COLLARS FOR ATTACHMENT OF FLEXIBLE DUCT TO ROUND DUCT, DAMPERS AND DIFFUSERS.
4) BAND RIGID ROUND DUCT INSULATION TO DUCT AND PROVIDE TAPE FOR INSULATION OVERLAP.

01 DIFFUSER CONNECTION DETAIL
NOT TO SCALE



GREASE EXHAUST DUCTWORK & HOOD SYSTEM SPECIFICATION

A. THE GREASE EXHAUST SYSTEM SHALL BE CONSTRUCTED OF PRE-MANUFACTURED UL-2221 LISTED DOUBLE WALL DUCT. THE SYSTEM SHALL BE SO CONSTRUCTED THAT NO GREASE WILL BECOME POCKETED IN ANY PORTION THEREOF AND SHALL SLOPE AT NOT LESS THAN 1/4" PER FOOT IF HORIZONTAL LENGTH UNDER 75 FEET LONG OR 1" PER FOOT IF OVER 75 FEET, BACK TO THE HOOD OR AS REQUIRED BY THE LOCAL AUTHORITIES.

B. OPENINGS IN DUCT SHALL CONFORM TO CODE REQUIREMENTS AND SHALL BE PROVIDED FOR COMPLETE AND THOROUGH CLEANING OF DUCT SYSTEM.

C. ANY FIELD FABRICATED GREASE EXHAUST DUCT SHALL BE ENCLOSED WITH COMPOSITE GREASE DUCT FIRE PROTECTION INSULATION SYSTEM. REFER TO MECHANICAL SPECIFICATIONS ON FOR ADDITIONAL INFORMATION.

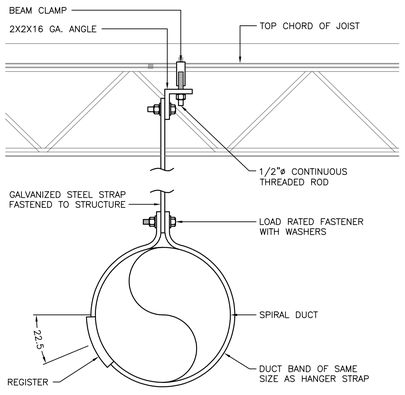
D. GREASE HOOD TO EXTEND A MINIMUM OF 6" BEYOND THE COOKING SURFACE ON ALL OPEN SIDES.

E. PROVIDE GREASE DUCT CLEAN-OUT ACCESS DOORS AT EVERY CHANGE OF DIRECTION IN THE DUCT AND/OR EVERY 10 FEET WITH MINIMUM OF 3 FEET OF CLEARANCE IN FRONT OF CLEAN-OUT. INSULATE ACCESS DOORS TO MAINTAIN RATING OF GREASE DUCT ENCLOSURE.

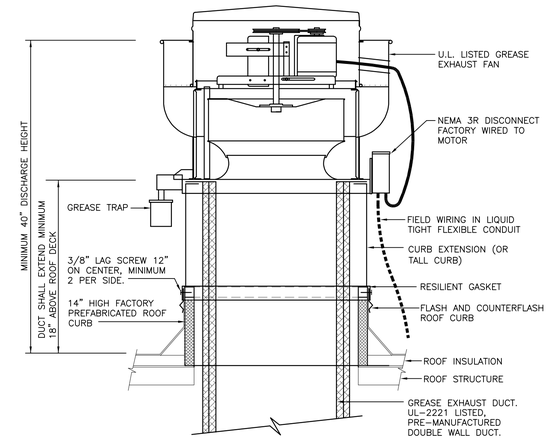
NOTES:

1. PROVIDE UL LISTED TYPE 1 EXHAUST HOOD.
2. THE GREASE HOOD SHALL MEET THE REQUIREMENTS OF THE MECHANICAL CODE, NSF AND NFPA FOR A TYPE I HOOD.
3. FIRE DEPARTMENT APPROVAL SHALL BE REQUIRED ON FIRE PROTECTION SYSTEM FOR GREASE HOODS AND DUCTS AS REQUIRED BY THE MECHANICAL CODE AND AS REQUIRED BY THE FIRE CODE.
4. PROVIDE CHEMICAL FIRE SUPPRESSION SYSTEM AS REQUIRED BY NFPA 17A.
5. PERFORM SMOKE TEST ON GREASE EXHAUST DUCTWORK AFTER DUCTWORK INSTALLATION IS COMPLETE BUT PRIOR TO DUCTWORK CONCEALMENT PER REQUIREMENTS OF LOCAL CODE AUTHORITIES.

08 KITCHEN HOOD SCHEMATICS
NOT TO SCALE

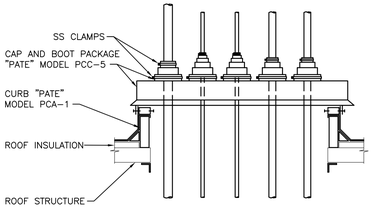


05 SPIRAL DUCT SUPPORT DETAIL
NOT TO SCALE



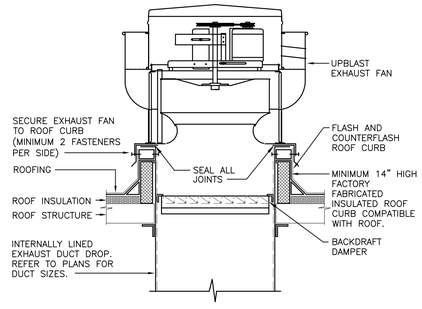
NOTE: INSTALLATION SHALL BE IN ACCORDANCE WITH NFPA 96 REQUIREMENTS.

02 ROOF MOUNTED GREASE EXHAUST FAN DETAIL
NOT TO SCALE



NOTES:
1. USE SINGLE ROOF PENETRATION FOR ALL CONTROL WIRING, POWER WIRING, AND REFRIGERANT LINES.
2. INSULATE REFRIGERANT LINES PER MANUFACTURER'S RECOMMENDATIONS.

06 PIPE ROOF PENETRATION DETAIL
NOT TO SCALE



03 UPBLAST EXHAUST FAN DETAIL
NOT TO SCALE

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