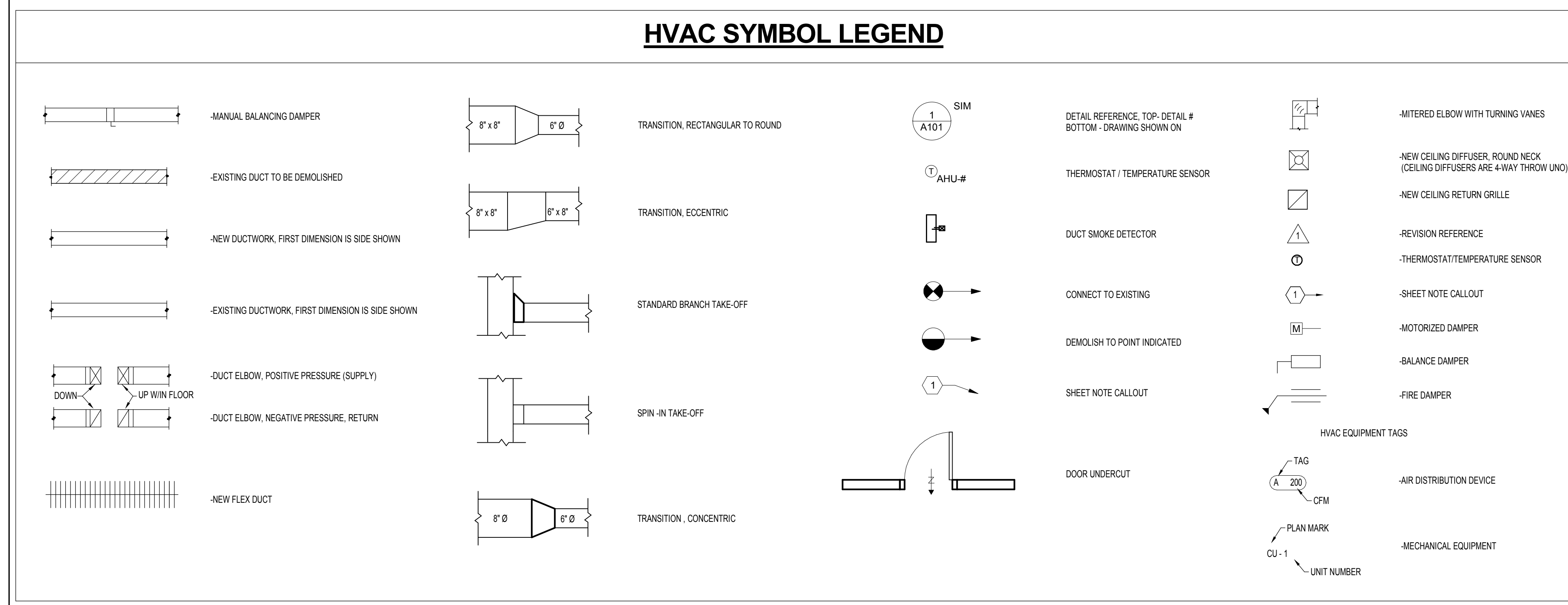


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MECHANICAL SPECIFICATIONS

1.0 BASIC MATERIAL AND METHODS

1.1 SCOPE OF WORK

PROVIDE LABOR AND MATERIALS AS REQUIRED TO PROVIDE A FULLY FUNCTIONING AND COMPLETE HVAC SYSTEM AS INDICATED ON DRAWINGS. THESE DRAWINGS ARE DIAGRAMMATIC IN NATURE AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND EQUIPMENT. FINAL LOCATIONS OF EQUIPMENT SHALL BE FIELD DETERMINED. ALL DISCREPANCIES ON DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IN WRITING PRIOR TO SUBMISSION OF BIDS.

1.2 GENERAL AND SPECIAL CONDITIONS

ALL ARCHITECTURAL GENERAL AND SPECIAL CONDITIONS OUTLINED IN THE CONTRACT DOCUMENTS APPLY TO MECHANICAL SYSTEMS. ADDITIONALLY, WORK SHALL COMPLY WITH FLORIDA BUILDING CODE, 2007 EDITION WITH 2009 AMENDMENTS, FLORIDA FIRE PREVENTION CODE 2007 EDITION, AND REGULATIONS OF THE LOCAL AUTHORITY HAVING JURISDICTION, NATIONAL FIRE PROTECTION ASSOCIATION, AND NATIONAL ELECTRICAL CODE. ALL EQUIPMENT SHALL CARRY THE UNDERWRITERS LABORATORIES (UL) SEAL WHERE APPLICABLE.

1.3 QUALITY CONTROL

UNLESS OTHERWISE NOTED, PROVIDE NEW MATERIALS FREE OF DEFECTS. WHERE NO SPECIFIC WEIGHTS OR GRADES ARE SPECIFIED PROVIDE MATERIALS OF AN ACCEPTED STANDARD WEIGHT AND GRADE ACCORDING TO CODE AND GOVERNING STANDARDS BY ASHRAE, SMACNA, NFPA, AND UL. INSTALL ALL EQUIPMENT, PIPING, DUCTWORK, AND CONTROLS IN ACCORDANCE WITH CODES, GOVERNING STANDARDS, AND MANUFACTURER'S RECOMMENDATIONS.

FIRE PERFORMANCE CHARACTERISTICS OF INSTALLED MATERIALS SHALL BE RATED IN ACCORDANCE WITH ASTM E84. MAXIMUM FLAME SPREAD RATING SHALL BE 25 AND MAXIMUM SMOKE DEVELOPED RATING SHALL BE 50.

SUPPLIED EQUIPMENT SHALL BE AS SCHEDULED OR OWNER APPROVED EQUAL IN QUALITY AND PERFORMANCE.

1.4 COORDINATION

COORDINATE ALL WORK FOR PROPER LOCATION, POWER, AND UTILITY REQUIREMENTS. SCHEDULE INSTALLATIONS TO AVOID CONFLICT AMONG TRADES. ADDITIONS TO THE CONTRACT FOR COORDINATION AMONG TRADES WILL NOT BE ALLOWED.

1.5 PENETRATIONS, CUTTING, AND PATCHING

SEAL ALL PIPING AND DUCT PENETRATIONS OF WALLS IN ACCORDANCE WITH ARCHITECTURAL DRAWINGS AND SPECIFICATIONS. PIPING PENETRATIONS OF RATED FLOORS AND WALLS SHALL BE SEALED WITH FIRESTOPPING MATERIAL. FLASH ALL ROOF AND WALL PENETRATIONS IN ACCORDANCE WITH ARCHITECTURAL DRAWINGS.

1.6 HANGERS AND SUPPORTS

PROVIDE HANGERS AND SUPPORTS FOR ALL PIPING, DUCTWORK, AND EQUIPMENT IN ACCORDANCE WITH SMACNA, MSS, ASME, AND ASHRAE STANDARDS. SUPPORT ALL ITEMS FROM INTEGRAL BUILDING STRUCTURAL MEMBERS. DO NOT HANG ITEMS FROM ROOF DECKING.

1.7 PAINTING

PAINT ALL EXPOSED DUCTWORK AND ACCESSORIES IN ACCORDANCE WITH PAINTING SPECIFICATION. COLOR SHALL BE SELECTED BY ARCHITECT AND OWNER.

2.0 DUCTWORK INSULATION

PROVIDE 2" JACKETED FLEXIBLE BLANKETS OF INORGANIC GLASS FIBERS (ASTM C 533, TYPE 2, CLASS F-1) ON ALL RECTANGULAR SUPPLY DUCTWORK AND RECTANGULAR RETURN DUCTWORK IN UNCONDITIONED SPACES. JACKET SHALL BE FOIL-SCRM-KRAFT, NON-COMBUSTIBLE. INSULATION SHALL HAVE A THERMAL CONDUCTIVITY OF 0.25 AT 75 F. WRAP INSULATION TIGHTLY OVER DUCTWORK. BUTT AND OVERLAP ALL JOINTS A MINIMUM OF 2", AND SEAL ALL JOINTS WITH VAPOR BARRIER ADHESIVE REINFORCED WITH TAPE.

4.0 DUCTWORK

4.1 GENERAL

IN LIEU OF DUCTWORK AND INSULATION, FLORIDA BUILDING CODE ALLOWS THE OPTION OF FIBERGLASS RIGID BOARD DUCT. RIGID BOARD DUCT SHALL BE CLASS 1, WITH 475 OR 800 EI STIFFNESS. INTERIOR SURFACE SHALL INCLUDE BIOCID, BE DAMAGE RESISTANT AND CLEANABLE. UNLESS OTHERWISE NOTED, DUCTWORK STATIC PRESSURES WILL NOT EXCEED 2" WG AND DUCT SYSTEM, FASTENERS, MASTICS, AND ADHESIVES SHALL BE UL LISTED AND LABELED CLASS 1. AIR LEAKAGE FROM DUCT SYSTEMS SHALL NOT EXCEED 5 PERCENT OF DESIGN AIR FLOW.

4.2 FLEXIBLE DUCTWORK

PROVIDE UL STANDARD 181, CLASS 1, COATED FLEXIBLE DUCTWORK WITH INTERNAL ALUMINUM SPIRAL HELIX. PROVIDE 2" INSULATION WITH OUTER JACKET AND INNER LINER. MINIMUM FLEXIBLE DUCTWORK R VALUE OF 6.

5.0 AIR DISTRIBUTION DEVICES

PROVIDE GRILLES, REGISTERS, AND DIFFUSERS WITH CERTIFIED AEC, ARI, AND AMCA COMPLIANCE. PROVIDE OFF-WHITE FINISH OF STYLES AND BORDER TYPES AS SCHEDULED. MAXIMUM DEVICE NECK VELOCITY SHALL BE 500 FPM AND MAXIMUM NC SHALL BE 25. DEVICE LOCATIONS SHALL BE COORDINATED WITH LIGHTING AND SPRINKLERS. ADJUST ACTUAL DIFFUSER LOCATIONS AS NECESSARY TO CONFORM TO CEILING GRID. PROVIDE WHITE FINISH UNLESS INDICATED OTHERWISE IN SCHEDULE.

6.0 TESTING, ADJUSTING AND BALANCING

TEST AND BALANCE ALL AIR HANDLING SYSTEM INSTALLED TO MATCH SCHEDULED SUPPLY, RETURN, AND EXHAUST AIRFLOWS WITHIN TOLERANCES SPECIFIED BY AABC. BALANCE ACCORDING TO AABC "NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE". PROVIDE ALL REQUIRED INSTRUMENTATION TO OBTAIN PROPER MEASUREMENTS. CUT INSULATION AND DUCTWORK AS NECESSARY FOR PROPER BALANCING. ADJUST SYSTEMS WHERE NECESSARY. MARK FINAL EQUIPMENT SETTINGS AND PATCH INSULATION AND DUCTWORK TO MAINTAIN VAPOR BARRIER. RECORD ALL DATA AND PROVIDE FINAL CERTIFIED AABC TEST REPORT OF TESTING AND BALANCING. INCLUDE RECOMMENDATIONS FOR CORRECTING UNSATISFACTORY MECHANICAL PERFORMANCES WHEN PROPER BALANCING CAN NOT BE ACHIEVED. THIS SHALL BE PERFORMED BY AN INDEPENDANT TEST AND BALANCE AGENCY.

6.1 OTHER

REFER TO OWNER PROJECT REQUIREMENTS DOCUMENT FOR OTHER SPECIFICATIONS.

Indoor Air Handling Unit Schedule (D/X Split)

Mark	Manufacturer	Model	Nom. Tons	Airflow		Electrical Data			
				Total	OA	Total MBH	Heating kW/Step	Fan HP	Volt/Phase
AHU-1	CARRIER	FE4ANB006	4	1515	225	48	7/1	0.75	208/1
AHU-2	CARRIER	FE4ANB006	5	1855	300	60	7/1	0.75	208/1

NOTES:
 1. BASIS OF DESIGN: CARRIER
 2. PROVIDE 2" PLEATED FILTER
 3. PROVIDE PROGRAMMABLE THERMOSTAT WITH 7-DAY TIMER AND AUTOMATIC HEAT/COOL CHANGEOVER WITH FAN ON/OFF/AUTO SWITCH.
 4. BALANCE UNITS FOR AIR FLOWS SHOWN ON PLANS.
 5. AHU UNITS HAVE A SEER 18 (AHU-1) AND 16.7 (AHU-2) RATINGS
 6. PROVIDE SMOKE DETECTOR FOR AHU-2.

Outdoor Condenser Unit Schedule (D/X Split)

Mark	Manufacturer	Model	Nom. Tons	Total MBH	Ref. Type	Volt/Phase	RLA	MCA	MCCP
CU-1	CARRIER	24ANB148	4	48	R-410A	208/3	21.2	29.2	40
CU-2	CARRIER	24ANB160	5	60	R-410A	208/3	28.8	38.7	60

NOTES:
 1. BASIS OF DESIGN: CARRIER
 2. PROVIDE ANTI-RECYCLE COMPRESSOR TIMER
 3. PROVIDE 5 YEAR COMPRESSOR WARRANTY.
 4. PROVIDE CONDENSER COIL GUARDS.
 5. REFRIGERANT SIZES PER MANUFACTURER REQUIREMENTS.

Exhaust Fan Schedule

Mark	Manufacturer	Model	Fan Type	Airflow (CFM)	Static Pressure	Drive Type	Fan Motor		
							RPM	Watts	Volt / Phase
EF-1	Panasonic	FV-05-11VKS1	Ceiling	100	0.25 in-wg	Direct	1179	14.0	120/1
EF-2	Panasonic	FV-05-11VKS1	Ceiling	50	0.25 in-wg	Direct	1072	7.0	120/1
EF-3	Panasonic	FV-05-11VKS1	Ceiling	50	0.25 in-wg	Direct	1072	7.0	120/1
EF-4	Panasonic	FV-05-11VKS1	Ceiling	100	0.25 in-wg	Direct	1179	14.0	120/1
EF-5	Panasonic	FV-05-11VKS1	Ceiling	75	0.25 in-wg	Direct	1131	10.2	120/1

NOTES:
 1. PROVIDE SPEED CONTROL
 2. PROVIDE BACKDRAFT DAMPER
 3. INTERLOCK WITH LIGHT SWITCH EF-1, EF-2, EF-3.
 4. INTERLOCK WITH WALL SWITCH EF-4
 5. INTERLOCK WITH VACUUM PUMP EF-5

MECHANICAL ABBREVIATIONS

AFD	ADJUSTABLE FREQUENCY DRIVE
AFR	ABOVE FINISH FLOOR
AHU	AIR HANDLING UNIT
AP	ACCESS PANEL
BOP	BOTTOM OF PIPE
BHP	BRAKE HORSEPOWER
BTU	BRITISH THERMAL UNIT
CL	CENTER LINE
CFM	CUBIC FEET PER MINUTE
CD	CEILING DIFFUSER
CT	COOLING TOWER
CV	CONSTANT AIR VOLUME
CU	CONDENSING UNIT
DDC	DIRECT DIGITAL CONTROLS
DN	DOWN
EAT	ENTERING AIR TEMPERATURE
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
FCU	FAN COIL UNIT
FD	FIRE DAMPER
FF	FINAL FILTERS
FLA	FULL LOAD AMPS
FFM	FEET PER MINUTE
GPM	GALLONS PER MINUTE
KW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LD	LINEAR DIFFUSER
LWT	LEAVING WATER TEMPERATURE
MBH	THOUSAND BTUS PER HOUR
MCA	MINIMUM CIRCUIT AMPS
MCCP	MAXIMUM OVER CURRENT PROTECTION
MOD	MOTOR OPERATED CONTROL DAMPER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OAL	OUTSIDE AIR LOUVER
PRS	PRESSURE REDUCING STATION
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PSIG	PSI GAUGE
PTAC	PACKAGED TERMINAL AIR CONDITIONER
PVC	POLYVINYL CHLORIDE PIPE
RA	RETURN AIR
RHC	REHEAT COIL
RHP	ROOFTOP HEAT PUMP
RPM	REVOLUTIONS PER MINUTE
RSL	REFRIGERANT SUCTION & LIQUID LINES
RTU	ROOFTOP AIR HANDLER UNIT
SA	SUPPLY AIR
SP	STATIC PRESSURE
TSP	TOTAL STATIC PRESSURE
UNO	UNLESS NOTED OTHERWISE
V/PH	VOLTS/PHASE
VAV	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE
ΔP	CHANGE IN PRESSURE
ΔT	CHANGE IN TEMPERATURE

GENERAL NOTES

- CONNECTION TO EQUIPMENT SHALL BE VERIFIED WITH MANUFACTURER'S CERTIFIED DRAWINGS. TRANSITIONS TO ALL EQUIPMENT SHALL BE VERIFIED AND PROVIDED FOR EQUIPMENT FURNISHED.
- DIMENSIONS SHALL BE FIELD-VERIFIED AND COORDINATED PRIOR TO PROCUREMENT OR FABRICATION. COORDINATE THE WORK WITH OTHER TRADES INVOLVED. FIELD MODIFICATIONS SUCH AS OFFSETS IN PIPING OR DUCTWORK (INCLUDING DIVIDED DUCTWORK) NEEDED DUE TO OBSTRUCTIONS OR INTERFERENCES SHALL BE PROVIDED AT NO ADDITIONAL COST. FOR PROJECTS INVOLVING RENOVATION, COORDINATE NEW WORK WITH EXISTING ELEMENTS SUCH AS THE BUILDING STRUCTURE AND ARCHITECTURAL FEATURES, SPRINKLER PIPING, LIGHTS, PLUMBING, AND ELECTRICAL CONDUIT.
- DUCT CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE SMACNA HVAC DUCT CONSTRUCTION STANDARD.
- SEE SPECIFICATIONS FOR GAUGES, THICKNESS, BRACING, REQUIREMENTS, ETC., OF DUCTWORK.
- PROVIDE AIR TURNING VANES IN ALL 90 DEGREE RECTANGULAR DUCT ELBOWS.
- DUCT SIZES AND ALL OPENINGS THROUGH BUILDING CONSTRUCTION SHALL SUIT EQUIPMENT FURNISHED.
- COORDINATE DIFFUSER, GRILLE AND REGISTER LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS AND EQUIPMENT OF ALL TRADES.
- LOCATE THERMOSTATS, TEMPERATURE SENSORS, HUMIDISTATS, AND HUMIDITY SENSORS AT 48" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. COORDINATE LOCATIONS WITH OTHER EQUIPMENT, FURNITURE, AND DOOR SWINGS.
- ALL EQUIPMENT, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED AND/OR SPECIFIED. PROVIDE ADDITIONAL SUPPORTS AS REQUIRED TO PROVIDE A VIBRATION-FREE, RIGID INSTALLATION.
- ALL DUCT SIZES SHOWN ARE INSIDE CLEAR DIMENSIONS.
- DAMPERS AND INSIDES OF DUCTS VISIBLE THROUGH GRILLES, REGISTERS AND DIFFUSERS SHALL BE PAINTED FLAT BLACK.
- REFER TO TYPICAL DETAILS FOR PIPING AND INSTALLATION OF EQUIPMENT.
- TRAPPED CONDENSATE DRAINS FROM ALL MECHANICAL EQUIPMENT SHALL BE PROVIDED FOR PROPER DRAINAGE TO SUIT EQUIPMENT FURNISHED.
- ACCESS PANELS IN DUCTWORK AND CEILINGS SHALL BE PROVIDED WHERE REQUIRED FOR OPERATION, BALANCING OR MAINTENANCE OF ALL MECHANICAL EQUIPMENT.
- ALL DUCTWORK AND PIPING IS SHOWN SCHEMATICALLY. PROVIDE ALL TRANSITIONS, TURNING VANES, ELBOWS, FITTINGS, ETC., TO ALLOW SMOOTH FLOWS. ALL SPLIT DUCT FITTINGS SHALL TRANSITION TO FULL SIZE OF THE SUM OF BOTH BRANCHES, UPSTREAM OF SPLIT.
- PROVIDE CONCRETE HOUSEKEEPING PAD UNDER ALL FLOOR-MOUNTED EQUIPMENT. REFER TO SPECIFICATIONS FOR DETAILED REQUIREMENTS.
- VERIFY FINISH WITH ARCHITECT PRIOR TO PURCHASING GRILLES, REGISTERS, DIFFUSERS, LOUVERS AND OTHER AIR DISTRIBUTION DEVICES.
- PROVIDE FLEXIBLE DUCT CONNECTIONS ON ALL DUCTWORK CONNECTING TO EACH FAN, AIR HANDLING UNITS, AND FAN COIL UNITS.
- PROVIDE TRANSITIONS AT DIFFUSER NECKS AS REQUIRED TO MATCH SIZES OF FLEX DUCTS TO BE CONNECTED.
- MAINTAIN CLEARANCE OF A MINIMUM OF 6" BETWEEN DUCTWORK, PIPING, EQUIPMENT, ETC., AND ALL FIRE RATED AND FIRE/SMOKE RATED PARTITIONS, TO ALLOW FOR INSPECTIONS OF RATED WALLS.
- LOCATE ALL OUTSIDE AIR INTAKES A MINIMUM OF 10'-0" CLEAR FROM ALL PLUMBING VENTS AND EXHAUST AIR DISCHARGE LOCATIONS. LOWEST POINT OF EACH OUTSIDE AIR INTAKE ON ROOF SHALL BE A MINIMUM OF 24" ABOVE ROOF.
- DUCT RUNOUTS TO DIFFUSERS SHALL MATCH THE SIZE OF THE DIFFUSER NECK.
- UNLESS OTHERWISE NOTED, ALL EQUIPMENT AND VALVE DRAINS SHALL BE INDEPENDENTLY PIPED FULL SIZE TO THE NEAREST PLUMBING DRAIN.

AIR TERMINAL SCHEDULE

MARK	SYMBOL	CFM	NECK SIZE	FACE SIZE LENGTH	DESCRIPTION
A		000-110	6"	24x24	BASIS OF DESIGN: TITUS OMNI SQUARE CONE DIFFUSER COLOR: WHITE MATERIAL: ALUMINUM - SILICON COATED STEEL OPPOSED BLADE DAMPERS: NO
		111-200	8"	24x24	
		201-330	10"	24x24	
B		000-110	6"	12x12	BASIS OF DESIGN: TITUS 90F EGGRATE FOR RETURN OR EXHAUST COLOR: WHITE MATERIAL: ALUMINUM OPPOSED BLADE DAMPERS: NO
		111-200	8"	12x12	
		201-330	10"	12x12	
B		000-600	6x24	24x24	BASIS OF DESIGN: TITUS 90F EGGRATE FOR RETURN OR EXHAUST COLOR: WHITE MATERIAL: ALUMINUM OPPOSED BLADE DAMPERS: NO
		601-900	12x24	24x24	
		901-2500	24x24	24x24	
B		000-600	12x12	12x12	BASIS OF DESIGN: TITUS 90F EGGRATE FOR RETURN OR EXHAUST COLOR: WHITE MATERIAL: ALUMINUM OPPOSED BLADE DAMPERS: NO
		601-900	12x12	12x12	

- NOTES:
- REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR DETERMINATION OF APPROPRIATE BORDER TYPES FOR EACH AIR DEVICE.
 - AIR DEVICES LOCATED IN SMALL ROOMS WHERE FULL 24"x24" GRID ARE NOT AVAILABLE SHALL BE PROVIDED WITH SURFACE MOUNTING BORDERS IN LIEU OF LAY-IN. SECURE EACH DEVICE TO CEILING GRID WITH FIELD-FABRICATED SUPPORTS.
 - MAXIMUM NC RATING OF 25.

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