SYMBOLS LIST AND ABBREVIATIONS

- VOLUME DAMPER
- FIRE DAMPER W/ACCESS DOOR
- MOTOR OPERATED DAMPER
- SMOKE DAMPER
- FLEXIBLE CONNECTION
- DOUBLE LINE SPIRAL SOUND LINED DUCTWORK
- DOUBLE LINE SOUND LINED DUCTWORK
- SINGLE LINE SPIRAL SOUND LINED DUCTWORK
- SINGLE LINE SOUND LINED DUCTWORK
- DOUBLE LINE CAPPED DUCTWORK
- SINGLE LINE CAPPED DUCTWORK
- DUCTWORK TRANSITION
- DOUBLE LINE RISE AND DROP IN DUCTWORK
- SINGLE LINE RISE AND DROP IN DUCTWORK
- TURNING VANES
- DOUBLE LINE SUPPLY DUCT DOWN
- SINGLE LINE SUPPLY DUCT DOWN
- DOUBLE LINE SUPPLY DUCT UP
- SINGLE LINE SUPPLY DUCT UP
- DOUBLE LINE RETURN DUCT DOWN
- SINGLE LINE RETURN DUCT DOWN
- DOUBLE LINE RETURN DUCT UP
- SINGLE LINE RETURN DUCT UP
- DOUBLE LINE EXHAUST DUCT DOWN
- SINGLE LINE EXHAUST DUCT DOWN
- DOUBLE LINE EXHAUST DUCT UP
- SINGLE LINE EXHAUST DUCT UP
- DOUBLE LINE SPIN-IN FITTING WITH INTEGRAL VOLUME DAMPER
- SINGLE LINE SPIN-IN FITTING WITH INTEGRAL VOLUME DAMPER
- FLEXIBLE DUCT
- SUPPLY AIR DIFFUSER
- RETURN AIR GRILLE (REGISTER)
- EXHAUST AIR GRILLE (REGISTER)
- LINEAR SUPPLY AIR DIFFUSER
- $ ON/OFF SWITCH
- DIRECTION OF AIR FLOW (POSITIVE)
- DIRECTION OF AIR FLOW (NEGATIVE)
- CONNECT TO EXISTING SYMBOL

AC	DUCTLESS SPLIT AIR CONDITIONING UNIT
ACCU	AIR COOLED CONDENSING UNIT
AFF	ABOVE FINISHED FLOOR
BDD	BACK DRAFT DAMPER
BPD	BY-PASS DAMPER
BTUH	BRITISH THERMAL UNITS PER HOUR
CFM	CUBIC FEET PER MINUTE
DB	DRY BULB
DIA, Φ	DIAMETER
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EF	EXHAUST FAN
ESP	EXTERNAL STATIC PRESSURE
EX.	EXISTING TO REMAIN
F	FAHRENHEIT
FD	FIRE DAMPER, FLOOR DRAIN
FS	FAN SWITCH, FLOW SWITCH
FT	FOOT OR FEET
GA	GAUGE
GC	GENERAL CONTRACTOR
HP	HORSEPOWER
HZ	FREQUENCY HERTZ
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
MBH	THOUSAND BTUH
MOD	MOTOR OPERATED DAMPER
OA	OUTDOOR AIR
PH, Φ	PHASE (ELECTRICAL)
PSI	POUNDS PER SQUARE INCH
RA	RETURN AIR
RPM	REVOLUTIONS PER MINUTE
RTU	ROOF TOP AIR HANDLING UNIT
RL	RAIN LEADER
RX.	REMOVE EXISTING
SA	SUPPLY AIR
SP	STATIC PRESSURE
TEMP	TEMPERATURE
TYP	TYPICAL
V	VOLTS OR VENT
WB	WET BULB
WC	WATER COLUMN
W/	WITH
VF	VENTILATION FAN
(1)	DRAWING NOTE- NEW WORK
12/10	DUCTWORK SIZE - PLAN VIEW 12" WIDE BY 10" HIGH
8/Φ	DUCT SIZE (8"Φ)
D-1/150	DIFFUSER/GRILLE TAG
T AC-X	THERMOSTAT - TELECOM ROOM
T RTU-X	7 DAY, 24 HR. PROGRAMMABLE THERMOSTAT, WITH SECURITY ACCESS. WALL MOUNTED, ON INSULATED BOARD. UNIT SERVED AS INDICATED.
TR RTU-X	REVERSE ACTING THERMOSTAT
₵	CUBIC FEET PER MINUTE
SD	SMOKE DETECTOR
Φ	DIAMETER
U/C	UNDERCUT DOOR
	CARBON DIOXIDE SENSOR
	CARBON DIOXIDE SENSOR - PROVIDED BY FSG

HVAC SPECIFICATIONS

1. ALL HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS AND EQUIPMENT MUST BE INSTALLED IN CONFORMANCE WITH THE STATE OF SOUTH CAROLINA, INCLUDING LOCAL BUILDING CODES, LOCAL FIRE DEPARTMENT REGULATIONS, AND THE LATEST EDITION OF SMACNA AND ASHRAE STANDARDS.
2. DUCTWORK AND ALL OTHER HVAC CONSTRUCTION MUST BE INSTALLED TO CLEAR ANY INTERIOR OBSTRUCTIONS, GAS LINES OR OTHER EXISTING CONSTRUCTION THAT OCCURS IN TENANT'S LEASED SPACE.
3. MAINTAIN 15' MINIMUM CLEARANCE FROM ALL SANITARY VENTS TO OUTDOOR AIR INTAKES. MAINTAIN 2' CLEARANCE FROM ALL OTHER EQUIPMENT.
4. HVAC CONTRACTOR WILL PROVIDE PERMANENT IDENTIFICATION OF THE STORE NAME ON EQUIPMENT FOR THE CONVENIENCE OF MAINTENANCE AND REPAIR WORK.
5. HVAC CONTRACTOR SHALL PAY ALL FEES, OBTAIN ALL PERMITS AND INSPECTIONS AS REQUIRED FOR THIS PORTION OF THE WORK.
6. HVAC CONTRACTOR SHALL VISIT THE SITE TO DETERMINE THE FULL EXTENT OF HIS WORK. ANY DISCREPANCIES WITH PLANS SHALL BE REPORTED TO TENANT'S REPRESENTATIVE. (REFER TO NOTE #11)
7. ALL NEW MATERIALS, EQUIPMENT, AND WORK SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FOLLOWING DATE OF ACCEPTANCE BY TENANT, EXCEPT WHERE A LONGER WARRANTY PERIOD IS PROVIDED BY THE MANUFACTURERS OF EQUIPMENT OR COMPONENTS.
8. PRIOR TO THE START UP OF THE HVAC SYSTEM, THE HVAC CONTRACTOR SHALL CLEAN ALL DUCTWORK AND EQUIPMENT TO REMOVE ANY DIRT, RUBBISH OR DEBRIS.
9. THE COMPLETE HVAC SYSTEM SHALL BE TESTED AND BALANCED BY THE BALANCING CONTRACTOR TO INSURE PROPER AIR FLOW TO ALL AREAS. THE GENERAL CONTRACTOR SHALL CONTRACT WITH AN INDEPENDENT TESTING ASSOCIATION TO VERIFY ALL AIR FLOW. A COPY SHALL BE FURNISHED TO THE TENANT.
10. FOR ADDITIONAL HVAC INFORMATION REFER TO MECHANICAL DETAILS AND DRAWINGS.
11. ALL DUCTWORK SHALL BE METAL. FIBERGLASS SHALL NOT BE USED IN ANY SITUATION. SHEET METAL CONTRACTOR SHALL FIELD VERIFY ALL DUCT ROUTING, DUCT SIZES, ETC. PRIOR TO ANY SHEET METAL FABRICATION. ANY CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE A/E TEAM, FOR ADDITIONAL INSTRUCTION.
12. PROVIDE CERTIFIED TEST AND BALANCE REPORT PERFORMED BY INDEPENDENT TESTING AND BALANCING AGENCY AT CONCLUSION OF CONSTRUCTION (REFER TO NOTE 9).
13. ALL HVAC EQUIPMENT SHALL MEET PERFORMANCE REQUIREMENTS OF ASHRAE 90.1-2013 AND SHALL BE ENERGY STAR LABELED AND UTILIZE R-410A.
14. REFER TO ASHRAE 90.1-2013, TABLE 6.5.1.1.3 FOR ALLOWABLE ECONOMIZER OPTIONS PER CLIMATE ZONE. PROTOTYPICAL DESIGN PROVIDES UNITS WITH COMPARATIVE ENTHALPY ECONOMIZERS IN MOIST (A) AND MARINE (C) CLIMATE ZONES, AND DRY-BULB ECONOMIZER IN DRY (B) REGIONS. CONTRACTOR SHALL PROVIDE CONTROLS FOR COMPARATIVE ENTHALPY ECONOMIZERS IN ALL REGIONS PER STANDARD OPERATION PROCEDURES (SOP).
15. PROVIDE ECONOMIZERS WITH BAROMETRIC RELIEF DAMPERS FOR ROOFTOP UNITS WITH CAPACITIES LESS THAN OR EQUAL TO 4 TONS COOLING. PROVIDE ECONOMIZERS WITH POWER RELIEF FANS FOR ROOFTOP UNITS WITH CAPACITIES GREATER THAN OR EQUAL TO 5 TONS COOLING.
16. EQUIPMENT SHALL BE INSTALLED WITH SUFFICIENT WORK SPACE FOR INSPECTION ROUTINE MAINTENANCE, CLEANING, AND CALIBRATION.
17. TEMPERATURE CONTROLS SHALL BE LABELED WITH ASSOCIATED HVAC UNIT AND INSTALLED PER MANUFACTURER'S SPECIFICATIONS INCLUDING LOCATING THE UNITS ON SURFACES THAT ARE NOT EXPECTED TO EXPERIENCE RAPIDLY CHANGING TEMPERATURES.
18. HVAC UNITS (EXCLUDING COMPUTER ROOM UNIT, IF APPLICABLE) SHALL SWITCH TO OCCUPIED MODE ONE HOUR BEFORE DOOR OPEN TIME AND SHALL SWITCH TO UNOCCUPIED MODE ONE HOUR AFTER CLOSE TIME.
19. DRAIN PANS SHALL SLOPE TOWARD THE DRAIN OUTLET BY AT LEAST 0.125 INCHES PER FOOT. THE OUTLET SHALL BE LOCATED AT THE LOWEST POINT OF THE PAN AND BE SIZED TO PRECLUDE OVERFLOW. FOR UNITS WITH NEGATIVE STATIC DRAW AT THE DRAIN PAN RELATIVE TO THE OUTLET, DRAIN LINE SHALL INCLUDE A P-TRAP OR OTHER SEAL TO PREVENT INGESTION OF AMBIENT AIR WHILE ALLOWING THE PAN TO DRAIN COMPLETELY. DRAIN PANS SHALL BE LOCATED DIRECTLY BELOW COILS OR OTHER WATER PRODUCING DEVICES.

ATC GENERAL NOTES

1. THE ATC CONTRACTOR SHALL FURNISH AND INSTALL ALL ELECTRICAL WIRING AND CONDUIT FROM POWER SOURCE, INCLUDING TERMINATION TO ALL REQUIRED ATC RELATED POWER CONNECTIONS INCLUDING, BUT NOT LIMITED TO, CONTROLLERS (PROVIDE LOW VOLTAGE CONTROLLER INCLUDING TRANSFORMERS, AND DISCONNECT SWITCHES AS REQUIRED), THERMOSTATS, CARBON DIOXIDE SENSOR, ETC.
2. THE ATC CONTRACTOR SHALL OBTAIN A SEPARATE ELECTRICAL PERMIT AS REQUIRED BY THE LOCAL AUTHORITY.
3. THE ATC CONTRACTOR SHALL BE WHOLLY RESPONSIBLE FOR ALL POWER REQUIREMENTS NECESSARY FOR A COMPLETE INSTALLATION FROM THE POWER SOURCE TO ALL ATC RELATED CONNECTIONS.
4. THE INTENDED POWER SOURCE SHALL BE AS INDICATED ON THE ELECTRICAL PLANS.
5. **ENERGY MANAGEMENT SYSTEM SHALL BE PROVIDED BY FSG SMART BUILDINGS, SEE ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.**
6. MECHANICAL CONTRACTOR SHALL PROVIDE ALL CONTROL WIRING ETC. FOR PROPER OPERATION OF ROOFTOP UNITS IN ALL MODES INCLUDING ECONOMIZER, POWER EXHAUST PER SEQUENCE OF OPERATION PRIOR TO INSTALL OF EMS.

SEQUENCE OF OPERATION - GAS FIRED ROOFTOP UNITS:

GENERAL:

1. DUCT MOUNTED SMOKE DETECTORS SHALL BE PROVIDED AND INSTALLED BY THE MECHANICAL CONTRACTOR. SMOKE DETECTORS SHALL STOP FAN UPON SENSING PRODUCTS OF COMBUSTION. SMOKE DETECTORS SHALL BE MANUAL RESET TYPE. HVAC UNITS WILL RESET AUTOMATICALLY ON RESET OF SMOKE DETECTOR. WHERE THERE IS A FIRE ALARM SYSTEM, DUCT SMOKE DETECTORS SHALL BE CONNECTED TO THE FIRE ALARM SYSTEM. WHERE THERE IS NO FIRE ALARM SYSTEM, DUCT SMOKE DETECTORS SHALL ACTIVATE A VISIBLE AND AUDIBLE SIGNAL IN AN APPROVED LOCATION BY THE AUTHORITY HAVING JURISDICTION AND SHALL BE IDENTIFIED PER CODE.
2. EMS CONTROLS SHALL BE PROVIDED BY FSG SMART BUILDINGS, 101 EAST OLD SETTLERS BLVD, SUITE #200, ROUND ROCK, TX 78664, (FSG SMART BUILDING - VERIZON SUPPORT: 512-835-6120).

OCCUPIED MODE (1 HOUR BEFORE STORE OPENS, ADJ):

1. FAN SHALL RUN CONTINUOUSLY.
2. OUTSIDE AIR DAMPER SHALL OPEN TO MINIMUM POSITION.
3. COOLING: ON A RISE IN SPACE TEMPERATURE ABOVE ROOM SETPOINT (72 DEG F, ADJ) THE OUTSIDE AIR DAMPERS SHALL OPEN TO THE MINIMUM POSITION AND THE COMPRESSORS SHALL ENERGIZE. ON A DROP IS SPACE TEMPERATURE BELOW SETPOINT THE COMPRESSORS SHALL DE-ENERGIZE.
4. HEATING: ON A DROP IN SPACE TEMPERATURE BELOW HEATING SETPOINT (68 DEG F, ADJ) THE GAS FIRED HEATING SECTION SHALL ENERGIZE. ON A RISE IN SPACE TEMPERATURE ABOVE SETPOINT THE GAS FIRED HEATING SECTION SHALL DE-ENERGIZE.
5. DEMAND CONTROL VENTILATION (DCV) - WHERE EQUIPMENT IS INDICATED AS DCV EQUIPPED, THE OUTDOOR DAMPER SHALL MODULATE BETWEEN THE BASE VENTILATION RATE (MINIMUM) OUTSIDE AIR SETTING (ADJ.) AND THE DESIGN VENTILATION RATE (MAXIMUM) OUTSIDE AIR SETTING (ADJ.) AS DETERMINED BY THE MINIMUM AND MAXIMUM O/A REQUIREMENTS SCHEDULED. WHEN THE CARBON DIOXIDE SENSOR CO2 DIFFERENTIAL (INDOOR - OUTDOOR) IS GREATER THAN 650 PPM THE OUTDOOR AIR DAMPER SHALL SLOWLY MODULATE OPEN TO MAINTAIN THE DIFFERENTIAL SETPOINT 650 PPM (ADJ.). ALARM SHALL INDICATE CO2 DIFFERENTIAL GREATER THAN 750 PPM FOR 90 MINUTES AND SHALL CLEAR WHEN CO2 DIFFERENTIAL IS < 700 PPM (ADJ.). ECONOMIZER CONTROL SHALL OVERRIDE DCV AS DESCRIBED ABOVE WHEN FREE COOLING IS AVAILABLE.
6. POWER EXHAUST - INTERLOCKED TO RUN WHEN SUPPLY AIR BLOWER IS OPERATING, FANS RUNS WHEN OUTDOOR AIR DAMPERS ARE 50% OPEN (ADJUSTABLE).

UNOCCUPIED MODE (1 HOURS AFTER STORE CLOSES, ADJ):

1. FAN SHALL BE OFF.
2. OUTSIDE AIR DAMPER SHALL BE IN THE CLOSED POSITION.
3. IF THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED SETPOINT (80 DEG F, ADJ) THE FAN SHALL ENERGIZE. ON A CONTINUED RISE IN TEMPERATURE THE COOLING SECTION SHALL BE ENERGIZED. ON A FALL IN SPACE TEMPERATURE THE OPPOSITE SHALL OCCUR.
4. IF THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED SETPOINT (60 DEG F, ADJ) THE FAN SHALL ENERGIZE. ON A CONTINUED FALL IN TEMPERATURE, THE GAS FIRED HEATING SECTION SHALL ENERGIZE. ON A RISE IN SPACE TEMPERATURE THE OPPOSITE SHALL OCCUR.

TELCO ROOM SPLIT SYSTEM:

1. THERMOSTAT FOR THE TELCO ROOM SPLIT SYSTEM SHALL BE SET TO 70°F, WITH AN ALARM VIA EMS AT 80°F.

DESIGN OPERATING CONDITIONS:

COOLING:	72 DEG F
	80 DEG F COOLING NIGHT SETBACK
HEATING:	68 DEG F
	60 DEG F HEATING NIGHT SETBACK
RELATIVE HUMIDITY:	55%

SCOPE

FURNISH ALL MATERIALS, EQUIPMENT, AND LABOR NECESSARY FOR A COMPLETE FULLY OPERATIVE HEATING, VENTILATING, AND AIR CONDITIONING SYSTEM EXCEPT AS SPECIALLY EXCLUDED BY THE DRAWINGS, AND/OR TENANT'S DIRECTIONS.

EQUIPMENT

STANDARD CONDITIONS FOR THERMOSTAT OPERATION AND CALIBRATION WILL BE AS FOLLOWS:

± 2° F PER VERIZON FACILITIES

DUCTWORK

1. SQUARE AND RECTANGULAR DUCTWORK SHALL BE CONSTRUCTED OF NEW GALVANIZED PRIME GRADE SHEET STEEL OF THE FOLLOWING GAUGES:

DUCT SIZE	GAUGE
13" AND LESS	NO. 26 U.S. GAUGE
13" TO 30"	NO. 24 U.S. GAUGE
31" TO 54"	NO. 22 U.S. GAUGE

2. SQUARE AND RECTANGULAR DUCTWORK SHALL BE CONSTRUCTED AS FOLLOWS:

DUCT SIZE	METHOD
17" AND LESS	"S" AND DRIVE CLEATS
18" TO 30"	"L" STANDING ON [illegible]'-0" CENTERS
31" TO 54"	1-1/[illegible]" STANDING ON [illegible]'-0" CENTERS

3. ROUND DUCTWORK SHALL BE CONSTRUCTED OF NEW GALVANIZED PRIME GRADE SHEET STEEL OF THE FOLLOWING GAUGES:

DUCT SIZE (DIAMETER)	DUCTS	FITTINGS
8" AND LESS	24	22
9" TO 18"	22	20

ALL 90 DEGREE ELBOWS FOR ROUND DUCTWORK SHALL BE FIVE (5) PIECE. ALL LONGITUDINAL SEAMS SHALL BE FORMED BY PITTSBURGH LOCKS. JOINTS SHALL BE SWAGED WITH ONE-HALF INCH (1/2") OVERLAP. ALL DUCTWORK SHALL BE MADE AIR TIGHT WITH MASTIC PRESSURE SENSITIVE GASKET, & DUCT SEALER FOR SLIP & DRIVE DUCTWORK, WHERE APPLICABLE.

4. SPIRAL ROUND SINGLE WALL DUCTWORK SHALL BE CONSTRUCTED OF NEW GALVANIZED PRIME GRADE SHEET STEEL OF THE FOLLOWING GAUGES:

DUCT SIZE (DIAMETER)	DUCTS	FITTINGS
[illegible] AND LESS	26	24
[illegible] TO 36"	24	22

ALL 90 DEGREE ELBOWS FOR ROUND DUCTWORK SHALL BE FIVE (5) PIECE. JOINTS SHALL BE SWAGED WITH ONE-HALF INCH (1/2") OVERLAP. ALL DUCTWORK SHALL BE MADE AIR TIGHT WITH MASTIC PRESSURE SENSITIVE GASKET, & DUCT SEALER FOR SLIP & DRIVE DUCTWORK, WHERE APPLICABLE.

5. DUCT CONSTRUCTION WILL BE PERFORMED IN ACCORDANCE WITH SMACNA's HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE.
6. FRONT OF HOUSE EXPOSED SPIRAL OR RECTANGULAR SUPPLY AND RETURN AIR DUCTWORK (WITHIN CONDITIONED SPACE) SHALL BE LINED WITH ONE INCH (1") THICK - DUCT LINER, BONDED WITH A THERMOSETTING RESIN, SPECIFICALLY FOR HIGH ACOUSTICAL AND THERMAL PERFORMANCE (R-4 MIN).
6. BACK OF HOUSE SUPPLY AND RETURN AIR DUCTWORK SHALL BE INSULATED WITH ONE AND ONE-HALF INCH (1-1/2") THICK FOIL-FACED FIBERGLASS INSULATION (R-6 MIN).
7. ALL OUTSIDE AIR AND EXHAUST AIR DUCTWORK SHALL BE INSULATED WITH ONE AND ONE-HALF INCH (1-1/2"). THICK FOIL-FACED FIBERGLASS INSULATION (R-6 MIN).
8. ALL DUCT DIMENSIONS SHOWN ON DRAWING ARE CLEAR INSIDE DIMENSIONS. INCREASE DUCT SIZE TO ALLOW FOR 1" LINER.
9. TURNING VANES SHALL BE INSTALLED IN DUCTWORK WITH TURNS OF 45° DEGREES OR MORE.
10. CONTRACTOR WILL INSTALL INSECT SCREENS ON ALL DUCT OPENINGS WHICH LEAD TO OR ARE OUTDOORS. INSECT SCREENS SHALL BE 10 GAUGE, ONE-QUARTER INCH (1/4")MESH IN REMOVABLE GALVANIZED STEEL FRAMES.
11. SEAL DUCTWORK WITH HEAVY LIQUID SEALANT, HARDCAST IRONGRIP 601, DESIGN POLYMER DP1010, UNITED MCGILL DUCT SEALER OR APPROVED EQUAL, APPLY ACCORDING TO SEALANT MANUFACTURER'S INSTRUCTIONS. OUTDOOR DUCTWORK SHALL BE SEALED TO: SUPPLY - CLASS A, EXHAUST - CLASS C, RETURN - CLASS A. INDOOR DUCTWORK SHALL BE SEALED TO : SUPPLY - CLASS C, EXHAUST - CLASS B, RETURN - CLASS C.
12. PROVIDE RADIUS ELBOWS, TURNS, AND OFFSETS WITH A MINIMUM CENTERLINE RADIUS OF 1-1/2 TIMES THE DUCT WIDTH. WHERE SPACE DOES NOT PERMIT FULL RADIUS ELBOWS, PROVIDE SHORT RADIUS ELBOWS WITH A MINIMUM OF TWO CONTINUOUS SPLITTER VANES. VANES SHALL BE THE ENTIRE LENGTH OF THE BEND. PROVIDE MITERED ELBOWS WHERE SPACE DOES NOT PERMIT RADIUS ELBOWS,WHERE SHOWN ON DRAWINGS, OR AT THE OPTION OF THE CONTRACTOR WITH THE ENGINEER'S APPROVAL. MITERED ELBOWS LESS THEN 45 DEGREES SHALL NOT REQUIRE TURNING VANES. MITERED ELBOW 45-DEGREES AND GREATER SHALL HAVE SINGLE THICKNESS TURNING VANES OF SAME GAUGE AS MITERED ELBOWS SHALL BE PROVIDED IN ALL SUPPLY AND EXHAUST DUCTWORK AND IN RETURN AND OUTSIDE AIR DUCTWORK THAT HAS AN AIR VELOCITY EXCEEDING 1,00 FPM.
13. PAINT THE INSIDE OF ALL VISIBLE DUCTWORK FLAT BLACK TO CONCEAL THE SHINE.

REFRIGERATION PIPING AND INSULATION

1. ALL REFRIGERANT PIPING SHALL BE TYPE "ACR" HARD COPPER PIPE WITH SILVER SOLDERED JOINTS AND STREAMLINE OR FORGED BRASS FITTINGS.
2. REFRIGERANT PIPING SHALL HAVE INSULATION WITH A CONDUCTIVITY VALUE OF 0.22-0.28 BTU-IN/(H-FT2*°F). REFRIGERANTS USED SHALL BE R-410A
3. SUCTION LINES SHALL BE INSULATED WITH 1/2-INCH THICKNESS FIBERGLASS DUAL-TEMPERATURE INSULATION WITH VAPOR BARRIER AND ASJ JACKET. EXTERIOR REFRIGERATION LINES TO BE INSULATED WITH 1-INCH ARMAFLEX INSULATION SLIPPED OVER THE PIPING (NOT SPLIT HORIZONTALLY) AND SEALED PER MANUFACTURER'S RECOMMENDATIONS AND PAINTED WITH ULTRA-VIOLET PAINT.

HANGERS AND SUPPORTS

1. ALL HORIZONTAL DUCTS HAVING A DIMENSION OF 40 INCHES AND LESS SHALL BE SUPPORTED BY MEANS OF BAND IRON HANGERS OF NO. 18 U.S. GAUGE ATTACHED TO THE DUCT BY MEANS OF RIVETS, SCREWS, OR CLAMPS, AND FASTENED TO STRUCTURE ABOVE BY TOGGLE BOLTS OR OTHER MEANS. EACH SECTION OF DUCTWORK SHALL HAVE AT LEAST ONE PAIR OF SUPPORT.
2. DUCTWORK SHALL BE SUPPORTED AT ALL TURNS AND TRANSITIONS. SUPPORT STRAIGHT DUCT EVERY 5 FT. UP TO 35".
3. HANGER DESIGN SHALL BE AS DESCRIBED IN THE LATEST EDITION OF THE "SMACNA" MANUAL. REINFORCEMENT MEMBERS MAY BE USED TO SUPPORT THE DUCT SYSTEM AND PROVIDED DETAILS OUTLINED IN THE AFOREMENTIONED DOCUMENTS ARE ADHERED TO.

REINFORCEMENT

1. ALL DUCTS REQUIRING REINFORCEMENT SHALL BE REINFORCED ACCORDING TO THE LATEST EDITION OF "SMACNA" MANUAL.
2. MATERIALS FOR REINFORCEMENT MEMBERS SHALL BE GALVANIZED STEEL. ALL SCREWS AND WASHERS SHALL BE PLATED GALVANIZED.

FLASHING

1. CONTRACTOR WILL PROVIDE WATER TIGHT 24 GA. SHEET METAL FLASHINGS AT ALL EXTERIOR WALLS AND ROOF PENETRATIONS.
2. ALL CUTTING OF ROOF OPENINGS, SUPPORTS FOR ROOF OPENINGS, PITCH PANS, ROOF CURBS, SUPPORTS FRO ROOF FLASHINGS, REPAIR TO ROOF, ETC. ASSOCIATED WITH HVAC SUBCONTRACTOR SHALL BE THE RESPONSIBILITY AND PART OF THE CONTRACT OF THE HVAC SUBCONTRACTOR. THEY SHALL EMPLOY THE LANDLORD'S ROOFERS FOR THIS WORK SO AS TO MAINTAIN THE ROOF BOND.

ACCESSORY ITEMS

1. ALL MANUAL DAMPERS, FIRE DAMPERS, TURNING VANES, REGISTER CONNECTIONS, ACCESS DOORS, OR OTHER ASSOCIATED ACCESSORIES SHALL BE INSTALLED ACCORDING TO THE LATEST PUBLICATION OF "SMACNA" MANUAL.

DAMPERS

1. THE SELECTED UNITS SHALL HAVE MAXIMUM DAMPER LEAKAGE AT 1.0" W.G. THAT DOES NOT EXCEED 10 CFM/SQ FT OF DAMPER AREA.
2. SPLITTER DAMPERS SHALL BE FABRICATED ON SHEET STEEL NOT LESS THAN NO. 16 U.S. GAUGE WITH LEADING EDGE HEMMED. EACH DAMPERS SHALL BE LARGE ENOUGH TO COVER THE SMALLER TWO OPENINGS IT CONTROLS. DAMPERS SHALL BE CONTROLLED AS FOLLOWS:
   A. EXPOSED OR ACCESSIBLE DUCTWORK - LOCKING QUADRANT EQUAL TO YOUNG REGULATOR NO. 1 WITH DAMPER ROD ENDING BEARINGS ON OPPOSITE END.
   B. CONCEALED DUCTWORK - LOCKING QUADRANT EQUAL TO YOUNG REGULATOR NO. 315 (CHROMIUM PLATED) WITH DAMPER ROD END BEARINGS ON BOTH ENDS).
3. VOLUME DAMPERS SHALL BE THE OPPOSITE INTERLOCKING TYPE AS MANUFACTURED BY AMERICAN FOUNDRY AND FURNACES CO. (AFFCO) OR EQUAL. BLADES SHALL BE OF NO. [illegible] GAUGE SHEET METAL AND SHALL NOT EXCEED [illegible] IN LENGTH OF [illegible] WIDTH. BLADES SHALL BE ON ONE-HALF INCH (1/2") DIAMETER LUBRICATING FERRULE TYPE.
4. JOB FABRICATED TURNING VANES SHALL BE ACCEPTABLE IN SQUARE ELBOWS. PROVIDE AND INSTALL TO SMACNA STANDARDS. TURNING VANES SHALL BE OF THE SAME GAUGE METAL AS THE DUCT IN WHICH THEY ARE INSTALLED. RADIUS ELBOWS SHALL HAVE A CENTERLINE RADIUS OF ONE AND ONE-HALF (1-1/2") TIMES THE DUCT WIDTH.

GENERAL HVAC NOTES:

1. COORDINATE ALL EQUIPMENT, DUCTWORK AND ASSOCIATED APPURTENANCES TO BE INSTALLED WITH OTHER TRADES, I.E., MECHANICAL FIRE PROTECTION, ELECTRICAL AND STRUCTURAL TO ASSURE THAT ALL HVAC SYSTEMS ARE INSTALLED ABOVE FINISHED CEILING OR IN A CONCEALED SPACE. ALL CEILING HEIGHT INDICATED ON ARCHITECTURAL AND/OR INTERIOR DESIGN DRAWINGS AND MINIMUM CLEARANCES REQUIRED BY LOCAL CODES SHALL BE MAINTAINED THROUGHOUT THE BUILDING. CONTRACTOR SHALL COORDINATE WITH LIGHTS, STEEL AND OTHER OBSTRUCTIONS.
2. INSTALL DUCTWORK TIGHT TO THE BOTTOM OF STEEL UNLESS OTHERWISE NOTED. SUPPORT DUCTWORK ACCORDING TO SMACNA STANDARDS AND SPECIFICATIONS. SUPPORTING DUCTWORK FROM METAL DECK PAN IS UN-ACCEPTABLE.
3. PROVIDE A MINIMUM OF 24 INCHES CLEARANCE FOR ACCESS DOORS AND PANELS. ACCESS SHALL BE PROVIDED FOR ALL PUMPS, VALVES, CONTROL VALVES, REGULATORS, FLOW STATIONS ETC. LOCATED AT/IN CEILINGS/WALLS OR FLOORS.
4. ALL HVAC SYSTEMS AND EQUIPMENT SHALL BE PROPERLY IDENTIFIED.
5. PROVIDE FIRE DAMPER AT AIR DEVICES THAT PENETRATE FIRE-RATED CEILING ASSEMBLIES. FIRE DAMPER RATE SHALL BE EQUAL TO OR EXCEED THE RATING OF THE CEILING ASSEMBLE.
6. FIRST 20 FT. OF SUPPLY AND RETURN AIR DUCTWORK LOCATED IN BACK OF HOUSE SHALL HAVE 1" DUCT LINER. THE DIMENSIONS INDICATED ARE INSIDE CLEAR INCREASE DUCT SIZES 1" IN ALL DIRECTIONS.
7. COORDINATE SENSORS / STAT LOCATIONS WITH GENERAL CONTRACTOR AND ARCHITECTURAL FEATURES. HEIGHTS SHALL BE ADA ACCESSIBLE.
8. FIELD VERIFY EXISTING CONDITIONS AND EXISTING DUCTWORK LAYOUTS.
9. COORDINATE DUCTWORK MOUNTING HEIGHTS W/CEILING HEIGHTS AND GENERAL CONTRACTORS.
10. PROVIDE ANCHOR BOLTS/CLIPS, STRAPS, AND ACCESSORIES FOR SECURING ALL HVAC CURBS AND UNITS TO ROOF TO SUSTAIN WINDS AND WIND GUSTS BASED ON STATE AND LOCAL CODES.

FINAL TESTING AND BALANCING:

1. SYSTEM SHALL BE TESTED, ADJUSTED AND BALANCED BY NEBB OR AABC CERTIFIED PERSONAL, THE TAB REPORT WILL INCLUDE OA FLOW READINGS.
2. EQUIPMENT WILL BE BALANCED TO AIR FLOW WITHIN:
   A. TERMINAL DEVICES AND BRANCH LINES ± 10%
   B. MAIN DUCTS AND RTU'S ± 5%
   C. EXHAUST AIR ± 10%
   D. OUTDOOR AIR + 5%
3. PROVIDE MINIMUM MERV-13 FILTERS MANUFACTURED BY FARR, AMERICAN AIR FILTER, FLANDERS, OR APPROVED EQUAL, UNLESS OTHERWISE INDICATED. AIR UNITS SHALL HAVE NEW FILTERS INSTALLED WHEN THEY ARE OPERATED BEFORE FINAL ACCEPTANCE.
4. MERV-13 FILTERS SHALL BE INSTALLED PRIOR TO TEST AND BALANCE.

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Mechanical Legend & Specifications

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