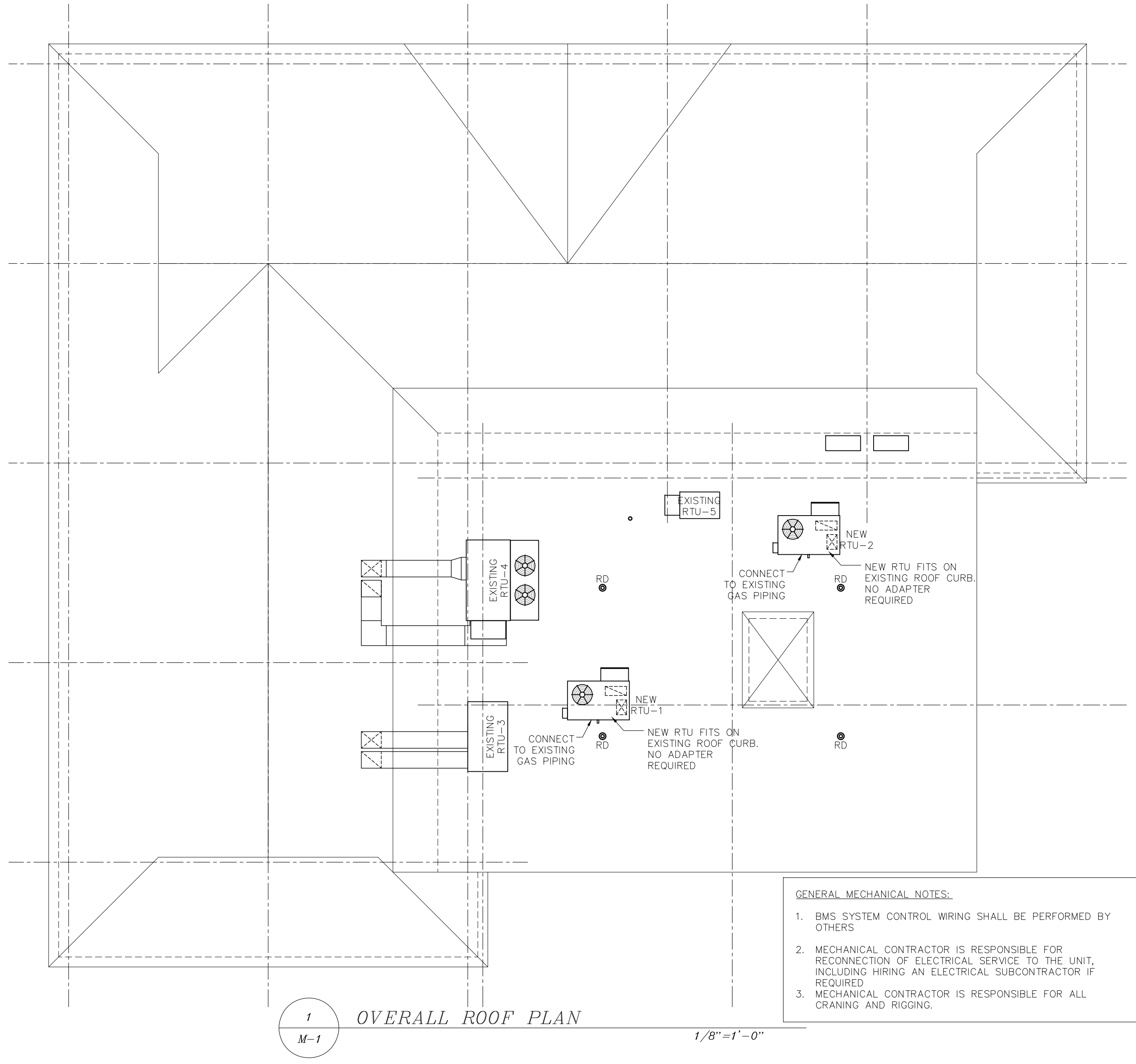


PROJECT DESIGN CONDITIONS:					
ASHRAE WEATHER STATION: MANCHESTER, NEW HAMPSHIRE					
SEASON	VALUE	UNITS	DESCRIPTION	SOURCE	
WINTER	-17.3	F	OA TEMP	ASHRAE EXTREME ANNUAL DESIGN CONDITIONS (50 YR)	
	72.0	F	INDOOR TEMP	2015 IECC SECTION 302.1	
SUMMER	91.1	F	OA DRY-BULB TEMP	2013 ASHRAE FUNDAMENTALS, CHAPTER 14, COOLING 0.4%	
	71.9	F	OA WET-BULB TEMP	2013 ASHRAE FUNDAMENTALS, CHAPTER 14, COOLING 0.4%	
	75.0	F	INDOOR TEMP	2015 IECC SECTION 302.1	



- GENERAL MECHANICAL NOTES:**
- BMS SYSTEM CONTROL WIRING SHALL BE PERFORMED BY OTHERS
 - MECHANICAL CONTRACTOR IS RESPONSIBLE FOR RECONNECTION OF ELECTRICAL SERVICE TO THE UNIT, INCLUDING HIRING AN ELECTRICAL SUBCONTRACTOR IF REQUIRED
 - MECHANICAL CONTRACTOR IS RESPONSIBLE FOR ALL CRANING AND RIGGING.

Derry Police Department Derry, New Hampshire			Per 2015 IMC Chapter 4 & ASHRAE 62.1-2013															
Ventilation Calculations & Airflows																		
Room #	Room Name	Occupancy Classification	Rp cfm/p	Pz # Occ	Rp*Pz cfm	IMC Requirements								Supply		Return cfm	Exhaust cfm	Notes:
						Ra cfm/sf	Az Ft2	Ra*Az cfm	Vbz cfm	Ez cfm	Voz cfm	Vpz cfm	Zp cfm					
102	Corridor	Corridor				0.06	375	23	23	0.8	28	200	0.14					
104	Toilet	Toilet					80									75		
106	Evidence Processing	Office	5.0	1	5	0.06	170	10	15	0.8	19	250	0.08					
109	Evidence Storage	Storage				0.12	550	66	66	0.8	83	450	0.18					
111	Exercise	Health Club	20.0	6	120	0.06	675	41	161	0.8	201	1,200	0.17					
RTU-1 Total			7	125			1,850	139		0.8	330	2,100	0.18			75		
Actual Total People At Any One Time			7			IMC Requirements								Actual				
						Ev	D	Vou	Vot		Min OA							
						0.9	1.00	330	367		375							
200	Prosecutor	Office	5.0	3	15	0.06	90	5	20	0.8	26	175	0.15					
201	Corridor	Corridor				0.06	125	8	8	0.8	9	75	0.13					
202	Toilet	Restroom					56									75		
203	Toilet	Restroom					50									75		
204	Prosecutor	Office	5.0	3	15	0.06	90	5	20	0.8	26	175	0.15					
205	It Office	Office	5.0	3	15	0.06	90	5	20	0.8	26	175	0.15					
207	Administrative Lieutenant	Office	5.0	3	15	0.06	150	9	24	0.8	30	300	0.10					
208	Corridor	Corridor				0.06	195	12	12	0.8	15	100	0.15					
209	Administrative Sergeant	Office	5.0	3	15	0.06	107	6	21	0.8	27	175	0.15					
210	Community Relations	Office	5.0	3	15	0.06	106	6	21	0.8	27	175	0.15					
211	Community Relations	Office	5.0	3	15	0.06	106	6	21	0.8	27	175	0.15					
212	Secretary Alcove	Office	5.0	6	30	0.06	360	22	52	0.8	65	375	0.17					
237	Supervisor	Office	5.0	2	10	0.06	100	6	16	0.8	20	100	0.20					
RTU-2 Total			29	145			1,625	91		0.8	295	2,000	0.20			150		
Actual Total People At Any One Time			29			IMC Requirements								Actual				
						Ev	D	Vou	Vot		Min OA							
						0.9	1.00	295	328		350							

GAS/ELECTRIC ROOF TOP UNIT SCHEDULE (RTU)																								
MARK	MAKE	MODEL	NOM TONS	SUPPLY (CFM)	ESP (IN. WC)	OA (CFM)	COOLING (BASED ON MAX OCC OA)						HEATING (BASED ON MAX OCC OA)						ELECTRICAL				NOTES	
							TOTAL (MBH)	SENSIBLE (MBH)	EFFICIENCY SEER	EDB	EWB	LDB	LWB	INPUT (MBH)	OUTPUT (MBH)	EFFICIENCY	FUEL	EAT	LAT	BHP	VOLT/PH	MCA		MOCP
RTU-1	CARRIER	48GCEN06D2A5-2FMCO	5	2,000	1.00	375	62.6	45.9	16.0	78.0	64.3	56.6	53.7	110/82	88/60	80.0%	NAT GAS	52.0	93.1	1.28	208/3	31.0	45	1,2
RTU-2	CARRIER	48GCEN06D3A5-2FMCO	5	2,000	1.50	350	62.5	45.6	16.0	77.8	64.1	56.5	53.5	110/82	88/65	80.0%	NAT GAS	53.1	94.2	1.66	208/3	29.0	40	1,2

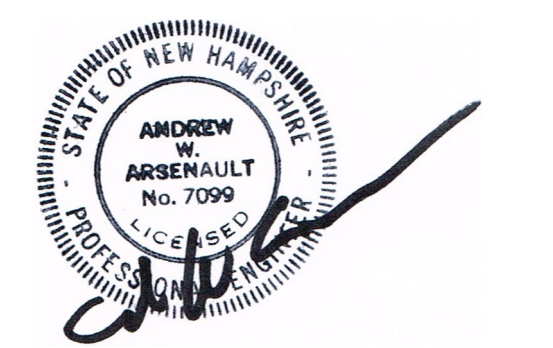
NOTES:

- DUAL ENTHALPY ECONOMIZER, FOIL FACED INSULATION, HINGED ACCESS PANELS NON-FUSED DISCONNECT, SMOKE DETECTORS IN SA & RA, BACNET INTERFACE, "HUMIDI-MIZER" DEHUMIDIFICATION
- PROVIDE NEW COMBINATION THERMOSTAT AND HUMIDISTAT



THE PROJECT MANAGER FOR THIS PROJECT IS NOTED BELOW. PLEASE REFER ALL QUESTIONS, SUBMITTALS AND CORRESPONDENCE TO THE PROJECT MANAGER.

HYAC PROJECT MANAGER:
DAVID C. MAGNUSON
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ADDRESS: 65 OLD CENTER RD, DEERFIELD, NH 03037



PROJECT:
DERRY POLICE DEPARTMENT
RTU REPLACEMENT
1 MUNICIPAL DRIVE
DERRY, NH

FOR:
TOWN OF
DERRY, NH

EXISTING AND
NEW ROOF PLANS
AND
SCHEDULES

REVISIONS:

DESIGNED BY: DCM
DRAWN BY: MRM
CHECKED BY: AWA

DDM JOB #: 20071
SCALE: AS NOTED

DATE: 06/11/2020

M-1

DIVISION 23 – HVAC SPECIFICATIONS

1) GENERAL

A) WORK INCLUDED:

- THESE SPECIFICATIONS INCLUDE GENERAL REQUIREMENTS FOR ALL WORK REPRESENTED ON THESE DRAWINGS. NOT ALL SYSTEMS OR SYSTEM COMPONENTS DESCRIBED IN THESE SPECIFICATIONS ARE NECESSARILY INCLUDED AS A PART OF THIS PROJECT.
- THE HEATING, VENTILATING, AND AIR CONDITIONING (HVAC) CONTRACTOR SHALL HEREAFTER BE DESCRIBED AS "THE CONTRACTOR" IN THIS HVAC SPECIFICATION. THE CONTRACTOR SHALL PROVIDE, INSTALL, PIPE, DUCT, AND WIRE, AS REQUIRED, HVAC SYSTEMS AS DESCRIBED BELOW, AND SHOWN OR DESCRIBED ON THESE PLANS AND SPECIFICATIONS.

B) QUALITY ASSURANCE:

- THE INTERNATIONAL MECHANICAL CODE (IMC) 2015, AND THE INTERNATIONAL ENERGY CONSERVATION CODE (IECC) 2015 ARE THE GOVERNING CODES FOR ALL HVAC WORK. THE CODES AND STANDARDS REFERENCED IN THE MECHANICAL CODE SHALL BE CONSIDERED A PART OF THE REQUIREMENTS OF CODE TO THE PRESCRIBED EXTENT OF EACH SUCH REFERENCE. WHERE DIFFERENCES OCCUR BETWEEN PROVISIONS OF THE CODE AND THE REFERENCED STANDARDS, THE PROVISIONS OF THE CODE SHALL APPLY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO BE FAMILIAR WITH THE REQUIREMENTS OF ALL CODES AS THEY HAVE BEEN ADOPTED BY THE STATE AND LOCAL JURISDICTIONS.
- EXCEPT AS SPECIFICALLY DESCRIBED OTHERWISE IN THESE SPECIFICATIONS, ALL COMPONENTS ALLOWED WITHIN THE ABOVE REFERENCED CODES SHALL BE ALLOWED AS A PART OF THE WORK.
- THE WORKMANSHIP AND MATERIALS COVERED BY THESE SPECIFICATIONS SHALL CONFORM TO ALL ORDINANCES AND REGULATIONS OF ALL AUTHORITIES HAVING JURISDICTION, INCLUDING BUT NOT LIMITED TO, ALL APPLICABLE REGULATIONS OF THE CITY, COUNTY, AND STATE.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PAYING FOR HVAC PERMITS, TAXES, CONNECTION AND INSPECTION FEES AS REQUIRED FOR THE COMPLETE INSTALLATION OF THE HVAC SYSTEM. THE CONTRACTOR SHALL PROVIDE TO THE OWNER ALL CERTIFICATES OF INSPECTION ISSUED BY THE JURISDICTION.
- THE CONTRACTOR SHALL VISIT THE SITE AND EXAMINE ALL CONDITIONS AFFECTING THE PROPER EXECUTION OF THE CONTRACT, VERIFY ALL EXISTING CONDITIONS IN THE FIELD AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK.
- DURING THE PROGRESS OF THE WORK, THE CONTRACTOR SHALL MAINTAIN AN ACCURATE RECORD OF ALL CHANGES MADE IN THE HVAC INSTALLATION FROM THE LAYOUT AND MATERIALS CONTAINED IN THE APPROVED DRAWINGS AND SPECIFICATIONS.
- DRAWINGS AND CATALOG CUTS, SHOWING ALL HVAC EQUIPMENT AND SYSTEM COMPONENTS, SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL. FIELD MEASURE AND COORDINATE WITH ARCHITECTURAL AND STRUCTURAL DRAWINGS AND ALL OTHER TRADES THE PROPOSED LOCATIONS FOR NEW EQUIPMENT AND COMPONENTS BEFORE PRODUCING SUBMITTALS. NO ITEMS SHALL BE PURCHASED OR ORDERED BEFORE APPROVAL IS GIVEN BY THE ENGINEER IN WRITING.
- THE CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL OTHER TRADES.

C) RELATED DOCUMENTS:

- THE GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTAL GENERAL CONDITIONS OF THE CONTRACT AND DIVISION 1 SPECIFICATION SECTIONS PROVIDED BY THE ARCHITECT, AND ALL OTHER DRAWINGS AND SPECIFICATIONS PROVIDED AS A PART OF THIS PROJECT, APPLY TO THIS DIVISION 23 AND TO ALL CONTRACTORS, SUBCONTRACTORS, OR OTHER PERSONS SUPPLYING MATERIALS AND/OR LABOR, ENTERING INTO THE PROJECT SITE AND/OR PREMISES, DIRECTLY OR INDIRECTLY.
- THE SPECIFICATIONS AND DRAWINGS ARE INTENDED TO BE COMPLEMENTARY. A PARTICULAR SECTION, PARAGRAPH OR HEADING IN A DIVISION MAY NOT DESCRIBE EACH AND EVERY DETAIL CONCERNING WORK TO BE DONE AND MATERIALS TO BE FURNISHED. THE DRAWINGS ARE DIAGNOSTIC AND MAY NOT SHOW ALL OF THE WORK REQUIRED OR ALL CONSTRUCTION DETAILS. DIMENSIONS ARE SHOWN FOR CRITICAL AREAS ONLY AS AN AID TO THE CONTRACTOR; ALL DIMENSIONS AND ACTUAL PLACEMENTS ARE TO BE VERIFIED IN THE FIELD. IT IS TO BE UNDERSTOOD THAT THE BEST TRADE PRACTICES OF THE DIVISION WILL PREVAIL.
- ALL TRADE SUBCONTRACTORS ARE TO NOTE THAT THE ORGANIZATION OF SPECIFICATIONS INTO DIVISIONS, AND LIKEWISE THE ARRANGEMENT OF THE DRAWINGS, IS SET UP FOR THE CONVENIENCE OF UNDERSTANDING THE SCOPE OF THE WORK ONLY. THIS STRUCTURING SHALL NOT CONTROL THE GENERAL CONTRACTOR IN DIVIDING THE WORK AMONG TRADE SUBCONTRACTORS OR IN ESTABLISHING THE EXTENT OF THE WORK TO BE PERFORMED BY ANY TRADE. REFER TO GENERAL CONDITIONS.

II) PRODUCTS

A) GENERAL MECHANICAL MATERIALS:

- ESCUTCHEONS: AT ALL FINISHED WALL PENETRATIONS, PROVIDE CHROME-PLATED SPUT-RING ESCUTCHEON. INSIDE DIAMETER SHALL CLOSELY FIT PIPE OUTSIDE DIAMETER OR OUTSIDE OF PIPE INSULATION WHERE PIPE IS INSULATED. OUTSIDE DIAMETER SHALL COMPLETELY COVER THE OPENING IN FLOORS, WALLS, OR CEILINGS.
- UNIONS: MALLEABLE-IRON, CLASS 150 FOR LOW PRESSURE SERVICE AND CLASS 250 FOR HIGH PRESSURE SERVICE; HEXAGONAL STOCK, WITH BALL-AND-SOCKET JOINTS, METAL-TO-METAL BRONZE SEATING SURFACES, FEMALE THREADED ENDS.
- DIELECTRIC UNIONS: PROVIDE DIELECTRIC UNIONS WITH APPROPRIATE END CONNECTIONS FOR THE PIPE MATERIALS IN WHICH INSTALLED (SCREWED, SOLDERED, OR FLANGED), WHICH EFFECTIVELY ISOLATE DISSIMILAR METALS, TO PREVENT GALVANIC ACTION, AND STOP CORROSION.
- SLEEVES: GALVANIZED STEEL METAL OR SCHEDULE 40 STEEL PIPE AS APPROPRIATE FOR THE WALL CONSTRUCTION.
- SLEEVE SEALS: MODULAR TYPE, CONSISTING OF INTERLOCKING SYNTHETIC RUBBER LINKS SHAPED TO CONTINUOUSLY FILL ANULAR SPACE BETWEEN PIPE AND SLEEVE, CONNECTED WITH BOLTS AND PRESSURE PLATES WHICH CAUSE RUBBER SEALING ELEMENTS TO EXPAND WHEN TIGHTENED, PROVIDING WATER TIGHT SEAL AND ELECTRICAL INSULATION.
- ACCESS DOORS: WHERE REQUIRED FOR PROPER SERVICE AND MAINTENANCE OF ALL MECHANICAL COMPONENTS, PROVIDE STEEL ACCESS DOORS AND FRAMES, FACTORY-FABRICATED AND ASSEMBLED UNITS, COMPLETE WITH ATTACHMENT DEVICES AND FASTENERS SUITABLE FOR THE SERVICE.

B) ELECTRICAL REQUIREMENTS OF MECHANICAL WORK:

- BASIC ELECTRICAL COMPONENTS INCLUDE, BUT ARE NOT LIMITED TO ALL REQUIRED STARTERS, DISCONNECT SWITCHES, CONTROL DEVICES, AND MOTORS. IT INCLUDES MOTORS THAT ARE FACTORY-INSTALLED AS PART OF EQUIPMENT AND APPLIANCES AS WELL AS FIELD-INSTALLED MOTORS.
- STARTERS AND DISCONNECTS: WHERE AVAILABLE, PROVIDE FACTORY MOUNTED DISCONNECTS AND STARTERS, OR, WHEN FACTORY MOUNTED STARTERS AND DISCONNECTS ARE NOT AVAILABLE PROVIDE COMBINATION STARTERS AND DISCONNECT SWITCHES; OR, WHERE COMBINATION STARTERS AND DISCONNECT SWITCHES ARE NOT AVAILABLE OR AVAILABLE, PROVIDE SEPARATE STARTERS AND DISCONNECTS FOR ALL HVAC EQUIPMENT, AS REQUIRED FOR PROPER INSTALLATION AND OPERATION OF EQUIPMENT.

C) MECHANICAL IDENTIFICATION:

- PLASTIC IDENTIFICATION MARKERS: PROVIDE MANUFACTURER'S STANDARD LAMINATED PLASTIC, COLOR CODED EQUIPMENT MARKERS.
- LETTERING AND GRAPHICS: COORDINATE NAMES, ABBREVIATIONS AND OTHER DESIGNATIONS USED IN MECHANICAL IDENTIFICATION WORK, WITH CORRESPONDING DESIGNATIONS SHOWN, SPECIFIED OR SCHEDULED. PROVIDE NUMBERS, LETTERING AND WORKING AS INDICATED OR, IF NOT OTHERWISE INDICATED, AS RECOMMENDED BY MANUFACTURERS OR AS REQUIRED FOR PROPER IDENTIFICATION AND OPERATION/MAINTENANCE OF MECHANICAL SYSTEMS AND EQUIPMENT.

D) VIBRATION CONTROL AND SEISMIC RESTRAINTS:

- FIBERGLASS PADS AND SHAPES, NEOPRENE PADS, VIBRATION ISOLATION SPRINGS, PAD-TYPE ISOLATORS, PLATE-TYPE ISOLATORS, DOUBLE-PLATE-TYPE ISOLATORS, THREADED DOUBLE-PLATE-TYPE ISOLATORS, ALL-DIRECTIONAL ANCHORS, NEOPRENE MOUNTINGS, FREE STANDING SPRING ISOLATORS, HOUSED SPRING ISOLATORS, VERTICALLY-RESTRAINED SPRING ISOLATORS, EARTHQUAKE-RESISTANT SPRING ISOLATORS, SEISMIC SHROBBERS, THRUST RESTRAINTS, EQUIPMENT RAILS, FABRICATED EQUIPMENT BASES, INERTIA BASE FRAMES, ROOF-CURB ISOLATORS, ISOLATION HANGERS, RISER ISOLATORS, FLEXIBLE PIPE CONNECTORS SHALL BE PROVIDED AS REQUIRED AND AS SUITABLE FOR USE AND SERVICE.
- WHERE SEISMIC RESTRAINTS ARE REQUIRED, THE CONTRACTOR SHALL PROVIDE CALCULATIONS, DETAILS AND LOCATIONS THAT ARE STAMPED BY A PROFESSIONAL ENGINEER.

E) REFRIGERATION PIPING SYSTEMS:

- COPPER TUBE AND FITTINGS:
 - DRAWN-TEMPER OR ANNEALED COPPER TUBE: ASTM B280, TYPE ACR.
 - WROUGHT-COPPER FITTINGS: ASME B16.22.
 - BRAZING FILLER METALS: AWS AS.8, CLASSIFICATION BAG-1 (SILVER)
- PREINSULATED COPPER ROLLS, SIMILAR TO PDM GELCOPPER ARE ACCEPTABLE.
- PROVIDE AND INSTALL ALL REFRIGERANT PIPING SPECIALTIES REQUIRED AND RECOMMENDED BY THE REFRIGERATION EQUIPMENT MANUFACTURER.

F) INSULATION:

- REFRIGERANT PIPING INSULATION SHALL BE FLEXIBLE ELASTOMERIC THERMAL INSULATION: CLOSED-CELL SPONGE-OR EXPANDED-RUBBER MATERIALS. COMPLY WITH ASTM C 534, TYPE I FOR TUBULAR MATERIALS AND TYPE II FOR SHEET MATERIALS.
 - ADHESIVE: AS RECOMMENDED BY INSULATION MATERIAL MANUFACTURER.
 - PROVIDE UV PROTECTIVE COATING ON ELASTOMERIC INSULATION THAT IS EXPOSED TO SUNLIGHT.
 - REFRIGERANT PIPE INSULATION THICKNESS (40-60° OPERATING TEMPERATURE)
 - 1/2" THICK INSULATION FOR 1-1/4" & SMALLER PIPE SIZES.
 - 2 1/2" THICK INSULATION FOR 1-1/2" & LARGER PIPE SIZES.
- DUCTWORK: ALL INDOOR SUPPLY AND OUTDOOR AIR DUCTS AND PLENUMS (INCLUDING THOSE INSTALLED IN RETURN AIR PLENUMS) SHALL BE INSULATED WITH FIBERGLASS WITH FSK JACKET WITH AN INSTALLED MINIMUM R-6 FORMALDEHYDE-FREE INSULATION, SIMILAR TO JOHNS MANVILLE MICROLITE EQ TYPE 75, 2-1/5" THICK, INTERNALLY LINED SUPPLY AIR DUCT DOES NOT REQUIRE EXTERNAL INSULATION.
 - ROOF MOUNTED SUPPLY, RETURN AND EXHAUST AIR DUCTS SHALL BE INSULATED WITH AN INSTALLED MINIMUM R-12 INSULATION, SIMILAR TO 2.5" THICK HUNTER H-SHIELD POLYISO OR JOHNS MANVILLE B14, 3" THICK, 3.0 PCF FIBERGLASS INSULATION BOARD WITH FSK JACKET.
 - SLOPE TOP TO SHED WATER.
 - COVER WITH VENTURECLAD 1577CW-E EMBOSSED ALUMINUM INSULATION JACKETING TAPE OR SIMILAR.
 - EXHAUST DUCTS SHALL BE INSULATED WITH R-6 TO TEN FEET BACK FROM BUILDING EXTERIOR.
 - ADDITIONAL DUCTWORK INSULATION REQUIREMENTS MAY BE SHOWN ON THE DRAWINGS.

III) EXECUTION

- THE CONTRACTOR SHALL PROVIDE ALL SUPERVISION, LABOR, EQUIPMENT, MATERIAL, MACHINERY, PLANS, RIGGING, AND ANY AND ALL OTHER ITEMS NECESSARY TO COMPLETE THE MECHANICAL SYSTEM. SMALL DETAILS NOT USUALLY INDICATED ON THE DRAWINGS OR SPECIFIED, BUT WHICH ARE NECESSARY FOR THE PROPER INSTALLATION AND OPERATION OF THE MECHANICAL SYSTEM SHALL BE INCLUDED IN THE WORK AND IN THE CONTRACTOR'S ESTIMATE THE SAME AS IF HEREIN SPECIFIED OR SHOWN ON THE DRAWINGS.
- THE CONTRACTOR SHALL INSTALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. THIS INCLUDES CHECKING THE MANUFACTURER'S INSTRUCTIONS TO DETERMINE WHAT TYPE OF GLYCOL SYSTEM MAY BE USED WITH EQUIPMENT SO AS NOT TO VOID THE WARRANTY OR IMPAIR THE OPERATION OF THE EQUIPMENT. WHERE THE DRAWINGS AND SPECIFICATIONS CONFLICT WITH THE MANUFACTURER'S RECOMMENDATIONS, IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO BRING THIS TO THE ATTENTION OF THE ENGINEER.
- THE HVAC EQUIPMENT MAY NOT BE USED FOR TEMPORARY HEAT DURING CONSTRUCTION. THE HVAC EQUIPMENT SHALL NOT BE STARTED AND TESTED UNTIL ALL CONSTRUCTION ACTIVITY THAT HAS THE POTENTIAL OF CREATING AIR BORNE PARTICULATES THAT COULD BE DRAWN INTO THE HVAC EQUIPMENT AND DUCTWORK SYSTEMS HAS BEEN COMPLETED. IN ADDITION, ALL DUCTWORK OPENINGS SHALL BE SEALED UNTIL THE TIME WHEN THE HVAC EQUIPMENT

IS TO BE STARTED AND TESTED.

- DUCTWORK AND FITTINGS SHALL HAVE ENDS COVERED WITH PLASTIC AT ALL TIMES.
- UPON COMPLETION OF WORK, THE CONTRACTOR SHALL CLEAN, OIL AND GREASE (UNLESS FACTORY LUBRICATED) ALL FANS, PUMPS, MOTORS, ALL OTHER RUNNING EQUIPMENT AND APPARATUS AND MAKE CERTAIN THAT ALL SUCH APPARATUS AND MECHANISMS ARE IN PROPER WORKING ORDER AND MADE READY FOR TESTING.
- REPLACE ALL FILTERS USED DURING CONSTRUCTION.
- EQUIPMENT SHALL BE STARTED, TESTED, ADJUSTED AND PLACED IN SATISFACTORY OPERATING CONDITION BY THE CONTRACTOR.
- THE CONTRACTOR SHALL INSTRUCT OWNER IN THE PROPER OPERATION OF EQUIPMENT, EXPLAIN THE PROPER OPERATING AND MAINTENANCE PROCEDURES AND SHALL FURNISH THE OWNER WITH ALL INSTRUCTION PAMPHLETS, BOOKS AND OTHER MATERIAL FURNISHED BY THE VARIOUS MANUFACTURERS.
- ALL VIBRATING EQUIPMENT NOT MOUNTED ON THE GROUND FLOOR SHALL BE MOUNTED ON OR SUSPENDED FROM VIBRATION ISOLATORS.
- EQUIPMENT SHALL BE INSTALLED WITH CLEARANCE FOR PROPER MAINTENANCE. FILTERS, COILS, DRIVES, VALVES, AND CONTROLS SHALL BE ACCESSIBLE FOR SERVICING AND/OR REPLACEMENT.
- EQUIPMENT SHALL BE COVERED FOR ONE YEAR FROM THE REVIEWING ENGINEER'S DATE OF ACCEPTANCE AND/OR THE DURATION OF THE MANUFACTURER'S GUARANTEE OR WARRANTY, WHICH EVER IS LONGER. THE CONTRACTOR SHALL FURNISH THE OWNER WITH ALL MANUFACTURER'S GUARANTEES OR WARRANTIES.
- THE WATER AND AIR SYSTEMS SHALL BE BALANCED FROM -10% TO +10% OF THE GPM AND CFM VALUES SHOWN ON THE APPROVED HVAC PLANS. BALANCING SHALL BE DONE IN ACCORDANCE WITH STANDARDS ESTABLISHED BY THE AABC OR NEBB USING REPORT SHEETS DEVELOPED BY THE AABC OR NEBB. SUBMIT REPORTS TO THE ENGINEER.

END OF DIVISION 23

LEGEND OF PIPING SYMBOLS

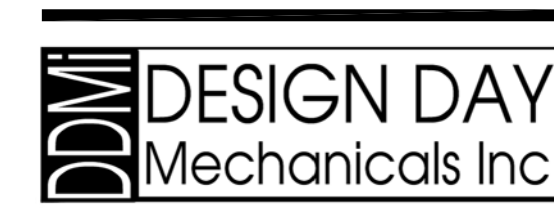
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	PIPE ELBOW UP		BALL VALVE
	PIPE ELBOW DOWN		BUTTERFLY VALVE
	PIPE TEE UP		GATE VALVE
	PIPE TEE DOWN		OS&Y GATE VALVE
	PIPE CROSS OVER		CHECK VALVE
	UNION		BACK FLOW PREVENTER
	FLEXIBLE PIPE CONNECTOR		TRIPLE-DUTY VALVE
	END CAP		TRIPLE-DUTY VALVE WITH MEASUREMENT PORTS
	PETE'S PLUG		2-WAY MOTORIZED VALVE
	HOSE THREAD DRAIN VALVE WITH CAP AND CHAIN		3-WAY MOTORIZED VALVE
	CIRCUIT SETTER		TEMPERING VALVE
	STRAINER		PRESSURE REDUCING VALVE
	STRAINER WITH BLOWDOWN		TEMPERATURE & PRESSURE RELIEF VALVE
	CIRCULATOR PUMP		DIFFERENTIAL PRESSURE BYPASS VALVE
	MANUAL AIR VENT		SOLENOID VALVE
	AUTOMATIC AIR VENT		GAS COCK
	AIR SCOOP		DIRECTION OF FLOW
	AIR SCOOP WITH VENT		DIRECTION OF PITCH
	AIR SEPARATOR WITH VENT		CONNECT TO EXISTING
	FIN TUBE IDENTIFICATION TAG		PIPE CONTINUES
	FIN TUBE RADIATION WITH COVER		THERMOMETER
	FIN TUBE RADIATION WITH COVER		PRESSURE GAUGE WITH SHUTOFF & PIGTAIL
	FIN TUBE RADIATION WITH COVER		VACUUM BREAKER
	FIN TUBE RADIATION WITH COVER		ELECTRIC HEAT TRACING

LEGEND OF DUCT SYMBOLS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	MANUAL BALANCING DAMPER		RECTANGULAR RETURN OR EXHAUST DUCT UP
	FIRE DAMPER		ROUND RETURN OR EXHAUST DUCT UP
	SMOKE DAMPER		RECTANGULAR RETURN OR EXHAUST DUCT DOWN
	SMOKE & FIRE DAMPER		ROUND RETURN OR EXHAUST DUCT DOWN
	CABLE OPERATED DAMPER		RECTANGULAR SUPPLY DUCT UP
	BACK DRAFT DAMPER		ROUND SUPPLY DUCT UP
	MOTORIZED DAMPER		RECTANGULAR SUPPLY DUCT DOWN
	SUPPLY AIRFLOW		ROUND SUPPLY DUCT DOWN
	RETURN / EXHAUST AIRFLOW		REGISTER, GRILLE AND DIFFUSER IDENTIFICATION TAG
	CONNECT TO EXISTING		

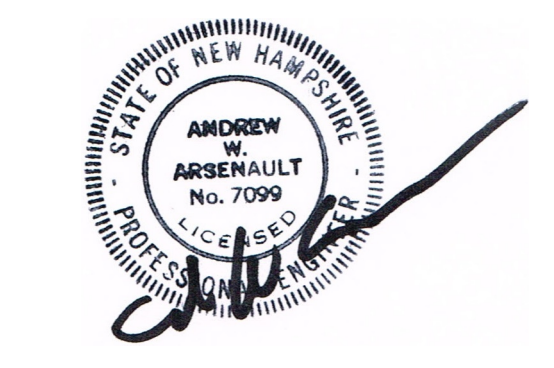
LEGEND OF CONTROL SYMBOLS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	THERMOSTAT		HUMIDISTAT
	TEMPERATURE SENSOR		PRESSURE SENSOR
	CARBON MONOXIDE SENSOR		SMOKE DETECTOR
	CARBON DIOXIDE SENSOR		INDICATOR LAMP



THE PROJECT MANAGER FOR THIS PROJECT IS NOTED BELOW. PLEASE REFER ALL QUESTIONS, SUBMITTALS AND CORRESPONDENCE TO THE PROJECT MANAGER.

HVAC PROJECT MANAGER:
DAVID C. MACHUSON
EMAIL: DAVEM@DESIGNDAYMECH.COM
PHONE: (603) 463-1088
ADDRESS: 65 OLD CENTER RD, DEERFIELD, NH 03037



PROJECT:
DERRY POLICE DEPARTMENT
RTU REPLACEMENT
1 MUNICIPAL DRIVE
DERRY, NH

FOR:
TOWN OF DERRY, NH

SPECIFICATIONS, LEGENDS AND SEQUENCES OF OPERATION

REVISIONS:

NO.	DESCRIPTION	DATE

DESIGNED BY: DCM
DRAWN BY: MRM
CHECKED BY: AWA
DDM JOB #: 20071
SCALE: AS NOTED

DATE: 06/11/2020

M-2

DIVISION 25 – HVAC CONTROLS AND SEQUENCES OF OPERATION

1) GENERAL

- REFER TO SPECIFICATION DIVISION 23 – HVAC SPECIFICATIONS, ESPECIALLY GENERAL FOR WORK INCLUDED, QUALITY ASSURANCE AND RELATED DOCUMENTS.
- PROVIDE A COMPLETE ELECTRIC/ELECTRONIC CONTROL SYSTEM TO ACCOMPLISH ALL CONTROL SEQUENCES AS DESCRIBED BELOW.
- ALL LINE AND LOW VOLTAGE CONTROL WIRING, TRANSFORMERS, DISCONNECTS, ETC REQUIRED FOR THE CONTROL SYSTEMS THAT IS NOT SHOWN ON THE ELECTRICAL DRAWINGS SHALL BE PROVIDED BY THE CONTROLS CONTRACTOR (HENCEFORTH CALLED "THE CONTRACTOR").
 - LINE VOLTAGE POWER FROM CIRCUIT BREAKERS IN ELECTRICAL PANELS TO CONTROL TRANSFORMERS OR CONTROL DEVICES SHALL BE INSTALLED BY THE CONTRACTOR.
 - COMPLY WITH DIVISION 26 REQUIREMENTS.
 - CONNECT VARIABLE FREQUENCY DRIVES (VFD) AND DUCT & AREA SMOKE DETECTORS (FURNISHED BY OTHERS) INTO CONTROL CIRCUITS TO ACCOMPLISH THE SEQUENCES OF OPERATION.

II) PRODUCTS

- PROVIDE CONTROL PRODUCTS (IF NOT FACTORY PROVIDED BY HVAC EQUIPMENT MANUFACTURER) INCLUDING, BUT NOT LIMITED TO, CONTROL DAMPERS & VALVES, THERMOSTATS, TIMELOCKS, SENSORS, RELAYS, CONTROLLERS, AND OTHER COMPONENTS AS REQUIRED FOR A COMPLETE INSTALLATION.
- CONTROL DAMPERS SHALL BE LOW LEAKAGE DAMPERS WITH BLADE AND EDGE SEALS. CLASS 1 WITH LEAKAGE OF LESS THAN 4 CFM/SQFT AT 1.0" W.G. AND 8 CFM/SQFT AT 4.0" W.G.
- CONTROL VALVES SHALL BE SELECTED FOR FLUID TYPE, TEMPERATURE AND PRESSURE CLASS WHICH MATCH PIPING MATERIALS AND END CONNECTIONS. CONTROL VALVES MUST CLOSE OFF AGAINST MAXIMUM SYSTEM PRESSURE.
- DAMPER AND VALVE ACTUATORS SHALL BE ELECTRIC, SIZED TO SMOOTHLY OPERATE DAMPER OR VALVE WITH ADEQUATE TORQUE FOR TIGHT SHUTOFF AGAINST MAXIMUM SYSTEM PRESSURE.
 - ACTUATION REQUIREMENTS SHALL BE PER THE SEQUENCES OF OPERATION.
- ROOM THERMOSTATS SHALL BE 7 DAY PROGRAMMABLE WITH A 5° DEADBAND BETWEEN HEATING & COOLING AND SETBACK CAPABILITY (55° HEATING & 85° COOLING).
 - USER ADJUSTABLE SETPOINTS SHALL BE PROVIDED UNLESS NOTED OTHERWISE ON THE DRAWINGS.
- EXECUTION
- INSTALL SYSTEMS AND MATERIALS IN ACCORDANCE WITH MANUFACTURER INSTRUCTIONS AND ROUGHING-IN DRAWINGS AND DETAILS ON THE DRAWINGS. INSTALL ELECTRICAL COMPONENTS AND USE ELECTRICAL PRODUCTS COMPLYING WITH REQUIREMENTS OF APPLICABLE DIVISION 26 SECTIONS. COORDINATE THE INSTALLATION IN ACCORDANCE WITH FINAL SHOP DRAWINGS, FIELD MEASUREMENTS, MANUFACTURER'S DATA AND AS SPECIFIED HEREIN.
- MOUNT CONTROLLERS AT CONVENIENT LOCATIONS AND HEIGHTS. COORDINATE WITH ARCHITECT AND OTHER TRADES.
- PROVIDE REMOTE CONTROL OF MANUAL RESET CONTROLLERS AS REQUIRED FOR USER ACCESSIBILITY. COORDINATE

WITH OWNER.

- THE TERM "CONTROL WIRING" IS DEFINED TO INCLUDE PROVIDING OF WIRE, CONDUIT AND MISCELLANEOUS MATERIALS AS REQUIRED FOR MOUNTING AND CONNECTING ELECTRIC CONTROL DEVICES.
- INSTALL COMPLETE CONTROL WIRING SYSTEM FOR CONTROL SYSTEMS. CONCEAL WIRING, EXCEPT IN MECHANICAL ROOMS AND AREAS WHERE OTHER CONDUIT AND PIPING ARE EXPOSED. PROVIDE MULTI-CONDUCTOR INSTRUMENT HARNESS (BUNDLES) IN PLACE OF SINGLE CONDUCTORS WHERE A NUMBER OF CONDUCTORS CAN BE RUN ALONG A COMMON PATH. FASTEN FLEXIBLE CONDUCTORS BRIDGING CABINETS AND DOORS NEATLY ALONG HINGE SIDE AND PROTECT AGAINST ABRASION. THE AND SUPPORT CONDUCTORS NEATLY.
- INSTALL CIRCUITS OVER 25-VOLT WITH COLOR-CODED THIN/THIN WIRE IN EMT OR MC CABLE AS WHIPS TO EQUIPMENT CONNECTIONS. USE LIQUID-TITE CONDUIT IN EXTERIOR OR HAZARDOUS LOCATIONS.
- INSTALL CIRCUITS UNDER 25-VOLT WITH COLOR-CODED NO. 18 WIRE WITH INSULATION ON EACH CONDUCTOR AND PLASTIC SHEATH OVER ALL. PROVIDE PLENUM RATED CABLE IN PLENUM CEILINGS.
- INSTALL LOW VOLTAGE CIRCUITS WHICH ARE LOCATED IN CONCRETE SLABS OR IN MASONRY WALLS IN CONDUIT.
- WHERE CONTROL WIRING MUST BE SURFACE MOUNTED IN OCCUPIED ROOMS AND IT IS NOT POSSIBLE TO CONCEAL WIRING, RUN WIRING IN WIREMOLD RACEWAY (COLOR BY ARCHITECT).
- NUMBER-CODE OR COLOR-CODE CONDUCTORS APPROPRIATELY FOR IDENTIFICATION AND SERVICING OF THE CONTROL SYSTEM.
- DEMONSTRATE CONTROL SYSTEM TO AND TRAIN OWNER'S PERSONNEL IN OPERATION AND MAINTENANCE OF CONTROL SYSTEM.
- ROOF TOP UNITS (RTU) – SINGLE ZONE
 - THE RTU FAN SHALL OPERATE CONTINUOUSLY DURING OCCUPIED TIMES.
 - DURING UNOCCUPIED TIMES, THE FAN SHALL ONLY RUN ON A CALL FOR HEATING OR COOLING.
 - DURING OCCUPIED TIMES, THE OA DAMPER SHALL OPEN TO ROOM PORTION MIN OA POSITION WHEN THE RTU FAN IS OPERATING.
 - FOR RTUS WITH CO2 CONTROL, AS THE CO2 LEVEL RISES FROM 500 TO 1,000 PPM, THE OA DAMPER SHALL MODULATE OPEN FROM ROOM PORTION MIN OA TO MAX OCCUPANCY MIN OA.
 - THE ASSOCIATED 7-DAY PROGRAMMABLE THERMOSTAT SHALL INCLUDE OCCUPIED AND UNOCCUPIED HEATING AND COOLING SETPOINTS WITH A DEADBAND OF 5°.
 - OCCUPIED SETPOINTS SHALL BE 70° HEATING AND 75° COOLING.
 - UNOCCUPIED SETPOINTS SHALL BE 55° HEATING AND 85° COOLING.
- RTUS EXCEEDING 54 MBH COOLING SHALL INCLUDE AN INTEGRATED DIFFERENTIAL ENTHALPY ECONOMIZER. WHEN OA ENTHALPY IS LESS THAN RA ENTHALPY AND COOLING IS CALLED FOR, MODULATE THE OA DAMPER OPEN AND THE RA DAMPER CLOSED TO SATISFY THE CALL FOR COOLING BEFORE MECHANICAL COOLING IS ENGAGED.

END OF DIVISION 25