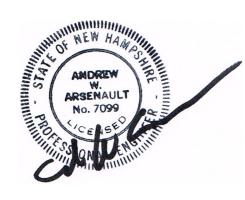


		R SCHEDULE (CH)					T T		I		
MARK	MAKE	MODEL	GPM	EWT (F)	LWT (F)	FLUID	PD (FT)	MCA	МОСР	VOLT/PH	NOTES
CH-1	CARRIER	30RAP40	99.5	54	44.0	40% PG	14.7	197.8	225	208/3	1
NOTES:											



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. MAGNUSON EMAIL: DAVEM@DESIGNDAYMECH.COM PHONE: (603) 463-1086 ADDRESS: 65 OLD CENTER RD, DEERFIELD, NH 03037



PROJECT:

ADAMS MEMORIAL BUILDING WEST BROADWAY DERRY, NH 03038

TOWN OF DERRY



REVISIONS:



DESIGNED BY: DRAWN BY: CHECKED BY:

DDM JOB #: SCALE:

19229A AS NOTED

DCM DCM AWA

DATE: 7/16/2020



SHEET I OF 2

DIVISION 23 - HVAC SPECIFICATIONS

A) WORK INCLUDED:

- 1)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.
- 2) 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:

- 1)THE INTERNATIONAL MECHANICAL CODE (IMC) 2015, AND THE INTERNATIONAL ENERGY CONSERVATION CODE (IEEC) 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.
- 2) EXCEPT AS SPECIFICALLY DESCRIBED OTHERWISE IN THESE SPECIFICATIONS, ALL COMPONENTS ALLOWED WITHIN THE ABOVE REFERENCED CODES SHALL BE ALLOWED AS A
- 3) 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.
- 4) 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.
- 5) 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.
- 6) 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.
- 7) 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
- 8) THE CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL OTHER TRADES.

C) RELATED DOCUMENTS:

- 1)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.
- 2) 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 DIAGRAMMATIC 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
- 3) 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:

- 1)ESCUTCHEONS: AT ALL FINISHED WALL PENETRATIONS, PROVIDE CHROME-PLATED SPLIT-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.
- 2) 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.
- 3) 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.
- 4) SLEEVES: GALVANIZED STEELMETAL OR SCHEDULE 40 STEEL PIPE AS APPROPRIATE FOR
- 5) SLEEVE SEALS: MODULAR TYPE, CONSISTING OF INTERLOCKING SYNTHETIC RUBBER LINKS SHAPED TO CONTINUOUSLY FILL ANNULAR SPACE BETWEEN PIPE AND SLEEVE, CONNECTED WITH BOLTS AND PRESSURE PLATES WHICH CAUSE RUBBER SEALING ELEMENTS TO EXPAND WHEN TIGHTENED, PROVIDING WATERTIGHT SEAL AND ELECTRICAL INSULATION.
- 6) FIRESTOPPING/FIRE-RESISTANT SEALANT: WHERE REQUIRED, PROVIDE A FIRESTOP SYSTEM APPROPRIATE FOR THE ASSEMBLY PENETRATED AND THE PENETRATING ELEMENT. USE ONLY FIRESTOP PRODUCTS THAT HAVE BEEN UL 1479 OR ASTM E 814 TESTED FOR SPECIFIC FIRE-RATED CONDITIONS CONFORMING TO CONSTRUCTION ASSEMBLY TYPE, PENETRATING ITEM TYPE, ANNULAR SPACE REQUIREMENT AND FIRE-RATING INVOLVED FOR EACH SEPARATE INSTANCE. SUBMIT MANUFACTUER'S SPECIFIC DETAIL FOR EACH TYPE OF PENETRATION.
- 7) VALVES PRESSURE AND TEMPERATURE RATED AS REQUIRED TO SUIT SYSTEM PRESSURES AND TEMPERATURES. UNLESS OTHERWISE INDICATED, PROVIDE VALVES OF SAME SIZE AS UPSTREAM PIPE SIZE.
- 8) THERMOMETERS: PROVIDE DIRECT MOUNT THERMOMETERS 9" ADJUSTABLE ANGLE TYPE, ALUMINUM CASE, ACRYLIC LENS, ORGANIC SPIRIT FILL OR SOLAR TYPE, SUITABLE FOR SERVICE REQUIRED. SELECT RANGE SUCH THAT NORMAL FLUID TEMPERATURES FALL WIITHIN THE MIDDLE THIRD OF THE DISPLAY. ACCURACY OF THERMOMETERS SHALL BE PLUS OR MINUS 1 PERCENT FULL SCALE. PROVIDE THERMOMETER WELLS, BRASS OR STAINLESS STEEL, PRESSURE RATED TO MATCH PIPING SYSTEM DESIGN PRESSURE.
- 9) PRESSURE GAUGES: PRESSURE GAUGES SHALL BE PHOSPHOR BRONZE BOURDON-TUBE TYPE, ALUMINUM OR BRASS CASE, GLASS LENS, SUITABLE FOR SERVICE REQUIRED. SELECT RANGE SUCH THAT NORMAL FLUID PRESSURES FALL WIITHIN THE MIDDLE THIRD OF THE DISPLAY. ACCURACY OF PRESSURE GAUGES SHALL BE PLUS OR MINUS 1 PERCENT FULL SCALE. PROVIDE PRESSURE GAUGE COCKS BETWEEN PRESSURE GAUGES AND GAUGE TEES, CONSTRUCTED OF BRASS WITH 1/4" FEMALE NPT ON EACH END, AND "T" HANDLE BRASS PLUG, WITH 1/4" BRASS BUSHING SNUBBER WITH CORROSION RESISTANT POROUS METAL DISC, THROUGH WHICH PRESSURE FLUID IS FILTERED. SELECT DISC MATERIAL FOR FLUID SERVED AND PRESSURE RATING.
- 10) SUPPORTS AND ANCHORS: HANGERS FOR PIPE UP TO AND INCLUDING 4" SHALL BE SWIVEL RING, SPLIT RING, WROUGHT PIPE CLAMP, BAND, ADJUSTABLE WROUGHT CLEVIS TYPE OR TRAPEZE. HANGERS FOR PIPES ABOVE 4" SHALL BE STANDARD CLEVIS, ROLLER OR
- 11) SADDLES AND SHIELDS: PROVIDE SADDLES AND SHIELDS UNDER PIPING HANGERS AND SUPPORTS, FACTORY-FABRICATED, FOR ALL INSULATED PIPING. SIZE SADDLES AND SHIELDS FOR EXACT FIT TO MATE WITH PIPE INSULATION.

B) ELECTRICAL REQUIREMENTS OF MECHANICAL WORK:

- 1)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
- 2) 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 SUITABLE OR AVAILABLE, PROVIDE SEPARATE STARTERS AND DISCONNECTS FOR ALL HVAC EQUIPMENT, AS REQUIRED FOR PROPER INSTALLATION AND OPERATION OF EQUIPMENT.
- C) MECHANICAL IDENTIFICATION:
- 1)PROVIDE PIPE MARKERS AND EQUIPMENT MARKERS COMPLYING WITH ANSI A13.1 FOR LETTERING SIZE, LENGTH OF COLOR FIELD, COLORS, AND INSTALLED VIEWING ANGLES OF IDENTIFICATION DEVICES.
- 2) PIPE MARKERS
- (a) SNAP-ON TYPE: PROVIDE MANUFACTURER'S STANDARD PRE-PRINTED, SEMI-RIGID, SNAP- ON, COLOR-CODED, PIPE MARKERS.

- (b) PRESSURE-SENSITIVE TYPE: PROVIDE MANUFACTURER'S STANDARD PRE-PRINTED, PERMANENT ADHESIVE, COLOR-CODED, PRESSURE-SENSITIVE VINYL PIPE MARKERS.
- (c) INSTALL EVERY 40 FEET AND AT EACH CHANGE IN DIRECTION. 3) PLASTIC EQUIPMENT MARKERS: PROVIDE MANUFACTURER'S STANDARD LAMINATED
- 4) 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 WORDING 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:

PLASTIC, COLOR CODED EQUIPMENT MARKERS.

- 1)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 SNUBBERS, 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.
- 2) WHERE SEISMIC RESTRAINTS ARE REQUIRED, THE CONTRACTOR SHALL PROVIDE CALCULATIONS, DETAILS AND LOCATIONS THAT ARE STAMPED BY A PROFESSIONAL ENGINEER.
- 1) HYDRONIC PIPING (HOT WATER AND CHILLED WATER) SHALL BE SCHEDULE 40 ASTM A53, GRADE B, TYPE E (ERW) STEEL OR ASTM B88, TYPE L COPPER TUBE (COPPER THROUGH 2" ONLY) WITH THE FOLLOWING JOINING METHODS:
- (a) THROUGH 2"SHALL USE CAST IRON CLASS 150 THREADED FITTINGS PER ASME B16.3 OR VIEGA MEGAPRESS FOR STEEL PIPE OR COPPER SOLDERED OR PRESSED FITTINGS FOR
- (b) 2-1/2"AND UP SHALL USE STEEL WELDED (ASME B16.9, STD WEIGHT), GROOVED OR FLANGED (ASME B16.5, CLASS 150, RAISED FACE) FITTINGS.
- (c) UPONOR ASTM F876/F877 SDR9 CROSSLINKED POLYETHYLENE (PEX-a) PIPING WITH ASTM F1960 COLD EXPANSION FITTINGS AND PEX REINFORCING RINGS INSTALLED PER MANUFACTURER'S INSTRUCTIONS IS ALSO ALLOWED.
- (a) THROUGH 2" BRONZE BALL VALVES EQUAL TO APOLLO 70 SERIES.
- (b) 2-1/2" AND UP DUCTILE IRON LUG STYLE BUTTERFLY VALVE WITH LEVER EQUAL TO CENTERLINE 200 SERIES.
- 3) PROVIDE AND INSTALL ISOLATION VALVES, UNIONS/FLANGES, MANUAL AIR VENTS, AND DRAIN VALVES AT ALL PIECES OF EQUIPMENT.
- 4) PITCH WATER PIPING UP IN THE DIRECTION OF FLOW, 1 INCH PER 40 FEET MINIMUM. PROVIDE AN AIR VENT AT ALL HIGH POINTS AND A DRAIN VALVE AT ALL LOW POINTS.
- 5) CUT ALL HOLES OF SUFFICIENT SIZE AND HANG ALL PIPE SO THAT THERE WILL BE NO COPPER OR STEEL TO METAL CONTACT AND RESULTANT NOISE DURING PIPE EXPANSION AND CONTRACTION. PROVIDE EXPANSION LOOPS WITH ROLLERS, GUIDES AND ANCHORS WHERE STRAIGHT RUNS OF PIPE EXCEED 100 FEET.
- 6) BEFORE SYSTEM OPERATION, CLEAN AND FLUSH ALL PIPING SYSTEMS TO REMOVE GREASE, OIL, SCALE, ETC. OPERATE SYSTEM FOR A MINIMUM OF 24 HOURS WITH STARTUP STRAINERS TO REMOVE DEBRIS, THEN REMOVE AND DISPOSE OF STARTUP STRAINER.
- 7) PROVIDE CHEMICAL WATER TREATMENT CHEMICALS TO PROHIBIT CORROSION FOR WATER SYSTEMS. PROPYLENE GLYCOL (CONCENTRATION SHALL PROVIDE FREEZE PROTECTION TO 5'F BELOW THE LOWEST ANTICIPATED AMBIENT TEMPERATURE) IS SUFFICIENT FOR WATER TREATMENT FOR SYSTEMS NEEDING FREEZE PROTECTION.
- - 1)ALL INSULATION SHALL BE UL APPROVED FOR A FLAME SPREAD RATING OF NOT OVER 25 AND A SMOKE DEVELOPED RATING OF NOT OVER 50.
 - 2) ALL INSULATION SHALL CONFORM TO THE REQUIREMENTS OF IECC 2015.
 - 3) HYDRONIC PIPING: ALL HYDRONIC PIPING SERVING AS PART OF A HEATING OR COOLING SYSTEM SHALL BE THERMALLY INSULATED WITH FIBERGLASS INSULATION IN ACCORDANCE WITH THE THICKNESS LISTED BELOW, BASED ON THE PIPE INSULATION HAVING A CONDUCTIVITY NOT EXCEEDING 0.27 BTU PER INCH/H*FT2*F. PROVIDE ASJ OR OTHER JACKET TO PROTECT INSULATION. SIMILAR TO JOHNS MANVILLE MICRO-LOK.
 - (a) FITTINGS SHALL HAVE PVC COVERS WITH FIBERGLASS INSERTS.

(b) NOTE THAT ALL PIPES CONTAINING FLUIDS AT TEMPERATURES LESS THAN LOCAL

- DEWPOINT MUST BE INSULATED FOR CONDENSATION CONTROL.
- (c) HOT WATER PIPE INSULATION THICKNESS (105-140F OPERATING TEMPERATURE)
- (1) 1"THICK INSULATION FOR 1-1/4" & SMALLER PIPE SIZES.
- (2) 1-1/2" THICK INSULATION FOR 1-1/2" & LARGER PIPE SIZES.
- A) 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.
- B) 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 WITHI 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.
- C) 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.
- D) DUCTWORK AND FITTINGS SHALL HAVE ENDS COVERED WITH PLASTIC AT ALL TIMES.
- E) 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.
- F) REPLACE ALL FILTERS USED DURING CONSTRUCTION.
- G) EQUIPMENT SHALL BE STARTED, TESTED, ADJUSTED AND PLACED IN SATISFACTORY OPERATING CONDITION BY THE CONTRACTOR.
- H) 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
- I) ALL VIBRATING EQUIPMENT NOT MOUNTED ON THE GROUND FLOOR SHALL BE MOUNTED ON OR SUSPENDED FROM VIBRATION ISOLATORS.
- J)EQUIPMENT SHALL BE INSTALLED WITH CLEARANCE FOR PROPER MAINTENANCE. FILTERS, COILS, DRIVES, VALVES, AND CONTROLS SHALL BE ACCESSIBLE FOR SERVICING AND/OR REPLACEMENT.
- K) 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.
- L)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

DESCRIPTION

SYMBOL

DESCRIPTION

	PIPE ELBOW UP		BALL VALVE
—— <u>—</u>	PIPE ELBOW DOWN		BUTTERFLY VALVE
<u> </u>	PIPE TEE UP		GATE VALVE
	PIPE TEE DOWN		OS&Y GATE VALVE
	PIPE CROSS OVER	~	CHECK VALVE
—	—II— UNION		BACK FLOW PREVENTER
	FLEXIBLE PIPE CONNECTOR	₹	TRIPLE-DUTY VALVE
	END CAP	Ŋ	TRIPLE-DUTY VALVE WITH MEASUREMENT PORTS
Y	PETE'S PLUG		2-WAY MOTORIZED VALVE
- ブ,,	HOSE THREAD DRAIN VALVE WITH CAP AND CHAIN		3-WAY MOTORIZED VALVE
	CIRCUIT SETTER		TEMPERING VALVE
├ ┤	STRAINER	Z	PRESSURE REDUCING VALVE
A	STRAINER WITH BLOWDOWN	7	TEMPERATURE & PRESSURE RELIEF VALVE
0	CIRCULATOR PUMP		DIFFERENTIAL PRESSURE BYPASS VALVE
MV \$\frac{1}{2}			SOLENOID VALVE
AV P	AUTOMATIC AIR VENT	- A	GAS COCK
AS	AIR SCOOP		DIRECTION OF FLOW
- F	AIR SCOOP WITH VENT)	DIRECTION OF PITCH
[AS]			CONNECT TO EXISTING
	AIR SEPARATOR WITH VENT		PIPE CONTINUES
AS		 	THERMOMETER
MARK	FIN TUBE IDENTIFICATION TAG	Θ %	PRESSURE GAUGE WITH SHUTOFF & PIGTAIL
FEET		\$	VACUUM BREAKER
C-111111-D	FIN TUBE RADIATION WITH COVER		ELECTRIC HEAT TRACING
LEGEND	OF DUCT SYMBOL	S	
1	· · · · · · · · · · · · · · · · · · ·		

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION		
L_	MANUAL BALANCING DAMPER		RECTANGULAR RETURN OR EXHAUST DUCT UP		
FD 	FIRE DAMPER		ROUND RETURN OR EXHAUST DUCT UP		
SD	SMOKE DAMPER		RECTANGULAR RETURN OR EXHAUST DUCT DOWN		
SFD SMOKE & FIRE DAMPER			ROUND RETURN OR EXHAUST DUCT DOWN		
٩	CABLE OPERATED DAMPER		RECTANGULAR SUPPLY DUCT		
<u> </u>	BACK DRAFT DAMPER		ROUND SUPPLY DUCT UP		
MH	MOTORIZED DAMPER		RECTANGULAR SUPPLY DUCT DOWN		
	SUPPLY AIRFLOW		ROUND SUPPLY DUCT DOWN		
─	RETURN / EXHAUST AIRFLOW	MARK SIZE	REGISTER, GRILLE AND		
•	CONNECT TO EXISTING	CFM	DIFFUSER IDENTIFICATION TAI		
LEGEN.	D OF CONTROL SYM	MB0LS			

LEGEND OF CONTROL SIMBOLS

MECHANICAL ABBREVIATIONS

BTU/H BRITISH THERMAL ERV ENERGY RECOVERY HWR VENTILATOR

AMP AMPACITY

CAP CAPACITY

APD AIR PRESSURE DROP

ATC AUTOMATIC TEMP.

CHW CHILLED WATER

C/HWR WATER RETURN

C/HWS CHILLED & HOT WATER SUPPLY

CHWR CHILLED WATER RETURN

CHWS CHILLED WATER SUPPLY

COND CONDENSATE

CONN CONNECT OR CONNECTION

CONV CONVECTOR

CW COLD WATER

CWR CONDENSER WATER RETURN

DB DRY BULB

DX EXPANSION

EA EXHAUST AIR

CONDENSER CWS WATER SUPPLY

CIRCULATOR

TEMPERATURE

EFFICIENCY RATIO HWUH HEATER

EXTERNAL STATIC HWS HOT WATER SUPPLY

CONTRACTOR

TEMPERATURE

ET EXPANSION TANK

FRESH AIR

FPD FLUID PRESSURE DROP

T HD FEET HEAD

FW FRESH WATER

CONTRACTOR

GHWR GLYCOL & WATER RETURN

GPM GALLONS PER MINUTE

HP HORSEPOWER

GHWS GLYCOL & WATER MBH

FTR RADIATION

FPM FEET PER MINUTE LB/# POUNDS

VENTILATOR

HW HOT WATER

HWCUH HOT WATER
CABINET HEATER

ID INSIDE DIAMETER

LEAVING AIR

LEAVING FLUID TEMPERATURE

LOW PRESSURE

THOUSANDS OF

CONTRACTOR

MINUTE OR

PROTECTION

PRESSURE STEAM

MINIMUM

MOCP

MINIMUM CIRCUIT

KW KILOWATTS

LPS STEAM

M MINUTES

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
T	THERMOSTAT	H	HUMIDISTAT
TS	TEMPERATURE SENSOR	P	PRESSURE SENSOR
©	CARBON MONOXIDE SENSOR	(SD)	SMOKE DETECTOR
<u>©</u>	CO) CARBON DIOXIDE SENSOR		INDICATOR LAMP

BELOW: PLEASE REFER ALL QUESTIONS, SUBMITTALS AND CORRESPONDENCE TO THE PROJECT MANAGER.

PHONE: (603) 463-1086 ADDRESS: 65 OLD CENTER RD, DEERFIELD, NH 03037

<u>HVAC PROJECT MANAGER</u>

ADAMS

MEMORIAL

BUILDING

TOWN OF

DERRY

WEST BROADWAY

DERRY, NH 03038

DAVID C. MAGNUSON EMAIL: DAVEM@DESIGNDAYMECH.COM

REVISIONS:

NA NOT APPLICABLE

NO NORMALLY OPEN

OA OUTSIDE AIR

PD PRESSURE DROF

POUNDS PER

PH/ø PHASE

RA RETURN AIR

RTU ROOFTOP UNIT

SF SQUARE FEET

SQ IN SQUARE INCHES

SA SUPPLY AIR

TEMP TEMPERATURE

V VOLTS

W WATTS

WB WET BULB

WC WATER COLUMN

SQUARE INCH

ADD BOILER INJECTION PUMPS

DESIGNED BY DRAWN BY CHECKED BY: DDM JOB #

SCALE:

DCM AS NOTED

DATE: 7/16/2020

SHEET 2 OF 2

DIVISION 25 - HVAC CONTROLS AND SEQUENCES OF OPERATION

I) GENERAL

A) REFER TO SPECIFICATION DIVISION 23 - HVAC SPECIFICATIONS, ESPECIALLY GENERAL FOR WORK INCLUDED, QUALITY ASSURANCE AND RELATED DOCUMENTS.

- B) PROVIDE A BACNET INTERFACE IN NEW EQUIPOMENT AND CONNECT TO EXISTING DDC CONTROL SYSTEM TO ACCOMPLISH ALL CONTROL SEQUENCES AS DESCRIBED BELOW.
- C) 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
- 1)LINE VOLTAGE POWER FROM CIRCUIT BREAKERS IN ELECTRICAL PANELS TO CONTROL TRANSFORMERS OR CONTROL DEVICES SHALL BE INSTALLED BY THE CONTRACTOR.

PROVIDED BY THE CONTROLS CONTRACTOR (HENCEFORTH CALLED "THE CONTRACTOR").

- 2) COMPLY WITH DIVISION 26 REQUIREMENTS.
- 3) CONNECT VARIABLE FREQUENCY DRIVES (VFD) AND DUCT & AREA SMOKE DETECTORS (FURNISHED BY OTHERS) INTO CONTROL CIRCUITS TO ACCOMPLISH THE SEQUENCES OF

II)PRODUCTS

A) PROVIDE CONTROL PRODUCTS (IF NOT FACTORY PROVIDED BY HVAC EQUIPMENT MANUFACTURER) INCLUDING, BUT NOT LIMITED TO, CONTROL DAMPERS & VALVES, THERMOSTATS, TIMECLOCKS, SENSORS, RELAYS, CONTROLLERS, AND OTHER COMPONENTS AS REQUIRED FOR A COMPLETE INSTALLATION.

- B) 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.
- C) 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.
- D) DAMPER AND VALVE ACTUATORS SHALL BE ELECTRIC, SIZED TO SMOOTHLY OPERATE DAMPER OR VALVE WITH ADEQUATE TORQUE FOR TIGHT SHUTOFF AGAINST MAXIMUM SYSTEM PRESSURE. 1) ACTUATION REQUIREMENTS SHALL BE PER THE SEQUENCES OF OPERATION.
- E) ROOM THERMOSTATS SHALL BE 7 DAY PROGRAMMABLE WITH A 5°F DEADBAND BETWEEN HEATING & COOLING AND SETBACK CAPABILITY (55°F HEATING & 85°F COOLING).
- 1)USER ADJUSTABLE SETPOINTS SHALL BE PROVIDED UNLESS NOTED OTHERWISE ON THE

DRAWINGS

III) EXECUTION

- A) INSTALL SYSTEMS AND MATERIALS IN ACCORDANCE WITH MANUFACTURER INSTRUCITONS 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. B) MOUNT CONTROLLERS AT CONVENIENT LOCATIONS AND HEIGHTS. COORDINATE WITH ARCHITECT
- C) PROVIDE REMOTE CONTROL OF MANUAL RESET CONTROLLERS AS REQUIRED FOR USER ACCESSIBILITY. COORDINATE WITH OWNER.
- D) THE TERM "CONTROL WIRING" IS DEFINED TO INCLUDE PROVIDING OF WIRE, CONDUIT AND MISCELLANEOUS MATERIALS AS REQUIRED FOR MOUNTING AND CONNECTING ELECTRIC CONTROL
- E) 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 (BUNDLE) 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. TIE AND SUPPORT CONDUCTORS NEATLY.
- F) INSTALL CIRCUITS OVER 25-VOLT WITH COLOR-CODED THWN/THHN WIRE IN EMT OR MC CABLE AS WHIPS TO EQUIPMENT CONNECTIONS. USE LIQUID—TITE CONDUIT IN EXTERIOR OR HAZARDOUS
- G) 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
- H) INSTALL LOW VOLTAGE CIRCUITS WHICH ARE LOCATED IN CONCRETE SLABS OR IN MASONRY I) 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). J)NUMBER—CODE OR COLOR—CODE CONDUCTORS APPROPRIATELY FOR IDENTIFICATION AND SERVICING OF THE CONTROL SYSTEM.
- K) DEMONSTRATE CONTROL SYSTEM TO AND TRAIN OWNER'S PERSONNEL IN OPERATION AND

- A) CHILLER (CH) AND ASSOCIATED CIRCULATOR PUMPS (CP)
- 1)THE MAIN LOOP SUPPLY WATER TEMPERATURE SHALL BE MAINTAINED AT 44°F.
- 2) THE CIRCULATOR PUMPS SHALL OPERATE ACCORDING TO EXISTING BMS PROGRAMMING END OF DIVISION 25

MAINTENANCE OF CONTROL SYSTEM. IV) SEQUENCES OF OPERATION