MINIMUM HANGER SIZES FOR RECTANGULAR DUCT

MINIMUM HALF OF DUCT PERIMETER	PAIR AT 10Ft SPACING		PAIR AT 8Ft SPACING		PAIR AT 5Ft SPACING		PAIR AT 4Ft SPACING	
	STRAP	ROD	STRAP	ROD	STRAP	ROD	STRAP	ROD
P/2 = 30"	1" x 22ga	¼"	1" x 22ga	¼"	1" x 22ga	¼"	1" x 22ga	¼"
P/2 = 72"	1" x 18ga	⅜"	1" x 20ga	¼"	1" x 22ga	¼"	1" x 22ga	¼"
P/2 = 96"	1" x 16ga	⅜"	1" x 18ga	⅜"	1" x 20ga	⅜"	1" x 22ga	⅜"
P/2 = 120"	**1½" x 16ga**	**½"**	**1" x 16ga**	**⅝"**	**1" x 18ga**	**⅝"**	**1" x 20ga**	**⅝"**
P/2 = 192"	-	-	1" x 16ga	½"	1" x 16ga	⅜"	1" x 18ga	⅜"

WHEN STRAPS ARE LAP JOINED USE THESE MINIMUM FASTENERS:

1" x 18, 20, 22ga - ON ¼" BOLT
1" X 16ga - TWO ¼" Dia.
1" X 16ga - TWO ⅜" Dia.

PLACE FASTENERS IN SERIES, NOT SIDE BY SIDE.

SINGLE HANGER MAXIMUM ALLOWABLE LOAD

STRAP	ROD (Dia.)
1" x 22ga - 260Lbs.	¼" - 270Lbs.
1" x 20ga - 32Lbs.	⅜" - 680Lbs.
1" x 18ga - 420Lbs.	½" - 1250Lbs.
1" x 16ga - 700Lbs.	⅝" - 2000Lbs.
1½" x 16ga - 1100Lbs.	¾" - 3000Lbs.

NOTES:
1. DIMENSIONS OTHER THAN GAUGE ARE IN INCHES.
2. TABLES ALLOW FOR DUCT WEIGHT, 1 LB/SF. INSULATION WEIGHT AND NORMAL REINFORCEMENT AND TRAPEZE WEIGHT, BUT NO EXTERNAL LOADS.
3. STRAPS ARE GALVANIZED STEEL.
4. ALLOWABLE LOADS FOR P/2 ASSUME THAT DUCTS ARE 16 GA. MAXIMUM, EXCEPT WHEN MAXIMUM DUCT DIMENSION (W) IS OVER 60" THEN P/2 MAXIMUM IS 1.25 W.

PIPE HANGER SCHEDULE

PIPE SIZE (INCHES)	MAXIMUM HORIZONTAL SPACING (FEET)				SINGLE STEEL ROD HANGER SIZE (INCHES)		HANGER TYPE STEEL	MAXIMUM VERTICAL SPACING (FEET)			
	COPPER TUBE	CAST IRON	STEEL PIPE	CPVC PIPE	TUBING	PIPING		COPPER TUBE	CAST IRON	STEEL PIPE	CPVC PIPE
½"	6	5	8 (5)	3	¼"	⅜"	BAND	10	15	15	10
¾"	6	5	8 (5)	3	¼"	⅜"	BAND	10	15	15	10
1"	6	5	8 (5)	3	¼"	⅜"	BAND	10	15	15	10
1¼"	6	5	9 (5)	4	¼"	⅜"	CLEVIS	10	15	15	10
1½"	6	5	9 (5)	4	¼"	⅜"	CLEVIS	10	15	15	10
2"	10	5	10 (5)	4	¼"	⅜"	CLEVIS	10	15	15	10
2½"	10	5	12 (5)	4	⅜"	½"	CLEVIS	10	15	15	10
3"	10	5	12 (5)	4	⅜"	½"	CLEVIS	10	15	15	10
4"	10	5	12 (5)	4	½"	⅝"	CLEVIS	10	15	15	10
5"	10	5	12 (5)	4	½"	⅝"	CLEVIS	10	15	15	10
6"	10	5	12 (5)	4	½"	¾"	CLEVIS	10	15	15	10
8"	10	5	12 (5)	4	⅝"	⅞"	CLEVIS	10	15	15	10
10"	10	5	12 (5)	4	⅝"	⅞"	CLEVIS	10	15	15	10
12"	10	5	12 (5)	4	⅝"	⅞"	CLEVIS	10	15	15	10

NOTES:
1. MAXIMUM HORIZONTAL SPACING OF CAST-IRON PIPE HANGERS SHALL BE INCREASED TO 10 FEET WHERE 10 FOOT LENGTHS OF PIPE ARE INSTALLED.
2. INSTALL HANGER OR SUPPORT CLOSE TO THE POINT OF CHANGE OF DIRECTION IN ALL PIPE RUNS.
3. INSTALL ADDITIONAL HANGERS ON SUPPORTS AT CONCENTRATED LOADS.
4. SUPPORT ALL BRANCH PIPING OVER 5'-0" IN LENGTH.
5. ½" GAS PIPING SHALL BE SUPPORTED EVERY 6'-0". ¾" AND 1" GAS PIPING SHALL BE SUPPORTED EVERY 8'-0". 1¼" AND LARGER GAS PIPING SHALL BE SUPPORTED EVERY 10'-0".
6. SUPPORT VERTICAL PIPING AT EVERY FLOOR.

HEATING AND COOLING MINIMUM PIPE INSULATION[a] COMMERCIAL

(THICKNESS IN INCHES)

FLUID	NOMINAL PIPE DIAMETER			
	< 1.5"	1.5" < 4.0"	4.0" to < 8.0"	≤ 8.0"
HOT WATER (141 - 200 °F)	1.5	2.0	2.0	2.0
CHILLED WATER OR REFRIGERANT	1.5	1.5	1.5	1.5
CONDENSATE	1.0	1.0	1.0	1.5

FOR SI:
1 INCH = 25.4mm, BTU PER INCH/H x FT^2 x °F = W PER 25mm/K x M^2

[a] BASED IN INSULATION HAVING A CONDUCTIVITY NOT EXCEEDING 0.27 BTU PER INCH/H x FT^2 X °F

MINIMUM DUCT INSULATION

COMMERCIAL

ALL SUPPLY AND RETURN AIR DUCTS AND PLENUMS SHALL BE INSULATED WITH A MINIMUM OF R-6 INSULATION WHEN LOCATED IN UNCONDITIONED SPACES AND WITH A MINIMUM OF R-12 INSULATION WHEN LOCATED OUTSIDE THE BUILDING ENVELOPE. WHEN LOCATED WITHIN A BUILDING ENVELOPE ASSEMBLY, THE DUCT OR PLENUM SHALL BE SEPARATED FROM THE BUILDING EXTERIOR OR UNCONDITIONED OR EXEMPT SPACES BY A MINIMUM OF R-12 INSULATION.

EXCEPTIONS:
1. WHEN LOCATED WITHIN EQUIPMENT.
2. WHEN THE DESIGN TEMPERATURE DIFFERENCE BETWEEN THE INTERIOR AND EXTERIOR OF THE DUCT OR PLENUM DOES NOT EXCEED 15°F (8°C).

ALL JOINTS, LONGITUDINAL AND TRANSVERSE SEAMS, AND CONNECTIONS IN DUCTWORK, SHALL BE SECURELY FASTENED AND SEALED WITH WELDS, GASKETS, MASTICS (ADHESIVES), MASTIC-PLUS-EMBEDDED FABRIC SYSTEMS OR TAPES. TAPES AND MASTICS USED TO SEAL DUCTWORK SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 181A OR UL 181B. DUCT CONNECTIONS TO FLANGES OF AIR DISTRIBUTION SYSTEM EQUIPMENT SHALL BE SEALED AND MECHANICALLY FASTENED. UNLISTED DUCT TAPE IS NOT PERMITTED AS A SEALANT ON ANY METAL DUCTS.

NOTE:
DUCT INSULATION, COVERINGS AND LINING MATERIALS AND ADHESIVES SHALL HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25, AND A SMOKE DEVELOPED INDEX OF NOT MORE THAN 50, IN ACCORDANCE WITH 2015 IMC SECTION 604.3.

MINIMUM HANGER SIZES FOR ROUND DUCT

DIAMETER	MAXIMUM SPACING	WIRE DIAMETER	ROD	STRAP
10" DN.	12'	-	¼"	1" x 22ga.
11" - 18"	12'	-	¼"	1" x 22ga.
19" - 24"	12'	-	¼"	1" x 22ga.
25" - 36"	12'	-	⅜"	1" x 22ga.
37" - 50"	12'	-	TWO ⅜"	TWO 1" x 20ga.
51" - 60"	12'	-	TWO ⅜"	TWO 1" x 18ga.
61" - 84"	12'	-	TWO ⅜"	TWO 1" x 16GA.

NOTES:
1. STRAPS AND RODS ARE GALVANIZED STEEL.
2. TABLE ALLOWS FOR CONVENTIONAL WALL THICKNESS, AND JOINT SYSTEMS PLUS ONE LB/SF OF INSULATION WEIGHT. IF HEAVIER DUCTS ARE TO BE INSTALLED, ADJUST HANGER SIZES.

GENERAL HVAC NOTES

1. ALL HVAC WORK SHALL BE INSTALLED IN ACCORDANCE WITH 2020 MECHANICAL, FIRE, PLUMBING, FUEL GAS, BUILDING, AND ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE, ALL LOCAL CODES AND GENERALLY ACCEPTED STANDARDS.
2. HVAC CONTRACTOR SHALL PROVIDE ALL EQUIPMENT, PIPING, VALVES, ACCESS DOORS, HANGERS, FITTINGS AND MISCELLANEOUS COMPONENTS NOT NECESSARILY DETAILED ON THESE DRAWINGS TO RENDER THE HVAC SYSTEMS COMPLETE, OPERABLE, AND IN ACCORDANCE WITH APPLICABLE CODES AND GENERALLY ACCEPTED INDUSTRY STANDARDS.
3. HVAC CONTRACTOR SHALL SUBMIT SHOP DRAWINGS ON ALL EQUIPMENT TO ENGINEER FOR APPROVAL. DEMONSTRATE NEW HVAC SYSTEMS TO SCHOOL AND REVIEW MAINTENANCE PROCEDURES.
4. HVAC CONTRACTOR SHALL SEAL AROUND ALL PIPE AND DUCT PENETRATIONS THROUGH FIRE RATED WALLS, FLOORS AND CEILINGS WITH HILTI INTUMESCENT FIRE STOP MATERIALS TO MAINTAIN FIRE AND SMOKE RATINGS. DUCTS PENETRATING FIRE RATED WALLS, FLOORS AND CEILINGS SHALL BE INSTALLED WITH FIRE DAMPER AND ACCESS DOORS WHETHER SPECIFICALLY SHOWN ON THE DRAWINGS OR NOT. PROVIDE FIRE STOP SEALANT ON ALL EXISTING PIPING AND DUCTWORK PENETRATING NEW FIRE RATED WALLS CONSTRUCTED AS PART OF THE PROJECT.
5. HVAC CONTRACTOR SHALL NOT DRILL OR CUT ANY STRUCTURAL MEMBERS WITHOUT PERMISSION OF ARCHITECT.
6. ALL EQUIPMENT SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS.
7. HVAC CONTRACTOR SHALL FURNISH AND INSTALL ALL CONTROL WIRING (24V) FOR SYSTEMS SHOWN ON HVAC DRAWINGS AND DESCRIBED IN HVAC SPECIFICATIONS, INCLUDING ALL RELAYS, TRANSFORMERS, CONDUIT, JUNCTION BOXES, CONDUCTORS, THERMOSTATS, APPURTENANCES AND ALL NECESSARY EQUIPMENT TO MAKE SYSTEMS COMPLETE AND OPERABLE.
8. HVAC CONTRACTOR SHALL PAY FOR ALL PERMITS AND INSPECTION FEES REQUIRED BY LOCAL AUTHORITY HAVING JURISDICTION.
9. HVAC CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL CUTTING, PATCHING AND PAINTING ASSOCIATED WITH HVAC WORK.
10. ALL DUCTWORK SHALL BE CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH SHEET METAL AND AIR CONDITIONING HVAC CONTRACTORS NATIONAL ASSOCIATION (SMACNA) DUCT STANDARDS. PROVIDE RADIUS TURNS OR TURNING VANES ON ALL CHANGES IN DIRECTION IN ACCORDANCE WITH SMACNA STANDARDS.
11. ALL CONTROL WIRING SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (N.E.C.) AND ALL LOCAL CODES. ALL CONDUCTORS SHALL BE COPPER WITH THHN INSULATION IN EMT CONDUIT. 120V/1 - MINIMUM CONDUCTOR SIZE #12. 24V - MINIMUM CONDUCTOR SIZE #18. MINIMUM CONDUIT SIZE SHALL BE ¾". CONDUIT INSTALLED OUTDOORS SHALL BE GALVANIZED.
12. UNLESS OTHERWISE NOTED, ALL DUCTWORK SHALL BE FABRICATED WITH MINIMUM 26 GAGE GALVANIZED STEEL INCLUDING ROUND DUCTS.
13. FINAL LOCATIONS OF ALL THERMOSTATS AND SENSORS SHALL BE APPROVED BY ARCHITECT PRIOR TO INSTALLATION, COORDINATE IN FIELD. THERMOSTATS AND SENSORS SHALL BE LOCATED 4'-0" ABOVE FINISHED FLOOR.
14. HVAC CONTRACTOR SHALL PROVIDE ACCESS DOORS FOR ALL VALVES AND DUCT ACCESSORIES CONCEALED IN WALLS/CEILINGS. ACCESS DOORS SHALL HAVE APPROPRIATE FIRE RATING TO MAINTAIN INTEGRITY OF WALL/CEILING.
15. HVAC CONTRACTOR SHALL COORDINATE FINAL LOCATIONS OF ALL PIPING IN FINISHED AREAS WITH GENERAL CONTRACTOR TO ENSURE CONCEALMENT OF ALL PIPING IN WALLS, FLOORS AND CEILINGS.
16. HVAC CONTRACTOR SHALL FURNISH AND INSTALL VALVE TAGS, PIPE LABELS, DUCT LABELS AND EQUIPMENT LABELS. LOG ALL TAGS AND LABELS IN A 3-RING BINDER WITH LOCATION, DESCRIPTION AND FUNCTION. SEE SPECIFICATIONS FOR MORE INFORMATION.
17. HVAC CONTRACTOR SHALL PROVIDE ALL AIR AND HYDRONIC BALANCING FOR ALL NEW HVAC SYSTEMS. PROVIDE ALL NECESSARY MOTOR, DRIVE, BELT CHANGES AND ETC. SEE SPECIFICATIONS FOR BALANCE PROCEDURES AND ADDITIONAL REQUIREMENTS. CONTRACTOR SHALL COMFORT BALANCE ALL HVAC SYSTEMS TO THE SATISFACTION OF ENGINEER/ARCHITECT.
18. HVAC CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SUPPLEMENTAL STRUCTURAL STEEL SUPPORT ASSOCIATED WITH NEW HVAC EQUIPMENT HUNG OR SUPPORTED FROM OR ON THE BUILDING STRUCTURE. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT FOR APPROVAL PRIOR TO STEEL FABRICATION AND INSTALLATION OF EQUIPMENT.
19. HVAC CONTRACTOR SHALL INSTALL DUCT MOUNTED SMOKE DETECTORS IN RETURN AIR DUCTWORK OR PLENUM UPSTREAM OF ANY FILTERS, EXHAUST AIR CONNECTIONS, OR OUTDOOR AIR CONNECTIONS. DUCT SMOKE DETECTORS SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR. CONNECTION TO FIRE ALARM SYSTEM SHALL BE BY ELECTRICAL CONTRACTOR. HVAC CONTRACTOR SHALL INSTALL AN ACCESS DOOR IN DUCTWORK FOR EACH SMOKE DETECTOR.
20. HVAC CONTRACTOR SHALL SUBMIT PIPING AND DUCTWORK FULLY COORDINATED SHOP DRAWINGS FOR ENGINEERS REVIEW. SEE GENERAL CONDITIONS FOR NUMBER OF SHOP DRAWINGS.
21. HVAC CONTRACTOR SHALL INSTRUCT FIRE DEPARTMENT AND KEY PERSONNEL ON OPERATION OF ALL HVAC SYSTEMS. SET ALL THERMOSTATS TO TEMPERATURES AND SCHEDULES AS DIRECTED BY FIRE DEPARTMENT.
22. HVAC CONTRACTOR SHALL INCLUDE IN BID ALL MATERIALS, RIGGING AND LABOR REQUIRED FOR THE COMPLETE AND PROPER INSTALLATION OF THE MECHANICAL SYSTEM.
23. HVAC CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO THE BEGINNING OF WORK, AND COORDINATE WORK ALL OTHER TRADES.
24. PROVIDE ALL PIPE OPENINGS THROUGH PARTITIONS WITH PIPE SLEEVES.
25. PROVIDE VOLUME DAMPERS ON ALL SUPPLY, RETURN AND EXHAUST BRANCH DUCTWORK, WHETHER SPECIFICALLY INDICATED ON DRAWINGS OR NOT.
26. ALL MOTOR STARTERS AND DISCONNECT SWITCHES FOR HVAC EQUIPMENT SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR. DISCONNECT SWITCHES FURNISHED BY THE MECHANICAL CONTRACTOR FOR HVAC EQUIPMENT SHALL BE HEAVY DUTY TYPE AND SHALL BE NEMA 3R WHEN LOCATED OUTSIDE.
27. CONTRACTOR SHALL GUARANTEE ALL WORKMANSHIP AND MATERIAL INSTALLED UNDER THIS CONTRACT FREE FROM DEFECTS FOR A PERIOD OF ONE (1) YEAR FROM DATE OF SUBSTANTIAL COMPLETION AND ACCEPTANCE BY THE OWNER AND AGREES TO REPLACE DEFECTIVE WORK (INCLUDING ALL REQUIRED LABOR AND MATERIAL) AT NO ADDITIONAL COST TO OWNER DURING THE GUARANTEE PERIOD.
28. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING START-UP OF ALL NEW EQUIPMENT, CONTROLS, AND ETC. TO ENSURE CORRECT OPERATION OF INSTALLED DEVICES.
29. CONTRACTOR SHALL PROVIDE OWNER WITH CATALOG DATA, OPERATING INSTRUCTIONS, MAINTENANCE INSTRUCTIONS, AND RECORD (AS-BUILT) DRAWINGS OF ALL COMPLETED WORK.
30. ALL NEW HOLES IN WALLS AND FLOORS SHALL BE CORE DRILLED BY THIS CONTRACTOR. PRIOR TO CORE DRILLING FLOORS, RADAR SCAN FLOOR SLABS. USE CAUTION WHEN CORE DRILLING TO AVOID DAMAGE TO EQUIPMENT, SYSTEMS, STRUCTURE AND ETC. ANY ITEMS DAMAGED AS A RESULT OF CORE DRILLING SHALL BE REPAIRED BY THIS CONTRACTOR AT NO ADDITIONAL COST TO FIRE DEPARTMENT.

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NEW STATION
FOR
PUTNAM VALLEY FIRE STATION #1

OSCAWANA LAKE ROAD
PUTNAM VALLEY, NEW YORK

REVISION HISTORY

	DATE	DESCRIPTION
1		
2		
3		
4		
5		
6		
7		
8		

MECHANICAL: EQUIPMENT SCHEDULES

SCALE: AS NOTED
DWG. BY: KC
DWG. DATE: 8/14/2020
STATUS: BID DRAWINGS

M300