MINIMUM METAL GAGES

CONSTRUCTION DETAILS FOR RECTANGULAR SHEET METAL DUCTS FOR STATIC AIR PRESSURES UP TO 2" WC

STEEL-U.S. STANDARD INCHES (GAGE)	ALUMINUM B. & S. INCHES (GAGE)	COPPER COLD ROLLED	DUCT DIMENSIONS (IN INCHES)	PERMISSIBLE GIRTH JOINTS AND LONGITUDINAL SEAMS
0.019 (26)	0.020 (24)	16 OZ.	UP THROUGH 12	DRIVE SLIP, PLAIN "S" SLIP, OR 1" POCKET LOCK
0.024 (24)	0.025 (22)	24 OZ.	19 THROUGH 30	HEMMED "S" SLIP, 1" BAR SLIP, OR 1" POCKET LOCK ON 5' CENTERS HEMMED "S" SLIP, 1" BAR SLIP, OR 1" POCKET LOCK ON 10' CENTERS WITH 1"x1"x1/8" ANGLES ON CENTER LINE BETWEEN HEMMED "S" SLIP, 1" BAR SLIP, OR 1" POCKET LOCK ON 10' CENTERS WITH CROSS BREAK 1" STANDING SEAM ON 5' CENTERS
0.030 (22)	0.032 (20)	32 OZ.	31 THROUGH 42	BAR SLIP, REINFORCED BAR SLIP, OR POCKET LOCK ON 5' CENTERS 1 BAR SLIP, REINFORCED BAR SLIP, OR POCKET LOCK ON 10' CENTERS WITH 1"x1"x1/8" ANGLES ON CENTER LINE BETWEEN 1" STANDING SEAM ON 5' CENTERS INSIDE LONGITUDINAL STANDING SEAMS WITH 1"x1"x1/8" ANGLES ON 5' CENTERS ON EXTERIOR
			43 THROUGH 54	1-1/2" BAR SLIP, REINFORCED BAR SLIP, OR POCKET LOCK ON 4' CENTERS 1-1/2" BAR SLIP, REINFORCED BAR SLIP, OR POCKET LOCK ON 8' CENTERS WITH 1-1/2"x1-1/2"x1/8" ANGLES ON CENTER LINE BETWEEN 1" STANDING SEAM ON 5' CENTERS 1-1/2" BAR SLIP, REINFORCED BAR SLIP, OR POCKET LOCK ON 4' CENTERS WITH CROSS BREAK
0.036 (20)	0.040 (18)	36 OZ.	55 THROUGH 60	1-1/2" STANDING SEAM ON 3' CENTERS INSIDE LONGITUDINAL STANDING SEAMS WITH 1-1/2"x1-1/2"x1/8" ANGLES ON 4' CENTERS ON EXTERIOR
0.036 (20)	0.040 (18)	36 OZ.	61 THROUGH 84	REINFORCED BAR SLIP, ANGLE SLIP, OR ALTERNATE BAR SLIP, OR ANGLE REINFORCED POCKET LOCK ON 4' CENTERS USING 1-1/2"x1-1/2"x1/8" REINFORCING ANGLES AND WITH 1-1/2"x1-1/2"x1/8" ANGLES ON CENTER LINE BETWEEN REINFORCED BAR SLIP, ANGLE SLIP, OR ALTERNATE BAR SLIP, OR ANGLE REINFORCED POCKET LOCK ON 8' CENTERS USING 1-1/2"x1-1/2"x1/8" REINFORCING ANGLES AND WITH 1-1/2"x1-1/2"x1/8" ANGLES ON 2' ON CENTERS IN BETWEEN 1-1/2" ANGLE REINFORCED STANDING SEAM ON 2' CENTERS USING 1-1/2"x1-1/2"x1/8" REINFORCING ANGLES INSIDE LONGITUDINAL STANDING SEAM WITH 1-1/2"x1-1/2"x1/8" ANGLES ON 2' CENTERS ON EXTERIOR
0.047 (18)	0.050 (16)	48 OZ.	85 THROUGH 96	COMPANION ANGLES, ANGLE SLIP, OR ANGLE REINFORCED POCKET LOCK USING 1-1/2"x1-1/2"x3/16" COMPANION OR REINFORCING ANGLES ON 4' CENTERS WITH 1-1/2"x1-1/2"x3/16" ANGLES ON CENTER LINE BETWEEN COMPANION ANGLES, ANGLE SLIP, OR ANGLE REINFORCED POCKET LOCK USING 1-1/2"x1-1/2"x3/16" COMPANION OR REINFORCING ANGLES ON 8' CENTERS WITH 1-1/2"x1-1/2"x3/16" ANGLES ON 2' CENTERS IN BETWEEN 1-1/2" ANGLE REINFORCED STANDING SEAM ON 2' CENTERS USING 1-1/2"x1-1/2"x3/16" REINFORCING ANGLES INSIDE LONGITUDINAL STANDING SEAM WITH 1-1/2"x1-1/2"x3/16" ANGLES ON 2' CENTERS ON EXTERIOR
0.047 (18)	0.050 (16)	48 OZ.	OVER 96	COMPANION ANGLES, ANGLE SLIP, OR ANGLE REINFORCED POCKET LOCK USING 2"x2"x1/4" COMPANION OR REINFORCING ANGLES ON 4' CENTERS WITH 2"x2"x1/4" ANGLES ON CENTER LINE BETWEEN COMPANION ANGLES, ANGLE SLIP, OR ANGLE REINFORCED POCKET LOCK USING 2"x2"x1/4" COMPANION OR REINFORCING ANGLES ON 8' CENTERS WITH 2"x2"x1/4" ANGLES ON 2' ON CENTER LINE IN BETWEEN 1-1/2" ANGLE REINFORCED STANDING SEAM ON 2' CENTERS USING 2"x2"x1/4" REINFORCING ANGLES INSIDE LONGITUDINAL STANDING SEAMS WITH 2"x2"x1/4" ANGLES ON 2' CENTERS ON EXTERIOR

FOR PRESSURES IN EXCESS OF 2-INCH WATER COLUMN, DUCT WALL THICKNESS SHALL BE TWO GAGES HEAVIER THAN SET FORTH IN THIS TABLE DUCT SPECIFICATIONS SHOWN HERE ARE APPLICABLE WHEN DUCTS LARGER THAN 18 INCHES ARE CROSS BROKEN. WHERE CROSS BREAKING IS NOT USED, DUCT WALL THICKNESS SHALL BE TWO GAGES HEAVIER ON DUCTS 19 INCHES THROUGH 60 INCHES WIDE, UNLESS LONGITUDINAL STANDING SEAMS ARE USED.

DUCT INSULATION REQUIREMENTS

MINIMUM DUCT INSULATION R-VALUE a, COMBINED HEATING AND COOLING SUPPLY AND RETURN DUCTS.

	DUCT LOCATION					
CLIMATE ZONE	EXTERIOR	VENTILATED ATTIC	UNVENTED ATTIC ABOVE INSULATED CEILING	UNVENTED ATTIC W/ ROOF INSULATION a	UNCONDITIONED SPACE b	CONDITIONED SPACE c
SUPPLY DUCTS						
3	R-6	R-6	R-6	R-6	R3.5	1" LINER
RETURN DUCTS						
1 TO 8	R-3.5	R-3.5	R-3.5	NONE	R-3.5	1" LINER

a. INSULATION R-VALUES ARE FOR THE INSULATION AS INSTALLED AND DO NOT INCLUDE FIRE RESISTANCE. THE REQUIRED MINIMUM THICKNESSES DO NOT CONSIDER WATER VAPOR TRANSMISSION AND POSSIBLE SURFACE CONDENSATION. WHERE EXTERIOR WALLS ARE USED AS PLENUM WALLS, WALL INSULATION SHALL BE AS REQUIRED BY THE MOST RESTRICTIVE CONDITION OF APPLICABLE CODES.
b. INCLUDES CRAWLSPACES, BOTH VENTILATED AND NONVENTILATED.
c. INCLUDES RETURN AIR PLENUMS WITH OR WITHOUT EXPOSED ROOFS ABOVE.

NOTES:

1. REGARDLESS OF THE THICKNESS SPECIFIED, THE INSULATION SHALL MEET THE REQUIREMENTS OF THE INTERNATIONAL ENERGY CODE AND ASHRAE 90.1
2. DIMENSIONS SHOWN ON PLANS ARE AIRSTREAM DIMENSIONS, METAL SIZE FOR LINED DUCTWORK WILL BE LARGER THAN DIMENSION SHOWN.
3. USE MATERIALS ONLY AS APPROVED BY AUTHORITIES HAVING JURISDICTION.
4. ALL MATERIALS USED SHALL HAVE A FLAME SPREAD RATING OF NOT MORE THAN 25 WITHOUT EVIDENCE OF CONTINUOUS PROGRESSIVE COMBUSTION, AND WITH A SMOKE DEVELOPED RATING OF NOT HIGHER THAN 50. SHOP DRAWING SUBMITTALS SHALL SHOW THIS INFORMATION.
5. ACCOUSTIC INSULATION ON FIRST 15' OF DUCT SHALL NOT RELIEVE INSULATION REQUIREMENT FOR FIRST 15'.

APPLICATION NOTES:

A. ALL PLENUMS SHALL BE INSULATED AS REQUIRED FOR DUCTWORK.
B. JOINTS SHALL BE LAPPED 6 INCHES IN BOTH DIRECTIONS, SEALED WITH APPROVED MASTIC APPLIED OVER EACH JOINT AND SECURED IN PLACE. WHEN WRAPPED INSULATION MEETS LINED DUCTS OVERLAP THE INSULATION TYPES 24 INCHES.
C. INSULATION SHALL BE INSTALLED IN A VAPOR-TIGHT MANNER AND MAY BE FASTENED WITH THE USE OF STAPLES OR OTHER FASTENING MATERIAL AS RECOMMENDED BY INSULATION MANUFACTURER PROVIDED THE FASTENERS ARE COVERED WITH MASTIC OR SMACNA TAPE.
D. WHERE RECTANGULAR DUCTS ARE 24" IN WIDTH OR GREATER, DUCT WRAP INSULATION SHALL BE ADDITIONALLY SECURED TO THE BOTTOM OF THE DUCT WITH MECHANICAL FASTENERS SUCH AS PINS AND SPEED CLIP WASHERS, SPACED 14" ON CENTERS (MAXIMUM) TO PREVENT SAGGING OF INSULATION.
E. SEAL ALL TEARS, PUNCTURES AND OTHER PENETRATIONS OF THE DUCT WRAP INSULATION FACING WITH TAPE OR MASTIC TO PROVIDE A VAPOR TIGHT SEAL.
F. WHERE INDICATED TO BE LINED, DUCTWORK SHALL BE INSULATED INTERNALLY, RATHER THAN EXTERNALLY. R-VALUES MUST BE EQUAL.
G. FOR INTERNAL INSULATION, APPLY INSULATION TO INSIDE OF DUCTS AND PLENUMS WITH FIRE RETARDANT ADHESIVE WITH FACED SIDE EXPOSED TO AIR STREAM. FORM LONGITUDINAL JOINTS IN CORNERS OF DUCT OR PLENUM ONLY. TIGHTLY BUTT JOINTS TOGETHER AND SIZE WITH FIRE-RETARDANT ADHESIVE TO PROVIDE A SMOOTH SURFACE. IN DUCTS AND PLENUMS WITH ONE SIDE MORE THAN 24", SECURE INSULATION WITH ADHERED WITH WELDED MECHANICAL FASTENERS IN ADDITION TO ADHESIVE, FASTENERS SPACED AT 14" CENTERS IN BOTH DIRECTIONS.

UNIT HEATER SCHEDULE

DESIGNATION	UH-1, 2
SERVES	STORAGE
C.F.M.	350
KW	5
AMPS	24
VOLTS/PHASE	208/1
CONTROLS	24V
MANUFACTURER	QMARK
MODEL #	MUH-0581
WEIGHT (LBS)	27 (W/ BRACKET)
REMARKS	

NOTES:
1. MOUNT PER MANUFACTURER'S GUIDELINES.
2. CONSULT OWNER FOR FINAL LOCATION OF THERMOSTATS.
3. OR APPROVED EQUAL.

VENTILATION AIR SCHEDULE

OCCUPANCY CLASSIFICATION	≈AREA (SF)	OCCUPANT DENSITY	CFM / OCCUPANT	CFM / AREA	EXHAUST AIRFLOW	MIN. CFM REQUIRED	MIN. CFM PROVIDED
102 - EXERCISE	16866	169	20	1012	-	4392	4400
103 - OFFICE	141	1	5	8	-	13	15
104 - STORAGE	148	-	-	9	-	9	10
105 - SNACK BAR	440	26	5	26	600	156	160
106 - PREP AREA	375	38	7.5	23	600	308	310
107 - HALLWAY	167	1	5	10	-	15	20
108 - WOMEN'S RR	265	-	-	16	375	16	20
109 - MEN'S RR	265	-	-	16	375	16	20
110 - STORAGE	602	-	-	36	-	36	40
111 - BREAK	107	1	5	6	-	11	15
112 - CORRIDOR	94	-	-	6	-	6	10
113 - EXIT	73	-	-	-	-	-	-
114 - STORAGE	529	-	-	-	-	-	-
115 - JANITOR	51	-	-	-	-	-	-
TOTAL	20123				1950	4978	5020

AIR BALANCE SCHEDULE

MARK	SUPPLY AIR - CFM	RETURN AIR - CFM	OUTSIDE AIR - CFM	EXHAUST AIR - CFM	PRESSURE
(X) RTU 1	4000	3500	500	0	+500
(X) RTU 2	4000	3500	500	0	+500
(X) RTU 3	4000	3500	500	0	+500
(X) RTU 4	4000	3500	500	0	+500
RTU 5	8000	6600	1400	0	+1,400
RTU 6	8000	6600	1400	0	+1,400
(X) RTU-7	2000	1890	110	0	+110
(X) RTU-8	2000	1890	110	0	+110
EF-1				1950	-1950
EF-2				50	-50
SUB-TOTAL	36000	30980	5020	2000	+3,020
BUILDING TOTAL	36000	30980	5020	2000	+3,020

NOTES:

1. A COMPLETE TEST AND AIR BALANCE SHALL BE PERFORMED ON ALL AIR DISTRIBUTION EQUIPMENT. THE TEST AND BALANCE SHALL BE PERFORMED BY AN INDEPENDENT, FULLY CERTIFIED TAB AGENCY THAT SPECIALIZES IN THE TESTING AND BALANCING OF AIR AND HYDRONIC SYSTEMS. THE TAB AGENCY SHALL SUBMIT TO THE OWNER (6) COPIES OF A WRITTEN REPORT WITHIN 10 DAYS AFTER THE INSPECTION IS COMPLETE. LIST ALL COMPLAINTS AND MALFUNCTIONS ENCOUNTERED AND INDICATE STEPS TAKEN TO CORRECT.
2. THE TAB AGENCY TO BE AABC CERTIFIED.

EXISTING ROOFTOP UNIT SCHEDULE

DESIGNATION	EXISTING RTU 1	EXISTING RTU 2	EXISTING RTU 3	EXISTING RTU 4	EXISTING RTU 7	EXISTING RTU 8
SERVES	SLICK CITY	SLICK CITY	SLICK CITY	SLICK CITY	RELOCATED	RELOCATED
C.F.M.	4000	4000	4000	4000	2000	2000
E.S.P. (IN. W.G.)	0.8	0.8	0.8	0.8	0.8	0.8
O.A. C.F.M. (MIN.)	600	600	600	600	600	600
COOLING COIL						
TOTAL CAPACITY (MBH)	120.0	120.0	120.0	120.0	60.0	60.0
SENSIBLE CAPACITY (MBH)	86.4	86.4	86.4	86.4	43.2	43.2
ENTERING AIR (DB/WB °F)	80/67	80/67	80/67	80/67	80/67	80/67
LEAVING AIR (DB/WB °F)	59/57	59/57	59/57	59/57	59/57	59/57
HEATING						
TEMPERATURE RISE RANGE	40-70	40-70	30-60	40-70	30-60	30-60
GAS INPUT/OUTPUT (MBH)	240/192	240/192	180/144	240/192	108/86.4	108/86.4
COMPRESSOR						
NO. OF COMPRESSORS	2	2	2	2	1	1
TYPE	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL
FILTERS	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8
ELECTRICAL						
VOLTAGE/PHASE	208/3	208/3	208/3	208/3	208/3	208/3
MINIMUM CIRCUIT AMPS	61	61	61	61	14	14
MAX. OVERCURRENT PROTECTION	70	70	70	70	20	20
ECONOMIZER	DRY BULB	DRY BULB	DRY BULB	DRY BULB	DRY BULB	DRY BULB
MANUFACTURER	LENNOX	LENNOX	LENNOX	LENNOX	LENNOX	LENNOX
MODEL NO.	KGA120S4BH3Y	KGA120S4BH3Y	KGA120S4BM3Y	KGA120S4BH3Y	ZGA060S4BM1Y	ZGA060S4BM1Y
SEER2/EER/IEER	-/11.0/12.7	-/11.0/12.7	-/11.0/12.7	-/11.0/12.7	13/10.7/-	13/10.7/-
NOMINAL TON.	10	10	10	10	5	5
WEIGHT	1293	1293	1293	1293	550	550
REMARKS	SINGLE POINT CONNECTION					

NOTES:
1. EXTERNAL S.P. DOES NOT ALLOW FOR WET COIL AND DIRTY FILTER.
2. PROVIDE BAROMETRIC RELIEF FOR ALL UNITS WITH MOTORIZED DAMPERS AND ECONOMIZERS.
3. PROVIDE AIR DUCT SMOKE DETECTORS FOR ALL UNITS, PER PLAN. PROVIDE REMOTE TEST AND RESET FOR SMOKE DETECTORS.
4. ALL UNITS TO BE BELT DRIVE OR VARIABLE SPEED.
5. PROVIDE HAIL GUARDS ON ALL UNITS.

GENERAL CONTRACTOR SHALL OBTAIN OWNERS/ENGINEERS APPROVAL FOR ALL NEW OR REPLACEMENT UNITS AND EQUIPMENT TO BE ATTACHED TO OR TO BE SET ON THE ROOF PRIOR TO PERFORMING ANY WORK.

AIR DEVICE SCHEDULE

DESIGNATION	A	B	C	D	E
MODULE SIZE	24"x24"	24"x24"	SEE PLAN	SEE PLAN	24"x24"
NECK SIZE	SEE PLAN	SEE PLAN	SEE PLAN	SEE PLAN	SEE PLAN
FLOW RATE (CFM)	SEE PLAN	SEE PLAN	SEE PLAN	SEE PLAN	SEE PLAN
NECK VELOCITY (FPM)	700 MAX.	700 MAX.	700 MAX.	400 MAX.	700 MAX.
N.C. LEVEL	18 MAX.	18 MAX.	18 MAX.	-	18 MAX.
MANUFACTURER	TITUS	TITUS	TITUS	RUSKIN	TITUS
MODEL NO.	TMS	PAR	350RL	NOTE 8	PAR
DESCRIPTION	SUPPLY DIFFUSER	PERFORATED RETURN DIFFUSER	TRANSFER RETURN	CONCENTRIC SUPPLY / RETURN DIFFUSER	EXHAUST DIFFUSER
REMARKS	-	-	-	-	-

NOTES:
1. MOUNTING FRAMES SHALL BE COMPATIBLE WITH CEILING TYPE.
2. PROVIDE OPPOSED BLADE DAMPER.
3. PROVIDE OFF WHITE FINISH.
4. ALL CEILING DIFFUSERS ARE 4-WAY DISCHARGE, UNLESS OTHERWISE INDICATED ON PLANS.
5. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
6. DUCT RUNOUTS ARE SAME SIZE AS AIR DEVICE NECK NOTED ON PLAN.
7. OR APPROVED ALTERNATE. ALTERNATE EQUIPMENT SUBMITTAL SHALL INCLUDE A CROSS REFERENCE GUIDE FOR APPROVAL.
8. 0-2000 CFM = RUSKIN 530-16
   2000-4000 CFM = RUSKIN 530-22
   4000-8000 CFM = RUSKIN 530-80

NEW HEAT PUMP SCHEDULE

	DESIGNATION	RTU 5, RTU 6
	NOMINAL TONS	20
	FAN C.F.M.	8000
	E.S.P. IN. W.G.	0.8
	O.A. C.F.M.	1600
COOLING COIL	TOTAL MBH	240
	EAT DB	80.0
	EAT WB	67
	LAT DB	59
	LAT WB	57.8
	SMBH	181.7
HEATING	KW	20
	STEPS	2
	HP CAPACITY MBH	191.2
	COP @ 47F	3.3
	SEER2 (IEER)	(12.5)
	EER2 (EER)	(9.5)
	FILTER	MERV 8
ELECTRICAL	VOLTS	208
	HZ	60
	PHASE	3
	MCA	40
	MOCP	45
	WEIGHT LBS (MAX)	1855
	COMPRESSOR	2/SCROLL
	REFRIGERANT	R454B
	MANUFACTURER	RHEEM
	MODEL	RHPH2T240ADG201

NOTES:
1. EXTERNAL S.P. DOES NOT ALLOW FOR WET COIL AND DIRTY FILTER.
2. PROVIDE BAROMETRIC RELIEF FOR ALL UNITS WITH MOTORIZED DAMPERS AND ECONOMIZERS.
3. PROVIDE AIR DUCT SMOKE DETECTORS FOR ALL UNITS, PER PLAN. PROVIDE REMOTE TEST AND RESET FOR SMOKE DETECTORS.
4. ALL UNITS TO BE BELT DRIVE OR VARIABLE SPEED.
5. PROVIDE HAIL GUARDS ON ALL UNITS.

GENERAL CONTRACTOR SHALL OBTAIN OWNERS/ENGINEERS APPROVAL FOR ALL NEW OR REPLACEMENT UNITS AND EQUIPMENT TO BE ATTACHED TO OR TO BE SET ON THE ROOF PRIOR TO PERFORMING ANY WORK.

FAN SCHEDULE

DESIGNATION	EF-1	EF-2
SERVES	PREP AREA SNACK BAR	JANITOR'S CLOSET
MOUNTING	ROOF	CEILING
TOTAL C.F.M.	1950	150
TOTAL S.P. (IN. W.G.)	0.5	0.5
MOTOR HP (WATTS)	0.3	(20)
DRIVE TYPE	DIRECT	DIRECT
VOLTAGE/PHASE	120/1	120/1
SONES / WEIGHT (LBS)	10.2 / 93	2.0 / 10
MANUFACTURER	GREENHECK	GREENHECK
MODEL NO.	CUE-160	SP-B90
ACCESSORIES	BD DAMPER BUILDING HOURS	BD DAMPER LOCAL SWITCH

NOTES:
1. MOUNT FAN PER MANUFACTURER'S RECOMMENDATIONS.
2. MAINTAIN CODE REQUIRED DISTANCE BETWEEN EXHAUST OUTLET AND OUTSIDE AIR INTAKES.
3. PROVIDE WITH SPEED CONTROL TO BE MOUNTED ON J-BOX ABOVE CEILING.
4. OR APPROVED EQUAL BY COOK.

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ISSUE RECORD

DESCRIPTION DATE

ISSUE FOR PERMIT 06/22/2026

REVISION RECORD

NO	DATE	REVISION
1	08/10/26	City Comments

PROFESSIONAL SEAL

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REMODEL

PROJECT NAME

SLICK CITY

NORMAN, OK

PROJECT NUMBER

NORMAN, OK

SHEET TITLE

MECHANICAL SCHEDULES

SHEET NUMBER

M400