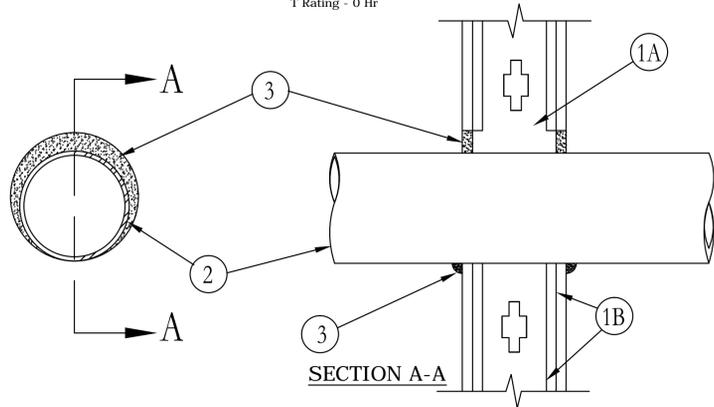


1 INFRA-RED HEATER DETAIL
M-2.1 NTS

System No. W-L-1146
September 03, 2004
F Ratings - 1 and 2 Hr (See Item 1)
T Rating - 0 Hr



1. Wall Assembly - The 1 or 2 hr fire rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300 or U400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. Studs - Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 in. by 4 in. (51 mm by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw attached to the steel studs at each end. The framed opening in the wall shall be 4 in. to 6 in. (102 to 152 mm) wider and 4 in. to 6 in. (102 to 152 mm) higher than the diam of the penetrating item such that, when the penetrating item is centered in the opening, a 2 in. to 3 in. (51 mm to 76 mm) clearance is present between the penetrating item and the framing in all four sides.

B. Gypsum Board - The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 26 in. (660 mm) for steel stud walls. Max diam of opening is 14-1/2 in. (368 mm) for wood stud walls.

The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. Through Penetrant - One metallic pipe, conduit or tubing installed either concentrically or eccentrically within the firestop system. The annular space between pipe, conduit or tubing and periphery of opening shall be min of 0 in. (point contact) to max 2 in. (0 mm to 51 mm). Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:

- A. Steel Pipe - Nom 24 in. (610 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
- B. Iron Pipe - Nom 24 in. (610 mm) diam (or smaller) service weight (or heavier) cast iron soil pipe, nom 12 in (305 mm) diam (or smaller) or Class 50 (or heavier) ductile iron pressure pipe.
- C. Conduit - Nom 6 in. (152 mm) diam (or smaller) steel conduit or nom 4 in (102 mm) diam (or smaller) steel electrical metallic tubing
- D. Copper Tubing - Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing
- E. Copper Pipe - Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.

3. Fill/Void or Cavity Materials* - Caulk or Sealant - Min 5/8 in. (16 mm) thickness of fill material applied within the annulus. Flush with both surfaces of wall. Min 1/2 in. (13 mm) diam bead of caulk or sealant applied to the penetrant/wallboard interface at the point contact location on both sides of wall.

3M COMPANY - CP 25WB+ caulk or FB-3000 WT sealant.

*Bearing the UL Classification Mark

SYMBOL		DESCRIPTION
SINGLE LINE	DOUBLE LINE	
LOW PRESSURE DUCTWORK		
		DUCT SECTION-1ST FIGURE WIDTH, 2ND DEPTH
		SQUARE TO ROUND TRANS.
		FLEX DUCTWORK
		ELBOW W/TURNING VANES
		LONG RADIUS ELBOW
EXH		EXHAUST DUCT SECTION
SA		SUPPLY DUCT SECTION
OA		OUTSIDE AIR DUCT SECTION
RA		RETURN/RELIEF AIR DUCT SECTION
TA		TRANSFER AIR DUCT SECTION
		CONICAL DUCT TAKE-OFF
		RECTANGULAR-TO-ROUND TAKE-OFF
		RECTANGULAR TAKE-OFF
		FIRE DAMPER "A" OR "B"
MISCELLANEOUS		
		THERMOSTAT
		MOTOR OPERATED DAMPER
		DAMPER
		MANUAL SWITCH

MINI-SPLIT SYSTEM SCHEDULE																										
Unit Tag	CFM High	CFM Low	Fan Motor			Cooling Performance			Heating Performance		Unit Electrical		Outdoor Unit							Model (Indoor Unit)	Remarks					
			FLA	Volts	Phase	EAT	MBH Total	Efficiency SEER	EAT	Capacity MBH	MCA	MOCP	Unit Tag	Fan		Compressor			MCA			MOCP	Volts	Phase		
MSAH-1	300	135	0.76	208/230	1	80/67	9	17	70	10.9	1	15	MSPH-1	1	0.52	1	9.2	7.8	12	15	208/230	1	Model (Outdoor Unit)	MUZ-A09NA	MSZ-A09NA	1-4

1. MODELS BY MITSUBISHI. EQUALS BY SANYO, LG.
2. MOUNT INDOOR SECTION TIGHT TO BOTTOM OF CEILING AND WALL.
3. INDOOR UNIT POWERED FROM OUTDOOR UNIT. M.C. SHALL COORDINATE POWER REQUIREMENTS FOR ALL SUBSTITUTIONS.
4. REFRIGERANT LINES AND ACCESSORIES PER SPECS AND AS RECOMMENDED BY UNIT MFG.

SPLIT SYSTEM UNIT SCHEDULE - CONDENSING GAS FURNACE																											
Unit Tag	CFM		ESP	Fan Motor			DX Coil Performance				Gas Heating Performance			Condensing Unit Performance							Model (furnace)	Remarks					
	SA	OA		HP	Volts	Phase	EAT	MBH Total	MBH Sens.	SEER	Air PD (Max.)	EAT	Input (MBH)	Output (MBH)	Unit Tag	Fan		Compressor					MCA	MOCP	Volts	Phase	
GF-1	1600	295	0.8	3/4	115	1	80/67	47.0	36.2	16.0	0.25	60	100	93	CU-1	1	1	1	109.0	19.9	26	45	208	1	4TTR6049	TUX1C100	1-3

1. MODEL NUMBERS BASED ON TRANE. EQUALS BY CARRIER AND YORK.
2. CONCENTRIC VENT BY FURNACE MFG. VENT SHALL BE SIMILAR IN APPEARANCE TO CONCENTRIC VENT DETAIL. UNIT SHALL BE UL LISTED FOR USE WITH VENT SHOWN IN CONCENTRIC VENT DETAIL.
3. P.D. ACROSS COILS IS MEASURED WHEN COIL IS WET.

GAS INFRA-RED HEATER SCHEDULE						
Unit Tag	Tube Length (ft)	Mounting Height	Input MBH/Hr.	Gas Type	Model	Remarks
IRH-1, IRH-2	30	16 ft.	50	NATURAL	SPACE-RAYLTU50	1 - 2

1. EQUALS BY REZNR, CHROMALOX OR APPROVED EQUAL.
2. INSTALL AT 45 DEG. ANGLE.

FAN SCHEDULE												
Unit Tag	CFM	ESP	Fan RPM	Sones (dBA)	Drive (W)	HP (180)	Volts	Phs	Type	GREENHECK Model No.	Rmks.	
EF-1	125	.35	1350	2.3	DIRECT	(180)	115	1	C	SP-A190	1-6	
EF-2	125	.35	1350	2.3	DIRECT	(180)	115	1	C	SP-A190	1-6	
VF-1	4000	.15	943	15.6	BELT	1/2	115	1	P	SBE-2L20-5	1,2,5,7	

1. EQUALS BY PENN, ILG, LOREN COOK.
2. TYPES: IL = INLINE CENTRIFUGAL, SW = SIDEWALL EXHAUSTER, SWP = SIDEWALL PROPELLER.
3. SOLID STATE SPEED CONTROL SW. ON FAN OR NEARBY FOR ALL DIRECT DRIVE SINGLE PHASE MOTORS.
4. VERIFY FAN INLET/OUTLET SIZE, TRANSITION TO FIRST DUCT SIZE IF NECESSARY.
5. DISCONNECT SWITCH (OR PLUG) BY MFG. FOR ALL SINGLE PHASE MOTORS (U.N.O.).
6. INTERLOCK WITH LIGHT SWITCH.
7. INTERLOCK WITH TSTAT AND WALL SWITCH.

GRILLE & DIFFUSER SCHEDULE									
SYM	TYPE	USE	CFM RANGE	NECK SIZE	OVER-ALL SIZE	FINISH	FRAME	PRICE MODEL NO	REMARKS
A-	LOUVER FACE	SUPPLY 4-WAY	SEE PLANS & RMK 5	RMK 5	RMK 4	OFF WHITE	RMK 3	SMDA	1-6
BT-	PERF.	RETURN/EXHAUST	SEE PLANS & RMK 6	RMK 7	RMK 4	OFF WHITE	RMK 3	PDDR	1-4, 7-10
BS-	PERF.	RETURN/EXHAUST	SEE PLANS & RMK 6	RMK 7	RMK 4	OFF WHITE	RMK 3	PDDR	1-4, 7-10
C-	SIDEWALL	SUPPLY	SEE PLANS	SEE PLANS	RMK 4	RMK 12	SEE PLANS	520D	1-4, 9, 11-13
D-	SIDEWALL	RETURN/EXHAUST	SEE PLANS	SEE PLANS	RMK 4	RMK 12	SEE PLANS	530	1-4, 9, 12, 13

REMARKS

1. EQUALS: METALAIRE, TITUS, KRUEGER, TUTTLE & BAILEY, NAIL-OR, CARNES. SCHEDULE IS GENERAL, SOME MAY NOT BE USED. PAINT ALL INSIDE VISIBLE SURFACES FLAT BLACK.
2. SYMBOL EXPLANATION: XXX/CFM = SYMBOL, FRAME (RMK 3), NECK (RMK 5.7)/CFM
3. FRAME TYPES: S = FLUSH SURF. MTD., PLASTER FRAME FOR CEILING MOUNTING. T = T-BAR, E = DUCT MOUNTED: V-BEVELED DROP SURF. (TYPE "A" DIFFUSER) D = DROPPED FRAME
4. OVERALL SIZE: LAY-IN = 2'x2', OTHER GRILLES = NECK + 2" +/-.
5. LOUVER FACE SUPPLY NECK SIZES

NO.	ROUND NK SIZE	CFM	NO.	SQUARE NK SIZE	CFM
A	6"	100	H	6x6	125
B	8"	175	I	9x9	280
C	10"	275	J	12x12	500
D	12"	400	K	15x15	780
E	14"	535	L	18x18	1125
F	16"	700	M	21x21	1530
G	18"	885	N	24x24	2000

- NOTE: VERIFY CFM / NECK SIZE.
6. ADJUSTABLE: HORIZONTAL/VERTICAL - "PIANO HINGE" DEVICE.
7. "B" & "E" EXH/RETURN NECK SIZES ("E" = SQ. NK. ONLY)

NO.	ROUND NK SIZE	CFM	NO.	SQUARE NK SIZE	CFM
A	6"	100	G	8x8	220
B	8"	175	H	10x10	345
C	10"	275	I	12x12	500
D	12"	400	J	14x14	680
E	14"	535	K	16x16	885
F	16"	700	L	18x18	1125
NOTE: VERIFY CFM / NECK SIZE.					
			M	22x22	1680
			N	22x46	2600

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT METHOD OF COMPLIANCE	
Prescriptive	Energy Cost Budget
Thermal Zone	4A
Exterior Design Conditions	
Winter Dry Bulb:	18
Summer Dry Bulb:	94
Interior Design Conditions	
Winter Dry Bulb:	70
Summer Dry Bulb:	75
Relative Humidity:	50%
Building Heating Load:	93.1 MBH
Building Cooling Load:	3.9 Tons
Mechanical Space Conditioning System	
Unitary:	
Desc Description of Unit:	Split System Condensing Furnace Infrared heat in truck bay
Heating Efficiency:	MIN. 80% AFUE
Cooling Efficiency:	16 SEER
Heat Heat Output of Unit:	158 MBH
Cooling Output of Unit:	3.9 TONS
List Equipment Efficiencies:	
Equipment Schedules with Motors (Mechanical Systems)	
Motor Horsepower:	Specs Require Compliance w/ 2012 NC Energy Code.
Number of Phases:	Specs Require Compliance w/ 2012 NC Energy Code.
Minimum Efficiency:	Specs Require Compliance w/ 2012 NC Energy Code.
Motor Type:	Specs Require Compliance w/ 2012 NC Energy Code.
Number of Poles:	Specs Require Compliance w/ 2012 NC Energy Code.
Designer Statement:	
To the best of my knowledge and belief, the design of this building complies with the mechanical systems, service systems and equipment requirements of the 2012 NC Energy Code. Section 506 compliance is met through Section 506.2.1 (More Efficient Mechanical Equipment).	

McKNIGHT-SMITH WARD & GRIFFIN ENGINEERS, INCORPORATED
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704/527-2112

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SOUTHEASTERN EMS
NEW SOUTHEASTERN EMS
FOR RUTHERFORD COUNTY

ISSUE DATE: 10-7-14

REVISION 1: _____
REVISION 2: _____
REVISION 3: _____
REVISION 4: _____

PROJECT #: 14-190-000
CONTENT: _____

PROJECT ENGINEER: JCC

DRAWN BY: MSB

CADD FILE NAME: _____

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Sheet
M-2.1