

HVAC LOAD CALCULATIONS

I. DATA

A. HEAT LOSS FACTORS

- ROOF U = 0.05
- MASONRY/STUD WALL U = 0.07
- INTERIOR STUD WALL U = 0.04
- GLASS/DOOR U = 0.55/0.45
- FLOOR SLAB 2 BTU/H/S.F. U = 0.15
- FLOOR/CEILING U = 0.15
- O/S AIR BTU/H = CFM x 1.1 x ΔT

B. HEAT GAIN FACTORS @4:00 p.m. JULY 21, 1996

- ROOF (U = .15) N 19 ETD E 21 ETD S 26 ETD W 22 ETD
- WALLS (U = .15) N 18 BTU/H/S.F. E 22 BTU/H/S.F. S 40 BTU/H/S.F. W 190 BTU/H/S.F.
- GLASS/DOOR MASONRY/STUD WALL 450i x 0.07u x 70°ΔT = 2,205
GLASS/DOOR 90i x 0.55u x 70°ΔT = 3,465
- WEST ELEVATION MASONRY/STUD WALL 80i x 0.07u x 70°ΔT = 390
GLASS/DOOR 30i x 0.55u x 70°ΔT = 1,155
- NORTH ELEVATION (INTERIOR PARTITION) STUD WALL 540i x 0.15u x 5°ΔT = 405
- EAST ELEVATION MASONRY/STUD WALL 105i x 0.07u x 70°ΔT = 515
GLASS/DOOR 15i x 0.55u x 70°ΔT = 590

II.D. HEAT LOSS (OCCUPIED) 2nd FLOOR (south)

ROOF 975i x 0.05u x 70°ΔT = 3,415
FLOOR 975i x 0.15u x 5°ΔT = 730

SOUTH ELEVATION MASONRY/STUD WALL 450i x 0.07u x 70°ΔT = 2,205
GLASS/DOOR 90i x 0.55u x 70°ΔT = 3,465

WEST ELEVATION MASONRY/STUD WALL 80i x 0.07u x 70°ΔT = 390
GLASS/DOOR 30i x 0.55u x 70°ΔT = 1,155

NORTH ELEVATION (INTERIOR PARTITION) STUD WALL 540i x 0.15u x 5°ΔT = 405

EAST ELEVATION MASONRY/STUD WALL 105i x 0.07u x 70°ΔT = 515
GLASS/DOOR 15i x 0.55u x 70°ΔT = 590

TOTAL TRANSMISSION 12,860

O/S AIR 50 CFM x 1.1 x 70°ΔT = 3,850

TOTAL 16,710

16.7 MBH x 1.2 SAFETY FACTOR = 20.1 MBH
20.1 MBH = 5.9 KW
3.41 MBH/KW

PROVIDE 7.5 KW HEATER

III.D. HEAT GAINED (OCCUPIED) 2nd FLOOR (south)

ROOF 975i x 0.05u x 50 ETD = 7,310
FLOOR/CEILING 975i x 0.15u x 5°ΔT = 730

SOUTH ELEVATION MASONRY/STUD WALL 450i x 0.15u x 26 ETD = 1,755
GLASS/DOOR 90i x 0.40 BTU/H/SF = 3,600

WEST ELEVATION MASONRY/STUD WALL 80i x 0.15u x 22 ETD = 265
GLASS/DOOR 30i x 0.190 BTU/H/SF x 0.5 SC = 2,850

NORTH ELEVATION (INTERIOR PARTITION) STUD WALL 540i x 0.15u x 5°ΔT = 405

EAST ELEVATION MASONRY/STUD WALL 105i x 0.15u x 26 ETD = 410
GLASS/DOOR 15i x 0.22 BTU/H/SF = 330

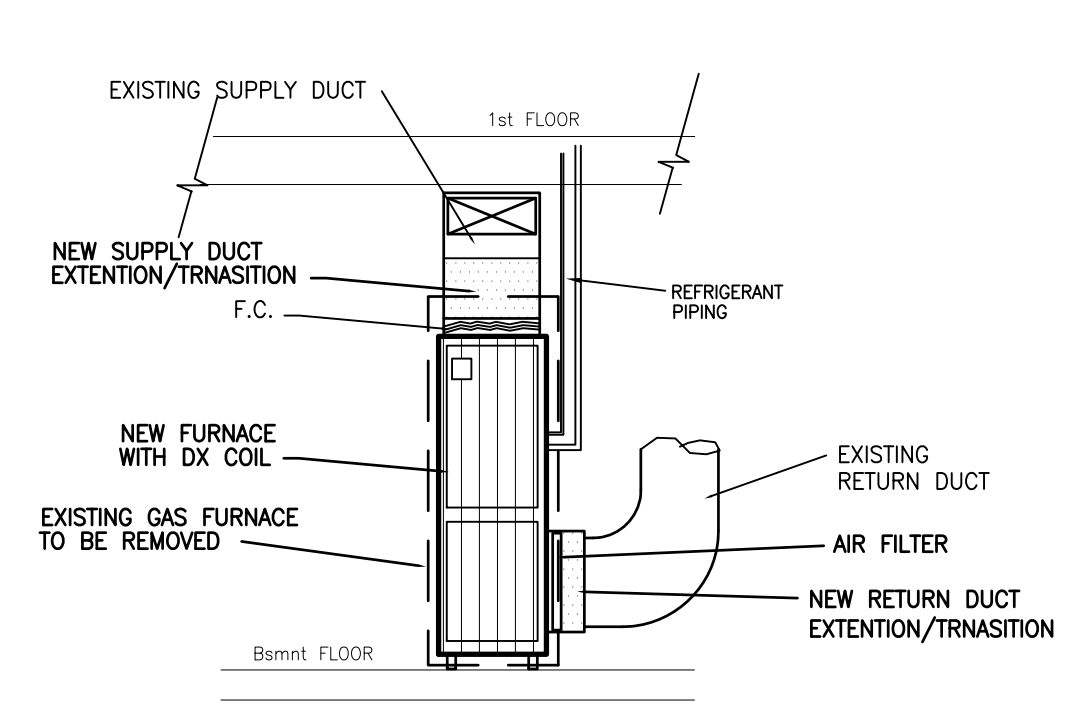
TOTAL TRANSMISSION 17,355 BTU/H

LIGHTS 0.5 W/ft x 975i x 3.413 BTU/H/W = 1,660
PEOPLE 2 x 400 BTU/H/PERSON = 800
MOTORS 0.2 HP x 3,300 BTU/H/HP = 660
EQUIPMENT 1 W/ft x 975i x 3.413 BTU/H/W = 3,330
O/S AIR 50 CFM x 4.5 x 17°ΔT = 3,825

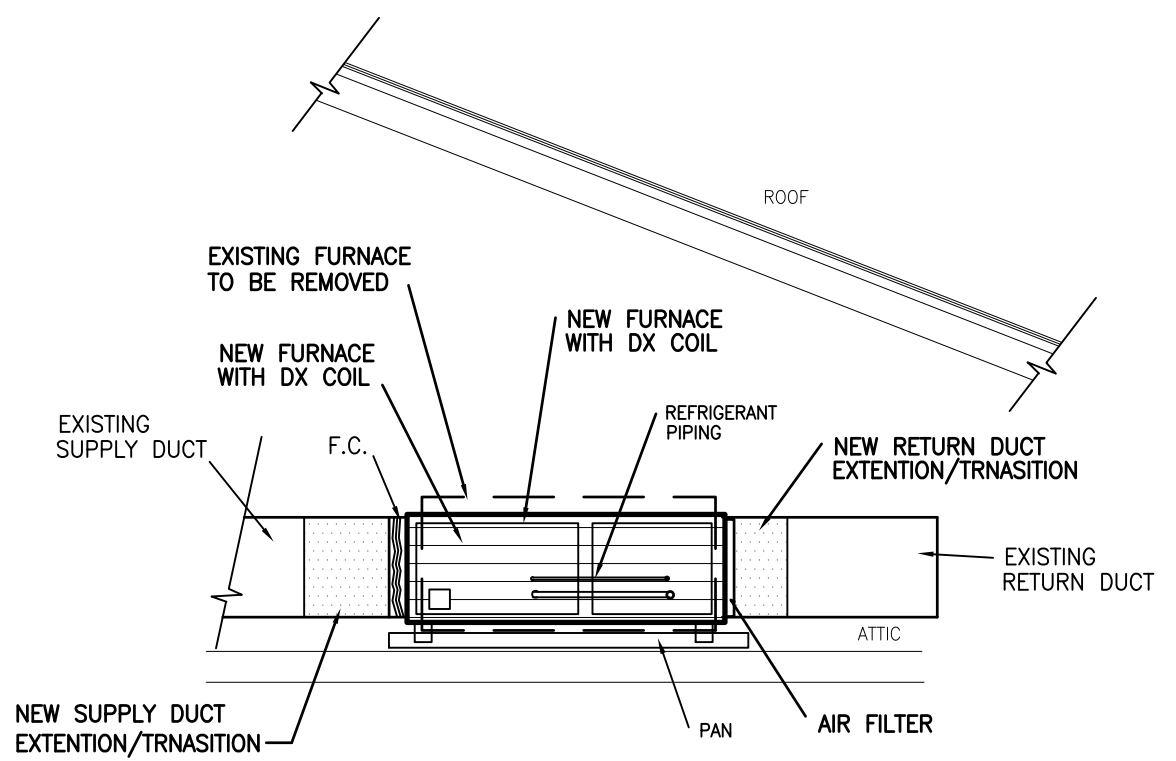
TOTAL INTERNAL 10,275 BTU/H

GRAND TOTAL 27,630 BTU/H

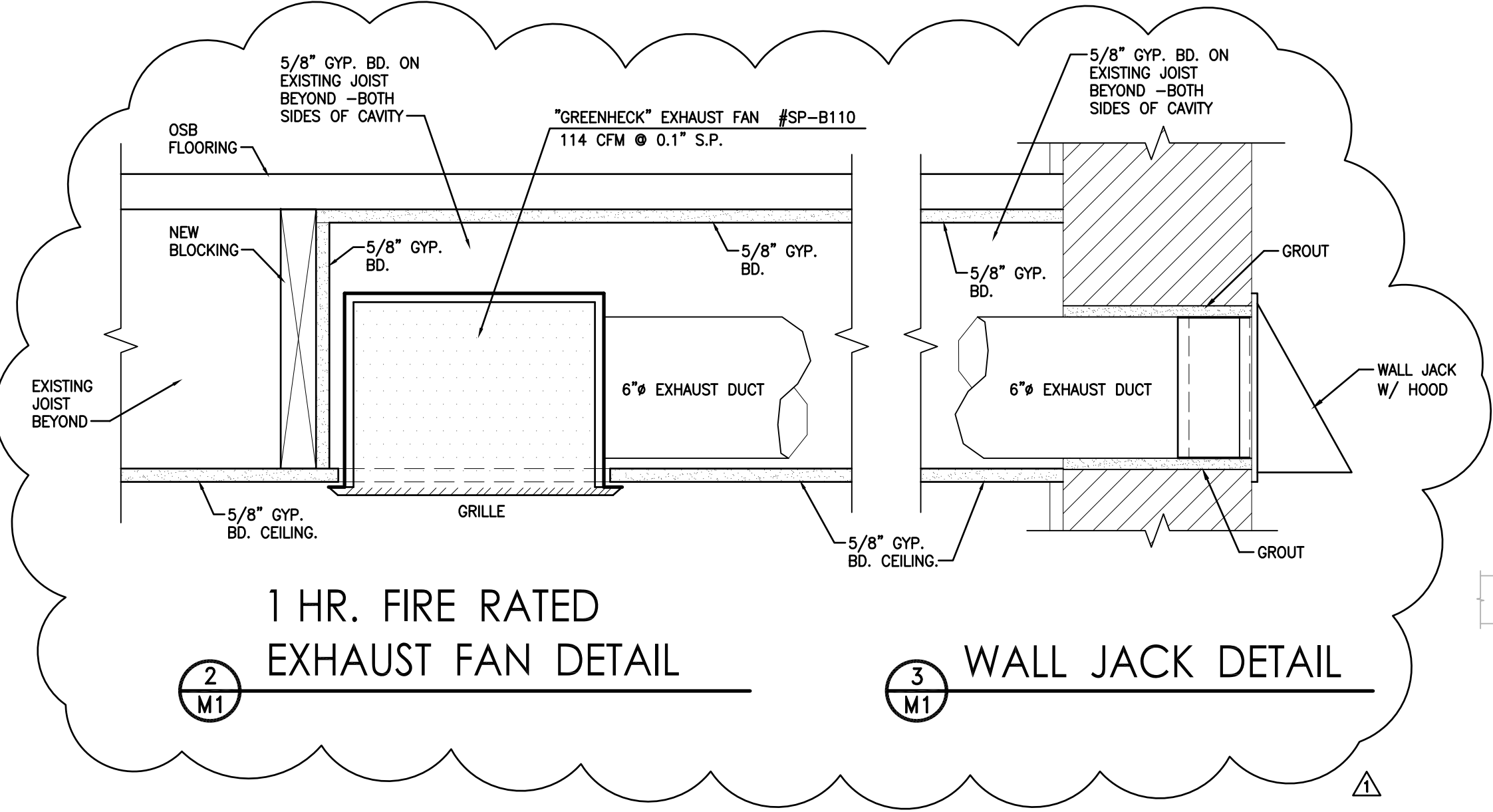
27.6 MBH = 2.3 TONS
12.0 MBH / TON
2.3 TONS x .9 DIVERSITY = 2.1 TONS
PROVIDE 2.5 TON SPLIT SYSTEM



A FURNACE DETAIL

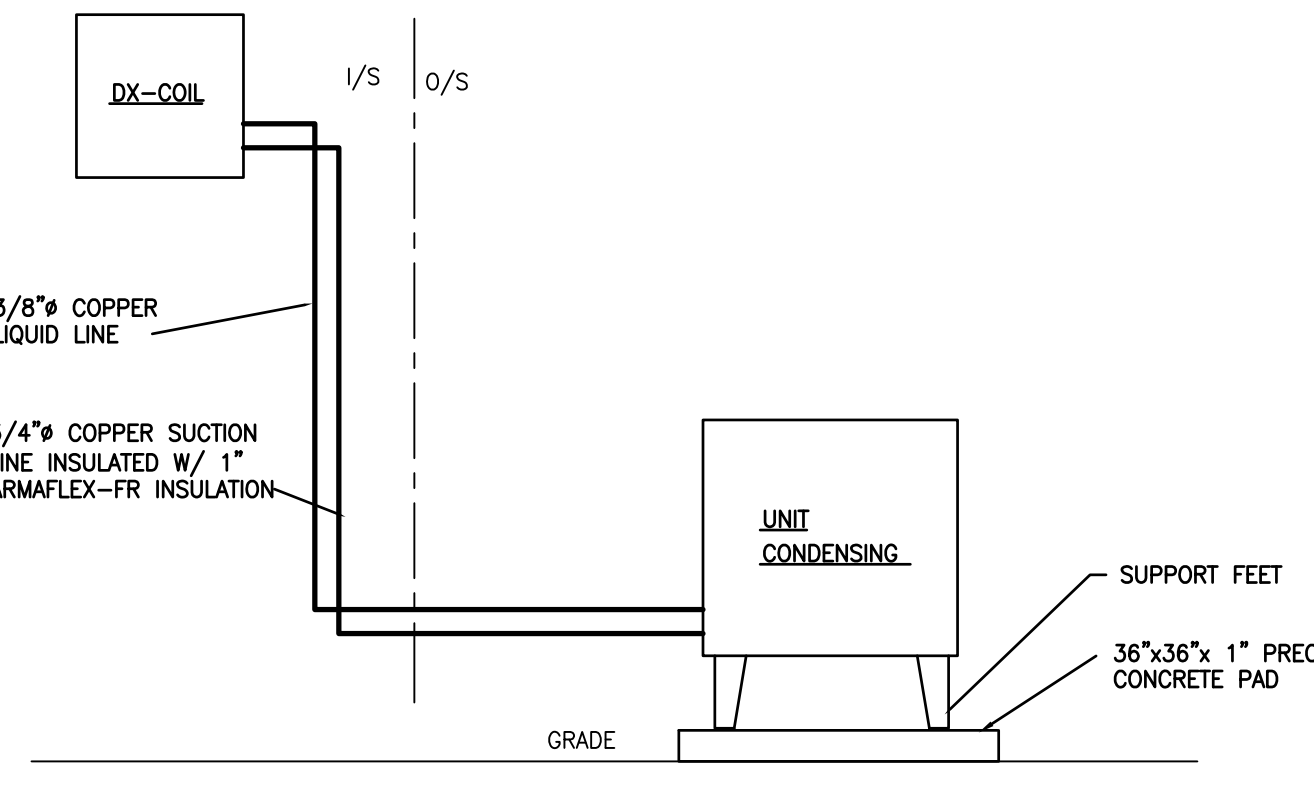


B FURNACE DETAIL



2 1 HR. FIRE RATED EXHAUST FAN DETAIL

3 WALL JACK DETAIL



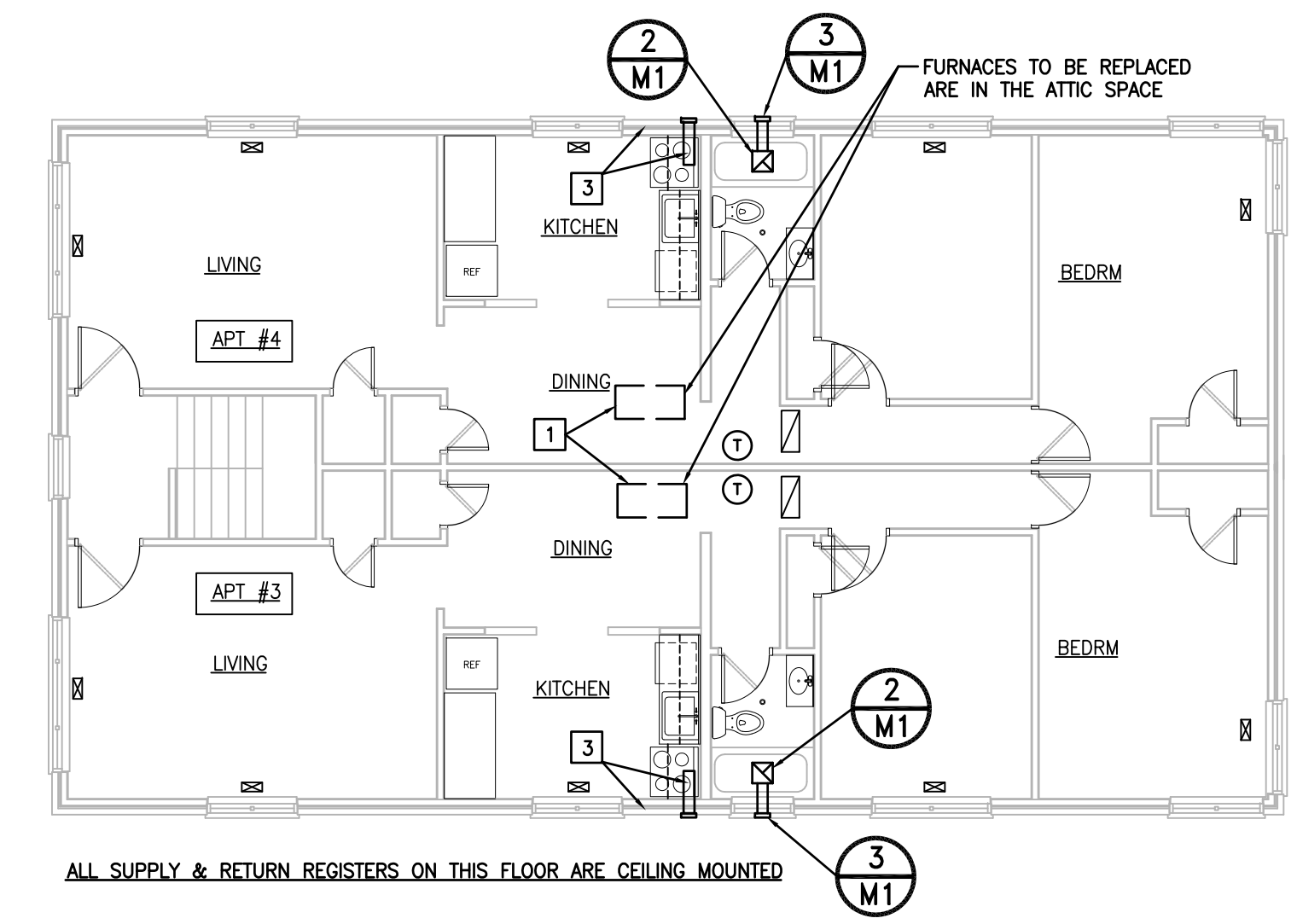
1 REFREGERANT PIPING DIAGRAM

TABULATION of SYSTEMS

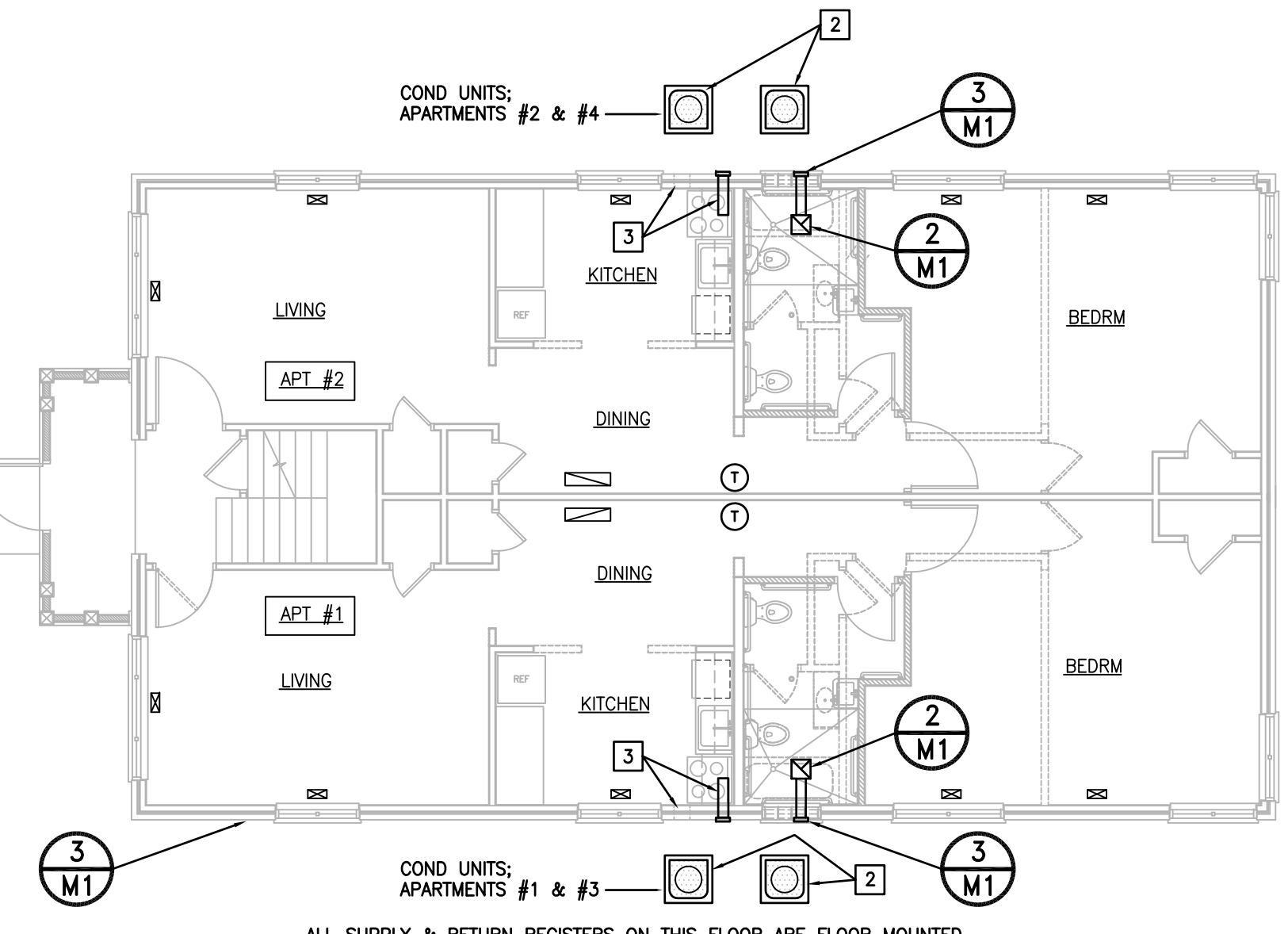
APARTMENT/FLOOR	SYSTEM
APARTMENT #1: 1st FLOOR	SYSTEM #1
APARTMENT #2: 1st FLOOR	SYSTEM #1
APARTMENT #3: 2nd FLOOR	SYSTEM #2
APARTMENT #4: 2nd FLOOR	SYSTEM #2

H.V.A.C. EQUIPMENT SCHEDULE

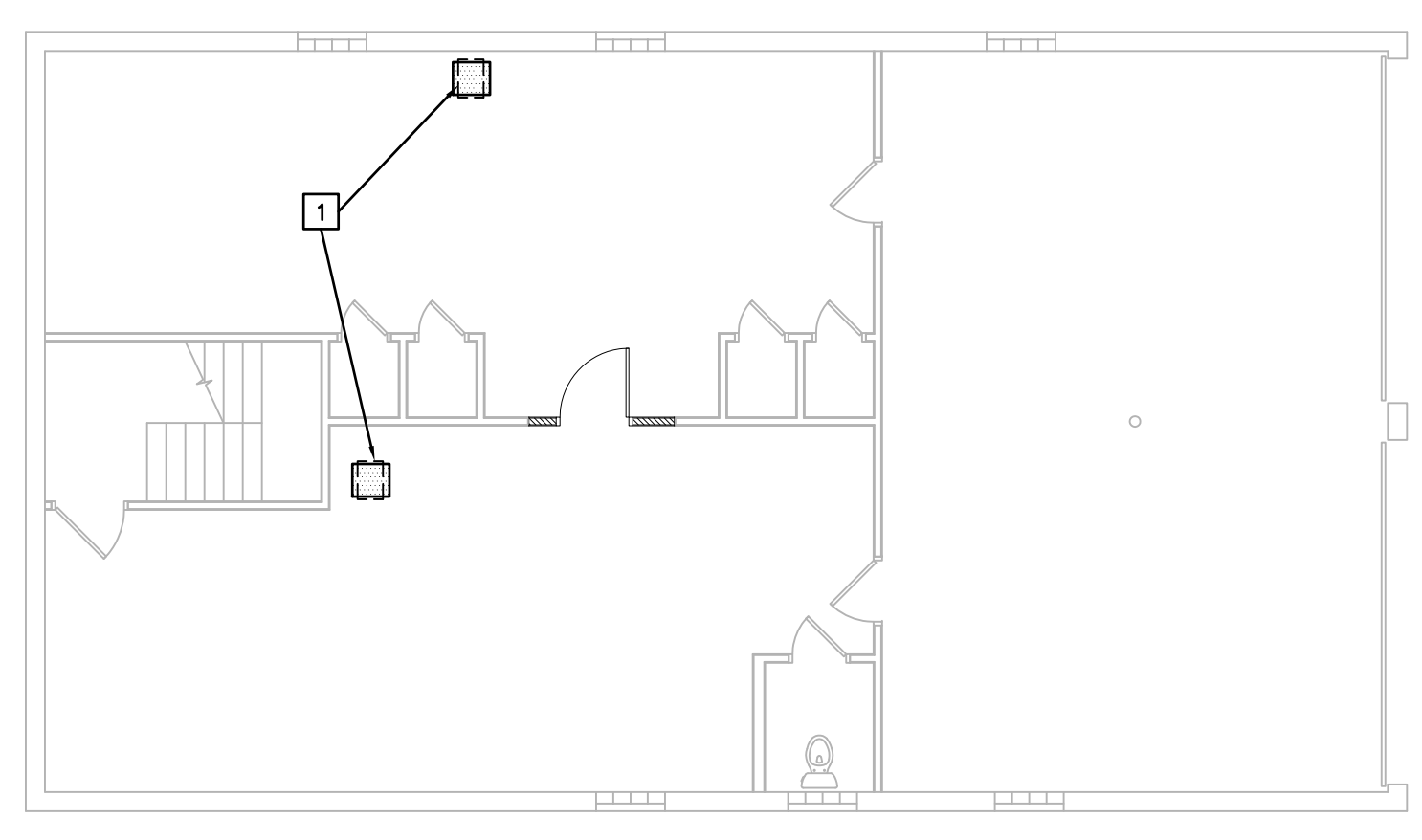
MARK	DESIGN PARAMETERS	SPACE LOAD	MANUF	EQUIPMENT	MODEL NO.	CAPACITY	ELECTRIC	OPTIONS	COMMENTS
SYSTEM #1	0'F O/S - 70'F I/S	20.0 MBH HT LOSS	GOODMAN	FURNACE & DX-COIL	ASPT 25B14AA - HKS C 08 XA AA	8.0 KW = 27.3 MBH HTG 24 MBH CLG @ ARI 800 CFM @ .50" SP	35 FLA @ 208v 1φ, 50 AMP 2P CB; #6cu WIRE 1/2 HP MULTI-SPEED BLOWER	THERMOSTAT, & 20"x16"x1" FILTER	UNIT EQUIPPED WITH CIRCUIT BREAKER, TXV VALVE; 20" w x 36" h x 16" d, 120 LBS
	93'F, 78'Fwb O/S 78'F, 50% rh I/S	21.0 MBH HT GAIN	GOODMAN	CONDENSING UNIT	GSX14 0241 AA	24 MBH CLG @ ARI @ 800 CFM 24 MBH HTG @ 800 CFM	12 FLA @ 208v 1φ, 20 AMP 2P CB; #10cu WIRE	SUPPORT LEGS & 30"x30"x1" CONCRETE PAD, HT RELAY, HARD START KIT, O/S STAT, FREEZE PROTECT KIT, ANTI-SHORT CYCLE, LOW PRESS	3/8" LIQ & 3/4" SUCT LINE; 150 LBS R-410A REFRIGERANT, 14.0 SEER
SYSTEM #2	0'F O/S - 70'F I/S	20.0 MBH HT LOSS	GOODMAN	FURNACE & DX-COIL	ASPT 25B14AA - HKS C 08 XA AA	8.0 KW = 27.3 MBH HTG 30 MBH CLG @ ARI 1000 CFM @ .50" SP	35 FLA @ 208v 1φ, 50 AMP 2P CB; #6cu WIRE 1/2 HP MULTI-SPEED BLOWER	THERMOSTAT, PAN & 20"x16"x1" FILTER	UNIT EQUIPPED WITH CIRCUIT BREAKER, TXV VALVE; 20" w x 36" h x 16" d, 120 LBS
	93'F, 78'Fwb O/S 78'F, 50% rh I/S	27 MBH HT GAIN	GOODMAN	CONDENSING UNIT	GSX14 0301 AA	30 MBH CLG @ ARI @ 1000 CFM 30 MBH HTG @ 1000 CFM	15 FLA @ 208v 1φ, 25 AMP 2P CB; #8cu WIRE	SUPPORT LEGS & 30"x30"x1" CONCRETE PAD	3/8" LIQ & 3/4" SUCT LINE; 180 LBS R-410A REFRIGERANT, 14.0 SEER
EXHAUST FAN #1	-	-	GREENHECK	EXHAUST FAN	SP-B110	114 CFM @ 0.1" S.P.	1.14 AMPS 80 WATTS	6" DUCT	HOODED WALL CAP -GREENHECK MODEL# WC-6



2nd FLOOR HVAC PLAN
SCALE: 1/8" = 1'-0"



1st FLOOR HVAC PLAN
SCALE: 1/8" = 1'-0"



Basement HVAC PLAN
SCALE: 1/8" = 1'-0"

H.V.A.C. LEGEND

- SUPPLY DUCT RISER
- RETURN/EXHAUST DUCT RISER
- DUCT WORK
- SUPPLY DIFFUSER AND AIR FLOW DIRECTION
- RETURN GRILLE OR DIFFUSER
- TURNING VANES
- THERMOSTAT MTD. 5' AFF
- EXHAUST FAN

GENERAL H.V.A.C. NOTES

- INSTALL ALL DUCTWORK PER "SMACNA" STANDARDS. DUCTWORK TO BE AIR-TIGHT, ASSEMBLED IN A NEAT ORDERLY MANNER, & TO HAVE ALL REQUIRED OFFSETS & RISERS AS REQUIRED BY THE BUILDING STRUCTURE.
- ALL DUCT DIMENSIONS ARE INTERIOR, FREE AREA SIZES.
- INSTALL ALL MANUFACTURED EQUIPMENT PER THE MANUFACTURER'S WRITTEN INSTRUCTIONS.
- VERIFY ROOF OPENINGS & LOCATIONS W/ THE GENERAL CONTRACTOR & HIS ROOFING SUBCONTRACTOR. REQUIRED ROOF CONES TO BE PROVIDED & INSTALLED BY GENERAL CONTRACTOR AS DESIGNATED BY HVAC CONTRACTOR.
- MOUNT STATS AT 5' A.F.F.
- ALL SYSTEMS SHALL RECEIVE A ONE (1) YEAR GUARANTEE BY THE MECHANICAL CONTRACTOR.
- GAS PIPING SHALL BE INSPECTED & TESTED IN ACCORDANCE W/ NFPA 54. ALL GAS PIPING SHALL BE SCHEDULE 40 BLACK-IRON W/ WROUGHT-IRON FITTINGS; PROVIDE DIRT LEG, UNION, & GAS COCK AT ALL APPLIANCES.

H.V.A.C. PROJECT DESCRIPTION

FURNISH AND INSTALL ALL LABOR AND MATERIAL REQUIRED FOR THE REPLACEMENT OF THE EXISTING FURNACES, DX-COILS, AND CONDENSING UNITS OF THIS FOUR FAMILY APARTMENT BUILDING (ALL EXISTING SUPPLY & RETURN DUCTWORK AND AIR DEVICES WILL REMAIN). COORDINATE WORK WITH THE GENERAL CONTRACTOR AND HIS SUB-CONTRACTORS. OBTAIN THE REQUIRED WORK PERMIT AND INSPECTIONS FOR A COMPLETE PROJECT; THE COMPLETED PROJECT WILL BE A LIKE NEW FACILITY.

DOCUMENTATION OF VENTILATION

ALL HABITAT ROOMS HAVE 4% OPENABLE AREA OF WINDOWS AND OR DOORS TO THE EXTERIOR BASED UPON THE ROOM FLOOR AREA.

THIS MECHANICAL VENTILATION IS NOT REQUIRED

H.V.A.C. WORK NOTES:

- REPLACE THE EXISTING GAS FURNACE WITH A NEW ELECTRIC FURNACE AND THERMOSTAT. REFIT SUPPLY AND RETURN DUCT WORK AT THE NEW FURNACE AS SITE CONDITIONS REQUIRE AND REWORK CONDENSATE PIPING AS NECESSARY.
- REPLACE THE EXISTING CONDENSING UNIT WITH NEW CONDENSING UNIT AND A MATCHING DX-COIL AT THE FURNACE
- FURNISH AND INSTALL DUCTWORK FROM THE KITCHEN HOOD TO AN EXTERIOR WALL JACK; COORDINATE WORK WITH GENERAL CONTRACTOR AS THE EXTERIOR BUILDING FAÇADE WILL REQUIRE RESTORATION (EXISTING EXHAUST FANS WILL BE REMOVED, OPENING RESTORED AND A NEW EXHAUST PENETRATION WILL BE REQUIRED).



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CINCINNATI, OH 45211

seal

JAMES T. RITTER, LICENSE # 5932
EXPIRATION DATE: 12/31/2017

revisions

NO.	DESCRIPTION
1	BUILDING DEPT. RESPONSE 28 FEBRUARY 2017

drawn / approved
HMH & JTR / J.T.R.
date
24 FEBRUARY 2017
file
17-115
sheet

M-1
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