# Baint Luke's **EAST HOSPITAL**

Saint Luke's East Hospital **ED** Patient Treatment Renovation 100 NE Saint Luke's Blvd Lee's Summit, MO 64086

## P R O J E C T T E A M

### ARCHITECT ACI BOLAND, INC.

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## MEP ENGINEER

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ACOUSTIC/ACOUSTICAL ADD. ADDENDUM ADD'N. ADDITION AGGREGATE BASE COURSE ABC ABOVE FINISH FLOOR AGG. AGGREGATE AIR CONDITIONING ALUMINUM ALTERNATE ANCHOR BOL A.B. AND ARCHITECT ARCH. ASP. ASPHALT @ AT ACT ACOUSTIC CEILING TILE/PANEL

BLKG. BLOCKIN BASEMENT BSMT. BM BEAM B.M. BENCHMAR BOARD B.O. BOTTOM OF BLDG. BUILDING

ANGLE

CAB'T. CABINET C.I.P. CAST IN PLACE C.B. CATCH BASIN CLG CEILING CEM. CEMENT/CEMENTITIOU CG. CENTIGRAM CENTIMETER CENTER LINE CERAMIC CER. C.T. CERAMIC TILE CHAN. CHANNEL CHANNEL CLR CLEAR C.O. CLEAN OUT

CLOS. CLOSET COL. COLUMN CONC. CONCRETE CONN. CONNECTION CONST. CONSTRUCTION C.J. CONTROL JOINT CONSTRUCTION JOIN CONT. CONTINUOUS CONTR. CONTRACTOR COR'G. CORRUGATED CTR. COUNTER

CTSK. COUNTERSUNK C.M.U. CONCRETE MASONRY UNIT DAMP PROOFIN DECIBEL DIAGONAL DIAMETER DIMENSION DISPENSER

DOWEL DOWN DOWNSPOUT D.S. DRAWING DWG. EACH ELEC ELECTRIC E.W.C. ELECTRIC WATER COOLER ELEVATION

DP

DB.

DIAG.

DIAM

DIM.

DISP

DWL.

DN.

FIN.

FIXT.

FLR.

ELEV. ELEVATOR EQ. EQUAL EQUIP. EQUIPMENT EXH. EXHAUST EXPAN. EXPANSION E.J. EXPANSION JOIN EXIST. EXISTING EXT. EXTERIOR

FEET / FOOT FINISH FIXTURE FLASHING FLOOR F.D. FLOOR DRAIN

FLUORESCEN FOOTING FOUNDATION FRAME FIRE HOSE CAB. F.H.C. FIELD VERIFY GAUGE GLASS / GLAZING GRADE

ABBREVIATIONS

FLOR.

FTG.

GL.

GRL.

G.S.

HR

HDN.

HDW.

HTR.

HР

ID

JT.

ΚP

LAM.

LDG.

LTH.

LAV.

LOC.

LVR.

LOC.

M.O.

MAT'L

MFR.

MAX.

MTL.

MIN.

N.G.

N.I.C.

OBS.

O.C.

O.D.

M.L.

Μ.

MECH.

MB.

LG.

LT.

LB.

INT.

H.M.

GRAM GRILLE GRID GROUND GND. GALVANIZED STEEL GYPSUM GWB/G.B. GYPSUM BOARD

HAND RAIL HARDENER HARDWARE HARDWOOD HDWD. HEATER HEIGHT HIGH POINT HOLLOW METAL HORIZ. HORIZONTAL

HOSE BIB H.B. HOT WATER H.W. INCH / INCHES INSIDE DIAMETER INSUL. INSULATION INTERIOR

INVERT INV. JAN. JANITOR JOINT JST. JOIST

> KICK PLATE LAMINATED POUND LANDING LATH LAVATORY LENGTH LOCATION LIGHT

LIGHT WEIGHT CONCRETE L.W.C. LOUVER LOCATION MASONRY OPENING MATERIAL MANUFACTURER

MARKER BOARD MAXIMUM MECHANICAL METAL METAL LATH METER MINIMUM MOLDING MLDG. MULL.

NATURAL GRADE NOM. NOMINAL NOT IN CONTRAC NOT TO SCALE N.T.S. NO. / # NUMBER

MULLION

OBSCURE ON CENTER OPN'G. OPENING O.A. OVERALL OUTSIDE DIAMETER OVERFLOW SCUPPER 0.F.S. O.F.D. OVERFLOW DRAIN O.H.D. OVERHEAD DOOR

PTD. PAINTED PAGE PG. PLAM. PLASTIC LAMINATE PAIR PR. PNL. PANEL PARTITION PTN. PENNY PLATE PLBG. PLUMBING PLYWD. PLYWOOD PT POINT P.S.I. POUNDS PER SQ. IN P.S.F. POUNDS PER SQ. FT. P.C. PRECAST PROPERTY LINE P.L.

RISER, RISERS RADIUS RAD. R.D. ROOF DRAIN RESILIENT BASE REFER TO REGISTER REG. REQ'D. REQUIRED REV. REVISION RF'G. ROOFING RGH. ROUGH RM. ROOM RND. ROUND R.O. ROUGH OPENING

SCHED. SCHEDULE SEALED CONCRETE S.C. SCR. SCREW SECT. SECTION SELECT SEL. SHG. SHEATHING SHEET SHT. SIDING SDG. SIM. SIMILAR SLIDING SLDG. SMOOTH SM. SPEC. SPECIFICATION SQUARE SQ. STAINED STANDARD STD. SS/ ST.STL. STAINLESS STEEL STRUC. STRUCTURE SUSP. SUSPENDED SW.BD. SWITCHBOARD

TREAD TOP OF CURB TEMPERED GLASS T.G. TOP OF T.O. T.S.D. TOP OF STEEL DECK T.W. TEACHERS WARDROBE TYP. TYPICAL

SYS. SYSTEM

V.

W/

U.N.O. UNLESS NOTED OTHERWISE VENT

VERT. VERTICAL V.G. VERTICAL GRAIN VESTIBULE VEST. V.C.T. VINYL COMPOSITION TILE VCP VITREOUS CLAY PIPE

W.W.M. WELDED WIRE MESH W.C. WATER CLOSET W.H. WATER HEATER W.F. WIDE FLANGE WITH WITHOUT W/O WD. WOOD WDW. WINDOW W.W. WINDOW WALL





AREA OF CONSTRUCTION 1" = 200'-0"



Professional Engineering Consultants

### LOCATION PLAN





- ILLUMINATED EXIT SIGNS

PASSIVE FIRE SAFETY FEATURES:

SMOKE COMPARTMENTS NO GREATER THAN 22,500 SF

![](_page_0_Picture_46.jpeg)

CODE S	SUMMARY
PROJECT CONSTRUCTION PURPOSE:	Renovating existing offices into 3 new exam rooms for the ED.
<u>OWNER:</u> Saint Luke's East Hospital 120 NE Saint Luke's Blvd Lee's Summit, MO 64063	
DESIGNER: ACI BOLAND ARCHITECTS 1710 WYANDOTTE ST. KANSAS CITY, MO 64108 PHONE: (816) 763-9600	
LOCAL AUTHORITY: RESPONDING FIRE SERVICE: CITY OF L LOCAL BUILDING INSPECTION: CITY OF	EE'S SUMMIT MO LEE'S SUMMIT MO
CODE INFORMATION: 2018 INTERNATIONAL BUILDING CODE 2018 INTERNATIONAL PLUMBING CODE 2018 INTERNATIONAL PLUMBING CODE 2018 INTERNATIONAL MECHANICAL CO 2017 NATIONAL ELECTRICAL CODE (NF 2018 INTERNATIONAL FIRE CODE 2012 LIFE SAFETY CODE (NFPA 101 CH/ 2009 ICC/ANSI A117.1 AS AMENDED ANI 2010 ADA STANDARDS FOR ACCESSIBL STATE OF MISSOURI DEPT. OF HEALTH CODES: 2012 NFPA 101 LIFE SAFETY CODE (LSC 2018 FGI GUIDELINES FOR DESIGN & CO 1979 19-CSR-30 NOTE: IF CODE REQUIREMENTS OVERL	DE PA 70) APTER 20) D ADOPTED BY THE CITY OF LEE'S SUMMIT .E DESIGN / AMERICANS WITH DISABILITIES ACT OF 1990 & ENVIRONMENT REFERENCES THE FOLLOWING C) ONSTRUCTION OF HOSPITALS & OUTPATIENT FACILITIES LAP, THE MOST STRINGENT SHALL APPLY
TYPE OF CONSTRUCTION:	TYPE 1-A -SECTION 602.2 (TYPE 1 - 332 SPRINKLERED - SECTION 18.1.6.1)
OCCUPANCY GROUP:	I-2 -SECTION 308.3 (HEALTHCARE - SECTION 6.1.5)
OCCUPANT LOAD: TOTAL SQUARE FOOTAGE: SF / = TOTAL NUMBER OF OCCUPANTS =	785SF 6
DEAD END CORRIDOR LENGTH LIMIT:	20'
EXIT ACCESS TRAVEL DISTANCE:	200'
AREA OF CONSTRUCTION:	785+/- SF
REQUIRED FIRE RESISTANCE RATINGS	(IN HOURS)
EXTERIOR BEARING WALLS INTERIOR BEARING WALLS PRIMARY STRUCTURAL FRAME FLOOR CONSTRUCTION ROOF CONSTRUCTION INTERIOR NON-BEARING WALLS	3 HR 3 HR 3 HR 2 HR 1 1/2 HR 0 HR
PLUMBING FIXTURE CALCULATIONS:	EXISTING TO REMAIN NO CHANGE IN OCCUPANCY
ACTIVE FIRE SAFETY FEATURES: - FIRE ALARM SYSTEM - THE FIRE ALAF SYSTEM. THE DEVICE TYPE AND LOCA ADA REQUIREMENTS.	RM SYSTEM IS SPECIFIED AS AN ADDRESSABLE TYPE TIONS ARE PER THE APPLICABLE CODES AS WELL AS
- SMOKE CONTROL SYSTEM - ALL DUC A SMOKE OR COMBINATION FIRE/SMOH DOCUMENTS. THESE DAMPERS WILL C SMOKE DETECTORS OR DUCT SMOKE	TWORK PENETRATING SMOKE RATED WALLS WILL HAVE KE DAMPER AS INDICATED ON CONSTRUCTION LOSE UPON DETECTION OF SMOKE BY THE AREA DETECTORS IN THE AIR HANDLING UNITS.
- FIRE SPRINKLER SYSTEM - SPECIFIEL SPECIFIED TO BE QUICK RESPONSE TY	D TO BE PER NFPA 13. THE SPRINKLER HEADS ARE YPE.
- EMERGENCY LIGHTING AND POWER - LOADS WILL RECEIVE POWER FROM A ELECTRICAL ROOM.	EMERGENCY LIGHTING, LIFE SAFETY AND CRITICAL BACKUP GENERATOR LOCATED OUTSIDE THE MAIN

### SHEET INDEX SHEET NAME

GENERAL	
A000	COVER SHEET & LIFE SAFETY PLAN
A030	PARTITION TYPES, DETAILS, GENERAL NOTES & SYMBOLS
AZII	OVERALL FLOOR PLAN, ROP, DEIVIO, AND ELEVATIONS
A700	INTERIOR FINISH PLAN, MATERIAL LEGENDS, SCHEDULES, AND DETAILS
PLUMBING, MECH	HANICAL, ELECTRICAL
MP001	MECHANICAL DETAILS AND SCHEDULE
MP002	MECHANICAL SPECIFICATIONS
MP003	MECHANICAL SPECIFICATIONS
P101	FIRST FLOOR PLUMBING PLAN
P102	FIRST FLOOR MEDICAL GAS PLAN
P501	PLUMBING DETAILS AND SCHEDULES
M101	FIRST FLOOR HVAC PLAN
M102	FIRST FLOOR MECHANICAL PIPING PLAN
M501	MECHANICAL DETAILS AND SCHEDULE
E-002	ELECTRICAL SPECIFICATIONS
E-101	ELECTRICAL DEMOLITION PLAN
E-131	POWER PLAN
E-141	LIGHTING PLAN
E-151	SYSTEMS PLAN
E-501	ELECTRICAL DETAILS
E-001	ELECTRICAL GENERAL NOTES AND SYMBOLS

SHEET NUMBER

A1 LIFE SAFETY PLAN 1/8" = 1'-0"

1

\*THIS DRAWING IS INTENDED TO BE PRINTED IN COLOR. USE BLACK AND WHITE COPIES AT YOUR OWN RISK.

![](_page_0_Figure_52.jpeg)

	1. UNLESS NOTED OTHERWISE, ALL INTERIOR METAL STUDS ARE 3 5/8" THICK. REFER TO SUFFI LOCATIONS OF METAL STUDS OTHER THAN 3-5/8" THICK. NOTE: STUD THICKNESS (GAUGE) MUMANULA CTUDEDIC DECOMMENDATIONS FOR SEAN (UECUT OF STUD)	IX SCHEDULE BELOW FOR JST CONFORM TO
	WHERE THE PARTITION TYPE INDICATION IS SHOWN WITH A NUMERICAL SUFFIX, THE METAL 2 BE AS SCHEDULED BELOW:	STUD THICKNESS SHALL
	1 1-5/8" MTL. STUDS	
	2 2-1/2" MTL. STUDS	
	<ol> <li>UNLESS NOTED OTHERWISE ON THE FLOOR PLAN, ALL INTERIOR DRYWALL PARTITIONS INDIC PLAN DRAWING ARE TYPE 'A' PARTITIONS. WHERE OCCURS, RATINGS ARE AS INDICATED ON</li> </ol>	CATED ON THE FLOOR THE LIFE SAFETY PLANS.
	4. ALL STUDS ARE CONTINUOUS FROM FLOOR STRUCTURE TO CEILING STRUCTURE UNLESS NO	DTED OTHERWISE.
	5. METAL STUDS ARE SPACED @ 16" O.C. MAX., UNLESS NOTED OTHERWISE.	
	6. UNLESS NOTED OTHERWISE, ALL GYPSUM BOARD IS TO BE 5/8" THICK "FIRECODE"	
	7. THE CORRESPONDING RATED ASSEMBLIES ARE INDICATED BELOW THE PARTITION TYPES.	
	8. PARTITION TYPE DESIGNATIONS ARE INDICATED ON THE FLOOR PLAN DRAWINGS.	
	9. PARTITION TYPES DO NOT INCLUDE APPLIED FINISHES CALLED FOR IN THE ROOM FINISH SCH	IEDULE.
	10. AT PARTITION TYPES WHERE MTL. STUDS ARE EXPOSED ON ONE OR BOTH SIDES, CUT STUD	1/4" SHORT AND SCREW
	PARTITION TYPES W/SOUND ATTENUATING BLANKETS	1/4" BEAD OF ACOUS.
		SEALANT AT NON-FIRE F PARTITION TYPES W/SO ATTENUATING BLANKET
	REQUIRING 1 OR 2 HOUR FIRE RATING	BOTTOM OF CONC. STRU
	CORRUGATED OR FLUTED STEEL	SEAL TO CONC. STRUCT U.L. HWD0012 OR U.L.
	NO. OF LAYERS OF GYP. BD. AS	TYPES REQUIRING 1 OR FIRE RATING
	INDICATED BY ATTACH GYP. BD. OR STUDS TO PARTITION METAL TRACK TYPE	NO. OF LAYERS OF GYP
_	TOP OF STUDS	BOARD AS INDICATED BY PARTITION TYPE
	TOP / STRU	ANCHORAGE OF PARTITION TO CONCRETE JCTURE SEE 3A AND 3B FOR ADDITIONAL
	$\begin{array}{c} \hline 2 \\ \hline 1-1/2^{"} = 1^{L}0^{"} \end{array} \qquad $	RMATION = 1'-0"
	ALL MECHANICAL AND ELECTRICAL DEVICES W/ACOUS. SEALANT AT PARTITION TYPES WITH	
	SOUND ATTENUATION BLANKETS	
	NO. OF LAYERS OF GYP. BOARD AS	ANCHOR 1 5/8" MTL. RUNNER
	BASE VARIES - REF. SCHEDULE MTL. RUNNER TRACK W/POWER	GYP. BD. CEILING: SUSPENSION NOT SHOWN
	DRIVEN FASTENERS @ 24" O.C.	
	1/4" BEAD OF ACOUS. SEALANT AT PARTITION	TAPE, FLOAT AND LEVEL CORNER
	TYPES WITH SOUND ATTENUATION BLANKETS	FINISH SURFACE OF GYP. BD.

10 11

NOT SHOWN

![](_page_1_Figure_2.jpeg)

![](_page_1_Figure_3.jpeg)

![](_page_2_Figure_1.jpeg)

![](_page_2_Figure_2.jpeg)

![](_page_2_Figure_3.jpeg)

![](_page_2_Figure_30.jpeg)

![](_page_2_Figure_32.jpeg)

![](_page_2_Figure_34.jpeg)

![](_page_3_Figure_0.jpeg)

C6 DETAIL AT CASEWORK 1 1/2" = 1'-0"

![](_page_3_Figure_1.jpeg)

![](_page_3_Figure_2.jpeg)

![](_page_3_Figure_3.jpeg)

![](_page_3_Figure_5.jpeg)

![](_page_3_Figure_6.jpeg)

GENERAL CASEWORK NOTES APPLY TO ALL INTERIOR ELEVATIONS.

PROVIDE 3 MM PVC EDGE BANDING ON COUNTERTOP EDGE AND (.018 MIN.) VINYL EDGING ON DRAWER, AND DOOR EDGES UNLESS NOTED OTHERWISE. EDGE BANDING TO MATCH ADJACENT PLAM SURFACE.

- ALL EXPOSED FACES AND SHELVES TO BE WRAPPED WITH PLAM UNLESS NOTED OTHERWISE.
- ALL INTERIOR SURFACES TO BE WHITE MELAMINE UNLESS NOTED OTHERWISE
- . PROVIDE WOOD BLOCKING OR 12" HIGH X 16 GA. CONTINUOUS SHEET METAL BRIDGING IN WALL AS REQUIRED FOR ADEQUATE SUPPORT OF ALL CASEWORK.
- . WALL BASE TO BE INSTALLED ON ALL CASEWORK UNLESS NOTED OTHERWISE. REFER TO FINISH
- SCHEDULE FOR TYPE.
- 7. "F" INDICATES FILLER PANEL, 1-1/2" MIN.
- 8. "EP" INDICATES END PANEL, 1-1/2" MIN.
- PROVIDE FINISHED ENDS AT ALL EXPOSED ENDS OF CASEWORK.
- 10. ALL ELECTRICAL, MECHANICAL, AND PLUMBING ITEMS SHOWN IN ELEVATION ARE FOR REFERENCE AND LOCATION ONLY. REFER TO MEP DRAWINGS FOR SIZES, TYPES AND QUANTITIES.

FII	NISH FL	OOR PLAN LEGEND
-	· · · —	WALL TREATMENT
		FLOOR TRANSITION
		CORNER GUARD
•	$\sim$	FLOOR FINISH DIRECTION
1.	FOR ALL F TO TYPICA SHEET A7 ON THIS P	LOORING TRANSITIONS, REFE LOORING TRANSITIONS, REFE LATRANSITION DETAILS ON 00, UNLESS OTHERWISE NOTE LAN.
2.	THIS FINIS ADDITION FINISHES	H PLAN IS TO BE USED FOR AL LOCATION CLARIFICATION ( NOTED IN FINISH SCHEDULE.

A3 TRANSITION STRIP DETAILS 6" = 1'-0"

FULL HT. U.O.N.	+				
WALL PROTECTION TO BE MOUNTED THEN CORNER GUARD TO BE MOUNTED ON TOP OF WALL PROTECTION		VERTICAL TRIM TO MATCH WALL PROTECTION. LOCATE AS DIRECTED IN SPEC.			
		2" HANDRAIL	_	+	
HANDRAIL & BUMPER RAIL TO STOP 2" BEFORE ALL DOOR FRAMES, FIRE EXTINGUISHER CABINETS, WALL OPENINGS, AND					L 4'-0"
CORNER GUARDS ———		WALL PROTECTION	-0 -0	2	OF HANDRAI
	-		-		0 10
		BUMPER RAIL			Ĕ
ABOVE BASE	-			-	
BASE AS SCHEDULED				+	*
FLOOR	LINI	WALL PROTECTION TERMINATION AT INTEGRAL COVE BASE	<u> </u>	-+-	-

C4 CASEWORK ISOMETRIC

TYP. CABINET NOTES 1. PROVIDE PLAM FILLER WHERE CABINETS BUTT UP TO WALLS. 2. ALL COUNTERTOPS HAVE A 4" BACKSPLASH (MATERIAL TO MATCH COUNTERTOP) AND OUTSIDE CORNERS HAVE 1 1/2" RADIUS EXCEPT WHERE NOTED OTHERWISE. . GROMMETS FOR CABLE PASSAGE THROUGH WORK COUNTERS: 2-1/2 INCH OD, MOLDED-PLASTIC GROMMETS WITH MATCHING PLASTIC CAPS WITH A SLOT FOR WIRE PASSAGE. PROVIDE (2) GROMMETS CENTERED BETWEEN THE COUNTERTOP SUPPORT BRACKETS AT EACH KNEE SPACE MODULE. GROMMETS TO BE INSTALLED IN FIELD AS DIRECTED BY OWNER. COLOR TO BE SELECTED BY ARCHITECT.

4. PLAM COUNTERTOP EDGES SHALL BE 3 MM PLASTIC. COLOR AS SELECTED BY ARCHITECT.

VAINSCOAT TRIM TO

- DOOR FRAME

![](_page_3_Figure_24.jpeg)

![](_page_3_Figure_25.jpeg)

## **MECHANICAL ABBR**

Ø	ROUND DIAMETER	HTG	HEA
ABV	ABOVE	IN	INCH
AC	AIR CONDITIONING	INV	INVE
ADD	ADDENDUM	LB / (#)	POU
AFF	ABOVE FINISHED FLOOR	LB/HR	POU
AFMS	AIRFLOW MEASURING STATION	LAT	LEA\
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY	LWT	LEA\
ALT	ALTERNATE	MAT	MIXE
ARCH	ARCHITECT/ARCHITECTURAL	MAX	MAX
BFF	BELOW FINISHED FLOOR	MBH	ONE
BFG	BELOW FINISHED GRADE	MC	MEC
BLW	BELOW	MECH	MEC
BOD	BOTTOM OF DUCT ELEVATION ABOVE FLOOR	MFR	MAN
BOP	BOTTOM OF PIPE ELEVATION ABOVE FLOOR	MIN	MINI
BOS	BOTTOM OF STEEL	MISC	MISC
BTU	BRITISH THERMAL UNITS	MTR	MOT
BTUH	BRITISH THERMAL UNITS PER HOUR	NCR	NOIS
CAP	CAPACITY	NC	NOR
CFM	CUBIC FEET PER MINUTE	NO	NOR
CI	CAST IRON	NTS	NOT
CLG	CEILING	OBD	OPP
COP	COEFFICIENT OF PERFORMANCE	PC	PLUI
CV	CONSTANT AIR VOLUME	PD	PRE
DB	DECIBELS	PIV	POS
DB	DRY BULB TEMPERATURE	PLBG	PLU
DIA	DIAMETER	PRESS	PRE
DEMO	DEMOLISH	PVC	POL
DN	DOWN	PSI	POU
DP	DIFFERENTIAL PRESSURE	PSIG	POU
(E)	EXISTING COMPONENT DESIGNATION	PWR	POW
ÈÁ	EACH	(R)	REL(
EAT	ENTERING AIR TEMPERATURE	ŘĤ	REL/
EC	ELECTRICAL CONTRACTOR	RM	ROC
ELEC	ELECTRICAL	RPM	REV
ETR	EXISTING TO REMAIN	SF	SQU
EQUIP	EQUIPMENT	SP	STA
EWT	ENTERING WATER TEMPERATURE	STM	STE/
°F	DEGREES FAHRENHEIT	TCC	TEM
FDC	FIRE DEPARTMENT CONNECTION	TOD	TOP
FHC	FIRE HOSE CABINET	TOP	TOP
FLR	FLOOR	TEMP	TEM
FL	FLOW LINE	TYP	TYPI
FOG	FUEL OIL GAUGE	UG	UND
FOV	FUEL OIL VENT	VAV	VAR
FPM	FEET PER MINUTE	VVT	VAR
FT	FOOT/FEET	VCP	VITR
GAL	GALLON	VENT	VEN
GC	GENERAL CONTRACTOR	VFD	VAR
GPM	GALLONS PER MINUTE	VTR	VFN
HP	HORSE POWER	WB	WFT
HR	HOSE REEL		
	·····		

## **COMPONENT ABBR**

<u>AC-#</u>	AIR CONDITIONING UNIT	<u> HWP-#</u>	HEAT
<u>AD-#</u>	AREA DRAIN	HWPP-#	HEAT
<u>AHU-#</u>	AIR HANDLING UNIT	HWSP-#	HEAT
<u>AS-#</u>	AIR SEPARATOR	<u>HRU-#</u>	HEAT
<u>B-#</u>	BOILER	<u>IU-#</u>	INDO
<u>BF-#</u>	BOTTLE FILLER	L-#	LOUV
<u>BT-#</u>	BATH TUB	<u>LV-#</u>	LAVA
<u>CH-#</u>	CHILLER	MAU-#	MAKE
CRAC-#	COMPUTER ROOM AIR CONDITIONING UNIT	<u>MB-#</u>	MOP E
<u>CO</u>	CLEANOUT	MSS-#	MINI S
<u>CT-#</u>	COOLING TOWER	ORD	OVER
<u>CU-#</u>	AIR COOLED CONDENSING UNIT	<u>OU-#</u>	OUTD
<u>CUH-#</u>	CABINET UNIT HEATER	PRV	PRES
<u>CWP-#</u>	CHILLED WATER PUMP	RCP-#	RADIA
<u>CWPP-#</u>	CHILLED WATER PRIMARY PUMP	<u>RD</u>	ROOF
CWSP-#	CHILLED WATER SECONDARY PUMP	<u>RF-#</u>	RETU
DWBP-#	DOMESTIC WATER BOOSTER PUMP	<u>RH-#</u>	ROOF
<u>DF-#</u>	DRINKING FOUNTAIN / WATER COOLER	<u>RHD-#</u>	ROOF
DHWP-#	DOMESTIC HOT WATER CIRCULATING PUMP	<u>RTU-#</u>	ROOF
<u>EE-#</u>	EMERGENCY EYE WASH	<u>SF-#</u>	SUPPI
<u>EF-#</u>	EXHAUST FAN	<u>SH-#</u>	SHOW
<u>EDH-#</u>	ELECTRIC DUCT HEATER	<u>SK-#</u>	SINK
<u>ES-#</u>	EMERGENCY SHOWER	<u>SP-#</u>	SUMP
<u>ET-#</u>	EXPANSION TANK	<u>ST-#</u>	STEAM
<u>F-#</u>	FURNACE	TD	TREN
<u>FCO</u>	FLOOR CLEANOUT	<u>TMV-#</u>	THER
<u>FCU-#</u>	FAN COIL UNIT	<u>TU-#</u>	TERM
<u>FD-#</u>	FLOOR DRAIN	<u>UH-#</u>	UNIT H
<u>FS-#</u>	FLOOR SINK	<u>UR-#</u>	URINA
<u>FTU-#</u>	FAN POWERED TERMINAL UNIT	<u>UV</u>	ULTR/
<u>FP-#</u>	FIRE PUMP	<u>WB-#</u>	WALL
<u>FTR-#</u>	FIN TUBE RADIATOR	<u>WC-#</u>	WATE
<u>GI-#</u>	GREASE INTERCEPTOR	<u>WH-#</u>	WATE
<u>H-#</u>	HUMIDIFIER	<u>WHD-#</u>	WALL
<u>HB-#</u>	HOSE BIBB	_	

NOTE: ALL GENERAL NOTES ON THIS SHEET ARE TO BE APPLIED TO THE SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET MAY OR MAY NOT BE USED IN THIS SET OF DRAWINGS.

REVIATIONS	<b>GENERAL SYMBOLS</b>	PLUN	<b>IBING SYMBC</b>
IEATING	$(\#) \langle \# \rangle \langle \# \rangle  \text{REFER TO PLAN NOTES}$		DOMESTIC COLD WATER (CW)
NCH NVERT	EXISTING COMPONENT PEN WEIGHT		DOMESTIC HOT WATER (HW)
	— — — DEMOLITION PEN WEIGHT - COMPONENT SHADED	W	DOMESTIC HOT WATER RECIRC. (HW
EAVING AIR TEMPERATURE	111 ROOM CALLOUT		BELOW GRADE WASTE (W)
EAVING WATER TEMPERATURE	AREA NOT IN SCOPE HATCHING		VENT
IAXIMUM		RL	RAINLEADER
IECHANICAL CONTRACTOR	CONNECT NEW TO EXISTING - VERIFY EXACT LOCATION	ORL	OVERFLOW RAINLEADER
/IECHANICAL /ANUFACTURER	$\bigcirc DISCONNECT FROM EXISTING - VERIFY EXACT LOCATION  2 \stackrel{\checkmark}{\rightarrow} 9 \text{ PIPE / DUCT CONTINUATION SYMBOL}$	<u></u>	
/INIMUM /ISCELLANEOUS		CA	COMPRESSED AIR
	DETAIL NUMBER	CD	CONDENSATE DRAIN
IORMALLY CLOSED		D	DRAIN
IORMALLY OPEN IOT TO SCALE	SECTION LETTER	OW	OIL WASTE
	M3.6- SHEET NUMBER WHERE DRAWN	IIW	INDUSTRIAL WASTE
RESSURE DROP	UNIQUE I.D. (FAN COIL UNIT NO. 1)	PW	PRODUCTION WASTE
POST INDICATOR VALVE	FC-01-TYPICAL EQUIPMENT CALLOUT	SCW	SOFT COLD WATER
	EQUIPMENT TYPE (FC=FAN COIL UNIT)	FCW	FILTERED COLD WATER
OUNDS PER SQUARE INCH		RO	
POUNDS PER SQUARE INCH GAUGE	HVAC SYMBOLS	DI	DEIONIZED WATER
		DIR	DEIONIZED WATER RETURN
ROOM	LOW VELOCITY SUPPLY AIR DUCT (SA)	—HW 140°—	DOMESTIC HOT WATER HIGH TEMP
REVOLUTIONS PER MINUTE	MEDIUM VELOCITY SUPPLY AIR DUCT (MVSA)	HWR 140°-	DOMESTIC HOT WATER HIGH TEMP I
TATIC PRESSURE		FG	
EMPERATURE CONTROL CONTRACTOR	OUTDOOR AIR DUCT (DA)	CO/FCO •	CLEANOUT (FLOOR)
OP OF DUCT ELEVATION ABOVE FLOOR	RELIEF AIR DUCT (RLF)	2-WAY CO ••	2-WAY CLEANOUT (FLOOR/GRADE)
EMPERATURE	FLUE GAS DUCT (FG)		WALL CLEANOUT / END OF LINE CLEA
INDERGROUND	COMBUSTION AIR DUCT (CA)		
ARIABLE AIR VOLUME	UP)DUCT SECTION, POSITIVE PRESSURE-		
ITRIFIED CLAY PIPE	DOWN) DUCT SECTION, POSITIVE PRESSURE		PF SYMBOLS
ARIABLE FREQUENCY DRIVE	$\square$ $\square$ 24x12 (UP) DUCT SECTION, NEGATIVE PRESSURE		
VET BULB TEMPERATURE	24x12 (DOWN) DUCT SECTION, NEGATIVE PRESSURE		DIRECTION OF FLOW
			PIPE DROP / SIDE CONNECTION / PIPE
	$\downarrow$ I URINING VANES $\downarrow$ 18x12 $\downarrow$ DUCT SIZE, FIRST IS SIDE SHOWN CLEAR INSIDE DIM.		BOTTOM / TOP CONNECTION 45° OR 9
	1000000000000000000000000000000000000	5	CAP / CAPPED OUTLET
	FLEXIBLE CONNECTION	  ↓	BALL VALVE / GLOBE VALVE
	← 📑 SIDE WALL SUPPLY REGISTER		CONCENTRIC / ECCENTRIC REDUCER
			ANCHOR / FLEXIBLE CONNECTION
ATING WATER SECONDARY PUMP			
OOR UNIT	RECT: OPPOSED BLADE / ROUND: BUTTERFLY		CHECK VALVE
ATORY	FD+-+ FD 🖂 FIRE DAMPER (FD) IN WALL / FLOOR		STRAINER / UNION
P BASIN	SD+-+ SD 🖂 SMOKE DAMPER (SD) IN WALL / FLOOR		BLIND FLANGE / FLOW METER
I SPLIT SYSTEM	$FSD + - + FSD \ge COMBO FIRE/SMOKE DAMPER (FSD) IN WALL / FLOOR$		
	() / [] THERMOSTAT (ISTAT) / TEMPERATURE SENSOR (H) / [H] HUMIDISTAT (HSTAT) / HUMIDITY SENSOR		WATER METER / IRRIGATION WATER M
DIANT CEILING PANEL	P PRESSURE SENSOR		PLUG VALVE / NEEDLE VALVE
OF DRAIN TURN/RELIEF FAN	M MOTOR		GAS COCK
OF HOOD			PRESSURE REGULATING VALVE / PETI
OFTOP UNIT	$\frac{T1.1}{(200)} = EQUIPMENT CALLOUT$		
PPLY AIR FAN DWER	GRD CALLOUT SYMBOLS	р в	
	MARK IN SCHEDULE CONNECTION &		PIPE PITCH DOWN / PIPE RISE UP
	ROUND SUPPLY DIFFUSER SB10 RUNOUT SIZE (10"ø)		SOLENOID VALVE /
AM TRAP	CFM ALT → SB10-250		PNEUMATIC 3-WAY CONTROL VALVE
AM TRAP INCH DRAIN IRMOSTATIC MIXING VALVE			ELECTRIC 3-WAY / 2-WAY CONTROL VA
AM TRAP INCH DRAIN RMOSTATIC MIXING VALVE MINAL UNIT	MARK IN SCHEDULE CONNECTION &	• —	
AM TRAP INCH DRAIN RMOSTATIC MIXING VALVE MINAL UNIT T HEATER NAL	MARK IN SCHEDULE CONNECTION & RECTANGULAR RETURN GRILLE RB12x12 RUNOUT SIZE (12x12)		
AM TRAP ENCH DRAIN ERMOSTATIC MIXING VALVE EMINAL UNIT T HEATER NAL RAVIOLET STERILE CONDITIONER LL BOX (PLUMBING UTILITY)	RECTANGULAR RETURN GRILLE CONNECTION & RB12x12 RUNOUT SIZE (12x12) CFM ALT RB12x12-250		MANUAL / EMERGENCY 3-WAY CONTR
AM TRAP ENCH DRAIN ERMOSTATIC MIXING VALVE EMINAL UNIT T HEATER NAL RAVIOLET STERILE CONDITIONER LL BOX (PLUMBING UTILITY) FER CLOSET	RECTANGULAR RETURN GRILLE CONNECTION & RB12x12 RUNOUT SIZE (12x12) CFM ALT RB12x12-250 MARK IN SCHEDULE CONNECTION &		MANUAL / EMERGENCY 3-WAY CONTR
AM TRAP ENCH DRAIN ERMOSTATIC MIXING VALVE MINAL UNIT T HEATER NAL RAVIOLET STERILE CONDITIONER .L BOX (PLUMBING UTILITY) FER CLOSET FER HEATER .L HYDRANT	RECTANGULAR       MARK IN SCHEDULE       CONNECTION & RB12x12       CONNECTION & RUNOUT SIZE (12x12)         CFM       ALT -> RB12x12-250         MARK IN SCHEDULE       CONNECTION & RUNOUT SIZE (12x12)         SLOT       MARK IN SCHEDULE         SLOT       SLOT DIFFUSER -       LSL8-2s         RUNOUT SIZE (8"ø)       RUNOUT SIZE (8"ø)		MANUAL / EMERGENCY 3-WAY CONTR THERMOMETER / PRESSURE GAUGE

## **MEDICAL GAS SYME**

02	OXYGEN
MA	MEDICAL COMPRESSED AIR
VAC	MEDICAL VACUUM
WAGD	WASTE ANESTHESIA GAS DISPOSAL
N2O	NITROUS OXIDE
CO2	CARBON DIOXIDE
IA	INSTRUMENT AIR
N2	NITROGEN
⊠ ◄	–ZONE VALVE BOX (ZVB)
□ -	-MEDICAL GAS OUTLET (MGO)

## PRESSURE CLASS SCHEDULE

		SEAL	LEAKAGE CLASS	
AIRSTSTEM	PRESSURE CLASS	CLASS	ROUND	RECT
OW-PRESSURE SUPPLY	2 INCH WG (500 PA)	A	6	12
/IEDIUM PRESSURE SUPPLY (UPSTREAM OF /AV & CV BOXES)	6 INCH WG (1500 PA)	A	3	6
RETURN AND RELIEF	2 INCH WG (500 PA)	A	6	12

SPACE OR AREA FAST TRACK/EXAM ROOM

OUTDOOR A SUMMER DB/WB WI 96/77

THIS IS A LIFE SAFETY BUILDING WHICH MEANS IT SHALL REMAIN REASONABLY OPERATIONAL IN THE CASE OF A SEISMIC EVENT. THEREFORE ALL STATIONARY EQUIPMENT ON THE FLOOR AND ALL CONCRETE PADS SHALL BE FIXED RIGIDLY TO THE STRUCTURE. ALL ROTATING OR RECIPROCATING OR VIBRATING EQUIPMENT SHALL BE INSTALLED WITH EARTHQUAKE SNUBBERS TO LIMIT MOVEMENT. ALL HANGING EQUIPMENT, PIPING, AND DUCTWORK SHALL BE BRACED TO THE STRUCTURE. REFER TO SPECIFICATION SECTIONS 21 0548, 22 0548, AND 23 0548.

	HWS-	
	HWR	HEATING WATER RETURN
	CWS	CHILLED WATER RETURN
	CWR	- CHILLED WATER RETURN
	CHWS-	CHILLED/HEATING WATER SUPPLY
	CHWR	CHILLED/HEATING WATER RETURN
	CS	CONDENSER WATER RETURN
	CR	- CONDENSER WATER RETURN
	RLRL	REFRIGERANT LIQUID LINE (SUPPLY)
		REFRIGERANT SUCTION LINE (RETURN)
	BMW	
	I PS	
	PR	- I OW PRESSURE STEAM RETURN
	MPS	MEDIUM PRESSURE STEAM SUPPLY
	— — — — — — — — — — — — — — — — — — —	- MEDIUM PRESSURE STEAM RETURN
	HPS	
	HPR	HIGH PRESSURE STEAM RETURN
	T1.1 -	EQUIPMENT CALLOUT
	(0.75) -	WATER COIL FLOW (GPM)
OUT	1. VERIFY ALL EXIS DISCREPANCIES IMMEDIATELY. MI SHALL NOT JUST	FROM THE DRAWINGS AND NOTES TO THE ARCHITECT NOR CHANGES IN THE SCOPE OF THE DEMOLITION WORK IFY AN ADDITIONAL COST.
	2. REMOVAL OF EXI	STING FIXTURES AND EQUIPMENT WILL REQUIRE ISOLATING
	THE PIPING RISE	RS OR MAINS VIA SHUT-OFF VALVES. INSTALL NEW
	3. REMOVAL OF EXI	STING PLUMBING FIXTURES AND EQUIPMENT, ETC. WILL
	REQUIRE CAPPIN	IG AND SEALING EXISTING MAINS OR BRANCHES AS
	NECESSARY AND	) REQUIRED TO ALLOW THE REMAINING SYSTEMS TO FULLY UT DEGRADATION
	4. CONTRACTOR SH	ALL PROVIDE PROTECTIVE PLASTIC DROP CLOTHS TO
SE	DEBRIS DURING	(ISTING OCCUPIED AREAS AND EQUIPMENT FROM DUST ANI THE CONSTRUCTION WORK AND SHALL CLEAN THE AREAS
	OF ALL CONSTRU	JCTION DIRT DAILY, AND UPON COMPLETION OF THE WORK.
	5. ALL DRAINED PIP	ING RISERS AND MAINS SHALL BE REFILLED WITH PROPER FRI Y VENTED BY THIS CONTRACTOR ONCE NEW WORK HA
	BEEN INSTALLED 6. COORDINATE WI	TH GENERAL CONTRACTOR THE REMOVAL AND
RINCREASER	6. COORDINATE WI REPLACEMENT C	TH GENERAL CONTRACTOR THE REMOVAL AND OF ALL EXISTING CEILINGS, WALLS, ETC. AS REQUIRED FOR
RINCREASER	BEEN INSTALLED 6. COORDINATE WI REPLACEMENT C MECHANICAL DEI 7. EXISTING PIPING	TH GENERAL CONTRACTOR THE REMOVAL AND F ALL EXISTING CEILINGS, WALLS, ETC. AS REQUIRED FOR MOLITION WORK. AND EQUIPMENT, ETC., NOT TO BE UTILIZED IN THE
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## **GENERAL NOTES**

VERIFY JOB SITE CONDITIONS AND DIMENSIONS BEFORE BEGINNING WORK. PLANS ARE SCHEMATIC IN NATURE. LAYOUT IS BASED ON BEST AVAILABLE INFORMATION. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND

- DIMENSIONS. NO PIPING, DUCTWORK, ETC. SHALL PENETRATE STRUCTURAL MEMBERS. PROVIDE MISCELLANEOUS CUTTING, PATCHING AND REPAIRING OF FINISHES, ROOF, WALLS, ETC., AS REQUIRED TO ACCOMMODATE THE NEW WORK. G.C. IS TO PATCH ANY OPENINGS IN CORRIDORS REQUIRED TO BE
- CONSTRUCTED TO LIMIT THE TRANSFER OF SMOKE AND IN SMOKE BARRIERS AS REQUIRED TO MEET CODE REQUIREMENTS. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY EXACT LOCATION,
- CONFIGURATION AND ROUTING OF EXISTING SYSTEMS REQUIRED TO REMAIN IN OPERATION DURING THE PROJECT TO PREVENT DAMAGE DURING DEMOLITION AND PHASING. REMOVE ALL EXISTING EQUIPMENT, DUCTWORK AND PIPING THAT IS NOT
- REQUIRED FOR A WORKING INSTALLATION. COORDINATE ALL WORK WITH OTHER TRADES PRIOR TO INSTALLATION.
- UNLESS OTHERWISE INDICATED, INSTALL ALL SPACE THERMOSTATS AND OTHER OCCUPANT ADJUSTABLE CONTROL DEVICES SAME HEIGHT AS ADJACENT LIGHT SWITCHES, BUT IN NO CASE HIGHER THAN 48 INCHES ABOVE FINISHED FLOOR PER ADA REQUIREMENTS. COORDINATE EXACT HEIGHT WITH ARCHITECT PRIOR TO INSTALLATION.
- ALL CUTTING AND PATCHING SHALL BE CLOSELY COORDINATED WITH THE G.C. COORDINATE ROUTING OF PLUMBING, AND HVAC PIPING WITH DUCTWORK, LIGHTS, ARCHITECTURAL CEILING AND STRUCTURAL ELEMENTS. PIPING SHALL RISE AND DROP, JOG OR OFFSET AS REQUIRED TO AVOID CONFLICTS. DUCTWORK SHALL TAKE PRECEDENCE OVER ALL PIPING, EXCEPT WHERE GRADE MUST BE MAINTAINED FOR DRAINAGE. REWORK OF INSTALLED WORK TO RESOLVE CONFLICTS RISING FROM LACK OF COORDINATION SHALL NOT JUSTIFY AN INCREASE IN THE CONTRACT AMOUNT.
- ALL DIFFUSERS ARE 4-WAY BLOW UNLESS INDICATED OTHERWISE ON THE DRAWINGS. FLEXIBLE DUCTWORK IS ALLOWED ON RUNOUTS TO SUPPLY DIFFUSERS ONLY.
- UTILIZE ONLY ABOVE LAY-IN ACCESSIBLE CEILINGS. DO NOT INSTALL FLEX DUCT ABOVE HARD CEILINGS OR WHERE EXPOSED. A MAXIMUM LENGTH OF 6'-0" MAY BE USED AT EACH CONNECTION.
- SEAL TRANSVERSE AND LONGITUDINAL JOINTS OF ALL DUCTWORK USING HARDCAST DT TAPE AND FTA-20 ADHESIVE OR HARDCAST AFG-1402 "FOIL GRIP" PER MANUFACTURERS INSTRUCTIONS.
- . INSTALL BALANCE DAMPER WITH STANDOFF AND LOCKING QUADRANT IN AN ACCESSIBLE LOCATION AT EACH RUNOUT TO SUPPLY DIFFUSERS, EXHAUST GRILLES, AND RETURN GRILLES WHERE AIRFLOW IS INDICATED, OR AS INDICATED OTHERWISE.
- . ALL PENETRATIONS THROUGH FIRE RATED ASSEMBLIES SHALL BE FIRE STOPPED BY THE TRADE MAKING THE PENETRATION. REFER TO
- ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR REQUIREMENTS DO NOT ROUTE PIPING OR DUCTWORK OVER ELECTRICAL PANELS OR EQUIPMENT. PIPING OR DUCTWORK SHALL NOT BE ROUTED THROUGH ELECTRICAL ROOMS, TELECOM ROOMS OR ELEVATOR EQUIPMENT ROOMS UNLESS SPECIFICALLY SERVING THAT ROOM. COORDINATE WITH E.C. PROVIDE WATERTIGHT DRIP PAN WITH DRAIN TO NEAREST APPROVED RECEPTOR WHERE REQUIRED.
- COORDINATE SIZE AND LOCATION OF ACCESS DOORS IN CONSTRUCTION
- REQUIRED FOR ACCESS TO MECHANICAL EQUIPMENT WITH G.C. 3. COORDINATE SIZE AND LOCATION OF MECHANICAL EQUIPMENT PADS WITH G.C. 19. ALL WORK IS TO CONFORM WITH APPLICABLE CODES AND STANDARDS.
- 20. DUCT SIZES SHOWN ARE ACTUAL INSIDE CLEAR DIMENSIONS. INCREASE SHEET METAL DIMENSIONS AS REQUIRED TO ACCOMMODATE DUCT LINER WHERE LINER IS SPECIFIED.
- 21. ALL EQUIPMENT SUPPORT STANDS SHALL BE PRIMED AND PAINTED WITH EPOXY ENAMEL.
- 2. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF ALL CEILING MOUNTED AIR DISTRIBUTION DEVICES.
- 3. PAINT INSIDE OF DUCTWORK BLACK ANYWHERE VISIBLE THROUGH FACE OF GRILLE OR DIFFUSER. 24. WHERE HYDRONIC RUNOUT SIZES ARE NOT INDICATED, SIZE PER THE
- FOLLOWING: UP TO 3 GPM - 3/4"; UP TO 6 GPM - 1"; UP TO 10 GPM - 1-1/4"; UP TO 17 GPM -1-1/2".
- 5. HYDRONIC PIPING SHALL BE MAINTAINED FULL SIZE UP TO COIL CONNECTIONS. SHUT-OFF VALVES, STRAINERS, BALANCE VALVES, ETC. WILL NOT BE ALLOWED TO REDUCE FROM LINE/RUNOUT SIZE. CONTROL VALVES MAY BE DOWN SIZED FOR FLOW RATE, NOT TO EXCEED 4 PSIG PRESSURE DROP AT DESIGN FLOW.
- UNDERGROUND-TYPE UTILITY MARKER: PROVIDED AND INSTALLED PER SPECIFICATION SECTIONS 220553 AND 230553 AT EVERY 100 FEET FOR ALL UNDERGROUND UTILITIES (INCLUDING HEAT PUMP WELL FIELD). LABEL WITH THE APPROPRIATE UTILITY. EACH VERTICAL GROUND SOURCE HEAT PUMP WELL/BORE SHALL BE LABELED "GCHP WELL #X WITH APPROPRIATE NUMERIC WELL NUMBER IDENTIFICATION.
- TEMPERATURE CONTROLS CONTRACTOR (T.C.C.) SHALL FURNISH AND INSTALL ALL LOW VOLTAGE WIRING AND ASSOCIATED CONDUIT REQUIRED FOR MECHANICAL CONTROL SYSTEM. WIRING SHALL BE IN CONDUIT INSIDE WALLS, IN ROOMS WITH EXPOSED CEILINGS, AND ABOVE HARD CEILINGS. LINE VOLTAGE WIRING AND ASSOCIATED CONDUIT SHALL BE PROVIDED AND INSTALLED BY E.C
- CONTROL SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH SPECIFICATIONS. ALL CONTROL DAMPERS SHALL BE FURNISHED BY T.C.C. AND INSTALLED BY THE M.C. MOTOR OPERATORS SHALL BE FURNISHED AND INSTALLED BY THE T.C.C. . COORDINATE ACCESS TO EQUIPMENT AND VALVES INSTALLED ABOVE 'HARD'
- CEILINGS AND IN MASONRY CHASES WITH GENERAL CONTRACTOR. PROVIDE LOCKING ACCESS DOORS FOR INSTALLATION BY CONTRACTOR AS REQUIRED TO SERVICE CONCEALED DAMPERS, VALVES AND EQUIPMENT. CEILING ACCESS DOORS FOR FIRE DAMPERS, SMOKE DAMPERS AND FIRE SMOKE DAMPERS FURNISHED AND INSTALLED BY CONTRACTOR.
- 0. CONTRACTOR TO INSTALL TEMPORARY FILTERS OVER ALL RETURN AND EXHAUST GRILLES IN WORK AREA DURING CONSTRUCTION. THESE DRAWINGS ARE ACCOMPANIED BY SPECIFICATIONS. REFER TO
- SPECIFICATIONS FOR FURTHER INFORMATION. 2. EQUIPMENT THAT REQUIRES MAINTENANCE SHALL BE LOCATED A MINIMUM OF
- 10'-0" FROM THE BUILDING ROOF EDGE WHERE REQUIRED BY CODE. 3. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS OF TEMPORARY
- PARTITIONS. 34. SQUARE THROAT NOT ALLOWED ON RADIUS ELBOWS.
- TERMINAL UNITS, MANUAL BALANCE DAMPERS, HYDRONIC AND PLUMBING VALVES, CIRCUIT SETTERS AND OTHER ACCESSORIES REQUIRING ACCESS SHALL BE ACCESSIBLE VIA A STANDARD LADDER SO COMPONENTS MAY BE REPLACED, REPAIRED, OR UTILIZED WITHOUT THE NEED FOR EXTENSIVE CEILING REMOVAL, SCAFFOLDING OR A MAN LIFT. WHERE POSSIBLE NO MORE THAN 48" ABOVE THE FINISHED CEILING.

## **MECHANICAL SHEET INDEX**

MECHANICAL COVER SHEET MP001 MECHANICAL SPECIFICATIONS MP002 MP003 MECHANICAL SPECIFICATIONS P101 FIRST FLOOR PLUMBING PLAN P102 FIRST FLOOR MEDICAL GAS PLAN PLUMBING DETAILS AND SCHEDULES P501 FIRST FLOOR HVAC PLAN M101

FIRST FLOOR MECHANICAL PIPING PLAN M102 M501 MECHANICAL DETAILS AND SCHEDULES

## **HVAC DESIGN CONDITIONS**

IR	INDOOR	INDOOR	RELATIVE	CODE MIN	ACTUAL	DEMADKS
NTER DB	HEATING °F	COOLING °F	HUMIDITY %RH	ACH	DESIGN ACH	REINARNO
6	68	72	60	6	6.2	1

![](_page_4_Picture_54.jpeg)

### 1.1 GENERAL CONDITIONS

A. The General Conditions, Supplemental General Conditions, Special Conditions and General Requirements in Division 01 are part of this contract and shall be referred to as they apply to this section of the specifications.

1.2 EXAMINATION OF SITE A. Visit the site, inspect the existing conditions, and check the drawings and specifications so as to be fully informed of the requirements for completion of the work. Lack of such information shall not justify an extra to the contract price.

- 1.3 SCOPE
- A. The Mechanical Work shall include labor, materials, and equipment to install systems as shown on plans and hereinafter specified. The installation shall include all labor, materials, tools, transportation, equipment, services, and facilities, required for the complete, proper and substantial installation of all mechanical work shown on the plans, and/or outlined in these specifications. The installation shall include all materials, appliances, and apparatus not specifically mentioned herein or noted on the drawings, but which are necessary to make a complete working installation of all mechanical systems.
- Show on prints in red ink all changes from original plans made during the installation. Return these prints to the Architect upon completion of the
- C. By bidding, this contractor acknowledges his understanding of the work to be done and agrees to install complete and workable systems. 1.4 CODES
- A. Execute work in compliance with all applicable Federal, State and Municipal laws, codes, ordinances, and local customs regarding the trade to perform the work. The Contractor is required to verify that all installations comply with applicable codes. The codes applicable to this specific project may be listed on the Architect's code compliance sheet. If not, it is the Contractor's responsibility to determine which codes apply to the installations.
- Codes shall govern in case of any direct conflict between codes and plans and specifications; except when plans and specifications require higher standards than those required by code. Variance from the plan and specifications made to comply with code must be approved by the Architect. If approved, they shall be made with no increased cost to the Owner.
- 1.5 DEFINITIONS
- A. It shall be understood that the drawings and specifications complement one another, and items specified shall also meet the criteria set forth on the drawings.
- B. Where any device or item is referred to in the singular sense (such as "the unit"), such reference applies to as many devices as are required to complete the installation as shown on the drawings
- C. The term "work" shall mean all obligations imposed upon the Contractor by the Contract Documents.

### 1.6 ABBREVIATIONS

- ADA Americans with Disabilities Act
- AGA American Gas Association AISI - American Iron and Steel Institute
- AMCA Air Moving and Conditioning Association, Inc.
- ANSI American National Standards Institute ASHRAE - American Society of Heating, Refrigeration & Air-Conditioning
- Engineers, Inc.
- ASME American Society of Mechanical Engineers
- ASTM American Society for Testing and Materials
- AWWA American Water Works Association BPVC - Boiler and Pressure Vessel Code of ASME
- CISPI Cast Iron Soil Pipe Institute
- NFPA National Fire Protection Association
- SMACNA Sheet Metal and Air-Conditioning Contractors National Association UL - Underwriters' Laboratories, Inc.
- ETL ETL Testing Laboratories, Inc. OSHA - Occupational Safety and Health Administration
- 1.7 PERMITS
- A. Obtain and pay for all licenses and permits, fees, inspection and certificates required for the execution of this work.
- B. Pay fees and charges for connection to outside services and use of
- C. Deliver permits and certificates to the Architect for transmittal to the Owner.
- 1.8 RESPONSIBILITY A. This contractor will be held responsible for any and all damage to any part of the building or to the work of other contractors, as may be caused through his operation.
- B. The operation and maintenance of the new Mechanical equipment during construction shall be the responsibility of this contractor until the acceptance of the building by the Owner.
- C. The General Contractor shall pay for all fuel cost for operation of the equipment, unless indicated otherwise in the specifications.
- D. The Mechanical and General Contractors shall coordinate to make all provisions for entry of equipment, installed under this Contract, to the installed location. Contractors shall provide openings in existing construction if necessary. Contractors shall perform repairs necessary to restore the building to the original condition. During the period of entry of equipment and removal of trash, no disruption of the Owner's normal business shall occur.
- 1.9 WORK TO BE DONE BY GENERAL CONTRACTOR
- A. Build in all openings, sleeves, chases, etc., for piping, as established, furnished, and set by this contractor. B. Mechanical Contractor shall furnish bolts, brackets, hangers, etc., required for work established and arrange for General Contractor to build into
- concrete structure. General Contractor shall install all factory sleeved fire dampers, furnished by Mechanical Contractor, in walls and floors. Frame around and provide openings for ductwork, louvers, roof drains, etc.
- D. Paint all mechanical equipment so specified. Use paint which is specified by the Architect. 1.10 WORK TO BE DONE BY ELECTRICAL CONTRACTOR
- A. The Electrical Contractor shall provide all motor starters complete with auxiliary contacts where required for the function of this system unless specifically noted otherwise on the plans or in these specifications.
- B. All required line voltage wiring for the mechanical control system shall be furnished and installed by the Electrical Contractor under supervision of the Control Manufacturer's representative.
- Check mechanical specifications to verify wiring requirements for motor driven equipment. Provide complete wiring for the equipment including all required interlocking. Provide complete wiring for power factor correction capacitors.
- D. The Electrical Contractor shall install the power factor correction capacitors furnished by the Mechanical Contractor for equipment so specified. 1.11 ELECTRICAL REQUIREMENTS BY MECHANICAL CONTRACTOR
- A. Mechanical Contractor shall furnish all motors, motor interlocking control devices, certain magnetic starters, etc.
- B. Submittals shall include complete equipment wiring diagrams and temperature control drawings for all the equipment furnished.
- Submittals shall show all wiring connections, starters, auxiliary contactors, interlocking selector switches, separate control voltage power supplies, for each and every item of equipment, etc., requiring wiring.
- Provide one copy of Engineer approved shop drawings showing all wiring and temperature control requirements of all mechanical equipment to the Electrical Contractor.

### 1.12 WORKMANSHIP AND COORDINATION

- A. Make installation substantially as shown on the plans. B. Pipe and duct routing and equipment location shown on the drawings schematic in nature. Make alterations in location of apparatus or pipir
- may be required to conform to building construction without extra cha C. Equipment service clearances, per equipment manufacturers' specifications, shall be maintained from general construction. No pipe ductwork shall be installed within these clearances. No piping, coils, ductwork shall be installed above electrical panels, starters, or switch or in elevator equipment rooms.
- D. Cooperate with other contractors in their installation of work. E. The ductwork shall take precedence over all pipe work except where
- necessary to maintain an even grade or specific slope on the piping. F. Use only experienced mechanics.
- 1.13 MATERIALS
- A. Material and equipment shall be new, of best quality and design and f from defects. A manufacturer's nameplate affixed in a conspicuous will be required on each major component of equipment stating manufacturer's name, address, and catalog number. 1.14 MATERIALS OF APPROVED EQUAL
- A. Where items of equipment and/or materials are specifically identified by a manufacturer's name, model, or catalog number, only such spec
- items may be used in the base bid, except as hereinafter provided. B. Unless requests for changes in base bid specifications are received approved and noted by addendum prior to the opening of bids, the
- successful contractor will be held to furnish specified item. C. After contract is awarded, changes in specifications shall be made of
- defined under "Substitution of Equipment". **1.15 SUBSTITUTION OF EQUIPMENT**
- A. After execution of the contract, substitution of equipment of makes ot than those specifically named in the contract documents will be appro by the Engineer only if the equipment named in the specifications can be delivered to the job in time to complete the work in proper sequence work of other contractors, due to conditions beyond control of the contractor
- B. Requests for substitutions must be accompanied by documentary pro equality or difference in price and delivery, if any, in form of certified
- guotations from suppliers of both specified and proposed equipment. C. The Owner shall receive all benefits of the difference in cost involved substitution, and the contract altered by change order to credit Owner any savings so obtained.
- 1.16 SUBMITTALS
- A. Contractor shall send to the Architect for approval submittals on all equipment, accessories, and components. B. Submittals shall be in electronic format (PDF) and all submittals by ea
- trade shall be submitted together as a package to be reviewed togeth Incomplete submittals packages or submittals sections sent in a piece manner will not be reviewed until all sections are received. C. Where catalog cuts are used, mark them to indicate equipment, capa
- controls, fittings, valves, sizes, etc. D. Reference each item to applicable specification paragraph number a plan sheet number. Reference items not appearing in base specificat applicable alternate numbers, change order numbers, letters of authorization, etc.
- E. All shop drawings shall be checked and signed by the mechanical
- contractor prior to submittal to the Engineer. F. Shop drawings submitted without contractor's signature or approval verification will not be approved. Quantities will not be checked or ve It is the contractor's responsibility to provide the proper quantities req to complete the job.
- G. Portions of the work requiring a shop drawing submittal shall not begin the shop drawing has been approved by the Engineer.
- H. Submit wiring diagrams for all mechanical equipment requiring field w clearly showing all required connections.
- Engineer's acceptance of Compliance Submittals will not relieve Cont from his responsibility for any deviations from the requirements of the Contract Documents unless Contractor has in writing called Engineer attention to such deviation at the time of submission and Engineer ha given written approval to the specific deviation, nor shall any accepta Engineer relieve Contractor from responsibility for errors or omissions Compliance Submittals.
- 1.17 CUTTING AND PATCHING A. Notify the General Contractor in ample time, of the location of all chas
- sleeves, and any other openings required in connection with the work this contract. B. Cutting and patching made necessary because of failure to comply w
- above shall be done by the General Contractor at the expense of the Mechanical Contractor. 1.18 TESTING
- A. Furnish testing equipment and test all piping systems under methods conditions as specified or per code. B. Make all necessary replacements and repair and repeat tests until the
- entire system is approved and satisfactory.
- C. Test under pressure with liquid or gas as directed or specified. D. Refer to TAB and piping sections for further information on duct and p
- 1.19 PAINTING
- A. All painting shall be done by the General Contractor. B. Painting shall be for the following items: all piping, ductwork, framework and all equipment not furnished with factory finish, etc., in all exposed areas of the building and/or as noted on the drawings. Omit painting
- 1.20 LABELING
- A. Install mechanically engraved metal or plastic label at equipment, not than 2-1/2 inches wide by 3/4 inch tall with letters between 1/4 inch a inch tall. Utilize labels with pre-drilled holes and stainless-steel rivets
- self-tapping screws, or labels with contact-type permanent adhesive. B. Identify all service piping which is accessible for maintenance operation with semi rigid plastic markers complete with direction of flow arrows. marker must show approved color-coded background, proper color of legend, approved legend letter size and approved marker length. Use on or self-adhesive markers on diameters 3/4" thru 5". Use strap-on self-adhesive on diameter 6" and larger. Locate pipe markers at each valve, each branch and riser takeoff, each passage through wall or flo
- construction, each passage to underground and at 25-foot intervals horizontal pipe runs. C. Install valve tags, stamped, or engraved with 1/4" high letters for pipin system abbreviation and 1/2" high numbers. and predrilled or stampe

	•
hole	es for attachment hardware.
1.	In existing buildings, coordinate with existing numbering system
2.	Furnish valve schedule on 8-1/2"x11" paper indicating valve
	numbering and where valves are installed. Include schedule in
	Operating and Maintenance Instructions.

Operating and Mainte		
Pipe Diameter	Marker Size	Letter H
3/4" thru 2"	1"x8"	3/4
2-1/4" thru 7-7/8"	2-1/4"x13"	1-3

piping in tunnels and in concealed areas.

	1.21 OPERATING INSTRUCTIONS	D. Provide all surface mounted and concealed unistrut for pipe supports in all
wings are	A. Prepare and submit to the Engineer for approval operating instructions made in conjunction with Equipment Manufacturer's representative.	equipment rooms and above ceilings for pipe and duct mounting. Unistrut shall all be at a minimum of heavy 12 ga., 1-5/8" construction. Contractor
r piping as	Instruction shall contain equipment starting sequence, interlocks, controls,	shall insure adequate support of each unistrut section based on the load that
a charge.	maintenance instructions brochure.	E. Support fire protection piping independent of all other piping.
o pipe or	1.22 MAINTENANCE INSTRUCTIONS	F. Size hangers on insulated pipe 3" and smaller to fit the pipe. Use copper plated bangers for copper pipe. Size bangers on insulated pipe 4" and larger
witch gear,	installed under this contract. Each brochure shall include certified	to fit the insulation and provide pipe sleeves and high density insulation
	equipment drawings and/or catalog data as submitted, complete maintenance instructions, parts lists for each item of equipment, any	G. Space hangers 8'-0" on center for steel, iron, and copper pipe up to 1".
here it is	special emergency operating instructions, all equipment warranties with	H. Space hangers 10'-0" on center for steel, iron, and copper pipe above 1".
bing.	addresses and telephone numbers.	J. Space hangers 5-0" on center for PVC.
and free	B. Label cover with the following:	K. Mount piping so that all runs are parallel and evenly spaced.
ous place	<ol> <li>Section of work covered by brochure, i.e., "Plumbing Heating,</li> </ol>	clamps complying with MSS SP-58, of one of the following types listed,
	3. Name and address of Architect, Engineer, Contractor.	selected by Installer to suit vertical piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of
lified herein	4. Telephone number of Contractor including night and emergency	vertical piping clamps to exactly fit pipe size of bare pipe. Provide copper-
specific	C. Brochures shall be submitted to the Engineer for approval and delivery to	M. Two-Bolt Riser Clamps: MSS Type 8.
ed. ved and	1.23 LOOSE EQUIPMENT	N. Except as otherwise indicated, provide factory-fabricated hanger-rod attachments complying with MSS SP-58, selected by Installer to suit
he	A. All keys and special wrenches furnished with the equipment shall be kept in	horizontal-piping hangers and building attachments, in accordance with MSS
de only as	completion of the project.	by one manufacturer for each piping service. Select size of hanger-rod
	1.24 FINAL INSPECTION A. Final inspection will be made upon written request from the Mechanical	attachments to suit hanger rods. Provide copper-plated hanger-rod attachments where attachments are in direct contact with copper piping.
es other	Contractor after the project is completed and Test and Balance (TAB) has	O. Except as otherwise indicated, provide factory-fabricated building
approved is cannot	B. Furnish a workman familiar with this project to accompany the Engineer on	substrate conditions, in accordance with MSS SP-69 and manufacturer's
quence to e	final inspection and have available ladders, drop cords, and other equipment as required to gain access to any portion of this system.	published product information. Select size of building attachments to suit hanger rods. Provide copper-plated building attachments where
	C. Submit TAB Report to Engineer for review at least 5 days prior to final	attachments are in direct contact with copper piping.
ry proot of fied	D. This contractor and his principal sub-contractors shall be represented at the	P. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement. Resting of pipe in framing or structural
nent. Jved in anv	inspection by a person of authority responsible to demonstrate to the Engineer that his work conforms to the intent of the plans and	members is not permitted.
Owner with	specifications.	loading and stresses from movement will not be transmitted to connected
	E. Extra inspections made necessary by the Mechanical Contractor's failure to comply with the conditions as set forth above shall be charged to the	equipment. R. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes,
all	contractor at the inspector's time both on the job and spent in travel	and so that maximum pipe deflections allowed by ANSI B31 are not
by each	1.25 GUARANTEE	S. Insulated Piping: Comply with the following installation requirements:
ogether. piecemeal	A. Guarantee all work, material and equipment for a period of one year after date of final certificate of acceptance by the Architect.	1. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation: do not exceed pipe stresses allowed by
	B. During the year guarantee period the mechanical contractor shall be	ANSI B31.
capacities,	Upon notification of a defect by the Architect, the Contractor shall make	are indicated on cold or chilled water piping, install coated protective
per and cification to	immediate effort to correct it and shall notify the Architect when this work is completed	shields. 3 Saddles: Where insulation without vanor barrier is indicated install
	C. Repairs and/or replacements shall be made with no cost to Owner.	protection saddles.
al	SECTION 200600 – MATERIALS AND METHODS COMMON TO FIRE	A. Provide all valves required for operation, service, and maintenance of
oval and	PROTECTION, PLUMBING, AND MECHANICAL.	systems and equipment, i.e., shut off valves both sides of equipment, coils, etc.
or verified.	1.1 PIPING SYSTEMS - GENERAL	B. Where Used:
siequiieu	the job.	ball valves
t begin until	B. Install offset connections for alignment of vertical to horizontal piping wherever required to make a true connection.	<ol> <li>Domestic and Hydronic Piping shut-off valves 2-1/2" and larger shall be butterfly valves.</li> </ol>
ield wiring	C. Make branch connections with offsets to provide for movement with the	<ol> <li>Valves in air lines and throttling valves shall be globe valves.</li> <li>Flow control valves shall be plug valves.</li> </ol>
Contractor	D. Install horizontal piping parallel to the building walls and partitions.	C. Ball Valves:
of the ineer's	E. Do not run piping through elevator equipment rooms, transformer vaults or other electrical equipment spaces (unless the piping serves that room) or	1. Ball valves two inches and smaller shall have a forged bronze body with screwed pipe ends for steel pipe and sweat ends for copper pipe. Body
er has	above electrical gear or panels.	shall be two-piece assembly full port. Hard chrome plated brass ball or
sions in	of the line they serve. Make change in pipe size noted on plans after last	between two Viton seats (300 psi) to provide positive seal in either
	fitting on larger pipe. When supply pipes are larger than equipment tappings, reduce pipe size immediately prior to equipment connection.	direction. Stem shall be brass or stainless steel and extended 1 1/4" above the valve to clear insulation and to receive molded packing brass
l chases,	1.2 PIPE AND FITTINGS	packing nut and handle nut. Handle shall be constructed of zinc plated
WOIK OI	name, type of pipe and length, in accordance with ASTM standards. All	180°F.
ply with the	pipe must be new. Re-processed pipe which has been cleaned and re- finished due to extended vard storage will not be accepted. All pipe must	<ul> <li>D. Butterfly Valves:</li> <li>1. Butterfly valves shall conform to MSS-SP-67. Liners and discs shall be</li> </ul>
	be corrosion free. Submit shop drawings on piping along with certified mill	suitable for the intended service.
hods and	B. Mechanically Formed Tee Connections: (Optional)	2. Butterny valves shall be lug type suitable for dead end service. Body constructed of cast or ductile iron - heavy duty stem bushing to absorb
til the	1. Mechanically extracted collars shall be formed in a continuous	operator side thrust - aluminum bronze disc - 300 series stainless steel
	surface to form a collar having a height of not less than three times the	thru 4" - wormgear with handwheel for sizes above 4" - valve pressure
and pipe	thickness of the tube wall. The collaring device shall be fully adjustable as to insure proper tolerance and complete uniformity of	E. Gate and Globe Valves:
	the joint.	1. All gate and globe valves shall be designed for repacking under
	tube and dimpled to ensure penetration of the branch tube into the	for the intended service. When the valve is fully opened, the back seat
mework, posed	collar is of sufficient depth for brazing and that the branch tube does not obstruct the flow in the main line tube.	shall protect the packing and the stem threads from the fluid. All gate and globe valves shall have a gland follower. The pressure-
nting of	3. All joints shall be brazed in accordance with the Copper Development	temperature rating of valves shall be not less than the design criteria
	4. Note: Soft Soldered joints will not be permitted.	<ol> <li>2. Gate valves shall be of the solid wedge type, designed and</li> </ol>
t, not less uch and 1/2	C. Polyvinyl Chloride Pipe and Fittings conform to ASTM D2665.	manufactured in such a way that seating surfaces are prevented from contacting until near the point of closure. Valves two inches and smaller.
rivets or	ASTM A-74 carrying the insignia of the Cast Iron Soil Pipe Institute.	shall be rising stem with threaded, solder, socket, or flanged end to suit
sive. peration	E. Cast Iron No-hub Pipe and Fittings: conform to Standard 301 of the Cast Iron Soil Pipe Institute.	service. Valves 2 1/2" and larger shall be flanged, and unless otherwise specified all shall be OS&Y.
rows. Each	F. Copper tubing: seamless copper water tube conforming to ASTM	3. Globe valves two inches and smaller shall be threaded, flanged, solder
n. Use snap	G. Black or Galvanized Steel Pipe and Fittings: For pipe 2" and smaller	shall be flanged, unless otherwise specified. Where composition discs
p-on or t each	A-120/A53 continuous weld pipe, threaded and coupled, with 150# cast iron screwed fittings. For steel nipples close and short use extra strong	are used, the disc shall be suitable for the intended service. For steam throttling service, composition disc valves shall be fitted with throttling
or floor	weight.	nut. Metal seated globe valves shall have hardened stainless steel disc
	welded pipe, beveled plain end, with ASTM A234 butt weld fittings.	4. Pressure containing parts of iron body valves shall be of material
<sup>-</sup> piping amped	Flanges for steel pipe ASA-B 16.5 flat face, 150# welding neck. For galvanized pipe 2 1/2" and larger use 150# cast iron screwed fittings.	conforming to ASTM Specification A-126 Grade B. If the wedge in OS&Y gate valves is fastened to the stem by threads, it shall be
n	I. Weld in accordance with American Welding Society Code. Mitering and	secured by a nickel alloy or monel pin.
ठाखा।।. Э	1.3 HANGERS AND SUPPORTS	conform to ANSI B16.10. Design, workmanship, materials, and testing
le in	A. Use strap type pipe ring hangers on pipe up thru 3" equal to Grinnel Fig. 69 or CT-69. Use standard duty clevis bangers on piping larger than 3" equal	<ul><li>shall conform to MSS-SP-70 and MSS-SP-71.</li><li>6. By-pass valves shall be globe type, and these two inches and smaller at</li></ul>
er Height	to Grinnel Fig. 260.	pressure reducing stations, shall be 500 Brinnel plug disc and seat ring
3/4" 1-3/4"	B. Use inserts or supporting members in construction above for overhead suspension. Set inserts or supporting members for hangers in form for	type, or stellite. Those 2 1/2 inches through 4 inches shall be hardened stainless steel plug disc globe valves.
	concrete construction. Use expansion inserts only where approved by the Architect's inspector	F. Check Valves:
	C. Use heavy welded steel brackets for wall suspension. Mount brackets and	and smaller shall be bronze, regrinding, with seating angle 40 to 45
	wall supports on masonry walls with bolts through the wall and a suitable steel back plate on the back of the wall.	degrees. A stop plug is required as a renewable stop for the hanger, unless otherwise specified. Disc and hanger shall be separate parts.
		and the disc shall be free to rotate. Hanger pins shall be supported on
		<ol> <li>Lift check valves two inches and smaller shall be bronze or forged steel,</li> </ol>
		to suit the service. 3. Check valves 2 1/2 inches and larger shall be flanged, swing type
		unless otherwise specified.
		ত. তাৱনাঘৰাų valves snail nave izo psi. working steam pressure or 200 psi. for water joil and gas

ts in all Inistrut	H. Sweat joint valves shall be used on all copper pipe. Bronze valves with the basic saturated steam rating of 125 psi or 150 psi
tractor	shall have pressure containing parts of a material having at least the
load that	physical properties of ASTM Specification B-62. Metallic seated bronze
	globe, angle, check and gate valves with a basic steam rating of 200 or 300
onner	Specification B-61 for temperatures to 550°F
and larger	J. Stems of bronze and Iron Bodied Bronze Mounted valves shall be of
tion	ASTM-B-198 Class 13C (cast silicon brass), ASTM B-371, Alloy A (rolled silicon brass), or other material equally resistant to dezincification
1".	K. All pressure casting shall be free of any impregnating materials.
ve 1".	L. Each valve is to be given shell and seat tests by the manufacturer and will
	carry a permanently affixed indication that tests have been successfully completed.
	M. Insofar as possible, all valves of the same type shall be of the same
ping	manufacturer. Before purchasing any valve, contractor shall submit for
ted,	approval the name of the manufacturer, the figure number which he
ITN MOD	proposes to furnish, and engineering data on each figure number, if not using those specified. The intent of this requirement is to obtain the most
opper-	suitable valve for each service. Nonstandard valves will not be considered.
11	N. Pressure Independent Control Valves for Hydronic Systems.
	1. Manufacturer: Danfoss, Belimo or an approved equal.
d +	2. Capacity: Flow rate to match equipment served, regardless of system
ι with MSS	2 to 32 PSI 4 to 57 PSI or 8 to 128 PSI depending on location within
one type	the piping system.
rod	3. Submittal shall include a schedule which delineates the control range
oina.	for each specific flow controller at every unit along with the valve size. 4. Valve shall include all internal working parts shall be of passivated
	stainless steel or nickel plated brass. The valve shall be tamperproof
t building	when installed. Body pressure tappings suitable for pressure gauge
to suit	across valve orifice shall be provided - Bronze body - 150 PSI and
	250°F rating - Units 1 1/2" and smaller located at coils shall have
	female threaded ball valve with lever handle on system side of
systems	controller for isolation with female sweat connection on unit side. A
liuciurai	tag will give valve model number rated flow GPM absorption range
nd dead	Units 3" and above shall be gray iron body Class 150 for flanged
ected	installation.
	1.5 JOINTS
siopes,	A. Provide joints of type indicated in each piping system.
•	2. Ream to the full inside diameter of the pipe with all burrs removed.
S:	3. Sweat joints in copper tubing - with 95-5 solder.
th clamps	4. Thread pipe in accordance with ANSI B2.1; cut threads full and clean
weu by	full inside diameter. Apply pipe joint compound, or pipe joint tape
oarriers	(Teflon) where recommended by pipe/fitting manufacturer, on male
ective	threads at each joint and tighten joint to leave not more than 3 threads
nstall	5 Braze copper tube-and-fitting joints where indicated in accordance
lotan	with ANSI B31.
~f	6. Solder copper tube-and-fitting joints where indicated, in accordance
or nt coils	with recognized industry practice. Cut tube ends squarely, ream to ful inside diameter, and clean outside of tube ends and inside of fittings
11, 00113,	Apply solder flux to joint areas of both tubes and fittings. Insert tube
	full depth into fitting, and solder in manner which will draw solder full
hall be	depth and circumference of joint. Wipe excess solder from joint before
r shall be	7. Copper Pressure Seal Joint fittings shall be in accordance with ASME
	B16.18 or ASME B16.23.
	B. Use insulating unions on HVAC and domestic water lines where steel and
	C. Use brass ferrules on plumbing systems where dissimilar metals are joined.
body with	1.6 UNIONS
pe. Body	A. Unions 2" and Smaller (150 WSP - 200 WOG): Standard Weight brass to
ss ball or	Iron seat malleable iron body with screwed ends.
ther	flanged ends
1 1/4"	C. Install wherever necessary for repair, replacement, or service of the
ing brass	equipment or system.
nc plated	1.7 STRAINERS
sig at	A. Provide basket or 'Y' type strainers with iron bodies of same size as
	perforated for a total net free area opening equal to four times the pipe
shall be	area.
Rody	B. Use brass bodied strainers on copper pipe.
absorb	A. Install for all pipes passing through floors, walls, or partitions. Size sleeves
ess steel	large enough to allow for free movement of the pipes with expansion.
zes 2 1/2"	B. Floor sleeves: 20-gauge galvanized sheet metal flanged at the bottom and
ressure	attached to the forms before concrete is poured (straighten sleeve after
	C. Sleeves for insulated nine passing through walls or partitions: 24-gauge
er	galvanized sheet metal with plaster bead set flush with the wall finish.
g suitable	D. Sleeves for uncovered pipe passing through walls or partitions: Galvanized
ack seat	steel pipe sleeves, extending outside of the wall finish as required to attach

- the cover plates. E. Sleeves for basement walls or floors: Provide "Link-Seal" as manufactured by GPT or silicone pressure sealants as manufactured by General Electric or Dow Chemical Co., field applied under the direction of the local Manufacturer's Representative.
- F. Provide chrome plated brass cover plates attached to the sleeves independent of the pipe on all pipes which pass through floors, walls, ceilings, and partitions in finished rooms
- G. Provide pipe escutcheons as specified herein with inside diameter closely fitting pipe outside diameter, or outside of pipe insulation where pipe is insulated. Select outside diameter of escutcheon to completely cover pipe penetration hole in floors, walls, or ceilings; and pipe sleeve extension, if any. Furnish pipe escutcheons with nickel or chrome finish for occupied
- areas, escutcheons not required for unoccupied areas. H. Pipe Escutcheons for Moist Areas: For waterproof floors, and areas where water and condensation can be expected to accumulate, provide cast
- brass or sheet brass escutcheons, solid or split or split hinged. I. Pipe Escutcheons for Dry Areas: Provide sheet steel escutcheons, solid or
- split hinged. J. Install pipe escutcheons on each pipe penetration thru floors, walls, partitions, and ceilings where penetration is exposed to view, and on exterior of building. Secure escutcheon to pipe or insulation so escutcheon
- covers penetration hole and is flush with adjoining surface. 1.9 FIRE BARRIER THROUGH PENETRATION PROTECTION SYSTEMS A. Manufacturer: Subject to compliance with requirements, provide fire barrier
  - penetration seals of one of the following: 1. 3M Fire Protection Products
- Hilti Corp. B. Provide seals for any opening through fire-rated walls, floors, roof, or ceilings used as passage for mechanical components such as piping or ductwork.
- C. Cracks, Voids or Holes Up to 4" Diameter: Use putty or calking, one-piece intumescent elastomer, non-corrosive to metal, compatible with synthetic cable jackets, and capable of expanding 10 times when exposed to flame or heat. UL-listed.
- D. Openings 4" or Greater: Use sealing system capable of passing 3-hour fire test in accordance with ASTM E-814, consisting of wall wrap or liner, partitions, and end caps capable of expanding when exposed to
- temperatures of 250 to 350 deg F (121 to 177 deg C), UL-listed. E. Execution: Fill entire opening with sealing compound. Adhere to manufacturer's installation instructions.

### 1.10 PRESSURE GAGES

- A. Manufacturers: Ashcroft Flo Fab Miljoco Palmer Wahl Tel-Tru Trerice – Watts – Weiss - Winters.
- B. Capacity: Anticipated pressure to be 50% of full scale unless otherwise indicated on the plans.
- C. Features: Phosphor bronze bourdon tube 4 1/2" diameter dial of white laminated phenol with black figures and graduation lines - nylon movement in rotary gear design - adjustable micrometer type pointer readily accessible from front of gage - black enameled cast - glass face window tightly constructed to be dust and moisture resistant - accuracy within 1/2 of 1% of scale range.
- D. Accessories: Pressure snubber utilizing porous metal filter to damper pulsations - syphon loop (steam duty only) - 1/4" brass T handle cock.
- 1.11 THERMOMETERS A. Manufacturers: Ashcroft - Miljoco - Palmer Wahl - Tel-Tru - Trerice -Weiss - Winters
- B. Capacity: Full range of anticipated temperatures or as indicated on plans. C. Features: Industrial glass thermometer - full 9" scale opening - metal scale with etched, scribed, or inlaid lines and figures vividly contrasting with background material - red reading mercury tube - heavy rattle proof glass cover to make unit dust and moisture resistant - non-corrosive steel bulb chamber - threaded connection - swivel and lock nut.
- D. Accessories: Separable socket on all liquid or vapor sensing thermometers - union connection on all air sensing thermometers.
- 1.12 EQUIPMENT SUPPORTS A. Provide each piece of equipment or apparatus suspended from ceilings or mounted above floor level with suitable structural support, platform or carrier in accordance with best recognized practice. All such supporting or mounting means shall be furnished by respective contractor who shall arrange for their inclusion and attachment to building structure, unless otherwise indicated on plans or herein specified. Contractors shall exercise extreme care that structural members of building are not overloaded by such equipment. In all cases details of such hangers, platforms, and supports, together with total weights of mounted equipment shall be approved by Architect-Engineer.
- 1.13 MOTORS A. Polyphase motors: NEMA MG 1, Design B medium induction motor, premium efficient, with 1.15 service factor. Multispeed motors shall have a
- separate winding for each speed. Bearings shall be regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading. Class B temperature rise with class F insulation. 3. Polyphase motors with additional requirements: With motors used with
- reduced voltage and multispeed controllers, match wiring connection requirements for controller with required motor leads. Motors used with variable frequency controllers shall have copper magnet wire windings, premium efficient motors shall be Class B temperature rise with Class F insulation, and inverter duty motors shall be Class F temperature rise with Class H insulation. All motors 10 HP and larger, driven by a variable frequency PWM drive shall include a factory installed maintenance free. circumferential, conductive micro-fiber or carbon brush shaft grounding ring to discharge shaft currents to ground. The conductive microfibers shall redirect shaft currents and provide a reliable, very low impedance path from shaft to motor frame by-passing motor bearings entirely. For vertical turbine pump motors, the upper shaft shall be provided with a coating to isolate the shaft from the bearings and the shaft grounding ring shall be installed within the motor casing. This information shall be provided with the shop drawing submittal for verification of method of installation and to ensure they are to be supplied. Comply with NEMA MG 1 for thermally protected motors.
- C. Single phase motors: Motors larger than 1/20 HP shall be permanent-split capacitor, split phase, or capacitor start. Multispeed motors shall be variable torque, permanent-split capacitor type. Bearings shall be prelubricated, antifriction ball bearings or sleeve bearings. Motors 1/20 HP and smaller shall be shaded pole type. All motors shall have internal automatic thermal protection calibrated to insulation temperature rating.
- 1.14 MOTOR STARTERS A. Unless specifically noted otherwise on the mechanical plans, or in the specifications, all motor starters shall be furnished and installed by the Electrical Contractor. Refer to the Electrical Specifications for Motor Starter requirements.
- 1.15 V-BELT DRIVES A. Capacity of V-Belt Drives at rated RPM shall be not less than 150 percent
- of motor nameplate horsepower rating. B. V-Belt Drive combinations shall be limited to A, B, C, and fractional
- horsepower belts. 3V, 5V, and 8V belts and sheaves shall not be used. C. Drives requiring single belt application shall be of the adjustable pitch type. Multiple belt drives shall be of the non-adjustable type. All fixed pitch sheaves, including single groove fan sheaves, shall be of the bushed type. Fixed bore sheaves will not be acceptable for non-adjustable pitch
- sheaves. 1.16 ACCESS DOORS
- A. Where valves, traps, dampers, devices or equipment of any kind is subject to service and maintenance are installed in inaccessible concealed spaces, access doors shall be furnished by the Mechanical Contractor and installed by the General Contractor. Doors shall be 12" x 12" for handhole and 24" x 24" for manhole where required.
- B. Doors shall be:
  - Milcor Style "K" in plastered wall or ceiling.
- Milcor Style "M" in masonry wall. Doors in unfinished walls to have a rustproof prime coat finish. Doors in tile finished walls shall be all stainless steel with satin finish.
- Milcor Style "DW" in drywall construction. 6. Fire rated doors - Milcor style as described above for various types of
- construction except with U.L. 1 1/2 hr. "B" label.
- C. Equivalent doors as manufactured by Bilco, J.L. Industries, MIFAB, Karp Assoc, Nystrom. 1.17 DRIP PANS
- A. Provide drip pans fabricated from corrosion-resistant sheet metal with watertight joints, and with edges turned up 2-1/2". Reinforce top, either by structural angles or by rolling top over 1/4" steel rod. Provide hole, gasket,
- and flange at low point for watertight joint and 1" drain line connection. B. Locate drip pans under piping passing within 3' horizontally of electrical equipment, and elsewhere as indicated. Hang from structure with rods and building attachments, weld rods to sides of drip pan. Brace to prevent sagging or swaying. Connect 1" drain line to drain connection, and run to nearest plumbing drain or elsewhere as indicated.

### **SECTION 200700 - INSULATION**

1.1 PIPE COVERING

- A. Manufacturers: Johns Manville Owens Corning CertainTeed Knauf. B. Features: All completed insulation of pipe and fittings shall have the following Underwriters Laboratories Fire Hazard Classification:
  - Flame spread not to exceed 25 2. Fuel contributed not to exceed - 50.
  - Smoke developed not to exceed 50.
- C. Four (4 lb.) density glass fiber insulation used for all pipe covering in this section shall have a maximum "K" factor of .23 at 75° F. mean temperature.
- D. Prepare all exposed insulated covering for painting. Apply insulation over clean dry surface. Butt all longitudinal joints tightly together. Insulate domestic hot and domestic cold water and condensate drains in their entirety. Rain leaders need not be insulated below grade.
- E. Domestic Water Pipe:
  - 1. Insulate Domestic Hot Water supply and Recirculating pipe up through 1-1/2" with 1" thick glass fiber pipe insulation. Insulate
  - piping 2" and larger with 1-1/2" thick insulation. 2. Insulate domestic cold water, interior rain leaders and
  - downspouts with 1" thick glass fiber pipe insulation.

![](_page_5_Figure_141.jpeg)

F.	<ul> <li>Hydronic Water Pipe:</li> <li>Insulate heating water supply and return piping through thick glass fiber pipe insulation and 2" or larger with 2"</li> </ul>	gh 1-1/2" with 1.5"	1.4 Al A.	JTOMATIC SPRINKLERS AND COMPONENTS Sprinklers should be installed in accordance with the lates
	<ol> <li>Insulate chilled water supply and return piping through thick glass fiber pipe insulation and 2" or larger with 2</li> </ol>	n 1-1/2" with 0.5"		Offices' Committee, governmental agencies, or similar org
G.	All pipe insulation to be covered with factory applied flame	retardant vapor	В.	Sprinkler Heads: Type and style as indicated or required b
	1. Interior concealed fittings and pipe hangers shall be in	s jacket or equal.		inch discharge orifice, for "Ordinary" temperature range. 1
	flexible glass fiber to a thickness equal to the adjoining Finish by spiral wrapping with white vinyl and apply a	g pipe insulation. brush coat of vapor		1. Rough brass upright, pendant, or pendant sidewall ty
	<ol> <li>barrier mastic. Childers CP-30 or equal.</li> <li>Interior exposed fittings shall be insulated with PVC fit</li> </ol>	tting covers		<ol> <li>be used in exposed areas without finished ceilings.</li> <li>White painted type heads and white coverplate shall</li> </ol>
	adjoining pipe insulation. Manville Zeston or equal.	equal to the /apor seal all joints		board ceilings and soffits, plaster ceilings, and lay-in a ceilings.
H.	with Childers CP-30 or equal. In finished rooms or areas where insulated pipes are subje	ect to abuse,		3. Sprinkler heads shall be located in straight line patter perpendicular to walls of room. Provide additional he
	additionally finish with .032 embossed aluminum jacketing jacketing for a distance of not less than 9 ft. up from finishe	or 30 mil PVC ed floor or to		above the required quantities for symmetrical installat to lights, structural and aesthetic elements. Particular
	finished ceiling level. Provide high density inserts at hanger locations between the	ne pipe and pipe		be exercised with regard to head locations in all gyp to ceilings, and aesthetic elements. Where lay-in ceiling
	shield for pipe sizes 4" and larger. Maintain a continuous through the hangers and match the jacketing of adjoining p	vapor barrier pipe insulation.		<ul><li>sprinkler heads shall be located in the exact center of</li><li>4. Furnish wall-mounted steel cabinet with hinged cover</li></ul>
	Outdoor Piping (exposed to weather): Use the same insulate exposed pipes carrying the same product and add: a jack	ation for interior et of .032		for minimum of six spare sprinklers plus sprinkler wre number of sprinklers required by NFPA 13 and sprink
	embossed aluminum with factory applies vapor barrier. Fin Foster Sealfas G-P-M 35-00 reinforced with Foster Mast-a	nish fittings with -Fab.		Include sprinklers and wrench for each type of sprinkl Project.
•	Refrigerant Suction Lines: insulate with 1" thick and conde with 1/2" thick Armstrong AP Armaflex, applied in strict acc	nsate drain lines ordance with	C.	Alarm Devices: Vane type waterflow detector, rated to 250 designed for horizontal or vertical installation – supervisory
	Armstrong Armaflex finish. Manville Aerotube or Owens-C	wo coats of white corning O.C. flexible	SECTI	electric alarm bell. ON 220400 - PLUMBING
EQI	tubing approved equal. JIPMENT		1.1 D( A.	OMESTIC WATER PIPING Domestic hot, cold and recirculated water pipe: Above gra
۱.	thick. Apply in accordance with manufacturers recommend	dations.		88 Type "L" hard drawn copper tube with wrought fittings. floors within the building use soft annealed Type "K" coppe
	Prepare all exposed insulated covering for painting. Apply clean dry surface. Butt all longitudinal joints tightly togethe	r insulation over	B.	fittings. Install water hammer arrestors per PDI-WH 201 and where
U(	CT WRAP INSULATION (EXTERNAL) Manufacturers: Johns Manville - CertainTeed - Owens Co	rning - Knauf.	C.	the plans. Test under 130 psi hydrostatic pressure.
	Insulate externally all concealed round ducts and rectangu ducts with 0.75-pound per cubic foot minimum density fibe	lar outdoor air rglass ductwrap	1.2 S/ A.	ANITARY WASTE PIPING Grade all waste piping less than 4" in diameter at a uniforr
	with a Foil-scrim Kratt vapor barrier applied with outward-c The duct insulation shall have Underwriters Laboratories fl	ame spread rating		than 1/4" per foot. Grade piping 4" diameter and greater 1 approval of Administrative Authority.
`	rating not to exceed 50.	- sinoke developed	В.	Install cleanouts at the base of all vertical stacks, changes where necessary for easy cleaning, and as indicated on the
'. 	damper sleeves to partitions.	Insulate fire	C. D.	Size cleanouts the full size of the pipe. Branch connections and changes in direction made with 4
)U( ۱.	Ductwork insulation minimum R-values to comply with the	latest adopted year		fittings or long sweep ells, except only that sanitary tees or may be used on vertical stacks and closet connections.
	adopted, utilize 90.1-2016 values: Exterior Ducts: R-12, Fu	illy Ducted	E. F.	Provide means for expansion in vertical stacks to roof. Extend vent stacks full size through the roof.
B.	Duct Wrap Insulation Thickness:		G	<ul> <li>Install vent connections on all fixtures, traps, and equipme the soil and waste system and extend vertical not less that</li> </ul>
DU	CTWORK SYSTEM	THICKNESS (IN.)	H.	floor line before connecting to any horizontal run. Use standard cast iron soil pipe and fittings with No-Hub jo
но Но	spital, Supply spital, Return, typical room temperature	None	I.	pipe within the building. Below grade waste pipe can be either cast iron as noted a
Ho Du	spital, Return, low room temperature	1.5	J.	Schedule 40 solid wall pipe PVC pipe with solvent welded Test soil, waste, and vent piping systems with 10 ft. water
Un	its (Entire coil must be insulated, including casing, ader, and return bends)	1.5	1.3 VI A.	INT PIPING Use cast iron pipe with no-hub joints.
	N 210500 – FIRE PROTECTION			<ol> <li>Schedule 40 solid wall PVC/DWV plastic pipe with so DWV fittings will be allowed only in ducted return app</li> </ol>
I GEI	NERAL REQUIREMENTS		1.4 TF	RAPS
Α.	Scope of the Work: The work shall include, but is not nece the Sprinkler Systems and any appurtenances common to	essarily limited to the systems,	A. B	fixtures and equipment.
	generally consisting of pipe, fittings, valves, hangers, cover cleaning, testing and such other work as is necessary and	ring, painting, specified or	D. C	placed as close to the fixture as possible.
	shown on the drawings. All areas are to be classed "ordin unless otherwise noted. Work shall be done by Licensed S	ary hazard" Sprinkler	о. П	shown on the plans.
\$.	Contractor. Shop Drawings: This Contractor shall submit complete spi	rinkler system	1.5 CI	-EANOUTS Manufacturers: Wade - Zurn - Josam - J. R. Smith - Mifab
	working plans showing sprinkler head locations, all piping l sizes, valves, alarms, fire department connections etc., as	locations and set forth in	B.	Accessible cleanouts shall be installed as required to clean waste lines at no greater than 100 ft, intervals. Plumbing 9
	National Fire Code 13. Shop drawings shall be sealed by a Protection Engineer in the State that the project is located.	a Licensed Fire Shop drawings		on the job shall mark in Red on Blue Line Drawings desire
	shall be submitted to the City Code Enforcement Authority Fire Department. After review by the Local Code Enforcem	and the Local nent Authority,	C.	Cleanouts in floors shall be submitted to architect and eng
	the Contractor will make any changes and/or additions to t system which the City Code Enforcement Authority or Fire	he plan and Department	D. 16 DI	Accessories: Clamping collar required in all locations.
). ).	deem necessary. Submit final approved plans to Owners I Piping systems shall be hydraulically designed per NFPA-	Representative. 13. Calculations	A.	Manufacturers: Wade - Zurn - Josam - J. R. Smith - Mifab General Floor Drains: Cast iron floor drain with seepage fl
D.	for hydraulic designed system shall be submitted with shop Regulations and Permits: All work under this section of the	o drawings. e specifications	2.	nickel bronze strainer. 2" outlet shall have a 5" strainer, 3" a 6" strainer. 4" outlet shall have an 8" strainer.
	shall comply with all laws, ordinances, rules and regulation authorities having jurisdiction and fire protection layout acc	s of the local cording to NFPA,	C.	Accessories: Trap guard on all floor drains subject to evap Set or equivalent. Cast iron soil-P-trap, deep seal. Backw
	Pamphlet #13 and the associated Factory Mutual's approv subject to the inspection and approval of the authorities ha	al and shall be	SECTI	drains installed below grade as required.
	not withstanding anything in this specification to the contra Contractor for the work, under this Division of the specifica	ry. The tions, shall		
	obtain and pay for all permits required to initiate and comp under this contract.	lete the work	1.1 FL A.	All fixtures shall be furnished complete with trim. All expos
	Approval: The sprinkler system shop drawings shall be ap Local Fire Department and the insuring agency, or as requ	proved by the ired by the		without pit holes or blemishes and the outlines shall be ge
F.	insuring agency before work shall begin on any part of the Fire Protection Equipment Guaranteed: All equipment and	systems. components	B	faulty.
	(1) year from the date of acceptance. Failures of any part	of the	D.	supports. Nipples through the wall to the fixture connectio
	guaranteed equipment during the guarantee period shall b replaced with new parts by and at the expense of the Cont	e promptly tractor.		is finished. All fixtures fitting against walls shall have group fixtures shall be cleaned before setting, and the installation
SYS A.	STEM DESCRIPTION Wet Pipe: System with automatic sprinklers attached to pi	ping system	C	ready for use.
	containing water and connected to water supply so that wa immediately from sprinklers when they are opened by fire.	ater discharges A wet pipe	0.	per ADA Standards for Accessible Design. Insulate hot wa
IP	system shall be utilized at all areas, unless noted otherwise E APPLICATIONS	e.	D.	Fixtures indicated on the plans must be set and all plumbin
	Wet pipe sprinkler system piping 2" and smaller shall be or following:	ne of the	1.2 PL	LUMBING FIXTURE SCHEDULE
	<ol> <li>Standard weight ASTM A53/A53M, Type E, Grade B with threaded ends, gray iron threaded fittings, and th</li> </ol>	black steel pipe readed joints.	А. D	Zurn - Sloan.
	<ol> <li>Standard weight ASTM A53/A53M, Type E, Grade B with plain ends, steel welded fittings, and welded joint</li> </ol>	black steel pipe ts.	C.	Faucet Manufacturers: Delta – Kohler – Chicago Faucets
	<ol> <li>Thinwall ASTM A135 Schedule 10 black steel pipe wi welded fittings, and welded joints.</li> </ol>	th plain ends,	D.	Standard - Zum - Stoan. Service Stops: All lavatories, sinks, and tank type closets
В.	Wet pipe sprinkler system piping 2-1/2" and larger shall be following:	one of the		and flexible risers.
	1. Standard weight ASTM A53/A53M, Type E, Grade B with cut or roll grooved ends, uncoated grooved end f	black steel pipe ittings for steel		
	piping, grooved end pipe couplings for steel piping, an joints.	nd grooved		
	2. Standard weight ASTM A53/A53M, Type E, Grade B with plain ends, steel welded fittings, and welded joint	black steel pipe ts.		
	3. Thinwall ASTM A135 Schedule 10 black steel pipe wi ends, uncoated grooved end fittings for steel piping, c	th roll grooved prooved end pipe		
	<ul><li>couplings for steel piping, and grooved joints.</li><li>4. Thinwall ASTM A135 Schedule 10 black steel pipe wi</li></ul>	th plain ends,		
	welded fittings, and welded joints.	,		

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ONENTS	SECTION 226000 MEDICAL CAS SYSTEMS	1.3 HYDRONIC SYSTEM TEST AND BALANCE PROCEDURE
ction Association, Factory Mutual, Fire gencies, or similar organizations and to	1.1 BASIC PIPES AND PIPE FITTINGS A. Vacuum Piping, All Sizes: Seamless Copper tube, hard-temper for exposed	<ul> <li>A. Procedure:         <ol> <li>Adjust pumps to deliver total design GPM.</li> <li>a. Measure total water flow and pump TDH.</li> <li>2. Adjust flow-measuring devices installed in mains and branches (</li> </ol> </li> </ul>
indicated or required by the ited, provide heads with nominal 1/2- temperature range. 165°F	locations, Type "L"; or ACR (ASTM B-280) wrought-copper, solder-joint fittings; brazed joints, copper-phosphorus alloy (BCu Series) brazing filler metal.	available) to design water flows. 3. Adjust flow-measuring devices installed at terminals for each space to design water flows.
or pendant sidewall type heads shall out finished ceilings. white coverplate shall be used in all gyp	<ul> <li>B. Oxygen, and Medical Air, all Sizes: Copper tube, factory cleaned and capped; Type K or L (ASTM B819), and shall bear one of the following markings: OXY, MED, OXY/MED, ACR/OXY, or ACR/MED. Each length of tube shall be permanently labeled, fittings, valves and other devices shall be sealed and marked. Brazed joints, copper-phosphorus alloy (BCu Series)</li> </ul>	<ul> <li>4. Verify final system conditions.</li> <li>5. Verify that memory stops have been set and marked with permanent paint or marker.</li> <li>B. If any issues arise during the test and balance procedure that prevent it from being properly completed, bring issues to owner and engineer before.</li> </ul>
or pendat sidewall type heads shall up trinished ceilings. white coverplate shall be used in all gyp or ceilings, and lay-in acoustical tile d in straight line pattern parallel and/or Provide additional heads over and or symmetrical installation with regard c elements. Particular attention shall d locations in all gyp board soffits, s. Where lay-in ceiling tile occurs, in the exact center of the tile. inter with highed cover, and with space lers plus sprinkler wrench. Include y NFPA 13 and sprinkler wrench. or each type of sprinkler used on weter pipe: Above grade use ASTM B method type "K" copper tubing with no PDI-WH 201 and where indicated on ure. In diameter at a uniform fall of not less flameter and greater 1/8" per foot with rtical stacks, changes in direction, and as indicated on the plans. Ise. direction made with 45 degree "Y" ly that sanitary tees or short sweep ells coset connections. Is straps, and equipment connected to d vertical not less than 3"-6" above the orizontal run. fittings with No-Hub joints for waste ar cast iron as noted above or e with solvent welded DWV fittings. teams with 10 ft. water column. . You furnished in combination with the e connections with a water sealed trap sible. . Is, condensate drain boxes, and where hall be of chromium plated cast brass. . n - J. R. Smith - Mifab. d arequired to lean all horizontal . intervals. Plumbing Superintendent Line Drawings desired locations and se locations by the Architects Inspector. d to architect and engineer for review mittal. . drain subject to evaporation by Pro ap, deep seal. Backwater valves on all red. . <b>ND TRIM</b> the with trim. All exposed trim shall be shall be of the best grade utireous ware the outlines shall be generally true. The any pieces which, in his opinion are . with solid backing behind lavatory to the fixture contexton shall be alter . In J. R. Smith - Mifab. d rain with seepage flange and round have a 5" strainer. 3' outlet shall be installed beign. Insulate hot water and drain any and the installed bef	<ul> <li>B. Oxygen, and Medical Air, all Sizes: Copyrent Like, factory desined and a capetity Type K for L (ASM BBD), and shift base must be fasting and the cover shall be sealed and marked. Brazed joints, coocer-phosphora. Bally (BC) Series)</li> <li>C. brazing file metail. Minimum 1000<sup>-7</sup> multips and other devices shall be sealed and marked. Brazed joints, coocer-phosphora. Bally (BC) Series)</li> <li>D. Medical jass system instaters must be ASSE 6010 qualified.</li> <li>MEDICAL GN VALVING.</li> <li>M. All values and Lubra shall be specifically popared for oxygen service and shall compare hubring status to NFPA 99. All values shall be charged status where shall be the shall of the status shall be constructed of PSG, clusters to m141 "CN" to 141 "CPT" by 90 degree turn of vinyi grapped value handle. Factory measible on a dista values shall be constructed of 16 gauge sheet state with all disk distatus. The marke shall be constructed of 16 gauge sheet state with all disk distatus. The mark shall be respectively be gain assessing with a shall be constructed of 16 gauge sheet state with all disk distatus. The mark shall be respectively be gain assessive, the area controlled by the value shall be constructed of 16 gauge sheet state with all disk distatus. The mark shall be shall be constructed of 16 gauge sheet state with all disk distatus. The mark shall be constructed of 16 gauge sheet state with all disk distatus. The mark shall be constructed of 16 gauge sheet state with a disk distatus. The source window with pluring. The state state with all disk distatus. The mark shall be constructed of 16 gauge sheet state state with a disk distatus. The source window with pluring. The state state with all disk distatus. The mark shall be constructed of 28 with the constructed of 16 gauge sheet state state with all disks distatus. The mark shall be constructed and with which with the shall be source withow with pluring. The source with all disks distatus and with the sown with the source withow with th</li></ul>	<ol> <li>Verity frain any space have been set and marked with permenent paint or marker.</li> <li>I verity frain any space base base and marked with permenent paint or marker.</li> <li>I ADAF FLE</li> <li>I any space frain any space base base based indicating A non-paint based states based indicating indicating for statistics or uper sector and devices based indicating any space based base</li></ol>
		<ul> <li>A. Manufacturers: Titus - Krueger - Price</li> <li>B. Capacity: As indicated on drawings.</li> <li>C. Accessories: As scheduled on the drawings for finish, opposed blade dampers, borders, directional vanes, etc.</li> </ul>

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	1.7	MANUAL VOLUME DAMPERS (UNDER 1500 FPM) A. Manufacturers: Air Balance Inc Ruskin - Carnes - Nailor – Greenheck –	
anches (if		Pottorff –McGill Airflow or equivalent. B. Features: 20 gauge min. galvanized steel blades - 20 gauge min. galvanized steel frame with blade stops - noncorrosive bearings (Oilite or	
each		Nylon) - rectangular dampers to have blade linkage concealed in frame - full width 3/8" minimum square cadmium plated steel axle shaft extending	
th		frame to allow for insulation. C. Single blade dampers may be used for duct sizes of 12" high x 36" wide	
vent it		and less. Sizes greater than 12" high or 36" wide shall be multiple opposed blade dampers.	
fore	1.8	SINGLE DUCT CONSTANT AND VARIABLE VOLUME AIR TERMINAL UNITS A. Manufacturers: Krueger – Titus – Trane - Price B. Capacity: As scheduled on plans.	
dicating		C. Features: Minimum 22 gage galvanized steel casing with minimum 1/2 inch thick fiber insulation meeting NFPA 90A and UL 181 requirements –	
ral of the chanical Ils		airflow measuring ring inside casing with balancing test ports – galvanized steel volume damper with gasket and self-lubricating bearings – multi-point flow sensor – 24 volt electric actuator – factory installed low voltage control transformer and disconnect switch – DDC controller and damper actuator	
itenance these		<ul> <li>D. Hot Water Heating Coil: 1/2 inch copper tube mechanically expanded into aluminum plate fins, leak tested under water to 200 psig pressure, factory</li> </ul>	
/ith	SEC	Installed. CTION 230923 - TEMPERATURE CONTROL SYSTEMS	
blished by	1.1	SYSTEM SUMMARY	
		A. The intent of this specification is to provide control strategies for expanding the existing BAS system, and utilizing the same software license agreement for the applications. All equipment as listed on the mechanical drawings/control drawings above to be controlled by the BAS system aboli drawings/control drawings above to be controlled by the BAS system aboli drawings/control drawings.	
ctwork	1 0	adhere to this specification. Temperature controls shall match existing.	
eater than	1.2	A. The Building Automation System (BAS) herein specified shall be fully integrated and installed as a complete package by the Temperature	
n a 2" w.c.		Controls Contractor. The system must be fully compatible with the current	
with		conduit, installation supervision, calibration, adjustments, and checkout necessary for a complete and fully operational system.	
bint	1.3	MATERIALS AND EQUIPMENT A. General: Provide temperature control products in sizes and capacities	
nply with ible" and Schedule"		indicated consisting of valves, dampers, thermostats, clocks, sensors, controllers, and other components as required for complete installation. Except as otherwise indicated, provide manufacturer's standard materials and components as published in their product information; designed and	
restraints		constructed as recommended by manufacturer, and as required for application indicated.	
es within		B. Control Valves: Provide selection as determined by manufacturer for installation requirements and pressure class, based on maximum pressure and temperature in piping system. Provide valve size in accordance with	
comply		scheduled or specified maximum pressure drop across control valve. Equip control valves with electric actuators, with proper shutoff rating for each individual application.	
uired to ventilating ers, access		C. Thermostats: Thermostats shall be a similar style to existing installed in the facility. Provide 7-day programmable thermostat with fan on/auto and heat/auto/cool switches for automatic heating and cooling operation.	
the		Program thermostat for continuous fan operation during occupied periods. Thermostat shall be capable of operating multiple heating and/or cooling stages as scheduled	
ruction		<ul> <li>D. Control Wiring:</li> <li>1 Provide and install all low-voltage wiring required for temperature</li> </ul>	
e local ors		control systems under this section excluding power feeder wiring.	
andards		<ol> <li>All wiring and installation shall be in accordance with the Electrical Specifications.</li> </ol>	
Foil-Grip" based	1.4	<ul> <li>A. Owner's Instructions: Provide services of manufacturer's technical representative to instruct Owner's personnel in operation and maintenance of control systems.</li> </ul>	
(HETO),	SEC	CTION 232113 – HYDRONIC PIPING	
)	1.1	HEATING WATER AND CHILLED WATER A. Install black steel pipe with threaded joints and fittings for 2 inch and	
on and ot changes		<ul> <li>smaller, and with welded joints for 2-1/2 inch and larger.</li> <li>B. At Contractors option in lieu of black steel, install Type L, drawn copper tubing with wrought copper fittings and solder joints for 2 inch and smaller,</li> </ul>	
r heavier	1.2	AND A Second American Anticipation and a second a secon	
		<ul> <li>B. Install drains at low points in mains, risers, and branch lines consisting of a tee fitting, 3/4" ball valve, and short 3/4" threaded nipple and cap.</li> <li>C. Install piping at a uniform grade of 1 inch in 40 feet upward in the direction</li> </ul>	
ing,		of flow. D. Install unions in pipes 2 inch and smaller, adjacent to each valve, at final connections to each piece of equipment, and elsewhere as indicated.	
nall be esistant,		Unions are not required on flanged devices. E. Install nipples or flanges to join dissimilar metals, including conner coil	
s o Dyne,		connections with steel pipe. F. Install strainers on the supply side of each control valve, pressure reducing	
l" long, ade with tion.		valve, pressure regulating valve, solenoid valve, inline pump, and elsewhere as indicated. G. Install drain valves at low points in mains, risers, branch lines, and	
		elsewhere as required for system drainage. H. Install manual air vents at high points in the system, at heat transfer coils.	
e class	1.3	and elsewhere as required for system air venting. PRESSURE INDEPENDENT CONTROL VALVES	
MACNA's 2-1, oplicable		A. PICV's are acceptable on this project. Refer to Section 200600 for more information.	
nd other letal and			
to ible,"			
ssure upport			

mended re rating of over 50. rted by Aluminized 2 inch wg or each igs.

dance with

![](_page_6_Figure_8.jpeg)

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![](_page_7_Picture_2.jpeg)

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### PLUMBING GENERAL NOTES

- 1. REFER TO THE PLUMBING FIXTURE SCHEDULE FOR PIPE SIZES TO INDIVIDUAL FIXTURES. NOT ALL REQUIRED CLEANOUTS ARE NECESSARILY SHOWN ON THESE PLANS. PROVIDE CLEANOUTS ON WASTE, VENT AND STORM PIPING AS REQUIRED BY
- CODE AND FOR REASONABLE MAINTENANCE BASED ON ACTUAL FIELD INSTALLATION. . PIPING ON EXTERIOR WALLS OR PRE-CAST WALLS TO BE ROUTED IN FRAMED WALL ON INTERIOR SIDE OF
- INSULATION. AVOID ROUTING OVER ELECTRICAL ROOMS AND ELECTRICAL PANELS; MAINTAIN N.E.C. CLEARANCES. COORDINATE ROUTING WITH ELECTRICAL
- CONTRACTOR. ROUTE DOMESTIC HOT WATER RECIRCULATION PIPES DOWN THE WALL TO WITHIN 2' OF ALL PUBLIC LAVATORIES WITH A 1/2" RUNOUT. IF TWO OR MORE LAVATORIES SHARE A ¾" OR LARGER BRANCH PIPE, THE HOT WATER RECIRCULATION PIPE SHALL CONNECT
- TO WITHIN 6" OF EACH LAVATORY. 6. ALL VALVES SHALL BE INSTALLED ABOVE DROP-IN CEILINGS IN ACCESSIBLE LOCATIONS, OR WITH ACCESS PANELS IN HARD LID CEILINGS.
- ACCESS PANELS SHALL BE 24x24, UNLESS NOTED OTHERWISE. LOCATIONS SHOWN ARE APPROXIMATE, EXACT LOCATIONS SHALL BE COORDINATED WITH THE ARCHITECTURAL DRAWINGS AND EQUIPMENT LOCATIONS. PROVIDE RATED ACCESS PANELS
- WHEREVER REQUIRED BY APPLICABLE CODES. ALL PIPING SHALL BE ROUTED AS HIGH AS POSSIBLE IN THE CEILING SPACE. UTILIZE JOIST SPACE WHEN POSSIBLE, ESPECIALLY WHERE CROSSING OTHER
- PIPES, DUCTS AND ELECTRICAL. 9. PROVIDE ACCESSIBLE SHUT-OFF VALVES TO ALL APPLIANCES AND EQUIPMENT. 10. COORDINATE ROUTING OF CONDENSATE DRAIN LINES
- WITH OTHER TRADES PRIOR TO INSTALLATION TO ENSURE SLOPE CAN BE MET. 1. VERIFY AND REFER TO ARCHITECTURAL DIMENSIONAL FLOOR PLAN FOR EXACT LOCATIONS OF ALL FIXTURES AND EQUIPMENT.

## **# SHEET KEYNOTES**

- 1 CONTRACT TO CONNECT COLD WATER, HOT WATER, AND HOT WATER RECIRCULATION PIPING TO EXISTING PIPING THE VICINITY. CONTRACTOR TO FIELD VERIFY
- EXACT LOCATION PRIOR TO BID. CONTRACTOR TO CONNECT SANITARY SEWER AND VENT PIPING TO EXISTING PIPING THE VICINITY.
- CONTRACTOR TO FIELD VERIFY EXACT LOCATION PRIOR TO BID.

![](_page_7_Figure_17.jpeg)

![](_page_7_Figure_20.jpeg)

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![](_page_8_Picture_2.jpeg)

![](_page_8_Picture_3.jpeg)

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### MED GAS GENERAL NOTES

- I. PLANS ARE SCHEMATIC IN NATURE. LAYOUT IS BASED ON BEST AVAILABLE INFORMATION. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS.
- ALL CUTTING, PATCHING, AND DEMOLITION WORK SHALL BE CLOSELY COORDINATED WITH THE EXISTING CONDITIONS AND THE REQUIRED NEW WORK. G.C. SHALL PATCH AND FINISH PENETRATIONS OF EXISTING SURFACES TO MATCH ADJACENT SURFACES.
- FIELD VERIFY BEST ROUTING FOR NEW PIPING AND DUCTWORK. COORDINATE WITH EXISTING EQUIPMENT, PIPING, AND DUCTWORK. PIPING SHALL RISE AND DROP, JOG OR OFFSET AS REQUIRED TO AVOID CONFLICTS. DUCTWORK SHALL TAKE PRECEDENCE OVER ALL PIPING, EXCEPT WHERE GRADE MUST BE MAINTAINED FOR DRAINAGE. ANY EXPENSES RISING FROM LACK OF COORDINATION SHALL BE MADE AT THE
- CONTRACTOR'S EXPENSE. REFER TO ARCHITECTURAL SPECIFICATIONS AND PLANS FOR PHASING OF DEMOLITION AND NEW WORK. ADJACENT AREAS ARE OCCUPIED AND CONTRACTOR SHALL WORK CLOSELY WITH OWNER TO SCHEDULE DEMOLITION AND CONSTRUCTION TO BE AS LEAST DISRUPTIVE AS POSSIBLE.
- **# SHEET KEYNOTES**
- CONTRACTOR SHALL CONNECT NEW MEDICAL GAS PIPING TO EXISTING PIPING IN VICINITY. FIELD VERIFY EXACT LOCATIONS PRIOR TO BID.

![](_page_8_Figure_11.jpeg)

![](_page_8_Figure_14.jpeg)

	PLUMBING FIXTURE SCHEDULE																	
						MATERIAL AND FINISH	TRIM					FLOW			PIPE RUN	OUT SIZES		
MARK	DESCRIPTION	MANUFACTURER	MODEL	DIMENSIONS	ADA COMPLIANT		MANUFACTURER	MODEL	FINISH	CONTROL TYPE	POWER	GALLONS PER MINUTE (GPM)	GALLONS E PER FLUSH (GPF)	COLD WATER	HOT WATER	WASTE	VENT	SPECIFICATION
LV-3	LAVATORY - WALL HUNG - MANUAL	AMERICAN STANDARD	NO. 0355.012 "LUCERNE"	20-1/2" x 18-1/4"	YES	WHITE VITREOUS CHINA	CHICAGO FAUCET	NO. 895-GN2FC-317-XK		MANUAL		1.2		1/2"	1/2"	2"	1-1/2"	WALL HUNG LAVATORY WITH 3 HOLES ON 4" CENTERS - 4" WRIST BLADE HANDLES WITH CERAN CARTRIDGE AND FLOW CONTROL. AMERICAN STANDARD NO. 2411.015 AMERICAN STANDARD N 2411.015 PERFORATED GRID STRAINER DRAIN WITH 1-1/4" TAILPIECE. DEARBORN NO. 510 1-1/2" GAUGE "P" TRAP WITH ADAPTER FOR 1-1/4" TAILPIECE, CLEANOUT AND ESCUTCHEONS. DEARE 2712 KCW HOTAND COLD WATER COMPRESSION INLET SUPPLIES WITH STOPS. PROVIDE TRUE "LAVSHIELD" PVC ENCLOSURE MODEL 2018-AS-L1.
SK-3	SINK-INTEGRAL WITH COUNTERTOP						CHICAGO FAUCET	895-317XKCPR		MANUAL		1.0		1/2"	1/2"	2"	1-1/2"	INTEGRAL WITH COUNTERTOP - ELKAY NO. LK08 C.P. BRASS GRID STRAINER AND 1-1/2" C.P. BA TAILPIECE. CHICAGO FAUCET NO. 895-317XKCPR FAUCET, 4" CENTERS, NO. GN2A 5-3/8" SPOUT, 4" WRIST BLADE HANDLES AND "FC" FLOW CONTROL DEVICE. DEARBORN NO. 510-17GAUGE 1-1 TRAP WITH CLEANOUT AND ESCUTCHEON, DEARBORN NO.2712 KCW HOT AND COLD WATER COMPRESSION INLET SUPPLIES WITH STOPS.

## **MEDICAL GAS CONNECTION SCHEDULE**

REMARKS: 1. WHERE ZONE VALVE BOXES OR AREA ALARM PANELS ARE LOCATED IN SMOKE WALL, PROVIDE APPROPRIATE PROTECTION AROUND THE BOX TO MAINTAIN THE RATING. A. INDICATE ABNORMAL PRESSURE.													
			PIPING	CONNECTIO	ONS (IN)	A	ARM SIGN						
MARK	MFR.	LOC.	OXYGEN	VACUUM	MEDICAL AIR	OXYGEN	VACUUM	MEDICAL AIR	REMARKS				
AAP-1	BEACON MEADES	NURSE STATION				Α	А	А					
ZVB-1	BEACON MEADES	CORRIDOR 1B060	1/2	3/4	1/2				1				

## **MEDICAL GAS OUTLET SCHEDULE**

REMARKS:

 MINIMUM RUNOUT SIZE TO BRANCH MAIN TO BE 1/2" FOR OXYGEN AND MED AIR; 3/4" FOR VAC.
 LOCATE A VACUUM SLIDE AT EACH VACUUM WALL TERMINAL. 3. SEE ARCHITECTURAL DRAWINGS FOR EXACT LOCATION FOR MEDICAL GAS WALL OUTLETS.

5

MARK	MFR.	OXYGEN (O2)	VAC (VAC)	MEDICAL AIR (MA)	REMARKS
MGO-1	BEACON MEADES	2	2	2	1-3

6

4

4

![](_page_9_Figure_12.jpeg)

NO SCALE

![](_page_9_Figure_14.jpeg)

![](_page_10_Figure_1.jpeg)

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![](_page_10_Picture_2.jpeg)

![](_page_10_Picture_4.jpeg)

3

![](_page_10_Picture_5.jpeg)

### HVAC GENERAL NOTES

- DUCT SIZES SHOWN ARE ACTUAL INSIDE CLEAR DIMENSIONS. INSULATION THICKNESS HAS NOT BEEN ACCOUNTED FOR. DUCTWORK EXPOSED TO SPACE SHALL NOT HAVE EXTERIOR INSULATION. T-STATS, HUMIDISTATS AND CO2 SENSORS SHALL BE
- LOCATED NEXT TO LIGHT SWITCH WITHIN THE ROOM SHOWN. COORDINATE WITH GC AND ELECTRICAL CONTRACTOR TO MATCH HEIGHT AND LOCATION. AVOID ROUTING DUCTWORK OVER ELECTRICAL ROOMS AND ELECTRICAL PANELS. MAINTAIN N.E.C.
- CLEARANCES. COORDINATE ROUTING WITH ELECTRICAL CONTRACTOR. ALL SUPPLY AND EXHAUST AIR BRANCHES FOR DIFFUSERS OR GRILLES SHALL HAVE MANUAL BALANCE
- DAMPERS. RETURN AIR BRANCHES SHALL HAVE MANUAL BALANCE DAMPERS EXCEPT IN THE CASE OF RETURN AIR PLENUM. FOR PLAN CLARITY, NOT ALL DAMPERS MAY BE SHOWN. WHERE HARD LID CEILINGS PREVENT BALANCE DAMPER ACCESS, CONFIRM WITH GRD SCHEDULE OR CONFIRM WITH ENGINEER TO USE OBD'S OR REMOTE
- BALANCE DAMPERS IF NOT ALREADY INDICATED. ALL DUCTWORK SHALL BE ROUTED AS HIGH AS POSSIBLE WITHIN THE CEILING SPACE. UTILIZE JOIST SPACE WHERE POSSIBLE, ESPECIALLY WHEN CROSSING OTHER DUCT, PIPE, AND ELECTRICAL. PROVIDE FLEXIBLE DUCT AND PIPE CONNECTIONS TO
- ALL MOTORIZED EQUIPMENT. VERIFY ALL EQUIPMENT ACCESS PANELS WITH MANUFACTURER AND ARCHITECT. ACCESS PANELS SHALL BE 24X24 UNLESS NOTED OTHERWISE LOCATIONS
- SHALL BE COORDINATED WITH THE ARCHITECT AND THE LOCATIONS OF THE EQUIPMENT THEY SERVE. REFER TO GRD SCHEDULE FOR DUCT CONNECTION SIZES. REFER TO TERMINAL BOX SCHEDULE FOR INLET
- DUCT SIZES. CEILING COORDINATION OF ALL MEP SYSTEMS (LIGHTING, DUCTWORK, DIFFUSERS, ELECTRICAL, ETC.) MUST BE COMPLETED BY THE CONTRACTOR PRIOR TO THE START OF ANY NEW INSTALLATION.

### **#** SHEET KEYNOTES

DEMOLISH EXISTING DUCTWORK TO POINT SHOWN AND CAP. SEAL PER SMACNA REQUIREMENTS. DEMOLISH EXISTING DUCTWORK TO POINT SHOWN AND PREPARE FOR NEW CONNECTION.

12x12 <u>B1-1B053B-E</u> EXISTING ELEC (1B053C) B1-B053C-E RA10 200

![](_page_10_Figure_19.jpeg)

![](_page_11_Figure_2.jpeg)

![](_page_11_Figure_3.jpeg)

5

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![](_page_11_Picture_5.jpeg)

3

### MECH. PIPING GENERAL NOTES . PIPING ON EXTERIOR WALLS OR PRE-CAST CONCRETE WALLS TO BE ROUTED IN FRAMED WALL ON INTERIOR SIDE OF INSULATION. AVOID ROUTING PIPING OVER ELECTRICAL ROOMS OR ELECTRICAL PANELS; MAINTAIN N.E.C. CLEARANCES. COORDINATE ROUTING WITH ELECTRICAL CONTRACTOR. PROVIDE FLEXIBLE PIPE CONNECTIONS TO ALL MOTORIZED EQUIPMENT. VERIFY ALL EQUIPMENT ACCESS PANELS WITH MANUFACTURER AND ARCHITECT. REFER TO TERMINAL BOX SCHEDULE FOR ALL BRANCH HEATING WATER PIPE SIZES. ALL VALVES SHALL BE INSTALLED ABOVE DROP-IN CEILINGS IN AN ACCESSIBLE LOCATIONS, OR WITH ACCESS PANELS IN HARD LID CEILINGS. ACCESS PANELS SHALL BE 24X24 UNLESS NOTED OTHERWISE COORDINATE PANEL LOCATIONS WITH ARCHITECT. CONTRACTOR SHALL MAINTAIN MINIMUM 4" CLEAR ABOVE LAY-IN CEILINGS. **#** SHEET KEYNOTES

DEMOLISH EXISTING HYDRONIC PIPING TO POINT

SHOWN AND CAP AND SEAL.

![](_page_11_Figure_7.jpeg)

## FIRST FLOOR MECHANICAL PIPING PLAN-NEW WORK

![](_page_11_Figure_10.jpeg)

CALIBRATED BALANCING VALVE-RETURN-

SUPPLY-

NOTES

![](_page_12_Picture_5.jpeg)

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![](_page_12_Picture_6.jpeg)

╰╴╼┵╺Ѻ╾╺╧╧┲╴╸┥│┝╴╸╼╳╦╸╸┥│┝╺╴┾<sup>┯</sup>┽╺╴┥║║┝╺╴┾<sup>┯</sup>┽╺╴┥│┝╶┟╳╶┨╵ STRAINER WITH BLOWDOWN VALVE, HOSE THREAD AND CAP -FLEX CONNECTION -ISOLATION VALVE, 2" AND BELOW BALL VALVE, 2-1/2" AND ABOVE BUTTERFLY VALVE, TYP.

Δ

1. FLEXIBLE PIPE CONNECTOR REQUIRED FOR EQUIPMENT CONTAINING FANS OR COMPRESSORS, BUT NOT REQUIRED FOR EQUIPMENT SUCH AS DUCT COILS. BRAIDED STAINLESS OR COPPER ONLY, NO RUBBER ALLOWED. MAX LENGTH OF 6 INCHES. 2. PIPE ALL MULTI-ROW COILS FOR COUNTERFLOW (WATER ENTERS MOST DOWNSTREAM COIL LEAVES MOST UPSTREAM COIL).

3. REFER TO CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION. 4. 2-WAY VALVE NORMALLY OPEN FOR HEATING AND NORMALLY CLOSED FOR COOLING. 5. CONFIRM SUPPLY AND RETURN CONNECTION LOCATIONS WITH EQUIPMENT MANUFACTURER

PRIOR TO INSTALLATION. 6. MEET MANUFACTURER'S REQUIREMENTS FOR ACTUATOR CLEARANCES AND STEM ORIENTATION. 7. COORDINATE PIPING LOCATION WITH EQUIPMENT ACCESS DOORS, ELECTRICAL JUNCTION BOXES AND DRAIN PIPING.

8. HYDRONIC PIPING SHALL BE MAINTAINED FULL SIZE UP TO COIL CONNECTIONS. SHUT-OFF VALVES, STRAINERS, BALANCE VALVES, ETC. WILL NOT BE ALLOWED TO REDUCE FROM LINE SIZE. CONTROL VALVES MAY BE DOWN SIZED FOR FLOW RATE, BUT NOT TO EXCEED 4 PSIG PRESSURE DROP AT DESIGN FLOW.

### **COIL PIPING DETAIL - TERMINAL UNIT-2-WAY**

4

![](_page_12_Picture_14.jpeg)

LOW VELOCITY SUPPLY AIR DUCT SEE FLOOR PLANS FOR SIZE AND ROUTING. TRANSITION AS REQUIRED TO MATCH BOX OUTLET SIZE-

## **TERMINAL UNIT REHEAT DETAIL NO SCALE**

FLEX DUCT REFER TO SPECIFICATIONS FOR MAX. ALLOWABLE LENGTH (TYPICAL)-

![](_page_12_Picture_19.jpeg)

![](_page_12_Picture_20.jpeg)

## **GRILLE, REGISTER, AND DIFFUSER SCHEDULE**

- NOTES:
- 1. PROVIDE SQUARE TO ROUND ADAPTERS AS REQUIRED TO ACCOMMODATE ROUND RUNOUTS.
- 2. PROVIDE ALL LAY-IN GRDs WITH 24x24 LAY-IN PANEL AS REQUIRED. 3. FINISH TO BE WHITE UNLESS OTHERWISE SPECIFIED. COORDINATE AND VERIFY ALL FINISHES WITH ARCHITECT.
- 4. ALL SELECTIONS ARE BASED ON A MAXIMUM NC OF 25 UNLESS NOTED OTHERWISE.
- 5. CONTRACTOR SHALL VERIFY ALL CEILING TYPES AND ASSOCIATED BORDER TYPES. 6. MARKS USED MAY NOT BE IN SEQUENCE.

U = FLOOR MOUNTED SUPPLY GRILLE

IMAG

FIRST LETTER IN MARK

S = SUPPLY DIFFUSER R = RETURN GRILLE

E = EXHAUST GRILLE

L = SLOT DIFFUSER

C = SECURITY GRILLE

MARK

RA

<u>REMARKS:</u>

MARK

P = PLENUM RETURN GRILLE

M = LAMINAR FLOW SUPPLY DIFFUSER

TYPE

**RETURN GRILLE** 

BASED ON

MFR MODEL

B1-1B053A TITUS DESV 6 B1-1B053B TITUS DESV 5 B1-1B053B-E TITUS DESV 5 B1-B053C-E TITUS DESV 4

SIZE

SJ SUPPLY DIFFUSER

7. LOUVERED GRILLES TO HAVE FRONT BLADES PARALLEL TO LONG DIMENSION UNLESS WALL MOUNTED. 8. WALL MOUNTED LOUVERED GRILLES TO HAVE FRONT BLADES PARALLEL TO FLOOR.

	BASED ON		MOUNT	PANEL SIZE		<b>BLADE SPACING /</b>			DEMADKS			
	MFR	MODEL		(FACE SIZE)		SLOT WIDTH	DEFLECTION	COLUK				
r I	TITUS	omni-aa	LAY-IN	24x24	ALUMINUM			WHITE				
	TITUS	350FL	LAY-IN	24x12 (22x10)	ALUMINUM	3/4"	35°	WHITE				

## **TERMINAL UNIT SCHEDULE**

ALL TERMINAL UNITS SHALL BE PROVIDED WITH FLOW-RING SERVICE 'T'. ALL TERMINAL UNITS FOR USE IN HEALTHCARE APPLICATIONS SHALL BE PROVIDED WITH FIBER FREE STERILOC LINER. UNLESS INDICATED OTHERWISE EXISTING TERMINAL UNIT TO REMAIN

_					•																P
		PRIMARY AIRFLOW									Н	EATING C	OIL					EI	EC		
	SIZE (INCH)			OP SP		AIR				HOT WATER COIL										LINER	
		MAX (CFM)	MIN (CFM)	(IN WC)	RAD	CFM	EAT (°F)	LAT (°F)	CAP. (MBH)	EWT (°F)	LWT (°F)	APD (IN WG)	FLOW (GPM)	WPD (FT H20)	ROWS	FPI	S & R RUNOUT SIZE (INCH)	VOLT	PHASE	TYPE	
	6"	375	210	0.5	30	375	55	99	10	180	146	0.17	0.6	0.08	2	10	1/2"	120	1	STERILOC	1,2
	5"	175	100	0.5	30	175	55	92	4	180	152	0.03	0.3	0.08	1	10	1/2"	120	1	STERILOC	1,2
	5"	230	0	0.5	30	230	55	90	7.9	180	140	0.1	0.5	0.3	1	10	1/2"	120	1	STERILOC	3
	4"	100	0	0.5	30	100	55	90	3.4	180	140	0.1	0.5	0.3	1	10	1/2"	120	1	STERILOC	3

![](_page_12_Figure_33.jpeg)

H1.	DO NOT ROUTE BRANCH CIRCUITS OR FEEDERS
	ABOVE OR BELOW IMAGING ROOMS BECAUSE OF POSSIBLE ELECTROMAGNETIC INTERFERENCE.
H2.	BOND PANELBOARDS SERVING THE SAME PATIENT CARE VICINITY WITH #6 AWG MINIMUM COPPER CONDUCTOR PER NEC ARTICLE 517. THIS INCLUDES NORMAL AND ESSENTIAL PANELBOARDS AND ESSENTIAL PANELBOARDS FED FROM DIFFERENT TRANSFER SWITCHES.
H3.	THE GROUNDING SYSTEM IN PATIENT CARE AREAS SHALL BE TESTED BY VOLTAGE AND IMPEDANCE MEASUREMENTS PER NFPA 99 REQUIREMENTS BY A THIRD-PARTY TESTING AGENCY. TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW PRIOR TO SUBSTANTIAL COMPLETION AND SHALL BE INCLUDED IN THE FINAL CLOSEOUT DOCUMENTS.
H4.	MEDICAL GAS ALARM CABLING SHALL BE PROVIDED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. VERIFY ALL REQUIREMENTS WITH THE MEDICAL GAS SUPPLIER. ALL MEDICAL GAS CABLING SHALL BE IN CONDUIT.
H5.	COORDINATE ALL BOX ROUGH-IN AND PATHWAY REQUIREMENTS FOR SOUND SYSTEMS IN OPERATING ROOMS WITH THE EQUIPMENT SUPPLIER
H6.	REFER TO THE SPECIFICATIONS FOR REQUIREMENTS ON COLOR CODING BOXES AND/OR CONDUIT ACCORDING TO THE SPECIFIC BRANCH OF THE ESSENTIAL ELECTRICAL SYSTEM.
H7.	REFER TO THE SPECIFICATIONS FOR REQUIREMENTS ON COLOR CODING OF NAMEPLATES ACCORDING TO THE SPECIFIC BRANCH OF THE ESSENTIAL ELECTRICAL SYSTEM.
H8.	THIS IS A LIFE SAFETY BUILDING WHICH MEANS IT SHALL REMAIN REASONABLY OPERATIONAL IN THE CASE OF A SEISMIC EVENT. REFER TO THE SPECIFICATIONS FOR SPECIFIC REQUIREMENTS ON EQUIPMENT BRACING.
H9.	FOR ISOLATION PANEL CIRCUITS, USE 1" MINIMUM EMT CONDUIT ROUTED AS DIRECT AS POSSIBLE. MAXIMUM OF 2 CIRCUITS PER CONDUIT. REFERENCE SPECIFICATION SECTION 260527 FOR ADDITIONAL REQUIREMENTS.
H10.	ALL PATIENT CARE AREAS (PATIENT ROOMS AND SUPPORT SPACES) SHALL HAVE TWO GROUND PATHS PER N.E.C. ARTICLE 517.
H11.	REFER TO MANUFACTURER DRAWINGS FOR ALL IMAGING EQUIPMENT REQUIREMENTS, INCLUDING BUT NOT NOT LIMITED TO CIRCUIT BREAKER SIZE, CABLE TRAY, DUCTS, CONDUITS, CABLES, CONDUCTORS, EPO SWITCHES, AND ALL DEVICES REQUIRED FOR A COMPLETE INSTALLATION.
H12.	THE LIFE SAFETY BRANCH AND THE CRITICAL BRANCH OF THE ESSENTIAL ELECTRICAL SYSTEM SHALL BE KEPT ENTIRELY INDEPENDENT OF ALL OTHER WIRING AND EQUIPMENT AND SHALL NOT ENTER THE SAME RACEWAY, BOXES, OR CABINETS WITH EACH OTHER OR OTHER WIRING PER N.E.C.
H13.	ARTICLE 517. DIGITAL CLOCK WITH INTEGRAL TIMER SHALL BE SIMPLEX #6303-9103 CLOCK WITH #6303-9202 CONTROL STATION OR APPROVED EQUAL. PROVIDE 120V. POWER TO CLOCK AND CONTROL WIRING FROM CLOCK TO CONTROL STATION AS REQUIRED.
H14.	DIGITAL CLOCK SHALL BE SIMPLEX #6334-9125 WITH #6334-9802 MOUNTING BRACKET AND #6334-9803 HARNESS ASSEMBLY OR APPROVED EQUAL. CLOCK SHALL BE 120V. WITH 2-1/2" LED (4) DIGIT DISPLAY.
H15.	HOSPITAL GRADE RECEPTACLES SHALL ONLY BE PROVIDED IN PATIENT CARE AREAS AS DEFINED BY NEC ARTICLE 517.

## **GENERAL NOTES**

- ALL ELECTRICAL WORK SHALL COMPLY WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NEC) & THE AMERICANS WITH DISABILITIES ACT (ADA).
- REFER TO RELATED ARCHITECTURAL, MECHANICAL, STRUCTURAL, AND CIVIL DRAWINGS FOR RELATED INFORMATION.
- REFER TO THE SPECIFICATIONS FOR DATA NOT ON THE DRAWINGS.
- E.C. SHALL REFER TO MECHANICAL DRAWINGS AND SPECIFICATIONS FOR THE REQUIREMENTS ASSOCIATED WITH WIRING AND CONNECTION OF INTERLOCKING AND CONTROLS OF MECHANICAL UNITS AND THERMOSTAT LOCATIONS.
- COORDINATE OUTLET BOX LOCATIONS WITH MASONRY TO MINIMIZE CUTTING OF BRICK OR BLOCK.
- ALL MOUNTING HEIGHTS TO CENTERLINE OF ITEM UNLESS OTHERWISE NOTED. VERIFY ALL OUTLET LOCATIONS ON THE JOB PRIOR TO ROUGH-IN.
- CONDUIT RUN W/CONDUCTORS AS INDICATED & GROUND WIRE SIZED PER N.E.C. 250.122. CONDUIT SIZE AS REQUIRED.
- WHEN INCREASED CONDUCTOR SIZES ARE SHOWN ON THE PLANS, THE LARGER CONDUCTOR SIZE SHALL BE USED THROUGHOUT THE LENGTH OF THE CIRCUIT, INCLUDING NEUTRAL AND GROUND.
- E.C. SHALL REFERENCE ARCHITECTURAL FINISH DRAWINGS FOR LOCATIONS AND HEIGHTS OF RIGID WALL COVERINGS, TILE, CHAIR RAIL, WAINSCOATING, ETC. AND ADJUST ELECTRICAL BOX ROUGH-IN HEIGHTS SO THAT COVERPLATES DO NOT PARTIALLY OVERLAP THESE ITEMS.
- BRANCH CIRCUITS ARE INDICATED AS ONE CIRCUIT HOME RUNS WITH INDIVIDUAL NEUTRALS. A MAXIMUM OF THREE CIRCUITS (MAXIMUM OF THREE PHASE CONDUCTORS) MAY BE GROUPED IN A SINGLE CONDUIT. WHERE MULTIPLE CIRCUITS ARE LOCATED IN THE SAME RACEWAY, JUNCTION BOX OR ENCLOSURE, NEUTRALS SHALL BE MARKED OR LABELED TO INDICATE WHICH CIRCUIT THEY ARE ASSOCIATED WITH. SEE SPECIFICATION SECTION "LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES" FOR ADDITIONAL INFORMATION.
- JUNCTION BOX OR RECEPTACLE FOR DRINKING FOUNTAINS SHALL BE LOCATED BEHIND THE EQUIPMENT SKIRT UNLESS OTHERWISE NOTED. COORDINATE CONNECTION TYPE AND LOCATION WITH EQUIPMENT PROVIDED.

### COMMUNICATION / DATA (ROUGH-IN ONLY)

EACH DATA, TELEPHONE, VIDEO, OR OTHER SYSTEMS OUTLET REQUIRES DOUBLE GANG BACKBOX WITH SINGLE GANG PLASTER RING AND 1"C. WITH PULL ROPE STUBBED 6" ABOVE NEAREST ACCESSIBLE CEILING UNLESS OTHERWISE NOTED ON PLANS. CONDUITS STUBBED UP ABOVE CEILINGS SHALL BE TURNED OUT 90 DEGREES. PROVIDE INSULATED BUSHINGS ON ALL CONDUITS. LABEL CONDUIT TO IDENTIFY ITS INTENDED USE (I.E. TELEPHONE, DATA, ETC.).

		FIRE ALAF	RN
F1.	THE FIRE ALARM SYSTEM SHOWN HAS BEEN DESIGNED PER THE REQUIREMENTS OF NFPA 72, 2013 EDITION. DEVICES SHOWN INDICATE DESIGN INTENT AND SHALL BE THE MINIMUM PROVIDED. SYSTEM SUPPLIER SHALL PROVIDE ANY ADDITIONAL CODE REQUIRED DEVICES OF DEVICES REQUIRED BY THE AUTHORITY HAVING JURISDICTION.	D F4 - L DR	ŀ.
F2.	FIELD VERIFY LOCATIONS OF AREA SMOKE DETECTOR AND HEAT DETECTORS. DO NOT LOCATE WITHIN 36" O A HVAC DIFFUSER (SUPPLY OR RETURN), IN A DIRECT AIR FLOW, WITHIN 36" OF A SPRINKLER HEAD, OR WITH 36" OF THE TIP OF A CEILING FAN BLADE. SMOKE DETECTORS FOR DOOR RELEASE SHALL BE LOCATED	S F IIN F5	ō.

ON THE CENTER LINE OF THE DOOR AND A MAXIMUM OF 5 FEET FROM THE DOOR. THE MINIMUM DISTANCE FROM THE DOOR IS THE DEPTH OF THE WALL SECTION ABOVE THE DOOR, BUT NOT LESS THAN 12". F3. FAN SHUTDOWN RELAY WIRING SHALL BE LOCATED

- WITHIN 3 FEET OF THE FAN CONTROLS AND THE WIRING TO THE RELAY SHALL BE MONITORED.
- N1. THE CONTRACTOR SHALL PROVIDE OUTLET BOXES AND 1"C. TO ABOVE NEAREST ACCESSIBLE CEILING FOR ALL NURSE CALL DEVICE LOCATIONS. ALL NURSE CALL DEVICE LOCATIONS SHALL BE COORDINATED WITH THE FINAL DRAWINGS FROM THE NURSE CALL SYSTEM SUPPLIER. COORDINATE ALL REQUIREMENTS WITH THE NURSE CALL SYSTEM SUPPLIER. MOUNTING HEIGHT FOR EMERGENCY BATH STATIONS SHALL BE PER AIA GUIDELINES.

12. LABEL THE FRONT OF EACH RECEPTACLE COVERPLATE WITH PANEL DESIGNATION AND CIRCUIT NUMBER USING CLEAR THERMAL TRANSFER (ELECTRONIC DYMO) LABELS WITH 1/8" HIGH BLACK LETTERS (OR CONTRASTING COLOR IF COVERPLATES ARE BLACK OR BROWN). LABELS SHALL BE SUITABLE FOR INDOOR/OUTDOOR USE. LABEL THE BACK OF EACH LIGHT SWITCH COVERPLATE WITH PANEL DESIGNATION AND CIRCUIT NUMBER USING A FINE BLACK PERMANENT MARKER.

13. PROVIDE 18" LONG (MIN.) CONDUIT SLEEVES THRU ALL WALLS WHERE CABLES ARE INDICATED OR REQUIRED TO PASS THRU WALLS. PROVIDE BUSHINGS ON BOTH ENDS. SIZE CONDUIT FOR CABLES INSTALLED. AT CABLE TRAYS, PROVIDE ONE 4" CONDUIT SLEEVE FOR EACH 4" WIDTH OF CABLE TRAY. MAXIMUMS SHALL BE:

1"C. = 10 CABLES 2 1/2"C. = 20 CABLES

3"C. = 30 CABLES 4"C. = 50 CABLES

14. LOCATE CABLE TRAYS 6" ABOVE CEILING. OFFSET TRAY UP AND OVER LIGHT FIXTURES AND DUCTWORK (FIELD VERIFY AND PROVIDE AS REQUIRED). IF PHYSICALLY IMPOSSIBLE TO RUN CABLE TRAY UP AND OVER, THEN PROVIDE CABLE SUPPORT HOOKS FROM STRUCTURE ABOVE, SIZED AND RATED FOR INSTALLED CABLES PLUS 25% SPARE.

15. PROVIDE DIMMER PER THE SPECIFICATIONS. COORDINATE DIMMER TYPE AND WIRING WITH ASSOCIATED LIGHT FIXTURE DIMMING REQUIREMENTS (I.E. 3-WIRE, 0-10V, ELECTRONIC OR MAGNETIC LOW VOLTAGE, ETC.) OR WITH LIGHTING CONTROL SYSTEM PROPRIETARY REQUIREMENTS (I.E. LUTRON, nLIGHT, DALI, ETC.) AS NECESSARY. 3-WIRE DIMMERS SHALL BE PROVIDED WITH A DEDICATED NEUTRAL FOR EACH CONTROL ZONE. 0-10V DIMMERS SHALL BE PROVIDED WITH DIM/ON/OFF CONTROL. COORDINATE PHASE CONTROL OF LED DRIVERS (I.E. REVERSE PHASE, FORWARD PHASE, ETC.) WITH LIGHT FIXTURE MANUFACTURER'S RECOMMENDATIONS. LOW VOLTAGE CONTROL WIRING IS NOT SHOWN ON PLANS FOR CLARITY, BUT SHALL BE PROVIDED AS REQUIRED.

16. "CT" INDICATED ADJACENT TO DEVICE INDICATES DEVICE MOUNTED ABOVE BACKSPLASH OF COUNTER TOP. VERIFY EXACT HEIGHT WITH ARCHITECTURAL PLANS AND ELEVATIONS.

LABEL REMOTE ALARM INDICATOR FOR DUCT
MOUNTED SMOKE DETECTORS (I.E. RTU-=1 SUPPLY
RTU-2 RETURN, FIRE/SMOKE DAMPER, ETC.). DUCT
DETECTORS SHOULD BE LOCATED IN THE AREA
BETWEEN 6 AND 10 DUCT EQUIVALENT DIAMETERS
OF STRAIGHT, UNITERRUPTED DUCTWORK. DUCT
DETECTORS FOR FIRE/SMOKE DAMPERS SHOULD
BE LOCATED BETWEEN THE LAST INLET OR OUTLET
UPSTREAM OF THE DAMPER AND THE FIRST INLET
OR OUTLET DOWNSTREAM OF THE DAMPER.

PROVIDE 120V POWER AND FUSTAT FOR EACH FIRE/SMOKE DAMPER. INTERLOCK WITH FIRE ALARM CONTROL PANEL TO CLOSE THE FIRE/SMOKE DAMPER UPON ANY ALARM AT THE FIRE ALARM CONTROL PANEL AND TO SHUTDOWN THE ASSOCIATED MECHANICAL UNIT.

NURSE CALL (ROUGH-IN ONLY)

SYMBOL DESCRIPTION MOUNTING SYMBOL DESCRIPTION MOUNTING						SYMBOL LIST					
SYMBOL	DESCRIPTION	MOUNTING	SYMBOL	DESCRIPTION	MOUNTING	SYMBOL	DESCRIPTION	MOUNTING	SYMBOL	DESCRIPTION	MOUNTING
		ABBRE	VIATIONS					COMMUNICAT	ION / DATA		
NL	NIGHT LIGHT - WIRE AHEAD OF CONTROLS		AFF AFG	ABOVE FINISHED FLOOR ABOVE FINISHED GRADE		⊳	1-DATA OUTLET & JACK (GEN NOTES T1 & T3)	18" AFF	⊳	2-DATA OUTLETS & JACKS (GEN NOTES T1 & T3)	18" AFF
EM	ON EMERGENCY POWER		DF	DRINKING FOUNTAIN - SEE GENERAL NOTE 11		►	1-VOICE OUTLET & JACK (GEN NOTES T1 & T3)	18" AFF	≫	3-DATA OUTLETS & JACKS (GEN	18" AFF
CT	COUNTERTOP (SEE GEN. NOTE 16)		GAP	GENERATOR ANNUNCIATOR PANEL		►	1-VOICE/1-DATA OUTLET &	18" AFF	₽	4-DATA OUTLETS & JACKS (GEN	18" AFF
W	WALL					₽	1-VOICE/2-DATA OUTLETS &	18" AFF	$\rightarrow$	2-VOICE/2-DATA OUTLETS & JACKS	18" AFF
		CONDUIT	AND WIRING				JACKS (GEN NOTES TT& T3)			(GEN NOTES IT & T3)	
× /-/	EMERGENCY CIRCUIT MASTER/SLAVE FIXTURE WHIP	CLG/WALL CEILING		CONDUIT HOME RUN, 1 CIRCUIT. 2#12 & 1#12 GRD 1/2"C.	CLG/WALL	•	CABLE TV OR VIDEO OUTLET & CONNECTOR (GEN NOTES T1 & T3)	18" AFF	₩	1-VOICE/3-DATA OUTLETS & JACKS (GEN NOTES T1 & T3)	18" AFF
∕·─·∕	LOW VOLTAGE WIRING CDT RUN 2#12 & 1#12 GRD 1/2"C.	CLG/WALL		CONDUIT HOME RUN, 2 CIRCUITS. 4#12 & 1#12 GRD 1/2"C.	CLG/WALL		DATA UTP CABLE HOME RUN	GEN NOTE 12 GEN NOTE T2	### XX	### = TERMINATION ROOM XX = CABLE CONFIGURATION	SEE HOR. CABLE
	OR CDT RUN AS NOTED ON PLAN		╱╫╫╼╼╼	CONDUIT HOME RUN, 3 CIRCUITS. 6#12 & 1#12 GRD 1/2"C.	CLG/WALL		VIDEO COAX CABLE HOME RUN FIBER OPTIC CABLE HOME RUN	GEN NOTE T2		FIBER OPTIC CABLE HOME RUN	GEN NOTE T2
, `	OR CDT RUN AS NOTED ON PLAN	FLOOR		CONDUIT HOME RUN, 2 CIRCUITS	CLG/WALL	× 2 ×	(MULTI MODE)			(SINGLE MODE)	
¥#10	CONDULT HOME RUN, 1 CIRCUIT. 2#10 & 1#10 GRD (GEN_NOTES 7 & 8)	CLG/WALL		- PHASE CONDUCTORS/							
	CONDUIT RUN PARTIAL CIRCUIT.	CLG/WALL		- SWITCH LEGS (#12 UON)			FIRE ALARM REMOTE ANNUNCIATOR	WALL	<u> </u>	IONIZATION AREA SMOKE	
	MISC. EQUIPMENT CONNECTION			- GROUND CONDUCTOR (#12 UON)			FIRE ALARM HORN	CEILING	<u>(S)</u>	PHOTO ELECTRIC AREA SMOKE	
	CONDUIT SEAL OFF					× ×		BOTTOM 80"	— Фр —	DETECTOR (GEN NOTE F2)	
	LIG	HTING, SWITCH	IES AND SENSOF	RS			COMB. F.A. HORN & VISUAL SIGNAL	BOTTOM 80"	(S)	DUCT SMOKE DETECTOR (GEN NOTE F4)	DUCTWORK
	LIGHT FIXTURE & FIXTURE LETTER	CLG SURF/ RECESSED	<b>\$ \$</b> 2 <b>\$</b> 3 <b>\$</b> 4	SWITCHES (1-POLE, 2-POLE, 3-WAY, 4-WAY)	46" AFF		COMB. F.A. HORN & VISUAL SIGNAL	CEILING		DUCT SMOKE DETECTOR & FIRE/ SMOKE DAMPER (GEN	
	STRIP LIGHT FIXTURE & FIXT LETTER	CEILING CLG SURF/	<u>\$К \$Р \$</u> Т а, b, c	SWITCHES (KEYED, PILOT, TIMER) INDICATES SWITCHING SCHEME	46" AFF			CEILING	FSD	NOTES F4 & F5)	
Ø <sub>A</sub> Ø <sub>A</sub>	LIGHT FIXTURE & FIXTURE LETTER	RECESSED	М	1 RELAY OCCUPANCY SENSOR SW	46" AFF		COMB. F.A. SPEAKER & VIS SIGNAL	CEILING		CARBON MONOXIDE DETECTOR	
Ð	LIGHT FIXTURE & FIXTURE LETTER	WALL	2M	2 RELAY OCCUPANCY SENSOR SW	46" AFF		CHIME	WALL	$\Delta_{\rm CO}$	CARBON DIOXIDE DETECTOR	
× A	EXIT SIGN (SHADING DENOTES FXIT FACE SIDE)	CEIL/WALL	1D	1 RELAY OCCUPANCY SENSOR/ DIMMER SWITCH (GEN NOTE 15)	46" AFF	<u> </u>	FIRE SPRINKLER ALARM BELL	WALL	PS	FIRE SPRINKLER PRESSURE SWITCH	
		WALL	ם	DIMMER SWITCH (GEN NOTE 15)	46" AFF	DH	ELECTROMAGNETIC DOOR HOLDER	WALL	TS	FIRE SPRINKLER TAMPER SWITCH	SPRKLR RSR
	FIXTURE WITH SHADED LAMP(S)	CLG SURF/	Ś	LOW VOLTAGE SWITCH	46" AFF	R	FIRE ALARM RELAY (GEN NOTE F3)		FS	FIRE SPRINKLER WATER FLOW SW	SPRKLR RSR
$\bullet_{A} \bullet_{A}$	ON EMERGENCY POWER	RECESSED	\$ 1	ON/OFF SWITCH	46" AFF	СМ	FIRE ALARM CONTROL MODULE		MM	FIRE ALARM MONITOR MODULE	
¢⋿⋺ <mark>⋪</mark> ⋒⋒	EMERGENCY BATTERY LIGHT FIXT	CEIL/WALL	\$ 2	ON/OFF/0-10V DIMMING SWITCH	46" AFF			PEN WEIGH	T LEGEND		
	COMB EXIT SIGN/EM BATTERY LIGHT	WALL	Š 3	DUAL TECH ON/OFF SENSOR	46" AFF	ALL DEVICE	S, LIGHT FIXTURES, ETC., DRAWN IN DA	ARK	ALL DEVICE	S, LIGHT FIXTURES, ETC., DRAWN IN DA	RK
	LIGHT FIXTURE & FIXTURE LETTER	POLE	<u>\$4</u>		46" AFF						
	& FIXTURE LETTERS	CEILING		DUAL TECH ON/OFF/U-10V DIM SW					- *67 511275113	DUPLEX GROUNDED REG TO BE REN	
PC	PHOTOCELL			LIGHTING CONTROL POWER PACK			NEW LIGHT FIXTURE			LIGHT FIXTURE TO BE REMOVED	
			<u> </u>	UL-924 LISTED POWER PACK AV SYSTEM/LIGHTING INTERFACE		ALL DEVICE SOLID LINE	S, LIGHT FIXTURES, ETC., DRAWN IN HA S ARE EXISTING TO REMAIN	ALFTONE	ALL DEVICE DASHED LIN	S, LIGHT FIXTURES, ETC., DRAWN IN LIC IES ARE EXISTING TO BE RELOCATED	GHT
			63	DAYLIGHT SENSOR	CEILING		EXISTING DUPLEX GROUNDED REC	TO REMAIN	1(=)	DUPLEX GROUNDED REC TO BE REL	OCATED
		PO	WER				EXISTING LIGHT FIXTURE TO REMAIN	J		LIGHT FIXTURE TO BE RELOCATED	
Φ	SINGLE GROUNDED RECEPTACLE	18" AFF		BRANCH CIRCUIT PANEL AND							
Ð	DUPLEX GROUNDED RECEPTACLE	18" AFF	<u> </u>	PANEL DESIGNATION		S`	YMBOL LIST IS FOR REFERENCE	ONLY. ALL SY	YMBOLS MA	Y NOT BE USED ON THIS PROJE	СТ
$\bigcirc$	DUPLEX GROUNDED RECEPTACLE	CEILING		ELECTRICAL DISTRIBUTION EQUIP							
		18" AFF	x-x (x-x)	EQUIPMENT - SEE EQUIPMENT							
		10 ΑΓΓ 18" ΔΕΕ									
 ₽	DUPLEX GRD REC BOTTOM SWITCHD	18" AFF		CABLE TRAY - WIRE BASKET.							
Ð	TAMPER-PROOF DUPLEX REC	18" AFF		LADDER (GEN NOTE 14)							
Ð	TAMPER-PROOF GFCI DUPLEX REC	18" AFF		MOTOR							
				DISCONNECT SWITCH							
$oldsymbol{ ilde{A}}_{A}$	SPECIAL OUTLET (SEE	FLOOR/WALL	\$ <sup>IVI</sup>								
	SPECIAL DEVICE (AS NOTED)			STARTER OR ATS (AS NOTED)							
2	FEEDER DESIGNATION			COMBINATION STARTER/DISC							
<u>1</u> J	JUNCTION BOX - 1-GANG		R	RELAY							
	JUNCTION BOX - 2-GANG		• •• •••	PUSHBUTTON (1-, 2-, 3-BUTTON)	46" AFF						
E Tra	FUSTAT BUSS #SSY	46" AFF		BOX MOUNTED TRANSFORMER							
	HANDICAP DOOR PUSHBUTTON	36" AFF	<u> </u>		WALL						
				BUSDUCT PLUG							
		NUKSE CALL (R			\\//\						
S	WITHOUT AUDIO			NC ZONE LIGHT							
SA	NC STAFF STATION W/ AUDIO			NC VISUAL SIGNAL	CLG/WALL						
SB	NC STAFF STATION WITH AUDIO		BI	NC BED INTERFACE UNIT							
	AND CODE BLUE		B	NC CODE BLUE STATION							
	NC PATIENT STATION			NC MASTER STATION	DESKTOP						
PB	NO PATIENT STATION WITH CODE BLUE			NC ALIXILIARY LACK							
Ν	NC DUTY STATION		Ē	NC EMERGENCY BATH STATION							
S)	(MBOL LIST IS FOR REFERENCE	ONLY. ALL	SYMBOLS MA	Y NOT BE USED ON THIS PROJE	СТ						

![](_page_13_Figure_33.jpeg)

DIV	/ISIO	N 26 - ELECTRICAL
A.	Ge	neral Instructions:
	1.	<ul> <li>Codes, Permits and Inspections:</li> <li>a. Wiring shall be in accordance with latest edition National Electrical Code (NEC), NFPA, and/or applicable local, state, and Utility Company rules, laws, codes, and ordinances.</li> <li>b. Secure all permits and inspections required for the installation</li> </ul>
		of the electrical work. c. All work shall comply with the latest edition of the Americans With Disabilities Act (ADA).
	2.	<ul> <li>Pay all fees associated with new utility services.</li> <li>Verifications:</li> </ul>
		<ul> <li>Verify mounting heights and locations of electrical equipment before installation or rough-in.</li> <li>Verify exact location of electrical service entrance including</li> </ul>
	3	point of service and system characteristics.
	0.	a. The Electrical Contractor shall cooperate with other Contractors and install equipment in proper sequence so as
		not to interfere with the progress of other Contractors. b. All materials shall be new and carry the Underwriter's Label or
		be "listed" by that group, and be fully equal to makes specified. c. Use only insulated copper conductors in conduit. Use flexible
		<ul><li>conduit for connections to motors and similar equipment.</li><li>d. All wiring shall be concealed and all outlets shall be flush</li></ul>
		mounted in finished spaces except as noted otherwise. e. All systems wiring in return air plenums shall be in conduit or
	4.	be plenum rated. Tests: 
		a. This Contractor shall be responsible for performing all tests necessary to prevent concealment of defective or improper
		<ul> <li>b. Upon completion of work, test the installation thoroughly and</li> <li>render it free from shorts, grounds or improper connections</li> </ul>
	5.	Guarantee: a This Contractor shall guarantee that all defective items of
		workmanship, material, labor or mechanical operation developing within one (1) year from the date of final acceptance of completed installation shall be replaced to the complete satisfaction of the Owner.
	6.	Workmanship: a. Electrical equipment shall be installed in a neat and workmanlike manner. Unsightly installations shall be removed or reworked at no additional expense to the Owner
	7.	Identification of Disconnecting Means: a. Provide a permanent nameplate for each disconnect switch indicating its purpose. The marking shall be of sufficient
		required by N.E.C. Section 110.22 and 230.72(A).
В.	Ele	ctrical Equipment:
	1.	Conduits: a. All conduit installed in earth, concrete, below concrete on
		earth, or exposed to weather shall be rigid steel or intermediate metal conduit. Electrical metallic tubing for all dry interior runs. Fittings shall be fully approved in accordance with N.E.C
		<ul> <li>b. Flexible or P.V.C. conduit may be used where not exposed to damage and approved by N.E.C. and local codes.</li> <li>c. Provide a ground wire sized per N.E.C. Art. 250.122 in all conduits both materilie and permetallie.</li> </ul>
		<ul> <li>conduits, both metallic and nonmetallic.</li> <li>d. Conduit shall be installed and sized according to code requirements and protected from damage during construction.</li> <li>e. Conduit may be re-routed where such action does not</li> </ul>
		<ul><li>adversely affect the intended design or circuiting.</li><li>f. Final connections to all kitchen and mechanical equipment shall be with U. L. approved liquidtite conduit. Liquidtite and</li></ul>
	2.	fittings shall be U.L. listed for grounding. Conductors:
		<ul> <li>Conductors shall be copper, generally with 600 volt rated insulation. Branch circuit wiring min. size #12 Type "THW" or</li> </ul>
		conductors Type "THWN/THHN" or "XHHW". Low voltage
		noted otherwise. All other types shall be as required by N.E.C.
		Connections to service equipment, feeder panels shall be made with solderless lugs. All splices, taps, connections to
		solderless lugs. All other splices, connections shall be
		pressure type connectors. c. Insulate joints, splices with Scotch #33 plastic tape or plastic
	3.	moulded jackets. Outlet Boxes and Plaster Rings:
		<ul> <li>Outlet boxes shall be galvanized steel of type and size approved for particular installation requirements.</li> </ul>
		<ul> <li>Use 4" square box with suitable plaster ring installed flush with finish materials in stud or concrete walls.</li> </ul>
		<ul> <li>Use standard octagon boxes for ceiling light outlets. All boxes shall be securely mounted to building construction and flush</li> </ul>
	4.	With finish materials. Wall Receptacles:
		<ul> <li>buplex receptacies shall be "opecification Grade", back of side</li> <li>wired, grounding type. Manufacturer shall be Hubbell or equal.</li> <li>b. Weatherproof receptacies (indicated WP) shall be weather</li> </ul>
		resistant GFCI duplex receptacles with extra-duty, weatherproof while-in-use metallic cover plate.

5. Wall Switches:

- a. Wall switches shall be "Specification Grade", 15 or 20A. as required by N.E.C. for the load served.
- b. Provide mechanically operated single pole, double pole, three way, four way or other types as indicated on the drawings. Manufacturer shall be Hubbell or equal. Maximum load shall be less than 80% of rated capacities.
- 6. Wall Plates and Covers a. Flush wiring devices shall be provided with high impact thermoplastic wall plates as made by the PS/Sierra Electrical and Mfg. Co. or equal.
- b. Flush junction boxes shall be equipped with blank plates. c. Surface wiring devices shall be provided with suitable heavy
- steel coverplates with rounded edges and corners. 7. Safety Switches: a. Furnish safety switches of size and type indicated on drawings.
- b. Heavy duty switches shall be fusible unless indicated otherwise. Provide Class "R" fuse clips. c. All exterior switches shall be raintight. 8. Starters:
- a. Starters shall be NEMA rated with H-O-A switch in cover and a
- control power transformer for controls. b. Provide Class 20 melting alloy relays or bimetallic overload relays (as required for load served). Size and install overload relay in field based on motor nameplate current. 9. Fuses:
- a. Furnish and install Class RK-5 time delay fuses for each active fuseholder, sized as scheduled or required.
- b. Provide fuses made by Bussmann or equal.
- 10. Lighting Fixtures and Lamps: a. Install lighting fixtures. Provide lamps as indicated on the drawings.
- b. No substitutions on lighting fixtures except as approved by Engineer prior to bidding.
- c. Verify exact locations of fixture outlets so as to cause no interference with piping, equipment and architectural treatment.
- d. Ballasts by "Advance" or equal, internally or externally fused, high power factor, VLH, fully compatible with lamps and shall carry UL label, ETL and CBM certifications of compliance, even though indicated fixture number may indicate otherwise. e. Furnish all fixtures with lamps as scheduled and/or required by
- final fixture selection. Lamps equal to G.E. 11. Wiring for Mechanical Equipment:
- a. Electrical Contractor to provide all wiring remote from panel to panel. Electrical Contractor to provide all wires for mechanical equipment and controls. All WIRING TO BE IN CONDUIT. ELECTRICAL CONTRACTOR TO MAKE FINAL CONNECTIONS. Electrical Contractor shall provide
- disconnect switch and all power wiring. b. Provide disconnect switches, starters, and all wiring for mechanical and kitchen equipment unless otherwise noted on
- plans. Coordinate requirements with equipment suppliers. 12. Grounding: a. Provide system ground as required by N.E.C. and utility
- company if not already existing.
- b. Bond mechanical equipment frames.
- c. Bond all service entrance equipment and conduit system. d. An equipment grounding conductor sized per N.E.C. Art. 250.122 shall be provided in all conduits. The ground wire is required for both metallic and nonmetallic conduit installations.
- 13. Branch Circuit Panels a. Branch circuit lighting panels equal to Square D, G.E., Siemens, or Cutler Hammer, with thermal magnetic breakers and ground buses. Load center construction is not permitted. Electrical Contractor shall obtain available short circuit current from local Utility co. Panelboards shall be U.L. listed for available fault current. Breakers and panels shall be fully rated or U.L. series rated with specified fuses (22,000 AIC minimum).
- b. Breakers shall have individual plastic cases sized as scheduled. Two pole breakers shall be common trip (single pole units with tie bars are not acceptable).
- c. Panel shall be mounted as noted on the drawings. Provide with a hinged door and a neatly typed circuit directory card.
- d. Re-assign circuits to properly balance the loads on the phases if final connections and tests show it to be advisable.

		4
14.	Equ a. b.	ipment Supplied By Other Contractors And/Or The Owner The Electrical Contractor shall furnish, install and connect all wiring, conduit, boxes, toggle switches, thermal switches, disconnect switches, remote pushbutton stations, etc., for all equipment requiring electrical power that is either furnished or specified by other contractors and/or the Owner, shown on drawings or listed below. The E.C. shall receive, install and connect all magnetic starters and controllers, capacitors, power factor correction devices, transformers, alarms, bells, horns, relays, remote switches for equipment supplied by others (i.e. starters or capacitors or power factor correction devices for Mechanical Equip., etc.). In general, all major equipment will be specified to be factory prewired with only service and interconnecting required at the site by the Electrical Contractor; however, the E.C. shall check all Divisions of the specification to verify whether the equipment is specified to be factory prewired. If not, then it shall be the responsibility of the Electrical Contractor to provide the complete wiring of the equipment in accordance with wiring diagrams provided by other Contractors and/or Owner to the Electrical Contractor. All interconnecting of equipment shall be by the Electrical Contractor.
	C.	It shall be assumed the Contractor is familiar with the equipment to be furnished by the other Contractors and/or the Owner in connection with this work and that provisions for such connections and work have been included in the Contractor's price. In no case will extra remuneration be allowed for such work.
	d.	Connections to all equipment have been designed from units as specified on the drawings or in the specifications. In the event equipment or control differs on approved mechanical shop drawings it shall be the responsibility of the supplying contractor to coordinate the electrical connections to the units and reimburse electrical contractor for any changes in the electrical system design. These changes shall not involve additional cost to the Owner.
15.	Con a. b.	tactors And Relays Shall be as manufactured by Cutler-Hammer, Allen Bradley, G.E. or Square D. They shall be as sized on the drawings. All contactors and relays shall be Tungsten rated.
16.	Time a. b.	e Switches: Time switches by Tork, Intermatic, or Paragon equal to those indicated below and approved by the Engineer will be acceptable. Exterior lighting or interior time switches shall be 7 day with
	c. d.	carry-over. All time switches shall be provided with momentary contacts if required. All time switches shall be provided with manual bypass
17.	Pho a.	switches and spring wound carry over mechanisms. to Electric Controls: Photo Electric Controls by Tork, Intermatic and Paragon equal to those indicated below and approved by the Engineer will be acceptable.
	D. C.	rated at 1800W, 120 volts, weatherproof. Mount on roof and orient photo electric controls to the north. Photo-electric controls supplied as a part of a fixture assembly shall be as provided by Eixture Manufacturer.
18.	Fire a.	Alarm System: All components shall be U.L. listed for use in a fire alarm system. In addition, the system shall have a U.L. listing as a fire alarm system. The entire installation shall be installed and tested as required by NFPA, ADA, Life Safety Code and local requirements.
	b.	Fire alarm panel shall comply with NFPA 72 and the firealarm system shall comply with NFPA 101 and ADA. Provide initiation zones for each zone shown on the plans. Include adequate indication circuits for all indicating devices shown on the plans or required by code or local authorities. Batteries shall provide enough power to maintain the system for 24 hours plus 5 minutes in alarm.
	C.	<ul> <li>Wiring shall be installed as described below:</li> <li>Initiation circuits- (2) #16 AWG.</li> <li>Signal wiring- (2) #14 AWG.</li> <li>Relay wiring- (2) #16 AWG.</li> </ul>
	d. e.	<ul> <li>⊢ıre Alarm Control Panel shall be equal to Simplex #</li> <li>4004-9101 with 2 initiation zones, 1 signal circuit, power supply, batteries, and charger.</li> <li>Duct smoke detectors shall be installed in the supply and</li> </ul>
		return ductwork of all HVAC equipment capable of delivering over 2000 CFM. Provide sampling tubes per manufacturers recommendations. Detector shall be equal to Simplex # 2098-9201 with #2098-9649 duct housing and #2098-9806 remote test station
	f.	Shut down relays equal to Simplex #2088-9010shall be

- CFM and to close fire smoke dampers.
- #2098-9201 with #2098-9211 base.
- NFPA requirements. Audible signals shall meet NFPA requirements for sound transmission. Separate wiring for horns and strobes to comply with requirements for temporal coding.

- 19. Transistorized Variable Frequency Drive: (Provided by TCC, installed by E.C.):
- a. The Variable Frequency Drive (VFD) shall be for use with a standard NEMA B induction motor. Manufacturer shall be AC
- Tech and must include the following: 1. Individual or simultaneous operation of the VFDs shall not add more than 5% total harmonic voltage distortion to the
- normal bus. 2. Maximum allowable total and individual harmonic current distortion limits for each odd harmonic shall not exceed limits as set forth by IEEE 519, 1992. If harmonic filters are required to meet these requirements, the VFD
- manufacturer must provide the filter. 3. The VFD shall be a microprocessor based digital Pulse
- Width Modulated (PWM) design.
- 4. The VFD shall be supplied with an input AC line reactor of 5% impedence. Line reactor is to be factory mounted and wired within the VFD enclosure.
- 5. The VFD shall be equipped with a load AC line reactor of 5% impedence built-in or motor termination filter to prevent voltage rate of rise, reflective voltage amplitude damage, and other potential damage to motor windings
- and bearings. b. The PWM VFD shall provide the following design features as standard:
- 1. Microprocessor logic. The VFD shall be microprocessor based and utilize digital input for all parameter adjustments.
- 2. Auto restart. The VFD shall automatically attempt to restart after a malfunction or an interruption of power. The number of attempted restarts shall be customer selectable (0 to 5).
- 3. Digital output displays and input parameter programming. 4. Critical frequency avoidance (Frequency jump points). The VFD shall provide a minimum of two (2) selectable frequency jump points, in 1.5 Hz increments, to be used to avoid critical resonance frequencies of the mechanical
- 5. Motor overload protection. Electronic motor protection shall be provided which is capable of predicting motor winding temperature based on inputting specific parameters including motor design type (TEFC, ODP, or
- other) and speed range. c. Enclosure. The drive shall be furnished in a NEMA enclosure most suitable for the installed equipment. Finned heatsinks and/or cooling fans shall be provided as necessary for proper heat dissipation. Inlet filters are required on all cooling fans, unless they are outside the drive enclosure and no circulated air passes circuit boards, transistors, or other electrical components.
- d. Protective features. The VFD shall be designed to meet the following specifications and operate within the following parameters:
- 1. AC input fuses. The VFD's power circuit shall be fused and isolated internally with respect to ground. Fuses shall provide a minimum of 100,000 A interrupting capacity and shall provide complete Type 2 protection, not allowing any damage to the VFD upon overload or short circuit. 2. Phase loss protection. Phase loss protection shall be
- provided to prevent single phasing. 3. Phase loss ride through. The VFD shall be capable of continued operation during an intermittent loss of power
- for 0.1 seconds (6 cycles). 4. Short circuit and ground fault protection. The VFD shall have an instantaneous electronic trip circuit to protect the VFD from output line to line and line to ground short circuits.
- 5. Transient and surge voltage protection. Transient and surge voltage protection shall be provided through the use of Metal Oxide Varistors (MOVs).
- 6. Rotating Motor Start. The VFD shall be able to start into a motor rotating in either direction and at any speed, and accelerate to set speed without any time delay, tripping or component loss.
- e. Additional features.
- 1. Operator panel: A door-mounted Softtouch Operator Panel shall be included with selection for Hand/Off/Auto
- 2. Automatic Bypass control circuitry. Bypass control circuitry shall be mounted integrally to the VFD enclosure. The bypass shall utilize an input switch to feed the VFD and isolate the VFD for trouble shooting. An output contactor which is electronially and mechanically interlocked with the bypass starter shall be utilized on the VFD to provide a positive disconnect between the VFD and the motor. Separate Hand/Off/Auto and Inverter/Bypass switches shall be included to allow manual or automatic transfer to across the line operation. A 120V control circuit transformer (fused on both the primary and secondary), auxiliary contacts, and overload relay with adjustable
- heater settings shall also be included. Any protective shutdown circuits shall function in all moded (hand, auto, or bypass). 3. A 120V control transformer fused on both the primary and
- the secondary. 4. Disconnect switch. The operating mechanism shall be designed so that the door can be padlocked in the "OFF"

- position. The switch shall have an interrupting capacity of 65,000 symmetrical amperes.

- Simplex # l circuit, power
- the supply and pable of delivering per manufacturers al to Simplex # and #2098-9806
- -9010shall be provided to shut down power to HVAC equipment over 2000
- g. Photoelectric area smoke detectors shall be equal to Simplex
- h. A/V signals shall have strobes that comply with ADA and

![](_page_14_Figure_122.jpeg)

![](_page_15_Figure_0.jpeg)

- REMOVAL.
- RACEWAY SYSTEMS, OUTLET BOXES, ETC.
- CONTINUITY OF THE CIRCUIT OR OPERATION OF THE SYSTEM.
- REMOVED, UNLESS NOTED OTHERWISE.
- REMAIN.
- **BEGINNING WORK.**

![](_page_15_Picture_10.jpeg)

![](_page_15_Picture_12.jpeg)

![](_page_16_Figure_0.jpeg)

![](_page_16_Figure_3.jpeg)

- TO INDICATE WHICH CIRCUIT THEY ARE ASSOCIATED WITH. SEE SPECIFICATION SECTION "LOW VOLTAGE ELECTRICAL POWER
- CONDUITS.
- MECHANICAL EQUIPMENT CONNECTION SCHEDULE.
- U.L. ASSEMBLY NUMBERS.
- AND SPECIFICATIONS.

- MOLDABLE FIRE BARRIER.
- THROUGHS WITH ARCHITECT PRIOR TO ROUGH-IN.
- CONDUCTORS AND EQUIPMENT GROUND CONDUCTORS.

![](_page_16_Picture_17.jpeg)

![](_page_17_Figure_0.jpeg)

![](_page_18_Figure_0.jpeg)

![](_page_19_Figure_0.jpeg)

	(1)(	2)(3)(4)	
	1.	GENERAL CONTRACTOR	SHALL PROVIE PER U.L. REQUI
	2.	MANUFACTURERS LISTE ONLY APPROVED MANUF CONTRACTORS AND SUF OR BY ADDENDUM DO SO	D IN THIS SCH FACTURERS TO PPLIERS USING O AT THEIR OW
NON-METALLIC BUSHING	3.	LIGHT FIXTURE SELECTION LISTED IN THE SCHEDUL SHALL BE EQUAL TO THE POST PAINTED FINISH, P	ONS ARE BASE E. FIXTURES A UNIT SPECIFII HOTOMETRICS
	4.	ALL LIGHT FIXTURES SH/ (SUCH AS BOLTS, SCREV CEILING FRAMING MEMB	ALL BE SECURE VS, OR RIVETS ER AND LIGHT
ACCESSIBLE CEILING	4.	ALL LIGHT FIXTURES SH/ (SUCH AS BOLTS, SCREV CEILING FRAMING MEMB	ALL BE SECURE VS, OR RIVETS ER AND LIGHT
ACCESSIBLE CEILING	4. MARK	ALL LIGHT FIXTURES SH/ (SUCH AS BOLTS, SCREV CEILING FRAMING MEMB DESCRIPTION	ALL BE SECURE VS, OR RIVETS ER AND LIGHT MANUFACT CATALOG N
ACCESSIBLE CEILING 1" EMT	4. MARK D	ALL LIGHT FIXTURES SH/ (SUCH AS BOLTS, SCREV CEILING FRAMING MEMB DESCRIPTION FIXTURE TO BE DEMOLISHED	ALL BE SECURE VS, OR RIVETS ER AND LIGHT MANUFACT CATALOG N
ACCESSIBLE CEILING 1" EMT WALL	4. MARK D HA	ALL LIGHT FIXTURES SH/ (SUCH AS BOLTS, SCREV CEILING FRAMING MEMB DESCRIPTION FIXTURE TO BE DEMOLISHED 6" RECESSED DOWNLIGHT W/LENS	ALL BE SECURE VS, OR RIVETS ER AND LIGHT MANUFACT CATALOG N WILLIAMS 6DR-TL-L10/ LM-OF-WH-I
ACCESSIBLE CEILING 1" EMT WALL 4 11/16"SQ. x 2 1/8"DEEP OUTLET BOX WITH SINGLE	4. MARK D HA K4	ALL LIGHT FIXTURES SH/ (SUCH AS BOLTS, SCREV CEILING FRAMING MEMB DESCRIPTION FIXTURE TO BE DEMOLISHED 6" RECESSED DOWNLIGHT W/LENS 2X4 LAY-IN	ALL BE SECURE VS, OR RIVETS ER AND LIGHT MANUFACT CATALOG N WILLIAMS 6DR-TL-L10/ LM-OF-WH-I WILLIAMS 50G-S24-L59 5-DIM-UNV
ACCESSIBLE CEILING 1" EMT WALL 4 11/16"SQ. x 2 1/8"DEEP OUTLET BOX WITH SINGLE GANG MUD RING	4. MARK D HA K4 R	ALL LIGHT FIXTURES SH/ (SUCH AS BOLTS, SCREV CEILING FRAMING MEMB DESCRIPTION FIXTURE TO BE DEMOLISHED 6" RECESSED DOWNLIGHT W/LENS 2X4 LAY-IN FIXTURE TO BE RELOCATED	ALL BE SECURE VS, OR RIVETS ER AND LIGHT MANUFACT CATALOG N WILLIAMS 6DR-TL-L10/ LM-OF-WH-I WILLIAMS 50G-S24-L59 5-DIM-UNV

**TYPICAL TELECOM OUTLET MOUNTING DETAIL** (3)

NO SCALE

4

![](_page_19_Figure_4.jpeg)

2 TYPICAL LAY-IN FIXTURE INSTALLATION NO SCALE

## LIGHTING FIXTURE SCHEDULE

IDE FIREPROOFING AROUND RECESSED FIXTURES INSTALLED IREMENTS. ELECTRICAL CONTRACTOR WILL COORDINATE.

EDULE OR APPROVED BY WRITTEN ADDENDUM WILL BE THE O BID THE LIGHTING FIXTURES FOR THIS PROJECT. FRICING FROM MANUFACTURERS NOT LISTED ON SCHEDULE NN RSK.

ED ON THE MANUFACTURER IN THE LEFT MOST COLUMN AS APPROVED AS EQUALS IN THIS SCHEDULE OR BY ADDENDUM ED IN THE LEFT MOST COLUMN, IE: SPRING LOADED LATCHES

RED TO THE CEILING FRAMING SYSTEM BY MECHANICAL MEANS S) OR BY CLIPS IDENTIFIED FOR USE WITH THE TYPE OF FIXTURE.

5. LIGHT FIXTURES SHALL BE PROVIDED WITH 0-10V DIMMING DRIVERS. DRIVERS SHALL BE CAPABLE OF DIMMING TO A MINIMUM OF 10% TOTAL LIGHT OUTPUT. LED DRIVERS SHALL HAVE A DISCONNECTING MEANS MEETING THE REQUIREMENTS OF NEC SECTION 410.130(G), EXCEPT FOR THOSE INSTALLED IN CORD AND PLUG CONNECTED FIXTURES. WHERE APPLICABLE, WHEN DIMMING SWITCHES ARE NOT PROVIDED AS PART OF THE DESIGN, CONTRACTOR SHALL CAP OFF THE 0-10V DIMMING WIRES FOR FUTURE EXTENSION BY THE OWNER.

6. PROVIDE ARROWS AND FACES AS INDICATED ON THE DRAWINGS.

7. TO COMPLY WITH NEC SECTION 410.130(G), ALL EXISTING OR RELOCATED LIGHT FIXTURES WITHOUT A BALLAST OR DRIVER DISCONNECTING MEANS SHALL HAVE A BALLAST OR DRIVER DISCONNECTING MEANS INSTALLED UNDER ANY OF THE FOLLOWING CONDITIONS: a. WHEN AN EXISTING BALLAST OR DRIVER IS REPLACED.

b. WHEN AN EXISTING LIGHT FIXTURE IS RELOCATED. c. WHEN AN EXISTING LIGHT FIXTURE IS RECIRCUITED.

LIGHT SOURCE DIMENSIONS REF. MANUFACTURER 2 **MANUFACTURER 3 URER 1** LENS/LOUVER/FINISH REMARKS W L D NOTE CATALOG NUMBER CATALOG NUMBER # TYPE WATTS VOLTS NUMBER 0 0 LED 9 UNV SEMI-CLEAR 1.17 1.32 0.63 5 1000LM; 3500K; 80CRI 0/835-DIM-UNV--MWT-N-F1 LED 48 UNV ACRYLIC 2.0 4.0 0.33 5 5900LM; 3500K; 80CRI 59/835-F-AF1212 0 0 1 LED 16 UNV ACRYLIC 0.38 3.0 0.08 5 1800 LUMENS; 80 CRI; 3500K /835-AF12125-A NV

![](_page_19_Figure_19.jpeg)