#### **EXISTING CONDITION NOTES**

THE CONTRACTOR AND SUB CONTRACTOR SHALL NOT INITIATE ANY WORK UNTIL EXISTING FIELD CONDITIONS ARE PROPERLY VERIFIED. THIS SHALL HOLD TRUE FOR FIRST GENERATION AND SECOND GENERATION SPACES. WHEN DEMOLITION IS REQUIRED. THAT WILL BE PERMITTED TO EXPOSE CONDITIONS. THESE VERIFICATIONS SHALL INCLUDE BUT NOT LIMITED TO: DIMENSIONS BOTH HORIZONTAL AND VERTICAL, ELECTRICAL SERVICE/PANELS LOCATION AND VOLTS/PHASE, LOCATION/QTY. OF ROOF MOUNTED HVAC EQUIPMENT, CONFIRM THAT INTERIOR HVAC HUNG UNITS HAVE PROPER SUPPORT CONNECTIONS FOR EXISTING STRUCTURE, FIRE SPRINKLER MAIN RUNS, TOILET ROOM DIMENSIONS, DOOR SWING FOR DOORS TO REMAINED ETC. IF NOT VERIFIED AND DISCOVERED AT A LATER TIME, THE CONTRACTOR SHALL REIMBURSE THE ARCHITECT FOR THE REDESIGN FEE. THIS DOES NOT INCLUDE HIDDEN WORK I.E. PITCH OF SANITARY LINES, ACTUAL CONDITIONS OF EXISTING HVAC EQUIPMENT, STRUCTURAL COLUMNS/BEARING WALLS OR CONDITIONS OF GREASE INTERCEPTORS AND ETC.

#### SCOPE OF WORK

REUSE EXISTING SIX 15.0 TON, ONE 3.0 TON, ONE 2.5 TON & ONE 8.5 TON GAS HEAT ROOF TOP UNITS. PROVIDE NEW DUCTWORK AND NECESSARY ACCESSORIES AS SHOWN IN PLAN. REUSE EXISTING CONCENTRIC SUPPLY GRILLES AS MUCH AS POSSIBLE.

PROVIDE FIVE NEW EXHAUST FANS AS SHOWN IS PLAN.

COORDINATE WITH GC ANY ADDITIONAL REFRIGERATION WORK REQUIRED AND PLUMBING CONTRACTOR PROVIDING CONDENSATE LINES FOR MECHANICAL EQUIPMENT.

#### **GENERAL NOTES**

- CONTRACTORS AND SUB-CONTRACTORS SHALL CAREFULLY REVIEW THE CONSTRUCTION DOCUMENTS. INFORMATION REGARDING THE COMPLETE WORK IS DISPERSED THROUGHOUT THE DOCUMENT SET AND CANNOT BE ACCURATELY DETERMINED WITHOUT REFERENCE TO THE COMPLETE DOCUMENT SET.
- CONTRACTOR TO VERIFY THAT ALL EQUIPMENT SHOWN AS EXISTING MATCHES THE DESCRIPTIONS AND SPECIFICATIONS SHOWN ON DRAWINGS AND SCHEDULES. IF DIFFERENT NOTIFY ARCHITECT/ENGINEER BEFORE BIDDING, ORDERING, OR PROCEEDING WITH WORK.
- DRAWINGS/DETAILS ARE TO BE CONSIDERED DIAGRAMMATIC, NOT NECESSARILY SHOWING IN DETAIL OR TO SCALE ALL MINOR ITEMS. UNLESS SPECIFIC DIMENSIONS ARE SHOWN, THE STRUCTURAL, ARCHITECTURAL AND SITE CONDITIONS SHALL GOVERN EXACT LOCATIONS. CONTRACTOR SHALL FOLLOW DRAWINGS IN LAYING OUT WORK, AND CHECK/COORDINATE DRAWINGS OF ALL TRADES.
- COORDINATE WITH THE WORK OF OTHERS SECTIONS, EQUIPMENT FURNISHED BY OTHERS, REQUIREMENTS OF THE OWNER, AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE. PROVIDE DUCT RISES AND DRIPS AS REQUIRED FOR FIELD INSTALLATION AND TRADE COORDINATION. NOTIFY ARCHITECT OF ANY DISCREPANCIES BEFORE STARTING WORK.
- DRAWINGS FOR HVAC WORK ARE DIAGRAMMATIC, SHOWING THE GENERAL LOCATION, TYPE, LAYOUT, AND EQUIPMENT REQUIRED. THE DRAWINGS SHALL NOT BE SCALED FOR EXACT MEASUREMENT. REFER TO MANUFACTURER'S STANDARD INSTALLATION DRAWINGS FOR EQUIPMENT CONNECTIONS AND INSTALLATION REQUIREMENTS. PROVIDE DUCTWORK, CONNECTIONS, ACCESSORIES, OFFSETS, AND MATERIALS NECESSARY FOR A COMPLETE SYSTEM.
- ALL WORK SHALL COMPLY WITH STATE AND LOCAL CODE REQUIREMENTS AS APPROVED AND AMENDED BY THE GOVERNING CITY. PURCHASE ALL PERMITS ASSOCIATED WITH THE WORK. OBTAIN ALL INSPECTIONS REQUIRED BY CODE.
- G. USE OF COMBUSTIBLE MATERIALS IS NOT ALLOWED IN THE RETURN AIR PLENUM. MATERIALS USED IN THE PLENUM SHALL HAVE FLAME SPREAD RATING NOT TO EXCEED 25, AND SMOKE DEVELOPED RATING NOT TO EXCEED 50 WHEN TESTED IN ACCORDANCE WITH ASTM E 84. ALL EXPOSED WIRING IN THE PLENUM SHALL BE PLENUM RATED.
- G.C.TO VERIFY LOCATION OF PERMISSIBLE NEW STRUCTURAL ROOF PENETRATIONS AND ADAPT THE REQUIRED DUCTS ACCORDINGLY. THE OPENINGS MUST BE LOCATED USING A REBAR LOCATOR, TRYING TO LEAVE A TRANSVERSE BAR WITHIN 4" FROM THE OPENING. LOCATE OPENINGS AT MID-DISTANCE BETWEEN THE STEMS OF THE DOUBLE TEE AND LONGITUDINAL REINFORCEMEN SHALL NEVER BE CUT. CALL THE ARCHITECT'S OFFICE IN CASE OF UNEXPECTED DIFFICULTIES.
- ALL A/C ROUND EXPOSED DUCTS WILL BE SPIRAL GALVANIZED AND READY FOR PAINTING. ALL RECTANGULAR DUCTS OVER CEILINGS MAY BE SHEET METAL WITH EXTERNAL INSULATION AND ALL EXPOSED ROUND SHEET METAL DUCTS SHALL BE INTERNALLY INSULATED.
- G.C. SHALL COORDINATE WITH LANDLORD APPROVED ROOFING CONTRACTOR TO FLASH AND SEAL ALL ROOF PENETRATIONS TO MAINTAIN ROOFING WARRANTY.
- CONSTRUCTION "AS BUILT" DRAWINGS AND DOCUMENTS SHALL BE PROVIDED TO THE OWNER WITHIN 90 DAYS AFTER THE DATE OF ACCEPTANCE AND PROVIDE COPY TO LL.
- OPERATION MANUALS AND MAINTENANCE MANUALS SHALL BE PROVIDED TO THE BUILDING OWNER.

#### MECHANICAL SYMBOLS



#### **MECHANICAL PLAN NOTES**

- REUSE EXISTING SIX 15.0 TON, ONE 3.0 TON, ONE 2.5 TON & ONE 8.5 T HEAT ROOF TOP UNITS. PROVIDE NEW DUCTWORK AND NE ACCESSORIES AS SHOWN IN PLAN. REUSE EXISTING CONCENTRIC DIFFUSERS AS MUCH AS POSSIBLE. PROVIDE FLEXIBLE CONNECT SUPPLY AIR DUCT CONNECTIONS. TRANSITION TO DUCT SIZES SHOWN. DUCTWORK AND AIR DISTRIBUTION DEVICES AS INDICATED ON THE PLAN TO A/C UNIT SCHEDULE FOR ADDITIONAL REQUIREMENTS
- B. FOR SYSTEM OVER 2,000 CFM CHECK FOR DUCT MOUNTED AIR DETECTORS AND THAT MEET THE REQUIREMENTS OF U.L. 268A, INTER TO SHUTDOWN A/C UNIT UPON DETECTION OF SMOKE. IF NECESSARY SMOKE DETECTOR WITH AN ANNUNCIATOR, ALARM AND POWER L.E.I VISIBLE AND AUDIBLE ALARM SIGNAL. AND VISIBLE TROUBLE SIGNAL ANNUNCIATOR ON ROOM SIDE OF CEILING.
- ALL DUCTS SHALL BE MINIMUM 26 GAUGE SHEET METAL WITH EXTERN WRAP INSULATION FOR CONCEALED DUCTS AND ALL EXPOSED DUC INTERNAL INSULATION. ALL DUCTS TO BE MANUFACTURED AND INS ACCORDING TO ASHRAE AND SMACNA METAL DUCT CONSTRUCTION ST LATEST EDITION. ALL MATERIALS WILL CONFORM TO NFPA 90A.
- D. THERMOSTATS SHALL BE 7-DAY PROGRAMMABLE TYPE. MOUNT THER 48" A.F.F. COORDINATE LOCATION OF THERMOSTAT.
- ALL INTERIOR AIR DUCTS WITH INSULATION SHALL HAVE A MINI THICKNESS OF 1.5", R-6 INSULATION. OUTSIDE AIR DUCTS TO HA INSULATION ACCORDING TO 2021 INTERNATIONAL ENERGY CONSE CODE
- ALL SEAMS, JOINTS, ETC WILL BE SEALED TO MAKE AIR DUCT PRESSURE SENSITIVE MATERIALS AND OTHERS APPROVED BY LATEST SEALING MATERIALS WILL BE USED.
- ALL EVAPORATOR UNITS SHALL HAVE A FLOAT SWITCH TO CONTROL OVE THAT WILL AUTOMATICALLY SHUT DOWN THE RTU SYSTEM. THE DEVIC BE ATTACHED TO THE SECONDARY DRAIN OUTLET ON THE UNIT.
- ALL CONDENSATE DRAINS WILL BE PVC FULL DIAMETER OF OUTLET TERMINATE IN THE NEAREST APPROVED PLACE OF DISPOSAL.
- ALL EQUIPMENT AND MATERIALS WILL BE INSTALLED ACCORDING MANUFACTURER'S INSTRUCTIONS AND ACCORDING TO THE BEST PRACT
- TESTING AND BALANCING SHALL BE DONE IN ACCORDANCE WI INTERNATIONAL ENERGY CONSERVATION, SECTION C408.2.2. BA PROCEDURES SHALL BE IN ACCORDANCE WITH THE NATIONAL ENVIRON BALANCING BUREAU (N.E.B.B.), THE ASSOCIATED AIR BALANCE (A.A.B.C) NATIONAL STANDARDS OR EQUIVALENT PROCEDURES.
- HANGER ATTACHMENTS TO THE STEEL STRUCTURE WILL BE RATED ACTUATED FASTENERS, "C" CLAMPS, WELDED STUDS, CLAMP HANGEF CLAMPS OR OTHER METHODS RECOMMENDED BY SMACNA'S "ME" FLEXIBLE STANDARDS", CHAPTER 4, AND WILL HAVE A MINIMUM SAFETY OF 4:1. SUSPENDED FROM TOP CHORD OF JOISTS, NOTHING FROM CROSS BRACING.
- ALL HVAC CONTROLS AND CONTROL WIRING SHALL BE PROVIDED MECHANICAL CONTRACTOR.
- M. PROVIDE FIRE OR FIRE+SMOKE DAMPER WHEREVER DUCTS ARE C FIRE/SMOKE RATED WALLS/BARRIERS/SLABS. COORDINATE ARCHITECTURAL DRAWING FOR FIRE RATING OF THE WALLS.

#### N. ATTLEBOROUGH, MA BUILDING NOT

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF MASSACHUSETTS CODE 2015 (2015 IBC) AND ALL AMENDMENTS AND RULES AND REGULATION DEPARTMENT OF BUILDINGS TO DATE.

- THE LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSO NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTAL SUCH MECHANICAL SYSTEMS AND CONDUCTING SUCH TESTS DOCUMENTATION AND REPORTS OF TESTS THAT THE SYSTEM COMPLIES CONSTRUCTION DOCUMENTS AND APPLICABLE LAWS.
- TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDAN THE FOLLOWING SECTIONS OF THE MASSACHUSETTS MECHANICAL C (2015 IMC):

A. VENTILATION SYSTEM - MASSACHUSETTS MECHANICAL CODE 2015 403.3.

THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, E COMPLY WITH THE REFERENCED CODE OR STANDARD:

- A. DUCT CONSTRUCTION AND INSTALLATION- MASSACHUSETTS MECH CODE 2015 (2015 IMC), 603
- B. STANDARDS OF HEATING MASSACHUSETTS MECHANICAL CODE 20 IMC), 309.1 C. AIR INTAKES, EXHAUSTS AND RELIEF - MASSACHUSETTS MECHANIC
- 2015 (2015 IMC), 401.5 D. AIR FILTERS - MASSACHUSETTS MECHANICAL CODE 2015 (2015 IMC),
- E. GAS FIRED EQUIPMENT MASSACHUSETTS FUEL & GAS CODE F. MANUAL AND AUTOMATIC FIRE AND SMOKE CONTROLS FOR AIR DISTRIBUTION SYSTEMS -MASSACHUSETTS MECHANICAL CODE 201 IMC), 606
- MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES HEATING SEASON: 68 DEG. FAHRENHEIT.
- VENTILATION FOR ALL AREA SHALL COMPLY WITH MASSACHUSETTS M CODE 2015 (2015 IMC), 401.
- A STATEMENT SHALL BE FILED BY THE OWNER OR TENANT IN POSSES THE VENTILATION SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION AT DURING THE NORMAL OCCUPANCY OF THE STRUCTURE AS REQU MASSACHUSETTS MECHANICAL CODE 2015 (2015 IMC) 403.
- REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE-RATED SMOKE WALL CONSTRUCTION AND LOCATION.
- . THESE PLANS ARE APPROVED ONLY FOR THE WORK INDICATED APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE I RELIED UPON OR TO BE CONSIDERED AS BEING APPROVED OR IN ACCO WITH APPLICABLE CODES.
- 10. ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.
- VENTILATION SYSTEMS SHALL BE BALANCED TO MAINTAIN THE VENTILATION AIRFLOW RATE AS SHOWN IN VENTILATION REQUIREME THIS SYSTEM SHALL BE BALANCED BY APPROVED. CONTRACTOR TO SU AIR - BALANCE REPORT TO INSPECTOR OF RESPECTIVE BUILDING DEP PRIOR TO FINAL INSPECTION.

OC		ALCULAT	ΓΙΟΝ					G	GAS HEAT I	ROOF TOP HEDULE				
		4110 \$	SQ. FT.	220 PEOPL			RTU -1(E), 2(E)	), BTIL-3		BTIL_5(E)	BTIL-7(E)	BTIL_8(E)	BTH -0	
CHECK IN & REDEMPTI	N	5870 : 524 :	SQ. FT. SQ. FT.	37 PEOPL 3 PEOPL			4(E) & 6(E)	HT0-5	·(Ľ)	HTO -5(L)	HTO -7 (E)		110-9	
ARCADE AREA		7000 \$	SQ. FT.	50 PEOPL			GAS HEAT	GAS HE	EAT	GAS HEAT	GAS HEAT	GAS HEAT	GAS HE	EAT
KRAVE SEATING AND B	R AREA SEATING	G 1850 S	SQ. FT.	30 PEOPL		R	LENNOX	LENNO	XC	LENNOX	LENNOX	LENNOX	LENNO	OX
OFFICE BREAKROOM		262 \$ 281 \$	SQ. FT. SQ. FT.	4 PEOPL 2 PEOPL		L	GH180H4MM3	G LGH180H4	MM3G LO	GH180H4MM3G	LGH036H4EU4G	KGB030S4DW1P	LGH102H4I	MM3G
LUCKY PUTT/ AXE THRO	WING/				STATUS		EXISTING	EXISTI	NG	EXISTING	EXISTING	EXISTING	EXISTI	NG
WRAPPED WALL/ NINJA EXTREME DODGE BALL	COURSE/ LAUNCHPAD/	9130 \$	SQ. FT.	60 PEOPL	EMOUNTING		ROOF	ROO	F	ROOF	ROOF	ROOF	ROOI	F
GLADIATOR PIT/ SHUNT	JUMP				NOMINAL CAPAC	CITY	15.0 TON	15.0 T	ON	15.0 TON	3.0 TON	2.5 TON	8.5 TC	ON
			TOTAL	406 PEOPL		G MBH	S.A.E	S.A.F	E	S.A.E	S.A.E	S.A.E	S.A.E	E
REFER TO THE OCCUPA	IT LOAD CALCUL	ATIONS ON	SHEET CS-1 F	OR	SENSIBLE COOL	ING MBH	S.A.E	S.A.I	E	S.A.E	S.A.E	S.A.E	S.A.E	E
ARCHITECTURAL OCCUP	ANCY CALCULAT	FION.			IEER/EER		S.A.E	S.A.E	E	S.A.E	S.A.E	S.A.E	S.A.E	E
VENTILATIO		IENTS P	ER 2015 II	MC,	HEATING INPUT	MBH	360.0 (V.I.F)	360.0 (\	/.I.F)	360.0 (V.I.F)	108.0 (V.I.F)	65.0 (V.I.F)	180.0 (V	/.I.F)
	TABLE 40	3.3.1.1					288.0 (V.I.F)	288.0 (V	/.I.F)	288.0 (V.I.F)	86.0 (V.I.F)	52.0 (V.I.F)	144.0 (V	/.I.F)
PARTY ROOMS	4110 SQ. FT. 220 PEOPLE	X 0.06 CFIV	EOPLE. =	247 CFN 1100 CFN			6000	6000	)	6000	1200	1000	500	
BOWLING ALLEY	4200 SQ. FT.	X 0.3 CFM/	'SQ. FT. =	1260 CFN	ESP @ IN WC.		SAF	S A F	=	SAF	SAF	SAF	S A F	F
BOWLING SEATING /	1670 SQ. FT.	X 0.12 CFN	//SQ. FT. =	201 CFN	V/P/Hz		460/3/60 (V.I.F		– (V.I.F)	460/3/60 (V.I.F)	460/3/60 (V.I.F)	208-230/1/60 (V.I.F)	460/3/60	∟ (V.I.F)
	37 PEOPLE.	X 10 CFM/F	PEOPLE. =	370 CFN	MCA (A)		39.0 (V.I.F)	39.0 (V	.I.F)	39.0 (V.I.F)	12.0 (V.I.F)	20.0 (V.I.F)	19.0 (V.	.l.F)
CHECK IN & REDEMPTION	524 SQ. FT. 3 PEOPLE		1/SQ.FT. = FOPLF =	32 CFN 15 CFN	MOCP (A)		45.0 (V.I.F)	45.0 (V	.l.F)	45.0 (V.I.F)	15.0 (V.I.F)	30.0 (V.I.F)	20.0 (V.	.l.F)
	7000 SQ. FT.	X 0.18 CFN	//SQ. FT. =	1260 CFN	WEIGHT (lbs)		S.A.E	S.A.E		S.A.E	S.A.E	S.A.E	S.A.E	E
	50 PEOPLE.	X 7.5 CFM/	PEOPLE. =	375 CFN		STING RTUS	ACOF00001-0	TO DEMAND					-	
(RAVE SEATING AND BAB AREA SEATING	1850 SQ. FT.	X 0.18 CFN	1/SQ. FT. =	333 CFN	1. EXISTING I 2. S.A.E : SAM	ME AS EXISTING	AUCESSORIES G.	IU KEMAIN SAME	AND TO BE F	IEUSED.				
	262 SQ. FT	X 0.06 CFM	//SQ. FT. =	225 CFN 16 CFN	3. V.I.F : VER	IFY IN FIELD. TOR TO FIELT		RTU ARE WORK		R 100% RATED		INFORM TO DESIGN		
OFFICE	4 PEOPLE.	X 5 CFM/P	EOPLE. =	20 CFN				RMANCE PRIOR T	O CONSTRUC	TION.				
BREAKROOM	281 SQ. FT.	X 0.06 CFN	//SQ. FT. =	17 CFN	5. CONTRAC	RED, PROVID	VERIFY EXACT	ERMOSTAT AND C		UNIT ON S URE SENSOR	COMPATIBLE WITH	EXISTING RTU. C	O-ORDINATE	FINAL
PASSAGE	2 PEOPLE.	X 5 CFM/PE	EUPLE. = //SQ. FT =	10 CFN	LOCATION	/REQUIREMEN TOR TO BAI AN	T OF T-SENSO	R WITH ARCHITEC	T/OWNER. DAMPERS ON	EXISTING RTU T	O MATCH VALUES MEN	ITIONED IN ABOVE TAI	BLE.	
VESTIBULE	245 SQ. FT.	X 0.06 CFN	//SQ. FT. =	15 CFN		FILTERS, IF REC	QUIRED.							
CLOSET	243 SQ. FT.	X 0.12 CFN	1/SQ. FT. =	30 CFN	9. CONTRAC SENSORS				S ARE PROVI NTROL VENTIL	ATION.	JEATING OA DAMPER.	IF NUT, PROVIDE DI	UCT MOUNTE	U UU2
STORAGE 1	660 SQ. FT.	X 0.12 CFN	1/SQ. FT. =	80 CFN	CONTRACTOR	SHALL VERIFY	EXACT ELECT	RICAL CONNECTIO	ONS, WIRE SI7	ES, BREAKERS. I	DISCONNECT ETC. PRIC	OR TO ORDERING AND	D BID.	
STORAGE 2	372 SQ. FT.	X 0.12 CFN	1/SQ. FT. =	45 CFN					_, C 012	,,,,,,,			.= .	
ELECTRICAL RM	100 SQ. FT.	X 0.12 CFN	//SQ. FT. =	12 CFN			FAN SC	HEDULE						
LUCKY PUTT/ AXE														
VALL/ NINJA COURSE/	9130 SQ. FT.	X 0.3 CFM/	′SQ. FT. =	2740 CFN	DESIGNATION	EF-1(N)	EF-2(N)	EF-3(N)	EF-4(N)	EF-5(N)				
EXTREME DODGE BALL LAUNCHPAD/ GLADIATO	R	,			STATUS	NEW	NEW	NEW	NEW	NEW				
					QUANTITY	1	1	1	1	1				
OUTSIDE AIR REQUIRED				8770 CFN	MANUFACTURE		K GREENHEC		GREENHECK	GREENHECK				
MEN RESTROOM	70 CFM X N	O. OF FIXTU	JRE (#8)	560 CFM					C60 4740					
VOMEN RESTROOM	70 CFM X N	O. OF FIXTU	JRE (#4)	280 CFN	WODEL	USP-A1050		USP-A1050	USP-A/10	CSP-A390				
	70 CFM X N	O. OF FIXTU	JRE (#1)	70 CFN	СЕМ	700 CFM A1 0.8" W.G. ES	ı ∣ 420 CFM A SP   0.8" W.G. ES	1 900 CFM AT SP 0.5" W.G. ESP	450 CFM AT 0.5" W.G. ESF	220 CFM AT 0.6" W.G. ESP				
JP SINK TCHEN & KRAVE	70 CFM			70 CFN	FLA (AMPS)	5.0	3.3	5.0	4.9	1.42				
ERVICE AREA	1265 SQ. FT.	X 0.7 CFM/	SQ. FT.	886 CFM		איזיד חחם	א דידי אחא		איז דו חחפ	איש דו וחחם				
OWLING PINSETTER	440 SQ. FT.	X 0.5 CFM/	'SQ. FT. =	220 CFN		עסט, LITE KI	, נווב ג, נווב K	, נווב אוום, נווב אוו	LIIE KII, ששט	LIIE NII				
	,			2086 CFN	WEIGHT (LBS)	65	40	60	40	25				
D/A PROVIDED THROU	iH RTU -1(E), 2(E)	,4(E) & 6(E)		1385 CFM	VOLTAGE	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60				
	H RTU-3(E)	.,,	-	1345 CFN				I						
O/A PROVIDED THROUG	іп кто-5(E) iH RTU-7(E)			1800 CFM 160 CFM	2. PROVIDE D	ACK DRAFT DA	AMPER.							
				175 CFN	3. INTERCON 4. INTERCON	NECT WITH RT	U SERVING TO WITH T-STAT A	THE SPACE. ND SET CUT ON						
EF-1(N) - @700 CFM	11110-9(E)			500 CFN -700 CFN	TEMPERAT	URE TO 80°F.	2.00174							
EF-2(N) - @420 CFM EF-3(N) - @900 CFM				-420 CFN	NECK SIZ	ZE TABLE - A								
EF-4(N) - @450 CFM				-900 CFN -450 CFN			GE							
EF-5(N) - @220 CFM				-220 CFN	Ø6"	0-100								
BUILDING PRESSURE (E	AROMETRIC REL	JEF)		+6790 CFM	Ø8"	101-200					GRAV	ITY VENT SCHED	ULE	
NOTE: CONTRACTOR TO A	DJUST MOTORIZI	ED/MANUAL	DAMPER ON	FRESH AIR TA	P Ø10"	201-400	—	MARK QU	ANTITY	MANUFACT	URER MODEL	SIZE THROA	T AREA C	FM T
TO PROVIDE OUTSIL	E AIR AS MENTIC	ONED IN ABO	OVE TABLE.		Ø12"	401-600	[	GV-1(N)	4	GREENHE	CK GRSR	24" DIA 3.00 S	SQ. FT. 1	500
		<b>-</b> c =			L				TH BR-10 RAP		DAMPER. DAMPER TRAY	Y PROTECT FROM PAIR		Y PER MA
		DIFF	USER SCHI	DULE		1								LI CIVIAI
JUFACTURER TITU	S TITUS	TITUS	TITUS	TITUS	TITUS TITUS	TITUS	S.A.E	D. VENT SHALL C. CONTRACTO		ATE THE DAMPER	, SO AS TO OPEN WHE	N EXCESS PRESSURE	IS CREATED IN	NSIDE THE
SIGNATION A	A1	В	С	R	R1 E	E1	EX	D. T.P.D : TOTA E. PROVIDE FL/	L PRESSURE I	OROP GE FOR MOUNTIN	IG AS PER MANUFACTU	RER RECOMMENDATIO	ONS.	
E SUPP	Y SUPPLY	SUPPLY	SUPPLY	RETURN	RETURN EXHAUST	EXHAUST	EXISTING	F. COORDINAT	E FINAL FINIS	H WITH ARCHITEC	CT / OWNER.			
		00077												
	I OMNÍ	300FS	DL	350 RL	56FL 56FL	56FL	S.A.E			DE				
	G CEILING	DUCT	DUCT	CEILING	WALL CEILING		S.A.E	OUTSIDE AI	R DAMPER CO	DNTROL LIMIT	OUTSIDE AIR DA	AMPER CONTROL LIM	IT- RTU-3(E)	OUTSI
								- 1110		-, - (-)				
CATION AS SHO	WIN AS SHOWN	AS SHOWN	AS SHOWN	AS SHOWN	SHOWN AS SHOWN	AS SHOWN	S.A.E	MINIMUM O REQUIRED IN	UTSIDE AIR	890 CFM	MINIMUM REQUIRED	OUTSIDE AIR	560 CFM	N   RE
CE SIZE 24" X 2	4" 12" X 12"	-	AS SHOWN	24" X 24" 🖌	S SHOWN 6" X 6"	AS SHOWN	S.A.E	DURING UNOCO		S	DURING UNO	CCUPIED HOURS		DURI
CK SIZE		-	-	-		-	S.A.E			1005 0	MAXIMUM			M
				LAY-IN			SAF	REQUIRED IN DURING OCCL	I THE SPACE	1385 CFM	REQUIRED	IN THE SPACE 1	345 CFM	RE DUF
	FLANGED			/FLANGED			3.A.E							
	IE VOLUME R DAMPER	VOLUME DAMPER	VOLUME DAMPER	VOLUME DAMPER	VOLUME   VOLUME DAMPER   DAMPER	VOLUME DAMPER	S.A.E							
								OUTSIDE AIR DAM	NPER CONTRO	JL LIMIT- RTU-8(E		AMPER CONTROL LIM	11- KTU-9(E)	
DTES :								MINIMUM O	UTSIDE AIR		MINIMUM	OUTSIDE AIR		
DTES : MAX. NC LEVEL 30 OR	ESS.									1		1		
DTES : MAX. NC LEVEL 30 OR PROVIDE SQUARE TO COORDINATE WITH AF	ESS. ROUND NECK AD CHITECT FOR PA	APTOR. NNT AND FIN	NISH.						THE SPACE וייסא CUPIED אייסים	35 CFM		IN THE SPACE 1	100 CFM	
DTES : MAX. NC LEVEL 30 OR PROVIDE SQUARE TO COORDINATE WITH AR PROVIDE 4-WAY AIR TH PROVIDE INSULATED F	ESS. ROUND NECK AD CHITECT FOR PA ROW PATTERN L ACKS ON ALL DU	APTOR. NINT AND FIN JNLESS NOT FFUSERS	NISH. TED OR INDIC	ATED.						35 CFM		IN THE SPACE 1 CCUPIED HOURS	100 CFM	
OTES : MAX. NC LEVEL 30 OR PROVIDE SQUARE TO COORDINATE WITH AF PROVIDE 4-WAY AIR TH PROVIDE INSULATED E CONTRACTOR TO FILE	ESS. ROUND NECK AD CHITECT FOR PA ROW PATTERN L ACKS ON ALL DI O VERIFY AND RE	APTOR. NINT AND FIN JNLESS NOT FFUSERS. EUSE THE EX	NISH. TED OR INDIC. XISTING CON	ATED. CENTRIC SUPP	LY DIFFUSERS FOR AL	L THE RTUs. IF		REQUIRED IN DURING UNOCO MAXIMUM O REQUIRED IN	I THE SPACE CUPIED HOUF UTSIDE AIR I THE SPACE	35 CFM 175 CFM	MAXIMUM REQUIRED	IN THE SPACE 1 CCUPIED HOURS OUTSIDE AIR IN THE SPACE	100 CFM	

тп		MODEL	SIZE					
					1500			540
		JCND	24 DIA	3.00 SQ. FT.	1000	0.035		040
F DA	MPER,	DAMPER TRAY	PROTECT	FROM PAINT OVERS	PRAY PE	ER MANUFACTURER		
TIVE ER, S	E COAT	ING. O OPEN WHEN	EXCESS F	RESSURE IS CREATE	ED INSID	E THE BUILDING.		
ING ECT	AS PEF / OWNI	R MANUFACTUF ER.	RER RECOI	MMENDATIONS.				
DEN	IAND	CONTROL V	ENTILAT	ION - RTU OUTSI	DE AIF	RLIMIT		
	OI	JTSIDE AIR DAI	MPER COI	NTROL LIMIT- RTU-3	E)	OUTSIDE AIR DAMPER CO	ONTROL	LIMIT- RTU-5(E)
		MINIMUM OUTSIDE AIR REQUIRED IN THE SPACE 560 CFM DURING UNOCCUPIED HOURS				MINIMUM OUTSIDE REQUIRED IN THE SI DURING UNOCCUPIED	AIR PACE HOURS	920 CFM
	MAXIMUM OUTSIDE AIR REQUIRED IN THE SPACE 1345 CFM DURING OCCUPIED HOURS					MAXIMUM OUTSIDE REQUIRED IN THE SI DURING OCCUPIED H	AIR PACE OURS	1800 CFM
3(F)								
/_/					_/			
		MINIMUM C REQUIRED II DURING UNOC	OUTSIDE A N THE SPA CUPIED H	IR CE 100 CFM OURS				
		MAXIMUM O REQUIRED II DURING OCC	OUTSIDE A N THE SPA UPIED HO	IR ACE 500 CFM URS				



	LOCATION OF DIGITAL THERMOSTAT CONTROL. RELOCATE AND REUSE 7-DAY PROGRAMMABLE THERMOSTAT OF ALL EXISTING ROOFTOP UNITS. COORDINATE EXACT LOCATION WITH ARCHITECT AND OWNER PRIOR TO ROUGH-IN. PROVIDE LOCKABLE COVER. PROVIDE NEW T-STAT OF SAME TYPE IF EXISTING FOUND DAMAGE.	
2	COORDINATE FINAL LOCATION OF EQUIPMENT WITH STRUCTURAL DRAWINGS AND CONFIRM THE SAME WITH ARCHITECT/OWNER.	
$\overline{3}$	NOT USED	
	EXTEND FULL SIZE SUPPLY & RETURN DUCTWORK FROM ROOFTOP UNITS TO SPACE. EXTEND AS SHOWN. ACOUSTICALLY LINE THE FIRST 10'-0" OF BOTH SUPPLY AND RETURN MAIN DUCTS.	
5	CHECK FOR RETURN AIR DUCT MOUNTED SMOKE DETECTOR IN EXISTING RTUS. IF EXISTING NOT FOUND/DAMAGED PROVIDE NEW ONE. SMOKE DETECTOR SHALL BE FURNISHED/INSTALLED BY MECHANICAL CONTRACTOR AND WIRED BY ELECTRICAL CONTRACTOR TO SHUT DOWN CORRESPONDING RTU UNDER ALARM CONDITIONS. ALL WIRING SHALL BE IN CONDUIT PER N E C.	
6	PROVIDE REMOTE TEMP SENSOR MOUNTED IN RETURN DUCT AND WIRE BACK TO T-STAT LOCATED AT OFFICE.	
	CONTRACTOR TO FIELD VERIFY IF THE EXISTING RTUS ARE PROVIDED WITH CO2 SENSORS FOR MODULATING OUTSIDE AIR SUPPLY. IF NOT PROVIDE NEW CO2 SENSOR IN RETURN AIR DUCT AND PROVIDE MODULATING OUTDOOR AIR SUPPLY CONTROL.	
8	Ø 8" EXHAUST DUCT UPTO THE ROOF.	
9	Ø 10" EXHAUST DUCT UPTO THE ROOF.	
10	PROVIDE 8"X8" DOOR GRILLE.	
	NOT USED	Ø10"(N)
	NOT USED	
13	Ø 28" SUPPLY DUCT FROM RTU-5(E). (REFER SHEET M-2.0)	R 200
14	Ø 12"/Ø 10" SUPPLY DUCT UPTO BOWLING SEATING & STANDING AREA. (REFER SHEET M-2.0)	
15	NOT USED	
16	Ø 8" SUPPLY DUCT UPTO WOMENS RESTROOM SUPPLY DIFFUSER. (REFER SHEET M-3.0)	
17	SUPPLY DUCT SERVING MENS RESTROOM, UNISEX RESTROOM (REFER SHEET M-3.0) & BOWLING AREA.	
18	CONTRACTOR TO FIELD VERIFY AND REUSE THE EXISTING CONCENTRIC SUPPLY GRILLES AND RE-BALANCE AS SHOWN IN THE PLAN. IF FOUND DAMAGED REPAIR/REPLACE WITH SAME TYPE.	24"X24" 24"X24" R 350
<u>CO2</u>	2 SENSOR AND INSTALLATION NOTES - DEMAND CONTROL VENTILATION FOR ALL RTU	
MOI 1. 2. 3. 4. 5. 6. 7.	JULATING OUTSIDE AIR DAMPER: UNOCCUPIED MODE: SUPPLY OUTSIDE AIR AS PROVIDED IN THE OUTSIDE AIR DAMPER CONTROL LIMIT TABLE. OCCUPIED MODE: ENERGIZED WHEN FAN IS RUNNING, DAMPER SHALL MODULATE BASED ON SIGNAL FROM CO2 SENSORS TO MAINTAIN LEVEL BETWEEN 600 PPM AND 1000 PPM BUT NOT EXCEEDING THE TOTAL DESIGN AIR FLOW RATE COMMERCIAL SENSOR UTILIZES A SIGNAL BEAM ABSORPTION INFRARED DIFFUSION SAMPLE METHOD FOR CO2 DETECTION. USING CO2 AS AN INDICATOR OF OCCUPANCY WILL ALLOW VENTILATION BASED ON ACTUAL OCCUPANCY WHILE MAINTAINING CODE MINIMUM VENTILATION. SENSOR WILL MODULE OUTSIDE AIR QUANTITIES THROUGH ECONOMIZER DAMPER ACTUATOR AND WILL CONTROL AMOUNT BETWEEN OCCUPIED AND UNOCCUPIED QUANTITY OF OUTSIDE AIR PER RESPECTIVE RTUS. SENSOR SHALL BE PROVIDED WITH ROOFTOP AIR CONDITIONING UNIT AND INSTALL PER MANUFACTURERS REQUIREMENTS. CO2 SENSORS SHALL BE DUCT MOUNTED IN THE RTU. IF EXISTING RTUS IS FOUND WITHOUT CO2 SENSOR ,PROVIDE NEW AND MODULATING OA DAMPER. SET THE DAMPER SETTING AS PER THE TABLE BELOW FOR RESPECTIVE RTUS.	

Ø10"(N)

24"X24" R 290

FLOOR PLAN KEY NOTES:





HVAC FLOOR PART PLAN KEY NOTES FOR MEZZANINE FLOOR (PARTY ROOMS):

- (1) COORDINATE FINAL LOCATION OF EQUIPMENT WITH STRUCTURAL DRAWINGS AND CONFIRM THE SAME WITH ARCHITECT/OWNER.
- 2 EXTEND FULL SIZE SUPPLY & RETURN DUCTWORK FROM ROOFTOP UNITS TO SPACE. EXTEND AS SHOWN. ACOUSTICALLY LINE THE FIRST 10'-0" OF BOTH SUPPLY AND RETURN MAIN DUCTS.
- CHECK FOR RETURN AIR DUCT MOUNTED SMOKE DETECTOR IN EXISTING RTUS. IF EXISTING NOT FOUND/DAMAGED PROVIDE NEW ONE. SMOKE DETECTOR SHALL BE FURNISHED/INSTALLED BY MECHANICAL CONTRACTOR AND WIRED BY ELECTRICAL CONTRACTOR TO SHUT DOWN CORRESPONDING RTU UNDER ALARM CONDITIONS. ALL WIRING SHALL BE IN CONDUIT PER N E C.
- PROVIDE REMOTE TEMP SENSOR MOUNTED IN RETURN DUCT AND WIRE BACK TO T-STAT LOCATED AT OFFICE.
- 5 CONTRACTOR TO FIELD VERIFY IF THE EXISTING RTUS ARE PROVIDED WITH CO2 SENSORS FOR MODULATING OUTSIDE AIR SUPPLY. IF NOT PROVIDE NEW CO2 SENSOR IN RETURN AIR DUCT AND PROVIDE MODULATING OUTDOOR AIR SUPPLY CONTROL.
- 6 10"X10" SUPPLY DUCT UPTO VESTIBULE. (REFER SHEET M-2.0)
- 7 10"X10" RETURN DUCT UPTO VESTIBULE. (REFER SHEET M-2.0)
- 8 26"X12" SUPPLY DUCT DOWN TO FIRST FLOOR PARTY ROOMS (REFER SHEET M-2.0)







- (1) Ø10" EXHAUST DUCT UPTO THE ROOF.
- (2) Ø12" EXHAUST DUCT UPTO THE ROOF.
- (3) Ø14" EXHAUST DUCT UPTO THE ROOF.
- 4 SUPPLY DUCT FROM RTU-3(E). (REFER SHEET M-2.0)
- 5 SUPPLY DUCT FROM RTU-5(E). (REFER SHEET M-2.1)





HVAC FLOOR PLAN - RESTROOM

SCALE

1/4" = 1'-0"

2

 $\langle 4 \rangle$ 

З

	ROOF PLAN KEY NOTES:	
	Ø 14" EXHAUST DUCT FROM BELOW FLOOR. TERMINATE WITH GOOSENECK AND BIRD SCREEN. MAINTAIN MINIMUM 10' FROM ANY OUTSIDE AIR INTAKE.	
2	CONTRACTOR TO FIELD VERIFY AND IDENTIFY THE EXACT LOCATIONS OF THE EXISTING UNIT PRIOR STARTING ANY CONSTRUCTION.	
3	CONTRACTOR TO FIELD VERIFY THE CONDITIONS OF THE EXISTING UNIT IF IT IS PERFORMING TO ITS 100% CAPACITY. IF NOT REPORT ENGINEER IN RECORD.	
4	CONDENSATE DRAIN LINES FROM EXISTING RTU TO REMAIN AS IT IS. IF PIPING IS DAMAGED OR BLOCKED, REPAIR OR REPLACE AS/IF DAMAGED. USE SIMILAR MATERIAL OR APPROVED MATERIALS PER LOCAL CODE.	
5	CONTRACTOR SHALL FILED VERIFY AND CONFIRM ALL OUTSIDE AIR INTAKE ARE MINIMUM 10' AWAY FROM ANY EXHAUST AIR.	
		10'
		RTU-8(E)
		WEIGHT: S.A.E





- CONTRACTOR SHALL FILED VERIFY AND CONFIRM ALL OUTSIDE AIR INTAKE ARE MINIMUM 10' AWAY FROM ANY EXHAUST AIR.
- CONDENSATE DRAIN LINES FROM EXISTING RTU TO REMAIN AS IT IS. IF PIPING IS DAMAGED OR BLOCKED, REPAIR OR REPLACE AS/IF DAMAGED. USE SIMILAR MATERIAL OR APPROVED MATERIALS PER LOCAL CODE.
- CONTRACTOR TO FIELD VERIFY THE CONDITIONS OF THE EXISTING UNIT IF IT IS PERFORMING TO ITS 100% CAPACITY. IF NOT REPORT ENGINEER IN RECORD.
- CONTRACTOR TO FIELD VERIFY AND IDENTIFY THE EXACT LOCATIONS OF THE EXISTING UNIT PRIOR STARTING ANY CONSTRUCTION.
- Ø 12" EXHAUST DUCT FROM BELOW FLOOR. TERMINATE WITH GOOSENECK AND BIRD SCREEN. MAINTAIN MINIMUM 10' FROM ANY OUTSIDE AIR INTAKE.
- Ø 10" EXHAUST DUCT FROM BELOW FLOOR. TERMINATE WITH GOOSENECK AND BIRD SCREEN. MAINTAIN MINIMUM 10' FROM ANY OUTSIDE AIR INTAKE.
- MAINTAIN MINIMUM 10<sup>°</sup> FROM ANY OUTSIDE AIR INTAKE.
   Ø 10<sup>°</sup> EXHAUST DUCT FROM BELOW FLOOR. TERMINATE WITH GOOSENECK AND BIRD SCREEN
- ROOF PLAN KEY NOTES:Ø 8" EXHAUST DUCT FROM BELOW FLOOR. TERMINATE WITH GOOSENECK AND BIRD SCREEN.<br/>MAINTAIN MINIMUM 10' FROM ANY OUTSIDE AIR INTAKE.



#### **SPECIFICATIONS - DIVISION 23 - HVAC** SECTION 230500 - GENERAL MECHANICAL REQUIREMENTS DEFINITIONS: FURNISH MEANS TO SUPPLY AND DELIVER TO PROJECT SITE, READY FOR INSTALLATION. INSTALL MEANS TO PLACE IN POSITION AND MAKE CONNECTIONS FOR SERVICE OR USE. PROVIDE MEANS TO FURNISH AND INSTALL, COMPLETE AND READY FOR INTENDED USE. WARRANTY: PROVIDE LABOR AND MATERIALS TO REPAIR OR REPLACE DEFECTIVE PARTS AND MATERIALS AS REQUIRED FOR ONE YEAR 3.4 TOLERANCES AFTER SUBSTANTIAL COMPLETION OR OWNER ACCEPTANCE OF THE COMPLETED PROJECT. PROVIDE A SEPARATE LINE ITEM DEDUCT AMOUNT ON THE PROPOSAL FORM TO DELETE WARRANTY SERVICE, AT THE OWNER'S OPTION. CONTRACTOR SHALL INCLUDE ONE YEAR WARRANTY ON OWNER FURNISHED EQUIPMENT. CONTRACTOR SHALL INCLUDE COSTS FOR RECEIVING, HANDLING, STORAGE, AND HOISTING OF OWNER FURNISHED EQUIPMENT. COORDINATION: COORDINATE WITH THE WORK OF OTHER SECTIONS, EQUIPMENT FURNISHED BY OTHERS, REQUIREMENTS OF THE OWNER END OF SECTION AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE. DUCT DIMENSIONS: SECTION 230700 - HVAC INSULATION UNLESS OTHERWISE NOTED, DUCT DIMENSIONS ON THE DRAWINGS ARE INSIDE CLEAR DIMENSIONS. PART 1 - GENERAL **1.1 SECTION REQUIREMENTS** TEMPERATURE CONTROLS: PROVIDE PROGRAMMABLE THERMOSTATS WITH REMOTE TEMPERATURE SENSORS COMPATIBLE WITH ROOFTOP UNIT CONTROL WIRING SHALL BE INSTALLED IN CONDUIT. THERMOSTAT SHALL MEET SETPOINT ADJUSTMENT FOR UNOCCUPIED MODE: HEATING DOWN TO 55 DEGREES AND COOLING UP TO 85 DEGREES. PART 2 - PRODUCTS 2.1 PERFORMANCE REQUIREMENTS END OF SECTION SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC ASTM E 84. PART 1 - GENERAL 2.2 INSULATION MATERIALS **1.1 SECTION REQUIREMENTS** A. SUBMITTALS: 1. CERTIFIED TAB REPORTS. B. TAB FIRM QUALIFICATIONS: NBC CERTIFIED. C. TAB REPORT FORMS: STANDARD TAB CONTRACTOR'S FORMS APPROVED BY ARCHITECT. PART 2 - PRODUCTS (NOT USED) PART 3 - EXECUTION 3.1 EXAMINATION A. EXAMINE THE CONTRACT DOCUMENTS TO BECOME FAMILIAR WITH PROJECT REQUIREMENTS AND TO DISCOVER OR LESS. CONDITIONS IN SYSTEMS' DESIGNS THAT MAY PRECLUDE PROPER TAB OF SYSTEMS AND EQUIPMENT. B. EXAMINE THE APPROVED SUBMITTALS FOR HVAC SYSTEMS AND EQUIPMENT C. EXAMINE SYSTEMS FOR INSTALLED BALANCING DEVICES, SUCH AS TEST PORTS, GAGE COCKS, THERMOMETER WELLS, FLOW-CONTROL DEVICES, BALANCING VALVES AND FITTINGS, AND MANUAL VOLUME DAMPERS. VERIFY THAT LOCATIONS OF THESE BALANCING DEVICES ARE ACCESSIBLE. D. EXAMINE SYSTEM AND EQUIPMENT INSTALLATIONS AND VERIFY THAT FIELD QUALITY-CONTROL TESTING, CLEANING, AND ADJUSTING SPECIFIED IN INDIVIDUAL SECTIONS HAVE BEEN PERFORMED. E. EXAMINE HVAC EQUIPMENT AND FILTERS AND VERIFY THAT BEARINGS ARE GREASED, BELTS ARE ALIGNED AND TIGHT, AND EQUIPMENT WITH FUNCTIONING CONTROLS IS READY FOR OPERATION. F. EXAMINE TERMINAL UNITS, SUCH AS VARIABLE-AIR-VOLUME BOXES, AND VERIFY THAT THEY ARE ACCESSIBLE AND PART 3 - EXECUTION THEIR CONTROLS ARE CONNECTED AND FUNCTIONING. 3.1 INSULATION INSTALLATION G. EXAMINE AUTOMATIC TEMPERATURE SYSTEM COMPONENTS TO VERIFY THE FOLLOWING: 1. DAMPERS, VALVES, AND OTHER CONTROLLED DEVICES ARE OPERATED BY THE INTENDED CONTROLLER. 2. DAMPERS AND VALVES ARE IN THE POSITION INDICATED BY THE CONTROLLER. 3. INTEGRITY OF DAMPERS AND VALVES FOR FREE AND FULL OPERATION AND FOR TIGHTNESS OF FULLY CLOSED AND FULLY OPEN POSITIONS. THIS INCLUDES DAMPERS IN MULTIZONE UNITS, MIXING BOXES, AND VARIABLE-AIR-VOLUME TERMINALS. 4. AUTOMATIC MODULATING AND SHUTOFF VALVES. INCLUDING TWO-WAY VALVES AND THREE-WAY MIXING AND DIVERTING VALVES, ARE PROPERLY CONNECTED. 5. THERMOSTATS AND HUMIDISTATS ARE LOCATED TO AVOID ADVERSE EFFECTS OF SUNLIGHT, DRAFTS, AND COLD WALLS. 6. SENSORS ARE LOCATED TO SENSE ONLY THE INTENDED CONDITIONS 7. SEQUENCE OF OPERATION FOR CONTROL MODES IS ACCORDING TO THE CONTRACT DOCUMENTS. 8. CONTROLLER SET POINTS ARE SET AT INDICATED VALUES. 9. INTERLOCKED SYSTEMS ARE OPERATING. 10. CHANGEOVER FROM HEATING TO COOLING MODE OCCURS ACCORDING TO INDICATED VALUES. H. REPORT DEFICIENCIES DISCOVERED BEFORE AND DURING PERFORMANCE OF TEST AND BALANCE PROCEDURES 3.2 GENERAL PROCEDURES FOR TESTING AND BALANCING A. PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM ACCORDING TO THE PROCEDURES CONTAINED IN AABC'S "NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE", NBC, ASHRAE 111, NEBB'S "PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, AND BALANCING OF ENVIRONMENTAL SYSTEMS" OR SMACNA'S "HVAC SYSTEMS - TESTING, ADJUSTING, AND BALANCING" AND IN THIS SECTION. VAPOR BARRIER. B. CUT INSULATION, DUCTS, PIPES, AND EQUIPMENT CABINETS FOR INSTALLATION OF TEST PROBES TO THE MINIMUM EXTENT NECESSARY FOR TAB PROCEDURES. AFTER TESTING AND BALANCING, PATCH PROBE HOLES IN DUCTS WITH SAME MATERIAL AND THICKNESS AS USED TO CONSTRUCT DUCTS. INSTALL AND JOIN NEW INSULATION THAT MATCHES REMOVED MATERIALS. RESTORE INSULATION, COVERINGS, VAPOR BARRIER, AND FINISH. 1. CONCEALED SUPPLY AIR. C. MARK EQUIPMENT AND BALANCING DEVICES, INCLUDING DAMPER-CONTROL POSITIONS, VALVE POSITION

INDICATORS, FAN-SPEED-CONTROL LEVERS, AND SIMILAR CONTROLS AND DEVICES, WITH PAINT OR OTHER SUITABLE, PERMANENT IDENTIFICATION MATERIAL TO SHOW FINAL SETTINGS.

3.3 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. PREPARE SCHEMATIC DIAGRAMS OF SYSTEMS' "AS-BUILT" DUCT LAYOUTS.

B. FOR VARIABLE-AIR-VOLUME SYSTEMS, DEVELOP A PLAN TO SIMULATE DIVERSITY.

C. DETERMINE THE BEST LOCATIONS IN MAIN AND BRANCH DUCTS FOR ACCURATE DUCT AIRFLOW MEASUREMENTS. D. VERIFY THAT MOTOR STARTERS ARE EQUIPPED WITH PROPERLY SIZED THERMAL PROTECTION.

E. CHECK FOR AIRFLOW BLOCKAGES.

F. CHECK CONDENSATE DRAINS FOR PROPER CONNECTIONS AND FUNCTIONING.

G. CHECK FOR PROPER SEALING OF AIR-HANDLING UNIT COMPONENTS.

H. CHECK FOR PROPER SEALING OF AIR DUCT SYSTEM.

A. SET HVAC SYSTEM AIRFLOW AND WATER FLOW RATES WITHIN THE FOLLOWING TOLERANCES: SUPPLY, RETURN, AND EXHAUST FANS AND EQUIPMENT WITH FANS: PLUS OR MINUS 5 PERCENT. 2. AIR OUTLETS AND INLETS: PLUS OR MINUS 10 PERCENT.

A. QUALITY ASSURANCE: LABELED WITH MAXIMUM FLAME-SPREAD INDEX OF 25 AND MAXIMUM SMOKE-DEVELOPED INDEX OF 50 ACCORDING TO ASTM E 84.

A. SURFACE-BURNING CHARACTERISTICS:

1. INDOOR INSULATION AND RELATED MATERIALS: TO BE FACTORY LABELED DESIGNATING MAXIMUM FLAME-SPREAD INDEX OF 25 OR LESS, AND SMOKE-DEVELOPED INDEX OF 50 OR LESS ACCORDING TO

A. FLEXIBLE ELASTOMERIC: CLOSED-CELL, SPONGE- OR EXPANDED-RUBBER MATERIALS. COMPLY WITH ASTM C 534, TYPE I FOR TUBULAR MATERIALS AND TYPE II FOR SHEET MATERIALS.

B. MINERAL-FIBER BLANKET INSULATION: COMPLY WITH ASTM C 553, TYPE II AND ASTM C 1290, TYPE I.

1. FSK JACKET: ALUMINUM-FOIL, FIBERGLASS-REINFORCED SCRIM WITH KRAFT-PAPER BACKING; COMPLYING WITH ASTM C 1136, TYPE II.

2. FSK TAPE: FOIL-FACE, VAPOR-RETARDER TAPE MATCHING FACTORY-APPLIED JACKET WITH ACRYLIC ADHESIVE; COMPLYING WITH ASTM C 1136.

C. MINERAL-FIBER, PIPE AND TANK INSULATION: COMPLYING WITH ASTM C 1393, TYPE II OR TYPE IIIA CATEGORY 2, OR WITH PROPERTIES SIMILAR TO ASTM C 612, TYPE IB; AND HAVING FACTORY-APPLIED ASJ JACKET. NOMINAL DENSITY IS 2.5 LB/CU. FT. OR MORE. THERMAL CONDUCTIVITY (K-VALUE) AT 100 DEG F IS 0.29 BTU X IN./H X SQ. FT. X DEG F

1. ASJ: WHITE, KRAFT-PAPER, FIBERGLASS-REINFORCED SCRIM WITH ALUMINUM-FOIL BACKING; COMPLYING WITH ASTM C 1136, TYPE I.

2. ASJ TAPE: WHITE VAPOR-RETARDER TAPE MATCHING FACTORY-APPLIED JACKET WITH ACRYLIC ADHESIVE, COMPLYING WITH ASTM C 1136.

D. FLEXIBLE ELASTOMERIC ADHESIVE: COMPLY WITH MIL-A-24179A, TYPE II, CLASS I.

E. MINERAL-FIBER ADHESIVE: COMPLY WITH MIL-A-3316C, CLASS 2, GRADE A.

F. VAPOR-BARRIER MASTIC: WATER BASED; SUITABLE FOR INDOOR AND OUTDOOR USE ON BELOW AMBIENT SERVICES: COMPLY WITH MIL-PRF-19565C, TYPE II.

A. COMPLY WITH REQUIREMENTS OF THE MIDWEST INSULATION CONTRACTORS ASSOCIATION'S "NATIONAL COMMERCIAL & INDUSTRIAL INSULATION STANDARDS" FOR INSULATION INSTALLATION ON PIPES AND EQUIPMENT.

B. INSULATION INSTALLATION AT INTERIOR WALL AND PARTITION PENETRATIONS (THAT ARE NOT FIRE RATED): INSTALL INSULATION CONTINUOUSLY THROUGH WALLS AND PARTITIONS.

C. INSULATION INSTALLATION AT FIRE-RATED WALL, PARTITION, AND FLOOR PENETRATIONS: INSTALL INSULATION CONTINUOUSLY THROUGH PENETRATIONS. SEAL PENETRATIONS. COMPLY WITH REQUIREMENTS IN SECTION 078400. D. FLEXIBLE ELASTOMERIC INSULATION INSTALLATION

1. SEAL LONGITUDINAL SEAMS AND END JOINTS WITH ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.

2. INSULATION INSTALLATION ON PIPE FITTINGS AND ELBOWS: INSTALL MITERED SECTIONS OF PIPE INSULATION. SECURE INSULATION MATERIALS AND SEAL SEAMS WITH ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT LOW PASSAGE OF AIR TO SURFACE BEING INSULATED.

E. MINERAL-FIBER INSULATION INSTALLATION:

. INSULATION INSTALLATION ON STRAIGHT PIPES AND TUBES: WHERE VAPOR BARRIERS ARE INDICATED, SEAL ONGITUDINAL SEAMS, END JOINTS, AND PROTRUSIONS WITH VAPOR-BARRIER MASTIC AND JOINT SEALANT.

2. FOR INSULATION WITH FACTORY-APPLIED JACKETS ON ABOVE AMBIENT SURFACES, SECURE LAPS WITH OUTWARD CLINCHED STAPLES AT 6 INCHES O.C.

3. FOR INSULATION WITH FACTORY-APPLIED JACKETS ON BELOW AMBIENT SURFACES, DO NOT STAPLE LONGITUDINAL TABS BUT SECURE TABS WITH ADDITIONAL ADHESIVE AS RECOMMENDED BY INSULATION MATERIAL MANUFACTURER AND SEAL WITH VAPOR-BARRIER MASTIC AND FLASHING SEALANT.

4. BLANKET INSULATION INSTALLATION ON DUCTS AND PLENUMS: SECURE WITH ADHESIVE AND INSULATION PINS. 5. FOR DUCTS AND PLENUMS WITH SURFACE TEMPERATURES BELOW AMBIENT, INSTALL A CONTINUOUS UNBROKEN

F. PLENUMS AND DUCTS REQUIRING INSULATION:

2. CONCEALED AND EXPOSED OUTDOOR AIR.

3. CONCEALED AND EXPOSED RETURN AIR LOCATED IN NONCONDITIONED SPACE.

3.2 DUCT AND PLENUM INSULATION SCHEDULE

THOSE RETAINED.

DENSITY.

3.3 HVAC PIPING INSULATION SCHEDULE

A. CONDENSATE PIPING: INSULATION SHALL BE 1" THICK FLEXIBLE ELASTOMERIC B. REFRIGERANT PIPING: INSULATION SHALL BE 1" THICK FLEXIBLE ELASTOMERIC.

END OF SECTION

SECTION 233100 - HVAC DUCTS AND CASINGS

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE.' STANDARDS - METAL AND FLEXIBLE".
- C. COMPLY WITH NFPA 96 FOR DUCTS CONNECTED TO COMMERCIAL KITCHEN HOODS. 2.2 DUCTS

1. GALVANIZED COATING DESIGNATION: G90.

FOR PAINT.

B. TYPE 1 KITCHEN EXHAUST DUCTWORK

. FACTORY-BUILT COMMERCIAL KITCHEN GREASE DUCT:

- c. NO FIRE WRAP SHALL BE REQUIRED FOR THIS INSTALLATION.
- WELDED LIQUID TIGHT.

FLEXIBLE."

2.3 ACCESSORIES

FABRICATED AND COMPLETE WITH REQUIRED HARDWARE AND ACCESSORIES.

- INSTALLATION, AS REQUIRED.
- BLADE WIDTH SHALL NOT EXCEED 6".
- LENGTH OF FLEXIBLE DUCT SHALL NOT EXCEED 5 FEET.
- DOUBLE THICKNESS AIRFOIL TYPE.
- SCREENS.
- "ACCESS PANELS ROUND DUCT."



#### **SPECIFICATIONS - DIVISION 23 - HVAC**

#### PART 3 - EXECUTION

3.1 INSTALLATION

- A. INSTALL DUCTWORK, ACCESSORIES, AND SUPPORTS ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" UNLESS OTHERWISE INDICATED.
- B. SEAL DUCTS TO THE FOLLOWING SEAL CLASSES ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE": 1-INCH WG, SEAL CLASS A.
- C. CONCEAL DUCTS FROM VIEW IN FINISHED AND OCCUPIED SPACES.
- D. AVOID PASSING THROUGH OR ABOVE ELECTRICAL EQUIPMENT SPACES AND ENCLOSURES.
- E. CLEAN DUCT SYSTEMS BEFORE TESTING, ADJUSTING, AND BALANCING.

END OF SECTION

SECTION 233423 - HVAC EXHAUST FANS

#### PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. PRODUCTS SHALL BE LICENSED TO USE THE AMCA-CERTIFIED RATINGS SEAL.

B. EXHAUST FANS SHALL COMPLY WITH UL 705. TYPE 1 FANS SHALL ALSO COMPLY WITH UL 762.

- C. TYPE 1 FANS TO BE DESIGNED FOR HIGH HEAT OPERATION AT 300°F.
- D. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES; LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.
- 2.2 CENTRIFUGAL VENTILATORS
- A. HOUSING: REMOVABLE, SPUN-ALUMINUM, DOME TOP AND OUTLET BAFFLE; SQUARE, ONE-PIECE, ALUMINUM BASE WITH VENTURI INLET CONE.
- 1. UPBLAST UNITS: ALUMINUM DISCHARGE BAFFLE TO DIRECT DISCHARGE AIR UPWARD, WITH RAIN AND SNOW DRAINS.
- B. FAN WHEELS: ALUMINUM HUB AND WHEEL WITH BACKWARD-INCLINED BLADES.
- C. BELT-DRIVEN DRIVE ASSEMBLY: RESILIENTLY MOUNTED TO HOUSING.
- 1. FAN SHAFT: TURNED, GROUND, AND POLISHED STEEL; KEYED TO WHEEL HUB.
- 2. SHAFT BEARINGS: PERMANENTLY LUBRICATED, PERMANENTLY SEALED, SELF-ALIGNING BALL BEARINGS.
- 3. PULLEYS: CAST-IRON, ADJUSTABLE-PITCH MOTOR PULLEY.
- 4. FAN AND MOTOR ISOLATED FROM EXHAUST AIRSTREAM.
- D. ACCESSORIES:
- 1. DISCONNECT SWITCH: NON-FUSIBLE TYPE, WITH THERMAL-OVERLOAD PROTECTION, FACTORY WIRED THROUGH AN INTERNAL ALUMINUM CONDUIT.
- 2. BIRD SCREENS: REMOVABLE, 1/2-INCH MESH, ALUMINUM OR BRASS WIRE.
- 3. DAMPERS: COUNTERBALANCED, PARALLEL-BLADE, BACKDRAFT DAMPERS MOUNTED IN CURB BASE; FACTORY SET TO CLOSE WHEN FAN STOPS.
- 4. MOTORIZED DAMPERS: PARALLEL-BLADE DAMPERS MOUNTED IN CURB BASE WITH ELECTRIC ACTUATOR; WIRED TO CLOSE WHEN FAN STOPS.
- E. ROOF CURBS: 20 GAUGE GALVANIZED STEEL; MITERED AND WELDED CORNERS; 1-1/2-INCH THICK, RIGID, FIBERGLASS INSULATION ADHERED TO INSIDE WALLS; AND 1-1/2-INCH WOOD NAILER. SIZE AS REQUIRED TO SUIT ROOF OPENING AND FAN BASE.
- 1. CONFIGURATION: SELF-FLASHING WITHOUT A CANT STRIP, WITH MOUNTING FLANGE.
- 2. OVERALL HEIGHT: 12 INCHES FOR GENERAL EXHAUST FANS; 20 INCHES FOR KITCHEN EXHAUST FANS.
- 3. PITCH MOUNTING: MANUFACTURE CURB FOR ROOF SLOPE.
- 4. MOUNTING PEDESTAL: GALVANIZED STEEL WITH REMOVABLE ACCESS PANEL.
- 5. TYPE 1 ROOF CURBS TO BE VENTED TYPE.
- 6. TYPE 1 AND TYPE 2 ROOF CURBS TO BE HINGED TYPE.
- F. CAPACITIES AND CHARACTERISTICS:
- 1. SEE SCHEDULE.

#### 2.3 MOTORS

- A. COMPLY WITH NEMA DESIGNATION, TEMPERATURE RATING, SERVICE FACTOR, ENCLOSURE TYPE, AND EFFICIENCY REQUIREMENTS FOR MOTORS.
- 1. MOTOR SIZES: MINIMUM SIZE AS INDICATED. IF NOT INDICATED, LARGE ENOUGH SO DRIVEN LOAD WILL NOT REQUIRE MOTOR TO OPERATE IN SERVICE FACTOR RANGE ABOVE 1.0.
- B. ENCLOSURE TYPE: TOTALLY ENCLOSED, FAN COOLED.

#### PART 3 - EXECUTION

3.1 INSTALLATION

A. INSTALL UNITS WITH CLEARANCES FOR SERVICE AND MAINTENANCE.

B. ROOF-MOUNTED UNITS: INSTALL ROOF CURB ON ROOF STRUCTURE, ACCORDING TO ARI GUIDELINE B. INSTALL AND SECURE ROOF-MOUNTED FANS ON CURBS, AND COORDINATE ROOF PENETRATIONS AND FLASHING WITH ROOF CONSTRUCTION.

END OF SECTION

3.1 INSTALLATION

END OF SECTION

SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

PART 2 - PRODUCTS 2.1 DIFFUSERS, REGISTERS, AND GRILLES:

A. REFER TO SCHEDULES FOR FINISH TYPE, COLOR, MATERIAL, AND MOUNTING.

PART 3 - EXECUTION

A. INSTALL DIFFUSERS, REGISTERS, AND GRILLES LEVEL AND PLUMB.

B. CEILING-MOUNTED OUTLETS AND INLETS: DRAWINGS INDICATE GENERAL ARRANGEMENT OF DUCTS, FITTINGS, AND ACCESSORIES. MAKE FINAL LOCATIONS WHERE INDICATED, AS MUCH AS PRACTICAL. FOR UNITS INSTALLED IN LAY-IN CEILING PANELS, LOCATE UNITS IN THE CENTER OF PANEL UNLESS OTHERWISE INDICATED. WHERE ARCHITECTURAL FEATURES OR OTHER ITEMS CONFLICT WITH INSTALLATION, NOTIFY ARCHITECT FOR A DETERMINATION OF FINAL LOCATION.

C. AFTER INSTALLATION, ADJUST DIFFUSERS, REGISTERS, AND GRILLES TO AIR PATTERNS INDICATED, OR AS DIRECTED, BEFORE STARTING AIR BALANCING.





- REUSE THE EXISTING 800A, 277/480V, 3-PHASE, 4-WIRE ELECTRICAL SERVICE FROM UTILITY SUPPLY FOR THE PROJECT SPACE. REUSE EXISTING 800A, 277/480V, 3-PHASE, 4-WIRE ELECTRICAL METER
- REUSE (1) 800A, 277/480V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "MDP".
- REUSE (1) 200A(M.L.O.), 277/480V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "HA". REUSE (1) 200A(M.L.O.), 277/480V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "HB".
- REUSE EXISTING (1) 75KVA, 3-PHASE TRANSFORMER "T-3" WITH 277/480V PRIMARY & 120/208V SECONDARY.
- REUSE EXISTING (1) 225A(M.L.O.), 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "LE SECTION-1"
- REUSE EXISTING (1) 225A(MLO), 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "LE SECTION-2" . REUSE EXISTING (1) 30KVA, 3-PHASE TRANSFORMER "T-2" WITH 277/480V PRIMARY & 120/208V SECONDARY.
- 10. REUSE EXISTING (1) 100A(M.L.O.), 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "LA".
- 11. REUSE (1) 80A, 277/480V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "HC". 12. REUSE EXISTING (1) 15KVA. 1-PHASE TRANSFORMER "T-1" WITH 277/480V PRIMARY & 120/240V SECONDARY
- 13. REUSE (1) 80A. 120/240V. 1-PHASE. 3-WIRE ELECTRICAL PANEL "LC".
- 14. REUSE EXISTING (1) 10KVA, 1-PHASE TRANSFORMER "T-4" WITH 277/480V PRIMARY & 120/240V SECONDARY.
- 15. REUSE (1) 80A, 120/240V, 1-PHASE, 3-WIRE ELECTRICAL PANEL "LB". 16. REUSE THE EXISTING 200A, 120/208V 3-PHASE, 4-WIRE ELECTRICAL DISCONNECT
- 16. REUSE THE EXISTING 100A, 120/208V 3-PHASE, 4-WIRE ELECTRICAL DISCONNECT.
- 17. DEMOLISH THE EXISTING (1) 40A. 120/240V. 1-PHASE. 3-WIRE ELECTRICAL PANEL "LF". PROVIDE NEW 75KVA, 3-PHASE TRANSFORMER WITH PRIMARY 277/480V AND SECONDARY 120/208V.
- 21. PROVIDE NEW 200A, 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "A".
- 22. ALL NECESSARY EQUIPMENT, WIRING AND LIGHTING FOR THE PROJECT SPACE INCLUDING WIRING FOR VENTILATION EQUIPMENT. COORDINATE WITH G.C FOR LOW VOLTAGE WIRING.

#### **EXISTING CONDITIONS NOTES**

#### STOP AND READ

THE CONTRACTOR AND SUB-CONTRACTORS SHALL NOT INITIATE ANY WORK UNTIL EXISTING FIELD CONDITIONS ARE PROPERLY VERIFIED.

THIS SHALL HOLD TRUE FOR FIRST GENERATION AND 2ND GENERATION SPACES. WHEN DEMOLITION IS REQUIRED, THAT WILL BE PERMITTED TO EXPOSE CONDITIONS. THESE VERIFICATIONS SHALL INCLUDE BUT NOT LIMITED TO: DIMENSIONS BOTH HORIZONTALLY AND VERTICAL, ELECTRICAL SERVICE /PANELS LOCATION AND VOLTS/PHASE, LOCATION/QTY OF ROOF MOUNTED HVAC EQUIPMENT, CONFIRM THAT INTERIOR HVAC HUNG UNITS HAVE PROPER SUPPORT CONNECTIONS FOR EXISTING STRUCTURE, FIRE SPRINKLER MAIN RUNS, TOILET ROOM DIMENSIONS, DOOR SWING FOR DOORS TO REMAIN AND ETC. IF NOT VERIFIED AND DISCOVERED AT A LATER TIME, THE CONTRACTOR SHALL REIMBURSE THE ARCHITECT FOR THE REDESIGN FEE. THIS DOES NOT INCLUDE HIDDEN WORK I.E. PITCH OF SANITARY LINES, ACTUAL CONDITIONS OF EXISTING HVAC EQUIPMENT, STRUCTURAL COLUMNS/BEARING WALLS OR CONDITIONS OF GREASE INTERCEPTORS AND ETC.





	LIGH	ſING	FIXTURE SCHEDU	JLE							
MBOL DESCRIPTION	SYMBOL	TYPE	DESCRIPTION	MANUFACTURER		VOLT	NUMBER OF	LAMP TYPE	TOTAL	MOUNTING	
EXHAUST FAN     Image: 230V RECEPTACLE       J     JUNCTION BOX     Image: 230V RECEPTACLE       Image: Back up Exit Light     Image: 230V RECEPTACLE		A	2X4 LED RECESSED LAY-IN	ELITE LIGHTING	24-FPL1-LED- 3000/4000/5000-DIM10- MVOLT-35K/40K/50K-85	120	116	LED	6148 WATTS	RECESSED	
BATTERY BACK UP EMERGENCY LIGHT OS CEILING MOUNTED OCCUPANCY SENSOR	0	В	PENDANT LIGHT-BOTTOM AT 10'-0" A.F.F.	TBD	TBD	120	75	LED	1200 WATTS	PENDANT	
S     WALL SWITCH (SINGLE)       \$_T     WALL SWITCH (TIMER)	p	WS	GOOSENECK LIGHT FIXTURE	TBD	TBD	120	4	LED	64 WATTS	WALL	NOTE: 1. E.C. SHALL COORDINATE WITH
Sos     OCCUPANCY SENSOR WALL     TELEPHONE/DATA OUTLET       ➡     DUPLEX RECEPTACLE     ➡     DATA OUTLET		D	HANGING FLUORESCENT	F. TBD	TBD	120	17	FLUORESENT	595 WATTS	HANGING	ARCHITECT FOR FINAL FIXTURE COUNT AND TYPE.
DUPLEX RECEPTACLE, 42" TO AFF OR     CL     CEILING MOUNTED DATA OUTLET       6" AFF ABOVE COUNTER     FL     FLOOR MOUNTED DATA OUTLET	Ð	F	твр	TBD	TBD	120	76	LED	3800 WATTS	RECESSED	<ol> <li>COORDINATE EXACT CONTROL REQUIREMENTS WITH OWNER.</li> <li>E.C SHALL PROVIDE REQUIRED DOWNER DAOKS AND DELAYS</li> </ol>
QUADRUPLEX RECEPTACLE MD MOTORISED DAMPER	۲	G	HIGH-BAY LED	RHINOZ	ULTRA 1	120	70	LED	10500 WATTS	_	SUITABLE FOR THE ABOVE LIGHT FIXTURES IN COORDINATION WITH
CEILING MOUNTED DUPLEX RECEPTACLE	ାର୍ଚ୍ଚ	н	SPOT LED MOVING LIGHT	CHAUVET DJ	INTIMSPOT360	120	3	LED	555 WATTS	_	THE LIGHTING VENDOR. BASE BID ACCORDINGLY.
FEED FLOOR MOUNTED DUPLEX RECEPTACLE	6000	I	WAVE MOVING LIGHT	CHAUVET DJ	INTIMWAVE360IRC	120	2	LED	380 WATTS	_	
BOVE FINISH FLOOR= A.F.F. BELOW COUNTER= BC COUNTER TOP LEVEL= C PUSH BUTTON= PB		J	LED STRIP LIGHT	BLIZZARD	LB SPECTRUM-SKU124240	120	11	LED	275 WATTS	_	
GROUND FAULT INTERRUPTER= GFCI       UNDER CABINET= UC         VERIFY PRIOR TO INSTALL= VH       VAPOR PROOF= VP         VERIFY DROOF= WD       FLECTRICAL CONTRACTOR= FLECTRICAL CONTRACTOR		к	LED WASH LIGHT	CHAUVET DJ	SLIMPAR56	120	36	LED	756 WATTS	_	
VEATHER PROOF= WP ELECTRICAL CONTRACTOR=E.C. XHAUST FAN = EF BATHROOM EXHAUST FAN=BEF VATER HEATER= WH RECIRCULATION PLIMP=RCP	$\overline{\mathbf{x}}$	X1	EXIT SIGN	TBD	TBD	120	1	LED	3 WATTS	WALL	
AUTHORITY HAVING JURISDICTION= A.H.J. ROOF TOP UNIT= RTU	$\overline{\otimes}$	X2	DIRECTIONAL EXIT SIGN	TBD	TBD	120	5	LED	15 WATTS	WALL	
	<u>~</u> >	Y1	EMERGENCY LIGHTS	TBD	TBD	120	36	LED	129.6 WATTS	WALL	
ENERAL LIGHTING NOTES	\$	-	SINGLE POLE SWITCH	LUTRON	CLARO, 15A	120	-	-	-	WALL	
UPPER CASE LETTER NEXT TO LIGHT FIXTURE DENOTES FIXTURE	\$ <sub>D</sub>	-	DIM SWITCH	DOUGLAS	SWX-131-D-WH	120	-	-	-	WALL	
ALL EMERGENCY FIXTURES SHALL BE CONNECTED TO AN UNSWITCHED HOT CONDUCTOR. SO THAT THEY ARE ENERGIZED ALL		(E)	EXISTING LIGHT TO REMAIN		-	-	-	-	-	-	



EXISTING 800A, 277/480V, 3-PHASE ELECTRICAL SERVICE FOR THE PROJECT SPACE SHALL REMAIN. E.C. SHALL GET INFORMATION ABOUT THE EXISTING POWER DISTRIBUTION PRIOR TO COMMENCING ANY WORK AND INFORM ENGINEER ON RECORD FOR ANY DISCREPANCIES. BASE BID ACCORDINGLY. (2) EXISTING 800A, 277/480V, 3-PHASE, 4-WIRE CT CABINET & METER FOR THE PROJECT SPACE SHALL REMAIN. E.C TO FIELD VERIFY THE EXACT LOCATION, SIZE & OPERABLE CONDITION OF EXISTING METER REPLACE IF INOPERABLE. BASE BID ACCORDINGLY. EXISTING 800A, 277/480V, 3-PHASE, 4-WIRE MAIN DISTRIBUTION PANEL "MDP" FOR THE PROJECT SPACE SHALL REMAIN. E.C TO FIELD VERIFY THE EXACT LOCATION, SIZE & OPERABLE CONDITION OF EXISTING "MDP", REPLACE IF INOPERABLE. BASE BID ACCORDINGLY. ACCORDINGLY. 5 EXISTING 200A(M.L.O), 277/480V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "HB" FOR THE PROJECT SPACE SHALL REMAIN. E.C TO FIELD VERIFY THE EXACT LOCATION, SIZE & OPERABLE CONDITION OF EXISTING PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY. 6 EXISTING 75KVA 3-PHASE TRANSFORMER "T3" WITH PRIMARY 277/480V AND SECONDARY 120/208V FOR THE PROJECT SPACE SHALL REMAIN. E.C TO FIELD VERIFY THE EXACT LOCATION, SIZE & OPERABLE CONDITION OF EXISTING TRANSFORMER, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY. EXISTING 225A(M.L.O), 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "LE-1" FOR THE PROJECT SPACE SHALL REMAIN. E.C TO FIELD VERIFY THE EXACT LOCATION, SIZE & OPERABLE CONDITION OF EXISTING PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY. 8 EXISTING 225A(M.L.O), 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "LE-2" FOR THE PROJECT SPACE SHALL REMAIN. E.C TO FIELD VERIFY THE EXACT LOCATION, SIZE & OPERABLE CONDITION OF EXISTING PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY. EXISTING 30KVA 3-PHASE TRANSFORMER "T2" WITH PRIMARY 277/480V AND SECONDARY 120/208V FOR THE PROJECT SPACE SHALL REMAIN. E.C TO FIELD VERIFY THE EXACT LOCATION, SIZE & OPERABLE CONDITION OF EXISTING TRANSFORMER, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY. EXISTING 100A(M.L.O), 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "LA" FOR THE PROJECT SPACE SHALL REMAIN. E.C TO FIELD VERIFY THE EXACT LOCATION, SIZE & OPERABLE CONDITION OF EXISTING PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY. (11) EXISTING 80A, 277/480V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "HC" FOR THE PROJECT SPACE SHALL REMAIN. E.C TO FIELD VERIFY THE EXACT LOCATION, SIZE & OPERABLE CONDITION OF EXISTING PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY. EXISTING 15KVA 3-PHASE TRANSFORMER "T1" WITH PRIMARY 277/480V AND SECONDARY 120/240V FOR THE PROJECT SPACE SHALL REMAIN. E.C TO FIELD VERIFY THE EXACT LOCATION, SIZE & OPERABLE CONDITION OF EXISTING TRANSFORMER, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY. (13) EXISTING 80A, 120/240V, 1-PHASE, 3-WIRE ELECTRICAL PANEL "LC" TO BE RELOCATED AND REUSE. E.C TO FIELD VERIFY THE EXACT LOCATION, SIZE & OPERABLE CONDITION OF EXISTING PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.

(15) EXISTING 80A, 120/240V, 1-PHASE, 3-WIRE ELECTRICAL PANEL "LB" FOR THE PROJECT SPACE SHALL REMAIN. E.C TO FIELD VERIFY THE EXACT LOCATION, SIZE & OPERABLE CONDITION OF EXISTING PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY. (16) EXISTING INCOMING FEEDERS TO REMAIN. E.C. TO VERIFY OPERABLE CONDITION OF FEEDER'S IN FIELD AND PROVIDE NEW IF FOUND INOPERABLE. BASE BID ACCORDINGLY.

(17) EXISTING 200A, 120/208V, 3-PHASE, 4-WIRE ELECTRICAL DISCONNECT FOR THE PROJECT SPACE SHALL REMAIN. E.C TO FIELD VERIFY THE EXACT LOCATION, SIZE & OPERABLE CONDITION OF EXISTING DISCONNECT REPLACE IF INOPERABLE. BASE BID ACCORDINGLY. (18) EXISTING 100A, 120/208V, 3-PHASE, 4-WIRE ELECTRICAL DISCONNECT FOR THE PROJECT SPACE SHALL REMAIN. E.C TO FIELD VERIFY THE EXACT LOCATION, SIZE & OPERABLE CONDITION OF EXISTING DISCONNECT REPLACE IF INOPERABLE. BASE BID ACCORDINGLY. (19) DEMOLISH EXISTING 40A, 120/240V, 1-PHASE, 3-WIRE ELECTRICAL PANEL "LF". E.C. SHALL COORDINATE WITH BASE LANDLORD/OWNER FOR LIABILITIES AND SCOPE OF WORK BEFORE COMMENCING ANY WORK. BASE BID ACCORDINGLY. NEW 75KVA, 3-PHASE TRANSFORMER WITH PRIMARY 277/480V AND SECONDARY 120/208V TO PROVIDE. E.C. SHALL COORDINATE EXACT LOCATION WITH ARCHITECT/OWNER.

-EXISTING (16)

ELECTRICAL RIS	ER SYMBOLS
	NEW
	EXISTING ITEM/FEEDER TO REMAIN EXISTING ITEM/FEEDER
	TO BE DISCONNECTED & REMOVED
<u>ELECT</u> <u>GENEI</u> NOTE:	RICAL RAL

- A. ABOVE RISER DIAGRAM IS FOR REFERENCE PURPOSES ONLY. E.C. SHALL VERIFY EXACT POWER DISTRIBUTION IN FIELD AND INFORM ENGINEER ON RECORD FOR ANY DISCREPANCY.
- B. E.C. SHALL VERIFY INCOMING SERVICE AMPERAGE, WIRE SIZING AND DISTRIBUTION.
- C. ELECTRICAL CONTRACTOR TO COORDINATE FAULT CURRENT (Isc) RATING WITH UTILITY COMPANY AND AHJ PRIOR TO COMMENCING ANY WORK.

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SCALE N.T.S.

# **SPECIFICATIONS - DIVISION 26 - ELECTRICAL**

#### SECTION 26 00 01 - GENERAL ELECTRICAL REQUIREMENTS

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SUPPLEMENTAL
- CONDITIONS AND DIVISION-1 SPECIFICATION SECTIONS, APPLY TO WORK OF DIVISION 26 SECTIONS. B. E-SERIES DRAWINGS APPLY TO WORK OF DIVISION 26 SECTIONS AND VICE VERSA.
- 1.2 GENERAL STANDARDS
  - PROVIDE WORK IN COMPLIANCE WITH APPLICABLE PROVISIONS OF THE FOLLOWING STANDARDS. PROVIDE UL LISTING AND UL LABEL FOR ALL ELECTRICAL MATERIALS, EQUIPMENT, LUMINAIRES, DEVICES, ETC. IN CASES WHERE UL LISTING AND/OR LABELING IS NOT AVAILABLE FOR A PARTICULAR PRODUCT, PROVIDE EQUIVALENT LISTING AND LABELING FROM ANOTHER THIRD PARTY NATIONALLY RECOGNIZED CERTIFICATION LABORATORY, SUBJECT TO APPROVAL BY LOCAL ELECTRICAL INSPECTOR AND AUTHORITIES HAVING JURISDICTION.
  - B. PROVIDE WORK IN STRICT ACCORDANCE WITH THE LATEST EDITION OF APPLICABLE CODES INCLUDING (BUT NOT LIMITED TO) THE FOLLOWING CODES AND STANDARDS. 1.NATIONAL ELECTRICAL CODE (NEC), NFPA 70.
    - 2.LIFE SAFETY CODE, NFPA 101.
    - 3.OTHER PROVISIONS OF NFPA AS APPLICABLE.
    - 4.LOCAL ELECTRICAL CODES. 5.LOCAL UTILITY COMPANY REQUIREMENTS.
    - 6.ADA/ADAAG REQUIREMENTS.
    - 7.ASME.
    - 8.INTERNATIONAL BUILDING CODE. 9.INTERNATIONAL ENERGY CONSERVATION CODE
- 1.3 MATERIALS AND EQUIPMENT
  - UNLESS SPECIFICALLY INDICATED OTHERWISE PROVIDE (FURNISH AND INSTALL) ALL SPECIFIED AND DRAWN EQUIPMENT, RACEWAY, BOXES, LUMINAIRES, CONTROLS, WIRING, CABLING, SUPPORTS AND OTHER MATERIALS AS REQUIRED TO RENDER ALL ELECTRICAL AND ELECTRICALLY OPERATED EQUIPMENT. LUMINAIRES, DEVICES, ETC. FULLY OPERATIONAL. UNLESS SPECIFICALLY INDICATED OTHERWISE PROVIDE (FURNISH AND INSTALL) ALL MATERIALS THAT ARE SPECIFIED UNDER DIVISION 26. DISCREPANCIES OR UNCERTAINTIES PERCEIVED BY A BIDDER, OR OTHER QUESTIONABLE INTERPRETATIONS BY A BIDDER, ARE SUBJECT TO FINAL INTERPRETATIONS AND DECISIONS BY THE OWNER'S REPRESENTATIVE UNLESS ADDRESSED BEFORE BIDDING BY ADDENDUM OR UNLESS QUALIFIED OR EXCEPTED WITHIN BIDS.
  - PROVIDE MATERIALS THAT ARE NEW, FULL WEIGHT, OF THE BEST QUALITY. PROVIDE SIMILAR MATERIALS THAT ARE OF THE SAME TYPE AND MANUFACTURER. PROVIDE MATERIALS, APPARATUS AND EQUIPMENT WITH UNDERWRITER'S LABORATORY, INC. LABEL WHERE REGULARLY SUPPLIED.
  - MAINTAIN SAFETY AND GOOD CONDITION OF THE MATERIALS AND EQUIPMENT INSTALLED UNTIL FINAL ACCEPTANCE BY THE OWNER. STORE MATERIALS TO PREVENT DAMAGE AND WEATHERING PRIOR TO INSTALLATION.
  - WHEN SEVERAL MATERIALS, PRODUCTS OR ITEMS OF EQUIPMENT ARE SPECIFIED BY NAME FOR ONE USE, D. SELECT ONE OF THOSE SPECIFIED.

#### END OF SECTION

SECTION 26 00 02 - BASIC ELECTRICAL MATERIALS AND METHODS

#### PART 1 - GENERAL

#### 1.1 GENERAL

A. FURNISH AND INSTALL ALL LABOR AND MATERIAL, TOOLS AND EQUIPMENT NECESSARY TO RENDER ALL SYSTEMS COMPLETE AND OPERATIONAL, AND READY FOR TURNOVER TO OWNER.

1.2 HEIGHT OF BOXES

- A. OUTLET MOUNTING HEIGHTS AS INDICATED ON THE PLANS ARE APPROXIMATE. DETERMINE THE EXACT MOUNTING HEIGHTS (AND LOCATIONS) OF OUTLETS IN THE FIELD WITH RELATION TO ARCHITECTURAL DETAIL AND EQUIPMENT BEING SERVED. COORDINATE OUTLET LOCATION WITH EQUIPMENT, WITH FURNITURE PLANS AND WITH ARCHITECTURAL ELEVATION PLANS. WHERE MOUNTING HEIGHTS ARE NOT DETAILED OR DIMENSIONED, CONTACT THE OWNER'S REPRESENTATIVE FOR DIRECTION.
- PRIOR TO ROUGH-IN, COORDINATE FINAL MOUNTING HEIGHTS OF SYSTEM OUTLET BOXES IN FIELD WITH OWNER'S REPRESENTATIVE. INSTALL BOXES AT HEIGHTS AS FOLLOWS, TO CENTER OF BOX, UNLESS DIRECTED OTHERWISE IN FIELD OR OTHERWISE NOTED ON E-SERIES DRAWINGS OR ARCHITECTURAL PLANS. HEIGHT OF BOXES DIMENSIONED FROM CEILING APPLY TO ROOMS HAVING CEILINGS 9' OR LESS; IN ROOMS HAVING HIGHER CEILINGS. LOCATE THESE AS DIRECTED IN THE FIELD.

44" (FIELD VERIFY & MATCH COUNTER RECEPT. HEIGHTS)
54" TO TOP OF OUTLET BOX
54" TO TOP OF OUTLET BOX
AS RECOMMENDED BY MANUFACTURER
44" (FIELD VERIFY)
18"
46"
72" TO TOP OF PANEL UNLESS SPECIAL CIRCUMSTANCES
ARE INDICATED OR OTHERWISE APPLY
AS NOTED ON PLANS OR AS DIRECTED BY ARCHITECT
46"
46" TO TOP OF OPERATING HANDLE
80" TO BOTTOM OF OUTLET BOX
18"
46"
18" TO TOP OF OUTLET BOX.

#### 1.3 ELECTRICAL INSTALLATIONS

- A. INSTALL WORK CONDUIT, WIRING, OUTLET BOX TYPE WORK IN FINISHED AREAS CONCEALED. SUCH WORK INSTALLED IN UNFINISHED AREAS MAY BE EXPOSED AT THE DISCRETION OF THE OWNER'S REPRESENTATIVE.
- VERIFY DIMENSIONS BY FIELD MEASUREMENTS. TAKE MEASUREMENTS AND BE RESPONSIBLE FOR EXACT B. SIZE AND LOCATIONS OF OPENINGS REQUIRED FOR THE INSTALLATION OF WORK. FIGURED DIMENSIONS ARE REASONABLY ACCURATE AND SHOULD GOVERN IN SETTING OUT WORK. WHERE DETAILED METHOD OF INSTALLATION IS NOT INDICATED OR WHERE VARIATIONS EXIST BETWEEN DESCRIBED WORK AND APPROVED PRACTICE, FOLLOW DIRECTION OF THE OWNER'S REPRESENTATIVE.
- PROVIDE BRANCH SUBFEEDER CIRCUITS AS SHOWN ON THE PLANS. THE SYMBOLS USED TO INDICATE THE PURPOSE OF WHICH THE VARIOUS OUTLETS ARE INTENDED ARE IDENTIFIED IN THE ELECTRIC LEGEND. WHERE OUTLETS ARE INDICATED BY LETTERS ON PLANS, PROVIDE CORRESPONDING SWITCHES TO CONTROL THEM.
- PROVIDE NO WIRE SIZE SMALLER THAN NO. 12 FOR BRANCH CIRCUITS UNLESS OTHERWISE NOTED ON D. PLANS FOR CONTROL CIRCUITS. PROVIDE LARGER SIZES WHERE REQUIRED BY PREVAILING CODES OR INDICATED ON CONTRACT DOCUMENTS. PROVIDE NEUTRAL CONDUCTOR FOR ALL MULTI-POLE FEEDERS. PROVIDE NEUTRAL CONDUCTOR(S) FOR ALL MULTI-POLE FEEDERS AND BRANCH CIRCUITS UNLESS THIS CONTRACTOR DETERMINES IN FIELD THAT THE AFFECTED LOAD(S) WILL NEVER HAVE NEED FOR A NEUTRAL CONDUCTOR AND NEC DOES NOT MANDATE OTHERWISE.

1.4 COORDINATION

A. PLANS ARE DIAGRAMMATIC INDICATING DESIGN INTENT AND INDICATING REQUIRED SIZE, POINTS OF TERMINATION AND, IN SOME CASES, SUGGESTED ROUTES OF RACEWAYS, ETC. HOWEVER, IT IS NOT INTENDED THAT DRAWINGS INDICATE FULLY COORDINATED CONDUIT ROUTING, NECESSARY OFFSETS, ETC. THE DRAWINGS ARE AN OUTLINE TO INDICATE THE APPROXIMATE LOCATION AND ARRANGEMENT OF DUCTWORK, PIPING, EQUIPMENT, OUTLETS, RACEWAYS, CABLES, ETC. INSTALL PIPING, CONDUIT, RACEWAYS, CABLE ASSEMBLIES, ETC. AS STRAIGHT AS POSSIBLE AND SYMMETRICAL (PERPENDICULAR TO OR PARALLEL WITH) WITH ARCHITECTURAL ITEMS. WORK IN AND ON THE BUILDING INSTALLED DIAGONAL TO BUILDING MEMBERS IS PROHIBITED.

- WITH THOSE.
- D. MAINTENANCE WHILE ENERGIZED.
- COORDINATE AND CORRECT CONFLICTS IN EQUIPMENT AND MATERIALS PRIOR TO INSTALLATION. IF A DECISION AS TO METHOD AND MATERIAL. 1.5 IDENTIFICATION
- A. GENERAI
  - HEIGHTS, FASTENING METHODS, ETC.
  - 2.CABLE AND CONDUCTOR IDENTIFICATION
  - ONLY (#4 AWG AND LARGER).

CODED INSULATION OR JACKETS.

- d. EQUIPMENT GROUNDING: GREEN
- C. RACEWAY IDENTIFICATION FINISHED AREAS THAT WILL BE OCCUPIED.

#### END OF SECTION

#### SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

- 1.1 GENERAL
  - INSTALLED.

#### 1.2 CONDUCTORS

- OTHERWISE ON SINGLE-LINE DIAGRAM ON DRAWINGS.
- SINGLE-LINE DIAGRAM ON DRAWINGS.
- PROVIDE MINIMUM #12 AWG CONDUCTOR SIZE.
- STRANDED CONDUCTORS FOR ALL OTHER APPLICATIONS.

PROVIDE THE FOL A 15 OR 20 AMPE CONDUCTORS AS LAST DEVICE FOR	LOWING MINIMUM WI RE GENERAL LIGHTING REQUIRED FOR VOLTAC BRANCH CIRCUITS MOF
DISTANCE	AWG WIRE SIZES
UP TO 60 FEET	#12
61 TO 90 FEET	#10
91 TO 150 FEET	#8
151 TO 240 FEET	#6

VOLTAGE DROP AND TO ACCOMMODATE SPECIAL CONDITIONS. DO NOT DERATE ANY GROUNDED (NEUTRAL) CONDUCTORS.

	EQUIPMENT GRO
SOURCE BREAKER/FL	JSE AWG WIRE
15 AMPERE	#14
20 AMPERE	#12
25 AMPERE	#10
30 AMPERE	#10
35 AMPERE	#8
40 AMPERE	# 8
45 AMPERE	# 8
50 AMPERE	# 6
60 AMPERE	# 6
70 AMPERE	# 4
80 AMPERE	# 4
90 AMPERE	# 2
100 AMPERE	# 2

- LOCATIONS WHERE INSTALLED.
- CONDITIONS.
- CONDUCTOR FED FROM 15 AMPERE AND 20 AMPERE BRANCH CIRCUIT BREAKERS.
- OTHERWISE ON POWER DISTRIBUTION SINGLE-LINE DIAGRAM.

B. CONSULT THE PLANS OF OTHER TRADES BEFORE INSTALLING WORK SO THAT WORK WILL NOT INTERFERE

PARTICIPATE IN COORDINATION EFFORTS AND IN PREPARATION OF COORDINATION DRAWINGS PRIOR TO FABRICATION OR INSTALLATION OF EQUIPMENT, MATERIALS, ETC. COORDINATE ACTUAL CLEARANCES OF INSTALLED EQUIPMENT. COORDINATE EXACT LOCATION OF ELECTRICAL OUTLETS, LIGHTING FIXTURES, CONDUITS, RACEWAYS, EQUIPMENT, CABLE ASSEMBLIES, APPLICABLE DEVICES, ETC. WELL IN ADVANCE OF INSTALLATION SO THERE WILL BE NO INTERFERENCES AT INSTALLATION BETWEEN THE VARIOUS TRADES.

ENSURE THAT WORK AND WORKING CLEARANCES IN ELECTRICAL ROOMS AND SIMILAR SPACES COMPLIES WITH NEC ARTICLE 110. THIS ALSO APPLIES TO FINALIZING LOCATIONS OF DISCONNECTS. STARTERS. CONTACTORS AND OTHER ELECTRICALLY OPERATED EQUIPMENT THAT MAY REQUIRE TESTING OR

CONFLICT CANNOT BE RESOLVED, REFER THE MATTER TO THE OWNER'S REPRESENTATIVE FOR A FINAL

1.SUBMIT MANUFACTURER'S DATA ON ELECTRICAL IDENTIFICATION MATERIALS AND PRODUCTS. SUBMIT DETAILED NAMEPLATE SCHEDULE INDICATING PROPOSED NOMENCLATURE, COLORS, TEXT

1.PROVIDE MANUFACTURER'S STANDARD VINYL-CLOTH SELF-ADHESIVE CONDUCTOR MARKERS OF WRAP-AROUND TYPE, EITHER PRE-NUMBERED PLASTIC COATED TYPE, OR WRITE-ON TYPE WITH CLEAR PLASTIC SELF-ADHESIVE COVER FLAP; NUMBERED TO SHOW CIRCUIT IDENTIFICATION. PROVIDE ON CONDUCTORS. PROVIDE COLOR CODED INSULATION FOR CONDUCTORS. PROVIDE COLOR CODED JACKETS FOR CABLES. MATCH COLOR SCHEMES WITH MARKING SYSTEM USED IN SUBMITTALS, CONTRACT DOCUMENTS, INDUSTRY STANDARDS, ETC. APPLY CABLE/CONDUCTOR IDENTIFICATION ON EACH CABLE IN EACH BOX/ENCLOSURE/CABINET FOR CABLES THAT ARE NOT AVAILABLE WITH COLOR

2. USE THE FOLLOWING INSULATION COLOR CODE FOR POWER SYSTEM AND VOLTAGE IDENTIFICATION. THIS APPLIES TO BOTH FEEDER AND BRANCH CIRCUIT WIRING. DO NOT INTERCHANGE COLORS. THE USE OF SCOTCH COLOR CODING TAPES FOR PHASE IDENTIFICATION MAY BE USED ON FEEDER CABLES

a. 480/277V SYSTEM: BROWN, ORANGE, YELLOW & GRAY (NEUTRAL) b. 208Y/120V SYSTEM:BLACK, RED, BLUE & WHITE (NEUTRAL) c. ELECTRONIC GROUND: GREEN WITH YELLOW TRACER (NEUTRAL)

1.PROVIDE MANUFACTURER'S STANDARD SELF-ADHESIVE VINYL TAPE NOT LESS THAN 3 MILS THICK BY 1-1/2" WIDE. UNLESS OTHERWISE INDICATED OR REQUIRED BY GOVERNING REGULATIONS PROVIDE BLACK LETTERING ON ORANGE BASE WITH MINIMUM 1/2" HIGH LETTERING. AS A MINIMUM, NEATLY INSTALL MARKERS AT EACH AND EVERY ENTRY POINT TO ROOMS, JUNCTION BOXES, PULL BOXES, EQUIPMENT CONNECTIONS, ETC. DO NOT INSTALL THESE MARKERS ON EXPOSED RACEWAYS IN

D. PROVIDE WIRE AND CABLE SUITABLE FOR THE TEMPERATURE, CONDITIONS, AND LOCATION WHERE

A. PROVIDE COPPER CONDUCTOR MATERIAL FOR WIRES AND CABLES UNLESS SPECIFICALLY INDICATED

B. CONDUCTOR SIZES INDICATED ARE BASED ON COPPER UNLESS SPECIFICALLY INDICATED OTHERWISE ON

STRANDED OR SOLID CONDUCTORS MAY BE USED FOR TYPE MC CABLE CONDUCTORS THAT ARE #10 AW OR LESS WHERE PERMITTED BY PREVAILING CODES AND AUTHORITIES HAVING JURISDICTION. PROVIDE

> IRE SIZES BASED ON DISTANCES FROM PANEL TO FIRST DEVICE OF OR RECEPTACLE BRANCH CIRCUIT. IN ADDITION TO UPSIZING GE DROP, PROVIDE MINIMUM #10 AWG CONDUCTORS TO THE RE THAN 150 FEET IN LENGTH.

PROVIDE THE FOLLOWING MINIMUM AWG CONDUCTOR SIZES FOR GENERAL BRANCH CIRCUITING, BASED ON USING COPPER CONDUCTORS. WHERE APPLICABLE INCREASE AS REQUIRED TO ACCOMMODATE

#10

PROVIDE CONDUCTOR INSULATION RATED AT 600VAC AND 90 DEGREES C. PROVIDE THHN/THWN INSULATION FOR CONDUCTORS SIZE 500 KCMIL AND LARGER, AND FOR CONDUCTORS # 8 AWG AND SMALLER. PROVIDE THW OR THHN/THWN INSULATION FOR OTHER SIZES AS APPROPRIATE FOR THE

PROVIDE XHHW-2 INSULATION FOR WIRING BELOW GRADE AND FOR WIRING SUBJECT TO MOISTURE

PROVIDE DEDICATED PARITY SIZED GROUNDED (NEUTRAL) CONDUCTOR FOR EACH BRANCH CIRCUIT PHASE

PROVIDE GROUNDED (NEUTRAL) CONDUCTOR(S) FOR ALL MULTI-POLE FEEDERS UNLESS INDICATED

K. PROVIDE GROUNDED (NEUTRAL) CONDUCTOR(S) FOR ALL MULTI-POLE BRANCH CIRCUITS.

#### 1.3 TYPE AC/MC CABLES

- A. PROVIDE TYPE AC/MC CABLES THAT ARE MINIMUM 90 DEGREES C RATED, WITH COMPONENTS AND FITTINGS LISTED FOR GROUNDING, AND COMPLIANT WITH THE FOLLOWING. 1.UL STD.4 AND UL STD. 83.
  - 2.ANSI E119 AND E814. 3.NEC ARTICLES 250 AND 333.
- B. PROVIDE CABLE FORMED FROM CONTINUOUS LENGTH OF SPIRALLY WOUND, INTERLOCKED ZINC-COATED OR GALVANIZED (INSIDE & OUTSIDE) STRIP STEEL. PROVIDE CABLES WITH FULL PARITY SIZED GREEN INSULATED EQUIPMENT GROUND CONDUCTOR.
- C. PROVIDE COMPATIBLE STEEL FITTINGS WITH INTEGRAL RED PLASTIC INSULATED THROAT BUSHINGS, COMPLIANT WITH NEC 350-5.
- TYPE AC/MC CABLE MAY BE UTILIZED ONLY IF NEC APPROVED AND IF APPROVED BY LOCAL AUTHORITY D. HAVING JURISDICTION AND IF INCLUDED IN THE LIMITED APPLICATIONS DEFINED BELOW. 1.PROVIDE FOR NEW 15 THROUGH 20 AMPERE BRANCH CIRCUIT WORK. THIS APPLIES ONLY UNDER ALL
  - OF THE FOLLOWING CIRCUMSTANCES AND CONDITIONS. a. PROVIDE ONLY WHERE CONCEALED (INSTALL WIRING FOR EXPOSED APPLICATIONS IN RACEWAY).
  - ROUTE CABLES PERPENDICULAR AND PARALLEL TO THE BUILDING ARCHITECTURAL LINES SURFACES, AND STRUCTURAL MEMBERS, KEEPING OFFSETS TO A MINIMUM AND FOLLOWING SURFACE CONTOURS WHERE POSSIBLE. MAINTAIN A UNIFORM ELEVATION FOR CABLE RUNS WHEREVER POSSIBLE. SUPPORT AND ANCHOR CABLES AT MAXIMUM 4 FOOT INTERVALS AN WITHIN 12" OF BOX OR OUTLET IN A MANNER THAT PREVENTS SAGGING. INSTALL CABLES IN A MANNER THAT PREVENTS OVERHEATING. FASTEN CABLES DIRECTLY TO THE STRUCTURE USING FACTORY CLAMPS AND CLIPS SPECIFICALLY DESIGNED FOR THE RESPECTIVE CABLE (CADDY OR EQUAL).
  - FOR EXPOSED RUNS OF CABLES DOWN WALLS TO SURFACE MOUNTED PANELBOARDS, PROVIDE PARTITION CHASE WALLS (CONSTRUCTED IN A MANNER APPROVED BY ARCHITECT), OR WITHIN APPROPRIATELY SIZED STEEL WIREWAY(S), OR WITHIN A CUSTOM FABRICATED HEAVY-GAGE PAINTED SHEETMETAL CHASE APPROVED IN ADVANCE BY THE ENGINEER. INSTALL IN A MANNER THAT FULLY CONCEALS CABLES, PREVENTS OVERHEATING OF CABLES,
  - AND IS APPROVED BY THE LOCAL AUTHORITY HAVING JURISDICTION. PROVIDE ONLY WHERE INSTALLED FOR NORMAL UTILITY CIRCUITS, INSTALL WIRING FOR EMERGENCY SYSTEM CIRCUITS IN STEEL CONDUIT, NO EXCEPTIONS

#### PART 2 - EXECUTION

#### 2.1INSTALLATION

- A. PROVIDE GROUNDED ("NEUTRAL") CONDUCTOR IN ALL LIGHTING CONTROL DEVICE (SWITCH, DIMMER, OCCUPANCY SENSOR, ETC.) WALL OUTLET BOXES, EVEN IF NOT IMMEDIATELY USED.
- B. CONNECT WIRES #6 AWG AND LARGER TO PANELS AND APPARATUS BY MEANS OF APPROVED LUGS OR CONNECTORS LARGE ENOUGH TO ENCLOSE ALL STRANDS OF THE CONDUCTORS. PROVIDE SOLDERLESS TYPE CONNECTORS.
- PROVIDE FACTORY SPLICE KITS (U.L. APPROVED FOR SUBMERSION IN WATER AND DIRECT BURIAL) FOR WIRE SPLICING IN OUTDOOR GRADE, OR SLAB ON GRADE, JUNCTION BOXES.

#### END OF SECTION

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

## PART 1 - GENER

- 1.1 SECTION INCLUDES
  - THIS SECTION INCLUDES GROUNDING AND BONDING REQUIREMENTS FOR ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS, CIRCUITS, AND EQUIPMENT.
  - PROVIDE THE FOLLOWING MINIMUM REQUIREMENTS FOR GROUNDING.
  - 1.NFPA: COMPONENTS AND INSTALLATION SHALL COMPLY WITH NFPA 70, "NATIONAL ELECTRICAL CODE" (NEC).
  - 2.UL COMPLY WITH UL 467, "GROUNDING AND BONDING EQUIPMENT."
  - 3.ANSI/TIA/EIA-607, "COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS.

#### PART 2 - PRODUCTS 2.1 MATERIALS

- A. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE GROUNDING AND BONDING PRODUCT MANUFACTURERS OF THE INSTALLER'S CHOICE UNLESS NOTED OTHERWISE.
- B. EXCEPT AS OTHERWISE INDICATED, PROVIDE COPPER ELECTRICAL GROUNDING AND BONDING SYSTEMS AND MATERIALS WITH ASSEMBLY OF MATERIALS INCLUDING BUT NOT LIMITED TO CABLES/WIRES. CONNECTORS, SOLDERLESS LUG TERMINALS, GROUNDING ELECTRODES AND PLATE ELECTRODES, BONDING JUMPER BRAID, AND ADDITIONAL ACCESSORIES NEEDED FOR A COMPLETE INSTALLATION. WHERE MATERIALS OR COMPONENTS ARE NOT INDICATED, PROVIDE PRODUCTS THAT COMPLY WITH NEC, UL, AND IEEE REQUIREMENTS, AND WITH ESTABLISHED INDUSTRY STANDARDS FOR THOSE APPLICATIONS INDICATED. UTILIZE COMPATIBLE METALLIC MATERIALS THROUGHOUT SYSTEM TO ELIMINATE GALVANIC ACTION.
- C. PROVIDE STEEL GROUNDING ELECTRODES WITH COPPER WELDED EXTERIOR, AND 3/4" DIAMETER BY 10 FEET LENGTH. PROVIDE SHEET COPPER PLATE ELECTRODES THAT ARE 20-GAGE BY 36" BY 36", WITH CABLE ATTACHMENTS (MINIMUM QUANTITY OF 2), SIZED FOR CABLES AS NECESSARY TO FULFILL PROJECT GROUNDING REQUIREMENTS. PROVIDE COPPER GROUND PLATES WHERE GROUND RODS CANNOT BE USED. PROVIDE CONNECTIONS TO GROUND ELECTRODES AT A POINT NOT LESS THAN 1 FOOT BELOW GRADE LEVEL, AND NOT LESS THAN 2 FEET AWAY FROM FOOTINGS AND FOUNDATIONS. WELD GROUNDING CONDUCTORS TO UNDERGROUND GROUNDING ELECTRODES WHERE MECHANICAL CONNECTIONS CAN NOT, OR SHOULD NOT, BE UTILIZED.

#### PART 3 - EXECUTION

3.1 INSTALLATION

- A. TERMINATE FEEDER AND BRANCH CIRCUIT INSULATED EQUIPMENT GROUNDING CONDUCTORS WITH GROUNDING LUG, BUS, OR BUSHING. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND AND PROTECTIVE DEVICES IN SHORTEST AND STRAIGHTEST PATHS AS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES.
- B. INSTALL CLAMP-ON CONNECTORS ON CLEAN METAL CONTACT SURFACES, TO ENSURE ELECTRICAL CONDUCTIVITY AND CIRCUIT INTEGRITY.
- C. PROVIDE CORROSION-RESISTANT FINISH TO BURIED METALLIC GROUNDING AND BONDING PRODUCTS.
- TERMINATE GROUND ELECTRODE CONDUCTORS WITH TWO-HOLE COMPRESSION LUGS. TERMINATE BONDING JUMPER CONDUCTORS WITH ONE-HOLE COMPRESSION LUGS.
- E. INSTALL BRAIDED TYPE BONDING JUMPERS WITH GROUND CLAMPS ON VALVED WATER PIPING WHERE SUCH PIPING PENETRATES EXTERIOR WALLS AND FIRE WALLS. INSTALL WATER PIPE CONNECTOR FITTINGS SO THAT THEY MAKE CONTACT WITH THE WATER PIPE FOR A MINIMUM DISTANCE OF 1-1/2 INCHES (MEASURED ALONG THE AXIS), AND HAVE A MINIMUM CONTACT SURFACE AREA OF 3 SQUARE INCHES.
- PROVIDE AND TEST A COMPLETE EARTHING (EARTH GROUND) SYSTEM FOR THE ENTIRE ELECTRICAL AND TELECOMMUNICATIONS INFRASTRUCTURE.
- G. EQUALIZE (BOND TOGETHER) GROUND POTENTIALS ASSOCIATED WITH THE ELECTRICAL DISTRIBUTION SYSTEM, SEPARATELY DERIVED SYSTEMS, STEEL STRUCTURAL SYSTEMS, AND WATER SERVICES PER NEC AND AS APPLICABLE.
- H. PROVIDE CORROSION-RESISTANT FINISH TO FIELD-CONNECTIONS, TO PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DAMAGED, AND WHERE SUBJECT TO CORROSIVE ACTION.
- ROUTE GROUND CONDUCTORS USED FOR BONDING IN PROTECTIVE CONDUIT SLEEVES. PROVIDE BOTH ENDS OF THESE CONDUIT SLEEVES WITH GROUND BUSHINGS, AND BOND GROUND BUSHINGS TO ENCLOSURES AND GROUND TERMINATIONS AT BOTH ENDS USING JUMPERS. SIZE GROUND JUMPER

PART 1 - GENERA

1.1 RELATED WOR

- CONDUCTORS THE SAME AS THE RESPECTIVE GROUND CONDUCTOR THAT IS BEING PROTECTED WITHIN THE RESPECTIVE CONDUIT.
- PROVIDE CORROSION-RESISTANT FINISH TO BURIED METALLIC GROUNDING AND BONDING PRODUCTS. K. TERMINATE GROUND ELECTRODE CONDUCTORS WITH TWO-HOLE COMPRESSION LUGS. TERMINATE BONDING JUMPER CONDUCTORS WITH ONE-HOLE COMPRESSION LUGS.

#### END OF SECTION

SECTION 26 05 33 - RACEWAYS FOR ELECTRICAL SYSTEMS

- INSTALL WIRE IN RACEWAY/CONDUIT (SIZED PER NEC) UNLESS SPECIFICALLY PERMITTED OTHERWISE ELSEWHERE IN DIVISION 26 SECTIONS, OR ON DRAWINGS.
- INSTALL WIRING FOR DIFFERENT POWER VOLTAGES IN RACEWAY SYSTEMS SEPARATE FROM EACH OTHER I.E. 24V SEPARATE FROM 208Y/120V, SEPARATE FROM 480Y/277V, ETC.).
- INSTALL WIRING, WITH THE EXCEPTION OF VOICE AND DATA, FOR THE VARIOUS ELECTRICAL SYSTEMS IN RACEWAY SYSTEMS, WHICH ARE SEPARATE FROM EACH OTHER (I.E. FIRE ALARM SEPARATE FROM VOICE/DATA SEPARATE FROM ETC.).
- D. DO NOT INSTALL CONDUITS WITHIN SLABS UNLESS SPECIFICALLY NOTED ON DRAWINGS, OR UNLESS PART OF AN UNDERFLOOR DUCT RACEWAY SYSTEM.
- E. DO NOT INSTALL CONDUITS BENEATH SLABS ON GRADE, EXCEPT IF WHERE SPECIFICALLY INDICATED OTHERWISE ON DRAWINGS, OR UNLESS SPECIAL CASE BY CASE PERMISSION IS OBTAINED FROM OWNER'S REPRESENTATIVE IN THE FIELD.
- F. PROVIDE STEEL CONDUIT AND STEEL FITTINGS FOR INDOOR ABOVE-SLAB APPLICATIONS, AS SPECIFIED IN THIS SECTION.
- G. PROVIDE CONDUIT FITTINGS WITH INSULATED THROATS. OR PLASTIC BUSHINGS FOR CONDUITS 2" AND LARGER WHERE INSULATED THROATS ARE NOT READILY AVAILABLE.
- H. PROVIDE MAXIMUM OF 40 PERCENT FILL FOR RACEWAYS, OR A THRESHOLD OF LESS IF REQUIRED BY NEC.

# SPECIFICATIONS - DIVISION 26 - ELECTRICAL (CONTINUED)

#### SECTION 26 05 33 - RACEWAYS FOR ELECTRICAL SYSTEMS (CONTINUED)

#### PART 2 - PRODUCTS

2.1ELECTRICAL METALLIC TUBING (EMT)

- A. PROVIDE GALVANIZED OR ZINC COATED STEEL EMT COMPLIANT WITH FS WW-C-563, ANSI C80.3 AND UL 797. B. PROVIDE EMT FOR ABOVE-GRADE CONDUIT, EXCEPT WHERE INDICATED OTHERWISE HEREIN, UNDER OTHER **DIVISION 26 SECTIONS, OR ON DRAWINGS.**
- 2.2 STEEL RIGID METAL CONDUIT (RMC)
- A. PROVIDE RIGID STEEL, HEAVY WALL, FULL WEIGHT, ZINC-COATED, THREADED TYPE (GALVANIZED AFTER CUTTING/THREADING) CONDUIT CONFORMING TO ANSI C80.1 AND UL 6. PROVIDE ZINC COATING FUSED TO INSIDE AND OUTSIDE WALLS OF CONDUIT.
- PROVIDE GALVANIZED OR ZINC COATED STEEL THREADED FITTINGS.
- C. PROVIDE FOR THE FOLLOWING APPLICATIONS.
  - 1.CONDUIT INSTALLED EMBEDDED IN CONCRETE, OR MASONRY
  - 2.CONDUITS (GROUNDED) THAT TURN UP FROM BELOW GRADE OR BELOW SLAB, EXCLUDING THE 90 DEGREE FITTINGS THAT CONNECT TO HORIZONTAL CONDUITS BELOW GRADE OR SLAB.
  - 3.0THER APPLICATIONS AS INDICATED IN PROJECT MANUAL OR ON DRAWINGS, AS REQUIRED BY NEC, OR AS OTHERWISE REQUIRED FOR SPECIAL PHYSICAL PROTECTION (I.E. NEARBY VEHICULAR/EQUIPMENT
- TRAFFIC, SITE MAINTENANCE EQUIPMENT, ETC.).
- 2.3 PVC COATED STEEL RIGID METAL CONDUIT (PVC/RMC)
  - A. PROVIDE RIGID STEEL, HEAVY WALL, FULL WEIGHT, THREADED TYPE (GALVANIZED AFTER CUTTING/THREADING INSIDE AND OUT) PVC COATED CONDUIT CONFORMING TO UL 6 STANDARD FOR SAFETY, RIGID METAL CONDUIT, AND UL514B STANDARD FOR SAFETY, FITTINGS FOR CONDUIT AND OUTLET BOXES
  - THE PVC COATED GALVANIZED RIGID CONDUIT MUST BE ETL VERIFIED TO THE INTERTEK ETL SEMKO HIGH TEMPERATURE H2O PVC COATING ADHESION TEST PROCEDURE FOR 200 HOURS. THE PVC COATED GALVANIZED RIGID CONDUIT MUST BEAR THE ETL VERIFIED PVC-001 LABEL TO SIGNIFY COMPLIANCE TO THE ADHESION

C. PROVIDE FOR APPLICATIONS SPECIFICALLY DESIGNATED ON DRAWINGS.

- 2.4 FLEXIBLE METAL CONDUIT (FMC)
  - A. PROVIDE FLEXIBLE METAL CONDUIT COMPLIANT WITH FS WW-C-566 AND UL 1, AND FORMED FROM CONTINUOUS LENGTH OF SPIRALLY WOUND, INTERLOCKED ZINC-COATED OR GALVANIZED (INSIDE & OUTSIDE) STRIP STEEL. PROVIDE CONDUIT FITTINGS FOR USE WITH FLEXIBLE STEEL CONDUIT OF THREADLESS HINGED CLAMP TYPE, WITH INSULATED THROATS. PROVIDE STRAIGHT TERMINAL CONNECTORS CONSISTING OF ONE PIECE BODY, FEMALE END WITH CLAMP AND DEEP SLOTTED MACHINE SCREW FOR SECURING CONDUIT, AND MALE THREADED END WITH LOCKNUT. DO NOT USE 45 DEGREE OR 90 DEGREE TERMINAL ANGLE CONNECTORS FOR FLEXIBLE OR WATER-TIGHT FLEXIBLE METAL CONDUIT IN LOCATIONS THAT WILL NOT BE FULLY ACCESSIBLE AFTER COMPLETION OF CONSTRUCTION. PROVIDE FULL SIZE GREEN INSULATED GROUND WIRE FOR ALL APPLICATIONS, REGARDLESS OF LENGTH. PROVIDE FLEXIBLE METAL CONDUIT FOR THE FOLLOWING CONDITIONS AS APPLICABLE.
    - 1.PROVIDE FOR FINAL 72 INCHES FROM OUTLET/JUNCTION BOXES TO RECESSED LUMINAIRES THAT ARE LOCATED IN ACCESSIBLE CEILING SYSTEMS. OPTIONALLY, TYPE AC/MC CABLE MAY BE USED FOR "FIXTURE WHIPS" (REFER TO SECTION 26 05 19).
    - 2.PROVIDE FOR FINAL 24-72 INCHES OF CONNECTION TO INDOOR EQUIPMENT THAT IS SUBJECT TO MOVEMENT OR VIBRATION. LEAVE SUFFICIENT SLACK IN FLEXIBLE CONDUIT TO PERMIT MOVEMENT FROM VIBRATION WITHOUT ADVERSELY AFFECTING CONDUITS AND CONNECTIONS.

#### PART 3 - EXECUTION

- GENERA
- 1.PROVIDE CONDUIT, TUBING AND FITTINGS OF TYPES, GRADES, SIZES AND WEIGHTS (WALL THICKNESSES) FOR APPLICATIONS AS NEEDED TO RENDER ELECTRICAL WORK FULLY OPERATIONAL. 2.PROPERLY SUPPORT AND ANCHOR RACEWAYS FOR THEIR ENTIRE LENGTH USING STRUCTURAL MATERIALS. DO NOT SPAN ANY SPACE UNSUPPORTED.

SECTION 26 05 34 - BOXES AND FITTINGS FOR ELECTRICAL SYSTEMS END OF SECTION

#### PART 1 - PRODUCTS

1.1 INDOOR BOXES

- A PROVIDE MINIMUM SIZE OF 4 INCHES SQUARE BY 1-1/2 INCHES DEEP FOR OUTLET BOXES AND JUNCTION BOXES. PROVIDE OUTLET BOX ACCESSORIES AS REQUIRED FOR EACH INSTALLATION, INCLUDING BOX SUPPORTS, MOUNTING EARS AND BRACKETS, WALLBOARD HANGERS, BOX EXTENSION RINGS, FIXTURE STUDS, CABLE CLAMPS, AND METAL STRAPS FOR SUPPORTING OUTLET BOXES, WHICH ARE COMPATIBLE WITH OUTLET BOXES BEING USED TO FULFILL INSTALLATION REQUIREMENTS FOR INDIVIDUAL WIRING SITUATIONS. PROVIDE WITH STAINLESS STEEL NUTS, BOLTS, SCREWS AND WASHERS.
- 1.2 DAMP AND WET LOCATION OUTLET BOXES AND COVERS
  - A. PROVIDE CORROSION-RESISTANT WEATHERTIGHT/RAINTIGHT OUTLET WIRING BOXES, OF TYPES, SHAPES AND SIZES, INCLUDING DEPTH OF BOXES, WITH THREADED CONDUIT HOLES FOR FASTENING ELECTRICAL CONDUIT, SUITABLY CONFIGURED FOR EACH APPLICATION, INCLUDING FACE PLATE GASKETS AND CORROSION-RESISTANT PLUGS AND FASTENERS. PROVIDE WEATHERTIGHT OUTLETS FOR INTERIOR AND EXTERIOR LOCATIONS EXPOSED TO WEATHER OR MOISTURE, I.E. IN DAMP OR WET LOCATIONS.
  - PROVIDE MINIMAL PROFILE ASSEMBLIES THAT ARE RATED NEMA 3R WHILE IN USE AND THAT EMPLOY RECESSED BOX AND COVER DESIGN, EQUAL TO THOMAS & BETTS "RED DOT" SERIES. PROVIDE TRIM COLOR(S) AS DIRECTED BY ARCHITECT.

#### PART 2 - EXECUTION

2.1 INSTALLATION

- A. INSTALL ELECTRICAL BOXES IN THOSE LOCATIONS THAT ENSURE ACCESSIBILITY TO ENCLOSED ELECTRICAL WIRING
- B. DO NOT INSTALL ALUMINUM PRODUCTS IN CONCRETE.
- CONSIDER THE OUTLET, JUNCTION, AND PULL BOX LOCATIONS INDICATED ON DRAWINGS APPROXIMATE. STUDY THE GENERAL CONSTRUCTION WITH RELATION TO SPACES AND EQUIPMENT SURROUNDING EACH OUTLET, AND NEATLY INSTALL OUTLETS ACCORDINGLY.

#### END OF SECTION

SECTION 26 05 80 - MECHANICAL EQUIPMENT

PART 1 - GENERAL

1.1 RELATED WORK

PROVIDE ALL NECESSARY ELECTRICALLY RELATED WORK AS REQUIRED TO RENDER ALL MECHANICAL EQUIPMENT (INCLUDING PLUMBING, HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT) FULLY OPERATIONAL AND FULLY COMPLIANT WITH NEC. THIS INCLUDES, PRIOR TO ORDERING MATERIALS OR COMMENCING WITH ROUGH-IN, REVIEWING EQUIPMENT SUBMITTAL DATA AND COORDINATING WITH INSTALLING CONTRACTORS TO ENSURE THE CORRECT SIZE, RATING AND QUANTITY OF CONDUCTORS ARE PROVIDED.

PART 2 - EXECUTION

- A. GENERAL
  - MULTI-TAP CONNECTORS.
  - EQUIPMENT, WIRING, CONDUIT, ETC.
  - MOUNTING HEIGHTS, CONNECTION POINTS, ETC. OF MECHANICAL EQUIPMENT.
- B. DISCONNECT SWITCH AND STARTER LOCATIONS ARTICLE 110 REQUIREMENTS FOR PANELBOARDS.
  - 2.SEE DETAILS ON DRAWINGS.

  - CONTROLS
- END OF SECTION

#### SECTION 26 05 90 - MISCELLANEOUS SPECIALTIES

PART 1 - GENERAL

- 1.1 RELATED WORK
  - A. TIME BASED CONTROL MULTI-PURPOSE TIME CLOCK (365 DAY) 100-HOUR CARRYOVER.

#### END OF SECTION

SECTION 26 09 23 - OCCUPANCY SENSORS

#### PART 1 - GENERAL

- 1.1 RELATED WORK

  - C. PROVIDE OCCUPANCY SENSORS FOR ENTIRE PROJECT THAT ARE ALL MADE BY THE SAME MANUFACTURER,

SPECIFIED IN DIVISION 26 DOCUMENTS.

- APPLICABLE CODE REQUIREMENTS.
- INTENT AND FUNCTIONALITY AND SUSTAINABILITY OF THE DESIG

۹.	CEILING SENSORS
	1.PROVIDE STANDARD OF QUALITY EQUAL
	WT-2205, WT-2200, WT-2250, WT-2255
	W-2000A, W-2000H, UT-300, UT-305, U
	DT-355, CX-100, CX-105, CI-200, CI-205,
2	
	1.PROVIDE STANDARD OF QUALITY EQUAL
	C2//E-P, S120/2//-P, A1-120 OR A1-2/

DUAL TECHNOLOGY SENSORS
1.PROVIDE SENSORS THAT ARE EITHER WAL
SUCH A WAY AS TO MINIMIZE COVERAG

**GENERAL STANDARDS** 

- AND RATED MOTOR LOADS. 2.PROVIDE SENSORS WITH COVERAGE THAT REMAINS CONSTANT AFTER SENSITIVITY CONTROL HAS BEEN
- FANS IS NOT PERMITTED.
- TAMPERING
- MOTION IS BEING DETECTED DURING BOTH TESTING AND NORMAL OPERATION.

## RATE OF LESS THAN ONE-THIRD OF ONE PERCENT. PART 2 - SPECIFIC REQUIREMENTS 2.1 ACCEPTABLE MANUFACTURERS

# 2.2PRODUCTS

1.PROVIDE DISCONNECT SWITCH AHEAD OF ALL EQUIPMENT, INCLUDING CONTROLS, UNLESS THE MECHANICAL EQUIPMENT COMES WITH INTEGRAL NEC-COMPLIANT DISCONNECT(S). PROVIDE NEMA 3R METAL RACEWAY OR TO A FULL SIZE GREEN GROUND CONDUCTOR OR BOTH. PROVIDE THE NECESSARY

ENCLOSURES WHERE INSTALLED OUTDOORS AND WHERE INSTALLED INDOORS IN AREAS SUBJECT TO MOISTURE. GROUND METAL FRAMES OF EQUIPMENT BY CONNECTING FRAMES TO THE GROUNDED ELECTRICAL CONNECTIONS BETWEEN THE SPECIFIED EQUIPMENT AND THE JUNCTION BOX NEAR EQUIPMENT WITH FLEXIBLE METALLIC CONDUIT (LIQUID-TIGHT OUTDOORS) AND MATCHED CONNECTORS (SEE SECTION 26 05 33). WHERE MECHANICAL EQUIPMENT LUGS CANNOT ACCOMMODATE CONDUCTOR SIZES SHOWN ON DRAWINGS, PROVIDE ILSCO CLEARTAP INSULATED

2.SIZES, ELECTRICAL RATINGS, ETC. OF EQUIPMENT AND WIRING SHOWN ON DRAWINGS ARE BASED ON

THE RESPECTIVE EQUIPMENT DESIGN BASE MANUFACTURERS. IF DIFFERENT MANUFACTURER(S) OR

MODEL(S) ARE ACTUALLY SUPPLIED, PROVIDE NECESSARY COORDINATION IN FIELD (PRIOR TO ORDERING MATERIALS AND PRIOR TO ROUGH-IN) AND PROVIDE THE NECESSARY SIZE OF RELATED ELECTRICAL PART 2 - PRODUCTS

3.PRIOR TO FURNISHING SUBMITTALS AND PRIOR TO ROUGH-IN, DETERMINE EXACT ELECTRICALLY RELATED

CHARACTERISTICS, LOADS, VOLTAGES, DISCONNECT AND STARTER REQUIREMENTS, LOCATIONS,

1.LOCATIONS OF DISCONNECTS AND STARTERS SHOWN ON DRAWINGS ARE INDICATED FOR SCHEMATIC PURPOSES ONLY. DETERMINE EXACT LOCATIONS IN FIELD SO THAT THEY ARE COMPLIANT WITH NEC

a. REFER TO FOOD SERVICE DRAWINGS, FOOD SERVICE SPECIFICATIONS AND MANUFACTURER'S SUBMITTALS FOR SPECIFIC INFORMATION. FIELD COORDINATE WORK WITH AFFECTED ENTITIES. b. PROVIDE INTERLOCK WIRING AND CONNECTIONS TO AND FROM THE VARIOUS EQUIPMENT AND

c. PROVIDE CONTROL WIRING FROM THE FAN UNITS TO RESPECTIVE REMOTE DUCT STATS. d. PROVIDE AUXILIARY CONTROL CIRCUIT WIRING FROM THE FACTORY MICRO-SWITCH IN THE HOOD FIRE SUPPRESSION SYSTEMS TO RESPECTIVE DEDICATED FIRE ALARM SYSTEM MONITOR MODULES TO INITIATE ALARM SIGNAL WHEN RESPECTIVE HOOD FIRE PROTECTION SYSTEM IS ACTIVATED. e. PROVIDE AUXILIARY CONTROL CIRCUIT WIRING FROM THE FACTORY MICRO-SWITCH IN THE HOOD FIRE SUPPRESSION SYSTEM TO CONTACTOR CONTROL COIL(S).

1.PROVIDE INTERMATIC #ET90415CR SERIES MULTI-PURPOSE TIME CLOCK (OR EQUAL BY TORK), WHICH IS PROGRAMMABLE 365-DAY/24-HOUR WITH OVERRIDE CONTROLS. PROVIDE FOUR-CHANNEL UNIT. PROVIDE REQUIRED EXTERNAL CONTACTORS, RELAYS, ETC. TO RENDER THE CONTROL SYSTEMS FULLY OPERATIONAL. VERIFY ZONE CONTROL REQUIREMENTS IN FIELD PRIOR TO ROUGH-IN. PROVIDE

2.REFER TO SECTION 26 27 40 FOR DEFINITION OF LIGHTING CONTACTORS. NOTE THAT ANY GIVEN LIGHTING CONTACTOR DESIGNATION MAY ACTUALLY INCLUDE MULTIPLE CONTACTORS DEPENDING ON HOW MANY CIRCUITS ARE CONTROLLED BY THE RESPECTIVE CONTACTOR DESIGNATION.

#### A. PROVIDE LABOR, MATERIALS, TOOLS, APPLIANCES, CONTROL HARDWARE, SENSOR, WIRE, JUNCTION BOXES AND EQUIPMENT NECESSARY FOR AND INCIDENTAL TO THE DELIVERY, INSTALLATION AND FURNISHING OF COMPLETELY OPERATIONAL OCCUPANCY SENSOR LIGHTING CONTROLS, AS DESCRIBED HEREIN.

PROVIDE PRODUCTS SUPPLIED FROM A SINGLE MANUFACTURER THAT HAS BEEN CONTINUOUSLY INVOLVED IN MANUFACTURING OF OCCUPANCY SENSORS FOR A MINIMUM OF FIVE (5) YEARS.

REGARDLESS OF WHERE THE MATERIALS ARE SPECIFIED IN DIVISION 26 DOCUMENTS. PROVIDE COMPONENTS THAT ARE ALL MADE BY THE SAME MANUFACTURER IN CASES WHERE OCCUPANCY SENSOR COMPONENTS ARE ALSO CONNECTED TO A BUILDING LIGHTING CONTROL SYSTEM, REGARDLESS OF WHERE THE MATERIALS ARE

D. PROVIDE COMPONENTS THAT ARE U.L. LISTED, OFFER A FIVE (5) YEAR WARRANTY AND MEET STATE AND LOCA

E. PROVIDE PRODUCTS MANUFACTURED BY AN ISO 9002 CERTIFIED MANUFACTURING FACILITY WITH A DEFECT

A. BASIS OF DESIGN MANUFACTURER IS WATTSTOPPER. OTHER ACCEPTABLE MANUFACTURERS ARE HUBBELL, SENSOR SWITCH, LEVITON, LUTRON, LC&D AND COOPER GREENGATE CA IN AS MUCH THE SYSTEMS MEET THE

> **WATT**STOPPER: WT-605, WT-600, WT-1105, WT-1100, VP-605, WP-1105, WP-2255, WP-2205, W-500A, W-1000A, , WPIR, HB-100, HB-150, DT-200, DT-205, DT-300, DT-305, CI-300, CI-305, CI-355, CI-12 OR CI-24 SERIES.

> WATTSTOPPER: B120E-P, B277E-P, BZ-100, LC-100, C120E-P, SERIES

LL MOUNTED, CORNER MOUNTED OR CEILING MOUNTED IN E IN UNWANTED AREAS. PROVIDE PASSIVE INFRARED AND LTRASONIC TECHNOLOGIES FOR OCCUPANCY DETECTION.

.PROVIDE SENSORS CAPABLE OF OPERATING NORMALLY WITH ELECTRONIC BALLASTS, PL LAMP SYSTEMS

SET. AUTOMATIC REDUCTION IN COVERAGE DUE TO THE CYCLING OF AIR CONDITIONER OR HEATING

PROVIDE SENSORS WITH READILY ACCESSIBLE, USER ADJUSTABLE SETTINGS FOR TIME DELAY AND SENSITIVITY. LOCATE SETTINGS ON THE SENSOR (NOT THE CONTROL UNIT) AND RECESS TO LIMIT

4.PROVIDE BYPASS MANUAL OVERRIDE ON EACH SENSOR TO ACCOMMODATE FAILURES. CONFIGURE SO THAT WHEN BYPASS IS UTILIZED, LIGHTING REMAINS ON CONSTANTLY OR CONTROL DIVERTS TO A WALL SWITCH UNTIL SENSOR IS REPLACED. RECESS THIS CONTROL TO PREVENT TAMPERING.

5.PROVIDE SENSORS WITH AN LED AS A VISUAL MEANS OF INDICATION AT ALL TIMES TO VERIFY THAT 6.WHERE SPECIFIED, PROVIDE SENSOR WITH INTERNAL ADDITIONAL ISOLATED RELAY WITH NORMALLY

OPEN, NORMALLY CLOSED AND COMMON OUTPUTS FOR USE WITH HVAC CONTROL, DATA LOGGING AND OTHER CONTROL OPTIONS. DO NOT USE SENSORS THAT UTILIZE SEPARATE COMPONENTS OR SPECIALLY

MODIFIED UNITS TO ACHIEVE THIS FUNCTION.

7.PROVIDE SENSORS WITH UL RATED, 94V-0 PLASTIC ENCLOSURES.

END OF SECTION

SECTION 26 24 16 - PANELBOARDS

PART 1 - GENERAL

1.1 RELATED WORK

A. TYPES OF PANELBOARDS AND ENCLOSURES REQUIRED FOR THE PROJECT INCLUDE THE FOLLOWING. 1.POWER-DISTRIBUTION PANELBOARDS. 2.GENERAL USE PANELBOARDS.

2.1 MANUFACTURERS

- SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PANELBOARD PRODUCTS OF ONE OF THE FOLLOWING (FOR EACH TYPE AND RATING OF PANELBOARD AND ENCLOSURE): 1.SQUARE D COMPANY.
  - 2.GENERAL ELECTRIC COMPANY
- 3.SIEMENS/ITE.
- 4.EATON. 2.2 GENERAL REQUIREMENTS
  - A. EXCEPT AS OTHERWISE INDICATED, PROVIDE PANELBOARDS, ENCLOSURES AND ANCILLARY COMPONENTS, OF TYPES, SIZES, AND RATINGS INDICATED, WHICH COMPLY WITH MANUFACTURER'S STANDARD MATERIALS; WITH
  - THE DESIGN AND CONSTRUCTION IN ACCORDANCE WITH PUBLISHED PRODUCT INFORMATION B. PROVIDE PANELBOARDS WITH PROPER NUMBER OF UNIT PANELBOARD DEVICES AS REQUIRED FOR COMPLETE INSTALLATION. WHERE TYPES, SIZES, OR RATINGS ARE NOT INDICATED, COMPLY WITH NEC, UL AND ESTABLISHED INDUSTRY STANDARDS FOR THOSE APPLICATIONS INDICATED.
  - PROVIDE PANELBOARDS THAT ARE NEW AND MANUFACTURER'S LATEST STANDARD CATALOG DESIGN.
  - PROVIDE PANELBOARDS THAT BEAR UL LABELS FOR THEIR SPECIFIC APPLICATIONS. PROVIDE PANELBOARDS SUITABLE FOR SERVICE VOLTAGE WITH NUMBER OF BRANCH CIRCUITS OF CAPACITY
  - SCHEDULED. PROVIDE PANELBOARDS, AND SECTIONS THEREOF IF APPLICABLE, WITH MAIN-LUGS-ONLY OF CAPACITY EQUAL TO, OR GREATER THAN, THE RATING OR SETTING OF THE OVERCURRENT PROTECTIVE DEVICE NEXT BACK ON THE LINE.
  - G. PROVIDE PANELBOARD BRANCHES AS SCHEDULED ON THE DRAWINGS
  - PROVIDE CIRCUIT BREAKER PANELBOARD BUS ASSEMBLIES WITH DISTRIBUTED (SEQUENCE) TYPE BUSSING THROUGHOUT, SO THAT ANY TWO ADJACENT SINGLE-POLE BREAKERS, OR SPACES, ARE REPLACEABLE BY A TWO-POLE INTERNAL COMMON TRIP BREAKER, AND SO THAT ANY THREE ADJACENT SINGLE-POLE BREAKERS, OR SPACES, ARE REPLACEABLE BY A THREE-POLE INTERNAL COMMON TRIP BREAKER. THIS APPLIES FOR BRANCH BREAKERS SIZED 15 AMP THROUGH 70 AMP INCLUSIVE, WITHOUT DISTURBING ANY OTHER BREAKER.
  - PROVIDE DEAD-FRONT SAFETY TYPE PANELBOARDS AS INDICATED, WITH PANELBOARD SWITCHING AND PROTECTIVE DEVICES IN QUANTITIES, RATINGS, TYPES, AND WITH ARRANGEMENT SHOWN. PROVIDE WITH ANTI-TURN SOLDERLESS PRESSURE TYPE MAIN LUG CONNECTORS APPROVED FOR USE WITH COPPER OR ALUMINUM CONDUCTORS.
  - PROVIDE FULL-SIZED (100 PERCENT) NEUTRAL BUS. PROVIDE SUITABLE LUGS ON NEUTRAL BUS FOR OUTGOING DERS REQUIRING NEUTRAL CONNECTIONS.

PROVIDE PANELBOARDS WITH BARE UNINSULATED GROUNDING BARS SUITABLE FOR BOLTING TO ENCLOSURES. 2.3 GENERAL USE CIRCUIT BREAKER PANELBOARDS

PROVIDE 208Y/120V THREE-PHASE GENERAL USE PANELBOARDS EQUAL TO SQUARE D NQOD WITH BOLT-ON BRANCH BREAKERS.

## 2.4 BUSSING

- A. PROVIDE COPPER BUSSING. 2.5 CIRCUIT BREAKER PANELBOARD ENCLOSURES
  - PROVIDE GALVANIZED SHEET STEEL CABINET TYPE ENCLOSURES, IN SIZES AND NEMA TYPES AS INDICATED, CODE-GAGE, MINIMUM 16-GAGE THICKNESS.
- PROVIDE BOXES WITH CODE-COMPLIANT SIDE AND END GUTTERS (MINIMUM 4 INCHES), AND OF CODE GAUGE GALVANIZED STEEL. PROVIDE BOXES THAT ARE 20 INCHES WIDE MINIMUM, AND 5-3/4 INCHES DEEP MINIMUM. PROVIDE BOXES WITH MULTIPLE KNOCKOUTS AND WIRING GUTTERS.
- PROVIDE PANELBOARD TRIMS THAT ARE FLUSH OR SURFACE AS REQUIRED FOR RESPECTIVE APPLICATION. THAT ARE CONSTRUCTED OF CODE GAUGE STEEL. THAT ARE FINISHED WITH RUST INHIBITING PRIME COAT AND THEN FACTORY APPLIED HOT SPRAY LACQUER OR BAKED-ON ENAMEL, AND THAT ARE FACTORY PAINTED MANUFACTURER'S STANDARD LIGHT GRAY. PROVIDE TRIMS COMPLETE WITH CONCEALED HINGES AND CONCEALED TRIM CLAMPS. PROVIDE DOORS WITH FLUSH CHROMIUM PLATED COMBINATION CYLINDER LOCK AND CATCH, AND WITH DIRECTORY SUITABLE FOR CLEAR PLASTIC. PROVIDE LOCKS THAT ARE KEYED ALIKE.
- PROVIDE ENCLOSURES THAT ARE FABRICATED BY SAME MANUFACTURER AS PANELBOARDS, WHICH MATE AND MATCH PROPERLY WITH PANELBOARDS TO BE ENCLOSED.
- 2.6 MOLDED CASE CIRCUIT BREAKERS
  - A. PROVIDE FACTORY-ASSEMBLED, MOLDED-CASE CIRCUIT BREAKERS OF FRAME SIZES, CHARACTERISTICS, AND RATINGS INCLUDING RMS SYMMETRICAL INTERRUPTING RATINGS REQUIRED FOR EACH APPLICATION. PROVIDE BREAKERS WITH PERMANENT THERMAL AND INSTANTANEOUS MAGNETIC TRIP, WITH FAULT-CURRENT LIMITING PROTECTION, AND WITH AMPERE RATINGS AS INDICATED.
  - PROVIDE COORDINATED SERIES-RATED CIRCUIT BREAKERS AS APPLICABLE THROUGHOUT, ACCOMMODATING RESPECTIVE AVAILABLE FAULT CURRENT.
  - PROVIDE BREAKERS THAT ARE DESIGNED TO BE MOUNTED AND OPERATED IN ANY PHYSICAL POSITION, AND TO BE OPERATED IN A MINIMUM AMBIENT TEMPERATURE OF 40 DEGREES C. PROVIDE BREAKERS WITH MECHANICAL SCREW TYPE REMOVABLE CONNECTOR LUGS, AL/CU RATED.
  - D. PROVIDE BRANCH CIRCUIT BREAKERS THAT ARE FULL AMBIENT COMPENSATED THERMAL MAGNETIC MOLDED CASE TYPE, WITH QUICK-MAKE AND QUICK-BREAK ACTION, AND WITH POSITIVE HANDLE TRIP INDICATION (ON BOTH MANUAL AND AUTOMATIC OPERATION). PROVIDE BREAKERS OF THE OVER-THE-CENTER TOGGLE OPERATING TYPE WITH THE HANDLE GOING TO A POSITION BETWEEN "ON" AND "OFF" TO INDICATE AUTOMATIC TRIPPING.
- PROVIDE BOLT-ON BRANCH BREAKERS. PROVIDE FULL SIZE CIRCUIT BREAKERS. DO NOT PROVIDE "TANDEM" OR "SPLIT" BREAKERS
- 2.7 FAULT CURRENT RATINGS
  - A. PROVIDE ELECTRICAL DISTRIBUTION RELATED EQUIPMENT WITH APPROPRIATELY BRACED BUSSING AND PROPERLY RATED BREAKERS, FUSES, ETC. FOR THE AVAILABLE FAULT CURRENTS.
  - B. IN EXISTING BUILDINGS WHERE FAULT CURRENT VALUES ARE NOT INDICATED ON DRAWINGS, COORDINATE WITH EXISTING "UPSTREAM" DISTRIBUTION EQUIPMENT, AND PROVIDE EQUIPMENT AIC RATINGS THAT MEET OR EXCEED SAME.
- 2.8 SERIES COORDINATION
- PROVIDE FACTORY SERIES COORDINATION FOR ALL CIRCUIT BREAKERS (INCLUDING BRANCH BREAKERS) RELATIVE TO UPSTREAM BREAKERS, SO THAT ONLY THE BREAKER CLOSEST IN THE CIRCUIT TO THE LOAD TRIPS UPON AN OVERLOAD OR FAULT CONDITION.

PART 3 - EXECUTION 3.1 INSTALLATION

> PROVIDE ENCLOSURES FASTENED FIRMLY TO WALLS AND STRUCTURAL SURFACES, ENSURING THAT THEY ARE Δ PERMANENTLY AND MECHANICALLY ANCHORED.

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	В.	PROVIDE N INSTALLATI SIGNAGE/[	EATLY TYPEWRITTEN CIRCUIT DIRECTORY CARD FOR EACH PANELBOARD UPON COMPLETION OF ION WORK. INCLUDE THE ACTUAL ROOM NAMES/NUMBERS THAT ARE SELECTED FOR INTERIOR DESIGNATION.
	C.	SCHEDULIN REQUIREM BALANCING	NG SHOWN ON DRAWINGS IS SHOWN TO INDICATE FEEDER AND BRANCH CIRCUITING ENTS. DETERMINE EXACT NUMBERING SEQUENCE OF CIRCUITS IN FIELD AFTER PERFORMING FINAL
ID	OF SEC		
СТ	ION 26	5 27 26 - WIF	RING DEVICES
RT	- 1 - GE	NERAL	
1	SUM	MARY	
	Α.	PROVIDE W APPLICATIO APPLICABL	VIRING DEVICES, IN TYPES, CHARACTERISTICS, GRADES, COLORS, AND ELECTRICAL RATINGS FOR ONS INDICATED WHICH ARE UL LISTED AND WHICH COMPLY WITH NEMA WD 1 AND OTHER E UL AND NEMA STANDARDS. VERIFY COLOR SELECTIONS WITH OWNER'S REPRESENTATIVE.
RT	2 - PR	ODUCTS	
11	IANUF	ACTURERS	
	A.	SUBJECT TO	O COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING.
	SWIT	CHES:	LEVITON, HUBBELL, BRYANT, PASS & SEYMOUR, COOPER
		IERS:	LUTRON LEVITON HUBBELL BRYANT DASS & SEVMOUR COODER
	WALL	PLATES:	LEVITON, HUBBELL, BRYANT, PASS & SEYMOUR, COOPER
2	WIRIN	NG DEVICE C	OLORS
	A.	UNLESS SPI NORMAL U	ECIFICALLY INDICATED OTHERWISE, OR DIRECTED OTHERWISE IN FIELD, PROVIDE WHITE COLOR FOR TILITY WIRING DEVICES.
3	SPECI	FICATION GI	RADE RECEPTACLES
-	^		
	Α.	1.PROVI WITI #536	DE DUPLEX RECEPTACLES EQUAL TO LEVITON #5362 SERIES. FOR RECEPTACLE CIRCUITS PROTECTED H 15A BREAKERS, PROVIDE NEMA 5-15R EQUIVALENTS. PROVIDE RECEPTACLES EQUAL TO LEVITON 51 SERIES FOR SIMPLEX (SINGLE) APPLICATIONS.
	В.	GROUND-F 1.PROVI FOR 2.RECEF SAM FOR	AULT INTERRUPTER SPECIFICATION GRADE RECEPTACLES DE GROUND FAULT CIRCUIT INTERRUPTER DUPLEX RECEPTACLES EQUAL TO LEVITON #8898 SERIES. RECEPTACLE CIRCUITS PROTECTED WITH 15A BREAKERS, PROVIDE NEMA 5-15R EQUIVALENTS. TACLES INDICATED AS GFI MAY BE GFI-PROTECTED BY AN UPSTREAM GFI RECEPTACLE ON THE E CIRCUIT ONLY IF LOCATED IN THE SAME ROOM. OTHERWISE PROVIDE A SEPARATE GFI RECEPTACLE EACH ONE SHOWN.
	C.	ISOLATED ( 1.PROVI (SING PROT ISOL	GROUND SPECIFICATION GRADE RECEPTACLES IDE DUPLEX ISOLATED GROUND RECEPTACLES EQUAL TO LEVITON #5362-IG. PROVIDE SIMPLEX GLE) ISOLATED GROUND RECEPTACLES EQUAL TO LEVITON #5361-IG. FOR RECEPTACLE CIRCUITS FECTED WITH 15A BREAKERS, PROVIDE NEMA 5-15R EQUIVALENTS. PROVIDE DEDICATED INSULATED ATED GROUND CONDUCTORS (GREEN WITH YELLOW TRACER) FOR EACH APPLICATION.
	D.	WEATHER 1.PROVI RECE	RESISTANT GFCI RECEPTACLES DE DUPLEX WEATHER RESISTANT RECEPTACLES EQUAL TO LEVITON # W7899 SERIES. FOR PTACLE CIRCUITS PROTECTED WITH 15A BREAKERS, PROVIDE NEMA 5-15R EQUIVALENTS.
4	WIRIN	NG DEVICE A	CCESSORIES
	A.	WALL PLAT 1.PROVI TO A DEVI SCRE DEVI	ES DE SINGLE AND COMBINATION, OF TYPES, SIZES, AND WITH GANGING AND CUTOUTS AS REQUIRED CCOMMODATE EACH APPLICATION. PROVIDE PLATES WHICH MATE AND MATCH WITH WIRING CES TO WHICH ATTACHED. PROVIDE METAL SCREWS FOR SECURING PLATES TO DEVICES WITH W HEADS COLORED TO MATCH FINISH OF PLATES. PROVIDE WALL PLATE COLOR TO MATCH WIRING CES UNLESS SPECIFICALLY INDICATED OTHERWISE.
		2.PROV "EXT	IDE STANDARD SIZE WALL PLATES. DO NOT PROVIDE "MIDWAY", "OVERSIZED" ("JUMBO") OR RA DEEP" WALL PLATES.
		3.PROV 4.PROV BEVE	IDE GALVANIZED STEEL WALL PLATES IN UNFINISHED EXPOSED-CONDUIT AREAS. IDE COMMERCIAL GRADE, SATIN FINISH STAINLESS STEEL WALL PLATES IN FINISHED AREAS, WITH ELED EDGES, EQUAL TO LEVITON TYPE 302 SERIES.
		5.PROV	IDE COMMERCIAL SPECIFICATION GRADE THERMOPLASTIC WALL PLATES IN FINISHED AREAS.
RT	- 3 - EX	ECUTION	

- 3.1INSTALLATION
  - A. PROVIDE GROUNDED ("NEUTRAL") CONDUCTOR IN ALL LIGHTING CONTROL DEVICE (SWITCH, DIMMER, OCCUPANCY SENSOR, ETC.) WALL OUTLET BOXES, EVEN IF NOT IMMEDIATELY USED.
- B. INSTALL RECEPTACLES SO THAT THE GROUND PIN IS ORIENTED IN A CONSISTENT MANNER THROUGHOUT THE FACILITY, SO THAT THE ORIENTATION IS COMPLIANT WITH ALL PREVAILING CODES AND REGULATIONS, AND SO THAT THE ORIENTATION IS ACCEPTABLE TO THE ELECTRICAL INSPECTOR.

END OF SECTION

## SPECIFICATIONS - DIVISION 26 - ELECTRICAL (CONTINUED)

#### SECTION 26 27 40 - DISCONNECTS, STARTERS, CONTACTORS

#### PART 1 - GENERAL

#### 1.1 RELATED WORK

PROVIDE NEMA STANDARD EQUIPMENT, INCLUDING THOSE INCORPORATED AS AN INTEGRAL PART OF A FACTORYSHOP PRE-FABRICATED PIECE OF EQUIPMENT. DO NOT USE IEC STANDARDS FOR EQUIPMENT

#### PART 2 - PRODUCTS

#### 2.1 ACCEPTABLE MANUFACTURERS

- SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE EQUIPMENT OF ONE OF THE FOLLOWING (FOR EACH TYPE AND RATING):
  - 1. ALLEN-BRADLEY CO. 2. GENERAL ELECTRIC CO.
  - **3. SIEMANSITE**
- 4. SQUARE D CO

5. EATON 2.2 MATERIALS

- A. DISCONNECT SWITCHES
  - 1. PROVIDE DISCONNECT SWITCHES EQUAL TO SQUARE D TYPE HD, HEAVY DUTY, SAFETY TYPE, QUICK MAKE AND QUICK BREAK AND EXTERNALLY OPERATED.
  - 2. PROVIDE FUSIBLE DISCONNECTS UNLESS NOTED OTHERWISE ON DRAWINGS OR DIRECTED OTHERWISE IN FIFLD. 3. PROVIDE DISCONNECT SWITCHES BRACED FOR 200,000 A.I.C.
  - 4. PROVIDE UNITS WITH FUSES OF CLASSES AND CURRENT RATINGS INDICATED, AND UL LISTED FOR USE AS SERVICE EQUIPMENT UNDER UL STANDARD 98 OR 869. SEE SECTION "FUSES" FOR FUSE SPECIFICATIONS. WHERE CURRENT LIMITING FUSES ARE INDICATED, PROVIDE SWITCHES WITH NON-INTERCHANGEABLE FEATURE SUITABLE ONLY FOR CURRENT LIMITING TYPE FUSES
  - 5. INSTALL DISCONNECT SWITCHES WITHIN SIGHT OF CONTROLLER POSITION UNLESS OTHERWISE INDICATED.
- CONTACTORS В.
  - 1. PROVIDE CONTACTORS EQUIPPED WITH EXTERNAL PILOT LIGHTS IN COVER, AND EXTERNAL HOA SELECTOR SWITCHES IN COVER. 2. WIRE CONTACTORS FOR LIGHTING APPLICATIONS SO THAT THE "AUTO" POSITION IS THE NORMAL ACTIVATED CONDITION (I.E. PHOTOCELL CONTROLLED, PHOTOCELLTIME-CLOCK CONTROLLED, REMOTE
  - SWITCH CONTROLLED, BAS CONTROLLED, ETC.); SO THAT THE "OFF" POSITION IS MANUAL OVERRIDE TO TURN LIGHTING OFF; AND SO THAT THE "HAND" POSITION IS MANUAL OVERRIDE TO TURN LIGHTING ON. 3. PROVIDE CONTACTORS WITH FIELD CONVERTIBLE N.O.N.C. CONTACTS AND DESCRIPTIVE NAMEPLATES. 4. PROVIDE CONTACTORS EQUAL TO SQUARE D CLASS 8903 (OR ALLEN-BRADLEY BUL. 500L-BA\*94 SERIES) FOR TUNGSTEN LIGHTING LOADS, BALLAST LIGHTING LOADS, AND SMALL RESISTANCE HEATING LOADS.
  - PROVIDE CONTACTORS THAT ARE ELECTRICALLY OPERATED AND ELECTRICALLY HELD (EOEH). PROVIDE CONTACTORS IN FACTORY NEMA 1 ENCLOSURES, WITH 120V COILS (UNLESS INDICATED OTHERWISE ELSEWHERE OR OTHERWISE REQUIRED TO RENDER CONTROLS FULLY OPERABLE) 5. PROVIDE "DRY" CONTACTS RATED AT 30A, MINIMUM 250V (600V IF REQUIRED BY APPLICATION).
  - PROVIDE NUMBER OF POLES (MINIMUM OF THREE POLES) AND NUMBER OF CONTACTORS AS REQUIRED FOR EACH APPLICATION. FIELD VERIFY COIL VOLTAGE RATINGS. 6. PROVIDE MAGNETIC (MECHANICALLY LATCHED) CONTACTORS EQUAL TO SQUARE D CLASS 8502 (OR
  - ALLEN-BRADLEY BUL. 500-BA\*930 SERIES) FOR HEATING LOADS, CAPACITOR LOADS, TRANSFORMER LOADS, MOTOR LOADS, AND SIMILAR LOADS. PROVIDE CONTACTORS WITH FACTORY NEMA ENCLOSURES, WITH 120V COILS (UNLESS INDICATED OTHERWISE ELSEWHERE OR OTHERWISE REQUIRED TO RENDER CONTROLS FULLY OPERABLE). PROVIDE STARTERS WITH HOLDING CIRCUIT CONTACTS (PROVIDE RELATED INTERLOCK WIRING). PROVIDE MAGNETIC CONTACTORS THAT ARE NEMA SIZE 1 MINIMUM. PROVIDE "DRY" CONTACTS RATED AT 30A, MINIMUM 250V (600V IF REQUIRED BY APPLICATION). PROVIDE NUMBER OF POLESINIMUM OF THREE POLES) AND NUMBER OF CONTACTORS AS REQUIRED FOR EACH APPLICATION. FIELD VERIFY COIL VOLTAGE RATINGS.

#### PART 3 - EXECUTION

3.1 INSTALLATION

- PROVIDE UNITS WITH HORSEPOWER RATINGS SUITABLE TO THE LOADS. SIZE UNITS ACCORDING TO LOAD BEING SERVED OR AS NOTED ON DRAWINGS, WHICHEVER REQUIREMENT IS LARGER. INSTALL OVERLOADS AND FUSES AS NECESSARY TO FULFILL REQUIREMENTS OF EACH APPLICATION.
- FURNISH ADDITIONAL FUSESOVERLOADS AMOUNTING TO 10 PERCENT OF FUSES PROVIDED, BUT NOT LESS THAN ONE SET OF 3 OF EACH KIND, FOR REQUIRED TYPES AND RATINGS. PROVIDE NEMA 3R ENCLOSURES FOR UNITS THAT ARE INSTALLED OUTDOORS, IN MOIST AREAS, AND IN OTHER
- ATMOSPHERES SUBJECT TO SIMILAR MOISTURE OR EXPOSURE. INSPECT OPERATING MECHANISMS FOR MALFUNCTIONING AND. WHERE NECESSARY, ADJUST UNITS FOR FREE D.
- MECHANICAL MOVEMENT. SUBSEQUENT TO COMPLETION OF INSTALLATION OF EQUIPMENT, ENERGIZE CIRCUITS AND DEMONSTRATE CAPABILITY AND COMPLIANCE WITH REQUIREMENTS. BEGIN BY DEMONSTRATING SWITCH OPERATION THROUGH SIX OPENINGCLOSING CYCLES WITH CIRCUIT UNLOADED. OPEN EACH SWITCH ENCLOSURE AND INSPECT INTERIORS, INSPECT MECHANICAL AND ELECTRICAL CONNECTIONS. INSPECT FUSEOVERLOAD INSTALLATIONS. AND VERIFY ACCURACY OF TYPE AND RATING OF FUSESOVERLOADS INSTALLED. CORRECT DEFICIENCIES THEN RETEST TO DEMONSTRATE COMPLIANCE. REMOVE AND REPLACE DEFECTIVE UNITS WITH NEW UNITS AND RETEST.

END OF SECTION

## **ELECTRICAL NOTE :**

- 1. ELECTRICAL CONTRACTOR SHALL REVIEW ALL DRAWINGS OF THIS SET. 2. CONTRACTOR TO VERIFY THAT ALL EQUIPMENT SHOWN AS EXISTING MATCHES THE DESCRIPTIONS AND SPECIFICATIONS SHOWN ON DRAWINGS AND SCHEDULES. IF DIFFERENT, NOTIFY ARCHITECT/ENGINEER BEFORE BIDDING, ORDERING, OR PROCEEDING WITH WORK.
- 3. ELECTRICAL CONTRACTOR SHALL SUPPLY AND INSTALL ALL NEW ELECTRICAL WORK INDICATED. CONSTRUCTION SHALL BE IN ACCORDANCE WITH DRAWINGS AND APPLICABLE SPECIFICATIONS. IF A PROBLEM IS ENCOUNTERED IN COMPLYING WITH THIS REQUIREMENT, CONTRACTOR SHALL NOTIFY THE OWNER OR HIS REPRESENTATIVE AS SOON AS POSSIBLE AFTER DISCOVERY OF THE PROBLEM AND SHALL NOT PROCEED WITH THAT 36. ELECTRICAL CONTRACTOR SHALL LABEL ALL PANELS W/TYPE WRITTEN PORTION OF THE WORK UNTIL OWNER HAS DIRECTED CORRECTIVE ACTION TO BE TAKEN.
- 4. ELECTRICAL CONTRACTOR SHALL VISIT JOB SITE AND FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING ELECTRICAL AND COMMUNICATIONS INSTALLATION AND MAKE PROVISIONS AS TO THE COST THEREOF. EXISTING 38. ALL LIGHT SWITCHES TO BE AT 48" A.F.F. CONDITIONS OF ELECTRICAL EQUIPMENT, LIGHT FIXTURES, ETC... THAT ARE PART OF THE FINAL SYSTEM SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO SUBMITTING HIS BID.
- 5. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE 2023 EDITION OF THE NATIONAL ELECTRIC CODE AND ALL CODES AND ORDINANCES OF THE AUTHORITY HAVING JURISDICTION.
- 6. DO NOT SCALE THE ELECTRICAL DRAWINGS. REFER TO ARCHITECTURAL PLANS AND ELEVATIONS FOR EXACT LOCATION FOR ALL EQUIPMENT. CONFIRM WITH OWNER'S REPRESENTATIVE.
- 7. ALL ELECTRICAL NOT BEING REUSED MUST BE REMOVED IN ITS ENTIRETY. 8. ALL CONDUIT IN OR UNDERGROUND OR IN CONCRETE MUST BE RIGID GALVANIZED STEEL.
- 9. CIRCUIT BREAKERS AND PANELS TO BE BOLT ON TYPE
- 10. ALL EQUIPMENT SHALL BE APPROVED BY UL OR OTHER NATIONALLY RECOGNIZED TESTING COMPANY.
- 11. ALL RECEPTACLES SHALL BE GROUNDED AS REQUIRED BY NEC 250.146 12. SUBMIT SERVICE ENTRANCE EQUIPMENT FOR SEPARATE APPROVAL.
- 13. ALL LOW VOLTAGE MUST BE IN CONDUIT TO ABOVE THE DROP CEILING. BRIDAL RINGS OR "J" HOOKS REQUIRED.
- 14. SEPARATE PERMITS ARE REQUIRED FOR ALL LOW VOLTAGE SUCH AS TELEPHONE, DATA, THERMOSTAT, MUSIC, ALARMS ETC.
- 15. SEPARATE PERMIT REQUIRED FOR SIGNAGE.
- GENERAL CONTRACTORS IS REQUIRED.
- 17. ELECTRICIAN MUST BE ON SITE FOR ALL INSPECTIONS.
- 18. MINIMUM WIRE SIZE SHALL BE #12 A.W.G. EXCLUDING CONTROL WIRING. ALL CONDUCTORS SHALL BE COPPER AND UNLESS OTHERWISE NOTED THHN INSULATION.
- 19. OUTLET BOXES SHALL BE PRESSED STEEL IN DRY LOCATIONS, PLASTIC AND CAST ALLOY WITH THREADED HUBS IN WET OR DAMP LOCATIONS, AND SPECIAL ENCLOSURES FOR OTHER CLASSIFIED AREAS.
- 20. IT IS NOT THE INTENT OF THESE PLANS TO SHOW EVERY MINOR DETAIL OF CONSTRUCTION. THE CONTRACTOR IS EXPECTED TO FURNISH AND INSTALL ALL ITEMS FOR A COMPLETE ELECTRICAL SYSTEM AND PROVIDE ALL REQUIREMENTS NECESSARY FOR EQUIPMENT TO BE PLACED IN PROPER WORKING ORDER.
- 21. ELECTRICAL SYSTEM SHALL BE COMPLETE AND EFFECTIVELY GROUNDED AS REQUIRED BY THE N.E.C. OR LOCAL CODES.
- 22. ALL MATERIALS SHALL BE NEW AND BEAR UNDERWRITERS' LABELS WHERE APPLICABLE.
- 23. ALL WORK SHALL BE PERFORMED BY A LICENSED ELECTRICAL CONTRACTOR COMPLIANCE WITH NEC AND UL REQUIREMENTS. IN A FIRST CLASS WORKMANLIKE MANNER. THE COMPLETED SYSTEM SHALL BE FULLY OPERATIVE AND ACCEPTED BY ENGINEER/ARCHITECT.
- 24. ALL WORK SHALL BE COORDINATED WITH OTHER TRADES TO AVOID INTERFERENCE WITH THE PROGRESS OF CONSTRUCTION.
- 25. ELECTRICAL CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND WORKMANSHIP FREE FROM DEFECTS FOR A PERIOD OF NOT LESS THAN ONE YEAR FROM DATE THAT CERTIFICATE OF OCCUPANCY IS ISSUED
- WARRANTY SHALL BE PROVIDED IN WRITING. PROVIDE COPY TO LL. 26. CORRECTION OF ANY DEFECTS SHALL BE COMPLETED WITHOUT ADDITION CHARGE AND SHALL INCLUDE REPLACEMENT OR REPAIR OF ANY OTHER
- PHASE OF THE INSTALLATION WHICH MAY HAVE BEEN DAMAGED THEREBY. 27. ALL REQUIRED INSURANCE SHALL BE PROVIDED FOR PROTECTION AGAINST PUBLIC LIABILITY AND PROPERTY DAMAGE FOR THE DURATION OF THE WORK.
- 28. CONTRACTOR SHALL PAY FOR ALL PERMITS, FEES, INSPECTIONS AND TESTING. CONTRACTOR TO OBTAIN PERMIT AND APPROVED SUBMITTALS
- PRIOR TO BEGINNING WORK OR ORDERING EQUIPMENT. 29. THE ELECTRICAL INSTALLATION SHALL MEET ALL STANDARD REQUIREMENTS 61. COORDINATE ALL CONCRETE TRENCHING/CORING TO ENSURE THAT ANY OF POWER AND TELEPHONE COMP
- 30. CONTRACTOR SHALL COORDINATE WITH MECHANICAL DRAWINGS AND PROVIDE ALL NECESSARY CONTROL WIRING.
- 31. ALL CIRCUIT BREAKERS FEEDING MECHANICAL EQUIPMENT SHALL BE HACR TYPE CIRCUIT BREAKERS.
- 32. PROVIDE AND INSTALL CONDUIT, CONDUCTORS, PULL WIRES, BOXES, COVER PLATES, DEVICES, ETC. FOR ALL OUTLETS AS INDICATED.

- 3. MATERIALS, PRODUCTS, AND EQUIPMENT, INCLUDING ALL COMPONENTS THEREOF. SHALL BE NEW AND SUCH AS APPEAR ON THE UL LIST OF APPROVED ITEMS AND SHALL MEET OR EXCEED THE REQUIREMENTS OF N.E.C. NEMA, AND IECE.
- . CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OR CUT SHEETS OF LIGHTING FIXTURES, SWITCHES, AND OTHER ELECTRICAL ITEMS FOR APPROVAL BY ENGINEER/ARCHITECT
- 35. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING, PATCHING AND FIRED CAULKING REQUIRED OF HIS WORK.
- DIRECTORIES. ALL ELECTRICAL OUTLETS SHALL BE AT 18" A.F.F. UNLESS NOTED
- OTHERWISE, AND VERTICALLY MOUNTED.
- 39. ALL ELECTRICAL WIRING SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. ALL ELECTRICAL WIRING FOR HVAC SYSTEM INCLUDING CONTROLS, THERMOSTATS, POWER, ETC. SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
- . BREAKER AND PANELS -- ALL CURRENT CARRYING BUSSES SHALL BE COPPER. ALL GROUND BUS BARS SHALL BE COPPER. PANEL BOARD ENCLOSURES SHALL BE FURNISHED WITHOUT PRE-PUNCHED CONCENTRIC HOLES. A.I.C. RATINGS SHALL BE AS INDICATED ON PANEL BOARD SCHEDULES.
- DISCONNECT SWITCHES SHALL BE H.P. RATED, GENERAL DUTY, QUICK-MAKE, QUICK-BREAK ENCLOSURES AS REQUIRED BY EXPOSURE.
- 42. MOTOR STARTERS SHALL BE MANUAL OR MAGNETIC, WITH OVERLOAD RELAYS IN EACH HOT LEG.
- . THE TERM "PROVIDE" USED IN THE CONSTRUCTION DOCUMENTS AND SPECIFICATIONS INDICATES THE CONTRACT SHALL FURNISH AND INSTALL
- . CONTRACTOR SHALL CONFIRM WITH ANY AND ALL REQUIREMENTS SUCH AS: LUG SIZE RESTRICTIONS, CONDUIT ENTRY, TRANSFORMER SIZE, SCHEDULED DOWN TIME FOR OWNERS CONFIRMATION, ETC. ANY CONFLICTS SHALL BE BROUGHT TO ATTENTION OF THE ENGINEER BEFORE PROCEEDING WITH ANY WORK.
- . VOLTAGE DROP FOR ALL BRANCH CONDUCTORS SHALL NOT EXCEED 3%. WHERE VOLTAGE DROP EXCEEDS 3%, CONTRACTOR SHALL INCREASE SIZE OF CONDUCTORS.
- . CONTRACTOR SHALL PROVIDE GFI TYPE BREAKER FOR ALL EXTERIOR 120V CIRCUITS OR GFI PROTECTION -- FOR THE WHOLE CIRCUIT.
- 16. PRIOR TO ANY CONSTRUCTION WORK BEGINNING AN ON-SITE MEETING WITH 47. GAS PIPING SHALL BE BONDED.
  - 48. ALL OUTDOOR EQUIPMENT SHALL BE WEATHERPROOF. 49. CONSTRUCTION "AS BUILT" DRAWINGS AND DOCUMENTS SHALL BE PROVIDED TO THE OWNER WITHIN 30 DAYS AFTER THE DATE OF
  - ACCEPTANCE. PROVIDE A COPY TO LL. 50. OPERATION MANUALS AND MAINTENANCE MANUALS SHALL BE PROVIDED TO THE BUILDING OWNER.
  - ABSOLUTELY NO FLEXIBLE CONDUIT IS PERMITTED IN DEMISING WALLS. FLEXIBLE CONDUIT IS PERMITTED FOR SHORT FINAL CONNECTIONS ONLY (6'-0" OR LESS).
  - 52. EXPOSED CONDUIT SHALL BE INSTALLED IN STRAIGHT LINES, PARALLEL OR IN RIGHT ANGLES TO THE BUIDING STRUCTURE. DO NOT LOOP EXCESS FLEXIBLE CONDUIT IN CEILING SPACE OR WALL CAVITY. NO CONDUIT TO BE SUPPORTED FROM THE ROOF DECK.
  - 53. CABLE TYPES AC AND NM CABLES ARE NOT ACCEPTABLE. TYPE MC CABLE, ELECTRIC METALLIC TUBING (EMT) AND RIGID GALVANIZED CONDUIT ARE PERMITTED.
  - ALL EQUIPMENT, DEVICES AND FIXTURES SHALL BE GROUNDED IN
  - 55. ALL NEW PANELS TO BE UL LABELED WITH BOLT-ON TYPE CIRCUIT BREAKERS
  - 56. 7-DAY 24-HOUR TIME CLOCK IS REQUIRED TO CONTROL STOREFRONT ENTRY LIGHTS, SHOW WINDOW LIGHTS, SHOW WINDOW RECEPTACLES AND STOREFRONT SIGNAGE. ILLUMINATED STOREFRONT SIGNS MUST REMAIN LIT DURING ALL MALL BUSINESS HOURS.
  - TENANT IS REQUIRED TO MAKE A FIELD SURVEY OF THE EXISTING LECTRICAL SERVICE TO ENSURE THAT THE TOTAL CONNECTED LOAD DOES T EXCEED THE ELECTRIC SERVICE. ANY/ALL MODIFICATIONS OR UPGRADES NEEDED ARE SUBJECT TO LANDLORD'S PRIOR APPROVAL AND WILL BE COMPLETED BY TENANT/TENANT'S GC AT TENANT'S SOLE EXPENSE.
  - ALL ELECTRICAL PANELS TO BE MOUNTED ON PLYWOOD BACKER BOARD.
  - PANEL PHASE LOADS TO BE BALANCED WITHIN 10%. 60. ELECTRICAL PANELS MAY NOT BE RECESSED IN DEMISING PARTITIONS.
  - SURFACE MOUNT OR FULL FUR OUT WALL TO ACHIEVE FLUSH FINAL APPEARANCE.
  - UNDER SLAB UTILITIES, ETC, ARE NOT DAMAGED DURING FLOOR CUT, ANY DAMAGE TO BE REPAIRED AT TENANT'S EXPENSE. PRIOR APPROVAL AND COORDINATION WITH PROPERTY MANAGEMENT IS REQUIRED FOR ALL CONCRETE CUTTING.











E A	LECTRICAL POWER PLAN KEYED WORK NOTES: 24VOLT STRING MACHINE POWER. PROVIDE JB IN FLOOR AND MAKE FINAL CONNECTION.	
	TO ROUGH IN.	2. ALL HARD
(B)	14'-6" A.F.F. FOR LOW VOLTAGE SCORING. RUN $1-1/2$ " EMPTY CONDUIT WITH PULL STRING FROM JB TO 6" PAST REAR SIDE OF CURTAIN WALL AND STUB. COORDINATE WITH BOWLING REP. PRIOR TO ROUGH IN FOR EXACT REQUIREMENT AND PROVIDE ACCORDINGLY.	CONDUCTO 3. MECHANIC/ AND ADJU
Ô	NEMA 5–20R RECEPTACLE AT APPROXIMATELY $14^{\circ}-6^{\circ}$ A.F.F. FOR LANE COMPUTER SCORING REFER TO BOWLING LANE DETAIL E5 AND COORDINATE WITH BOWLING REP PRIOR TO ROUGH IN.	4. ALL POWE 5. ALL SINGL
⑥	NEMA 5–20R RECEPTACLE (HUBBELL IG 5262 OR IG 8262 OR EQUIVALENT) AT APPROXIMATELY 14'–6" A.F.F. FOR SCORING MONITOR POWER. REFER TO BOWLING LANE DETAILS AND COORDINATE WITH BOWLING REP PRIOR TO ROUGH IN. MOUNT SIDE BY SIDE WITH LANE COMPUTER POWER RECEPTACLE.	6. ALL ARCA
Ê	PHONE/DATA LOCATION. PROVIDE JB AND PULL 3/4" EMPTY CONDUIT WITH PULL STRING TO ABOVE ACCESSIBLE CEILING AND STUB.	7. FOR LUCK – ALL CIRCU – COORDIN, – SHOULE
Ê	LOCATION & QUANTITY WITH OWNER/LV VENDOR REP PRIOR TO ROUGH IN.	– ALL ELI – CLIENT
Ô	AIRBAG BLOWER MOTOR. COORDINATE EXACT LOCATION WITH OWNER REP PRIOR TO ROUGH IN. ROUTE CIRCUIT THROUGH CONTACTOR/KEYED SWITCH FOR CONTROL.	PROVIDEI – ALL LU – EACH R
⑪	HAZE MACHINE: PROVIDE DUPLEX RECEPTACLE ON WALL/CEILING. COORDINATE EXACT LOCATION WITH OWNER REP PRIOR TO ROUGH IN. ROUTE CIRCUIT THROUGH CONTACTOR/SWITCH.	– ALL TEF – ALL CABI – REGISTF
	ARCADE GAME: PULL CIRCUIT UNDER RAISED PLATFORM THROUGH CONTACTOR/SWITCH FOR CONTROL. COORDINATE FINAL LOCATION WITH ARCADE GAME VENDOR PRIOR TO ROUGH IN.	<u> </u>
①	E.C SHALL COORDINATE WITH KITCHEN EQUIPMENT VENDOR/MANUFACTURER FOR EXACT POWER REQUIREMENT, MOUNTING HEIGHT AND LOCATION BEFORE COMMENCING ANY WORK. INFORM ENGINEER ON RECORD FOR ANY DISCREPANCY BASE BID ACCORDINGLY.	
Ŕ	IT RACK: STUB 4" EMPTY CONDUIT WITH PULLSTRING FROM CEILING SPACE TO ABOVE RACK. COORDINATE EXACT LOCATION WITH OWNER REP PRIOR TO INSTALLATION. L6-30R FOR IT.	
企	EXTERIOR SIGN: PROVIDE JB. IF SIGN DOES NOT COME EQUIPPED WITH A DISCONNECT, PROVIDE TOGGLE SWITCH. ROUTE THROUGH CONTACTOR/TIMER FOR CONTROL.	
	TRENCH FOR POWER (AND DATA) CONDUITS. BACKFILL AND PATCH TO MATCH.	
	COVER PLATE AND DUPLEX RECEPTACLE AND DATA.	
٠ ۲	EXISTING 800A, 277/480V, 3–PHASE, 4–WIRE ELECTRICAL PANEL "MDP" IN ELECTRICAL ROOM TO REMAIN. E.C. TO FIELD VERIFY THE EXACT SIZE, LOCATION & OPERABLE CONDITION OF THE PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.	
0	EXISTING 75KVA, 3-PHASE TRANSFORMER WITH PRIMARY 277/480V AND SECONDARY 120/208V. E.C. TO FIELD VERIFY THE EXACT RATING, SIZE, LOCATION & OPERABLE CONDITION OF THE TRANSFORMER, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.	
R	EXISTING 225A, 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "LE-1"(SEC-1) IN ELECTRICAL ROOM TO REMAIN. E.C. TO FIELD VERIFY THE EXACT SIZE, LOCATION & OPERABLE CONDITION OF THE PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.	
\$	EXISTING 225A, 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "LE-2"(SEC-2) IN ELECTRICAL ROOM TO REMAIN. E.C. TO FIELD VERIFY THE EXACT SIZE, LOCATION & OPERABLE CONDITION OF THE PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.	
①	EXISTING 200A(M.L.O), 277/480V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "HA" IN ELECTRICAL ROOM TO REMAIN. E.C. TO FIELD VERIFY THE EXACT SIZE, LOCATION & OPERABLE CONDITION OF THE PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.	
创	EXISTING 80A, 277/480V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "HC" IN ELECTRICAL ROOM TO REMAIN. E.C. TO FIELD VERIFY THE EXACT SIZE, LOCATION & OPERABLE CONDITION OF THE PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.	
Ŷ	EXISTING 10KVA, 1-PHASE TRANSFORMER WITH PRIMARY 277/480V AND SECONDARY 120/240V(CEILING MOUNTED). E.C. TO FIELD VERIFY THE EXACT RATING, SIZE, LOCATION & OPERABLE CONDITION OF THE TRANSFORMER, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.	
Ŵ	EXISTING 80A, 120/240V, 1-PHASE, 3-WIRE ELECTRICAL PANEL "LB" IN ELECTRICAL ROOM TO REMAIN. E.C. TO FIELD VERIFY THE EXACT SIZE, LOCATION & OPERABLE CONDITION OF THE PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.	
$\bigotimes$	EXISTING 200A(M.L.O), 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "HB" IN ELECTRICAL ROOM TO REMAIN. E.C. TO FIELD VERIFY THE EXACT SIZE, LOCATION & OPERABLE CONDITION OF THE PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.	
企	EXISTING 100A(M.L.O), 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "LA" IN ELECTRICAL ROOM TO REMAIN. E.C. TO FIELD VERIFY THE EXACT SIZE, LOCATION & OPERABLE CONDITION OF THE PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.	
②	EXISTING 30KVA, 3-PHASE TRANSFORMER WITH PRIMARY 277/480V AND SECONDARY 120/208V. E.C. TO FIELD VERIFY THE EXACT RATING, SIZE, LOCATION & OPERABLE CONDITION OF THE TRANSFORMER, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.	
<b>@</b>	EXISTING 15KVA, 1-PHASE TRANSFORMER WITH PRIMARY 277/480V AND SECONDARY 120/240V TO BE RELOCATED AND REUSE. E.C. TO FIELD VERIFY THE EXACT RATING, SIZE, LOCATION & OPERABLE CONDITION OF THE TRANSFORMER, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.	
Ŵ	EXISTING 80A, 120/240V, 1-PHASE, 3-WIRE ELECTRICAL PANEL "LC" TO BE RELOCATED AND REUSE. E.C. TO FIELD VERIFY THE EXACT SIZE, LOCATION & OPERABLE CONDITION OF THE PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.	
<u>ƙ</u>	DEMOLISH EXISTING 40A, 120/240V, 1-PHASE, 3-WIRE ELECTRICAL PANEL "LF". E.C. SHALL COORDINATE WITH BASE LANDLORD/OWNER FOR LIABILITIES AND SCOPE OF WORK BEFORE COMMENCING ANY WORK. BASE BID ACCORDINGLY.	
	E.C. SHALL VERIFY/PERFORM THE INSTALLATION OF ELECTRICAL PANELS IN COMPLIANCE WITH NEC ARTICLE 110.26(A) AND (B). E.C. SHALL FIELD VERIFY THAT THE PANELS ARE UNOBSTRUCTED AND THE AREA WHERE THE PANELS ARE PLACED SHALL NOT BE USED AS A STORAGE SPACE.	
	E.C SHALL COORDINATE WITH PLAY AREA EQUIPMENT VENDOR/MANUFACTURER FOR EXACT POWER REQUIREMENT, MOUNTING HEIGHT AND LOCATION BEFORE COMMENCING ANY WORK. INFORM ENGINEER ON RECORD FOR ANY DISCREPANCY. BASE BID ACCORDINGLY.	
Ŵ	NEW 75KVA, 3-PHASE TRANSFORMER WITH PRIMARY 277/480V AND SECONDARY 120/208V TO PROVIDE. E.C. SHALL COORDINATE EXACT LOCATION WITH ARCHITECT/OWNER.	
<u>ƙ</u> g	NEW 200A, 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "A". E.C. SHALL COORDINATE EXACT LOCATION WITH ARCHITECT/OWNER.	

- GROUND OR LESS SHALL HAVE GFCI PROTECTION.
- CKY PUTT AREA:-
- PRIOR TO CREATIVE WORKS INC. ARRIVAL.
- ED PLANS.

- BLING NEEDS TO BE TAGGED ON BOTH ENDS.



#### POWER PLAN GENERAL NOTES(SHEET E-3, E-3.1 & E-3.2):

EQUIPMENT SHOWN FROM DESIGN PLANS RECEIVED, INCLUDING ELECTRICAL INFORMATION INDICATED. EC TO VERIFY ALL EQUIPMENT LOCATIONS AND AL REQUIREMENTS WITH OWNER REP PRIOR TO ROUGH IN.

WIRED CONNECTIONS TO BE MADE WITH SEAL-TIGHT FLEXIBLE METAL CONDUIT WITH INSULATED GROUND WIRE INSTALLED WITH PHASE AND NEUTRAL ORS. GROUND WIRE TO BE BONDED AT BOTH ENDS.

CAL INFORMATION SHOWN IS PER SPECIFIC MANUFACTURER DESIGN. EC TO COORDINATE WITH HVAC CONTRACTOR FOR ACTUAL EQUIPMENT SELECTED UST ELECTRICAL INFORMATION ( BREAKER SIZE REQUIRED) ACCORDINGLY.

VER WIRING IN OPEN CEILING TO BE INSTALLED IN CONDUIT. MC CABLE SHALL ONLY BE USED ABOVE ACCESSIBLE CEILINGS.

LE PHASE RECEPTACLES 50A OR LESS, RATED 150V TO GROUND OR LESS, AND ALL THREE PHASE RECEPTACLES THAT ARE 100A OR LESS, RATED

ADE GAME MACHINES SHALL BE ROUTED THROUGH CONTACTOR/SWITCH FOR CONTROL.

CUITS TO BE WIRED TO THE CORRESPONDING SWITCH LOCATED IN THE CONTROL AREA.

NATE POSITION OF NETWORK SWITCHES/OUTLETS IN CONTROL AREA WITH MILLWORK CONTRACTOR. LD YOUR FACILITY BE USING FLOOR OUTLETS, ALL ELECTRICAL FLOOR OUTLETS AND LOW VOLTAGE LOCATIONS ARE TO BE TRENCHED, INSTALLED AND

ECTRICAL OUTLETS AND LOW VOLTAGE LOCATIONS ARE TO BE INSTALLED AND FINISHED PRIOR TO CREATIVE WORKS INC. ARRIVAL. TO NOTIFY CREATIVE WORKS INC. FOR ANY ISSUES OR ADJUSTMENT NEEDS TO THE ELECTRICAL LOCATIONS IF VARYING FROM CREATIVE WORKS INC. UCKY PUTT CHALLENGES REQUIRE DEDICATED CAT5/6 TERMINATION ALONG SIDE THE POWER RECEPTACLE.

RUN SHOULD TERMINATE AT THE MAIN REGISTRATION KIOSK (THIS WILL BE THE LUCKY PUTT IDF).

ERMINATIONS SHOULD BE DONE USING KEYSTONE JACKS WITH MOUNTED WALL PLATES.

FRATION KIOSK AREA NEEDS MAIN RUN FROM SITE NETWORK TO CONNECT THE LUCKY PUTT NETWORK TO SITE NETWORK.

ITEM	QTY.	DESCRIPTION	VOLTAGE	PHASE	AMPS	kW	PLUG
1	3	POS STATION	115	1	1.55	0.18	5-15P
2	4	DOUBLE BATCH OVEN	208	1	50.00	8.32	6-50P
3	2	MEGA PREP STATION	115	1	10.30	1.18	5-15P
4	1	REFRIGERATED MERCHANDISER	115	1	9.40	1.08	5-15P
5	2	ICE MACHINE	115	1	9.40	1.08	5-15P
6	1	DIPPING CABINET	115	1	1.40	0.16	5-15P
7	1	REACH-IN REFRIGERATOR	115	1	4.50	0.52	5-15P
8	1	REACH-IN FREEZER	115	1	12.00	1.38	5-15P
10	1	PIZZA XPRESS DOUGH PRESS	120	1	9.80	1.13	5-15P
11	1	SMARTENDER	115	1	1.55	0.18	HARDWIRE
12	1	COUNTERTOP FRYER	208	1	40.00	8.32	6-50P
15	2	BACK BAR COOLER	120	1	7.00	0.825	5-15P
18	1	SODA MACHINE	120	1	1.00	0.12	5-15P
19	2	UNDERCOUNTER ICE MACHINE	115	1	10.00	1.15	5-15P
28	1	WALK IN COOLER/FREEZER	(TBD)				
39	1	PEPSI	(TBD)				
41	1	UNDERCOUNTER REFRIGERATOR	(TBD)				
42	1	ICEE MACHINE	(TBD)				
43	1	KEG COOLER	(TBD)				



ELECTRICAL ROOF POWER PLAN KEYED V	WORK NOTES:
EXISTING MECHANICAL EQUIPMENT WITH ITS ELECTRICAL CONNE	ECTION AND ELECTRICAL
FIXTURE TO REMAIN. E.C. SHALL VERIFY OPERABLE CONDITION	I OF ELECTRICAL
CONNECTION AND ELECTRICAL FIXTURE ON FIELD. REPLACE IF	INOPERABLE. BASE
BID ACCORDINGLY. E.C. SHALL COORDINATE WITH LANDLORD F	FOR THE EXACT
LOCATION OF RTU AND ITS ELECTRICAL CONNECTIONS ON FIELD	LD.

- EXISTING ROOF OUTLETS SHALL REMAIN WITH ITS BRANCH CIRCUITS. E.C. SHALL COORDINATE IN FIELD THE OPERABLE CONDITIONS OF THE SAME AND PROVIDE NEW IF FOUND INOPERABLE AS SHOWN ON THE DRAWINGS. BASE BID ACCORDINGLY.
- ★ EXISTING MECHANICAL EQUIPMENT WITH ITS ELECTRICAL FIXTURE TO REMAIN. E.C. SHALL VERIFY OPERABLE CONDITION OF ELECTRICAL FIXTURE ON FIELD. REPLACE IF INOPERABLE. BASE BID ACCORDINGLY. E.C. SHALL COORDINATE WITH LANDLORD FOR THE EXACT LOCATION OF RTU-8(E) AND ITS ELECTRICAL CONNECTIONS ON FIELD.



WP = WP/GFI $RTU-4(E)$			
$WP \longrightarrow WP/GFI$ $RTU-2(E)$			
RC	OOF PLAN	<b>SCALE</b> $1/8" = 1'-0"$	1



WP/GFI $RTU-6(E)$		
ROOF PLAN	<b>SCALE</b> $1/8" = 1'-0'$	, 1



# Power & Circuit Requirements

POW	ER REQUIREN	IENTS - STRIN	NG PINSETTER	R LANE PAIR >	>> CUSTOME
	VOLT	HERTZ	AC/DC	PHASE	AMP
EXAMPLE EUROPE	230 V	50/50	AC	1	2,6
EXAMPLE EUROPE	400 V	50/60	AC	3	2,6
EXAMPLE USA	208 V	50/60	AC	3	4,5

CIRCU	IT REQUIREMENTS - STRIN	IG PINSETTER LANE PAIR	>> CUSTOME
	GROUND SUB PANEL	WIRES PER CIRCUIT	LANE PAIR PER CIRCUIT
EXAMPLE	230 VAC	3 WIRE	1
EUROPE	1 PHASE	(L1 - N - PE)	
EXAMPLE	400 VAC	5 WIRE	2
EUROPE	3 PHASE	(L1 - L2 - L3 - N - PE)	
EXAMPLE	208 VAC	5 WIRE	2
USA	3 PHASE	(L1 - L2 - L3 - N -PE)	

Switch® International Bowling Ekipmanları A.Ş.

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	N.T.S.	1
ELECTRICAL DETAILS	SCALE	
r LOCATED).		
PERED DT THE COSTONER.		
DEN DALE TRACISTADDING ON AND EXTRA		
HER BALL TRACKS ADDING ON ANY FYTRA		
CATHIS IS THE CENTRELINE OF LANES -1/2		
ENDING INSTALLATION COMMENCES.		
FEORE INSTALLATION COMMENCES		
THE COSTOPIER.		
THE CUSTOMED		
MED BY COSTOMER WITH EQUIPMENT ORDER		
ALD DV CUSTOMED WITH COURSELT CODED		
VSUCKETS SUPPLIED BY SWITCH.		
	1	
	1	
8	1	

![](_page_21_Figure_0.jpeg)

![](_page_21_Figure_1.jpeg)

![](_page_21_Figure_2.jpeg)

![](_page_21_Figure_3.jpeg)

CONTACTORS LC-1 THRU LC-6 (CHECK IN, KITCHEN, SEATING, SERVICE, ARCADE REDEMPTION AREA LIGHTING)

#### PANEL SCHEDULE:

PANEL:	MDP(E)														MOUNTING:	FLOOR MOUNTED		
480Y/277	VOLTS,		3	PHASE,			4	WIRE										
MAIN CB	800A		MLO	NA		BUS	EXISTING		MIN,						FED FROM:	EXISTING ME	ETER	
	TRIP	DEC					MINIMUM BRANCH	PE	ER PHASE (K	VA)	MINIMUM BRANCH	LOAD						
CKT NU.	AMPS	DES		FLUAD	LUAD TIPE		CIRCUIT	А	В	С	CIRCUIT	(KVA)			ESCRIPTION OF L	UAD	I KIP AIVIPS	CKT NO.
					н	10.81		21.62				10.81	н					
1	60-3P	RTU-1(E)			н	10.81	EXISTING		21.62		EXISTING	10.81	н	RTU-5(E)			60-3P	2
					н	10.81				21.62		10.81	н					
					н	10.81		21.62				10.81	н					
3	60-3P	RTU-2(E)			н	10.81	EXISTING		21.62		EXISTING	10.81	н	RTU-3(E)			60-3P	4
					н	10.81	1			21.62		10.81	н					
					0	18.67		27.01				8.33	0					
5	200-3P	TRANSFOR	MER T-3(PA	NEL LE)	0	18.67	EXISTING		27.01		EXISTING	8.33	0	PANEL HC			100-3P	6
					0	18.67	1			27.01	1	8.33	0					
					0	38.99		50.29				11.29	0					
7	200-3P	PANEL HB			0	38.99	EXISTING		50.29		EXISTING	11.29	0	PANEL HA			200-3P	8
					0	38.99				50.29	1	11.29	0					
					н	10.81		19.74				8.93	0					
9	60-3P	RTU-4(E)			н	10.81	EXISTING		19.74		EXISTING	8.93	0	TRANSFO	RMER T-2(PANEL	LA)	60-3P	10
					н	10.81				19.74		8.93	0	1				
					н	10.81		10.81										
11	60-3P	RTU-6(E)			н	10.81	EXISTING		10.81		1			SPARE			60-3P	12
					н	10.81	1			10.81	1			1				
			-	TOTAL LOAD	(KVA)			151.07	151.07	151.07								

PANEL:	HA(E.)														MOUNTING:	SURFACE		
480Y/277	VOLTS,		3	PHASE,			4	WIRE										
MAIN CB	NA		MLO	200A		BUS	EXISTING		MIN,						FED FROM:	EXISTING MD	P PANEL	
	TRIP	DESCR					MINIMUM BRANCH	PE	R PHASE (K	VA)	MINIMUM BRANCH	LOAD		DE				
CKT NO.	AMPS	DESCR		.UAD	LOAD TIPE		CIRCUIT	А	В	С	CIRCUIT	(KVA)	LOAD TIPE	DL			CKI NO.	
1	20	LIGHTING- ARCADE RE	MAIN CHEC	CK IN,	L	4.00	2#12, #12G, 3/4"C	6.80			2#12, #12G, 3/4"C	2.80	L	LIGHTING-KRAVE SEATING, LUCKY PUT, ARCADE		20	2	
3	20	LIGHTING- LUCKY PUT	MAIN CHEC	CK IN,	L	3.60	2#12, #12G, 3/4"C		6.40		2#12, #12G, 3/4"C	2.80	L	LIGHTING-KRAVE SEATING, LUCKY PUT, ARCADE			20	4
5	20	LIGHTING- SERVICE, LI DODGEBAL	KREAVE FO UCKY PUT, E .L, GLADIAT	OD EXTREME OR PIT	L	2.80	2#12, #12G, 3/4"C			5.60	2#12, #12G, 3/4"C	2.80	L	LIGHTING- LUCKY PUT GLADIATO	KREAVE FOOD , EXTREME DO R PIT	20	6	
7	20	LIGHTING- SERVICE, LI DODGEBAL	KREAVE FO UCKY PUT, E .L, GLADIAT	OD EXTREME OR PIT	L	2.40	2#12, #12G, 3/4"C	2.40						SPARE			20	8
9	20	SPARE							0.00					SPARE			20	10
11	20	SPARE								2.40	2#12, #12G, 3/4"C	2.40	L	LIGHTING- LUCKY PUT GLADIATO	KREAVE FOOD , EXTREME DO R PIT	) SERVICE, DGEBALL,	20	12
13	20	SPARE						0.00						SPARE			20	14
15	20	SPARE							0.00					SPARE			20	16
17	20	SPARE								0.00				SPARE			20	18
19	20	SPARE						0.00						SPARE			20	20
21	20	SPARE							0.00					SPARE			20	22
23	20	SPARE								0.00				SPARE			20	24
25	20	SPARE						0.00						SPARE			20	26
27	20	SPARE							0.00					SPARE			20	28
29	20	SPARE								0.00				SPARE			20	30
31	20	WALL PACH	KS		L	1.60	EXISTING	1.60						SPARE			20	32
33	20	WALL PACH	KS		L	1.90	EXISTING		1.90					SPARE			20	34
35	20	SPARE								0.00				SPARE			20	36
37		SPACE						0.00						SPACE				38
39		SPACE							0.00					SPACE				40
41		SPACE								0.00				SPACE				42
								10.00	0.00	0.00	I							

							TOTAL LOAD (KVA)	10.80	8.30	8.00								
PANEL:	HB(E.)														MOUNTING	SURFACE		
480Y/277	VOLTS,		3	PHASE,			4	WIRE										
MAIN CB	NA		MLO	200A		BUS	EXISTING		MIN,						FED FROM:	EXISTING M	OP PANEL	
CKT NO.	NO. TRIP DESCRIPTION OF LOAD		.OAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH	PE	R PHASE (K	VA)	MINIMUM BRANCH	LOAD	LOAD TYPE	DE	DESCRIPTION OF LOAD			CKT NC	
	AMPS			-	_		CIRCUIT	A	В	С	CIRCUIT	(KVA)	-					
1	20/2P	PARKING LO	OT LIGHTIN	G	L	2.0	EXISTING	8.30				6.3	Н					2
3					L	2.0			8.30		EXISTING	6.3	Н	RTU-9(E) 			30/3P	4
5	20/2P	PARKING LO	OT LIGHTIN	G		2.0	EXISTING			8.30		6.3	Н					6
/						2.0		2.00									25/20	8
9	20	SPARE							0.00				-	SPARE			25/3P	10
11	20	SPARE				2.0		2.00		0.00								12
15	20/20					3.0	EXISTING	3.00	2.00					SDADE			20/20	14
17	50/5P				н	3.0			3.00	2.00				JFARL			20/31	10
17	20	SPARE				5.0		0.00		5.00				SPARE			20	20
21	20	SPARE						0.00	0.00					SPARE			20	20
23	20	SPARE							0.00	0.00				SPARE			20	24
25	20	SPARE						0.00		0.00				SPARE			20	26
27	20	SPARE							0.00					SPARE			20	28
29	20	SPARE								0.00				SPARE			20	30
31	20	SPARE						0.00						SPARE			20	32
33	20	SPARE							0.00					SPARE			20	34
35	20	SPARE								0.00				SPARE			20	36
37					0	16.0		28.03				12.0	0					38
39	125/3P	TRANSFOR	MER "T-6"		0	16.0	3#1, #6G, 3/4"C		28.03		3#6, #10G, 3/4"C	12.0	0	WATER HE	ATER		60/3P	40
41					0	16.0				28.03		12.0	0					42
							TOTAL LOAD (KVA)	41.33	39.33	39.33								

PANEL:	HC(E.)														MOUNTING:	SURFACE		
480Y/277	VOLTS,		3	PHASE,			4	WIRE										
MAIN CB	80A		MLO			BUS	EXISTING		MIN,						FED FROM:	EXISTING MD	P PANEL	
	TRIP	DESCR			Ι Ο Δ Ο ΤΥΡΕ		MINIMUM BRANCH	PE	R PHASE (K	VA)	MINIMUM BRANCH	LOAD						
	AMPS	DESCR		OAD			CIRCUIT	A	В	С	CIRCUIT	(KVA)				LOAD		CKI NO.
1	20	SPARE						0.00						SPARE			20	2
3	20	SPARE							0.00					SPARE			20	4
5	20	SPARE								0.00				SPARE			20	6
7	20	SPARE						7.50			EXISTING	7.50	0	15KVA TR	ANSFORMER T-	1	60/2P	8
9	20	SPARE							7.50			7.50	0	131077110		-		10
11	20	SPARE								5.00	EXISTING	5.00	0	10KVA TR	ANSFORMER T-	4	25/2P	12
13	20	SPARE						5.00				5.00	0			•		14
15	20	SPARE							0.00					SPARE			20	16
17	20	SPARE								0.00				SPARE			20	18
19	20	SPARE						0.00						SPARE			20	20
21	20	SPARE							0.00					SPARE			20	22
23	20	SPARE								0.00				SPARE			20	24
25	20	SPARE						0.00						SPARE			20	26
27	20	SPARE							0.00					SPARE			20	28
29	20	SPARE								0.00				SPARE			20	30
31	20	SPARE						0.00						SPARE			20	32
33	20	SPARE							0.00					SPARE			20	34
35	20	SPARE								0.00				SPARE			20	36
37		SPACE						0.00						SPACE				38
39		SPACE							0.00					SPACE				40
41		SPACE								0.00				SPACE				42
							TOTAL LOAD (KVA)	12.50	7.50	5.00								

					TOTAL LOAD	(KVA) <b>1</b>	2.50 7	.50 5	5.00							
				C		<u> </u>										
PANEL:	LA(E)		<b>_</b>						1				MOUNTING:	SURFACE		
208Y/120	VOLTS,	3 PHASE,			4	WIRE										
MAIN CB	NA	MLO 100A		BUS	EXISTING		MIIN,						FED FROM:	TRANSFORMER T-2		1
						DI	ER DHASE (K									
CKT NO.	AMPS	DESCRIPTION OF LOAD	TYPE	(KVA)	CIRCUIT	Δ			CIRCUIT	(KVA)	LOAD TYPE		DESCRIPT	ION OF LOAD	AMPS	CKT NO.
1	20	LIGHTING-BREAK ROOM, OFFICE, MENS REST ROOM, UNISEX RESTROOM, WOMENS RESTROOM	Ľ	1.96	2#12, #12G, 3/4"C	2.46			EXISTING	0.5	R	EXISTING F	TU RECEPTACL	ES	20	2
3	20	LIGHTING-AXE THROWING,	L	0.60	2#12, #12G, 3/4"C		0.60					SPARE			20/2P	4
5	20	LIGHTING-BAR AREA SEATING	L	0.60	2#12, #12G, 3/4"C			0.60							,_	6
7	20	LIGHTING-KRAVE FOOD SERVICE, KITCHEN	L	0.44	2#12, #12G, 3/4"C	1.37			2#12, #12G, 3/4"C	0.93	L	LIGHTING- PIT,LUCKY	SPECIAL FX LIG PUT	HTING LIGHTING GLADIATOR	20	8
9	20	LIGHTING-KRAVE SEATING	L	0.75	2#12, #12G, 3/4"C		1.55		2#12, #12G, 3/4"C	0.80	L	LIGHTING-	NINJA COURSE		20	10
11	20	LIGHTING-PARTY ROOM	L	1.91	2#12, #12G, 3/4"C			3.26	2#12, #12G, 3/4"C	1.35	L	LIGHTING- ARCADE	SPECIAL FX LIG	HTING GLADIATOR PIT,	20	12
13	20	LIGHTING-MAIN CHECK IN	L	0.65	2#12, #12G, 3/4"C	1.85			2#12, #12G, 3/4"C	1.20	L	LIGHTING- EXTREME [	SPECIAL FX LIG DODGEBALL, AI	HTING NINJA COURSE, RCADE	20	14
15	20	LIGHTING-MAIN CHECK IN	L	1.30	2#12, #12G, 3/4"C		2.50		2#12, #12G, 3/4"C	1.20	L	LIGHTING-	BOWLING ARE	4	20	16
17	20	LIGHTING-ARCADE REDEMPTION	L	0.60	2#12, #12G, 3/4"C			1.80	2#12, #12G, 3/4"C	1.20	L	LIGHTING-	SPECIAL FX LIG DODGEBALL, AI	HTING NINJA COURSE, RCADE	20	18
19	20	LIGHTING- ROOM	L	0.50	2#12, #12G, 3/4"C	2.15			2#12, #12G, 3/4"C	1.65	L	LIGHTING-	SPECIAL FX LIG	HTING BOWLING, LUCKY PUT	20	20
21	20	LIGHTING-SPECIAL FX LIGHTING	L	1.95	2#12, #12G, 3/4"C		4.05		2#12, #12G, 3/4"C	2.10	L	LIGHTING-	SPECIAL FX LIG	HTING BOWLING, LUCKY PUT	20	22
23	20	SPARE						1.91	2#12, #12G, 3/4"C	1.91	L	LIGHTING-	PARTY ROOM		20	24
25	20	SPARE				0.00						SPARE			20	26
27	20	SPARE	_				1.35		2#12, #12G, 3/4"C	1.35	L	LIGHTING	SPECIAL FX LIG	HTING	20	28
29	20	SPARE						1.35	2#12, #12G, 3/4"C	1.35	L	LIGHTING-	SPECIAL FX LIG	HTING	20	30
31	20	SPARE				0.00						SPARE			20	32
33	20	SPARE					0.00	0.00				SPARE			20	34
35	20/2P	SPARE			-	0.00		0.00				SPARE			20	36
39						0.00	0.00					SPARE			20	40
41	20/2P	SPARE			1		0.00	0.00				SPARE			20	42
					TOTAL LOAD (KVA)	7.83	10.05	8.92								

#### ELECTRICAL PANEL SCHEDULE GENERAL NOTE:

1. ALL THE CIRCUITING SHOWN FOR THE PANEL SCHEDULES IS FOR THE REFERENCE PURPOSE ONLY. E.C. SHALL GATHER INFORMATION ABOUT THE EXISTING CONDITIONS, VERIFY THE EXACT COMBINATION OF EXISTING CIRCUIT BREAKERS AVAILABLE IN THE RESPECTIVE EXISTING PANEL SCHEDULES IN FIELD AND REARRANGE THE CIRCUITING PER THE REQUIREMENTS BEFORE COMMENCING ANY WORK. ALL THE NEWLY REQUIRED BREAKERS (BASED ON THE EXISTING CIRCUIT BREAKER ARRANGEMENT) IN THE PANEL SCHEDULE SHALL BE TAKEN INTO THE CONSIDERATION FOR THE BIDDING. E.C. SHALL VERIFY THE EXACT SIZE OF THE EXISTING ELECTRICAL PANELS AND INFORM ENGINEER ON RECORD FOR ANY DISCREPANCY. BASE BID ACCORDINGLY.

PANLE SCHEDULE	1/

SCALE (4" = 1'-0"

#### PANEL SCHEDULE:

			1	1											•			•
PANEL:	LE-1(E)														MOUNTING:	SURFACE		
208Y/120	VOLTS,		3	PHASE,			4	WIRE										
MAIN CB	NA		MLO	225A		BUS	EXISTING		MIN,						FED FROM:	TRANSFORMER T-3		
CKT NO.	TRIP AMPS	D	ESCRIPTION	N OF LOAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	PE A	R PHASE (K) B	/A) C	MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE		DESCRIPT	ION OF LOAD	TRIP AMPS	CKT NO.
1	20	ARCADE			R	0.35	2#12, #12G, 3/4"C	0.81			2#12, #12G, 3/4"C	0.46	R	ARCADE			20	2
3	20	ARCADE			R	0.69	2#12, #12G, 3/4"C		1.15		2#12, #12G, 3/4"C	0.46	R	ARCADE			20	4
5	20	ARCADE			R	0.69	2#12, #12G, 3/4"C			1.15	2#12, #12G, 3/4"C	0.46	R	ARCADE			20	6
7	20	ARCADE			R	0.58	2#12, #12G, 3/4"C	1.96			2#12, #12G, 3/4"C	1.38	R	ARCADE			20	8
9	20	ARCADE			R	0.63	2#12, #12G, 3/4"C		1.21		2#12, #12G, 3/4"C	0.58	R	ARCADE			20	10
11	20	ARCADE			R	0.69	2#12, #12G, 3/4"C			1.41	2#12, #12G, 3/4"C	0.72	R	LUCKY PUT	Т		20	12
13	20	REGISTRAT	ION KIOSK		R	0.18	2#12, #12G, 3/4"C	0.72			2#12, #12G, 3/4"C	0.54	R	LUCKY PUT	Т		20	14
15	20	ARCADE			R	0.46	2#12, #12G, 3/4"C		1.00		2#12, #12G, 3/4"C	0.54	R	LUCKY PUT	Т		20	16
17	20	ARCADE			R	1.15	2#12, #12G, 3/4"C			2.95	2#12, #12G, 3/4"C	1.80	R	POS(MAIN	CHECK-IN)		20	18
19	20	POS(MAIN	CHECK-IN)		R	1.44	2#12, #12G, 3/4"C	1.80			2#12, #12G, 3/4"C	0.36	R	ARCADE RE	EDEMPTION RE	CPTACLE	20	20
21	20	POS(ARCAE	DE REDEMP	TION)	R	1.8	2#12, #12G, 3/4"C		3.24		2#12, #12G, 3/4"C	1.44	R	PARTY ROC	OM RECEPTACL	ES	20	22
23	20	RECEPTACL	E GENERAL	PURPOSE	R	0.72	2#12, #12G, 3/4"C			2.16	2#12, #12G, 3/4"C	1.44	R	PARTY ROC	OM RECEPTACL	ES	20	24
25	20	RECEPTACL	E GENERAL	PURPOSE	R	1.08	2#12, #12G, 3/4"C	2.34			2#12, #12G, 3/4"C	1.26	R	KRAVE ARE	A SEATING RE	CEPTACLES	20	26
27	20	RECEPTACL	e restroo.	Μ	R	0.54	2#12, #12G, 3/4"C		1.62		2#12, #12G, 3/4"C	1.08	R	BAR AREA S	SEATING RECE	PTACLES	20	28
29	20	RECEPTACL	E OFFICE		R	0.72	2#12, #12G, 3/4"C			0.90	2#12, #12G, 3/4"C	0.18	R	RECVEPTAC	CL BREAK ROIC	M	20	30
31	20	RECEPTACL	E OFFICE		R	1.08	2#12, #12G, 3/4"C	1.26			2#12, #12G, 3/4"C	0.18	R	RECVEPTAC	CL BREAK ROIC	M	20	32
33	20	RECEPTACL	E IT RACK		R	0.18	2#12, #12G, 3/4"C		0.36		2#12, #12G, 3/4"C	0.18	R	RECVEPTAC	CL BREAK ROIC	M	20	34
35	20	SINAGE			L	0.8	2#12, #12G, 3/4"C			0.98	2#12, #12G, 3/4"C	0.18	R	RECVEPTAC	CL BREAK ROIC	M	20	36
37	20	SINAGE			L	0.8	2#12, #12G, 3/4"C	0.80						SPARE			20	38
39	20	ARCADE			R	0.46	2#12, #12G, 3/4"C		0.46					SPARE			20	40
41	20	TIME CLOC	К		L	0.5	2#12, #12G, 3/4"C			0.50				SPARE			20	42
							TOTAL LOAD (KVA)	9.68	9.04	10.05								

PANEL:	LE-2(E)														MOUNTING:	SURFACE		
208Y/120	VOLTS,		3	PHASE,			4	WIRE										
MAIN CB	NA		MLO	225A		BUS	EXISTING		MIN,						FED FROM:	TRANSFORMER T-3		
CKT NO.	TRIP AMPS	D	ESCRIPTION	I OF LOAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	PE A	R PHASE (K) B	/A) C	MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE		DESCRIPT	ION OF LOAD	TRIP AMPS	CKT NO.
43	20	AIRBAG BL	OWER MOT	OR	м	0.80	2#12, #12G, 3/4"C	2.60	_	-		1.80	R					44
45	20	AIRBAG BL	OWER MOT	OR	м	0.80	2#12, #12G, 3/4"C		2.60		2#10, #10G, 3/4"C	1.80	R	STRING M	ONITOR POWE	R	25/2P	46
47	20	AIRBAG BL	OWER MOT	OR	м	0.80	2#12, #12G, 3/4"C			2.60		1.80	R					48
49	20	AIRBAG BL	OWER MOT	OR	М	0.80	2#12, #12G, 3/4"C	2.60			2#10, #10G, 3/4"C	1.80	R	STRING M	ONITOR POWE	R	25/2P	50
51	20	AIRBAG BL	OWER MOT	OR	М	0.80	2#12, #12G, 3/4"C		2.60			1.80	R			_	/	52
53	20	HAZE MACI	HINE		R	0.20	2#12, #12G, 3/4"C			2.00	2#10, #10G, 3/4"C	1.80	R	STRING M	ONITOR POWE	R	25/2P	54
55	20	WARPED W	ALL BLOWE	ER	М	0.80	2#12, #12G, 3/4"C	2.60				1.80	R				25 /25	56
57	20	WARPED W	ALL BLOWE	ER	М	0.80	2#12, #12G, 3/4"C		2.60		2#10, #10G, 3/4°C	1.80	R		ONITOR POWE	К	25/2P	58
59	20	AIRBAG BL	OWER MOT	OR	М	0.80	2#12, #12G, 3/4"C			1.00	2#12, #12G, 3/4"C	0.20	R	HAZE MAC	CHINE		20	60
61	20	LIGHTED CA	APPING POV	VER	R	0.8	2#12, #12G, 3/4"C	0.98			2#12, #12G, 3/4"C	0.18	R	RECEPTAC	LE ELECTRICAL	ROOM	20	62
63	20	LIGHTED CA	APPING POV	VER	R	0.8	2#12, #12G, 3/4"C		0.80					SPARE			20	64
65	20	RECEPTACL	E GENERAL	POURPOSE	R	0.36	2#12, #12G, 3/4"C			1.16	2#12, #12G, 3/4"C	0.80	М	AIRBAG BL	OWER MOTOR	{	20	66
67	20	EF-1(N)			М	0.58	2#12, #12G, 3/4"C	0.74			2#12, #12G, 3/4"C	0.16	М	EF-5(N)			20	68
69	20	EF-2(N)			М	0.38	2#12, #12G, 3/4"C		0.94		2#12, #12G, 3/4"C	0.56	М	EF-4(N)			20	70
71	20	EF-3(N)			М	0.58	2#12, #12G, 3/4"C			1.43	2#12, #12G, 3/4"C	0.85	М	RCP			20	72
73	20	SPARE						1.08			2#12, #12G, 3/4"C	1.08	R	ROOF RECI	EPTACLE		20	74
75	20	SPARE							0.54		2#12, #12G, 3/4"C	0.54	R	ROOF RECI	EPTACLE		20	76
77	20	SPARE								0.00				SPARE			20	78
79	20	SPARE						0.00						SPARE			20	80
81	20	SPARE							0.00					SPARE			20	82
83	20	SPARE								0.00				SPARE			20	84
							TOTAL LOAD (KVA)	10.60	10.08	8.19								

_															
	PANEL:	LB(E)													MOUN
	120/240	VOLTS,		1	PHA	SE,			3	WIRE					LOCA
	MAIN CB	80A		MLO:	NA			BUS:	EXISTING	MIN,					FED F
[								LOAD		PER PH/	ASE (KVA)	MINIMUM BRANCH	LOAD		
	CKT NO.			DESCRIPTION OF	LUAD		LUAD TYPE	(KVA)	MINIMON BRANCH CIRCOIL	Α	В	CIRCUIT	(KVA)	LUAD TYPE	DE
Ī	1	20	SPARE							0.00					SPARE
[	3	20	SPARE								0.00				SPARE
[	5	20	SPARE							0.00					SPARE
Ī	7	20	SPARE								0.00				SPARE
$\sim$	9	20/20					н	0.24	2#10 #100 2/4"	0.24					SPARE
ΑJ	11	30/2P	KIU-8(E)				Н	0.24	2#10, #10G, 3/4		0.24				SPARE
[				TOT	AL CONNI	CTED LOAD	(KVA)			0.24	0.24				

PANEL:	LC(E)												MOUNTING:	RECESSED		
120/240	VOLTS,		1	PHASE,			3	WIRE					LOCATION:			
MAIN CB	80A		MLO:	NA		BUS:	EXISTING	MIN,					FED FROM:	TRANSFORMER "	1"	
								-								
	TRIP		ESCRIPTION OF LC		LOAD	LOAD	MINIMUM BRANCH	PER PH	ASE (KVA)	MINIMUM BRANCH	LOAD	LOAD	DESCRIPTION OF LO	AD	TRIP	
	AMPS				TYPE	(KVA)	CIRCUIT	A	В	CIRCUIT	(KVA)	TYPE			AMPS	ckr No.
1	20	LANE MONITOR P	DESCRIPTION OF LOAD		R	0.80	2#12, #12G, 3/4"C	1.60		2#12, #12G, 3/4"C	0.80	R	NETWORK SWITCH ( HUB)		20	2
3	20	LANE COMPUTER	SCORING POWER		R	0.80	2#12, #12G, 3/4"C		0.80				SPARE		20	4
5	20	LANE MONITOR P	POWER		R	0.80	2#12, #12G, 3/4"C	0.80					SPARE		20	6
7	20	LANE COMPUTER	SCORING POWER		R	0.80	2#12, #12G, 3/4"C		0.80				SPARE		20	8
9	20	LANE MONITOR P	POWER		R	0.80	2#12, #12G, 3/4"C	0.80					SPARE		20	10
11	20	LANE COMPUTER	SCORING POWER		R	0.80	2#12, #12G, 3/4"C		0.80				SPARE		20	12
13	20	LANE MONITOR P	POWER		R	0.80	2#12, #12G, 3/4"C	0.80					SPARE		20	14
15	20	LANE COMPUTER	SCORING POWER		R	0.80	2#12, #12G, 3/4"C		0.80				SPARE		20	16
17	20	SPARE						0.00					SPARE		20	18
19	20	SPARE							0.00				SPARE		20	20
			TOTAL CONN	IECTED LOAD (KV	A)			4.00	3.20							

							1		1					1	i	1		i
PANEL:	A(N)														MOUNTING:	SURFACE		
208Y/120	VOLTS,		3	PHASE,			4	WIRE										
MAIN CB	200A		MLO	NA		BUS	EXISTING		MIN,						FED FROM:	PANEL HB(E)		-
	TRIP			051040	LOAD	LOAD	MINIMUM BRANCH	PE	R PHASE (K)	/A)	MINIMUM BRANCH	LOAD	LOAD		DECODIDE		TRIP	OUTNO
CKT NO.	AMPS		DESCRIPTION	OF LOAD	TYPE	(KVA)	CIRCUIT	Α	В	С	CIRCUIT	(KVA)	TYPE		DESCRIPTI	ION OF LOAD	AMPS	CKTNO.
1	20	POS STAT	[ION_(#1)		E	0.18	2#12, #12G, 3/4"C	4.34				4.16	E				50/20	2
3	20	POS STAT	[ION_(#1)		E	0.36	2#12, #12G, 3/4"C		4.52		2#8, #10G, 3/4 C	4.16	E			-)	50/2P	4
5	20	POS STAT	[ION_(#1)		E	0.18	2#12, #12G, 3/4"C			4.34	2/10 //100 2/4/10	4.16	E			(2)	50/20	6
7	20	UNDERCO	OUNTER ICE I	MACHINE_(#19)	E	1.08	2#12, #12G, 3/4"C	5.24			2#8, #10G, 3/4°C	4.16	E	DOORLE BA	ATCH OVEN_(#	ŦZ)	50/2P	8
9	20	DIPPING	CABINET_(#6	5)	E	0.96	2#12, #12G, 3/4"C		5.12			4.16	E			(2)		10
11	20	REACH IN	I REFRIGERAT	FOR(#7)	E	1.08	2#12, #12G, 3/4"C			5.24	2#8, #10G, 3/4°C	4.16	E	DOORLE BA	ATCH OVEN_(#	ŧ2)	50/2P	12
13	20	SODA MA	ACHINE_(#18	)	E	0.12	2#12, #12G, 3/4"C	1.20			2#12, #12G, 3/4"C	1.08	E	UNDERCOL	JNTER ICE MA	CHINE_(#19)	20	14
15	20	REACH IN	I FREEZER(#8	)	E	1.08	2#12, #12G, 3/4"C		1.98		2#12, #12G, 3/4"C	0.90	E	MEGA PRE	PSTATION_(#3	3)	20	16
17	20	PEPSI MA	CHINE_(#39)	)	E	0.96	2#12, #12G, 3/4"C			3.15	2#12, #12G, 3/4"C	2.19	E	KEG COOLE	ER_(#43)		30	18
19	20	REFRIGE	RATED MERCI	HENDISER_(#4)	E	1.08	2#12, #12G, 3/4"C	5.24			2/10 //100 2/4/10	4.16	E			12)	50/25	20
21	20	MEGA PR	EPSTATION_	<u>(</u> #3)	E	0.90	2#12, #12G, 3/4"C		5.06		2#8, #10G, 3/4°C	4.16	E	COUNTERI	OP FRYER_(#1	12)	50/2P	22
23	20	PIZZA XPI	RESS DOUGH	PRESS_(#10)	E	1.13	2#12, #12G, 3/4"C			5.29		4.16	E			12)	= = / = =	24
25	20	PIZZA XPI	RESS DOUGH	PRESS_(#10)	E	1.13	2#12, #12G, 3/4"C	5.29			2#8, #10G, 3/4°C	4.16	E	COUNTERI	OP FRYER_(#1	12)	50/2P	26
27	20	ICE MACH	HINE_(#5)		E	0.92	2#12, #12G, 3/4"C		3.73			2.81	E				10/05	28
29	20	ICE MACH	HINE_(#5)		E	0.92	2#12, #12G, 3/4"C			3.73	2#8, #10G, 3/4"C	2.81	E	UNDERCOL	JNTER DISHM	ACHINE_(#24)	40/2P	30
31	20	UNDERCO	OUNTER REFE	RIGERATOR(#41)	E	1.20	2#12, #12G, 3/4"C	1.86				0.66	E					32
33	20	ICE MACH	HINE_(#42)		E	1.20	2#12, #12G, 3/4"C		1.86		2#12, #12G, 3/4"C	0.66	E	WALK IN C	OOLER		20/2P	34
35	20	BACK BA	R COOLER_(#	15)	E	1.20	2#12, #12G, 3/4"C			2.30		1.10	E					36
37	20	LIGHTING	G-WALK IN CO	OOLER, WALK IN	L	0.35	2#12, #12G, 3/4"C	1.45			2#12, #12G, 3/4"C	1.10	E	WALK IN FI	REEZER		20/2P	38
39	20	SMARTE	NDER_(#11)		E	0.18	2#12, #12G, 3/4"C	-	1.38		2#12, #12G, 3/4"C	1.20	E	BACK BAR	COOLER_(#15)	)	20	40
41	20	RECEPTA	CLE GENERAL	POURPOSE	R	0.36	2#12, #12G, 3/4"C			1.16	2#12, #12G, 3/4"C	0.80	E	BEAR TAPS	_(#35)		20	42
					1	۹	TOTAL LOAD (KVA)	24.61	23.64	25.21			ļ	1				1

![](_page_23_Figure_6.jpeg)

ALL THE CIRCUITING SHOWN FOR THE PANEL SCHEDULES IS FOR THE REFERENCE PURPOSE ONLY. E.C. SHALL GATHER INFORMATION ABOUT THE EXISTING CONDITIONS, VERIFY THE EXACT COMBINATION OF EXISTING CIRCUIT BREAKERS AVAILABLE IN THE RESPECTIVE EXISTING PANEL SCHEDULES IN FIELD AND REARRANGE THE CIRCUITING PER THE REQUIREMENTS BEFORE COMMENCING ANY WORK. ALL THE NEWLY REQUIRED BREAKERS (BASED ON THE EXISTING CIRCUIT BREAKER ARRANGEMENT) IN THE PANEL SCHEDULE SHALL BE TAKEN INTO THE CONSIDERATION FOR THE BIDDING. E.C. SHALL VERIFY THE EXACT SIZE OF THE EXISTING ELECTRICAL PANELS AND INFORM ENGINEER ON RECORD FOR ANY DISCREPANCY. BASE BID ACCORDINGLY.

## ELECTRICAL PANEL SCHEDULE KEY NOTE:

(A) E.C SHALL VERIFY IN FIELD FOR EXISTING BREAKER, IF NOT FOUND PROVIDE AS SHOWN IN THE SCHEDULE. BASE BID ACCORDINGLY.

![](_page_23_Figure_10.jpeg)

PANLE SCHEDULE

#### **SCOPE OF WORK**

PROVIDE ALL PLUMBING FOR NEW TRAMPOLINE PARK WITHIN AN EXISTING BUILDING SHELL, INCLUDING ALL WATER, GAS, VENT, GREASE & SANITARY LINES AND CONNECT TO EXISTING UTILITIES. PROVIDE NEW INTERIOR GREASE INTERCEPTOR AND NEW ELECTRIC TANK TYPE WATER HEATER.

#### **KITCHEN EQUIPMENT SERVICE NOTES**

- KITCHEN EQUIPMENT SHALL BE FURNISHED BY TENANT AND INSTALLED BY THE GENERAL CONTRACTOR. PLUMBING ACCESSORIES, INCLUDING FAUCETS, DRAINS, VALVES, PRESSURE/FLOW REGULATORS, FILTERS, ETC., ARE FURNISHED LOOSE WITH THE KITCHEN EQUIPMENT, FOR INSTALLATION AND FINAL CONNECTION BY THE PLUMBING CONTRACTOR, UNLESS INDICATED OTHERWISE.
- . INSTALL KITCHEN EQUIPMENT PIPING AND ACCESSORIES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND REQUIREMENTS. SEE KITCHEN EQUIPMENT DOCUMENTATION FOR SPECIFIC DIRECTION AT INDIVIDUAL ITEMS.
- SEE KITCHEN EQUIPMENT DOCUMENTATION FOR ADDITIONAL INFORMATION PERTAINING TO KITCHEN EQUIPMENT PLUMBING REQUIREMENTS, INCLUDING UTILITIES REQUIRED, CONNECTION SIZES AND ROUGH-IN LOCATIONS FOR SPECIFIC ITEMS (SUPPLY AND DRAIN). COORDINATE FINAL INSTALLATION WITH THE KITCHEN EQUIPMENT AS ACTUALLY INSTALLED. LOCATIONS OF FLOOR DRAINS, FLOOR SINKS AND OTHER ASSEMBLIES UTILIZED FOR INDIRECT DRAINAGE FROM FOOD SERVICE EQUIPMENT, ARE TO BE DETERMINED FROM THE KITCHEN EQUIPMENT LAYOUT PLANS. THE PLUMBING CONTRACTOR SHALL EXTEND PIPING BELOW COUNTERS, IN CASEWORK OR STRUCTURE AS REQUIRED FROM DROP OR RISE POINTS INDICATED ON PLANS TO EQUIPMENT CONNECTION POINTS.
- . PLUMBING SUPPLY PIPING (HW, CW, ETC.) SERVING KITCHEN EQUIPMENT PROVIDED WITH SOLENOID VALVES OR OTHER QUICK-CLOSING DEVICES SHALL HAVE A SHOCK ABSORBER FURNISHED AND INSTALLED BY THE PLUMBING CONTRACTOR AT THE TOP OF THE SUPPLY DROP OR BASE OF SUPPLY RISER. MULTIPLE ITEMS SERVED BY A COMMON SUPPLY DROP OR RISE MAY BE SERVED BY A SINGLE SHOCK ABSORBER, SIZED AND INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS FOR TYPE AND QUANTITY OF FIXTURES SERVED. WHERE QUICK CLOSING DEVICES SUPPLY PIPING IS FURNISHED WITH A BACKFLOW PREVENTER OR CHECK VALVE, THE SHOCK ABSORBER SHALL BE INSTALLED DOWNSTREAM SIDE OF THE BACKFLOW PREVENTER OR CHECK VALVE.
- EACH KITCHEN EQUIPMENT FIXTURE AND/OR PIECE OF EQUIPMENT TO BE PROVIDED WITH INDIVIDUAL IN-LINE STOP VALVE IN EACH PLUMBING SUPPLY CONNECTED.
- COORDINATE INSTALLATION OF ALL ITEMS AND VERIFY CONDITIONS IN ADVANCE WITH THE KITCHEN EQUIPMENT CONTRACTOR.
- GREASE BEARING DRAIN/WASTE PIPING FROM FIXTURES AND/OR EQUIPMENT TO INTERCEPTOR IS TO BE SLOPED AS PER LOCAL CODE REQUIREMENTS.
- . ALL ICE MAKING AND BEVERAGE DISPENSING EQUIPMENT (WATER FILTERS, COFFEE, JUICE, SODA, WATER, ETC.) SUPPLIED WITH CW AND/OR HW IS TO HAVE INDIVIDUAL SUPPLY PIPING PROVIDED WITH AN ISOLATION VALVE DUAL CHECK BACKFLOW PREVENTER ASSEMBLY PER LOCAL CODES AND SHOCK ABSORBER, ARRANGED IN ORDER LISTED IN DIRECTION OF FLOW. ALL ITEMS TO BE IN ACCESSIBLE LOCATION PER THE INSPECTION/APPROVAL AUTHORITIES.

#### **VERIFY FIELD ALL CONDITIONS**

- A. DESIGN DRAWINGS ARE SCHEMATIC. THIS CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING OR AWARD OF CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING OR AWARD OF CONTRACT TO INSPECT EXISTING FIELD CONDITIONS. THIS CONTRACT SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY FOR FIELD MODIFICATIONS DUE TO EXISTING CONDITIONS
- THE CONTRACTOR SHALL CONTACT THE CONSTRUCTION MANAGER PRIOR TO BIDDING FOR INTERPRETATIONS AND CLARIFICATIONS OF THE DESIGN AND INCLUDE IN HIS BID ALL COSTS TO MEET THE DESIGN INTENT. CLARIFICATIONS MADE BY THE CONSTRUCTION MANAGER AFTER BIDDING WILL BE FINAL AND SHALL BE IMPLEMENTED AT CONTRACTORS COST
- BIDDING CONTRACTORS SHALL HAVE A WORKING KNOWLEDGE OF LOCAL CODES AND ORDINANCES AND SHALL INCLUDE IN THEIR BIDS THE COSTS FOR ALL WORK INSTALLED IN STRICT ACCORDANCE WITH GOVERNING CODES, THE PLANS AND SPECIFICATIONS NOT WITHSTANDING. THE CONTRACTOR SHALL ALERT THE CONSTRUCTION MANAGER OF ANY APPARENT DISCREPANCIES BETWEEN GOVERNING CODES AND DESIGN INTENT

#### **CONSTRUCTION NOTES**

DIRECTED.

- A. ALL WORK TO BE SCHEDULED IN ADVANCE WITH THE LANDLORD AND CONSTRUCTION MANAGER TO MINIMIZE DOWNTIME OF THE AFFECTED AREA. INCLUDING ALL ASSOCIATED WORK REQUIRED IN CEILING SPACE OF FLOOR BELOW
- SEQUENCING AND PHASING OF WORK TO BE PER THE OWNER'S AND CONSTRUCTION MANAGER'S DIRECTION.
- DESIGNATED WORK AREAS ARE AS INDICATED BY THE ARCHITECTURAL PLANS AND BY THE LANDLORD AND CONSTRUCTION MANAGER. ANY WORK REQUIRED OUTSIDE OF THESE AREAS TO BE APPROVED BY AND SCHEDULED IN ADVANCE WITH THE CONSTRUCTION MANAGER, INCLUDING ALL ASSOCIATED WORK REQUIRED IN CEILING SPACE OF FLOOR BELOW AND/OR ABOVE
- WORK TO BE DONE IN SUCH A MANNER AS TO AVOID OR MINIMIZE INTERRUPTION OF NORMAL ACTIVITIES IN ADJACENT AREAS REMAINING IN OPERATION DURING CONSTRUCTION, INCLUDING ALL ASSOCIATED WORK REQUIRED IN CEILING SPACE OF FLOOR BELOW AND/OR ABOVE. ANY UTILITY OUTAGES OR IMPAIRMENTS TO BE SCHEDULED WITH THE OWNER AND CONSTRUCTION MANAGER IN ADVANCE AND EXECUTED IN THE MANNER
- ALL WORK LOCATED INSIDE THE LIMITS OF CONSTRUCTION LINE CAN BE INSTALLED DURING REGULAR BUSINESS HOURS.
- ALL CONDITIONS UPON COMPLETION OF WORK INCLUDED UNDER THIS CONTRACT TO MATCH CONDITIONS PRIOR TO START OF WORK.
- CONTRACTOR SHALL FIELD VERIFY CONDITIONS AND MAKE ALL NECESSARY ADJUSTMENTS TO COMPLETE INSTALLATION OF HIS WORK AT NO ADDITIONAL COST.

#### **GENERAL NOTES**

- ALL WORK TO BE PERFORMED TO MEET ALL STATE, CITY, AND LOCAL CODE REQUIREMENTS.
- PLUMBING CONTRACTOR SHALL EXAMINE THE PROJECT CONTRACT DOCUMENTS PRIOR TO SUBMITTING BID TO DEVELOP A COMPLETE UNDERSTANDING OF THE SCOPE OF WORK. FAILURE TO REVIEW ALL CONTRACT DOCUMENTS SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITIES TO PERFORM ALL WORK REQUIRED. THE CONTRACTOR SHALL, UPON REVIEW OF THE CONTRACT DOCUMENTS, ADVISE THE ARCHITECT/ENGINEER OF ANY DISCREPANCIES WHICH WILL AFFECT THE EXECUTION OF HIS WORK EXECUTION OF HIS WORK.
- PLUMBING CONTRACTOR TO FURNISH ALL PERMITS REQUIRED FOR THEIR WORK.
- PLUMBING CONTRACTOR TO COORDINATE ALL WORK WITH OTHER TRADES. IF PLUMBING CONTRACTOR FAILS TO COORDINATE WITH OTHER TRADES AND WORK IS REQUIRED TO BE ALTERED, THE PLUMBING CONTRACTOR WILL BE RESPONSIBLE FOR THE WORK AT THEIR OWN EXPENSE.
- PLUMBING CONTRACTOR SHALL FIELD VERIFY THE EXTENT OF DEMOLITION WORK PRIOR TO BIDDING, AND FOR COORDINATING THE EXTENT OF DEMOLITION WITH THE INSTALLATION OF NEW CONSTRUCTION INDICATED IN THE CONTRACT DOCUMENTS.
- REFER TO ARCHITECTURAL DOCUMENTATION FOR ADDITIONAL SCOPE/INFORMATION REGARDING DEMOLITION/REMODELING WORK INCLUDING IDENTIFICATION OF AREAS AND ITEMS INVOLVED, AS WELL AS INFORMATION OF BOTH A GENERAL AND SPECIFIC NATURE.
- VERIFY LOCATION, SIZE AND INVERTS OF ALL UTILITIES PRIOR TO STARTING WORK.
- PATCH WATERTIGHT AND FIRESTOP ALL HOLES IN EXISTING FLOOR SLAB AS A RESULT OF NEW PIPING BEING INSTALLED AS REQUIRED FOR THIS WORK.
- ALL SAW CUTTING, CORE DRILLING AND PATCHING OF EXISTING FLOORS TO BE PART OF THE PLUMBING CONTRACTOR BID.
- COORDINATE ALL FLOOR AND WALL PENETRATIONS WITH STRUCTURAL DRAWINGS. SET SLEEVES IN FLOORS AND WALLS AND ATTACHMENTS FOR HANGERS AS CONSTRUCTION PROGRESSES. ALL PENETRATIONS MUST BE SEALED AND HELD AS TIGHT TO COLUMNS OR WALLS AS POSSIBLE
- THE PLUMBING CONTRACTOR IS RESPONSIBLE FOR FIRESTOPPING AT ALL THE PLUMBING CONTRACTOR IS RESPONSIBLE FOR FIRESTOPPING AT ALL PLUMBING RELATED PENETRATIONS OF FIRE, SMOKE AND OTHER RATED STRUCTURES, INCLUDING FLOORS, WALLS, PARTITIONS, ETC.. REFER TO ARCHITECTURAL DOCUMENTATION FOR LOCATIONS OF ALL RATED STRUCTURES, AND SPECIFIC INFORMATION AND REQUIREMENTS PERTAINING TO SAME. ALL RATED PENETRATIONS SHALL HAVE A UL CLASSIFIED FIRE STOP SYSTEM TESTED TO ASTM E814 AND UL 1497 BY UNDERWRITERS LABORATORIES. FIRE STOP SYSTEMS SHALL BE PROSET SYSTEMS, PENSIL FIRESTOP SYSTEMS OR 3M COMPANY.
- LAYOUT AND INSTALLATION OF PLUMBING CONTRACT PIPING, EQUIPMENT, ITEMS AND ELEMENTS INDICATED ON PLAN IS SCHEMATIC IN NATURE. EXACT LOCATION, ROUTING AND INSTALLATION TO BE COORDINATED WITH BUILDING STRUCTURE AND ALL OTHER WORK PROVIDED UNDER SEPARATE CONTRAC
- COORDINATE EXACT LOCATION AND INSTALLATION OF ALL PLUMBING UTILITIES REQUIRED AND PROVIDED FOR WORK UNDER SEPARATE CONTRACT WITH THE APPROPRIATE CONTRACTOR(S) IN ADVANCE OF WORK. THIS INCLUDES SUPPLY AND DRAIN ELEMENTS, FOR DIRECT (PIPED) AND/OR INDIRECT (FLOOR/HUB DRAIN, AIR GAP, ETC.) CONNECTION/SERVICE.
- THE PLUMBING CONTRACTOR IS TO SECURE AND VERIFY ALL MEASUREMENTS AND CONDITIONS AT THE PROJECT IN ADVANCE OF WORK (INCLUDING FABRICATION).
- ALL PIPING SHALL BE CONCEALED INSIDE WALLS, BELOW FLOORS OR ABOVE CEILINGS UNLESS INDICATED OTHERWISE
- ALL DRAINAGE WASTE AND VENT PIPING SHALL BE SLOPED AS PER THE MINIMUM GRADE REQUIRED BY CODE (UNLESS NOTED OTHERWISE) FOR EACH PARTICULAR PIPE SIZE. Q. RUN ALL WATER LINES LEVEL.
- PLUMBING PIPING IS NOT PERMITTED TO RUN ABOVE ANY ELECTRICAL SWITCHGEAR, MOTOR CONTROL CENTERS OR PANELS (INCLUDING ACCESS/CLEARANCE SPACE 42" IN FRONT OF THESE ITEMS, AND MIN, 30" WIDE), UNDER ANY CIRCUMSTANCES. ACTUAL INSTALLATION AND LOCATION OF ELECTRICAL EQUIPMENT TO BE DETERMINED AND CONFIRMED WITH THE ELECTRICAL CONTRACTOR PRIOR TO START OF WORK.
- INSTALL WATER HAMMER ARRESTORS (PDI'S) ON DOMESTIC COLD AND HO WATER LINES AT EACH FIXTURE OR BATTERY OF FIXTURES AND IN ACCORDANCE WITH THE 248 CMR 10: MASSACHUSETTS PLUMBING CODE. ARRESTORS SHALL BE INSTALLED IN AN ACCESSIBLE LOCATION.
- ALL EQUIPMENT, PIPING, APPURTENANCES SHALL BE PROTECTED FROM DEBRIS AND DAMAGE. SENSITIVE EQUIPMENT SHALL NOT BE DELIVERED TO THE JOB SITE UNTIL SUCH TIME AS IT IS TO BE INSTALLED. PIPING ENDS SHALL BE CLOSED BY TEMPORARY MEANS WHEN PORTIONS OF THE SYSTEM ARE NOT COMPLETE.
- LOCATE ALL VALVES WHERE THEY ARE ACCESSIBLE FOR SERVICE AND USE WHERE ACCESS PANELS ARE REQUIRED COORDINATE SELECTION AND LOCATION WITH ARCHITECT AND THE GENERAL TRADES CONTRACTOR. PROVIDE TRAP PRIMER AND CONNECTION FOR ANY FLOOR DRAIN, FLOOR
- SINK OR HUB DRAIN NOT SUBJECT TO REGULAR FLOW. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF ALL PLUMBING FIXTURES. EXACT LOCATION OF ALL FIXTURES MUST BE VERIFIED IN THE FIELD PRIOR TO INSTALLATION. FINAL LOCATION SHALL BE AS DIRECTED BY ARCHITECT.
- PLUMBING CONTRACTOR TO COORDINATE WITH THE GENERAL TRADES CONTRACTOR ON EXACT LOCATION OF ROUGH-INS.
- MATERIALS IN PLENUM SPACES SHALL BE NONCOMBUSTIBLE OR SHALL HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25 AND A SMOKE -DEVELOPED INDEX OF NOT MORE THAN 50 PER 2015 INTERNATIONAL MECHANICAL CODE SECTION 602.2.1.

![](_page_24_Picture_47.jpeg)

PLUMBING L	EGEND
∽ — san — → ∽ — gsan — →	SANITARY SEWER PIPING (UNDERGROUND) GREASE SANITARY SEWER PIPING (UNDERGROUND)
← · v ·	
· · · · · · · · · · · · · · · · · · · ·	DOMESTIC COLD WATER PIPING
<u> </u>	HOT WATER PIPING
<u> </u>	HOT WATER RETURN PIPING
∽soda	SODA CONDUIT LINE
<u>∽</u>	PIPE RISE
<del>،</del>	PIPE DROP
E	CAPPED END OF PIPE
FCOO	FLOOR CLEAN OUT
——>>>	P-TRAP
S.O.V.	SHUT - OFF VALVE
CW	DOMESTIC COLD WATER
HW	DOMESTIC HOT WATER
HWR	DOMESTIC HOT WATER RETURN
WCO	WALL CLEAN OUT
KES	KITCHEN EQUIPMENT SUPPLIER
$\bowtie$	GATE VALVE
	FLOOR DRAIN
Z	CHECK VALVE
	FLOOR SINK
Ø	BALANCING VALVE
	POINT OF CONNECTION
	THERMOSTATIC MIXING VALVE (TMV)
ENERGY CO	NSERVATION NOTES

AS PER 2021 INTERNATIONAL ENERGY CONSERVATION CODE C404.4, PIPING FROM A WATER HEATER TO THE TERMINATION OF HEATED WATER FIXTURE SUPPLY PIPE SHALL BE INSULATED IN ACCORDANCE WITH TABLE OF MINIMUM PIPE INSULATION THICKNESS TABLE C403.12.3.

	MINIMUM PIPE II	NSULATION THIC	KNESS (I	N INCHES)	
FLUID OPERATING	INSULATION C	ONDUCTIVITY	NOMINA	AL PIPE OR T (INCHES)	TUBE SIZE
TEMPERATURE RANGE AND USAGE (°F)	CONDUCTIVITY BTU x IN./ (H x FT <sup>2</sup> x °F)	MEAN RATING TEMPERATURE, °F	<1	1 to < 1½	1½ to < 4
141-200	0.25-0.29	125	1.5	1.5	2.0
105-140	0.21-0.28	100	1.0	1.0	1.5
40-60	0.21-0.27	75	0.5	0.5	1.0

HOT WATER SYSTEM PIPING IS DESIGNED ACCORDING TO THE MAXIMUM ALLOWED PIPE LENGTH METHOD AS PER 2021 INTERNATIONAL ENERGY CONSERVATION CODE C404.5.1. THE HOT WATER VOLUME FROM THE NEAREST SOURCE OF HEATED WATER TO THE TERMINATION OF THE FIXTURE SUPPLY PIPE SHALL BE AS PER MAXIMUM PIPING LENGTH TABLE.

NOMINAL PIPE SIZE	MIXIMUM F (	PIPING LENGTH FEET)
(INCHES)	PUBLIC LAV	OTHER FIXTURES
3/8"	3'	50'
1/2"	2'	43'
3⁄4"	0.5'	21'
1"	0.5'	13'
11⁄4"	0.5'	8'
1½"	0.5'	6'
2" OR LARGER	0.5'	4'

S PER 2021 INTERNATIONAL ENERGY CONSERVATION CODE C404.6.1, UTOMATIC CONTROLS SHALL BE INSTALLED THAT LIMITS THE OPERATION OF A RECIRCULATING PUMP AND THE SYSTEM RETURN PIPE SHALL BE A DEDICATED RETURN PIPE OR A COLD WATER SUPPLY PIPE. THE CONTROL SHALL LIMIT THE TEMPERATURE OF THE WATER ENTERING THE COLD WATER PIPING TO NOT GREATER THAN 104°F (40°C).

PLUM	IBIN	G FIXTURE SCHEDULE	Ξ		W	ATER	WASTE		
tem No.	Qty.	Description	Manufacturer	Model	Hot	Cold	Waste	Usage	Spec
М	2	URINAL	тото	UT447EV			2"		
	2	FLUSH VALVE	ECO-POWER	TEU1LA12#CP		3/4"		0.5	GPF
Ν	11	WATER CLOSET	тото	CT708UC			4"		
	11	FLUSH	ECO-POWER	TET1LA32#CP		1"		1.28	GPF
	11	SEAT	тото	SC534					
0	8	LAVATORY	KOHLER	K-2084			2"		
	8	FAUCET	MOEN	6190	1/2"	1/2"			
	9	TMV	WATTS	LFMMV	1/2"/ 3/2	1" <sup>1</sup> / <sub>2</sub> "/ <sup>3</sup> / <sub>4</sub> "			
	8	DRAIN	KOHLER	57248					
	8	TRAP	McGUIRE	8912CBECO					
	8	SUPPLY	McGUIRE	LF2165LK					
	8	PIPING COVER	TRUEBRO	LAV-GUARD 23E-Z					
	8	CARRIER	ZURN	Z1231					
Р	1	MOP SINK	TBD	TBD	1/2"	1/2"	3"		
Q	1	BREAKROOM SINK	твр	TBD	1/2"	1/2"	2"		
FCO	12	FLOOR CLEANOUT	ZURN	CR06NIC3N					
WCO	16	WALL CLEANOUT	ZURN	Z1441					
FD	9	FLOOR DRAIN	SIOUX CHIEF FINISHL	NE 833-23DNRB			3"		
FS	11	FLOOR SINK	ZURN	FD2370-PVC-DS-H-Y			3"		
						ср		тс	
Item No.		v. Description	Manufacture	r Model	Hot	Cold	Direct	Indirect	
4		REFRIGERATED MERCHANDISER	TRUE	THAC-36-LD				1"	
5	2	2 ICE MACHINE	TBD	ТВО		1/2"		1"	
11	-	SMARTENDER	SMART BAR USA	A1800				1/2"	
13		ICE BIN	KROWNE	KR19-24-10				1"	
14		BAR SINK	ADVANCE TABC	D CRB-53C	1/2"++	1/2"		1-1/2"	
17		BAG-IN-BOX SHELF		IBD COMPOSE		1/2"		2/4"	
18		SODA MACHINE	CORNELIUS	631100050		1/2		3/4	
19	2		MANITIWOC	NEO 310 - URF0310A		1/2"		3/8"	
20		DIPPING WELL	KROWNE	16-153L	4 (0)	1/2"	01	1"	
21		HAND SINK		D 7-PS-EC-SP	1/2"++	1/2"	2"		
22				D FC-1-1818	1/2"++	1/2"		1-1/2"	
23			ADVANCE TABC	J FE-3-1620-18LK	3/4"+	3/4"		1-1/2"	
25		EYE WASH	GUARDIAN	G1814P	1/2"++	1/2"	2"		
28		WALK-IN COOLER/FREEZER	TBD	TBD					
32	3	B DROP-IN HAND SINK	ADVANCE TABC	O 7-PS-EC-SP	1/2"++	1/2"	2"		
36	1		KROWNE	KR19-24-10				1"	
42	1		TBD	TBD		1/2"		1"	

PLUM	IBIN	IG FIXTURE SCHEDUL	E			l v	VATER	WASTE		
Item No.	Qty.	Description	Ma	nufacturer	Model	Hc	t Cold	Waste	Usage	Spec
М	2	URINAL	тото		UT447EV			2"		
	2	FLUSH VALVE	ECO-POW	ER	TEU1LA12#CP		3/4"		0.5	GPF
Ν	11	WATER CLOSET	тото		CT708UC			4"		
	11	FLUSH	ECO-POW	ER	TET1LA32#CP		1"		1.28	GPF
	11	SEAT	тото		SC534					
0	8	LAVATORY	KOHLER		K-2084			2"		
	8	FAUCET	MOEN		6190	1/2	." 1/2"			
	9	TMV	WATTS		LFMMV	1/2"/	<sup>3</sup> ⁄ <sub>4</sub> " <sup>1</sup> ⁄ <sub>2</sub> "/ <sup>3</sup> ⁄ <sub>4</sub>			
	8	DRAIN	KOHLER		57248					
	8	TRAP	McGUIRE		8912CBECO					
	8	SUPPLY	McGUIRE		LF2165LK					
	8	PIPING COVER	TRUEBRO	,	LAV-GUARD 23E-Z					
	8	CARRIER	ZURN		Z1231					
Р	1	MOP SINK	TBD		TBD	1/2	." 1/2"	3"		
Q	1	BREAKROOM SINK	TBD		TBD	1/2	." 1/2"	2"		
FCO	12	FLOOR CLEANOUT			CR06NIC3N					
WCO	16	WALL CLEANOUT	ZURN		71441					
FD	9				833-23DNRB			3"		
F0								0"		
FS	11	FLOOR SINK	ZURN		FD2370-PVC-DS-H-Y			3		
KITCH	IEN	EQUIPMENT PLUMBIN	NG SCH	EDULE		WA	TER	WAS	TE	
Item No.	Q	ty. Description		Manufacturer	Model	Hot	Cold	Direct	Indirect	
4		REFRIGERATED MERCHANDISER		UE	THAC-36-LD		4/01		1"	
5		2 ICE MACHINE	IB SM		1BD		1/2"		1"	
13		1 ICE BIN	KR	OWNE	KR19-24-10				1"	
14		1 BAR SINK	AD	VANCE TABCO	CRB-53C	1/2"++	1/2"		1-1/2"	
17		BAG-IN-BOX SHELF	MA	NITIWOC	TBD		1/2"			
18		1 SODA MACHINE	СО	RNELIUS	631100050		1/2"		3/4"	
19		2 UNDERCOUNTER ICE MACHINE	MA	NITIWOC	NEO 310 - URF0310A		1/2"		3/8"	
20		1 DIPPING WELL	KR	OWNE	16-153L		1/2"		1"	
21		1 HAND SINK	AD	VANCE TABCO	7-PS-EC-SP	1/2"++	1/2"	2"	-	
22		1 PREP SINK	AD	VANCE TABCO	FC-1-1818	1/2"++	1/2"		1-1/2"	
23		1 3-COMP SINK	AD	VANCE TABCO	FE-3-1620-18LR	3/4"+	3/4"		1-1/2"	
25		1 EYE WASH	GU	ARDIAN	G1814P	1/2"++	1/2"	2"		
28		1 WALK-IN COOLER/FRFF7FR	TB	D	TBD					
32		3 DROP-IN HAND SINK	AD	VANCE TABCO	7-PS-EC-SP	1/2"++	1/2"	2"		
36		1 ICE BIN	KR	OWNE	KR19-24-10			-	1"	
		1 ICE MACHINE	ТВ	D	TBD		1/2"		1"	
44										

![](_page_25_Figure_0.jpeg)

## **GENERAL NOTES**

- CONTRACTOR TO COORDINATE WITH KITCHEN CONSULTANT / ARCHITECT FOR FINAL EQUIPMENT SELECTION.
- SLOPE OF DRAINAGE PIPING SHALL BE 1/8" PER FOOT OF RUN FOR PIPE LARGER THAN 3" AND 1/4" PER FOOT OF RUN FOR PIPE 3" AND SMALLER. VENT PIPING SHALL BE PITCHED TO DRAIN.
- CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.
- ALL MATERIAL INDICATED AND IMPLIED ON THESE DRAWINGS SHALL BE NEW UNLESS OTHERWISE NOTED.
- ALL CLEANOUTS TO BE ACCESSIBLE.
- PROVIDE TRAP PRIMER FOR ALL FLOOR DRAINS.
- CONTRACTOR TO FIELD VERIFY THE EXISTING SANITARY PIPING SIZE, LOCATION & INVERT.

#### SANITARY KEY NOTES

- PROVIDE GREASE INTERCEPTOR (GI) BELOW FINISHED FLOOR AS PER SCHEDULE. REFER TO DETAIL ON SHEET P-8. SAW CUT AND TRENCH FLOOR AS REQUIRED. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE ALL NECESSARY ACCESSORIES FOR A COMPLETE INSTALLATION.
- 2 EXTEND & CONNECT NEW 4" SANITARY WASTE PIPING TO EXISTING SANITARY LINE OF ADEQUATE SIZE IN AREA. CONTRACTOR TO FIELD VERIFY EXACT SIZE, LOCATION, FLOW DIRECTION, INVERT, AND POINT OF TIE-IN PRIOR TO BID & MAKE NECESSARY CHANGES / UPGRADE EXISTING LINE IF REQUIRED.
- 3 PROVIDE FULL INDIRECT SIZE DRAIN FROM EQUIPMENT TO NEARBY FS AND TERMINATE WITH MINIMUM 3" AIR GAP. PROVIDE FLOW CONTROL DEVICE PRIOR TO AIR GAP AND BALANCE TO NOT EXCEED GREASE INTERCEPTORS FLOW CAPACITY. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
- PROVIDE FULL INDIRECT SIZE DRAIN FROM EQUIPMENT TO NEARBY FS AND TERMINATE WITH MINIMUM 3" AIR GAP. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

GREASE INTERCEPTOR SCHEDULE						
ITEM	SERVICE	FLOW CAPACITY (GPM)	GREASE CAPACITY (LBS)	LIQUID CAPACITY (GALLONS)	MANUFACTURER AND MODEL	
GREASE INTERCEPTOR (GI)	KITCHEN AREA	100	1895	260	SCHIER GB-250	
NOTE:- 1. CONTRACTOR TO PROVIDE ALL REQUIRED ACCESSORIES FOR SATISFACTORY WORKING OF GREASE TRAP AS PER SITE CONDITIONS. 2. CONTRACTOR SHALL SUBMIT PROPOSED GREASE INTERCEPTOR INSTALLATION PLANS AND SPECIFICATIONS TO LOCAL AUTHORITIES FOR THEIR APPROVAL BEFORE ACQUISITION.						

![](_page_26_Figure_15.jpeg)

#### **GENERAL NOTES**

- CW/HW/HWR PIPING TO BE PROVIDED WITH INSULATION AS PER INTERNATIONAL ENERGY CONSERVATION CODE 2021 (REFER NOTES ON SHEET P-1).
- PROVIDE BRANCH PRV IF PRESSURE EXCEEDS 80 PSI.
   PROVIDE ACCESS PANELS FOR WATER HAMMER ARRESTOR 8
- SHUT-OFF VALVES AS REQUIRED.4. NEW WATER HEATER DRAIN SPILLS TO MOP SINK.
- 5. CONTRACTOR TO COORDINATE WITH KITCHEN CONSULTANT / ARCHITECT FOR FINAL EQUIPMENT SELECTION.
- 6. CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.
- ALL MATERIAL INDICATED AND IMPLIED ON THESE DRAWINGS SHALL BE NEW UNLESS OTHERWISE NOTED.
- CONTRACTOR TO FIELD VERIFY THE EXISTING WATER PIPING SIZE AND LOCATION.
- 9. ALL WATER PIPES ARE RUNNING ABOVE THE CEILING UNLESS UNTIL SPECIFIED.

#### WATER SUPPLY KEY NOTES

- EXTEND & CONNECT NEW 2" COLD WATER PIPING TO EXISTING COLD WATER LINE OF ADEQUATE SIZE IN AREA. PROVIDE SHUT-OFF VALVE AT THE POINT OF CONNECTION IN NEW CW LINE. CONTRACTOR TO FIELD VERIFY EXACT SIZE AND LOCATION OF EXISTING COLD WATER MAIN AND UPGRADE EXISTING LINE IF REQUIRED.
   CONTRACTOR TO FIELD VERIFY THE REQUIREMENT OF NEW WATER METER AND BFP WITH LANDLORD/OWNER. PROVIDE NEW IF NOT EXISTING OR UPGRADE IF REQUIRED.
   PROVIDE THERMOSTATIC MIXING VALVE FOR ALL HAND SINKS, BREAKROOM SINK, KITCHEN SINKS, EYE WASH & LAVATORIES.
   WATER PIPES RUNNING UNDER THE SLAB.
   PROVIDE 1/2" VALVED HARD WATER PIPE STUBBED WITH SHUTOFF VALVE, THREADED ENDS, AND CAP TO NEW WATER FILTER.
- PROVIDE 1/2" VALVED HARD WATER PIPE STUBBED WITH SHUTOFF VALVE, THREADED ENDS, AND CAP TO NEW WATER FILTER. COORDINATE EXACT REQUIREMENTS WITH THE SODA VENDOR. MOUNT FILTER 12" BELOW FINISHED CEILING. PROVIDE ALL REQUIRED SUPPORTS AND ACCESSORIES FOR A COMPLETE INSTALLATION. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
- 6 PROVIDE POINT OF USE WATER FILTER FOR EQUIPMENT. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. VERIFY EXACT LOCATION, ELEVATION, AND REQUIREMENTS PRIOR TO BID.
- PROVIDE P.V.C. UNDERGROUND CHASE FROM BAG AND BOX RACK TO SODA DISPENSER. COORDINATE CHASE WITH KITCHEN EQUIPMENT SUPPLIER (KES). KES TO PULL SODA LINES FROM BAG AND BOX TO DISPENSER.
- PROVIDE SUPPLY PIPING DOWN IN WALL BELOW SLAB AND ROUTE TO HALF HEIGHT WALL. G.C. TO SAW CUT AND TRENCH FLOOR AS REQUIRED. SLEEVE ALL FLOOR PENETRATIONS. SEAL ALL PENETRATIONS AIR AND WATERTIGHT THERE SHALL BE NO PIPE FITTINGS BELOW SLAB. PATCH FLOOR TO MATCH SURROUNDING FINISHED SURFACE.
- PROVIDE ASSE1022 LISTED BFP AND FINAL CONNECTION TO EQUIPMENT. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE DRAIN FUNNEL AND ROUTE TO CLOSEST DRAIN. PROVIDE MINIMUM 3" AIR GAP.
- PROVIDE SUPPLY PIPING UP FROM SLAB AND ROUTE IN HALF-HEIGHT WALL TO EQUIPMENT. SLEEVE ALL FLOOR PENETRATIONS. SEAL ALL PENETRATIONS AIR- AND WATER-TIGHT. COORDINATE EXACT ROUTE AND ELEVATION PRIOR TO BID.
- PROVIDE ASSE1013 LISTED BFP AND FINAL CONNECTION TO EQUIPMENT. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE DRAIN FUNNEL AND ROUTE TO CLOSEST DRAIN. PROVIDE MINIMUM 3" AIR GAP.

WATER HEATER SCHEDULE				
MANUFACTURER	AO SMITH			
MODEL	DVE-120			
EQUIPMENT TAG	WH-1			
STATUS	NEW			
QUANTITY	1			
CAPACITY	119 GALLONS			
FUEL	ELECTRIC			
POWER	36 KW			
FLOW RATE	148 GPH*			
STANDBY LOSS	0.53			
VOLTAGE	480/3/60			
AMPERAGE	43.3			
WEIGHT (EMPTY)	390 LBS.			
NOTES:				
1. * @ 100°F TEMPERATURE RISE.				

2. INSTALL NEW EXPANSION TANK (ET-1) AMTROL MODEL THERM-X-TROL ST-12C-DD, TANK VOL: 6.4 GAL, PER LOCAL CODE REQUIREMENTS.

RECIRCULATION P	UMP SCHEDULE
MANUFACTURER & MODEL	GRUNDFOS UP-15-18 B5
EQUIPMENT TAG	RCP-1
STATUS	NEW
GPM	2
WATER TEMP.(°F)	140
PUMP TYPE	INLINE
MHP	85 WATTS
V/PH/HZ	115/1/60
RPM	2280
SERVICE FACTOR	1.0
NOTE:	
PROVIDE AQUA STAT TIMER KIT FOR THE TI	WITH AUTOMATIC EMPERATURE

CONTROL OF HOT WATER SYSTEM. COORDINATE ELECTRICAL REQUIREMENTS FOR TIMER WITH ELECTRICAL CONTRACTOR.

![](_page_27_Figure_22.jpeg)

![](_page_28_Picture_0.jpeg)

### GAS KEY NOTES

EXISTING RTU TO REMAIN WITH EXISTING GAS LINE, ASSOCIATED ACCESSORIES AND FITTINGS. CONTRACTOR TO FIELD VERIFY THE CONDITION OF THE EXISTING GAS PIPING AND REPLACE IF REQUIRED.

	SCALE	
ROOF GAS PLAN	1/8" = 1'-0"	1)

![](_page_29_Picture_0.jpeg)

	C	0
2		

## GAS KEY NOTES

EXISTING RTU TO REMAIN WITH EXISTING GAS LINE, ASSOCIATED ACCESSORIES AND FITTINGS. CONTRACTOR TO FIELD VERIFY THE CONDITION OF THE EXISTING GAS PIPING AND REPLACE IF REQUIRED.

EXISTING GAS METER TO REMAIN WITH EXISTING MAIN GAS LINE, ASSOCIATED ACCESSORIES AND FITTINGS. CONTRACTOR TO FIELD VERIFY THE CONDITION OF THE EXISTING GAS METER AND REPLACE IF REQUIRED.

RTJ-6(F) ▲ RTJ-6(F) ROOF GAS PLAN SCALE 1(8'= 110')			
RTU-6(E)         ①         Image: Scale of the second secon			
RTU-6(E)         ①         ROOF GAS PLAN       SCALE         1/8" = 1'-0"       1			
RTU-6(E)         ①         ①         SCALE         1/8" = 1'-0"			
RTU-6(E)         Image: Comparison of the second s			
SCALE         1           1/8" = 1'-0"         1	RTU-6(E)		
ROOF GAS PLAN         SCALE           1/8" = 1'-0"         1			_
	ROOF GAS PLAN	SCALE 1/8" = 1'-0"	1

REFER PLUMBING SANITARY FLOOR PLAN ON SHEET P-3 FOR SANITARY KEY NOTES.

![](_page_30_Figure_2.jpeg)

REFER PLUMBING WATER FLOOR PLAN ON SHEET P-4 FOR WATER KEY NOTES.

![](_page_31_Figure_2.jpeg)

![](_page_32_Figure_0.jpeg)

#### **SPECIFICATIONS - DIVISION 22 - PLUMBING**

	A.CO
PART 2 - PRODUCTS	S B INS
2.1 PERFORMANCE REQUIREMENTS	C.INS
A.HANGERS AND SUPPORTS FOR PLUMBING PIPING EQUIPMENT:	IS
<ol> <li>STRUCTURAL PERFORMANCE: HANGERS AND SUPPORTS SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED ACCORDING TO ASCE/SEI 7.</li> <li>DESIGN SUPPORTS FOR MULTIPLE PIPES CAPABLE OF SUPPORTING COMPINED WEIGHT OF SUPPORTED</li> </ol>	D.LO M
b DESIGN FQUIPMENT SUPPORTS CAPABLE OF SUPPORTING COMBINED WEIGHT OF SUPPORTED	E.HO S
EQUIPMENT AND CONNECTED SYSTEMS AND COMPONENTS.	8
FROM AUTHORITIES HAVING JURISDICTION.	9
2.2 SLEEVES AND SLEEVE SEALS	10
A.GALVANIZED-STEEL-PIPE SLEEVES: ASTM A 53/A 53M, TYPE E, GRADE B, SCHEDULE 40, ZINC COATED, WITH PLAIN ENDS.	11
B.PVC-PIPE SLEEVES: ASTM D 1785, SCHEDULE 40.	12
LONGITUDINAL JOINT.	E VE
2.3 GROUT	SF. VE
HYDRAULIC-CEMENT GROUT.	1.E 2.0
2 DESIGN MIX: 5000-PSI 28-DAY COMPRESSIVE STRENGTH	
3 PACKAGING: PREMIXED AND FACTORY PACKAGED	3.3 GE
2.4 ESCUTCHEONS AND FLOOR PLATES	A.INS <sup>-</sup> INI
A.ONE-PIECE, DEEP-PATTERN TYPE: DEEP-DRAWN, BOX-SHAPED BRASS WITH CHROME-PLATED FINISH AND SPRING-CLIP FASTENERS.	B.INST CC
B.ONE-PIECE, STAMPED-STEEL TYPE: WITH CHROME-PLATED FINISH AND SPRING-CLIP FASTENERS.	C.INS
C.ONE-PIECE FLOOR PLATES: CAST-IRON FLANGE WITH HOLES FOR FASTENERS.	INS
2.6 HANGERS AND SUPPORTS FOR PLUMBING PIPING EQUIPMENT	D.INST
A.CARBON-STEEL PIPE HANGERS AND SUPPORTS: 1.DESCRIPTION: MSS SP-58, TYPES 1 THROUGH 58, FACTORY-FABRICATED COMPONENTS.	
2.GALVANIZED METALLIC COATINGS: PREGALVANIZED OR HOT DIPPED.	
3.NONMETALLIC COATINGS: PLASTIC COATING, JACKET, OR LINER.	SECTIO
4.PADDED HANGERS: HANGER WITH FIBERGLASS OR OTHER PIPE INSULATION PAD OR CUSHION TO SUPPORT BEARING SURFACE OF PIPING.	PART 1
5.HANGER RODS: CONTINUOUS-THREAD ROD, NUTS, AND WASHER MADE OF CARBON STEEL.	1.1 SE
B.COPPER PIPE HANGERS:	A.SUB
1.DESCRIPTION: MSS SP-58, TYPES 1 THROUGH 58, COPPER-COATED-STEEL, FACTORY-FABRICATED COMPONENTS. 2.HANGER RODS: CONTINUOUS-THREAD ROD, NUTS, AND WASHER MADE OF COPPER-COATED STEEL.	1.P PART 2
C.FASTENER SYSTEMS:	2.1 SY
1.MECHANICAL-EXPANSION ANCHORS: INSERT-WEDGE-TYPE, ZINC-COATED STEEL ANCHORS, FOR USE IN HARDENED PORTLAND CEMENT CONCRETE; WITH PULL-OUT, TENSION, AND SHEAR CAPACITIES APPROPRIATE FOR SUPPORTED LOADS AND BUILDING MATERIALS WHERE USED.	A.ASM B.NSF
D.MISCELLANEOUS MATERIALS:	2.2 GE
1. STRUCTURAL STEEL: ASTM A 36/A 36M, CARBON-STEEL PLATES, SHAPES, AND BARS; BLACK AND GALVANIZED.	A.VAL
2.GROUT: ASTM C 1107, FACTORY-MIXED AND -PACKAGED, DRY, HYDRAULIC-CEMENT, NONSHRINK AND NONMETALLIC GROUT; SUITABLE FOR INTERIOR AND EXTERIOR APPLICATIONS.	B.VAL
a.PROPERTIES: NONSTAINING, NONCORROSIVE, AND NONGASEOUS.	
b.DESIGN MIX: 5000-PSI, 28-DAY COMPRESSIVE STRENGTH.	D.ONE SE
	E.TWC
3.1 GENERAL PIPING INSTALLATIONS	FIFAI
A INSTALL FIFTING FREE OF SAGS AND BENDS.	PART 3
C.SLEEVES:	3.1 INS
1.INSTALL SLEEVES FOR PIPING PASSING THROUGH PENETRATIONS IN FLOORS, PARTITIONS, ROOFS, AND WALLS.	A.USE
2.INSTALL SLEEVES IN CONCRETE FLOORS, CONCRETE ROOF SLABS, AND CONCRETE WALLS AS NEW SLABS AND WALLS ARE CONSTRUCTED.	
a.USE GROUT AND SEAL THE SPACE OUTSIDE OF SLEEVES IN SLABS AND WALLS WITHOUT SLEEVE-SEAL SYSTEM.	D.INS
3. INSTALL SLEEVES FOR PIPES PASSING THROUGH INTERIOR PARTITIONS.	E.INST
4.FIRE-BARRIER PENETRATIONS: MAINTAIN INDICATED FIRE RATING OF WALLS, PARTITIONS, CEILINGS, AND FLOORS AT PIPE PENETRATIONS. SEAL PIPE PENETRATIONS WITH FIRESTOP MATERIALS. COMPLY WITH REQUIREMENTS FOR FIRESTOPPING SPECIFIED IN SECTION 078446 "PENETRATION FIRESTOPPING."	F.INST
D.ESCUTCHEONS AND FLOOR PLATES:	
4.INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FINISHED FLOORS. 5.INSTALL ESCUTCHEONS WITH ID TO CLOSELY FIT AROUND PIPE. TUBE. AND INSULATION OF PIPING AND WITH OD	SECTIO
THAT COMPLETELY COVERS OPENING.	PART 2
0.INSTALL FLOOR PLATES FOR PIPING PENETRATIONS OF EQUIPMENT-ROOM FLOORS. 7.INSTALL FLOOR PLATES WITH ID TO CLOSELY FIT AROUND PIPE, TUBE, AND INSULATION OF PIPING AND WITH OD THAT COMPLETELY COVERS OPENING	2.1 PE A.INS
G.INSTALL UNIONS AT FINAL CONNECTION TO EACH PIECE OF EQUIPMENT.	LE
H.INSTALL DIELECTRIC UNIONS AND FLANGES TO CONNECT PIPING MATERIALS OF DISSIMILAR METALS IN GAS PIPING.	

IGERS AND SUPPORTS

PLY WITH MSS SP-69 AND MSS SP-89. INSTALL BUILDING ATTACHMENTS WITHIN CONCRETE OR TO STRUCTURAL EL.

LL HANGERS AND SUPPORTS TO ALLOW CONTROLLED THERMAL AND SEISMIC MOVEMENT OF PIPING SYSTEMS. ALL POWDER-ACTUATED FASTENERS AND MECHANICAL-EXPANSION ANCHORS IN CONCRETE AFTER CONCRETE URED. DO NOT USE IN LIGHTWEIGHT CONCRETE OR IN SLABS LESS THAN 4 INCHES THICK.

DISTRIBUTION: INSTALL HANGERS AND SUPPORTS SO PIPING LIVE AND DEAD LOADING AND STRESSES FROM /EMENT WILL NOT BE TRANSMITTED TO CONNECTED EQUIPMENT.

CONTAL-PIPING HANGERS AND SUPPORTS: UNLESS OTHERWISE INDICATED AND EXCEPT AS SPECIFIED IN PIPING TEM SPECIFICATION SECTIONS, INSTALL THE FOLLOWING TYPES:

DJUSTABLE STEEL CLEVIS HANGERS (MSS TYPE 1): FOR SUSPENSION OF NONINSULATED OR INSULATED STATIONARY PIPES, NPS 1/2 TO NPS 30.

PE HANGERS (MSS TYPE 5): FOR SUSPENSION OF PIPES, NPS 1/2 TO NPS 4, TO ALLOW OFF-CENTER CLOSURE FOR HANGER INSTALLATION BEFORE PIPE ERECTION.

JUSTABLE STEEL BAND HANGERS (MSS TYPE 7): FOR SUSPENSION OF NONINSULATED STATIONARY PIPES, PS 1/2 TO NPS 8.

DJUSTABLE BAND HANGERS (MSS TYPE 9): FOR SUSPENSION OF NONINSULATED STATIONARY PIPES, NPS 1/2 TO PS 8.

DJUSTABLE SWIVEL-RING BAND HANGERS (MSS TYPE 10): FOR SUSPENSION OF NONINSULATED STATIONARY IPES, NPS 1/2 TO NPS 2.

FICAL-PIPING CLAMPS: UNLESS OTHERWISE INDICATED AND EXCEPT AS SPECIFIED IN PIPING SYSTEM CIFICATION SECTIONS, INSTALL THE FOLLOWING TYPES:

TENSION PIPE OR RISER CLAMPS (MSS TYPE 8): FOR SUPPORT OF PIPE RISERS, NPS 3/4 TO NPS 20. RBON- OR ALLOY-STEEL RISER CLAMPS (MSS TYPE 42): FOR SUPPORT OF PIPE RISERS, NPS 3/4 TO NPS 20, IF ONGER ENDS ARE REQUIRED FOR RISER CLAMPS.

ERAL EQUIPMENT INSTALLATIONS

LL EQUIPMENT TO ALLOW MAXIMUM POSSIBLE HEADROOM UNLESS SPECIFIC MOUNTING HEIGHTS ARE NOT CATED.

LL EQUIPMENT LEVEL AND PLUMB, PARALLEL AND PERPENDICULAR TO OTHER BUILDING SYSTEMS AND PONENTS, UNLESS OTHERWISE INDICATED.

LL MECHANICAL EQUIPMENT TO FACILITATE SERVICE, MAINTENANCE, AND REPAIR OR REPLACEMENT OF PONENTS. CONNECT EQUIPMENT FOR EASE OF DISCONNECTING, WITH MINIMUM INTERFERENCE TO OTHER ALLATIONS. EXTEND GREASE FITTINGS TO ACCESSIBLE LOCATIONS.

LL EQUIPMENT TO ALLOW RIGHT OF WAY FOR PIPING INSTALLED AT REQUIRED SLOPE.

ECTION

220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

GENERAL

TION REQUIREMENTS

ITTALS:

ODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

PRODUCTS TEM DESCRIPTION

E COMPLIANCE: ASME B16.10 AND ASME B16.34 FOR FERROUS VALVE DIMENSIONS AND DESIGN CRITERIA.

OMPLIANCE: NSF 61 FOR VALVE MATERIALS FOR POTABLE-WATER SERVICE.

ERAL-DUTY VALVES

E SIZES: SAME AS UPSTREAM PIPING UNLESS OTHERWISE INDICATED.

S IN INSULATED PIPING: WITH 2-INCH STEM EXTENSIONS.

CONNECTIONS: THREADS SHALL COMPLY WITH ANSI B1.20.1. FLANGES SHALL COMPLY WITH ANSI B16.24 FOR NZE VALVES. SOLDER-JOINT CONNECTIONS SHALL COMPLY WITH ANSI B16.18.

PIECE, COPPER-ALLOY BALL VALVES: LEAD FREE BRONZE BODY WITH CHROME-PLATED BRASS BALL, MTFE TS, AND 600-PSIG MINIMUM CWP RATING.

PIECE, COPPER-ALLOY BALL VALVES: LEAD FREE BRONZE BODY WITH FULL-PORT, CHROME-PLATED BRASS ;; RPTFE SEATS; AND 600-PSIG MINIMUM CWP RATING AND BLOWOUT-PROOF STEM.

REE BRONZE, SWING CHECK VALVES: CLASS 125, BRONZE BODY WITH BRONZE DISC AND SEAT.

EXECUTION ALLATION

ALL VALVES FOR SHUTOFF DUTY AND FOR THROTTLING DUTY.

E VALVES FOR EASY ACCESS AND PROVIDE SEPARATE SUPPORT WHERE NECESSARY.

LL VALVES FOR EACH FIXTURE AND ITEM OF EQUIPMENT.

L VALVES IN HORIZONTAL PIPING WITH STEM AT OR ABOVE CENTER OF PIPE.

L VALVES IN A POSITION TO ALLOW FULL STEM MOVEMENT.

CHECK VALVES FOR PROPER DIRECTION OF FLOW IN HORIZONTAL POSITION WITH HINGE PIN LEVEL.

ECTION 220523

220700 - PLUMBING INSULATION

## RODUCTS

FORMANCE REQUIREMENTS

ATION INSTALLED INDOORS: FLAME-SPREAD INDEX OF 25 OR LESS, AND SMOKE-DEVELOPED INDEX OF 50 OR ACCORDING TO ASTM E 84. 2.2 INSULATION MATERIALS

A.MINERAL-FIBER, PREFORMED PIPE FACTORY-APPLIED ASJ.

1.PRODUCTS: SUBJECT TO COMP a.JOHNS MANVILLE; MICRO-LO b.KNAUF INSULATION; 1000-DE

c.OWENS CORNING; FIBERGL

2.TYPE I, 850 DEG F MATERIALS: WITH ASTM C 547, TYPE I, GR ARE SPECIFIED IN "FACTORY

B.PROTECTIVE SHIELDING PIPE COV 1.MANUFACTURERS: SUBJECT TO FOLLOWING:

> a.MCGUIRE MANUFACTURIN b.PLUMBEREX. c.TRUEBRO; A BRAND OF IPS

d.ZURN INDUSTRIES, LLC; TU

2.DESCRIPTION: MANUFACTURE SUPPLIES AND TRAP AND DR. REQUIREMENTS.

2.3 ADHESIVES

A.MINERAL-FIBER ADHESIVE: COMP 1.FOR INDOOR APPLICATIONS, AE ACCORDING TO 40 CFR 59, SU

> 2.ADHESIVE SHALL COMPLY WITH OF HEALTH SERVICES' "STAN VARIOUS SOURCES USING SM

2.4 MASTICS

A.VAPOR-BARRIER MASTIC: WATER 1.FOR INDOOR APPLICATIONS, US 2.WATER-VAPOR PERMEANCE: A 3.SERVICE TEMPERATURE RANGE 4.SOLIDS CONTENT: ASTM D 1644 5.COLOR: WHITE.

B.BREATHER MASTIC: WATER BASE 1.WATER-VAPOR PERMEANCE: A 2.SERVICE TEMPERATURE RANG 3.SOLIDS CONTENT: 60 PERCENT 4.COLOR: WHITE.

2.5 SEALANTS

A.JOINT SEALANTS: 1.MATERIALS SHALL BE COMPATI 2.PERMANENTLY FLEXIBLE, ELAS 3.SERVICE TEMPERATURE RANG 4.COLOR: WHITE OR GRAY.

5.FOR INDOOR APPLICATIONS, SE B.ASJ FLASHING SEALANTS:

1.MATERIALS SHALL BE COMPATI 2.FIRE- AND WATER-RESISTANT, 3.SERVICE TEMPERATURE RANG

4.COLOR: WHITE.

5.FOR INDOOR APPLICATIONS, SE 2.6 FACTORY-APPLIED JACKETS

A.INSULATION SYSTEM SCHEDULES FACTORY-APPLIED JACKETS ARE 1.ASJ: WHITE, KRAFT-PAPER, FIB ASTM C 1136, TYPE I.

2.7 TAPES

A.ASJ TAPE: WHITE VAPOR-RETARDI COMPLYING WITH ASTM C 1136. 1.WIDTH: 3 INCHES.

2.THICKNESS: 11.5 MILS.

3.ADHESION: 90 OUNCES FORCE

4.ELONGATION: 2 PERCENT.

5.TENSILE STRENGTH: 40 LBF/ING

6.ASJ TAPE DISKS AND SQUARES

#### **SPECIFICATIONS - DIVISION 22 - PLUMBING**

PART 3 - EXECUTION

3.1 PIPE INSULATION INSTALLATION

A.COMPLY WITH REQUIREMENTS OF THE MIDWEST INSULATION CONTRACTORS ASSOCIATION'S "NATIONAL COMMERCIAL & INDUSTRIAL INSULATION STANDARDS" FOR INSULATION INSTALLATION ON PIPES AND EQUIPMENT.

B.INSULATION INSTALLATION AT INTERIOR WALL AND PARTITION PENETRATIONS (THAT ARE NOT FIRE RATED): INSTALL INSULATION CONTINUOUSLY THROUGH WALLS AND PARTITIONS.

C.INSULATION INSTALLATION AT FIRE-RATED WALL, PARTITION, AND FLOOR PENETRATIONS: INSTALL INSULATION CONTINUOUSLY THROUGH PENETRATIONS. SEAL PENETRATIONS. COMPLY WITH REQUIREMENTS IN SECTION 078400. D.MINERAL-FIBER INSULATION INSTALLATION:

1.INSULATION INSTALLATION ON STRAIGHT PIPES AND TUBES: WHERE VAPOR BARRIERS ARE INDICATED, SEAL LONGITUDINAL SEAMS, END JOINTS, AND PROTRUSIONS WITH VAPOR-BARRIER MASTIC AND JOINT SEALANT.

2.FOR INSULATION WITH FACTORY-APPLIED JACKETS ON ABOVE AMBIENT SURFACES, SECURE LAPS WITH OUTWARD CLINCHED STAPLES AT 6 INCHES O.C.

3.FOR INSULATION WITH FACTORY-APPLIED JACKETS ON BELOW AMBIENT SURFACES, DO NOT STAPLE LONGITUDINAL TABS BUT SECURE TABS WITH ADDITIONAL ADHESIVE AS RECOMMENDED BY INSULATION MATERIAL MANUFACTURER AND SEAL WITH VAPOR-BARRIER MASTIC AND FLASHING SEALANT.

E.INTERIOR PIPING SYSTEM APPLICATIONS: INSULATE THE FOLLOWING PIPING SYSTEMS:

1.DOMESTIC HOT WATER.

2.RECIRCULATED DOMESTIC HOT WATER.

3.EXPOSED WATER SUPPLIES AND SANITARY DRAINS OF FIXTURES FOR PEOPLE WITH DISABILITIES.

F.DO NOT APPLY INSULATION TO THE FOLLOWING SYSTEMS, MATERIALS, AND EQUIPMENT:

1.FLEXIBLE CONNECTORS.

2.SANITARY DRAINAGE AND VENT PIPING.

3.DRAINAGE PIPING LOCATED IN CRAWLSPACES UNLESS OTHERWISE INDICATED.

4.CHROME-PLATED PIPES AND FITTINGS, EXCEPT FOR PLUMBING FIXTURES FOR PEOPLE WITH DISABILITIES.

5.PIPING SPECIALTIES, INCLUDING AIR CHAMBERS, UNIONS, STRAINERS, CHECK VALVES, PLUG VALVES, AND FLOW REGULATORS.

- 3.2 INDOOR PIPING INSULATION SCHEDULE
- A.DOMESTIC COLD WATER:

1.NPS 1 AND SMALLER: INSULATION SHALL BE THE FOLLOWING:

a.MINERAL-FIBER, PREFORMED PIPE INSULATION, TYPE I: 1/2 INCH THICK.

2.NPS 1-1/4 AND LARGER: INSULATION SHALL BE THE FOLLOWING

a.MINERAL-FIBER, PREFORMED PIPE INSULATION, TYPE I: 1 INCH THICK

B.DOMESTIC HOT AND RECIRCULATED HOT WATER:

1.NPS 2 AND SMALLER: INSULATION SHALL BE THE FOLLOWING:

a.MINERAL-FIBER, PREFORMED PIPE INSULATION, TYPE I: 1 INCH THICK.

C.EXPOSED SANITARY DRAINS, DOMESTIC WATER, DOMESTIC HOT WATER, AND STOPS FOR PLUMBING FIXTURES FOR PEOPLE WITH DISABILITIES:

1.ALL PIPE SIZES: INSULATION SHALL BE THE FOLLOWING:

a.PROTECTIVE SHIELDING PIPING COVERS

b.MANUFACTURED PLASTIC WRAPS FOR COVERING PLUMBING FIXTURE HOT- AND COLD-WATER SUPPLIES AND TRAP AND DRAIN PIPING. COMPLY WITH AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS.

#### END OF SECTION

SECTION 221116 - DOMESTIC WATER PIPING

#### PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A.POTABLE-WATER PIPING AND COMPONENTS SHALL COMPLY WITH NSF 14 AND NSF 61.

2.2 PIPE AND FITTINGS

A. HARD COPPER TUBING: ASTM B 88, TYPE L, WATER TUBE, DRAWN TEMPER WITH WROUGHT-COPPER, SOLDER-JOINT FITTINGS. FURNISH WROUGHT-COPPER FITTINGS IF INDICATED.

1. COPPER UNIONS: CAST-COPPER-ALLOY, HEXAGONAL-STOCK BODY, WITH BALL-AND-SOCKET, METAL-TO-METAL SEATING SURFACES AND SOLDER-JOINT OR THREADED ENDS.

2. JOINING MATERIALS: USE ASTM B 813, WATER-FLUSHABLE, LEAD-FREE FLUX; ASTM B 32, LEAD-FREE-ALLOY SOLDER.

B. SOFT COPPER TUBING: ASTM B 88, TYPES K, WATER TUBE, ANNEALED TEMPER WITH COPPER PRESSURE FITTINGS, CAST-COPPER-ALLOY OR WROUGHT-COPPER, SOLDER-JOINT FITTINGS. FURNISH WROUGHT-COPPER FITTINGS IF INDICATED.

1. JOINING MATERIALS: USE ASTM B 813, WATER-FLUSHABLE, LEAD-FREE FLUX; ASTM B 32, LEAD-FREE-ALLOY SOLDER.

C. CPVC PIPING: ASTM F 441/F 441M, SCHEDULE 40 PIPE WITH ASTM F 438, CPVC SCHEDULE 40 SOCKET-TYPE FITTINGS. D. UPONOR PEX TUBE AND FITTINGS: ASTM F 877, SDR 9 PEX TUBING AND ASTM F 1807, METAL INSERT-TYPE FITTINGS

WITH COPPER OR STAINLESS-STEEL CRIMP RINGS.

1. MANIFOLD: ASTM F 877 PLASTIC OR CORROSION-RESISTANT-METAL ASSEMBLY, WITH A PLASTIC OR CORROSION-RESISTANT-METAL VALVE FOR EACH OUTLET.

E. SPECIAL-DUTY VALVES:

1. COMPLY WITH REQUIREMENTS IN SECTION 220523 "GENERAL-DUTY VALVES FOR PLUMBING PIPING" FOR GENERAL-DUTY METAL VALVES.

2. COMPLY WITH REQUIREMENTS IN SECTION 221119 "DOMESTIC WATER PIPING SPECIALTIES" FOR BALANCING VALVES, DRAIN VALVES, BACKFLOW PREVENTERS, AND VACUUM BREAKERS.

F. TRANSITION FITTINGS: MANUFACTURED PIPING COUPLING OR SPECIFIED PIPING SYSTEM FITTING. SAME SIZE AS PIPES TO BE JOINED AND PRESSURE RATING AT LEAST EQUAL TO PIPES TO BE JOINED.

G. FLEXIBLE CONNECTORS: STAINLESS-STEEL, CORRUGATED-METAL TUBING WITH WIRE-BRAID COVERING. WORKING-PRESSURE RATING A MINIMUM OF 200 PSIG.

PART 3 - EXECUTION

3.1 INSTALLATION

A. COMPLY WITH REQUIREMENTS IN SECTION 220500 "COMMON WORK RESULTS FOR PLUMBING" FOR BASIC PIPING INSTALLATION REQUIREMENTS.

- B. INSTALL WALL PENETRATION SYSTEM AT EACH SERVICE PIPE PENETRATION THROUGH FOUNDATION WALL. MAKE INSTALLATION WATERTIGHT. COMPLY WITH REQUIREMENTS IN SECTION 220500 "COMMON WORK RESULTS FOR PLUMBING" FOR WALL PENETRATION SYSTEMS.
- C. INSTALL SHUTOFF VALVE, HOSE-END DRAIN VALVE, STRAINER, PRESSURE GAGE, AND TEST TEE WITH VALVE, INSIDE THE BUILDING AT EACH DOMESTIC WATER SERVICE ENTRANCE. COMPLY WITH REQUIREMENTS IN SECTION 220500 "COMMON WORK RESULTS FOR PLUMBING" FOR PRESSURE GAGES AND SECTION 221119 "DOMESTIC WATER PIPING SPECIALTIES" FOR DRAIN VALVES AND STRAINERS.
- D. INSTALL DOMESTIC WATER PIPING WITHOUT PITCH FOR HORIZONTAL PIPING AND PLUMB FOR VERTICAL PIPING. E. COMPLY WITH REQUIREMENTS IN SECTION 220500 "COMMON WORK RESULTS FOR PLUMBING" FOR BASIC PIPING JOINT CONSTRUCTION.
- 1. SOLDERED JOINTS: COMPLY WITH PROCEDURES IN ASTM B 828 UNLESS OTHERWISE INDICATED. F. COMPLY WITH REQUIREMENTS IN SECTION 220500 "COMMON WORK RESULTS FOR PLUMBING" FOR PIPE HANGER AND SUPPORT DEVICES.
- 1. INSTALL HANGERS FOR STEEL PIPING WITH THE FOLLOWING MAXIMUM HORIZONTAL SPACING AND MINIMUM ROD DIAMETERS:
- a. NPS 1-1/4 AND SMALLER: 84 INCHES WITH 3/8-INCH ROD.
- b. NPS 1-1/2: 108 INCHES WITH 3/8-INCH ROD.
- c. NPS 2: 10 FEET WITH 3/8-INCH ROD.
- d. NPS 2-1/2: 11 FEET WITH 1/2-INCH ROD.
- e. SUPPORT VERTICAL PIPING AT EACH FLOOR.
- 2. INSTALL VINYL-COATED HANGERS FOR CPVC PIPING WITH THE FOLLOWING MAXIMUM HORIZONTAL SPACING AND MINIMUM ROD DIAMETERS:
- a. NPS 1 AND SMALLER: 36 INCHES WITH 3/8-INCH ROD.
- b. NPS 1-1/4 TO NPS 2: 48 INCHES WITH 3/8-INCH ROD.
- c. NPS 2-1/2 TO NPS 3-1/2: 48 INCHES WITH 1/2-INCH ROD.
- d. INSTALL SUPPORTS FOR VERTICAL CPVC PIPING EVERY 60 INCHES FOR NPS 1 AND SMALLER, AND EVERY 72 INCHES FOR NPS 1-1/4 AND LARGER.
- 3. INSTALL VINYL-COATED HANGERS FOR PEX PIPING WITH THE FOLLOWING MAXIMUM HORIZONTAL SPACING AND MINIMUM ROD DIAMETERS:
- a. NPS 1 AND SMALLER: 32 INCHES WITH 3/8-INCH ROD.
- b. INSTALL HANGERS FOR VERTICAL PEX PIPING EVERY 48 INCHES.

3.2 INSPECTING AND CLEANING

A. INSPECT AND TEST PIPING SYSTEMS AS FOLLOWS:

- 1. FILL DOMESTIC WATER PIPING. CHECK COMPONENTS TO DETERMINE THAT THEY ARE NOT AIR BOUND AND THAT PIPING IS FULL OF WATER.
- 2. TEST FOR LEAKS AND DEFECTS IN NEW PIPING AND PARTS OF EXISTING PIPING THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED.
- B. CLEAN AND DISINFECT POTABLE DOMESTIC WATER PIPING BY FILLING SYSTEM WITH WATER/CHLORINE SOLUTION WITH AT LEAST 50 PPM OF CHLORINE. ISOLATE WITH VALVES AND ALLOW TO STAND FOR 24 HOURS. FLUSH SYSTEM WITH CLEAN, POTABLE WATER UNTIL NO CHLORINE IS IN WATER COMING FROM SYSTEM AFTER THE STANDING TIME.
- 3.3 PIPING SCHEDULE
- A. ABOVEGROUND DISTRIBUTION PIPING: TYPE L HARD COPPER TUBING, CPVC PLASTIC PIPING OR PEX PIPING.
- B. BELOWGROUND DISTRIBUTION PIPING: TYPE K SOFT COPPER TUBING OR PEX PIPING INSTALLED IN PROTECTIVE PVC CONDUIT

#### 3.4 VALVE SCHEDULE

- A. DRAWINGS INDICATE VALVE TYPES TO BE USED. WHERE SPECIFIC VALVE TYPES ARE NOT INDICATED, THE FOLLOWING REQUIREMENTS APPLY:
- 1. SHUTOFF DUTY: USE BRONZE BALL VALVES FOR PIPING NPS 2 AND SMALLER.
- 2. THROTTLING DUTY: USE BRONZE BALL VALVES FOR PIPING NPS 2 AND SMALLER.
- 3. HOT-WATER-PIPING, BALANCING DUTY: MEMORY-STOP BALANCING VALVES.
- 4. DRAIN DUTY: HOSE-END DRAIN VALVES.
- B. INSTALL BALL VALVES CLOSE TO MAIN ON EACH BRANCH AND RISER SERVING TWO OR MORE PLUMBING FIXTURES OR EQUIPMENT CONNECTIONS AND WHERE INDICATED
- C. INSTALL BALL VALVES ON INLET TO EACH PLUMBING EQUIPMENT ITEM, ON EACH SUPPLY TO EACH PLUMBING FIXTURE NOT HAVING STOPS ON SUPPLIES, AND ELSEWHERE AS INDICATED.
- D. INSTALL DRAIN VALVE AT BASE OF EACH RISER, AT LOW POINTS OF HORIZONTAL RUNS, AND WHERE REQUIRED TO DRAIN WATER DISTRIBUTION PIPING SYSTEM.
- E. INSTALL SWING CHECK VALVE ON DISCHARGE SIDE OF EACH PUMP AND ELSEWHERE AS INDICATED.
- F. INSTALL BALL VALVES IN EACH HOT-WATER CIRCULATING LOOP AND DISCHARGE SIDE OF EACH PUMP.

#### END OF SECTION

SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

#### PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

A. POTABLE-WATER PIPING AND COMPONENTS SHALL COMPLY WITH NSF 61AND NSF 14.

#### 2.2 PERFORMANCE REQUIREMENTS

MINIMUM WORKING PRESSURE FOR DOMESTIC WATER PIPING SPECIALTIES: 125 PSIG UNLESS OTHERWISE INDICATED.

#### 3 MANUFACTURED UNITS

A. PIPE-APPLIED, ATMOSPHERIC-TYPE VACUUM BREAKERS:

- 1. STANDARD: ASSE 1001.
- 2. SIZE: NPS 1/4 TO NPS 3, AS REQUIRED TO MATCH CONNECTED PIPING.
- 3. BODY: BRONZE.
- 4. INLET AND OUTLET CONNECTIONS: THREADED.
- 5. FINISH: CHROME PLATED.
- C. REDUCED-PRESSURE-PRINCIPLE BACKFLOW PREVENTERS:
- 2. STANDARD: ASSE 1013.
- 3. OPERATION: CONTINUOUS-PRESSURE APPLICATIONS.
- 4. PRESSURE LOSS: 12 PSIG MAXIMUM, THROUGH MIDDLE THIRD OF FLOW RANGE
- 5. BODY: LEAD FREE BRONZE OR STAINLESS STEEL FOR NPS 2 AND SMALLER.
- 6. END CONNECTIONS: THREADED FOR NPS 2 AND SMALLER.
- 7. CONFIGURATION: DESIGNED FOR HORIZONTAL, STRAIGHT-THROUGH FLOW.
- 8. ACCESSORIES:
- a. VALVES NPS 2 AND SMALLER: BALL TYPE WITH THREADED ENDS ON INLET AND OUTLET. b. AIR-GAP FITTING: ASME A112.1.2, MATCHING BACKFLOW-PREVENTER CONNECTION.

F. THERMOSTATIC, WATER MIXING VALVES:

- 4. STANDARD: ASSE 1017.
- 5. PRESSURE RATING: 125 PSIG MINIMUM UNLESS OTHERWISE INDICATED.

- 8. CONNECTIONS: THREADED OR UNION INLETS AND OUTLET.
- ADJUSTABLE, TEMPERATURE-CONTROL HANDLE.
- 10. TEMPERED-WATER SETTING: AS SPECIFIED ON DRAWINGS

- 12. VALVE FINISH: CHROME PLATED.
- 13. PIPING FINISH: CHROME PLATED.
- K. WATER-HAMMER ARRESTERS: 7. STANDARD: ASSE 1010 OR PDI-WH 2
- 8. TYPE: COPPER TUBE WITH PISTC
- L. SUPPLY-TYPE, TRAP-SEAL PRIMER DEVICE: 1. STANDARD: ASSE 1018
- 2. PRESSURE RATING: 125 PSIG MIN
- BODY: BRONZE.
- 4. INLET AND OUTLET CONNECTIONS: NPS 1/2 THREADED, UNION, OR SOLDER JOINT

PART 3 - EXECUTION

#### **.1 INSTALLATION**

- VING JURISDICTION.
- B. INSTALL WATER-HAMMER ARRESTERS IN WATER PIPING ACCORDING TO PDI-WH 201. PROPER FLOW.
- 3.2 FIELD QUALITY CONTROL
- A. PERFORM THE FOLLOWING TESTS AND INSPECTIONS:
- THE DEVICE'S REFERENCE STANDARD.
- INSPECTIONS. 3. PREPARE TEST AND INSPECTION REPORTS

END OF SECTION 221119

#### SECTION 221316 - SANITARY WASTE AND VENT PIPING

PART 2 - PRODUCTS

2.2 PIPES AND FITTINGS

PART 3 - EXECUTION

**3.1 PIPING INSTALLATION** 

PROHIBITED.

COMPLETED.

INDICATED:

HAVING JURISDICTION.

JOINT CONSTRUCTION.

AND SUPPORT DEVICES.

FITTINGS.

- 2.1 PERFORMANCE REQUIREMENTS
- PRESSURE UNLESS OTHERWISE INDICATED:
- 1. SOIL, WASTE, AND VENT PIPING: 10-FOOT HEAD OF WATER.
- PIPING COMPONENTS.

1. ADHESIVE PRIMER: ASTM F 656.

2. SOLVENT CEMENT: ASTM D 2564.

K. COMPLY WITH REQUIREMENTS IN SECTION 220513 "COMMON WORK RESULTS FOR PLUMBING" FOR PIPE HANGER

J. COMPLY WITH REQUIREMENTS IN SECTION 220513 "COMMON WORK RESULTS FOR PLUMBING" FOR BASIC PIPING

I. DO NOT ENCLOSE, COVER, OR PUT PIPING INTO OPERATION UNTIL IT IS INSPECTED AND APPROVED BY AUTHORITIES

G. INSTALL PVC SOIL AND WASTE DRAINAGE AND VENT PIPING ACCORDING TO ASTM D 2665. H. INSTALL UNDERGROUND PVC SOIL AND WASTE DRAINAGE PIPING ACCORDING TO ASTM D 2321.

TOWARD VERTICAL FIXTURE VENT OR TOWARD VENT STACK.

1. HORIZONTAL SANITARY DRAINAGE PIPING: 2 PERCENT DOWNWARD IN DIRECTION OF FLOW FOR PIPING NPS 2-1/2 AND SMALLER; 1 PERCENT DOWNWARD IN DIRECTION OF FLOW FOR PIPING NPS 3 AND LARGER. 2. VENT PIPING: ALL VENT AND BRANCH VENT PIPING SHALL BE GRADED AND CONNECTED TO DRAIN BACK

D. INSTALL SOIL AND WASTE DRAINAGE AND VENT PIPING AT THE FOLLOWING MINIMUM SLOPES, UNLESS OTHERWISE

C. LAY BURIED BUILDING DRAINAGE PIPING BEGINNING AT LOW POINT OF EACH SYSTEM. INSTALL TRUE TO GRADES AND ALIGNMENT INDICATED, WITH UNBROKEN CONTINUITY OF INVERT. PLACE HUB ENDS OF PIPING UPSTREAM. INSTALL REQUIRED GASKETS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS FOR USE OF LUBRICANTS, CEMENTS, AND OTHER INSTALLATION REQUIREMENTS. MAINTAIN SWAB IN PIPING AND PULL PAST EACH JOINT AS

B. MAKE CHANGES IN DIRECTION FOR SOIL AND WASTE DRAINAGE AND VENT PIPING USING APPROPRIATE BRANCHES, BENDS, AND LONG-SWEEP BENDS. SANITARY TEES AND SHORT-SWEEP 1/4 BENDS MAY BE USED ON VERTICAL STACKS IF CHANGE IN DIRECTION OF FLOW IS FROM HORIZONTAL TO VERTICAL. USE LONG-TURN, DOUBLE Y-BRANCH AND 1/8-BEND FITTINGS IF TWO FIXTURES ARE INSTALLED BACK TO BACK OR SIDE BY SIDE WITH COMMON DRAIN PIPE. STRAIGHT TEES, ELBOWS, AND CROSSES MAY BE USED ON VENT LINES. DO NOT CHANGE DIRECTION OF FLOW MORE THAN 90 DEGREES. USE PROPER SIZE OF STANDARD INCREASERS AND REDUCERS IF PIPES OF DIFFERENT SIZES ARE CONNECTED. REDUCING SIZE OF DRAINAGE PIPING IN DIRECTION OF FLOW IS

A. INSTALL WALL PENETRATION SYSTEM AT EACH PIPE PENETRATION THROUGH FOUNDATION WALL. MAKE INSTALLATION WATERTIGHT. COMPLY WITH REQUIREMENTS IN SECTION 220513 "COMMON WORK RESULTS FOR PLUMBING" FOR WALL PENETRATION SYSTEMS.

a. PVC SOLVENT CEMENT SHALL HAVE A VOC CONTENT OF 510 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).

a. ADHESIVE PRIMER SHALL HAVE A VOC CONTENT OF 550 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).

A. PVC PLASTIC, DWV PIPE AND FITTINGS: ASTM D 2665, SCHEDULE 40, PLAIN ENDS WITH PVC SOCKET-TYPE, DWV PIPE

B. PIPING MATERIALS SHALL BEAR LABEL, STAMP, OR OTHER MARKINGS OF SPECIFIED TESTING AGENCY. C. COMPLY WITH NSF/ANSI 14, "PLASTICS PIPING SYSTEMS COMPONENTS AND RELATED MATERIALS," FOR PLASTIC

A. COMPONENTS AND INSTALLATION SHALL BE CAPABLE OF WITHSTANDING THE FOLLOWING MINIMUM WORKING

2. DOMESTIC WATER PIPING SPECIALTIES WILL BE CONSIDERED DEFECTIVE IF THEY DO NOT PASS TESTS AND

1. TEST EACH PRESSURE VACUUM BREAKER, REDUCED-PRESSURE-PRINCIPLE BACKFLOW PREVENTER, AND DOUBLE-CHECK BACKFLOW-PREVENTION ASSEMBLY ACCORDING TO AUTHORITIES HAVING JURISDICTION AND

C. INSTALL SUPPLY-TYPE, TRAP-SEAL PRIMER VALVES WITH OUTLET PIPING PITCHED DOWN TOWARD DRAIN TRAP A MINIMUM OF 1 PERCENT, AND CONNECT TO FLOOR-DRAIN BODY, TRAP, OR INLET FITTING. ADJUST VALVE FOR

. INSTALL BACKFLOW PREVENTERS IN EACH WATER SUPPLY TO MECHANICAL EQUIPMENT AND SYSTEMS AND TO OTHER EQUIPMENT AND WATER SYSTEMS THAT MAY BE SOURCES OF CONTAMINATION. COMPLY WITH AUTHORITIES

M. WATER FILTERS: CARTRIDGE TYPE, INCLUDING HOUSING, FITTINGS, FILTER CARTRIDGES, AND CARTRIDGE END CAPS.

GRAVITY DRAIN OUTLET CONNECTION: NPS 1/2 THREADED OR SOLDER JOINT. 6. FINISH: CHROME PLATED, OR ROUGH BRONZE FOR UNITS USED WITH PIPE OR TUBE THAT IS NOT CHROME

9. SIZE: ASSE 1010, SIZES AA AND A THROUGH F, OR PDI-WH 201, SIZES A THROUGH F

11. PRESSURE DROP AT DESIGN FLOW RATE: NOT EXCEED 15 PSIG.

9. ACCESSORIES: MANUAL TEMPERATURE CONTROL, CHECK STOPS ON HOT- AND COLD-WATER SUPPLIES, AND

7. MATERIAL: LEAD FREE BRONZE BODY WITH CORROSION-RESISTANT INTERIOR COMPONENTS.

6. TYPE: EXPOSED-MOUNTED, THERMOSTATICALLY CONTROLLED, WATER MIXING VALVE.

#### **SPECIFICATIONS - DIVISION 22 - PLUMBING**

3.2 PIPE SCHEDULE	SECTION
A. ABOVEGROUND APPLICATIONS: PVC PLASTIC, DWV PIPE AND FITTINGS WITH SOLVENT-CEMENTED JOINTS, COPPER DRAINAGE TUBE AND FITTINGS WITH SOLDERED JOINTS. PVC PLASTIC PIPE AND FITTINGS SHALL NOT BE PERMITTED FOR INSTALLATION IN RETURN AIR PLENUMS OR LOCATIONS EXPOSED TO RETURN AIR PLENUMS.	PART 1 - G
B. BELOWGROUND APPLICATIONS: PVC PLASTIC, DWV PIPE AND DRAINAGE-PATTERN FITTINGS WITH CEMENTED JOINTS.	A. FURN DOM POIN MAIN
END OF SECTION	B. WATE
	PART 2 - P
SECTION 221319 - SANITARY WASTE PIPING SPECIALTIES	A. GLAS JAC
PART 1 - GENERAL	B. HEATE
1.1 SECTION REQUIREMENTS A. SUBMITTALS:	C. WATE PRO
1. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.	D. HEATI
a. INCLUDE RATED CAPACITIES, OPERATING CHARACTERISTICS, AND ACCESSORIES FOR GREASE INTERCEPTORS.	E. WATE CAP
PART 2 - PRODUCTS	F. THER
2.1 PERFORMANCE REQUIREMENTS	PLAI
A. DRAINAGE PIPING SPECIALTIES SHALL BEAR LABEL, STAMP, OR OTHER MARKINGS OF SPECIFIED TESTING AGENCY.	WAT
2.2 MANUFACTURED UNITS - AS INDICATED ON DRAWINGS	FITT
A. FLOOR CLEANOUTS: PER STANDARD ASME A112.36.2M-2002.	G. ALL W ACC
B. WALL CLEANOUTS:	PIPI
C. FLOOR DRAINS: PER STANDARD ASME A112.6.3-2001.	WAI
D. CAST IRON FLOOR SINKS: PER STANDARD ASME A112.6.7-2001.	
E. PVC PLASTIC FLOOR SINKS: PER STANDARD ASME A112.6.7-2001.	PART 3 - E
PART 3 - EXECUTION	C. INSTA
3.1 INSTALLATION	D. INSTA VALVE
A. INSTALL CLEANOUTS AT GRADE AND EXTEND TO WHERE BUILDING SANITARY DRAINS CONNECT TO BUILDING	E. SET H

- SANITARY SEWERS. B. INSTALL FLOOR DRAINS AT LOW POINTS OF SURFACE AREAS TO BE DRAINED. SET GRATES OF DRAINS FLUSH WITH FINISHED FLOOR UNLESS OTHERWISE INDICATED.
- 1. INSTALL FLOOR-DRAIN FLASHING COLLAR OR FLANGE SO NO LEAKAGE OCCURS BETWEEN DRAIN AND
- ADJOINING FLOORING. MAINTAIN INTEGRITY OF WATERPROOF MEMBRANES WHERE PENETRATED. 2. INSTALL INDIVIDUAL TRAPS FOR FLOOR DRAINS CONNECTED TO SANITARY BUILDING DRAIN, UNLESS OTHERWISE INDICATED.
- C. PROVIDE A 2" MINIMUM AIR-GAP OR 2 TIMES THE PIPE DIAMETER (WHICHEVER IS GREATER) ON INDIRECT-WASTE PIPING DISCHARGE INTO SANITARY DRAINAGE SYSTEM.

END OF SECTION

SECTION 224000 - PLUMBING FIXTURES

#### PART 1 - GENERAL

- 1.1 SECTION REQUIREMENTS
- A. SUBMITTALS:
- 1. PRODUCT DATA FOR EACH TYPE OF PLUMBING FIXTURE, INCLUDING TRIM, FITTINGS, ACCESSORIES, APPLIANCES, APPURTENANCES, EQUIPMENT, AND SUPPORTS.
- 2. DOCUMENTATION INDICATING FLOW AND WATER CONSUMPTION REQUIREMENTS.

#### PART 2 - PRODUCTS

- 2.1 PERFORMANCE REQUIREMENTS
- A. REGULATORY REQUIREMENTS: COMPLY WITH REQUIREMENTS IN ICC A117.1, "ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES", PUBLIC LAW 90-480, "ARCHITECTURAL BARRIERS ACT"; AND PUBLIC LAW 101-336, "AMERICANS WITH DISABILITIES ACT" FOR PLUMBING FIXTURES FOR PEOPLE WITH DISABILITIES.
- B. REGULATORY REQUIREMENTS: COMPLY WITH REQUIREMENTS IN PUBLIC LAW 102-486, "ENERGY POLICY ACT," ABOUT WATER FLOW AND CONSUMPTION RATES FOR PLUMBING FIXTURES.
- C. NSF STANDARD: COMPLY WITH NSF 61, "DRINKING WATER SYSTEM COMPONENTS HEALTH EFFECTS," FOR FIXTURE MATERIALS THAT WILL BE IN CONTACT WITH POTABLE WATER.
- D. FIXTURES SHALL BE PROVIDED AS SCHEDULED ON THE DRAWINGS.

#### PART 3 - EXECUTION

- 3.1 INSTALLATIONS
- A. INSTALL FITTING INSULATION KITS ON FIXTURES FOR PEOPLE WITH DISABILITIES.
- B. INSTALL FIXTURES WITH FLANGES AND GASKET SEALS.
- C. INSTALL TANKS FOR ACCESSIBLE, TANK-TYPE WATER CLOSETS WITH LEVER HANDLE MOUNTED ON WIDE SIDE OF COMPARTMENT.
- D. FASTEN WALL-HANGING PLUMBING FIXTURES SECURELY TO SUPPORTS ATTACHED TO BUILDING SUBSTRATE WHEN SUPPORTS ARE SPECIFIED, AND TO BUILDING WALL CONSTRUCTION WHERE NO SUPPORT IS INDICATED.
- E. FASTEN FLOOR-MOUNTED FIXTURES TO SUBSTRATE. FASTEN FIXTURES HAVING HOLES FOR SECURING FIXTURE TO WALL CONSTRUCTION, TO REINFORCEMENT BUILT INTO WALLS.
- F. FASTEN WALL-MOUNTED FITTINGS TO REINFORCEMENT BUILT INTO WALLS.
- G. FASTEN COUNTER-MOUNTING PLUMBING FIXTURES TO CASEWORK.
- H. SECURE SUPPLIES TO SUPPORTS OR SUBSTRATE WITHIN PIPE SPACE BEHIND FIXTURE.
- I. SET MOP BASINS IN LEVELING BED OF CEMENT GROUT.
- J. INSTALL INDIVIDUAL SUPPLY INLETS, SUPPLY STOPS, SUPPLY RISERS, AND TUBULAR BRASS TRAPS WITH CLEANOUTS AT FIXTURE.
- K. INSTALL WATER-SUPPLY STOP VALVES IN ACCESSIBLE LOCATIONS.
- L. INSTALL TRAPS ON FIXTURE OUTLETS. OMIT TRAPS ON FIXTURES HAVING INTEGRAL TRAPS. OMIT TRAPS ON INDIRECT WASTES UNLESS OTHERWISE INDICATED.
- M. INSTALL ESCUTCHEONS AT WALL, FLOOR, AND CEILING PENETRATIONS IN EXPOSED, FINISHED LOCATIONS AND WITHIN CABINETS AND MILLWORK. USE DEEP-PATTERN ESCUTCHEONS WHERE REQUIRED TO CONCEAL PROTRUDING PIPE FITTINGS.
- N. SEAL JOINTS BETWEEN FIXTURES AND WALLS, FLOORS, AND COUNTERS USING SANITARY-TYPE, ONE-PART, MILDEW-RESISTANT, SILICONE SEALANT. MATCH SEALANT COLOR TO FIXTURE COLOR.
- O. INSTALL PIPING CONNECTIONS BETWEEN PLUMBING FIXTURES AND PIPING SYSTEMS AND PLUMBING EQUIPMENT. INSTALL INSULATION ON SUPPLIES AND DRAINS OF FIXTURES FOR PEOPLE WITH DISABILITIES.

END OF SECTION

#### ON 223300 - STORAGE TANK ELECTRIC WATER HEATER

#### - GENERAL

- RNISH AND INSTALL ELECTRIC WATER HEATER(S), ASSESSORS AND APPURTENANCES AS REQUIRED TO PROVIDE OMESTIC HOT WATER SUPPLY TO ALL ITEMS/ELEMENTS INDICATED ON PLANS, AND TO ANY AND ALL OTHER OINTS REQUIRING SAME. THE ASSEMBLY SHALL INCLUDE ALL COMPONENTS NECESSARY FOR AUTOMATICALLY IAINTAINING CONSTANT WATER TEMPERATURE SUPPLY.
- ATER HEATERS MUST COMPLY WITH ALL REQUIREMENTS OF THE APPLICABLE ENERGY CONSERVATION CODE.
- ASS LINED TANK SHALL BE INSULATED WITH VERMIN-PROOF CLASS FIBER INSULATION AND THE OUTER STEEL ACKET SHALL HAVE A BAKED ENAMEL FINISH OVER A BONDERIZED UNDER COATING.
- ATER SHALL HAVE A WORKING PRESSURE OF 150 PSIG.
- ATER HEATER SHALL HAVE AN EXTRUDED MAGNESIUM ANODE ROD RIGIDLY SUPPORTED FOR CATHODIC ROTECTION.
- ATER SHALL HAVE A THREE YEAR LIMITED WARRANTY AGAINST CORROSION.
- TER HEATER BY A.O. SMITH, RHEEM, BRADFORD WHITE, RUUD, STATE, OR LOCHINVAR OF THE SAME TYPE AND CAPACITY AND SIZE MAY BE FURNISHED AT THE CONTRACTOR'S OPTION.
- ERMAL EXPANSION TANKS SHALL BE SIMILAR TO AMTROL INC. ST EXTROL SERIES, CAPACITIES AS INDICATED ON PLANS. FURNISH WITH STEEL SHELL, RIGID POLYPROPYLENE LINER AND HEAVY DUTY RUBBER DIAPHRAGM. LINER AND DIAPHRAGM MECHANICALLY BONDED TO SHELL TO FORM A SEPARATE AIR CHAMBER AND NON-CORROSIVE VATER RESERVOIR. AIR CHAMBER IS PRE-CHARGED TO 55 PSIG, AND PROVIDE WITH A STANDARD AIR VALVE
- FITTING. TANKS TO BE ASME LISTED CONSTRUCTION WHEN HEATER INPUT IS 200,000 BTUH OR GREATER.
- ACCORDANCE WITH ANSI STANDARDS SHALL HAVE A VACUUM RELIEF VALVE INSTALLED IN COLD WATER SUPPLY PIPING TO THE HEATER PER INSPECTION/APPROVAL AUTHORITIES REQUIREMENTS. RELIEF VALVE TO BE SIMILAR TO WATTS MODEL NO. N36.

#### - EXECUTION

- STALL WATER HEATER, PIPING AND ACCESSORIES AS RECOMMENDED BY MANUFACTURER.
- D. INSTALL ASME RATED TEMPERATURE-PRESSURE RELIEF VALVES AS REQUIRED AND/OR AS INDICATED ON THE PLANS. VALVE SETTING 210°F AND 125 PSIG. EXTEND DISCHARGE PIPE FULL SIZE TO APPROVED DRAIN LOCATION.
  E. SET HOT WATER SUPPLY WATER TEMPERATURE AS INDICATED ON THE PLANS.

END OF SECTION

![](_page_35_Picture_53.jpeg)