	ABE	REVIATIONS			MECHANICA	L SYMBOLS		
	A		L		ALL SYMBOLS SHOWN MAY N SYMBOLS ARE SHOWN SCHEMAT	OT APPEAR ON DRAWINGS. TC AND MAY NOT BE TO SCALE.		1. COORDINATE ALL V NECESSARY: IT IS CLEARANCES, AND
ABV AC A/C	ABOVE ALTERNATING CURRENT AIR CONDITIONER ABOVE FINISHED CEILING	L LTG LAT	LAVATORY LIGHTING LEAVING AIR TEMPERATURE	90° ELBOW DOWN		DOOR GRILLE	- [\	2. HVAC WORK SHALL
AFF AFG AG	ABOVE FINISHED FLOOR ABOVE FINISHED GRADE ABOVE GRADE AND GFI		M	90° ELBOW UP	6 0	VOLUME DAMPER		INCLUDING, BUT NO 2.1. MANUFACTURE 2.2. ROOF OPENING
ahap Ahu Alt	AS HIGH AS POSSIBLE AIR HANDLING UNIT ALTERNATE	MAX. MCA MOCP	MAXIMUM MINIMUM CURRENT AMPS. MAX. OVER CURRENT PROTECTION	OFFSET TO CHANGE ELEVATION (AT 30° WHEN POSSIBLE ARROW SLOPES DN.)	6))9	FIRE DAMPER		2.3. COPPER COND GAS PIPING SUF 2.4. DUCTWORK, TU SMACNA STANE
AMB AMP APPROX ARCH	AMBIENT TEMPERATURE (°F) AMPERE APPROXIMATELY ARCHITECTURAL	MECH. MFR. MIN.	MECHANICAL MANUFACTURER MINIMUM	ROUND RADIUS ELBOW		MOTORIZED DAMPER		2.5. DIFFUSERS, SU 2.6. LINE SETS, AU HANDLER IN SP 2.7 CONTROLS SE
AVG	AVERAGE B	MVD MS	MANUAL VOLUME DAMPER MOP SINK N	45° ELBOW	erso	GRAVITY BACKDRAFT DAMPER	H BDD	CABLE), 2.8. SHIMS AND MIS DRAINAGE,
B B.G. BMS	BOILER BELOW GRADE BUILDING MANAGEMENT SYSTEM	N/A NC NEC	NOT APPLICABLE NOISE CRITERIA NATIONAL ELECTRICAL CODE	90° STRAIGHT TEE		AUTO SMOKE DAMPER		2.9. OFFICIALS, 2.10. WEATHER-PROP
BRD BTU BLDG	BAROMETRIC RELIEF DAMPER BRITISH THERMAL UNIT BUILDING	NIC NK NO	NOT IN CONTRACT NECK SIZE NORMALLY OPEN	90° CONICAL TEE		DUCT MOUNTED SMOKE DETECTOR		2. UNLESS OTHERWIS PARTITIONS AND O CONTRACTOR SHAL PENETRATIONS OF
CD	C CONSTRUCTION DOCUMENTS	NTS	NOT TO SCALE	45° BRANCH		SMOKE/FIRE DAMPERS (CLASS II MIN.)	D TATE	SEALED TO COMPL THROUGH FIRE RAT 4. SHALL KEEP ALL E
CFH CFM CH. CHEM.	CUBIC FEET PER HOUR CUBIC FEET PER MINUTE CHILLER CHEMICAL	OA OAR OBD	OUTSIDE AIR OWNERS AUTHORIZED REPRESENTATIVE OPPOSED BLADE DAMPER	45° CONICAL TEE		THERMOSTAT	Ū	SPACES AND ADJA DEBRIS RESULTING PERMITTED TO ACC
CHP CKT. CLG	CHILLED WATER PUMP CIRCUIT CEILING	OD ORIG.	ORIGINAL	SIZE TRANSITION		TEMPERATURE SENSOR	©	5. ALL CONSTRUCTIO PROPERTY OF THE REQUESTED BY THE THE DRAWINGS SHA
CMPR. CT CWP CU	COMPRESSOR COOLING TOWER CONDENSER WATER PUMP CONDENSING UNIT	P.D. PH.	PRESSURE DROP (FT) PHASE	SHAPE TRANSITION		HUMIDITY SENSOR CARBON MONOXIDE SENSOR	(I) (I)	6. DUCTWORK IS SHO RISES OF RUNS. TH
CW	COLD WATER	PMB PLBG. PNL.	POWERED MIXING BOX PLUMBING PANEL PRESSURE	ROUND FLEXIBLE DUCT		CARBON DIOXIDE SENSOR	60	AVOID OBSTRUCTINGCOORDINATION WIT7. ALL DUCT SIZES SH
DB DEFL °F DET	DRY BULB DEFLECTION DEGREES FAHRENHEIT DETAIL		R	90° ELBOW DOWN W/ TURNING VANES (U.N.O.)		NITROGEN DIOXIDE SENSOR		8. SUPPORT ALL DUC
DD DIA DISC	DESIGN DEVELOPMENT DIAMETER DISCONNECT SWITCH	RA RAG RAD.	RETURN AIR RETURN AIR GRILLE RADIUS REFERENCE	90° ELBOW UP W/ TURNING VANES (U.N.O.)		MECHANICAL FITTINGS A		MANNER. WHERE O EQUIPMENT, FURNI STRUCTURE AS POS
DIM DWG DC DCO	DIMENSION DRAWING DIRECT CURRENT DOUBLE CLEAN OUT	RPM RTU	REVOLUTIONS PER MINUTE ROOF TOP UNIT	TEE WITH SPLITTER & TURNING VANES IN VERTICAL		PRODUCTION CHILLED WATER SUPPLY/RETURN HOT WATER SUPPLY/RETURN	PCHS/R HWS/R	9. PROVIDE VOLUME CONNECTING TO TH
	EXHAUST AIR		SINGLE SPEED MOTOR	OFFSET TO CHANGE ELEVATION (AT 30° WHEN POSSIBLE ARROW SLOPES DN.)		CONDENSER WATER SUPPLY/RETURN REFRIGERANT SUCTION AND LIQUID LINES CONDENSATE DRAIN LINE	CS/R RS/RL CD	11. ALL FLEXIBLE DUCT CODE. SUPPORT E
EDB EDH EF	ENTERING DRY BULB ELECTRIC DUCT HEATER EXHAUST FAN	SA SAG SDC	SUPPLY AIR SUPPLY AIR GRILLE STAND ALONE DIGITAL CONTROLLER	RECTANGULAR RADIUS ELBOW		LOW PRESSURE STEAM CONDENSATE MEDIUM PRESSURE STEAM CONDENSATE		12. COVER ALL HVAC DURING STORAGE
ELEC ELEV EMCS. E.S.P.	ELECTRICAL ELEVATION ENERGY MGMT. CONTROL SYSTEM EXTERNAL STATIC PRESS. (IN. W.G.)	SEER SENS. SP SO	SEASON ENERGY EFFICIENCY RATIO SENSIBLE STATIC PRESSURE	RECTANGULAR ELBOW WITH TURNING VANES		LOW PRESSURE STEAM SUPPLY (0 TO 15 PSIG) MEDIUM PRESSURE STEAM SUPPLY (15 TO 100 PSIG)		FINAL STARTUP TO ENTERING. 13. DO NOT OPERATE A
EWB EWT EXH.	ENTERING WET BULB ENTERING WATER TEMPERATURE EXHAUST	SGL STR. SS S	MOTOR STARTER SANITARY SEWER SINK	SPLIT BRANCH TAKE-OFF WITH SQUARE ELBOW AND SPLITTER DAMPER.		HIGH PRESSURE STEAM (ABOVE 100 PSIG) FLOAT AND THERM. TRAP BUCKET STEAM TRAP		AFTER CONSTRUC FILTERS. 14. REMOVABLE ACCES
EWC EWH EX	ELECTRIC WATER COOLER ELECTRIC WATER HEATER EXISTING		Т	SPLIT BRANCH TAKE-OFF WITH RADIUS ELBOW AND SPLITTER DAMPER.		GATE VALVE BALANCING VALVE CHECK VALVE		SHAFTS AND WALLS OTHER MECHANIC/ LOCATION REQUIRE BUTTONS TABS
	FIRE ALARM	TEMP. T.S.P. TYP	TEMPERATURE TOTAL STATIC PRESSURE (IN. W.G.) TYPICAL	BRANCH TAKE-OFF WITHOUT AIR BALANCING DAMPER.	≠ <u> </u>	OS & Y VALVE GLOBE VALVE		EQUIPMENT. 15. PROVIDE THERMOS
FAAP FACP F/A	FIRE ALARM ANNUNCIATION PANEL FIRE ALARM CONTROL PANEL FREE AREA OPENING (SQ. FT.)	UG UH	UNDERGROUND UNIT HEATER	BRANCH TAKE-OFF WITH AIR BALANCING DAMPER. (SCOOP DAMPER)	<u>↓</u> <u>↓</u> ↓	BUTTERFLY VALVE BALL VALVE SOLENOID VALVE		APPLIANCES. COOF
FCU FHP FLA	FAN COIL UNIT FRACTIONAL HORSE POWER FULL LOAD AMPERES	UL UNO	UNDERWRITERS LABORATORIES UNLESS NOTED OTHERWISE	TEE WITH SPLITTER DAMPER		PRESSURE REDUCING VALVE PRESSURE RELIEF VALVE CONTROL, 2 WAY VALVE		17. PAINT ALL SUPPLY A
FLR. FPI FPM FPS	FLOOR COIL FINS PER INCH. FEET PER MINUTE FEET PER SECOND	V VAV	VENT VARIABI E AIR VALVE	SPIN-IN TAP WITH DAMPER	<u>≠</u> <u></u>	CONTROL, 3 WAY VALVE STRAINER & BLOW OFF VALVE	œ	 ALL DUCTWORK S PRESSURE. TIE BACK, TO BAR JO
FT. FD	FOOT OR FEET FLOOR DRAIN	VEL. VFD VTR	VELOCITY VARIABLE FREQUENCY DRIVE VENT THRU ROOF	4-WAY DIRECTIONAL THROW UNLESS INDICATED OTHERWISE.		UNION OR COMPANION FLANGES PLUG VALVE		20. FIRE DAMPERS MUS WALL. PROVIDE SM FIRE DAMPERS TO F
GFI GPM	GROUND FAULT INTERRUPTER GALLONS PER MINUTE		W WITH	4-WAY DIRECTIONAL THROW UNLESS INDICATED OTHERWISE.		THERMOMETER PRESSURE & TEMPERATURE TAP (PETES PLUG)		21. SEAL OPENINGS A FLOORS (NOT IN SH
GCO	GRADE CLEAN OUT	W/O W.G. WB	WITHOUT WATER GUAGE WET BULB	SIDEWALL SUPPLY GRILLE OR REGISTER WITH O.B.D.		ANCHOR (PIPE) EXPANSION JOINT		22. PERFORM TESTING SHALL ALSO PERFO OR SPECIFIED). U
HOA HP HPU	HANDS/OFF/AUTO. MOTOR STARTER HORSE POWER HEAT PUMP UNIT	WP WPD WC W	WATER PRESSURE DROP WATER CLOSET WASTE	SUPPLY DUCT RISER		AUTOMATIC AIR VENT HOSE END DRAIN	۲ ۲ ۲	PAYMENT. THE TAE WITHIN 10 DAYS AFT
HR. HT. HTG. HTP	HOUR(S) HEIGHT HEATING HEATER		X	RETURN, EXHAUST OR OUTSIDE AIR DUCT RISER.		HOSE BIBB THERMOMETER & WELL TEMPERATURE SENSOR	-+++	23. DEVELOP AND MA CONSTRUCTION SI RED-LINED DRAWIN INSTALLATION THAT
HVAC HWP HW	HEAT, VENT AND AIR CONDITIONING HOT WATER PUMP HOT WATER	XFMR.	IRANSFORMER	CEILING RETURN AIR GRILLE OR REGISTER		FLOW SWITCH PRESSURE SENSOR	► F	INCLUDE ALL PUI ARCHITECT/ENGINE 24. PROVIDE A RETURN
HWR HX HZ.	HOT WATER RETURN HEAT EXCHANGER FREQUENCY (HERTZ)	DRAWING	G/DETAIL REFERENCE KEY	CEILING EXHAUST AIR GRILLE OR REGISTER				ONE SQUARE FOOT 25. REFER TO THE ARC
ID				CEILING SUPPLY AIR DIFFUSER	\boxtimes			26. COORDINATE THE IN 27. ALL ROOF PENET
IN.	INCHES	۲۰۰۱۴ RE:1/M5.0	1 SHEET NUMBER ON					28. MAINTAIN A MINIMU PLUMBING VENT.
KW KWH	KILOWATT KILOWATT HOUR		WHICH DETAIL IS DRAWN					

GENERAL NOTES

WORK INDICATED WITH ALL OTHER TRADES INVOLVED IN THIS PROJECT, AS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY DIMENSIONS, WORKING THE WORKING ARRANGEMENT OF EQUIPMENT, AS WELL AS THE LOCATIONS OF AND ASSOCIATED DUCTWORK, PIPING, ETC., AND TO COORDINATE THE ORDINGLY.

. INCLUDE FURNISHING (EXCEPT WHERE NOTED), INSTALLING, AND TESTING ALL OR A COMPLETE, FULLY OPERATIONAL, AND CODE COMPLIANT INSTALLATION OT LIMITED TO: R'S STANDARD ROOF CURBS OR AS SPECIFIED,

INSATE DRAINS WITH MINIMUM 3" TRAP DEPTH (U.N.O.) AND PROPER SLOPE,

PPORTED EVERY 10 FEET, AND OTHER PIPING AND FITTINGS, JRNING VANES, SPLITTERS, DAMPERS, SPIN-INS, ETC. IN ACCORDANCE WITH DARDS FOR LOCATION, THICKNESS, AND CONSTRUCTION, PPLY AND RETURN GRILLES

XILIARY DRAIN PANS AND PIPING, AND FRESH AIR INTAKE FOR EACH AIR LIT SYSTEMS (IF USED), NSORS, AND LOW VOLTAGE WIRING (E.G. 8-STRAND, 18 AWG. NON-SHIELDED

ISCELLANEOUS STEEL FOR LEVEL INSTALLATION AND PROPER CONDENSATE

TORS IN RETURN AIR DUCTS OR SUPPLY DUCTS AS REQUIRED BY LOCAL CODE

DOF ROOF AND WALL PENETRATIONS FOR COPPER PIPING, MAKE-UP AIR, PADS.

SE SPECIFIED, ALL REQUIRED CUTTING AND PATCHING OF FLOORS, WALLS, OTHER MATERIALS IN THE BUILDING IS TO BE INCLUDED IN THE SCOPE. THE ALL RESTORE THESE AREAS TO ORIGINAL CONDITION UPON COMPLETION. ALL WALLS, CEILINGS, OR FLOORS SHALL BE CORE-DRILLED, SLEEVED, AND PLY WITH RESPECTIVE BUILDING CODE REQUIREMENTS. ALL PENETRATIONS TED WALL SHALL COMPLY WITH UL LISTED SLEEVE ASSEMBLY REQUIREMENTS.

EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR ACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE UMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.

ON DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT AND APPARATUS E BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON IALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.

OWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND HE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF DUCTWORK TO IONS. EXACT LOCATIONS ARE SUBJECT TO APPROVAL OF ARCHITECT. TH OTHER TRADES IS REQUIRED.

HOWN ARE INSIDE, FREE AREA DIMENSIONS REQUIRED FOR PROPER AIRFLOW. LLY INDICATED, ALL DUCT TRANSITIONS SHALL BE SMOOTH AND GRADUAL WITH NT ANGLE OF 15°.

CTWORK FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR ISH ADDITIONAL FRAMING. INSTALL DUCTWORK AS HIGH AND TIGHT TO THE SSIBLE.

DAMPER AT CONNECTION OF DIFFUSER BRANCH INCLUDING THOSE HE BOTTOM OF MAIN TRUNK.

VANES IN ALL ELBOWS IN SUPPLY AIR DUCT.

TWORK SHALL BE STRETCHED AND SUSPENDED IN ACCORDANCE WITH LOCAL EVERY 3' WITH 2" WIDE GALVANIZED STEEL BANDS (MAX. SAG 1/2" BETWEEN LENGTH OF DUCT SHALL BE FIVE (5) FEET.

UNITS, ALL RELATED DISTRIBUTION EQUIPMENT AND ALL DUCT OPENINGS AT CONSTRUCTION SITE AND AT THE TIME OF ROUGH INSTALLATION UNTIL O PREVENT DIRT, DEBRIS, CONSTRUCTION DUST, AND MOISTURE FROM

A/C UNITS WITHOUT CONSTRUCTION FILTERS IN PLACE. REPLACE ALL FILTERS TION AND BEFORE REQUESTING FINAL PAYMENT WITH MINIMUM MERV 8

ESS TILE S AND/OR ACCESS DOORS ARE REQUIRED IN SUSPENDED CEILINGS, S FOR ALL VOLUME DAMPERS, FIRE DAMPERS, AUTOMATIC DAMPERS AND ALL CAL EQUIPMENT AND DEVICES. HVAC CONTRACTOR TO FURNISH ACCESS EMENTS TO GENERAL CONTRACTOR. ACCESS TILE IDENTIFICATION: PROVIDE AND MARKERS TO IDENTIFY LOCATION OF CONCEALED DAMPERS AND

STATS AND REMOTE SENSORS FOR NEW COOLING AND HEATING EQUIPMENT. THERMOSTATS OR SENSORS CLOSE TO HEAT AND/OR STEAM PRODUCING RDIANTE FINAL LOCATIONS WITH ARCHITECT/TENANT.

GRILLES/DIFFUSERS IN THE PLENUM SIDE TO PREVENT CONDENSATION OR ED SUPPLY GRILLES/DIFFUSERS.

AND RETURN AIR DEVICES AS REQUIRED BY THE OWNER.

SHALL BE SEALED FOR SEAL CLASS B AND LEAK TESTED AT THE RATED

IOISTS, ALL DIFFUSERS AS REQUIRED BY LOCAL GOVERNING CODES.

ST BE INSTALLED AT ALL LOCATIONS WHERE DUCT PENETRATES A FIRE RATED MOKE/FIRE DAMPERS FOR AN EGRESS. PROVIDE ACCESS DOORS AS REQUIRED. BE OF TYPE APPROVED BY THE AGENCIES HAVING JURISDICTION.

AROUND DUCTS AND PIPING THROUGH NON-RATED PARTITIONS, WALLS AND HAFTS) WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL.

, ADJUSTING, AND BALANCING (T.A.B.) OF ALL AIR SYSTEMS. CONTRACTOR ORM T.A.B. OF ALL CHILLED OR CONDENSER WATER SYSTEMS (WHERE SHOWN JSE A.A.B.C. OR N.E.B.B. CERTIFIED TECHNICIANS AND PROVIDE A WRITTEN ILTS TO TENANT (AND LL IF APPLICABLE) PRIOR TO REQUEST FOR FINAL AB AGENCY SHALL SUBMIT TO THE OWNER (6) COPIES OF A WRITTEN REPORT TER THE INSPECTION IS COMPLETE.

AINTAIN A SET OF RED-LINED "AS BUILT" DRAWINGS AT THE PROJECT TTE AND MAKE AVAILABLE TO THE ARCHITECT/ENGINEER UPON REQUEST. NGS MUST BE KEPT CURRENT AND REFLECT ALL ACTUAL ASPECTS OF THE DEVIATE FROM RECORD DESIGN DRAWINGS. RED-LINED DRAWINGS SHALL INCH-LIST ITEMS AND TESTING, AND SHALL BE SUBMITTED TO THE EER AT THE COMPLETION OF THE PROJECT.

I AIR OPENING THROUGH ANY PARTITION EXTENDED TO ROOF DECK, SIZED AT T PER 500 CFM.

CHITECTURAL REFLECTED CEILING PLAN FOR ALL CEILING DEVICE LOCATIONS.

INSTALLATION OF THE DUCTWORK WITH EXISTING STRUCTURE.

RATIONS SHALL BE INSTALLED AND FLASHED BY THE OWNER'S ROOFING

NUM OF 10 FEET BETWEEN OA INTAKE AND ANY EXHAUST DISCHARGE OR

GENERAL MECHANICAL REQUIREMENTS:

FURNISH TO THE OWNER ALL OPERATING & MAINTENANCE MANUALS, RECORD DRAWINGS, TEST & BALANCE REPORT.

CONTRACTOR SHALL COORDINATE WITH MANUFACTURER REPRESENTATIVES FOR RAINING REQUIREMENTS FOR ALL EQUIPMENT.

MECHANICAL CONTRACTOR SHALL SUBMIT COMPLIANCE CHECKLIST TO BUILDING D. CHECK FOR AIRFLOW BLOCKAGES. OFFICIAL UPON SUBSTANTIAL COMPLETION OF PROJECT.

PROVIDE EQUIPMENT INDICATED ON THE DRAWINGS, AND AS REQUIRED FOR A F. CHECK FOR PROPER SEALING OF AIR-HANDLING UNIT COMPONENTS. COMPLETE FUNCTIONING SYSTEM.

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 AFTER SUBSTANTIAL COMPLETION OR OWNER END OF SECTION 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, AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE.

DUCT DIMENSIONS: UNLESS OTHERWISE NOTED, DUCT DIMENSIONS ON THE DRAWINGS ARE INSIDE CLEAR DIMENSIONS.

END OF SECTION

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

- 1.1 SECTION REQUIREMENTS
- A. SUBMITTALS:
- 1. CERTIFIED TAB REPORTS.
- B. TAB FIRM QUALIFICATIONS: AABC NEBB OR TABB CERTIFIED.
- C. TAB REPORT FORMS: STANDARD TAB CONTRACTOR'S FORMS APPROVED BY ARCHITECT.
- D. PERFORM TAB AFTER LEAKAGE AND PRESSURE TESTS ON AIR DISTRIBUTION SYSTEMS HAVE BEEN SATISFACTORILY COMPLETED.
- 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 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 AUTOMATIC TEMPERATURE SYSTEM COMPONENTS TO VERIFY THE F. VAPOR-BARRIER MASTIC: WATER BASED; SUITABLE FOR INDOOR A FOLLOWING:
- 1. DAMPERS, VALVES, AND OTHER CONTROLLED DEVICES ARE OPERATED BY THE PART 3 EXECUTION 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. THERMOSTATS AND HUMIDISTATS ARE LOCATED TO AVOID ADVERSE EFFECTS OF SUNLIGHT, DRAFTS, AND COLD WALLS.
- 5. SENSORS ARE LOCATED TO SENSE ONLY THE INTENDED CONDITIONS.
- 6. SEQUENCE OF OPERATION FOR CONTROL MODES IS ACCORDING TO THE CONTRACT DOCUMENTS.
- 7. CONTROLLER SET POINTS ARE SET AT INDICATED VALUES.
- 8. INTERLOCKED SYSTEMS ARE OPERATING.
- 9. 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", 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.
- 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.
- C. MARK EQUIPMENT AND BALANCING DEVICES, INCLUDING DAMPER-CONTROL POSITIONS, VALVE POSITION INDICATORS, FAN-SPEED-CONTROL LEVERS, AN 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 LAYO
- B. DETERMINE THE BEST LOCATIONS IN MAIN AND BRANCH DUCTS F
- DUCT AIRFLOW MEASUREMENTS. C. VERIFY THAT MOTOR STARTERS ARE EQUIPPED WITH PROPERLY SIZ PROTECTION.
- E. CHECK CONDENSATE DRAINS FOR PROPER CONNECTIONS AND FUNCT
- G. CHECK FOR PROPER SEALING OF AIR DUCT SYSTEM.
- 3.4 TOLERANCES
- A. SET HVAC SYSTEM AIRFLOW AND WATER FLOW RATES WITHIN TH TOLERANCES:
- 1. SUPPLY, RETURN, AND EXHAUST FANS AND EQUIPMENT WITH FA MINUS 10 PERCENT.
- 2. AIR OUTLETS AND INLETS: PLUS OR MINUS 10 PERCENT.

HVAC INSULATION

- PART 1 GENERAL
- 1.1 SECTION REQUIREMENTS
- A. SUBMITTALS:
- 1. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.
- B. QUALITY ASSURANCE: LABELED WITH MAXIMUM FLAME-SPREAD IND
- MAXIMUM SMOKE-DEVELOPED INDEX OF 50 ACCORDING TO ASTM E 84. PART 2 - PRODUCTS
- 2.1 PERFORMANCE REQUIREMENTS
- A. SURFACE-BURNING CHARACTERISTICS:
- 1. INDOOR INSULATION AND RELATED MATERIALS: TO BE FACTO DESIGNATING MAXIMUM FLAME-SPREAD INDEX OF 25 OR SMOKE-DEVELOPED INDEX OF 50 OR LESS ACCORDING TO ASTM E
- 2.2 INSULATION MATERIALS
- A. FLEXIBLE ELASTOMERIC: CLOSED-CELL, SPONGE- OR EXPAN MATERIALS. COMPLY WITH ASTM C 534, TYPE I FOR TUBULAR MA TYPE II FOR SHEET MATERIALS.
- B. MINERAL-FIBER BLANKET INSULATION: COMPLY WITH ASTM C 553 ASTM C 1290, TYPE I

UNCONDITIONED SPACES WITHIN BUILDING:	R-6
WITHIN BUILDING ENVELOPE ASSEMBLY:	R-8
OUTSIDE OF BUILDING:	R-8

- 1. FSK JACKET: ALUMINUM-FOIL, FIBERGLASS-REINFORCED KRAFT-PAPER BACKING; COMPLYING WITH ASTM C 1136, TYPE II.
- 2. FSK TAPE: FOIL-FACE, VAPOR-RETARDER TAPE MATCHING FAC JACKET WITH ACRYLIC ADHESIVE; COMPLYING WITH ASTM C 1136.
- C. MINERAL-FIBER, PIPE AND TANK INSULATION: COMPLYING WITH ASTM OR TYPE IIIA CATEGORY 2, OR WITH PROPERTIES SIMILAR TO ASTM AND HAVING FACTORY-APPLIED ASJ JACKET. NOMINAL DENSITY IS 2.5 MORE. THERMAL CONDUCTIVITY (K-VALUE) AT 100 DEG F IS 0.29 BTU X X DEG F OR LESS.
- 1. ASJ: WHITE, KRAFT-PAPER, FIBERGLASS-REINFORCED ALUMINUM-FOIL BACKING; COMPLYING WITH ASTM C 1136, TYPE I.
- 2. ASJ TAPE: WHITE VAPOR-RETARDER TAPE MATCHING FACTORY-API WITH ACRYLIC ADHESIVE, COMPLYING WITH ASTM C 1136.
- D. FLEXIBLE ELASTOMERIC ADHESIVE: COMPLY WITH MIL-A-24179A, TYPE
- E. MINERAL-FIBER ADHESIVE: COMPLY WITH MIL-A-3316C, CLASS 2, GRAD USE ON BELOW AMBIENT SERVICES; COMPLY WITH MIL-PRF-19565C, TYP
- 3.1 INSULATION INSTALLATION
- A. COMPLY WITH REQUIREMENTS OF THE MIDWEST INSULATION C ASSOCIATION'S "NATIONAL COMMERCIAL & INDUSTRIAL INSULATION FOR INSULATION INSTALLATION ON PIPES AND EQUIPMENT.
- B. INSULATION INSTALLATION AT INTERIOR WALL AND PARTITION PENET ARE NOT FIRE RATED): INSTALL INSULATION CONTINUOUSLY THROUG PARTITIONS.
- C. INSULATION INSTALLATION AT FIRE-RATED WALL, PARTITION, PENETRATIONS: INSTALL INSULATION CONTINUOUSLY THROUGH SEAL PENETRATIONS. COMPLY WITH REQUIREMENTS IN SECTION 0784
- D. FLEXIBLE ELASTOMERIC INSULATION INSTALLATION:
- 1. SEAL LONGITUDINAL SEAMS AND END JOINTS WITH ADHESIVE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SU INSULATED.
- 2. INSULATION INSTALLATION ON PIPE FITTINGS AND ELBOWS: INS SECTIONS OF PIPE INSULATION. SECURE INSULATION MATERIA SEAMS WITH ADHESIVE TO ELIMINATE OPENINGS IN INSULATION PASSAGE OF AIR TO SURFACE BEING INSULATED.
- E. MINERAL-FIBER INSULATION INSTALLATION:
- 1. INSULATION INSTALLATION ON STRAIGHT PIPES AND TUBES: V BARRIERS ARE INDICATED, SEAL LONGITUDINAL SEAMS, END PROTRUSIONS WITH VAPOR-BARRIER MASTIC AND JOINT SEALANT.
- 2. FOR INSULATION WITH FACTORY-APPLIED JACKETS ON ABO URFACES, SECURE LAPS WITH OUTWARD CLINCHED STAPLES AT
- 3. FOR INSULATION WITH FACTORY-APPLIED JACKETS ON BEL SURFACES, DO NOT STAPLE LONGITUDINAL TABS BUT SECUR ADDITIONAL ADHESIVE AS RECOMMENDED BY INSULATIO MANUFACTURER AND SEAL WITH VAPOR-BARRIER MASTIC AI SEALANT.
- . BLANKET INSULATION INSTALLATION ON DUCTS AND PLENUMS: ADHESIVE AND INSULATION PINS.
- 5. FOR DUCTS AND PLENUMS WITH SURFACE TEMPERATURES BEL INSTALL A CONTINUOUS UNBROKEN VAPOR BARRIER.
- PLENUMS AND DUCTS REQUIRING INSULATION:
- 1. CONCEALED SUPPLY AIR.
- 2. CONCEALED AND EXPOSED OUTDOOR AIR.
- 3. CONCEALED AND EXPOSED RETURN AIR LOCATED IN NONCONDITIONED SPACE.
- 3.2 DUCT AND PLENUM INSULATION SCHEDULE
- A. CONCEALED DUCT INSULATION SHALL BE 1-1/2" THICK MINERAL-FIBER BLANKET WITH A 1.5-LB/CU. FT. NOMINAL DENSITY.
- 3.3 HVAC PIPING INSULATION SCHEDULE

MECHANICAL SPECIFICATIONS

	MECHANICAL SPECIFICATIONS	
	A. CONDENSATE PIPING: INSULATION SHALL BE 1" THICK FLEXIBLE ELASTOMERIC.	HVAC POWERED VETILATORS
UTS.	B. REFRIGERANT PIPING: INSULATION SHALL BE 1" THICK FLEXIBLE ELASTOMERIC.	PART 1 - GENERAL
OR ACCURATE	END OF SECTION	A. SUBMITTALS:
IZED THERMAL	HVAC DUCTS AND CASINGS	1. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.
	PART 1 - GENERAL	PART 2 - PRODUCTS
FIONING.	1.1 NOT USED.	2.1 PERFORMANCE REQUIREMENTS
	PART 2 - PRODUCTS	A. PRODUCTS SHALL BE LICENSED TO USE THE AMCA-CERTIFIED RATINGS
	2.1 PERFORMANCE REQUIREMENTS	B. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FC
	FLEXIBLE."	
E FOLLOWING	B. STRUCTURAL PERFORMANCE: DUCT HANGERS AND SUPPORTS SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND LINDER	E. CAPACITIES AND CHARACTERISTICS:
ANS: PLUS OR	CONDITIONS DESCRIBED IN SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS -	1. SEE SCHEDULE.
	METAL AND FLEXIBLE .	2.2 ROOF MOUNTED VENTILATORS
	2.2 DUCTS	A. HOUSING: REMOVABLE, SPUN-ALUMINUM, DOME TOP AND OUTLET BAFF
	B. METAL DUCT FABRICATION: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE."	1. UPBLAST UNITS: ALUMINUM DISCHARGE BAFFLE TO DIRECT DISC
	C. SINGLE WALL GALVANIZED-STEEL SHEET: WITH G90 HOT-DIP GALVANIZED COATING.	UPWARD, WITH RAIN AND SNOW DRAINS. PROVIDE GREASE COLLECT
	1. GALVANIZED COATING DESIGNATION: G90.	2. DOWN BLAST UNITS:
	2. FINISHES FOR SURFACES EXPOSED TO VIEW: MILL PHOSPHATIZED. DUCTWORK SHALL BE C.LEANED OF DEBRIS AND OIL, PROVIDE WITH PAINT GRIP FINISH.	B. FAN WHEELS: ALUMINUM HUB AND WHEEL WITH BACKWARD-INCLINED BI
	D. DOUBLE WALL GALVANIZED-STEEL WITH G90 HOT-DIP GALVANIZED COATING	1. FAN SHAFT: TURNED, GROUND, AND POLISHED STEEL: KEYED TO WH
	1. OUTER DUCT: CONSTRUCT DUCT OF GALVANIZED SHEET STEEL UNLESS	2. SHAFT BEARINGS: PERMANENTLY LUBRICATED, PERMANENTI
	2. INTERSTITIAL INSULATION: FIBER-GLASS LINER. MAXIMUM THERMAL	SELF-ALIGNING BALL BEARINGS.
	CONDUCTIVITY 0.27 BTU * IN / h * SQ FT * DEG F AT 75 DEG F.	3. PULLEYS: CAST-IRON, ADJUSTABLE-PITCH MOTOR PULLEY.
	 INNER DUCT: 24 GAUGE PERFORATED GALVANIZED SHEET STEEL WITH 3/32 INCH DIAMETER PERFORATIONS. 	 PAN AND MOTOR ISOLATED PROM EXHAUST AIRSTREAM. D. ACCESSORIES:
	4. MANUFACTURERS EQUAL TO BUT NOT LIMITED TO MCGILL.	1. DISCONNECT SWITCH: NON-FUSIBLE TYPE, WITH THERMAI
R LESS, AND	2.3 ACCESSORIES	PROTECTION, FACTORY WIRED THROUGH AN INTERNAL ALUMINUM CO
84.	A. VOLUME DAMPERS AND CONTROL DAMPERS: SINGLE-BLADE AND MULTIPLE	2. BIRD SCREENS: REMOVABLE, 1/2-INCH MESH, ALUMINUM OR BRASS V
NDED-RUBBER	HORIZONAL OR VERTICAL APPLICATIONS; FACTORY FABRICATED AND COMPLETE	MOUNTED IN CURB BASE; FACTORY SET TO CLOSE WHEN FAN STOPS
ATERIALS AND	WITH REQUIRED HARDWARE AND ACCESSORIES.	4. MOTORIZED DAMPERS: PARALLEL-BLADE DAMPERS MOUNTED IN
3, TYPE II AND	FRAME AND BLADES, MINIMUM 3/8" SQUARE STEEL AXLE, MOLDED SYNTHETIC	E. ROOF CURBS: 20 GAUGE GALVANIZED STEEL: MITERED AND WELDED
	POSITIONED WITH ELECKING FOSITION REGULATOR, REGULATOR SHALL BE POSITIONED WITH SHEET METAL BRACKET BEYOND DUCT COVERID. WHERE	1-1/2-INCH THICK, RIGID, FIBERGLASS INSULATION ADHERED TO INSIDE 1-1/2-INCH WOOD NAILER. SIZE AS REQUIRED TO SUIT ROOF OPENIN
	EXTENSION ROD WITH REGULATOR FOR CEILING OR WALL INSTALLATION, AS	BASE.
	REQUIRED.	 CONFIGURATION: SELF-FLASHING WITHOUT A CANT STRIP, WITH FLANGE.
	2. RECTANGULAR VOLUME DAMPERS. PROVIDE MINIMUM 18 GAUGE GALVANIZED STEEL CHANNEL FRAME, 16 GAUGE GALVANIZED STEEL BLADES, MINIMUM 1/2"	2. OVERALL HEIGHT: 12 INCHES FOR GENERAL EXHAUST FANS;
SCRIM WITH	STEEL CONTROL SHAFT. LINKAGES SHALL BE CONCEALED IN THE FRAME.	3. PITCH MOUNTING: MANUFACTURE CURB FOR ROOF SLOPE.
TORY-APPLIED	OPERATING SHAFT SHALL EXTEND BEYOND FRAME AND DUCT TO A LOCKING QUADRANT WITH ADJUSTABLE LEVER. MAXIMUM BLADE WIDTH SHALL NOT	4. MOUNTING PEDESTAL: GALVANIZED STEEL WITH REMOVABLE ACCES
	EXCEED 6".	2.3 CEILING MOUNTED VENTILATORS
C 1393, TYPE II C 612, TYPE IB;	B. FLEXIBLE DUCT CONNECTORS: FLAME-RETARDED OR NONCOMBUSTIBLE FABRICS, COATINGS, AND ADHESIVES COMPLYING WITH UL 181, CLASS 1. CONNECTOR TO BE	A. HOUSING: STEEL, LINED WITH ACOUSTIC INSULATION
5 LB/CU. FT. OR (IN./H X SQ. FT.	30 OUNCE, NEOPRENE COATED, FIBERGLASS FABRIC.	SHROUDS, MOTORS AND FAN WHEEL REMOVABLE FOR SERVICE.
	(R-5 MIN.), 1 PCF FIBERGLASS INSULATION AND REINFORCED OUTER PROTECTIVE	C. GRILLE: PLASTIC LOUVERED GRILLE.
SCRIM WITH	SPREAD UNDER 25, SMOKE DEVELOPED UNDER 50, AND SHALL BE RATED FOR	2.4 MOTORS
PPLIED JACKET	MINIMUM 2-INCH WG PRESSURE AND 0 TO 250°F TEMPERATURE. PROVIDE SCREW-OPERATED METAL ADJUSTABLE CLAMPING DEVICES. USE TWIST-LOCK	A. COMPLY WITH NEMA DESIGNATION, TEMPERATURE RATING, SERVIC ENCLOSURE TYPE, AND EFFICIENCY REQUIREMENTS FOR MOTORS.
II. CLASS I.	CONICAL TAP COLLARS AT CONNECTIONS INTO SHEET METAL DUCTWORK. MAXIMUM EXTENDED LENGTH OF FLEXIBLE DUCT SHALL NOT EXCEED 5 FEET.	1. MOTOR SIZES: MINIMUM SIZE AS INDICATED. IF NOT INDICATED, LAR
DE A.	D. TURNING VANES: PROVIDE FABRICATED TURNING VANES AND VANE RUNNERS,	RANGE ABOVE 1.0.
AND OUTDOOR	CONSTRUCTED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS". PROVIDE TURNING VANES CONSTRUCTED OF CURVED BLADES,	B. ENCLOSURE TYPE: TOTALLY ENCLOSED, FAN COOLED.
PE II.	SUPPORTED WITH BARS PERPENDICULAR TO BLADES, AND SET INTO SIDE STRIPS SUITABLE FOR MOUNTING IN DUCTWORK. FOLLOW SMACNA GUIDELINES FOR	PART 3 - EXECUTION
_	SPACING SUPPORT, AND CONSTRUCTION. ALL BLADES SHALL BE DOUBLE THICKNESS AIRFOIL TYPE.	3.1 INSTALLATION
CONTRACTORS	E. FIRE DAMPERS: STATIC REATED AND LABELED TO UL 555, FIRE REATED TO MATCH	B. ROOF-MOUNTED UNITS: INSTALL ROOF CURB ON ROOF STRUCTURE, AC
N STANDARDS"	FIRE WALL RATING. CURTAIN TYPE, BLADES OUT OF THE AIRSTREAM.PROVIDE 165 DEG FUSABLE LINK. MANUFACTURERS EQUAL TO BUT NOT LIMITED TO NCA, RUSKIN,	ARI GUIDELINE B. INSTALL AND SECURE ROOF-MOUNTED FANS ON (COORDINATE ROOF PENETRATIONS AND FLASHING WITH ROOF CONSTRU
RATIONS (THAT	POTTORFF. PROVID WHERE INDICATED.	END OF SECTION
GH WALLS AND	F. COMBINATION FIRE SMOKE DAMPERS: STATIC RATED AND LABLED ACCORDING TO UL 555. FIRE RATED TO MATCH FIRE WALL RATING. ROLL-FORMED HORIZONTAL	
AND FLOOR	BLADES OVERLAPING GALVANIZED SHEET STEEL IN ACCORDANCE WITH UL LISTING. PROVIDE REPLACEABLE 165 DEG FUSABLE LINK. SMOKE DETECTOR INTEGRAL	DIT USERS, REGISTERS, AND GRIELES
100.	FACTORY WIRED UNLESS DAMPER IS TO BE CONTROLED BY FIRE ALARM. MANUFACTURERS EQUAL BUT NOT LIMITED TO RUSKIN, PORTORFF, NCA.	PART 1 - GENERAL 1.1 SECTION REQUIREMENTS
	G. DUCT-MOUNTED ACCESS DOORS: FABRICATE ACCESS PANELS ACCORDING TO	A. SUBMITTALS:
TO ELIMINATE JRFACE BEING	SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE"; FIGURES 2-10, "DUCT ACCESS DOORS AND PANELS," AND 2-11, "ACCESS PANELS -	1. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED, INCLU
	ROUND DUCT."	PART 2 - PRODUCTS
ALS AND SEAL	PART 3 - EXECUTION	2.1 DIFFUSERS, REGISTERS, AND GRILLES:
I THAT ALLOW	A INSTALLATION A INSTALL DUCTWORK ACCESSORIES AND SUPPORTS ACCORDING TO SMACNA'S	A. REFER TO SCHEDULES FOR FINISH TYPE, COLOR, MATERIAL, AND MOUN PART 3 - EXECUTION
	"HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" UNLESS	3.1 INSTALLATION
WHERE VAPOR	B. SEAL DUCTS TO THE FOLLOWING SEAL CLASSES ACCORDING TO SMACNA'S "HVAC	A. INSTALL DIFFUSERS, REGISTERS, AND GRILLES LEVEL AND PLUMB.
JUINTS, AND	DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE": 1-INCH WG, SEAL	B. CEILING-MOUNTED OUTLETS AND INLETS: DRAWINGS INDICATE ARRANGEMENT OF DUCTS, FITTINGS, AND ACCESSORIES. MAKE FINAL
OVE AMBIENT	C. CONCEAL DUCTS FROM VIEW IN FINISHED AND OCCUPIED SPACES.	WHERE INDICATED, AS MUCH AS PRACTICAL. FOR UNITS INSTALLE CEILING PANELS, LOCATE UNITS IN THE CENTER OF PANEL UNLESS
O INCHES U.C.	D. AVOID PASSING THROUGH OR ABOVE ELECTRICAL EQUIPMENT SPACES AND	INDICATED. WHERE ARCHITECTURAL FEATURES OR OTHER ITEMS CON INSTALLATION, NOTIFY ARCHITECT FOR A DETERMINATION OF FINAL LOC
RE TABS WITH	ENCLOSURES.	C. AFTER INSTALLATION, ADJUST DIFFUSERS, REGISTERS, AND GRILL
ND FLASHING	E. ULEAN DUCT STSTEMS BEFORE TESTING, ADJUSTING, AND BALANCING. 3.2 TESTING, ADJUSTING, AND BALANCING	PATTERNS INDICATED, OR AS DIRECTED, BEFORE STARTING AIR BALANC
SECURF WITH	A. BALANCE AIRFLOW WITHIN DISTRIBUTION SYSTEMS, INCLUDING SUBMAINS,	END OF SECTION
	BRANCHES, AND TERMINALS TO INDICATED QUANTITIES PER SPECIFICATIONS.	
LOW AMBIENT,	END OF SECTION	

	DX ROOF TOP UNIT
	PART 1 - GENERAL
	1.1 MANUFACTURERS: AAON, YORK, CARRIER, TRANE, DAIKEN
	1.2 SECTION REQUIREMENTS A SUBMITTALS:
	1. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.
	PART 2 - PRODUCTS
SEAL.	2.1 EQUIPMENT
OR INTENDED	A. GENERAL: PACKAGED, DIRECT-EXPANSION, ROOF TOP UNIT. UNIT SHALL BE COMPLETE WITH
	COIL, FAN MOTOR, COMPRESSOR, CONDENSER, HEATER, ELECTRICAL CONNECTIONS, MICROPROCESSOR CONTROL SYSTEM, AND INTEGRAL
	TEMPERATURE SENSING.
	B. REFER TO SCHEDULE FOR CAPACITY AND CHERICTORISTICS.
	C. UNIT CABINET: GALVANIZED STEEL MANUFACTURERS STANDARD FINISH. DOUBLE WALL CONSTRUCTION.
FLE; SQUARE,	D. FANS:
	FAN SHALL BE OF THE MULTI-BLADE CENTRIFUGAL TYPE WITH ITS PERFORMANCE DESIGNED TO MATCH THE COIL PERFORMANCE. THE FAN SHALL BE STATICALLY AND
TOR.	DYNAMICALLY BALANCED TO ENSURE LOW NOISE AND VIBRATION AND CAPABLE OF UP TO 1.0 IN, WG EXTERNAL STATIC PRESSURE.
	E. COIL:
BLADES.	COIL SHALL BE COPPER TUBE WITH ALUMINUM FINS. FINS SHALL BE BONDED TO THE
HEEL HUB.	FACTORY-INSTALLED DRAIN CONNECTION FOR PIPING ATTACHMENT TO REMOVE
TLY SEALED,	CONDENSATE.
-	MOTORS SHALL BE TOTALLY ENCLOSED, PERMANENTLY LUBRICATED BALL BEARING
	WITH INHERENT OVERLOAD PROTECTION. FAN MOTORS SHALL BE INVERTER CONTROLLED VARIABLE SPEED.
	G. CONTROLS:
AL-OVERLOAD	THE SYSTEM SHALL BE MICROPROCESSOR-CONTROLLED TO MAINTAIN PRECISE ROOM TEMPERATURE AND MAXIMIZE EFFICIENCY. PROVIDE WALL MOUNTED
	PROGRAMABLE THERMOSTAT
T DAMPERS	E. ROOF CURBS: GALVANIZED STEEL, WATERTIGHT GASKETS RIGID, FIBERGLASS INSULATION ADHERED TO INSIDE WALLS, AND FACTORY INSTALLED WOOD NAILER.
3.	SIZE AS REQUIRED TO SUIT ROOF OPENING AND UNIT BASE.
I CURB BASE	 CONFIGURATION: SELF-FLASHING WITHOUT A CANT STRIP, WITH MOUNTING FLANGE.
D CORNERS;	2. OVERALL HEIGHT: 24 INCHES.
NG AND FAN	3. PITCH MOUNTING: MANUFACTURE CURB FOR ROOF SLOPE.
	FILTERS:
H MOONTING	END OF SECTION
SS PANEL.	
SHAFT. FAN	
ICE FACTOR,	
VICE FACTOR	
CORDING TO	
RUCTION.	
DING COLOR	
NTING.	
E GENERAL	
ED IN LAY-IN	
OTHERWISE	
CATION.	
CING.	



O1 FLOOR PLAN - MECHANICAL SCALE: 1/4" = 1'-0"

	Ν	AECHANICAL ROOF PLAN KEY NOTES
RAL	1	COORDINATE FINAL LOCATION OF EQUIPMENT WITH STRUCTURAL DRAWINGS/ENGINEER OR LANDLORD/CLIENT.
RED THE	2	CONTRACTOR TO FIELD VERIFY THAT THE LOCATION OF ANY EXHAUST SOURCE FROM ADJACENT TENANTS SHOULD BE AT LEAST 10' AWAY FROM RTU-1(E).
ORK, SED	3	CONTRACTOR TO FIELD VERIFY THAT THE LOCATION OF ANY INTAKE SOURCE FROM ADJACENT TENANTS SHOULD BE AT LEAST 10' AWAY FROM THE EXHAUST DUCT TERMINATING ON ROOF.
UAL	4	Ø6" TOILET EXHAUST DUCT UP THROUGH ROOF WITH TALL CONE FLASHING, WEATHER SKIRT, BIRDSCREEN & ROOF CAP. MAINTAIN A MINIMUM OF 10'-0" FROM ALL OUTSIDE AIR INTAKES.
ION JCT	5	EXISTING RTU-1(E) TO REMAIN AS IS AND TO BE REUSED WITH ALL ITS EXISTING ACCESSORIES. CONTRACTOR TO FIELD VERIFY LOCATION OF THE EQUIPMENT ON SITE & INFORM TO ARCHITECT IF ANY ACCESSORIES NOT WORKING OR NOT IN GOOD CONDITION.
	6	MAINTAIN 10 FEET DISTANCE BETWEEN ANY EXHAUST AIR SOURCE AND ANY OUTSIDE AIR INTAKE SOURCE FROM ADJACENT TENANTS.
	7	EXISTING CONDENSATE DRAIN FROM RTU-1(E) TO REMAIN AS IT IS. CONTRACTOR TO FLUSH THE EXISTING DRAIN LINES. REPLACE AS/IF REQUIRED.
	8	PROVIDE ROOF MOUNTED EXHAUST FAN. MAINTAIN A MINIMUM OF 10'-0" FROM ALL OUTSIDE AIR INTAKES.
	9	Ø8" OUTSIDE AIR INTAKE DUCT UP THROUGH ROOF WITH TALL CONE FLASHING, WEATHER SKIRT, BIRDSCREEN & ROOF CAP. MAINTAIN A MINIMUM OF 10'-0" FROM ANY EXHAUST AIR SOURCE.
	10	PROVIDE NEW CONDENSING UNIT CU-1(N). COORDINATE FINAL LOCATION OF THE UNIT WITH LANDLORD/ARCHITECT PRIOR TO INSTALLATION. UNIT TO BE INSTALLED WITH MANUFACTURER'S RECOMMENDED CLEARANCES. CONDENSING UNIT SHALL BE PROVIDED WITH STANDARD SUPPORTING STAND. REFER MOUNTING DETAIL ON SHEET M3.01.
	(11)	PIPING SHOULD RUN ABOVE FINISHED FLOOR.

G.C. TO VERIFY WITH OWNER OR LANDLORD ANY REQUIREMENT TO USE THEIR PREFERRED ROOFING CONTRACTOR. ROOFING SUB-CONTRACTOR SHALL NOT PERFORM ANY NEW WORK WITHOUT PERMISSION FROM THE OWNER / LANDLORD AS TO AVOID INVALIDATING ANY EXISTING ROOFING WARRANTY WHICH MAY CURRENTLY BE IN PLACE.

MATERIALS (DUCTWORK/PIPING/CONDUIT) ABOVE CEILINGS THAT ARE VISIBLE SHALL BE RIGID TYPE AND INSTALLED PARALLEL OR PERPENDICULAR TO STRUCTURE AND BUILDING LINES. NO FLEXIBLE

ALL VISIBLE MATERIALS SHALL BE PAINTED IN FIELD, COORDINATE ALL FINISHES WITH ARCHITECT.

	N	AECHANICAL FLOOR PLAN KEY NOTES
VITH THE	1	EXTEND FULL SIZE SUPPLY & RETURN DUCTWORK FROM EXISTING ROOFTOP UNIT TO SPACE. EXTEND AS SHOWN. ACOUSTICALLY LINE. THE FIRST 10'-0" OF BOTH SUPPLY AND RETURN MAIN DUCTS.
AND THE DRK,	2	RELOCATE AND REUSE EXISTING THERMOSTAT/HUMIDISTAT. IF EXISTING THERMOSTAT IS NOT IN GOOD CONDITION TO REUSE, THEN INSTALL AND WIRE NEW 7-DAY PROGRAMMABLE THERMOSTAT. COORDINATE EXACT LOCATION WITH ARCHITECT AND OWNER PRIOR TO ROUGH-IN.
SED UAL	3	ROUTE 6"Ø EXHAUST DUCT UP THROUGH ROOF WITH TALL CONE FLASHING, WEATHER CAP, BIRDSCREEN & ROOF CAP. MAINTAIN A MINIMUM OF 10'-O" FROM ALL OUTSIDE AIR INTAKES AND TERMINATES.
MED LAR	4	INTERLOCK EXHAUST FAN EF-1 (N) & EF-2 (N) WITH RTU-1(E). COORDINATE WITH ELECTRICAL CONTRACTOR.
ATE	5	10"X10" EXHAUST DUCT UP TO FAN ON ROOF.
TION UCT ORK	6	INSTALL AND WIRE A NEW 7-DAY PROGRAMMABLE THERMOSTAT FOR A/C-1(N). MOUNT THERMOSTAT 48" A.F.F. PROVIDE LOCKING CLEAR PLASTIC COVER FOR THERMOSTAT. COORDINATE EXACT LOCATION WITH ARCHITECT AND OWNER PRIOR TO ROUGH-IN.
OKE NGS	7	FURNISH & INSTALL MOTORIZED DAMPER IN OUTSIDE AIR DUCT FOR CONTROL OF OUTSIDE AIR & INTERLOCK WITH RESPECTIVE AC FOR CONTROL OF OUTSIDE AIR.
	8	ROUTE 8"Ø OUTSIDE AIR INTAKE DUCT UP THROUGH ROOF.
OES	9	INTERLOCK MOTORIZED DAMPER WITH A/C-1(N).
	10	ROUTE CONDENSATE DRAIN LINE FROM A/C-1(N) TO NEAREST DRAIN POINT. PROVIDE HORIZONTAL SLOPE IN THE DIRECTION OF DISCHARGE OF NOT LESS THAN $\%$ $^{\rm TH}$ UNITS VERTICAL IN 12 UNITS HORIZONTAL.
	(11)	4" DRYER EXHAUST WALL CAP. COORDINATE LOCATION, COLOR & FINISH WITH BASE BUILDING.
	(12)	PROVIDE 12"X6" DOOR GRILLE FOR AIR TRANSFER.



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			MODEL	AR	EA NOMINAL				ΤΟΤΑΙ											- THERMAL	F			
	MANOFAC	TURER	MODEL	SERV	VED TONS									IBH OUTPUT	MBH Y	VOLTS	PH H	Z MCA (A) MOCP (<i>I</i>	A) EFFICIENCY (%)				
							420							E) 91/\/	1 E) 208	2 220(1/1E)	2()/IE) 60()	/15) 20()/15)	20(\/IE)	S A E	5		-	1. SINGLE ZONE ROOFTOP UNIT
	INANE (V	7.1.17 1300	05005010141140000 (1		LAN 3.0 (V.I.P)	1200 (V.I.P)	420		J.A.L	J.A.L	J.A.L	J.A.L	100 (v.1		1.1) 200	5-230(117)]		/1/) 20(1/)	50(VIP)	J.A.L	5.	A.L J J.A.L	-	
$1) S \Delta F - S$			E - VERIEV IN FIELD																				-	A PROGRAMMABLE THERMOSTAT/HI
2) FXISTIN			SORIES TO REMAIN SA																				-	OF THE ROOFTOP UNIT. DESIRED OC
(2) CONTR/						ΛΡΛΟΙΤΥ																	-	HUMIDITY SETPOINTS ARE PROGRAM
																							-	THE POSITION OF THE FAN "ON-AUT
										TADIE													-	
5) CONTRA					IPERS ON EXISTI		IATCH VALUES		NADOVE	TADLE														HEATING AND COOLING OPERATION
																								"HEAT-AUTO-COOL-OFF" SWITCH IS I
Г																	1				-			
					-	HEAT	PUMP IND	OOR UNIT SCH	EDULE								BASIS	OF DESIGN	I: DAIKIN	OR EQUIVALENT	_			OCCUPIED MODE
							NAI HEATING	SUPPLY			ELECTRICAL	DATA	DIMENS		REFRIGER	RANT PIPE	SIZE (IN.)	SOUND	WFIG	ант				PROGRAMMABLE THERMOSTAT SIGN
TAG	AREA SERV	VED	TYPE	TON			AP (MBH)	AIRFLOW								GAS (INI.)	DRAIN	RATING (dB		MODEL NO.				OUTSIDE AIR DAMPER OPENS TO ITS
								(CFM)						(113.)			(ID)(IN.)			.,				REQUIREMENT) WHEN THE SUPPLY I
A/C-1(N)	SEE PLA	N ROU	IND FLOW CASSETTE	1.5	18		20	742	140	1/208-	230/60 0.50	15 9	-11/16x33-1/	16X33-1/16	3/8	5/8	1	38	55	5 FCQ18AAVJU				
NOTES :-																								UPON A RISE IN SPACE TEMPERATUI
1) SUPPLY	AIR CFM BA	ASED ON HIC	GH SPEED. PROVIDE VA	ARIABLE AI	IRFLOW ADJUST	MENT CONTR	ROL FOR ALL U	JNITS.																UNIT COOLING IS INITIATED.
2) REFRIGE	ERANT R410	DA SHALL BE	PROVIDED.																					
3) PPROVI	DE MOUNT	ING BRACKE	TS AND ALL ASSOCIAT	TED ACCESS	SORIES.																			UPON A DROP IN SPACE TEMPERATI
4) ALL REF	RIGERANT F	PIPING TO B	E SIZED PER MANUFAC	CTURERS R	ECOMMENDATI	ONS.															1			UNIT HEATING IS INITIATED. OUTSID
5) PROVID	E FILTER BA	ASE WITH 2"	FILTER.																					HEATING IS ENGAGED.
6) CONTRA	ACTOR SHAI	LL PROVIDE	A LONG LINE SET FOR	REFRIGERA	ANT PIPING IN T	HE EVENT TH	AT TOTAL REF	RIGERANT LEN	GTH EXCE	EDS THE M	ANUFACTURER	R'S STANDARD R	ECOMMEND	D LENGTH.								• • •		
7) PROVID	E DISCONN	IECT SWITCH	& NON-POWERED GF	FI OUTLET.																	1	· · · ·		UNOCCUPIED MODE
8) A/C TO	BE INSTALL	ED WITH VIE	BRATION ISOLATION (RESILIENTL	Y SUPPORTED) 1		SOUND AND	VIBRATION INT	O THE SP	ACE.											-			PROGRAMMABLE THERMOSTAT SIGN
9) PROVID	F FRESH AI	R INTAKF KI	T FOR OUTSIDE AIR INT	TERGRATIO)N.																-			HEATING OR COOLING
0)110110																					_			
																								OUTSIDE AIR DAMPER OPENS TO MIL
																								UNOCCUPIED HEATING SETPOINT IS
						HEAT PUM	P OUTDOOR	CONDENSING	GUNIT S	CHEDULE							BA	SIS OF DES	IGN: DAIK	IN OR EQUIVALENT				
TAG		INDOOR UN	ITS SERVED CAP.	MAX. CO	OOLING CAP.	MAX. HEATIN	IG CAP. UNI	r dimensions	WEIGHT	REF. PIP	ING SIZE (IN.)	ELEC	RICAL DATA	SC	OUND RATI	ING EEF	R2 SEE	R2 HSPF	2 HEA	TING MODEL NO				ROOFTOP UNIT HEATING AND COOLI
			(TON)	((MBH)	(MBH))	N.(HxWxD)	(LBS)	LIQ.	GAS	PH./V/Hz	MCA (A)	IOCP (A)	(dBA)				C	OP				AS TO MAINTAIN UNOCCUPIED HEAT
CU-1(N)	ROOF	A/C-	1(N) 1.5		18	20	3	9x37x12-5/8	200	3/8	5/8	1/208-230/60	16.5	20	61	13	.3 18.	5 9.2	4	I.3 RZQ18TBVJU	JA			
NOTES :-																								2. EXHAUST FANS
1) UNIT SH	IALL HAVE T	TEN YEAR EX	TENDED WARRANTY F		RESSORS/PARTS	,																		
2) PROVID	E LOW AME	BIENT CONT	ROL FOR CONDENSING	G UNIT OPE	ERATION DOWN	TO -4°F.																		EF - 2: EXHAUST FAN WILL BE CONTE
3) PROVID	E COMPRES	SSOR CYCLE	PROTECTOR.																					AND AFTER OCCUPANCY SCHEDULE
4) CONDE	NSING UNIT	ΓΤΟ ΒΕ ΜΟυ	JNTED ON ROOD WITH	I VIBRATIO	N ISOLATORS A	ND MOUNTIN	NG STAND.																	
5) OUTDO	OR REFRIGE	RANT LINES	ET TO BE WRAPPED IN	UV RESIST	TANT, FIRE RATE	D, AND ANTI	-MICROBIAL I	NSULATION PRO	OTECTIO	N BASED ON	AIREX-FLEX G	JUARD OR EQUA	L.											FE - 1 [·] CONTROL WITH LIGHTS
6) REFFRIC	GERANT LINI	ESET PENETI	RATION THROUGH BUI	ILDING EXT	FERIOR TO BE PR	OPERLY SEAL	ED WITH FIRE	RESISTANT SEA	LANT DE	PENDING U	PON WALL COI	NSTRUCTION.												
7) OUTDO	OR CONDEN	NSING UNIT	TO BE LOCATED WITH	PROPER CL	LEARANCES AND	MUST PREV	ENT RE-CIRCU	ILATION OF AIR	. COORDI	NATE WITH	MANUFACTU	RER AND ARCHI	FECT.											3 INTERLOCK
																								INTERLOCK RTU-1 AND FE-2 FOR SIM
																								FAN SET TO RUN CONTINUOUSLY W
															1									
			EVTERNIAL		ГІГСТ																			RTU AND FAN SHALL BE POWERED P
TAC		FLOW RA		SPEED	ELECT				BA	SIS OF DES	IGN	WEIGHT	S DE											THE CONTROLLERS FAN AND RTUL
TAG	QUANTI		STATIC PRESSURE		V/PH/HZ			ESS				(LBS)	REI	VIARK										THE CONTROLLERO, FAN, AND RTO P
		CFM	IN W.G.	RPM	(AN	/IPS) (AM	PS) DBA	MANUFAC			MODEL								•					
EF-1(N)	1	75	0.25	950	115/1/60 C	.2 19	o 35	GREENF		SP-A110 (NI) 20	1, 2, 5	, 6, 8, 10										
EF-2 (N)	1	485	0.5	1446	115/1/60 3	.5 1	55	GREENF	IECK	G-095-VG	(OR EQUIVALE	NT) 65	1, 2, 3, 4	, 5, 7, 9, 10										
NOTES:																								
1) FIELD IN	ISTALLED DI	ISCONNECT	PROVIDED BY OTHERS	5. (COORDII	NATE WITH W/E	.C.).																		
2) FACTOR	AY BACKDRA	AFT DAMPER	₹.																					
3) PROVID	E ROOF CU	RB & THERM	IAL OVERLOAD PROTE	CTION.																				
4) FACTOR	Y BRIDSCRE	EEN.															•							
5) INSTALL	PER MANU	JFACTURER'S	S INSTRUCTIONS/RECO	OMMENDA	TIONS.																			

								EXI	ISTING R	OOF TOP UNIT	SCHEDULE]	
			4.054			SUPPLY FAN	l		C	OOLING CAPACI	TY	GAS HEAT	ING CAPACITY		ELECTRIC	CALDATA				OPERATING		SEQU
UNITID MANU	FACTURER	MODEL			JPPLY AIR O	UTSIDE AIR	MAX. ESP	TOTAL S	ENSIBLE	AMBIENT TEMP	. ENTERING TE	MP.							EER	R WEIGHT	ł	
			SERVE		CFM	CFM	(IN. OF W.G.)	MBH	MBH	DB (°F)	DB/WB(°	F)		VOLIS			MOCP (A)	EFFICIENCY (%)		(LBS.)		
RTU-1(E) TRAN	E (V.I.F)	YSC036E3EMA1NA0000 (V.I.F)) SEE PLA	N 3.0 (V.I.F) 12	200 (V.I.F)	420	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	100 (V.I.F)	81 (V.I.F)	208-230(VIF) 3(VIF) 60(VIF) 20(VIF)	30(VIF)	S.A.E	S.A.	E S.A.E		1. SINGLE ZONE ROOFTOP UNIT
NOTES:																						
1) S.A.E - SAME AS	S EXISTING	G , V.I.F - VERIFY IN FIELD																				A PROGRAMMABLE THERMOSTAT/HU
2) EXISTING RTU V	VITH ALL A	CCESSORIES TO REMAIN SAME	E AND TO E	BE REUSED.																		OF THE ROOFTOP UNIT. DESIRED OC
3) CONTRACTOR T	O CONFIF	RM IF EXISTING RTU IS WORKING	IG AT ITS 1	.00% RATED CAP	ACITY.																	HUMIDITY SETPOINTS ARE PROGRAM
4) CONTRACTOR T	fo field v	ARIFY EXACT LOCATION AND C	CONFIGUR	ATION OF RTU O	ON SITE.																	THE POSITION OF THE FAN "ON-AUTO
5) CONTRACTOR T	TO REBALA	NCE OUTSIDE AIR & RETURN AI	IR DAMPE	RS ON EXISTING	RTU TO MA	TCH VALUES	MENTIONED IN	ABOVE	TABLE													
																						"HEAT-AUTO-COOL-OFF" SWITCH IS I
					HEAT P		OR UNIT SCH	EDULE							BASIS	OF DESIGN:		EQUIVALENT]			
							SUPPLY			ELECTRICAL D	ATA	DIMENSION	REFI	RIGERANT PIP	E SIZE (IN.)	COLINIE			1			PROGRAMMABLE THERMOSTAT SIGN
TAG AREA	SERVED	ТҮРЕ	TON		G NOMINA	AL HEATING	AIRFLOW	OUTSIL				DIMENSION				SOUND	WEIGHT	MODEL NO.				OUTSIDE AIR DAMPER OPENS TO ITS
				CAP. (MBH)	CAP.	. (MBH)	(CFM)	AIR (CF	M) PH/V	OLT/HZ MCA (A	A) MOCP (A)	(HxWxD) (IN	1.) LIQ.(IN.) GAS (IN	.) (ID)(IN.)	RATING (dBA) (LBS.)					REQUIREMENT) WHEN THE SUPPLY I
A/C-1(N) SEE	PLAN	ROUND FLOW CASSETTE	1.5	18		20	742	140	1/208	-230/60 0.50	15 9	9-11/16x33-1/16X	33-1/16 3/	8 5/8	1	38	55	FCO18AAVJU	1			Regolitement) when the oot ter
NOTES :-							,		1-/ 200										1			LIPON A RISE IN SPACE TEMPERATU
1) SUPPLY AIR CEN	A BASED C	N HIGH SPEED PROVIDE VARIA	ABIEAIRE																			
2) REERIGERANT R	24104 SHA																		1			ONTI COOLING IS INTIATED.
3) PPROVIDE MOL		RACKETS AND ALL ASSOCIATED																	1			LIPON A DROP IN SPACE TEMPERATI
					IC														1			
				OMMENDATION	15.																	HEATING IS ENGAGED
6) CONTRACTORS																			-	· • •		HEATING IS ENGAGED.
						TOTAL KEFT				ANOFACIORER	5 STANDARD R		ENGIH.						1			
7) PROVIDE DISCO		WITCH & NON-POWERED GFT O																	-			
8) A/C TO BE INST.	ALLED VVI	TH VIBRATION ISOLATION (RES		SUPPORTED) TO	IVIIINIIVIIZE SU	JUNDAND	/IBRATION IN I	U THE SPA	ACE.										-			PROGRAMMABLE THERMOSTAT SIGN
9) PROVIDE FRESF	AIR IN IA	KE KIT FOR OUTSIDE AIR INTER	KGRATION.	•															J			HEATING OR COOLING.
				HE	EAT PUMP	OUTDOOR	CONDENSING	UNIT SC	HEDULE						BA	SIS OF DESIG	SN: DAIKIN	OR EQUIVALENT				UNOCCUPIED HEATING SETPOINT IS
		CAP.	MAX. COO	LING CAP. MA	X. HEATING	CAP. UNIT	DIMENSIONS	WEIGHT	REF. PIF	PING SIZE (IN.)	ELEC	TRICAL DATA	SOUND	RATING			HEATIN					
		(TON)	(MI	BH)	(MBH)	IN	I.(HxWxD)	(LBS)	LIQ.	GAS	PH./V/Hz	MCA (A) MOC	P (A) (d	BA)			COP	WIODEL NO.				
CU-1(N) ROOF		A/C-1(N) 1.5	1	8	20	39	x37x12-5/8	200	3/8	5/8	1/208-230/60	16.5 2	0 (61	13 18	.5 9.2	4.3	RZQ18TBVJU	A			AS TO MAINTAIN UNOCCOFIED HEAT
NOTES :-				•		•	·			•		I	•	•	•	•						
1) UNIT SHALL HAY	VE TEN YE	AR EXTENDED WARRANTY FOR		SSORS/PARTS.																•		2. EAHAUST FANS
2) PROVIDE LOW	AMBIENT	CONTROL FOR CONDENSING UN	NIT OPERA	ATION DOWN TO) -4°F.																	
3) PROVIDE COMP	PRESSOR C	YCLE PROTECTOR.																				
4) CONDENSING L	JNIT TO BE	MOUNTED ON ROOD WITH VIE	BRATION	ISOLATORS AND	MOUNTING	STAND.																AND AFTER OCCOPANCE SCHEDULE
5) OUTDOOR REFF	RIGERANT	LINESET TO BE WRAPPED IN UV	V RESISTA	NT, FIRE RATED,	AND ANTI-N	ICROBIAL IN	SULATION PRO	DTECTION	BASED O	N AIREX-FLEX G	UARD OR EQUA	AL.										
6) REFFRIGERANT	LINESET P	ENETRATION THROUGH BUILDI	ING EXTER	RIOR TO BE PROP	ERLY SEALED	WITH FIRE F	RESISTANT SEA	LANT DEP	ENDING	JPON WALL CON	ISTRUCTION.											EF - 1. CONTROL WITH LIGHTS.
7) OUTDOOR CON	DENSING	UNIT TO BE LOCATED WITH PRO	OPFR CLEA	ARANCES AND M	IUST PREVEN	TRF-CIRCUI	ATION OF AIR.				RER AND ARCHI	TECT.										
,,			01 11 011																			
																						INTERLOCK RTU-TAND EF-2 FOR SIM
																						FAN SET TO RUN CONTINUOUSLY WI
					EXHAUST	FAN SCHED	DULE															
	FLC	W RATE EXTERNAL S		ELECTRIC	DATA	ΜΑΧΙΜΙ	JM	RΔ		SIGN	WEIGHT	TS		•								RIU AND FAN SHALL BE POWERED B
TAG QUAI		STATIC PRESSURE		//PH/H7 MCA	MOCP	LOUDNE	ESS				(185)	REMAI	RK									THE CONTROLLERS, FAN, AND RTU I
		CFM IN W.G.	RPM	(AMPS	S) (AMPS) DBA	MANUFAC	TURER		MODEL	(103)											
EF-1(N) 1	1	75 0.25	950 1	.15/1/60 0.2	15	35	GREENH	ECK	SP-A110	(OR EQUIVALEN	IT) 20	1, 2, 5, 6,	8, 10								L	
EF-2 (N)	1	485 0.5	1446 1	.15/1/60 3.5	15	55	GREENH	ECK	G-095-VG	G (OR EQUIVALE	NT) 65	1, 2, 3, 4, 5,	7, 9, 10									
NOTES:																						
1) FIELD INSTALLE	D DISCON	NECT PROVIDED BY OTHERS. (C	COORDINA	ATE WITH W/E.C.	.).																	
2) FACTORY BACK	DRAFT DA	MPER.																				
3) PROVIDE ROOF	CURB & T	HERMAL OVERLOAD PROTECTIO	ON.																			
4) FACTORY BRIDS	SCREEN.																					
5) INSTALL PER MA	ANUFACT	JRER'S INSTRUCTIONS/RECOM	IMENDATI	ONS.																		
		, , ,																				

					EXISTING	G ROOF TOP UN	IT SCHEDULE										
			SUPPLY FAN			COOLING CAPA	CITY	GAS HEAT	ING CAPACITY	/	ELECTRIC	CALDATA				OPERATING	SEQU
UNIT ID MANUFACTUR	ER MODEL AR		PLY AIR OUTSIDE AIR	MAX. ESP	TOTAL SENSIB	LE AMBIENT TEM	1P. ENTERING	TEMP.							EER	R WEIGHT	
	SER	VED TONS	CFM CFM	(IN. OF W.G.)	MBH MBH	DB (°F)	DB / WB	(°F)						EFFICIENCY (%)		(LBS.)	
RTU-1 (E) TRANE (V.I.F)) YSC036E3EMA1NA0000 (V.I.F) SEE F	PLAN 3.0 (V.I.F) 120	0 (V.I.F) 420	S.A.E	S.A.E S.A.E	S.A.E	S.A.E	100 (V.I.F)	81 (V.I.F)	208-230(VI	IF) 3(VIF) 60(VIF) 20(VIF)	30(VIF)	S.A.E	S.A.	E S.A.E	1. SINGLE ZONE ROOFTOP UNIT
NOTES:																	
1) S.A.E - SAME AS EXISTI	NG , V.I.F - VERIFY IN FIELD																
2) EXISTING RTU WITH AL	LACCESSORIES TO REMAIN SAME AND T	O BE REUSED.															
3) CONTRACTOR TO CONI	FIRM IF EXISTING RTU IS WORKING AT IT	S 100% RATED CAPA	CITY.														THE DOSITION OF THE FAN "ON ALT
4) CONTRACTOR TO FIELD	OVARIFY EXACT LOCATION AND CONFIG	URATION OF RTU ON	SITE.														THE POSITION OF THE PARTON-AUT
5) CONTRACTOR TO REBA	ALANCE OUTSIDE AIR & RETURN AIR DAM	IPERS ON EXISTING R	TU TO MATCH VALUES	MENTIONED IN	ABOVE TABLE.	•											HEATING AND COOLING OPERATION
																	"HEAT-AUTO-COOL-OFF" SWITCH IS I
			HEAT PUMP INDO	OR UNIT SCH	EDULE						BASIS	OF DESIGN:	DAIKIN OR	EQUIVALENT	1		
				SUPPLY		ELECTRICAL	DATA		REF	RIGERANT PI	IPE SIZE (IN.)	COLINID			1		PROGRAMMABLE THERMOSTAT SIG!
TAG AREA SERVED	TYPE TON			AIRFLOW							DRAIN		WEIGHT	MODEL NO.			OUTSIDE AIR DAMPER OPENS TO ITS
		CAP. (IVIDH)		(CFM)					N.) LIQ.((IN.) GAS (II	^{N.)} (ID)(IN.)	KATING (UBA)	(LDS.)				REQUIREMENT) WHEN THE SUPPLY
A/C-1(N) SEE PLAN	ROUND FLOW CASSETTE 1.5	18	20	742	140 1/	208-230/60 0.5	0 15	9-11/16x33-1/16X	33-1/16 3/	/8 5/8	1	38	55	FCQ18AAVJU			
NOTES :-																	UPON A RISE IN SPACE TEMPERATU
1) SUPPLY AIR CFM BASED	O ON HIGH SPEED. PROVIDE VARIABLE A	IRFLOW ADJUSTMEN	T CONTROL FOR ALL U	NITS.													UNIT COOLING IS INITIATED.
2) REFRIGERANT R410A SH	HALL BE PROVIDED.																
3) PPROVIDE MOUNTING	BRACKETS AND ALL ASSOCIATED ACCES	SORIES.													_		UPON A DROP IN SPACE TEMPERATI
4) ALL REFRIGERANT PIPI	NG TO BE SIZED PER MANUFACTURERS R	RECOMMENDATIONS													4		UNIT HEATING IS INITIATED. OUTSID
5) PROVIDE FILTER BASE \	WITH 2" FILTER.														4		HEATING IS ENGAGED.
6) CONTRACTOR SHALL PI	ROVIDE A LONG LINE SET FOR REFRIGER	ANT PIPING IN THE E	VENT THAT TOTAL REFI	RIGERANT LENG	TH EXCEEDS TH	IE MANUFACTURE	ER'S STANDARD	D RECOMMENDED L	ENGTH.						-		
7) PROVIDE DISCONNECT	SWITCH & NON-POWERED GFI OUTLET.														4		
8) A/C TO BE INSTALLED V	WITH VIBRATION ISOLATION (RESILIENTI	LY SUPPORTED) TO N	INIMIZE SOUND AND \	IBRATION INTO	D THE SPACE.										4		PROGRAMMABLE THERMOSTAT SIGN
9) PROVIDE FRESH AIR IN	TAKE KIT FOR OUTSIDE AIR INTERGRATIO	UN.															HEATING OR COOLING.
															_ (
	1 1	HEA	T PUMP OUTDOOR	CONDENSING	UNIT SCHEDU	ILE					B	ASIS OF DESIG		OR EQUIVALENT			
TAG LOCATION IND	OOR UNITS SERVED CAP. MAX. C	OOLING CAP. MAX	. HEATING CAP. UNIT	DIMENSIONS	WEIGHT REF.	PIPING SIZE (IN.)) ELE	ECTRICAL DATA	SOUND	ORATING	EER2 SEE	R2 HSPF2	HEATIN	G MODEL NO.			ROOFTOP UNIT HEATING AND COOL!
	(TON)	(MBH)	(MBH) IN	I.(HxWxD)	(LBS) LI	Q. GAS	PH./V/Hz	MCA (A) MOC	P (A) (d	IBA)			СОР				AS TO MAINTAIN UNOCCUPIED HEAT
CU-1(N) ROOF	A/C-1(N) 1.5	18	20 39	x37x12-5/8	200 3,	/8 5/8	1/208-230/6	0 16.5 2	0	61	13 18	9.2	4.3	RZQ18TBVJU	JA		
NOTES :-																	2. EXHAUST FANS
1) UNIT SHALL HAVE TEN		RESSURS/PARIS.	4°F														
2) PROVIDE LOW AIVIBIEN	R CYCLE PROTECTOR	ERATION DOWN TO -	4 F.									•					EF - 2: EXHAUST FAN WILL BE CONTF
A) CONDENSING UNIT TO															-		AND AFTER OCCUPANCY SCHEDULE
5) OLITDOOR REERIGERAN	NT LINESET TO BE WRAPPED IN LIV RESIS	TANT FIRE RATED A	ND ANTI-MICROBIAL IN		TECTION BASE	D ON AIREX-ELEX		ΙΔΙ									
6) REFERIGERANT LINESET	T PENETRATION THROUGH BUILDING EXT	TERIOR TO BE PROPE	RIY SEALED WITH FIRE	RESISTANT SEAL													EF - 1: CONTROL WITH LIGHTS.
7) OUTDOOR CONDENSIN	IG UNIT TO BELOCATED WITH PROPER C	I FARANCES AND MU	ST PREVENT RE-CIRCUI	ATION OF AIR.				HITECT.									
,, 0010001100110110110														—			
																	EAN SET TO PLIN CONTINUOUSLY M
																	TAN SET TO KON CONTINUOUSET WI
	EVTERNAL	ELECTRIC															RTU AND FAN SHALL BE POWERED F
	LOW RATE				BASIS OF	DESIGN	WEIG										THE CONTROLLERS FAN AND RTUL
						MODEL	(LB	S)									
$EE_{-1}(N)$ 1	75 0.25 950	115/1/60 0.2	(AIVIF3) DBA	GREENH			ENIT) 20	1 1 2 5 6	8 10								
EF-2(N) 1	485 0.5 1446	115/1/60 3.5	15 55	GREENH			ENT) 65	5 12345	7 9 10								
	405 0.5 1440	113/1/00 3.5	15 55	GREENT				, <u>,</u> , <u>,</u> , <u>,</u>	7, 5, 10								
1) FIELD INSTALLED DISCO		INATE WITH W/F.C.)							_								
2) FACTORY BACKDRAFT	DAMPER.																
3) PROVIDE ROOF CURB &	THERMAL OVERLOAD PROTECTION																
4) FACTORY BRIDSCREEN.																	
5) INSTALL PER MANUFAC	CTURER'S INSTRUCTIONS/RECOMMENDA	ATIONS.															

									FY														7	
							ΣΙ ΙΡΡΙ Υ ΕΛΙ	N					GASHE				FLECTRIC							I SEQU
			MODEL	AR	EA NOMINAL				ΤΟΤΑΙ											- THERMAL	F			
	MANOFAC	TURER	MODEL	SERV	VED TONS									IBH OUTPUT	MBH Y	VOLTS	PH H	Z MCA (A) MOCP (<i>I</i>	A) EFFICIENCY (%)				
							420							E) 91/\/	1 E) 208	2 220(1/1E)	2()/IE) 60()	/15) 20()/15)	20(\/IE)	S A E	5		-	1. SINGLE ZONE ROOFTOP UNIT
	INANE (V	7.1.17 1300	05005010141140000 (1		LAN 3.0 (V.I.P)	1200 (V.I.P)	420		J.A.L	J.A.L	J.A.L	J.A.L	100 (v.1		1.1) 200	5-230(117)]		/1/) 20(1/)	50(VIP)	J.A.L	5.	A.L J J.A.L	-	
$1) S \Delta F - S$			E - VERIEV IN FIELD																				-	A PROGRAMMABLE THERMOSTAT/HI
2) FXISTIN			SORIES TO REMAIN SA																				-	OF THE ROOFTOP UNIT. DESIRED OC
(2) CONTR/						ΛΡΛΟΙΤΥ																	-	HUMIDITY SETPOINTS ARE PROGRAM
																							-	THE POSITION OF THE FAN "ON-AUT
										TADIE													-	
5) CONTRA					IPERS ON EXISTI		IATCH VALUES		NADOVE	TADLE														HEATING AND COOLING OPERATION
																								"HEAT-AUTO-COOL-OFF" SWITCH IS I
Г																	1				-			
					-	HEAT	PUMP IND	OOR UNIT SCH	EDULE								BASIS	OF DESIGN	I: DAIKIN	OR EQUIVALENT	_			OCCUPIED MODE
							NAI HEATING	SUPPLY			ELECTRICAL	DATA	DIMENS		REFRIGER	RANT PIPE	SIZE (IN.)	SOUND	WEIG	ант				PROGRAMMABLE THERMOSTAT SIGN
TAG	AREA SER	VED	TYPE	TON			AP (MBH)	AIRFLOW								GAS (INI.)	DRAIN	RATING (dB		MODEL NO.				OUTSIDE AIR DAMPER OPENS TO ITS
								(CFM)						(113.)			(ID)(IN.)			.,				REQUIREMENT) WHEN THE SUPPLY I
A/C-1(N)	SEE PLA	N ROU	IND FLOW CASSETTE	1.5	18		20	742	140	1/208-	230/60 0.50	15 9	-11/16x33-1/	16X33-1/16	3/8	5/8	1	38	55	5 FCQ18AAVJU				
NOTES :-																								UPON A RISE IN SPACE TEMPERATUI
1) SUPPLY	AIR CFM BA	ASED ON HIC	GH SPEED. PROVIDE VA	ARIABLE AI	IRFLOW ADJUST	MENT CONTR	ROL FOR ALL U	JNITS.																UNIT COOLING IS INITIATED.
2) REFRIGE	ERANT R410	DA SHALL BE	PROVIDED.																					
3) PPROVI	DE MOUNT	ING BRACKE	TS AND ALL ASSOCIAT	TED ACCESS	SORIES.																			UPON A DROP IN SPACE TEMPERATI
4) ALL REF	RIGERANT F	PIPING TO B	E SIZED PER MANUFAC	CTURERS R	ECOMMENDATI	ONS.															1			UNIT HEATING IS INITIATED. OUTSID
5) PROVID	E FILTER BA	ASE WITH 2"	FILTER.																					HEATING IS ENGAGED.
6) CONTRA	ACTOR SHAI	LL PROVIDE	A LONG LINE SET FOR	REFRIGERA	ANT PIPING IN T	HE EVENT TH	AT TOTAL REF	RIGERANT LEN	GTH EXCE	EDS THE M	ANUFACTURER	R'S STANDARD R	ECOMMEND	D LENGTH.								• • •		
7) PROVID	E DISCONN	IECT SWITCH	& NON-POWERED GF	FI OUTLET.																	1	· · · ·		UNOCCUPIED MODE
8) A/C TO	BE INSTALL	ED WITH VIE	BRATION ISOLATION (RESILIENTL	Y SUPPORTED) 1		SOUND AND	VIBRATION INT	O THE SP	ACE.											-			PROGRAMMABLE THERMOSTAT SIGN
9) PROVID	F FRESH AI	R INTAKF KI	T FOR OUTSIDE AIR INT	TERGRATIO)N.																-			HEATING OR COOLING
0)110110																					_			
																								OUTSIDE AIR DAMPER OPENS TO MIL
																								UNOCCUPIED HEATING SETPOINT IS
						HEAT PUM	P OUTDOOR	CONDENSING	GUNIT S	CHEDULE							BA	SIS OF DES	IGN: DAIK	IN OR EQUIVALENT				
TAG		INDOOR UN	ITS SERVED CAP.	MAX. CO	OOLING CAP.	MAX. HEATIN	IG CAP. UNI	r dimensions	WEIGHT	REF. PIP	ING SIZE (IN.)	ELEC	RICAL DATA	SC	OUND RATI	ING EEF	R2 SEE	R2 HSPF	2 HEA	TING MODEL NO				ROOFTOP UNIT HEATING AND COOLI
			(TON)	((MBH)	(MBH))	N.(HxWxD)	(LBS)	LIQ.	GAS	PH./V/Hz	MCA (A)	IOCP (A)	(dBA)				C	OP				AS TO MAINTAIN UNOCCUPIED HEAT
CU-1(N)	ROOF	A/C-	1(N) 1.5		18	20	3	9x37x12-5/8	200	3/8	5/8	1/208-230/60	16.5	20	61	13	.3 18.	5 9.2	4	I.3 RZQ18TBVJU	JA			
NOTES :-																								2. EXHAUST FANS
1) UNIT SH	IALL HAVE T	TEN YEAR EX	TENDED WARRANTY F		RESSORS/PARTS	,																		
2) PROVID	E LOW AME	BIENT CONT	ROL FOR CONDENSING	G UNIT OPE	ERATION DOWN	TO -4°F.																		EF - 2: EXHAUST FAN WILL BE CONTE
3) PROVID	E COMPRES	SSOR CYCLE	PROTECTOR.																					AND AFTER OCCUPANCY SCHEDULE
4) CONDE	NSING UNIT	ΓΤΟ ΒΕ ΜΟυ	JNTED ON ROOD WITH	I VIBRATIO	N ISOLATORS A	ND MOUNTIN	NG STAND.																	
5) OUTDO	OR REFRIGE	RANT LINES	ET TO BE WRAPPED IN	UV RESIST	TANT, FIRE RATE	D, AND ANTI	-MICROBIAL I	NSULATION PRO	OTECTIO	N BASED ON	AIREX-FLEX G	JUARD OR EQUA	L.											FE - 1 [·] CONTROL WITH LIGHTS
6) REFFRIC	GERANT LINI	ESET PENETI	RATION THROUGH BUI	ILDING EXT	FERIOR TO BE PR	OPERLY SEAL	ED WITH FIRE	RESISTANT SEA	LANT DE	PENDING U	PON WALL COI	NSTRUCTION.												
7) OUTDO	OR CONDEN	NSING UNIT	TO BE LOCATED WITH	PROPER CL	LEARANCES AND	MUST PREV	ENT RE-CIRCU	ILATION OF AIR	. COORDI	NATE WITH	MANUFACTU	RER AND ARCHI	FECT.											3 INTERLOCK
																								INTERLOCK RTU-1 AND FE-2 FOR SIM
																								FAN SET TO RUN CONTINUOUSLY W
															1									
			EVTERNIAL		ГІГСТ																			RTU AND FAN SHALL BE POWERED P
TAC		FLOW RA		SPEED	ELECT				BA	SIS OF DES	IGN	WEIGHT	S DE											THE CONTROLLERS FAN AND RTUL
TAG	QUANTI		STATIC PRESSURE		V/PH/HZ			ESS				(LBS)	REI	VIARK										THE CONTROLLERO, FAN, AND RTO P
		CFM	IN W.G.	RPM	(AN	/IPS) (AM	PS) DBA	MANUFAC			MODEL								•					
EF-1(N)	1	75	0.25	950	115/1/60 C	.2 19	o 35	GREENF		SP-A110 (NI) 20	1, 2, 5	, 6, 8, 10										
EF-2 (N)	1	485	0.5	1446	115/1/60 3	.5 1	55	GREENF	IECK	G-095-VG	(OR EQUIVALE	NT) 65	1, 2, 3, 4	, 5, 7, 9, 10										
NOTES:																								
1) FIELD IN	ISTALLED DI	ISCONNECT	PROVIDED BY OTHERS	5. (COORDII	NATE WITH W/E	.C.).																		
2) FACTOR	AY BACKDRA	AFT DAMPER	₹.																					
3) PROVID	E ROOF CU	RB & THERM	IAL OVERLOAD PROTE	CTION.																				
4) FACTOR	Y BRIDSCRE	EEN.															•							
5) INSTALL	PER MANU	JFACTURER'S	S INSTRUCTIONS/RECO	OMMENDA	TIONS.																			

6) CONTROL WITH LIGHTS (COORDINATE W/E.C.). 7) CONTROL VIA TIMECLOCK (OPERATIONAL DURING OCCUPIED HOURS).

8) FACTORY ISOLATION KIT, ALUNIMIUM ENAMEL GRILLE, SPEED CTLR.

9) FACTORY CORROSION RESISTANCE (WITHIN 20 MILES OF OCEAN COAST).

10) REFERENCE SEQUENCE OF OPERATIONS.

		AIR TERMINA	DEVICES SCHED	OULE		
тас		DESCRIPTION	CONSTRUCTION	BASIS OF DE	SIGN	NOTES
TAG		DESCRIPTION	CONSTRUCTION	MANUFACTURER	MODEL	NOTES
S1	24X24	SQUARE CONE DIFFUSER	ALUMINUM	TITUS (OR EQUIVALENT)	TMS-AA	1,2,3,4,5
R1	24X24	ALUMINUM EGGCRATE RETRURN	ALUMINUM	TITUS (OR EQUIVALENT)	50F	1,2,3,4,5
E1	24X24	ALUMINUM EGGCRATE RETRURN	ALUMINUM	TITUS (OR EQUIVALENT)	50F	1,2,3,4,5
NOTES:-	•					
1) PROVID	E FRAME FO	R MOUNTING AIR DEVICE IN LAY-IN GRI	D CEILING UNLESS	REFLECTED CEILING	PLAN INDICATI	ES HARD
CEILING. IN	N AREAS WIT	HARD CEILINGS, PROVIDE FRAMES FC	R SURFACE MOUN	NTING.		
2) UNLESS	OTHERWISE	NOTED, BRANCH DUCTS SERVING AIR D	EVICES SHALL BE S	SAME SIZE AS NECK O	F AIR DEVICE.	
3) COORDI	INATE FINAL	COLOR/FINISH WITH ARCHITECT/OWN	ER.			
4) MAXIMU	UM NOISE CH	RITERION RATING < 30 DBA.				
5) FOR RO	UND NECK D	IFFUSERS: NECK SIZES SHALL BE:-				
16" DIA: 90	01-1100 CFM					
14" DIA: 60	01-900 CFM					
12" DIA: 40	01-600 CFM					
10" DIA: 20	01-400 CFM					
8" DIA: 101	1-200 CFM					
6" DIA: 0-1	LOO CFM					

					VENTILATIO	N CALCULATION					
				EINIAI	MIN OUTSIDE AIR	AS PER IMC-2021	REQUIRED	PROVIDED	EXHAUST (CFM/SQFT)		
ROOM NAME	AREA (SQ FT)				CFM/	CFM/	OUTSIDE AIR CFM	OUTSIDE AIR	OR PER FIXTURE AS PER	(CEM)	
		A3 FER INIC-2021		PEOPLE NO.	PEOPLE	SQ.FT	AS PER -IMC-2021	(CFM)	IMC-2021		
RETAIL	345	15	6	6	7.5	0.12	86		0	0	
GROOMING	275	10	3	3	7.5	0.18	72	560	0.9	248	560
WASH/DRY	260	10	3	3	7.5	0.18	69	500	0.9	234	500
RESTROOM	50	0	0	0	0	0	0		70	75	
TOTAL	930	-	-	12	-	-	228	560	-	557	560

		AIR BAI	ANCE			
UNIT	AREA SERVED	SUPPLY AIR	OUTSIDE AIR	RETURN AIR	EXHAUST AIR	
RTU-1 (E)	SEE PLAN	1200 CFM	420 CFM	780 CFM	0 CFM	
A/C-1(N)	SEE PLAN	742 CFM	140 CFM	602 CFM	0 CFM	
EF-1(N)	RESTROOM	-	-	-	75 CFM	
EF-2 (N)	ROOF	-	-	-	485 CFM	
	TOTAL:	1942 CFM	560 CFM	1382 CFM	560 CFM	
BU	ILDING PRESSURE:			0 CFM	POSITIVE	
1) CONTRACTOR TO BALANCE OUTSIDE AIR & RETURN AIR DAMPERS ON RTU & A/C						
TO MATCH V	ALUES MENTIONE	D IN ABOVE	TABLE.			

JENCE OF OPERATIONS

IUMIDITY SENSOR (WHEN REQUIRED) CONTROLS THE OPERATION CCUPIED AND UNOCCUPIED HEATING, COOLING, AND RELATIVE AMMED VIA THE THERMOSTAT. FAN OPERATION IS DETERMINED BY O" SWITCH, AS WELL AS BY THE MODE OF OCCUPANCY.

N AS DESCRIBED HEREIN ASSUMES THAT THE SYSTEM IN THE "AUTO" POSITION.

SNIFIES OCCUPIED MODE. SUPPLY FAN RUNS CONTINUOUSLY. S MINIMUM POSITION (REFERENCE SCHEDULE FOR OA FAN IS IN OPERATION.

URE ABOVE THE OCCUPIED COOLING SETPOINT OF 75°F, ROOFTOP

TURE BELOW THE OCCUPIED HEATING SETPOINT OF 70°F, ROOFTOP DE AIR DAMPER REMAINS AT MINIMUM POSITION, AND ELECTRIC

SNIFIES UNOCCUPIED MODE. SUPPLY FAN CYCLES UPON A CALL FOR

INIMUM POSITION UPON A CALL FOR HEATING OR COOLING. S 60°F (ADJ.). UNOCCUPIED COOLING SETPOINT IS 80°F (ADJ.).

LING OPERATE AS DESCRIBED ABOVE IN OCCUPIED MODE, EXCEPT TING AND COOLING SETPOINTS.

TROLLED VIA TIMECLOCK. FAN SHALL START ONE HOUR PRIOR TO .E, 7 AM – 9 PM (ADJ.). FAN IS OFF DURING UNOCCUPIED HOURS.

MULTANEOUS OPERATION. RTU-1 IS THE MAKE-UP AIR FOR EF-2. HILE SPACE IS OCCUPIED.

BY ELECTRICAL CONTRACTOR. ALL INTERLOCK WIRING BETWEEN IS THE RESPONSIBILITY OF THE GENERAL CONTRACT.

	ABBI	REVIATIO	NS
	Α		Μ
A AC AF AFF AFG AHU AIC	AMPERE(S) ALTERNATING CURRENT AMPERE FRAME ABOVE FINISHED FLOOR ABOVE FINISHED GRADE AIR HANDLING UNIT AMPERE INTERRUPTING CAPACITY	MAX MCB MCC MCP MECH MEP	MAXIMUM MAIN CIRCUIT BREAKER MOTOR CONTROL CENTER MOTOR CIRCUIT PROTECTOR MECHANICAL MECHANICAL, ELECTRICAL, AND PLUMBING
AT ATS AUX AWG	(ROOT MEAN SQUARE, SYMMETRICAL) AMPERE TRIP AUTOMATIC TRANSFER SWITCH AUXILIARY AMERICAN WIRE GAGE	MGB MH MIN MLO	MAIN OR MASTER GROUND BAR METAL HALIDE MINIMUM MAIN LUGS ONLY
	В		
BFC BFG BLDG	BELOW FINISHED CEILING BELOW FINISHED GRADE BUILDING	NC NE NEC NEMA	NORMALLY CLOSED NORMAL/EMERGENCEY POWER NATIONAL ELECTRICAL CODE NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
C CB CCTV CKT	CONDUIT CIRCUIT BREAKER CLOSED CIRCUIT TELEVISION CIRCUIT	NIC NO NTS	NOT IN CONTRACT NORMALLY OPEN NOT TO SCALE
CLG CT	CEILING CURRENT TRANSFORMER	OC	
	D	OCP	
DC DWG		P PA	POLE(S) PUBLIC ADDRESS
ECB EDH	ENCLOSED CIRCUIT BREAKER ELECTRIC DUCT HEATER	PB PF PGS PH BNI BD	PUSHBUITON POWER FACTOR PARKING GUIDEDANCE SYSTEM PHASE PANEL BOARD
EF EGS ELEC EMT	EXHAUST FAN ENGINE-GENERATOR SET ELECTRIC OR ELECTRICAL ELECTRICAL METALLIC TUBING	PT PVC PWR	POTENTIAL TRANSFORMER POLYVINYL CHLORIDE POWER
EQUIP ESDF EWC	EQUIPMENT ELECTROSTATIC DISSIPATIVE FLOORING ELECTRIC WATER COOLER		R
EWH EX	ELECTRIC WATER HEATER EXISTING	REC RGS RTU	RECEPTACLE(S) RIGID GALVANIZED STEEL ROOFTOP UNIT
F.	FUSE		S
FA FAAP FACP FC	FIRE ALARM FIRE ALARM ANNUNCIATION PANEL FIRE ALARM CONTROL PANEL FOOTCANDLES	SF SPD SPDT	SINGLE POLE PRESET FAN SPEEP CONTROL SWITCH SURGE PROTECTION DEVICE SINGLE POLE, DOUBLE THROW
FCU FLA FLA	FAN COIL UNIT FULL LOAD AMPERES FULL LOAD AMPERES	SFD1 STD SW	STANDARD SWITCH
FLUOR FO	FLUORESCENT FIBEROPTIC	SWBD SWGR	SWITCHBOARD SWITCHGEAR
	G		Τ
GFI G	GROUND FAULT CIRCUIT INTERRUPTER GROUND	TTC TYP	TELEPHONE TERMINAL BOARD TELEPHONE TERMINAL CABINET TYPICAL
HID	HIGH INTENSITY DISCHARGE		
HOA HP	HAND-OFF-AUTOMATIC HORSEPOWER	UH UL UNO UPS	UNIT HEATER UNDERWRITERS LABORATORIES UNLESS NOTED OTHERWISE UNINTERRUBTIBLE POWER SUPPLY
IG IMC	ISOLATED GROUND INTERMEDIATE METALLIC CONDUIT		V
INCAND IG IMC INCAND	INCANDESCENT ISOLATED GROUND INTERMEDIATE METALLIC CONDUIT INCANDESCENT	V VA VAC VDC VFD	VOLTS VOLT-AMPERE(S) VOLTS, ALTERNATING CURRENT VOLTS, DIRECT CURRENT VARIABLE FREQUENCY DRIVE
J	JUNCTION BOX		W
	K	W W/	WATT(S) WITH
KCMIL	THOUSANDS OF CIRCULAR MILS	WP	WEATHERPROOF
KVA KW	KILOVOLTS KILOVOLT-AMPERE(S) KILOWATT(S)	XFMR	TRANSFORMER
	L	XP	EXPLOSION-PROOF
LED LI LIG	LIGHT-EMITTING DIODE LONG TIME, INSTANTANEOUS LONG TIME, INSTANTANEOUS, GROUND FAI	JLT	
LSIG LTFMC	LONG TIME, SHORT TIME, INSTANTANEOUS LONG TIME, SHORT TIME, INSTANTANEOUS, GROUND FAULT LIQUID-TIGHT FLEXIBLE METALLIC	\frown	
		DRAWIN	IG/DETAIL REFERENCE KEY
			REFER TO DRAWING/DETAIL NUMBER
		RE:1/E	E5.01

ELECTRICAL SYMBOLS

ALL SYMBOLS SHOWN MAY NOT APPEAR ON DRAWINGS. SYMBOLS ARE SHOWN SCHEMATIC AND MAY NOT BE TO SCALE

	STWBOLS ARE SHOWN SCHEWAT		NOTE	SE TO SCALE.	2.	DO NOT SCALE OR DIMENSION
B	WHERE SHOWN, INDICATES HOMERUN TO PANEL WITH CIRCUIT NUMBER(S) AS INDICATED	8	¥ €	CEILING MOUNTED EXIT SIGN. ARROWS AS INDICATED. DARKENED AREA DENOTES LIGHTED FACE	3.	"FURNISH" SHALL MEAN TO SU SITE, READY FOR UNLOADING, INSTALLATION AND SIMILAR OF
LA-2,4,6	CONDUIT RUN UNDERFLOOR OR BELOW GRADE	нØ	×	WALL MOUNTED EXIT SIGN. ARROWS AS INDICATED. DARKENED AREA DENOTES LIGHTED FACE. WHERE SHOWN OVER DOORS, MOUNT 6" ABOVE DOOR FRAME, 7'-6" AFE OTHERWISE	4.	"INSTALL" SHALL MEAN OPERA INCLUDING UNLOADING, TEMP ASSEMBLING, ERECTING, PLAC
0	CONDUIT STUB UP		EM	EMERGENCY LIGHTING UNIT WITH INTEGRAL BATTERY.		WORKING TO DIMENSION, FINI AND SIMILAR OPERATION. "PR
	0 - 10V DIMMING CIRCUIT 2# 14 CONTROL WIRES AND POWER CIRCUIT AS INDICATED IN SCHEDULES. (3) - 110 MIN.	•	•	SEE LIGHTING FIXTORE SCHEDULE		AND INSTALL, COMPLETE AND
		\$	3	THREE-WAY TOGGLE SWITCH	5.	REFER TO ELECTRICAL AND M AND DETAILS FOR LOCATIONS
		\$	4	FOUR-WAY TOGGLE SWITCH		FIXTURES, DIFFUSERS, ETC.) A DEVICES. IF LOCATION FOR ITE
[]]]]	PANELBOARD TO BE REMOVED	\$	M	MOTOR RATED SWITCH		LISTED DRAWINGS, VERIFY CR PROJECT MANAGER.
	PANELBOARD, 208Y/120V	\$	ос	WALL MOUNTED OCCUPANCY SENSOR SWITCH	6.	ELECTRICAL SYSTEMS INDICA
	PANELBOARD, 480Y/277V	\$	К	THREE POSITION KEY SWITCH		DIAGRAMMATIC AND REQUIRE WORK TO COMPLY WITH APPL
	DISTRIBUTION PANELBOARD	\$	F	SINGLE POLE PRESET FAN SPEED CONTROL SWITCH		AMENDMENTS, AND WITH ASS TRADES, INCLUDING NECESSA
SPD	SURGE PROTECTION DEVICE		S	CEILING MOUNTED OCCUPANCY SENSOR		PROVIDED TO MAKE SYSTEMS ORDER. COORDINATE WORK V
	TRANSFORMER	D] _x	LED LIGHTING CONTROL DRIVER 75W TYPICAL. ALPHANUMERIC CHARACTER(S) INDICATE NUMBER OF DRIVERS	7.	INDICATED CIRCUIT RUNS ARE LOCATE PULL BOXES PER NEC
ππ	GROUNDING BAR	R1 -	R1A	CONTROL RELAY DESIGNATED R1		DISCIPLINES. BUILDING COND CONDUIT RUNS. PVC SHALL N
	TRANSFORMER, DESIGNATION AND RATINGS AS NOTED (DELTA-CONNECTED PRIMARY AND WYE-CONNECTED SECONDARY) UNLESS OTHERWISE NOTED.	PC	3	PHOTO ELECTRIC CELL		SPACES. 8. UNLESS OTHERWIS SHALL BE 2#12, 1#12G, 3/4" C.
÷		ТС	2	TIMECLOCK	8.	INSTALLED OVER 90 FEET LON
<u> </u>	CIRCUIT BREAKER, TRIP RATING AS SHOWN, 3 POLE UNLESS OTHERWISE NOTED	φ)	WALL MOUNTED SIMPLEX RECEPTACLE (NEMA 5-20R, UON)		FEET LONG SHALL BE 8 AWG, 0 AWG. SIZE RACEWAY ACCORD
\	SWITCH, TRIP RATING AS SHOWN, 3 POLE UNLESS	φ		WALL MOUNTED DUPLEX RECEPTACLE (NEMA 5-20R)		CODE. (ALL LENGTHS GIVEN AI BRANCH CIRCUIT).
	OTHERWISE NOTED	₩		WALL MOUNTED QUADRAPLEX RECEPTACLE (NEMA 5-20R)	9.	CIRCUIT EMERGENCY AND EXI
∩ _{st}	SHUNT TRIP CIRCUIT BREAKER	ф	с	CEILING MOUNTED DUPLEX RECEPTACLE (NEMA 5-20R)	40	
(L,S,I,G)	DENOTES CIRCUIT BREAKER WITH ADJUSTABLE TRIP SETTINGS: L = LONG, S = SHORT, I = INSTANTEOUS, G = GROUND FAULT PROTECTION, GI = GROUND FAULT	# ,	WP	WALL MOUNTED DUPLEX RECEPTACLE. GROUND FAULT INTERRUPTING RECEPTACLE (NEMA 5-20R). "WP" DENOTES WEATHERPROOF IN USE COVER, SHADED CENTER DENOTES GROUND FAULT INTERUPTING.	10.	REFER TO ARCHITECTURAL PL OWNER FOR EXACT LOCATION FIXTURES AND DEVICES PRIOF MOUNTING HEIGHTS NOTED AI MOUNTING HEIGHTS MUST BE FOUIPMENT PRIOR TO ROUGH
⊶⊡⊷	FUSE	φ.	ΤV	RECEPTACLE FOR TELEVISION (NEMA 5-20R). VERIFY EXACT MOUNTING HEIGHT AND LOCATION WITH ARCHITECTURAL DRAWINGS PRIOR TO ROUGH-IN.	11.	REFER TO MECHANICAL DRAW REQUIREMENTS FOR HVAC EQ
Ţ	GROUND	\$ =	#	WALL MOUNTED DUPLEX RECEPTACLE. SHADED CENTER DENOTES (GFI) GROUND FAULT INTERRUPTING RECEPTACLE	12.	LIGHT FIXTURES ARE CONTRO WITHIN THE SAME ROOM OR A
``	AUTOMATIC TRANSFER SWITCH	📏 Ф.	A	RECEPTACLE MOUNTED AT 6" ABOVE COUNTER TOP OR BACKSPLASH		LOWER CASE LETTER ADJACE LIGHT FIXTURE OPERATED BY DESIGNATION
	NON-FUSIBLE SAFETY SWITCH. '200/3/150' DENOTES AMPERES/POLE/FUSE. 'NF' DENOTES NON-FUSED. PROVIDE 30/3/NF UNLESS OTHERWISE NOTED. PROVIDE NEMA 3R FOR	ф	U	DUPLEX RECEPTACLE (U - COMBINATION TYPE W/ (2) USB PORTS.	13.	OCCUPANCY SENSOR LOCATIO REFERENCE ONLY. COORDINA
	ALL OUTDOOR INSTALLATIONS.	ΦΦ		FLOOR MOUNTED RECEPTACLE (NEMA 5-20R). FLOOR MOUNTED RECEPTACLE WITH DATA/COMMUNICATIONS.		QUANTITIES WITH MANUFACTU PROPER OPERATION.
L ک	COMBINATION STARTER AND NON-FUSIBLE SAFETY SWITCH	۲)	FLOOR POKE-THRU RECEPTACLE (NEMA 5-20R). FLOOR MOUNTED RECEPTACLE WITH DATA/COMMUNICATIONS.	14.	LIGHTING CIRCUIT INDICATED
드	CONTROL PANEL WITH INTEGRAL DISCONNECT	φ)	SPECIAL PURPOSE RECEPTACLE	15.	UNLESS OTHERWISE NOTED, U
	SWITCH, FURNISHED WITH EQUIPMENT	9)	JUNCTION BOX		WHERE 0-10V DIMMING CONTR
	MOTOR CONNECTION VARIABLE FREQUENCY DRIVE, FURNISHED MY MECHANICAL	P		RECESSED JUNCTION BOXES MOUNTED ADJACENT TO EACH OTHER. ONE FOR POWER AND ONE FOR DATA. IF FIELD CONDITIONS WILL NOT ACCOMMODATE THE TWO	16.	ALL CIRCUIT FEEDERS AND DIS
•	PUSH BUTTON			BOXES, USE A TWO-GANG BOX OR LARGER WITH AN NEC APPROVED DIVIDER.	17.	CONTRACTOR SHALL VERIFY C SWITCH, AND FUSE SIZES WIT
	2' x 4' FIXTURE, FIXTURE TYPE AS NOTED	V	• -	TWO VOICE AND TWO DATA OUTLETS-SINGLE-GANG OUTLET BOX WITH 1"C TO ABOVE NEAREST ACCESSIBLE CEILING UON		MANUFACTURER'S SHOP DRAV AND PROVIDE ALL APPURTEN
Г	4' INDUSTRIAL STRIP FIXTURE, FIXTURE TYPE AS NOTED	▼	· ·	TELEPHONE OUTLET-SINGLE-GANG OUTLET BOX WITH 3/4" C TO ABOVE NEAREST ACCESSIBLE CEILING UON	18.	ELECTRICAL EQUIPMENT ENCL FOR INTERIOR AND NEMA 3R F REGIONS, THE STANDARD RAT
\mathbf{T}^{s}	WALL-MOUNTED FIXTURE, FIXTURE TYPE AS NOTED		- w	TELEPHONE OUTLET - SINGLE - GANG OUTLET BOX WITH EMPTY 3/4"C TO ABOVE NEAREST ACCESSIBLE CEILING, UON. "W" DENOTES WALL MOUNTED.	19.	SHALL BE NEMA-4X.
ОВ	CEILING-MOUNTED FIXTURE, FIXTURE TYPE AS NOTED		H ;	CABLE TV OUTLET SINGLE-GANG OUTLET BOX WITH 3/4" C. TO ABOVE NEAREST ACCESSIBLE CEILING, UNO.	20.	FIRE-STOP ALL CONDUIT PENE MAINTAIN FIRE RATING.
NL BE			- 1	NTERCOM STATION	21.	PROVIDE A COMPLETE, OPERA
NL BE	HATCH DENOTES FIXTURE WITH BATTERY BACK UP OR ON EMERGENCY GENERATOR. "NL" DENOTES NIGHT LIGHT. "E" DENOTES EMERGENCY. FIXTURE TYPE AS NOTED.			WALL MOUNTED HORN		INCLUDING BUT NOT LIMITED T ALARM NOTIFICATIONS APPLIA AUXILIARY CONTROL DEVICES ANNUNCIATORS, POWER SUPF SPECIFICATIONS. THE CONTRA
						SERVICES OF A LICENSED FIRM



- BE LABELED WITH PANELBOARD AND CIRCUIT NUMBER.
- 2. DUPLEX RECEPTACLES SHALL BE MOUNTED VERTICALLY U.N.O.
- FINISHED CEILING. 4. MOUNTING HEIGHTS SHOWN ON ARCHITECTURAL ELEVATIONS SHALL GOVERN OVER THOSE SHOWN ABOVE.

DEVICES INDICATED TO BE INSTALLED AT DIFFERENT MOUNTING HEIGHTS AND LOCATED WITHIN ONE STUD SPACE FROM EACH OTHER SHALL ALIGN

FINISHED FLOOR

ADJACENT TO STUD.

- TO DESIGN, INSTALL AND TEST THE FIRE ALARM SYSTEM. THE SYSTEM SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE AND IN COMPLIANCE WITH NFPA 72 AND MEET LOCALLY ENFORCED CODE AND ADA REQUIREMENTS.

GENERAL NOTES

- 1. GENERAL NOTES APPLY TO ENTIRE DRAWING SET.

- IIT.
- H-IN

- IRF

N FROM THESE DRAWINGS. UPPLY AND DELIVER TO PROJECT

, UNPACKING, ASSEMBLY, PERATION.

ATIONS AT PROJECT SITE, PORARY STORING, UNPACKING, CING, CONNECTING, ANCHORING, ISHING, PROTECTING, CLEANING, ROVIDE" SHALL MEAN TO FURNISH READY FOR INTENDED USE.

IECHANICAL PLANS, ELEVATIONS, S OF CEILING ELEMENTS (LIGHTING AND OTHER WALL MOUNTED TEM IS NOT SHOWN ON ABOVE RITICAL AREAS WITH FIELD

TED ON DRAWINGS ARE ES ADDITIONAL UNFORESEEN ICABLE LOCAL CODES AND SOCIATED WORK OF OTHER ARY CIRCUITRY, SHALL BE S COMPLETE AND IN SAFE WORKING WITH OTHER TRADES.

E DIAGRAMMATIC. SIZE AND C AND COORDINATE OTHER DITIONS SHALL DETERMINE ACTUAL NOT BE USED IN INTERIOR EXPOSED SE INDICATED, BRANCH CIRCUITS

120-VOLT, 20A CIRCUIT WIRING NG SHALL BE 10 AWG, OVER 140 OVER 220 FEET LONG SHALL BE 6 DING TO THE NATIONAL ELECTRICAL ARE FOR TOTAL LENGTH OF

(IT LIGHTS TO NON-SWITCHED LEG

LANS AND COORDINATE WITH N AND MOUNTING HEIGHT OF ALL R TO ROUGH-IN. ALL DEVICE RE APPROXIMATE. FINAL VERIFIED WITH ASSOCIATED

VINGS FOR EXACT LOCATION AND QUIPMENT. COORDINATE ALL WITH MECHANICAL CONTRACTOR.

DLLED BY SWITCHING DEVICE AREA UNLESS OTHERWISE NOTED. ENT TO LIGHT FIXTURE INDICATES A SWITCH WITH THE SAME

ONS ARE SHOWN FOR GENERAL IATE SENSOR LOCATIONS AND URER'S RECOMMENDATIONS FOR

ADJACENT TO SWITCHING DEVICE,

UTILZE COMBINED POWER & E #MCPPCS DUO (OR EQUAL) ROLS ARE INDICATED.

ISCONNECTS SHALL BE SIZED PER

CIRCUIT BREAKER, DISCONNECT H SELECTED EQUIPMENT WINGS PRIOR TO PLACING ORDER IANCES AS REQUIRED.

LOSURES RATING SHALL BE NEMA 1 FOR EXTERIOR. IN COASTAL TING FOR EXTERIOR ENCLOSURES

REQUIREMENTS BY OTHERS.

ETRATIONS AT RATED WALLS TO

ATIVE FIRE ALARM SYSTEM TO ALARM INITIATING DEVICES, ANCES, CONTROL PANEL, S, DUCT DETECTORS, PLIES AND WIRING PER ACTOR SHALL ENGAGE THE RE ALARM INSTALLATION COMPANY **PART 1 GENERAL INSTRUCTIONS**

- **1-1 GENERAL REQUIREMENTS**
- 1. ALL REQUIREMENTS IN THE ARCHITECTURAL SPECIFICATIONS, ARCHITECTURAL GENERAL NOTES AND THE GENERAL AND SUPPLEMENTARY CONDITIONS OF THESE SPECIFICATIONS APPLY TO THIS SECTION AND DIVISION. WHERE THE REQUIREMENTS OF THIS SECTION AND DIVISION EXCEED THOSE OF THE ARCHITECTURAL SPECIFICATIONS AND ARCHITECTURAL GENERAL NOTES, THIS SECTION AND DIVISION TAKE PRECEDENCE. BECOME THOROUGHLY FAMILIAR WITH ALL REQUIREMENTS THAT AFFECT THIS DIVISION, SECTION OR BOTH. WORK 1-8 PROTECTION OF EQUIPMENT AND MATERIALS REQUIRED UNDER THIS DIVISION INCLUDES ALL MATERIAL. EQUIPMENT. APPLIANCES, AND LABOR REQUIRED TO COMPLETE THE ENTIRE ELECTRICAL SYSTEM AS REQUIRED BY THE DRAWINGS AND SPECIFICATIONS, OR REASONABLY INFERRED TO BE NECESSARY TO FACILITATE EACH SYSTEM'S FUNCTIONALITY AS IMPLIED BY THE DESIGN AND THE EQUIPMENT SPECIFIED.
- 2. THE SPECIFICATIONS AND DRAWINGS FOR THE PROJECT ARE COMPLEMENTARY. AND PORTIONS OF THE WORK DESCRIBED IN ONE, SHALL BE PROVIDED AS IF DESCRIBED IN BOTH. IN THE EVENT OF DISCREPANCIES, NOTIFY THE ENGINEER AND REQUEST CLARIFICATION PRIOR TO PROCEEDING WITH THE WORK INVOLVED.
- 3. DRAWINGS ARE GRAPHIC REPRESENTATIONS OF THE WORK UPON WHICH THE CONTRACT IS BASED. THEY SHOW THE MATERIALS AND THEIR RELATIONSHIP TO ONE ANOTHER, INCLUDING SIZES, SHAPES, LOCATIONS, AND CONNECTIONS. THEY ALSO CONVEY THE SCOPE OF WORK, INDICATING THE INTENDED GENERAL ARRANGEMENT OF THE EQUIPMENT, FIXTURES, OUTLETS AND CIRCUITS WITHOUT SHOWING ALL OF THE EXACT DETAILS AS TO ELEVATIONS, OFFSETS, CONTROL LINES, AND OTHER INSTALLATION REQUIREMENTS. USE THE DRAWINGS AS A GUIDE WHEN LAYING OUT THE WORK AND TO VERIFY THAT MATERIALS AND EQUIPMENT 1-9 SUBSTITUTIONS WILL FIT INTO THE DESIGNATED SPACES AND WHICH, WHEN INSTALLED PER MANUFACTURERS' REQUIREMENTS, WILL ENSURE A COMPLETE, COORDINATED, SATISFACTORY AND PROPERLY OPERATING SYSTEM.
- 4. DRAWINGS ARE SCHEMATIC IN NATURE, SHOW THE VARIOUS COMPONENTS OF THE SYSTEMS APPROXIMATELY TO SCALE AND ATTEMPT TO INDICATE HOW THEY SHALL BE INTEGRATED WITH OTHER PARTS OF THE WORK. FIGURED DIMENSIONS TAKE PRECEDENCE TO SCALED DIMENSIONS. DETERMINE EXACT LOCATIONS BY JOB MEASUREMENTS, BY CHECKING THE REQUIREMENTS OF OTHER TRADES, AND BY REVIEWING ALL CONTRACT DOCUMENTS. CORRECT ERRORS THAT COULD HAVE BEEN AVOIDED BY PROPER CHECKING AND INSPECTION, AT NO ADDITIONAL COST. 5. SPECIFICATIONS DEFINE THE QUALITATIVE REQUIREMENTS FOR PRODUCTS, MATERIALS. AND WORKMANSHIP UPON WHICH THE CONTRACT IS BASED.

1-2 DEFINITIONS

- WHENEVER USED IN THESE SPECIFICATIONS OR DRAWINGS, THE FOLLOWING TERMS SHALL HAVE THE INDICATED MEANINGS: 1. FURNISH: TO SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING,
- UNPACKING, ASSEMBLING, INSTALLING, AND SIMILAR OPERATIONS. 2. INSTALL: TO PERFORM ALL OPERATIONS AT THE PROJECT SITE, INCLUDING, BUT NOT LIMITED TO, AND AS REQUIRED: UNLOADING, UNPACKING, ASSEMBLING, ERECTING, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, TESTING, COMMISSIONING, STARTING UP AND SIMILAR OPERATIONS, COMPLETE, AND READY FOR THE INTENDED USE
- 3. PROVIDE: TO FURNISH AND INSTALL COMPLETE, AND READY FOR THE INTENDED USE. 4. FURNISHED BY OWNER (OR OWNER-FURNISHED) OR FURNISHED BY OTHERS: AN ITEM FURNISHED BY THE OWNER OR UNDER OTHER DIVISIONS OR CONTRACTS, AND INSTALLED UNDER THE REQUIREMENTS OF THIS DIVISION, COMPLETE, AND READY FOR THE INTENDED USE, INCLUDING ALL ITEMS AND SERVICES INCIDENTAL TO THE WORK NECESSARY FOR PROPER INSTALLATION AND OPERATION. INCLUDE THE INSTALLATION UNDER THE WARRANTY REQUIRED BY THIS DIVISION.
- 5. ENGINEER: WHERE REFERENCED IN THIS DIVISION, "ENGINEER" IS THE ENGINEER OF RECORD AND THE DESIGN PROFESSIONAL FOR THE WORK UNDER THIS DIVISION. AND IS A CONSULTANT TO, AND AN AUTHORIZED REPRESENTATIVE OF, THE ARCHITECT, AS DEFINED IN THE GENERAL AND/OR SUPPLEMENTARY CONDITIONS. WHEN USED IN THIS DIVISION, IT MEANS INCREASED INVOLVEMENT BY. AND OBLIGATIONS TO, THE ENGINEER, IN ADDITION TO INVOLVEMENT BY, AND **OBLIGATIONS TO, THE "ARCHITECT"**
- 6. AHJ: THE LOCAL CODE AND/OR INSPECTION AGENCY, AUTHORITY HAVING JURISDICTION OVER THE WORK.
- 7. NRTL: NATIONALLY RECOGNIZED TESTING LABORATORY, AS DEFINED AND LISTED BY OSHA IN 29 CFR 1910.7 (E.G., UL, ETL, CSA), AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT
- 3. THE TERMS "EQUIVALENT". OR "EQUAL" ARE USED SYNONYMOUSLY AND SHALL MEAN "ACCEPTED BY OR ACCEPTABLE TO THE ENGINEER AS EQUIVALENT TO THE ITEM OR MANUFACTURER SPECIFIED". "EQUIVALENT" OR "EQUAL" PRODUCTS SHALL BE LABELED, LISTED, CERTIFIED, OR ALL THREE, BY AN NRTL. AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT.

1-3 PRE-BID SITE VISIT

1. PERSONALLY INSPECT THE SITE OF THE PROPOSED WORK AND BECOME FULLY INFORMED OF CONDITIONS UNDER WHICH THE WORK IS TO BE DONE. FAILURE TO DO SO WILL NOT BE CONSIDERED SUFFICIENT JUSTIFICATION TO REQUEST OR OBTAIN EXTRA COMPENSATION OVER AND ABOVE THE CONTRACT PRICE.

1-4 MATERIAL AND WORKMANSHIP

1. PROVIDE ALL MATERIAL AND EQUIPMENT NEW AND IN FIRST CLASS CONDITION. 1-11 TRAINING PROVIDE MARKINGS OR A NAMEPLATE FOR ALL MATERIAL AND EQUIPMENT IDENTIFYING THE MANUFACTURER AND PROVIDING SUFFICIENT REFERENCE TO ESTABLISH QUALITY, SIZE AND CAPACITY. ALL WORKMANSHIP SHALL BE OF THE FINEST POSSIBLE BY EXPERIENCED MECHANICS OF THE PROPER TRADE. IN GENERAL, PROVIDE THE FOLLOWING QUALITY GRADE(S) FOR ALL MATERIALS AND EQUIPMENT (LIGHT DUTY AND RESIDENTIAL TYPE EQUIPMENT WILL NOT BE ACCEPTABLE):

2. COMMERCIAL SPECIFICATION GRADE.

- 3. PROVIDE ALL HOISTS, SCAFFOLDS, STAGING, RUNWAYS, TOOLS, MACHINERY AND EQUIPMENT REQUIRED FOR THE INSTALLATION AND PERFORMANCE OF THE ELECTRICAL WORK. STORE AND MAINTAIN MATERIAL AND EQUIPMENT IN CLEAN CONDITION, AND PROTECTED FROM WEATHER, MOISTURE, AND PHYSICAL DAMAGE. 1-12 WARRANTIES
- 4. FURNISH ONLY MATERIAL AND EQUIPMENT THAT ARE LISTED, LABELED, CERTIFIED, OR ALL THREE, BY A NATIONALLY RECOGNIZED TESTING LABORATORY, WHENEVER ANY LISTING OR LABELING EXISTS FOR THE TYPES OF MATERIAL AND EQUIPMENT SPECIFIED. AT A MINIMUM, GENERAL WORK PRACTICES FOR ELECTRICAL CONSTRUCTION SHALL BE IN ACCORDANCE WITH NECA 1 (LATEST EDITION), "STANDARD PRACTICES FOR GOOD WORKMANSHIP IN ELECTRICAL CONSTRUCTION".

1-5 MANUFACTURERS

- 1. IN OTHER ARTICLES WHERE LISTS OF MANUFACTURERS ARE INTRODUCED, SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE MANUFACTURERS SPECIFIED.
- 2. WHERE MANUFACTURERS ARE NOT LISTED, PROVIDE PRODUCTS SUBJECT TO COMPLIANCE WITH REQUIREMENTS FROM MANUFACTURERS THAT HAVE BEEN ACTIVELY INVOLVED IN MANUFACTURING THE SPECIFIED PRODUCT FOR NO LESS THAN 5 YEARS.

1-6 COORDINATION

1. COORDINATE ALL WORK WITH OTHER DIVISIONS AND TRADES SO THAT VARIOUS COMPONENTS OF THE ELECTRICAL SYSTEMS ARE INSTALLED AT THE PROPER TIME, FIT THE AVAILABLE SPACE, AND ALLOW PROPER SERVICE ACCESS TO ALL EQUIPMENT. REFER TO ALL DRAWINGS, INCLUDING, BUT NOT LIMITED TO, CIVIL ARCHITECTURAL, STRUCTURAL, MECHANICAL, AND PLUMBING, AND TO RELEVANT EQUIPMENT SUBMITTALS AND SHOP DRAWINGS TO DETERMINE THE EXTENT OF 1-13 MISCELLANEOUS REMODELING WORK CLEAR SPACES. MAKE ALL OFFSETS REQUIRED TO CLEAR EQUIPMENT, BEAMS AND OTHER STRUCTURAL MEMBERS, AND TO FACILITATE CONCEALING RACEWAYS IN THE MANNER ANTICIPATED IN THE DESIGN. PROVIDE MATERIALS WITH TRIM THAT WILL FIT PROPERLY THE TYPES OF CEILING, WALL, OR FLOOR FINISHES ACTUALLY INSTALLED.

1-7 ORDINANCES, CODES, AND CLIENT STANDARDS

- 1. COMPLY WITH NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS, STATE AND LOCAL BUILDING CODES, AND ALL OTHER APPLICABLE CODES AND ORDINANCES FOR PERFORMANCE, WORKMANSHIP, EQUIPMENT, AND MATERIALS. ADDITIONALLY, COMPLY WITH RULES AND REGULATIONS OF PUBLIC UTILITIES AND MUNICIPAL DEPARTMENTS AFFECTED BY CONNECTION OF SERVICES.
- 2. WHERE CONFLICTS BETWEEN VARIOUS CODES. ORDINANCES. RULES. AND REGULATIONS EXIST. COMPLY WITH THE MOST STRINGENT. WHEREVER REQUIREMENTS OF THESE SPECIFICATIONS, DRAWINGS, OR BOTH, EXCEED THOSE OF THE ABOVE ITEMS, THE REQUIREMENTS OF THESE SPECIFICATIONS, DRAWINGS, OR BOTH, SHALL GOVERN. CODE COMPLIANCE, AT A MINIMUM. IS MANDATORY. CONSTRUE NOTHING IN THESE CONSTRUCTION DOCUMENTS AS PERMITTING WORK

- NOT IN COMPLIANCE, AT A MINIMUM, WITH THESE CODES.
- 3. BRING ALL CONFLICTS OBSERVED BETWEEN CODES, ORDINANCES, RULES, REGULATIONS, REFERENCED STANDARDS, AND THESE DOCUMENTS TO THE
- 5. VERIFY THE LOADING OF EACH CIRCUIT AFFECTED BY THE REMODELING. DO NOT LOAD ENGINEER'S ATTENTION FOR FINAL RESOLUTION. CONTRACTOR WILL BE HELD CIRCUITS TO MORE THAN 80% OF ITS RATING 6. PROVIDE UPDATED, TYPED DIRECTORY FOR EACH PANELBOARD BEING USED OR MODIFIED RESPONSIBLE FOR ANY VIOLATION OF THE LAW. UNDER THIS CONTRACT. DESIGNATE NEW CIRCUITS AND SUITE BEING SERVED. SAFETY OF THE PUBLIC. OBTAIN AND PAY FOR ALL PERMITS FOR WORK IN THIS 7. NO BX CABLE SHALL BE INSTALLED FOR THIS PROJECT. DIVISION. 8. FLEXIBLE STEEL CONDUIT SHALL BE USED TO WIRE ALL LIGHT FIXTURES AND EQUIPMENT CONNECTIONS REQUIRED FOR VIBRATION OR EASE OF MAINTENANCE IN LENGTHS FROM 18 INCHES TO 72 INCHES ONLY. 9. CONDUIT AND CABLE ABOVE CEILING SHALL BE SUPPORTED BY A UNISTRUT AND ALL-THREAD
- 4. PROVIDE AND MAINTAIN ALL NECESSARY SIGNAL LIGHTS AND GUARDS FOR THE 1. STORE AND PROTECT FROM DAMAGE EQUIPMENT AND MATERIALS DELIVERED TO

- JOB SITE, IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS. FOR MATERIALS AND EQUIPMENT SUSCEPTIBLE TO CHANGING WEATHER CONDITIONS, DAMPNESS, OR TEMPERATURE VARIATIONS, STORE INSIDE IN PROPERLY CONDITIONED SPACES. FOR MATERIALS AND EQUIPMENT NOT SUSCEPTIBLE TO THESE CONDITIONS, COVER WITH WATERPROOF, TEAR-RESISTANT, HEAVY TARP OR POLYETHYLENE PLASTIC AS REQUIRED TO PROTECT FROM PLASTER, DIRT, PAINT, WATER, OR PHYSICAL DAMAGE. EQUIPMENT AND MATERIAL THAT HAS BEEN DAMAGED BY CONSTRUCTION ACTIVITIES WILL BE REJECTED, AND CONTRACTOR SHALL FURNISH NEW EQUIPMENT AND MATERIAL OF A LIKE KIND. 2. PLUG OR CAP OPEN ENDS OF CONDUITS WHILE STORED AND INSTALLED DURING
- CONSTRUCTION WHEN NOT IN USE, TO PREVENT THE ENTRANCE OF DEBRIS INTO THE SYSTEMS. 3. RE-ESTABLISH SERVICE TO EXISTING EQUIPMENT THAT MAY HAVE BEEN
- INTERRUPTED DUE TO REMODELING.

- 1. INCLUDE IN THE BASE BID THE PRODUCTS SPECIFICALLY NAMED IN THESE SPECIFICATIONS OR ON THE DRAWINGS. SUBMIT, IN THE FORM OF ALTERNATES, 2-1 BUILDING OPERATION WITH THE BID, PRODUCTS OF ANY OTHER MANUFACTURERS FOR SIMILAR USE, PROVIDED THE DIFFERENCES IN COST, IF ANY, ARE INCLUDED FOR EACH PROPOSED ALTERNATE. PRIOR TO THE BID DATE, SUBSTITUTIONS WILL NOT BE CONSIDERED UNLESS SUBMITTED TO THE ARCHITECT, FOR ENGINEER'S REVIEW, AT LEAST TEN CALENDAR DAYS PRIOR TO THE DATE FOR RECEIPT OF BIDS. INCLUDE THE NAME OF THE MATERIAL OR EQUIPMENT FOR WHICH IT IS TO BE SUBSTITUTED AND A COMPLETE DESCRIPTION OF THE PROPOSED SUBSTITUTE INCLUDING CUTSHEETS, PHOTOMETRIC DATA, AND ALL OTHER INFORMATION NECESSARY FOR AN EVALUATION FOR EACH SUCH REQUEST. PROVIDE FACTORY GENERATED 2-2 COINCIDENTAL DAMAGE POINT-BY-POINT CALCULATIONS FOR ALL EXTERIOR LIGHT FIXTURES (PHOTOMETRIC FILES SUPPLIED SO THE ENGINEER CAN GENERATE A POINT-BY-POINT DO NOT SUFFICE FOR THE POINT- BY-POINT CALCULATIONS). PROVIDE INTERIOR POINT-BY-POINT CALCULATIONS AT THE DISCRETION OF THE ENGINEER. SUBMIT A \$100.00 REVIEW FEE TO THE ENGINEER WITH EACH SUCH POINT-BY-POINT CALCULATION FOR USE OF ELECTRONIC BASE FILES.
- 2. THE ENGINEER WILL HAVE THE FINAL AUTHORITY AS TO WHETHER THE PRODUCT IS AN ACCEPTABLE REPLACEMENT TO THE SPECIFIED ITEM. THE PROPOSED SUBSTITUTION MAY ALSO BE REJECTED BY THE ARCHITECT FOR AESTHETIC 2-3 CUTTING AND PATCHING REASONS IF FELT NECESSARY OR DESIRABLE. IN THE EVENT THE PROPOSED SUBSTITUTIONS HEREIN DESCRIBED ARE REJECTED, FURNISH THE SPECIFIED ITEM.

1-10 SUBMITTALS

- 1. ASSEMBLE AND SUBMIT TO THE ARCHITECT, FOR ENGINEER'S REVIEW, MANUFACTURERS' PRODUCT LITERATURE FOR ALL MATERIAL AND ALL EQUIPMENT TO BE FURNISHED, INSTALLED, OR BOTH, UNDER THIS DIVISION, INCLUDING SHOP DRAWINGS, MANUFACTURERS' PRODUCT DATA AND PERFORMANCE SHEETS, SAMPLES, AND OTHER SUBMITTALS REQUIRED BY THIS DIVISION. PROVIDE THE NUMBER OF SUBMITTALS REQUIRED BY THE ARCHITECTURAL SPECIFICATIONS. BEFORE SUBMITTING, VERIFY THAT ALL MATERIALS AND EQUIPMENT SUBMITTED ARE MUTUALLY COMPATIBLE AND SUITABLE FOR THE INTENDED USE, FIT THE AVAILABLE SPACES, AND ALLOW AMPLE AND CODE-REQUIRED ROOM FOR ACCESS AND MAINTENANCE. SUBMITTALS SHALL CONTAIN THE FOLLOWING INFORMATION. SUBMITTALS NOT SO IDENTIFIED WILL BE RETURNED TO THE CONTRACTOR WITHOUT ACTION.
- A. THE PROJECT NAME AND LOCATION (STREET ADDRESS, FLOOR/SUITE NUMBER, 2-4 ROUGH-IN CITY AND STATE) B. THE APPLICABLE SPECIFICATION SECTION AND PARAGRAPH
- C. THE SUBMITTAL DATE. D. THE CONTRACTOR'S STAMP, WHICH SHALL CERTIFY THAT THE STAMPED
- DRAWINGS HAVE BEEN CHECKED BY THE CONTRACTOR, COMPLY WITH THE 2-5 SUPPORT SYSTEMS DRAWINGS AND SPECIFICATIONS, AND HAVE BEEN COORDINATED WITH OTHER TRADES.
- E. BLANK PAGE FOR PLACEMENT OF ENGINEERS REVIEW STAMP. F. TRANSMIT SUBMITTALS AS EARLY AS REQUIRED TO SUPPORT THE PROJECT SCHEDULE. ALLOW TWO WEEKS FOR ENGINEER REVIEW TIME, PLUS MAILING TIME, ALLOW AN ADDITIONAL TWO WEEKS FOR RE-SUBMITTALS, IF REQUIRED. TRANSMIT SUBMITTALS AS SOON AS POSSIBLE AFTER NOTICE TO PROCEED AND BEFORE CONSTRUCTION STARTS. THE ENGINEER'S SUBMITTAL REVIEWS WILL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS IN DIMENSIONS, DETAILS, SIZE OF MEMBERS, OR QUANTITIES; OR FOR OMITTING COMPONENTS OR FITTINGS; OR FOR NOT COORDINATING ITEMS WITH ACTUAL BUILDING CONDITIONS.

- 1. AT A TIME MUTUALLY AGREED UPON BETWEEN THE OWNER AND CONTRACTOR, TRAIN OWNER'S DESIGNATED PERSONNEL ON THE OPERATION AND MAINTENANCE OF THE EQUIPMENT PROVIDED FOR THIS PROJECT.
- 2. PROVIDE TRAINING TO INCLUDE BUT NOT BE LIMITED TO AN OVERVIEW OF THE SYSTEM AND/OR EOUIPMENT AS IT RELATES TO THE FACILITY AS A WHOLE; OPERATION AND MAINTENANCE PROCEDURES AND SCHEDULES RELATED TO STARTUP AND SHUTDOWN, TROUBLESHOOTING, SERVICING, PREVENTIVE MAINTENANCE AND APPROPRIATE OPERATOR INTERVENTION; AND REVIEW OF DATA INCLUDED IN THE OPERATION AND MAINTENANCE INSTRUCTIONS.
- 3. SCHEDULE TRAINING WITH OWNER WITH AT LEAST 30 DAYS IN ADVANCE NOTICE.

1. WARRANT EACH SYSTEM AND EACH ELEMENT THEREOF AGAINST ALL DEFECTS DUE TO FAULTY WORKMANSHIP, INSTALLATION, PRODUCT DESIGN OR MATERIAL FOR A PERIOD OF 12 MONTHS FROM DATE OF SUBSTANTIAL COMPLETION, UNLESS SPECIFIC ITEMS ARE NOTED TO CARRY A LONGER WARRANTY IN THE CONSTRUCTION DOCUMENTS OR MANUFACTURER'S STANDARD WARRANTY EXCEEDS 12 MONTHS. REMEDY ALL DEFECTS, OCCURRING WITHIN

- THE WARRANTY PERIOD(S), AS STATED IN THE GENERAL CONDITIONS AND DIVISION 1. 2. ALSO WARRANT THE FOLLOWING ADDITIONAL ITEMS: A. ALL RACEWAYS ARE FREE FROM OBSTRUCTIONS, HOLES, CRUSHING, OR BREAKS OF ANY
- NATURE. B. ALL RACEWAY SEALS ARE EFFECTIVE. C. THE ENTIRE ELECTRICAL SYSTEM IS FREE FROM ALL SHORT CIRCUITS AND UNWANTED
- OPEN CIRCUITS AND GROUNDS. 3. THE ABOVE WARRANTIES SHALL INCLUDE LABOR AND MATERIAL. MAKE REPAIRS OR
- REPLACEMENTS WITHOUT ANY ADDITIONAL COSTS TO THE OWNER. 4. PERFORM THE REMEDIAL WORK PROMPTLY, UPON WRITTEN NOTICE FROM THE ENGINEER OR OWNFR.
- 5. AT THE TIME OF SUBSTANTIAL COMPLETION, DELIVER TO THE OWNER ALL WARRANTIES, IN WRITING AND PROPERLY EXECUTED, INCLUDING TERM LIMITS FOR WARRANTIES EXTENDING EYOND THE ONE YEAR PERIOD, EACH WARRANTY INSTRUMENT BEING ADDRESSED TO THE WNER AND STATING THE COMMENCEMENT DATE AND TERM.

- . PROVIDE ALL DEMOLITION OF EXISTING ELECTRICAL SYSTEMS AND NEW ELECTRICAL SYSTEM MODIFICATIONS REQUIRED BECAUSE OF BUILDING REMODELING, AS NOTED ON THE DRAWINGS, OR NECESSARY FOR PROPER OPERATION AND NEW CONSTRUCTION. REMOVE ALL ABANDONED CABLES AND WIRING ABOVE ACCESSIBLE CEILINGS AND VENTILATION 2-8 ACCESS DOORS SHAFTS.
- 2. EXERCISE EXTREME CAUTION IN THE INSTALLATION OF THIS WORK TO AVOID AN ELECTRICAL SHOCK ACCIDENT. THE FACILITY IS EXISTING AND MAY REMAIN IN OPERATION DURING THIS WORK. COORDINATE ALL WORK SCHEDULES WITH THE BUILDING MANAGEMENT PRIOR TO DE-ENERGIZING ANY ELECTRICAL CIRCUITS TO AVOID CONFLICTS WITH ANY OTHER TENANT'S OPERATION. ALLOW 3 DAYS PRIOR CONFIRMED NOTIFICATION. 3. VERIFY THAT NEW AND EXISTING TO REMAIN INSTALLATIONS ARE CODE COMPLIANT, AND 2-9 EQUIPMENT FURNISHED BY OTHERS
- MAKE CORRECTIONS AS REQUIRED. 4. DEVELOP AND MAINTAIN A SET OF "RED-LINE AS-BUILT" DRAWINGS. THESE DRAWINGS
- SHALL BE MAINTAINED AT THE PROJECT CONSTRUCTION SITE AND AVAILABLE TO THE ENGINEER UPON REQUEST. THEY SHALL BE CURRENT AND SHALL REFLECT ALL ACTUAL ASPECTS OF THE ELECTRICAL INSTALLATION WHICH DEVIATED FROM THE PRESENT ELECTRICAL DESIGN DRAWINGS. THESE DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER

ELECTRICAL SPECIFICATIONS

(END OF PART 1)

PART 2 ELECTRICAL WORK

JUNCTION BOX.

ELECTRICAL DEVICES.

PUNCH LIST ITEMS.

OF 12" ABOVE THE CEILING.

1. COMPLY WITH THE SCHEDULE OF OPERATIONS AS OUTLINED IN THE ARCHITECTURAL PORTIONS OF THIS SPECIFICATION. BUILDING FACILITY SHALL BE MAINTAINED IN CONTINUOUS OPERATION. ACCOMPLISH WORK THAT REQUIRES INTERRUPTION OF BUILDING AND BUILDING TENANT OPERATIONS AT A TIME WHEN THE BUILDING IS NOT IN OPERATION, AND ONLY WITH WRITTEN APPROVAL OF BUILDING OWNER AND/OR AFFECTED TENANT(S). COORDINATE INTERRUPTION OF BUILDING OPERATION WITH THE OWNER AND/OR TENANT(S) A MINIMUM OF DAYS IN ADVANCE OF WORK.

1. REPAIR ALL STREETS, SIDEWALKS, DRIVES, PAVING, WALLS, FLOORING, FINISHES, AND OTHER FACILITIES DAMAGED IN THE COURSE OF THIS WORK. REPAIR MATERIALS SHALL MATCH EXISTING CONSTRUCTION. ALL BACKFILLING AND REPAIRING SHALL MEET ALL REOUIREMENTS OF THE OWNER, CITY AND OTHERS HAVING JURISDICTION. REPAIR WORK SHALL BE FIRST CLASS UTILIZING THE BEST MATERIALS AND TRADESMEN TO PERFORM ALL 2-13 SYSTEM START UP NECESSARY REPAIR WORK. CONFORM TO ALL REQUIREMENTS OF DIVISION 2 OF THESE SPECIFICATIONS.

- 1. FOLLOWING THE REQUIREMENTS IN DIVISION 1, CUT WALLS, FLOORS, CEILINGS, AND OTHER PORTIONS OF THE FACILITY AS REQUIRED TO PERFORM WORK UNDER THIS DIVISION. OBTAIN PERMISSION OF THE ARCHITECT, OWNER, AND OWNER'S DESIGNATED STRUCTURAL ENGINEER BEFORE DOING ANY CUTTING. CUT ALL HOLES AS SMALL AS POSSIBLE. PATCH WALLS, FLOORS, AND OTHER PORTIONS OF THE FACILITY AS REQUIRED BY WORK UNDER THIS DIVISION. ALL PATCHING SHALL BE FIRST CLASS AND SHALL MATCH THE ORIGINAL MATERIAL AND CONSTRUCTION, INCLUDING FIRE RATINGS IF APPLICABLE. DO NOT CUT OR PENETRATE MATERIAL AND CONSTRUCTION, INCLUDING FIRE RATINGS. DO NOT CUT OR PENETRATE STRUCTURAL ELEMENTS.
- . BEFORE ANY NEW FLOOR CORES ARE MADE, PROVIDE A LETTER FROM THE BUILDING OWNERS STRUCTURAL ENGINEER APPROVING THE LOCATION OF EACH NEW FLOOR CORE. THE LETTER SHALL ADDRESS CORES FOR FOR CONDUIT AND POKE-THRUS. WHERE A LETTER IS NOT SUPPLIED TO THE ENGINEER AND ARCHITECT OF RECORD BEFORE ANY FLOOR CORES ARE MADE, THE CONTRACTOR ASSUMES ALL LIABILITY FOR ANY AND ALL ISSUES THAT MAY OR COULD ARISE FROM CORING THE FLOOR.

. COORDINATE WITHOUT DELAY ALL ROUGHING-IN WITH OTHER DIVISIONS. CONCEAL ALL PART 3 EXISTING EQUIPMENT REUSE AND REMOVAL RACEWAYS EXCEPT IN UNFINISHED AREAS AND WHERE OTHERWISE INDICATED ON THE DRAWINGS.

- 1. STEEL SLOTTED SUPPORT SYSTEMS (SLOTTED CHANNEL): COMPLY WITH MFMA-3, FACTORY-FABRICATED COMPONENTS FOR FIELD ASSEMBLY; 12-GAUGE, 1-5/8-INCH BY 1-5/8-INCH; COOPER B-LINE, ERICO INTERNATIONAL CORPORATION, POWER-STRUT, THOMAS & BETTS CORPORATION, UNISTRUT.
- 2. FINISHES: A. METALLIC COATINGS: HOT-DIP GALVANIZED AFTER FABRICATION AND APPLIED ACCORDING TO MFMA-3
- NONMETALLIC COATINGS: MANUFACTURER'S STANDARD PVC, POLYURETHANE, OR POLYESTER COATING APPLIED ACCORDING TO MFMA-3. PAINTED COATINGS: MANUFACTURER'S STANDARD PAINTED COATING APPLIED
- ACCORDING TO MFMA-3. D. STAINLESS STEEL: TYPE 304, PER ASTM A240.
- ALUMINUM (EXTRUDED): TYPE 6063-T6, PER ASTM B221. FIELD FABRICATION:
- A. WHERE FIELD CUTTING OF STANDARD LENGTHS OF CHANNEL ARE REQUIRED, MAKE CUTS STRAIGHT AND PERPENDICULAR TO MANUFACTURED SURFACES.
- B. FOR FIELD-CUT OR DAMAGED SURFACES OF COATED CHANNELS, DRESS CUT ENDS, (END OF PART 3) DAMAGED SURFACES, OR BOTH, WITH AN ABRASIVE MATERIAL (E.G., FILE, GRINDING STONE, OR SIMILAR) AND CLEANSER TO REMOVE OILS, RUST, SHARP EDGES AND SHARDS. PART 4 BASIC ELECTRICAL MATERIALS AND METHODS C. FOR CHANNEL WITH A FACTORY-APPLIED COATING, RE-FINISH CUT EDGES WITH A COATING COMPATIBLE WITH THE FACTORY FINISH AND AS RECOMMENDED BY THE 4-1 METHODS MANUFACTURER (E.G., MANUFACTURER'S TOUCH- UP PAINT OR ZINC-RICH COLD-GALVANIZING COMPOUND, AS APPLICABLE).

2-6 PENETRATIONS

- . COORDINATE SLEEVE SELECTION AND APPLICATION WITH SELECTION AND APPLICATION OF FIRE-STOPPING MATERIALS. MAINTAIN FIRE AND UL RATING OF WALL AND FLOOR TYPE. 2. WALLS AND FLOORS:
- A. SLEEVES FOR RACEWAYS AND CABLES:
- B. STEEL PIPE SLEEVES: ASTM A 53/A 53M, TYPE E, GRADE B, SCHEDULE 40, GALVANIZED STEEL, PLAIN ENDS AND DRIP RINGS. C. CAST-IRON PIPE SLEEVES: CAST OR FABRICATED "WALL PIPE," EQUIVALENT TO
- DUCTILE-IRON PRESSURE PIPE, WITH PLAIN ENDS AND INTEGRAL WATERSTOP, UNLESS OTHERWISE INDICATED. D. SLEEVES FOR RECTANGULAR OPENINGS: GALVANIZED SHEET STEEL WITH MINIMUM
- 0.052-INCH THICKNESS AS INDICATED AND OF LENGTH TO SUIT APPLICATION.

2-7 FIRE STOPPING FLOOR AND WALL PENETRATIONS

- 1. FIRE RESISTANT PENETRATION SEALANTS: TWO PART, FOAMED IN PLACE, SILICONE SEALANT FORMULATED FOR USE IN THROUGH PENETRATION FIRE STOPPING AROUND CABLES, RACEWAYS, AND CABLE TRAY PENETRATIONS THROUGH FIRE RATED WALLS AND FLOORS. SEALANTS AND ACCESSORIES SHALL HAVE FIRE RESISTANCE RATINGS INDICATED, AS 4-1-2 RACEWAY INSTALLATION ESTABLISHED BY TESTING IDENTICAL ASSEMBLIES IN ACCORDANCE WITH ASTM E 814, BY UNDERWRITERS' LABORATORIES, INC., OR OTHER NRTL ACCEPTABLE TO AHJ.
- 2. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING:
- A. "3M FIRE STOP FOAM #2001," 3M CORP. B. "METACAULK 835+," RECTORSEAL.
- C. "SPECSEAL PENSIL 200 SILICONE FOAM," SPECIFY TECHNOLOGY INC.
- D. "FIRE STOP SYSTEM," UNITED STATES GYPSUM COMPANY.

. PROVIDE ACCESS DOORS IN CEILINGS AND WALLS, WHERE INDICATED OR REQUIRED FOR ACCESS OR MAINTENANCE TO CONCEALED EQUIPMENT INSTALLED UNDER THIS SECTION. PROVIDE CONCEALED HINGES, SCREWDRIVER-TYPE LOCK, AND ANCHOR STRAPS. MANUFACTURED BY MILCOR, ZURN, TITUS, OR EQUAL. OBTAIN ARCHITECT'S APPROVAL OF TYPE, SIZE, LOCATION AND COLOR BEFORE ORDERING.

. PROVIDE NECESSARY EQUIPMENT AND ACCESSORIES THAT ARE NOT PROVIDED BY THE EQUIPMENT SUPPLIER OR OWNER TO COMPLETE INSTALLATION OF EQUIPMENT FURNISHED BY OTHERS, IN LOCATIONS AS INDICATED ON THE DRAWINGS, SPECIFIED HEREIN, OR BOTH. EQUIPMENT AND ACCESSORIES NOT PROVIDED BY THE EQUIPMENT SUPPLIER MAY INCLUDE SUCH ITEMS AS FLEXIBLE CORDS AND PLUGS, AS REQUIRED FOR PROPER OPERATION OF THE COMPLETE SYSTEM, IN ACCORDANCE WITH THE MANUFACTURERS' INSTRUCTIONS.

- 2. MAINTAIN ALL CORRECT ROUGH-IN DIMENSIONS, AND VERIFY THEM WITH ARCHITECT, OWNER'S REPRESENTATIVE, EQUIPMENT SUPPLIER, OR ALL THREE, PRIOR TO ROUGH-IN AND SERVICE INSTALLATIONS.
- 2-10 CLEANING 1. IN ADDITION TO THE REQUIREMENTS SET FORTH IN THE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS, REMOVE FROM THE PREMISES DIRT AND REFUSE RESULTING FROM THE PERFORMANCE OF THE ELECTRICAL WORK, AS REQUIRED, TO PREVENT ACCUMULATION. COOPERATE IN MAINTAINING REASONABLY CLEAN PREMISES AT ALL TIMES. IMMEDIATELY PRIOR TO FINAL INSPECTION, MAKE A FINAL CLEANUP OF DIRT AND REFUSE RESULTING FROM THE WORK. CLEAN ALL MATERIAL AND EQUIPMENT INSTALLED UNDER THIS DIVISION. REMOVE DIRT, DUST, PLASTER, STAINS AND FOREIGN MATTER FROM ALL SURFACES. TOUCH UP AND RESTORE ALL DAMAGED FINISHES TO THEIR ORIGINAL CONDITION.

2-11 ADJUSTING, ALIGNING AND TESTING

- 1. ADJUST, ALIGN, AND TEST ALL ELECTRICAL EQUIPMENT ON THIS PROJECT PROVIDED UNDER THIS DIVISION AND ALL ELECTRICAL EQUIPMENT FURNISHED BY OTHERS FOR INSTALLATION OR WIRING UNDER THIS DIVISION, FOR PROPER OPERATION 2. TEST ALL SYSTEMS AND EQUIPMENT ACCORDING TO THE REQUIREMENTS IN NETA ATS
- (LATEST EDITION) AND ALL ADDITIONAL REQUIREMENTS SPECIFIED IN FOLLOWING SECTIONS. PROVIDE COPIES OF ALL TEST REPORTS TO THE ENGINEER OF RECORD. 3. MAINTAIN THE FOLLOWING ON THE PROJECT PREMISES AT ALL TIMES: A TRUE RMS READING VOLTMETER, A TRUE RMS READING AMMETER, AND A MEGOHMMETER INSULATION RESISTANCE TESTER. PROVIDE TEST DATA READINGS AS REQUESTED OR AS REQUIRED BY

2-12 EOUIPMENT IDENTIFICATION

THE ENGINEER.

- 1. PROVIDE EQUIPMENT IDENTIFICATION NAMEPLATES: A. ON ALL PANELBOARDS, SWITCHES, STARTERS, AND DIMMERS, A/C UNITS, AND METERS.
- B. WHERE INDICATED ON THE DRAWINGS. C. RECEPTACLE FACEPLATES AND JUNCTION BOXES WITH CIRCUIT AND PANEL.
- D. LIGHT SWITCH FACEPLATES BACKSIDE WITH CIRCUIT AND PANEL. 2. NAMEPLATES:
- A. ENGRAVED, CONTRASTING COLOR, THREE-LAYER, LAMINATED PLASTIC INDICATING THE NAME OF THE EQUIPMENT, LOAD, OR CIRCUIT AS DESIGNATED ON THE DRAWINGS AND IN THE SPECIFICATIONS
- B. SELF-ADHERING, WITH A PERMANENT, WEATHERPROOF ADHESIVE. C. ATTACHMENT METHOD SHALL BE ACCEPTABLE TO THE MANUFACTURERS OF THE EQUIPMENT TO WHICH THE NAMEPLATES ARE BEING APPLIED.
- D. COLOR: BLACK BACKGROUND WITH WHITE LETTERS FOR NORMAL POWER. LETTER HEIGHT: 1/4-INCH MINIMUM. E. LIGHT SWITCH FACEPLATES: PERMANENT BLACK MAGIC MARKER.

- 1. PRIOR TO STARTING UP THE ELECTRICAL SYSTEMS:
- A. CHECK ALL COMPONENTS AND DEVICES. B. LUBRICATE ITEMS ACCORDINGLY.
- TIGHTEN SCREWS AND BOLTS FOR CONNECTORS AND TERMINALS ACCORDING TO MANUFACTURER'S PUBLISHED TORQUE-TIGHTENING VALUES. IF MANUFACTURER'S TORQUE VALUES ARE NOT INDICATED, USE THOSE SPECIFIED IN UL 486A AND UL 486B.
- D. ADJUST TAPS ON EACH TRANSFORMER FOR RATED SECONDARY VOLTAGE. E. CHECK AND RECORD BUILDING'S SERVICE ENTRANCE VOLTAGE, GROUNDING CONDITIONS,
- GROUNDING RESISTANCE, AND PROPER PHASING. F. BALANCE ALL SINGLE-PHASE LOADS AT EACH PANELBOARD, REDISTRIBUTING BRANCH
- CIRCUIT CONNECTIONS UNTIL BALANCE IS ACHIEVED. DO NOT TYPE UP FINAL PANELBOARD DIRECTORIES UNTIL ALL REBALANCING AND REDISTRIBUTION OF CIRCUITS 4-1-3 BUSHINGS AND LOCKNUTS ARE COMPLETE. G. REPLACE ALL BURNED-OUT LAMPS, LAMPS NOT UNIFORM IN COLOR, AND LAMPS USED FOR
- TEMPORARY CONSTRUCTION LIGHTING IN PERMANENT LIGHT FIXTURES. H. AFTER ALL SYSTEMS HAVE BEEN INSPECTED AND ADJUSTED, CONFIRM ALL OPERATING
- FEATURES REQUIRED BY THE DRAWINGS AND SPECIFICATIONS AND MAKE FINAL ADJUSTMENTS AS NECESSARY.

(END OF PART 2)

- REMOVE ALL EXISTING WIRING, LIGHT FIXTURES, EXPOSED CONDUITS AND OTHER 4-1-4 CONDUCTORS AND CABLES ELECTRICAL INSTALLATIONS NOT REUSED PRIOR TO SUBSTANTIAL COMPLETION OF THE 1. CONDUCTOR MATERIAL: WORK
- 2. EXISTING RACEWAYS MAY BE REUSED IF THEIR POINTS OF TERMINATION ARE SUITABLE; IF THEY MEET OR EXCEED CURRENT APPLICABLE CODES; IF THEY ARE CLEAN INSIDE WITH NO EVIDENCE OF RUST OR BURRS; IF THEY ARE FREE FROM CRACKS, FLATTENED SECTIONS OR SHARP BENDS; AND, IF SUITABLY LOCATED TO AVOID CONFLICTS WITH OTHER TRADES OR INSTALLATIONS. CAREFULLY "FISH" ALL EXISTING CONDUITS REUSED UNDER THIS CONTRACT TO REMOVE ALL DEBRIS AND OBSTRUCTIONS, AND SWAB UNTIL ALL MOISTURE IS REMOVED.
- 3. CUT, PATCH, AND REPAIR WHERE REQUIRED FOR NEW ELECTRICAL INSTALLATIONS, AND PATCH AND REPAIR ALL SURFACE DAMAGE RESULTING FROM THIS WORK. CUT FLUSH WITH THE FLOOR AND PLUG AT BOTH ENDS, RACEWAYS STUBBED ABOVE THE FLOOR AND NOT USED AT SUBSTANTIAL COMPLETION OF THE WORK.
- 4. RELOCATE ALL EXISTING ELECTRICAL SYSTEMS REOUIRED TO BE IN OPERATION AT SUBSTANTIAL COMPLETION OF THE CONTRACT, IF REQUIRED, AS A RESULT OF WORK INCLUDED UNDER THIS CONTRACT, EVEN IF NOT SPECIFICALLY INDICATED IN THE DRAWINGS OR SPECIFICATIONS.

4-1-1 RACEWAYS

- 1. METALLIC CONDUIT AND TUBING: A. ELECTRICAL METALLIC TUBING AND FITTINGS (EMT): ANSI C80.3, UL 797.
- B. FLEXIBLE METAL CONDUIT (FMC): ZINC-COATED STEEL OR ALUMINUM, UL 1. C. INTERMEDIATE METAL CONDUIT (IMC): HOT-DIP GALVANIZED RIGID STEEL CONDUIT:
- ANSI C80.6, UL 1242.
- D. LIQUID TIGHT FLEXIBLE METAL CONDUIT (LFMC): FLEXIBLE STEEL CONDUIT WITH PVC JACKET: UL 360. E. RIGID METAL CONDUIT (RMC): HOT-DIP GALVANIZED RIGID STEEL CONDUIT (GRS): ANSI
- C80.1, UL 6.
- F. RIGID ALUMINUM CONDUIT (RAC): ANSI C80.5, UL 6A.
- G. PLASTIC COATED IMC, RMC, AND FITTINGS: NEMA RN 1, UL LISTED. H. IMC AND RMC FITTINGS: NEMA FB 1; COMPATIBLE WITH CONDUIT TYPE AND MATERIAL,
- UL LISTED 2. NON-METALIC CONDUIT AND TUBING:
- A. RIGID NONMETALLIC CONDUIT (RNC): SCHEDULE 40 PVC, 90 DEG C RATED, NEMA TC-2, UL 651; FITTINGS: NEMA TC 3, TC 6; UL 514, COMPATIBLE WITH CONDUIT/TUBING TYPE AND MATERIAL, UL LISTED.

- 1. INSTALL ALL RACEWAYS A MINIMUM OF 12" ABOVE SUSPENDED CEILINGS, CONCEALED IN WALLS OR FLOORS EXCEPT WHERE OTHERWISE INDICATED. FOR AREAS WHERE CONDUITS MUST BE ROUTED CLOSER THAN 12", WRITTEN APPROVAL FROM THE ENGINEER OF RECORD MUST BE OBTAINED.
- 2. PROVIDE RGSC FOR ALL CONDUITS RUN UNDERGROUND, EXPOSED TO WEATHER, OR EXPOSED TO OTHER HAZARDOUS CONDITIONS. PROVIDE RGSC INSTALLED BELOW GRADE WITH A CORROSION RESISTANT BONDED- PLASTIC OR APPROVED MASTIC COATING. THIS SHALL INCLUDE THE 90-DEGREE ELBOW BELOW GRADE AND THE ENTIRE VERTICAL TRANSITION TO ABOVE GRADE.
- 3. ALL OTHER RACEWAY MAY BE EMT WHERE APPROVED BY LOCAL CODE. USE COMPRESSION TYPE FITTINGS FOR EMT, WITH ALL FITTINGS UL LISTED FOR THE ENVIRONMENT IN WHICH THEY ARE USED.
- 4. AT CONTRACTOR'S OPTION, PVC CONDUIT MAY BE USED UNDERGROUND WHERE PERMITTED BY LOCAL CODE AND WHERE NOT SPECIFICALLY RESTRICTED BY THESE DOCUMENTS. WHEN USED, PROVIDE COATED GRS, AS SPECIFIED ABOVE, FOR ALL BENDS GREATER THAN 30 DEGREES, INCLUDING THE 90-DEGREE ELBOWS BELOW GRADE AND THE ENTIRE VERTICAL
- RISERS FOR TRANSITIONS FROM BELOW TO ABOVE GRADE OR ABOVE- SLAB. 5. USE FMC FOR FINAL CONNECTION TO EACH MOTOR AND TRANSFORMER, AND TO ANY DEVICE THAT WOULD OTHERWISE TRANSMIT MOTION, VIBRATION, OR NOISE. WHERE EXPOSED TO LIQUIDS, VAPORS OR SUNLIGHT, USE LFMC. PROVIDE ALL FMC AND LFMC WITH AN INSULATED BONDING CONDUCTOR.
- 6. USE ONLY METAL RACEWAYS FOR ALL POWER WIRING FROM THE OUTPUT OF VARIABLE FREQUENCY DRIVES TO THEIR RESPECTIVE MOTORS.

WITHIN 10 DAYS OF SUBSTANTIAL COMPLETION OF THE WORK AND MUST INCLUDE ALL

ROD TRAPEZE. EACH PIECE OF CONDUIT SHALL BE SECURED TO THE TRAPEZE WITH A

CONDUIT STRAP. THE TRAPEZE SUPPORTS SHALL BE INSTALLED PER CODE PLUS A MINIMUM

COMPATIBILITY WITH EXPANSION AND DUAL SWITCHING, NO CHANGE ORDER SHALL BE

APPROVAL OF THE ENGINEER OF RECORD. CIRCUIT NUMBERS SHALL BE INDICATED ON EACH

REMOVAL OF PANEL COVERS, JUNCTION BOX COVERS, RECEPTACLES, SWITCHES, AND OTHER

10. PRIOR TO BID, THE EXISTING LIGHTING INSTALLATION SHALL BE INSPECTED TO VERIFY

11. NO CHANGES SHALL BE MADE TO THE CIRCUITING SHOWN WITHOUT PRIOR WRITTEN

12. AT THE TIME OF FINAL PUNCH LIST, (3) ELECTRICIANS SHALL BE PRESENT TO ASSIST IN THE

ISSUED DURING CONSTRUCTION FOR CHANGES DUE TO INCOMPATIBILITY

7. INSTALL RACEWAYS PARALLEL AND PERPENDICULAR TO BUILDING LINES. 8. INSTALL RACEWAYS TO REQUIREMENTS OF STRUCTURE AND TO REQUIREMENTS OF ALL

OTHER WORK ON THE PROJECT. INSTALL RACEWAY TO CLEAR ALL OPENINGS, DEPRESSIONS PIPES, DUCTS, REINFORCING STEEL, AND OTHER IMMOVABLE OBSTACLES. INSTALL RACEWAYS SET IN FORMS FOR CONCRETE STRUCTURE IN SUCH A MANNER THAT INSTALLATION WILL NOT AFFECT THE STRENGTH OF THE STRUCTURE. EXCEPT WHERE APPROVED IN WRITING BY THE ENGINEER, INSTALL NO RACEWAY IN A SLAB-ON-GRADE LOCATE RACEWAY IN GRANULAR FILL BELOW SLABS-ON-GRADE

9. INSTALL RACEWAYS CONTINUOUS BETWEEN CONNECTIONS TO OUTLETS, BOXES AND CABINETS WITH A MINIMUM POSSIBLE NUMBER OF BENDS AND NOT MORE THAN THE EQUIVALENT OF FOUR 90-DEGREE BENDS BETWEEN CONNECTIONS. USE MANUFACTURED ELBOWS FOR ALL 45-DEGREE AND 90-DEGREE BENDS, UNLESS APPROVED BY THE ENGINEER IN ADVANCE. MAKE OTHER BENDS SMOOTH AND EVEN AND WITHOUT FLATTENING RACEWAY OR FLAKING GALVANIZING OR ENAMEL. RADII OF BENDS SHALL BE AS LONG AS POSSIBLE AND NEVER SHORTER THAN THE CORRESPONDING TRADE ELBOW. USE LONG RADIUS ELBOWS WHERE NECESSARY, INDICATED, OR BOTH.

10. SECURELY FASTEN RACEWAYS IN PLACE WITH APPROVED STRAPS, HANGERS AND STEEL SUPPORTS AS REQUIRED. ATTACH RACEWAY SUPPORTS TO THE BUILDING STRUCTURE SUPPORT RACEWAYS FOR FEEDERS WITH TRAPEZE SUPPORTS MADE OF ALL THREAD ROD AND UNISTRUT. SPACED NOT OVER 10 FEET APART. SECURELY CLAMP VERTICAL FEEDER RACEWAYS TO STRUCTURAL STEEL MEMBERS ATTACHED TO STRUCTURE. INSTALL CABLE CLAMPS FOR SUPPORT OF VERTICAL FEEDERS WHERE REQUIRED. ADD RACEWAY SUPPORTS WITHIN 12 INCHES OF ALL BENDS, ON BOTH SIDES OF THE BENDS. DO NOT SUPPORT RACEWAYS FROM SUSPENDED CEILING COMPONENTS.

11. REAM RACEWAY ENDS, THOROUGHLY CLEAN RACEWAYS BEFORE INSTALLATION, AND KEEP CLEAN AFTER INSTALLATION. PLUG OR COVER OPENINGS AND BOXES AS REQUIRED TO KEEP RACEWAYS CLEAN DURING CONSTRUCTION AND FISH ALL RACEWAYS CLEAR OF OBSTRUCTIONS BEFORE PULLING CONDUCTORS WIRES. PROVIDE RACEWAYS OF AMPLE SIZE FOR PULLING OF WIRE AND NOT SMALLER THAN CODE REQUIREMENTS AND NOT LESS THAN 3/4-INCH IN SIZE, UNLESS OTHERWISE INDICATED ON DRAWINGS.

12.EMT UP TO 2", IMC OR RIGID GALVANIZED STEEL GREATER THAN 2". ONLY STEEL COMPRESSION FITTINGS SHALL BE USED. SET SCREW FITTINGS ARE NOT ALLOWED UNDER ANY CIRCUMSTANCES. DO NOT RUN MORE THAN 6 CURRENT-CARRYING CONDUCTORS IN ANY ONE CONDUIT, UNLESS OTHERWISE NOTED. ALL CONDUITS SHALL CONTAIN A SEPARATE EQUIPMENT GROUND WIRE.

13. PROTECT ALL RACEWAY INSTALLATIONS AGAINST DAMAGE DURING CONSTRUCTION. REPAIR ALL RACEWAYS DAMAGED OR MOVED OUT OF LINE AFTER ROUGHING-IN TO MEET ENGINEER'S APPROVAL WITHOUT ADDITIONAL COST TO THE OWNER. 14. ALIGN AND INSTALL TRUE AND PLUMB ALL RACEWAY TERMINATION'S AT PANELBOARDS

SWITCHBOARDS, MOTOR CONTROL EQUIPMENT AND JUNCTION BOXES. 15. INSTALL APPROVED EXPANSION/DEFLECTION FITTINGS WHERE RACEWAYS PASS THROUGH (IF EMBEDDED) OR ACROSS (IF EXPOSED) EXPANSION JOINTS.

- 16. INSTALL A PULL WIRE IN EACH EMPTY RACEWAY THAT IS LEFT FOR INSTALLATION OF CONDUCTORS OR CABLES UNDER OTHER DIVISIONS OR CONTRACTS. USE POLYPROPYLENE OR MONOFILAMENT PLASTIC LINE WITH NOT LESS THAN 200-LB TENSILE STRENGTH. LEAVE AT LEAST 24 INCHES OF SLACK AT EACH END OF PULL WIRE. INSTALL A PULL WIRE IN ALL RACEWAYS 1" OR GREATER IN SIZE THAT HAVE ROOM FOR ADDITIONAL WIRE TO BE ADDED.
- 17. EFFECTIVELY SEAL RACEWAYS, BY INSTALLING A CONDUIT FITTING AT THE BOUNDARY OF THE TWO SPACES, AND FILLING IT WITH AN APPROVED PLIABLE MATERIAL, AFTER CONDUCTORS OR CABLES HAVE BEEN INSTALLED AND TESTED, WHERE:

A. RACEWAYS PASS FROM NON-COOLED TO COOLED SPACES. B. RACEWAYS TRANSITION FROM OUTSIDE A FACILITY OR ENCLOSURE TO INSIDE, WHETHER BURIED OR EXPOSED.

1. RIGIDLY TERMINATE CONDUITS ENTERING SHEET METAL ENCLOSURES TO THE ENCLOSURE WITH A PLASTIC BUSHING AND LOCKNUT ON THE INSIDE AND A LOCKNUT OR AN APPROVED HUB ON THE OUTSIDE. CONDUIT SHALL ENTER THE ENCLOSURE SQUARELY 2. PROVIDE BUSHINGS AND LOCKNUTS MADE OF GALVANIZED MALLEABLE IRON WITH SHARP CLEAN-CUT THREADS.

- 3. WHERE EMT ENTERS A BOX, PROVIDE APPROVED EMT COMPRESSION CONNECTORS. SET SCREW CONNECTORS ARE NOT ALLOWED UNDER ANY CIRCUMSTANCES. 4. USE INSULATED, GROUNDING, OR COMBINATION, BUSHINGS WHEREVER CONNECTION IS
- SUBJECT TO VIBRATION OR MOISTURE, WHEN REQUIRED BY NFPA 70, OR BOTH.
- 5. INSTALL PLASTIC BUSHINGS ON ALL EXISTING CONDUITS CONNECTORS.

- A. ANNEALED (SOFT) COPPER COMPLYING WITH ICEA S-95-658/NEMA
- WC70; SOLID CONDUCTOR FOR NO. 10 AWG AND SMALLER; CONCENTRIC, COMPRESSED STRANDED FOR NO. 8 AWG AND LARGER.
- B. CONDUCTOR INSULATION TYPES: 90-DEGREE C-RATED, TYPE THHN/THWN-2 OR XHHW-2 COMPLYING WITH ICEA S-95-658/NEMA WC70. SIZES OF CONDUCTORS AND CABLES INDICATED OR SPECIFIED ARE IN AMERICAN WIRE GAGE (AWG - BROWN AND SHARPE).
- D. UNLESS INDICATED OTHERWISE, SPECIAL PURPOSE CONDUCTORS AND CABLES, SUCH AS LOW VOLTAGE CONTROL AND SHIELDED INSTRUMENT WIRING, SHALL BE AS RECOMMENDED BY THE SYSTEM EQUIPMENT MANUFACTURER.
- 2. ALL FEEDER AND BRANCH CIRCUIT CONDUCTORS NO. 12 AWG AND LARGER:
- STRANDED, TYPE THHN-2 OR XHHW-2 INSULATION. 3. ALL BRANCH CIRCUIT WIRING: NOT SMALLER THAN NO. 12 AWG. IF NO
- CONDUCTOR SIZE IS INDICATED ON THE DRAWINGS FOR A BRANCH
- CIRCUIT, PROVIDE CONDUCTORS AND CONDUIT SIZED PER NFPA 70 AND BASED ON THE INDICATED BRANCH CIRCUIT OVERCURRENT PROTECTIVE DEVICE (OCPD) RATING AND NUMBER OF POLES. WHERE NO CIRCUIT SIZE (I.E., CONDUCTORS AND OCPD) IS INDICATED ON THE
- DRAWINGS FOR A BRANCH CIRCUIT, PROVIDE THREE NO. 12 AWG
- CONDUCTORS, IN 3/4-INCH RACEWAY, AND A 20A CIRCUIT BREAKER. 4. CONDUCTORS FIELD-INSTALLED WITHIN FLUORESCENT LIGHT FIXTURE CHANNELS: TYPE
- 5. CONTROL WIRING: STRANDED COPPER CONDUCTORS, 600V INSULATION, OF THE PROPER TYPE, SIZE AND NUMBER AS REQUIRED TO ACCOMPLISH SPECIFIED FUNCTION. MINIMUM SIZE: NO. 14 AWG, UNLESS NOTED OTHERWISE.

PART 4 (CONTINUED)

- 4-1-5 INSTALLATION OF CONDUCTORS AND CABLES
- 1. INSTALL ALL WIRING IN APPROVED RACEWAY AND ENCLOSURES, EXCEPT WHERE SPECIFIED OR INDICATED. 2. MC CABLE MAY BE INSTALLED FOR THIS PROJECT AS LONG AS ALL OF THE FOLLOWING
- INSTALLATION METHODS ARE ADHERED TO: A. ALL MC CABLE ROUTED ABOVE CEILINGS ARE INSTALLED A MINIMUM OF 12" ABOVE THE CEILING.
- B. MC CABLE MUST BE SUPPORTED PER THE NEC WITH SUPPORTS INDEPENDENT OF THE CEILING GRID OR CEILING TILES.
- C. MAXIMUM SAG OF THE MC CABLE BETWEEN SUPPORTS IS 6". D. NO MC CABLE MAY BE DIRECTLY CONNECTED TO ANY PANELBOARDS.
- E. EACH WIRE IN AN MC CABLE THAT IS SPLICED INTO ANOTHER WIRE IN A JUNCTION BOX MUST BE LABELED WITH WIRE NUMBER MARKER TAPE THAT INDICATES THE CIRCUIT THE WIRES ARE CONNECTED TO.
- 3. SUPPORT ALL CONDUCTORS AND CABLES IN VERTICAL INSTALLATIONS, AS REQUIRED BY NFPA 70, BY INSTALLING CABLE SUPPORTS OR PLUG-TYPE CONDUIT RISER SUPPORTS, OR WIRE-MESH SAFETY GRIPS.
- 4. INSTALL ALL CONDUCTORS AND CABLE IN RACEWAYS CONTINUOUS WITHOUT TAPS OR SPLICES. SPLICE OR TAP ONLY IN APPROVED BOXES AND ENCLOSURES WITH APPROVED 4-1-12 WEATHERPROOF COVER PLATES SOLDERLESS CONNECTORS, OR CRIMP CONNECTORS AND TERMINAL BLOCKS FOR CONTROL WIRING, AND KEEP TO THE MINIMUM REQUIRED. INSULATE ALL SPLICES, TAPS, AND JOINTS AS REQUIRED BY CODES.
- 5. ALL MATERIALS USED TO TERMINATE, SPLICE OR TAP CONDUCTORS: DESIGNED FOR, PROPERLY SIZED FOR, AND UL LISTED FOR THE SPECIFIC APPLICATION AND CONDUCTORS INVOLVED, AND INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, USING THE MANUFACTURER'S RECOMMENDED TOOLS.
- 6. WHERE WIRING IS INDICATED AS INSTALLED, BUT THE CONNECTION IS INDICATED "FUTURE" OR "BY OTHER DIVISION, TRADES, OR CONTRACTS", LEAVE A MINIMUM 3-FOOT "PIGTAIL" AT THE BOX, TAPE THE ENDS OF THE CONDUCTORS, AND COVER THE BOX. THE NUMBER OF 4-2 ELECTRICAL SERVICE AND GROUNDING CONDUCTORS IN A SPECIFIC RACEWAY "HOME RUN" IS INDICATED WITH CROSS LINES (TICK MARKS) ON EACH "CIRCUIT RUN" ON THE DRAWINGS. IN GENERAL, THE DIRECTION OF BRANCH 4-2-1 CONNECTION TO SERVING UTILITIES CIRCUIT "HOME RUN" ROUTING IS INDICATED ON THE DRAWINGS, COMPLETE WITH CIRCUIT NUMBERS AND PANELBOARD DESIGNATION. CONTINUE ALL SUCH "HOME RUN" WIRING TO THE DESIGNATED PANELBOARD, AS THOUGH "CIRCUIT RUNS" WERE INDICATED IN THEIR ENTIRETY.
- 7. WHEN MULTIPLE HOME RUNS ARE COMBINED INTO A SINGLE RACEWAY SUCH THAT THE NUMBER OF CONDUCTORS EXCEEDS FOUR (CONDUCTOR COUNT IS MADE UP OF ANY COMBINATION OF PHASE AND NEUTRAL CONDUCTORS), THE FOLLOWING RESTRICTIONS APPLY, WHICH ARE IN ADDITION TO THOSE IN NFPA 70: A. EMERGENCY POWER CIRCUITS - INCLUDES ALL CIRCUITS COVERED UNDER ARTICLES 700,
- 701 AND 702 B. MAXIMUM OF 16 CONDUCTORS IN A SINGLE RACEWAY. FOR UP TO EIGHT CONDUCTORS IN A RACEWAY, MINIMUM RACEWAY SIZE: 3/4-INCH. FOR GREATER THAN EIGHT CONDUCTORS, MINIMUM RACEWAY SIZE: 1- INCH. DO NOT INSTALL ANY OTHER TYPE OF CIRCUIT IN THIS RACEWAY.
- C. THE MINIMUM WIRE SIZE FOR ALL CONDUCTORS IN THIS RACEWAY: NO. 10 AWG. D. ONLY 15A AND 20A BRANCH CIRCUIT HOMERUNS MAY BE COMBINED INTO ONE RACEWAY. E. GFCI CIRCUITS
- a. DO NOT USE MULTI-CONDUCTOR CIRCUITS, WITH A SHARED NEUTRAL, FOR ANY GFCI CIRCUIT BREAKER OR RECEPTACLE CIRCUIT.
- 8. FOR BRANCH CIRCUITS FED FROM GFCI CIRCUIT BREAKERS, LIMIT THE ONE-WAY CONDUCTOR LENGTH TO 100 FEET BETWEEN THE PANELBOARD AND THE MOST REMOTE 4-3 DISTRIBUTION AND CONTROL EQUIPMENT RECEPTACLE OR LOAD ON THE GFCI CIRCUIT
- 9. WIRING SHALL HAVE INSULATION OF THE PROPER COLOR TO MATCH COLOR CODE SYSTEM IN 4-3-1 LIGHTING AND APPLIANCE PANELBOARDS THE TABLE BELOW. IN LARGER SIZES, WHERE PROPERLY COLORED INSULATION IS NOT AVAILABLE, USE VINYL PLASTIC ELECTRICAL TAPE OF THE APPROPRIATE COLOR AROUND EACH CONDUCTOR AT ALL TERMINATION POINTS, JUNCTION AND PULL BOXES.
- 10. PROPERLY IDENTIFY ALL TERMINAL BLOCKS AND WIRE TERMINALS FOR CONTROL WIRING WITH VINYL STICK-ON MARKERS OR EQUIVALENT. PROVIDE ENGINEER WITH A LIST OF PROPOSED IDENTIFYING NUMBERS FOR REVIEW PRIOR TO INSTALLING MARKERS.
- 11.PROVIDE AN EQUIPMENT-GROUNDING CONDUCTOR, OR BONDING JUMPER, AS APPLICABLE, IN ALL BRANCH CIRCUITS AND FEEDERS, SIZED IN ACCORDANCE WITH NFPA 70 TABLES 250.66 OR 250.122, AS APPLICABLE, UNLESS INDICATED AS LARGER ON THE DRAWINGS. VOLTAGE DROP IN BRANCH CIRCUITS SHALL NOT EXCEED 2 PERCENT.

4-1-6 JUNCTION BOXES, PULL BOXES, CABINETS AND WIREWAYS

. PROVIDE JUNCTION BOXES, PULL BOXES, CABINETS AND WIREWAYS WHEREVER NECESSARY FOR PROPER INSTALLATION OF VARIOUS ELECTRICAL SYSTEMS ACCORDING TO NFPA 70 AND 4-3-2 CIRCUIT BREAKERS IN EXISTING PANELBOARDS WHERE INDICATED ON THE DRAWINGS. SIZE AS REQUIRED FOR THE SPECIFIC FUNCTION OR AS REQUIRED BY NFPA 70, WHICHEVER IS LARGER. CONSTRUCTION SHALL BE OF A NEMA DESIGN SUITABLE FOR THE ENVIRONMENT INSTALLED. INSTALL ENGRAVED NAMEPLATES ON ALL J-BOXES, PULL BOXES, CABINETS AND WIREWAYS THAT PROVIDE NAME OF CIRCUITS EITHER TERMINATED, SPLICED, OR PASSING THRU AND THE NAME OF THE PANELBOARD THE **4-3-3 SERIES RATINGS ON PANELBOARDS** CIRCUITS ORIGINATE.

4-1-7 OUTLET BOXES

1. ALL OUTLETS INCLUDING LIGHT FIXTURE, SWITCH, RECEPTACLE, AND SIMILAR OUTLETS: NATIONAL ELECTRICAL, APPLETON, STEEL CITY, RACO, OR APPROVED EQUAL, GALVANIZED STEEL KNOCKOUT BOXES, SUITABLE IN DESIGN TO THE PURPOSE THEY SERVE AND THE SPACE THEY OCCUPY. SIZE AS REQUIRED FOR THE SPECIFIC FUNCTION OR AS REQUIRED BY NFPA 70, WHICHEVER IS LARGER. SET ALL OUTLET BOXES IN WALLS, COLUMNS, FLOORS, OR CEILINGS SO THEY ARE FLUSH WITH THE FINISHED SURFACE, ACCURATELY SET, AND RIGIDLY SECURED IN POSITION. PROVIDE PLASTER RINGS, EXTENSION RINGS AND/OR MASONRY RINGS AS REQUIRED FOR FLUSH MOUNTING. PROVIDE APPROVED CAST OUTLET BOXES, WITH HUBS AND WEATHERPROOF COVERS, IN ALL AREAS SUBJECT TO DAMP, WET, OR HARSH CONDITIONS.

- 2. EACH OUTLET AND/OR FIXTURE SHALL BE PROVIDED WITH 4 INCH SQUARE DEEP OUTLET 4-3-4 DISCONNECT (SAFETY) SWITCHES BOX WITH APPROPRIATE COVER AND WIRING TO SUIT FIELD CONDITIONS.
- 3. ELECTRICAL MATERIALS USED ON THIS PROJECT SHALL BE UL LISTED AND LABEL.

4-1-8 OUTLET LOCATIONS

1. COORDINATE LOCATIONS OF OUTLET BOXES. OUTLETS ARE ONLY APPROXIMATELY LOCATED ON THE SMALL SCALE DRAWINGS. USE GREAT CARE IN THE ACTUAL LOCATION BY CONSULTING THE VARIOUS LARGE SCALE DETAILED DRAWINGS USED BY OTHER DIVISION TRADES, AND BY SECURING DEFINITE LOCATIONS FROM THE ARCHITECT.4-1-9 MOUNTING HEIGHTS

1. UNLESS OTHERWISE NOTED, INSTALL WIRING DEVICES AS INDICATED BELOW (NOTE: ALL DIMENSIONS ARE TO THE BOTTOM OF THE OUTLET BOX UNLESS OTHERWISE NOTED): A. RECEPTACLES:

- a. GENERAL:
- a.1. VERTICALLY WITH THE GROUND SLOT MOUNTED AT THE TOP: 16 INCHES ABOVE FINISHED FLOOR. a.2. HORIZONTALLY, WITH NEUTRAL SLOT MOUNTED AT THE TOP: 16 INCHES ABOVE FINISHED FLOOR.
- b. ABOVE COUNTERS: b.1. FOR 36-INCH HIGH COUNTER TOPS: 44 INCHES ABOVE FINISHED FLOOR, VERTICALLY.
- b.2. FOR 34-INCH HIGH COUNTER TOPS: 40 INCHES ABOVE FINISHED FLOOR, VERTICALLY.
- c. MECHANICAL AND ELECTRICAL EQUIPMENT ROOMS AND JANITORS CLOSETS: 44 INCHES ABOVE FINISHED FLOOR, VERTICALLY. d. WEATHERPROOF EXTERIOR RECEPTACLES: 24 INCHES ABOVE FINISHED GRADE OR
- ROOF, OR AS INDICATED ON DRAWINGS, VERTICALLY. e. GFCI RECEPTACLES: SAME AS GENERAL RECEPTACLES.
- f. ISOLATED GROUND RECEPTACLES: SAME AS GENERAL.
- g. CONCRETE BLOCK WALLS: DIMENSIONS ABOVE MAY BE ADJUSTED SLIGHTLY, AS REQUIRED TO COMPENSATE FOR VARIABLE JOINT DIMENSIONS, SUCH THAT BOTTOM OR TOP OF BOXES, AS APPLICABLE, ARE AT BLOCK JOINTS.
- B. SWITCHES:
- a. GENERAL: 44 INCHES ABOVE FINISHED FLOOR. b. ABOVE COUNTERS: SAME AS FOR RECEPTACLES.
- c. CONCRETE BLOCK WALLS: 40 INCHES ABOVE FINISHED FLOOR (DIMENSION MAY BE
- ADJUSTED SLIGHTLY, AS REQUIRED TO COMPENSATE FOR VARIABLE. d. JOINT DIMENSIONS, SUCH THAT BOTTOM OF BOXES ARE AT BLOCK JOINTS.
- e. WALLS WITH WAINSCOTING: 6 INCHES MINIMUM ABOVE WAINSCOTING, BUT NOT
- EXCEEDING 48 INCHES ABOVE FINISHED FLOOR.
- C. MULTI-OUTLET ASSEMBLIES: a. 48 INCHES ABOVE FINISHED FLOOR, AS INDICATED ON THE DRAWINGS, OR 6 INCHES ABOVE COUNTER TOP.
- D. TELEPHONE/DATA OUTLET BOXES: a. GENERAL: MATCH MOUNTING HEIGHT OF ADJACENT WIRING DEVICE LISTED ABOVE.
- E. FOR OTHER WIRING DEVICES, REFER TO PARAGRAPHS, ARTICLES, SECTIONS, DIVISIONS OR DRAWINGS TO OBTAIN MOUNTING HEIGHTS FOR SPECIFIC EQUIPMENT OR SYSTEMS.

4-1-10 WIRING DEVICES

1. PROVIDE THE FOLLOWING WIRING DEVICES WHERE SHOWN ON DRAWINGS OR REQUIRED. MINOR CHANGES RELATIVE TO THE LOCATION OF ELECTRICAL EQUIPMENT MAY BE MADE TO COMPLY WITH STRUCTURAL AND BUILDING REQUIREMENTS AS DETERMINED IN THE COURSE 4-4-2 LIGHT FIXTURES OF CONSTRUCTION. PROVIDE ALL WIRING DEVICES OF THE SAME MANUFACTURER AND NOT MIXED ON THE PROJECT, TO THE MAXIMUM EXTENT POSSIBLE. PROVIDE COLOR OF TOGGLES AND RECEPTACLES AS REQUESTED BY THE ARCHITECT. ACCEPTABLE MANUFACTURERS SHALL INCLUDE HUBBELL, PASS & SEYMOUR, LEVITON, & COOPER WIRING DEVICES.

4-1-11 SWITCH AND OUTLET COVER PLATES

1. SWITCH AND OUTLET PLATES: COLORED, SMOOTH NYLON; BY THE SAME MANUFACTURER AS THE WIRING DEVICES, WHERE EVER POSSIBLE. VERIFY SPECIFIED MATERIALS AND COLORS WITH ARCHITECT BEFORE INSTALLATION INSTALLATION. SWITCH PLATES IN UNFINISHED ROOMS AND SPACES: STAMPED STEEL, CADMIUM PLATED. INSTALL GROUPS OF SWITCHES UNDER ONE GANGED-PLATE, USUALLY HORIZONTALLY; OR, WHERE REQUIRED BY DETAILS, VERTICALLY. SET ALL COVER PLATES PLUMB, PARALLEL, AND FINISHED FLUSH WITH THE WALL

- 1. PROVIDE GFCI RECEPTACLES FOR DESIGNATED WEATHERPROOF RECEPTACLES, UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
- 2. FOR UNATTENDED, WET LOCATIONS: IN-USE NEMA 3R, UL-LABELED PLATES MOLDED FROM A CLEAR HIGH IMPACT ULTRAVIOLET STABILIZED POLYCARBONATE MATERIAL FOR EASY VERIFICATION THAT CORDS ARE PLUGGED IN AND THAT THE GFCI IS FUNCTIONING. 3. COVER PLATES: BY THE SAME MANUFACTURER AS THE WIRING DEVICES; COMPLYING WITH NFPA 70 406.8 (A) OR (B) REQUIREMENTS FOR ATTENDED OR UNATTENDED USE AS

1. PROVIDE RACEWAYS, TERMINATIONS, METERING PROVISIONS, AND MISCELLANEOUS EQUIPMENT, AS REQUIRED, FOR ELECTRICAL AND TELEPHONE SERVICES FOR CONNECTION BY THE SERVING UTILITY, IN STRICT COMPLIANCE WITH THE REQUIREMENTS OF ALL 4-5 MISCELLANEOUS ELECTRICAL APPLICABLE CODES AND OF THE SERVING UTILITY INVOLVED. VERIFY ALL SERVICE TERMINATIONS AND CONNECTION POINTS IN THE FIELD AND WORK IN CONJUNCTION WITH **4-5-1 TELEPHONE SYSTEM PROVISIONS** THE UTILITY INVOLVED IN THE INSTALLATION OF ALL SERVICES. PROVIDE ALL MATERIALS AND EQUIPMENT REQUIRED FOR COMPLETE UTILITY CONNECTION BUT NOT FURNISHED BY THE SERVING UTILITY. NOTIFY THE UTILITY COMPANIES INVOLVED WITHIN TWO WEEKS AFTER NOTICE TO PROCEED, OF ALL REQUIRED INFORMATION NECESSARY FOR THE UTILITY TO SUPPLY THE PROJECT WITHOUT DELAY. PAY ALL CHARGES OF THE SERVING UTILITY FOR THE ELECTRICAL SERVICE(S).

4-2-2 GROUNDING

APPLICABLE.

1. PERMANENTLY AND EFFECTIVELY GROUND AND BOND THE ELECTRICAL INSTALLATION IN A THOROUGH AND EFFICIENT MANNER, AND IN CONFORMANCE, AT A MINIMUM, WITH NFPA 70, OR THESE DOCUMENTS, WHERE THEY EXCEED CODE REQUIREMENTS. USE BARE OR INSULATED CONDUCTORS, AS SPECIFIED HEREIN, AND OTHER MATERIALS INDICATED ON THE DRAWINGS.

1. PANELBOARDS: SQUARE D TYPE NOOD (FOR 240/208V SERVICE) OR NF (FOR 480V SERVICE) OR APPROVED EQUAL BY SIEMENS, CUTLER HAMMER, OR GENERAL ELECTRIC, AS SCHEDULED ON THE DRAWINGS; COMPLETE WITH BOLT-ON THERMAL MAGNETIC, MOLDED CASE CIRCUIT BREAKERS ASSEMBLED IN A DEAD-FRONT FINISHED CABINET CONTAINING A TYPEWRITTEN **4-5-4 MISCELLANEOUS EQUIPMENT AND CONNECTIONS** CARD DIRECTORY INDICATING EXACTLY WHAT EACH CIRCUIT BREAKER CONTROLS; FULLY-RATED OR SERIES-RATED AND WITH THE INTEGRATED SHORT CIRCUIT CURRENT RATINGS INDICATED ON THE DRAWINGS. PLUG-IN TYPE BREAKERS WILL NOT BE ACCEPTABLE. ALL TWO AND THREE POLE BREAKERS: COMMON TRIP TYPE. BREAKERS USED AS SWITCHES FOR 120V OR 277V LIGHTING CIRCUITS: APPROVED FOR THE PURPOSE AND MARKED "SWD". BREAKERS USED FOR THE PROTECTION OF HVAC AND REFRIGERATION 4-5-5 SEISMIC PROTECTION COPPER BUSES, AND FEED THRU LUGS.

1. PROVIDE NEW CIRCUIT BREAKERS, FOR INSTALLATION IN EXISTING PANELBOARDS OF THE SAME MANUFACTURER, TYPE AND SHORT CIRCUIT CURRENT INTERRUPTING RATINGS AS THE EXISTING PANELBOARD CIRCUIT BREAKERS.

1. LABEL PANELBOARDS WITH A UL INTEGRATED SHORT CIRCUIT CURRENT RATING. WHEN SERIES RATINGS ARE APPLIED WITH INTEGRAL OR REMOTE UPSTREAM DEVICES, PROVIDE LABELS COMPLYING WITH NFPA 70 ARTICLES 240.86 AND 110.22. IN ADDITION TO THE WARNING LABEL, INCLUDE, AT A MINIMUM, THE FOLLOWING CONDITIONS OF THE UL 67 SERIES RATINGS:

- A. SIZE AND TYPE OF UPSTREAM DEVICE.
- B. BRANCH DEVICES THAT CAN BE USED. C. UL SERIES SHORT CIRCUIT CURRENT RATING.
- D. WHEN THERE IS NOT ENOUGH ROOM IN THE EQUIPMENT TO SHOW ALL THE LEGITIMATE SERIES RATED COMBINATIONS, REFERENCE A BULLETIN SUPPLIED WITH THE
- PANELBOARD, PER UL 67. E. SERIES RATINGS SHALL COVER ALL TRIP RATINGS OF INSTALLED FRAMES.

- 1. DISCONNECT (SAFETY) SWITCHES: SQUARE D, SIEMENS, CUTLER HAMMER, OR GENERAL ELECTRIC FUSED OR NON-FUSED (AS INDICATED ON DRAWINGS OR REQUIRED) NEMA KS1, HEAVY DUTY, EXTERNALLY OPERATED, VISIBLE-BLADE SAFETY SWITCHES; NEMA ENCLOSURE TYPE INDICATED ON THE DRAWINGS OR SUITABLE FOR THE ENVIRONMENT IN WHICH INSTALLED. BASED ON FUSIBLE SWITCH AND FUSE SIZES INDICATED, INCLUDE CLASS R, J, OR L FUSE PROVISIONS AS APPLICABLE.
- 2. WHERE INDICATED, PROVIDE FUSIBLE SWITCHES PERMANENTLY LABELED AS SUITABLE FOR USE AS SERVICE ENTRANCE EQUIPMENT, WITH INTEGRAL AND SEPARATE NEUTRAL AND GROUND ASSEMBLIES, SUITABLE FOR THE SIZES OF CONDUCTORS INDICATED. DO NOT DOUBLE-LUG ANY TERMINATIONS NOT SPECIFICALLY LISTED AS SUITABLE FOR MORE THAN ONE CONDUCTOR.
- 3. PROVIDE SWITCHES WHERE NOT FURNISHED WITH THE STARTING EQUIPMENT, AT ALL OTHER POINTS REQUIRED BY NFPA 70, AND WHERE INDICATED ON THE DRAWINGS.

4-3-5 FUSES

1. PROVIDE EACH CIRCUIT AND SET OF FUSE CLIPS THROUGHOUT THE WORK WITH BUSSMANN, FERRAZ SHAWMUT, OR LITTLEFUSE FUSES, SIZES AND TYPES AS REQUIRED OR INDICATED. ALL FUSES LARGER THAN 600A: UL CLASS L, SIMILAR TO TYPE KRP-C BUSSMANN LOW PEAK OR EQUAL. FUSES USED TO PROTECT MOTORS: UL CLASS RK5, BUSSMANN FUSETRON OR EQUAL. FUSES USED TO PROTECT ALL OTHER ELECTRICAL EQUIPMENT: UL CLASS RK1, DUAL ELEMENT, BUSSMAN LPS/LPN OR EQUAL. ALL FUSED DEVICES SHALL BE LABELED AS TO TYPE AND SIZE OF FUSE REQUIRED.

4-3-6 DRY-TYPE TRANSFORMERS

- TRANSFORMERS: GENERAL PURPOSE, UL-LISTED/LABELED 150 DEGREES C TEMPERATURE ABOVE 40 DEGREES C AMBIENT. INSULATING MATERIALS: EXCEED NEMA ST-020 STANDARDS, RATED FOR 220 DEGREES C, UL-COMPONENT RECOGNIZED INSULATION SYSTEM. PHASES, VOLTAGES, AND SIZES: AS INDICATED ON THE DRAWINGS. SOUND LEVEL: NOT EXCEEDING NEMA STANDARDS FOR THE SIZES INDICATED. FULL- CAPACITY PRIMARY TAPS: BELOW 25 KVA - MINIMUM OF TWO 5 PERCENT (2-); 25 KVA TO 300 KVA - MINIMUM OF SIX 2.5 PERCENT (2+, 4-); ABOVE 300 KVA - FOUR 2.5 PERCENT (2+, 2-). TRANSFORMER CORE AND COIL ASSEMBLIES: MOUNTED ON INTEGRAL VIBRATION-ABSORBING PADS. MAKE FINAL CONDUIT CONNECTIONS TO TRANSFORMERS WITH FLEXIBLE CONDUIT, WITH AT LEAST 6 INCHES OF SLACK IN ALL DIRECTIONS. TRANSFORMER ENCLOSURES: FULLY ENCLOSED (EXCEPT FOR VENTILATION OPENINGS), NEMA 2, DRIP-PROOF, FABRICATED OF HEAVY GAUGE SHEET STEEL CONSTRUCTION. WINDING SHALL BE MADE OF COPPER. 2. ENERGY-EFFICIENT TRANSFORMERS: COMPLYING WITH NEMA TP-1, WHEN TESTED IN ACCORDANCE WITH NEMA TP-2. PROVIDE ENERGY-EFFICIENT TRANSFORMERS WHEN REQUIRED BY LOCAL CODE.
- 3. MANUFACTURERS: SQUARE D, GENERAL ELECTRIC, ACME, SIEMENS.

4-4 LIGHT FIXTURES, LAMPS AND BALLASTS

4-4-1 LIGHT FIXTURE LOCATIONS

1. LIGHT FIXTURES SHOWN ON THE ELECTRICAL DRAWINGS REPRESENT GENERAL ARRANGEMENTS ONLY. REFER TO ARCHITECTURAL DRAWINGS FOR MORE EXACT

LOCATIONS. COORDINATE LOCATION WITH ALL OTHER TRADES BEFORE INSTALLATION TO AVOID CONFLICTS. COORDINATE LIGHT FIXTURE LOCATIONS IN MECHANICAL ROOMS WITH FINAL INSTALLED PIPING AND DUCTWORK LAYOUTS

- 1. LIGHT FIXTURES FURNISHED BY OWNER WHERE INDICATED ON SCHEDULE. COMPLY WITH ALL NOTES AND SPECIFICATION AS INDICATED IN SCHEDULE. INSTALL AND PROVIDE AS NEEDED ALL LIGHT FIXTURES AS SCHEDULED ON DRAWINGS, INCLUDING ALL LAMPS, ALL NECESSARY ACCESSORIES, MATERIAL AND LABOR TO SECURELY HANG, CLEAN, AND MAKE LIGHT FIXTURES COMPLETELY READY FOR USE. LIGHT FIXTURE MODEL NUMBERS SCHEDULED ON THE DRAWINGS SHOW ONLY THE MANUFACTURER, GRADE AND STYLE OF LIGHT FIXTURES REQUIRED. PROVIDE: ALL HANGERS, SUPPORTS, AND MISCELLANEOUS HARDWARE REQUIRED TO INSTALL LIGHT FIXTURES; PROPER TRIM TO FIT EACH CEILING CONDITION ACTUALLY ENCOUNTERED; ADDITIONAL TIE WIRES CONNECTED TO STRUCTURE TO CONFORM TO SEISMIC REQUIREMENTS AND WHERE REQUIRED BY THE APPLICABLE BUILDING CODE.
- 2. ONLY THOSE FIXTURES LISTED IN THE LIGHT FIXTURE SCHEDULE, OR APPROVED IN ACCORDANCE WITH SUBSTITUTIONS OF THESE SPECIFICATIONS, WILL BE ACCEPTED UNLESS FIXTURE IS SUPPLIED BY OWNER. WHERE THE LIGHT FIXTURE SCHEDULE INDICATES AN ALLOWANCE FOR A SPECIFIC LIGHT FIXTURE, THE PRICE IS A CONTRACTOR PRICE. INCLUDE ALL ADDITIONAL COSTS FOR FREIGHT, LAMPS, AND INSTALLATION OF LIGHT FIXTURE AND LAMPS
- 3. SURFACE-MOUNT ALL FLUORESCENT LIGHT FIXTURES LOCATED IN AREAS WITHOUT SUSPENDED CEILINGS UNLESS OTHERWISE INDICATED ON THE DRAWINGS
- 4. INSTALL FLUORESCENT LIGHT FIXTURES HUNG IN CONTINUOUS ROWS ON CHANNEL STRUTS SPECIFICALLY DESIGNED FOR THIS PURPOSE.
- 5. INSTALL ALL FLUORESCENT LIGHT FIXTURES LOCATED IN AREAS WITHOUT CEILINGS IMMEDIATELY BELOW THE ROOF-FRAMING MEMBERS, OR SUSPENDED FROM CHAIN HANGERS SUITABLE IN LENGTH TO PROVIDE THE INDICATED MOUNTING HEIGHT. HANGERS: "HYDEE" HANGER TYPE FOR OUTLET BOX MOUNTING, COMPLETE
- WITH GROUNDING RECEPTACLE, PLUG, 3-WIRE CORD AND NECESSARY CHAIN. 6. THROUGH WIRING OF RECESSED LIGHT FIXTURES, IN SUSPENDED CEILINGS, IS NOT PERMITTED. CONNECT EACH LIGHT FIXTURE BY A WHIP TO A JUNCTION BOX. THE WHIP SHALL BE OF SUFFICIENT LENGTH TO ALLOW THE LIGHT FIXTURE TO BE RELOCATED WITHIN A 6-FOOT RADIUS.

1. PROVIDE INCOMING TELEPHONE SERVICE RACEWAYS AS INDICATED ON DRAWINGS OR AS 4. PRODUCTS: REQUIRED BY THE SERVING TELEPHONE COMPANY. PROVIDE 3/4-INCH THICK PLYWOOD BOARD, FIRE RETARDANT TREATED AND STAMPED FRT, SECURELY ANCHORED TO THE WALL, AT THE LOCATION AND OF THE SIZE AS INDICATED ON THE DRAWINGS. PROVIDE FLUSH MOUNTED TELEPHONE OUTLET BOXES WITH 1-INCH EMT STUB-UP CONCEALED TO ACCESSIBLE CEILING SPACE AT LOCATIONS AS INDICATED ON THE DRAWINGS.

4-5-2 DATA SYSTEM PROVISIONS

1. PROVIDE FLUSH MOUNTED DATA OUTLET BOXES WITH 1-INCH CONDUIT STUB-UP CONCEALED TO ACCESSIBLE CEILING SPACE AT LOCATIONS AS INDICATED ON THE DRAWINGS. INSTALL A PULL STRING IN THE CONDUIT.

4-5-3 TIME SWITCHES

1. TIME SWITCHES: MECHANICAL TYPE, WITH MANUAL BYPASS SWITCH, NEMA ENCLOSURE SUITABLE FOR THE ENVIRONMENT INSTALLED; NUMBER AND TYPES OF CONTACTS, SEQUENCE, AND VOLTAGE AS INDICATED ON THE DRAWINGS, OR AS REQUIRED, BASED ON THE TIME SWITCH FUNCTION AND THE NUMBER OF BRANCH CIRCUITS OR CONTRACTORS CONTROLLED. PROVIDE WIRING TO PHOTOCELLS, CONTRACTORS, RELAYS OR OTHER CONTROL POINTS AS REQUIRED. MANUFACTURERS: INTERMATIC, PARAGON OR TORK.

- 1. PROVIDE WIRING AND CONNECTIONS TO ILLUMINATED CASES. 2. ALL WIRING AND CONNECTIONS TO EQUIPMENT FURNISHED BY OTHERS.
- ALL RACEWAYS, AND ALL WIRING AND CONNECTIONS OF DEVICES TO ENERGY MANAGEMENT SYSTEM THAT ARE NOT THE RESPONSIBILITY OF DIVISION 15.

EQUIPMENT: HACR TYPE. PANELBOARDS SHALL HAVE DOOR-IN-DOOR COVERS, TIN PLATED 1. SEISMIC PROTECTION OF LIGHT FIXTURES, AND RACEWAYS, PANELBOARDS AND SWITCHGEAR SHALL MEET REQUIREMENTS OF LOCAL CODE IN EFFECT

5-1 FIRE ALARM AND DETECTION SYSTEM (FOR REFERENCE ONLY)

WORK INCLUDED IN THIS SECTION

- A. THIS IS A PERFORMANCE-BASED SPECIFICATION. QUANTITY & LOCATION OF DEVICES SHOWN ON THE DRAWINGS ARE MINIMUMS. PROVIDE ADDITIONAL DEVICES AS REQUIRED TO PROVIDE A COMPLETE WORKING SYSTEM PER MANUFACTURER'S RECOMMENDATIONS AND NFPA APPROVED METHODS.
- PROVIDE THE FIRE ALARM AND DETECTION SYSTEMS AS SHOWN ON THE DRAWINGS AND AS SPECIFIED HEREIN. SYSTEM SHALL BE WIRED, CONNECTED, VERIFIED AND LEFT IN FIRST CLASS OPERATING CONDITION.
- C. FIRE ALARM SYSTEM CONTROL WIRING AND CONDUIT FROM ALL FANS, AHU'S DAMPERS and other mechanical equipment shall be furnished and installed by the fire LARM SYSTEM SUB-CONTRACTOR PROVIDED UNDER DIVISION 16. THIS FIRE ALARM CONTROL WIRING SYSTEM SHALL BE COMPLETELY INDEPENDENT OF THE MECHANICAL CONTROL WIRING SYSTEM.
- D. ALL NECESSARY FIRE ALARM SYSTEM WIRING DIAGRAMS AND CONTROL DIAGRAMS REQUIRED BY FIRE ALARM SUBCONTRACTOR SHALL BE SUPPLIED TO GENERAL CONTRACTOR FROM AUTOMATIC TEMPERATURE CONTROLS (ATC) SUBCONTRACTOR. FINAL FIRE ALARM SYSTEM CONTROL WIRING DIAGRAMS SHALL BE PROVIDED TO ATC SUBCONTRACTOR FROM FIRE ALARM SUBCONTRACTOR FOR ATC REVIEW AND COMMENT PRIOR TO INSTALLATION.
- E. TWENTY-FOUR HOUR BATTERY BACK UP SYSTEM WITH CHARGER. SYSTEM SHALL BE ABLE TO OPERATE FOR 24-HOURS IN NORMAL MODE AND 15 MINUTES IN ALARM MODE OR AS PER NFPA 72 REQUIREMENTS. SUBMIT BATTERY SIZE CALCULATIONS FOR ENGINEERS REVIEW AND APPROVAL. ALL COMPONENTS SHALL BE MOUNTED IN LOCKED CABINET SIMILAR IN APPEARANCE, CONSTRUCTION AND COLOR TO THE FIRE ALARM CONTROL PANEL (FACP).
- F. ALL CONDUIT AND WIRE (CONTROL WIRE) FOR A COMPLETE AND OPERATIONAL SYSTEM SHALL BE PROVIDED AND SHALL INCLUDE BOTH `LINE (120 & 277V.)' AND 'LOW' VOLTAGE WIRING. THESE CONDUITS AND ASSOCIATED J-BOXES SHALL BE PAINTED RED IN COLOR. G. LABEL ALL INITIATING DEVICES WITH A ZONE NUMBER OR ADDRESS. LABEL EACH DEVICE THAT HAS AN END OF LINE RESISTOR AS FOLLOWS: "EOLR".
- H. THE DESIGN SHALL CONFORM TO NFPA 72 AND LOCAL FIRE MARSHALL REQUIREMENTS I. ALL FIRE ALARM CABLES SHALL BE RED IN COLOR, PLENUM RATED, AND SUPPORTED BY THEIR OWN SUPPORT SYSTEM. ALL FIRE ALARM CABLES SHALL BE ROUTED HORIZONTALLY A MAXIMUM OF 6" BELOW THE STRUCTURE. FIRE ALARM CABLES MAY ONLY BE ROUTED VERTICAL AT 90° ANGLES.
- J. WHERE FIRE ALARM CABLES ENTER A METAL BOX, THESE CABLES SHALL ENTER THE METAL BOX THRU EITHER A METALLIC CHASE NIPPLE WITH A PLASTIC BUSHING ON THE END OF THE CHASE NIPPLE INSIDE THE METAL BOX OR THRU A ROMEX CONNECTOR WITH A PLASTIC BUSHING ON THE END OF THE ROMEX CONNECTOR INSIDE THE METAL BOX. K. ALL METAL BOXES THAT HOUSE ANY FIRE ALARM CABLE CONNECTORS SHALL BE PAINTED
- RED IN COLOR WITH AN ENGRAVED NAMEPLATE MOUNTED OF EITHER COVER OR THE SIDE OF THE BOX THAT STATES THE FOLLOWING: "FIRE J-BOX". 2. SUBMITTALS
- A. MANUFACTURER'S LITERATURE AND ILLUSTRATIONS INCLUDING CUT SHEETS OF ALL ALARM DETECTION DEVICES (I.E., IONIZATION DETECTORS, PULL STATIONS, FLOWSWITCHES, ETC) AND ALARM SIGNALING DEVICES (I.E., HORNS, LIGHTS, ETC.).
- B. A DESCRIPTION OF THE SYSTEM OPERATION WHICH INCLUDES THE METHOD OF OPERATION AND SUPERVISION OF EACH TYPE OF CIRCUIT (ALARM INITIATION, SIGNALING, CONTROL ANNUNCIATION, ETC.), OPERATION OF MANUAL CONTROLS, AND SEQUENCE OF AUTOMATIC AND MANUAL OPERATION. THE SYSTEM DESCRIPTION SHALL BE WRITTEN SPECIFICALLY FOR THIS PROJECT. THE MANUFACTURER'S STANDARD DESCRIPTIONS WHICH REFER ONLY TO GENERAL OPERATION ARE NOT ACCEPTABLE. C. WIRING DIAGRAMS WHICH SHOW THE METHOD OF WIRING FOR EACH TYPE OF CIRCUIT
- FOR EACH FUNCTION PERFORMED. THESE SHALL INCLUDE THE FOLLOWING: a. EACH TYPE OF ALARM INITIATION CIRCUIT. b. EACH TYPE OF ALARM SIGNALING CIRCUIT.
- c. ANNUNCIATION METHODS. d. CONTROL METHODS (SEPARATE DIAGRAMS SHALL BE PROVIDED FOR EACH TYPE OF DEVICE CONTROLLED)
- e. EACH WIRING DIAGRAM SHALL INDICATE: e.1. METHOD OF FUSING AND LOCATION OF FUSES ON THE CIRCUIT.
- e.2. RECOMMENDED WIRING TYPE AND SIZE, METHOD OF GROUND OR SHIELDING IF USED, AND SIZE OF CONDUIT.
- e.3. TERMINAL IDENTIFICATION AT CONTROL PANEL AND REMOTE DEVICES. e.4. END OF LINE DEVICE, TYPE, RATING AND LOCATION.

- D. THE FOLLOWING DATA SHALL BE SUPPLIED TO VERIFY COMPLIANCE WITH ALARM SYSTEM AMPLIFICATION AND SOUND LEVEL REQUIREMENTS. a. LIST OF EACH HORN CIRCUIT, WITH AREA SERVED, NUMBER OF SPEAKER CONNECTED.
- SPEAKER TAP USED, ANTICIPATED SOUND LEVEL AT 10' AT TAP USED, AND AT NEXT AND AT NEXT HIGHER TAP.
- b. LIST OF EACH AMPLIFIER WITH RATED OUTPUT (INTERMITTENT AND CONTINUOUS OUTPUT SHALL BE INDICATED IF THEY ARE DIFFERENT), LIST OF SPEAKER CIRCUITS CONNECTED TO EACH AMPLIFIER.
- c. NUMBER OF STANDBY AMPLIFIERS PROVIDED. E. PROVIDE TOTAL SYSTEM OPERATING AND SUPERVISORY POWER REQUIREMENTS
- INCLUDING BATTERY SIZE CALCULATIONS.
- F. PROVIDE A FIRE ALARM ONE-LINE (RISER) DIAGRAM FOR BOTH THE FLOOR WHERE THE WORK IS OCCURRING AND THE ENTIRE BUILDING IN THE SUBMITTAL PACKAGE
- G. ALL SUBMITTALS SHALL BE RECEIVED BY THE ENGINEER OF RECORD BEFORE THEY ARE SUBMITTED TO THE FIRE MARSHALL
- H. ALL SUBMITTALS MUST CONFORM TO THESE SPECIFICATIONS AND LOCAL FIRE MARSHALL
- REQUIREMENTS FOR SUBMITTALS TO THE ENGINEER OF RECORD. I. ALL PLANS, DRAWINGS, SKETCHES, OR OTHER DOCUMENTS THAT REQUIRE THE SIGNATURE OF A LICENSED FIRE PROTECTION ENGINEER SHALL BE SIGNED WHEN SUBMITTED TO THE ENGINEER OF RECORD. FAILURE TO SIGN THESE DOCUMENTS WILL CAUSE THE ENGINEER OF RECORD TO FILE A COMPLAINT WITH BOTH THE LOCAL AND STATE FIRE MARSHALL'S.
- J. PROVIDE (7) SETS OF SUBMITTALS IN A HARD COPY FORMAT. PROVIDE A SOFT COPY OF ALL DRAWINGS IN AN AUTOCAD 2005 FORMAT. 3. OPERATION AND MAINTENANCE MANUA
- A. GENERAL:
- a. PROVIDE THAT PORTION OF THE MANUAL AS REQUIRED TO FULLY DESCRIBE THE OPERATION AND MAINTENANCE OF THE FIRE ALARM AND DETECTION SYSTEMS. b. THE MANUAL SHALL INCLUDE AT LEAST THE DATA AS GIVEN BY THE OUTLINE LISTED BELOW.
- B. INSTALLATION INSTRUCTIONS:
- a. INSTALLATION b. ADJUSTMENT
- c. CHECK-IN C. OPERATION INSTRUCTIONS
- a. START-UP
- b. ROUTINE AND NORMAL INSTRUCTIONS REGULATION AND CONTROL
- A. ACCEPTABLE MANUFACTURERS SHALL MATCH BUILDING STANDARD
- B. GENERAL a. THE COMPLETE INSTALLATION SHALL BE LISTED BY THE UNDERWRITERS LABORATORIES INC. AND BEAR THE U.L. LABEL. THE COMPLETE INSTALLATION SHALL CONFORM TO N.F.P.A. 72 AND 72E, THE LOCAL JURISDICTION HAVING AUTHORITY REQUIREMENTS FOR CENTRAL FIRE ALARM SYSTEMS, ADOPTED BUILDING CODE AND THE NATIONAL ELECTRICAL CODE.
- D. THE EQUIPMENT FURNISHED UNDER THIS SECTION SHALL BE THE STANDARD PRODUCT OF ONE MANUFACTURER. EQUIPMENT DESCRIPTIONS ARE INTENDED TO INDICATE THE TYPE AND QUALITY OF DESIGN AND MATERIALS AS WELL AS THE OPERATING FEATURES DESIRED.
- c. PROVIDE FIRE ALARM TERMINAL CABINETS (FATC) AS REQUIRED FOR TERMINATING CIRCUITS AND HOUSING END-OF-LINE RESISTORS. d. IF A MULTIPLEX FIRE-ALARM SYSTEM IS PROVIDED, THEN INTERFACE UNITS SHALL BE
- LOCATED IN OR NEXT TO TERMINAL BOXES. RESPONSE TIME FOR MULTIPLEX CIRCUITS SHALL NOT EXCEED 6 SECONDS. FAILURE OF INTERFACE UNITS SHALL CAUSE A DEFAULT CONDITION WHICH WILL NOT INHIBIT FIRE ALARMS. e. EXACT LOCATION OF ALL ALARM AND DETECTION DEVICES SHALL BE COORDINATED
- WITH THE ARCHITECT PRIOR TO INSTALLATION. f. FIRE ALARM CONTROL PANEL (FACP):
- f.1. EXPAND EXISTING PANEL AS REQUIRED TO ACCOMMODATE NEW DEVICES. q. MANUAL STATIONS g.1. MANUAL STATIONS SHALL MATCH EXISTING AND BE 2-POLE DOUBLE ACTION
- DEVICES AND CONSTRUCTED OF RUGGED, DIE-CAST MATERIAL DESIGNED FOR SEMI-FLUSH MOUNTING. STATIONS SHALL NOT BE OF THE BREAK-GLASS DESIGN. STATIONS MUST BE RESET WITH A SPECIAL TOOL. IT SHALL NOT BE POSSIBLE TO CLOSE A STATION WITHOUT FIRST RESETTING IT. PROVIDE SIX SPECIAL MANUAL-STATION RESETTING TOOLS. MANUAL STATIONS SHALL BE PROVIDED AT THE FOLLOWING LOCATIONS AND AS INDICATED ON THE DRAWINGS: g.1.1. EACH ENTRY/EXIT TO THE BUILDING
- h. DUCT IONIZATION SMOKE DETECTORS
- h.1. DUCT SMOKE DETECTOR SHALL MATCH EXISTING AND BE MOUNTED IN A HOUSING WHICH WILL WORK IN CONJUNCTION WITH AIR SAMPLING TUBES SUPPLIED TO DETECT PRODUCTS OF COMBUSTION IN THE DUCTS OF AIR HANDLING SYSTEM. THE HOUSING SHALL BE SUITABLE FOR MOUNTING DIRECTLY ON THE DUCT OR REMOTELY, AS INDICATED ON THE DRAWINGS, WHERE DIRECT MOUNTING IS NOT POSSIBLE. THE UNIT WILL BE INSTALLED UNDER THE MECHANICAL SECTION OF THESE SPECIFICATIONS, BUT SUPPLIED UNDER THIS ELECTRICAL SECTION. THE DETECTORS SHALL BE SUITABLE FOR OPERATION FROM THE POWER (END OF PART 5) SUPPLIED FROM THE FIRE ALARM CONTROL PANEL (FACP). THE DETECTOR SHALL INCLUDE A REMOTE TEST STATION WITH "POWER ON" LIGHT, AN ALARM LIGHT, AND A TEST-RESET SWITCH. REMOTE TEST STATION SHALL BE LOCATED IN CLOSEST MECHANICAL ROOM OR BACK OF HOUSE SPACE TO DETECTOR. COORDINATE LOCATION OF STATION WITH ARCHITECT. LABEL TEST STATION AS "DUCT DETECTOR" _____ (INSERT FAN DESCRIPTION IN BLANK). THE DETECTOR SHALL MEET NFPA 90A REQUIREMENTS. THE DETECTOR'S SAMPLING TUBES SHALL SPAN THE ENTIRE WIDTH OF THE DUCT. EACH DETECTOR WILL BE REQUIRED TO HAVE TWO AUXILIARY POSITIVE-ACTION CONTACTS: ONE FOR DEVICE IDENTIFICATION AND ONE FOR SHUTTING DOWN THE ASSOCIATED SUPPLY AIR FAN. DETECTORS SHALL BE INSTALLED IN ACCORDANCE WITH NFPA. NOTE SPECIFICALLY FIGURES A-9-4.8 (B) AND (C) - 1990 EDITION. i. IONIZATION DETECTORS
- i.1. AUTOMATIC IONIZATION DETECTORS SHALL MATCH EXISTING AND BE IN ACCORDANCE WITH NFPA 72E, U.L. LISTED FOR 900 SQUARE FEET AND OPERATE ON THE IONIZATION PRINCIPAL UTILIZING THE DUAL CHAMBER DESIGN, SHALL BE SELECTED BASED ON APPROPRIATE AIR VELOCITY REQUIREMENTS FOR EACH APPLICATION, AND SHALL BE ACTIVATED BY THE PRESENCE OF PRODUCTS OF COMBUSTION. AN INTEGRAL INDICATOR LIGHT ON THE DEVICE SHALL PROVIDE VISUAL INDICATION OF THE INITIATION OF AN ALARM. THE BASE SHALL HAVE TERMINALS FOR MAKING ALL CONNECTIONS AND PROVISIONS FOR A REMOTE RELAY OUTPUT. REMOTE RELAYS SHALL BE FURNISHED AS REQUIRED FOR LOCAL AIR HANDLING UNIT AND FAN SHUTDOWN. POWER FOR DETECTOR OPERATION AND AUXILIARY DEVICES SHALL BE VIA A SEPARATE SUPERVISED PAIR OF WIRES. DETECTORS LOCATED IN AIR HANDLING UNIT PLENUM SPACES SHALL BE MOUNTED ON A CONDUIT BOX LOCATED DIRECTLY IN THE PATH OF AIR TO THE UNIT. ALL IONIZATION DETECTOR COVERS IN FINISHED AREAS SHALL BE WHITE. IONIZATION DETECTORS SHALL BE PROVIDED AS FOLLOWS AND AS INDICATED ON THE DRAWINGS. CONTRACTOR SHALL PROVIDE CORRECT QUANTITY OF DETECTORS AT ALL RETURN AIR SPACES/OPENINGS AT EACH SUPPLY AND EXHAUST FAN (OVER 2000 CFM), EXCEPT SMOKE EXHAUST FANS, AS REQUIRED TO COMPLY WITH NFPA 72E, SPECIFICALLY FIGURE A-9.3.2.2 (A) - 1990 EDITION. i.2. EACH ELECTRICAL CLOSET.
- j. VISUAL ALARMS j.1. VISUAL ALARM INDICATING UNITS SHALL MATCH EXISTING AND BE DESIGNED FOR SIDE VIEWING WITH A TAMPERPROOF RED LENS HAVING THE WORD "FIRE" SILKSCREENED IN WHITE. VISUAL ALARMS SHALL BE UL LISTED AND SHALL PRODUCE A MINIMUM OF 100 CANDELA AND MEET ALL ADA REQUIREMENTS.
 - VISUAL ALARMS SHALL BE PROVIDED IN THE FOLLOWING LOCATIONS AND AS
 - INDICATED ON THE DRAWINGS: j.1.1. EACH ENTRY/EXIT TO THE BUILDING.
 - j.1.2. EACH RESTROOM.
 - j.1.3. PUBLIC CORRIDORS (MAXIMUM 50' SPACING). j.1.4. AS REQUIRED BY LOCAL CODE.
- j.2. WHERE VISUAL ALARMS AND AUDIBLE DEVICES ARE SHOWN ON THE CONTRACT DRAWINGS IN CLOSE PROXIMITY, THEN COMBINATION AUDIBLE/VISUAL DEVICES MAY BE PROVIDED AT DISCRETION OF ARCHITECT.
- j.3. PROVIDE UNITS TO MATCH EXISTING. k. FIRE ALARM HORNS
- k.1. ALARM SIGNAL HORNS SHALL BE UL LISTED WALL MOUNTED FLUSH TYPE REENTRANT TYPE HORNS HOUSED IN DIE CAST ALUMINUM FRAMES AND GRILLES WITH FINISH AS SELECTED BY THE ARCHITECT. THEY SHALL BE CONSTRUCTED FOR SAFE USE IN BOILER ROOMS, KITCHENS, AND EXTERIOR LOCATIONS WITHOUT IMPAIRING THE OUALITY OF TONE OR VOICE REPRODUCTION IN CLIMATES RANGING FROM -300F TO 1500F. THE HORN DIAPHRAGM SHALL BE CONSTRUCTED OF STAINLESS STAINLESS STEEL OR A POLYAMIDE PHENOLIC

MATERIAL. THE HOUSING SHALL CONTAIN A RAPIDLY FLARED, FOLDED, REENTRANT TYPE HORN AND SHALL PROTECT THE HORN MECHANISM FROM MALICIOUS ATTACK. HORNS SHALL BE PROVIDED SUCH THAT A MINIMUM SOUND LEVEL OF 15 DBA OR 5 DBA ABOVE AMBIENT SOUND LEVELS IS MAINTAINED IN ALL PUBLIC AND BACK OF HOUSE AREAS. LOCATIONS SHALL INCLUDE BUT NOT BE LIMITED TO:

- k.1.1. AT EACH MANUAL PULL STATION. k.1.2. EACH ENTRY/EXIT.
- k.1.3. PUBLIC CORRIDORS (MAXIMUM 50' SPACING).
- k.1.4. AS INDICATED ON THE DRAWINGS.
- k.1.5. SYSTEM SHALL BE PROVIDED WITH ALL NECESSARY ELECTRONICS HARD CARDS, PANELS, AMPLIFIERS, ETC., WITH WIRING AND TERMINAL STRIPS AT EACH FLOOR'S/BUILDING FIRE ALARM TERMINAL CABINET (FATC) READY FOR CONNECTION OF DEVICES TO SUPPLY ONE HORN FOR EVERY 1000 SF OF FUTURE SPACE. k.1.6. ALL HORNS SHALL BE U.L. LISTED AS AN APPROVED AUDIO APPLIANCE FOR FIRE ALARM SIGNALING.
- k.1.7. PROVIDE UNITS TO MATCH EXISTING.

C. EXECUTION a. FIRE ALARM WIRING

- a.1. FURNISH AND INSTALL ALL WIRING, CONDUIT AND OUTLET BOXES REQUIRED FOR THE ERECTION OF A COMPLETE AND PROPERLY OPERATING SYSTEM IN ACCORDANCE WITH APPLICABLE NATIONAL, STATE AND LOCAL CODES, THE MANUFACTURER'S RECOMMENDATIONS, THE PLANS AND SPECIFICATIONS. a.2. ALL WIRING SHALL BE IN A COMPLETELY SEPARATE CONDUIT SYSTEM. WIRING
- SHALL BE PROVIDED AS FOLLOWS: a.3. AUDIBLE ALARM CIRCUITS: TWISTED JACKETED #16 PAIRS.
- a.4. OTHER WIRING: THHN, SIZE AS REQUIRED.
- b. AUDIBLE ALARM CIRCUITING AND SYSTEM AMPLIFICATION REQUIREMENTS
- b.1. A MAXIMUM OF 10 CIRCUITS SHALL BE CONNECTED TO ANY AMPLIFIER. b.2. NO LIMITATION OF COMPONENT POWER SUPPLY OR OTHER CONSIDERATION
- SHALL CAUSE THE SOUND OUTPUT LEVEL TO DETERIORATE FROM THOSE SPECIFIED IN ANY MODE OF SYSTEM OPERATION. b.3. ONE STANDBY AMPLIFIER SHALL BE PROVIDED FOR EVERY TEN (10) SYSTEM
- AMPLIFIERS.
- c. SYSTEM TESTS c.1. THE MANUFACTURER'S AUTHORIZED TECHNICAL REPRESENTATIVE, THE ENGINEER OF RECORD SHALL BE PRESENT DURING ALL TESTS AND INSPECTIONS CONDUCTED BY THE FIRE MARSHAL'S OFFICE. THE MANUFACTURER'S AUTHORIZED REPRESENTATIVE SHALL PROVIDE SUPERVISION OF FINAL CONNECTIONS TO THE SYSTEM PANEL, PERFORM A COMPLETE FUNCTIONAL TEST OF THE SYSTEM AND SUBMIT A WRITTEN REPORT TO THE ENGINEER ATTESTING TO THE PROPER OPERATION OF THE COMPLETED SYSTEM. THE REPORT SHALL LIST MEASURED SOUND PRESSURE LEVELS OF 10%%% OF THE HORNS. MEASUREMENTS SHALL BE TAKEN BY THE MANUFACTURER'S TECHNICAL REPRESENTATIVE. A SOUND PRESSURE LEVEL METER SHALL BE PROVIDED BY THE MANUFACTURER FOR THE USE OF THE FIRE MARSHAL DURING TESTING.
- c.2. ANY REQUIRED RETESTS SHALL BE MADE BY THE CONTRACTOR AT NO EXPENSE TO THE OWNER INCLUDING ENGINEERING FEES TO WITNESS SYSTEM RETESTS THE CONTRACTOR SHALL PROVIDE AT LEAST TWO WEEKS WRITTEN NOTICE TO THE ARCHITECT, OWNER, ENGINEER OF RECORD, CITY BUILDING DEPARTMENT AND THE CITY FIRE DEPARTMENT PRIOR TO THE DATE OF TESTING.
- c.3. UPON SATISFACTORY COMPLETION OF ALL SYSTEM TESTS, THE MANUFACTURER'S REPRESENTATIVE SHALL PRESENT FOR THE OWNER'S CONSIDERATION A PROPOSAL TO PROVIDE SEMIANNUAL INSPECTION AND TESTS OF THE SYSTEM THIS PROPOSAL AND THE REQUIREMENTS SHALL CONFORM TO N.F.P.A. 72. d. OPERATING INSTRUCTIONS AND DRAWINGS
- d.1. UPON COMPLETION OF INSTALLATION, PRINTED SYSTEM INSTRUCTIONS AND AS-BUILT WIRING DIAGRAMS ILLUSTRATING COMPLETE SYSTEM WIRING AND CENTRAL CONTROL STATION SCHEMATICS SHALL BE FURNISHED TO THE OWNER, AND THE ENGINEER OF RECORD.
- d.2. THE MANUFACTURER SHALL PROVIDE AN AUTHORIZED REPRESENTATIVE TO INSTRUCT AND TRAIN FIRE DEPARTMENT PERSONNEL AND THE OWNER IN THE OPERATION OF THE SYSTEM.
- e. GUARANTEE AND SERVICE e.1. ALL EQUIPMENT AND WIRING SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP FOR A ONE (1) YEAR PERIOD FROM THE START UP AND BENEFICIAL USE OF THE SYSTEM. WARRANTY SERVICE FOR THE EQUIPMENT SHALL BE PROVIDED BY THE MANUFACTURER'S FACTORY TRAINED SERVICE REPRESENTATIVE DURING NORMAL WORKING HOURS (MONDAY THROUGH FRIDAY, 8:00 A.M. TO 5:00 P.M. EXCLUDING HOLIDAYS). EMERGENCY SERVICE PROVIDED AT TIMES OTHER THAN AS STIPULATED ABOVE, SHALL BE AVAILABLE ON A 24 HOUR BASIS FROM THE SAME SOURCE AT ADDITIONAL SOURCE AT ADDITIONAL COST TO THE OWNER.



POWER PLAN KEY NOTES

- 1. E.C. SHALL COORDINATE WITH THE MECHANICAL CONTRACTOR FOR THE EXACT LOCATION AND ELECTRICAL CONNECTION REQUIREMENT OF THE MECHANICAL UNIT IN THE FIELD. PROVIDE CIRCUIT AND CONTROLS AS REQUIRED.
- 2. INTERLOCK EXHAUST FAN TO LIGHT SWITCH IN RESTROOM. REFER TO LIGHTING PLAN FOR CIRCUITING INFORMATION. REFER TO MECHANICAL FOR EXACT LOCATION AND REQUIREMENTS.
- 3. SHOW WINDOW RECEPTACLE. INSTALL WITHIN 18 INCHES OF TOP OF WINDOW, CIRCUIT AS INDICATED.
- 4. VERIFY NEMA RECEPTACLE TYPE FOR WASHER AND DRYER CONNECTIONS WITH SUPPLIED EQUIPMENT PRIOR TO ROUGH-IN.
- 5. ROUTE (1) 3" CONDUIT FROM TELECOM DEMARCATION AND STUB INTO TENANT SPACE ABOVE CEILING FOR CABLING REQUIREMENTS. COORDINATE EXACT LOCATION AND ROUTING IN FIELD PER SPECIFIC SITE. FIRE-STOP ALL CONDUIT PENETRATIONS AT RATED WALLS TO MAINTAIN FIRE RATING.
- 6. SURFACE MOUNT POWER AND DATA RECEPTACLES BELOW FRONT COUNTER FOR CONNECTION TO POS AND TECHNOLOGY DEVICES. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT WITH MILLWORK VENDOR AND ARCHITECT PRIOR TO ROUGH-IN.
- 7. RECESSED JUNCTION BOXES FOR POWER, COMMUNICATIONS, AND SECURITY CABLING REQUIREMENTS. PROVIDE A 3/4" CONDUIT FOR POWER AND A 2" CONDUIT FOR DATA WITH PULL-STRING TO ABOVE ACCESSIBLE CEILING SPACE. COORDINATE LOW VOLTAGE REQUIREMENTS WITH TECHNOLOGY CONTRACTOR.
- EXISTING (E) MECHANICAL UNITS SHALL REMAIN CONNECTED TO THE EXISTING CIRCUIT. E.C. TO VERIFY THE OPERABLE CONDITION OF THE ELECTRICAL CIRCUIT AND CONTROLS IN THE FIELD. REPLACE IF FOUND INOPERABLE, BASE BID ACCORDINGLY.
- E.C. SHALL VERIFY THE LOCATION, RATING, AND OPERABLE CONDITION OF EXISTING, RELOCATED AND NEW PANEL IN THE FIELD. ALSO, ENSURE CLEAR WORKING AND DEDICATED SPACE HAVE BEEN PROVIDED AS PER NEC 110.26.. INFORM THE ENGINEER OF RECORD OF ANY DISCREPANCY, BEFORE BIDING.
- 10. E.C. SHALL COORDINATE WITH THE PLUMBING CONTRACTOR FOR THE EXACT LOCATION AND ELECTRICAL CONNECTION REQUIREMENT OF THE UNIT IN THE FIELD. PROVIDE CIRCUIT AND CONTROL AS REQUIRED.
- 1. EXHAUST FAN CONTROL WITH TIMECLOCK (OPERATIONAL DURING OCCUPIED

POWER PLAN GENERAL NOTES

- A. ALL THE BRANCH WIRING SHALL BE COPPER. THE INSULATION SHALL BE RATED FOR THE AREA OF THE USE.
- B. THE LOCATION OF ALL ELECTRICAL EQUIPMENT (NOT PROVIDED IN THE ARCHITECTURAL PLAN) SHALL BE VERIFIED WITH THE ARCHITECT/OWNER BEFORE BID.
- C. POWER AND LOCATION OF ALL THE MECHANICAL AND PLUMBING UNITS SHALL BE COORDINATED WITH THE RESPECTIVE CONTACTORS BEFORE BID.
- D. ELECTRICAL OUTLETS PLACED ON BOTH SIDES OF THE WALL PARTITION TO BE LOCATED OFFSET OF EACH OTHER.
- E. THE DISCONNECT SWITCHES FOR THE BRANCH CIRCUIT SHOWN ON THE PLAN SHALL BE RATED EQUAL TO OR HIGHER THAN THE BREAKER RATING. REFER BREAKER RATING IN THE PANEL SCHEDULE AND PROVIDE DISCONNECT AS NEEDED.
- F. ALL 125V-250V RECEPTACLES SUPPLIED BY SINGLE-PHASE CIRCUITS RATED 150V OR LESS TO GROUND, 50A OR LESS, AND ALL RECEPTACLES SUPPLIED BY THREE PHASE BRANCH CIRCUIT RATED 150V OR LESS TO GROUND, 100A OR LESS INSTALLED IN THE LOCATIONS SPECIFIED IN NEC 210.8(B)(1) THROUGH (12) SHALL HAVE GFCI PROTECTION.
- G. GFI MARKED ON THE PLAN INDICATES THAT THE CIRCUIT SHALL BE GFI PROTECTED. E.C. SHALL PROVIDE A GFI RECEPTACLE DISCONNECT IN THE READILY ACCESSIBLE LOCATION. PROVIDE GFI BREAKER IN THE PANEL IF EITHER THE RECEPTACLE IS NOT AVAILABLE OR NOT ACCESSIBLE WHEN INSTALLED IN THE DESIRED LOCATION.
- H. COORDINATE EXACT LOCATION AND ELECTRICAL CONNECTION REQUIREMENTS OF THE MOTORIZED DAMPERS AND THERMOSTATS IN THE FIELD. PROVIDE WIRING AS REQUIRED.
- I. E.C. SHALL COORDINATE WITH THE ARCHITECT/OWNER FOR THE EXACT LOCATION AND MOUNTING HEIGHT OF THE ELECTRICAL OUTLET IN THE FIELD. MAKE PROVISION ACCORDINGLY.
- J. E.C. SHALL COORDINATE WITH THE ARCHITECT/OWNER FOR THE EXACT LOCATION OF THE EQUIPMENT IN THE FIELD BEFORE ROUGH-IN. PROVIDE ELECTRICAL PROVISION AS REQUIRED.
- K. E.C. SHALL COORDINATE WITH THE ARCHITECT/EQUIPMENT VENDOR FOR THE EXACT ELECTRICAL CONNECTION REQUIREMENT OF THE EQUIPMENT IN THE FIELD. PROVIDE ELECTRICAL OUTLET, BRANCH CIRCUIT AND BREAKER AS REQUIRED.
- L. ALL THE ELECTRICAL ELEMENT VIZ. CONDUITS, WIRING, AND DISCONNECT SWITCHES SHALL BE RATED FOR THE EXTERIOR USE.
- M. A 125-VOLT, SINGLE-PHASE, 15- OR 20-AMPERE-RATED RECEPTACLE OUTLET SHALL BE INSTALLED AT AN ACCESSIBLE LOCATION WITHIN 7.5 M (25 FT) OF THE EQUIPMENT AS SPECIFIED IN 210.63(A) AND (B) AS PER NEC 210.63.









- TYPICAL.

LIGHTING PLAN GENERAL NOTES

- SPACE.

S	CHEDU	ILE		
	VOLT.	DIMMABLE	WATT.	REMARKS
	120 V	YES	20W MAX	RECESSED LED DOWNLIGHT - DROP CEILING.
	120 V	YES	40W	2x2 FLAT LED PANEL WITH 90 MINUTE EMERGENCY BATTERY BACKUP
	120 V	YES	40W	2x4 FLAT LED PANEL
BS	120 V	YES	27W	CHANDELIER OVER TREAT TABLE. VERIFY MOUNTING HEIGHT PER ARCH. RCP.
3	120 V	YES	15W	TRACK COUPLERS AND ALL CONNECTORS BY VENDOR, WHITE FINISH. VERIFY MOUNTING HEIGHT PER ARCH. RCP.
	120 V	NO	9W	WET LOCATION LISTED WALL MOUNTED EMERGENCY EGRESS LIGHT WITH PHOTOCELL CONTROL AND 90-MINUTE EMERGENCY BACKUP BATTERY.
	120 V	NO	5W	EMERGENCY EGRESS LIGHT WITH 90-MINUTE BATTERY BACKUP, CEILING MOUNT ALTERNATE: FOR OPEN CEILING CONFIGURATION, EMERGENCY FIXTURES SHALL BE WALL MOUNTED AT 7'-6" AFF.
	120 V	NO	5W	EXIT SIGN WITH 90-MINUTE BATTERY BACKUP

LIGHTING PLAN KEY NOTES

1. PROVIDE WEATHER TIGHT JUNCTION BOX (DISCONNECT SWITCH) AND CIRCUIT FOR EXTERIOR SIGNAGE TO BE CONTROLLED VIA TIMECLOCK FOR DUSK TO DAWN OPERATION. COORDINATE EXACT LOCATION AND REQUIREMENTS WITH ARCHITECT AND SIGN VENDOR.

2. BRANCH LIGHTING CIRCUIT INDICATED ADJACENT TO SWITCHING DEVICE OR POWER PACK, TYPICAL.

3. LOWER CASE LETTER ADJACENT TO POWER PACK INDICATES CONTROL OF LIGHT FIXTURES WITH SAME DESIGNATION, TYPICAL.

4. PROVIDE A 3-AMP CURRENT LIMITING DEVICE FOR TRACK LIGHTING CIRCUIT. 5. LOCATE ALL LIGHTING CONTROL POWER PACKS ABOVE ACCESSIBLE CEILING,

6. LOOP ALL EMERGENCY LIGHT FIXTURES AND EXIT SIGNS AND WIRE THEM BACK TO THE EMERGENCY LIGHTING CIRCUIT IN THE PANEL BOARD. THE CIRCUIT BREAKER SHALL HAVE A LOCKOUT.

7. CONNECT EMERGENCY LIGHT FIXTURE TO ADJACENT LIGHTING CIRCUIT.

A. EMERGENCY LIGHT FIXTURES SHALL TURN ON DURING POWER FAILURE WHEREAS ALL EXIT SIGNS SHALL BE PERMANENTLY ON. E.C. TO WIRE THE EMERGENCY LIGHTING FIXTURES AND EXIT SIGNS ACCORDINGLY.

B. THE OCCUPANCY SENSOR, TIMERS, AND OTHER APPROVED LIGHTING CONTROLS SHALL MATCH THE CONTROL FUNCTION REQUIREMENT SPECIFIED IN THE IECC C405.2.

C. PROVIDE LINE VOLTAGE (UNLESS SPECIFIED) LIGHTING CONTROLS AND, SENSORS, OR POWER PACK AS REQUIRED.

D. THE OCCUPANCY SHALL BE SET TO TURN OFF THE LIGHTS WITHIN 15

MINUTES AFTER ALL OCCUPANTS LEAVE THE SPACE. E. THE TIME CLOCK SHALL BE SET AS PER THE REQUIREMENT OF THE PROJECT

F. COORDINATE SCOPE AND POWER REQUIREMENT OF THE CAMERA WITH THE OWNER AND VENDOR RESPECTIVELY.







				2																
		000	UPANO	CY SEI	NSOR	TIM	IE CLOCK	1		WAL	LSWI	ТСН		DAYLI	GHT S	ENSOR		OTHER	,	
		VACANCY MODE (MANUAL ON)	OCCUPANCY MODE (AUTO ON)	SENSOR TIME OUT PERIOD (MINUTES)	DUAL TECHNOLOGY	SCHEDULE ON TIME	SCHEDULE OFF TIME	SCHEDULE OVERRIDE SWITCH	MANUAL (ON/OFF)	MANUAL DIMMING	KEY SWITCH	SCENE CONTROL	GRAPHIC TOUCHSCREEN	SWITCHING (ON/OFF)	DIMMING	TARGET LIGHTING LEVELS (FC)	EXTERIOR LOCATION	PLUG LOAD CONTROL	NETWORKED	NOTES
Α	MAIN ENTRY		Х	10	X	TBD	TBD						X						X	1
В	GROOMING AREA		Х	10	X	TBD	TBD			Х									X	1
С	WASH/DRY		Х	10	X	TBD	TBD			Х									X	1
D	RESTROOM		X	10	X				X										X	1
Ε	EXTERIOR SIGNAGE					DUSK	DAWN												X	
NOT	TES: 1 LIGHTING SHALL	BE CO			TIM	E CLOCK AN				F SCH		WITH	OWNE	R AT (STARTI	IP				

OCCUPANCY SENSORS USED FOR AFTER HOURS OPERATION.





PANEL:	Α	(EXISTING)	EXISTING) CENTREPOINTE HOUSE PANEL (CHP)								MOUNTING:	RECESSED		
		-	•											
208Y/120	VOLTS	PHASE	3		-	-			DEMAND LOAD	46.32		PANEL LOCATION:	WASH/DRY	AREA
200A	MLO	WIRE	4		-	-			DEMAND CURRENT	128.73		FED FROM:	ELECTRICAL	METER
NOTE:														
			LOAD	LOAD		PER P	HASE ((KVA)		LOAD	LOAD			
CKTNU.		DESCRIPTION OF LOAD	TYPE	(KVA)		Α	В	С		(KVA)	TYPE	DESCRIPTION OF LOAD	TRIP AIVIPS	CKT NO.
1	20	LIGHTING - GROOMING,		1.40						0.22	1		20	2
L	20	WASH/DRY/RESTROOM & EF-1(N)		1.40	2#12 + 1#12G, 3/4 C	1.63			2#12 + 1#12G, 3/4 C	0.23	L	SALES LIGHTING	20	Z
3	20	EXTERIOR SIGNAGE	L	1.20	2#12 + 1#12G, 3/4"C		1.47		2#12 + 1#12G, 3/4"C	0.27	L	TRACK LIGHTING	20	4
5	20**	EMERGENCY LIGHTING	L	0.05	2#12 + 1#12G, 3/4"C			0.05				SPARE	20	6
7	20	RCP-1	0	0.18	2#12 + 1#12G, 3/4"C	0.38			2#12, #12G, 3/4"C	0.20	Е	GROOMING TABLE	20	8
9	20/20		0	4.50	2#10 + 1#106 2/4"6		4.70		2#12, #12G, 3/4"C	0.20	Е	GROOMING TABLE	20	10
11	- 50/ZP		0	4.50	2#10 + 1#10G, 5/4 C			4.70	2#12, #12G, 3/4"C	0.20	Е	GROOMING TABLE	20	12
13			н	3.60		5.44			2#12, #12G, 3/4"C	1.84	0	CAGE DRYER	20	14
15	30/3P	RTU-1 (E)	н	3.60	EXISTING		3.80		2#12, #12G, 3/4"C	0.20	Е	GROOMING TABLE	20	16
17			н	3.60				4.60	2#12, #12G, 3/4"C	1.00	L	WINDOW OUTLETS	20	18
19	20*	POS	R	0.54	2#12, #12G, 3/4"C	1.08			2#12, #12G, 3/4"C	0.54	R	GENERAL RECEPT.	20*	20
21	20*	FREEZER	E	0.91	2#12, #12G, 3/4"C		1.09		2#12, #12G, 3/4"C	0.18	R	RECEPT	20*	22
23	20*	RECEPT	R	0.18	2#12, #12G, 3/4"C			0.36	2#12, #12G, 3/4"C	0.18	R	RECEPT	20*	24
25	20*	RECEPT	R	0.18	2#12, #12G, 3/4"C	0.36			2#12, #12G, 3/4"C	0.18	R	RECEPT	20*	26
27	20*	RECEPT	R	0.18	2#12, #12G, 3/4"C		0.36		2#12, #12G, 3/4"C	0.18	R	RECEPT	20*	28
29	20*	DRYING TABLE EQUIPMENT	E	1.60	2#12, #12G, 3/4"C			1.80	2#12, #12G, 3/4"C	0.20	Е	GROOMING TABLE	20*	30
31	20*	DRYING TABLE EQUIPMENT	E	1.60	2#12, #12G, 3/4"C	1.78			2#12, #12G, 3/4"C	0.18	R	RECEPT	20*	32
33	20/20*	A (C 1(N))	н	0.05	2#12 #126 2/4%		0.23		2#12, #12G, 3/4"C	0.18	R	RECEPT	20*	34
35	20/28*		н	0.05	2#12, #12G, 3/4 C			0.23	2#12, #12G, 3/4"C	0.18	R	RECEPT	20*	36
37			0	3.05		3.47			2#12, #12G, 3/4"C	0.42	Н	EF-2(N)	20*	38
39	100/3P*	PANEL - B	0	3.05	4#3 + 1#8G, 1 1/4"C		4.77			1.72	Н		20/20*	40
41			0	3.05				4.77	2#12 + 1#126, 3/4°C	1.72	Н		20/28*	42
						14 14	16 42	16 51						

PANEL:	В	(RELOCATED)	HOUSE PANEL (HP)

PANEL:	В	(RELOCATED)	HOUS	E PANEL	. (HP)							MOUNTING:	SURFACE	
208Y/120	VOLTS	PHASE	3		-	_			DEMAND LOAD	9.15		PANEL LOCATION:	WASH/DRY	AREA
100A	MLO	WIRE	4		_	_			DEMAND CURRENT	25.43		FED FROM:	PANELA	
NOTE:		,							11					
CKT NO.		DESCRIPTION OF LOAD	LOAD	LOAD	MINIMUM BRANCH CIRCUIT	PER	PHASE (I	(VA)	MINIMUM BRANCH CIRCUIT	LOAD	LOAD	DESCRIPTION OF LOAD	TRIP AMPS	СКТ NO.
1	20	<u>ΒΟΟΕ ΒΕΓΕΡΤΑΓΙΕ</u>	R		2#12 + 1#12G 3///"C	0.36	D	L	2#12 + 1#12G 3/4"C	(KVA) 0.18	R	RESTROOM RECEPT	20	2
3	20		F	0.10	2#12 + 1#12G, 3/4 C	0.50	0.91		2#12 + 1#120, 37 4 0	0.10		SPARF	20	<u> </u>
5	20	RECEPT	R	0.18	2#12 + 1#12G, 3/4"C		0.51	0.36	2#12 + 1#12G. 3/4"C	0.18	R	RECEPT.	20	6
7	20	RECEPT	R	0.18	2#12 + 1#12G. 3/4"C	1.38			2#12, #12G, 3/4"C	1.20	E	WASHER	20	8
9	20	RECEPT.	R	0.18	2#12 + 1#12G, 3/4"C		0.18					00405	20 (25	10
11	20	RECEPT.	R	0.18	2#12 + 1#12G, 3/4"C			0.18				SPARE	20/2P	12
13	20*	AC-1(N) SERVICE RECEPT.	R	0.18	2#12 + 1#12G, 3/4"C	3.30			2#10 #100 2/480	3.12	0	DDVCD	20/20*	14
15	20*	MOTORIZED DAMPER	н	0.10	2#12 + 1#12G, 3/4"C		3.22		2#10, #10G, 3/4 C	3.12	0	DRIER	50/ ZP 1	16
17	20*	SPARE						0.00				SPARE	20*	18
19	20*	SPARE				0.00						SPARE	20*	20
21		SPACE					0.00					SPACE		22
23		SPACE						0.00				SPACE		24
25		SPACE				0.00						SPACE		26
27		SPACE					0.00					SPACE		28
29		SPACE						0.00				SPACE		30
31		SPACE				0.00						SPACE		32
33		SPACE					0.00					SPACE	-	34
35		SPACE						0.00				SPACE		36
37		SPACE				0.00						SPACE		38
39		SPACE					0.00					SPACE		40
41		SPACE						0.00				SPACE		42
						5.04	4.31	0.54						

PANEL SCHEDULE GENERAL NOTES

- A. CONTRACTOR SHALL VERIFY BREAKER AND BRANCH CIRCUIT REQUIREMENTS FOR THE EQUIPMENT IN THE FIELD.
- B. THE ELECTRICAL LOAD IS BALANCED WITHIN 10% FOR ALL 3 PHASES.
- C. THE VOLTAGE DROP FOR THE BRANCH CIRCUIT SHALL NOT EXCEED 2% OR 5% IN COMBINATION WITH THE FEEDER CIRCUIT.
- D. GFI MARKED ON THE PLAN INDICATES THAT THE CIRCUIT SHALL BE GFI PROTECTED. E.C. SHALL PROVIDE A GFCI BREAKER IN THE PANEL FOR THE INDICATED CIRCUIT IF EITHER THE RECEPTACLE IS NOT AVAILABLE OR NOT READILY ACCESSIBLE.
- E. COORDINATE AVAILABLE FAULT CURRENT (AIC RATING) WITH UTILITY/LANDLORD/OWNER. CALCULATE THE EXACT AIC RATING OF EACH PANEL IN THE FIELD. AIC RATING SHALL BE WRITTEN ON EACH PANEL AS PER STANDARD.
- F. PROVIDE BREAKER LOCKING DEVICES IN THE PANELS, WHERE EVER REQUIRED BY CODE. INCLUDING BUT NOT LIMITED TO EMERGENCY LIGHTING, FIRE ALARM CIRCUITS, AND HARD-WIRED EQUIPMENT.
- G. THE BREAKER FEEDING HVAC UNITS SHALL BE HACR TYPE.
- H. THE CONTRACTOR SHALL MODIFY THE BREAKERS OF THE EXISTING PANEL (WHEREVER REQUIRED) TO BE IN LINE WITH THE PANEL SCHEDULE.
- I. REPLACE THE EXISTING OR PROVIDE A NEW BREAKER IF THE EXISTING IS INOPERABLE.
- J. ALL EXISTING CIRCUITS SHOWN ON THE EXISTING ELECTRICAL PANELS ARE FOR REFERENCE PURPOSE ONLY. E.C. TO FIELD VERIFY AND INFORM ENGINEER OF RECORD BEFORE BID.
- K. THE CONTRACTOR IS TO PROVIDE A CIRCUIT DIRECTORY FOR EACH PANE BOARD.
- L. ALL WIRING SHOWN SHALL BE COPPER TYPE "THHN/THWN", UNLESS NOTED OTHERWISE.
- M. BREAKER SIZES, EQUIPMENT LOADS AND FINAL CONNECTIONS MUST BE VERIFIED WITH FINAL EQUIPMENT SPECIFICATIONS.



PANEL SCHEDULE ABBREVIATIONS

L = LIGHTING R = RECEPTACLE

- H = HVAC E = EQUIPMENT
- M = MOTOR
- O = OTHER

* = PROVIDE NEW BREAKER AS MARKED IN THE PANEL SCHEDULE ** = PROVIDE LOCKOUT BREAKER

MOUNTING:	RECESSE



RISER DIAGRAM GENERAL NOTES

- A. E.C. SHALL VERIFY/COORDINATE THE FOLLOWING INFORMATION IN THE FIELD WITH THE UTILITY/LANDLORD/OWNER AND INFORM THE ENGINEER OF RECORD OF ANY DISCREPANCY.
- B. THE EXACT POWER DISTRIBUTION AND SCOPE OF WORK WITH THE LANDLORD/OWNER BEFORE BID.
- C. THE ELECTRICAL WORK SHALL BE PERFORMED IN COMPLIANCE WITH THE NEC, LOCAL CODES AND AHJ.
- D. COORDINATE AVAILABLE FAULT CURRENT WITH UTILITY/LANDLORD/OWNER. CALCULATE THE EXACT AIC RATING OF EACH EQUIPMENT IN THE FIELD. PROVIDE THE EQUIPMENT ACCORDINGLY. AIC RATING SHALL BE WRITTEN ON EACH EQUIPMENT PER STANDARD.
- E. THE VOLTAGE AND FREQUENCY FLUCTUATION IN THE ELECTRICAL UTILITY SERVICE AT THE SERVICE ENTRY SHALL NOT BE MORE THAN +/- 5% AND +/-1% RESPECTIVELY. PROVIDE THE REGULATORS IF SUCH CASE IS OBSERVED.
- F. ENSURE THE COMBINED VOLTAGE DROP OF THE FEEDER AND BRANCH CIRCUIT SHALL NOT EXCEED 5% PER CODE.
- G. PROVIDE GEC AND EGC AS PER 250.66 & 250.122 RESPECTIVELY, AS NEEDED. PROVIDE SEPARATE GROUND CONDUCTORS IN ALL CONDUITS.
- H. REFER POWER PLAN FOR THE PROPOSED LOCATION OF THE ELECTRICAL PANELS. INFORM THE ENGINEER OF THE RECORD OF ANY DISCREPANCY.
- I. THE PART OF RISER MARKED AS EXISTING IS FOR REFERENCE PURPOSE ONLY. E.C. SHALL VERIFY THE EXACT POWER DISTRIBUTION (INCLUDING RISER IN THE FIELD. INFORM THE ENGINEER OF THE RECORD OF ANY DISCREPANCY FOUND.
- J. SPARE AMPS AVAILABLE IN THE EXISTING ELECTRICAL SERVICE SHALL BE MORE THAN THE NEWLY ADDED DEMAND AMPS.
- K. VERIFY THE LOCATION, RATING, AND OPERABLE CONDITION OF ALL THE EXISTING DEVICES REUSED. REPLACE IF FOUND INOPERABLE (WITHIN THE SCOPE OF WORK). BASE BID ACCORDINGLY.
- L. ADDITION OR ALTERATION TO THE EXISTING SYSTEM SHALL NOT BE DONE WITHOUT THE WRITTEN CONSENT OF THE OWNER.
- M. THE CONTRACTOR SHALL VERIFY THE EXACT VOLTAGE LEVEL IN THE FIELD. INFORM THE ENGINEER OF THE RECORD OF ANY DISCREPANCY BEFORE THE BID.
- N. REUSE OF THE EXISTING EQUIPMENT IS SUBJECT TO THE VERIFICATION OF THE LOCATION, RATING, OPERABLE CONDITION AND FAULT CURRENT IN THE FIELD. REPLACE THE EXISTING EQUIPMENT WITH A NEW ONE IF THE EXISTING EQUIPMENT CAN NOT BE REUSED DUE TO ANY OF THE REASONS MENTIONED EARLIER.
- O. THE EXISTING ELECTRICAL EQUIPMENT THAT IS NOT BEING REUSED (WHETHER OR NOT SHOWN ON THE ELECTRICAL PLAN) SHALL BE DEMOLISHED. E.C. SHALL COORDINATE WITH THE OWNER/ARCHITECT IN THE FIELD BEFORE DEMOLITION.



PROPOSED FLOOR

RISER DIAGRAM KEYNOTES

- 1. E.C. SHALL VERIFY THE EXACT LOCATION, RATING, AND OPERABLE CONDITION OF EVERY EQUIPMENT MARKED EXISTING IN THE FIELD. INFORM THE ENGINEER OF RECORD OF ANY DISCREPANCY, BEFORE BIDING.
- 2. COORDINATE AVAILABILITY OF EXISTING "HOUSE PANEL IN FIELD". PROVIDE NEW PANEL IN-LIEU OF HOUSE PANEL IF LATER IS NOT AVAILABLE FOR REUSE.
- 3. E.C. SHALL CALCULATE THE AVAILABLE FAULT CURRENT RATING FOR THE PANEL IN THE FIELD. REPLACE IF THE AVAILABLE FAULT CURRENT IS MORE THAN THE AIC RATING OF THE ELECTRICAL PANEL.
- 4. PROVIDE DISCONNECT SWITCH BEFORE ELECTRICAL PANEL A IF SERVICE DISCONNECT IS NOT LOCKABLE.

(ALL ABBR	EVIATIONS SHOWN ARE NOT NECESSARILY USED ON DRA	AWINGS)	C		D
A/C		G GND	GROUND	 PD	
ABV	ABOVE	GA	GAUGE	PF	POWER FACTOR
ACC	AIR COOLED CHILLER	GALV	GALLON GALVANIZED	PIV	PHASE POST INDICATOR V
ACCU ADJ	AIR COOLED CONDENSING UNIT ADJUSTABLE	GC GFI	GENERAL CONTRACTOR GROUND FAULT INTERRUPTER	PLBG PNL	PLUMBING PANEL
AF AFC	AMPERE FUSE ABOVE FINISHED CEILING	GFR GPD	GROUND FAULT RELAY GALLONS PER DAY	PSF PSI	POUNDS PER SQU
AFF	ABOVE FINISHED FLOOR	GPH	GALLONS PER HOUR	PSIA	POUNDS PER SQU
AIC	ABOVE FINISHED GRADE AMPS INTERRUPTIC CURRENT	GT	GREASE TRAP, GREASE INTERCEPTOR	PRV	PRESSURE REGUL
AL AMPS	ALUMINUM AMPERES	GW	GREASE WASTE	PSV PV	PRESSURE SAFETY PLUG VALVE
ANSI ARCH ARI	AMERICAN NATIONAL STANDARDS INSTITUTE ARCHITECT; ARCHITECTURAL; ARCHITECTURE AIR CONDITIONING AND REFRIGERATION		Н	PVC	POLYVINYL CHLOR
ASHRAE	INSTITUTE AMERICAN SOCIETY OF HEATING,	H HD	HEIGHT; HIGH HEAD; HUB DRAIN		0
ASME	REFRIGERATION AND AIR CONDITIONING ENGINEERS	HID HOA	HIGH INTENSITY DISCHARGE		
ASPE	AMERICAN SOCIETY OF PLUMBING ENGINEERS	HORIZ	HORIZONTAL	QTT	QUANTIT
AUX	AMERICAN SOCIETY OF TESTING AND MATERIALS	HSTAT	HUMIDISTAT		_
AV AWG	AIR VENT AMERICAN WIRE GAUGE	HSTM HTG	HIGH PRESSURE STEAM HEATING		R
AWS AWWA	AMERICAN WELDING SOCIETY AMERICAN WATER WORKS ASSOCIATION	HTR HVAC	HEATER HEATING, VENTILATION AND AIR CONDITIONING	RA RCP	RETURN AIR REFLECTED CEILIN
		HW HWR	HOT WATER RETURN		CONCRETE PIPE
	P	HYD	HYDRANT	RD RE:	REFER; REFERENC
	В	ΗZ	HERTZ	RECIRC REINF	RECIRCULATE
BD BFF	BACKDRAFT DAMPER BELOW FINISHED FLOOR			REQD REV	REQUIRED
BFW	BOILER FEED WATER			RGS	RIGID GALVANIZED
BLDG	BUILDING	ID IE		RHG	REFRIGERANT HOT
BOD BOP	BOTTOM OF DUCT BOTTOM OF PIPE	IEEE		RL RLA	REFRIGERANT LIQU RUNNING LOAD AM
BOS BTU	BOTTOM OF STRUCTURE	IES	ENGINEERS ILLUMINATING ENGINEERING SOCIETY	RM RPM	ROOM
2.0		IG IN	ISOLATED GROUND INCH	RS	REFRIGERANT SUC
	e	IN WC	INCHES OF WATER COLUMN		
С	CONDUIT		K		S
°C CATV	DEGREES CELCIUS CABLE TELEVISION SYSTEM	KCMII		_ SA SAN	SUPPLY AIR SANITARY
CCTV CFH	CLOSED CIRCUIT TELEVISION SYSTEM CUBIC FEET PER HOUR	KUMIL	KILOVOLT	SD, STM SECT	STORM DRAIN
CFM		KVA KW	KILOVOLT-AMP KILOWATT	SF	SQUARE FEET
CI	CAST IRON	KWH	KILOWATT-HOUR	SH SHT	SHOWER
CISPI CIRC	CAST IRON SOIL PIPE INSTITUTE CIRCULATING			SIM SHT MTL	SIMILAR SHEET METAL
CIRC CL	CIRCUIT CENTER LINE		L	SMACNA	SHEET METAL AND
CLG	CEILING CONCRETE MASONRY LINIT	L	LENGTH; LONG	SP	STATIC PRESSURE
CO	CLEANOUT	LAT LB. #	LEAVING AIR TEMPERATURE POUND	SQ	SQUARE
COL	COLUMN CHLORINATED POLYVINYL CHLORIDE			SS SSD	STAINLESS STEEL; SUB-SOIL DRAIN
CU CW	COPPER COLD WATER	LP	LOW PRESSURE	ST STD	SOUND TRAP; STE STANDARD
		LRA LSTM	LOCKED ROTOR AMPS LOW PRESSURE STEAM (15-PSIG)	STL	STEEL
	D	LTG LWB	LIGHTING LEAVING WET BULB	SUSP	SUSPEND
		LWT	LEAVING WATER TEMPERATURE		
D DB	DEPTH DRY BULB				т
dB DC	DECIBEL DIRECT CURRENT		Μ	TDH	TOTAL DYNAMIC HI
DEG DESIG	DEGREES DESIGNATION	MAX	MAXIMUM	THRU	THROUGH
DIA	DIAMETER	MHB MCA	1000 BTU PER HOUR MINIMUM CIRCUIT AMPACITY	TSP	TOTAL STATIC PRE
DISC	DISCONNECT	MCB MCC	MAIN CIRCUIT BREAKER MOTOR CONTROL CENTER	TYP	TYPICAL
DN DPDT	DOWN DOUBLE-POLE, DOUBLE-THROW	MD			
DPST DSN	DOUBLE-POLE, SINGLE-THROW DOWNSPOUT NOZZLE	MFGR	MANUFACTURER		
DWG DX	DRAWING DIRECT EXPANSION	MG MH	MOTOR GENERATOR MANHOLE; METAL HALIDE		
БХ		MIN MLO	MINIMUM MAIN LUGS ONLY	U/G	UNDERGROUND
	F	MTD	MOUNTED	U/S UL	UNDERSLAB
	E			UON UPS	UNLESS OTHERWIS
EA EAT	EACH ENTERING AIR TEMPERATURE		Ν		X
ECC EDB	ECCENTRIC ENTERING DRY BULB	N/A	NOT APPLICABLE	_	V
EF		NC NEC	NOISE CRITERIA; NORMALLY CLOSED NATIONAL ELECTRIC CODE	v	VENT; VOLT
ELEV	ELEVATION	NEMA	NATIONAL ELECTRIC MANUFACTURER'S ASSOCIATION	VA VAC	VOLT-AMPERE VACUUM
EQUIP	EQUIPMENT	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION	VAV	VARIABLE AIR VOL
ESP EWB	EXTERNAL STATIC PRESSURE ENTERING WEB BULB	N.O.	NORMALLY OPEN	VD	VOLUME DAMPER
EWC EWT	ELECTRIC WATER COOLER	NIS	NOT TO SCALE	VERT	VERTICAL
EXH	EXHAUST			VIR	VENT THROUGH R
					W
	F	OAT		W	WATT; WIDE; WID
°F	DEGREES FAHRENHEIT	OBD	OPPOSED BLADE DAMPER ON CENTER	W/O	WITHOUT
FA FACP	FIRE ALARM	OD OH	OVERFLOW DRAIN, OUTSIDE DIAMETER	WB WC	WET BULB WATER CLOSET; V
FCO	FLOOR CLEANOUT	OPG OS&Y	OPENING OUTSIDE STEM & YOKE	VG WPD	WATER GONG
FLA		OSHA	OCCUPATIONAL SAFETY AND HEALTH	WP w/T	WEATHER-PROOF
FLEX FPM	FLEXIBLE FEET PER MINUTE	OWS	OIL-WATER SEPARATOR	VVI	WATERHUHT; WEI
FPS FT	FEET PER SECOND FOOT; FEET				Х
FVNR	FULL-VOLTAGE, NON-REVERSING			XFMR	TRANSFORMER
		X			

				(SINGLE LINE DIAGRAM SYMBOLS)		
	SAN	SANITARY SEWER	G	ELBOW DOWN	1.	DRAWINGS AND SP DOCUMENT IS NOT
	— v — —	SANITARY VENT	O	ELBOW UP	2.	THE DRAWINGS CO
	GW	GREASE WASTE (KITCHEN)	·	TEE OUTLET UP		GENERAL INTENT. DRAWINGS AND DE
VALVE	OW	OIL / WATER WASTE		TEE OUTLET DOWN		TRADES AND BUILD
JARE FOOT JARE INCH	CD	CONDENSATE DRAIN	<u> </u>	VALVE IN DROP	3.	INFORMATION ABO
JARE INCH ABSOLUTE JARE INCH GAUGE	D	DRAIN	Δ			BASED ON RECORE FOR INFORMATION
LATING VALVE IY RELIEF VALVE	SSD	SUB-SOIL DRAIN (GROUND WATER)		VALVE IN RISE		DESIGN TEAM IMME
RIDE	SD	STORM DRAIN (STORM PRIMARY DRAIN)	<u> </u>	VALVE IN CENTER DROP	4.	REFER TO SPECIFIC
	OD	OVERFLOW DRAIN (STORM SECONDARY DRAIN)		CONCENTRIC INCREASER / REDUCER	5.	PERFORM WORK IN AMENDMENTS OR S
	CW	COLD WATER (DOMESTIC - POTABLE)		ECCENTRIC INCREASER / REDUCER		JURISDICTION IN EF
	HW	HOT WATER (DOMESTIC - POTABLE)		GATE VALVE	6.	ALL APPLICABLE ST (IPC), 2018 EDITION
	HW (XXX °F)	HOT WATER (DOMESTIC - POTABLE), WHERE "XXX" = TEMPERATURE OF SERVICE		GLOBE VALVE		FABRICATION, CON 2018 IPC TO CHAPT
	HWR	HOT WATER RETURN (DOMESTIC - POTABLE)	¢	OUTSIDE STEM AND YOKE (OS&Y) VALVE	7.	DO NOT SCALE OR
NG PLAN; REINFORCED	HWR (XXX °F)	HOT WATER RETURN (DOMESTIC - POTABLE), WHERE "XXX" = TEMPERATURE OF SERVICE		BUTTERFLY VALVE		CONSTRUCTION PL
ICE	NPW	NON-POTABLE WATER		BALANCING VALVE WITH DIFFERENTIAL PRESSURE TAPS	8.	VERIFY EXACT LOC WALLS WITH ARCHI
	TP	TRAP PRIMER SUPPLY		PRESSURE REGULATING VALVE	9.	COORDINATE ALL S
E D STEEL	F	FIRE SUPPRESSION WATER		TWO-WAY SELF OPERATING VALVE		POUR.
TY DT GAS	G	NATURAL GAS		THREE-WAY SELF OPERATING VALVE	10.	
QUID MPS	A	COMPRESSED AIR	M			
		EXISTING PIPE,		MOTOR OPERATED VALVE	11.	CEILING SPACES, M
	55140			PNEUMATIC OPERATED VALVE	12.	REFER TO STRUCT
		EXISTING PIPE TO BE DEMOLISHED		SOLENOID OPERATED VALVE	10	
			FS	FLOW SWITCH	13.	THE LOCATION OF
			PS	PRESSURE SWITCH	14.	COORDINATE LOCA ROOF DRAINS WITH
				CHECK VALVE		INSTALLATION TO E TOWARDS DRAIN.
				DOUBLE CHECK BACKFLOW PREVENTER	15.	INSTALL ALL DRAIN FINISHED SLAB LEV
D AIR CONDITIONING ATIONAL ASSOCIATION			P			DRAWINGS. PROVID AND EXHIBITING NO
E			P	REDUCED PRESSURE BACKFLOW PREVENTER	16	
; SANITARY SEWER	•			STRAINER	10.	COMPONENTS FRO
EAM TRAP			+++++++++++++++++++++++++++++++++++++++	STRAINER WITH BLOWDOWN VALVE		WHICH UNDER NOF INCLUDING BUT NO INCLUDING THAT FF
				BALL VALVE		WASTED CONSTRU ALSO TO THE SPEC
			+	GAS VALVE	17.	PROVIDE COVERS A
			4	MANUAL AIR VENT	18	
HEAD	X		Ą	AUTOMATIC AIR VENT	10.	REPLACE WITH NEW
ESSURE			₹	TEMPERATURE AND PRESSURE RELIEF VALVE	19.	PROVIDE ALL SANIT PROTECTION DEVIC
			\ \ \ \ \ \ \ \ \ \ \ \ \ \		20.	DO NOT PENETRAT
				VACUUM BREAKER	21.	
				DIELECTRIC UNION		BELOW GRADE AND
			Ø	CLEANOUT (FLOOR OR SLAB)	22.	NEAREST APPROVE
LABORATORIES, INC.			<i>Ø-Ø</i>	TWO-WAY CLEANOUT (FLOOR OR SLAB)	23.	ROUTE ALL PIPIN OTHERWISE INDI
E POWER SUPPLY			ı	LINE CLEANOUT		OTHER SYSTEMS
				PIPE SLOPE		
			>	DIRECTION OF FLOW (PUMPED MEDIUM)		
			X	PIPE ANCHOR		\frown
PIPE				PIPE EXPANSION FITTING		
				PIPE GUIDE		
ROOF						
1						(1)
DTH			\bigcirc			
			│ r ♣	PRESSURE GAUGE WITH GAUGE COCK		
WATER COLUMN						© Ô
E DKOP : FIGHT				THERMOMETER		¢
				THERMOMETER WELL		$-\oplus$
			(M)	METER		

GAS PRESSURE REGULATOR

(R)

S AND SPECIFICATIONS ARE COMPLIMENTARY TO ONE ANOTHER. EACH IT IS NOT COMPLETE WITHOUT THE OTHER.

VINGS CONTAINED HEREIN ARE DIAGRAMMATIC IN NATURE AND CONVEY INTENT. COORDINATE WITH ARCHITECTURAL AND STRUCTURAL S AND DEVELOPED DETAILED PIPING INSTALLATION SHOP DRAWINGS, FOR EAM REVIEW AND APPROVAL, WHICH DELINEATE COORDINATION WITH ALL ND BUILDING ELEMENTS. OBTAIN APPROVALS PRIOR TO ACTUAL

ION ABOUT EXISTING FACILITIES AND SYSTEMS DELINEATED HEREIN IS RECORD DRAWINGS FURNISHED TO THE DESIGN TEAM AND IS INCLUDED MATION ONLY. FIELD VERIFY LOCATIONS AND CONFIGURATIONS OF SYSTEMS AND CONDITIONS PRIOR TO START OF ANY WORK. NOTIFY EAM IMMEDIATELY OF ANY DIFFERING CONDITIONS DISCOVERED.

SPECIFICATIONS FOR MATERIALS AND METHODS FOR CONSTRUCTION.

WORK IN ACCORDANCE WITH THE LATEST EDITIONS, REVISIONS, INTS OR SUPPLEMENTS OF APPLICABLE STATUTES, ORDINANCES, CODES, LATIONS OF FEDERAL, STATE AND LOCAL AUTHORITIES HAVING TION IN EFFECT ON THE DATE BIDS ARE RECEIVED.

CABLE STANDARDS REFERENCED IN THE INTERNATIONAL PLUMBING CODE EDITION, ARE HEREBY INCORPORATED INTO THE REQUIREMENTS FOR ION, CONSTRUCTION AND INSTALLATION OF THE WORK. REFER IN THE O CHAPTER 1, "SCOPE AND ADMINISTRATION" AND TO CHAPTER 14, ICED STANDARDS".

CALE OR MAKE PHYSICAL MEASUREMENTS FROM THESE DRAWINGS FOR CTION PURPOSES.

ACT LOCATIONS OF ALL PIPING PENETRATIONS THROUGH SLABS AND TH ARCHITECTURAL AND STRUCTURAL DRAWINGS AND ACTUAL JOBSITE

ATE ALL SLAB PENETRATIONS AND SLEEVES PRIOR TO EACH CONCRETE

IATE WORK WITH ARCHITECTURAL FEATURES AND OTHER WORK SUCH THAT ENCES BETWEEN PIPING AND PLUMBING WORK, MECHANICAL WORK, AL WORK AND BUILDING STRUCTURE WILL BE AVOIDED.

IPING TO PROVIDE MAXIMUM CLEAR HEIGHT UNDERNEATH. IN ABOVE PACES, MAINTAIN 12" MINIMUM CLEARANCE BELOW PIPING TO ALLOW FOR

STRUCTURAL AND ARCHITECTURAL DRAWINGS FOR ANY FRAMING AROUND PIPES PENETRATING ROOFS, WALLS AND FLOORS.

ARCHITECTURAL DRAWINGS AND ELEVATIONS, WHERE AVAILABLE, FOR TION OF ALL WALL MOUNTED DEVICES.

ATE LOCATIONS OF TRENCH DRAINS, AREA DRAINS, FLOOR DRAINS AND AINS WITH THE ARCHITECTURAL AND STRUCTURAL DRAWINGS PRIOR TO TION TO ENSURE PROPER AND UNIFORM SLOPE OF FINISHED SURFACES

LL DRAINS AND GRATES, ACCESS COVERS AND MANHOLES, FLUSH WITH SLAB LEVELS AS SHOWN ON ARCHITECTURAL AND STRUCTURAL S. PROVIDE FINISHED INSTALLATIONS TRUE TO FINISHED SLAB ELEVATIONS BITING NO RISES, BUMPS, HUMPS, CROWNS, DIPS, VALLEYS, DROPS, OR

ALL NECESSARY MEASURES TO PROTECT DRAINAGE SYSTEM(S) AND INTS FROM DAMAGE DUE TO CONSTRUCTION ACTIVITIES. PREVENT FROM DRAINS AND DRAINAGE SYSTEMS (EXISTING AND NEW) ALL MATERIALS IDER NORMAL DRAIN SYSTEM USE WOULD BE CONSIDERED FOREIGN, BUT NOT LIMITED TO THE FOLLOWING: EXCESS CONCRETE AND CEMENT THAT FROM OVERPOWERING OR SPILLAGE; SOILS AND AGGREGATES; CONSTRUCTION RUN-OFF; DEBRIS AND MATERIALS IN GENERAL. REFER THE SPECIFICATIONS.

COVERS AND CAPS TO SEAL OFF DRAIN BODIES AND RECEIVERS DURING CTION ACTIVITIES AND PREVENT RUN-OFF FROM ENTERING DRAINAGE R DRAIN BODY INTERIORS.

ALL AREA DRAINS AND FLOOR DRAINS WITH HEEL-PROOF GRATES. WITH NEW, ALL GRATES WITH BROKEN, BENT OR DAMAGED TINES.

ALL SANITARY FLOOR DRAINS AND FLOOR SINKS WITH IN-LINE TRAP SEAL ON DEVICES. BASIS OF DESIGN: SURE SEAL MANUFACTURING.

ENETRATE STRUCTURAL ELEMENTS (BEAMS, GRADE BEAMS, PRETENSION TC.) WITHOUT PRIOR CONSENT OF STRUCTURAL ENGINEER.

A MINIMUM OF 24" COVER ABOVE ALL PIPING INDICATED TO BE ROUTED RADE AND OUTSIDE OF BUILDING FOOTPRINT.

CONDENSATE DRAINAGE FOR HVAC EQUIPMENT AND DISCHARGE INTO APPROVED FLOOR SINK OR MOP SINK.

LL PIPING IN ABOVE CEILING LEVEL SPACE, EXCEPT WHERE ISE INDICATED. COORDINATE ROUTING WITH OTHER SLOPED PIPING ELEVATIONS TAKE PRIORITY OVER ALL YSTEMS AND TRADES.

MISCELLANEOUS

	RISER DESIGNATION
	DENOTES SYSTEM TYPE DW: DOMESTIC WATER SAN: SANITARY SD: STORM F: FIRE DENOTES RISER NUMBER CORRELATION
•	NOTE BY SYMBOL REFERENCE
	POINT OF CONNECTION, NEW PIPING TO EXISTING PIPING
	DRAIN BODY
	FLOOR OR SLAB CLEANOUT
	HOSE BIBB / WALL HYDRANT HB: HOSE BIBB WH: WALL HYDRANT (MILD CLIMATE) NFWH: NON-FREEZE WALL HYDRANT

COMPRESSED AIR OUTLET

A

GENERAL PROVISIONS:

- PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, NECESSARY FOR THE COMPLETE INSTALLATION OF Α THE PLUMBING AND MECHANICAL SYSTEMS OUTLINED.
- OBTAIN ALL PERMITS, FEES, LICENSES, INSPECTIONS, AND CERTIFICATES OF COMPLIANCE OR APPROVAL AS REQUIRED BY THE AUTHORITIES.
- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE LAWS, CODES AND REGULATIONS OF THE GOVERNMENTAL BODIES HAVING JURISDICTION OVER THE SITE.
- ALL TESTING REQUIRED BY AUTHORITIES SHALL BE CONSIDERED PART OF THIS WORK.
- DURING CONSTRUCTION, ALL FIXTURES, EQUIPMENT, PIPE, DUCT, ETC. SHALL BE COVERED, PLUGGED, OR CAPPED AS REQUIRED TO KEEP CLEAN AND UNDAMAGED. ALL DAMAGED ITEMS SHALL BE RESTORED TO ORIGINAL CONDITION OR REPLACED. ALL PROTECTIVE COVERING SHALL BE REMOVED BEFORE FINAL ACCEPTANCE.
- PROVIDE ALL NECESSARY CUTTING AND PATCHING OF WALLS, FLOORS, CEILINGS, AND ROOFS AS NECESSARY. PATCH AROUND ALL OPENINGS SHALL MATCH ADJACENT AREA. COORDINATE ALL ROOFING WORK WITH OWNER OR RESPONSIBLE PARTY, SO THAT THE EXISTING ROOFING WARRANTY WILL BE MAINTAINED.
- CONTRACTOR SHALL GUARANTEE ALL WORK AND MATERIALS AGAINST DEFECTS FOR A PERIOD OF ONE YEAR FROM FINAL ACCEPTANCE.

OPERATION AND MAINTENANCE MANUALS:

- DURING THE COURSE OF CONSTRUCTION, COLLECT AND COMPILE OPERATING INSTRUCTIONS, WIRING DIAGRAMS, CATALOG CUTS, LUBRICATION AND PREVENTIVE MAINTENANCE INSTRUCTIONS. PARTS LISTS, ETC. FOR ALL EQUIPMENT FURNISHED UNDER THIS CONTRACT.
- ALL LITERATURE AND INSTRUCTIONS SHIPPED WITH THE EQUIPMENT SHALL BE SAVED FOR INCLUSION IN THE OPERATION AND MAINTENANCE MANUALS.
- ALL LITERATURE LISTED ABOVE AND ALL PAPERS LISTING WARRANTIES, ETC. SHALL BE BOUND IN A 3-RING BINDER AND LABELED WITH THE PROJECT NAME, ADDRESS, ARCHITECT, ENGINEER, CONTRACTORS, ETC.

MANUFACTURERS:

MANUFACTURERS, MODEL NUMBERS, ETC. INDICATED OR SCHEDULED ON THE DRAWINGS SHALL BE INTERPRETED AS HAVING ESTABLISHED A STANDARD OF QUALITY AND SHALL NOT BE CONSTRUED AS LIMITING COMPETITION. ARTICLES, FIXTURES, ETC. OF EQUAL QUALITY BY MANUFACTURERS SHALL BE ACCEPTABLE, SUBJECT TO STRUCTURAL AND ELECTRICAL CONSTRAINTS OF THE PROJECT DESIGN, UNLESS NOTED OTHERWISE.

MOTORS:

PROVIDE THERMAL OVERLOAD PROTECTION FOR EACH MOTOR PROVIDED BY THIS WORK.

TESTING, BALANCING, AND CLEANING:

- ALL PIPING SHALL BE TESTED FOR LEAKS BEFORE BEING CONCEALED IN WALL CONSTRUCTION OR COVERED WITH INSULATION.
- SEWER AND VENT PIPING SHALL BE HYDROSTATICALLY TESTED WITH NO LESS THAN 10 FEET OF HEAD FOR A PERIOD OF NOT LESS THAN 15 MINUTES, PER THE LOCAL PLUMBING CODE, WITH NO LEAKS
- DOMESTIC WATER PIPING SHALL BE HYDROSTATICALLY TESTED AT A PRESSURE OF NOT LESS THAN 1-1/2 TIMES THE OPERATING PRESSURE, BUT NOT LESS THAN 50 PSI, FOR A PERIOD OF NOT LESS THAN 2 HOURS, WITH NO LEAKS.
- NATURAL GAS PIPING SHALL BE PNEUMATICALLY TESTED AT A PRESSURE OF NOT LESS THAN 1-1/2 TIMES THE OPERATING PRESSURE, BUT NOT LESS THAN 50 PSI, FOR A PERIOD OF NOT LESS THAN 2 HOURS, WITH NO LEAKS.
- BEFORE DOMESTIC WATER PIPING IS PLACED IN SERVICE, ALL DOMESTIC WATER DISTRIBUTION SYSTEMS, INCLUDING THOSE FOR COLD WATER AND HOT WATER SYSTEMS, SHALL BE FLUSHED, STERILIZED AND CHLORINATED IN ACCORDANCE WITH HEALTH DEPARTMENT REGULATIONS. THE SYSTEMS SHALL BE THOROUGHLY FLUSHED OF ALL DIRT AND FOREIGN MATTER. THEN FILLED WITH WATER TREATED WITH 50 PPM OF CHLORINE. DURING THE FILLING PROCESS, VALVES AND FAUCETS SHALL BE OPENED SEVERAL TIMES TO ASSURE TREATMENT OF THE ENTIRE SYSTEM. THE TREATED WATER SHALL BE LEFT IN THE SYSTEM FOR 24 HOURS AFTER WHICH TIME THE SYSTEM SHALL BE FLUSHED; IF THE RESIDUAL CHLORINE IS NOT LESS THAN 10 PPM, THE FLUSHING SHALL BE REPEATED. AFTER STERILIZATION, SAMPLES OF WATER IN THE SYSTEM SHALL BE APPROVED BY THE BOARD OF HEALTH.

PIPING:

PART 1- GENERAL

1.1 NOT USED

- PART 2- PRODUCTS
- 2.1. DOMESTIC COLD, HOT, AND HOT WATER RE-CIRCULATING (ABOVEGROUND).
- TYPE L HARD DRAWN COPPER TUBING, ASTM B-88.
- PEX, HIGH-DENSITY CROSS-LINKED POLYETHYLENE TUBING SHALL BE MANUFACTURED TO THE REQUIREMENTS OF ASTM F876 AND MEET THE STANDARD GRADE HYDROSTATIC PRESSURE RATINGS FROM PLASTIC PIPE INSTITUTE IN ACCORDANCE WITH TR-4/03.
- PEX MECHANICAL, CRIMP/INSERT FITTINGS. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. PIPE SIZES GIVEN ON THE DRAWINGS ARE NOMINAL COPPER PIPE SIZE, INCREASE PEX PIPING SIZE AS REQUIRED TO EQUAL OR EXCEED COPPER PIPE INSIDE DIAMETER.
- 2.1. DOMESTIC COLD, FILTERED COLD WATER, AND HOT WATER (UNDERGROUND).
- TYPE K SOFT DRAWN COPPER TUBING, ASTM B-88.
- WROUGHT BRONZE FLARED FITTINGS.
- 2.1. DOMESTIC WATER SERVICE, 1"-3"
- TYPE K SOFT DRAWN COPPER TUBING, ASTM B-88.
- WROUGHT BRONZE FLARED FITTINGS.
- 2.1. SANITARY SEWER, GREASE WASTE, AND VENTS. (UNDERGROUND, INTERIOR TO THE BUILDING).
- ABS SCHEDULE 40 CELLULAR CORE (FOAM CORE) PIPE AND DWV FITTING SYSTEM: PIPE AND FITTINGS SHALL BE MANUFACTURED FROM ABS COMPOUND WITH A CELL CLASS OF 42222 FOR PIPE AND 32222 FOR FITTINGS AS PER ASTM D 3965 AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM F 628 FITTINGS SHALL CONFORM TO ASTM D 2661. SOLVENT CEMENTS SHALL CONFORM TO ASTM D 2235.
- PVC SCHEDULE 40 CELLULAR CORE (FOAM CORE) PIPE AND DWV FITTING SYSTEM PIPE AND FITTINGS SHALL BE MANUFACTURED FROM PVC COMPOUND WITH A CELL CLASS OF 11432 PER ASTM D 4396 FOR PIPE AND 12454 PER ASTM D 1784 FOR FITTINGS AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM F 891. INJECTION MOLDED FITTINGS SHALL CONFORM TO ASTM D 2665. FABRICATED FITTINGS SHALL CONFORM TO ASTM F 1866. SOLVENT CEMENTS SHALL CONFORM TO ASTM D 2564.
- С PVC SCHEDULE 40 SOLID WALL PIPE AND DWV FITTING SYSTEM: PIPE AND FITTINGS SHALL BE MANUFACTURED FROM PVC COMPOUND WITH A CELL CLASS OF 12454 PER ASTM D 1784 AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM D 1785 AND ASTM D 2665. INJECTION MOLDED FITTINGS SHALL CONFORM TO ASTM D 2665. FABRICATED FITTINGS SHALL CONFORM TO ASTM F 1866.

- SOLVENT CEMENTS SHALL CONFORM TO ASTM D 2564.
- CERTIFIED BY NSF ® INTERNATIONAL.

D.

E.

2.5. SANITARY SEWER, GREASE WASTE, AND VENTS. (ABOVE GROUND, INTERIOR TO THE BUILDING).

- Α. D 2235
- TO ASTM D 2564.
- C. JURISDICTIONS. NOT FOR USE IN A RETURN AIR PLENUM.)
- D. CERTIFIED BY NSF ® INTERNATIONAL.
- E.
- 2.6. SANITARY SEWER AND VENTS. (UNDERGROUND, EXTERIOR TO THE BUILDING).
- Α. ASTM D 2235.
- В. TO ASTM D 2564.
- C. SOLVENT CEMENTS SHALL CONFORM TO ASTM D 2564.
- D. CERTIFIED BY NSF® INTERNATIONAL.
- 74

2.7. NATURAL GAS.

- BLACK STEEL PIPE, SCHEDULE 40, ASTM A53. Α.
- USE WITH ASTM A53 SCHEDULE 40 BLACK IRON PIPE.
- PIPE 2-1/2" AND LARGER, WELDED.

- 2.8. CONDENSATE DRAINS (INSIDE BUILDING).
- DWV, WROUGHT COPPER, ANSI B-16.29. Α.
- В. PVC SCHEDULE 40
- 2.9. INDIRECT WASTE (ABOVEGROUND).
- Α. ANSI B-16.29.
- 2.10. WATER HEATER T&P, INDIRECT WASTE FROM DISHWASHER (INSIDE BUILDING). ADWV, WROUGHT COPPER, ANSI B-16.29.

PART 3- EXECUTION

- REAM PIPE AND TUBE ENDS, REMOVE BURRS
- REMOVE SCALE AND DIRT, ON INSIDE AND OUTSIDE BEFORE ASSEMBLY.
- С
- D. VALVE IN SERVICE PIPING WHERE WATER PRESSURE EXCEEDS 80 PSIG.
- E. REQUIRED BY FIXTURE MANUFACTURER.
- F ALL EXPOSED PIPE SHALL BE CHROME PLATED BRASS PIPE, NO FERROUS PIPE.
- G. RUNS.
- Н. PROVIDE ACCESS PANELS FOR ALL CONCEALED VALVES AND TRAPS.
- PIPING CONNECTIONS TO HOT WATER HEATERS AND EXPANSION TANKS.

PLUMBING SPECIFICATIONS

HUBLESS CAST IRON SOIL PIPE AND FITTINGS: HUBLESS CAST IRON PIPE AND FITTINGS SHALL BE MANUFACTURED FROM GRAY CAST IRON AND SHALL CONFORM TO ASTM A 888 AND CISPI STANDARD 301. HUBLESS COUPLINGS SHALL CONFORM TO CISPI STANDARD 310 AND BE

HUB AND SPIGOT CAST IRON SOIL PIPE AND FITTINGS: HUB AND SPIGOT CAST IRON PIPE AND FITTINGS SHALL BE MANUFACTURED FROM GRAY CAST IRON AND SHALL CONFORM TO ASTM A

ABS SCHEDULE 40 CELLULAR CORE (FOAM CORE) PIPE AND DWV FITTING SYSTEM: PIPE AND FITTINGS SHALL BE MANUFACTURED FROM ABS COMPOUND WITH A CELL CLASS OF 42222 FOR PIPE AND 32222 FOR FITTINGS AS PER ASTM D 3965 AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM F 628 FITTINGS SHALL CONFORM TO ASTM D 2661. SOLVENT CEMENTS SHALL CONFORM TO ASTM

PVC SCHEDULE 40 CELLULAR CORE (FOAM CORE) PIPE AND DWV FITTING SYSTEM: PIPE AND FITTINGS SHALL BE MANUFACTURED FROM PVC COMPOUND WITH A CELL CLASS OF 11432 PER ASTM D 4396 FOR PIPE AND 12454 PER ASTM D 1784 FOR FITTINGS AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM F 891. INJECTION MOLDED FITTINGS SHALL CONFORM TO ASTM D 2665. FABRICATED FITTINGS SHALL CONFORM TO ASTM F 1866. SOLVENT CEMENTS SHALL CONFORM

PVC SCHEDULE 40 SOLID WALL PIPE AND DWV FITTING SYSTEM: PIPE AND FITTINGS SHALL BE MANUFACTURED FROM PVC COMPOUND WITH A CELL CLASS OF 12454 PER ASTM D 1784 AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM D 1785 AND ASTM D 2665. INJECTION MOLDED FITTINGS SHALL CONFORM TO ASTM D 2665. FABRICATED FITTINGS SHALL CONFORM TO ASTM F 1866. SOLVENT CEMENTS SHALL CONFORM TO ASTM D 2564. (WHERE APPROVED BY LOCAL

HUBLESS CAST IRON SOIL PIPE AND FITTINGS: HUBLESS CAST IRON PIPE AND FITTINGS SHALL BE MANUFACTURED FROM GRAY CAST IRON AND SHALL CONFORM TO ASTM A 888 AND CISPI STANDARD 301. HUBLESS COUPLINGS SHALL CONFORM TO CISPI STANDARD 310 AND BE

HUB AND SPIGOT CAST IRON SOIL PIPE AND FITTINGS: HUB AND SPIGOT CAST IRON PIPE AND FITTINGS SHALL BE MANUFACTURED FROM GRAY CAST IRON AND SHALL CONFORM TO ASTM A

ABS SCHEDULE 40 CELLULAR CORE (FOAM CORE) PIPE AND DWV FITTING SYSTEM: PIPE AND FITTINGS SHALL BE MANUFACTURED FROM ABS COMPOUND WITH A CELL CLASS OF 42222 FOR PIPE AND 32222 FOR FITTINGS AS PER ASTM D 3965 AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM F 2680 FITTINGS SHALL CONFORM TO ASTM D 2680. SOLVENT CEMENTS SHALL CONFORM TO

PVC SCHEDULE 40 CELLULAR CORE (FOAM CORE) PIPE AND DWV FITTING SYSTEM: PIPE AND FITTINGS SHALL BE MANUFACTURED FROM PVC COMPOUND WITH A CELL CLASS OF 11432 PER ASTM D 4396 FOR PIPE AND 12454 PER ASTM D 1784 FOR FITTINGS AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM F 891. INJECTION MOLDED FITTINGS SHALL CONFORM TO ASTM F 794. FABRICATED FITTINGS SHALL CONFORM TO ASTM F 1866. SOLVENT CEMENTS SHALL CONFORM

PVC SCHEDULE 40 SOLID WALL PIPE AND DWV FITTING SYSTEM: PIPE AND FITTINGS SHALL BE MANUFACTURED FROM PVC COMPOUND WITH A CELL CLASS OF 12454 PER ASTM D 1784 AND CONFORM WITH NATIONAL SANITATION FOUNDATION (NSF) STANDARD 14. PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM F 794. FITTINGS SHALL CONFORM TO ASTM F 794.

HUBLESS CAST IRON SOIL PIPE AND FITTINGS: HUBLESS CAST IRON PIPE AND FITTINGS SHALL BE MANUFACTURED FROM GRAY CAST IRON AND SHALL CONFORM TO ASTM A 888 AND CISPI STANDARD 301. HUBLESS COUPLINGS SHALL CONFORM TO CISPI STANDARD 310 AND BE

HUB AND SPIGOT CAST IRON SOIL PIPE AND FITTINGS: HUB AND SPIGOT CAST IRON PIPE AND FITTINGS SHALL BE MANUFACTURED FROM GRAY CAST IRON AND SHALL CONFORM TO ASTM A

PIPE 2" AND SMALLER; 150 LB. MALLEABLE IRON, THREADED FITTINGS

PIPE 2" AND SMALLER; VIEGA MEGAPRESS FOR WATER AND GAS. CSA LC4, TSSA/ASME B31 FOR

PLUG VALVE: ROCKWELL NORDSTROM FIGURE NO. 142 OR 143.

BALL VALVE: JOMAR T-100NE, APPROVALS- UL842, FM, CSA, NSF 61-8, MSS SP-110

COPPER DWV: DRAINAGE TUBE SHALL CONFORM TO ASTM B306, WROUGHT COPPER FITTINGS,

L PIPE HANGERS AND SUPPORTS SHALL BE STANDARD PRODUCTS OF GRINNELL, FEE AND MASON, OR ELCEN. HANGER SPACING SHALL BE IN ACCORDANCE WITH MSS-SP-69.

PREPARE PIPING CONNECTIONS TO EQUIPMENT WITH FLANGES OR UNIONS.

DETERMINE WATER PRESSURE AS BUILDING SITE. INSTALL AS APPROVED PRESSURE REDUCING

PROVIDE AN APPROVED WATER HAMMER ARRESTOR FOR EACH PLUMBING FIXTURE SUPPLY AS

PROVIDE CLEANOUTS AT EACH CHANGE OF DIRECTION AND AT 100 FOOT INTERVALS IN STRAIGHT

PROVIDE DIELECTRIC UNIONS WITH APPROPRIATE END CONNECTIONS TO MATCH THE PIPE SYSTEM IN WHICH INSTALLED (SCREWED, SOLDERED, OR FLANGED). PROVIDE DIELECTRIC UNIONS ON ALL

SLEEVES AND ESCUSSIONS

PART 1- GENERAL

A. NOT USED

PART 2 - PRODUCTS

PROVIDE, SET, AND PROPERLY LOCATE PIPE SLEEVES AS REQUIRED FOR THIS WORK. ALL 2.1. SLEEVES SHALL BE OF SUFFICIENT SIZE TO PERMIT PIPE MOVEMENT DUE TO EXPANSION AND CONTRACTION AND TO ACCOMMODATE PIPE INSULATION.

- INTERIOR PARTITIONS: 16 GAGE GALVANIZED STEEL, PACK BETWEEN PIPE AND SLEEVE WITH 2.2. FIRE SAFING AND CAULK AT EACH END WITH FIRE RESISTANT SEALANT.
- ROOF: PROSET OR EQUAL, MANUFACTURED PVC SCHEDULE 40 PIPE SLEEVE WITH 2.3. WATERPROOF SEAL. COORDINATE WITH ROOFING CONTRACTOR AND FLASH AS REQUIRED TO MAINTAIN ROOF WARRANTY.
- PLUMBING VENTS: FLASH ROOF VENT INTO ROOFING SYSTEM AS REQUIRED BY THE ROOFING 2.4. CONTRACTOR TO MAINTAIN ROOF WARRANTY. ALL PLUMBING VENT TERMINALS SHALL TERMINATE A MINIMUM OF 12" ABOVE ROOF OR EQUAL TO HEIGHT OF PARAPET, WHICHEVER IS GREATER.

PART 3- EXECUTION

- INSTALL SLEEVES FOR PIPING THROUGH PENETRATIONS IN FLOORS, PARTITIONS, ROOFS, AND WALLS.
- FOR SLEEVES WITH A SLEEVE SEAL SELECT SLEEVES OF SIZE LARGE ENOUGH TO PROVIDE 1" ANNULAR CLEAR SPACE BETWEEN PIPING AND SLAB OR WALLS
- CUT SLEEVES TO LENGTH FOR MOUNTING FLUSH WITH BOTH SURFACES
- EXCEPTION: EXTEND SLEEVES INSTALLED IN FLOORS FOR MECHANICAL EQUIPMENT AREAS OR OTHER WET AREAS 2" ABOVE FINISHED FLOOR.
- USE GROUT OR SILICONE SEALANT TO SEAL SPACE OUTSIDE OF SLEEVES IN SLABS AND WALLS D. WITHOUT SLEEVE-SEAL SYSTEMS.
- PROVIDE CHROME PLATED ESCUTCHEONS ON ALL PIPE ENTERING FINISHED AREAS. E.

GAS PIPING LABELING

C.

- PART 1- GENERAL
- NOT USED 1.1
- PART 2- PRODUCTS

2.1 NOT USED

PART 3- EXECUTION

ALL ELEVATED PRESSURE GAS PIPING SHALL BE LABELED EVERY 40 FEET WITH SIGNS INDICATING "ELEVATED PRESSURE".

PIPE INSULATION - ABOVE GRADE:

- GENERAL
- SECTION REQUIREMENTS

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

PART 2- PRODUCTS

- THE PIPING INSULATION USED SHALL HAVE A THERMAL CONDUCTIVITY OF 0.27 Btu PER in/hr*sqft*F° OR LESS.
- FIBERGLASS INSULATION WITH FACTORY APPLIED VAPOR BARRIER, ASJ JACKET, FACTORY APPLIED PRESSURE SEALING LONGITUDE LAP JOINT, NO STAPLES, ZESTON PREMOLDED PVC FITTING COVERS. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- FLEXIBLE CLOSED CELL ELASTOMERIC THERMAL INSULATION, UNSLIT OR PRESLIT WITH C PRESSURE SENSITIVE ADHESIVE SYSTEM FOR CLOSURE AND VAPOR SEALING, EQUAL TO ARMSTRONG AP ARMAFLEX OR ARMAFLEX 2000.
- FOR NON CIRCULATING SYSTEMS, THE FIRST 8 FEET OF INLET AND OUTLET PIPING BETWEEN THE TANK AND THE HEAT TRAP (INCLUDING THE HEAT TRAP) MUST BE INSULATED.

PART 3- EXECUTION

- INSULATION SCHEDULE: Α.
 - 1. DOMESTIC COLD WATER 1/2"
 - 2. DOMESTIC HOT WATER 1-1/2"
 - 3. HOT WATER RECIRCULATING 1-1/2"
 - CONDENSATE DRAINS INSIDE BUILDING 1"
 - REFRIGERANT SUCTION 1-1/2" FOR PIPING UP TO 1 1/2"Ø, & 2" FOR PIPING 1-1/2"Ø AND LARGER.
- COMPLY WITH REQUIREMENTS OF THE MIDWEST INSULATION CONTRACTORS ASSOCIATION'S "NATIONAL COMMERCIAL & INDUSTRIAL INSULATION STANDARDS" FOR INSULATION INSTALLATION ON PIPES AND EQUIPMENT.
- INSULATION INSTALLATION AT INTERIOR WALL AND PARTITION PENETRATIONS (THAT ARE NOT FIRE RATED): INSTALL INSULATION CONTINUOUSLY THROUGH WALLS AND PARTITIONS.
- INSULATION INSTALLATION AT FIRE-RATED WALL, PARTITION, AND FLOOR PENETRATIONS INSTALL INSULATION CONTINUOUSLY THROUGH PENETRATIONS. SEAL PENETRATIONS.
- E. 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 ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.
- 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.
- 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.

PART-1 **B. SUBMITTALS**

PART -2

EXECUTION A. EXAMINE ROUGH-IN OF WATER AND SANITARY DRAINAGE AND VENT PIPING SYSTEMS TO VERIFY ACTUAL LOCATIONS OF PIPING CONNECTIONS BEFORE INSTALLATION. B. EXAMINE WALLS AND FLOORS FOR SUITABLE CONDITIONS WHERE FIXTURES WILL BE INSTALLED.

C. PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.

PLUMBING FIXTURES

GENERAL

A. FURNISH ALL LABOR AND MATERIALS. TOOLS, EQUIPMENT, AND RELATED ITEMS REQUIRED FOR THE COMPLETE INSTALLATION OF PLUMBING EQUIPMENT AS INDICATED BY CONTRACT DOCUMENTS.

1. PRODUCT DATA: PROVIDE PRODUCT DATA FOR EACH TYPE OF PRODUCT INDICATED. PRODUCT



A. REFER TO PLUMBING FIXTURES SCHEDULES

D. INSTALL LEVEL AND PLUMB ACCORDINGLY TO ROUGHING IN DRAWINGS.

E. COMPLY WITH WATER PIPING REQUIREMENTS SPECIFIED IN PIPING SECTION







PLUMBING KEYNOTES

- 1 CONNECT NEW 4" SANITARY LINE TO EXISTING SANITARY LINE IN SPACE. CONTRACTOR TO FIELD VERIFY EXISTING SANITARY SIZE, ROUTING AND INVERT ON SITE.
- 2 EXTEND AND CONNECT NEW 1" CW PIPING TO EXISTING CW LINE IS SPACE. CONTRACTOR CONFIRM WATER METER, BACKFLOW PREVENTOER REQUIREMENT WITH LANDLORD. CONTRACTOR TO FIELD VERIFY EXACT SIZE, ROUTING AND LOCATION OF EXISTING CW LINE IN SPACE PRIOR TO BID.
- CONNECT NEW 3" VENT TO EXISTING VENT LINE IN SPACE. CONTRACTOR TO FIELD VERIFY EXACT SIZE AND LOCATION OF EXISTING VENT IN SPACE.
- 4 1/2" TRAP PRIMER PIPING TO <u>TP</u>. 1/2" TRAP PRIMER PIPING DN. <u>TP</u> BEHIND RECESSED ACCESS PANEL.
- S EXISTING RTU TO REMAIN WITH EXISTING GAS PIPING. CONTRACTOR TO FIELD VERIFY THE GAS PIPING FOR RTU-1(E) AND ENSURE GAS PIPING IN A GOOD WORKING CONDITION, REPAIR AND REPLACE IF REQUIRED.
- 6 PROVIDE HOT WATER MIXING VALVE (TMV-1). SET MAX. OUTLET TEMP. AT 110°F

- 1. ALL SANITARY DRAINAGE (SS) PIPING IS LOCATED BELOW SLAB, UNLESS
- 3. ROUTE ALL PIPING INTENDED FOR ABOVE CEILING LEVEL INSTALLATION AS HIGH AS POSSIBLE. COORDINATE ROUTING WITH OTHER TRADES. SLOPED PIPING ELEVATIONS TAKE PRIORITY OVER ALL OTHER SYSTEMS AND TRADES.
- 4. PROVIDE SLEEVED AND WATERTIGHT PENETRATIONS AT ALL PIPE PENETRATIONS
- 5. PROVIDE WATERTIGHT INSTALLATIONS OF ALL FLOOR EMBEDDED DEVICES INCLUDING BUT NOT LIMITED TO: FLOOR DRAINS, FLOOR SINKS, SHOWER DRAINS, HUB DRAINS, FLOOR RECESSED CLEANOUTS AND, FLUSH TO FLOOR ACCESS
- 6. COORDINATE WITH ARCHITECT TO MAINTAIN THE WATERTIGHT INTEGRITY OF THE BUILDING ENVELOPE AND FLOOR SLABS.
- 7. PROVIDE BALL VALVE FOR ISOLATION OF ALL DOMESTIC WATER BRANCH LINES.
- 8. CONTRACTOR TO FIELD VERIFY AND SPILL WATER HEATER INDIRECT WASTE TO NEAREST FLOOR DRAIN.



WATER HEATER SCHEDULE (OPTIONAL)							
MARK	AREA SERVED	MANUFACTURE	INPUT	ELECTRICAL	STORAGE	RECOVERY	
WH-1	RESTROOM/ DOG TUBS	A.O.SMITH	9 KW	208/1/60	50 GAL.	41 GPH @ 90°F RISE	BASIS OF DESIGN: MODEL A.O.SMITH DEL-50-9 UP TO 98% THERMAL EFFICIENCY.

* MAINTAIN PROPER CLEARANCE AROUND UNIT TO COMPLY WITH APPLICABLE CODES AND MANUFACTURER'S RECOMMENDATIONS FOR SERVICE ACCESS.

CIRCULATION PUMP SCHEDULE											
MARK	LOCATION	SERVES	TYPE	GPM (EACH)	TDH (FT)	HP (EACH)	RPM	VOLTS/PHASE	CYCLE	MANUFACTURER/ MODEL NUMBER	REMARKS
<u>RCP-1</u>	NEAR WATER HEATER	DOMESTIC HOT WATER	IN-LINE	1	10	1/12	2800	120/1	60	ARMSTRONG H20-20 SS	BRONZE CASING, STAINLESS STEEL IMPELLER, AQUASTAT CONTROLLED, FLANGED CONNECTIONS, RATED FOR HOT WATER SERVICE

PLUMBING ACCESSORIES SCHEDULE 🛛 🔶 🔨						
DESIGNATION	FIXTURE	MANUFACTURER & MODEL NO.	DESCRIPTION, TRIM & NOTES			
WCO	WALL CLEANOUT	JOSAM SERIES 58600-COT	COATED CAST IRON CLEANOUT TEE WITH RECESSED, TAPPED PLUG AND POLISHED STAINLESS STEEL.			
FCO	FLOOR CLEANOUT	JOSAM SERIES 57000-Z-SQ	CAST IRON BODY WITH POLISHED BRASS COVER			
TMV-LTHERMOSTATIC MIXING VALVE (LAVATORIES)LEONARD MODEL 270-USW-BRKT-BVASSE 1070 CERTIFIED, CAPABLE OF 0.5 GPM MINIMUM FLOW, COMPLETE WITH UNIONS, MOUNTING BRACKET AND BALL VALVES ON INLETS. SET FOR 105 DEG. F. OUTLET TEMP.						



TYPE OF FIXTURE	WASTE	VENT	CW	HW	
WATER CLOSET (TANK TYPE)	4"	2"	1/2"	-	
LAVATORY	2"	2"	1/2"	1/2"	
MOP SINK	3"	2"	3/4"	3/4"	

PLUMBING FIXTURE SCHEDULE						
MARK	FIXTURE	REMARKS				
WC-1 (ADA)	AMERICAN STANDARD CADET PRO RIGHT HEIGHT ROUND FRONT TOILET MODEL 215BA.104, VITREOUS CHINA, HIGH EFFICIENCY TOILET, ULTRA-LOW CONSUMPTION (1.28GPM), POWERWASH RIM SCRUBS BOWL WITH EACH FLUSH, 16 1/2" RIM HEIGHT FOR ACCESSIBLE APPLICATIONS, CHROME FINISH TRIP LEVER IS SUPPLIED.	(OR EQUAL AS APPROVED BY OWNER)				
L-1	KOHLER CHESAPEAKE K-1728 19 1/4"x17 1/4" WALL MOUNTED WHITE VITREOUS CHINA, FAUCET - KOHLER CORALAIS MODEL K-15241-4DRA, 1.2GPM MAXIMUM FLOW RATE, McGUIRE 2165 SUPPLIES AND STOPS, McGUIRE 8872 -TRAP TRUEBRO LAV GUARD2 TRAP/RISER INSULATION KIT THERMOSTATIC MIXING VALVE - WATTS LFUSG-M2.	(OR EQUAL AS APPROVED BY OWNER)				
MS-1	EAGLE GROUP MODEL F2820-12, OVERALL SIZE 25 1/2" x 32 5/8" x 19 1/2", 4-POLE MOP HOLDER, 24" x 4", PROJECTS OUT 1", MODEL 321561, HOSE AND BRACKET, 30", MODEL 312689, SERVICE FAUCET, 8" CENTER, 1/2" NPT FEMALE INLETS, MODEL 312690.	(OR EQUAL AS APPROVED BY OWNER)				
FD-1	JOSAM 30000-A-4-50 CAST IRON DRAIN WITH SATIN NIKALOY STRAINER, CAST IRON FLASHING COLLAR AND TRAP PRIMER CONNECTION.	(OR EQUAL AS APPROVED BY OWNER)				
HT-1	JOSAM 61000 SERIES NIKALOY SOLIDS INTERCEPTOR, BOTTOM ACCESS FIXTURE TRAP TYPE, SLIP JOINT INLET AND THREADED OUTLET CONNECTIONS, GASKETED COVER AND REMOVABLE PERFORATED STAINLESS STEEL BASKET.	(OR EQUAL AS APPROVED BY AHJ)				
ТР	PRECISION PLUMBING PRODUCTS PR-500 THE PR-500 AUTOMATIC PRESSURE DROP ACTIVATED TRAP PRIMER VALVE . SYSTEM OPERATING RANGE IS 20 PSI MINIMUM TO 80 PSI MAXIMUM. THE VALVE REQUIRES A 3 PSI PRESSURE DROP ACROSS THE VALVE TO ACTIVATE AND WILL DELIVER A METERED AMOUNT OF WATER TO THE FLOOR DRAIN. TRAP PRIMER IS TO BE CONNECTED TO A COLD WATER SUPPLY ONLY CONSTRUCTED OF 693 BRASS, EPDM E70 O-RINGS, DOW #7 SILICONE, #60 STAINLESS STEEL MESH SCREEN.SURFACE WALL MOUNTED STEEL CABINET,	(OR EQUAL AS APPROVED BY OWNER)				
DST-1	FLYING PIG GROOMING: 50" PROFESSIONAL STAINLESS STEEL PET GROOMING BATH TUB WITH RAMP. PRODUCT CODE: <i>FP701</i> W/ DELUXE COMPLETE FAUCET PACKAGE. PRODUCT CODE: <i>FPKIT02</i>	(OR EQUAL AS APPROVED BY OWNER)				
DST-2	FLYING PIG GROOMING: 38" PROFESSIONAL STAINLESS STEEL PET GROOMING BATH TUB WITH RAMP. PRODUCT CODE: <i>FP301</i> W/ DELUXE COMPLETE FAUCET PACKAGE. PRODUCT CODE: <i>FPKIT02</i>	(OR EQUAL AS APPROVED BY OWNER)				
WB-1	WASHING MACHINE DRAIN BOX, 16 GAUGE STEEL BOX WITH EPOXY FINISH, MALE IRON PIPE WATER SUPPLY CONNECTIONS AND DRAIN FITTING. PROVIDE SIOUX CHIEF LAUNDRY MINI WATER HAMMER ARRESTOR NO. 660-H AT BOTH HOT AND COLD WATER HOSE THREADS. GUY GRAY B-200.	(OR EQUAL AS APPROVED BY OWNER)				
NOTES: 1. VERIFY MOUN 2. ALL P-TRAPS : 3. ALL PLUMBIN(4. FLOOR SINK T SINK. THEN C 5. ALL SINKS AN	TING LOCATIONS AND HEIGHTS. SHALL HAVE CLEAN-OUT PLUGS 3 FIXTURES MUST CONFORM TO CURRENT WATER CONSERVATION REGULATIC RAP AND DISCHARGED PIPING SHALL BE CAST IRON APPROX. 2'-0" FROM BASE ONTRACTOR TO TRANSITION TO PVC MATERIAL. D LAVATORIES THAT ARE ACCESSIBLE TO THE	NS. OF FLOOR				

PUBLIC SHALL BE "TO PROVIDE TEMPERED WATER, THROUGH A POINT-OF -USE DEVICE THAT IS ASSE 1070/ASME A112.1070/CSA B125.70, COMPLIANT,"(REF. SECTION 412.7 IN IPC 2018