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PUBLICATION OR REVISION OF THESE DRAWINGS OR ANY DETAILS THEREOF MUST BE IN THE WRITTEN CONSENT OF THE ARCHITECT

CODES

- A. WORK AND MATERIALS SHALL CONFORM TO THE LATEST RULES OF THE NATIONAL BOARD OF FIRE UNDERWRITERS' CODE, REGULATIONS OF THE STATE FIRE MARSHAL, AND WITH APPLICABLE LOCAL CODES AND WITH ALL PREVAILING RULES AND REGULATIONS PERTAINING TO ADEQUATE PROTECTION AND/OR GUARDING OF ALL MOVING PARTS, OR OTHERWISE HAZARDOUS CONDITIONS. NOTHING IN THESE SPECIFICATIONS SHALL BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THE MOST STRINGENT OF APPLICABLE CODES.**
- B. THE NATIONAL ELECTRIC CODE, THE LOCAL ELECTRIC CODE, AND THE ELECTRICAL REQUIREMENTS AS ESTABLISHED BY THE STATE AND LOCAL FIRE MARSHAL, AND RULES AND REGULATIONS OF THE POWER COMPANY SERVING THE PROJECT, ARE HEREBY MADE PART OF THE DRAWINGS OR SPECIFICATIONS TO MAKE THE WORK COMPLY WITH THESE REQUIREMENTS. THE ELECTRICAL CONTRACTOR SHALL SO NOTIFY THE ARCHITECT.**

SECTION 2 - ELECTRICAL DISTRIBUTION SYSTEM

- 1. FEEDERS AND BRANCH CIRCUITS**
- A. GENERAL:** THE ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL A COMPLETE ELECTRICAL DISTRIBUTION SYSTEM AS SHOWN ON THE DRAWINGS OR AS REQUIRED FOR A COMPLETE SYSTEM. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM WITH SECTION 168 OF THE SPECIFICATIONS, NATIONAL ELECTRICAL CODE AND THE LOCAL ELECTRIC CODE.
- NONMETALLIC-SHEATHED CABLE IS PERMISSIBLE WHERE ACCEPTABLE BY THE NEC.**
- B. CONDUIT MATERIALS**
- 1. RIGID CONDUIT (HEAVY WALL):** RIGID CONDUIT SHALL BE GALVANIZED RIGID STEEL CONDUIT WITH A MINIMUM SIZE OF 3/4" UNLESS OTHERWISE STATED. RIGID STEEL CONDUIT SHALL BE INSTALLED FOR THE FOLLOWING SERVICES AND LOCATIONS UNLESS OTHERWISE NOTED ON DRAWINGS: SERVICE ENTRANCE, UNDERGROUND IN CONTACT WITH EARTH, IN CONCRETE SLAB, PANEL FEEDERS, EXTERIOR OF BUILDING WALLS, MOTOR FEEDERS OVER 10 HP, ELECTRICAL EQUIPMENT FEEDERS OVER 10 KW, *WET* LOCATIONS, AND AS REQUIRED BY THE NATIONAL ELECTRIC CODE AND LOCAL CODES.
- 2. ELECTRICAL METALLIC TUBING (EMT):** ELECTRICAL METALLIC TUBING SHALL BE GALVANIZED STEEL WITH A MINIMUM SIZE OF 3/4" INCH. ELECTRICAL METALLIC TUBING SHALL BE USED IN ALL LOCATIONS NOT OTHERWISE SPECIFIED FOR RIGID OR FLEXIBLE CONDUIT AND WHERE NOT IN VIOLATION OF THE NATIONAL ELECTRIC CODE.
- 3. FLEXIBLE METAL CONDUIT:** FLEXIBLE METAL CONDUIT SHALL BE GALVANIZED STEEL. FLEXIBLE METAL CONDUIT LOCATED IN WET LOCATIONS SHALL BE THE LIQUID-TIGHT TYPE. FLEXIBLE METAL CONDUIT MAY BE USED IN PLACE OF EMT WHERE COMPLETELY ACCESSIBLE, SUCH AS ABOVE REMOVABLE ACUSTICAL TILE CEILINGS AND FOR EXPOSED WORK IN UNFINISHED SPACES.
- A SHORT PIECE OF FLEXIBLE METAL CONDUIT SHALL BE USED FOR THE CONNECTION TO ALL MOTORS AND VIBRATING EQUIPMENT. CONNECTION BETWEEN RECESSED LIGHT FIXTURES AND JUNCTION BOX, AND AS OTHERWISE NOTED, PROVIDED THE USE MEETS THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE AND LOCAL CODES. THE FLEXIBLE METAL CONDUIT SHALL BE THE TYPE APPROVED FOR CONTINUOUS GROUNDING.**
- C. CONDUCTOR MATERIAL**
- 1. THE CONDUCTOR MATERIAL SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:**
- A. FEEDERS:** SHALL BE TYPE THHN OR THWN RATED AT 75 DEGREE CENTIGRADE.
 - B. BRANCH CIRCUITS:** SHALL BE TYPE THHN OR THWN RATED AT 75 DEGREE CENTIGRADE, EXCEPT BRANCH CIRCUITS WITH CONDUCTOR SIZES OF NO. 10 AND SMALLER IN DRY LOCATIONS MAY BE TYPE THHN OR THWN.
 - C. SPECIAL LOCATIONS:** CONDUCTORS IN SPECIAL LOCATIONS SUCH AS RANGE HOODS, LIGHTING FIXTURES, ETC., SHALL BE AS REQUIRED BY THE NATIONAL ELECTRICAL CODE, LOCAL CODE OR AS OTHERWISE STATED.
- 2. NO CONDUCTOR SHALL BE SMALLER THAN NO. 12 WIRE, EXCEPT FOR THE CONTROL WIRING AND AS STATED IN OTHER SECTIONS OF THE SPECIFICATIONS OR ON THE DRAWINGS. WIRING TO SWITCHES SHALL NOT BE CONSIDERED AS CONTROL WIRING.**
- 3. CONDUCTORS INDICATED ON THE DRAWINGS ARE BASED ON COPPER.**
- 4. ALL CONDUCTORS WITH THE SIZE OF NO. 8 OR LARGER SHALL BE STRANDED.**
- 5. ALL LIGHTING AND RECEPTACLE BRANCH CIRCUITS IN EXCESS OF 100 LINEAR FEET SHALL BE INCREASED ONE SIZE TO PREVENT EXCESSIVE VOLTAGE DROP.**
- 4. SAFETY SWITCHES (FSS) (NFSS)**
- A. GENERAL:** FURNISH AND INSTALL SAFETY SWITCHES AS INDICATED ON THE DRAWINGS OR AS REQUIRED. ALL SAFETY SWITCHES SHALL BE NEMA HEAVY DUTY TYPE AND UNDERWRITERS' LABORATORIES LISTED. THE SWITCHES SHALL BE FUSED SAFETY SWITCHES (FSS) OR NONFUSED SAFETY SWITCHES (NFSS) AS SHOWN ON THE DRAWINGS OR REQUIRED.
- B. SWITCHES:** SWITCHES SHALL HAVE A QUICK-MAKE AND QUICK-BREAK OPERATING HANDLE AND MECHANISM WHICH SHALL BE AN INTEGRAL PART OF THE BOX. PADLOCKING PROVISIONS SHALL BE PROVIDED FOR PADLOCKING IN THE "OFF" POSITION WITH AT LEAST THREE PADLOCKS. SWITCHES SHALL BE AT LEAST 15 HORSEPOWER RATED FOR 250 VOLTS AC OR DC AS REQUIRED. TAGS SHALL BE UL LISTED FOR COPPER AND A MINIMUM SIZE.
- 7. DEVICES**
- A. CONDUCTOR SHALL FURNISH AND INSTALL ALL LIGHTING SWITCHES, CONVENTIONAL OUTLETS, SPECIAL PURPOSE RECEPTACLES, AND TRIM PLATES. ALL TRIM PLATES SHALL BE SPECIFICATION GRADE AND COMPLY WITH THE APPLICABLE REQUIREMENTS OF THE NEC, NEMA, IEEE, AND BE UL LISTED AND LABELED. TRIM PLATES SHALL BE OF SAME STYLE, MATCHING THROUGHOUT THE PROJECT, UNLESS NOTED OTHERWISE. TRIM PLATES SHALL BE OF #302 STAINLESS STEEL.**

- C. ENCLOSURES:** SWITCHES SHALL BE FURNISHED IN NEMA 1 GENERAL PURPOSE ENCLOSURES WITH KNOCKOUTS UNLESS OTHERWISE NOTED OR REQUIRED. SWITCHES LOCATED ON THE EXTERIOR OF THE BUILDING OR IN *WET* LOCATIONS SHALL HAVE NEMA 3R ENCLOSURES (NEMA 4).
- D. INSTALLATION:** THE SAFETY SWITCHES SHALL BE SECURELY MOUNTED IN ACCORDANCE WITH THE NEC. THE CONTRACTOR SHALL PROVIDE ALL MOUNTING MATERIALS. INSTALL FUSES IN THE FSS. THE FUSES SHALL BE DUAL ELEMENT ON MOTOR CIRCUITS.
- E. MANUFACTURER:** SQUARE D, GENERAL ELECTRIC, CUTLER-HAMMER, WESTINGHOUSE, OR ITC.
- 5. PANEL BOARDS - CIRCUIT BREAKER**
- A. GENERAL:** FURNISH AND INSTALL CIRCUIT-BREAKER PANEL BOARDS AS INDICATED IN THE PANEL BOARD SCHEDULE AND WHERE SHOWN ON THE DRAWINGS. THE PANEL BOARD SHALL BE DEAD FRONT SAFETY TYPE EQUIPPED WITH MOLDED CASE CIRCUIT BREAKERS AND SHALL BE THE TYPE AS LISTED IN THE PANEL BOARD SCHEDULE. SERVICE ENTRANCE PANEL BOARDS SHALL INCLUDE A FULL CAPACITY BOX BONDING STRAP AND APPROVED FOR SERVICE ENTRANCE. THE ACCEPTABLE MANUFACTURERS OF THE PANEL BOARDS ARE SQUARE D, ITC, GENERAL ELECTRIC, CUTLER-HAMMER, AND WESTINGHOUSE, PROVIDED THAT THEY ARE FULLY EQUAL TO THE TYPE LISTED ON THE DRAWINGS. THE PANEL BOARD SHALL BE LISTED BY UNDERWRITERS' LABORATORIES AND BEAR THE UL LABEL.
- B. CIRCUIT BREAKERS:** PROVIDE MOLDED CASE CIRCUIT BREAKERS OF FRAME, TRIP RATING AND INTERRUPTING CAPACITY AS SHOWN ON THE SCHEDULE. ALSO, PROVIDE THE NUMBER OF SPACES FOR FUTURE CIRCUIT BREAKERS AS SHOWN IN THE SCHEDULE. THE CIRCUIT BREAKERS SHALL BE QUICK-MAKE, QUICK-BREAK, THERMAL-MAGNETIC, TRIP INDICATING AND HAVE COMMON TRIP ON ALL MULTIPOLAR BREAKERS WITH INTERNAL TIE MECHANISM.
- C. PANEL BOARD BUS ASSEMBLY:** BUS BAR CONNECTIONS TO THE BRANCH CIRCUIT BREAKERS SHALL BE THE "PHASE SEQUENCE" TYPE. SINGLE-PHASE 3-WIRE PANEL BOARD BUSING SHALL BE SUCH THAT ANY TWO ADJACENT SINGLE-POLE BREAKERS ARE CONNECTED TO OPPOSITE POLARITIES IN SUCH A MANNER THAT THREE-PHASE 4-WIRE BREAKERS ARE INSTALLED AT ANY LOCATION. ALL CURRENT CARRYING PARTS OF THE BUS ASSEMBLY SHALL BE PLATED. MAINS RATINGS SHALL BE AS SHOWN IN THE PANEL BOARD SCHEDULE ON THE PLANS. PROVIDE SOLID NEUTRAL ASSEMBLY (S/N) WHEN REQUIRED.
- D. WIRING TERMINALS:** TERMINALS FOR FEEDER CONDUCTORS TO THE PANEL BOARD MAINS AND NEUTRAL SHALL BE SUITABLE FOR THE TYPE OF CONDUCTOR SPECIFIED. TERMINALS FOR BRANCH CIRCUIT WIRING, BOTH BREAKER AND NEUTRAL, SHALL BE SUITABLE FOR THE TYPE OF CONDUCTOR SPECIFIED.
- E. CABINETS AND FRONTS:** THE PANEL BOARD BUS ASSEMBLY SHALL BE ENCLOSED IN A STEEL CABINET. THE SIZE OF THE WIRING GUTTERS AND GAUGE OF STEEL SHALL BE IN ACCORDANCE WITH NEMA STANDARDS. THE BOX SHALL BE FABRICATED FROM GALVANIZED STEEL OR EQUIVALENT RUST RESISTANT STEEL. FRONTS SHALL INCLUDE DOOR AND HAVE FLUSH, BRUSHED STAINLESS STEEL SPRING-LOADED DOOR PULLS. THE FLUSH LOCK SHALL NOT PROTRUDE BEYOND THE FRONT OF THE DOOR. ALL PANEL BOARD LOCKS SHALL BE KEYPED A LIKE.
- F. DIRECTORY:** ON THE INSIDE OF THE DOOR OF EACH CABINET, PROVIDE A TYPEWRITEN DIRECTORY WHICH WILL INDICATE THE LOCATION OF THE EQUIPMENT OR OUTLETS SUPPLIED BY EACH CIRCUIT. THE DIRECTORY SHALL BE MOUNTED IN A METAL FRAME WITH A NONBREAKABLE TRANSPARENT COVER. THE PANEL BOARD DESIGNATION SHALL BE TYPED ON THE DIRECTORY CARD AND PANEL DESIGNATION STENCILED IN 1-1/2" HIGH LETTERS ON THE INSIDE OF THE DOOR.
- G. PANEL BOARD INSTALLATION**
- 1. BEFORE INSTALLING PANEL BOARDS CHECK ALL OF THE ARCHITECTURAL DRAWINGS FOR POSSIBLE CONFLICT OF SPACE AND ADJUST THE LOCATION OF THE PANEL BOARD TO PREVENT SUCH CONFLICT WITH OTHER ITEMS.**
- 2. WHEN THE PANEL BOARD IS RECESSED INTO A WALL SERVING AN AREA WITH ACCESSIBLE CEILING SPACE ABOVE OR FLOOR BELOW, INSTALL AN EMPTY CONDUIT SYSTEM FOR FUTURE WIRING. THE MINIMUM ACCESS SHALL BE 1-1/4" CONDUIT.**
- 3. THE PANEL BOARDS SHALL BE MOUNTED IN ACCORDANCE WITH ARTICLE 373 OF THE NEC. THE ELECTRICAL CONTRACTOR SHALL FURNISH ALL MATERIAL FOR MOUNTING THE PANEL BOARDS.**
- 6. LIGHTING SYSTEM**
- A. FIXTURE TYPES AND MANUFACTURERS SHALL BE AS INDICATED ON THE DRAWINGS.**
- B. CATALOG NUMBERS SHOWN ON THE DRAWINGS ARE FOR GENERAL IDENTIFICATION ONLY. ALL RECESSED PANEL BOARD AS PLASTER RING, JUNCTION BOXES, PLUGS, WHELDS, MOUNTING STUBS, CANCHIPS, CONNECTORS, STRAPS, NIPPLES, ETC. REQUIRED TO FIRM THEM PROPERLY TO THE CONSTRUCTION SHALL BE FURNISHED AND INSTALLED.**
- 7. DEVICES**
- A. CONDUCTOR SHALL FURNISH AND INSTALL ALL LIGHTING SWITCHES, CONVENTIONAL OUTLETS, SPECIAL PURPOSE RECEPTACLES, AND TRIM PLATES. ALL TRIM PLATES SHALL BE SPECIFICATION GRADE AND COMPLY WITH THE APPLICABLE REQUIREMENTS OF THE NEC, NEMA, IEEE, AND BE UL LISTED AND LABELED. TRIM PLATES SHALL BE OF SAME STYLE, MATCHING THROUGHOUT THE PROJECT, UNLESS NOTED OTHERWISE. TRIM PLATES SHALL BE OF #302 STAINLESS STEEL.**

PANEL "MDP"

Mfg & Type "Square D MD"
 Service 208/120 Y 3PH 4W 60 Hz
 Cabinet Surface
 AC Rating 22,000 AC
 Mains 200 Amp MLO
 Breakers Bolt-on type
 Copper Bus & Neutral and Gnd Kit

Panel Summary Lights 1,036
 Receptacles 1,260
 HVAC 0
 Motors 0
 Fans 0
 W Hrs/Pumps 4,500
 Kitchen 2,100
 Other 4,500

DESCRIPTION	NO	WIRE SIZE	CONDUCTOR TYPE	PHASE	NEUTRAL	GROUND	AMPS	FEET	DESCRIPTION
RECEPTACLE	1,260	12	3/4"	A	B	N	15	1,260	RECEPTACLE
... (more rows) ...									
TOTAL									

PANEL "A"

Mfg & Type "Square D MD"
 Service 208/120 Y 3PH 4W
 Cabinet Surface
 AC Rating 22,000 AC
 Mains 100 Amp MCB
 Breakers Bolt-on type
 Copper Bus & Neutral and Gnd Kit

Panel Summary Lights 183
 Receptacles 180
 HVAC 0
 Motors 0
 Fans 0
 W Hrs/Pumps 0
 Kitchen 0
 Other 16,200

DESCRIPTION	NO	WIRE SIZE	CONDUCTOR TYPE	PHASE	NEUTRAL	GROUND	AMPS	FEET	DESCRIPTION
RECEPTACLE	180	12	3/4"	A	B	N	15	1,800	RECEPTACLE
... (more rows) ...									
TOTAL									

PANEL "B"

Mfg & Type "Square D MD"
 Service 208/120 Y 3PH 4W
 Cabinet SURFACE
 AC Rating 22,000 AC
 Mains 100 Amp MCB
 Breakers Bolt-on type
 Copper Bus & Neutral and Gnd Kit

Panel Summary Lights 183
 Receptacles 180
 HVAC 0
 Motors 0
 Fans 0
 W Hrs/Pumps 0
 Kitchen 0
 Other 16,200

DESCRIPTION	NO	WIRE SIZE	CONDUCTOR TYPE	PHASE	NEUTRAL	GROUND	AMPS	FEET	DESCRIPTION
RECEPTACLE	180	12	3/4"	A	B	N	15	1,800	RECEPTACLE
... (more rows) ...									
TOTAL									

1 PANEL SCHEDULES
 SCALE: NONE

LOAD SUMMARY

LOAD	VOLT-AMPS	DEMAND FACTOR	VOLT-AMPS
LIGHTS	1,219	1.25	1,524
RECEPTACLES	1,440	1	1,440
WATER HEATERS/PUMPS	4,500	1	4,500
KITCHEN INTERMITTENT LOADS	2,100	0.65	1,365
WATER TREATMENT SYSTEM	16,200	1	16,200
MISCELLANEOUS OTHER	4,800	1	4,800
TOTAL			29,829
FUTURE CAPACITY SERVICE - 480/277 VOLTS 3 PHASE 4W			17.3 X 208 = 3,588 118 AMPS 200 AMPS

Order Plans

ELECTRICAL SPECIFICATIONS

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