

ELECTRICAL SPECIFICATIONS

BASIC ELECTRICAL REQUIREMENTS

- A. THE INSTRUCTIONS TO BIDDERS, FORM OF BID, FORM OF CONTRACT, GENERAL CONDITIONS, SUPPLEMENTARY GENERAL CONDITIONS AND THE CONTRACT DRAWINGS ARE A PART OF THE SPECIFICATIONS FOR THIS DIVISION OF WORK AND THIS CONTRACTOR SHALL REFER TO THEM FOR INSTRUCTIONS PERTAINING TO HIS WORK.
B. THE CONTRACTOR, "THIS CONTRACTOR," "E.C.," AND "DIVISION 16," AS USED IN THESE DRAWINGS AND SPECIFICATIONS, MEANS THE ELECTRICAL CONTRACTOR.
C. WHERE SPECIFICATIONS AND/OR DRAWINGS CONFLICT WITH ANY CODE REQUIREMENT, CODE REQUIREMENTS SHALL BE FOLLOWED.
D. CODES AND STANDARDS:
1. STATE BUILDING CODE
2. NFPA STANDARDS
3. ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES
4. INTERNATIONAL ENERGY CONSERVATION CONSTRUCTION CODE
5. LATEST ADOPTED NATIONAL ELECTRICAL CODE
E. THE ELECTRICAL SYSTEMS COVERED BY THIS CONTRACT INCLUDE, BUT ARE NOT LIMITED TO:
1. BRANCH CIRCUIT WIRING AND RACEWAYS
2. WIRING DEVICES
3. DISCONNECTS
4. MOTOR STARTERS AND MOTOR STARTING EQUIPMENT
5. GROUNDING AND BONDING
6. LIGHTING FIXTURES AND LAMPS
7. ELECTRICAL DISTRIBUTION SYSTEM, INCLUDING PANELBOARDS, OVERCURRENT DEVICES, AND FEEDERS
8. EXISTING CONSTRUCTION AND COORDINATION OF DEMOLITION WORK
9. CONNECTIONS TO HVAC, PLUMBING, FIRE PROTECTION, AND OTHER SYSTEMS OR EQUIPMENT ELECTRICALLY SUPPLIED EQUIPMENT, CONTROLS, CONTROL PANELS, PROGRAMS OR STARTERS, MOTOR STARTING EQUIPMENT AND DISCONNECTS FOR OTHER SYSTEMS UNDER HVAC, PLUMBING, FIRE PROTECTION, OR OTHER SYSTEMS
F. PAY FOR ALL PERMITS, INSPECTION FEES, LICENSES AND FOR TESTS WHICH WILL BE REQUIRED IN DETERMINING THE COMPLETENESS OF THE ELECTRICAL WORK SHALL BE UNDERWRITER'S LABORATORIES (UL).
G. ALL ELECTRICAL PRODUCTS USED ON THIS PROJECT SHALL BE LISTED BY UNDERWRITER'S LABORATORIES (UL).
H. ALL ELECTRICAL PRODUCTS USED ON THIS PROJECT SHALL CONFORM TO APPLICABLE STANDARD OF THE NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA).
I. ALL ELECTRICAL INSTALLATION AND PRODUCTS USED ON THIS PROJECT SHALL COMPLY WITH THE NATIONAL ELECTRICAL CODE (NEC).
J. THE PLANS SHOW THE APPROXIMATE LOCATION OF ALL PARTS OF THE WORK. THE ARCHITECT WILL GIVE EXACT LOCATIONS, WHERE STRUCTURAL CONDITIONS ENCOUNTERED NECESSITATE MINOR CHANGES, THESE SHALL BE MADE WITHOUT CHARGE, BUT MUST MEET WITH THE APPROVAL OF THE ARCHITECT. WHERE MAJOR CHANGES ARE REQUIRED, THEY SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT FOR DECISION BEFORE PROCEEDING WITH THE WORK.
K. NOTIFY THE ARCHITECT, AND OBTAIN APPROVAL, BEFORE ANY COMPONENTS OF THE ELECTRICAL SYSTEM ARE CONCEALED BY CLOSING OFF AREAS, POURING CONCRETE, ETC.
L. DETERMINE AND BE RESPONSIBLE FOR PROPER SIZE AND LOCATION OF OPENINGS AND CHASES, AND GIVE GENERAL CONTRACTOR NOTICE OF REQUIREMENTS. INSTALL ALL SLEEVES NECESSARY FOR THE WORK; WHEREVER ANY RACEWAY PASSES THROUGH A WALL, THE OPENING SHALL BE SEALED TIGHT AGAINST THE RACEWAY BY THIS CONTRACTOR. RACEWAYS THROUGH FOUNDATION WALLS AND ROOFS SHALL BE SEALED WATER TIGHT BY THIS CONTRACTOR.
M. THIS CONTRACTOR SHALL DO ALL NECESSARY CUTTING AND PATCHING WHICH IS NOT CALLED TO BE DONE UNDER ANOTHER DIVISION. ALL CUTTING AND REPAIRING SHALL BE PERFORMED BY SKILLED WORKERS.
N. PAINT ALL EXPOSED RACEWAYS IN FINISHED ROOMS WITH TWO COATS OF PAINT TO MATCH SURROUNDINGS. INSTALL PANELBOARDS, TRIM, CABINETS, ENCLOSURES, ETC., IN SUFFICIENT TIME SO THAT THE PAINTING CONTRACTOR MAY PAINT THESE SURFACES WITH THE WALLS. THIS CONTRACTOR SHALL PAY FOR ALL NECESSARY PAINTING IF THE ABOVE PROCEDURE IS NOT FOLLOWED.
O. THE CONTRACTOR SHALL FURNISH AND INSTALL THE POWER AND LIGHTING REQUIRED FOR THE CONSTRUCTION THE SCOPE SHALL INCLUDE, BUT NOT LIMITED TO:
1. TEMPORARY POWER DISTRIBUTION
2. LAMP SOCKETS AND LAMPS
3. DEVICES AND CONSTRUCTION EQUIPMENT CONNECTION INCLUDING WELDERS
4. REMOVAL OF TEMPORARY DISTRIBUTION AFTER COMPLETION OF CONSTRUCTION
P. THE ELECTRICAL CONTRACTOR SHALL INSTALL RACEWAYS IN SUCH A MANNER THAT THE EXPANSION JOINTS OF THE BUILDING WILL FUNCTION PROPERLY AND NOT STRESS ANY ELECTRICAL RACEWAYS. EXPANSION JOINTS SHALL BE INSTALLED IN ALL RACEWAYS AT THE EXPANSION JOINTS OF THE BUILDING.
Q. BEFORE ORDERING ANY MATERIAL OR DOING ANY WORK THIS CONTRACTOR SHALL VERIFY ALL MEASUREMENTS AT THE BUILDING AND SHALL BE RESPONSIBLE FOR THE CORRECTNESS OF SAME. NO EXTRA CHARGE OR COMPENSATION WILL BE ALLOWED ON ACCOUNT OF DIFFERENCE BETWEEN ACTUAL DIMENSIONS AND THE MEASUREMENTS INDICATED ON THE DRAWINGS, ANY DIFFERENCE WHICH MAY BE FOUND SHALL BE SUBMITTED TO THE ARCHITECT FOR CONSIDERATION BEFORE PROCEEDING WITH THE WORK.
R. PROVIDE PRODUCT DATA, CATALOG CUT SHEETS WITH MFG. SPECIFICATIONS FOR REVIEW BY ARCH./ENGR. FOR THE FOLLOWING ITEMS:
1. PANELBOARDS
2. SAFETY DISCONNECT SWITCHES
3. OUTLET BOXES
4. FITTINGS
5. LIGHTING FIXTURES
6. LAMPS
7. CONDUCTORS
8. DEVICES
9. TIME SWITCHES
10. PHOTOELECTRIC CONTROLS
S. PROVIDE A MINIMUM OF SEVEN (7) SUBMITTAL COPIES FOR EACH ITEM LISTED ABOVE.
T. MAINTAIN THROUGHOUT PROJECT A SET OF PLANS WHICH ACCURATELY PORTRAY THE ACTUAL INSTALLATION, INCLUDING LOCATION OF ALL WIRING, EQUIPMENT, CIRCUIT NUMBERS, ETC. TURN OVER TO OWNER AT COMPLETION OF JOB.
RACEWAYS AND FITTINGS
A. WHERE CALLED FOR ON THE DRAWINGS, FLOOR OUTLET BOXES AND POKE-THROUGH DEVICES SHALL BE AS MANUFACTURED BY THE MFG. WITH THE MFG. OR LEW.
B. WIRING AND RACEWAYS SHALL BE CONCEALED IN ALL ROOMS AND SPACES UNLESS OTHERWISE NOTED.
C. ALL FEEDERS AND BRANCH CIRCUIT HOMERUNS SHALL BE INSTALLED IN MET. WHERE ALLOWED, BRANCH CIRCUITS MAY BE INSTALLED IN MET. HOMERUN JUNCTION BOX AND EQUIPMENT/DEVICE CONNECTIONS MAY BE INSTALLED IN MET. HOMERUN JUNCTION BOX TO BE A MAXIMUM OF 20 FT. FROM THE DEVICE.
D. FOR USE IN UNFINISHED AREAS: WIRE IN UNFINISHED RGS CONDUIT.
E. FOR OUTDOOR USE: WIRE IN THREADED, RIGID STEEL CONDUIT.
F. FOR UNDERGROUND USE: WIRE IN SCHEDULE 80 RIGID PVC NONMETALLIC CONDUIT.
G. FOR FINAL CONNECTION IN DAMP OR WET LOCATIONS: LIQUID TIGHT FLEXIBLE METAL CONDUIT, WITH LISTED FITTINGS.
H. NOT USED
I. IN ALL INSTANCES, INCLUDE A SEPARATE GROUNDING CONDUCTOR IN EACH FEEDER AND BRANCH CIRCUIT, SIZE PER NEC.
J. FURNISH ALL FITTINGS REQUIRED, BUT NOT LIMITED TO: BUSHINGS TO PREVENT WIRE ABRASION; SINGLE- AND MULTIPLE-GANG BOXES TO ACCOMMODATE DEVICE INSTALLATION; ADAPTERS FROM CONDUIT TO RACEWAYS; TRANSITIONS TO BOTH LARGER AND SMALLER SURFACE METAL RACEWAYS; 90 DEGREE ELBOWS, TEES, FIXTURE BOXES, AND FLEXIBLE SECTIONS.

- K. SURFACE METAL RACEWAY AND FITTINGS SHALL MEET ALL REQUIREMENTS OF NEC ARTICLE 352A AND SHALL BE UL LISTED.
L. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER APPLICATION, INSTALLATION, AND LOCATION OF ALL NECESSARY AND REQUIRED INSERTS, SUPPORTS, AND ANCHOR BOLTS, AND FOR A SATISFACTORY RACEWAY SYSTEM UPON COMPLETION OF THE PROJECT.
M. WHERE ANY COMPONENT OF THE RACEWAY SYSTEM IS DAMAGED PRIOR TO FINAL ACCEPTANCE BY THE OWNER, THIS CONTRACTOR SHALL BE REQUIRED TO REPLACE SAME OR PROVIDE A NEW RACEWAY SYSTEM, AT THE EXPENSE OF THE CONTRACTOR RESPONSIBLE FOR THE DAMAGE.
N. CONDUITS SHALL BE RUN TO AVOID ADVERSE CONDITIONS SUCH AS HEAT AND MOISTURE AND TO AVOID ALL MATERIALS AND EQUIPMENT OF OTHER TRADES. CONDUITS SHALL MAINTAIN A MINIMUM CLEARANCE OF SIX INCHES FROM ALL HOT WATER PIPES, FLUES, OR AND HIGH TEMPERATURE PIPING OR DUCTWORK. SHOULD IT BE FOUND NECESSARY TO INSTALL CONDUIT CLOSER THAN THIS TO HOT WATER PIPES, FLEXIBLE INSULATING COVERING SHALL BE USED TO PROTECT THE CONDUIT FROM HIGH TEMPERATURE.
O. RACEWAYS SHALL NOT BE SMALLER THAN THE SIZE REQUIRED BY THE NATIONAL ELECTRICAL CODE FOR THE CONDUCTORS ENCLOSED AND SHALL BE LARGER WHERE SO SPECIFIED OR INDICATED ON THE PLANS.
P. ALL EXPOSED RUNS OF CONDUIT SHALL BE INSTALLED PARALLEL OR PERPENDICULAR TO WALLS OR CEILINGS. SUPPORTS SHALL BE FROM THE MASONRY OR STEEL STRUCTURE RATHER THAN FROM OTHER MECHANICAL WORK SUCH AS DUCTS, PIPING, ETC., IN ACCORDANCE WITH GOOD INDUSTRY PRACTICE IN A MANNER NOT DETRIMENTAL TO THE ARCHITECT.
Q. SUPPORTS AND ATTACHMENTS PROVIDED SHALL BE SPECIFICALLY DESIGNED FOR THE APPLICATIONS, PERFORATED HANGERS OR WIRE TIE SUPPORTS ARE NOT ACCEPTABLE. ALL HANGERS AND SUPPORTS SHALL HAVE CORROSION RESISTANT FINISH.
R. ALL CONDUITS AND RACEWAYS PASSING THROUGH WALLS, FLOORS, AND CEILINGS SHALL BE SLEEVED WITH A PIECE OF SCHEDULE 40 GALVANIZED STEEL PIPE WITH PLAN ENDS. ALL SLEEVES SHALL BE SEALED WATER TIGHT USING A MATERIAL SIMILAR IN APPEARANCE TO THE SURROUNDING AREA OR APPROVED MATERIAL.
S. ALL RACEWAYS EXTENDING THROUGH ROOFS SHALL BE EQUIPPED WITH PITCH POCKETS.
T. EMPLOY RACEWAYS SHALL BE PROVIDED WITH A NYLON PULLWIRE.
U. ALL CONDUIT PASSING THROUGH A FIRE ZONE SHALL HAVE A FIRE RATED INSTALLATION.
V. CONDUIT SHALL BE INSTALLED SO THAT A CONTINUOUS GROUNDING SYSTEM WILL BE MAINTAINED FROM THE FURTHERMOST OUTLET TO THE ESTABLISHED WATER PIPE GROUND.
W. CONDUITS, UNLETS, OR SIMILAR APPROVED TYPE FITTINGS SHALL BE USED ON EXPOSED WORK WHERE CONDUIT CHANGES DIRECTION AND WHERE BENDS WILL NOT MAKE A NEAT JOB.
X. EXPOSED CONDUIT SHALL BE SECURELY FASTENED TO THE BUILDING AT EIGHT-FOOT MAXIMUM INTERVALS, USING APPROVED HANGERS, STRAPS, CLAMPS, OR SCREWS. WOOD PLUGS SHALL NOT BE USED FOR FASTENING PURPOSES. CONDUIT RUN ABOVE HUNG CEILING OR IN CRAWL SPACES SHALL BE SUPPORTED IN THE SAME MANNER AS FOR EXPOSED RUNS. WIRE TIES ARE NOT ACCEPTABLE SUPPORTS.
Y. CARE SHALL BE EXERCISED TO MAKE CERTAIN THAT THE CONDUIT SYSTEM NOW PLANNED WILL PERMIT REMOVAL OF CONDUCTORS FOR FUTURE CHANGES AS MAY BE REQUIRED, ALTHOUGH UP TO FOUR 90 DEGREE BENDS ARE PERMITTED BY THE NATIONAL ELECTRICAL CODE. THE PRACTICE OF USING MORE THAN THREE 90 DEGREE BENDS PER RUN SHALL BE AVOIDED. PULL BOXES SHALL BE USED IF AT ALL FEASIBLE.
Z. PULLBOXES SHALL BE INSTALLED AT 100 FOOT INTERVALS IN LONG STRAIGHT RUNS. CLOSE NIPPLES WILL NOT BE PERMITTED.
AA. CONDUIT SMALLER THAN 1/2" SHALL NOT BE USED.
THE REQUIRED STRENGTH OF THE SUPPORTING EQUIPMENT AND THE SIZE AND TYPE OF ANCHORS SHALL BE BASED ON THE COMBINED WEIGHT OF CONDUIT, HANGERS, AND CONDUCTORS. THE USE OF PERFORATED IRON STRAPS FOR SUPPORTING CONDUITS WILL NOT BE PERMITTED.
BB. SINGLE RUNS:
1. WHERE CONDUITS ARE RUN INDIVIDUALLY, THEY SHALL BE SUPPORTED BY APPROVED PIPE STRAPS, SECURED BY MEANS OF TOGGLE BOLTS
2. IN HOLLOW MASONRY; EXPANSION SHELDS AND MACHINE SCREWS OR STANDARD PRESET INSERTS IN CONCRETE OR SOLID MASONRY; MACHINE SCREWS OR BOLTS IN METAL SURFACES; AND WOOD SCREWS IN WOOD CONSTRUCTION. THE USE OF PERFORATED IRON STRAPS WILL NOT BE PERMITTED.
3. CONDUITS INSTALLED EXPOSED ON THE SURFACE IN DAMP LOCATIONS OR IN REFRIGERATED AREAS SHALL BE PROVIDED WITH CLAMP BACKS UNDER EACH CONDUIT CLAMP TO PREVENT ACCUMULATION OF MOISTURE AROUND THE CONDUITS. WHERE INDIVIDUAL CONDUITS ARE SUSPENDED FROM THE CEILING THEY SHALL BE SUPPORTED BY HANGERS EQUIVALENT TO STEEL CITY NO. C-149.
CC. MULTIPLE RUNS:
1. WHERE A NUMBER OF CONDUITS ARE TO BE RUN EXPOSED AND PARALLEL, ONE WITH ANOTHER, THEY SHALL BE GROUPED AND SUPPORTED BY TRAPEZOIDAL HANGERS.
2. HANGER RODS SHALL BE FASTENED TO STRUCTURAL STEEL MEMBERS WITH SUITABLE BOLTS, CLAMPS, OR TO CONCRETE INSERTS SET FLUSH WITH SURFACE.
DD. THE CONTRACTOR SHALL FURNISH AND INSTALL JUNCTION BOXES, PULLBOXES, AND CABLE SUPPORT BOXES AS SHOWN ON THE DRAWINGS, SPECIFIED HEREIN, OR AS OTHERWISE NOTED ON THE DRAWINGS, OR SPECIFIED HEREIN, OR SPECIFIED INDEPENDENTLY OF CONDUITS ENTERING THE METAL RACEWAY. ROD HANGERS, BRACKETS, OR OTHER APPROVED MEANS, OUTLET BOXES SHALL BE SECURELY FASTENED TO CEILINGS, WALLS OR FLOORS.
EE. BOXES INSTALLED IN FINISHED ROOMS, WALLS OR CEILINGS SHALL BE SET SO THAT THE TOP EDGE OF THE BOX SHALL BE FLUSH WITH FINISHED CEILING, WALLS OR FLOORS.
FF. UNFINISHED AREAS NOTED ON THE DRAWINGS OR SPECIFIED HEREIN, RECEPTACLE OUTLET BOXES SHALL BE INSTALLED 18" ABOVE THE FLOOR.
GG. WIRE TIE STRAPPING ON CONDUITS AND RACEWAY PENETRATIONS OR FIRE-RATED WALLS OR AN WALL ASSUMES TO ACHIEVE FIRE-RESISTANCE RATING OF THE WALL.
WIRE ANCHORS
A. ACCEPTABLE MANUFACTURERS SHALL BE ANCONADA, GENERAL ELECTRIC, CERRO, OR BRADY.
B. ALL CONDUCTORS SHALL BE COPPER, WITH 600 VOLT INSULATION, UNLESS OTHERWISE NOTED; STRANDING AND INSULATION TYPES AS FOLLOWS:
C. BRANCH CIRCUIT FEEDERS
1. #10 AWG AND SMALLER (SOLID) - TYPE THHN/THWN INSULATION.
2. #8 AWG AND LARGER (STRANDED) - TYPE THHN/THWN INSULATION.
D. ALL WIRE AND CABLE SHALL BE NEW, WITHIN ONE YEAR OF MANUFACTURE WHEN DELIVERED TO THE SITE AND BEAR THE UL LABEL, INSULATION TYPE, VOLTAGE, AND MANUFACTURER'S NAME AT REGULAR INTERVALS ON THE INSULATION.
E. ALL WIRING SHALL BE DONE SO THAT THE SYSTEM WILL BE CONTINUOUSLY POLARIZED THROUGHOUT, FOLLOWING THE COLOR CODING INDICATED IN THE NEC.
F. ALL CONNECTIONS USING COPPER SHALL BE MADE WITH CONNECTORS THAT ARE DESIGNED AND APPROVED FOR COPPER.
G. JOINTS, TAPS AND SPLICES OF WIRES OF SIZES #10 AWG AND SMALLER SHALL BE MADE BY MEANS OF "SCOTCHLOK" SPRING CONNECTORS.
H. JOINTS, TAPS AND SPLICES OF WIRES OF SIZE #8 AWG AND LARGER SHALL BE MADE WITH THOMAS AND BETTS ALUMINUM/COPPER COLOR -KEYED COMPRESSION CONNECTORS, INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
I. WIRE SIZES SHALL BE AS SHOWN ON THE DRAWINGS OR SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.
J. ALL FEEDER CABLES SHALL BE CONTINUOUS FROM ORIGIN TO EQUIPMENT TERMINATION WITHOUT RUNNING SPLICES IN INTERMEDIATE PULL OR SPICE BOXES AS FAR AS PRACTICABLE. NO SPLICES ARE ALLOWED IN "C" CONDUITS.
K. CONDUCTORS SHALL NOT BE SMALLER THAN CODE SIZE FOR THE LOADS BEING HANDLED AND SHALL BE LARGER IF SO INDICATED IN THE PLANS OR SPECIFICATIONS. THE CONDUCTOR SHALL BE LESS THAN #12 AWG EXCEPT FOR CONTROL CIRCUITS, WHICH MAY BE #14 WIRE WHEN INDICATED.

- L. PROVIDE SEPARATE GREEN GROUND (EQUIPMENT GROUND) CONDUCTOR WITH EACH FEEDER AND BRANCH CIRCUIT.
M. WIRING IN DUCTS, PLENUMS, AND OTHER AIR HANDLING SPACES SHALL BE PROVIDED WITH APPROVED GREEN GROUNDING CABLE. CONDUIT SECTIONS, WHERE PROVIDED PLENUM CABLE SHALL BE LISTED AS BEING SUITABLE FOR USE IN DUCTS, PLENUMS, AND OTHER SPACES USED FOR ENVIRONMENTAL AIR AND SHALL ALSO BE LISTED AS HAVING ADEQUATE FIRE-RESISTANT AND LOW SMOKE-PRODUCING CHARACTERISTICS. WIRING SHALL INCLUDE BUT NOT LIMITED TO POWER, LIGHTING, TELEPHONE, DATA, FIRE ALARM, SECURITY, ETC.
CABINETS, BOXES, AND FITTINGS
A. USE SHEET STEEL JUNCTION, OUTLET AND PULL BOXES SIZED PER NEC IN ALL DRY LOCATIONS.
B. USE CAST BOXES FOR EXTERIOR USE, WHERE IN CONCRETE FLOORS, AND IN ALL DAMP OR WET LOCATIONS.
C. NOT USED.
D. USE STEEL OR MALLEABLE IRON FITTINGS SPECIFICALLY DESIGNED FOR EACH RACEWAY TYPE, AS DICTATED BY GOOD PRACTICE.
E. IN ALL CASES, ALL CABINETS, JUNCTION AND OUTLET BOXES SHALL BE ACCESSIBLE.
ELECTRICAL CONNECTIONS FOR EQUIPMENT
A. FIXED EQUIPMENT REQUIRING ATTACHMENT PLUGS SHALL BE PROVIDED WITH APPROPRIATE RECEPTACLE TO MATCH PLUG.
B. FIXED EQUIPMENT REQUIRING DIRECT WIRE CONNECTIONS SHALL BE PROVIDED WITH LOCAL JUNCTION BOX AND FLEXIBLE NONMETALLIC CONDUIT, OR LIQUID TIGHT FLEXIBLE NONMETALLIC CONDUIT CONNECTIONS TO EQUIPMENT.
C. PROVIDE SEPARATE FUSIBLE DISCONNECT FOR EQUIPMENT NOT FURNISHED WITH INTEGRAL OR FACTORY FURNISHED DISCONNECTING MEANS.
D. PROVIDE MOTOR STARTER FOR EQUIPMENT NOT FURNISHED WITH FACTORY STARTER.
WIRING DEVICES
A. FOR FINISHED AREAS, USE SPECIFICATION GRADE DEVICES, COLOR AS SELECTED BY ARCHITECT, WITH SMOOTH THERMOPLASTIC WALL PLATE, COLOR TO MATCH DEVICE.
B. FOR UNFINISHED DRY INTERIOR SPACES, USE SPECIFICATION GRADE DEVICE IN STEEL UTILITY BOXES WITH MATCHING STEEL DEVICE COVERS.
C. FOR INTERIOR AND EXTERIOR WET LOCATIONS, USE SPECIFICATION GRADE DEVICES INSTALLED WITH AN OUTLET ENCLOSURE CLEARLY MARKED "SUITABLE FOR WET LOCATIONS WHEN IN USE" AS MANUFACTURED BY TAYMAC CORP., WITH PUSH-BUTTON RELEASE.
D. RECEPTACLES:
20A, 125V DUPLEX RECEPTACLE: HUBBELL #J5352
20A, 125V DUPLEX IG RECEPTACLE: HUBBELL #J5362
20A, 125V DUPLEX IG RECEPTACLE: HUBBELL #J5362
E. SWITCHES:
20A, 120/277V A.C. TOGGLE SWITCH: HUBBELL #J51221
20A, 120/277V A.C. THREE-WAY SWITCH: HUBBELL #J51223
20A, 120/277V A.C. FOUR-WAY SWITCH: HUBBELL #J51224
F. MOUNTING: MOUNT DEVICES IN SINGLE OR GANGED ARRANGEMENT AS CALLED FOR ON THE DRAWINGS. PROVIDE APPROPRIATE STEEL BACKBOXES, REQUIRED. USE SINGLE OR MULTIPLE DEVICE COVERS, AS REQUIRED. MULTIPLE DEVICES TO BE EQUALLY SPACED, AND ALIGNED STRAIGHT SO AS TO ALLOW DEVICES TO FIT TIGHTLY AND PROPERLY.
G. WHERE MOUNTING ON MILLWORK OR OTHER FINISH, VERIFY PROPER ROUGH-IN DIMENSIONS WITH ARCHITECT.
H. DEVICES IN MECHANICAL EQUIPMENT AREAS MAY BE MOUNTED USING SURFACE MOUNTED CONDUIT DEVICES TO BE INSTALLED IN ACCORDANCE WITH APPLICABLE HANDICAPPED ELEMENTS. OPTICALS TYPE, UNLESS OTHERWISE NOTED; WALL SWITCHES 148"; FINISH: WIRE PULLS 148"; FIRE ALARM AUDIO VISUAL DEVICES 148" TO CENTERLINE OF STROBE UNLESS OTHERWISE NOTED. REFER TO THE ARCHITECT FOR THE LABOR SIZE DRAWING. REFER TO TYPICAL FINISHING HEIGHT DETAIL ON DRAWINGS FOR FURTHER REQUIREMENTS.
I. MANUFACTURERS: HUBBELL, SEYMOUR, LEVITON.
SAFETY DISCONNECT DEVICES
A. DISCONNECT DEVICES INSTALLED SHALL BE AS SHOWN ON THE DRAWINGS, HEAVY-DUTY, "QUICK-MAKE, QUICK-BREAK," SAFETY SWITCHES WITH WITH LOCKING COVER, CONSTRUCTED OF CODE GAUGE STEEL (UL 98) ENCLOSURES SHALL BE TREATED WITH RUST INHIBITING PHOSPHATE AND FINISHED IN GRAY BAKED ENAMEL.
B. DISCONNECTS SHALL BE FUSED OR NON-FUSED AS INDICATED ON THE DRAWINGS, OR AS REQUIRED BY NEC. NUMBER OF POLES, WITH OR WITHOUT SOLID NEUTRAL, SHALL BE AS INDICATED ON THE DRAWINGS, OR AS REQUIRED.
C. ENCLOSURES FOR INDOOR USE SHALL BE NEMA 1; ENCLOSURES FOR EXTERIOR USE SHALL BE NEMA 3R. ENCLOSURES FOR HAZ. LOCATIONS SHALL BE CLASS II DIV. 2, LISTED.
D. DISCONNECTS SHALL REQUIRE THE USE OF A SCREWDRIVER FOR ACCESS TO INTERIOR WITHOUT OPENING CONTACTS.
E. DISCONNECTS SHALL HAVE PROVISIONS FOR PADLOCKING THE SWITCH IN THE "OFF," OR "OPEN" POSITION.
F. ACCEPTABLE MANUFACTURERS ARE SQUARE D, I.E., WESTINGHOUSE, OR GENERAL ELECTRIC.
G. FURNISH A SAFETY DISCONNECT DEVICE ON ALL EQUIPMENT CONNECTIONS WHERE INDICATED ON THE DRAWINGS, OR AS REQUIRED BY CODE.
H. DISCONNECTS SHALL BE MOUNTED TO PERMANENT STRUCTURAL ELEMENTS WITH APPROVED FASTENING MEANS. DISCONNECTS SHALL NOT BE FASTENED BY WELDING THE ENCLOSURE TO ITS DESIGNATED STRUCTURAL SUPPORT, BEAM CLAMPS, UNISTRUT AND BOLTED WASHERS COMPRISE ACCEPTABLE FASTENING MEANS.
I. NAMEPLATES SHALL BE PLASTIC LAMINATE WITH WHITE BACKGROUND AND 1/4" BLACK ENGRAVED LETTERS WITH THE TITLE OF THE EQUIPMENT THAT IS FED. NAMEPLATES SHALL BE ATTACHED USING RIVETS OR NUTS, WASHERS, AND BOLTS.
GROUNDING
1. PROVIDE GROUNDING IN ACCORDANCE WITH NFPA 70 ARTICLE 250.
2. RACEWAY AND CABLE SYSTEMS, WHICH INCLUDES ALL METAL CONDUIT, WIREWAYS, PULLBOXES, JUNCTION BOXES, BUILT-UP ENCLOSURES, ENCLOSURES, MOTOR FRAMES, ETC., SHALL BE MADE TO FORM A CONTINUOUS, CONDUCTING PERMANENT GROUND CIRCUIT OF THE LOWEST PRACTICAL IMPEDANCE TO ENHANCE THE SAFE CONDUCTION OF GROUND FAULT CURRENTS AND TO PREVENT OBJECTIONABLE DIFFERENCES IN VOLTAGE BETWEEN METAL NON-LOAD CURRENT CARRYING PARTS OF THE ELECTRICAL SYSTEM.
3. THE CONDUIT SYSTEM SHALL NOT BE SOLE SOURCE OF GROUND. A GROUND WIRE SHALL BE INSTALLED IN EACH CONDUIT OR RACEWAY TO GROUND THE RESPECTIVE DEVICE.
4. ALL EXPOSED GROUNDING CONDUCTORS SUCH AS BARS, STRAPS, CABLES, FLEXIBLE JUMPERS, BRANDS, SHUNTS, ETC., SHALL BE BARE COPPER.
5. CABLE SIZE SHALL BE AS REQUIRED BY NEC CODE, ARTICLE 250, STRANDED, SOFT DRAWN, OR SOFT ANNEALED, UNLESS OTHERWISE SHOWN ON PLANS OR SPECIFIED.
PANELBOARDS
A. SHALL BE UL LISTED AS "SUITABLE FOR USE AS SERVICE ENTRANCE EQUIPMENT", WHERE APPLICABLE.
B. PHASE, NEUTRAL AND GROUND BUSSES SHALL BE COPPER, AND PHASE BUSSES SHALL EXTEND THE ENTIRE HEIGHT OF PANELBOARD, FOR FUTURE INSTALLATION OF ADDITIONAL CIRCUIT BREAKERS, WITHOUT THE NEED FOR CONNECTORS, BUT CIRCUIT BREAKERS CONNECTIONS TO THE BUS SHALL BE BOLT-ON, DOUBLE ROW ARRANGEMENT, DISTRIBUTED PHASE-BUS TYPE.
C. CIRCUIT BREAKERS SHALL BE MOLDED CASE, THERMAL MAGNETIC, BOLT-ON TYPE, DEAD FRONT DESIGN, WITH QUICK-MAKE, QUICK-BREAK, COMMON TRIP TYPE SINGLE TOGGLE OPERATING MECHANISMS, 1, 2, OR 3 POLE, AND HACR LISTED WHEN USED FOR HVAC EQUIPMENT, SIZED PER PANELBOARD SCHEDULE.

- D. BACKBOXES SHALL BE FABRICATED FROM GALVANIZED, CODE GAUGE, SHEET STEEL, MEETING OR EXCEEDING NECESSARY REQUIREMENT FOR WIRE BENDING SPACE, WITHOUT KNOCKOUTS.
E. COVERS SHALL BE DEAD FRONT DESIGN, WITH HINGED DOOR, CONCEALED FASTENERS, FABRICATED FROM CODE GAUGE STEEL WITH POINTED ENAMEL FINISH, FLUSH LOCK AND CATCH.
F. PANELBOARD DIRECTORY CARD, WITH CLEAR PLASTIC COVER, SHALL BE PROVIDED ON BACK OF DOOR. CONTRACTOR SHALL COMPLETE DIRECTORY CARD, WITH CIRCUIT BREAKER NUMBERS CROSS REFERENCED TO THEIR RESPECTIVE LOAD(S), BY LOAD TYPE AND ROOM OR SPACE NAME AND NUMBER.
G. PROVIDE PERMANENT LAMACOD OR EQUAL TYPE LABEL INSIDE PANELBOARD DOOR, IDENTIFYING PANELBOARD NAME.
H. DESIGN EQUIPMENT SHALL BE SQUARE D CO. - TYPE: NOOD FOR 20BY/20V PANELBOARDS, TYPE NF FOR 480Y/277V PANELBOARDS; TYPE I-LINE FOR DISTRIBUTION PANELBOARDS. ALTERNATE MANUFACTURERS ARE: CUTLER-HAMMER/WESTINGHOUSE, OR SIEMENS/ITE.
FUSES
A. PROVIDE INSTANTANEOUS OR TIME DELAY TYPE FUSES FOR EACH FUSIBLE DEVICE, INCLUDING DISCONNECTS, FUSIBLE MOTOR STARTERS, SERVICE SWITCHES. PROVIDE TIME CURRENT CURVES FOR EACH TYPE AND SIZE FUSE USED. PROVIDE ONE SPARE SET OF FUSES FOR EACH SIZE INSTALLED.
B. CARRIAGE FUSE APPLICATION:
1. MAIN SERVICE: CLASS L FAST ACTING.
2. MAIN FEEDERS: CLASS J TIME DELAY.
3. MOTOR BRANCH CIRCUITS: CLASS RK1 TIME DELAY.
4. OTHER BRANCH CIRCUITS: CLASS RK5 NON-TIME DELAY.
C. MANUFACTURERS: BUSSMAN, EAGLE ELECTRIC, GENERAL ELECTRIC, GOULD.
MOTOR STARTERS
A. FRACTIONAL HORSEPOWER MOTOR CIRCUIT SWITCH: FOR MANUALLY CONTROLLED MOTORS LESS THAN 1 H.P., USE MOTOR CIRCUIT SWITCH WITH PILOT LIGHT, WITH THERMAL UNITS, OR AUXILIARY N.O./N.C. CONTACTS IN PILOT LIGHT, BASIS FOR DESIGN: SQUARE D TYPE K.
B. MANUAL MOTOR STARTER: FOR MANUALLY CONTROLLED MOTORS 1 H.P. THROUGH 3 H.P., USE INTERLOCKED MANUAL STARTER PUSH-BUTTON TYPE, WITH THERMAL UNITS, OR AUXILIARY N.O./N.C. CONTACTS IN PILOT LIGHT, BASIS FOR DESIGN: SQUARE D TYPE M.
C. COMBINATION MOTOR STARTER: FOR ALL OTHER MOTORS, WHEN INDICATED ON THE DRAWINGS, USE COMBINATION MOTOR STARTER, FUSIBLE DISCONNECT TYPE, WITH OVERLOADS, CONTROL, POWER TRANSFER AND FUSE HANDLING - AUTO SELECTOR SWITCH, OFF POSITION, PILOT LIGHT, (2) N.O. CONTACTS, NEMA 1 ENCLOSURE FOR INDOOR USE, NEMA 4 FOR EXTERIOR USE. NON-REVERSING OR REVERSING MOTOR AS INDICATED ON THE DRAWINGS. SIZE AS REQUIRED BY THE ARCHITECT/ENGINEER. THE DATA SUBMITTED WHERE A SPECIFIC SIZE IS INDICATED ON THE DRAWING, FUSIBLE TYPE SHALL BE FURNISHED, UNLESS OTHERWISE NOTED ON THE DRAWINGS. BASIC DESIGN: SQUARE D CLASS RK5 (CIRCUIT BREAKER, NON-REVERSING); CLASS 87 (CIRCUIT BREAKER, REVERSING); CLASS 85 (CIRCUIT BREAKER, NON-REVERSING); CLASS 87/89 (CIRCUIT BREAKER, REVERSING).
D. MANUFACTURERS: SQUARE-D, GENERAL ELECTRIC, CHALLENGER, SIEMENS.
INTERIOR LIGHTING
A. PROVIDE AND INSTALL LAMPS AS SPECIFIED HEREIN AND LISTED ON THE LIGHTING FIXTURE SCHEDULE ON THE DRAWINGS.
B. CATALOG NAMES AND NUMBERS USED IN THE LIGHTING FIXTURE SCHEDULE ARE TO ESTABLISH A STANDARD OF QUALITY AND SHALL NOT BE CONSTRUED AS LIMITING COMPETITION.
C. IF ALTERNATED, OR OPTIONAL, METHODS ARE PROPOSED AS SUBSTITUTION FOR ANY ONE OF THE LIGHTING FIXTURES, THEY MUST BE EQUAL IN DESIGN AND QUALITY AS DETERMINED BY THE ARCHITECT/ENGINEER. THE DATA SUBMITTED MUST INCLUDE A DESCRIPTION OF THE LIGHTING FIXTURE, LENS, BALLAST, SHEET METAL GAGE, PHOTOMETRIC DATA, ETC.
D. UPON REQUEST OF THE ENGINEER, A SAMPLE OF THE PROPOSED SUBSTITUTION SHALL BE PROVIDED.
E. FURNISH AND INSTALL ALL LIGHTING FIXTURES COMPLETE WITH LAMPS. PROVIDE 10% ADDITIONAL LAMPS FOR EACH TYPE OF LAMP REQUIRED ON PROJECT AND TURN OVER TO OWNER.
F. ALL LIGHTING FIXTURES SHALL CARRY THE UNDERWRITER'S LABEL OF APPROVAL.
G. FIXTURES SHALL BE FREE OF IMPERFECTIONS, HANDLING, OR INSTALLATION DAMAGE.
H. OBTAIN EXACT LOCATION OF ALL CEILING OUTLETS FROM THE ARCHITECT.
I. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE FIT OF ALL LIGHTING FIXTURES INTO THE ACTUAL CEILING INSTALLED.
J. ALL WIRING WITHIN EACH LIGHTING FIXTURE SHALL BE CONTAINED IN METALLIC WIRING CHANNEL AND NOT IN THE LAMP CHAMBER.
K. FLOURESCENT LIGHTING FIXTURES SHALL BE "F" RATED, PREMIUM GRADE, AND SO LABELED AS PER NEC.
L. CONFIRM COMPATIBILITY AND INTERFACE OF OTHER MATERIALS WITH LUMINAIRE AND CEILING SYSTEM. REPORT DISCREPANCIES TO THE ENGINEER/ARCHITECT AND DEFER ORDERING UNTIL CLARIFIED.
M. COORDINATE WITH DIVISION 15 TO AVOID CONFLICTS BETWEEN LUMINAIRES, SUPPORTS, FITTINGS, AND MECHANICAL EQUIPMENT.
N. ALL INCANDESCENT, FLOURESCENT, METAL HALIDE, AND HIGH PRESSURE SODIUM LAMPS SHALL BE AS MANUFACTURED BY GENERAL ELECTRIC, G.E.-SYLVANIA, WESTINGHOUSE, OR PHILIPS.
O. ALL FLOURESCENT LIGHTING FIXTURES SHALL HAVE HIGH POWER FACTOR BALLASTS HAVING A SOUND LEVEL OF "A". BALLASTS CONSIDERED BY THE OWNER OR ENGINEER TO HAVE OBJECTIONABLE NOISE OR HUM SHALL BE REPLACED DURING THE PERIOD OF GUARANTEE AT THE DIVISION 16 CONTRACTOR'S EXPENSE.
P. FLOURESCENT BALLASTS TO BE PROGRAMMED START, SOLID STATE ELECTRONIC, LOW LOSS ENERGY SAVING TYPE, WITH THE FOLLOWING RATINGS FOR COMPACT TWIN TUBE FLOURESCENT LAMPS 16 TO 55 WATTS, AND LINEAR FLOURESCENT LAMPS 16 TO 60 WATTS:
a. TOTAL HARMONIC DISTORTION (THD) LESS THAN 10% ACCORDING TO NEMA, C82.11
b. LAMP CURRENT GREST FACTOR AT OR BELOW 1.7
c. TRANSIENT VOLTAGE PROTECTION: ANSI/IEEE C82.41, CATEGORY A.
d. OPERATE IN AMBIENT TEMPERATURES UP TO 105 DEGREES F.
e. MINIMUM 95 PERCENT POWER FACTOR.
f. MINIMUM 85 PERCENT BALLAST FACTOR.

- Q. IT WILL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO VERIFY, WITH THE CONSTRUCTION CONTRACTOR, THE TYPES OF CEILINGS IN ALL ROOMS HAVING TROFFERS, AS TO THE TYPE OF TROFFER CONSTRUCTION REQUIRED TO MATCH THE CEILING CONSTRUCTION.
R. MOUNT HIGH INTENSITY DISCHARGE BALLASTS ON RUBBER GROMMETS TO REDUCE NOISE TRANSMISSION.
S. ALL METAL PARTS SHALL BE GROUNDING AS A COMMON UNIT.
T. SUPPORT FLOURESCENT LUMINAIRES DIRECTLY FROM BUILDING STRUCTURE BY ROD HANGERS AND INSERTS, OR METAL ANGLE HEADERS SUPPORTED FROM FRAMING STRUCTURE OF CEILING SUSPENSION SYSTEM.
U. INSTALL RECESSED LUMINAIRES TO PERMIT REMOVAL FROM BELOW, TO GAIN ACCESS TO OUTLET OR PRE-WIRED LIGHTING FIXTURE BOX.
FIRE ALARM SYSTEM
A. INSTALL ALL FIRE ALARM SYSTEM WIRING IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, IN SEPARATE METAL RACEWAYS (PDS OR EMT). DEVICES SHALL BE WIRED CLASS A BY CULVERT, AS REQUIRED TO MATCH EXISTING INSTALLATION.
B. ALL FIRE ALARM SYSTEM DEVICES SHALL BE INSTALLED FLUSH OR SEMI-FLUSH, WALL OR CEILING MOUNTED, NEVER RECESSED INTO CEILING OUTLET OR BACKBOXES.
C. TEST THE FIRE ALARM SYSTEM BEFORE AND AFTER COMPLETING THE WORK, TO SHOW THAT IT IS IN FIRST CLASS OPERATING CONDITION, AND GUARANTEE THE WORK FOR ONE YEAR, AFTER ACCEPTANCE. PROVIDE TEST REPORTS AND RISK ANALYSES.
D. NEW EXPANSIONS, OR RENOVATIONS TO EXISTING SYSTEMS SHALL BE PROVIDED WITH THE SAME QUALITY MATERIALS, DEVICES, CONSTRUCTION METHODS, ETC. AS THOSE WHICH ARE PRESENTLY INSTALLED, UNLESS OTHERWISE NOTED, USE ONLY EXISTING MANUFACTURER'S PRODUCTS.
E. MAIN PRIORITY OF ALL EXISTING SYSTEM OPERATIONS AND WIRING AT ALL TIMES ADVISE OWNER OF ANY AND ALL DISCONNECTIONS, REMOVALS AND SERVICE INTERRUPTIONS, PRIOR TO PROCEEDING WITH SAME. DO NOT LEAVE ANY SYSTEM OF SUB-SYSTEM UNOPERATIONAL, WITHOUT SUPERVISION PRESENT.
F. DEVICES INCLUDE BUT ARE NOT LIMITED TO:
1. DUCT SMOKE DETECTORS
2. PHOTOELECTRIC SMOKE DETECTORS
3. HEAT DETECTORS
4. VISUAL ONLY DEVICES: XENON STROBE LIGHT WITH CLEAR OR NOMINAL WHITE POLYCARBONATE LENS, THE WORD "FIRE" IS ENGRAVED ON THE LENS.
5. AUDIO/VISUAL ALARM DEVICES: ELECTRIC VIBRATING 24V DC HORN AND XENON STROBE LIGHT
G. THE OPERATION OF NEW MANUAL STATION OR ACTIVATION OF A NEW SMOKE/HEAT DETECTOR SHALL AUTOMATICALLY:
1. ACTIVATE THE CENTRAL STATION ALARM TRANSMISSION.
2. SOUND ALL AUDIBLE DEVICES THROUGHOUT THE BUILDING.
3. FLASH ALL ALARM STROBES THROUGHOUT THE BUILDING.
4. INTERCONNECT WITH HVAC EQUIPMENT AS REQUIRED TO FACILITATE FAN SHUTDOWN.
H. INSTALLATION
1. ENGAGE A LICENSED, FACTORY AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT, FIELD ASSEMBLE COMPONENTS AND CONNECTIONS; SUPERVISE PRE-TENSIONING, TESTING AND FINAL ADJUSTMENT OF THE SYSTEM; PREPARE FORMS FOR SYSTEMATIC RECORDING OF ACCEPTANCE TEST RESULTS.
2. PROVIDE EIGHT (8) HOURS OF TRAINING TO OWNERS MAINTENANCE PERSONNEL.
I. WIRING
1. INSTALL ALL SYSTEM WIRING IN METAL RACEWAY IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, IN SEPARATE METAL RACEWAYS (PDS OR EMT). DEVICES SHALL BE WIRED CLASS A BY CULVERT, AS REQUIRED TO MATCH EXISTING INSTALLATION.
2. COLOR CODING: USE ONE COLOR FOR ALARM CIRCUIT WIRING AND A DIFFERENT COLOR FOR SUPERVISORY CIRCUITS PER MANUFACTURER'S WIRING INSTRUCTIONS.
F. INSTALLATION
1. ENGAGE A LICENSED, FACTORY AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT, FIELD ASSEMBLE COMPONENTS AND CONNECTIONS; SUPERVISE PRE-TENSIONING, TESTING AND FINAL ADJUSTMENT OF THE SYSTEM; PREPARE FORMS FOR SYSTEMATIC RECORDING OF ACCEPTANCE TEST RESULTS.
2. PROVIDE EIGHT (8) HOURS OF TRAINING TO OWNERS MAINTENANCE PERSONNEL.
G. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH THE REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE: CATERBURY PYROTECHNICS, EDWARDS SYSTEMS TECHNOLOGY, SIMPLEX TIME RECORDER CO., NOTIFIER OR LIFE SAFETY.
ELECTRICAL SPECIFICATIONS
DRAWN BY: K.V.D. SHEET NUMBER:
SCALE: AS NOTED
DATE: 14SEP2020
JOB NUMBER: 3771
REVISIONS
DATE: ISSUED FOR CLIENT REVIEW
DATE: ISSUED FOR BID
1 11/06/2021
2 10/04/2021
3 09/04/2021

LIFE STORAGE, INC. Life Storage #497

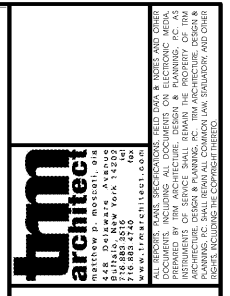
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ELECTRICAL SPECIFICATIONS

E9.0

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