

GENERAL ELECTRICAL REQUIREMENTS

RECEPTACLE SPACING	
HABITABLE ROOMS:	Within 6-feet of the edge of any door
	Not more than 12-feet apart along wall
	At all wall spaces 24" or more wide
KITCHEN:	Within 24" of edge of sink, range, refrigerator, and end of counter
	Not more than 4-feet apart along counter top
	At all counter spaces 12" or more wide
	At all kitchen island counter spaces
	At all kitchen peninsula countertops
	Not more than 20" above countertops
BATHROOM:	Within 3-feet of each basin
GARAGE:	A minimum of 1 receptacle required in garage
HALLWAY:	1 receptacle required for hallways 10-feet or more in length
OUTDOOR:	1 receptacle required at the front and back of dwelling, located less than 6-1/2 feet above grade
H. V. A. C.	1 receptacle within 25-feet on air conditioning unit.

G. F. C. I. RECEPTACLES	
KITCHEN:	All kitchen countertop receptacles must be GFCI protected
OUTDOOR:	All outdoor receptacles must be GFCI protected
GARAGE:	All general purpose garage receptacle must be GFCI protected
BATHROOM:	All bathroom receptacles must GFCI protected
WET BAR SINK:	Receptacles within 6-feet of sink must be GFCI protected
WORKSHOP:	Receptacles in grade level workshop/storage buildings must be GFCI protected

A. F. C. I. (ARC-FAULT) OUTLETS	
BEDROOM:	All bedroom/sleeping area outlets must be AFCI protected

BATHROOM CIRCUIT	
AMPERAGE:	Minimum of 1 – 20 amp circuit
DEDICATED:	Circuit supplying more than one bathroom cannot supply any fan, light, or receptacle, other than the bathroom receptacle(s)

WASHING MACHINE CIRCUIT	
SIZE:	20-amp circuit
DEDICATED:	Circuit cannot supply any light, receptacle, etc. other than washing machine receptacle

KITCHEN CIRCUITS	
SIZE:	20-amp rating for all kitchen receptacle circuits.
# OF CIRCUITS:	Minimum of 2 – 20 amp circuits to supply kitchen

WIRE AND BREAKER SIZES				
RECEPTACLES / APPLIANCES				
CIRCUIT TYPE		WIRE SIZE		BREAKER SIZE
General Purpose Outlets		12-2 with ground romex		20-amp 1-pole
		14-2 with ground romex		15-amp 1-pole
Kitchen Outlets		12-2 with ground romex		20-amp 1-pole
Washing Machine		12-2 with ground romex		20-amp 1-pole
Water Heater (4500 Watt)		10-2 with ground romex		30-amp 2-pole
Water Heater (< 4500 Watt)		12-2 with ground romex		20-amp 1-pole
Range		6-3 with ground romex		50-amp 2-pole
Dryer		10-3 with ground romex		30-amp 2 pole
HEAT / AIR CONDITIONING				
TYPE		RATING	WIRE SIZE	BREAKER SIZE
AIR HANDLER		7.5 KW	6-2 with ground romex	50-amp 2-pole
AIR HANDLER		10 KW	6-2 with ground romex	60-amp 2-pole
AIR HANDLER		15 KW	6-2 with ground romex	60-amp 2-pole
			10-2 with ground romex	30-amp 2-pole
AIR COND		3-TON	10-2 with ground romex	30-amp 2-pole
AIR COND		3-1/2 TON	8-2 with ground romex	40-amp 2-pole
AIR COND		4-TON	6-2 with ground romex	40-amp 2 pole
AIR COND		5-TON	6-2 with ground romex	50-amp 2 pole
WATER PUMP (COPPER WIRE)				
H. P.	VOLTS	WIRE LENGTH	WIRE SIZE	BREAKER
1/2 H. P.	120 VOLT	< 100 feet	10-2 with ground UF	20-amp
	120 VOLT	100 to 200 feet	8-2 with ground UF	20-amp
	120 VOLT	200 to 300 feet	6-2 with ground UF	20-amp
	240 VOLT	< 100 feet	12-2 with ground UF	15-amp
	240 VOLT	100 to 200 feet	12-2 with ground UF	15-amp
	240 VOLT	200 to 300 feet	10-2 with ground UF	15-amp
3/4 H. P.	120 VOLT	< 100 feet	10-2 with ground UF	30-amp
	120 VOLT	100 to 200 feet	6-2 with ground UF	30-amp
	120 VOLT	200 to 300 feet	#4 copper	30-amp
	240 VOLT	< 100 feet	12-2 with ground UF	20-amp
	240 VOLT	100 to 200 feet	10-2 with ground UF	20-amp
	240 VOLT	200 to 300 feet	8-2 with ground UF	20-amp
1 H. P.	120 VOLT	< 100 feet	8-2 with ground UF	30-amp
	120 VOLT	100 to 200 feet	6-2 with ground UF	30-amp
	120 VOLT	200 to 300 feet	#4 copper	30-amp
	240 VOLT	< 100 feet	12-2 with ground UF	20-amp
	240 VOLT	100 to 200 feet	10-2 with ground UF	20-amp
	240 VOLT	200 to 300 feet	8-2 with ground UF	20-amp

NAIL PLATES	
HOLES:	Required where edge of hole is less than 1-1/4 inch from face of stud.
NOTCHES:	Nail plates required over all notches for wiring.
P. V. C.	Required where PVC piping is less than 1-1/4 inch from face of stud.
STAPLES	
ATTICS	
SCUTTLE HOLE:	Wiring stapled to sides of rafters/ joists within 6-ft of the attic entrance.
SPACING:	Attic wiring must be stapled not more than 4-1/2 feet apart.
BOXES:	Wiring must be stapled within 12-inches of each box.
WALLS	
PLASTIC BOXES:	Wiring must be stapled within 8-inches of plastic wall boxes.
METAL BOXES:	Wiring must be stapled within 12-inches of metal wall boxes.
STUDS:	Wiring must be stapled 1-1/4 inch from the face of the stud.
SPACING:	Wiring must be stapled not more than 4-1/2 feet apart along studs.

EXPOSED WIRING	
WALLS:	Exposed wires in wall must be protected with PVC or EMT up to 8-ft above floor
ATTIC:	Protection required within 6-feet of scuttle hole (unless run on side of joist).
OUTSIDE:	Exterior wiring must be protected up to 8-feet above grade.

UNDERGROUND WIRING	
UNDER SLAB:	Must be in conduit (PVC) until outside of building.
BELOW GRADE:	Must be protected by conduit to a depth of 18-inches minimum.
ABOVE GRADE:	Must be protected by conduit up to 8-feet above grade.
BURIAL DEPTH	
SERVICE CABLE:	24-inches deep to top of cable
U. F. ROMEX	24-inches deep to top of romex
P. V. C.	18-inches deep to top of conduit
RIGID CONDUIT:	6-inches deep to top of conduit
DRIVEWAYS:	All wiring under driveways must be 24-inches deep minimum.

ALUMINUM WIRING	
CORROSION:	All aluminum wires must have oxidation inhibitor at terminations.
SPLICES:	Copper & aluminum can only be spliced with split bolt connectors rated for that use.

SMOKE DETECTORS	
WHERE REQUIRED:	<ol style="list-style-type: none"> 1. In each sleeping room. 2. Outside each sleeping area (in immediate vicinity). 3. Each story of the dwelling unit.
POWER:	Smoke detectors must be hardwired and have battery backup
WIRING:	Smoke detectors must be interconnected to activate all detectors at once

P. V. C.	
COLOR:	All electrical PVC must be gray in color and UL listed for electrical use.

FOOTER GROUND	
REBAR:	#4 ground wire must be connected to 20-foot length of rebar in footer and extended to the outside for connection to the ground rod.

LIGHTING	
CLOTHES CLOSETS	
OPEN BULB:	Open bulb incandescent fixtures are not allowed in clothes closets.
INCANDESCENT:	Enclosed incandescent fixtures must be at least 12" from storage areas.
RECESSED:	Recessed fixtures must be at least 6" from storage areas.
FLUORESCENT:	Fluorescent fixtures must be at least 6" from storage areas (shelves).

ATTICS:	
LIGHTS:	A switched light must be installed in all attics used for storage.
HVAC:	A receptacle and light is required in all attics containing HVAC equipment.

REQUIRED LIGHTING	
BATROOMS:	Wall switched light fixture required.
KITCHENS:	Wall switched light fixture required.
STAIRWAYS:	Light fixture required switched at top and bottom of stairs.
HALLWAYS:	Wall switched light fixture required.
GARAGES:	Wall switched light fixture required.
DOORWAYS:	Light fixture required at each exterior doorway.
OTHER:	Bedroom, living rooms, etc. may have switched receptacle instead of light.

4-WIRE CIRCUITS	
RANGE:	Ranges require a 4-wire circuit, 4-wire receptacle, and 4-wire cord.
DRYER:	Ranges require a 4-wire circuit, 4-wire receptacle, and 4-wire cord
SUB PANEL:	Sub panels require a 4-wire supply with a separate ground buss at sub panel.

GROUND ROD	
LENGTH:	8-feet long minimum.
GALVANIZED:	Galvanized ground rods must be 5/8" minimum diameter.
COPPER:	Copper ground rods must be 1/2" minimum diameter.
PIPE:	Galvanized pipe ground rods must be 3/4" minimum diameter.
CLAMP:	Ground clamps at, or below grade, must rated for below ground use.
DEPTH:	Ground rods must be driven full depth into earth.

120 VOLT COPPER VOLTAGE DROP TABLE						
Maximum Wire Length (Feet)						
Current Draw	Wire Size					
	14	12	10	8	6	4
5-amp	115	182	290	461	732	1165
10-amp	57	91	145	230	366	582
12-amp	48	76	121	192	305	485
15-amp	38	61	97	154	244	388
17-amp	-	54	85	136	215	343
20-amp	-	46	72	115	183	291
25-amp	-	-	58	92	146	233
30-amp	-	-	48	77	122	194
40-amp	-	-	-	58	92	146
50-amp	-	-	-	46	73	116

240 VOLT COPPER VOLTAGE DROP TABLE						
Maximum Wire Length (Feet)						
Current Draw	Wire Size					
	14	12	10	8	6	4
5-amp	229	364	579	921	1465	2330
10-amp	115	182	290	461	732	1165
12-amp	96	152	241	384	610	971
15-amp	76	121	193	307	488	777
17-amp	-	107	170	271	431	685
20-amp	-	91	145	230	366	582
25-amp	-	-	116	184	293	466
30-amp	-	-	97	154	244	388
40-amp	-	-	-	115	183	291
50-amp	-	-	-	92	146	233