

**MULTIFAMILY SERVICE LOAD CALCULATIONS
BASED ON THE 2008 NEC SECTION 220.84**

CONNECTED LOADS - NEC 220.84

TOTAL SQ FOOTAGE (9,000 SQ FT X 3 VA) = 27,000 VA
 APPLIANCE CIRCUITS (12 X 1,500 VA) = 18,000 VA
 LAUNDRY CIRCUITS (6 X 1,500 VA) = 9,000 VA

RANGES (4 ON ANY 2 PHASES) = 32,000 KVA
 PER PHASE DEMAND (32,000 VA ÷ 2) = 16,000 VA
 EQUIVALENT 3-PHASE LOAD (16,000 VA X 3) = 48,000 VA

DRYERS (4 ON ANY 2 PHASES) = 30,000 KVA
 PER PHASE DEMAND (20,000 VA ÷ 2) = 10,000 VA
 EQUIVALENT 3-PHASE LOAD (10,000 VA X 3) = 30,000 VA

WATER HEATER LOAD 15,000 VA
 MISC LOADS 7,200 VA
 LARGEST HEATING OR COOLING LOAD 24,000 VA
 TOTAL CONNECTED LOAD 178,200 VA

CONNECTED AMPS (178,200 VA ÷ 208 V ÷ 1.732) = 495 A
 DEMAND FACTOR NEC TABLE 220.84 = 44%
 ADJUSTED AMPS (495 A X 0.44) = 218 A
 HOUSE PANEL AMPS 0 A
 SUBTOTAL 218 A
 FUTURE FACTOR (218 A X 0.00) = 0 A
 SERVICE SIZE 218 A

KEY

- A - Amps
- AFC - Available Fault Current
- C - Conductor Constance
- CF - Conductor Factor
- CLC - Conductor Let Through Current
- CM - Conductor Multiplier
- L - Length
- MC - Motor Contribution
- N - Number of Conductors
- R - Resistance
- UA - Utility Adjustment
- V - Volts
- VA - Volt Amps
- VD - Voltage Drop

PROJECT NAME SAMPLE PROJECT
MAIN PANEL

NEUTRAL LOAD PER NEC 220.61

TOTAL SQ FOOTAGE (9,000 SQ FT X 3 VA) = 27,000 VA
 APPLIANCE CIRCUITS (12 X 1,500 VA) = 18,000 VA
 LAUNDRY CIRCUITS (6 X 1,500 VA) = 9,000 VA
 TOTAL CONNECTED NEUTRAL LOAD 54,000 VA

FIRST 3,000 VA @ 100% (3,000 VA X 1.00) = 3,000 VA
 3,000-120,000 VA @ 35% (51,000 VA X 0.35) = 17,850 VA
 OVER 120,000 VA @ 25% (0 VA X 0.25) = 0 VA
 SUBTOTAL 20,850 VA

RANGE DEMAND
 PROHIBITED REDUCTION NEC 220.61(C)(1)
 100% OF TABLE 220.55 (21,000 VA X 1.00) = 21,000 VA

DRYER DEMAND
 PROHIBITED REDUCTION NEC 220.61(C)(1)
 100% OF TABLE 220.54 (30,000 VA 0.75 VA X 1.00) = 22,500 VA

UNBALANCED 120 VOLT MISC. LOADS AT 100% 2,400 VA

NEUTRAL LOAD VA 66,750 VA

NEUTRAL LOAD (66,750 VA ÷ 1.732 ÷ 208 V) = 185 A

FURTHER DEMAND FACTOR - NEC 220.61(B)(2)
 FIRST 200 A @ 100% (185 A X 1.00) = 185 A
 REMAINDER @ 70% (0 A X 0.70) = 0 A

MINIMUM NEUTRAL CONDUCTOR AMPACITY 185 A

VOLTAGE DROP CALCULATIONS

(2 X 50' L X 0.0529 R X 218.0 A ÷ 1,000 X 0.866) = 1.0 VD
 (1.0 VD ÷ 208 V X 100) = 0.5 % VD

FAULT CURRENT CALCULATIONS

((30,000 AFC X 1.10 UA) + 0 MC) = 33,000 AFC
 (1.732 X 50 L X 33,000 AFC) ÷ (16,671 C X 1 N X 208 V) = 0.824 CF
 (1) ÷ (1 + 0.824 CF) = 0.548 CM
 (33,000 AFC X 0.548 CM) = 18,084 CLC