

**MULTIFAMILY SERVICE LOAD CALCULATIONS  
BASED ON THE 2023 NEC SECTION 220.84**

**CONNECTED LOADS - NEC 220.84**

TOTAL SQ FOOTAGE ( 3,000 SQ FT X 3 VA ) = 9,000 VA  
 APPLIANCE CIRCUITS ( 6 X 1,500 VA ) = 9,000 VA  
 LAUNDRY CIRCUITS ( 3 X 1,500 VA ) = 4,500 VA

RANGES ( 2 ON ANY 2 PHASES ) = 16,000 KVA  
 PER PHASE DEMAND ( 16,000 VA ÷ 2 ) = 8,000 VA  
 EQUIVALENT 3-PHASE LOAD ( 8,000 VA X 3 ) = 24,000 VA

DRYERS ( 2 ON ANY 2 PHASES ) = 15,000 KVA  
 PER PHASE DEMAND ( 10,000 VA ÷ 2 ) = 5,000 VA  
 EQUIVALENT 3-PHASE LOAD ( 5,000 VA X 3 ) = 15,000 VA

WATER HEATER LOAD 7,500 VA  
 MISC LOADS 3,600 VA  
 LARGEST HEATING OR COOLING LOAD 12,000 VA  
 TOTAL CONNECTED LOAD 84,600 VA

CONNECTED AMPS ( 84,600 VA ÷ 208 V ÷ 1.732 ) = 235 A  
 DEMAND FACTOR NEC TABLE 220.84 = 45%  
 ADJUSTED AMPS ( 235 A X 0.45 ) = 106 A  
 HOUSE PANEL AMPS 0 A  
 SUBTOTAL 106 A  
 FUTURE FACTOR ( 106 A X 0.00 ) = 0 A  
 SERVICE SIZE 106 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 ( 3,000 SQ FT X 3 VA ) = 9,000 VA  
 APPLIANCE CIRCUITS ( 6 X 1,500 VA ) = 9,000 VA  
 LAUNDRY CIRCUITS ( 3 X 1,500 VA ) = 4,500 VA  
 TOTAL CONNECTED NEUTRAL LOAD 22,500 VA

FIRST 3,000 VA @ 100% ( 3,000 VA X 1.00 ) = 3,000 VA  
 3,000-120,000 VA @ 35% ( 19,500 VA X 0.35 ) = 6,825 VA  
 OVER 120,000 VA @ 25% ( 0 VA X 0.25 ) = 0 VA  
 SUBTOTAL 9,825 VA

RANGE DEMAND  
 PROHIBITED REDUCTION NEC 220.61(C)(1)  
 100% OF TABLE 220.55 ( 14,000 VA X 1.00 ) = 14,000 VA

DRYER DEMAND  
 PROHIBITED REDUCTION NEC 220.61(C)(1)  
 100% OF TABLE 220.54 ( 15,000 VA 1.00 VA X 1.00 ) = 15,000 VA

UNBALANCED 120 VOLT MISC. LOADS AT 100% 1,200 VA

NEUTRAL LOAD VA 40,025 VA

NEUTRAL LOAD ( 40,025 VA ÷ 1.732 ÷ 208 V ) = 111 A

FURTHER DEMAND FACTOR - NEC 220.61(B)(2)  
 FIRST 200 A @ 100% ( 111 A X 1.00 ) = 111 A  
 REMAINDER @ 70% ( 0 A X 0.70 ) = 0 A

MINIMUM NEUTRAL CONDUCTOR AMPACITY 111 A

**VOLTAGE DROP CALCULATIONS**

( 2 X 50' L X 0.1590 R X 106.0 A ÷ 1,000 X 0.866 ) = 1.5 VD  
 ( 1.5 VD ÷ 208 V X 100 ) = 0.7 % 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 ) ÷ ( 7,187 C X 1 N X 208 V ) = 1.912 CF  
 ( 1 ) ÷ ( 1 + 1.912 CF ) = 0.343 CM  
 ( 33,000 AFC X 0.343 CM ) = 11,319 CLC

**Two Dwelling Unit NEC 220.85**

THE CALCULATIONS SHOW ABOVE ARE FOR THREE  
 DWEILLING UNITS AND MAY BE USED PER NEC 220.85