

RULE NO. 2
Character of Service

A. GENERAL

1. The character of service available at any particular location should be ascertained by the Company and will depend upon the size and nature of the customer's load.
2. Alternating current service of approximately 60-cycle frequency will be supplied.
3. Voltages referred to in the tariff are nominal and may vary within the limits set forth in Sec. B.3 of this rule.
4. The rate schedules in the tariff are applicable for service supplied from overhead facilities and for service supplied from underground facilities when underground facilities are provided in accordance with Rule Nos. 13 and 14.
5. The rate schedules in the tariff are applicable only for service where the customer purchases his entire electric energy requirements from the Company, except when such schedules provide otherwise.

B. PHASE AND VOLTAGE SPECIFICATIONS

The Company shall specify the available phase and service voltage for all customers. Customers who wish to install new load, either for a new service or additional load on an existing service, shall notify the Company before installing the new load and the Company will specify the available phase and service voltage for the new load. The Company may, for engineering and operating reasons, change the phase or service voltage, or both, for the existing equipment of a customer provided that no undue hardship will result.

1. Voltages Less Than 2 KV

a. Single-Phase Service

Single-phase service will be 3-wire 120/240 volts or in certain locations approved by the Company will be 3-wire 120/208 volts.

b. Three-Phase Service At 240 Volts or Less

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Three-phase service will be 3-wire 240 volts, or 4-wire 208Y/120 volts or 240/120 volts. Where three-phase service is supplied, the load shall be balanced on the three phases in accordance with good engineering practice.

c. Three Phase Service at 480 Volts or 2400 Volts

Customers with an aggregate connected load of 100 KVA or more or a motor rated 50 HP or more may be served at 3-wire 480 volts or 4-wire 480Y/277 volts. Customers with an aggregate connected load of 500 KVA or more or a motor rated 250 HP or more may be served at 3-wire 2400 volts.

d. Limitation on Number of Voltages

Electric service at only one nominal voltage level will be supplied for each class of service at any one location. In certain locations only single-phase 3-wire 120/208 volts and three-phase, 4-wire 208Y/120 volts or 480Y/277 volts service will be available and if such service is supplied to a building, services at other voltages will not be supplied to the same building. In all other locations, only one nominal voltage level will be supplied for each class of service. For this purpose the nominal voltage levels are:

2-wire, 1-phase, 120 volts
3-wire, 1-phase, 120/240 volts
3-wire, 1-phase, 120/208 volts

3-wire, 3-phase, 240 volts
3-wire, 3-phase, 480 volts
3-wire, 3-phase, 2400 volts

4-wire, 3-phase, 208Y/120 volts
4-wire, 3-phase, 240/120 volts
4-wire, 3-phase, 480Y/277 volts

e. In special circumstances service may be rendered under conditions other than those specified in this subparagraph 1, provided requests for service under such conditions are made in writing to the Company and are approved by the Company.

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2. Primary and Transmission Voltages

The nominal primary line-to-line voltages are 2.4, 4.16, 12.47, 13.8 KV and 24.94 KV. If service is rendered at any of these voltages by transformation from another primary voltage, then such service will be considered secondary for determining the charges in the rate schedules. Nominal transmission voltages are 34.5 and 69 KV.

Service will be supplied at primary or transmission voltage only under conditions specifically provided in the rate schedules. Where three-phase service is supplied, the load shall be balanced on the three phases in accordance with good engineering practice.

3. Voltage Limits

Voltage variations will normally be within the range specified in paragraphs a, b, and c below.

a. Secondary Voltages

For all service, except power service, the voltage variation will normally be no more than 5 percent above or below the nominal voltage. For power service the voltage variation will normally be no more than 7-1/2 percent above or below the nominal voltage. Where 3-phase service is provided the Company shall exercise reasonable care to assure that the phase voltages are in balance.

b. Primary Voltages

For service rendered at a primary voltage the voltage variation will normally be no more than 5 percent above or below the nominal voltage.

c. Transmission Voltages

For service rendered at a transmission voltage the voltage variation will normally be no more than 10 percent above or below the nominal voltage.

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d. Exceptions to Voltage Requirements

Voltage outside the limits specified above may be furnished when:

- (1) The customer, by contract, agrees to accept service with unregulated voltage.
- (2) The variations arise from the action of the elements.
- (3) The variations are infrequent fluctuations not exceeding 5 minutes duration.
- (4) The variations arise from service interruptions.
- (5) The variations arise from temporary separation of parts of the system from the main system.
- (6) The variations are from causes beyond the control of the Company.
- (7) Such fluctuations are caused solely by the load of one particular customer which does not affect the voltage of other customers in the vicinity.

C. MOTOR AND EQUIPMENT PROTECTION

Customer's motors and other equipment should conform with the following requirements:

1. Motors that cannot be subjected to full rated voltage on starting with safety to the customer's and the Company's equipment, or that drive machinery of such a nature that the machinery or the product it handles will not permit the motor to resume normal speed upon the restoration of normal supply voltage, should be equipped with devices that will disconnect them from the line upon failure of supply voltage and that will prevent the automatic reconnection of the motors upon restoration of normal supply voltage.

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2. All motors, single or three phase, should be equipped with thermal relays, fuses, or other automatic overcurrent interrupting devices to disconnect completely such motors from the line as a protection against damage due to overheating. It is recommended that such protection devices be installed in each conductor connected to three-phase motors to protect against overheating due to open phase or low voltage conditions.

3. Reverse phase relays are recommended on all polyphase installations where a reversal of rotation might cause damage to the equipment.

4. Any other equipment, apparatus or device that would be subject to damage from low or high voltage should be equipped with similar devices.

D. ALLOWABLE STARTING CURRENTS

Motor starting currents shall comply with the requirements tabulated below. If the starting currents exceed those listed in the tables, a current-limiting device must be used or other means employed to limit the current to that specified. Locked-rotor current as used in the following tables is defined as the steady state current taken from the line with the motor rotor or rotors locked, with all other power consuming components, including a current-limiting device, if used, connected in the starting position, and with nominal service voltage and frequency applied at the service entrance.

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Table 1 - Maximum Locked Rotor Current For Single-Phase Motors

| |
|--------------------------|
| 50 Amperes at 120 Volts |
| 110 Amperes at 208 Volts |
| 100 Amperes at 240 Volts |

Table 2 - Polyphase Motors Rated in Horsepower

| <u>Motor Rating</u> <u>in HP</u> | <u>Max. Locked-Rotor Amperes at Nominal</u> <u>Service Voltage</u> | | |
|-------------------------------------|---|-------------|-------------|
| | <u>208V</u> | <u>240V</u> | <u>480V</u> |
| Under 30 | 403 | 349 | 175 |
| 30 | 403 | 349 | 175 |
| 40 | 416 | 361 | 180 |
| 50 | 520 | 451 | 225 |
| 60 | 625 | 541 | 271 |
| 75 | 778 | 674 | 337 |
| 100 | 1041 | 902 | 451 |
| 125 | 1302 | 1129 | 564 |
| 150 | 1557 | 1350 | 675 |
| 200 | 2080 | 1803 | 902 |

For motors rated over 200 horsepower - see Notes 1 and 2

Table 3 - Polyphase Motors Rated in Running
Current without Horsepower Rating

| <u>208 Volts</u> | | <u>Nominal Service Voltage</u> <u>240 Volts</u> | | <u>480 Volts</u> | |
|--------------------------------|--|--|--|--------------------------------|--|
| <u>Rated</u> <u>Amperes</u> | <u>Max. Locked</u> <u>Rotor Amps.</u> | <u>Rated</u> <u>Amperes</u> | <u>Max. Locked</u> <u>Rotor Amps.</u> | <u>Rated</u> <u>Amperes</u> | <u>Max. Locked</u> <u>Rotor Amps.</u> |
| Below 100 | 403 | Below 90 | 349 | Below 45 | 175 |
| 100 | 403 | 90 | 351 | 45 | 176 |
| 150 | 585 | 100 | 390 | 50 | 195 |
| 200 | 780 | 150 | 585 | 75 | 293 |
| 250 | 975 | 200 | 780 | 100 | 390 |
| 300 | 1170 | 250 | 975 | 125 | 488 |
| 350 | 1365 | 300 | 1170 | 150 | 585 |
| 400 | 1560 | 350 | 1365 | 175 | 683 |
| 450 | 1755 | 400 | 1560 | 200 | 780 |
| 500 | 1950 | 450 | 1755 | 225 | 878 |
| 550 | 2145 | 500 | 1950 | 250 | 975 |

For motors rated over 200 KVA - see Notes 1 and 2.

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NOTES

1. Applications requiring motors rated more than 200 HP, more than 200 KVA or above 600 volts must be approved by the Company. For such applications, the Company may require that the customer furnish an increment starting device capable of limiting the current increment between successive steps to 3.3 amperes per running ampere and limiting the total current on any step to 6.0 amperes per running ampere.
2. In applications requiring motors requiring more than 450 HP, the Company will specify the service voltage. The customer will provide HP rating, full load current, speed, inertia and other pertinent data. It is the customer's responsibility to provide the appropriate equipment to insure motor starting.
3. When unusual circumstances exist and if system conditions permit, locked-rotor currents larger than those stated in Tables 1, 2, and 3 and in Note 1 may be used if approved by the Company. Any requests for permission to exceed the above listed starting currents or to apply a motor with a horsepower or voltage rating not covered in Tables 1, 2, or 3 must be made to the Company in writing, giving full details of the proposed installation including the locked-rotor current of the motor to be started and the motor nameplate data.
4. Current-limiting devices may be omitted on the smaller motors of a group installation when their omission will not result in a starting current that is in excess of the allowable starting current of the largest motor in the group.
5. Increment starting is considered to meet these rules, provided the following four conditions are met:
 - a. The current increment between successive steps does not exceed the values stated in Tables 1, 2, and 3.
 - b. The total current on any step does not exceed 154% of the values stated in Tables 1, 2, and 3;
 - c. The interval between steps is not less than one half of a second;
 - d. At no time is the circuit interrupted.

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6. Motor starting devices using open transition must limit the maximum current drawn during the starting period to the values stated in Tables 1, 2, and 3 and are limited to applications with motors rated 200 HP (200 KVA) or less.

7. Applications requiring motors rated 50 HP or more, shall be equipped with reduced-voltage starting equipment.

E. USAGE OF SERVICE DETRIMENTAL TO OTHER CUSTOMERS

The Company shall have the right to refuse to supply loads of a character that may impair service to other customers. In the case of motor starting, welding machines, x-ray machines, arc furnaces and other installations of like character where the use of electricity is intermittent or subject to substantial fluctuation, the customer shall provide at his own expense suitable equipment to reasonably limit such fluctuation or the Company may alter its facilities to correct such fluctuations and the customer shall make a contribution in the amount of the cost of alteration.

F. POWER FACTOR CORRECTION

Where neon, fluorescent or high intensity discharge lamps, welding transformers, x-ray machines and other devices including air conditioners having power factor below 85%, or non-utility self-generators with induction generators that are served by the Company, the customer shall provide at his own expense power factor corrective equipment to increase the power factor of the load to not less than 85%.

Customers served on rate schedules without power factor clauses maybe required by the Company to provide, at their own expense, power factor corrective equipment to increase their power factor to not less than 85%.

When a power factor adjustment provision is specified in a special service contract it shall supersede or modify the application of the power factor clause in the Company's rate schedule.

G. NOTICE OF CHANGE

The Company shall inform its customers of any change made, or proposed to be made, in the character of electric service supplied as would affect the efficiency or safety of operations of the appliances or equipment which may be in use by said customers.

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