

**RULE NO. 2**

**DESCRIPTION OF SERVICE**

A. GENERAL

1. The character of electric service available at any particular location should be ascertained by inquiry at the City's Electrical Engineering Division office.
2. The Rates, Rules and Regulations are applicable for electric service provided in a manner that is suitable for ease of operation and maintenance at the determination of the Utility.
3. Alternating current service of approximately 60-cycle frequency will be supplied.
4. Voltages referred to in the Rates, Rules and Regulations are considered standard nominal voltages.
5. Electric service will be supplied at one standard voltage as described in Paragraph B.1 below. Each service shall have a service main disconnecting device with an ampere rating equal to or less than the ampere rating of the terminating pull section or the service conductors. Where there are multiple services, the total ampere rating of all service main disconnecting devices including taps to the terminating pull section shall be equal to or less than the ampere rating of all service conductors.

B. PHASE AND VOLTAGE SPECIFICATIONS

1. Standard nominal voltages of the Utility are as follows:
  - a. Distribution voltages: 120, 120/240, 120/208, 277/480, 6,900, and 12,000 volts.
  - b. Voltages of 69,000 volts and above are transmission voltages. For its operating convenience, the City may elect to supply a Customer from lines of transmission voltage.
  - c. Where the City maintains four-wire wye-connected polyphase secondary mains: 120, 120/208, and 277/480 volts.

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**B. PHASE AND VOLTAGE SPECIFICATIONS (Continued)**

- d. Where the City maintains four-wire, delta-connected, polyphase, secondary mains: 120 or 120/240 volts.
- e. All customer-owned utilization equipment must be designed and rated in accordance with utilization voltages specified by the American National Standard C84.1 for customer equipment to perform satisfactorily.
- f. The utility system is designed and maintained to provide service voltage levels at the customer's main switch as specified by the American National Standard C84.1. The Utility has no control over the customer's utilization voltage that results from voltage drop in customer's wiring.
- g. While average voltages are maintained as described in Paragraph B.1.f. above, it must be recognized that short term voltage excursions (transients) exceeding these levels can occur as the result of normal systems operations (circuit switching, motor start-up, etc.). Equipment containing microprocessors or other sensitive electronic components can be damaged or otherwise rendered inoperative by such transients. It is the customer's responsibility to determine the suitability of the supplied power, and to provide any necessary power conditioning equipment.

**2. Single-Phase Service**

a.	<u>General Voltage</u>	<u>Minimum Connected Load Required</u>	<u>Maximum Connected Load Allowed</u>
	120 Volts	None	1-15 amp. and 1-20 amp. branch circuit
	120/240 Volts	None	600 amp. main switch
	120/208 Volts	None	100 amp. main switch

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**B. PHASE AND VOLTAGE SPECIFICATIONS (Continued)**

- b. The maximum size 120 volt single-phase motor allowed is 1 hp and the maximum size 240 volt, or higher voltage, single-phase motor allowed is 10 hp.
- c. Where the City maintains four-wire wye-connected 120/208 or 277/480 volt secondary mains, single-phase service is supplied at 120/208 volts, three-wire, for which the maximum allowed is a 100-amp main switch. Loads in excess of a 100-amp main switch will be supplied at 120/208 or 277/480 volts, three phase, four-wire.

**3. Three-Phase Service**

**a. General**

Voltage	Minimum Connected Load Required		Maximum Demand Load Allowed		Maximum Main Switch	
	OH	UG	OH	UG	OH	UG
120/240 Volts	15 KVA	*	150 KVA	*	400 A	*
120/208 Volts	15 KVA	45 KVA	225 KVA	1000 KVA	600 A	3000 A
277/480 Volts	30 KVA	45 KVA	225 KVA	3750 KVA	400 A	4000 A
12,000 Volts*						

\*Contact the Electrical Engineering Division of the Public Utilities Department

- b. Single Family Domestic Service. In areas where the City does not maintain three-phase secondary mains, only single-phase service will be supplied unless the applicant's load includes at least one motor rated in excess of 10 hp.
- c. Service to all loads of 1,000 KVA maximum demand, or over, must be approved by the City as to adequacy of facilities for service.
- d. Loads on three-phase service must be balanced between phases in accordance with good engineering practice.
- e. Three-phase service may be supplied to installations having a proposed main service switch in excess of the switch capacities specified above provided approval of the Utility first has been obtained as to the number and size of switches, circuits and related facilities. Such service will be supplied from two separate service connections at one location from one transformer location. Energy so supplied will be measured through one meter. The loads will be balanced as closely as practicable between the services.

**4. Combined Single-phase Service and Three-phase Service**

- a. Service may be combined at 120/208 volts four-wire, wye-connected where the Utility does not maintain four-wire secondary polyphase mains, provided (1) written application is made for such service by the customer; (2) the customer's load is of such a size as to require an individual transformer installation of not less than 15 KVA when supplied from the overhead system and 45 KVA when supplied from an underground system. Transformer capacity is based on load diversity as determined by the Utility; and (3) the customer provides space acceptable to the Utility on the premises to accommodate the installation of the Utility's facilities.

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**B. PHASE AND VOLTAGE SPECIFICATIONS (Continued)**

- b. Service may be combined at 277/480 volts four-wire wye-connected where the Utility maintains 120/208 volt or 240 volt secondary polyphase mains, provided: (1) written application is made for such service by the customer; (2) the customer's load is of such size as to require an individual transformer installation of not less than 30 KVA of transformer capacity when supplied from the overhead system and 45 KVA when supplied from the underground system. Transformer capacity shall be based on load diversity as determined by the Utility; and (3) the customer provides space acceptable to the Utility on the premises to accommodate the installation of the Utility's facilities.
  - c. Service may be combined at 120/240 volts four-wire delta-connected where the Utility does not maintain four-wire secondary polyphase mains, provided: (1) the customer's load is of such a size as to require an individual transformer installation of not less than 15 KVA of transformer capacity, as determined by the Utility and complies with paragraph 3-b above if applicable; (2) the imbalance between phases is less than 100 kW; and (3) the customer provides space acceptable to the Utility on the premises to accommodate the installation of the Utility's facilities.
  - d. The maximum demand allowances for combined single-phase and three-phase are set forth in B-3 above.
  - e. The minimum demand load for a three-phase padmounted transformer is 45 KVA for 120/208 volt service or 277/480 volt service.
  - f. All three-phase circuits not exceeding 250 volts shall have either a phase or neutral grounded and a four-wire polyphase service run to the customer's service entrance main switch.
5. At the option of the City, the above voltage and phase specifications may be modified because of service conditions at the location involved.

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**C. MOTOR PROTECTION AND EQUIPMENT**

Customer's motor equipment must conform with the following requirements.

1. Motors that cannot be subjected safely to full rated voltage on starting, or that drive machinery of such a nature that the machinery itself, or the product it handles will not permit the motor to resume normal speed upon the restoration of normal supply voltage shall 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.
2. All motors of 1 hp or larger shall 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.
3. Three-phase motors driving elevators, hoists, tramways, cranes, conveyers or other equipment, which would create hazard to life in the event of uncontrolled reversal of motor rotation, shall be provided with reverse-phase and open-phase protection to disconnect completely the motors from the line in the event of phase reversal or loss of one phase.
4. Wind machines thermostatically controlled with automatic reclosing switches must be equipped with suitable time-delay devices, such as hereinafter specified, at the customer's expense, to permit the required adjustment of the time of reclosure after interruption of service.

A suitable time-delay device, within the meaning of this rule, is a relay or other type of equipment that can be present to delay with various time intervals the reclosing of the automatic switches (and the consequent starting up of the electric motors on the wind machines) and to stagger the reconnection of the load on the Utility's system, and such device must be constructed so as effectively to permit a variable overall time interval of not less than five minutes with adjustable time increments of not greater than ten seconds. The particular setting to be utilized for each separate installation is to be determined by the Utility from time to time in accordance with its operating requirements, and the customer is to obtain from the Utility the setting for each installation as thus determined.

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**D. ALLOWABLE MOTOR STARTING CURRENTS**

1. The starting current drawn from the Utility's lines shall be considered the nameplate locked rotor current or that guaranteed by the manufacturer.

At its option the Utility may determine the starting current by test, using a stop ammeter with not more than 15% overswing or an oscillograph, disregarding the value shown for the first 10 cycles subsequent to energizing the motor.

If the starting current for a single motor exceeds the value stated in the following tables, reduced voltage starting or other suitable means must be employed, at the customer's expense, to limit the current to the value specified, except where specific exemptions are provided in Sections D.2,3, and 4.

TABLE 1 Alternating Current - Single-Phase Motors *		
Rated Size	Allowable Locked Rotor Currents	
	120 Volts	240 Volts
1 hp and less	50 amperes	36 amperes
1-1/2 hp		48 amperes
2 hp		60 amperes
3 hp		80 amperes
5 hp		120 amperes
7-1/2 hp		170 amperes
10 hp		220 amperes

\* Contact Electrical Engineering Division of the Public Utilities Department for additional motor ratings.

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**DESCRIPTION OF SERVICE**

D. ALLOWABLE MOTOR STARTING CURRENTS (Continued)

TABLE 2 Alternating Current - Three-Phase Motors		
Rated Size	Allowable Locked Rotor Currents	
	240 Volts	480 Volts
3 hp	64 amperes	32 amperes
5 hp	92 amperes	46 amperes
7-1/2 hp	127 amperes	63 amperes
10 hp	162 amperes	81 amperes
15 hp	232 amperes	116 amperes
20 hp	290 amperes	145 amperes
25 hp	365 amperes	183 amperes
30 hp	435 amperes	218 amperes
40 hp	580 amperes	290 amperes
50 hp	725 amperes	363 amperes
60 hp		435 amperes
75 hp		535 amperes
100 hp		725 amperes
Over 100 hp - The Utility should be consulted for allowable locked rotor currents or for additional motor ratings.		

2. Where service conditions permit, subject to Utility approval, reduced-voltage starters may be omitted in the original installation until such time as the Utility may order the installation of a reduced-voltage starter to be made, and, similarly, the Utility may at any time require starting current values lower than set forth herein where conditions at any point on its system require such reduction to avoid interference with service.
3. Reduced-voltage starters may be omitted on any motor of a group installation provided that its starting current does not exceed the allowable starting current of the largest motor of the group.
4. A reduced-voltage starter may be omitted on any motor in a group installation provided that its starting current does not exceed three times the maximum demand in amperes of the entire installation.

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**E. PROTECTIVE DEVICE COORDINATION**

Customer's protective relays, fuses, circuit breakers and other protective devices must comply with the following requirements:

1. All customer protective device operating times and circuit breaker trip element upper-bound trip times shall be a minimum of 0.25 seconds (15 cycles) less than the trip time of the Utility feeder protective relay settings for all current values between the customer service entrance rating and the maximum available fault current.
2. All customer fuse maximum fault clearing times shall be a minimum of 0.30 seconds (18 cycles) less than the trip time of the Utility feeder protective relay settings for all current values between the customer service entrance rating and the maximum available fault current.
3. Three-phase primary service customers shall submit protective device characteristics and/or relay calibration data to the Utility for approval prior to establishment of service.

**F. INTERFERENCE WITH SERVICE**

1. Customers who operate equipment which causes detrimental voltage fluctuations (such as, but not limited to, hoists, welders, radio transmitters, large motors, compressors, and furnaces) reasonably must limit such fluctuations upon request by the Utility. The customer will be required to pay for whatever corrective measures are necessary.
2. In the case of arc furnace installations not in excess of 100 KVA single-phase, or 300 KVA three-phase, the Utility may furnish energy at 240 or 480 volts, providing the customer permanently installs suitable equipment to limit secondary short-circuit current values to 300% of full load value. In the case of arc furnace installation in excess of 100 KVA, single-phase, or 300 KVA three-phase, the Utility may require the customer to provide, at his own expense, special furnace type transformers and reactors sufficient to limit secondary short-circuit current values to 300% of full load value. In such cases, the Utility shall furnish energy at standard voltages over 5,000 volts.
3. Any customer who superimposes a current of any frequency upon any part of his electrical system, other than the current supplied by the Utility, shall, at his own expense, prevent the transmission of such current beyond his electrical system.

**G. POWER FACTOR**

The Anaheim Public Utilities may require the customer to provide, at his own expense, equipment to correct the customer's operating power factor to between 90% lagging and 90% leading.

**H. WAVE FORM**

The Utility may require that the wave form of current drawn by equipment of any kind be in conformity with good engineering practice.

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**I. ADDED FACILITIES**

Added Facilities are considered to be existing, upgraded, or new services or facilities installed and/or used by the Utility at an Applicant's request, except in the instance of a School Applicant who shall install, own, maintain, and/or use the Added Facilities, in addition to the standard facilities, which the Utility would normally install or use, and which represent additional costs to the Utility over normally installed facilities. Added Facilities may include, but are not limited to, those facilities necessary to supply Preferred/Emergency Service, data monitoring services, or other non-standard services or facilities. Except where provided by Rate Schedule, authorization for or installation of Added Facilities will be made, provided the type of Added Facilities requested is acceptable to the Utility and the Utility agrees to the installation of the Added Facilities, under the following conditions:

1. The Applicant for Added Facilities is also an Applicant for Permanent Service or is a Customer for Permanent Service at the same location.
2. Prior to the Utility authorizing, in the instance of a School Applicant, or installing Added Facilities, the Applicant shall agree to pay for the Added Facilities in the amount determined by the Utility based upon the applicable costs of the services or facilities and, where applicable, ongoing maintenance. At its option, the Utility may finance the Added Facilities when these facilities require capital outlay for electric utility equipment or, in the instances of a School Applicant, when I.4 applies, subject to a creditworthiness evaluation. The amount financed by the Utility shall not exceed, on a per project basis, the Applicant's cumulative annual electric bill for all accounts over the duration of the repayment schedule for the capital outlay for electric utility equipment, and the Applicant shall be responsible for the associated financing costs as set forth in an Added Facilities worksheet mutually agreed to by the Applicant and the General Manager. The Utility may include the Added Facilities charges on the Applicant's Customer bill.
3. In the event that the Added Facilities are no longer requested by the Applicant, the Utility may charge the Applicant the balance owed on the cost of installed Added Facilities, less the estimated salvage value of equipment removed, if any.
4. The Utility may provide upfront capital funding assistance to a School Customer, as set forth in an Added Facilities worksheet mutually agreed to by the Applicant and the General Manager, to be used to pay for electric facility upgrades under the following conditions: (1) the upgrades are determined by the Utility to meet reliability, sustainability, or efficiency program parameters and are within budget allocations; (2) the repayment duration shall not exceed the estimated useful life of the upgrades; (3) the Applicant shall have documented site control of the facility where the upgrade is to be made; and (4) that facility shall be within the Utility's service territory.

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J. UNMETERED SERVICE

1. Except as provided below, all electric service provided by the Utility shall be metered and such metering shall conform to the requirements of the Rates, Rules and Regulations. Notwithstanding the foregoing, the Utility shall provide unmetered electric service to a Customer load where a Customer will own, operate and maintain the equipment to be provided service and the Utility's Electrical Engineering Division determines that any of the following is applicable:
  - a. It will be impractical to install a Meter at the requested location.
  - b. Electric service is for non-motor operated loads or non-building loads located in any street, highway, roadway, or right of way.
  - c. The low power demand and usage of the Customer's load will not register on a Meter.
2. For any Customer load subject to this Section J, the following requirements shall apply:
  - a. The Utility shall reasonably determine electric consumption from the manufacturer's specifications and operating characteristics of Customer's unmetered equipment.
  - b. The Point of Delivery shall be determined by the Utility at the time service is requested by the Customer.
  - c. The Customer shall allow the Utility to place seals on service enclosure covers, which protect unmetered energized conductors installed by the Customer, and Customer's equipment shall accommodate those seals as required and accessed solely by the Utility.
  - d. The Utility may perform on-site inspections to verify the energy consumption location and inventory of the equipment at any time.