

**COMMERCIAL
AND
INDUSTRIAL**

ARTICLE 4. COMMERCIAL AND INDUSTRIAL

SEC. 4.1 AVAILABLE ELECTRIC SERVICE FOR COMMERCIAL AND INDUSTRIAL (including five unit dwellings and larger)

Single-phase, 60 hertz, 120/240 volts, three-wire.

Three-phase, 60 hertz, 120/208 volts four-wire.

Three-phase, 60 hertz, 277/480 volts, four-wire.

Under certain conditions, primary service at three-phase, 60 hertz, 7200/12,470Y or 7620/13,200Y volts, four-wire.

An existing Customer who alters their service entrance to supply additional load must install equipment in compliance with the voltages above.

SEC. 4.2 GENERAL PROVISIONS

- A.** All new commercial and industrial services, customer-initiated upgrades, relocations, or modifications shall be placed underground.
- B.** Architects, engineers, contractors, builders, etc., are requested to consult with IPL in advance of developing plans/designs to obtain any special specifications and directions for the proposed service entrance. This may avoid delay and expense if carefully observed and followed.
- C.** To avoid expensive alterations later, the service entrance should be sized for future growth as well as for present requirements. It is the Customer's responsibility to install service equipment in accordance with NEC provisions as a minimum. An important provision of the current edition of the NEC is contained in Section 230-65 which recommends that "Service equipment shall be suitable for the short-circuit current available at its supply terminals." In order for architects, engineers and wiring contractors to select proper service equipment to meet NEC guidelines, the following information will apply to new installations.
 - 1. Available fault currents will vary with each installation. Inquiry for a particular location should be directed to IPL.

D. In apartments and other buildings where a number of meters are installed, each meter enclosure is to be clearly marked by the building owner, the Customer or their agent with a permanent identification of the apartment or space which it serves. General services and electric heat services must be similarly distinguished. The identification shall be permanently inscribed on the inside back of each meter enclosure near the meter socket clips. It is the responsibility of the building owner, the Customer or their agent to see that wiring in such locations is connected to the proper meter or meters. IPL will not render service until all meters are properly marked.

E. Area Development

1. Development of a commercial or industrial area will likely necessitate the installation of an underground distribution system for the entire area. The Customer of such an area should contact IPL prior to design of such a development.
 - a. The Customer is responsible for the cost and installation of all conduit, vaults and pads as may be required.
 - b. The Customer is required to provide and install landscaping consistent with Independence City Code, Art. 8.
2. Upon receipt of plans for a proposed development or by request of the Customer, IPL will specify the type of electric service available and location of proposed and existing Distribution System for use in the development. The Customer is required to construct the proposed commercial area development in accordance with the following:
 - a. **Provide IPL with complete “load data” before IPL agrees to type and characteristics of the proposed service.**
 - b. Complete all work in accordance with IPL’s Electric Service Policy, construction standards and electrical codes.
 - c. The Customer shall provide and install all conduit for all primary, secondary, lighting, and service conductors. The Customer shall provide and install all transformer pads and service pedestals (IPL will own and maintain primary, secondary and lighting conduits after they have been properly installed).
 - 1) Conduits may be required beyond the customers property. Such conduits and distance shall be determined by IPL.

- 2) All street crossing associated with new development shall be provided by the customer.
- d. IPL will install, own and maintain transformers and all primary secondary, and lighting conductors required to serve the Customer, and will terminate its conductors. The metering socket must be installed by the Customer at the location designated by IPL which is generally on the side of the building or transformer.
 - e. The Customer shall provide and/or describe at no cost to IPL, all rights-of-way and easements required for IPL's primary and secondary conductors, pad-mounted transformers, secondary pedestals and any other Facilities that may be required to serve the Customer. The grading must be within 6 inches of final grade, with lots pinned or staked and the easement cleared of all trees, stumps and obstructions before IPL begins construction. Excessive spoils (rock, tree, stumps, etc.) resulting from the installation of IPL's Distribution System will be the responsibility of the Customer to remove. Access for IPL vehicles shall be provided to all IPL Facilities prior to sodding, landscaping and fencing.
 - f. Complete all earth or rock removal and fill to final grade prior to trenching or boring for underground distribution system.
 - g. Excavate all rock and remove all brush or trees, as required to facilitate installation and maintenance of IPL's Distribution and Lighting System. (Specifically, the proposed facility route shall be cleared to ground level).
 - h. Take adequate precaution to assure that underground conductors, transformers and other equipment will not be damaged or disturbed in the course of other construction operations, and if damage should occur, to reimburse IPL for the cost of necessary replacement or repairs.
 - i. Pay amounts specified (if required) to IPL before construction of its proposed Distribution System.
 - j. Provide adequate drainage and landscaping to assure that IPL's Distribution System shall not be exposed due to erosion or excavation during developmental stages and if exposure should occur, to reimburse IPL for the cost of necessary replacement, repairs, or preventative measures.

3. Conduit Installation

- a. Conduits installed by the Customer for IPL use shall be installed according to the design provided by IPL. Revisions or field changes are not allowed unless prior written approval is provided by IPL.
- b. Such conduit shall be installed within dedicated utility easements.
- c. All PVC conduit joints must be glued together with PVC cement. Bands, clamps or other connecting devices are not allowed. Polyethylene conduit joints must be made with fittings designed for use with polyethylene.
- d. Conduit should be installed when grade is within 6 inches of final grade (except as otherwise provided in §3.2, D.2.b.).
- e. All conduit runs shall be continuous rigid electrical plastic (Schedule 40) without sharp bends or indentations. Conduits at transformers and pedestal locations shall turn up above grade. All primary conduit bends shall be rigid steel and have 36-inch radii and secondary conduit bends shall be rigid steel and have 24-inch radii. Primary conduit shall be buried a minimum of 30 inches from top of grade and secondary conduit shall be buried a minimum of 24 inches from top of grade. In solid rock, this may be reduced to 12 inches, provided 2 inches of concrete are installed above conduit. The Customer shall contact IPL for an open trench inspection. The trench shall not be backfilled until the conduit installation has been approved by IPL in writing. The Customer is to provide and install all conduit risers, meter sockets, and any other conduits necessary to complete the entrance in accordance with IPL standards. Open ends of conduit are to be capped or sealed. All conduit installed by the Customer shall have heavy duty string or nylon cord inside for IPL to install its cable pulling rope. The Customer shall backfill the trench after inspection of the conduit to within 36 inches of a pole or proposed equipment.
- f. All open ends of conduit shall be capped.
- g. All conduit shall be of proper size as noted on IPL construction drawing.
- h. Backfill shall be clean and adequately tamped to prevent future settling.
- i. Conduits at transformer, Service Pedestal and sectionalizer locations shall turn up as shown in Section 6. Long radius 36-inch rigid steel elbows shall be used for primary and 24 inch rigid steel elbows for secondary on all horizontal bends, such as around corners or at a change in direction.

- j. All conduits entering vaults shall be terminated, grouted, and provided with conduit end bells flush with the vault interior wall.
 - k. **TRENCHING BY THE CUSTOMER SHALL NOT BE PERFORMED WITHIN THREE (3) FEET OF EXISTING IPL FACILITIES.**
4. IPL will supply new buildings with underground secondary systems. In these cases IPL will furnish service at a point to be specified by IPL depending upon several factors including the Customer's electrical load requirements. The Customer may be required to furnish and install empty conduit to ensure the future reliability of underground service in the area via looped feed. Appropriate switches and protective devices are to be furnished by the Customer at the entrance to the building. The Customer shall consult with IPL regarding space requirements for its distribution and metering equipment prior to actual design and layout.

SEC. 4.3 METERING

- A. The Customer shall install an IPL provided meter socket enclosure at a location marked and approved by IPL's service inspector. Service shall be denied if an unapproved meter socket enclosure is installed. Current Transformer (CT) rated meter socket enclosures will be provided by IPL when required.
- B. Services requiring CT metering requires a ½ inch by 8-foot copper or copper clad steel ground rod as near as possible to the location of the meter socket enclosure. The upper end of the rod shall be flush with or slightly below grade. The meter socket enclosure shall be grounded to the rod using a solid bare copper wire at least #6 AWG. The use of combination meter socket enclosures will not be acceptable for any class of service.
- C. The Customer may purchase and install a prefabricated U.L. rated device that includes the meter socket. The Customer shall obtain approval from IPL of the installation prior to purchase of any equipment. In these cases, the Customer will own and maintain the meter socket and enclosure. IPL will own and maintain the meter.
- D. In multiple-occupancy buildings, each of the premises and common Facilities shall be individually metered. All meters shall be grouped at the same location and properly marked with the corresponding service switch. The building owner or its agent shall purchase and install prefabricated, package-type, multiple-metering and entrance equipment. The type and size of the equipment shall be approved in advance by IPL. All pulling space provided in the Customer's equipment for termination of IPL's service conductors shall conform to the size requirements set forth in the NEC covering pull boxes. In this case the building owner or their agent

shall own and maintain the meter sockets and enclosures and IPL will own and maintain the meters. The building owner or their agent shall maintain a supply of spare parts consisting of a minimum of one pair of meter blocks or four terminal clips for each twelve meters or fraction thereof for each size socket in each building. These are to be kept in a marked enclosure at each metering location in each building.

- E. Metering CT's will be furnished by IPL for installation by the Customer in the Customer's metering enclosure or as an integral part of:
1. Bus or bus extensions
 2. Switchgear
 3. Metering enclosure

Such CT's shall be installed with the polarity identification mark toward IPL source and shall be separate from other metering or control circuits.

- F. Metering CT's may be installed in IPL's pad-mounted transformers at IPL's discretion. Meters for such installations shall be mounted to the Customer's building. As a general rule, CT's cannot be installed in transformers that serve or have a high probability of serving multiple Customers. These installations may require the Customer to install metering enclosures.

- G. The size of the metering enclosure required will vary with the size of the entrance conductors and their routing through the enclosure.

1. **Table 2** lists suggested minimum size enclosures. Larger enclosures may be required. The Customer shall furnish the enclosure.

Entrance Size (Amperes)	Inside Size C.T. Enclosure
800 or less	30" x 36" x 10"
Greater than 800	36" X 48" x 12"

Table 2

2. **C.T. enclosures shall be readily accessible from ground level or floor level, to IPL personnel only and shall be a separate, hinged compartment with hasp for IPL lock. Enclosures shall not be used as splice boxes or raceways.**

H. The Customer shall furnish and install a 1-inch diameter conduit with sufficient pull boxes from the metering CT location to the meter socket. This conduit shall not exceed 65 feet in length without prior approval from IPL.

I. Meter Location

1. Meters shall be located outside where they will not be subjected to vibration, jarring, gasses, dust, fluids, etc., that may affect the accuracy of the meter.
2. Meters shall not be located above platforms that are not accessible by stairs. Ladders are not an acceptable substitute for stairs. When meters are located above platforms, the space in front of the meter shall be at least 36 inches wide and protected by suitable railings.
3. When meters are located in a passageway or narrow space, the clear space in front of the meter shall not be less than 36 inches.
4. For ease of reading meters, the center of the meter where no walk or driveway exists shall not be less than 42 inches nor more than 60 inches, and where a driveway or walk exists, shall be 78 inches above the final elevation.

SEC. 4.4 OVERHEAD SERVICE

A. Single Occupant Building - 200 Ampere

The Customer shall install an IPL provided meter socket enclosure, all conduit, and all conductors from the service entrance and equipment to the meter socket enclosure, a conduit riser weatherhead and service conductors to attach to IPL's service drop. IPL will furnish and install the service drop. The Customer's service conductors shall run from the meter socket enclosure through the service conduit riser with at least 24 inches of conductor extending from the weatherhead to provide for connection to the service drop with an adequate drip loop. IPL will make the connections to the Customer's service conductors and install the meter. The service conduit mast or service attachment shall be of a strength that is adequate for the span tension and of sufficient height to provide proper clearances for IPL's service drop.

B. Single Occupant Building - 400 Ampere and Larger

The Customer shall furnish and install a service conduit riser with a weatherhead and the service entrance conductors from the service entrance equipment. The service conduit riser or service hook shall be of a strength adequate for the span tension and of sufficient height to provide proper clearances for IPL's service drop.

C. Multi-Occupant Buildings

The Customer shall furnish and install an IPL approved meter socket enclosure, conduit and conductors from their service entrance and equipment to the meter socket enclosure, a conduit riser, weatherhead and service conductors. IPL will furnish and install the service drop to the building. The service conduit riser or service attachment shall be adequate for the span tension and of sufficient height to provide proper clearances for IPL's service drop. The Customer's service conductors shall run from the meter socket enclosure through the service conduit riser with at least 24 inches of conductor extending from the weatherhead to provide for connection to the service bus with an adequate drip loop. IPL will make the connections of the Customer's service conductors to the service bus and install the meter.

- D.** The Customer's service conductors shall extend at least 24 inches beyond the weatherhead to provide make-up length for IPL to install connections to its service drop. IPL will furnish and install its meter and metering cable. IPL will furnish metering CT's and the meter socket enclosure for the Customer to install. The Customer shall furnish and install the metering socket enclosure and conduit for the metering circuits. If circumstances prevent installation in this manner, the Customer shall contact IPL for alternate methods.

SEC. 4.5 UNDERGROUND SERVICE

- A.** IPL requires service lateral conductors installed by the Customer to be in conduit. The minimum depth to the top of the conduit shall be 24 inches. The depth may be reduced to 12 inches when installed in solid rock, providing 2 inches of concrete are installed above the conduit.
- B.** The Customer shall provide and install all primary, secondary and service conduit on the Customer's property which is required by IPL prior to the installation of its Facilities. The Customer shall also provide and install the vaults and equipment pads within the easements or right-of-ways designated for use by IPL and in accordance with standard IPL specifications. Underground conduit installed by the Customer shall be manufactured according to NEMA standards for Electrical Plastic Conduit.

C. Service entrance conductors shall conform to the following table:

<u>MAIN SIZE</u>	<u>MAX NUMBERS OF CONDUCTORS PER PHASE</u>
200 Ampere	1
400 Ampere	2
600 to 800 Ampere	3
1000 to 1200 Ampere	4
1400 to 1600 Ampere	5
1800 to 2000 Ampere	6

Table 3

D. Service conductors for services above 400 Ampere shall be no larger than 600 MCM, unless approved by IPL.

E. Service entrances above 2000 Ampere shall be bus duct suitable for attachment to IPL's equipment. The Customer shall request approval for bus duct entrances prior to development of final plans.

F. All installations where switchgear is used and installations larger than 1200 amperes require special consideration. IPL representatives will work closely with the Customer to develop a mutually acceptable plan. IPL should be contacted as early as possible to coordinate the work.

G. Commercial, Industrial and Multi-Family Dwellings (Five units and larger)

1. The Customer shall extend underground service lateral conductors to the low voltage compartment of IPL's pad-mounted transformer or designated equipment.
2. The transformer location shall be designated by IPL, near a paved area and accessible by vehicle for maintenance.
3. The Customer shall provide and install the necessary electrical plastic conduits (Schedule 40), without sharp bends or indentations, for IPL's primary conductors between the transformer and IPL's Facilities. A heavy duty pull string or nylon cord shall be provided in the conduit. IPL shall be given an opportunity to inspect these conduits prior to backfilling. Open ends of conduits are to be capped or sealed. Runs with bends or curves in excess of 50 feet must be installed with rigid steel 36 inch radius for primary and rigid steel 24 inch radius rigid steel elbows for secondary.

4. The Customer shall install the concrete pads, concrete pull boxes and the concrete bases as required for the transformer and other equipment as may be determined by IPL.
5. IPL will own and install all primary conductors and equipment and will make all terminations in the transformer.
6. If IPL's system is not on the Customer's property or at the Customer's property line, the Customer shall extend the conduit and underground service lateral conductors to the property line or a point designated by IPL.
7. IPL will not take title to, own or maintain any of the Customer's service lateral conductors or service Facilities that are located on the Customer's property.
8. Since metering methods vary considerably, the Customer shall contact IPL prior to construction and coordinate the details of meter location and equipment requirements.

SEC. 4.6 PRIMARY SERVICE (not available for residential class use)

- A.** Due to the variety of methods by which a Customer can take primary service, it is difficult to generalize as to specific requirements. IPL representatives will work closely with the Customer's architect and engineer to develop a mutually acceptable and economical design within the framework of IPL's rate schedules.
- B.** In general, however, the Customer shall provide, install and maintain all necessary lines, switches, transformers, secondary distribution systems and protective equipment on their premises. Primary protective equipment shall be approved by IPL to ensure coordination with its Distribution System.
- C.** The Customer shall provide space and Facilities for IPL to terminate its primary lines. Each primary service Customer shall be required to install a main disconnect switch and protective device at their property line.
- D.** Metering applications vary for primary service. Each situation shall be coordinated during design stages with IPL's representative.
- E.** The Customer shall supply IPL two copies of their substation drawings and equipment specifications before plans are finalized and before equipment is ordered.
- F.** At the time of construction, the Customer-owned substation shall comply with all current editions of IPL's standards or specifications. Copies of these specifications are available from IPL.