ROCK ENERGY COOPERATIVE

Empowering Members Since 1936

Commercial

Electric Service Installation

ROCK ENERGY COOPERATIVE

ELECTRIC METERING

COMMERCIAL ELECTRIC SERVICE INSTALLATION

GENERAL

The use of the name Rock Energy Cooperative (REC) refers to the electric utility operating in Wisconsin and Illinois.

PURPOSE

A. The purpose of these Electric Service Standards is to supply information to members, employees, architects, engineers, contractors, inspectors, and others concerned with the planning and construction of electric service installations in Rock Energy's service area. Rock Energy's objective is to cooperate and assist members to obtain safe and efficient electric service.

B. Information in these Electric Service Standards is intended to cover typical installations. Rock Energy shall be consulted when special consideration is required.

C. Before and during the planning stages for electric service, especially larger projects, members, their contractors, architects, and engineers should contact Rock Energy to avoid misunderstanding and unnecessary expenses. Rock Energy will assist in the planning, scheduling, and explain all applicable rates and rules. Early notification will prevent unnecessary delays and expense.

SCOPE

The scope of these installation standards is to provide information to assist in the design and construction of electric service installations. Information is provided to address the responsibilities for ownership, installation and maintenance of service equipment to accommodate installation of utility owned service drops, underground service laterals and the installation of member termination and metering facilities.

Information and requirements relating to sketches or other information contained in these standards are intended to aid contractors with the design, planning and installation of service facilities for their customers.

WORD APPLICATION

A. **"Shall"** denotes a rule or mandatory requirement which shall be followed.
B. **"Should"** recommends a desirable practice for a specific condition.
C. **"May"** indicates a possible option.
D. **"Access" or "Accessible"** requires member to provide keys or lock combinations to enter buildings, fenced areas, and/ or locked gates.

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ELECTRIC METERING

POINT OF SERVICE

The energy supplied by Rock Energy changes ownership at the point of service. This is the location where the members wiring starts and Rock Energy's ends.

A. The overhead point of service is where Rock Energy attaches its service drop to the Member owned attachment point on the building or structure, and where the Rock Energy conductor connects to the member owned conductor from the weatherhead.

B. The point of service for an underground service is located at the line side terminals of the meter socket (self-contained services) or the line side terminals of the CT Cabinet (CT rated services).

Note: For 3 phase services requiring a pad mount transformer, the member supplies, owns, and maintains the secondary conductor between the transformer and the point of service.

CODES AND RULES

Rock Energy requires that all member wiring installations meet the minimum requirements of the *National Electric Safety Code, National Electric Code, National Fuel and Gas Code (NFPA 54), Liquefied Petroleum Gas Code (NEPA 58), DOT Regulations,* and/or state and local codes when their requirements are more restrictive, including Wisconsin Administrative Code PSC 114 which Rock Energy follows in Wisconsin and Illinois service territories.

A. Rock Energy reserves the right to refuse to extend service where a member's installation does not comply with these provisions and requirements as stated.

B. Rock Energy shall de-energize any service when that service is found to be in an unsafe condition.

C. All meter sockets, meter pedestals, group meter assemblies, modular meter assemblies, CT and VT cabinets, and other electrical cabinets shall be listed by an independent testing agency (such as U.L.) for the specified voltage and amperage rating indicated and carry the testing agency's listing mark.

WIRING INSPECTIONS:

A. Members wiring installations shall meet the minimum requirements set forth by the State Regulatory Commissions and any local authority having jurisdiction. Rock Energy shall receive a written approval form from the Authority Having Jurisdiction.

B. Where no inspection authority exists, Rock Energy shall receive a signed copy of the Wiring Statement – Certificate of Electrical Inspection before energizing any new or rewired electric service. This statement must include the Master Electrician License Number.

C. Rock Energy reserves the right to inspect for compliance with these standards but assumes no responsibility for inspection of the member's installation.

ROCK ENERGY COOPERATIVE

ELECTRIC METERING

APPLICATION FOR SERVICE

Applications for a **new service** and/or **changes to an existing service** shall be in writing and made well in advance of the date service is required. This will permit Rock Energy to plan and schedule its work to provide service by the date required.

A. Application forms: The proper application for service must be submitted when applying for service.

B. Service Location:

1. The member shall, at this time, provide Rock Energy with the **projected demand load** information and the proposed **service entrance size** and **voltage requirements.** ***These are required fields.***
2. The member shall contact Rock Energy for assistance and approval when determining the service location on the building or where the structure supporting the service will be located.

C. Easements:

1. The member shall provide Rock Energy with a lot site plan which includes existing or future septic systems, wells, pools, decks, sheds, additions or other possible obstructions to the service conductor. Should the member require the service conductor be relocated after installation, the member will be responsible for all associated costs.
2. The member shall provide Rock Energy with a recorded copy of the Certified Survey or Plat plan of the property where the service is requested.
3. The member shall provide easements for services and/or distribution facilities where required.

D. Line Clearance:

The member shall be responsible for clearing any trees or brush which might inhibit the service installation or maintenance of Rock Energy facilities.

E. Wiring Inspections:

1. Members wiring installations shall meet the minimum requirements set forth by the State Regulatory Commissions and any local authority having jurisdiction. Rock Energy shall receive a written approval form from the Authority Having Jurisdiction.
2. Where no inspection authority exists, Rock Energy shall receive a signed copy of the Wiring Statement – Certificate of Electrical Inspection before energizing any new or rewired electric service. This statement must include the Master Electrician License Number.
3. Rock Energy reserves the right to inspect for compliance with these standards but assumes no responsibility for inspection of the member's installation.

F. Charges

Once we receive the application, Rock Energy will conduct a site visit, plan a route, and measure the route, then generate a construction invoice. After Rock Energy receives an approved wiring inspection, by the Authority Having Jurisdiction, and the construction invoice is paid in full with all codes and standards met, Rock Energy will move the project to the construction phase. Once a project moves to the construction phase, services are generally installed within 2 – 3 weeks.

ROCK ENERGY COOPERATIVE

ELECTRIC METERING

METERING FACILITIES

A. All residential meter sockets shall be ringless, equipped with a manual operated bypass (either horned (minimum) or lever locking jaw (preferred), have individual covers and Rock Energy approved. An individual self-contained 200-amp meter socket is the minimum allowed for an underground service.

B. Commercial meter sockets shall be ringless, equipped with a lever locking jaw bypass capable of carrying full rated continuous duty current, have individual covers, and Rock Energy approved.

C. Traffic Signals shall be considered a commercial service, requiring a lever locking jaw bypass capable of carrying full rated continuous duty current, have individual covers, and Rock Energy approved.

D. Permanent or added 5th terminals shall be member installed, horizontally, in the nine o' clock position. Permanent or added 6th terminals shall be member installed, horizontally, in the three o' clock position. All added terminals to the meter socket must be of the screw-in type and not plugged into the socket.

E. The billing rate to which a member is assigned determines whether a residential meter socket or commercial meter socket will be used.

F. All outdoor service raceway or cable connections to meter socket bases, meter enclosures, or switches shall be rain tight. Service conductor termination fittings in metering equipment shall be set screw type terminal lug connectors. These lugs shall be rated to accept conductor sizes from #6 to 350KCM. Rock Energy **does not** use compression fittings.

G. All instrument transformer cabinets shall be approved by Rock Energy. An approved list is available from Rock Energy for your specific service size.

H. Instrument transformer cabinets shall be sized based on the service size.

I. Instrument transformer cabinets will also have factory bus bars installed to accommodate bar style CT's installed by Rock Energy. **Rock Energy bar style CT's outside mounting hole distance is 10 7/8 inches.**

J. Short Circuit Current Rating (SCCR), Fault Current Ratings and Amperage Interrupting Current (AIC) do not apply to meter sockets unless the meter assembly contains breakers as a part of the assembly. Then the assembly must meet the SCCR requirements.

K. Meter sockets are required on all new services, including municipal street lighting and area lighting.

L. Grounding shall conform to NEC. Rock Energy ***requires*** all bonding conductors to be installed ***external*** of service equipment or metering equipment enclosures. **THE GROUNDING CONDUCTOR BETWEEN THE MEMBER'S SERVICE DISCONNECT AND THE GROUND RODS SHALL NOT PASS THROUGH THE METER SOCKET, INSTRUMENT TRANSFORMER CABINETS, OR THE UTILITY PORTION OF A METER MAIN PEDESTAL.**

M. Intersystem bonding – CATV, Satellite systems, and Telephone Companies shall bond to the grounding electrode system, if available. If the grounding electrode system is not readily available, bonding shall be done at the ground terminal bar in the main service entrance equipment (NEC 250.94 (2) or (3) only). This intersystem bonding shall not be done in or on the metering equipment. Rock Energy adheres to this policy in Illinois as well. Wisconsin is the jurisdiction of the PSC. (PSC 114.099)

ROCK ENERGY COOPERATIVE

ELECTRIC METERING

SERVICE INSTALLATIONS

A. The member furnishes and installs all meter sockets, ganged meter sets, instrument transformer cabinets, troughs, and other related metering equipment. Rock Energy will provide all meters, instrument transformers, and CT meter wiring. The member will install the 1 ½" – 2" galvanized rigid steel conduit, for the metering wires, between the CT cabinet and the meter socket.

B. The member is required to furnish the service panel, secondary conductor and all equipment on the load side of the meter. All installations must meet National and State Codes and REC specifications.

C. The member is required to furnish and install, between Rock Energy's transformer and the member's CT cabinet, properly sized secondary conductor(s) to accommodate the members service.

D. Rock Energy will terminate secondary conductors in the transformer.

E. Meter mounting devices shall be securely fastened to the supporting building or structure with rust-resistant fasteners. Certain structures may require the addition of a rust resistant reinforced mounting surface. Conduits and cables shall not be used to support wall mounted devices. In no case shall sockets be installed where they will be exposed to mechanical injury, excessive dust, excessive moisture, corrosive vapors, or vibrations.

F. Metering Equipment shall be accessible, at all times. The member shall furnish Rock Energy with a well-maintained access road, wide enough for truck traffic, to all metering equipment that is placed away from town roads. Example: Metering equipment at an irrigation pivot.

G. Meters and metering devices shall be mounted plumb and at such a height that the center of the meter is at a nominal height of 5 feet (+/- 6") above the final grade, except as follows:
Exception #1 – Group mounted meter sockets shall be mounted so that meters centers are between 2'-6" and 6' above final grade.
Exception #2 – Outdoor wall mounted, or free-standing meter pedestals shall be mounted so that meter centers are a minimum of 36" above final grade, while the bottom of the socket is 18" below final grade.
Exception #3 – Instrument rated meter sockets shall be installed so that meter centers are at a nominal height of 5 feet above final grade, plus or minus 6 inches.
Exception #4 – Flood zones. Rock Energy may grant a variance for height requirements in 100 year flood plain areas. A variance request shall be submitted to Rock Energy before any electrical work has begun. The requestor must supply 100 year flood plain documentation for the location and a design that conforms to OSHA Standards 1926.1052 and 1910.23 with the variance request. Rock Energy will not approve any meters heights beyond 3 feet above the 1000 year flood plain levels. Required unobstructed work areas shall be maintained on this and all meter installations.

H. Member owned equipment shall not be installed in meter sockets, instrument transformer cabinets, or termination cabinets that are sealed by Rock Energy.

I. All conduits entering the building shall be filled with duct seal to prevent moisture and condensation from entering the meter socket.

ROCK ENERGY COOPERATIVE

ELECTRIC METERING

LOCATION OF METERS

A. Rock Energy shall approve the location of all meters and metering equipment. The metering equipment shall be accessible, at all times, to Rock Energy representatives. If the electric metering equipment is ever enclosed behind a locked gate, locked fenced area or made inaccessible due to a building addition, the member shall furnish Rock Energy with a key or code to access the metering equipment.
B. The meter sockets, enclosures or cabinets shall be installed outdoors on a substantial building or structure.
C. Rock Energy **does not** allow meter sockets to be installed on enclosures or cabinets.
D. Rock Energy **does not** allow Current Transformers to be placed inside pad mount transformers or member's switchgear. Current transformer cabinets are required. **Contact Rock Energy for an approved list of CT Cabinets for your service size.**
E. Member shall provide a Test Switch Block for **ALL** CT rated services.
F. Meter sockets shall be positioned on the **latch side** of the CT cabinet (unless CT cabinet has two doors). **Contact Rock Energy for an approved list of Meter Sockets.**
G. Meter sockets shall be mounted at least 36" from the **hinge side** of any hinged door on the building.
H. When used for metering purposes, Rock Energy requires all yard pole meters, field built metering structures, or free-standing metering pedestals, to be installed so the meter faces an area (usually a driveway) that will accommodate motor vehicle access to the meter. This will allow the meter to be read from the vehicle if necessary.
I. If a self-contained meter is installed at a location other than a building, or farm distribution center, over current protection and grounding shall be required at the metering point.

IDENTIFICATION OF METERS

For multiple metering installations (two or more), each meter position shall be marked on the outside of the socket or by the breaker (if available) with the address of the unit served. This marking shall also be placed on the corresponding distribution panel(s). The external marking shall be a **permanent self-sticking brass or engraved rigid plastic label** with minimum ½ inch block letters or numbers, suitable for the location so as to be considered permanent. A permanent marking shall also be inside the meter socket base in a visible location. Meters will not be installed until this requirement is met.

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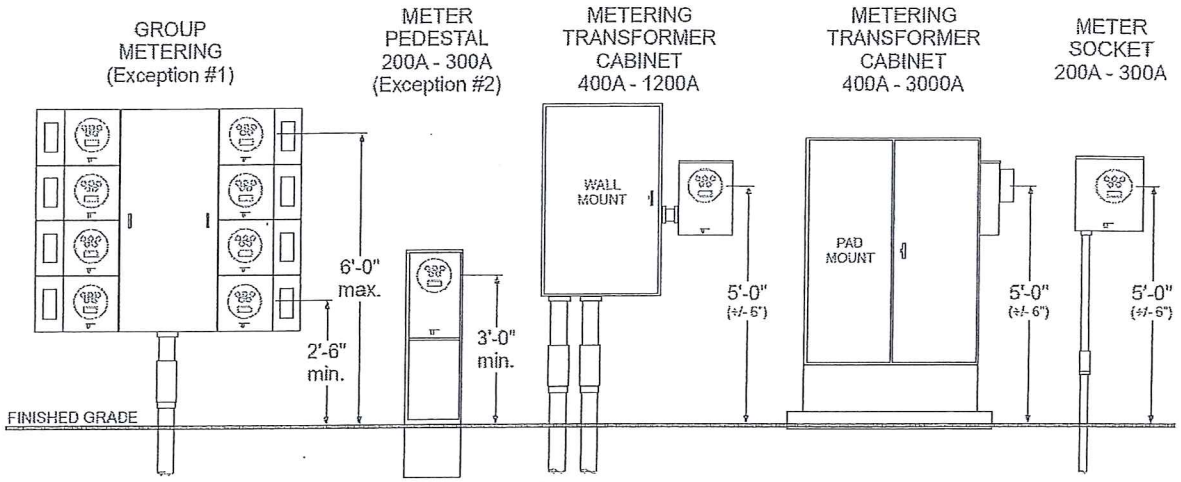
ELECTRIC METERING

METERING INSTALLATIONS



A. Equipment

1. Member furnishes and installs:
   - Meter sockets
   - Ganged meter sets
   - Meter test switch
   - Metering transformer cabinets
   - Cable tray or raceway
   - 1" – 1 ½" conduit for instrument transformer wiring
   - Any other related metering equipment
2. Rock Energy furnishes and installs
   - Meters
   - Instrument transformers (CT's and PT's)
   - Instrument transformer wiring

B. Meter mounting devices shall be securely fastened to the supporting building or structure with non-corrosive fasteners. Conduits and cables shall not be used to support wall mounted devices. Meter sockets or cabinets shall not be installed where they will be exposed to mechanical damage, excessive dust, excessive moisture, corrosive vapors or vibrations.

C. Member owned equipment shall not be installed in any cabinets that are sealed by Rock Energy.

NOTES:

1. In Illinois, Exposed Secondary Conduits MUST be Rigid Steel, Rigid Aluminum, or Galvanized IMC.
2. Member shall provide a Metering Current Transformer Test Switch for ALL CT rated services. The preferred Test Switch configuration is shown here:

Preferred 10-Pole Test Switch Configuration									
P	P	P	Pn	C+	C	C+	C	C+	C

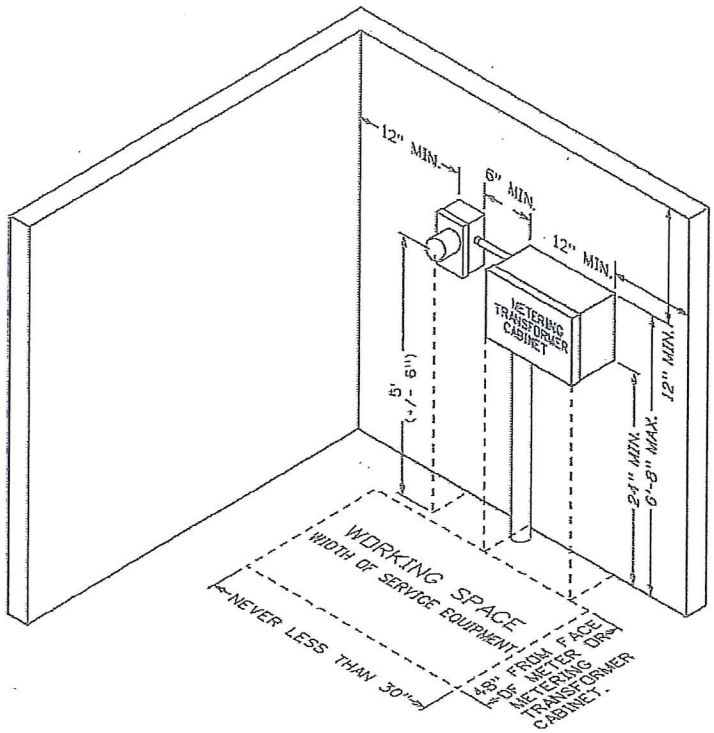
ROCK ENERGY COOPERATIVE

ELECTRIC METERING

CLEARANCE REQUIREMENTS FOR METERING EQUIPMENT

Rock Energy requires a minimum of 48 inches working space in front of each meter, meter cabinet, or instrument transformer cabinet.

UNOBSTRUCTED WORK AREA



NOTES:

1. Workspace is measured out 48" from the face of the meter or door(s) of the cabinet and a minimum 30" wide.
2. A minimum 6" vertical and horizontal separation shall be maintained between metering equipment and other obstructions or non-metering equipment. (NESC 125)
3. The space shall be large enough to allow cabinet doors to open 90 degrees.
4. The space shall be clear from final grade to at least 6'6" (8' preferred) above the ground.
5. An area of at least 30" in width shall be provided to access the work area.
6. This work area shall not be used for storage.

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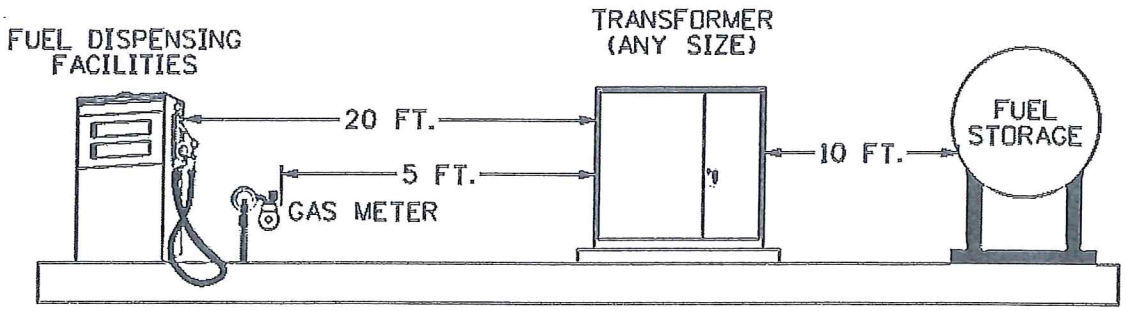
PAD-MOUNT TRANSFORMER LOCATIONS

- Rock Energy shall approve the location of all transformer pads.
- Transformer pad locations shall be in accordance with the requirements of **NEC, NESC, National Fire Protection Association (NFPA), Environmental Protection Agency (EPA) and any state or local requirements**.
- Pad-mounted transformers are to be located far enough from the building overhang so they will not be subject to damage by falling snow and ice.
- Pad-mounted transformer locations shall be graded for proper drainage and be readily accessible by truck or other means for change-out.
- Where danger of snow plowing or traffic damage exists, barriers consisting of concrete filled pipe shall be provided for protection.
- Strict adherence to clearance requirements is required in all cases.

Clearance to Fuel Equipment

1. Transformers shall have a minimum separation of 5-feet from gas service equipment.
2. A minimum separation of 5-feet shall be maintained between transformers and liquid petroleum facilities on site but not filled on site.
3. If the liquid petroleum facilities are filled on site, the minimum separation is 10-feet.



ROCK ENERGY COOPERATIVE

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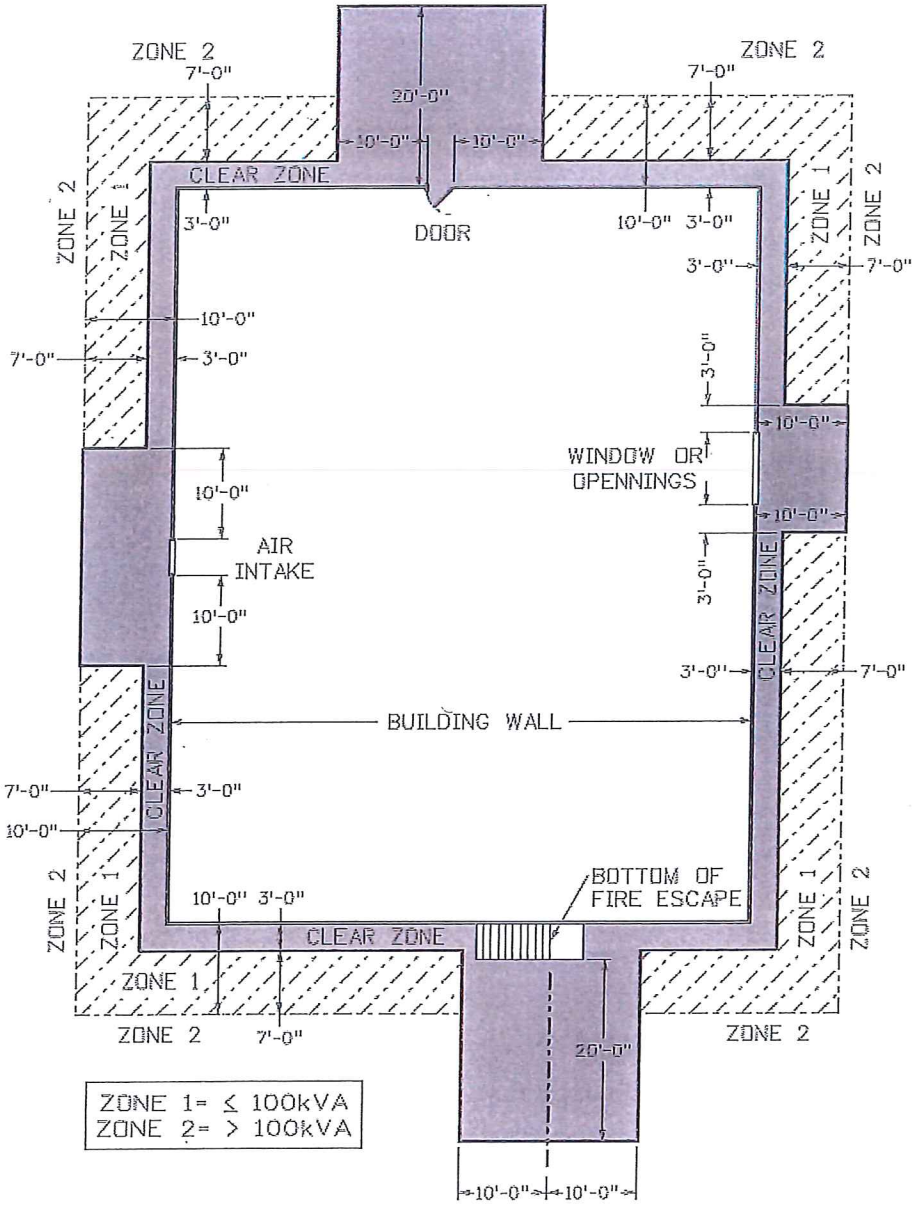
PAD-MOUNT TRANSFORMER LOCATION MAP



Notes:

Clear Zone: (Grey Area) = No transformers shall be located in this zone

Zone 1: (Shaded Area) = Minimum distance for pad-mounted transformer up to 100 kVA

Zone 2: Minimum distance for pad-mounted transformers greater than 100 kVA from a combustible building

An oil-collecting sump shall be installed for transformers over 500kVA if the immediate terrain is pitched toward the building.

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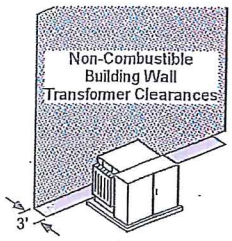
NON-COMBUSTIBLE BUILDING WALLS

A non-combustible wall is one that will not ignite, burn or support combustion when subject to fire or heat. Non-combustible walls are made of non-combustible materials, such as Portland cement concrete, full size brick or stone, hollow concrete block or steel.

Metal skinned wood framed buildings are considered to be combustible.

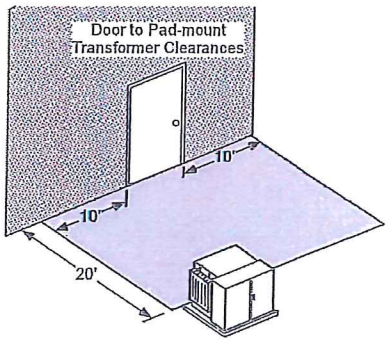
A non-combustible wall shall have not less than a 3 hour fire-resistance rating with all openings in the wall protected with 3 hour rated fire door assemblies. Reference Wisconsin's State Electrical Code SPS 316.



Pad-Mount oil insulated transformers shall be located a minimum of 3-feet away from non-combustible walls. The following clearances shall also be maintained from doors, windows and other openings:

1. Doors:

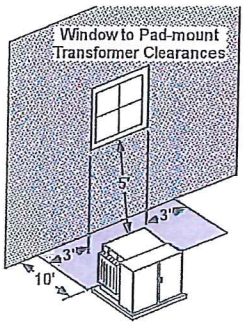
   Pad-Mount oil insulated transformers shall not be located within a zone extending 20-feet outward and 10-feet to either side of the building door.



2. Windows or Openings Other than Air Intake:

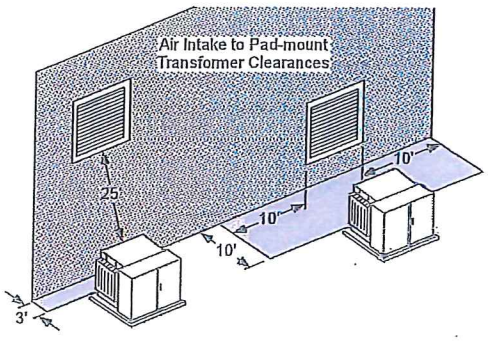
   a) Pad-Mount oil insulated transformers shall not be located within a zone extending 10-feet outward and 3-feet to either side of a window or opening other than an air intake.

   b) Pad-Mount oil insulated transformers shall not be located less than 5-feet from any part of a second story window or opening other than an air intake.



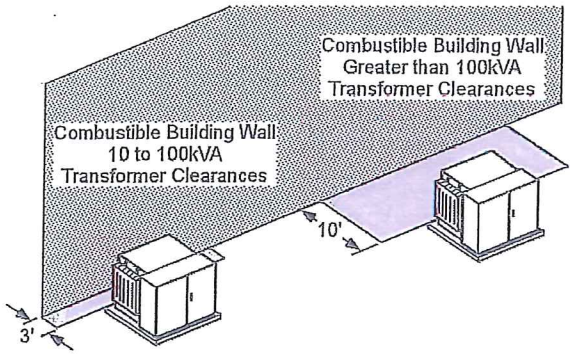
3. Air-Intake Openings:

   Pad-Mount oil insulated transformers shall not be located within a zone extending 10 feet outward and 10 feet to either side of an air intake opening. Transformers may be located within the zone beneath an air intake opening provided there is a minimum 25 feet diagonal separation between the transformer and the opening.



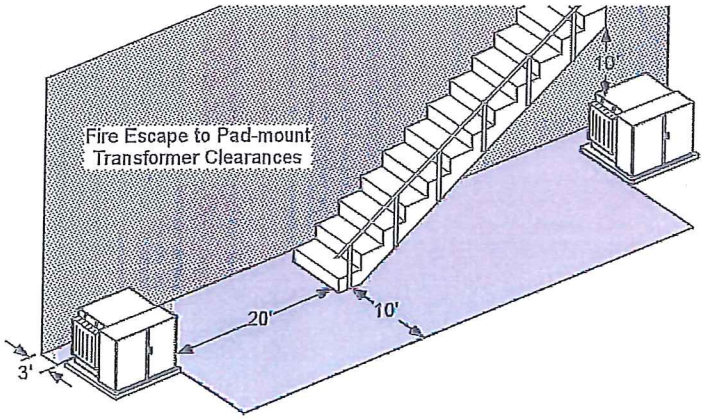
COMBUSTIBLE BUILDING WALLS

1. Pad-mount oil insulated transformers in sizes up to and including 100 kVA shall be located according to the provisions set forth in the Non-Combustible Buildings Walls
2. Transformers greater than 100 kVA shall be located a minimum of 10-feet from a combustible wall. Also, the clearances from building doors, windows and other openings set forth for non-combustible walls shall be maintained.
3. An oil-collecting sump shall be installed for transformers in sizes exceeding 500 kVA if the immediate terrain is pitched toward the building.



Fire Escapes

Pad-mount oil insulated transformers shall be located such that a minimum outward clearance of 20-feet and a minimum clearance of 10-feet to either side of the point where the fire escape touches the ground shall be maintained at all times. If the pad-mount transformer is located under the fire escape, a vertical clearance of 10-feet shall be maintained.



PSC 114.317 Outdoor location of oil–insulated padmounted transformers near buildings. [Follows NESC 316, p. 236] (Addition) Add the following section:

PSC 114.317 Outdoor location of oil–insulated padmounted transformers near buildings.

A. Noncombustible and Combustible Walls

For the purposes of this section, combustible walls are walls of Type No.V buildings as determined by Wisconsin Building Code (Construction Classification IBC Chapter 6). All other walls are considered to be non–combustible.

B. Noncombustible Walls

Padmounted oil–insulated transformers may be located directly next to noncombustible walls if the following clearances are maintained from doors, windows and other building openings.

1. Padmounted oil–insulated transformers shall not be located within a zone extending 6.1 m (20 ft) outward and 3.0 m (10 ft) to either side of a building door. See Figure PSC 114–317B1.

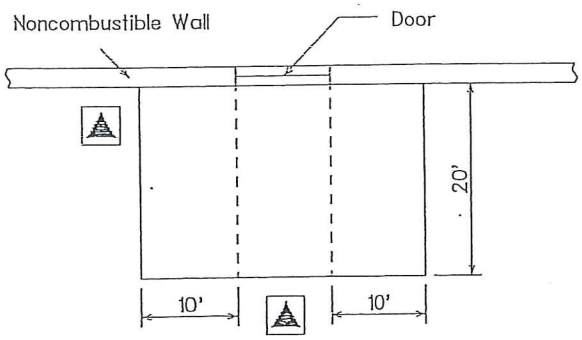


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Figure PSC 114–317B1.

2. Padmounted oil–insulated transformers shall not be located within a zone extending 3.0 m (10 ft) outward and 3.0 m (10 ft) to either side of an air intake opening. Such transformers may be located within said zone beneath an air intake opening provided there is not less than 7.6 m (25 ft) diagonal separation between the transformer and said opening. See Figure PSC 114–317B2.

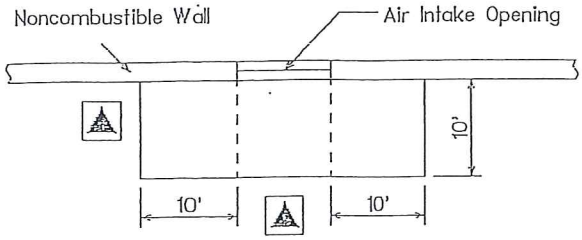

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Figure PSC 114–317B2.

3.a. Padmounted oil–insulated transformers shall not be located within a zone extending 3.0 m (10 ft) outward and 0.9 m (3 ft) to either side of a building window or opening other than an air intake. See Figure PSC 114–317B3a.

Exception: This does not apply to a glass block or fire window meeting the requirements of the Wisconsin Commercial Building Code (Fire Window IBC Chapter 7, Section 714.3).

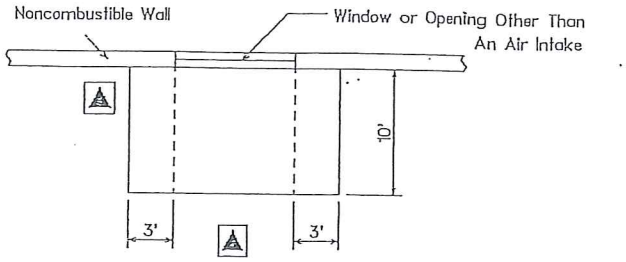

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Figure PSC 114–317B3a.

3.b. For second story windows, the transformer shall not be located less than 1.5 m (5 ft) from any part of the window. See Figure PSC 317B3b.

Exception: This does not apply to a glass block or fire window meeting the requirements of the Wisconsin Commercial Building Code (Fire Window, IBC Chapter 7, Section 714.3).

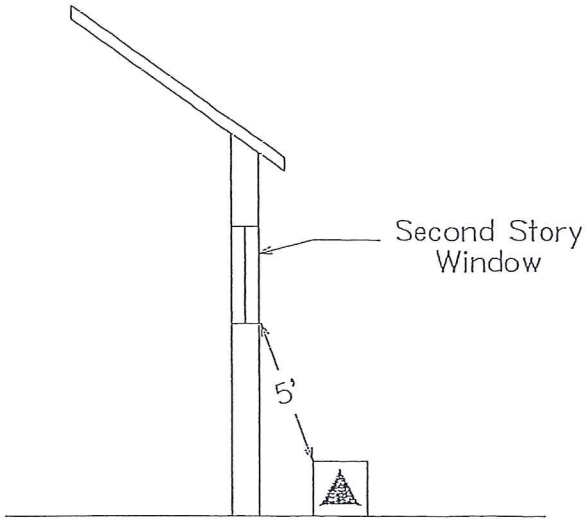

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Figure PSC 114–317 B3b.

C. Combustible Walls

1. Padmounted oil–insulated transformers in sizes up to and including 100 kVA shall be located according to the provisions set forth in Subsection B for noncombustible walls.

2. Padmounted oil–insulated transformers in sizes above 100 kVA shall be located a minimum of 3.0 m (10 ft) from the building wall in addition to the clearances from building doors, windows and other openings set forth for noncombustible walls. Also, a sump shall be installed for transformers in size exceeding 500 kVA if the immediate terrain is pitched toward the building.

D. Barriers

If the clearances specified in PSC 114.317 cannot be obtained, a fire–resistant barrier may be constructed in lieu of the required separation. The following methods of construction are acceptable:

1. Noncombustible Walls

The barrier shall extend to a projection line from the corner of the padmounted transformer to the furthest corner of the window, door or opening in question. The height of the barrier shall be 0.3 m (1 ft) above the top of the padmounted transformer. See Figure PSC 114–317D1.

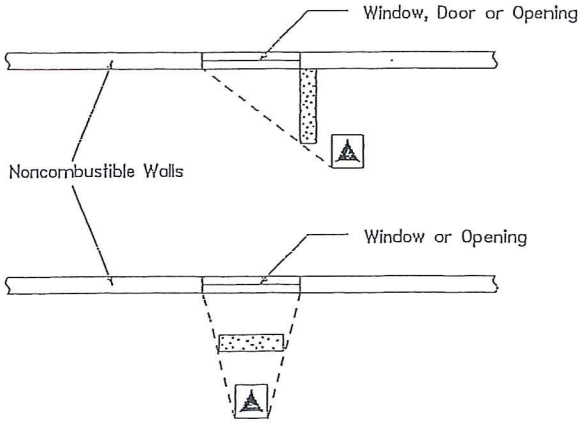

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Figure PSC 114–317D1.

2. Combustible Walls

The barrier shall extend 0.9 m (3 ft) beyond each side of the padmounted transformer. The height of the barrier shall be 0.3 m (1 ft) above the top of the transformer. See Figure PSC 114–317D2.

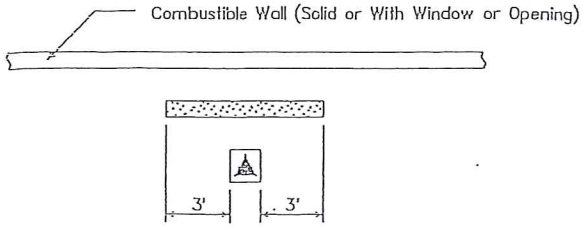

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Figure PSC 114–317D2.

E. Fire Escapes

1. Padmounted oil–insulated transformers shall not be located within a zone extending 6.1 m (20 ft) outward and 3 m (10 ft) to either side of the point where a fire escape meets the ground. See Figure PSC 114–317E1.

2. Padmounted oil–insulated transformers located beneath fire escapes shall have a vertical clearance of not less than 3 m (10 ft) from the top of the transformer to the bottom of the fire escape. See Figure PSC 114–317E2.

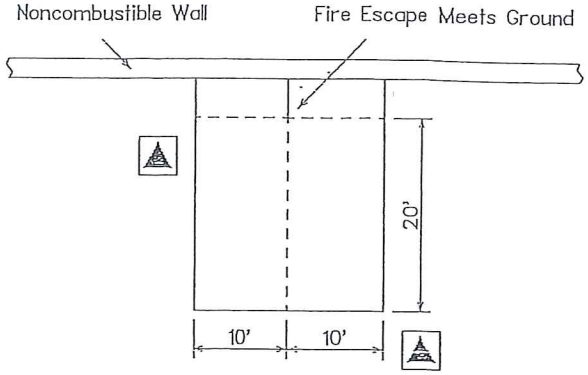

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Figure PSC 114–317E1

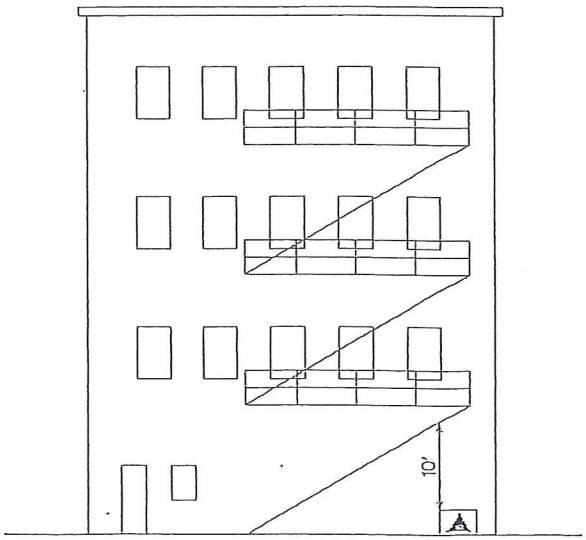

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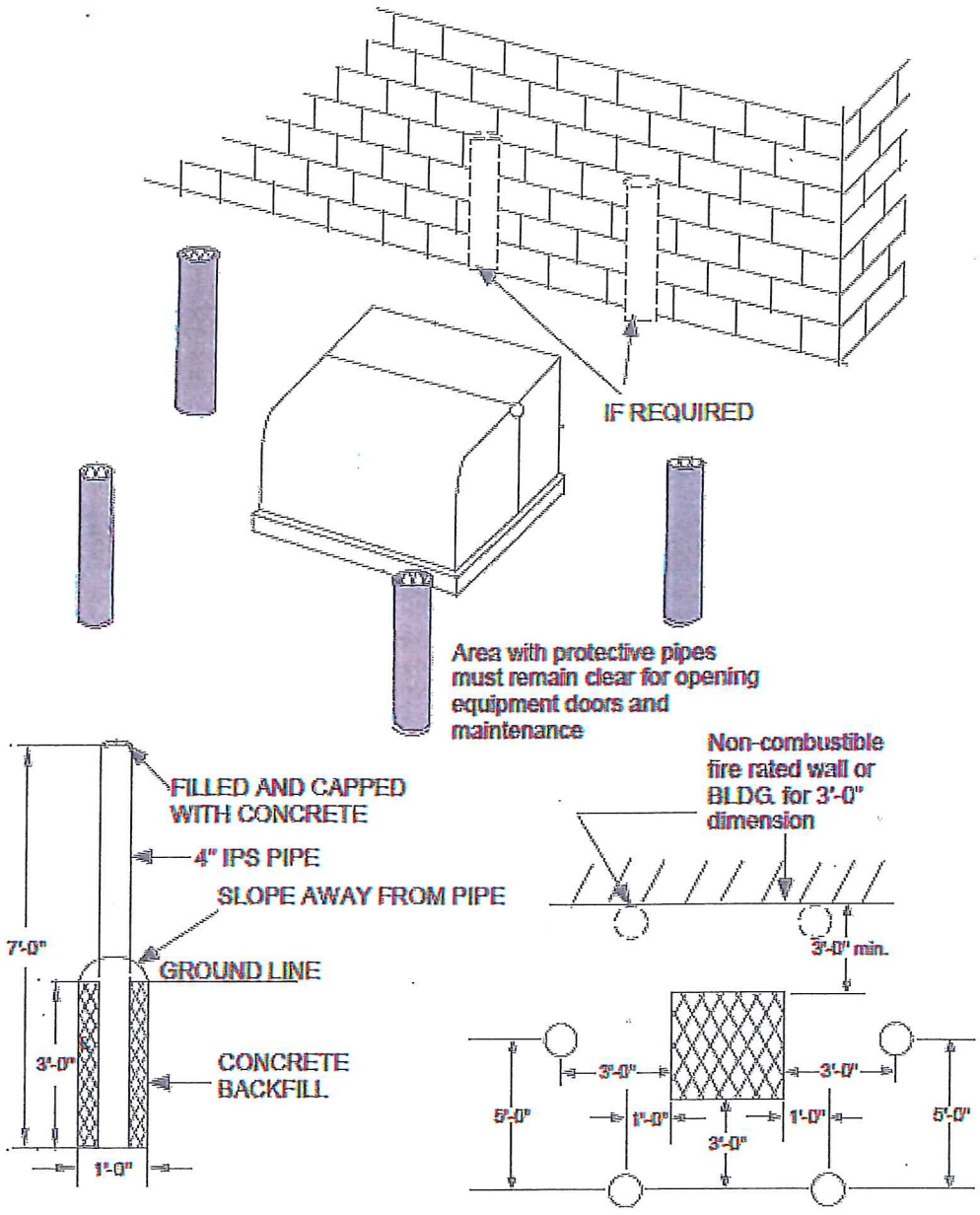
Figure PSC 114–317E2

History: CR 07–021: cr. Register January 2008 No. 625, eff. 2–1–08; CR 13–0 r. and recr. Register June 2014 No. 702, eff. 7–1–14.

ROCK ENERGY COOPERATIVE

ELECTRIC METERING

SINGLE-PHASE, PAD-MOUNT TRANSFORMER PROTECTION

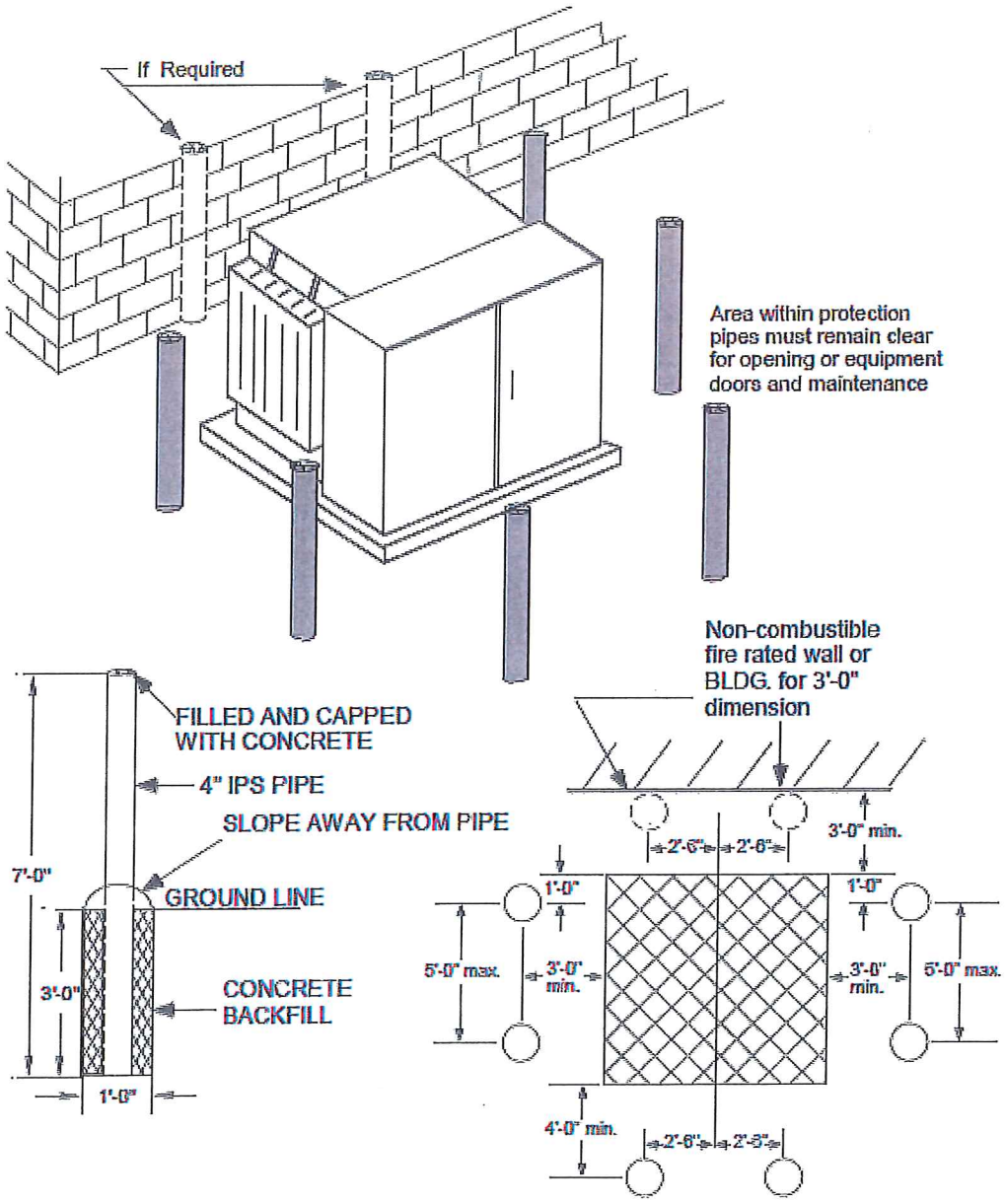


Transformer protection required as requested by Rock Energy.

ROCK ENERGY COOPERATIVE

ELECTRIC METERING

THREE-PHASE, PAD-MOUNT TRANSFORMER PROTECTION

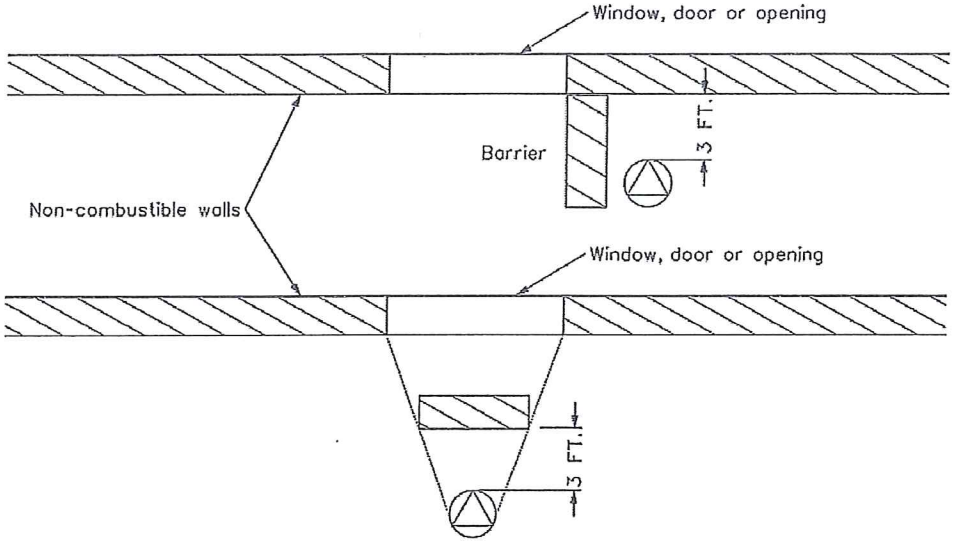


Transformer protection required as requested by Rock Energy.

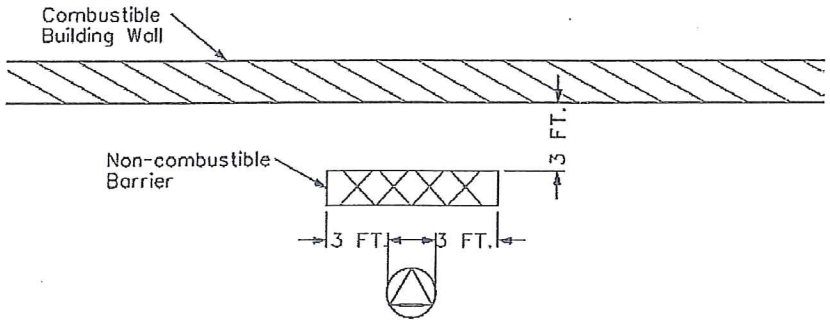
BARRIERS

If the clearances specified above cannot be obtained, a fire resistant barrier may be constructed in lieu of the separation. The following methods of construction are acceptable.

A. Non-combustible walls – The barrier shall extend to a projection line from the corner of the pad-mount to the farthest corner of the window, door or opening in question. The height of the barrier shall be 1 foot above the top of the pad-mount transformer.



B. Combustible walls – The barrier shall extend 3-feet beyond each side of the pad-mount transformer. The height of the barrier shall be 1-foot above the top of the pad-mount transformer.



C. A barrier is not an acceptable solution to Air-Intake opening clearance requirements.

ROCK ENERGY COOPERATIVE

ELECTRIC METERING

RIGID CONDUIT

A. "Rigid Conduit" includes rigid galvanized steel, rigid aluminum, galvanized IMC, or rigid non-metallic conduit schedule #80 PVC electrically rated and schedule #80 equivalent polyethylene. The rigid non-metallic conduit shall conform to specifications in Article 342, 344, and 352 of the National Electric Code. Refer to individual sections for specific installations. "Galvanized steel conduit" may be either rigid steel or galvanized intermediate metal conduit (IMC). It shall not be electric metallic tubing (EMT).

B. Schedule #40 electrically rated PVC is allowed for horizontal runs 18" below final grade and into pad mount transformers and pad mount cabinets.

C. The table shown below is to be used by Rock Energy personnel, as a general guide to determine the number of conduits and conduit sizes for the listed service. The sizes and numbers of these facilities may have to be modified to take into account the length of the lateral, the member loads, and any voltage drop considerations that may apply.

UNDERGROUND THREE-PHASE (25 ft max.)

Main Service Disconnect Amperes	Number of Conduit	Conduit Size	Min. Radius Bend Galvanized Steel	Min. Radius Bend Rigid Non-Metallic
100	1	3"	13"	24"
200	1	3"	13"	24"
300	1	4"	13"	24"
400	2	4"	16"	30"
600	2	4"	16"	30"
800	3	4"	16"	30"
1200	5	4"	16"	30"
1600	4	5"	24"	36"
2000	5	5"	24"	36"
2500	7	5"	24"	36"
3000	8	5"	24"	36"

NOTES:

1. All PVC service elbows shall be sweeps, and preformed.
2. For longer conduit runs containing three or more bends, the Member shall consult with Rock Energy for the conduit size, and for the radius bend to use.

ROCK ENERGY COOPERATIVE

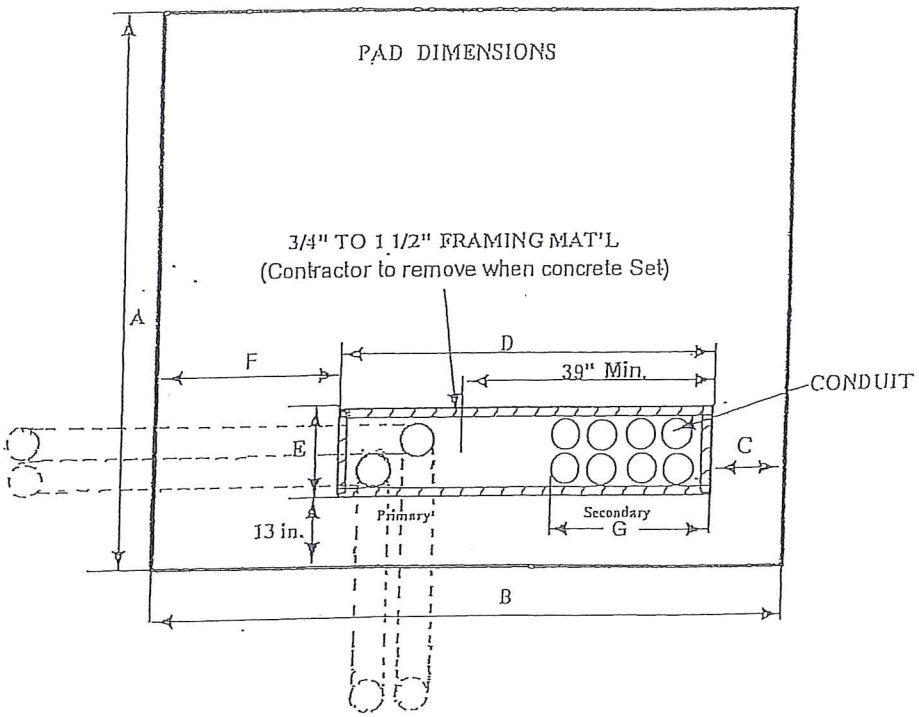
ELECTRIC METERING

PAD SPECIFICATIONS FOR THREE-PHASE, PAD MOUNT TRANSFORMERS 75 – 2500 KVA

A. The member shall install, own, and maintain a concrete transformer pad whenever the underground service requires a three phase transformer pad.

B. A clear space of **10 feet** (minimum) shall be maintained in front of the transformer to provide working space for hot-stick operation of the transformer.

C. Additional transformer pad foundation wall shall be used for locations having poor soil conditions or a large number of secondary cables.



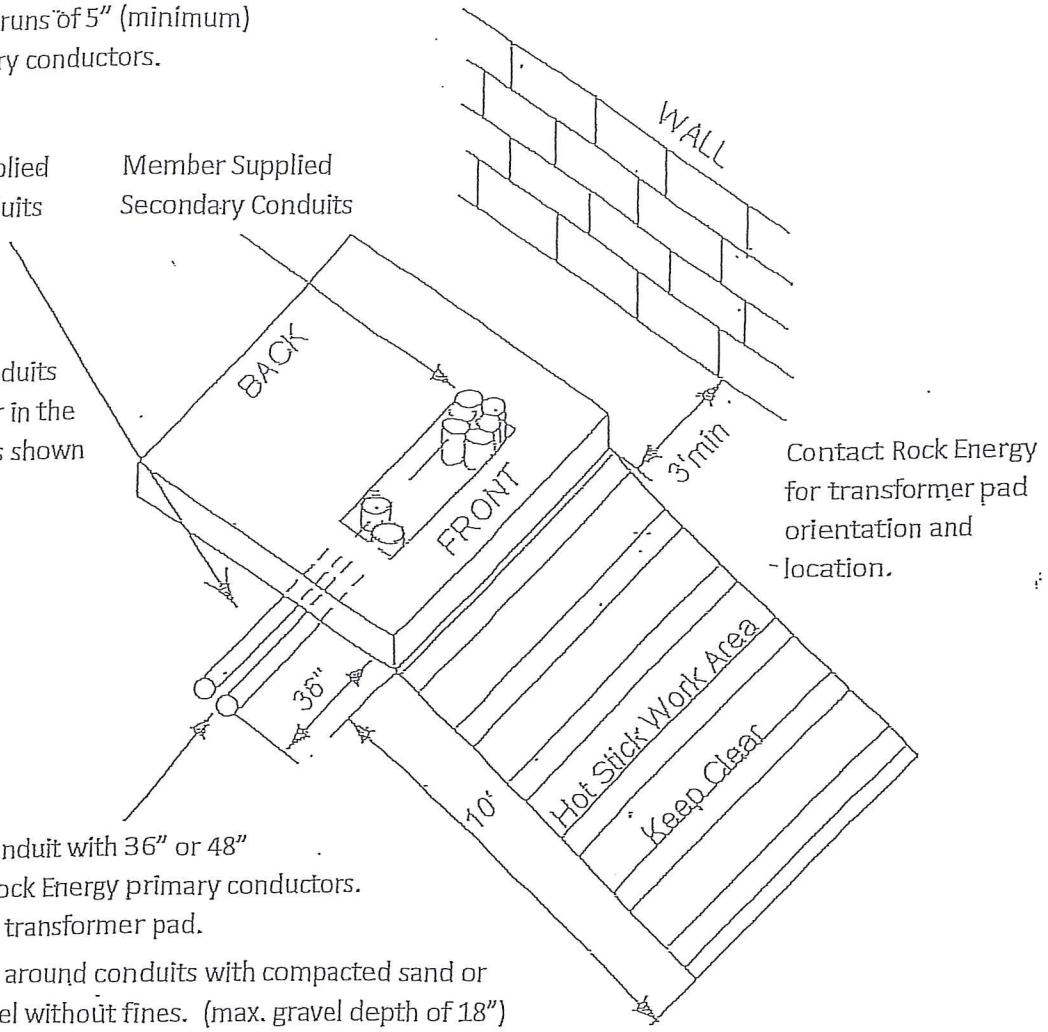
PAD	TRANSFORMER	SERVICE SIZE		PAD SPECIFICATIONS IN INCHES							
	KVA	208Y/120	480Y/277	A	B	C	D	E	F	G	THICKNESS
		AMPS	AMPS								
I	75-500	100-1200	100-600	84	96	10	55	17	31	22	6
II	750-2500	1600-3000	800-3000	105	108	14	60	17	34	27	8

ROCK ENERGY COOPERATIVE

ELECTRIC METERING

PAD LAYOUT FOR THREE-PHASE, PAD MOUNT TRANSFORMERS 75 – 2500 KVA

*** Rock Energy REQUIRES 2 runs of 5" (minimum) conduit for the primary conductors.



*** Primary and Secondary conduits MUST be grouped together in the transformer pad window as shown

Contact Rock Energy for transformer pad orientation and location.

Plug ends of conduit.
Mark ends of conduit with a stake.
Label stake "conduit"

Contractor to install primary conduit with 36" or 48" preformed sweep elbows for Rock Energy primary conductors. Conduits to extend 36" beyond transformer pad.

Backfill area around conduits with compacted sand or "clean" gravel without fines. (max. gravel depth of 18")

NOTES:

1. REC may require Primary Conduits to extend farther than the noted 36 inches. Contact REC for site visit to determine conduit length requirements.
2. All conduits shall enter through the window opening provided in the pad foundation. These conduits shall be cut off so the top of the conduit is flush with the surface of the concrete pad.
3. All metallic conduits shall be fitted with an insulated bushing.
4. When an oil sump is required, excavate 18" under, and around the pad, and fill with coarse crushed rock. Check with local building code to determine if an oil sump is required.
5. Concrete mix shall have a minimum strength of 4000 lb/sq in after 28 days.
6. The top of the pad shall be level and all edges and corners rounded off.
7. The pad shall be reinforced with #4 wire, 4" x 4" welded mesh or equivalent materials with additional 3/8 reinforcing rods around the cable opening. The mesh shall not be less than 1" from the edges and opening, and 3" below the surface. If the #4 wire, 4" x 4" mesh is not available, 2 layers of #10 wire, 6" x 6" mesh, horizontally staggered, may be substituted for the #4 wire.

ROCK ENERGY COOPERATIVE

ELECTRIC METERING

BONDING CONDUCTOR SIZING

A. Equipment bonding conductors on the supply side of service shall be sized according to NEC 250.102C. These tables shall be used as a guide in determining the minimum size for equipment bonding conductors for metering installations.

B. Tables assume 75°C temperature ratings for service entrance conductors, with no adjustment factor for more than three current-carrying conductors. On a 3-phase 4-wire wye service where the major portion of the load consists of nonlinear (harmonic) loads, the neutral shall be considered as a "current-carrying" conductor (NEC310.15(B)(5)(c)); in such cases, a larger equipment-bonding conductor shall be used.

Aluminum Bonding Conductor Table

Metering	Service Entrance	kcmil	NEC Table	Number of Runs	Total Ampacity	Service Entrance	Bonding	Minimum Wquipment Bonding	
Amps	AL	kcmil	Amps, per run	Runs	Amps	kcmil	kcmil	AL, AWG/kcmil	Cu, AWG/kcmil
Notes:		(5)	(4) (6)					(1)* (2)**	(3)
400	250	250	205	2	410	500	63	** 1/0	#2
	350	350	250	2	500	700	88	** 3/0	1/0
600	250	250	205	3	615	750	94	** 3/0	1/0
	350	350	250	3	750	1050	131	** 4/0	2/0
800	250	250	205	4	820	1000	125	** 4/0	2/0
	350	350	250	4	1000	1400	175	** 4/0	2/0
1200	350	350	250	5	1250	1750	219	** 4/0	2/0
	500	500	310	4	1240	2000	200	* 250	3/0
	600	600	340	4	1360	2400	300	* 350	4/0
1600	350	350	250	7	1750	2450	306	* 350	4/0
	500	500	310	6	1860	3000	375	* 400	250
	600	600	340	5	1700	3000	375	*400	250
2000	350	350	250	8	2000	2800	350	* 350	4/0
	500	500	310	7	2170	3500	438	* 600	350
	600	600	340	6	2040	3600	450	* 600	350
2500	750	750	385	7	2695	5250	656	* 750	500
	1000	1000	445	6	2670	6000	750	* 750	500
3000	750	750	385	8	3080	6000	750	* 750	500
	1000	1000	445	7	3115	7000	875	* 1200	700

Copper Bonding Conductor Table

Metering	Service Entrance	kcmil	NEC Table	Number of Runs	Total Ampacity	Service Entrance	Bonding	Minimum Wquipment Bonding	
Amps	CU	kcmil	Amps, per run	Runs	Amps	kcmil	kcmil	Cu, AWG/kcmil	AL, AWG/kcmil
Notes:		(5)	(4) (6)					(1)* (2)**	(3)
400	3/0	168	200	2	400	336		** #2	1/0
	4/0	212	230	2	460	454		** 1/0	3/0
	600	600	420	1	420	600		** 1/0	3/0
600	3/0	168	200	3	600	504		** 1/0	3/0
	4/0	212	230	3	690	636		** 2/0	4/0
	350	350	310	2	620	700		** 2/0	4/0
800	350	350	310	3	930	1050		** 2/0	4/0
	500	500	380	3	1140	1500	188	* 4/0	350
1200	350	350	310	4	1240	1400	175	* 4/0	350
	500	500	380	4	1520	2000	250	* 250	400
	750	750	475	3	1425	2250	281	* 350	600
1600	350	350	310	6	1860	2100	263	*350	600
	500	500	380	5	1900	2500	313	* 350	600
	600	600	420	4	1680	2400	300	* 350	600
	750	750	475	4	1900	3000	375	* 400	600
2000	350	350	310	7	2170	2450	306	* 350	500
	500	500	380	6	2280	3000	375	* 400	600
	600	600	420	5	2100	3000	375	* 400	600
	750	750	475	5	2375	3750	469	* 500	750
2500	500	500	380	7	2660	3500	438	* 500	750
	600	600	420	6	2520	3600	450	* 500	750
	750	750	475	6	2850	4500	563	* 700	1200
3000	500	500	380	8	3040	4000	500	* 500	750
	600	600	420	8	3360	4800	600	* 700	1200
	750	750	475	7	3325	5250	656	* 700	1200

Notes:
(1) NEC 250.102 (C)(1) Size - Supply-Side Bonding Jumper - 12.5%
(2) NEC Table 250.66, up to 1000 kcmil (Copper Bonding Table) up to 1750 kcmil (Aluminum Bonding Table)
(3) NEC Table 250.122, Equivalent Copper to Aluminum
(4) NEC Table 310.15(B)(16) 75°C Ampacity
(5) NEC Chapter 9, Table 8, Conductor Properties
(6) NEC 310.15 (B) (5) (a) Neutral Conductor Not Considered a "Current-Carrying" Conductor

ROCK ENERGY COOPERATIVE

ELECTRIC METERING

SHORT CIRCUIT DUTY REQUIREMENTS

The member's service equipment and other devices shall be adequate to withstand and interrupt the maximum available short circuit current (Fault Current).

Definitions:

1. Short Circuit Current Requirements (SCCR) – The prospective symmetrical fault current at a nominal voltage to which an apparatus or system is able to be connected without sustaining damage exceeding defined acceptance criteria. (NEC 100)
2. Fault Current – is an abnormal current in an electrical circuit due to a fault, usually a short circuit or abnormally low impedance path. Fault Current comes in three varieties; phase to neutral fault, phase to phase fault, and phase to earth fault.
3. Ampere Interrupting Capacity (AIC) – This applies to circuit breakers and their ability to open and protect a circuit with a specific amount of current flowing in the circuit. Short Circuit Ratings from 10,000 to 65,000 amps.

A. SELF-CONTAINED METERING: MINIMUM SHORT CIRCUIT CURRENT RATINGS

120/240 VOLT, SINGLE-PHASE & 120/208 VOLT SINGLE/ THREE-PHASE	
Service Ampacity	**Minimum Short Circuit Current Ratings**
100 amp	10,000
150 amp	10,000
200 amp (service length > 50')	10,000
200 amp (service length < 50')	22,000
300 amp	22,000

NOTES:

1. Self-contained meter service applications are limited to a single service and have a maximum transformer size of 50kva for single phase or a 150kva three phase overhead bank. If larger transformer is installed, these numbers will change.
2. Total service ampacity ratings of all present and future service entrance equipment connected to the same overhead service drop or underground service lateral.

B. INSTRUMENT TRANSFORMER METERING: MINIMUM SHORT CIRCUIT RATINGS

120/ 240 VOLT, SINGLE PHASE & 120/ 208 VOLT, SINGLE/ THREE PHASE & 277/ 480 THREE PHASE	
Service Ampacity	**Minimum Short Circuit Current Ratings**
400	42,000
600	42,000
800	42,000
1200	65,000
1600	65,000
2000	65,000
2500	65,000
3000	65,000

NOTES:

1. Total service ampacity ratings of all present and future service entrance equipment connected to the same distribution transformer.
2. Minimum fault current equipment requirements do not apply to member yard pole, pole top switches.
3. All 277/ 480 volt services require instrument transformer metering.

ROCK ENERGY COOPERATIVE

ELECTRIC METERING

PAD PRECAST OPTION

As previously detailed, the member installs, owns, and maintains the concrete transformer pad for three phase applications. *Please contact Rock Energy for transformer pad orientation and location.*

If you would prefer to purchase a precast concrete pad rather than framing and pouring your own, we have included a local option from a company based in Janesville WI.

Dalmaray Concrete Products, Inc.

405 South Arch St.
Janesville, WI 53548-4422
Phone: (608) 752-6507 Fax: (608) 752-5671
(888) 222-4541
www.dalmarayconcreteproducts.com

Utility Structures Products

Price List Effective May 1, October 7, 2014

Transformer Pads	Prices	
Type 1 Pad	$725.00	
Type 2 pad	$1104.00	$10 to $30 delivery charge
Type 3 Pad	$1638.00	

Light Pole Bases

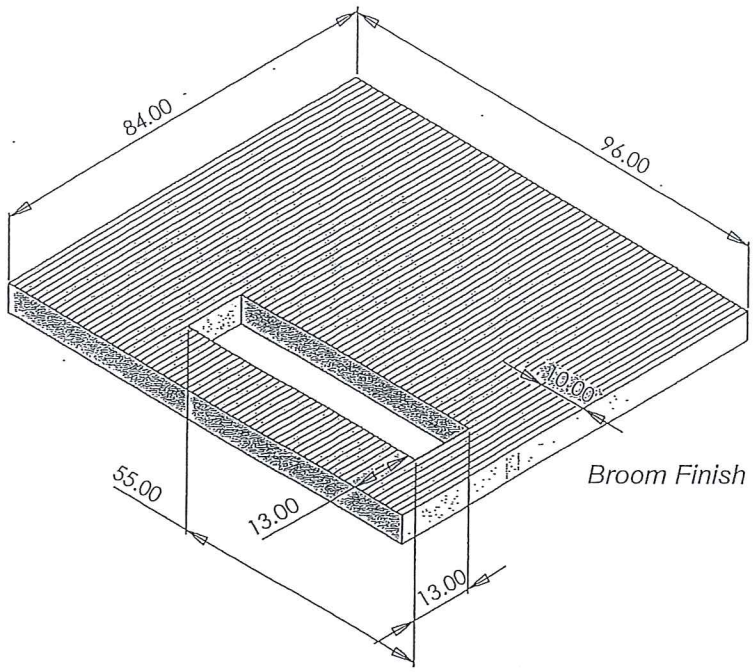
Call for prices

Electrical Vaults

Call for Prices

*Above prices are subject to state and local sales tax.
*All prices subject to change without notice.
*Minimum $350 charge for free delivers (within 75 mile radius of Janesville)

Dalmaray Concrete Products Inc.
Transformer Pad I



Serv. Size - 208Y/120

100-1200 AMPS

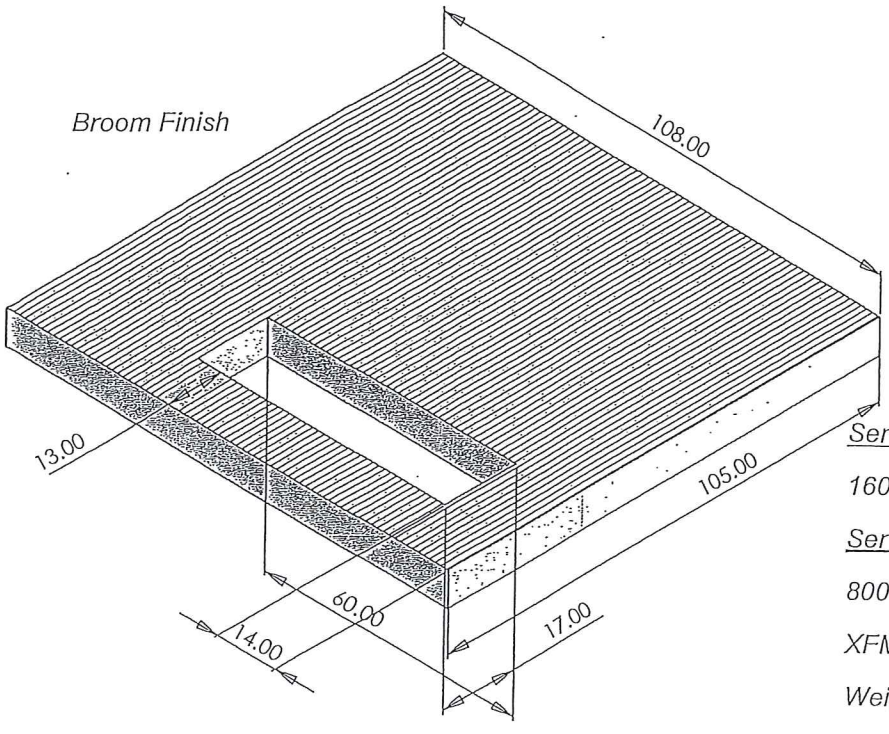
Serv. Size - 480Y-277

100-600 AMPS

XFMR - 75-500 KVA

Weight - 5000 lbs

Dalmaray Concrete Products Inc.
Transformer Pad II



Serv. Size - 208Y/120

1600-3000 AMPS

Serv. Size - 480Y-277

800-3000 AMPS

XFMR - 750-2500 KVA

Weight - 8000 lbs

ROCK ENERGY COOPERATIVE

ELECTRIC METERING

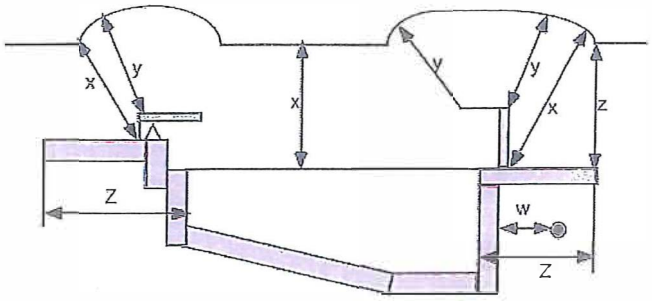
OVERHEAD SECONDARY CLEARANCES

Where Service Drop Attaches or Crosses to a Supplied Building	Minimum Required Clearances	Notes
Weatherhead	Attachments shall be 12 inches min. and 24 inches max. horizontally; 6 inches & 12 inches max vertical from weatherhead	
Building attachment	12 feet above ground	1
Residential areas accessible to pedestrian only	10 feet (0 – 150 volts Phase to Ground)	
Driveway	16 feet above ground (non-residential); 12 feet above ground if residential only (no trucks)	2
Commercial areas not subject to truck traffic	16 feet above ground	
Roads, streets, commercial driveways and other areas subject to truck traffic	18 feet; 20 feet (Iowa State and Federal Hwys); 22 feet (Minn. State and Federal Hwys)	
Decks and balconies readily accessible to pedestrians	10 feet	
Decks and balconies not readily accessible to pedestrians	8 feet where possible; 3.5 feet minimum	3
Drip loop on triplex	10 feet above ground	
Windows, doors, porches, fire escapes, and awnings attached to a building	3 feet	
Where wires pass opposite a window	5 feet	
Communication wires	2 feet	7
Gas Regulator	3 feet from electric meter or terminating equipment; 5 feet from electric transformers	
LP Gas (liquid petroleum)	10 feet from electric metering or termination equipment	4
Where service drop crosses but does not attach to building, or sign, etc.	4.5 feet (Horizontally)	
Where service passes over a roof but does not attach	11 feet (Vertically) if accessible; 3.5 feet (Vertically) if non-accessible	6
Pool or Pond	22.5 feet (any direction 0 – 750 volts); 25 feet from diving board (any direction 0 – 750 volts); 5 feet from Underground Secondary Conductors	5
Where doors open outward	Service equipment shall be minimum of doors width, plus 6 inches away	8

Secondary Clearance Notes:

1. If height of building does not permit 12 ft., it may be reduced to 10.5 ft.
2. May be reduced to 12.5 Feet for residential only driveways
3. Maintain 8 feet if possible, may be reduced to 3.5 feet if necessary
4. If drop is subject to wind movement, the horizontal clearance is 3.5 feet min. at blow out position.
5. Only under the most extreme conditions should lines be run over water
6. **In Wisconsin** clearance may be reduced to 8 feet if accessible and 3.0 feet if it is non-accessible with a 4/12 slope roof
7. Clearances for services over state and federal highways are 17 Feet in Wisconsin
8. Where door opens outward clearance shall be the width of the door plus 6 inches

MINIMUM CLEARANCES FOR SERVICES 300 VOLTS AND BELOW, OVER POOLS



	Insulated supply/ service cables up to 750v to ground. Supported and cabled with an effectively grounded neutral conductor	All other supply/ service drop conductors
X- Clearances in any direction to the water level, edge or water surface, base of diving platform or permanently anchored raft	22.5'	25'
Y- Clearance in any direction to the diving platform or tower	14.5'	17'

W- Clearance from all underground conductors from the outside edge of the pool shall be a minimum of 5 feet.

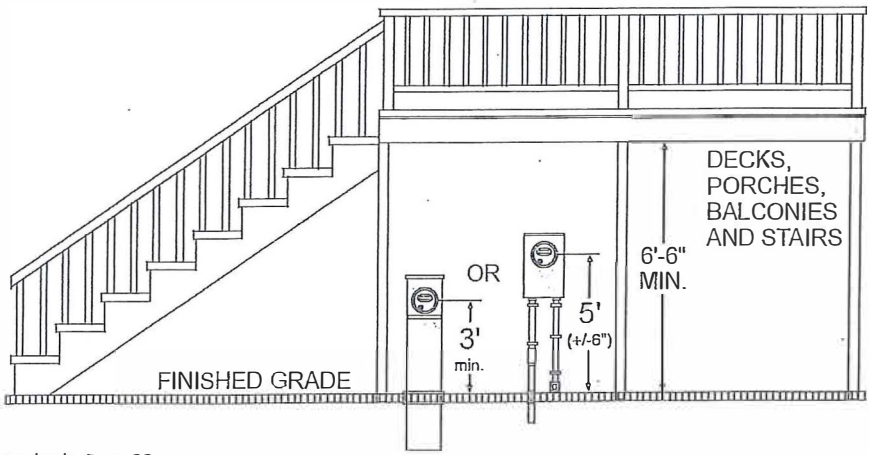
Z- Horizontal limit of clearance measured from the inside wall of the pool shall extend to the outer edge of the structure and not less than 10 feet.

SERVICE CONDUCTOR CLEARANCE FROM SIGNS

Conductor or Cable	Clearance
Horizontal (displaced by wind)	3.5'
Vertical	3.5'

METERING EQUIPMENT UNDER DECKS, PORCHES, BALCONIES, OR STAIRS

In order for a meter socket, pedestal or any other metering equipment to be located under decks, porches, balconies or stairs, a minimum vertical clearance of 6.5 feet is required.

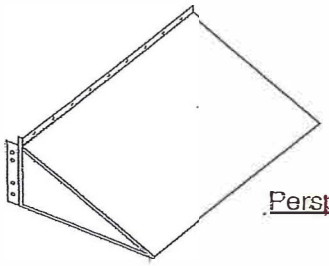


ROCK ENERGY COOPERATIVE

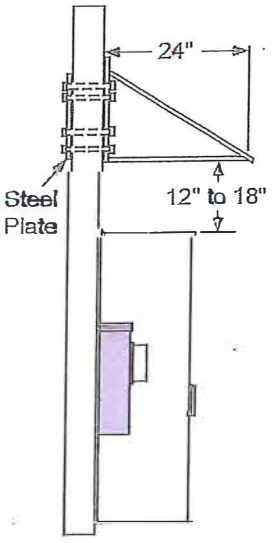
ELECTRIC METERING

METERING EQUIPMENT SHIELD

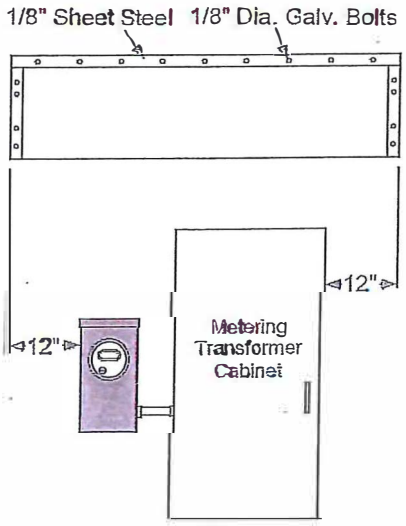
The Member is responsible for protecting Rock Energy's meter(s) and Member's own metering equipment from damage caused by falling, ice, snow, or other objects. If protection is not provided for meter equipment, by adequate roof overhang, the Member shall construct a protective shield, or the meter location shall be moved to a safe area. The Member will be charged for meter replacement if damage occurs and typically an outage will be required to replace any damaged equipment. An adequate roof overhang shall extend a minimum of 18 - 24" out from the face of the wall to which the meter is mounted.



Perspective View



Wall Section



Front View

NOTES:

1. Steel to be primed and painted with rust resistant paint.
2. Shield shall be capable of supporting 50 pounds.
3. Shield may be constructed of steel, treated wood or masonry. Thin sheet metal (tin) is not acceptable.
4. Shield to be so located as to not be a "head bumping" hazard.
5. Width of shield may vary depending on the number of meters being protected.

ROCK ENERGY COOPERATIVE

ELECTRIC METERING

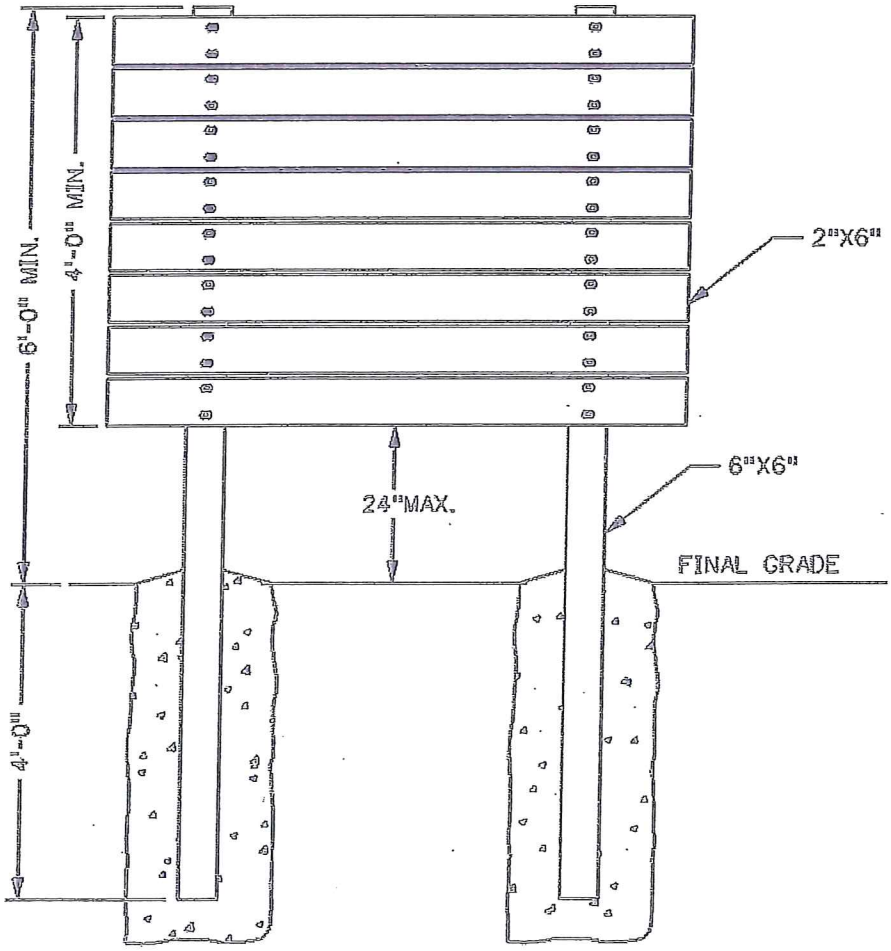
FREE STANDING METER STRUCTURES – FIELD BUILT

A. Field built structures are limited to 1200 amp – maximum

B. Wood field-built structures shall have a minimum of two 6" x 6" wood posts and 2" x 6" planks that are commercially treated against decay. The posts shall be buried a minimum of 4 feet deep, plumb and set in concrete the full depth. The planks shall be level and fastened with galvanized hardware (bolts, washers, nuts, etc.), **nails and screws are not acceptable.** The member is responsible for the maintenance of the structure. The standard width is 24 to 60 inches.

C. All service equipment shall be waterproof, lockable and listed by an approved testing agency for all service entrance use.

WOOD CONSTRUCTION



ROCK ENERGY COOPERATIVE
Empowering Members Since 1936

Rock Energy Approved Meter Sockets

Form 9s
13 Terminal - Amp Rating 20 - 3 Phase

Manufacturer	Catalog Number	Terminals	Amps	Service	Bypass	Mount	AIC
Durham	USTS13-2B (WP&L)	13	20	OH/UG	~	Wall	10000
Durham	USTS13-2B101 (IP&L)	13	20	OH/UG	~	Wall	10000
Durham	USTS13-2B-CH (WP&L)	13	20	OH/UG	~	Wall	10000
Eaton-CH	USTS13-2B101 (IP&L)	13	20	OH/UG	~	Wall	10000
Eaton-CH	USTS13-2B-CH (WP&L)	13	20	OH/UG	~	Wall	10000
Erickson Electric	I340 (IP&L)	13	20	UG			
Erickson Electric	W340 (WP&L)	13	20	UG			
Midwest Electric	USTS13-2B101-MEP (IP&L)	13	20	OH/UG	~	Wall	10000
Midwest Electric	USTS13-2B-MEP (WP&L)	13	20	OH/UG	~	Wall	10000
Milbank	UC7449-XL (WP&L)	13	20	OH/UG	~	Wall	10000
Milbank	UC7449-XL-871 (IP&L)	13	20	OH/UG	~	Wall	10000
Siemans/ Talon	9837-0932 (IP&L)	13	20	OH/UG	~	Wall	10000
Siemans/ Talon	9837-0933 (IP&L)	13	20	OH/UG	~	Wall	10000
Siemans/ Talon	9837-8503 (WP&L)	13	20	OH/UG	~	Wall	10000
Square D	USTS13-2B101-SQD (IP&L)	13	20	OH/UG	~	Wall	10000
Square D	USTS13-2B-SQD (WP&L)	13	20	OH/UG	~	Wall	10000
Tesco/ Advent	9070111 (IP&L)	13	20	OH/UG	~	Wall	10000
Tesco/ Advent	9070122 (WP&L)	13	20	OH/UG	~	Wall	10000

10 -Pole Test Switch (REQUIRED w/ above meter sockets)

Milbank Catalog Number TS10-0109

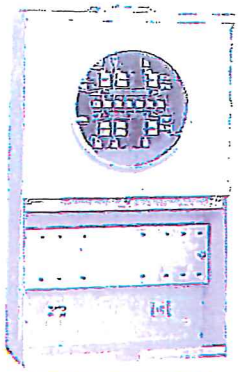
Preferred Test Switch Configuration

P P P Pn C+ C C+ C C+ C

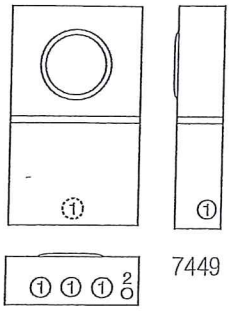
10/16gmj

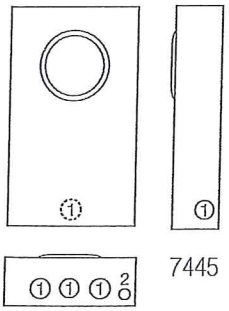
Transformer Rated

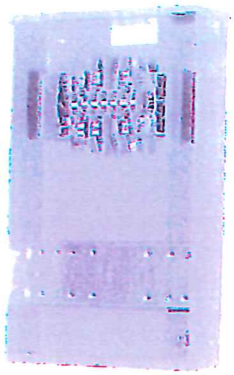
20 Amp | 13 Terminals | Test Switch Provision



UC7449-XL







UC7445-XL

1 Piece Cover — Ringless — Overhead / Underground — with test switch provision*

UC7445-RL	13	H.O.	6, 8, 9 & (ALT) 10S	#14 - #4 Max	None	4⅛	12	20	1¼	¼, ½

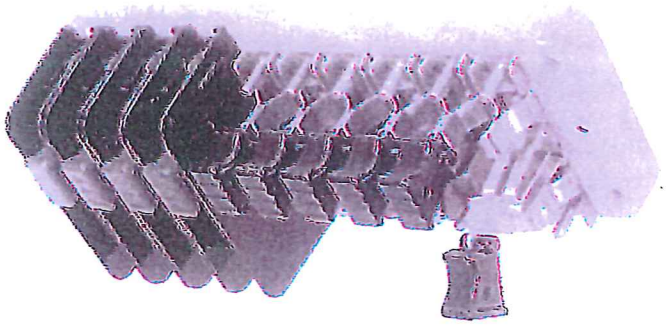
2 Piece Cover — Overhead / Underground — with test switch provision*

Ringless Catalog Number	Ring Type Catalog Number	Terminals	Hub	Connectors CU	Bypass	Dimensions			Knockouts	
						D"	W"	H"	1	2
UC7449-RL	UC7461-RL	13	H.O.	#14 - #4 Max	None	4⅛	12	20	1¼	¼, ½

Notes

- Prewiring: If standard factory pre-wiring is required, refer to wiring diagrams in the general engineering section of this catalog. Determine appropriate diagram and send copy with order.
- Connectors: Units are supplied with mechanical type connectors (#4 max)

Test Switch



Catalog Number	10-Pole									
TS10-0109	P	P	P	Pn	C+	C	C+	C	C+	C

Meter Form

Reference Information

DIAGRAM J
3Ø4W "Y" with 3 P.T.'s & 3 C.T.'s
3 Stator Meter - Form 9S
13T Socket, Test Switch #TS10-0109