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DISTRIBUTION ENGINEERING DEPARTMENT
OVERHEAD STANDARDS AND PLANNING

SPECIFICATION EO-6242
REVISION 4
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INSTALLATION REQUIREMENTS FOR OIL-FILLED
PADMOUNT TRANSFORMERS LOCATED INDOORS OR
NEAR BUILDING DOORWAYS AND WINDOWED WALLS

FILE: APPLICATION AND DESIGN MANUAL No. 4
FIELD MAUAL No. 5, SECTION 7
FIELD MAUAL No. 6, SECTION 3
FIELD MAUAL No. 11, SECTION 1
FIELD MAUAL No. 17, SECTION 1

TARGET AUDIENCE	REGIONAL ENGINEERING CUSTOMER ENGINEERING, ENERGY SERVICES
NESC REFERENCE	ALL SECTIONS
NEC REFERENCE	450.25, 450.26

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1.0 PURPOSE

This specification provides guidance for proper transformer positioning when designing outdoor above-ground or indoor installations of oil-filled pad-mount transformers.

2.0 APPLICATION

This specification applies to all operating areas.

3.0 ASSUMPTIONS AND CRITERIA

3.1 Local Building and Electrical Codes: All applicable codes shall take precedence whenever they contradict the minimum distances recommended in this specification.

3.2 Transformer Size: Minimum clearance requirements are generally determined by the transformer's size and volume of transformer oil.

3.3 Material Composition: Clearance requirements also consider the building's exterior material (combustible vs. non-combustible).

3.4 Factors not Considered: Clearance requirements provided in this specification do not take transformer noise and aesthetic factors into consideration. The Energy Service Representative or Customer Project Manager shall exercise judgment to provide consideration of both factors.

4.0 GENERAL CLEARANCE REQUIREMENTS

The following dimensions are to be maintained at all transformer locations:

4.1 Between Transformer's Open Door and Any Structure: A clearance of ten feet is required in front of padmounted transformers to enable unobstructed transformer maintenance and operation. This ten-foot requirement is in reference to any structures or shrubbery, and is in addition to the transformer compartment door swing radius.

4.2 Area Surrounding Transformer: A clearance of 3 feet shall be added to all wall, door, or windowed openings when referenced to transformer pad. This will take into consideration any transformer overhang off the pad.

5.0 TRANSFORMER CLEARANCES FROM BUILDINGS

The following section outlines clearance requirements for various sizes of single and three-phase padmounted transformers from buildings doors and windowed walls. The requirements apply to building exteriors with combustible and non-combustible materials.

5.1 Transformer Sizes 100kVA or Less:

- 5.1.1. Transformers shall not be installed within a zone extending 10 feet in front of and 5 feet to either side of a building door. See Exhibit A, Figure 1.
- 5.1.2. Transformers shall not be located within a zone extending 10 feet in front of and 3 feet to either side of a building window or opening. See Exhibit A, Figure 2.

5.2. Transformer Sizes Over 100KVA

- 5.2.1. Transformers shall not be installed within a zone extending 20 feet in front of and 10 feet to either side of a building door. See Exhibit A, Figure 3.
- 5.2.2. Transformers shall not be located within a zone extending 20 feet in front of and 6 feet to either side of a building window or opening. See Exhibit A, Figure 4.
- 5.2.3. For second floor windows, the transformer shall not be installed less than 10 feet from any part of the window.

5.3. Barriers

- 5.3.1. If field conditions do not permit the above clearances to be maintained, a suitable barrier shall be constructed.
- 5.3.2. The barrier shall comply with all NYC building codes, or any applicable municipal building codes.
- 5.3.3. The barrier shall have an 8" minimum thickness, and shall be Concrete Masonry Unit (CMU), with fully grouted cells and epoxy coated rebars. The rebar shall be vertical reinforcement, at a minimum of every second cell. The barrier shall be designed to sustain fire for a minimum of 3 hours.
- 5.3.4. For buildings with **non-combustible walls**, the width of the barrier shall extend 3 feet beyond each side of the transformer. The height of the barrier

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shall be a minimum of one foot above the top of the padmounted transformer. See exhibit B, **Figure 5**. An alternative barrier placement between a transformer and window or wall opening is given in Exhibit B, **Figure 6**.

5.3.5. For buildings with **combustible walls**, the width of the barrier shall extend 5 feet beyond each side of the transformer. The height of the barrier shall be a minimum of 3 feet above the top of the transformer.

5.3.6. Distribution Engineering, Overhead Standards and Planning section may be consulted regarding barrier construction as required. See samples in Exhibit B.

5.4. Fire Escapes: Transformers shall be located a minimum of 20 feet from fire escapes.

6.0 INDOOR INSTALLATION REQUIREMENTS

Indoor installation of oil-filled transformers should be considered only in cases when conventional outdoor installation on a pad is not a feasible option. In addition to the installation procedure outlined in [EO-13827-B](#), the following guidelines shall be followed for indoor installations.

6.1. Safety and Environmental Considerations

6.1.1. To mitigate any environmental impact in the event of oil release, ensure there are no drains or sewers near the transformer location. A concrete liquid confinement area with a minimum height of 4 inches shall be constructed around the transformer pad. The size of the confinement area shall be determined by the transformer's size to hold the transformer's oil capacity. Refer to transformer nameplate for oil capacity.

6.1.2. Each doorway leading into transformer housing rooms shall open in the egress direction and shall be equipped with egress panic bars. The door shall have a minimum fire rating of 3 hours.

6.1.3. The transformer housing room shall be equipped with an automatic fire extinguishing system (e.g. fire sprinkler system) rated for electrical fires, in compliance with all applicable local fire safety requirements.

6.1.4. All insulating oil for indoor transformers shall be natural ester fluid with higher flash point rating. Additionally, all walls enclosing the transformer

shall be non-combustible, and be rated with a minimum fire resistance of 3 hours.

6.1.5. All primary and secondary cable ducts shall be sealed according to instructions in [EO-1100](#).

6.2. Structural Considerations

6.2.1. Walls and roofs of transformer rooms shall be constructed according to design guidelines in [EO-1121](#). Structural requirement will vary depending on transformer size and total weight.

6.2.2. For transformers located on the ground level, transformer room floors shall be a minimum of 4 inches of concrete.

6.2.3. For transformers located on levels above ground, transformer room floors shall have adequate structural strength for the total transformer load as described in [EO-1121](#).

6.2.4. Any pipe or duct system not part of the electrical installation or vault fire protection shall not enter or pass through the transformer room/vault.

6.3. Ventilation

6.3.1. Adequate natural ventilation to the transformer shall be provided as required in [EO-2032](#). Natural ventilation is required for indoor installations; for locations where natural ventilation cannot be achieved, consult Overhead Standards and Planning group via [email](#) for alternatives.

6.3.2. Transformer room dimensions shall be a minimum of 164" W x 336" D x 138" H. All exceptions to this requirement shall be forwarded to Overhead Standards and Planning group via [email](#) for approval.

6.3.3. Transformer compartment shall not be used as a storage area for any other materials.

6.3.4. All other clearances outlined in this specification and drawing [EO-13775-B](#) shall be adhered to.

6.4. Access Considerations

- 6.4.1. Access shall be provided to Con Edison employees at all times for switching, routine maintenance, and emergency response purposes. Access shall be restricted to qualified Con Edison employees.
- 6.4.2. For areas with vehicle access, protection barriers (bollards) shall be installed around the transformer as outlined in [drawing 507436](#).
- 6.4.3. Customer shall make access provisions for transformer replacement when necessary.
- 6.4.4. Cable and duct arrangements shall be designed and installed according to [EO-6224](#) requirements.

7.0 REFERENCES

EO-6229	Requirements for the Installation of Single and Three-Phase Padmounted Transformers
EO-1100	Sealing of Service Ducts, Entrances, and Bus Openings in Electrical Distribution Structures
EO-13775-B	Concrete Pad for Three-Phase Padmounted Transformers
EO-1121	Structural Design Guidelines for Electric Distribution Structures
EO-2032	Design Criteria for Ventilation of Transformer Vaults and Network Protector Compartments
EO-16696-D	Clearance for Planting Around Transformer Pads
EO-13827-B	Installation Procedure for 4kV, 13kV, 27kV Three-Phase Dead Front Padmount Transformer
Drawing 507436	Protection Barrier for Padmounted Equipment Subject to Vehicular Traffic
EO-6224	Trenching Requirements for Conduit and Equipment Structure for Underground Residential Distribution (URD) Electric System

8.0 ATTACHMENTS

Figures 1 & 2 - Minimum Clearance Requirements for Transformers 100 kVA or Less

Figures 3 & 4 – Minimum Clearance Requirements for Transformers Over 100 kVA

Figure 5 - Barrier Location Option 1

Figure 6 - Barrier Location Option 2

Figures 7 & 8 - Barrier Minimum Clearance Requirements

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REVISION 4: Added new Section 6.0 for indoor installations. Added reference specifications.	FILE: Application and Design Manual No. 4 Field Manual No. 5, Section 7 Field Manual No. 6, Section 3 Field Manual No. 11, Section 1 Field Manual No. 17, Section 1
Due for revision: 03/2030 or as needed	

EXHIBIT A

MINIMUM CLEARANCE REQUIREMENTS FOR TRANSFORMERS 100KVA OR LESS

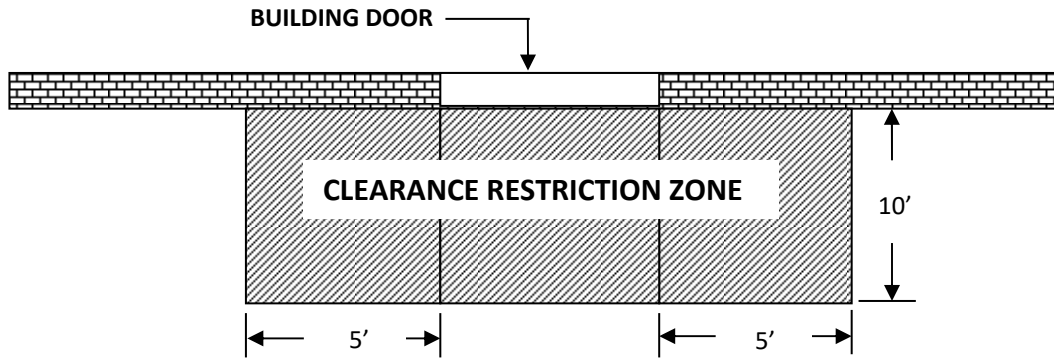


FIGURE 1

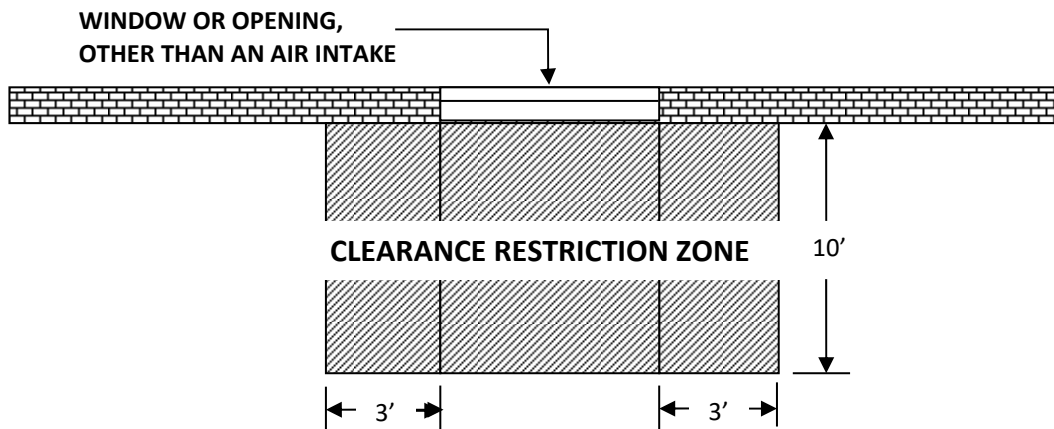


FIGURE 2

EXHIBIT A (continued)

MINIMUM CLEARANCE REQUIREMENTS FOR TRANSFORMERS OVER 100KVA

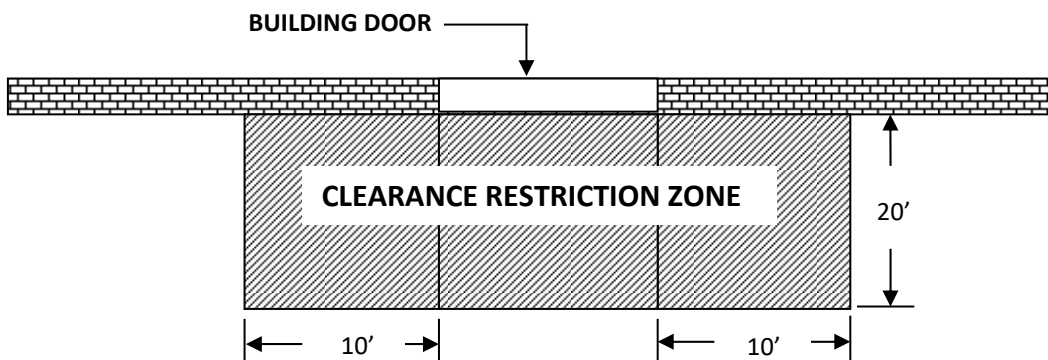


FIGURE 3

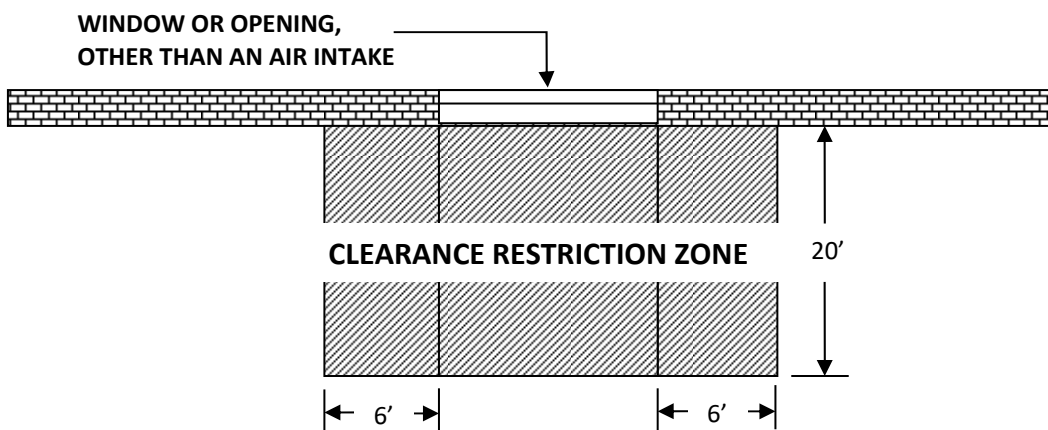


FIGURE 4

EXHIBIT B

SAMPLE BARRIER LOCATION

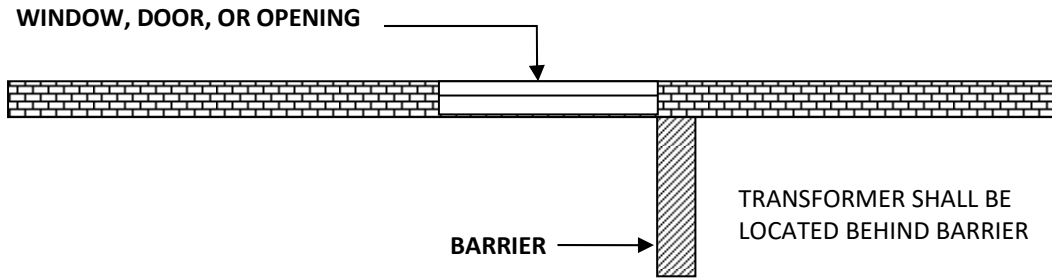


FIGURE 5: Barrier Location Option 1

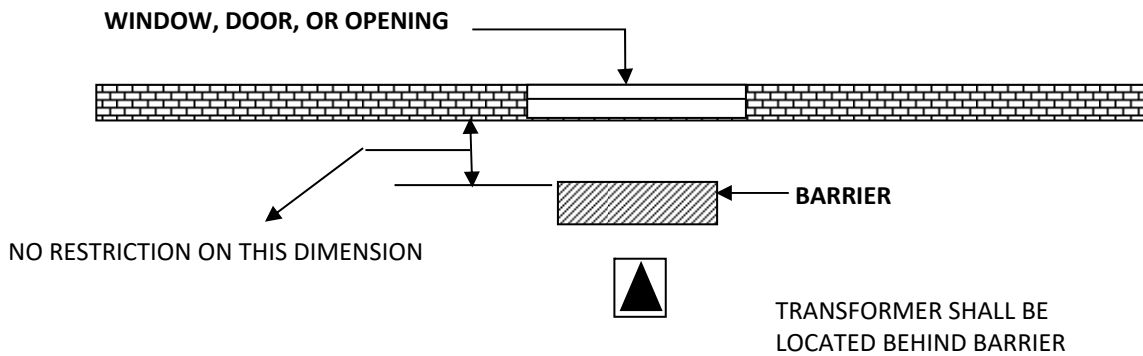


FIGURE 6: Barrier Location Option 2

EXHIBIT B (continued)

BARRIER MINIMUM CLEARANCE REQUIREMENTS

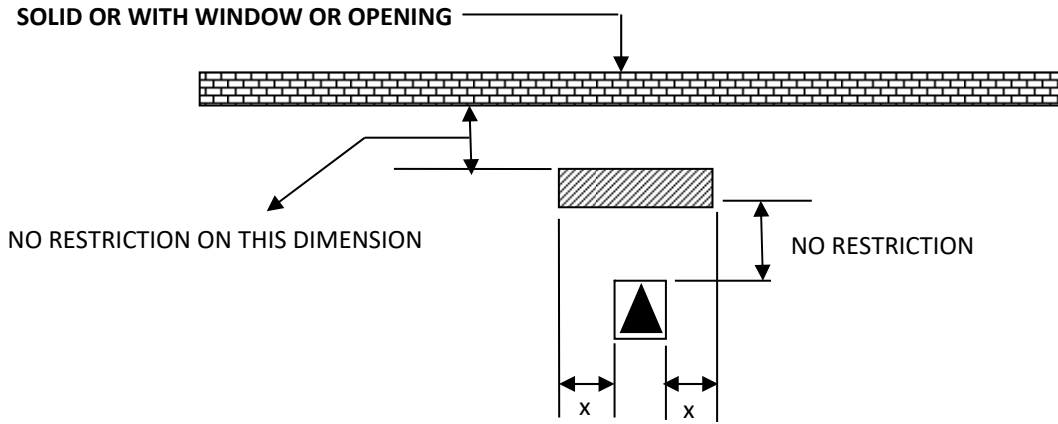


FIGURE 7 (Plan View)

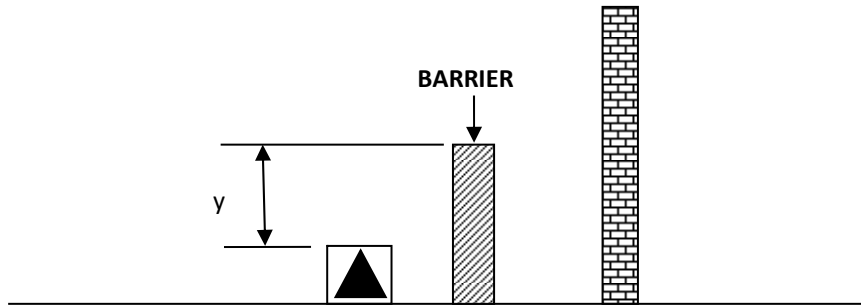


FIGURE 8: (Elevation View)

MINIMUM CLEARANCE REQUIREMENTS FOR BARRIER WALLS		
	<u>x</u>	<u>y</u>
Combustible Wall	60 inches	36 inches
Non-combustible Wall	36 inches	12 inches