

Location of Mineral Oil-Filled Padmount Transformers Outdoors Near Buildings and Equipment

The purpose of this document is to provide guidelines for the location of mineral oil-filled padmount transformers outdoors near buildings and equipment. These guidelines specify minimum distances to buildings, building openings, and equipment to provide fire risk protection and adequate working space.

Table 1 below lists the minimum clearances to buildings and building openings. Refer to sections A, B, and C below concerning placement around doors, windows, and air vents (intakes and exhausts). Section D lists allowable distances to specific equipment.

TABLE 1 – Clearances from Buildings and Building Openings

Type of Construction	Clearance extending out from building*	Side clearance	Height Clearance
Combustible	12 ft		
Non-Combustible	6 ft		
Doors	20 ft	10 ft	
Windows	10 ft	5 ft (See Table 2)	10 ft
Air Vents	20 ft	10 ft (See Table 3)	25 ft

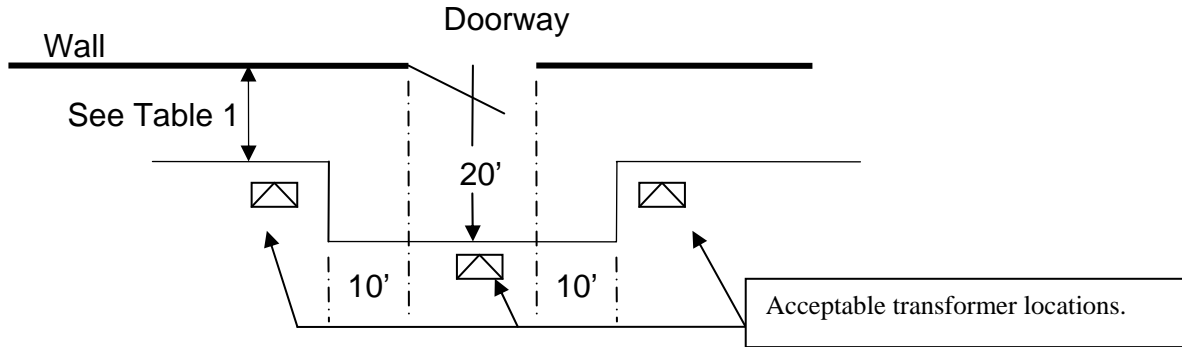
*habitable and non-habitable buildings

Notes:

1. Distances are from the pad or transformer whichever is closer to the building or opening.
2. If the building has an overhang, the distance is measured from the outside edge of the overhang.
3. Outside walkways or stairs attached to the building shall be considered as part of the building. Minimum clearance must also be maintained from walkways used for exit to a place of safety.
4. Avoid placing transformers in front of doors and windows or beneath windows and vents whenever possible.
5. Final grade at the location of the transformer shall provide for mineral oil to drain from the building. Otherwise, an oil containment means is required.
6. Distances less than those specified in Table 1 but not less than the working space required in Section E may be allowed if approved by the appropriate code enforcement authority. This may require alternate means of fire protection per NEC Section 450.27 and NESC Section 152(A)(2) including fire barriers, fire rated walls, sprinkler systems, oil containment means, less flammable liquid filled transformers, or other approved measures. Use of less flammable liquid filled transformers must be pre-approved by Duke Energy. Use of alternate means of fire protection must be approved by the local code enforcement authority.
7. It shall be the customer's responsibility to conform to all local building codes, insurance regulations, or ordinances affecting the transformer location.
8. Combustible/Non-combustible construction type shall be that which is defined by respective state building codes.

A. Doors, Fire Escapes, or Fire Exits.

Padmounted transformers shall not be located within a zone extending outward 20 feet and 10 feet to the side from any doorway, fire escape, or fire exit. See diagram below.



B. Window or opening other than an air vent.

Where the vertical clearance to a window is less than 10 ft, the mineral oil-filled transformer shall not be located within a zone extending 10 feet outward from the building and 5 feet to the side of the window. See Table 2 below. Where the vertical clearance is 10 ft or greater, the transformer shall not be located within the distance outward from the building wall as determined by building construction type.

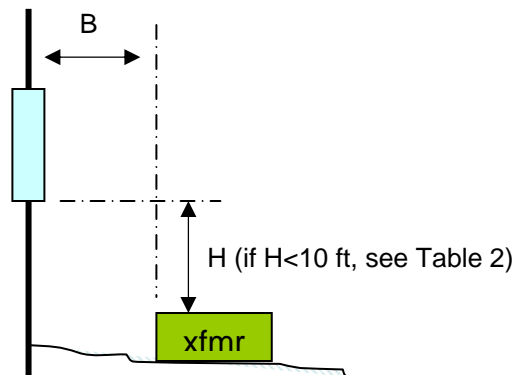
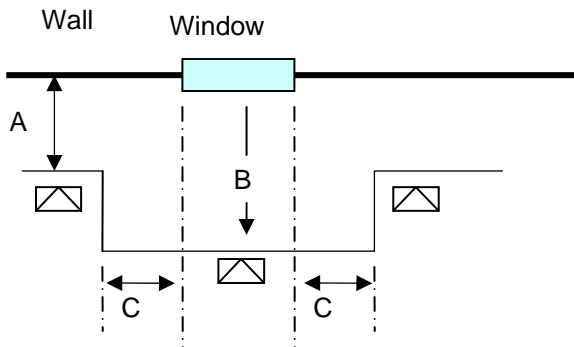


Table 2 (H<10ft)

Type of Construction	A	B	C
Combustible	12 ft	12 ft	----
Non-combustible	6 ft	10 ft	5 ft

C. Air Vent

Where the vertical clearance to an air vent is less than 25 ft, the mineral oil-filled transformer shall not be located within a zone extending 20 feet outward from the building and 10 feet to the side of the vent. See Table 3 below. Where the vertical clearance is 25 ft or greater, the transformer shall not be located within the distance outward from the building wall as determined by building construction type.

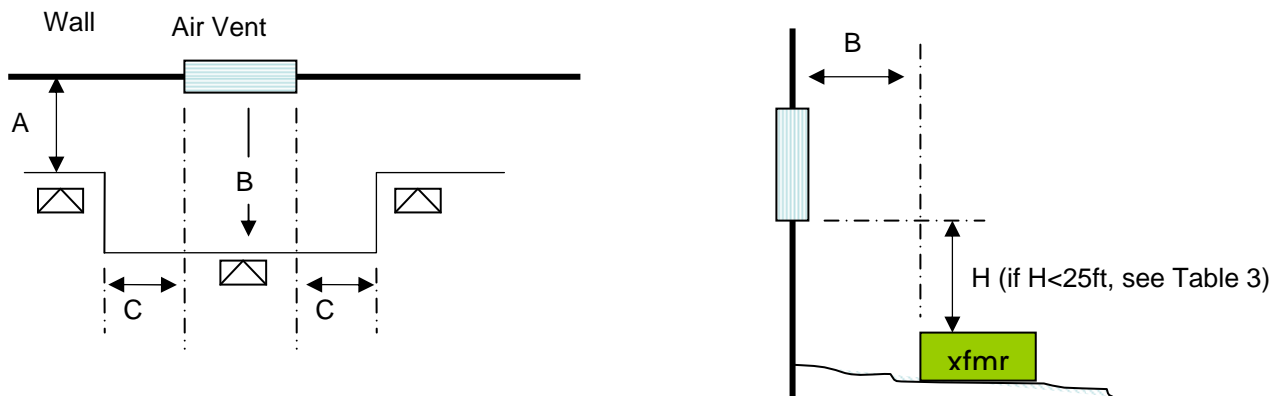


Table 3 (H<25ft)

Type of Construction	A	B	C
Combustible	12 ft	20 ft	10 ft
Non-combustible	6 ft	20 ft	10 ft

D. Allowable Distances from Equipment – See Table 4 below:

Table 4 – Clearance to Equipment*

Type of Equipment	Minimum Distance
Containers of flammable liquids or gas. (Oxygen, LP, Gasoline, etc)	20 ft
Generators, customer owned transformers, etc.	6 ft
Fire hydrants, sprinkler valves, standpipes, etc.	6 ft
Natural gas meters	3 ft

* This is not an all-inclusive list.

E. Working Space

A minimum clear working space of 3 ft must be maintained from each side of the transformer and a minimum of 10 ft from the front. Where a meter is mounted on a transformer, a clear space around the meter at least 3 ft wide, 4 ft deep, and 8 ft high must be provided and always be available for reading, inspecting, testing, and maintenance operations. Clear space for safe access to and egress from the working space must be maintained.