

Chapter 27

WIND LOADS ON BUILDINGS—MWFRS (DIRECTIONAL PROCEDURE)

27.1 SCOPE

27.1.1 Building Types

This chapter applies to the determination of MWFRS wind loads on enclosed, partially enclosed, and open buildings of all heights using the Directional Procedure.

- 1) Part 1 applies to buildings of all heights where it is necessary to separate applied wind loads onto the windward, leeward, and side walls of the building to properly assess the internal forces in the MWFRS members.
- 2) Part 2 applies to a special class of buildings designated as enclosed simple diaphragm buildings, as defined in Section 26.2, with $h \leq 160$ ft (48.8 m).

27.1.2 Conditions

A building whose design wind loads are determined in accordance with this chapter shall comply with all of the following conditions:

1. The building is a regular-shaped building or structure as defined in Section 26.2.
2. The building does not have response characteristics making it subject to across-wind loading, vortex shedding, instability due to galloping or flutter; or it does not have a site location for which channeling effects or buffeting in the wake of upwind obstructions warrant special consideration.

27.1.3 Limitations

The provisions of this chapter take into consideration the load magnification effect caused by gusts in resonance with along-wind vibrations of flexible buildings. Buildings not meeting the requirements of Section 27.1.2, or having unusual shapes or response characteristics shall be designed using recognized literature documenting such wind load effects or shall use the wind tunnel procedure specified in Chapter 31.

27.1.4 Shielding

There shall be no reductions in velocity pressure due to apparent shielding afforded by buildings and other structures or terrain features.

PART 1: ENCLOSED, PARTIALLY ENCLOSED, AND OPEN BUILDINGS OF ALL HEIGHTS

27.2 GENERAL REQUIREMENTS

The steps to determine the wind loads on the MWFRS for enclosed, partially enclosed and open buildings of all heights are provided in Table 27.2-1.

User Note: Use Part 1 of Chapter 27 to determine wind pressures on the MWFRS of enclosed, partially enclosed or an open building with any general plan shape, building height or roof geometry that matches the figures provided. These provisions utilize the traditional “all heights” method (Directional Procedure) by calculating wind pressures using *specific wind pressure equations* applicable to each building surface.

27.2.1 Wind Load Parameters Specified in Chapter 26

The following wind load parameters shall be determined in accordance with Chapter 26:

- Basic Wind Speed, V (Section 26.5)
- Wind directionality factor, K_d (Section 26.6)
- Exposure category (Section 26.7)
- Topographic factor, K_{zt} (Section 26.8)
- Gust-effect factor (Section 26.9)
- Enclosure classification (Section 26.10)
- Internal pressure coefficient, (GC_{pi}) (Section 26-11).

27.3 VELOCITY PRESSURE

27.3.1 Velocity Pressure Exposure Coefficient

Based on the exposure category determined in Section 26.7.3, a velocity pressure exposure coefficient K_z or K_h , as applicable, shall be determined from Table 27.3-1. For a site located in a transition zone between exposure categories that is near to a change in ground surface roughness, intermediate values of K_z or K_h , between those shown in Table 27.3-1 are permitted provided that they are determined by a rational analysis method defined in the recognized literature.