

**Table 12.14-1** (Continued)

Seismic Force-Resisting System	ASCE 7 Section Where Detailing Requirements Are Specified	Response Modification Coefficient, $R^a$	Limitations <sup>b</sup>		
			Seismic Design Category		
			B	C	D, E
17. Intermediate reinforced masonry shear walls	14.4	4	P	P	NP
18. Ordinary reinforced masonry shear walls	14.4	2	P	NP	NP
19. Detailed plain masonry shear walls	14.4	2	P	NP	NP
20. Ordinary plain masonry shear walls	14.4	1½	P	NP	NP
21. Prestressed masonry shear walls	14.4	1½	P	NP	NP
22. Light-frame (wood) walls sheathed with wood structural panels rated for shear resistance or steel sheets	14.5	7	P	P	P
23. Light-frame (cold-formed steel) walls sheathed with wood structural panels rated for shear resistance or steel sheets	14.1	7	P	P	P
24. Light-frame walls with shear panels of all other materials	14.1 and 14.5	2½	P	P	NP <sup>d</sup>
25. Steel buckling-restrained braced frames	14.1	8	P	P	P
26. Steel special plate shear walls	14.1	7	P	P	P

<sup>a</sup>Response modification coefficient,  $R$ , for use throughout the standard.<sup>b</sup>P = permitted; NP = not permitted.<sup>c</sup>Light-frame walls with shear panels of all other materials are not permitted in Seismic Design Category E.<sup>d</sup>Light-frame walls with shear panels of all other materials are permitted up to 35 ft (10.6 m) in structural height,  $h_n$ , in Seismic Design Category D and are not permitted in Seismic Design Category E.

$d_{1i}$  = the distance from the wall  $i$  or braced frame  $i$  to the center of rigidity, perpendicular to major axis 1

$d_{2j}$  = the distance from the wall  $j$  or braced frame  $j$  to the center of rigidity, perpendicular to major axis 2

$e_1$  = the distance perpendicular to major axis 1 between the center of rigidity and the center of mass

$b_1$  = the width of the diaphragm perpendicular to major axis 1

$e_2$  = the distance perpendicular to major axis 2 between the center of rigidity and the center of mass

$b_2$  = the width of the diaphragm perpendicular to major axis 2

$m$  = the number of walls and braced frames resisting lateral force in direction 1

$n$  = the number of walls and braced frames resisting lateral force in direction 2

Eq. 12.14-2 A and B need not be checked where a structure fulfills all the following limitations:

1. The arrangement of walls or braced frames is symmetric about each major axis direction.

2. The distance between the two most separated lines of walls or braced frames is at least 90 percent of the dimension of the structure perpendicular to that axis direction.

3. The stiffness along each of the lines considered for item 2 above is at least 33 percent of the total stiffness in that axis direction.

9. Lines of resistance of the seismic force-resisting system shall be oriented at angles of no more than 15° from alignment with the major orthogonal horizontal axes of the building.
10. The simplified design procedure shall be used for each major orthogonal horizontal axis direction of the building.
11. System irregularities caused by in-plane or out-of-plane offsets of lateral force-resisting elements shall not be permitted.

**EXCEPTION:** Out-of-plane and in-plane offsets of shear walls are permitted in two-story buildings of light-frame construction provided that the framing supporting the upper wall is designed for seismic force effects from overturning of the wall amplified by a factor of 2.5.

12. The lateral load resistance of any story shall not be less than 80 percent of the story above.