where

Q_{mSFRS} = force in an element of the damping system equal to the design seismic force of the m^{th} mode of vibration of the structure in the direction of interest

Q_{DSD} = force in an element of the damping system required to resist design seismic forces of displacement-dependent damping devices

Seismic forces in elements of the damping system, Q_{DSD}, shall be calculated by imposing design forces of displacement-dependent damping devices on the damping system as pseudostatic forces. Design seismic forces of displacement-dependent damping devices shall be applied in both positive and negative directions at peak displacement of the structure.

2. Stage of maximum velocity: Seismic design force at the stage of maximum velocity shall be calculated in accordance with Eq. 18.7-2:

$$Q_E = \sqrt{\sum_m (Q_{mDSV})^2} \qquad (18.7\text{-}2)$$

where

Q_{mDSV} = force in an element of the damping system required to resist design seismic forces of velocity-dependent damping devices due to the m^{th} mode of vibration of the structure in the direction of interest

Modal seismic design forces in elements of the damping system, Q_{mDSV}, shall be calculated by imposing modal design forces of velocity-dependent devices on the nondeformed damping system as pseudostatic forces. Modal seismic design forces shall be applied in directions consistent with the deformed shape of the mode of interest. Horizontal restraint forces shall be applied at each floor Level i of the nondeformed damping system concurrent with the design forces in velocity-dependent damping devices such that the horizontal displacement at each level of the structure is zero. At each floor Level i, restraint forces shall be proportional to and applied at the location of each mass point.

3. Stage of maximum acceleration: Seismic design force at the stage of maximum acceleration shall be calculated in accordance with Eq. 18.7-3:

$$Q_E = \sqrt{\sum_m \left(C_{mFD}\Omega_0 Q_{mSFRS} + C_{mFV} Q_{mDSV}\right)^2} \pm Q_{DSD} \qquad (18.7\text{-}3)$$

The force coefficients, C_{mFD} and C_{mFV}, shall be determined from Tables 18.7-1 and 18.7-2, respectively, using values of effective damping determined in accordance with the following requirements:

For fundamental-mode response ($m = 1$) in the direction of interest, the coefficients, C_{1FD} and C_{1FV}, shall be based on the velocity exponent, α, that

Table 18.7-1 Force Coefficient, C_{mFD}[a,b]

	$\mu \le 1.0$				
Effective Damping	$\alpha \le 0.25$	$\alpha = 0.5$	$\alpha = 0.75$	$\alpha \ge 1.0$	$C_{mFD} = 1.0$[c]
≤0.05	1.00	1.00	1.00	1.00	$\mu \ge 1.0$
0.1	1.00	1.00	1.00	1.00	$\mu \ge 1.0$
0.2	1.00	0.95	0.94	0.93	$\mu \ge 1.1$
0.3	1.00	0.92	0.88	0.86	$\mu \ge 1.2$
0.4	1.00	0.88	0.81	0.78	$\mu \ge 1.3$
0.5	1.00	0.84	0.73	0.71	$\mu \ge 1.4$
0.6	1.00	0.79	0.64	0.64	$\mu \ge 1.6$
0.7	1.00	0.75	0.55	0.58	$\mu \ge 1.7$
0.8	1.00	0.70	0.50	0.53	$\mu \ge 1.9$
0.9	1.00	0.66	0.50	0.50	$\mu \ge 2.1$
≥1.0	1.00	0.62	0.50	0.50	$\mu \ge 2.2$

[a]Unless analysis or test data support other values, the force coefficient C_{mFD} for viscoelastic systems shall be taken as 1.0.
[b]Interpolation shall be used for intermediate values of velocity exponent, α, and ductility demand, μ.
[c]C_{mFD} shall be taken as equal to 1.0 for values of ductility demand, μ, greater than or equal to the values shown.