

ASCE 7 Wind and Seismic Load Combinations

The ASCE 7 standard provides two design methods:

- Section 2.3 of ASCE 7-2010:**
- **Load and Resistance Factor Design (LRFD)** compares required strength to actual strengths. LRFD provides the actual response of the system, including deflections and loads on supports and structure, when the actual wind or seismic load is applied.
- Section 2.4 of ASCE 7-2010:**
- **Allowable Stress Design (ASD)** compares actual and allowable stresses. ASD uses load reduction factors (0.7 for seismic events and 0.6 for wind events) when calculating stresses.

CAESAR II uses ASD to evaluate a piping system under wind and seismic loads. To comply with ASCE 7 requirements, you must include the load reduction factors in your load cases for stress compliance.

The following table provides example load combinations showing the use of ASCE 7 load reduction factors (in bold).

Load Case	Definition	Name	Stress Type
L1	W+T1+P1+ 0.7U1	Operating case with seismic load (using the reduction factor) for computing stresses	OPE
L2	W+T1+P1+U1	Operating case with seismic load for computing loads on supports and deflections	OPE
L3	W+T1+P1+ 0.6WIN1	Operating case with wind load (using the reduction factor) for computing stresses	OPE
L4	W+T1+P1+WIN1	Operating case with wind load for computing loads on supports and deflections	OPE
L5	W+T1+P1	Operating case	OPE
L6	W+P1	Sustained case	SUS
L7	L1-L5	Preparatory case for stress evaluation due to seismic load	OCC
L8	L3-L5	Preparatory case for stress evaluation due to wind load	OCC
L9	L6+L7	Seismic sustained + occasional	SUS+OCC
L10	L6+L8	Wind sustained + occasional	SUS+OCC

For reactions and deflections, we are using allowable stress design loads, not strength design loads

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For reactions and deflections, we are using allowable stress design loads, not strength design loads. The WIN1 for L4 is used for LRFD steel