

GP 04-01-04	Surge Vibration Design Loads	October 2004
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Surge Vibration Design Loads

GP 04-01-04

Scope

[I] This Global Practice (GP) covers the calculation of surge forces for fluidized solids process vessels and support structures that are subject to surge vibration.

[I] An asterisk (*) indicates that additional information is required. If a job is contracted, this additional information is furnished in the Job Specification.

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1. Definitions

Term	[I] Description
Abnormal Surge Forces	Those forces corresponding to the most severe combination of fluid-bed height and density in the process vessels and piping during startup or upset of the unit.
Concentrically Braced Frame	A braced frame in which the members are subjected primarily to axial forces.
Normal Surge Forces	Those forces corresponding to the maximum fluid-bed height and density in the process vessels and piping during normal operation of the unit.
Support Structures	Any structure supporting or laterally connected to the process vessel, including access structures, such that surge vibrations are transmitted to it by the process vessel.
Surge Forces	As used herein, are equivalent static lateral forces that account for the dynamic loads generated by surge vibration.
Surge Vibration	Movement induced by the action of fluidized solids contained in process vessels and piping.

2. Symbols

Symbols used in this GP (All terms are expressed as "force" in consistent units unless noted otherwise.)
C = Weight of fluidized solids specified for a single vessel for a particular design operating condition.
S = Total surge force applied to a single vessel and its support structure.
S_v = The portion of S applied directly to the vessel.
S_s = The portion of S applied directly to the support structure.

3. Design

- 1) [R] Surge forces shall be applied to the full length of the process vessel and to any portion of the support structure extending above the support base of the vessel skirt.
- 2) [R] The total surge force, S, applied to a single process vessel and its support structure for selected process units is as shown in Table 1.

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