

Standard Test Method for Static Load Testing of Framed Floor or Roof Diaphragm Constructions for Buildings¹

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This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers procedures designed (1) to evaluate the static shear capacity of a typical segment of a framed diaphragm under simulated loading conditions, and (2) to provide a determination of the stiffness of the construction and its connections. A diaphragm construction is an assembly of materials designed to transmit shear forces in the plane of the construction.

1.2 No effort has been made to specify the test apparatus, as there are a number that can be used as long as the needs of the testing agency are met. If round-robin testing is to be conducted, test apparatus and testing procedures shall be mutually agreed upon in advance by the participants.

1.3 The text of this standard contains notes and footnotes that provide explanatory information and are not requirements of the standard. Notes and footnotes in tables and figures are requirements of this standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For specific precautionary statements, see Section 5.

2. Terminology

2.1 Symbols:

E	= modulus of elasticity of flange or web material, depending upon which material is held constant in a transformed section analysis, psi (or MPa)
G	= shear modulus of the web material, psi (or MPa)

G'	= shear stiffness of the diaphragm obtained from test (includes shear deformation factor for the connection system), lbf/in. (or N/mm)
I	= moment of inertia of the transformed section of the diaphragm based on webs or flanges, in. ⁴ (or mm ⁴)
L	= total span of a simply supported diaphragm, in. (or mm)
P	= concentrated load, lbf (or N)
R_u	= maximum diaphragm reaction, lbf (or N)
S_u	= ultimate shear strength of the diaphragm, lbf/ft (or N/m)
a	= span length of cantilever diaphragm, in. (or mm)
b	= depth of diaphragm, in. (or mm)
t	= thickness of web material, in. (or mm)
w	= uniform load, lbf/in. (or N/mm)
Δ_b	= bending deflection of diaphragm, in. (or mm)
Δ_k	= empirical expression for that portion of the diaphragm deflection contributed by the shear deformation of the connection system, in. (or mm)
Δ_s	= pure shear deformation of diaphragm, in. (or mm)
Δ_s'	= apparent total shear deformation of the diaphragm based on test (see section 8.1.2.2), in. (or mm). This factor includes both the pure shear deformation and that contributed by distortion of the connection system.
Δ_t	= total deflection of diaphragm, in. (or mm)
$\Delta_{1,2, \dots}$	= deformation measured at Point 1, 2, ..., in. (or mm)

3. Summary of Method

3.1 The general purpose of this test method is to evaluate the shear forces that can be carried by the web of a framed floor or roof diaphragm assembly by testing a simulation of the construction. The test method outlines basic procedures for the static load testing of these constructions using simple beam or cantilever-type test specimens. Suggested specimen and test

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