Physical and structural properties.

Steel framing is engineered to take advantage of the physical properties of formed steel to provide strength where needed and as needed in the construction of buildings. This section provides the basic information needed by architects and engineers to make sure the member called for in the plans will meet the criteria required by the structure.

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Symbols and terms.

The following tables are provided to help architects and engineers design structures that withstand various forces. Those forces include vertical loads such as weight from over head, lateral loads such as wind, other applied pressure or a combination of those. Such natural forces can result in deflection and/or twisting of cold-formed steel framing materials.

Key among these tables are the physical and structural properties tables in this next section. The tables provide typical data required to make determinations about the suitability of materials for certain intended purposes. The nature of those data are identified by commonly used engineering symbols and terms. This legend will help you to understand the symbols and terms used here.

Ix = $in.^4$: Moment of inertia about the X-X axis, used for DEFLECTION
Sx = $in.^3$: Section modulus about the X-X axis, used for STRESS & LOADS
Rx = in.: Radius of gyration about the X-X axis
Iy = $in.^4$: Moment of inertia about the Y-Y axis
Ry = in.: Radius of gyration about the Y-Y axis, used for AXIAL LOADS

Wind load (lbs./sq. ft.): Forces produced by wind, either direct wind (positive pressure), a vacuum (negative pressure) or those generated by wind whipping around the corners of a building. These forces are usually calculated according to the prevailing building code. Wind forces are referred to as transverse loads, are perpendicular to the wall and cause the wall to deflect.

Axial load (lbs.): A vertical force produced by overhead loads such as floors and roof. Floors and roofs contain both dead loads and live loads, which combine to make up most of the vertical loading.

Header: A joist or beam that spans two or more studs, accepts overhead loads from floors and roof and distributes the overhead load to the studs.

Deflection: The amount of movement of a system, usually greatest at the midpoint, caused by transverse loading.

L/120: Length (height) of stud, in inches, divided by 120 (short interior wall studs)
L/240: Length (height) of stud, in inches, divided by 240 (interior wall studs, exterior siding or EIFS)
L/360: Length (height) of stud, in inches, divided by 360 (exterior stucco)
L/600: Length (height) of stud, in inches, divided by 600 (exterior brick)
L/720: Length (height) of stud, in inches, divided by 720 (exterior brick)

Limited deflection: A design criteria which specifies the maximum allowable deflection for a system (L/240, L/360, L/600, etc.). Deflection modification factor = IBC 2006 table 1604.3, note f. Allows wind load to be multiplied by 0.7 for checking "component and cladding" deflection limits.