STANDARD SPECIFICATION FOR STRUCTURAL STEEL FOR BUILDINGS

As adopted by the
American Institute of Steel Construction

1. This Specification defines the practice adopted by the American Institute of Steel Construction for the design, fabrication, and erection of structural steel for buildings.

2. GENERAL

To obtain a satisfactory structure, the following major requirements must be fulfilled.

(a) The material used must be suitable, of uniform quality, and without defects affecting the strength or service of the structure.

(b) Proper loads and conditions must be assumed in the design.

(c) The unit stresses must be suitable for the material used.

(d) The workmanship must be good, so that defects or injuries are not produced in the manufacture.

(e) The computations and design must be properly made so that the unit stresses specified shall not be exceeded, and the structure and its details shall possess the requisite strength and rigidity.

3. MATERIAL

Structural steel shall conform to the Standard Specifications of the American Society for Testing Materials for Structural Steel for Buildings, Serial Designation A 9-21, as amended to date.

4. LOADING

(a) Steel structures shall be designed to sustain the dead weight imposed upon them, including the weight of the steel frame itself, and, in addition, the maximum live load as specified in each particular case. Proper provision shall be made for temporary stresses caused by erection.

(b) In cases where live loads have the effect of producing impact or vibration, a proper percentage shall be added to the static live load stresses to provide for such influences, so that the total stress found in any member is an equivalent static stress.

(c) Proper provision shall be made for stresses caused by wind both during erection and after completion of the building. The wind pressure is dependent upon the conditions of exposure, but the allowable stresses specified in section five (5), paragraphs (f) and (g), are based upon the steel frame being designed to carry a wind pressure of not less than twenty (20) pounds

per square foot on the vertical projection of exposed surfaces during erection, and fifteen (15) pounds per square foot on the vertical projection of the finished structure.

(d) Proper provision shall be made to securely fasten the reaction points of all steel construction and transmit the stresses to the foundations of the structure.

5. ALLOWABLE STRESSES

All parts of the structure shall be so proportioned that the sum of the maximum static stresses in pounds per sq. in. shall not exceed the following:

(a) *Tension.

Rolled Steel, on net section 18000

On the area of the nominal diameter of rivets under the limitations defined in Section 13, Paragraph **e** 13500

(b) Compression.

Rolled Steel, on short lengths or where lateral deflection is prevented. 18000

On gross section of columns,

$$\frac{18000}{1 + \frac{l^2}{18000 r^2}}$$

with a maximum of 15000

in which l is the unsupported length of the column, and r is the corresponding least radius of gyration of the section, both in inches.

For main compression members, the ratio l/r shall not exceed 120, and for bracing and other secondary members, 200.

(c) Bending.

On extreme fibres of rolled shapes, and built up sections, net section, if lateral deflection is prevented 18000

When the unsupported length l exceeds 15 times b, the width of the compression flange, the stress in pounds per sq. in. in the latter shall not exceed

$$\frac{20000}{1 + \frac{l^2}{2000 b^2}}$$

The laterally unsupported length of beams and girders shall not exceed 40 times b the width of the compression flange.

On extreme fibres of pins, when the forces are assumed as acting at the center of gravity of the pieces 27000

(d) Shearing.

On pins 13500

On power-driven rivets 13500

On turned bolts in reamed holes with a clearance of not more than 1/50 of an inch 13500

On hand-driven rivets 10000

On unfinished bolts 10000

*revised Nov. 1st, 1928.

On the gross area of the webs of beams and girders, where h, the height between flanges in inches, is not more than 60 times t, the thickness of the web in inches 12000

On the gross area of the webs of beams and girders if the web is not stiffened where h, the height between flanges in inches, is more than 60 times t, the thickness of the web, the maximum shear per square inch, $\frac{V}{A}$, shall not exceed

$$\frac{18000}{1 + \frac{h^2}{7200\,t^2}}$$

In Which V is the total shear, and A is gross area of web in square inches.

(e) Bearing.

	Double Shear	Single Shear
On pins	30000	24000
On power-driven rivets	30000	24000
On turned bolts in reamed holes	30000	24000
On hand-driven rivets	20000	16000
On unfinished bolts	20000	16000

On expansion rollers per lineal inch 600 times the diameter of the roller in inches.

(f) **Combined Stresses.** For combined stresses due to wind and other loads, the permissible working stress may be increased 33⅓%, provided the section thus found is not less than that required by the dead and live loads alone.

(g) **Members Carrying Wind Only.**
For members carrying wind stresses only, the permissible working stresses may be increased 33⅓%.

6. SYMMETRICAL MEMBERS.

Sections shall preferably be symmetrical.

7. BEAMS AND GIRDERS.

(a) **Rolled beams** shall be proportioned by the moment of inertia of their net section. Plate girders with webs fully spliced for tension and compression shall be so proportioned that the unit stress on the net section does not exceed the stresses specified in section five (5) as determined by the moment of inertia of the net section.

(b) **Plate girder webs** shall have a thickness of not less than 1-160 of the unsupported distance between the flanges.

(c) **Web splices** shall consist of a plate on each side of the web capable of transmitting the full stress through the splice rivets.