

WORKING STRESSES

The values given in the safe load tables are based on the allowable stresses in BS 449 as follows:

Thickness of material (mm)	Grade of steel	Allowable stresses (N/mm ²)		
		Bending	Shear* ¹	Bearing
Up to and including 40	43	165	100	190
Over 40		150	90	
Up to and including 65	50	230	140	260
Over 65		$Y_b/1.52^{*2}$		
Up to and including 40	55	280	170	320
Over 40		260	160	

Note: *1 On unstiffened web.

*2 Y_b = yield stress, to be agreed with the manufacturer and not to exceed 350N/mm². This applies only to universal column sections and plated compound sections and, in this handbook, affects certain universal column stanchions only for which a value of $Y_b = 325\text{N/mm}^2$ has been assumed.

Web buckling

The buckling values for the unstiffened webs have been calculated in accordance with the formula in Clause 28a(i) of BS 449, namely $W = p_c t B$ where

- W = allowable reaction or concentrated load in N, but tabulated in kN.
- p_c = allowable axial stress for struts as given in BS 449, Clause 30a for a slenderness ratio of $(d/3)/t$, in which
- d = clear depth of web between root fillets
- t = web thickness
- B = $\frac{1}{2}D + t_p + L_b$, for end bearings of simply supported beams
- = $D + 2t_p + L_b$, for intermediate bearings, in which
- D = overall depth of beam
- t_p = thickness of bearing and/or flange plate
- L_b = length of stiff portion of bearing which shall not be taken as greater than half depth of beam for simply supported beams and the full depth of beam for an intermediate bearing over which the beam is continuous, unless the web is stiffened.

Web crushing

To prevent local crushing of the web, the direction bearing stress at the root of the web is limited to the values given in BS 449, and included in the table above.

The length of web resisting crushing is determined on the assumption that the load is dispersed through the flange and the bearing and/or flange plate at an angle of 30° (BS 449, Clause 27e).

COMBINED STRESSES

Where bending and shear stresses, or bearing, bending and shear stresses, are co-existent, the beam should be checked in accordance with BS 449, Clauses 14.c and d.