

BUCKLING STRESS COEFFICIENTS FOR FLAT PLATES TAPERED IN PLAN, UNDER COMPRESSION

1. NOTATION

a	length of panel measured perpendicular to ends	m	in
b_1	plate width at narrow end	m	in
b_2	plate width at wide end	m	in
E	Young's modulus of plate material	N/m ²	lbf/in ²
f_1	compressive stress at end with width b_1	N/m ²	lbf/in ²
f_2	compressive stress at end with width b_2	N/m ²	lbf/in ²
K	buckling coefficient defined by $f_2 = KE \left(\frac{t}{b_2} \right)^2$		
t	plate thickness	m	in
ν	Poisson's ratio (assumed to be 0.3)		

Both SI and British units are quoted but any coherent system of units may be used.

2. NOTES

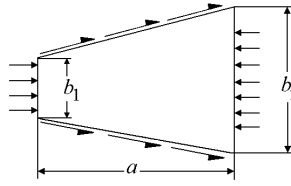
Elastic buckling coefficients K are given for flat plates of constant thickness tapered symmetrically in plan when loaded by uniform, but not necessarily equal, compressive loads on the parallel ends. The buckling coefficient, K , is plotted against a/b_2 for several values of b_1/b_2 and of f_1/f_2 and for various edge conditions.

The full lines on Figures 1 to 12 apply when the difference in load between the ends is balanced by shear distributed along the sloping sides; there is no stress normal to the sides. The broken lines on Figures 5 to 8 are for the cases of constant longitudinal stress and no displacement normal to the axis of taper.

3. DERIVATION

1. POPE, G.G. The buckling of plates tapered in planform. ARC R & M 3324, 1963

Issued July 1963



$$F_1/F_2 = 0.8$$

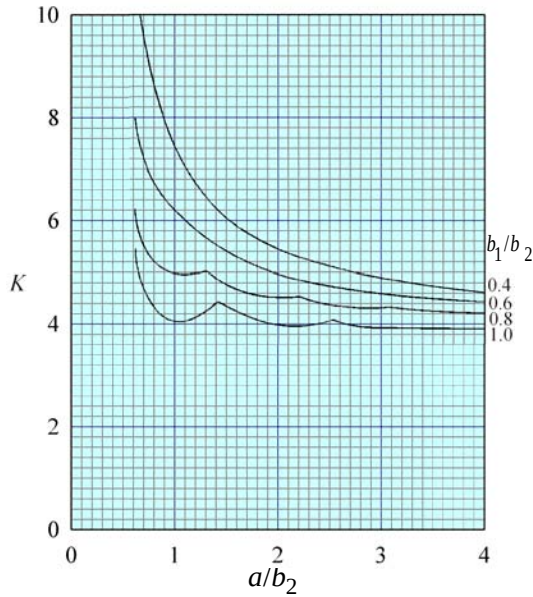


**FIGURE 1 ENDS AND SIDES
SIMPLY-SUPPORTED**

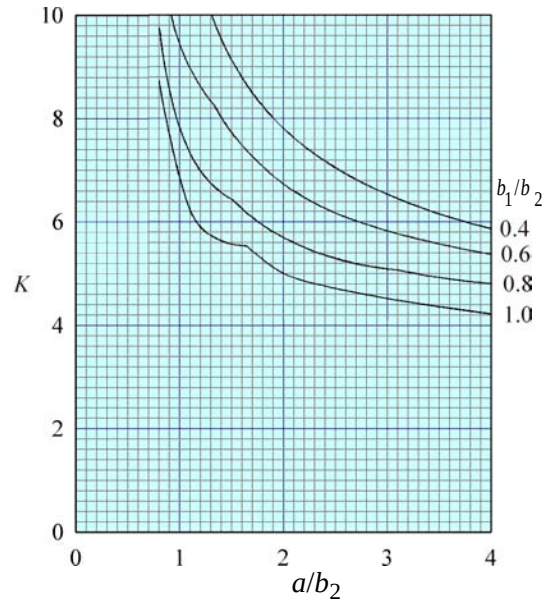


**FIGURE 2 ENDS CLAMPED, SIDES
SIMPLY-SUPPORTED**

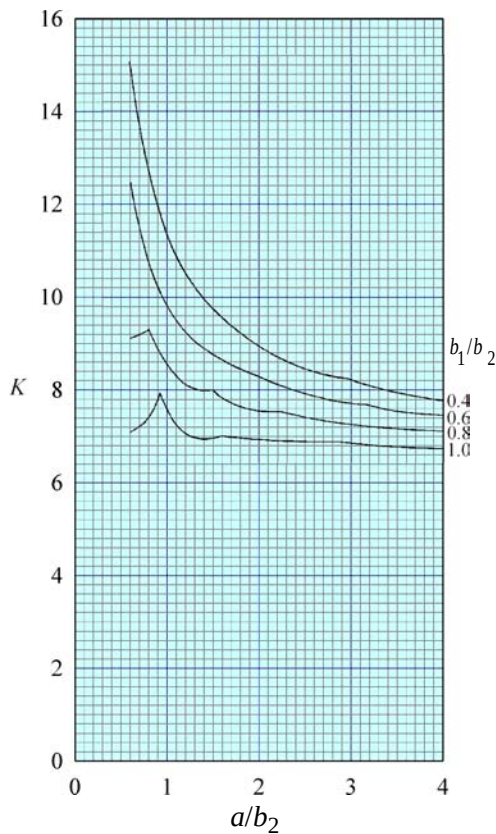


**FIGURE 3 ENDS SIMPLY-SUPPORTED
SIDES CLAMPED**

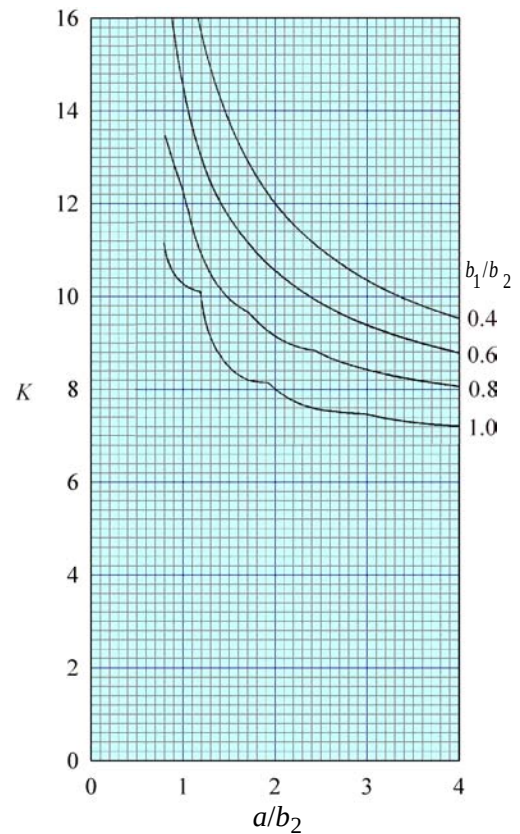


**FIGURE 4 ENDS AND SIDES
CLAMPED**