

Beam Deflection Cases

Mechanical Engineering

Maximum deflection for the five standard cases, ready to use.

Small deflection, linear-elastic material, constant EI along the span.

Beam and load	Maximum deflection
Cantilever, end load P	$PL^3 \div 3EI$
Cantilever, uniform load w	$wL^4 \div 8EI$
Simple span, centre load P	$PL^3 \div 48EI$
Simple span, uniform load w	$5wL^4 \div 384EI$
Both ends fixed, uniform w	$wL^4 \div 384EI$

Deflection goes as the cube or fourth power of span. Halving the span cuts it by 8 or 16 times.