PRELIMINARY BEAM DESIGN REPORT

Element: Beam 1

Design Code: BS EN 1992-1-1:2004 | Date: 27 October 2026

REFERENCE	CALCULATIONS	OUTPUT
EN 1992-1-1:2004 Material Properties	**MATERIAL PROPERTIES** Concrete Strength, f_{ck} = 30.0 N/mm² Concrete Grade = C30/37 Fire Resistance = 2.0 hours Reinforcement Dia: φ = 16.0 mm	**f_{ck} = 30.0 N/mm²** **Grade: C30/37** **Fire: R2.0** **φ = 16.0 mm**
Table 4.3N Structural Class	**STRUCTURAL CLASS** Exposure Class = XC1 Design Working Life = 50.0 years Structural Class per Table 4.3N with modifications: Design working life = 50 years → Initial structural class = S4 Concrete strength fck = 30.0 MPa (≥ 30 MPa) and exposure class XC1 → Reduce structural class by 1 (S4 → S3) Beam geometry (not slab) → No reduction No special quality control → No reduction → Final Structural Class: **S3**	**Exposure: XC1** **Life: 50.0 yrs** **Class: S3**
Table 4.4N EN 1992-1-1 §4.4.1 Concrete Cover	**CONCRETE COVER** **Durability Cover:** For structural class = S3 and exposure class: XC1 $C_{min,dur}$ = 10 mm (Table 4.4N) **Bond Cover:** $C_{min,b}$ = 1.0 × φ $C_{min,b}$ = 1.0 × 16.0 = 16.0 mm **Minimum Cover:** $c_{min} = \max(c_{min,b}, c_{min,dur} + \Delta c_{dur}, 10$ $c_{min} = \max(10, 16.0, 10) = 16.0mm$ **Nominal Cover:** $c_{nom} = c_{min} + \Delta c_{dev} = 16.0 + 10.0 = 26.0mm$ **Adopted Cover = 30.0 mm**	**$C_{min,dur}$ = 10 mm** **$C_{min,b}$ = 16.0 mm** **c_{min} = 16.0 mm** **c_{nom} = 26.0 mm** **Cover = 30.0 mm**
EN 1992-1-1 §7.4.2 Beam Sizing	**BEAM DIMENSIONS** Span Length: L = 3000.0 mm Basic L/d Ratio = 30.0 **Minimum Effective Depth:** $d_{min} \geq \frac{L}{ratio} = \frac{3000.0}{30.0} = 100.0mm$ **Minimum Overall Depth:** $h_{min} \geq d_{min} + cover + \frac{\phi}{2} = 100.0 + 30.0 + \frac{16.0}{2} = 138.0mm$ **Adopted: b = 215.0 mm, h = 450.0 mm**	**L = 3000.0 mm** **L/d = 30.0** **d_{min} ≥ 100.0 mm** **h_{min} ≥ 138.0 mm** **b = 215.0 mm** **h = 450.0 mm**