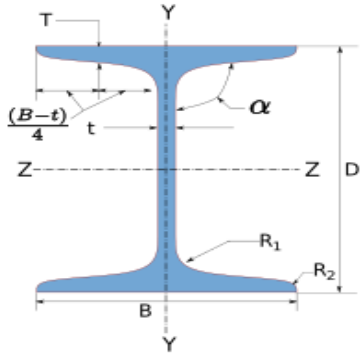
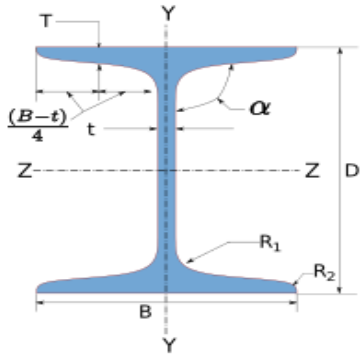


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## 1 Input Parameters

Module		Fin Plate		
MainModule		Shear Connection		
Connectivity		Column flange-Beam web		
Shear(kN)*		10.0		
Supporting Section				
	Supporting Section		HB 350	
	Material *		E 250 (Fe 410 W)A	
	Ultimate strength, fu (MPa)		410	
	Yield Strength , fy (MPa)		230	
	Mass	67.4	Iz(cm4)	192000000.0
	Area(cm2) - A	8590.0	Iy(cm4)	24500000.0
	D(mm)	350.0	rz(cm)	149.0
	B(mm)	250.0	ry(cm)	53.4
	t(mm)	8.3	Zz(cm3)	1090000.0
	T(mm)	11.6	Zy(cm3)	196000.0
	FlangeSlope	94	Zpz(cm3)	1090000.0
	R1(mm)	12.0	Zpy(cm3)	196000.0
	R2(mm)	6.0		
Supported Section				
	Supported Section		JB 200	
	Material *		E 250 (Fe 410 W)A	
	Ultimate strength, fu (MPa)		410	
	Yield Strength , fy (MPa)		230	
	Mass	9.9	Iz(cm4)	7810000.0
	Area(cm2) - A	1260.0	Iy(cm4)	173000.0
	D(mm)	200.0	rz(cm)	78.60000000000001
	B(mm)	60.0	ry(cm)	11.7
	t(mm)	3.4	Zz(cm3)	78100.0
	T(mm)	5.0	Zy(cm3)	5800.0
	FlangeSlope	91.5	Zpz(cm3)	78100.0
	R1(mm)	5.0	Zpy(cm3)	5800.0
	R2(mm)	1.5		
Bolt Details				
Diameter(mm)*		[12.0, 16.0, 20.0, 24.0, 30.0, 36.0]		
Grade *		[3.6, 4.6, 4.8, 5.6, 5.8, 6.8, 8.8, 9.8, 10.9, 12.9]		
Type *		Bearing Bolt		
Bolt hole type		Standard		
Slip factor (μ_f)		0.3		
Type of edges		a - Sheared or hand flame cut		

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Gap between beam and  support (mm)	10.0
Are the members exposed to  corrosive influences	False
<b>Weld Details</b>	
Weld Type	Fillet
Type of weld fabrication	Shop Weld
Material grade overwrite (MPa) Fu	410.0

## 2 Design Checks

### 2.1 Bolt Design Checks

Check	Required	Provided	Remarks
Shear Capacity (kN)		$V_{dsb} = \frac{f_u b n_n A_{nb}}{\sqrt{3} \gamma_{mb}}$ $= \frac{410 * 1 * 84.3}{\sqrt{3} * 1.25}$ $= 11.68$	
Bearing Capacity (kN)		$V_{dpb} = \frac{2.5 k_b d t f_u}{\gamma_{mb}}$ $= \frac{2.5 * 0.52 * 12.0 * 3.4 * 410}{1.25}$ $= 11.68$	
Capacity (KN)		$V_{db} = \min (V_{dsb}, V_{dpb})$ $= \min (11.68, 11.68)$ $= 11.68$	
No of Bolts	$R_u = \sqrt{V_u^2 + A_u^2}$ $n_{trial} = R_u / V_{bolt}$ $R_u = \frac{\sqrt{10.0^2 + 10.0^2}}{11.68}$ $= 2$	2	
No of Columns		1	
No of Rows		2	
Min. Pitch (mm)	$p/g_{min} = 2.5 d$ $= 2.5 * 12.0 = 30.0$	0.0	N/A
Max. Pitch (mm)	$p/g_{max} = \min(32 t, 300 mm)$ $= \min(32 * 3.4, 300 mm)$ $= 300$	0.0	N/A
Min. Gauge (mm)	$p/g_{min} = 2.5 d$ $= 2.5 * 12.0 = 30.0$	70	Pass
Max. Gauge (mm)	$p/g_{max} = \min(32 t, 300 mm)$ $= \min(32 * 3.4, 300 mm)$ $= 300$	70	Pass
Min. End Distance (mm)	$e/e'_{min} = [1.5 \text{ or } 1.7] * d_0$ $= 1.7 * 13.0 = 22.1$	25	Pass

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Check	Required	Provided	Remarks
Max. End Distance (mm)	$e/e'_{max} = 12 t \varepsilon$ $\varepsilon = \sqrt{\frac{250}{f_y}}$ $e/e'_{max} = 12 * 4.0 * \sqrt{\frac{250}{230}}$ $= 49.92$	25	Pass
Min. Edge Distance (mm)	$e/e'_{min} = [1.5 \text{ or } 1.7] * d_0$ $= 1.7 * 13.0 = 22.1$	25	Pass
Max. Edge Distance (mm)	$e/e'_{max} = 12 t \varepsilon$ $\varepsilon = \sqrt{\frac{250}{f_y}}$ $e/e'_{max} = 12 * 4.0 * \sqrt{\frac{250}{230}}$ $= 49.92$	25	Pass
Capacity (KN)	11180.34	11680.95	Pass

## 2.2 Plate Design Checks

Check	Required	Provided	Remarks
Min. Plate Height (mm)	$0.6 * d_b = 0.6 * 200.0 = 120.0$	120	Pass
Max. Plate Height (mm)	$d_b - 2(t_{bf} + r_{b1} + gap)$ $= 200.0 - 2 * (5.0 + 5.0 + 10)$ $= 180.0$	120	Pass
Min. Plate Length (mm)	$2 * e_{min} + (n_c - 1) * p_{min}$ $= 2 * 22.1 + (1 - 1) * 30.0$ $= 54.2$	60.0	Pass
Min. Plate Thickness (mm)	$t_w = 3.4$	4.0	Pass
Shear yielding Capacity (V_dy) (kN)		$V_{dg} = \frac{A_v * f_y}{\sqrt{3} * \gamma_{mo}}$ $= \frac{120 * 4.0 * 230}{\sqrt{3} * 1.1}$ $= 34.77$	
Shear Rupture Capacity (V_dn) (kN)		$V_{dn} = \frac{0.75 * A_{vn} * f_u}{\sqrt{3} * \gamma_{mo}}$ $= 1 * (120 - (2 * 13.0)) * 4.0 * 410$ $= 115.62$	
Block Shear Capacity in Shear (V_db) (kN)		72.55	
Shear Capacity (V_d) (kN)	10.0	$V_d = \text{Min}(V_{dy}, V_{dn}, V_{db})$ $= \text{Min}(34.77, 115.62, 72.55)$ $= 34.77$	Pass

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Check	Required	Provided	Remarks
Tension Yielding Capacity (kN)		$T_{dg} = \frac{l * t * f_y}{\gamma_{mo}}$ $= \frac{60.0 * 4.0 * 230}{\sqrt{3} * 1.1}$ $= 50.18$	
Tension Rupture Capacity(kN)		$T_{dn} = \frac{0.9 * A_n * f_u}{\gamma_{m1}}$ $= \frac{0.9 * (60.0 - 2 * 13.0) * 4.0 * 410}{1.25}$ $= 55.5$	
Block Shear Capacity in Tension (T_db) (kN)		72.55	
Tension Capacity (kN)	10.0	$T_d = \text{Min}(T_{dg}, T_{dn}, T_{db})$ $= \text{Min}(50.18, 55.5, 72.55)$ $= 50.18$	Pass
Moment Capacity (kNm)	0.35	2.41	Pass
Interaction Ratio	$\leq 1$	$\frac{0.35}{2.41} + \frac{10.0}{50.18} = 0.34$	Pass

### 2.3 Weld Checks

Check	Required	Provided	Remarks
Min Weld Size (mm)	<i>Thickness of Thicker part</i> $= \text{Max}(11.6, 11.6) = 11.6$ <i>IS800 : 2007 cl.10.5.2.3 Table21,</i> $t_{w_{min}} = 4.0$	4	Pass
Max Weld Size (mm)	<i>Thickness of Thinner part</i> $= \text{Min}(11.6, 11.6) = 4.0$ $t_{w_{max}} = 4.0$	4	Pass
Weld Strength (kN/mm)	$R_w = \sqrt{(T_{wh} + A_{wh})^2 + (T_{wv} + V_{wv})^2}$ $T_{wh} = \frac{M * y_{max}}{I_{pw}} = \frac{350000.0 * 56.0}{234154.67}$ $T_{wv} = \frac{M * x_{max}}{I_{pw}} = \frac{350000.0 * 0.0}{234154.67}$ $V_{wv} = \frac{V}{l_w} = \frac{10000.0}{224}$ $A_{wh} = \frac{A}{l_w} = \frac{10000.0}{224}$ $R_w = \sqrt{(83.71 + 44.64)^2 + (0.0 + 44.64)^2}$ $= 135.89$	$f_w = \frac{t_t * f_u}{\sqrt{3} * \gamma_{mw}}$ $= \frac{3 * 410}{\sqrt{3}} * 1.25$ $= 568.11$	Pass

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3 3D View



Figure 1: 3D View