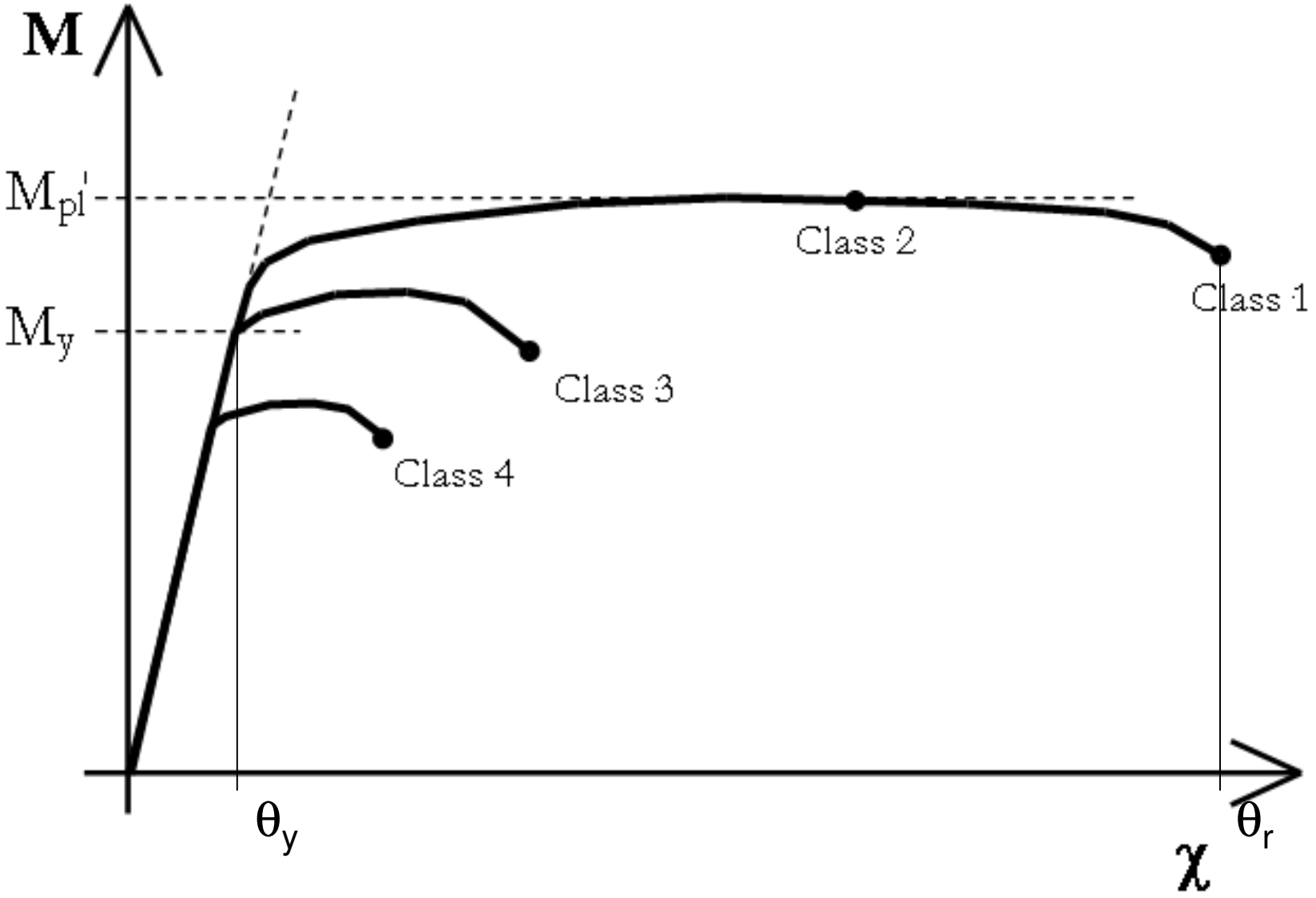
Classification of steel sections

According to EN 1993-1: 2005
and the Italian Code

Conceptual definition



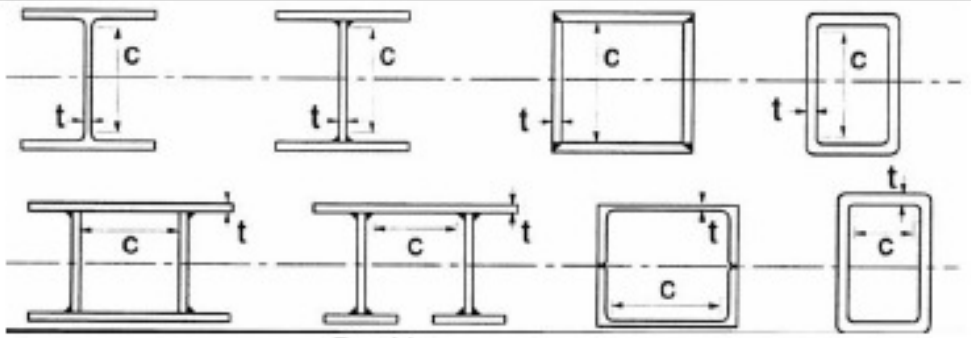
Conceptual definition

Rotational capacity

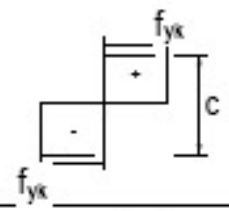
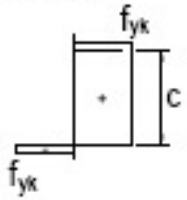
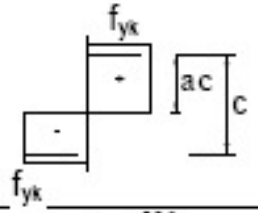
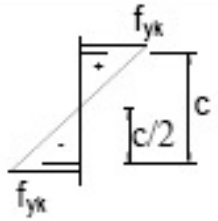
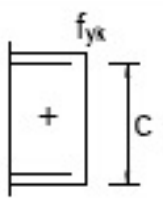
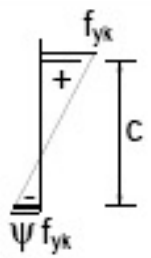
$$C_\vartheta = \vartheta_r / \vartheta_y - 1$$

- Class 1 → $C_\vartheta \geq 3.0$
- Class 2 → $C_\vartheta \geq 1.5$
- Class 3 → $C_\vartheta \approx 1.0$
- Class 4 → $C_\vartheta < 1.0$

Classification/1



Parti interne compresse

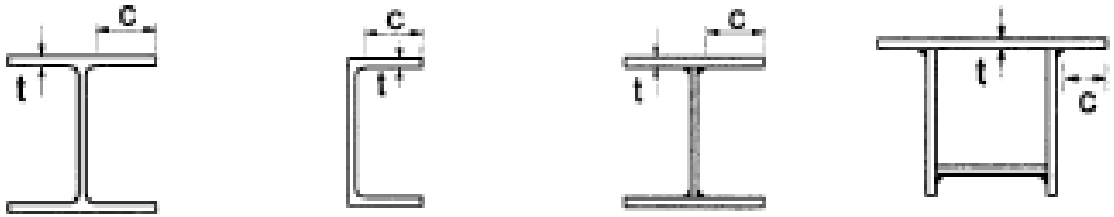
Classe	Parte soggetta a flessione	Parte soggetta a compressione	Parte soggetta a flessione e a compressione
Distribuzione delle tensioni nelle parti (compressione positiva)			
1	$c/t \le 72\varepsilon$	$c/t \le 33\varepsilon$	quando $\alpha > 0{,}5 : c/t \le \frac{396\varepsilon}{13\alpha - 1}$ quando $\alpha \le 0{,}5 : c/t \le \frac{36\varepsilon}{\alpha}$
2	$c/t \le 83\varepsilon$	$c/t \le 38\varepsilon$	quando $\alpha > 0{,}5 : c/t \le \frac{456\varepsilon}{13\alpha - 1}$ quando $\alpha \le 0{,}5 : c/t \le \frac{41{,}5\varepsilon}{\alpha}$
Distribuzione delle tensioni nelle parti (compressione positiva)			
3	$c/t \le 124\varepsilon$	$c/t \le 42\varepsilon$	quando $\psi > -1 : c/t \le \frac{42\varepsilon}{0{,}67 + 0{,}33\psi}$ quando $\psi \le -1^{*} : c/t \le 62\varepsilon(1 - \psi)\sqrt{(-\psi)}$

$\varepsilon = \sqrt{235/f_{yk}}$	f_{yk}	235	275	355	420	460
	ε	1,00	0,92	0,81	0,75	0,71

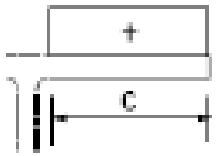
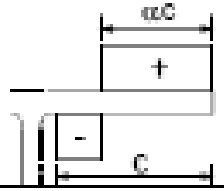
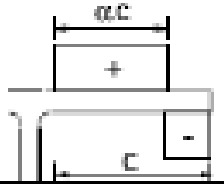
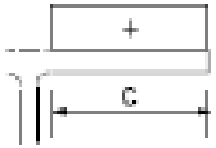
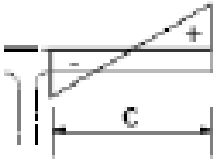
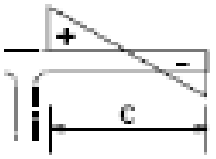
*) $\psi \le -1$ si applica se la tensione di compressione $\sigma \le f_{yk}$ o la deformazione a trazione $\varepsilon_y > f_{yk}/E$

Classification/2

Piattabande esterne



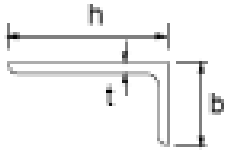
Profilati laminati a caldo — **Sezioni saldate**

Classe	Piattabande esterne soggette a compressione	Piattabande esterne soggette a flessione e a compressione	
		Con estremità in compressione	Con estremità in trazione
Distribuzione delle tensioni nelle parti (compressione positiva)			
1	$c/t \le 9\varepsilon$	$c/t \le \frac{9\varepsilon}{\alpha}$	$c/t \le \frac{9\varepsilon}{\alpha\sqrt{\alpha}}$
2	$c/t \le 10\varepsilon$	$c/t \le \frac{10\varepsilon}{\alpha}$	$c/t \le \frac{9\varepsilon}{\alpha\sqrt{\alpha}}$
Distribuzione delle tensioni nelle parti (compressione positiva)			
3	$c/t \le 14\varepsilon$	$c/t \le 21\varepsilon\sqrt{k_\sigma}$ Per k_σ vedere EN 1993-1-5	

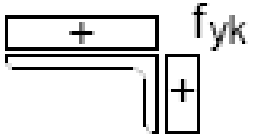
$\varepsilon = \sqrt{235/f_{yk}}$	f_{yk}	235	275	355	420	460
	ε	1,00	0,92	0,81	0,75	0,71

Classification/3

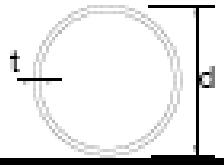
Angolari



Riferirsi anche alle piattabande esterne (v. Tab 4.2.II)
Non si applica agli angoli in contatto continuo con altri componenti

Classe	Sezione in compressione
Distribuzione delle tensioni sulla sezione (compressione positiva)	
3	$h/t \le 15\varepsilon$ $\qquad \frac{b+h}{2t} \le 11,5\varepsilon$

Sezioni Tubolari



Classe	Sezione inflessa e/o compressa
1	$d/t \le 50\varepsilon^2$
2	$d/t \le 70\varepsilon^2$
3	$d/t \le 90\varepsilon^2$ $\qquad$ (Per $d/t > 90\,\varepsilon^2$ vedere EN 1993-1-6)

$\varepsilon = \sqrt{235/f_{yk}}$

f_{yk}	235	275	355	420	460
ε	1,00	0,92	0,81	0,75	0,71
ε^2	1,00	0,85	0,66	0,56	0,51