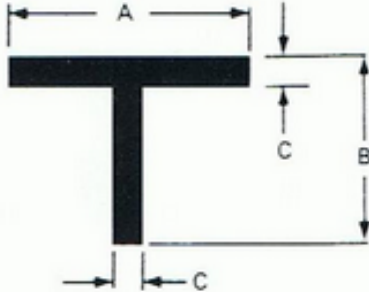## Mild Steel › T Section

Buy Mild Steel T Section Online.

Mild steel is sometimes referred to as carbon steel or plain steel. Typically, it is stiff and strong. Carbon steels do rust easily, but they can be easily painted or primed. They are cheap so they are the normal choice for most fabrications.

Mild Steel T Sections, also known as T Bars or Steel Tees, are often used for general fabrication. The bar is stocked in 3m or 6m lengths – but each length can be cut down further to meet each individual's desires. (PLEASE SEE OUR FREE CUTTING SERVICE*).

Description	Was (Ex VAT)	Now Only (Ex VAT)	Now Only (Inc. VAT)
25mm x 25mm x 3mm Mild Steel T Bar - 3 metre		£12.90	

Source: http://www.themetalstore.co.uk/products/steel-t-section 31/03/14

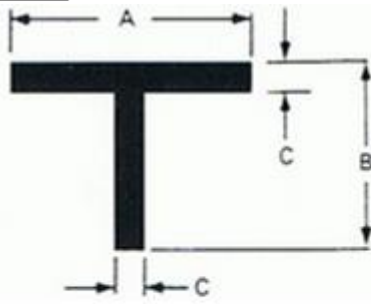### Density of mild steel: $7.8g/cm^3$ VAT is charged at 20%

1. Use the information in the description above to complete the two blank boxes.

2. Find the mass of a single T bar.

3. How much – including VAT – does the T bar cost, **per kilogram**?

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1. Use the information in the description above to complete the two blank boxes.

The 10% off sale gives a new price of £12.90, so the old price can be calculated by doing the reverse of a 10% decrease: $12.9 \div 0.9 = £\mathbf{14.33}$

VAT is an increase of 20%, so is calculated by: $12.9 \times 1.2 = £\mathbf{15.48}$

2. Find the mass of a single T bar.

To find the volume, first interpret the description $25mm \times 25mm \times 3mm$ in relation to the diagram. Labels A and B are both $25mm$ and label C is $3mm$. The diagram shows the cross-section, so to find the total volume we need the length ($3m$) as well as the area of this cross-section:

$$Area\ of\ cross-section:\quad 25mm \times 3mm + 22mm \times 3mm = 141mm^2$$
$$Volume\ of\ T\ bar:\quad 141mm^2 \times 3000mm = 423{,}000mm^3$$

Next, we need to convert this to cm^3 to fit with the density units: $423{,}000mm^3 = 423cm^3$

This uses $1000mm^3 = 1cm^3$ (consider $1cm^3 = 10mm \times 10mm \times 10mm = 1000mm^3$)
Alternatively, convert original units all into centimetres, getting:

$$Area\ of\ cross-section:\quad 2.5cm \times 0.3cm + 2.2cm \times 0.3cm = 1.41cm^2$$
$$Volume\ of\ T\ bar:\quad 1.41cm^2 \times 300cm = 423cm^3$$

Finally, apply the formula $Density = \frac{Mass}{Volume}$: $\quad 7.8 = \frac{M}{423} \quad \Rightarrow \quad M = 3299.4g \approx \mathbf{3.3kg}$

3. How much – including VAT – does the T bar cost, **per kilogram**?

Using total cost and total mass: $£15.48 \div 3.3 = £\mathbf{4.69}$