

WIDE FLANGE MEASURING ACTIVITY

ACTUAL BILL OF MATERIALS

- Wide flange section of any size or length
- Caliper
- Measuring tape

FABRICATION

- Select a piece of steel with access to the cross-section

ACTIVITY

- Start – explain how to use a caliper and a measuring tape, specifically identifying the fractional dimensions on each tool
- Identify each part of a wide flange shape
 - Top and bottom flanges
 - Web
 - The “k-area” or flange-to-web fillet radius
- Using the worksheet, measure the identified parts of the wide flange
- Complete the guided math problems
- Referencing the section properties found on the worksheet, use the online [Structural Steel Dimensioning Tool](#) to identify the wide flange section classification

HIGHLIGHTS

- Domestic steel mills use the electric arc furnace process to [make steel employing at least 93% recycled steel material](#)—the process is detailed in the [Nucor-Yamato Steel – Blytheville VR/360° Tour](#) video
- When compared to a single-family home construction material like rectangular-shaped lumber, the “I” shape of a wide flange might seem odd, however, it is a highly optimized shape for construction and use of material.
 - The wide flange shape optimizes the structural use of the material. When a wide flange is used in bending like in a beam, the taller the section and the more material concentrated at the top and bottom of the section, the stronger and stiffer that member is.
 - The thin flanges and web ease connection design and installation. The geometry allows for shorter fasteners and reduces additional twisting by placing the load transfer from one member to another closer to the members’ centers of gravity.

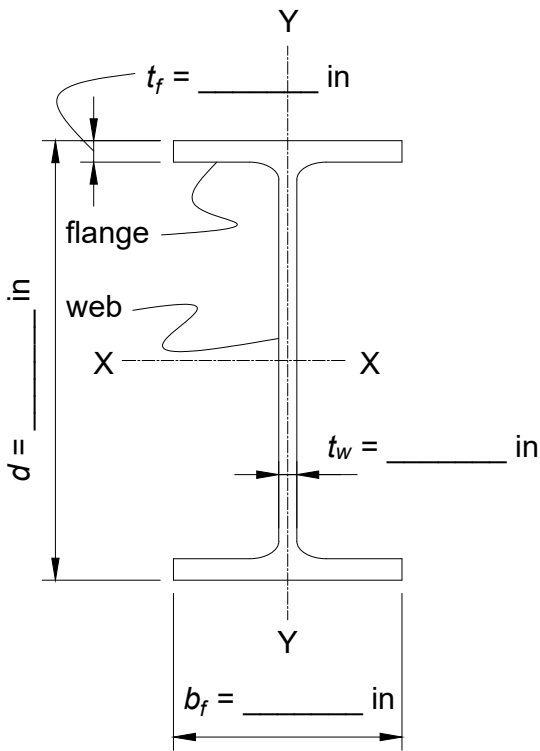


WIDE FLANGE MEASURING ACTIVITY

Name: _____

SECTION MEASUREMENTS

Overall height $d =$ _____ in
 Flange width $b_f =$ _____ in
 Flange thickness $t_f =$ _____ in
 Web thickness $t_w =$ _____ in



Note: Weight of steel = 490 lb/ft³

SECTION AREAS

Approximate flange area $A_f \approx b_f t_f$
 = _____
 $A_f \approx$ _____ in²
 Approximate web area $A_w \approx [d - (2 \times t_f)] \times t_w$
 = _____
 $A_w \approx$ _____ in²

Total approximate section area
 $A_{total} \approx 2 \times A_f + A_w$
 = _____
 $A_{total} \approx$ _____ in²

Total approximate section area converted to ft²
 $A_{total} / (12 \text{ in} \times 12 \text{ in})$
 = _____
 $A_{total} \approx$ _____ ft²

SECTION WEIGHT

Member weight per linear foot
 $w_{total} \approx 490 \text{ lb/ft}^3 \times A_{total}$
 = _____
 $w_{total} \approx$ _____ lb/ft

SECTION IDENTIFICATION

Use the [Structural Steel Dimensioning Tool](#) to identify the wide flange size.

Hint: Member height doesn't always equal the series number.

W _____ x _____

