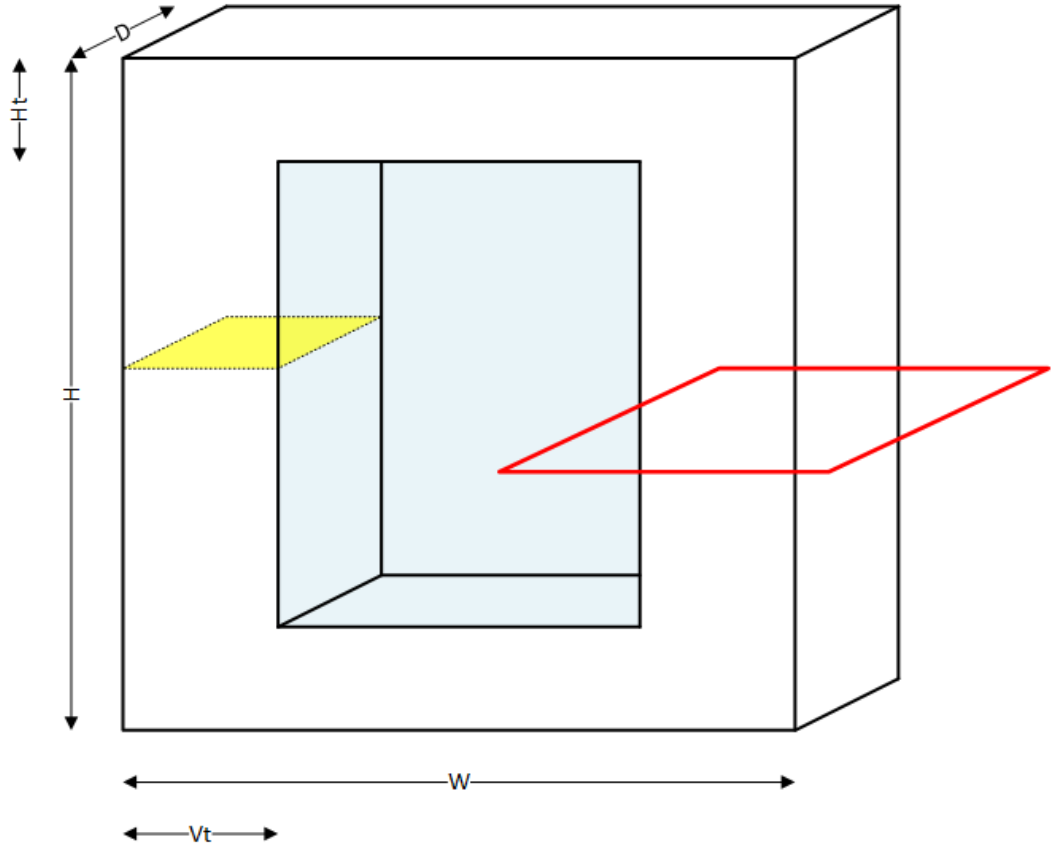
# Core Geometry Coefficient calculation for arbitrarily dimensioned UU core

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Yellow area – core cross-sectional area, Ae, carrying magnetic flux.

Blue area – window area, An, through which copper conductors pass

Red line – Mean length per turn (MLT), In.

Example core is UU 93/76/20. EPCOS Ferrites and Accessories Databook 2017 pp 610

Window fill factor

$K_u := 0.4$

Outer core width

$W := 93\ mm$

Outer core height (2 U cores facing each other)

$H := 2 \cdot 76\ mm = 0.152\ m$

Core thickness for vertical limbs

$Vt := 28\ mm$

Core thickness for horizontal limbs

$Ht := 76\ mm - 48\ mm = 28\ mm$

Core depth

$D := 16\ mm$

Internal width (horizontal dimension of the window)

$W_i := W - Ht \cdot 2 = 37\ mm$

Internal height (vertical dimension of the window)

$H_i := H - Vt \cdot 2 = 96\ mm$

Core cross-sectional area (carrying magnetic flux)

$A_e := D \cdot Vt = 448\ mm^2$

Core window area (through which copper windings are passed)

$A_n := (H - (2 \cdot Vt)) \cdot (W - (2 \cdot Ht)) = 35.52\ cm^2$

Area product (common figure of merit for a wound component core)

$A_p := A_e \cdot A_n = 159.13\ cm^4$

Mean length per turn (first method assuming each turn is rectangular as per drawing)

$$I_n := 2 \cdot D + 2 \cdot Ht + 8 \cdot \frac{W_i}{4} = 0.162\ m$$

Mean length per turn (Mc Lyman's method assuming each turn is rounded somewhat, Mc Lyman, "Transformer and Inductor Design Handbook" Third Ed. Figure 4.48). 2mm is the assumed thickness of the coil former.

$$I_{n1} := 2 \cdot (D + 2 \cdot 2\ mm) + 2 \cdot (Ht + 2 \cdot 2\ mm) + \frac{W_i}{2} \cdot \pi = 0.162\ m$$

Core geometry coefficient (common figure of merit for a wound component core)

$$K_g := \frac{{A_e}^2 \cdot A_n \cdot K_u}{I_n} = 17.602\ cm^5$$