How To Design a Rocket Stove

Sizing the combustion chamber to the pot size

Pot size	Entrance to combustion chamber **L** cm	Cross sectional Area of entrance L^2 =**A** cm^2	Inner Perimeter of combustion chamber $\mathbf{P_{inner}}$ cm	Outer circumference of combustion chamber (assuming 5 cm thick bricks) $\mathbf{C_{outer}}$	**Gap [a] =A/ P_{inner}** Distance between the pot and the inner perimeter of the combustion chamber cm	**Gap [b] =A/ C_{outer}** Distance between the pot and the outer edge of the combustion chamber cm
1-15L	11cm by 11cm **or** 12.5 cylindrical	121 122	44 39.2	87.9* 87.9*	**2.75** **3.1**	**1.37** **1.37**
15-50L	15 by 15	225	60	78.5	**3.75**	**2.86**
50-100L	16.5 by 16.5	272.25	66	83.2	**4.12**	**3.27**
100-150L	20 by 20	400	80	94.2	**5**	**4.24**
200-250L	22 by 22	484	88	100.5	**5.5**	**4.81**

(*This is based on a common size single pot rocket stove that has a 28cm diameter stove body. Obviously a stove body with a larger diameter would require an even smaller Gap[b]

The numbers that are given for Gap [A] and Gap [B] are minimums. If flow problems exist with these dimensions then the gaps can be increased by 5 mm.

The thickness of the insulation under the pot is equal to the **height of the pot supports minus the required Gap**.
Take the 20cm by 20cm combustion chamber as an example. If 6 cm pot supports are used and we require a 4.24 cm Gap [B] then we need to fill the stove with 1.76 cm of insulation. Notice that in the plans a 1.7 cm square mould is welded on the stove at Gap [B]

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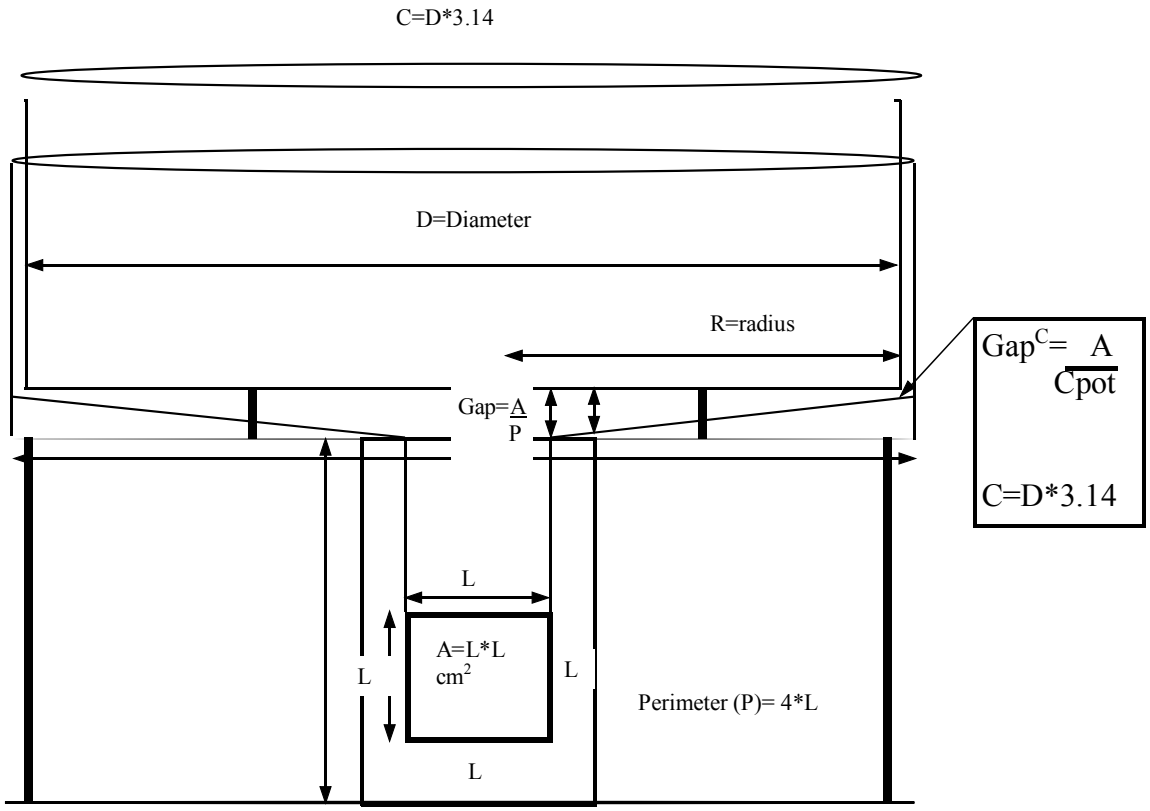
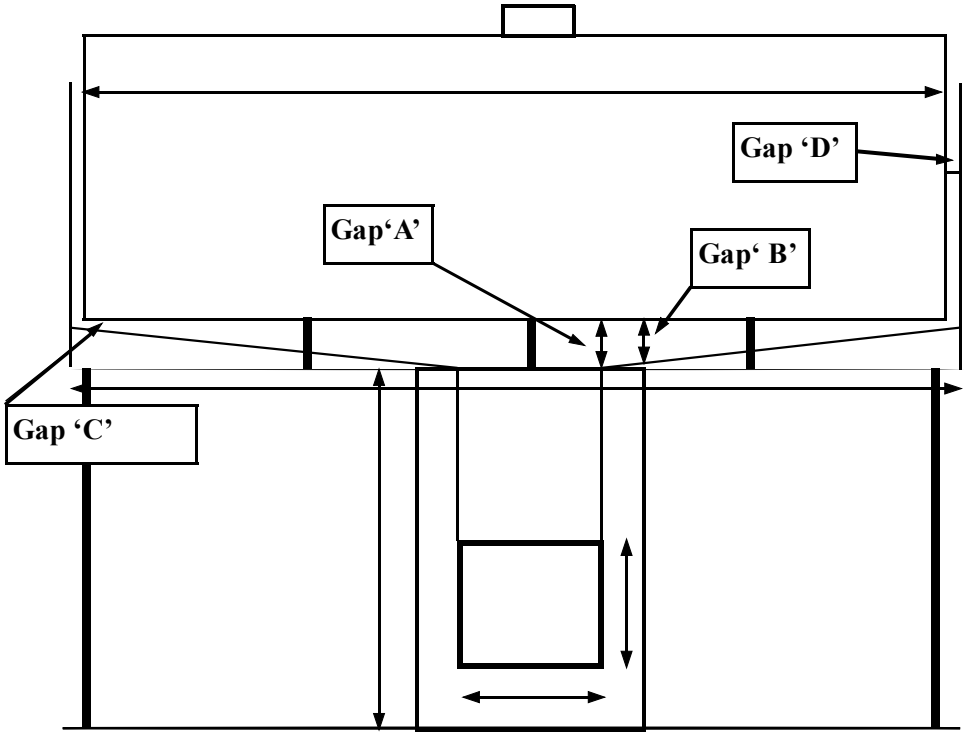

C=D*3.14
D=Diameter
R=radius
Gap=A/P
Gap^C= A/Cpot
C=D*3.14
L
A=L*L
cm2
L
L
L
Perimeter (P)= 4*L


Gap 'D'
Gap'A'
Gap' B'
Gap 'C'

To calculate Gap ^{A} (the distance between the pot and the inner perimeter of the combustion chamber**)** use the equation:

Gap ^{A} = **A**rea
Inner **P**erimeter of combustion chamber

To calculate Gap ^{B} (between the pot and the outer edge of the combustion chamber) use:

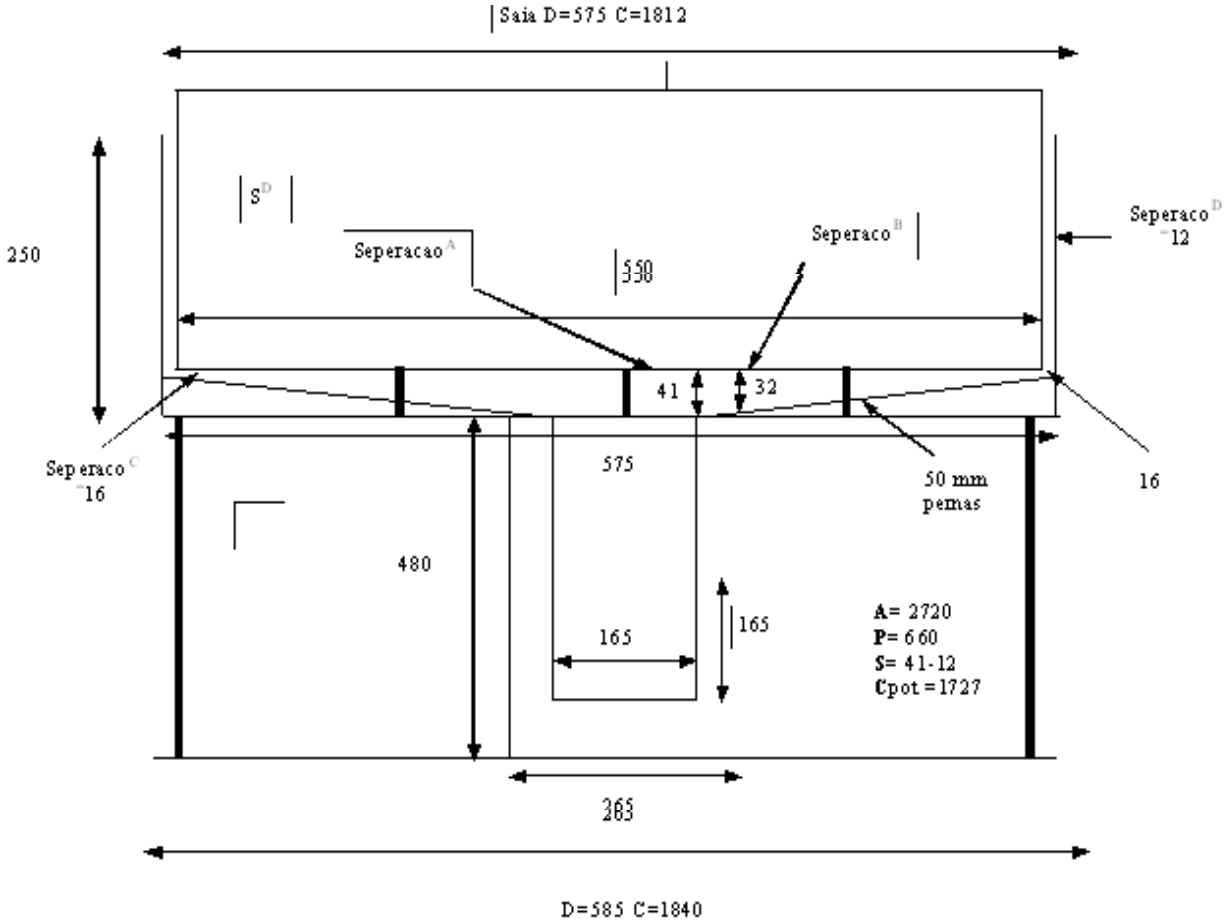
Gap ^{B} = **A**rea
Circumference = [(L+7-10 cm] *3.14)

To calculate the Gap^{C} (under the outer edge of the pot and the stove body) use

Gap ^{C} = Area
Circumference $_{Pot}$

To calculate Gap ^{D} (between the sides of the pot and the stove body) use

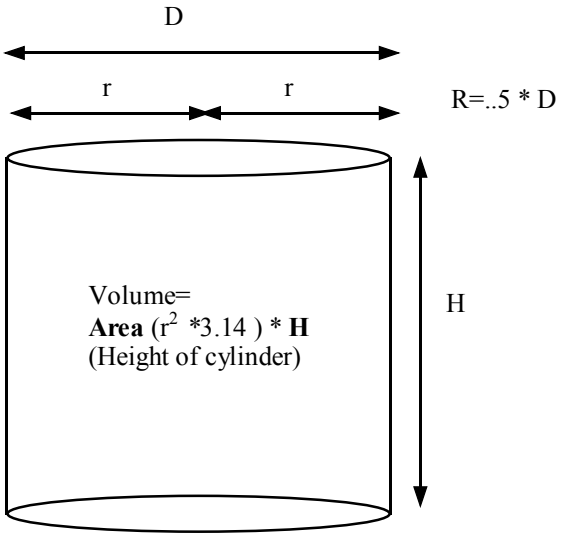
Gap ^{D} = Gap ^{C} * 0.75



Determining the volume of a pot or of a stove body

Volume= **A** (Cross sectional Area of cylinder) * (**H**) Height of cylinder

A= (r^2 *3.14) * **H**



To determine the circumference of the pot skirt

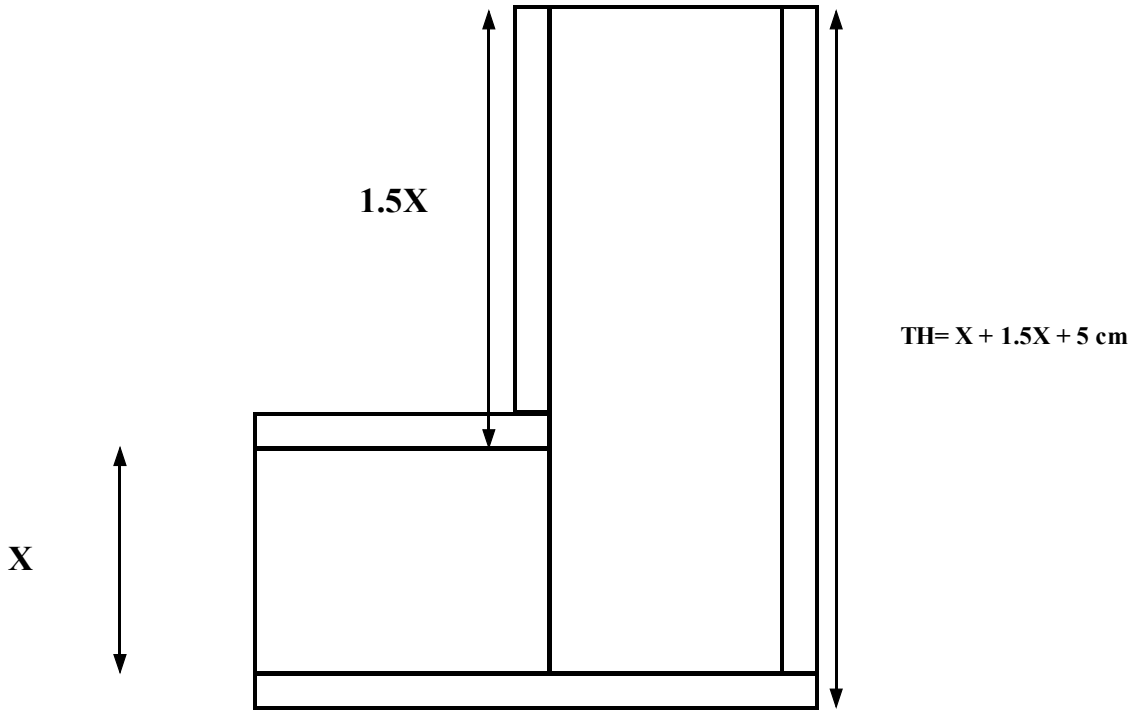
C= D *3.14
C = D [Pot diameter + Gap ^{D} + gap ^{D} + 1**t** (thickness of metal)] * 3.14

To determine the height of the combustion chamber use

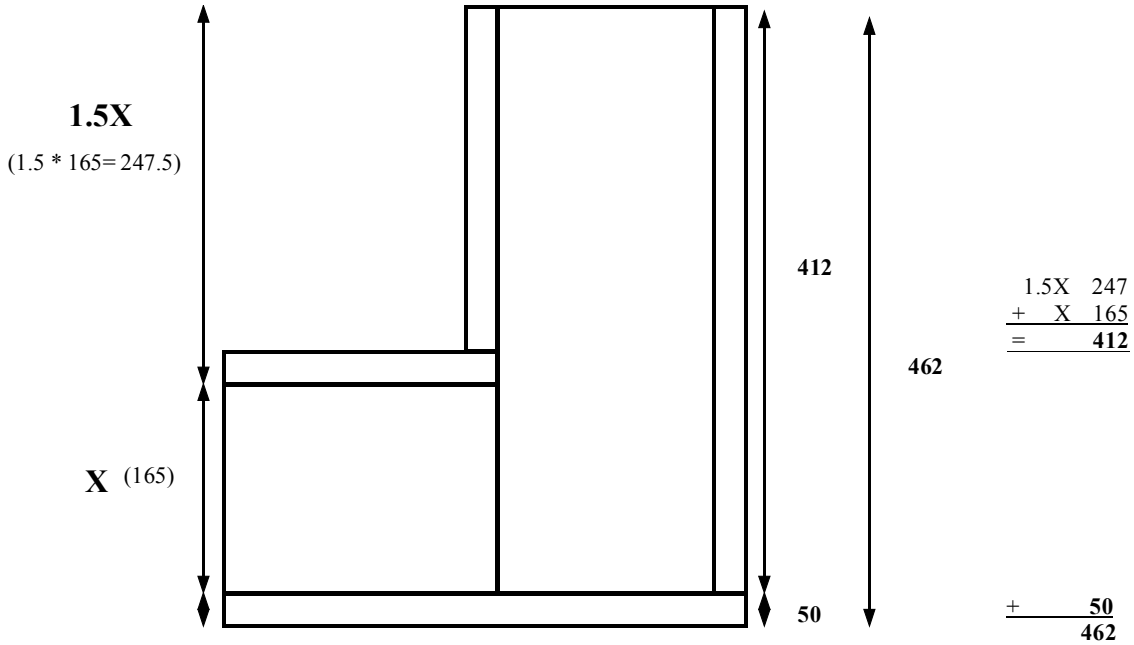
Height of stove entrance = X

Height of combustion chamber above stove entrance = 1.5X

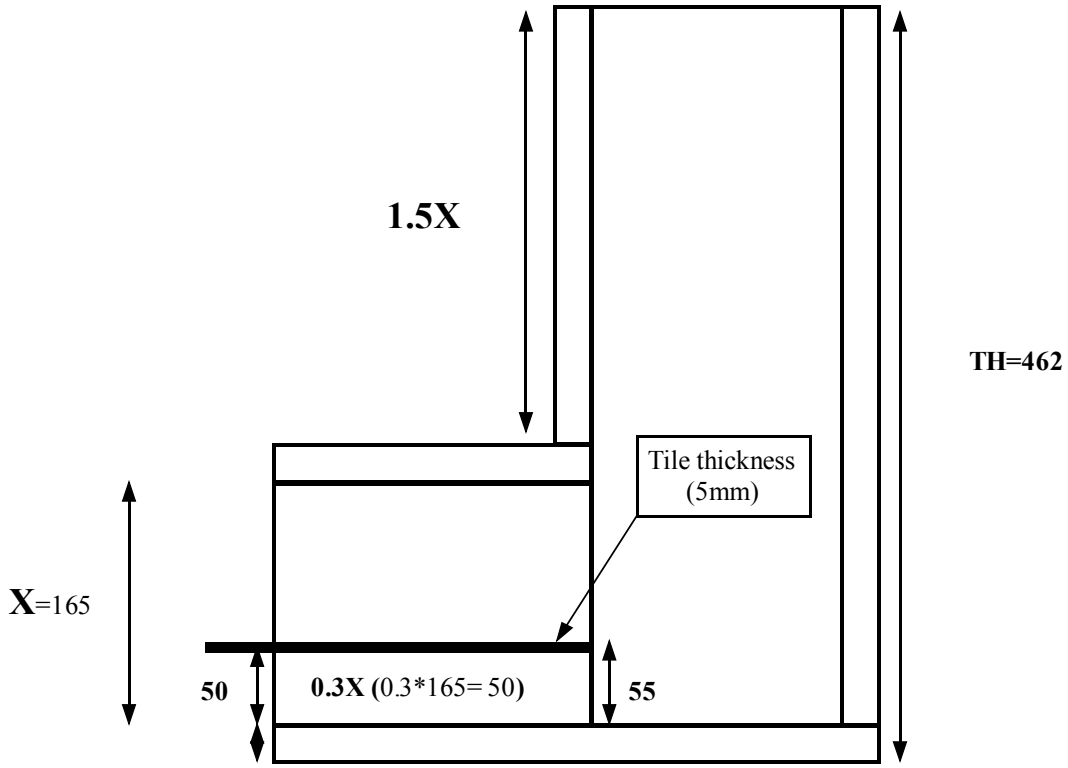
Total **H**eight of combustion chamber (**TH)** = X + 1.5X + 5cm (for thickness of insulation)



For example, the 60L institutional stove has these approximate dimensions



TO determine the height of the shelf above the bottom of the combustion chamber use
Shelf height (**SH**) = 0.3X



Common dimensions for a single pot Rocket stove