



If you bend metal the center line (ideal assumption) remains the same length, whereas the outer line is stretched and the inner line is compressed.

The metal is 2.5mm thick. The outside radius is 7.5mm the inside radius is 5mm, therefore the center radius is 6.25mm.

The total height of the cover is 42.5mm. The total height of the case is 90mm and there is a gap of 5mm between the upper and the lower half of the case.

The calculation is done on the center line (blue/red segments).

$$a = 42.5\text{mm} - 7.5\text{mm (outside radius)} = 35\text{mm}$$

$$b = 1/2 * 6.25\text{mm} * \pi \text{ (quarter length of a circle)} = 9.817\text{mm} \text{ (periphery full circle is } 2 * r * \pi)$$

$$c = 420\text{ mm} - 2 * 7.5\text{mm (outside radius)} = 405\text{mm}$$

$$\text{total length} = a + b + c + b + a = 35\text{mm} + 9.817\text{mm} + 405\text{mm} + 9.817\text{mm} + 35\text{mm} = \sim 494.64\text{ mm}$$