Answer on Question #80082 – Physics/Mechanics - Relativity

Ten identical circle of 12 cm edge are lying on ground density is 2.5g/cc calc work done in arranging them 1 over other.

Solution

Find the mass of one circle ($h = 0.12$ m, $\rho = 2500$ kg/m^3, r – radius of the circle):

$$m = \pi r^2 \cdot h \cdot \rho$$

Work done during the process of arrangement one circle over other:

$$W = mgh + mg \cdot 2h + mg \cdot 3h + \cdots + mg \cdot 9h = mgh\left(9 \cdot \frac{1+9}{2}\right) = 45\pi r^2 h^2 \rho g,$$

$$W = 45 \cdot 3.14 \cdot r^2 \cdot 0.12^2 \cdot 2500 \cdot 9.8 = 49875.9r^2 \text{ J}.$$

Answer

$W = 49875.9r^2$ J, where r – radius of the circle (in meters)