The density of gasoline is 730 kg/m3 at 0C. How many extra kilograms of gasoline are obtained when thirteen gallons of gasoline are bought at 0 C rather than at 25 C (temperature at the filling station)? One gallon of gasoline occupies 0.0038 m3 and gasoline's volume expansion coefficient is 0.00096(C)−1.Answer in units of kg

Solution:

Let:

$\rho = 730 \; Kg/m^3$

$T1 = 0°C$

$T2 = 25°C$

$V = 30 \; gallons = 30 * 0.0038 = 0.114 \; m^3$

$\alpha = 0.00096 \; °C^{-1}$

$m-?$

$m = \rho \Delta V \, , were \; \Delta V = \alpha V (T2 - T1)$

$m = \rho \alpha V (T2 - T1) = 730 * 0.00096 * 0.114 * (25 - 0) = 2 \; Kg \; (1.99728)$

Answer: 2 Kg