

MECH 261/262

Measurement Lab (& Statistics)

January 6, 2010

Unit Conversions & Miles per Gallon -*vs*- Litres per 100 Kilometers

(MECH261-2)MpGLp100km01e

1 Beer Bottle Measures

Look at an ordinary Canadian glass beer bottle. The label will say it contains 341ml. That's because it used to be a 12fl.oz.(Imp.) bottle and they just changed the label after "metrification" in 1973. Now look at an aluminum coke can; US technology, once again 12fl.oz. but (US) this time. In Canada the capacity is printed as 355ml. Since it is intended to compare litres and gallons and miles and kilometers we need the following well known conversions.

- 1gal.(Imp.)=160fl.oz.(Imp.), 1gal.(US)=128fl.oz.(US)

$$1\text{gal.}(\text{Imp.}) = \frac{160 \times 341}{12} = 4.546\frac{2}{3}\text{L.}, \quad 1\text{gal.}(\text{US}) = \frac{128 \times 355}{12} = 3.786\frac{2}{3}\text{L.}$$

- Or the inverse, 1L.=0.219941349gal.(Imp.)=0.264084507gal.(US)

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$$100\text{km.} = \frac{100000 \times 39.37}{5280 \times 12} = 62.13699495\text{mi.}$$

2 Two "Magic" Conversion Numbers

With respect to fuel mileage in mi./gal.(Imp.) or (US) -*vs*- L./100km. we form the fractions

$$\frac{62.13699405}{0.219941349} = 282.5162037 \quad \text{and} \quad \frac{62.13699405}{0.264084507} = 235.2920875$$

These fractions have the units of

$$\frac{\text{mi./100km.}}{\text{gal./L.}}$$

so if we *divide* them by appropriate mi./gal. *or* L./100km. we get the appropriate conversion. *E.g.*, the recently discontinued *VW-Lupo3L* was so called because of the claimed fuel consumption of 3L./100km. To convert to mi./gal.(Imp.) and (US)

$$\frac{282.5162037}{3} > 94 \quad \text{and} \quad \frac{235.2920875}{3} > 78$$

On the other if you buy a used "Hummer" that gets about 10mi./gal.(US) you'd need

$$\frac{235.2920875}{10} > 23\text{L./100km.}$$

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