

A 'whole number rule' for the metric system

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I would like to commend to you a **'whole number rule'** for the metric system when you are planning how you, and your organisation, will upgrade or complete your transition to the metric system. In this article I propose a **'whole number rule'** for the metric system that is based on an older **'rule of 1000'**.

Many occupations choose to limit the metric prefixes they use to those that are multiples or sub-multiples of 1000. They often refer to this as the *'rule of 1000'*. This rule is found in many respectable publications even though the *'rule of 1000'* is not an official part of the International System of Units (SI).

However, some people extend the *'rule of 1000'* so that numbers go from 1 to 999, after which the next metric prefix is used. For example:

- ◇ 1 milligram to 999 milligrams then
- ◇ 1 gram to 999 grams then
- ◇ 1 kilogram to 999 kilograms then
- ◇ 1 megagram to 999 megagrams, and so on.

But this extension to the *'rule of 1000'* can be limiting in many crafts, trades, and professions. In particular, this practice can lead to the continuing use of fractions. A **'whole number rule'** for the metric system would not use this restriction.

Consider this statement of the *'rule of 1000'* from the NIST web site at:

<http://ts.nist.gov/WeightsAndMeasures/Metric/metric.cfm>

Rule of 1000 -- The selected multiple or submultiple prefixes for SI units shall result in numerical values between 1 and 1000. This rule allows centimeters or millimeters to be used where a length declaration is less than 100 centimeters. For example: 500 g not 0.5 kg; 1.96 kg not 1960 g; or 750 mL, not 0.75 L, or 750 mm or 75 cm, not 0.75 m;

This barely makes sense. It applies the *'rule of 1000'* accurately but because it also employs the *'values between 1 and 1000'* restriction it retains decimal fractions, implied vulgar fractions (halves, quarters) and more importantly it retains centimetres that have been shown to dramatically slow down metric transitions See:

<http://www.metricationmatters.com/docs/ApproachesToMetrication.pdf>

One of the real strengths of the *'whole number rule'* for the metric system is that, unlike its use in the above definition, the original *'rule of 1000'* is a convenient way to completely rid a particular activity of all fractions – both vulgar or common fractions, and also all decimal fractions. Using the *'whole number rule'* will allow you to choose the best prefix for the range of values you are most likely to employ.

As an example, suppose that you are a soft drink bottler and you decide to buy your ingredients in kilolitres (cubic metres), and litres, and then to sell your products in millilitres. You then write your company policy like this:

The Pleasure Pops drink company will use millilitres, litres and kilolitres for measuring volume or capacity — centilitres, decilitres, decalitres, and hectolitres will not be used.

From then on, this company would have no need for fractions. Granted there would be turmoil and discussion when someone suggested a container that was 1250 millilitres. Some

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would say that this goes against the '*rule of 1000*' in that it has a number larger than 1000. Others might then want to call this 125 centilitres to remove the trailing 0 and to bring it back inside the '*rule of 1000*' limit. Others may want to call it 'one and a quarter' litres to demonstrate their arcane knowledge of fractions. The '**whole number rule**' for the metric system simply resolves all of these issues.

However, if the policy, as written above, was formulated and encouraged, there would always be definite policy advice that would invariably produce the simplest possible practice — always in whole numbers and with no need for fractions.

As another example, consider steak restaurants in Australia where a list of servings might read: 400 grams, 600 grams, and 800 grams. They could have chosen to use:

- ◇ 40 centigrams, 60 centigrams, and 80 centigrams, or
- ◇ 4 decigrams, 6 decigrams, and 8 decigrams, or
- ◇ 0.4 kilograms, 0.6 kilograms, and 0.8 kilograms.

But their choice of grams is the simplest and the easiest for Australians to understand as the original '*rule of 1000*' is invariably used in Australia for grams and kilograms, and this practice also avoids a proliferation of prefixes.

Australian, New Zealand, and South African builders have been enjoying the simplicity of using only millimetres on all buildings since 1974. There has been no need to use fractions in any buildings in these nations since then. Nor do they have any need to consider slithering decimal points since all of their measuring and calculating work is done using whole numbers. Nor do they have any use for mixed numbers such as 2 metres 34 centimetres and 5 millimetres as I saw on a building site in Italy (abbreviated to 2,34,5 with two decimal markers!). Building managers in Australia reckon that they save about 10 % of turnover by only using millimetres.

In the medical community I can see very real advantages for having a '**whole number rule**' for the metric system. There is a real and present danger if using mixed measurements in hospitals. One current estimate is that the error rate in USA hospitals is one error per patient per day. All staff could readily see that 750 micrograms is smaller than 1250 micrograms but it might not be so obvious that 750 micrograms is smaller than 1.25 milligrams.

One of the big advantages of a 'whole number rule' for the metric system is that once the culture has changed to the idea of a preference for using whole numbers, requests for fractional quantities of drugs such as 'a tenth of a milligram' or 'a quarter of a tenth of a milligram' would simply disappear.

By the way, for those who have not seen it, the article '*centimetres or millimetres — which will you choose*' explores many of these issues in detail. It is available as a pdf file at <http://www.metricationmatters.com/articles/> and it is near the top.

Metric system consultant, writer, and speaker, Pat Naughtin, has helped thousands of people and hundreds of companies upgrade to the modern metric system smoothly, quickly, and so economically that they now save thousands each year when buying, processing, or selling for their businesses. Pat provides services and resources for many different trades, crafts, and professions for commercial, industrial and government metrication leaders in Asia, Europe, and in the USA. Pat's clients include the Australian Government, Google, NASA, NIST, and the metric associations of Canada, the UK, and the USA. See <http://www.metricationmatters.com/> for more metrication information, contact Pat at pat.naughtin@metricationmatters.com or to get the free '*Metrication matters*' newsletter go to: <http://www.metricationmatters.com/newsletter/> to subscribe.

