

# THE METRIC SYSTEM AND HOW TO ADJUST TO IT

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## Introduction

In the light of advances made in physics and atomic energy, we have to acknowledge these great changes. In this world of constant change, old systems of weights and measures must also be changed. Men of science the world over have long recognised the immense advantage of the adoption of internationally accepted units for physical measurements of all kinds. Further, scientific research is by its nature international, and the adoption of agreed standards for all physically measurable quantities, is essential for its progress. People in our country, conservative as they are, will complain of disturbing the old customs and conventions and ancient ways of calculation, but gradually they are being educated to accept changes, if convinced of their true value. Nothing becomes good by just being old or new. If anything new is beneficial and conducive to efficient work and leads us on to progress, then we should adopt it.

**Length, Mass and Time** are the three irreducible entities accessible to physical observation which resist further analysis. The initiative establishing the units of measurement adopted for these purposes came from France in the years following the great political revolution in that country.

Before 1790 there were in Europe more than 280 different kinds of measuring systems which became a great hindrance to commercial expansion and scientific progress. This led France to calling a meeting in 1790 to which delegates from the different countries of Europe were invited for the purpose of organising a new system of measurements. The debate lasted over a year. In March 1791, a committee of the French Academy presented a report recommending that  $1/10,000,000$  of a quadrant of the meridian be the unit of length and that it be called a *metre*. The Metric System eventually came to be accepted throughout Europe and in 1875 the permanent International Bureau of Weights and Measures was established in Paris. The Metric System is in use in about fifty-five countries today including our own.

## Advantage

The fact that no nation has ever turned back having once adopted the metric system, is sufficient argument to suggest that there must be something inherently more desirable in the metric system than in the British system. Briefly, the advantages of the metric system are three :

1. **Simplicity** : When we compare some 53 concepts and terms in the English system of weights and measures with the three simple terms : *Meter*, *Litre* and *gram*, which constitutes the Metric System, this advantage is at once evident.
2. The one to one correspondence between the Metric System, units of length, capacity and weight.

One cubic centimetre of water has one centimetre for its cubic dimension and weighs one gram. This correspondence effects a tremendous simplicity in computation. There is no such correspondence in the English system where one cubic foot of water weighs approximately 62.5 lbs.

3. **Decimal Divisions of its units**. The fundamental concept of the Metric System is that the higher and lower secondary units are obtained from any unit either by multiplying the unit concerned by ten, or by taking a tenth of it. To indicate how many times any secondary unit in a series is in comparison with the primary unit viz : *gram*, *meter* and *litre*, we use prefixes like *Mille*, *Centi*, *Deci*, *Deca*, *Hecto*, *Kilo* etc ; for example, one *kilogram* means 1000 grammes and one *centigramme* means  $1/100$ th of a *gram*. This is the fundamental feature of the Metric System which makes it simple and desirable above all the other systems. The simplicity of the Metric System over rival systems is no longer a subject of dispute or controversy. Other systems where they survive, are tolerated only because established by long uses, their removal is difficult and expensive.

## India Adopts Metric System

For a long time the question of adoption of the Metric System to measure, weights and lengths had been under the consideration of the Government of India. In 1949, a special committee of the Indian Standards Institution recommended that the Metric System be adopted as the only system of weights and measures for the country. The standard of Weights and Measures Act 1956 was adopted by the Union Parliament which lays down that the change-over to the Metric system should be completed within the period of 10 years. The introduction of decimal currency has been a success.

## Metric System in Hospitals

Metric weights and measures have long been used exclusively in the terminology of chemistry and physics. With the increasing influence of these sciences on modern practice, the *metric* system has been coming slowly but steadily into use in medical and pharmaceutical literature where hitherto the Apothecaries weights and measures were used. It is about 80 years since the medical profession and scientists suggested the use of *metric* system but little impetus to implementing the change was given until after World War II.

Since the introduction of the Metric System by the Government of India, a large number of departments all over the country have already 'gone metric!' *Why Hospitals should adopt metric system*: Though in itself a *meter* is no better than yard as a standard, the Metric System is much more convenient in that, the multiples and sub-multiples being in the decimals, much time is saved in reduction, and quantities are expressed as the decimal of one denomination, and not in several.

The pharmacist prefers the metric system for calculations with the decimal point rather than the fraction. *Percentage* solutions are accurately dispensed because of the direct relationship of the *gram* and the *millilitre* and no longer is there confusion over the grain and minum.

With the introduction of the system in the hospitals, the nursing staff would have only one system to contend with. Understanding and close co-operation between the four pillars of the medical service *i.e.* the Doctor, the Nurse, the Pharmacist and the Drug Manufacturer, hold the key to success so far as implementation of the system in hospitals is concerned. Following are a few suggestions for consideration:

1. All fluid 'intake' and 'output' should be measured and recorded in Metric System.
2. Body temperatures should be taken and recorded in degrees centigrade.
3. Blood pressure should be recorded in *metric* system.
4. The height of patients must be measured and recorded in centimeters.

5. Body weights should be recorded in kilogrammes.
6. A metric conversion table of appropriate equivalents should be prepared and fixed in every ward and dispensary. This table will provide a standard for use by the nursing staff and would show the equivalent Fahrenheit for a recorded centigrade temperatures, the equivalents of stones in pounds to a recorded kilogramme. Body weight and the equivalent in feet and inches to height recorded in centimeters.
7. The Pharmacy should be instructed to change all ward labels showing imperial nomenclature to metric measurements:

Grains to Milligram	(mg)
Ounce to gram	(g)
Minum to millilitre	(ml)
Fluid ounce to millilitre	(ml)
One teaspoonful to 4 millilitres	(4 ml)
Two teaspoonful to 8 millilitres	(8 ml)
One tablespoonful to 15 millilitres	(15 ml)

8. The resident medical staff should be instructed to use the metric system.
9. Co-operation of the honorary medical staff should be sought to prescribing only in the Metric System.
10. The doctors and nurses must be specially trained in the use of Metric System.
11. Short term courses should be started to impart instruction to the staff on the Metric System.
12. Adequate funds should be made available for the purchase apparatus and equipment *e.g.* Thermometers scales etc., necessary for the change over.
13. When buying new stock, only articles graded in the Metric System should be considered.

We do not know when medicines and pharmaceuticals are proposed to be brought under the Weight and Measures Act, but the total adoption of Metric System will not be smooth or complete unless the medical and nursing professions fall in line, either of their own accord or by the compulsion of law. The continuance of two systems is confusing, dangerous and in every way undesirable.

