

MASS MEASUREMENT LABORATORY

INTRODUCTION

Rwanda bureau of standards mass measurement laboratory is required to provide world class-measurement standards in metrology and offers calibration facilities.

These facilities offered by mass measurement laboratory enable business and public authorities to make accurate measurements that are nationally and internationally accepted.

Mass measurement also raises productivity through improved measurement process and quality control.

Every year, mass laboratory carries out calibration for many industries, these include: manufacturing industries, learning institutions, pharmaceutical industries and hospitals, etc.

Since measurement traceability is a matter of considerable importance to many industries that are export oriented, all calibration is traceable to national standards.

The specific services offered by mass laboratory are as follows:

- Calibration of standards masses
- Calibration of masses from industries
- Calibration of weighing scales and balances

1.0 The kilogram and mass measurements

1.1 The unit of mass, Background

From the early history of human kind to the modern times, mass measurement has formed the corner stone for trade and commerce.

The use of weights/ masses and balances as tools to perform mass measurements for trade dates back thousands of years and is most likely associated with the early civilisations of the Nile valley and the middle east since those times, mass standards and the technology of balances and mass measurement have greatly evolved to meet the growing demand and changing needs of society.

Therefore, the activities of everyday life have always been affected either directly or indirectly by mass measurements

Also the industrialisation has generated requirements of international trade, therefore need for mass measurements.

Take example, whenever one buys groceries, take medication, designs a bridge, space shuttle, or air plane, trade goods, whether gains, olds or gemstones, mass plays a crucial and vital role.

To shade more light on direct impact on trade and commerce, mass measurement impact the scientific community as well as broad range of manufacturing industries including aerospace, air craft, automotive, chemical, semi conductor materials, nuclear, pharmaceutical, construction and measuring instruments.

Therefore, to ensure equity and equivalence in trade and manufacturing at the national and international levels, uniform standards are needed.

1.1.1 The SI unit of mass

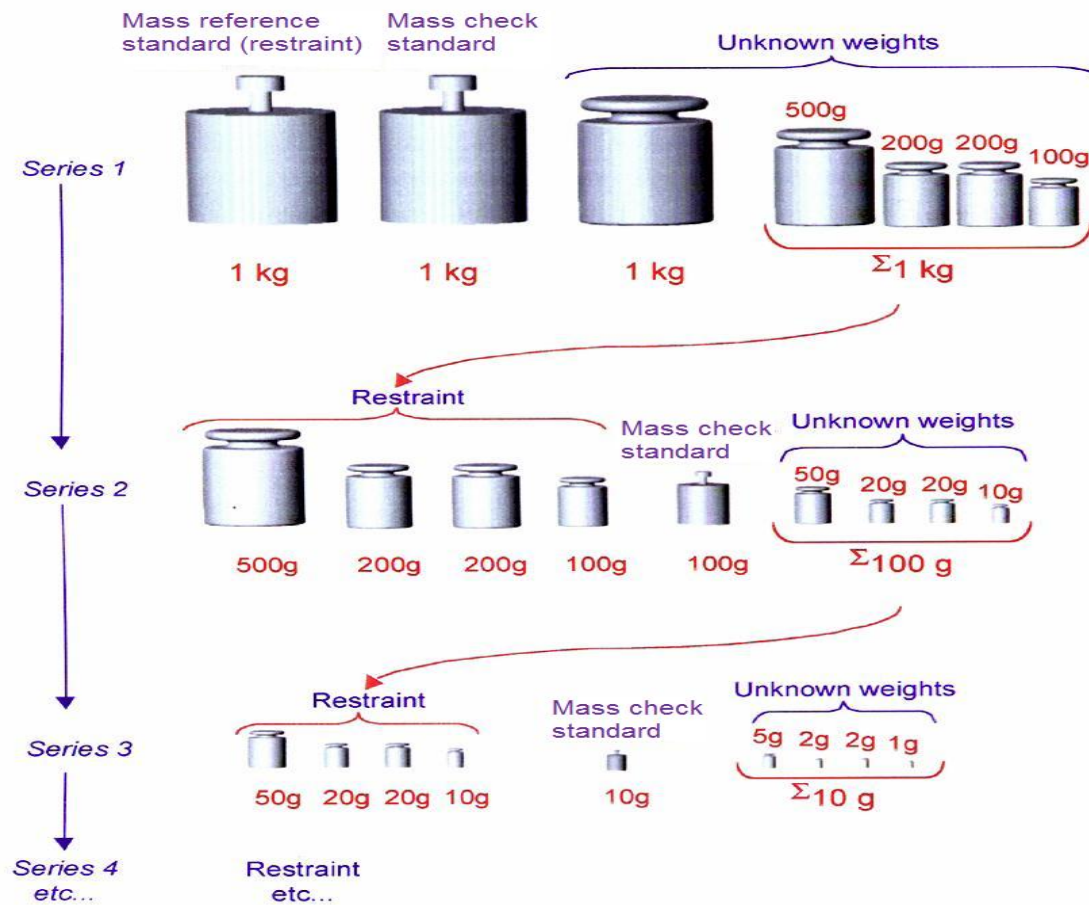
The SI unit of mass is kg, and is one of the seven basic units of measurement. This unit of mass is realised and disseminated from the international prototype kilogram kept and maintained by BIPM at Sèvres in Paris.

To affect tractability, give confidence to its users and provide confidence, especially where mutual recognition agreements are signed, National Metrology Institute (RBS Metrology unit) must conduct mass intercomparisons.

While the unit of mass is defined at the one kilogram level, the mass scale must be realised over a range broad enough to be of practical use in commerce and manufacturing.

In this case, the first stage in the realisation of the mass scale is to disseminate the unit from the international prototype kilogram to the national standard followed by the transfer to a set of working standards at one kilogram level.

This is then, followed by dissemination to multiplies and sub multiples of the kilogram covering the range from **1mg** to **560kg** in our mass measurement laboratory.



RBS standard weight sets in the **1g** to **1Kg** range

1.2 Mass measurements

1.2.1 Calibration of standards masses

This is done using substitution method, in this case to achieve accurate results; the standard is placed upon the comparator and then removed.

The mass under calibration is put on the balance and results recorded.

This is done in the number of cycles eg 6 cycles or 9 cycles, uncertainty and error limits computed.

1.2.2 Class of weights in RBS mass laboratory

Class of weights	Capacity range	Traceability
E ₂	1mg to 1kg	France
F ₁	1mg to 1kg	France
F ₂	1mg to 1kg	France
M ₁	1g to 1kg	PTB
M ₂	1g to 1kg	PTB
M ₃	5kg, 10kg, 20kg	UK

1.2.3 Calibration of weighing scales / balances

The laboratory offers calibration of balances in the range of up to 1 ton using calibrated standards masses.

The calibration services are carried out where the balances /scales are exactly mounted.

The calibration certificates and reports are issued to the clients and copies retained in the laboratory after the whole exercise.

1.2.4 Cleaning and handling of mass standards

Mass standards are typically used and stored in ambient air; therefore, they accumulate contaminants and must be cleaned occasionally in order to restore their original mass value.

Cleaning policies and protocols depend on the artefact material and can vary greatly among laboratories.

The internationally accepted cleaning method of platinum-iridium prototypes is well explained in OIML-R111-part1.

1.3 Future prospects

RBS mass laboratory has the vision of calibrating moisture content measuring instruments in near future.

The laboratory will ensure and maintain up to standards the moisture determining equipment(s) and offer calibration services that are of high accuracy.

1.4 Conclusion

For any research and development in mass measurement laboratory will communicated through RBS web site:

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