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PREFERRED NUMBERS

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BUREAU OF CEYLON STANDARDS

CEYLON STANDARD FOR PREFERRED NUMBERS

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CEYLON STANDARD FOR PREFERRED NUMBERS

FOREWORD

This Ceylon Standard was prepared under the authority of the Metric Divisional Committee of the Bureau of Ceylon Standards and was approved by the Council on 6 May 1971.

For the selection of a series of sizes as well as to secure a measure of uniformity in practice in the choice of a series, the Bureau of Ceylon Standards is propagating the use of Preferred Numbers which have been adopted by the International Organisation for Standardization (ISO). These numbers which provide a rational basis for simplification are conveniently rounded off values derived from certain theoretical geometric series. Their use in standardization work is based on the experience that consumer's requirements for a range of a product are frequently satisfied when the range follows, more or less closely, a geometric progression, even though the selection is made without any consideration of theory.

Preferred numbers were first used in France towards the end of the nineteenth century. They are often referred to as 'Renard numbers' as a tribute to Col. Charles Renard, who first proposed the series and their various uses.

The adoption of a series of preferred numbers is to limit the unnecessary variety which will come into use in the absence of guide for the selection of sizes and not to restrict the freedom of the designer. Without the guidance of a series of preferred sizes, individual designers will tend to vary in selection of component sizes, without real necessity, and thus produce unnecessary variety.

In the preparation of this standard considerable assistance has been obtained from the following publications.

I.S.O. R 3 — Series of preferred numbers.

I.S.O. R 17 — Guide to the use of preferred numbers and of series of preferred numbers.

I.S.O. R497 — Guide to the choice of series of preferred numbers and of series containing more rounded values of preferred numbers.

1. SCOPE

This Ceylon Standard gives series of preferred numbers and recommendations as to the use of them. It consists of three parts. Part 1 lists the preferred numbers in the four principal series, R 5, R 10, R 20, and R 40, as well as the additional R 80 series intended for special applications. It also gives information regarding their derivation, together with definitions of the terms used. Part 2 gives guidance as to the use of preferred numbers and Part 3 is a guide to the choice of series of preferred numbers and of series containing more rounded values of preferred numbers.

2. TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

- 2.1 Theoretical values**—The exact values of the terms of $(\sqrt[5]{10})^N$, $(\sqrt[10]{10})^N$ etc. These values have an infinite number of decimal places and are not suitable for practical use.
- 2.2 Calculated values**—Values approximating to the theoretical values, expressed to 5 significant figures (the relative error in comparison with the theoretical values is less than 1/20 000).
- 2.3 Serial numbers**—An arithmetic series of consecutive numbers indicating the preferred numbers starting with 0 for the preferred number 1.00.

PART 1

SERIES OF PREFERRED NUMBERS

3. DERIVATION OF SERIES

Preferred numbers are derived from geometric series having one of the following common ratios :—

$$\sqrt[5]{10}, \sqrt[10]{10}, \sqrt[20]{10}, \sqrt[40]{10} \text{ or } \sqrt[80]{10}.$$

These ratios are approximately equal to 1.58, 1.26, 1.12, 1.06 and 1.03 respectively. Thus successive terms in the respective series increase by approximately 58 percent, 26 percent, 12 percent, 6 percent or 3 percent.