

## Concise Conversion Tables and Circular Slide Rules

**MODEL CTCS-552**—Recommended for chemical and mechanical engineers, and chemists.

**MODEL EE-112**—Recommended for electrical and electronic engineers, and physicists.

**CIBA Medical Tables and Calculator**—Recommended for medical students and nurses.

### Designers, Importers and Distributors

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# CONCISE

## CONVERSION

## TABLES

## AND

## CIRCULAR

## SLIDE RULE

MODEL CTCS-552

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## INTRODUCTION

The Concise Conversion Tables and Circular Slide Rule, Model CTCS-552, was designed and constructed to facilitate calculations encountered daily by engineers, scientists and students. The conversion tables provide handy reference to many frequently used conversion factors and physical data, and the slide rule is sufficiently accurate for most purposes.

The circular slide rule has the following characteristics:

1. The outer scales have a circumference of approximately  $7\frac{1}{2}$  inches and as many subdivisions as a 10-inch slide rule.
2. Problems involving multiplication, division, squares, square roots, areas of circles, cubes, cube roots and logarithms, can easily be solved.
3. All scales and tables are engraved to ensure a lifetime of accurate readability.
4. As with all circular slide rules, the answer can never be off scale.

## USE OF CONVERSION TABLES

Tables of conversion factors of length, area, weight, decimal equivalents, volume, velocity, flow rate, gas constants, energy, pressure, useful constants and data, a table of the elements and a temperature conversion chart are included on three surfaces of the instrument for the user's quick reference.

Each table consists of a matrix of numbers which are the multiplication factors for converting from one unit of measurement to another.

Figure 1:



Example: Convert 3 meters into feet. (Figure 1)

**Procedure:** Pull the sliding insert out to the left. On the front of this insert the LENGTH table can be found. Pull the insert out to the m row in the from column. Locate the ft. column in the to row. The number found in the m row and the ft. column is 3.281. When 3 is multiplied by 3.281, the answer 9.843 is the number of feet in 3 meters.

The heights of H<sub>2</sub>O and Hg in the pressure conversion table refer to temperatures of 4°C and 0°C respectively.

For convenience in writing and manipulation, numbers are often expressed in the tables as factors of the appropriate power of 10, for instance:

$1.23 \times 10^6$  denotes 1,230,000

$1.23 \times 10^{-6}$  denotes 0.00000123

Squares and cubes are expressed by exponents of 2 and 3.

Note that there are stars on the face of the instrument and on the sliding insert near the AREA table. By keeping the two stars in the same relative position, the user's speed will be enhanced as he becomes familiar with the locations of the various tables of the instrument.

## ABBREVIATIONS

abs—absolute	fus—fusion
atm—atmosphere	g—gram
at. no.—atomic number	gal—gallon
at. wt.—atomic weight	gal (Br)—British gallon
bb1—barrel	g <sub>c</sub> —gravitational constant
Btu—British thermal unit	Hg—mercury
cal—calorie	hp—horsepower
cm—centimeter	hr—hour
coul—coulomb	H <sub>2</sub> O—water
deg—degree	in.—inch
°C—degree Centigrade	km—kilometer
°F—degree Fahrenheit	kw—kilowatt
°K—degree Kelvin	lb—pound
°R—degree Rankine	lg. ton—long ton
equiv—equivalent	lit—liter
fl—fluid	Ln—natural logarithm
ft—foot	

Log—logarithm base 10
m—meter
mm—millimeter
min—minute
mph—miles per hour
m. ton—metric ton
no.—number
oz—ounce
$\pi$ —ratio of circumference of a circle to its diameter
pt—pint
qt—quart
sec—second
sh. ton—short ton
sym.—symbol
vap—vaporization
yd—yard

## USE OF CIRCULAR SLIDE RULE

The slide rule has D, C, CI, L, A and K scales. The C, D and CI scales are used for multiplication and division. Scales A and C are used to calculate squares and square roots, and the K and C scales are used for cubes and cube roots. Areas of circles are determined with the A, C and gauge mark "c" on the D scale. Logarithms are obtained with the L and C scales. The circular slide rule is used in much the same manner as the conventional straight slide rule.

In order to simplify explanation of the use of circular slide rule, the following symbols are used in the booklet:

$\nearrow$	.....setting of the C scale
$\uparrow$	.....setting of the indicator
*	.....answer

## MULTIPLICATION

Example:  $1.8 \times 2.5 = 4.5$  (Figure 2)

Procedure: Locate 1.8 on the D scale, and line up  on the C scale

with it. Set the indicator to 2.5 on the C scale. The indicator shows the answer 4.5 on the D scale.



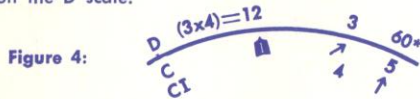
Example:  $3 \times 2 = 6$ ,  $3 \times 5 = 15$ ,  $3 \times 7 = 21$  (Figure 3)

Procedure: Locate 3 on the D scale, and line up  $\blacksquare$  on the C scale with it. Set the indicator to the values 2, 5 and 7 on the C scale, and read the answer 6, 15 and 21 on the D scale.



Example:  $3 \times 4 \times 5 = 60$  (Figure 4)

Procedure: Locate 3 on the D scale, and line up 4 on the CI scale with it. Move the indicator to 5 on the C scale, which gives the answer 60 on the D scale.



## DIVISION

Example:  $850 \div 25 = 34$  (Figure 5)

Procedure: Locate 850 on the D scale, and line up 25 on the C scale with it. The marking  $\blacksquare$  on the C scale points to answer 34 on the D scale.



**Example:**  $850 \div 25 \div 8 = 4.25$  (Figure 6)

**Procedure:** Locate 850 on the D scale and line up 25 on the C scale with it. Move the indicator to 8 on CI scale and read the answer 4.25 on the D scale.

Figure 6:



## MULTIPLICATION AND DIVISION

**Example:**  $3 \times 6 \div 5 = 3.6$  (Figure 7)

**Procedure:** Locate 3 on the D scale and line up 5 on the C scale with it. Set the indicator to 6 on the C scale. The answer 3.6 is read on the D scale.

Figure 7:

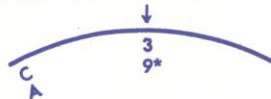


## SQUARES AND SQUARE ROOTS

**Example:**  $3^2 = 9$  (Figure 8)

**Procedure:** Set the indicator to 3 on the C scale. Read the answer 9 on the A scale.

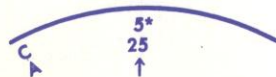
Figure 8:



**Example:**  $\sqrt{25} = 5$  (Figure 9)

**Procedure:** Set the indicator to 25 on the A scale. Read the answer 5 on the C scale.

Figure 9:



## AREAS OF CIRCLES

Areas of circles of known diameters can be obtained by use of the gauge mark "c" on the D scale and the A and C scales.

**Example:** Find the area of a circle with a diameter of 2.3 inches. (Figure 10).

**Procedure:** Locate the gauge mark "c" on the D scale and line up 2.3 on the C scale with it. Move the indicator to  $\downarrow$  on the D scale. The answer 4.15 square inches is found on the A scale.

Figure 10:

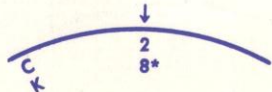


## CUBES AND CUBE ROOTS

**Example:**  $2^3 = 8$  (Figure 11)

**Procedure:** Move the indicator to 2 on the C scale. Read the answer 8 on the K scale.

Figure 11:



**Example:**  $\sqrt[3]{125} = 5$  (Figure 12)

**Procedure:** Move the indicator to 125 on the K scale. Read the answer 5 on the C scale.

Figure 12:



## LOGARITHMS

**Example:**  $\text{Log } 78 = 1.892$  (Figure 13)

**Procedure:** Set the indicator to 78 on the C scale. The mantissa 0.892 is read on the L scale. Since the characteristic number is 1, the logarithm of 78 is 1.892.

Figure 13:



## OTHER FEATURES

The size of the instrument is such that it will fit easily into a shirt pocket. For the measurement of small lengths, inch and centimeter scales are provided on the front face. The instrument is made of plastic and can be safely washed with lukewarm water and mild soap.



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