

5. RESULT CALCULUS

5.1. FOREWORD

The Software uses the reading of weight made by the analytical balance that is transmitted in real time through serial cable.

All the values (mass, volume) are acquired by the software only when the balance has reached the conditions of foreseen stability (the attainment of the stability is underlined by the symbol " g " on the display of the balance and on the software).

The meaningful values for the calculation of the density are the followings:

Total weight: value acquired by the balance after the application of the sample and the confirmation of the START test

Total volume (Total weight in liquid): value acquired by the balance after the complete lifting of the becker

Support weight: it is the weight of the needle and the magnetic support that is recorded in the relative field during the preparatory operation to the use of the densimeter.

Support Volume (Support weight in liquid): it is the volume of the part of needle dipped in the liquid of test. Such value is recorded in the preparatory phase to the use of the densimeter

Density liquid of test: it is the density of the liquid of test used (default water distilled) to the temperature selected of the laboratory.

Label	Description	Base Unit	Details
Mass	Mass	mg	Total weight in air – Support weight
Volume	Volume	mg	(Total weight in liquid – Support weight in liquid) / liquid density
Dens	Density	G/cm3	Mass / Volume
Mass_Trtr	Mass after aging test	mg	Total weight in air – Support weight
Volume_Trtr	Volume after aging test	mg	(Total weight in liquid – Support weight in liquid) / liquid density
Dens_Trtr	Density after aging test	G/cm3	Total weight in air – Support weight
Delta_M%	Percentage Mass Variation	%	$(\text{Mass_Trtr} - \text{Mass}) * 100 / \text{Mass}$
Delta_V%	Percentage Volume Variation	%	$(\text{Vol_Trtr} - \text{Vol}) * 100 / \text{Vol}$

6. STATISTICAL CALCULUS

Calculation	Formula Used
Mean (Xm)	$Xm = \Sigma(Xi) / n$
Standard deviation (s)	$s = \Sigma(Xi - Mean)^2 / (n - 1)$
Maximun	$Max(Xi)$
Minimal	$Min(Xi)$
Cp	$Cp = \frac{TollSup - TollInf}{6 * s}$
Cpk	$Cpk = \frac{TollSup - Xm}{3 * s}$ Or $Cpk = \frac{Xm - TollInf}{3 * s}$ (write the most unfavorable)

Xi= Result

N = Number of results

Toll Sup: Upper limit of set up tolerance

Toll Inf : Lower limit of set up tolerance