ISO/IEC GUIDE 25 / ISO 9000

LABORATORY STANDARDS

American Chemical Society (ACS)

LABORATORY ACCREDITATION

- National Academy of Sciences
- National Institute of Standards and Technology (NIST)
- National Voluntary Laboratory Accreditation Program (NVLAP)
- American Society of Crime Laboratory Directors (ASCLD)
- American Association For Laboratory Accreditation (A2LA)

Intoxilyzer® 5000 ACCREDITATION ?

- National Academy of Sciences
- National Institute of Standards and Technology (NIST)
- National Voluntary Laboratory Accreditation Program (NVLAP)
- Society of Forensic Toxicologists, Inc. (SOFT)
- American Academy of Forensic Sciences, Toxicology Section (AAFS)
- American Chemical Society (ACS) Analytical Division
- Association of Analytical Chemists (ANACHEM)
- Instrument Society of America, Analysis Division
- Royal Society of Chemistry (RSC) Analytical Division
- Society for Applied Spectroscopy (SAS)
- American Board of Forensic Toxicology (ABFT)
- National Forensic Science Technology Center (NFSTC)
- National Association of Medical Examiners (NAME)
- American Society of Crime Laboratory Directors (ASCLD)

INTOXILYZER 5000

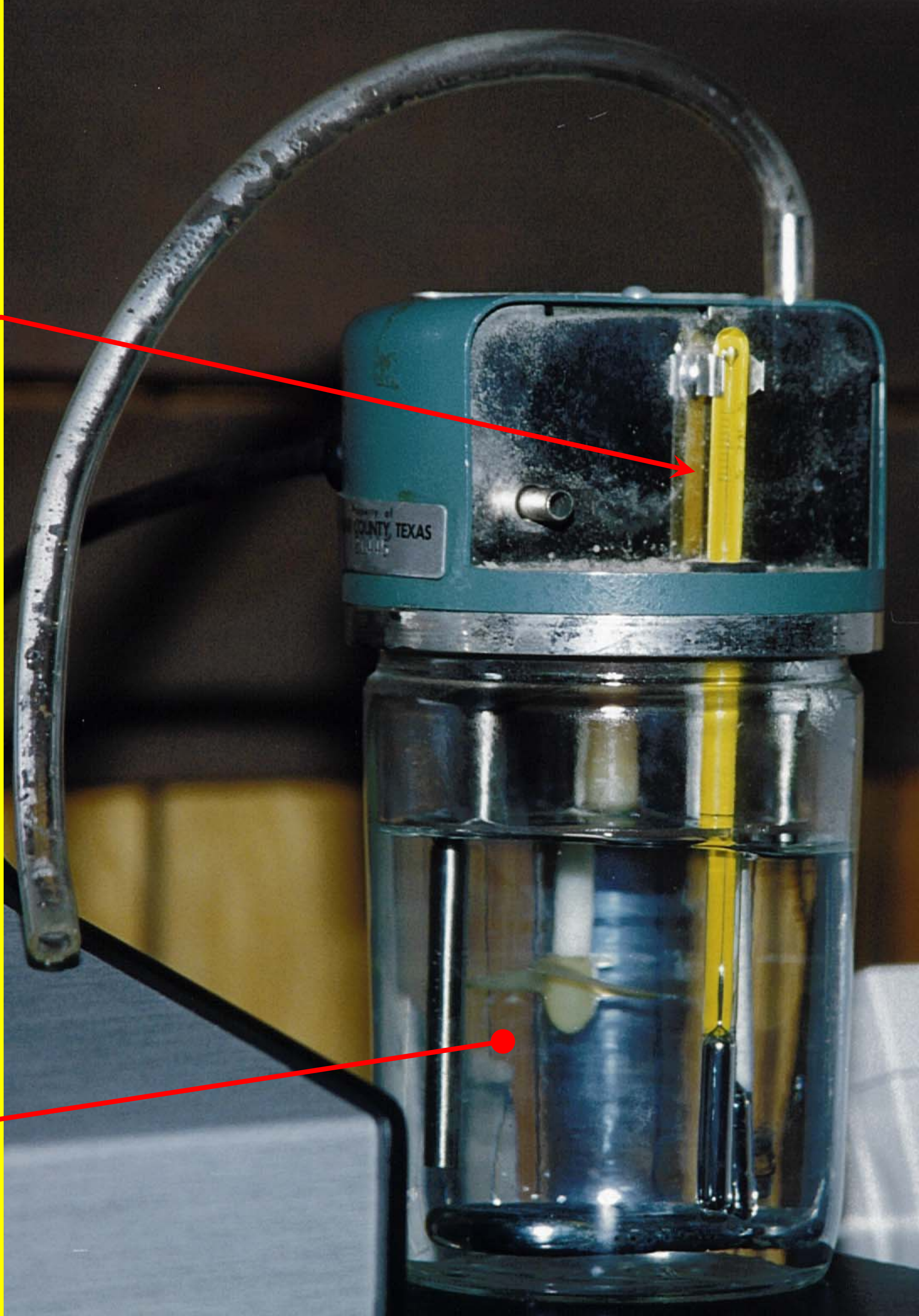
Reference Test Sample
Mark IIA Simulator

Analog Thermometer
34°C ± 0.2°C

TDPS Breath Alcohol Testing Regulations 19.1(b) (3):

The instrument shall analyze a reference sample, such as headspace gas from a mixture of water and a known weight of alcohol held at a constant temperature, the result of which must agree with the reference sample predicted value within ± 0.01g/210L or such limits as set by the scientific director.

Reference Test Solution
0.1g/210L ± 0.01g/210L



ETHANOL SIMULATOR SOLUTIONS

- **ALCOHOL**
  - ACS Grade Absolute Ethanol
  - Reagent Grade Ethanol
  - Traceable to NIST SRM 1828a
- **WATER**
  - Type 1 Laboratory Water
  - 18 Megohms resistance
  - Chemically pure & free of microorganisms
- **MASS MEASUREMENTS**
  - Standard laboratory analytical balance, sensitive to 0.01mg. The calibration of the balance is routinely verified by an independent analytical balance service using NIST – traceable mass standards.

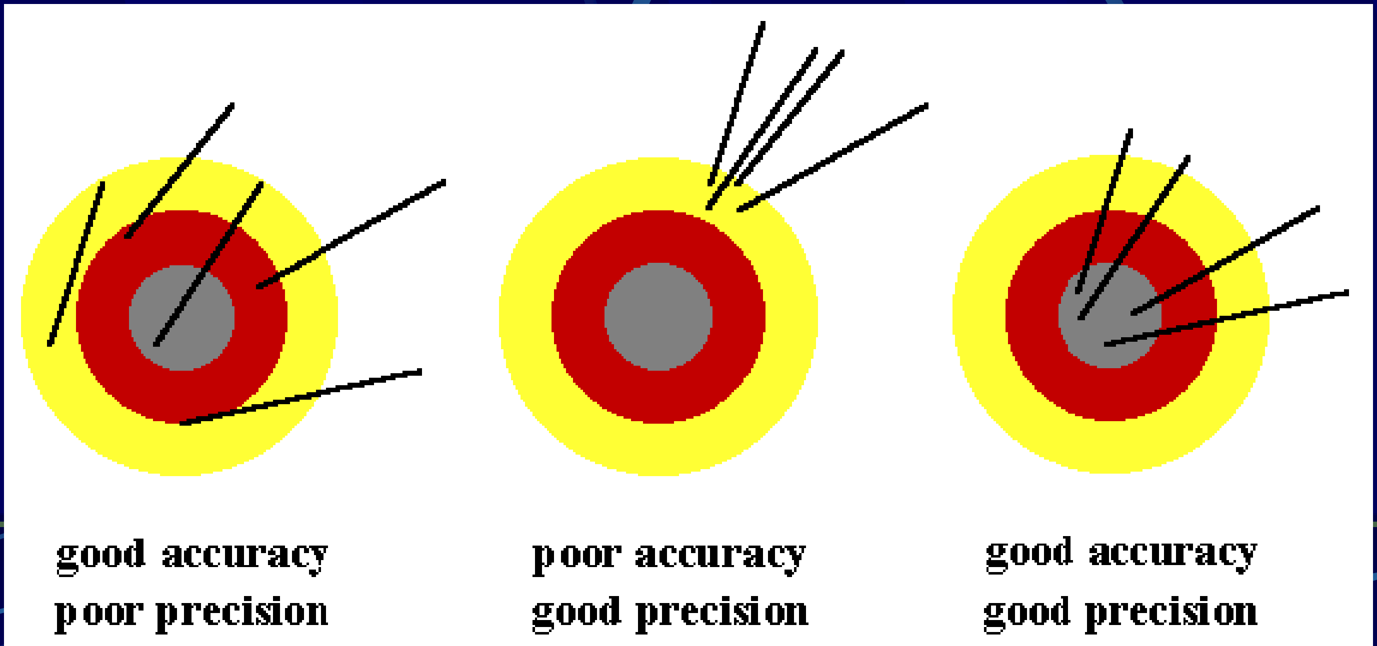
Accuracy & Precision

Accuracy

The accuracy of an analytical measurement is how close a result comes to the true value. Determining the accuracy of a measurement usually requires calibration of the analytical method with a known standard.

Precision

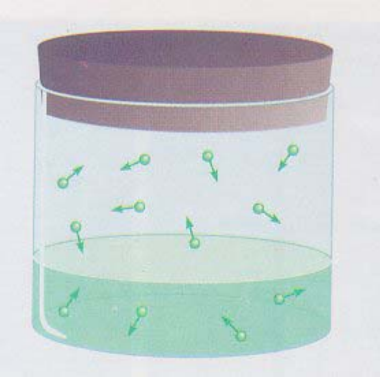
Precision is the reproducibility of multiple measurements and is usually described by the standard deviation, standard error, or confidence interval.



Henry's Law

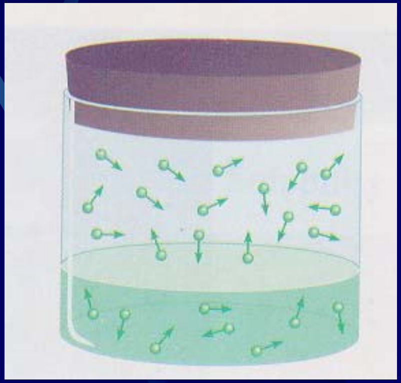
The solubility of a gas in a liquid is proportional to the pressure of the gas over the solution.

Above is the general definition of Henry's law. It's a commonly applied tool in physical chemistry. From it you can derive the following formula:



1. $c \propto P$

2. $c = kP$



Where c is the molar concentration (mol/L) of the dissolved gas and P is the pressure (in atm) of the gas over the solution. k for a given gas is the *Henry's Law constant* dependent only of temperature.

Beer-Lambert Law

$$A=\varepsilon bc$$

Where A is absorbance (no units, since $A = log_{10} P_0 / P$)

e is the molar absorbtivity with units of L mol^{-1} cm^{-1}

b is the path length of the sample - that is, the path length of the cuvette in which the sample is contained measured in centimeters.

c is the concentration of the compound in solution, expressed in mol L-1

Absorbance is directly proportional to the other parameters, as long as the law is obeyed.

Combined Gas Law

The combined gas law states that for a given mass of gas, the volume is inversely proportional to the pressure and directly proportional to the absolute temperature.

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

P_1 is the original pressure, V_1 is the original volume, T_1 is the original absolute temperature, P_2 is the new pressure, V_2 is the new volume, and T_2 is the new absolute temperature.