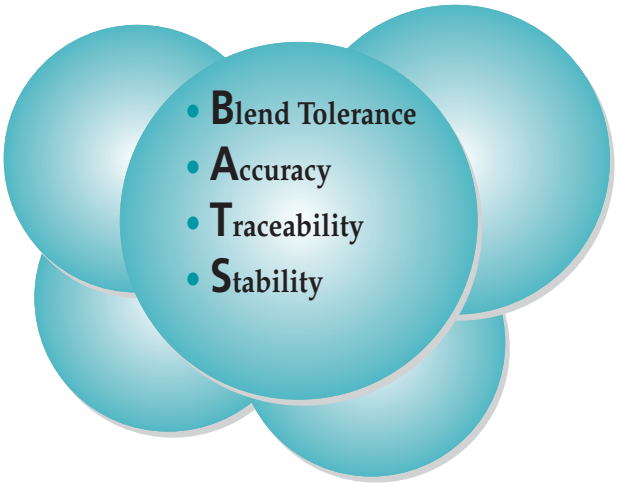
Introduction

The Gold Standard in Calibration Mixtures

Matheson pioneered gas mixture preparation, blending and analysis over 90 years ago. Since then, Matheson has invested a significant amount of research and development to continuously enhance and develop our state-of-the-art mixture blending technology and analytical techniques. As the world leader in specialty gases, we have committed ourselves to excellence by providing each customer with the safest, highest quality ***Gold Standard in Calibration Mixtures.***

We understand the importance of providing accurate and precise calibrations standards that directly address the application with the optimal gas mixture. Each mixture is designed and manufactured based on our commitment to the Matheson Four Cornerstones of Gas Mixture Performance, which we refer to as **B.A.T.S.**



Blend Tolerance

Definition: *The degree of agreement between the Blended Concentration and the Customer Requested Concentration.*

Blend Tolerance can be affected by many factors. The most common are:

- Blending method: partial pressure vs. gravimetric
- Mixture component reactivity with impurities, other components, cylinder surfaces and blending equipment
- The concentration of the mixture components
- Raw material impurities

Matheson's state of the art blending technology, cylinder treatment and cylinder preparation combined with our wealth of gas reactivity knowledge, allow us the control to meet even the tightest blend tolerances.

Accuracy

Definition: *The statistical agreement of a measured value with its true value. Accuracy is calculated using the propagation of error model using the common error factors of reference standard error, measurement precision, and a stability factor - all at the 95% confidence level.*

Many factors affect and influence mixture accuracy. These include:

- The reference standard materials used in the mixture analysis
- Precision of the analytical instrument used in the mixture analysis
- Stability factors of the mixture components
- Raw material purity of the mixture components
- Accuracy of the gravimetric system used in mixture preparation
- Human error

Matheson has over 90 years of experience in understanding, controlling and calculating each error contribution to the accuracy of each mixture. Calculating and decreasing all possible errors results in final gas mixtures that are the most repeatable and accurate in the industry.

Traceability

Definition: *An unbroken chain of comparisons to the National and International Measurement Systems using statistically valid methods.*

There are two types of Traceability:

- **Direct Traceability**: The analysis of a customer mixture against a NIST SRM, NTRM or NMI Standard.
- **Indirect Traceability**: The analysis of a customer mixture against a lab standard that is directly traceable to NIST SRM, NTRM or NMI or to an indirect mechanism such as weight or titrimetry.

NIST - National Institute of Standards and Technology
SRM - Standard Reference Material
NTRM -NIST Traceable Reference Material
NMI - Netherlands Measurement Institute

Certifications to the National Measurement System have increased significance when traceable instrument calibration is required because of environmental regulation, use of analyses in legal proceedings and other critical situations.

Stability

Definition: *The ability to maintain a constant concentration value over a defined time within statistical significance.*

Factors that affect mixture stability include:

- Cylinder and valve material of construction
- Internal cylinder preparation
- Raw material purity
- Component reactivity
- Component concentration
- Cylinder pressure
- Delivery systems

Mixture stability has a significant impact on the accuracy and long-term usability of the calibration standard. Matheson manufactures a wide spectrum of low concentration mixtures and guarantees their stability over a defined period of time.