QAR

QUALITY ASSURANCE RESOURCES, LLC
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ASSESSING LABORATORY PERFORMANCE THRU PROFICIENCY TESTING

The primary objective of Proficiency Testing is to provide a quality assurance tool for individual laboratories to compare their analytical performance with that of other high quality laboratories, to identify the need for remedial action, and to facilitate and demonstrate improvement. The accreditation communities, as well as most laboratory customers, consider proficiency testing a critical part of assuring that the laboratory is operated in an "in-control" mode.

A well-run Proficiency Testing Program provides many benefits to the participating laboratories:

1. Provides laboratories with a statistical Quality Assurance / Quality Control tool to compare individual laboratory performance with other domestic and international laboratories utilizing the same and different methods.

2. Provides laboratories with an objective method for assessing and demonstrating the reliability of data produced for their customers.

3. Provides a program to satisfy participation in proficiency testing programs as part of laboratory accreditation requirements.

4. Provides internal Quality Control materials for control charting and troubleshooting problems with test methods.

5. Provides data comparing different test methods which determine the same parameters, thereby providing an internal measurement for potential bias.

QUALITY ASSURANCE RESOURCES

The following is a brief synopsis of the protocols for the 60 Mesh and 4 Mesh Coal Proficiency Testing Programs. The 60 Mesh Program provides essential data to help assure that analytical processes in the laboratory are maintained in an "in-control" condition with additional monitors for sample preparation provided through the 4 Mesh Program. Both 60 Mesh and 4 Mesh samples are shipped at the beginning of each month. Results for the 60 Mesh samples are due around the 5th, with the 4 Mesh results due around the 18th of the following month.

Upon completion of testing, duplicate analytical results are entered by the participating laboratories into a set of database files accessed through a secure link via the QAR-Internet Data Input System (QAR-IDIS). Integrity of each lab's data is protected through a User ID/Password Security Program, The software and web interface are very user friendly and easy to navigate. At the end of the data input session, the participating laboratory will be asked to commit its data to the database. After committal of a lab's data, no changes are allowed. Following committal of the data from all labs, or expiration of the predetermined reporting period, the statistical analysis of the database for a specific sample will be initiated. The Statistical Protocols have been written to produce easily understood statistical and summary reports and allow for future functional changes as required.

QAR 60 MESH COAL PROGRAM (MONTHLY)

Samples of approximately 115 grams of 60 Mesh Coal are bottled on a large 10 foot diameter microprocessor controlled stainless steel wheel. Each sample receives in excess of 600 individual increments in the preparation process. Bottled samples are distributed to the participating laboratories from randomly selected wheel positions. Prior to distribution randomly selected samples have been analyzed and statistically evaluated to assure sufficient homogeneity. The samples are analyzed by the participants in duplicate for the parameters listed below. Results are entered via the QAR-IDIS, statistically analyzed, and reports disseminated via e-mail.

Two runs on the wheel generate 272 uniform bottles of each sample material. The unused bottles are available for Control or Reference Materials.

QAR 4 MESH COAL PROGRAM (MONTHLY)

Samples of 4 Mesh Coal weighing approximately 2200 grams each are packaged in foil/Mylar bags on a 12 foot diameter microprocessor controlled stainless steel wheel. Each sample receives in excess of 900 individual increments in the preparation process. Samples are distributed to the participating laboratories from randomly selected wheel positions. One sample is crushed to 8 Mesh, split by riffle, and each split air-dried for Total Moisture. Following pulverization to 60 Mesh, each sample is analyzed for the parameters listed below. Labs running Hardgrove Grindability and/or Equilibrium Moisture receive an additional bag of 4 Mesh sample. Results are entered via QAR-IDIS, statistically analyzed, and reports disseminated via e-mail using the same protocol as used for the 60 Mesh Samples.

STATISTICAL PROTOCOL

The protocol for statistical analysis of the data generated by the Program Participants has been written by an internationally recognized statistician, formerly Chairman of ASTM E11, ASTM Committee on Quality and Statistics. The QAR-IDIS system evaluates the database by parameter for each sample, produces a detailed report with multiple format Trend Charts (i.e., Statistical and ASTM Reproducibility), and stores the historical data. The final program is very user friendly and compliant with statistical methods and procedures defined within *ISO 13528 Statistical Methods for Use in Proficiency Testing by Interlaboratory Comparisons, ISO Guide 43 – Proficiency Testing by Interlaboratory Comparisons – Part 1: Development and Operation of Proficiency Testing Schemes,* and 21 other ISO Standards, ASTM Committee E11 documents, and Internationally recognized sources. The software has been installed on a state-of-the-art server with six 500 gigabyte drives to allow adequate space for data storage and rapid interface with the participants inputting data.

The QUALITY ASSURANCE RESOURCES analysis parameters for the 60 Mesh and 4 Mesh Coal Proficiency Testing Programs are tabulated below.

QAR 60 MESH COAL PROFICIENCY TESTING PARAMETERS

PROXIMATE – ULTIMATE

Moisture %
Ash %
Sulfur, Total %
Volatile %
BTU/lb.
Carbon %
Hydrogen %
Nitrogen %

Sulfur, Pyritic %
Sulfur, Sulfate %
Sulfur, Organic %

Free Swelling Index

ASH MINERAL (IGNITED BASIS)

SiO_2 wt %
Al_2O_3 wt %
Fe_2O_3 wt %
Ca O wt %
Mg O wt %
Na_2O wt %
K_2O wt %
MnO_2 wt %
P_2O_5 wt %
TiO_2 wt %
Ba O wt %
Sr O wt %
SO_3 wt %
Undetermined wt %

ASH FUSION TEMPERATURES

Oxidizing – Initial IT
Oxidizing – Softening ST
Oxidizing – Hemispherical HT
Oxidizing – Fluid FT

Reducing – Initial IT
Reducing – Softening ST
Reducing – Hemispherical HT
Reducing – Fluid FT

TRACE ELEMENTS

Antimony µg/g
Arsenic µg/g
Beryllium µg/g
Boron µg/g
Cadmium µg/g
Chlorine µg/g
Chromium µg/g
Cobalt µg/g
Copper µg/g
Fluorine µg/g
Lead µg/g
Lithium µg/g
Mercury µg/g
Manganese µg/g
Molybdenum µg/g
Nickel µg/g
Selenium µg/g
Silver µg/g
Thallium µg/g
Vanadium µg/g
Zinc µg/g

QAR 4 MESH COAL PROFICIENCY TESTING PARAMETERS

PROXIMATE

Moisture %
- Total
- Air Dry Loss Moisture
- Residual Moisture

Ash %
Sulfur %
Volatile %
BTU/lb.

Equilibrium Moisture %
Hardgrove Grindability