



Dear PQ Systems Software Owner:

PQ Systems, Inc. is dedicated to providing high-quality products and services to its customers. This letter is to assure you that your software package has been rigorously tested against well-known documented sources to insure accuracy of statistical analysis. They can be used as baseline data and results to compare with *GAGEpack*® Release 13.

One source used to test PQ Systems software is the *Automotive Industry Action Group, Measurement Systems Analysis (MSA)* reference manual, Fourth Edition. This manual was developed to standardize reference manuals, reporting formats, and technical nomenclature to be used by Chrysler, Ford, and General Motors. Many of the R&R, Uncertainty, and Linearity studies you will see in *GAGEpack* as sample studies are derived from data in this manual.

If you create a study from scratch using data from this manual, you should receive the same results in *GAGEpack*® Release 13 as those stated in the manual. Also, if you take raw data from *Evaluating the Measurement Process (EMP)*, Second Edition, by Donald J. Wheeler and Richard W. Lyday and perform the same calculations in *GAGEpack*, you should receive the same results. Minimal differences due to rounding may ensue, since *GAGEpack* carries calculations out to 7 significant figures before rounding, while the references used are less precise. The PQ Systems software results are therefore, more accurate. *SQCpack*® Release 8 was used to verify the calculations of the stability study located in the *Sample Gages* database. There are some inconsistencies in these manuals. For example *MSA* uses out of control ranges in an R&R study and *EMP* excludes out of control ranges for Appraiser Bias but includes them for Discrimination Ratio and Interclass Correlation calculations. Another example is that d_2^* , a better index for small data sets, is used throughout *GAGEpack*.

In order to facilitate the comparison, we have provided the following Excel file(s):

- MSA4th.xls
- EMP2nd.xls
- SQCpackStability.xls

These spreadsheets contain the raw data, the reference and page number, the statistical results from the source data, and the statistical results from *GAGEpack*. If you have any questions about the data, references, or results, please contact technical support at: support@pqsystems.com.

At PQ Systems, we are committed to continuous improvement and strive to keep raising the bar in the field of quality improvement.

Sincerely,

Beth A. Savage
President

210 East Spring Valley Road, Suite B, Dayton, OH 45458

800-777-3020 • 937-813-4700 • fax 937-813-4701 • sales@pqsystems.com • www.pqsystems.com