**ProMSA** is math-anxiety-free, comprehensive and dedicated software solution for **Measurement Systems Analysis** conforming to **AIAG's MSA Manual - 4ᵗʰ Edition.**

REPEATABILITY & REPRODUCIBILITY (R&R) STUDY

❖ R&R Studies using 3 methods:
  - Crossed ANOVA Method
  - Nested ANOVA for Destructive and Non-Replicable Tests
  - Range and Average Method

❖ Facility for Variable number of Appraisers, Samples, and Trials

❖ Randomized sequence GR&R data collection sheet

❖ GR&R Analysis for unilateral tolerance

❖ ANOVA Analysis for single appraiser (Repeatability Only)

❖ Advanced Control Chart analysis

❖ Traffic signals for Part to Part Variation, Repeatability and Total GR&R

❖ Computation of:
  - Components of Variation (AV, EV, PV, R&R and TV)
  - Comparison to targeted Ppk
  - Percentage Contribution
  - Signal to Noise Ratio
  - Distinct Data Categories (nDC)
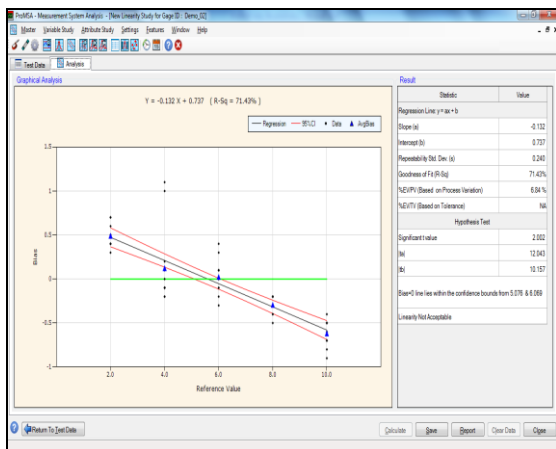 - Detailed ANOVA Tables
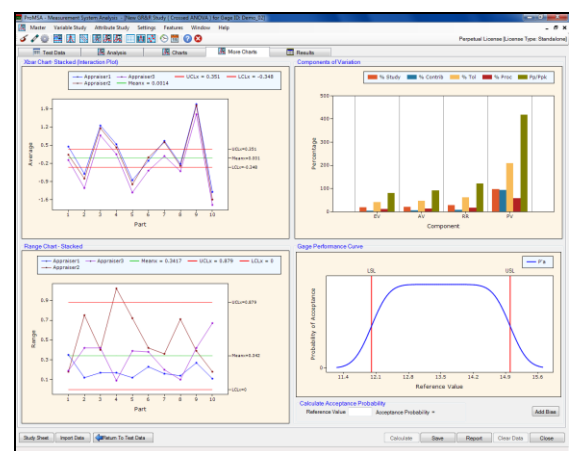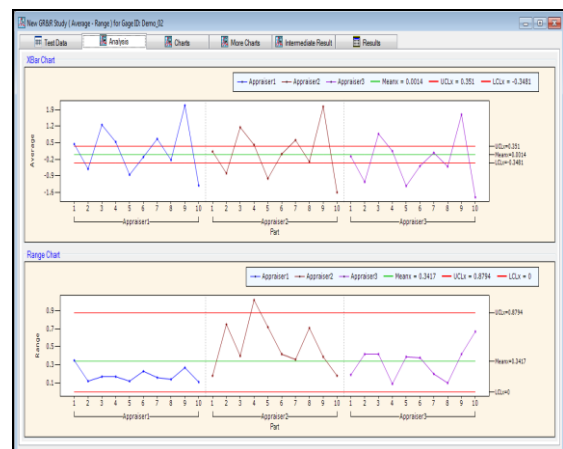
BIAS STUDY

- ❖ Statistical derivation of Bias Value

- ❖ Significance of Bias using t-test

- ❖ Traffic signal for Acceptance of Bias

- ❖ Histogram for advanced Analysis

- ❖ Bias Plot and Scatter Diagram

- ❖ Computation of % Repeatability
  - Compared to Tolerance
 - Compared to Process Variation
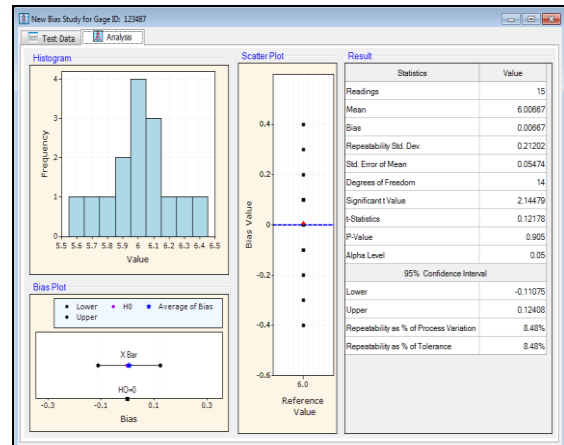
LINEARITY STUDY

- ❖ Computation of Bias and Spread at multiple Levels over the entire operating range

- ❖ Regression Analysis with Confidence Intervals

- ❖ Calculation of Goodness of Fit (R^2) parameter

- ❖ Traffic Signal for Acceptance criteria

- ❖ Hypothesis Test for constant bias

- ❖ Hypothesis Test for bias=0

- ❖ Evaluation of % Repeatability
  - Compared to Tolerance
  - Compared to Process Variation

STABILITY STUDY

❖ User-definable subgroup size

❖ Average (X-Bar) Chart

❖ Range (R) Chart

❖ Analysis using Western Electric Rules

❖ Traffic Signal for Out-Of-Control and Trend Situations
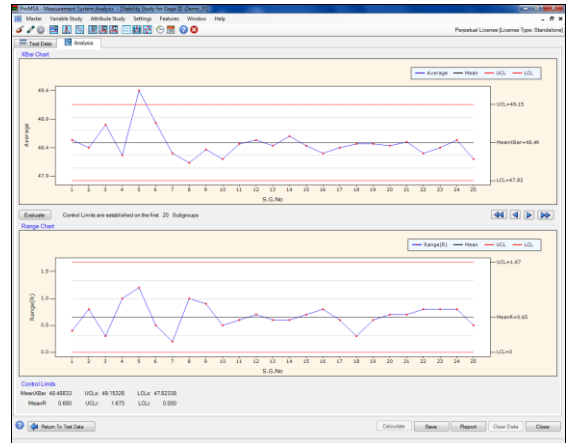
ATTRIBUTE R&R: CROSSTAB METHOD
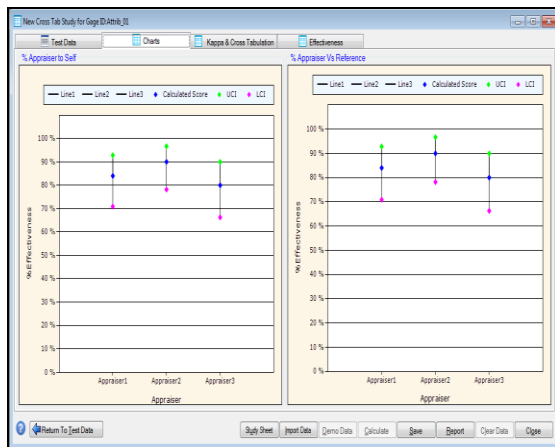

❖ Cross Tabulation across appraisers and with Reference Decision

❖ Evaluation of Inter-rater Agreement using **Cohen's Kappa parameter**

❖ Calculation of Effectiveness of Measurement System

❖ Calculation of False Alarm Rate

❖ Calculation of Miss Rate

ATTRIBUTE R&R: SIGNAL DETECTION METHOD

- ❖ Evaluation of Zone of disagreement between appraisers

- ❖ Cross Tabulation across appraisers

- ❖ Evaluation of Inter-rater Agreement using **Cohen's kappa parameter**

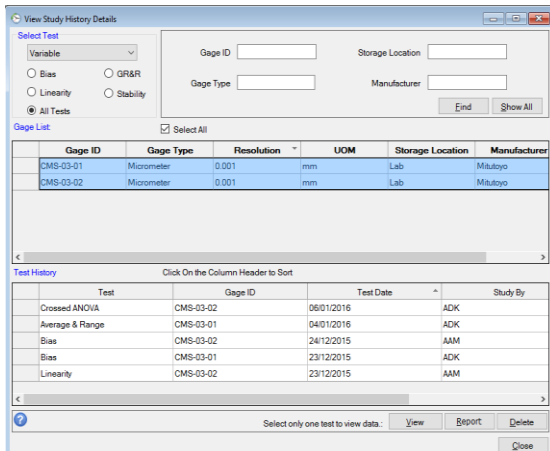- ❖ Evaluation of %GR&R for attribute measurement system
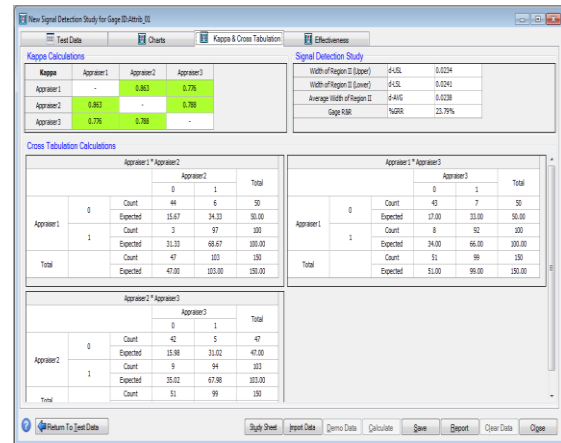
ATTRIBUTE R&R: ANALYTIC METHOD
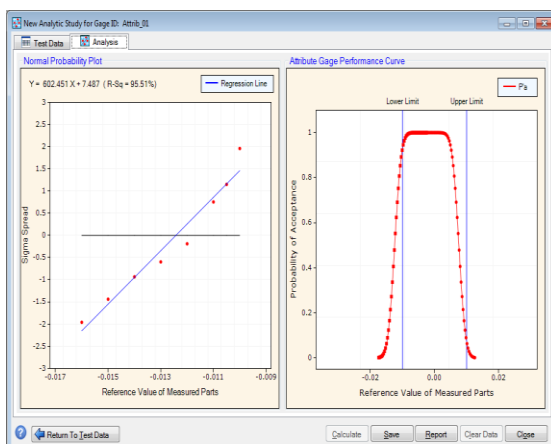
- ❖ Evaluation of Probability of Acceptance

- ❖ Computation of Bias and Repeatability for Attribute Gage

- ❖ Facility to conduct study at lower or upper end of tolerance zone

- ❖ Normal Probability Plot

- ❖ Gage Performance Curve
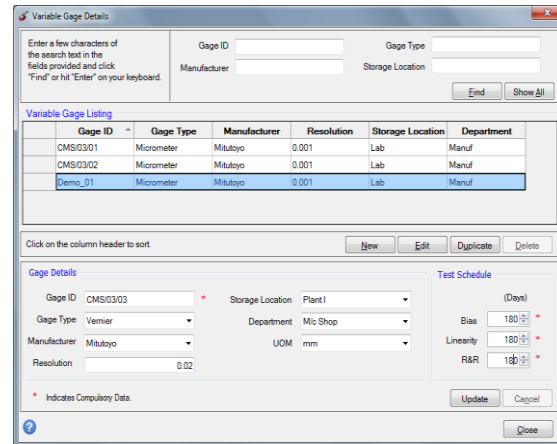
OTHER FEATURES: STUDY HISTORY, SCHEDULE, REPORTS

Study History

❖ Variable Gage Database with Test Frequency

❖ Attribute Gage Database with Test Frequency

❖ Import & Duplicate Gages

❖ History View for all studies

❖ View Study Schedule

❖ **Reports** in various formats: Excel, Word, PDF

❖ Reports can have Company Logo in the header
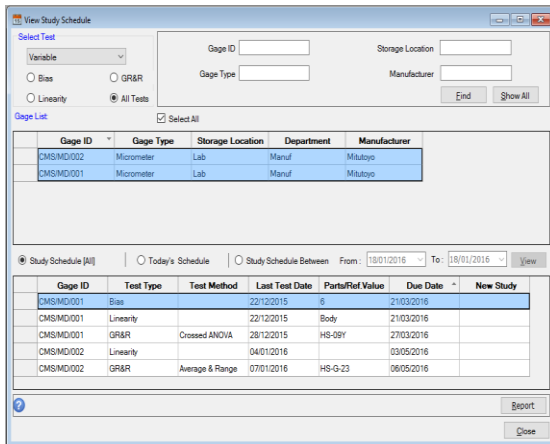
Study Schedule

Gage Database

❖ Free form Copy & Paste of data

❖ Intuitive Data Entry, Grid Navigation and Orientation
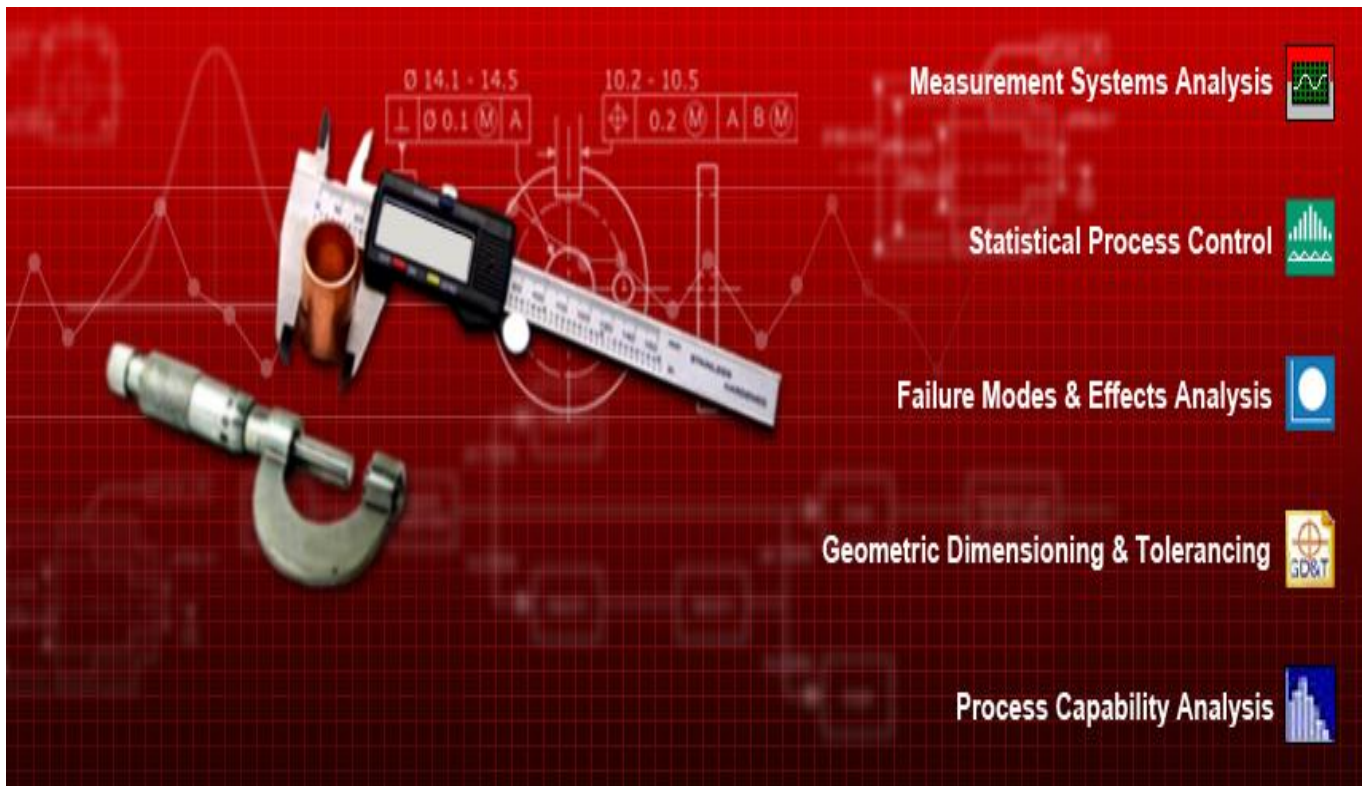
❖ Save results & graphs individually

❖ Extensive graphical & numerical analysis

❖ Comprehensive On-Line Help

❖ Compatible with all Windows OS including Windows 10

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Measurement Systems Analysis

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