

# Changes and Enhancements

## **Overview**

This section summarizes the major changes and enhancements to SAS/QC software in Versions 7 and 8. Information about changes and enhancements that were implemented in Version 8 is preceded by **V8**. All other changes and enhancements described in this section were implemented in Version 7. In other words, if your site upgraded directly from Version 6 to Version 8, then all of the changes and enhancements described here are new to you. If you upgraded from Version 7 to Version 8, then only the items preceded by **V8** are new to you.

## **Output Delivery System**

All procedures now incorporate the Output Delivery System (ODS). This is a system for managing the results of a procedure. By default, the results for a procedure are directed to the SAS listing file as in previous releases, but with ODS you can create HTML or RTF files, create SAS output data sets of any table in the output, select or exclude pieces of output from a procedure, or modify the organization and style of that output. Refer to *The Complete Guide to the SAS Output Delivery System* for complete documentation of ODS.

## **Graphics Output**

In Version 7 and later releases of SAS/QC software, charts are created with a graphics device *by default*. The GRAPHICS option in the procedure statement is no longer required and is ignored if specified. The LINEPRINTER option is now required to produce line printer output.

## **Inset Boxes**

In Version 7 and later releases, inset boxes have been added for the SHEWHART, MACONTROL, and CUSUM procedures. In Version 8 and later releases, inset boxes have been added for the PARETO procedure. In earlier releases, inset boxes were only available for the CAPABILITY procedure. For the procedures that produce primary and secondary charts, there is a separate INSET2 statement to specify inset boxes within the secondary chart.

## **CAPABILITY Procedure**

The ALPHA= option has been added to the PROC statement to specify the level for all confidence limits; the SPEC statement is now obsolete.

The EXCLNPWGT option has been added to the PROC statement to exclude observations with non-positive weights.

The ALL option has been added to the PROC statement to request all available tables of summary statistics.

The NEXTROBS= option has been added to the PROC statement to specify the number of extreme values.

The MUO= option has been added to the PROC statement to specify the null hypothesis for tests of location.

The TRIM= option has been added to the PROC statement to request a table of trimmed means.

The WINSOR= option has been added to the PROC statement to request a table of Winsorized means.

The LOCCOUNT option has been added to the PROC statement to request a table of the counts used to construct the sign test and signed rank tests.

The CIPCTLNORMAL option has been added to the PROC statement to request confidence intervals for percentiles assuming normality.

The CIPCTLDF option has been added to the PROC statement to request distribution-free confidence intervals for percentiles.

The CIINDICES option has been added to the PROC statement to specify properties of confidence intervals for capability indices.

The SPECIALINDICES option has been added to the PROC statement to request specialized capability indices.

The CIPROBEX option has been added to the PROC statement to request confidence intervals for the probability of exceeding a specification limit.

The CHECKINDICES= option has been added to the PROC statement to specify the goodness-of-fit test for normality used with capability indices.

The CIBASIC= option has been added to the PROC statement to specify properties of confidence intervals for basic parameters.

The ROBUSTSCALE option has been added to the PROC statement to request robust measures of scale.

The MODES option has been added to the PROC statement to request a table of all the nodes.

**V8**

Variables have been added to the SPEC= data set for customizing colors and patterns.

The DATA= SAS-data-set option has been added to the INSET statement to customize inset tables.

**V8**

The keywords MEAN and STD have been added to inset the mean and standard deviation of fitted distributions.

The WBARLINE= option has been added to the HISTOGRAM statement to specify the width of the histogram bar lines.

**V8**

The NMIDPOINTS= option has been added to the HISTOGRAM statement to specify the width of the histogram bar lines.

**V8**

The BARLABEL= option has been added to the HISTOGRAM statement to specify a label to be displayed above each bar.

**V8**

Support has been added for SAS time formats for horizontal axis histograms.

The CLIPSPEC option has been added to clip the extremes of first/last histogram bars intersected by specification limits. **V8**

The WGRID= option has been added to the COMPHISTOGRAM statement to specify the width of the grid lines.

The NEXCL option has been added to inset the number of observations excluded by the MAXSIGMAS= option in the COMPHISTOGRAM statement. **V8**

Confidence limits for capability indices have been added to the OUT= data set created with the OUTPUT statement.

Support has been added for maximum likelihood estimation of the threshold parameter for the beta, exponential, gamma, lognormal, and Weibull distributions in the HISTOGRAM statement.

Support has been added for maximum likelihood estimation of the shape parameters for the beta, gamma, lognormal, and Weibull distributions in the QQPLOT and PROBPLOT statements.

Support has been added for fitted Johnson distributions. **V8**

### ***CUSUM Procedure***

The DATA= SAS-data-set option has been added to the INSET and INSET2 statements to customize inset tables.

The HTML= and HTML\_LEGEND= options have been added to the XCHART statement to allow URLs to be associated with subgroups.

The SYMBOLORDER= option has been added to the XCHART statement to control the order in which symbols are assigned.

The ALLLABEL=, ALLLABEL2=, OUTLABEL=, and OUTLABEL= value options to the XCHART statement to label points with their values.

The HREFDATA= and HREFDATA2= options have been added to the XCHART statement to support quoted SAS data set names. The VREFDATA= and VREFDATA2= aliases have been added for VREF= and VREF2= options for consistency.

The TOTPANELS= option has been added to the XCHART statement to allow the user to specify the total number of panels to be used to display a chart.

The NOTICKREP option has been added to the XCHART statement to suppress repetition of adjacent identical tick mark labels for character-valued subgroup variables.

The WEBOUT= SAS-data-set option has been added to the XCHART statement which produces an output data set containing all the data in an OUTTABLE= data set, plus additional variables containing data to help users construct their own web pages that incorporate charts produced by the procedure.

### ***FACTEX Procedure***

The NAMELEN= option has been added for specifying the length of effect names in tables and output data sets.

**MACONTROL Procedure**

The DATA= SAS-data-set option has been added to the INSET and INSET2 statements to customize inset tables.

The HTML= and HTML\_LEGEND= options have been added to the chart statements to allow URLs to be associated with subgroups.

The SYMBOLORDER= option has been added to the chart statements to control the order in which symbols are assigned.

The ALLLABEL=, ALLLABEL2=, OUTLABEL=, and OUTLABEL= value options to the chart statements to label points with their values.

The HREFDATA= and HREFDATA2= options have been added to the chart statements to support quoted SAS data set names. The VREFDATA= and VREFDATA2= aliases have been added for VREF= and VREF2= options for consistency.

The TOTPANELS= option has been added to the chart statements to allow the user to specify the total number of panels to be used to display a chart.

The ZEROSTD option has been added to the chart statements to work with moving average control charts.

The NOTICKREP option has been added to the chart statements to suppress repetition of adjacent identical tick mark labels for character-valued subgroup variables.

The LIMLABSUBCHAR= option has been added to the chart statements for specifying a substitution character to be used with the UCLLABEL=, LCLLABEL=, RSYMBOL=, SSYMBOL=, and XSYMBOL= options to include the value of the limit or center line in a user-defined label.

The WEBOUT= SAS-data-set option has been added to the chart statements which produces an output data set containing all the data in an OUTTABLE= data set, plus additional variables containing data to help users construct their own web pages that incorporate charts produced by the procedure.

**OPTEX Procedure**

The NAMELEN= option has been added for specifying the length of effect names in tables and output data sets.

The STATUS= option has been added for specifying that the status of the search be checked at a given level.

**PARETO Procedure**

The DATA= SAS-data-set option has been added to the INSET statement to customize inset tables.

The HTML= option has been added to allow URLs to be associated with Pareto chart bars.

The HBAR statement has been added to create horizontal Pareto charts.

The NOHLLEG option had been added to suppress the legend generated by the CHIGH(n)=, CLOW(n)=, PHIGH(n)=, and PLOW(n)= options.

The WGRID=, WGRID2=, CBARLINE=, and WBARLINE= options have been added for controlling the widths of the primary and secondary grid lines and the color and width of bar outlines.

The BARLABEL= (*variable*) option has been changed to use the formatted values of the variable instead of the unformatted values. The same change has been applied to the BARLEGEND=, NLEGEND=, and TITLELEGEND= options.

### **RELIABILITY Procedure**

The procedure now allows probability plotting for arbitrarily censored life data through use of the Peto-Turnbull algorithm.

The procedure now allows identification of the mean, mode, and median of fitted distributions.

The PPOUT option has been added to allow output probability plotting positions to be summarized in a table or saved in a data set.

The ANNOTATE= option has been added to the PROC statement.

Weibull distribution parameters are now reported in terms of Weibull and extreme value distributions.

### **SHEWHART Procedure**

The DATA= SAS-data-set option has been added to the INSET and INSET2 statements to customize inset tables.

The TESTURLS= SAS-data-set option has been added to the PROC statement which contains variables for identifying a test for special causes and chart and a variable containing the URL to be associated with subgroups for which the given test on the given chart is positive.

The HTML= and HTML\_LEGEND= options have been added to the chart statements to allow URLs to be associated with subgroups.

Support has been added for SAS time formats for vertical axes of variables charts.

**V8**

The CLIPFACTOR= option to the BOXCHART statement to allow for Boxchart clipping.

The BOXCHART statement now uses subgroup standard deviations to estimate the process standard deviation by default. The RANGES option has been added to override this default.

The SYMBOLORDER= option has been added to the chart statements to control the order in which symbols are assigned.

The ALLLABEL=, ALLLABEL2=, OUTLABEL=, and OUTLABEL2= value options to the chart statements to label points with their values.

The TURNALL or TURNOUT option requests vertical orientation of labels produced by the ALLLABEL=, ALLLABEL2=, OUTLABEL=, and OUTLABEL2= options.

**V8**

The HREFDATA= and HREFDATA2= options have been added to the chart statements to support quoted SAS data set names. The VREFDATA= and VREFDATA2= aliases have been added for VREF= and VREF2= options for consistency.

**V8**

The VREF= option has been extended to support k-sigma limits.

The TOTPANELS= option has been added to the chart statements to allow the user to specify the total number of panels to be used to display a chart.

The ZEROSTD option has been added to the chart statements to work with attribute charts.

The NOTICKREP option has been added to the chart statements to suppress repetition of adjacent identical tick mark labels for character-valued subgroup variables.

The LIMLABSUBCHAR= option has been added to the chart statements for specifying a substitution character to be used with the UCLLABEL=, LCLLABEL=, CSYMBOL=, NPSYMBOL=, PSYMBOL=, RSYMBOL=, SSYMBOL=, USYMBOL=, and XSYMBOL= options to include the value of the limit or center line in a user-defined label.

The WEBOUT= SAS-data-set option has been added to the chart statements which produces an output data set containing all the data in an OUTTABLE= data set, plus additional variables containing data to help users construct their own web pages that incorporate charts produced by the procedure.

The SMETHOD= option now supports two additional methods for the IRCHART statement for estimating process standard deviation.

The ZONEVALUES, ZONE2VALUES, and ZONEVALPOS= options have been added to the chart statements to allow zone limits to be labeled with their values.

The CTESTS= option has been extended to allow different colors to be used for the labels and highlighted line segments associated with different tests for special causes.

The CIINDICES(ALPHA=*number* TYPE=*keyword*) option has been added for computing capability index confidence limits.

**V8**

The PHASELIMITS option has been added to label constant control limits within each phase.

**V8**

The INTSTART= option controls the starting point of the interval specified with the INTERVAL= option.

**V8**

The VFORMAT2= option has been added to the chart statements that produce a secondary chart to allow the user to specify a format for the secondary chart vertical axis.

**V8**

The NO3SIGMACHECK option has been added to the chart statements to allow tests for special causes to be applied with control limits other than  $3\sigma$  limits.

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