ProGAGE® ISO v6

Calibration Management Software

ProGAGE™ ISO 6

Calibration Management Software

User's Manual

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PROGAGE ISO 6 CALIBRATION MANAGEMENT SOFTWARE

User's Manual

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Table of Contents

USER'S MANUAL

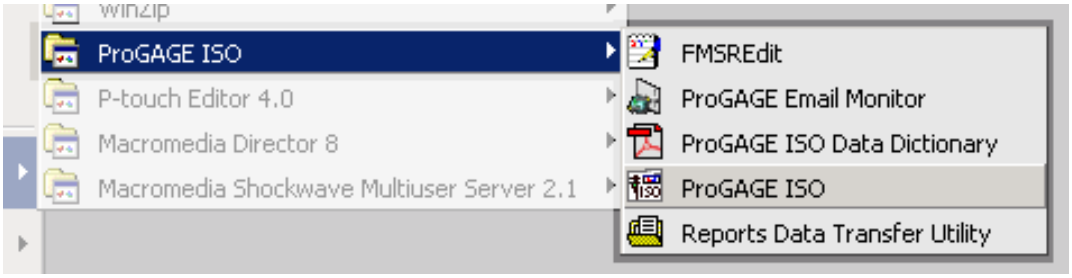
Chapter 1: Starting ProGAGE ISO

Running ProGAGE ISO 6

To start an initial ProGAGE ISO Session:

1 Click the START button and select PROGRAMS > PROGAGE ISO > PROGAGE ISO.

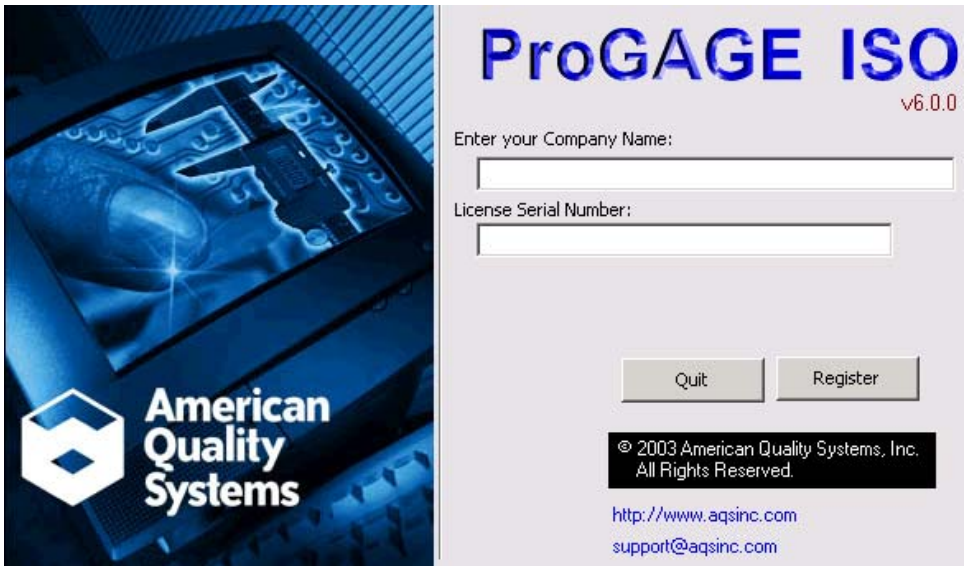
A



B

Opening ProGAGE ISO v6
A START button **B** Selecting ProGAGE ISO

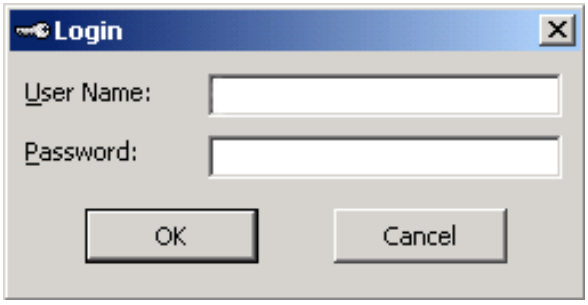
Note: If the program you're running is not yet registered, the window below will appear:



Register your copy of the program by entering your Company Name and the License Serial Number located on the ProGAGE ISO v6 Registration Form. Click REGISTER. A message box indicating successful installation will appear. It will also indicate the allowed number of users for the program.

If you choose not to register, you will automatically get the trial version of the program and this window will pop up every time you run the program.

3 If you have set up security, the login window will appear. Enter your User Name and Password, then click OK.



ProGAGE ISO 6 Menu

The main features of the program are organized under two groups: the MAIN modules and the UTILITIES. The table below provides a short description of each:

Main Modules

Main	Description
 Gage Master	Primary Gage Information and the related records on User Information and Procedures, Standards, Parts, Calibration Data, Gage R&R Studies, and Kits/Fixtures are stored in this module.
 Calibration	This module records calibration information of all the gages.
 Kits/Fixtures	The KITS/FIXTURES option tracks kits/fixtures and provides a comprehensive report on the status of the gages included in the kits.
 Parts	Parts measured by the gages are tracked by this module.
 Suppliers	A complete list of suppliers and the parts they supply are recorded in this module.
 Issue/Return	ISSUE/RETURN allows for easy access to the location and condition of Kits/Fixtures and the associated gages.
 Procedures	Features an entry and modification facility for each procedure.
 R&R	The R&R MODULE facilitates the conduction of Measurement System Analyses, and manage records of MSA studies conducted on the gages. The MSA Studies are divided into two: MSA 2 and MSA 3 Studies. MSA3 Studies allow you to conduct the following studies: Long AIAG, Linearity, Bias, Uncertainty, Stability, Attribute Risk Analysis, and Attribute Analysis. On the other hand, MSA 2 allows you to use statistical test procedures of Repeatability, Reproducibility, Bias, Stability, Linearity, and Variance.
 Reports	Provides you with a selection of documents for managing gage information.

Utilities

Utilities	Description
 Settings	Stores basic program user and owner information, some of which are used in the reports. This module lets you view program error logs, set up the Calibration Certification Statement, Standard Labor Rate and RR Labor Rate, generate invoice records every time you do a calibration or R&R record, and provide LiveUpdate of your ProGAGE System (such as when new installers are available at AQS Download Site).
 Users	Use this module to assign access rights to users. The user's email address is used by the automatic email function of ProGAGE ISO.
 Report Import/Export	This feature allows you to import and export data from previous versions of the program and from other compatible databases.
 Skip Dates	Identify specific dates or days of the week when you do not want calibrations to take place in this module. You can also instruct ProGAGE ISO on how to reschedule the calibration.
 Label Editor	Labels can be changed in this module. You can also modify the type of entry field for some of the fields and even assign tables for drop down fields.
 Table Editor	Database information can be viewed and edited in table format using this module. However, some data are results of computations imbedded in entry forms and TABLE EDITOR does not carry these formulas. In this case, you have to do manual computations and enter them into the table.
 Import Database	This module lets you import data from previous versions of ProGAGE ISO and from other useful databases like Procedure Pack.
 Compact Database	A database clean-up facility which removes temporary files from the database to make it as compact as possible.
 Repair Database	This utility facilitates the rebuilding of lost connections when database integrity (connection or link) between database tables are lost or corrupted.
 Backup/Restore Database	Creates database backup for data recovery in the event of total database failure. Select RESTORE DATABASE to repair and replace a corrupted database.
 Archive Database	Archives historical information individually by Gage ID. All records are kept in one archive file and may be restored individually. Archived records are removed from the active database.
 System Info	Features the built-in system info manager of your operating system.
 System Info	Initiates connection to a particular source database, allowing you to import Calibration and R&R Study Data.
 Database Structure	The DATABASE STRUCTURE UTILITY allows Administrators to explore and search the database. A valid SQL Query will allow you to perform a specific search of a database and its contents.
 Service Request	This module allows you to post and email a service request or corrective action to AQS.

 Invoices	Generated invoice records and job items from Calibration and R&R Records can be edited in this module. With the Terms Entry feature, it will also help you maintain terms of payment records.

Chapter 2: Program Conventions

ProGAGE ISO Help

Go to the HELP menu or press the F1 key to open HELP TOPICS: PROGAGE ISO VERSION 6. The Help window opens with the Contents tab. Click the tabs to switch among the Contents, Index, and Find tabs.

Contents tab

Use the CONTENTS tab to view the Help topics organized by subject matter, like the Table of Contents of a book. You can click the icons to the left of items to collapse or expand the outline.

Index tab

Use the INDEX tab to find Help topics in a linked, alphabetical list of terms for various functions, features, and concepts. You can browse the index in two ways. You can scroll to the term you want, and click a link to open the related Help topic. Or, you can use the top field to filter and show the list for just one letter of the alphabet, and then scroll and click a link to open the Help topic.

Find

Use the FIND tab to find a specific word in Help. Type the word in the text box and the results list shows the titles of all topics in which the search word appears, listed in the order that they appear on the CONTENTS tab. Select Help topic and click DISPLAY button.

Printing Help topics

You can print any individual topic from the Help documentation. Each topic must be printed individually. You cannot print multiple topics at a time or entire sections of Help.

To print a Help topic:

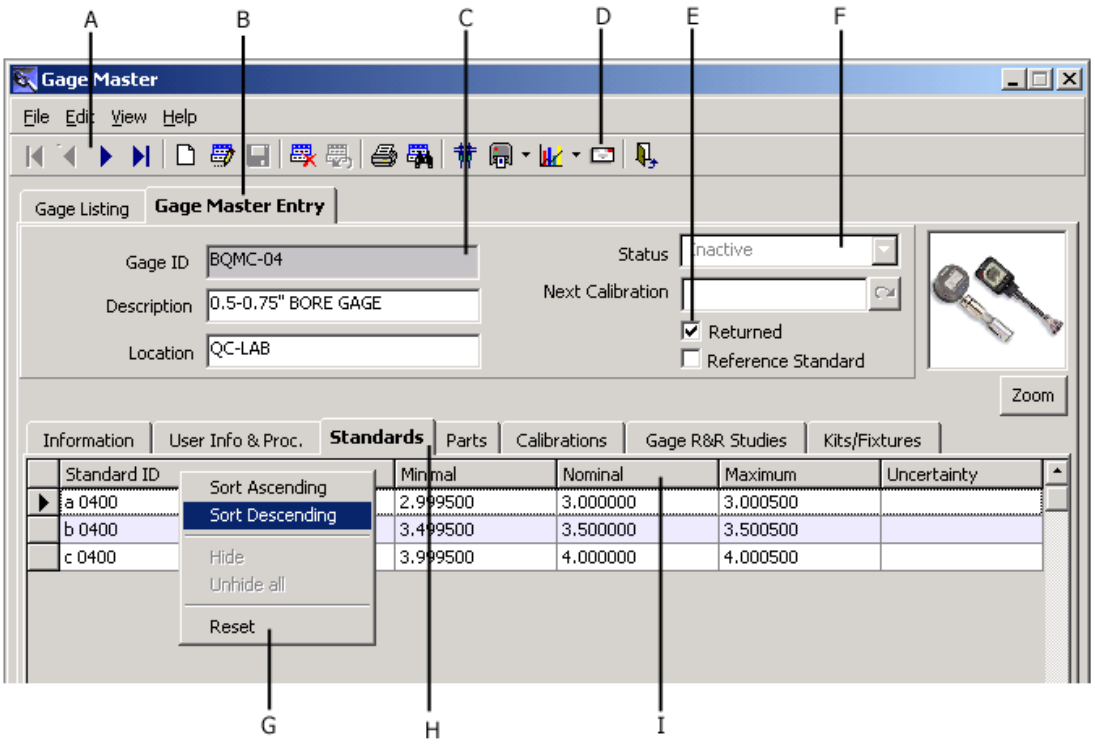
1 Open the Help topic that you want to print.

2 Click PRINT on the Help toolbar.

About Module Work Area

A ProGAGE ISO module window is usually divided into tab folders, with each tab folder containing a group of related controls, such as fields, checkboxes, and dropdown menus. A tab folder is sometimes divided into several tab pages containing more specific related information and controls. On the left side of the toolbar are navigation controls that help you browse through the records in a particular module. The toolbar may also contain buttons that command a specific action such as Print Record, Close

Window, or E-mail Record. A module may also contain other buttons for other actions that can be performed, or are specific, in a particular module; for example, the Gage Entry Module has buttons for duplicating a gage record and for generating charts. The lower part usually contains a Records Listing pane that provides a list of all records on that particular module.



The Module Work Area

A. Navigation Buttons **B.** Tab Folder **C.** Non-editable Field **D.** Button **E.** Checkbox **F.** Drop-down list Field **G.** Context Menu **H.** Tab Page **I.** Records Listing pane

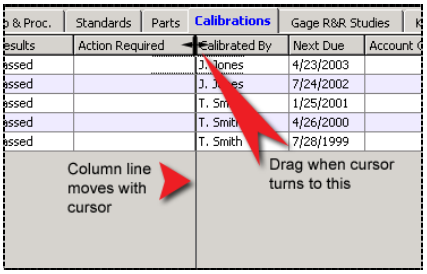
The Records Listing Pane

All of the main modules of ProGAGE ISO contain a Records Listing pane that lists all records for a particular module. Each record is composed of one or more fields identified in the column heading—the topmost row of the Record Listing pane. You can resize the column width to customize the display of the Records Listing pane by dragging the boundary between two column headings.

To resize column:

1 Position the pointer over the boundary between two column headings. Notice the pointer changes to ✣.

2 If you are interested with the column on the left, drag the cursor rightwards to increase it; leftwards to decrease. If, on the other hand, you are interested with the column on the right, drag the cursor towards the left to increase column size; towards the right, to decrease.



Drag pointer to resize column width

Navigation Controls

You can move from one record to another using the navigation controls in the toolbar. In addition, you can access a particular record by clicking the that corresponds to it.

To go to another record:

Do one of the following:

- To go the top or bottom record, click the TOP RECORD button or BOTTOM RECORD button in the toolbar.
- To go to next or previous page, click the NEXT RECORD button or the LAST RECORD button in the toolbar.

Using context menus

ProGAGE ISO provides context-sensitive menus that display commands for the particular item under the pointer. For example, you can left-click on the Records Listing Pane heading of Gage Master module to display a context menu that contains gage entry options.

To choose a command from the context menu:

1 Position the pointer over an item in the data grid, such as column head or entry.

2 Right-click to open the context menu, and then choose the *<command>* you want.

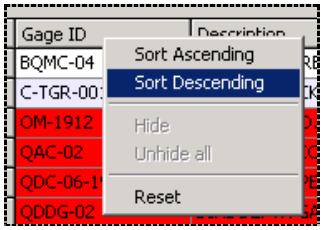
Sorting Records in Record Listing Pane

You can also list the records in the Record Listing pane following a sort order specified for a particular column. Identify the sort order from the left-click context menu.

To list records following a particular sort order:

1 Position pointer on the column in which you'll base the sort order.

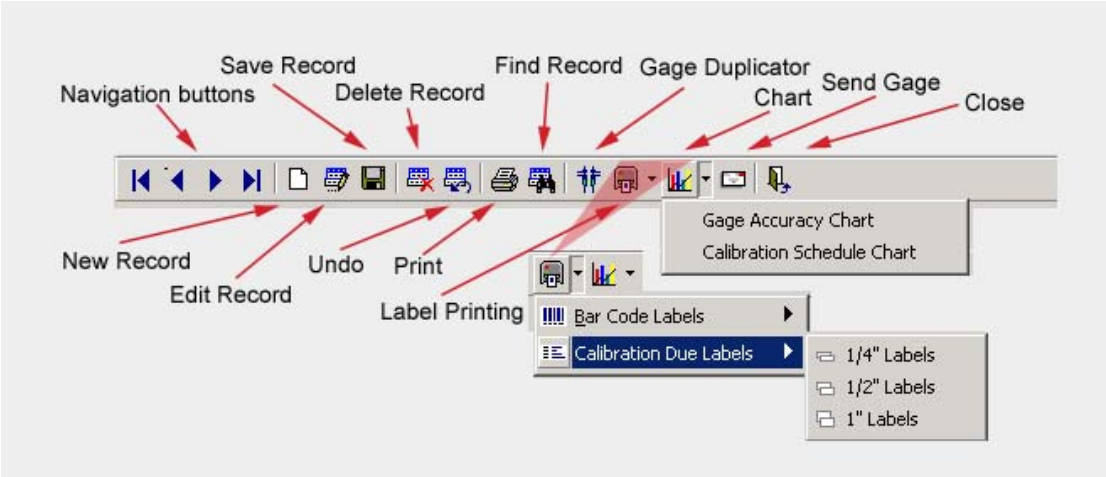
2 Left-click to open the context menu. Choose SORT ASCENDING to arrange entries from A to Z, or SORT DESCENDING to list entries from Z to A. Numbers appear first before letters when sort order is ascending.



Sort Gage ID entries in Descending Order

The Main Toolbar

You can access common program functions using dedicated buttons on the main toolbar of every module. Since some modules have more features and commands than others, the number of buttons in the toolbar varies from one module to another.



The Main Toolbar of Gage Master Module

The following table enumerates and describes the common buttons included in main toolbars of most ProGAGE ISO 6 modules. Other buttons that are unique to some modules (such as Gage Duplicator in Gage Master) are discussed extensively in other sections of the Manual.

Button		Description
	New Record	Use this button to add a new record.
	Edit Record	Click this button to edit or update an active record.
	Save Record	Choose this button to save a new record or save updates in an active record.
	Delete Record	Use this button to remove or delete record or records. ProGAGE ISO asks you for a confirmation to help you avoid unwitting and accidental deletions.

Button		Description
	Undo Current Field / Record	If you need to remove any changes to the current record, click this button.
	Print	Click this button to print a report of the active record or listing. The report opens in a separate window. ProGAGE ISO, with its Reports module, allows you to generate pre-customized reports. (See "Chapter 6: Reports" on page 37.)
	Find	Use this command to search for specific information. Place your cursor in the field containing the entry that you want to search, before clicking this button. (See "Finding a Specific Entry on a Record" on page 16 for more details.).
	Send	Click this button to send an electronic report based on the active record or listing. The report can be sent in the following formats: Text (.txt), Rich Text Format (.rtf), Adobe ® Portable Document File (.pdf), and MS Excel® worksheet format.
	Close	Click this button to terminate the active module session.
	Label	Click this button to generate and print pre-customized labels related to active record or listing. Open drop-down list and select from options.
	Chart	Choose this button to generate and print charts in Gage Master and R&R Study modules.

Working with ProGAGE ISO Controls

Controls provide you with input-capabilities. These include fields, drop-down lists, Textbox lists, textboxes, Buttons, Checkboxes, and RadioButtons. All of the Controls used in ProGAGE ISO are described in the succeeding discussions.

Fields

There are four types of fields used in ProGAGE ISO: Regular, Date, Drop-down List, and Non-editable. The regular field requires and accepts your input, and is distinguished by a white background. A Date field appears similar to a Regular field, except that it requires, and can only accept, date as value. Sometimes, a Date field is flagged in red, to signify that the date reflected in the field is past due. A Drop-down list field provides you with options from which you can choose the value that you want to enter. Click on the Drop-down field to open its options list. If the background is in gray, it means that this field is Non-editable, and is automatically populated by ProGAGE ISO, provided that you entered a valid value in the linked field.

Fields: **A.** Non-editable **B.** Regular **C.** Drop-down **D.** Date (flagged)

Browse (...) Button

Some fields require a path as value (such as when attaching or linking a file). To help you specify the path of a file, you can use the Browse button to open an ensuing dialog or window, in which you can map and identify the desired file.

Browse button of Error Log Field

Checkboxes and RadioButtons

You can mark a Checkbox or activate a RadioButton by clicking on it. When marked or activated, you deem the value of the Checkbox or RadioButton to be true; if not, False.

Date Format

There are only two acceptable date formats for the Date fields: MM**/**DD/YYYY and MM-DD-YYYY, where MM stands for ordinal month, DD for day of the month, and YYYY for the year. You may use a 2-digit year format instead of entering all four digits of the year. But you should take a caution in using so; ProGAGE ISO interprets a two-digit year to be a year in the 21st century. For example, ProGAGE ISO interprets 02 to be the year 2002 and 98 as year 2098 (not 1998).

Search and Filter Option

A Search and Filter option is used in filtering records using a specific string of characters. Other than the Reports module, all of the other ProGAGE ISO main modules contain a Search and Filter option that allows you to filter voluminous records and easily access a particular record.

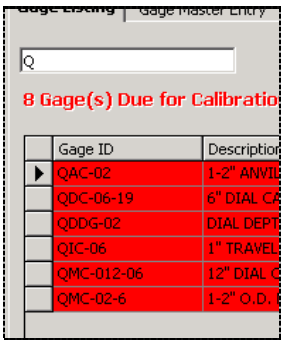
Doing a simple search

A simple search allows you to narrow your records listed in the Records Listing Pane of the active ProGAGE ISO Module, based on a string of characters.

To do a simple search

1 Open the ProGAGE ISO Module that you want to search.

2 Enter a string of characters on the unlabeled field besides the Search drop-down field. The records are automatically filtered, returning records that match the search string.



Search all records starting with Q

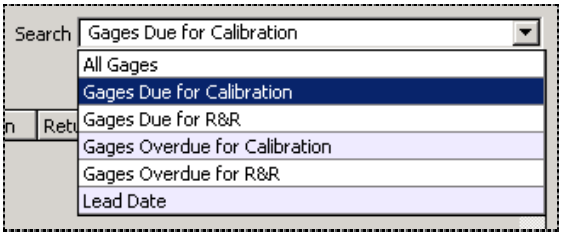
Advanced search using Filter tool

The Filter tool offers more options in narrowing your records listed in the Records Listing pane of the active ProGAGE ISO module. These options can either broaden or restrict your search by selecting from pre-defined filter criteria or from user-defined filter criteria.

To filter records using defined criteria:

1 Open the ProGAGE ISO module that you want to search.

2 Open Search field, and choose a defined filter criterion from the dropdown list. ProGAGE ISO will narrow the records in the Records Listing pane, only returning records that satisfy the filter criterion.



Advanced Filter Criteria: Gages Due for Calibration

Aside from the pre-defined filter criteria, you can also add a new filter criterion, or redefine an existing one, using Filter Builder.

The Filter Builder

The Filter Builder opens when you click on the EDIT/CREATE FILTER… button. With the Filter Builder, you'll be able to build a new search criterion or redefine an existing one.

Filter Builder Controls

Control	Description
Title	Enter in this field the title of the filter criterion that you want to create. It is suggested that you choose a title that will aptly describe the said filter criterion.
Sort By	Select from this dropdown list the field that will be become the basis in sorting your records. When you do an advanced filter, ProGAGE ISO will sort (ascending order) and return records that satisfy the filter criterion.
Field	Select from this drop-down list the field name that will be used for defining a search criterion. Field names are the column headings on the Records Listing

Control	Description
	pane.
Operator	Select from this drop down list of available field operators for creating a search criterion. The selection is limited to: "=" the search field matches the value entered. "<>" the search field is not equal to the value entered. "<" the search field is less than the value entered. ">" the search field is greater than the value entered. "<=" the search field is less than or equal to the value entered. ">=" the search field is greater than or equal to the value entered. "like" the value listed is a subset of or is part of the search field. Note: Wild card characters such as asterisk (*) and question mark (?) can only be used with the "like" operator. (See "Using Wild Card Characters" on page 15.)
Value	Enter a value in this field that will be used in defining the search criterion. Field entry may be string, numeric or in date format, depending on the *Field*. For example, the Value entry field will not permit a string value if the selected field is a numeric field. Also, dates should follow the format used by ProGAGE ISO. (See "Date Format" on page 12.)
Criteria	This textbox list contains the generated filter criteria. A Criteria may be a single criterion (composed of a search field, an operator and a value), or a combination of criterions (defined by using *OR)*. Add the *OR* element (by clicking on the *OR* button) after the initial criterion but before adding another criterion.
Add Criteria	Click this button to add a criterion to the criteria list. The criterion is built from the *Field, Operator* and *Value* entry fields. The following are the conventions used in building the criteria: - The first 6 operators in the list above are "Exact" operators, e.g., blank spaces are considered as characters. Say that "·" to represents a blank space. The following are not correct: "Bob = "Bob··" "··Bob" = "Bob" "·Bob" >="Bob" **Note:** Spaces go before characters when sorted in ascending order. - Only numeric characters from 0 – 9 are accepted in the Value field for Fields requiring a numeric value. - Only dates in the "mm/dd/yyyy" or "mm-dd-yyyy" format are permitted for date values. - The like operator has the following conventions: GageID like "C-200" fields with an exact "C-200" entry GageID like "C-200*" field entries starting with "C-200" GageID like "*C-200*" field entries containing "C-200" GageID like "C-200?" "C-2001"," C-2002", "C-200A" GageID like "C*00" "C-20000"," C-20200", "CA00" Note: When defining a criteria based from two criterions, click the "OR" operator button after the initial criterion but before another criterion is added.
Remove Criteria	Click this button to delete a criterion from the criteria list. Select the criterion to be deleted before clicking this button.
Reset	Click this button to clear all controls in the Filter Builder. Do this if you want to create a new search filter.

Control	Description
Delete Filter	Click this button to delete the active filter. You cannot delete the default filter, "All Gages." After closing the Filter Builder, the Search field is set to All Gages.
Save Filter	Click this button to save a new filter criterion or update an existing filter criterion.
Close	Click this button to close Filter Builder.
Up and Down Arrow Buttons	Click this button to arrange the criteria and/or the "OR" statement in the Criteria Text Box List.

To create a filter criterion:

1 Enter Title.

2 Open Sort by, and choose *<field name>*.

3 Open Field, and choose *field name>*.

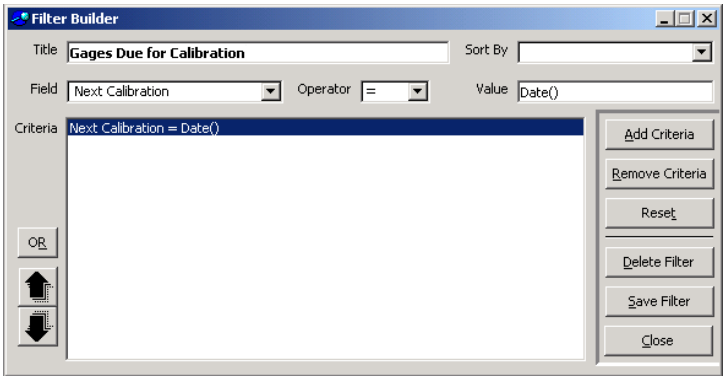
4 Open Operator, and choose *<option>*.

5 Enter Value for the criterion.

6 Click ADD CRITERIA.

7 Click SAVE FILTER.

8 Click CLOSE.



Create filter criterion

To delete a filter criterion

1 Open Search, and select the *<filter title>* that you want to delete.

2 Click EDIT/CREATE FILTER...

3 Click DELETE FILTER, and choose YES in the ensuing dialog.

4 Click CLOSE.

Using Wild Card Characters

ProGAGE ISO supports several wildcard characters in Search fields. Use wildcard characters as proxy for other characters when you specify a value that you wish to search. Wild card characters are especially useful when you only know part of the value being searched or when you want to search values that start with a specific letter or match a certain pattern.

Wildcard Characters

Wildcard Character	If You Enter	ProGAGE ISO Finds
*	wh*	*what*, *white*, and *why*; works like MS-DOS commands
*	*at	cat, bat, and what
*	*/*/94	records with any date in 1994
*	11/*/*	records with any date in the month of November
?	B?ll	*ball*, *bell*, and *bill*; this symbol matches any single character

Finding a Specific Entry on a Record

You use the FIND tool to search for a record in the active ProGAGE ISO module that contains a particular entry or field value.

Find Controls

Control	Description
Find What	Enter on this field the particular entry or field value that you wish to find.
Found Value	This is a Non-Editable field.
Look In:	Select from this drop-down list the field that contains the particular entry or field value that you are searching.
Match:	Select from this drop-down list the criteria that will be followed in matching the particular entry or field value with the entries in the field that you are searching. Options are Whole Field, Any Part of Field, or Start of Field.
Find Next	Click this button to find the Next record that matches the Find criterion.
Cancel	Click this button to cancel the action, or close Find Tool.
More>>	Click this button to further narrow the Find criterion. Click it again (now labeled Less>>), if you are already satisfied with the default.
Search	This field becomes available when MORE>> is clicked. Select from this drop-down list to indicate the part of the Records Listing Pane (relative to active record) that you want to search. Options are Up, Down, and All.
Match Case	Mark this checkbox to strictly follow the character case in matching the particular field entry or field value with the entries in the field that you are searching.

To search for a record that contains a specific entry or field value:

1 Open the ProGAGE ISO Module that you want to search.

2 Do any of the following:

- On the toolbar, click the FIND button 
- Choose VIEW > FIND
- Press the shortcut key: CTRL+F

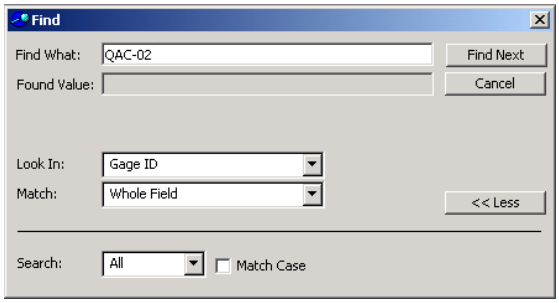
3 On Find What, enter the particular entry or field value that you want to find.

4 Open Look In, and choose *<field name>*.

5 Open Match, and choose one of the options.

6 Click FIND NEXT.

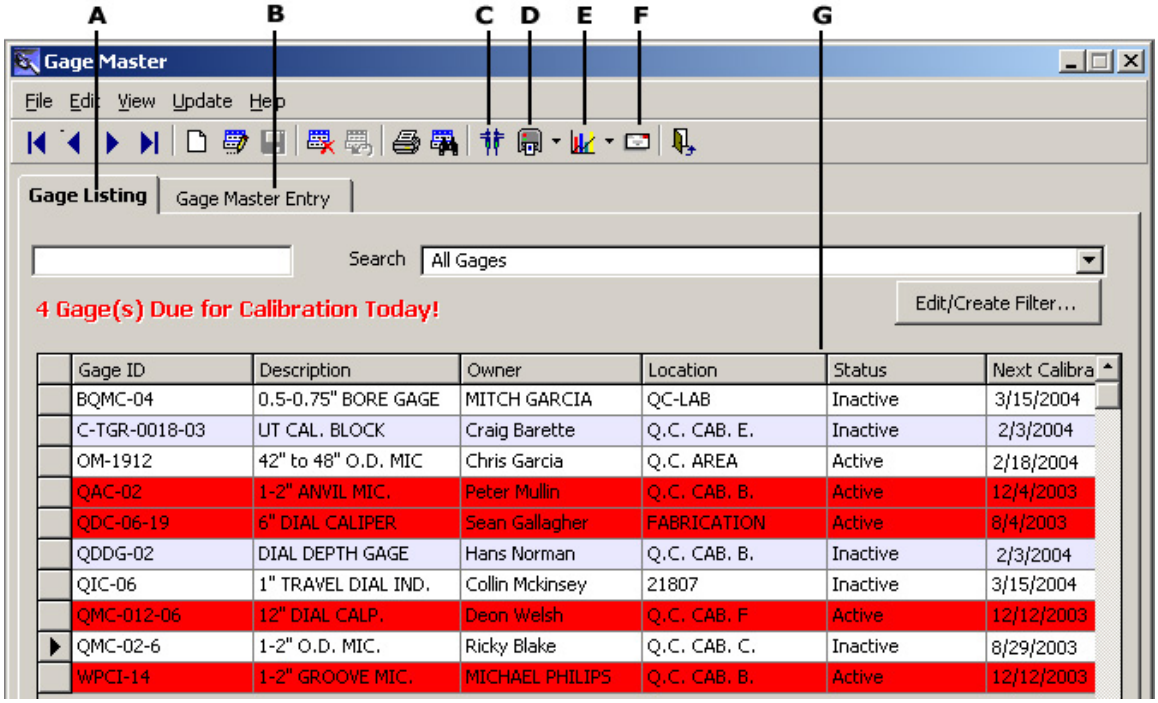
7 Click CANCEL.



Find QAC-02 from Gage ID field

Chapter 3: Entering Gage Records

The GAGE MASTER module contains the basic gage information such as Gage IDs and Descriptions. Under the GAGE LISTING tab folder, you can select from the list of gage records and view specific gage information.



Gage Master window

A. Gage Listing Tab **B.** Gage Master Entry Tab **C.** Gage Duplicator **D.** Label Printing **E.** Chart **F.** Send Gage **G.** Records Listing pane

To open a Gage Master record:

- In the Gage Listing window, double-click on a row.
- Access the Gage Master Entry tab.

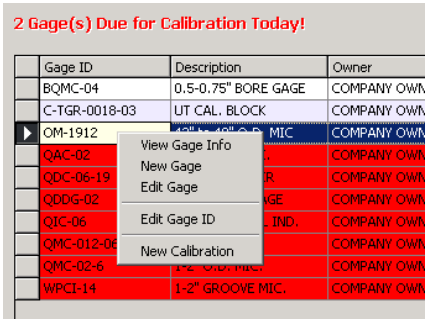
Gage Listing

This tab contains a Records Listing Pane which summarizes the information on all available gages. ProGAGE ISO 6 colors the rows in red if the gage is due or past due for calibration.

To edit or modify an entry, choose a record from the Gage Listing Records list and do any of the following:

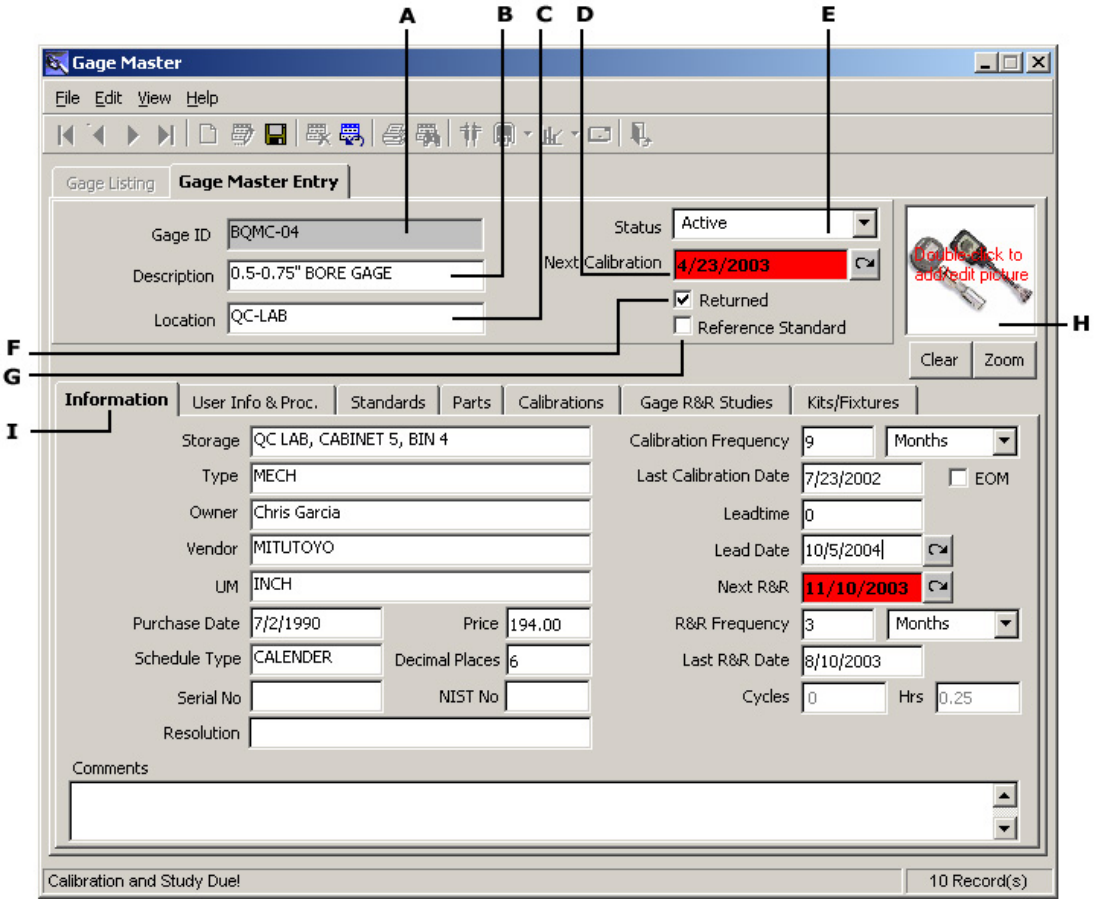
- On the main toolbar, click EDIT RECORD button.

- Click the shortcut key CTRL + T.
- Choose EDIT > EDIT RECORD.
- Open the right-click context menu and choose *<edit gage>*.



Gage Master Entry

This tab folder contains details of a particular gage Master record. To keep your information organized, information is grouped into seven tab pages.



Gage Master Entry screen

A. Gage ID **B.** Description **C.** Location **D.** Next Calibration **E.** Status **F.** Returned Checkbox **G.** Reference Standard checkbox **H.** Image box **I.** Tab pages

A set of seven controls identifies the particular gage master record.

Gage Master Tab Folder Controls

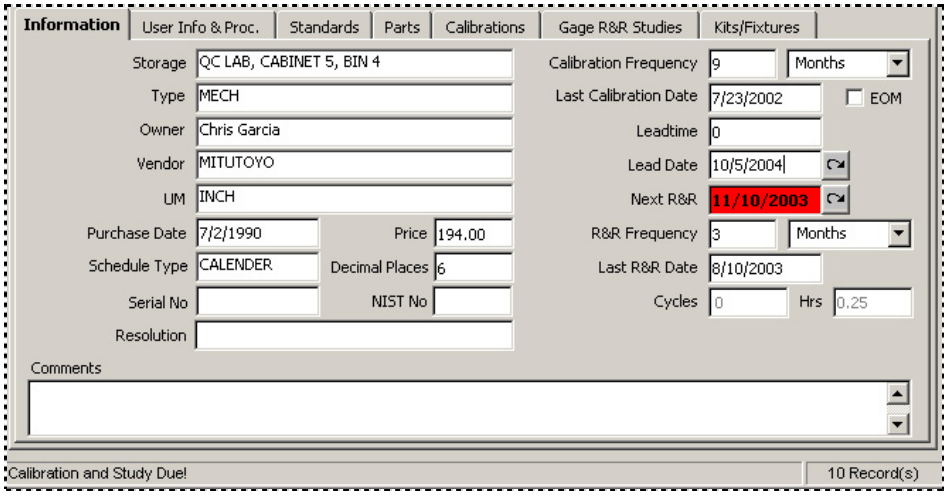
Control	Description
Gage ID	Enter a *unique* alphanumeric identification code for the gage. **Note:** Avoid using the characters ***** and **?** in your gage IDs or other fields, as these are considered wildcard characters in ProGAGE.
Description	Enter a brief description of the gage.
Location	This field indicates the gage's location.
Status	Select the gage's status from the drop-down list. Options are Active, Out for Repair, In Calibration, Inactive and Lost. This field is required. **Note:** If the Status field is not set to Active, the Calibration Due reports will skip over the gage.
Next Calibration	This field indicates the next calibration date. The CALCULATE button automatically computes for this field, making schedule planning easier.
Returned	This field is automatically populated by ProGAGE 6 and cannot be modified. When marked, this indicates that the gage has been returned. A currently issued gage will have an unmarked checkbox.
Reference Standard	Mark this checkbox to indicate that the gage is a reference standard.

You can also opt to display a picture of the gage by linking the image file to ProGAGE ISO 6. The program supports Joint Photographic Export Group (JPEG), Tagged Image File (TIF), Bitmap (BMP) and Graphics Interchange Format (GIF). The selected image format will depend on the size of the file. GIF files are usually smaller than TIF and BMP.

Click the ZOOM button to display a larger image in a separate window.

Gage Master Entry – Information

This tab page lets you enter detailed information on a gage, such as gage type, price and calibration data.



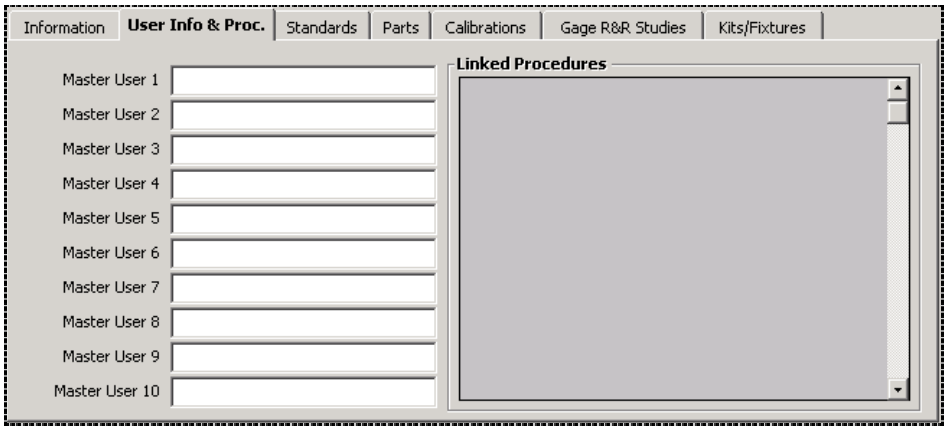
Gage Master Entry—Information Controls

Control	Description
Storage	Enter the gage's original storage location in this field
Type	Enter the type of gage.
Owner	Enter gage owner in this field.
Vendor	Enter the name of the supplier or manufacturer from whom the gage was purchased.
UM	Enter the unit of measurement here.
Purchase Date	Enter when the gage was purchased.
Price	Enter purchase price of the gage.
Schedule Type	Enter either METER- or CALENDAR-based in this field. METER-based schedule type uses Calibration/R&R frequency units in cycles.
Decimal Places	Enter the number of decimal places to be used in your computations in this field.
Calibration Frequency	Select from the drop-down units field any of the following units: days, weeks, months, years, usage, cycles, before use, and after use, for defining the frequency of gage calibration.
Last Calibration Date	Enter the date when you last calibrated your gages.
Leadtime	Enter the length (number of days) of lead-time. The lead-time serves as advance notice before a calibration is actually due; this time is used in preparing for the calibration, such as locating a gage, temporarily replacing a gage, etc.
Lead Date	Enter the date for calibration or study. This field lets you set a date earlier than the scheduled next calibration or R&R due date.
Next R&R	This field indicates the next R&R schedule.
R&R Frequency	From the drop-down units field, select any of the following units: days, weeks, months, years, usage, cycles, before use, and after use, for the frequency of R&R.
Last R&R Date	Enter the date when you last conducted an R&R Study.
Usage	Enter the gage's usage cycle.
Cycles	Enter the number of cycles.
Hrs	Enter the number of hours it takes to calibrate the gage.

Gage Master Entry – User Information and Procedures

This contains 10 user-defined fields that can accommodate all other information you want to store, such as model numbers and such, keeping in mind that a change in the name field will be carried over to the printed reports. The Linked Procedures box allows you to assign calibration procedures (from the Procedures module) as references or guides for calibration. (To enter or link a procedure, see "Chapter 5: Entering Procedure Records" on page 33.)

To change the labels of these fields, see "Chapter 5: Changing Control labels on page 181 of the System Administrator's Guide.

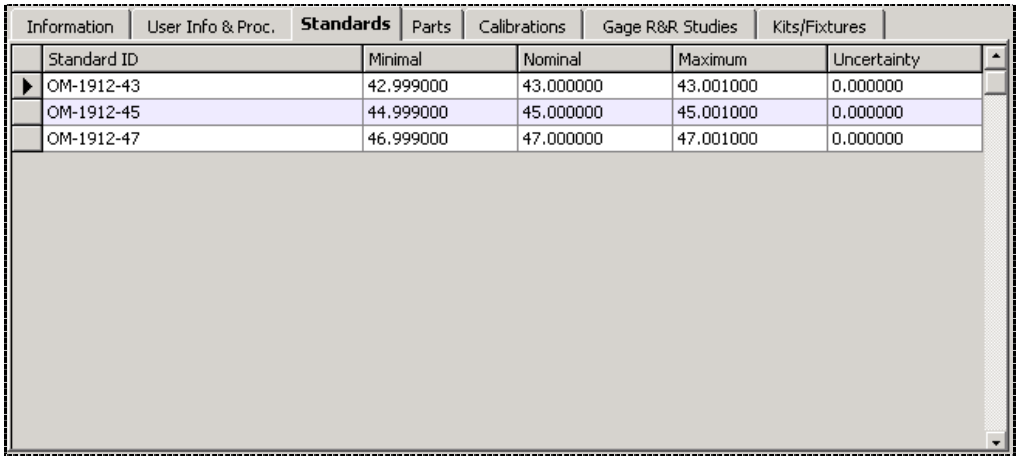


Gage Master—User Info and Proc Controls

Control	Description
User Defined 1 to 10	Enter in these user-defined fields all pertinent information you want recorded. Field names can be changed using Label Editor (See "Chapter 5: Changing Control Labels" on page 181 of System Administrator's Guide).
Linked Procedures	Double-click on this field to set procedure settings. These may include calibration procedures, procedures for R&R, procedures for proper gage usage, etc.

Gage Master Entry – Standards

The STANDARDS tab page allows you to define the set of standards for use in calibration. It displays a listing of the standards you have set.



Gage Master—Standards Controls

Control	**Description**
Standard ID	Enter a unique identification of the calibration standard or checkpoint (e.g., "Gage Block"). This may contain the name of the reference gage that was used to create the standard. Each *Standard ID* that you enter for the gage must be unique. If you need to use the same name for more than one ID, add a unique numeral extension to each. For example, you wish to use "CMM Check" for 3 gages, label each as: "1. CMM Check", "2. CMM Check", "3. CMM Check".

Control	Description
Minimum	This field contains the minimum acceptable reference value for the gage or instrument in reference to this standard (e.g., 0.999).
Nominal	Enter the nominal value for the gage or instrument when this standard is measured.
Maximum	This field contains the maximum acceptable reference value for the gage or instrument in reference to this standard.
Uncertainty	The uncertainty value of the calibration reference standard. This value can be obtained from the reference standard manufacturer and is expressed in units such as percentage (e.g. 0.5%), portion (0.005) or measurement units (0.0001 inch). *All values entered must be of the same units. Otherwise, the calculated Overall Uncertainty value will be erroneous.*

To create a standard:

1 Mark the Reference Standard checkbox in the upper portion of the screen to indicate that the gage you have indicated will be used as a reference standard. Values for the reference standard will then be used to populate the Uncertainty column.

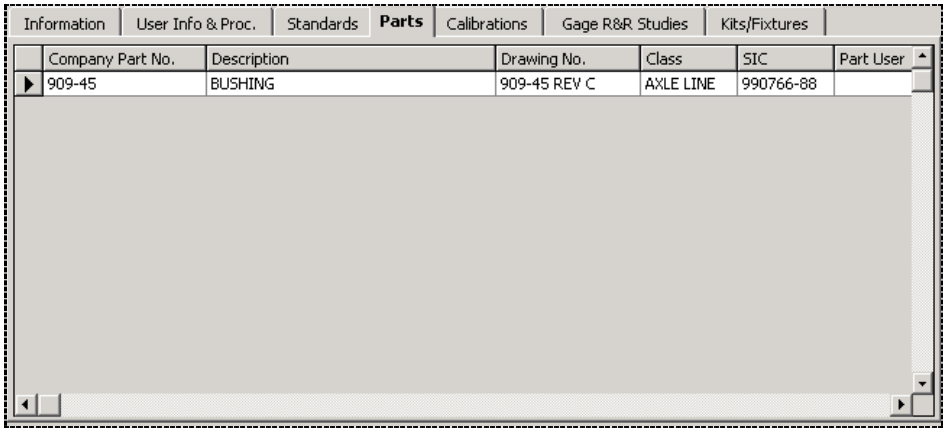
2 Enter as many standards as you need and ProGAGE will automatically copy these standards to the calibration record.

To delete a standard:

1 Right-click on the row and choose DELETE from the context menu.

Gage Master Entry – Parts

This section allows you to view the parts and operations for which the gage will be used as well as the user. To edit or modify these fields, go to the Parts module in the Main Menu List Bar. (See "Chapter 9: Parts Records" on page 69). You can also link the information in this tab page to facilitate manufacturing traceability.



Gage Master—Parts Entry Controls

Control	Description
Company Part No.	Select from the drop-down list the identification of the part that the gage will measure.
Description	Displays the name and description of the part that the gage will measure.
Drawing No.	Displays the drawing number of the part that the gage will measure.
Class	Displays the class of the part or material. (You can develop your own meanings

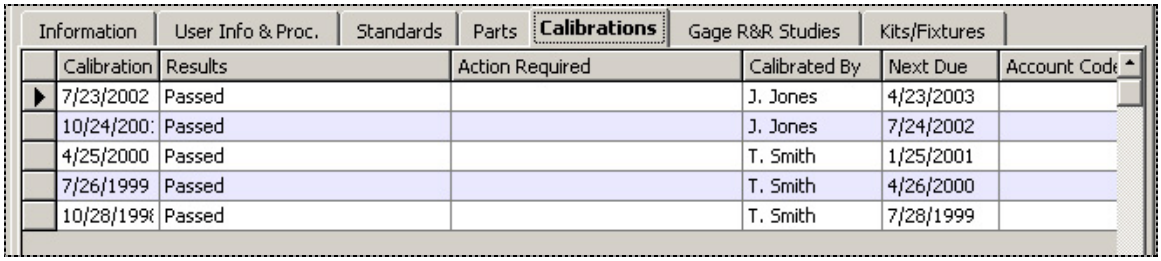
	for classification system; e.g., you may want to classify the degree of inspection required.
SIC	Displays the Standard Industry Classification Code.
Part User 1 and 2	Displays the name of the person of company who used the gage.

Gage Master Entry – Calibration

The Calibration tab page summarizes the calibration procedures performed on the gages as well as the results of the calibrations.

To view details of each procedure, do any of the following:

- Double-click on the row to display the CALIBRATION ENTRY window.
- Access the CALIBRATION module from the MAIN MENU. (see "Chapter 4: Entering Calibration Records" on page 27).

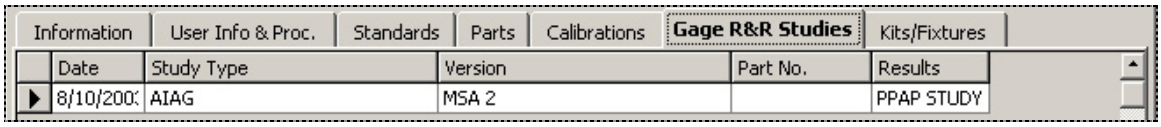


Gage Master—Calibrations Controls

Control	Description
Calibration Date	This field indicates when calibration was performed.
Results	This field indicates the summary of the results of the calibration.
Action Required	This field indicates the recommended or required action, such as "send for repair".
Calibrated By	This field indicates name of the calibrator.
Next Date	This field indicates next calibration due date.
Account Code	This field indicates the tracking number associated with the calibration cost, such as a job, purchase order, invoice, customer, or department number.
Reference No.	This field indicates the reference number of the account.

Gage Master Entry – Gage R&R Studies

This window lets you view the gage R&R studies performed on a specific part or equipment. Double-click on the row to review the details and results of the study in a separate window.



Field/Button	Description
Date	This field indicates the date calibration was performed.
Study Type	This field indicates the type of study performed.

Part No.	This field indicates the number of the part.
Results	This field indicates the findings of the study.

Gage Master Entry – Kits/Fixtures

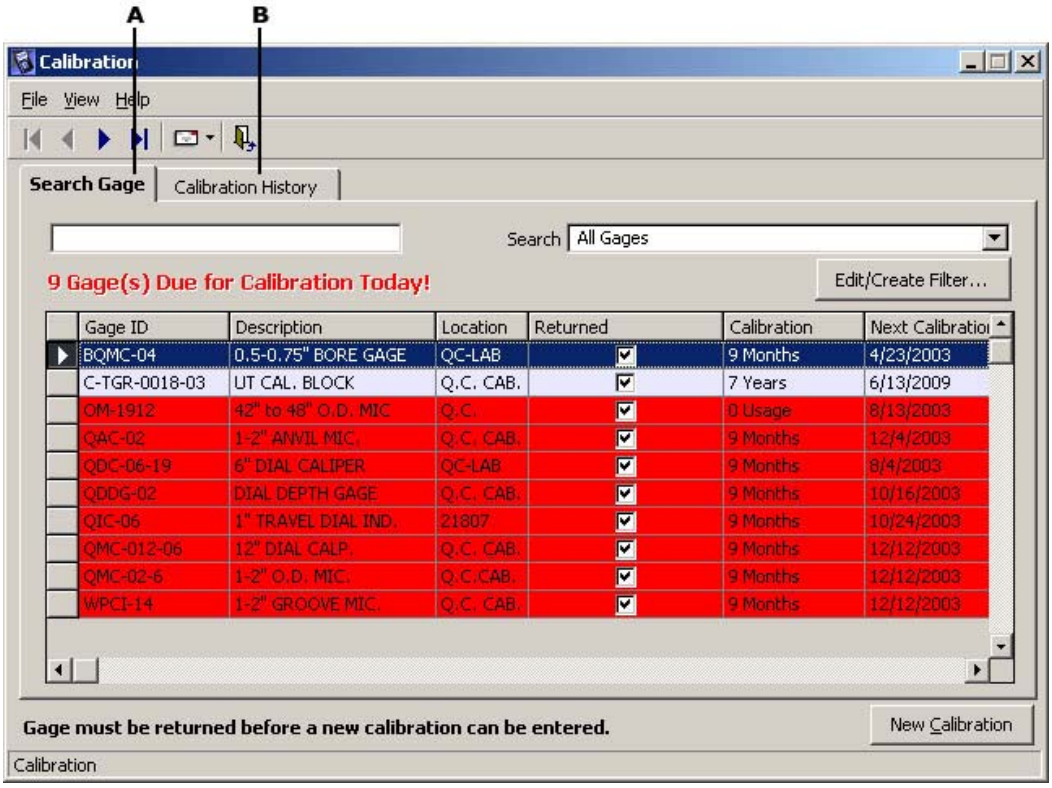
Kits/Fixtures are collections of gages used in measuring a particular part. It organizes the gages into kits/fixtures according to the part these are used and keeps track of the kits/fixtures the gages belong to. Right-click on the column headings to sort the information to your preference.

Gage Master Entry – Kits/Fixtures Controls

Field/Button	Description
Kit ID	This field indicates the unique alphanumeric Kit/Fixture identification.
Job No.	This field indicates the Job number for which the kit was used.
Rev Level	This field indicates the revision level; for example, 4, to indicate that the data entered is the fourth revision.
Rev Date	This field indicates when the last revision was made.
User	The field indicates the name of the user.
Return	This checkbox is automatically marked by ProGAGE ISO 6 and cannot be modified. Please see "Chapter 8: Issue/Return Gages and Records" on page 59 for a full description on issuing and returning Kits.

Chapter 4: Entering Calibration Records

The Calibration module stores all calibration-related information, including calibration procedures, results, and calibration dates. It displays the entries in color—when a record is flagged in red, it means that the gage is due and past due for calibration.



Calibration screen

A. Search Gage tab **B.** Calibration History tab

Search Gage

This tab folder lists a summary of all the gages in the database and their corresponding calibration information.

The Calibration History of a particular gage is summarized in the CALIBRATION HISTORY tab folder.

To view Calibration History:

Select a gage record from the Records Listing pane:

1 Double-click on a row to display the **Calibration History** screen.

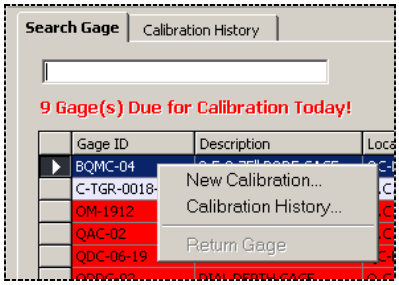
2 From this screen, double-click on a row again to open the Calibration Entry window.

To sort information:

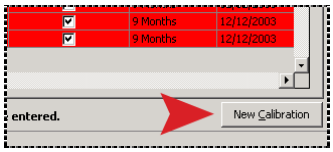
1 Left-click on the column headings and make your selection from the context menu.

To create a new calibration record, do any of the following:

- Right-click on a row and select New Calibration from the context menu.

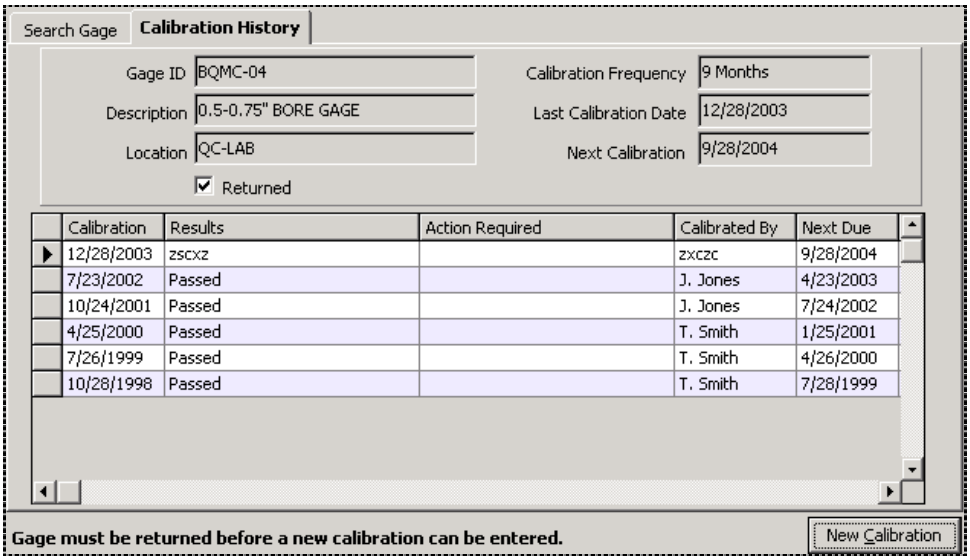


- Click on the NEW CALIBRATION button at the bottom of the screen.



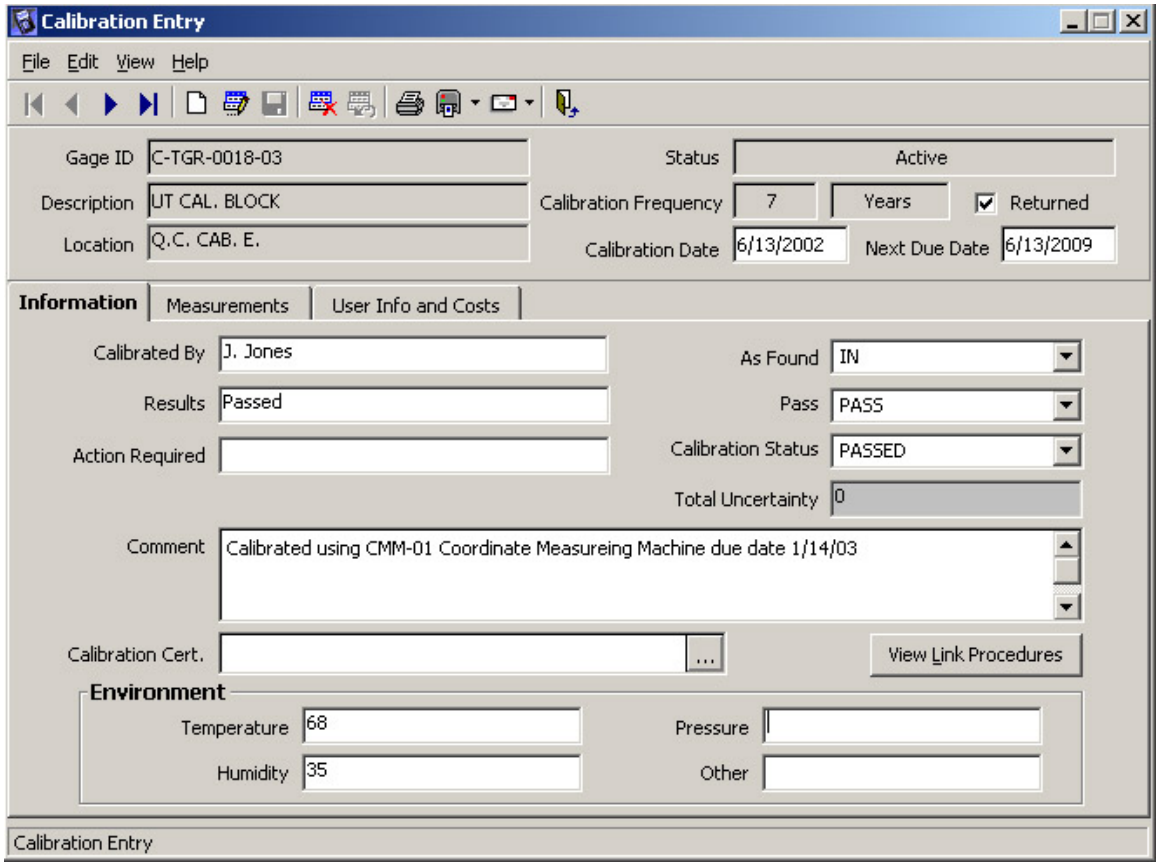
Calibration History

This tab folder tracks the calibration procedures performed on a specific gage, giving you a quick-view of the status of calibration for every calibration date.



Calibration Entry

You can view the particulars of a past calibration in this window.



Calibration window

A. Search Gage tab folder **B.** Calibration History folder

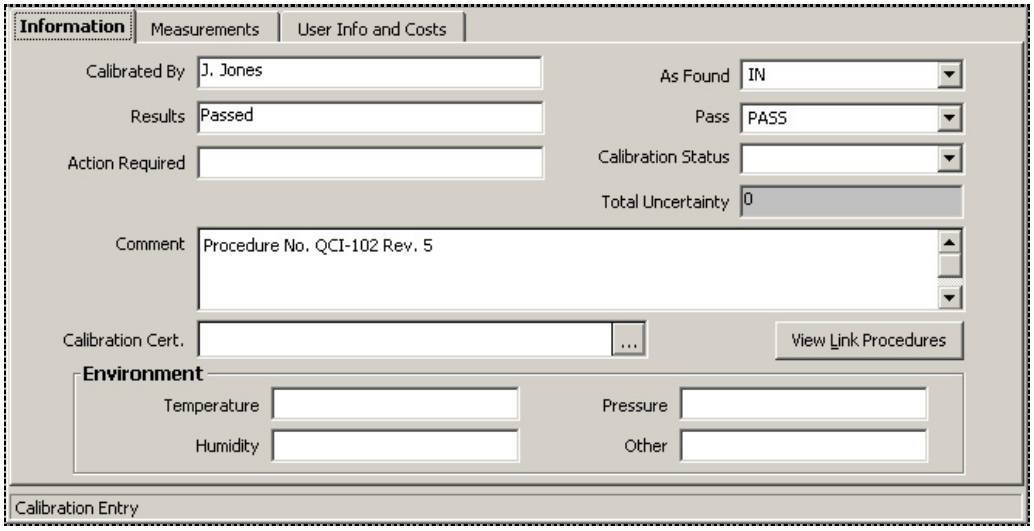
To open the Calibration Entry screen:

1 In the CALIBRATION HISTORY screen, double-click on a row.

The upper section indicates the basic information on the gage. It lists the gage description, location, status as to whether the gage is active or not, return status and calibration schedule. This section is standard in the tab pages discussed below.

Calibration Entry – Information

The calibration date, calibrator, test findings and calibration environment are recorded in this tab.



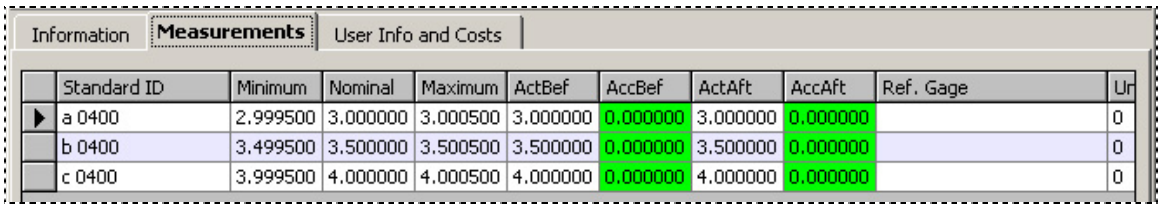
Calibration Entry—Information Controls

Control	Description
Calibration Date	Enter in this field the date calibration was done. Although it is automatically set to the current date, you can change it as long as you haven't saved the calibration record.
Next Due Date	Enter the date when calibration is next due in this field.
Calibrated By	Enter who performed the calibration.
Results	Enter any results or comments (typically used for attribute-type gaging or dimensional layouts). Enter calibration measurements into the Measurements tab folder screen (discussed in the next topic).
Action Required	Enter any action that may be required, such as "send out for repair".
As Found	Select from the dropdown list the condition of the gage before calibration or adjustment. Select *In* for "in-tolerance," *Out* for "out-of-tolerance", or *New* for a new instrument that has not been calibrated before. Prior to calibration, *all* test points of the instrument must be "within tolerance" to have the *As Found Condition* field set to *In*.
Pass	Select *Pass* if the gage passes the calibration test. Otherwise, select *Fail*.
Calibration Status	This field is always blank when you create a new calibration record. Set the appropriate status as to the result of the calibration test (*PASSED, FAILED, REPAIRED, LIMITED USE*).
Total Uncertainty	This field will indicate the total calculated uncertainty value using the root sum of squares method. This is a non-editable field. $\text{Uncertainty} = \sqrt{(\text{Uncertainty } 1^2 + \text{Uncertainty } 2^2 + \text{Uncertainty N}^2)}$ where "Uncertainty N" is the last reference standard's Uncertainty value
Comment	Enter any results or comments (typically used for attribute-type gaging or dimensional layouts).
Calibration Certificate	Enter the path of the calibration certificate (a text file/document) on this field. You may also map your system directory and specify the location and name of the text file by clicking the *Browse (…)* button to the right of the field.
View Linked Procedures	Click on this button to view the attached file/document that describes the procedure used for calibration.
Temperature	Enter the temperature during calibration.
Humidity	Enter the humidity during calibration.
Pressure	Enter pressure during calibration.

Control	Description
Other	Enter any other environmental parameter in this field, such as visual inspection notes. You can scroll through this field if you want longer text.

Calibration – Measurements

This section lists the actual calibration measurements based on the standards you have set. The Maximum, Minimum and Nominal values of the standards are automatically reflected on the table.



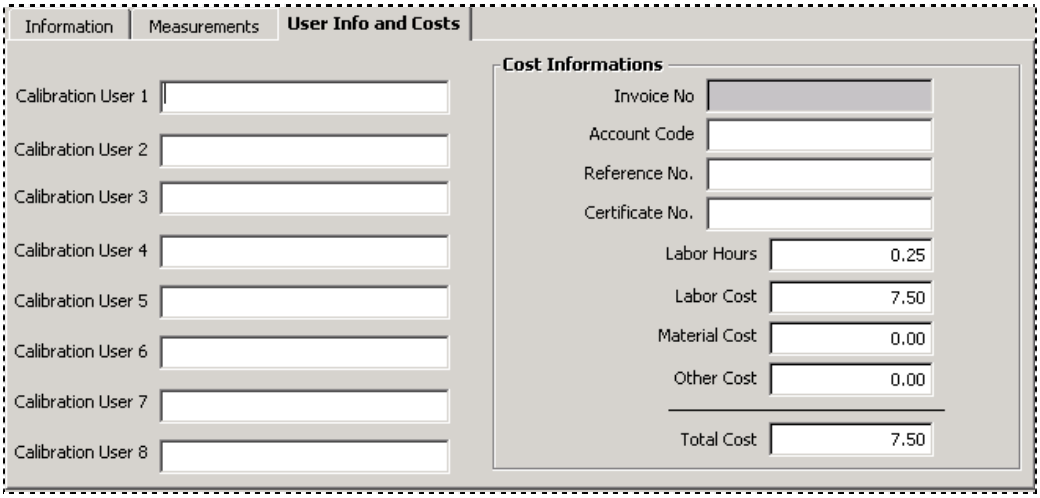
Note: The rows are colored so you can easily see which values are within tolerance: red if both before and after values are out-of-tolerance, yellow if before actual value is within tolerance and after actual value is out-of-tolerance or vice versa. The row is not colored if both values are within tolerance.

Calibration—Measurements Controls

Control	Description
Standard ID	This automatically lists Attached Calibration Standards. You can add a new standard only when Restrict Measurement Editing is NOT selected in the system settings. However, these are not added to the main standards table attached to the gage because entries in the grid are user-defined standards.
Maximum, Nominal and Minimum	These fields display the measurement ranges for the gage. Figures of attached standards are automatically recorded and are non-editable. However, you may add your own measurements.
Act. Bef.	Enter the actual measurement observed before the gage is calibrated.
Acc. Bef.	Displays the accuracy value based on the before measurement (Before minus Nominal). This is a non-editable field.
Act. Aft.	Enter the actual measurement observed after the gage is calibrated.
Acc. Aft.	Displays the accuracy value based on the measurement after calibration (After minus Nominal). This is a non-editable field.
Ref. Gage	This field stores the gage ID of the reference standard, which is important for traceability to a specific standard.
Uncertainty	If you select the reference standard from the list, the uncertainty value will automatically be displayed. If you manually enter the standard, type in the uncertainty value here. You can obtain this value from the manufacturer. This value is expressed in units, such as percentage (0.5%), proportion (0.005), or measurement (0.0001 inch). You must enter units of the same value; otherwise, the calculated *∑Uncertainty* will be erroneous.
Attribute	Enter related attributes (characteristics, features, traits, etc.) in this field.
Comments	Enter any comment related to the calibration that you want recorded.

Calibration – User Info & Costs

You can enter 1 to 8 user-defined information in this section. Costs involved in calibration procedures are also recorded in this tab.



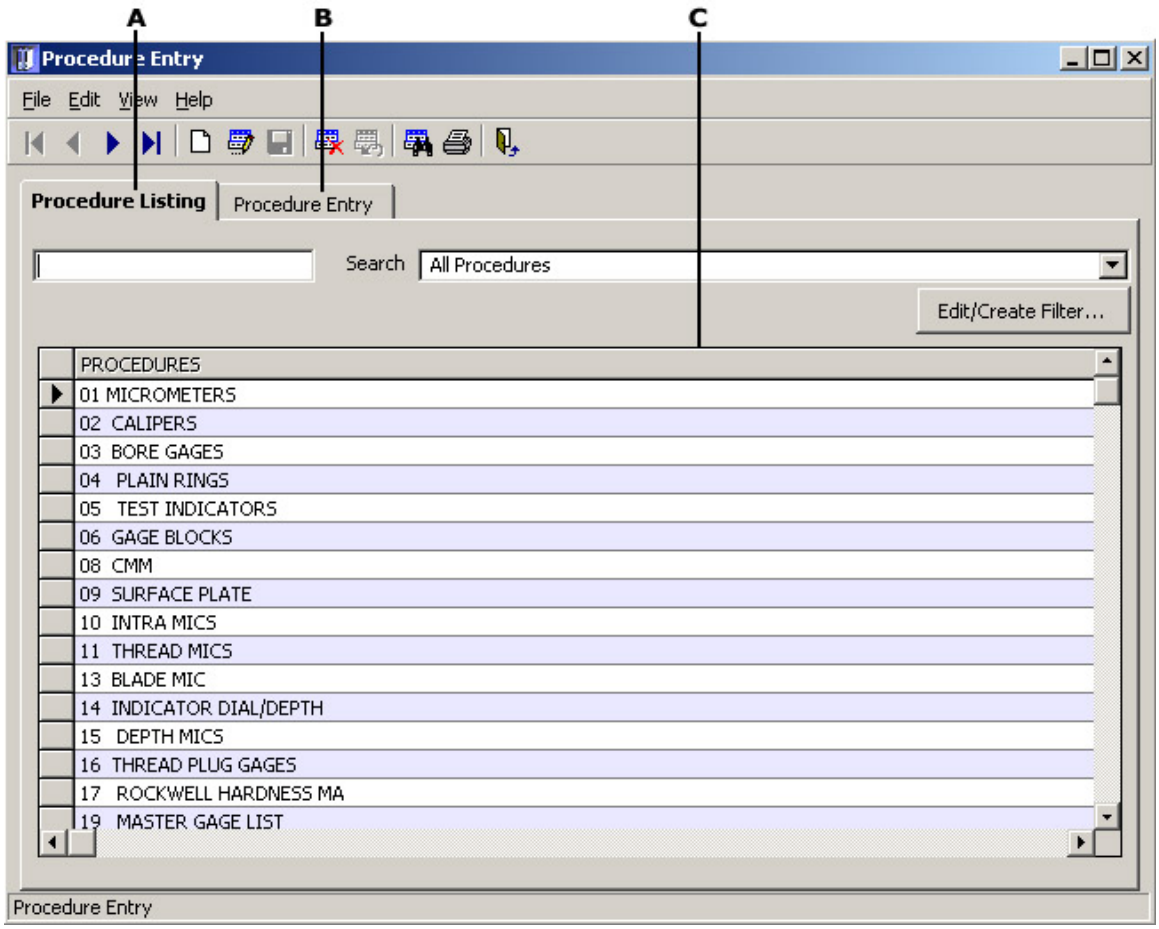
Calibration—User Info & Costs

Control	Description
Calibration User 1 to 8	Enter additional information you want to store in these fields. To be able to change these user-defined labels, see Label Editor. (See "Chapter 5: Changing Control Labels" on page 181.)
Invoice No	Enter the Invoice Number in this field. This field is automatically filled up by ProGAGE if you activated the Generate Invoice option in the Settings Utility (see "Settings—Information" on page 161).
Account Code	Enter an account number or other tracking number associated with the cost (examples include a job, purchase order, invoice, or customer number).
Reference No.	Enter the reference number of the account.
Certificate No.	Enter the certificate number issued by the outside calibration provider or your company in this section.
Labor Hours	Enter the number of hours worked.
Labor Cost	Enter the cost of labor incurred during calibration.
Material Cost	Enter the cost of materials used in the calibration process.
Other Cost	Enter other costs incurred in the calibration process.
Total Cost	The total cost is automatically computed when changing labor, material and other cost data. This field is non-editable.

Chapter 5: Entering Procedure Records

In this screen, you can create procedures for your gages or edit existing ones. With the Open Editor function, you can also format your text in terms of font type, size and color

To open the screen Procedure Entry window shown below, select Procedure from the Main Menu list Bar.



Procedure Entry window

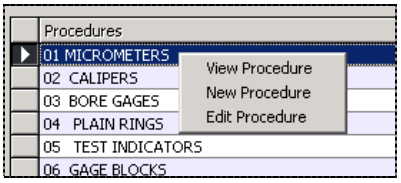
A. Procedure Listing tab folder **B.** Procedure Entry tab folder **C.** Records Listing pane

Procedure Listing

The screen lists all the available procedure files associated with your gages. ProGAGE ISO 6 can either contain the full copy of these procedures or maintain an active link to the corresponding procedure file.

To enter a new procedure, edit or view an existing one:

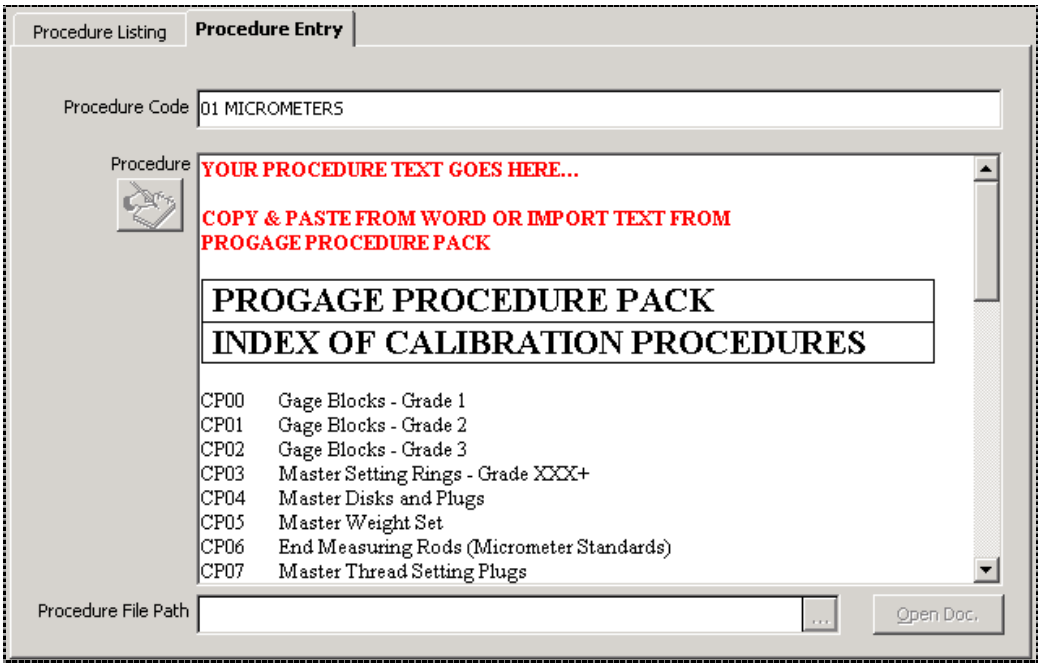
1 Right-click on the row and make your selection from the context menu.



Clicking on any of the three options will open its Procedure Entry tab folder.

Procedure Entry

This window allows you to view, edit or create new procedures for your gages.



Procedure Entry Controls

Control	Description
Procedure Code	Enter the code for the procedure.
Procedure	Enter the details of the procedure in this box.
Open Editor	Opens the procedure text is opened on a separate Notepad Window, allowing you to format and stylize text entered in the Procedure field.
Procedure File Path	Enter the name of linked document in this field. Click the Browse button to map and specify the file.
Browse (…)	This button enables you to select the document to link from your directory.
Open Doc.	Click this button to run a copy of the application that is needed to open the linked document.

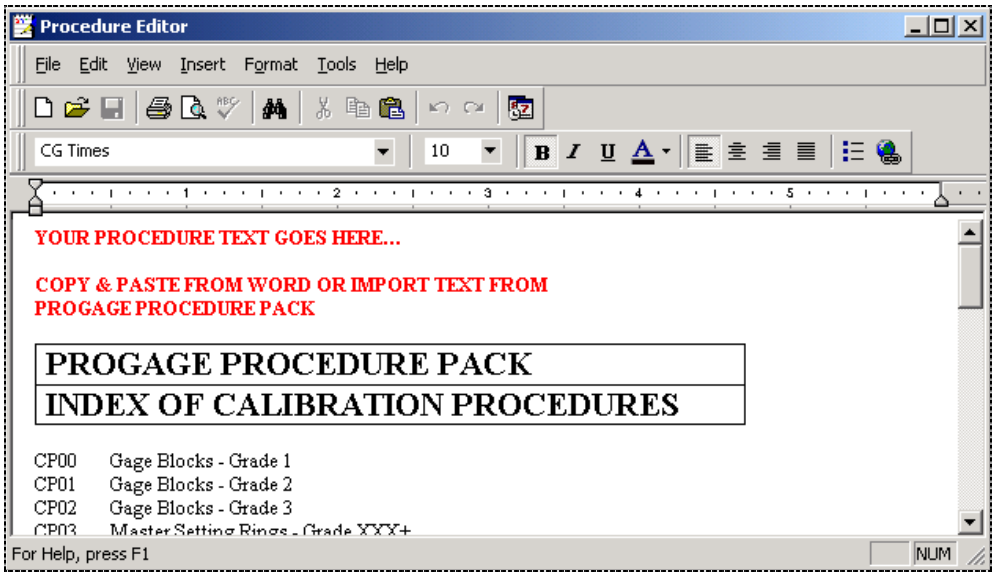
Entering and Linking a Procedure

To enter or link a procedure, do any of the following:

1 Double-click on the Linked Procedures box in the Procedure Listing screen and the Procedure Entry window will appear.

2 In the Procedure Entry window, do any of the following:

- Enter a new procedure or edit an existing one by clicking on an area in the Procedure box to open the Procedure Editor window or click on the Open Editor  button. A separate Notepad Window will open, allowing you edit and format procedure text.
- Or browse through your files for the procedure you want to link by clicking on BROWSE button, then select the particular file from your directory.

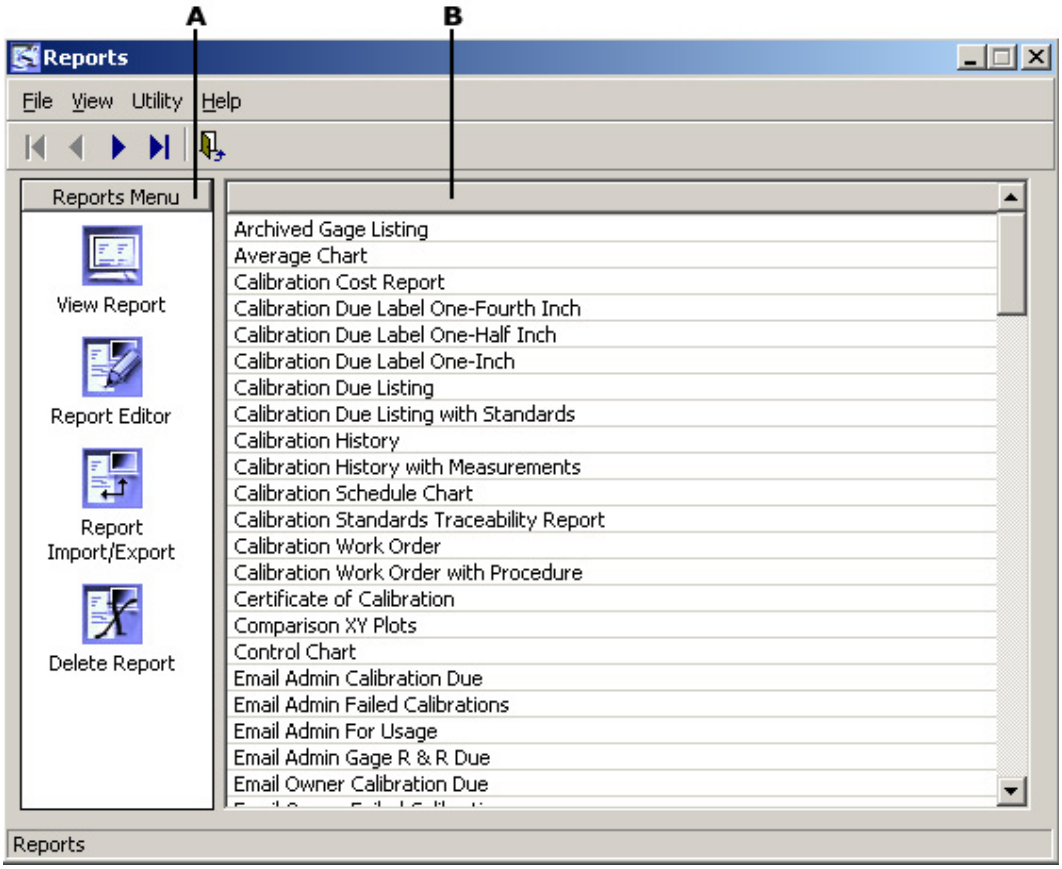


3 Enter the text for the procedure in the Procedure field (or edit the procedure on the screen) and then save it through the File menu.

4 If you forget to save your record and you exit the window, the program will prompt you if you want the procedure saved or not.

Chapter 6: Reports

ProGAGE ISO includes a selection of reports you can use. This module allows you to view, edit and print various pre-formatted reports from the data you have entered in the program.



Reports window

A. Reports Menu list **B.** Reports Listing pane

Reports Menu

Menu Item	Description
View Report	Allows you to view the selected report. A report filter screen will help you limit the data you will put in your report.
Report Editor	This feature can only be accessed when you purchase the Report Editor Upgrade Feature. Once available, this will enable you to edit hardcoded reports, or those used by other ProGAGE windows. However, SQL statements are read-only.
Report Import/Export	This allows you to transfer data to and from previous versions or other compatible databases. (See "Report Import/Export Utility" on page 234).
Delete Report	When you put the cursor on the list, a report is highlighted automatically.

	Selecting this item would open a delete confirmation window with the name of the selected report. This action is permanent so be careful in deleting reports.

Reports List

The table below describes each of the available report filters and their special filtering options.

Report	Description
Archived Gage Listing	Reports on gages currently on archive.
Average Chart	Used by the R&R module to print Chart by Part.
Calibration Cost Report	Use this report to track your calibration costs for each gage, department, location, account number, calibrator, or other criteria.
Calibration Due Labels (¼", ½" and 1")	You must have the optional Calibration Label Kit to print these labels. You can print a batch of calibration labels based upon the calibration date, gage ID, location, or description for any existing calibration records. Note: Use this report to print your calibration labels at the end of the day in one batch. This method eliminates the blank waste tape that prints for each label you print from Calibration Entry. You'll still get an initial piece of waste tape, but after that, the printer adjacently ejects and cuts your labels. To preview a label, check the *Preview* box and click the label button. To print a label, clear the *Preview* box, then click the label button. Be sure to install the appropriate label tape in your printer.
Calibration Due Listing	Select a report "by" specific report for viewing / printing specific Calibration Due Listing information. You can sort the list by several different fields, such as *Gage ID*. Note: The Calibration Due Listing report lists only gages that you assigned as *Active* (status ID 1) in Gage Entry.
Calibration Due Listing with Standards	Select a calibration due listing report by standards for viewing / printing specific Calibration Due Listing information. You can sort the list by several different fields, such as *Gage ID*. Note: The Calibration Due Listing report lists only gages that you assigned as *Active* (status ID 1) in Gage Entry.
Calibration History	To see a list of calibration history, select this report. Enter the dates for the time frame in question along with any other filters. Check the *Calibration Meas.* box to include the table of calibration measurements used for each calibration.
Calibration History with Measurements	Similar to the Calibration History except that this includes measurements according to standards.

Report	Description
Calibration Schedule Chart	Used by the Gage Master module to print the chart showing the calibration schedule information. If you have a large gage inventory with a variety of calibration frequencies, it's difficult to plan your workload. It helps you predict calibrations that are due during a specific time frame. It builds a temporary schedule for each gage and then summarizes the findings, taking your skip days/dates into account. Use this report as a labor and cost-planning tool. After you enter any filter values, click *View* to view the schedule. Note: Don't use too wide of a date range, such as a 10-year span, as it can take a long time to generate. If the schedule takes too long, press *CTRL-BREAK* to stop it, then try a smaller date range. Schedule report options include: *Include days with no activity*—If you want your report to include *complete time frames*, check this box to include days on which calibrations aren't scheduled. For example, suppose you wanted to create a schedule for January through March, and no calibrations were due in February. If you left this checkbox un-marked, your report would show January and March, but not February. If you marked this checkbox, the report would include February. *Default Hours*—ProGAGE ISO uses this value for gages that don't have an estimated calibration length (i.e., their *Calibration Hours* fields are blank). For example, if you enter 0.5, ProGAGE ISO assigns a half-hour of time only to those gages. If you entered *Calibration Hours* for your gages, leave this field blank. *Schedule Type*—Use this field to select how to summarize your schedule–by day, week, month, quarter, or year. Select *By Day With Details* for a comprehensive listing. Note: You can print more than one schedule type without having to re-generate the schedule each time.
Calibration Standards Traceability Report	Use this report to provide traceability for your calibration and reference standards.
Calibration Work Order	Use these forms to gather calibration data and document work assignments for your personnel.
Calibration Work Order with Procedure	Use these forms to gather calibration data, including linked procedures, and document work assignments for personnel.

Report	Description
Certificate of Calibration	Calibration certificates prove that you've performed the proper calibrations and that the procedures used meet/exceed certain minimum requirements. ProGAGE ISO retrieves the certificate information from Calibration Entry. You can update only three fields in the report screen: *Customer Information*, *Statement*, and *Format*. If you need to add or edit other information, go to Calibration Entry. *Customer Information*—Enter what you want to print on the certificate. This might include the customer's company name, contact name, address, telephone number, or other important information. *Statement*—You can edit the calibration statement for each certificate. Any changes you make to the calibration statement apply only to that record. If you want to change all future calibration statements, go to Settings—Calibration Options (see the *System Administrator's Guide*). *Uncertainty Format*—Select from the drop-down list box the uncertainty format for the standards that you used to calibrate the gage. You can view or print certificates for the most recent calibration or for all calibrations by using the *View/Print Current* or *View/Print All* buttons at the bottom of the window. The Quick Filter or Advanced Filter can be used to select the certificates to print.
Comparison of XY Plots	Shows Comparison of X and Y Plots for the MSA3 GRR study data.
Control Chart	Shows the behavior of data, and how these differ from each other, such as fluctuations to a standard.
Email Admin Calibration Due	Used by the Email Monitor program for sending Calibration Due reports to Gage Administrators.
Email Admin Failed Calibrations	Used by the Email Monitor program for sending Calibration Failed reports to Gage Administrators.
Email Admin for Usage	Used by the Email Monitor program for sending Usage reports to Gage Administrators.
Email Admin Gage R&R Due	Used by the Email Monitor program for sending Gage R&R Due reports to Gage Administrators.
Email Owner Calibration Due	Used by the Email Monitor program for sending Calibration due reports to Gage Owners.
Email Owner Failed Calibrations	Used by the Email Monitor program for sending Calibration Failed reports to Gage Owners.
Email Owner for Usage	Used by the Email Monitor program for sending Usage reports to Gage Owners.
Email Owner Gage R&R Due	Used by the Email Monitor program for sending Gage R&R Due reports to Gage Owners.
Gage Accuracy Chart	Used by the Gage Master module to print charts that show gage accuracy relative to the specified gage standards.
Gage Detail Sheet	Use this report to see a comprehensive gage report, including record details.
Gage Detail Sheet – Compact	Use this report to see a comprehensive gage report, including record details with only two (2) user-defined fields. The report is formatted into two columns.
Gage Detail Sheet with Standards	Use this report to see a comprehensive gage report, including record details and standards used for the gage.
Gage Inventory	Generates a listing of all gages and their corresponding IDs, descriptions, types, locations and prices/costs.

Report	Description
Gage Linearity Data Collection Sheet	Creates a comprehensive gage report with Linearity data.
Gage Listing	Select a gage listing report for viewing / printing specific information.
Gage Listing with Barcode	Select a gage listing report by barcode ID for viewing / printing specific information.
Gage Listing with Comments	Select a gage listing report sorted by added comments for viewing / printing specific information.
Gage Listing with Standards	Select a gage listing report with calibration standards for viewing / printing specific information.
Gage R & R Costs Reports	Generates a report on the date, number of hours required, and cost for the gage R&R.
Gage R & R Data Collection Sheet	Generates an individual data collection sheet for each gage R&R activity.
Gage R & R Due Listing	Lists all active gages with due R&R studies.
Gage R & R History Report	Generates a complete listing of gages R&R results per gage.
Gage R & R Report – AIAG	Used by the AIAG screen of the R&R module for printing built-in AIAG reports.
Gage R & R Report – ANOVA	Used by the ANOVA screen of the R&R module for printing built-in ANOVA reports.
Gage R & R Report – Attribute	Used by the Attribute screen of the R&R module for printing built-in Attribute reports.
Gage R & R Report – Linearity	Used by the Linearity screen of the R&R module for printing built-in Linearity reports.
Gage R & R Report – LinearityMSA3	Used by the Linearity screen of the R&R module for printing built-in Linearity reports for MSA 3 studies.
Gage R & R Report – Stability	Used by the Stability screen of the R&R module for printing built-in Stability reports
Gage Stability Data Collection Sheet	Comprehensive report with Stability study data.
Gage Traceability	Traces gage calibration entries using a reference gage defined in the measurement records.
GRR Error Histogram	MSA3 GRR Error Histogram Chart.
Hardcoded@Analytic Gage Performance	MSA3 Attribute Analytic Gage Performance Chart.
Hardcoded@Analytic Performance Curve	MSA3 Attribute Analytic Performance Curve Chart.
Hardcoded@GRR Error Chart MSA3	MSA3 GRR Error Chart.
Hardcoded@GRR Residual Plot	MSA3 GRR Residual Plot Chart.
Hardcoded@GRR Scatter Plot	MSA3 GRR Scatter Plot Chart.
Hardcoded@GRR Whiskers Chart MSA3	MSA3 GRR Error Histogram Chart.
Hardcoded@Progage BarCode Labels (½", and 1")	Use this to print pre-designed bar codes or groups of bar code labels. Make sure that the label height matches the cartridge installed on your label printer

Report	Description
Hardcoded@Progage Calibration Due Label (1/4", ½", and 1")	Use this to print one-half inch pre-designed calibration due labels. Make sure that the label height matches the cartridge installed on your label printer
Hardcoded@ProGAGE Gage Usage	Used by the Issue/Return Module for printing Gage Usage records.
Hardcoded@ProGAGE Kit Usage	Used by the Issue/Return Module for printing Kit Usage records.
Hardcoded@ProGAGE KitLabel (1/4", ½", and 1") One-Fourth Inch	Use this to print pre-designed kit labels. Make sure the right printer cartridge is installed before selecting the print button.
Hardcoded@PROGAGE R&R Report – Attribute Analytic	Used by the R&R module for printing Analytic Attribute Study records.
Hardcoded@PROGAGE R&R Report – GRR	Used by the R&R module for printing GRR Study records.
Hardcoded@PROGAGE R&R Report – Risk Analysis	Used by the R&R module for printing Attribute Risk Analysis Study records.
Hardcoded@PROGAGE R&R Report –Stability	Used by the R&R module for printing Stability Study records.
Hardcoded@PROGAGE_Individual_Calibration	Used by the kit Calibration Entry Screen for printing kit calibration records.
Hardcoded@PROGAGE_Individual_Gage	Used by the Gage Master module for printing gage records.
Hardcoded@PROGAGE_Individual_Kit	Used by the Kit Entry Screen for printing kit records.
Hardcoded@PROGAGE_Individual_Part	Used by the Parts Module for printing parts records.
Hardcoded@PROGAGE_Individual_Proc	Used by the Procedures module for printing procedure records.
Hardcoded@PROGAGE_Invoice	Used by the Invoices module for printing Invoice records.
Hardcoded@PROGAGE_Send Calibration	Used for sending calibration detail records.
Hardcoded@PROGAGE_Send Calibration Certificate	Used for sending calibration certificate records.
Hardcoded@PROGAGE_Send Service Request	Use this report for a list of open or closed corrective action or service requests. For each request, the report lists the date, supplier, requester, gage ID, type of request, and status.
Hardcoded@PROGAGE_StudySummary	Used by the R&R Study Summary Screen for printing study summary records.
Hardcoded@PROGAGE_SubAnalyticLSL	A Sub report used by the Hardcoded@PROGAGE R&R Report – Attribute Analytic Report.
Hardcoded@PROGAGE_SubAnalyticUSL	A Sub report used by the Hardcoded@PROGAGE R&R Report – Attribute Analytic Report.
Hardcoded@PROGAGE_SubGRR_OPT1	A Sub report used by the Hardcoded@PROGAGE R&R Report – GRR Report.
Hardcoded@PROGAGE_ SubGRR_OPT2	A Sub report used by the Hardcoded@PROGAGE R&R Report – GRR Report.

Report	Description
Hardcoded@PROGAGE_ SubGRR_OPT3	A Sub report used by the Hardcoded@PROGAGE R&R Report – GRR Report.
Hardcoded@PROGAGE_SubLinearityMSA3	A Sub report used by the Hardcoded@PROGAGE R&R Report – Linearity Report.
Hardcoded@PROGAGE_SubRiskAttA	A Sub report used by the Hardcoded@PROGAGE R&R Report – Risk Analysis Report.
Hardcoded@PROGAGE_ SubRiskAttB	A Sub report used by the Hardcoded@PROGAGE R&R Report – Risk Analysis Report.
Hardcoded@PROGAGE_ SubRiskAttC	A Sub report used by the Hardcoded@PROGAGE R&R Report – Risk Analysis Report.
Hardcoded@PROGAGE_ SubRiskAttD	A Sub report used by the Hardcoded@PROGAGE R&R Report – Risk Analysis Report.
Hardcoded@Stability Chart 2	MSA3 Stability Histogram Chart.
Hardcoded@Stability MSA3 Chart 1	MSA3 Stability Main Charts.
Issue/Return Listing	Generates a detailed listing of each gage's issue/return records.
Kit & Fixtures Listing	Generates a listing of kits/fixtures as to their ID, job number and return status.
Kit & Fixtures Listing with Gages	Generates a listing of kits/fixtures as to their ID, job number and return status. Each kit includes a listing of all its gages as to their ID, description and location.
Linearity Chart	A chart that plots values and calculations for linearity study.
Linearity ChartMSA3	A chart that plots values and calculations for MSA 3 linearity study.
Linearity Histogram MSA3	MSA3 Linearity Histogram Chart.
Normalized Individual Chart	MSA3 GRR Normalized Individual Chart.
Part Listing	These reports list parts, including descriptions and uses.
Part Listing with Gages	Generates the same listing as above with the inclusion of a listing of gages used for each part as to their ID, description and location.
Part User Average Control Chart	Used by the R&R Module for printing Control chart by Part User.
Procedure Listing	To see a list of calibration procedures, choose this report. Check the *Summary Listing By Gage ID* box to include the gages linked to each procedure.
Procedure Listing with Gages	Generates the same listing as above but includes a listing of gages the use the procedure as to their ID, description and location.
PROGAGE_Individual_ SupplierListing	This report lists your suppliers. Check *Enabled* to see only active suppliers. To see both active and inactive suppliers, uncheck *Enabled.*
PROGAGE_Study Summary	Used by the Suppliers Module for printing Supplier records.
Range Chart by User/Part	Plots study data against the upper specification limit and the average within the set of data.
Repeatability Range Control Chart	Used by the R&R module for printing Repeatability charts.
Residual Plot	MSA3 GRR Residual Plot Chart.
Run Chart by Part	Used by the R&R module for printing Chart by Part.
Short Attribute Data Collection Sheet	Comprehensive Short Attribute report with data.

Report	Description
Skip Date Listing	List of skip dates.
Supplier Listing	Generates a summary listing of suppliers as to their supplier code, name, SQA, type, contact person and telephone number.
Supplier Listing with Gages	Generates the same listing as above but now also includes a listing of gages that come from the supplier as to their ID, description and location.
Supplier Traceability with Parts	Generates a listing of supplier names with their corresponding codes, SQA, type, contact person, telephone number and a list of parts/gages they supply.
Users Listing	This report prints a complete listing of group permissions and users and their access permission on the forms, reports and controls of the program. Access to this and all other reports can be limited through Security.
XY Plot of Average by Size	Used by the R&R module for printing XY chart.

Report Filter

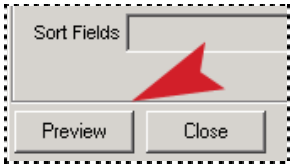
A filter form will appear every time you view a report (highlight a report then click View report, or double-click on the report name to open the Report Filter window, then click on the Preview button). The Report Filter screen will allow you to specify the group of records you want to be included in the generated report. (See "Search and Filter Option" on page 12)

Viewing, Printing and Exporting Reports

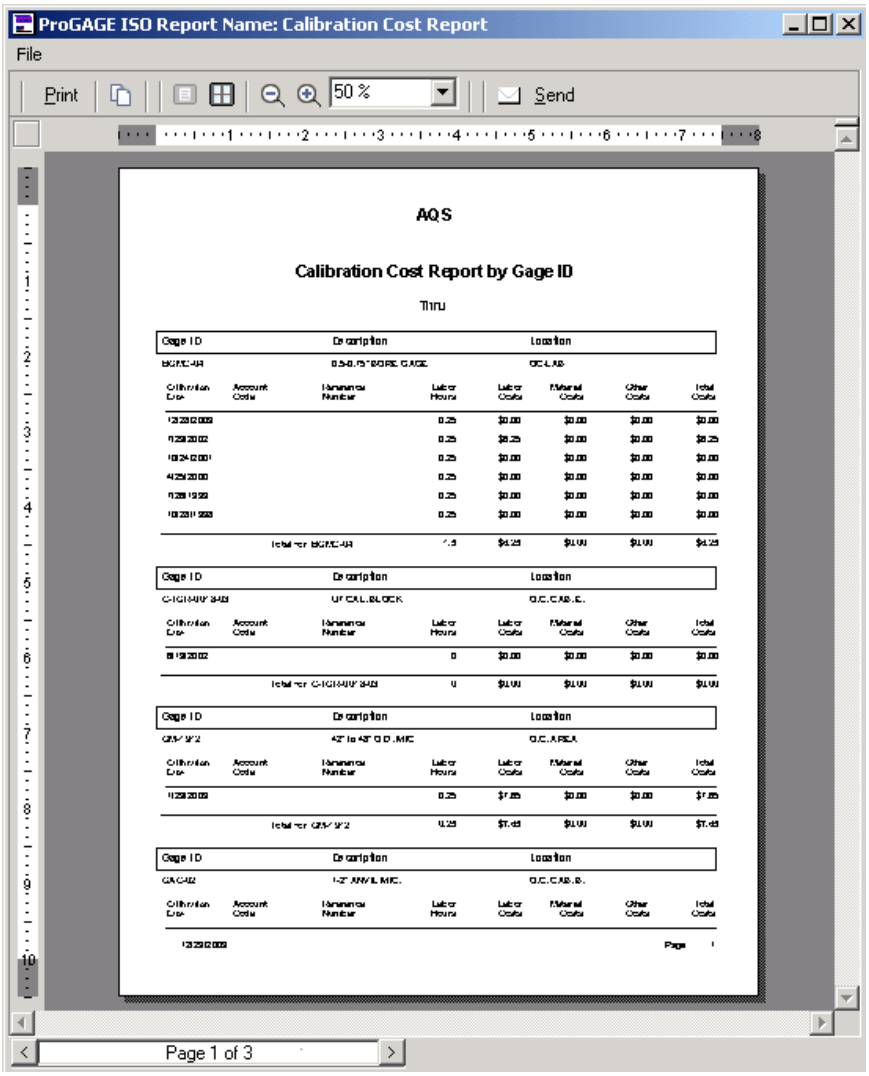
Follow the steps below to view, print or export reports.

To View Reports:

1 Click on the PREVIEW button at the bottom of the Report Filter:



The REPORT PREVIEW window will appear.



2 Use the ZOOM IN/ZOOM OUT buttons to make the image bigger or smaller.

To Print Reports:

1 Select FILE > PRINT from the main floating toolbar, or click on the Print button; the default printing format is the default settings of your printer.

To change default printer settings, go to FILE > PRINTER SETUP.

The report window will refresh to reflect the new settings when you exit the setup window.

Exporting Reports

ProGAGE ISO allows you to transfer reports in six export formats: Rich Text Format (RTF); Portable Document Format (PDF); Hypertext Markup Language (HTML); Microsoft Excel Worksheet (XLS); Tagged Image Format (TIF); and Text (TXT).

To export a report:

1 View the file you want to export.

2 Click on FILE > OUTPUT TO.

3 Select the output format from the drop-down list.

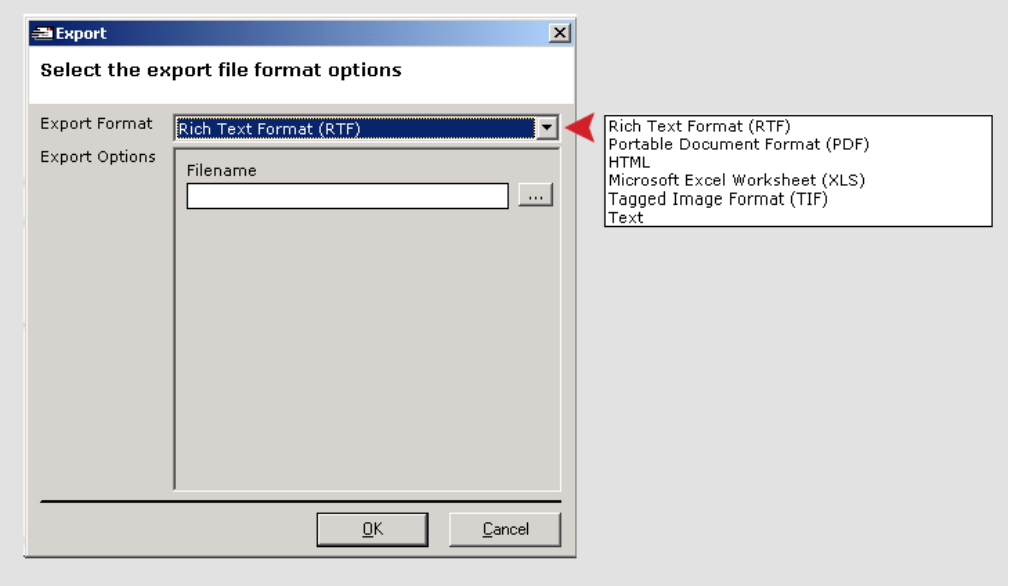
4 Assign a filename or click the Browse button to the right of the field.

5 Click Ok. A message box will appear notifying you of the success of the report export.

While these steps are standard to all the reports, each format opens in a separate dialogue with unique controls dedicated to each format.

RTF

Rich Text Format is considered the 'universal word processing' format because it can be opened in almost every word processing program there is.

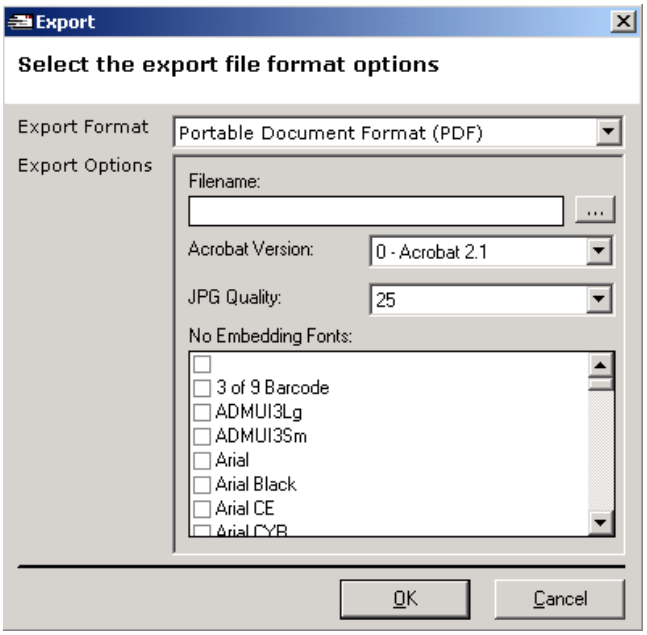


RTF Export Format Control

Control	Description
Filename	Any appropriate filename. This filename will have a default extension *.rtf.* The *Browse* button on the right hand side of the entry field will open a Browse Window where you can select the destination directory and specify the filename. If you know this information, just type it directly on the entry field.

PDF

To be able to export in this format, you have to install Acrobat Reader in your computer first.

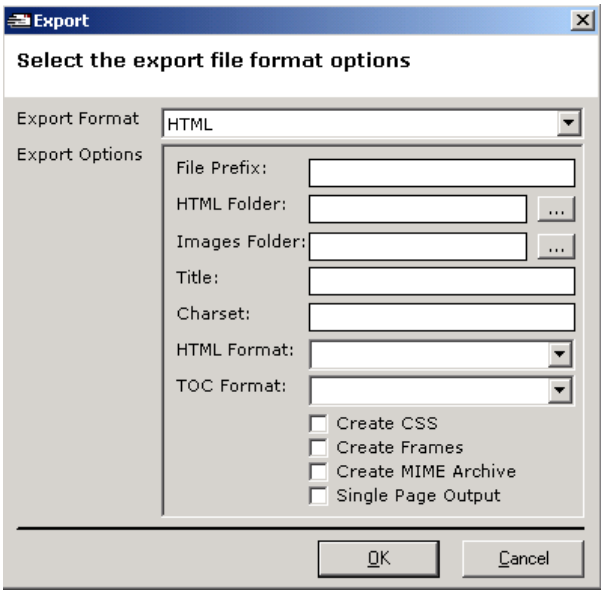


PDF Export Format Controls

Control	Description
File Name	Enter an appropriate filename, which will have a default extension *.pdf.* The *Browse* button on the right hand side of the entry field will open a browse dialogue where you can select the destination directory and specify the filename. If you know this information, just type it directly on the entry field.
Acrobat Version	Enter the version of acrobat you wish to save into.
JPG Quality	Set the quality of the images embedded into the file. Images or graphics embedded are only in JPEG format.
No Embedding Fonts	Select a font to embed with the file. This is particularly useful if you are using a special font that is not usually found in the default font list.
OK Button	Click this button to start the export process.
Cancel Button	Click this button to abort action.

HTML

This format can be read by any web browser. Choose this format if you want to publish your report in the Web.



RTF Export Format Controls

Control	Description
File Prefix	Enter the filename for your HTML file.
HTML Folder	Enter the path or browse for the folder where you want to save your HTML files.
Images Folder	Enter the path or browse for the image folder where images for HTML files will be stored. It is recommended to create a file called Images in the root directory of your HTML file.
Title	Enter the title of your report. This will be displayed in the title bar of your browser.
Charset	Enter a character set if you want to use a language other than the default (English).
HTML Format	Select from HTML 3.2 or Dynamic HTML formats from the drop-down list.
TOC Format	Select from the following options is you want to include a table of contents: *1 - Simple HTML, 2 - Dynamic HTML, and 3 - XML* formats. Choose *0 - None* if you do not wish to make a table of contents.
Create CSS	Mark this checkbox if you want to create a Cascading Style Sheet which you can use in creating other HTML of this format.
Create Frames	Mark this checkbox to include frames into your HTML.
Create MIME Archive	Mark this checkbox to create a MIME Archive.
Single Page Output	Mark this checkbox if you want your whole report to be fitted in a single HTML page.
OK Button	Click this button to start the export process.
Cancel Button	Click this button to abort action.

Excel Worksheet Format

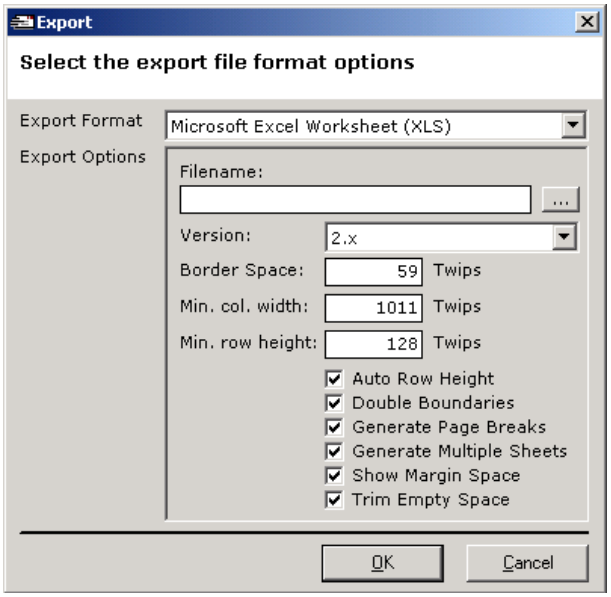
In this format, fields are separated into spreadsheet cells and records are separated by rows.

To export in MS Excel ® Worksheet Format.

1 View the file you want to export.

2 Click on FILE > OUTPUT to.

3 Select the output format from the drop-down list.

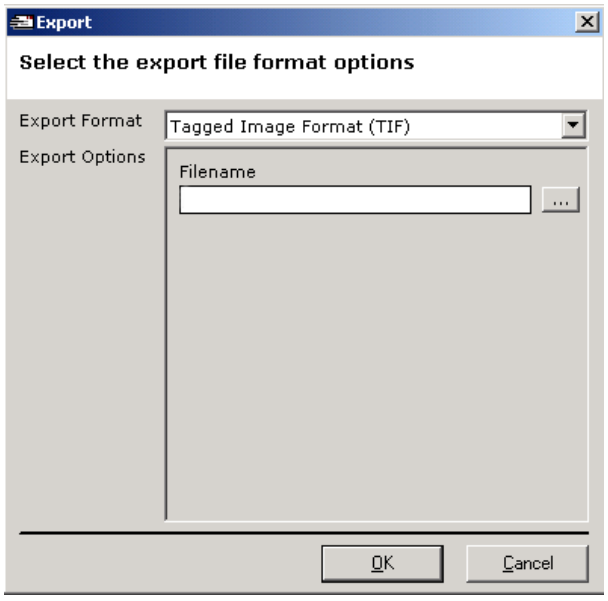


Excel Worksheet Export Format Controls

Control	Description
Filename	Enter any appropriate filename. This filename will have a default extension *.xls.* The *Browse* button on the right hand side of the entry field will open a Browse Window where you can select the destination directory and specify the filename. If you know this information, just type it directly on the entry field.
Version	Select from the drop-down list the version of XLS you wish to save into. Older versions of Microsoft Excel may not be able to open files saved in newer versions.
Border Space	Enter the space between border and text.
Min. Col. Width	Enter the minimum width set for columns.
Min. Row Height	Enter the minimum height set for rows.
Auto Row Height	Mark this checkbox to automatically adjust row height according to cell contents.
Double Boundaries	Mark this checkbox to set the boundary to double line.
Generate Page Breaks	Mark this checkbox to automatically generate a page break for each page of the report.
Generate Multiple Sheets	Mark this checkbox to generate multiple spreadsheets.
Show Margin Space	Mark this checkbox to show margin space.
Trim Empty Space	Mark this checkbox to remove any empty space. Empty rows are not converted into cells.
OK Button	Click this button to start the export process.
Cancel Button	Click this button to abort the export process.

TIF

The report exported in TIF has a default resolution of 72 pixels per inch.

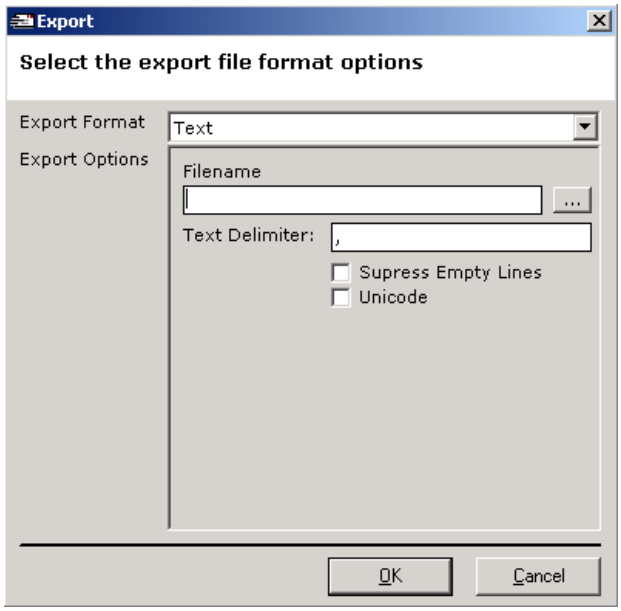


TIF Export Format Control

Control	Description
Filename	Any appropriate filename. This filename will have a default extension *.tif.* The *Browse (…)* button on the right hand side of the entry field will open a Browse Window where you can select the destination directory and specify the filename. If you know this information, just type it directly on the entry field.

TXT

This option gives you a text-formatted output which allows you to choose the type of text delimiters (symbol or character to separate columns). This format is readable for the most common text editing programs such as Windows Notepad.



TXT Export Format Controls

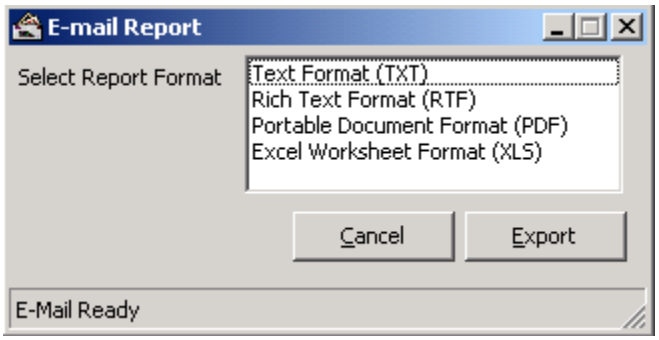
Field/Button	Description
File Name	Enter any appropriate filename. This filename will have a default extension *.txt.* The *Browse* button on the right hand side of the entry field will open a browse window where you can select the destination directory and specify the filename. If you know this information, just type it directly on the entry field.
Text Delimiter	Enter the character used to separate the fields. For the data to be well organized when exported, field entries are separated with delimiters – text with the same number of delimiters preceding them are of the same field heading or group.
Suppress Empty Lines	Mark this checkbox to ignore blank lines and exclude these from the export format.
Unicode	Mark this checkbox to print the report in Unicode format.
OK Button	Click this button to start the export process.
Cancel Button	Click this button to abort the action.

E-mailing Reports

You can e-mail your reports directly from the Preview window. However, this option will only work if you have set the SMTP server and entered your e-mail address in the Settings window. (See "Settings—Information" on page 161).

1 Click on the SEND button at the top pf the page.

2 The dialog window below will appear:



3 Select the report format and click the EXPORT button .

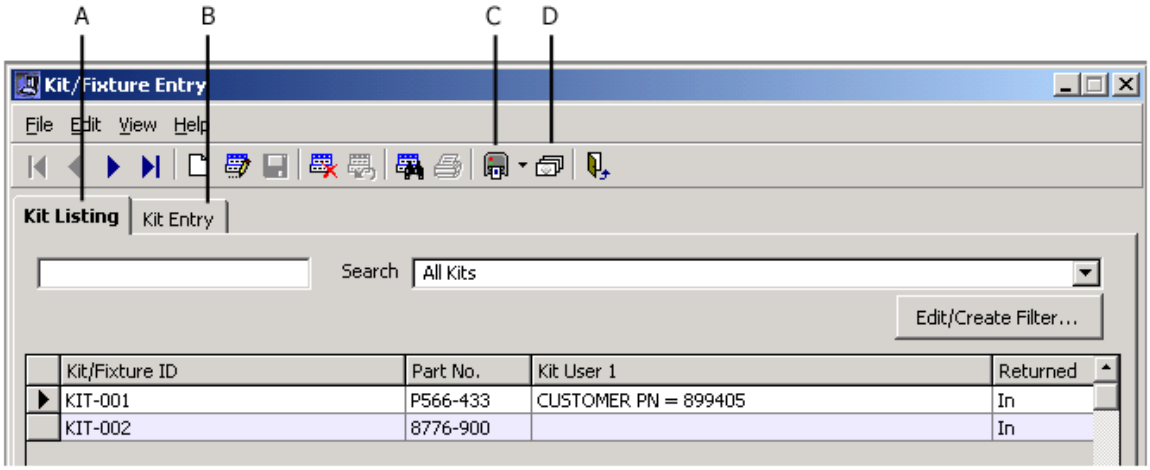
4 The NEW MESSAGE window will appear; enter the recipient's name the subject of the email in the fields; enter your message, if any.

5 Click on SEND to begin the process.

Chapter 7: Kits/Fixtures Records

A Kit/Fixture is a collection of gages or accessories used in measuring a specific part. It offers you convenience by only requiring a single tracking and management system for a set of gages used for a particular job, instead of individually handling it. You can separately issue gages that belong to a Kit/Fixture, but you should not issue a Kit/Fixture when gages that belong to it are not complete. You may assign a particular gage to different Kits/Fixtures, provided that you don't issue these Kits/Fixtures at the same time, evidently because—except for one—all of the other Kits /Fixtures will be rendered incomplete.

This module helps you create and maintain Kits/Fixtures records with your gages and accessories records. When you track or manage a schedule of a Kit, individual records of gages belonging to it are also automatically updated. Gages can be added or removed from a Kit/Fixture at any time; however, you need to update the gage's records using the Gage Master module.



About the Kit Fixture Work Area

A. Kit Listing tab folder **B.** Kit Entry tab folder **C.** Kit Label button **D.** Kit Calibration Entry

Kit Listing

The Kit Listing tab folder contains a Records Listing pane that lists all of your Kit/Fixture record. Details of a particular Kit/Fixture record is outlined in its corresponding Kit Entry tab folder

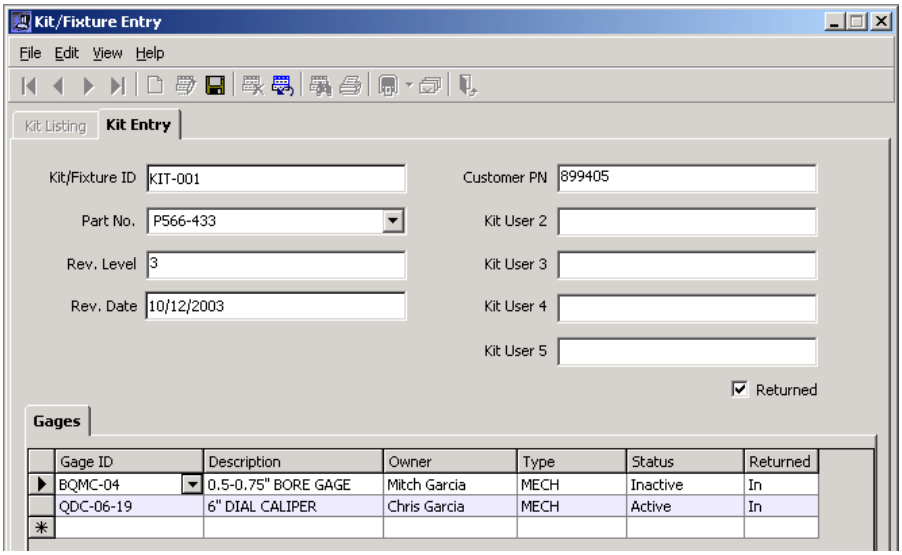
To open a Kit/Fixture record:

1 Select *<record>* from the Records Listing pane.

2 Click the KIT ENTRY tab.

Kit Entry

Details of a particular Kit/Fixture are recorded in its individual KIT ENTRY tab folder.



Creating Kit Entry record

Kit Entry Controls

Control	Description
Kit/Fixture ID	Enter in this field the unique identification for the Kit/Fixture.
Job No.	Enter in this field the particular part or job on which the Kit is used. If you are using this Kit for a particular part or job, you may open the drop-down list, and choose from the options that reflect your records in the Parts Module.
Rev. Level	Enter in this field the number of updates made for the Kit/Entry record. For example, enter 3 in this field if the current update is the third revision ever since the Kit/Entry record was made.
Rev. Date	Enter in this field the date when the latest update was made.
Kit User 1 to 5	These are User-defined fields, and are designed to accommodate other categories of related information to a Kit/Fixture Record. You can only use these fields if you purchase the Label Editor module. (See "Chapter 5: Changing Control Labels" on page 181).
Returned	If this checkbox is marked, it means that the Kit/Fixture is returned by the last user and is currently available; if unmarked, it means that the Kit/Fixture is currently issued. This checkbox is non-editable and is automatically updated when the corresponding Issue/Return record is updated. (See "Chapter 8: Issue/Return Gages and Kits" on page 59).
Gages	You can assign a gage to a Kit/Fixture using this Records Listing pane, provided that it has a corresponding Gage Master record. To assign a gage, open the Gage ID field drop-down list of the active "record" (row), and choose from the available options. The rest of the entries (Description, Type, Owner, Type, Status, and Returned) are then automatically populated. For a description of gage record entries, see "Chapter 3: Entering Gage Records" on page 19.

To create a Kit/Fixture Entry

1 Do any of the following:

- On the toolbar, click NEW RECORD button  .
- Choose EDIT > NEW RECORD.
- Press the shortcut key: CTRL+N.
- From the Records Listing pane, open the left-click context menu, and choose NEW KIT.

2 Enter Kit Fixture ID.

3 Open Part No., and select *<part>* from dropdown list.

4 Enter Rev Level.

5 Change Rev Date, if desired.

6 Enter Kit-User 1, if desired.

7 Open active Gage ID, and select *<gage>* from drop-down list.

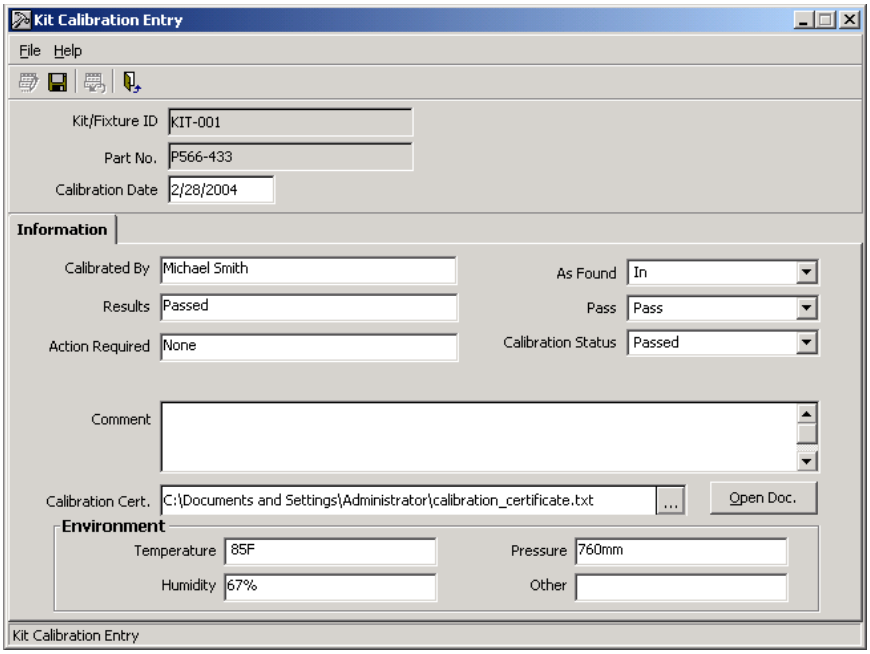
8 Repeat Step 7 to assign another gage.

9 Save the record by doing any of the following:

- On the toolbar, click the SAVE RECORD button  .
- Choose FILE > SAVE RECORD.
- Press the shortcut key: CTRL+S.

Kit Calibration Entry

You can create a record on a calibration of a Kit/Fixture. When a Kit Calibration Entry is updated, all of the related common calibration entries for all gages are also automatically updated. Take note that a Kit/Fixture can only be calibrated only when all gages belonging to it are available.



Creating Kit Calibration Record

Kit Calibration Controls

Control	Description
Kit/Fixture ID	This field indicates the unique identification of the Kit/Fixture, and is non-editable.
Part No.	This field indicates the part to which the gages belonging to the Kit/Fixture are being used. This field is non-editable.
Calibration Date	Enter on this field the date when the calibration is conducted. By default, this field is automatically populated with the current system date.
Calibrated By	Enter your name, or the name of the personnel who is conducting the calibration, on this field.
Results	Enter the results of the calibration in this field.
Action Required	Enter in this field any action that is required for the Kit, as determined from the calibration. For example, if gages are found to be out-of-tolerance, you may enter "Send out for Repair" in this field.
As Found	Select from this field the condition of the Kit before calibration. Select IN for in-tolerance, Out for out-of- tolerance, or New for a new Kit/Fixture that was never been calibrated before. Prior to calibration, all test points of every gage must be within tolerance.
Pass	Select either PASS or FAIL from this drop-down list. This is required in calculating the next calibration due date.
Calibration Status	Select from this drop-down list the final calibration status: PASSED, FAILED, REPAIRED, or LIMITED USE.
Comments	Enter on this textbox any comment on the calibration of the Kit/Fixture.
Calibration Cert.	Enter on this field the path of the file containing the calibration certificate. You can use the *Browse…* button to map and specify the file. To open and edit the calibration certificate, click the adjacent *Open Document* button.
Environment	Enter in these fields the relevant environmental parameters during the calibration. These include Temperature, Humidity, Pressure, and another important parameter.

To create Kit Calibration Entry:

1 Select *<Kit Record>* from the Kit Listing tab folder.

2 Click KIT CALIBRATION ENTRY button .

3 Fill-up KIT CALIBRATION ENTRY.

4 Do any of the following:

- On the toolbar, click the SAVE RECORD button .
- Choose FILE > SAVE RECORD.
- Press the shortcut key: CTRL+S.

Printing Kit/Fixture Labels

The Kits/Fixture module allows you to generate and print labels in any of the three pre-defined label templates. The label templates are of the following sizes: ¼", ½", and 1 inch.

To generate and print label

1 Select <Kit/Fixture record> from KIT LISTING.

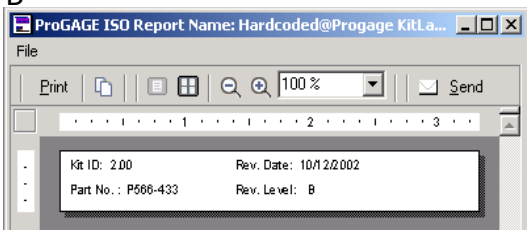
2 On the toolbar, click KIT LABEL. The drop-down list opens.

3 Select <label template>. The label template opens on the Report Editor.

4 Click PRINT button.

A

B



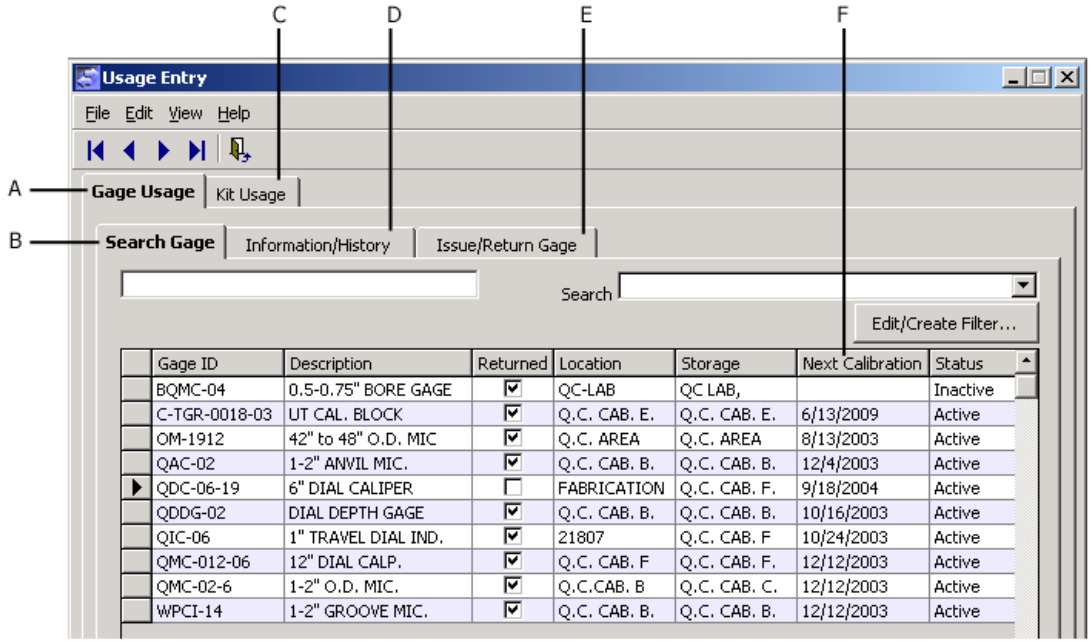
Generate and Print Kit/Fixture label

A. Select label template from Kit Label drop-down **B.** View and Print label on Report Editor

Chapter 8: Issue/Return Gages and Kits

Use this module to track the issuance and return of your gages and kits. With this module, you can easily manage the gage crib, where gages and Kits are issued out for use, and later returned for storage and safekeeping. Once you have properly established operations traceability, you can easily locate a gage or Kit at any time, as well as determine its usage history.

The Issue/Return Module is divided into two: Gage Usage for tracking the issuance and return of your gages, and Kit Usage for your Kits/Fixtures.



About the Issue/Return Module Work Area

A. Gage Usage tab folder **B.** Search Gage tab page **C.** Kit Usage tab folder **D.** Information/History tab page **E.** Issue Return Gage tab page **F.** Records Listing pane

Gage Usage

Access this tab page to record an issuance or return of a gage.

Gage Usage—Search Gage

This contains a Records Listing pane that lists all of your gages and the corresponding information on latest usage. The history of usage for a particular gage is enumerated in the INFORMATION/HISTORY tab page.

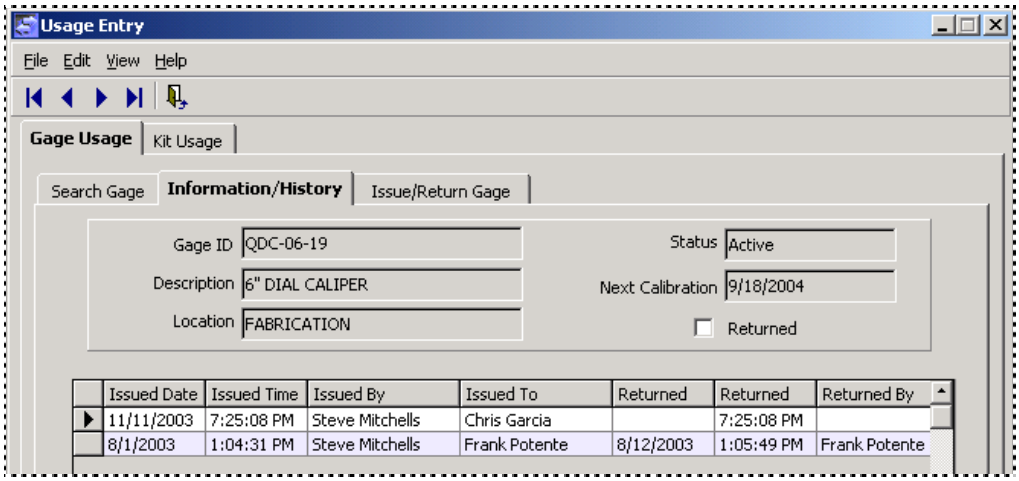
To view history of a gage's usage:

1 Select *<record>* from the Records Listing pane.

2 Click the INFORMATION/HISTORY tab page.

Gage Usage—Information/History

The history of usage cycles for a particular gage is outlined here. A "record" (row) represents one usage cycle or the issuance and subsequent return of a gage. A set of non-editable fields is included in the tab page, and summarizes the information on the gage.



Viewing Gage Usage History

Information/History Controls

Control	Description
Gage ID	This identifies the gage to which the usage cycle record is ascribed. This field is non-editable.
Description	This describes the gage to which the usage cycle record is ascribed. This field is non-editable.
Location	This indicates the current location of the gage. This field is non-editable.
Status	This indicates the status—Either Active or Inactive—of the gage. This field is non-editable.
Next Calibration	This indicates when the gage is next due for calibration. This field is non-editable.
Returned	When checkbox is marked, it means the gage is currently available in the gage crib; when unmarked, gage is loaned out.
Issue Date and Time	These fields indicate the date and time when the gage was issued.
Issued By	This indicates who issued the gage.
Issued To	This indicates to whom the gage was issued.
Return Date and Time	These fields indicate the date and time when gage was returned. These remain blank when gage is currently issued.
Returned By	This indicates who return the gage.
Returned To	This indicates to whom the gage was returned.
Return Cycles	This indicates the number of cycles used or parts measured by the gage.

Control	Description
Part No.	This indicates the part for which the gage is used. This is useful in tracking gage usage for part recall when a gage is found to be grossly inaccurate during the latest calibration.

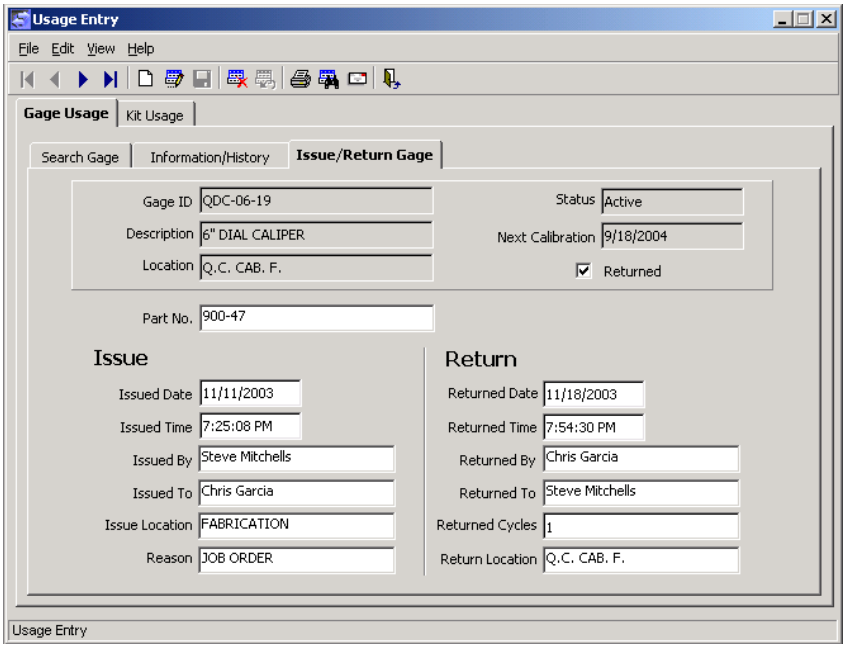
To view a particular usage cycle record:

1 Select *<row>* from the Records Listing pane.

2 Click the ISSUE/RETURN GAGE tab page.

Gage Usage—Issue/Return Gage

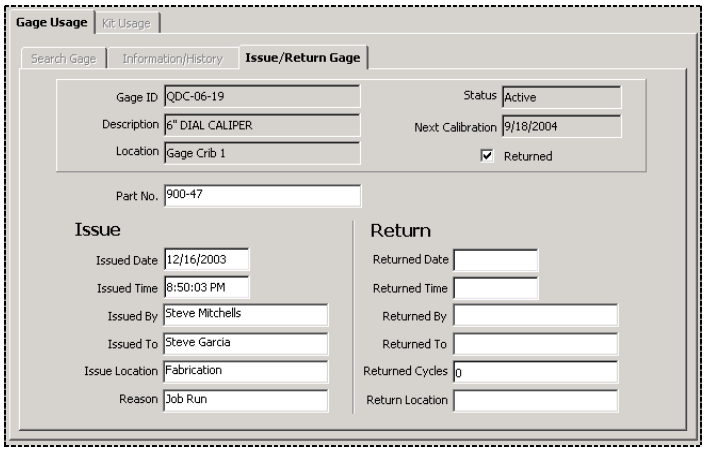
View the details of a specific usage cycle in this tab page. You can also record an issuance and the subsequent return within this tab page. A set of non-editable fields is included, and summarizes the information of the gage to which the usage cycle is ascribed.



Issue/Return Controls

Control	Description
Gage ID	This identifies the gage to which the usage cycle record is ascribed. This field is non-editable.
Description	This describes the gage to which the usage cycle record is ascribed. This field is non-editable.
Location	This indicates the current location of the gage. This field is non-editable.
Status	This indicates the status—Either Active or Inactive—of the gage. This field is non-editable.
Next Calibration	This indicates when the gage is next due for calibration. This field is non-editable.
Returned	When checkbox is marked, it means the gage is currently available in the gage crib; when unmarked, gage is loaned out.
Part No.	Enter the number of part for which the gage is used. This is useful in tracking gage usage during part recall.

Control	Description
Issue Date and Time	Enter in these fields the date and time when gage was issued. By default, these fields are populated with the current system date and time.
Issued By	Enter who issued the gage.
Issued To	Enter to whom the gage is issued.
Issue Location	Enter new location of the gage while loaned out.
Reason	Enter the reason why the gage is issued.
Return Date and Time	Enter in these fields the date and time when gage was returned. By default, these fields are populated with the current system date and time.
Returned By	Enter who return the gage.
Returned To	Enter to whom the gage is returned.
Return Cycles	Enter the number of cycles used or parts measured by the gage. This value is added to the previous total, which is then used by ProGAGE ISO to calculate the next *Calibration Due Date*.
Return Location	Enter where the gage is returned for storage.



Issue Gage

To record an issuance of a gage:

1 Do any of the following:

- On the toolbar, click NEW RECORD button .
- Choose EDIT > NEW RECORD
- Press the shortcut key: CTRL+N
- From the Records Listing pane of INFORMATION/HISTORY tab page , open the right-click context menu, and choose ISSUE GAGE.

2 Enter Part No.

3 Enter Issued By.

4 Enter Issued To.

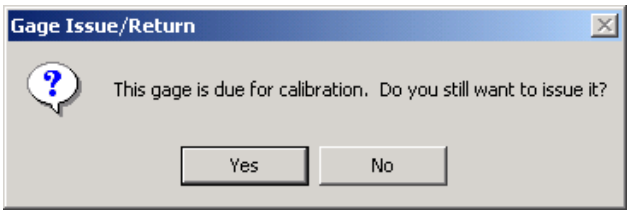
5 Enter Issue Location.

6 Enter Reason.

7 Save usage cycle record by doing any of the following:

- On the toolbar, click SAVE RECORD button .
- Choose EDIT > SAVE RECORD
- Press the shortcut key: CTRL+S

If the gage to be issued is due for calibration, you will be warned appropriately and will be asked to decide on whether you want to continue or cancel the action.



To record the subsequent return of a gage:

1 Select the most recent usage cycle record from INFORMATION/HISTORY tab page.

2 Open the right-click context menu, and choose RETURN GAGE. ISSUE/RETURN GAGE tab page opens.

3 Enter Returned Cycles.

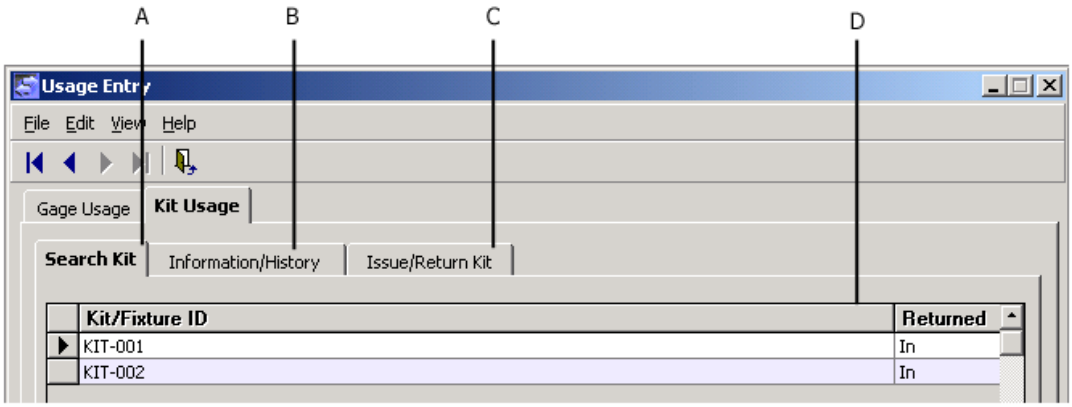
4 Close and usage cycle record by doing any of the following:

- On the toolbar, click SAVE RECORD button .
- Choose EDIT > SAVE RECORD.
- Press the shortcut key: CTRL+S.

The program assumes that the person who loaned the gage is also the one returning it, and that the gage is returned to its storage location. If you edit a record from within ISSUE/RETURN GAGE tab page, ProGAGE ISO assumes that you want to return a gage when the most recent usage cycle record is incomplete (only an issuance is recorded).

Kit Usage

Access this tab folder to record an issuance or return of a Kit/Fixture. Similar to Gage Usage, Kit Usage is also divided into 3 tab pages: Search Gage, Information/History, and Issue/Return Kit.



About the Issue/Return Module Work Area

A. Search Kit tab page **B.** Information/History tab page **C.** Issue/Return Kit tab page

Kit Usage—Search Gage

This enumerates the your kits/fixtures with their corresponding Returned status. The history of usage for a particular kit/fixture is enumerated in the INFORMATION/HISTORY tab page.

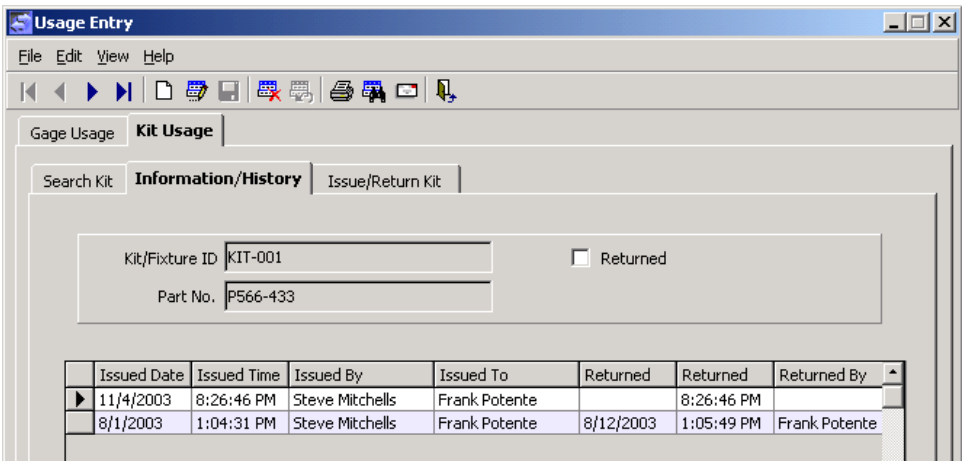
To view history of a kit's usage:

1 Select *<record>* from the Records Listing pane.

2 Click the INFORMATION/HISTORY tab page.

Kit Usage—Information/History

The history of usage cycles for a particular kit/fixture is outlined here. A "record" (row) represents one usage cycle or the issuance and subsequent return of a kit/fixture. A set of linked fields is included in the tab page, and summarizes the information on the kit/fixture.



View Kit Usage—Information/History

Information/History Controls

Control	Description
Gage ID	This identifies the kit/fixture to which the usage cycle record is ascribed.
Returned	When checkbox is marked, it means the kit/fixture is currently available in the gage crib; when unmarked, gage is loaned out.
Part No.	This identifies the number of part for which the kit/fixture is used.
Issue Date and Time	These fields indicate the date and time when the kit/fixture was issued.
Issued By	This indicates who issued the kit/fixture.
Issued To	This indicates to whom the kit/fixture is issued.
Return Date and Time	These fields indicate the date and time when kit/fixture is returned.
Returned By	This indicates who return the kit/fixture. This remains blank when gage is currently issued.
Returned To	This indicates to whom the kit/fixture was returned. This remains blank when gage is currently issued.
Return Cycles	This indicates the number of cycles used or parts measured by the kit/fixture.

Control	Description
Part No.	This indicates the part for which the kit/fixture is used. This is useful in tracking kit/fixture usage for part recall.

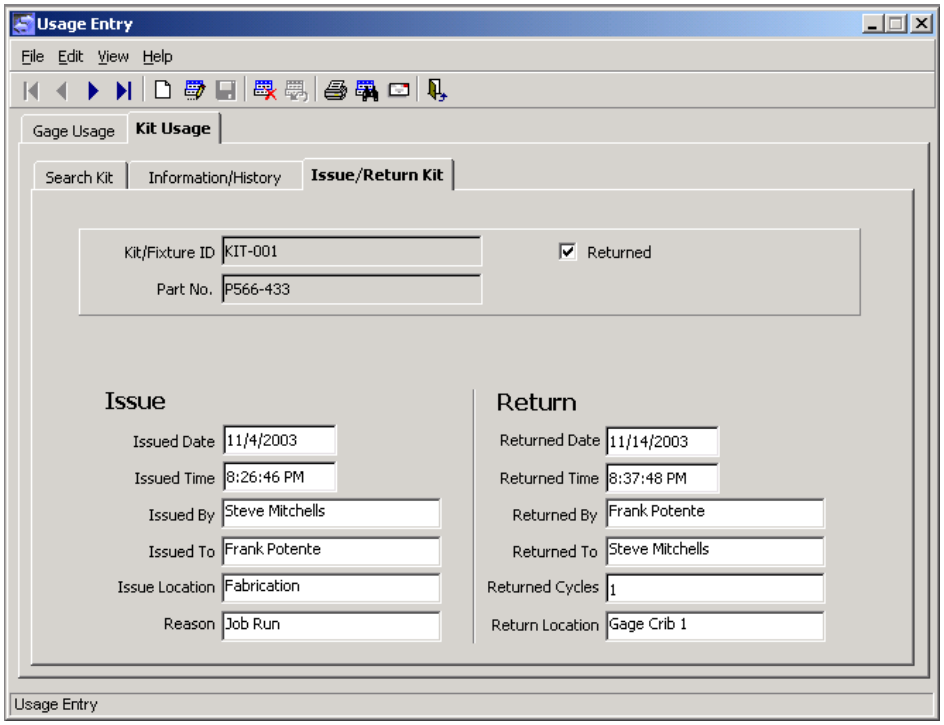
To view a kit's specific usage cycle record:

1 Select *<row>* from the Records Listing pane.

2 Click the ISSUE/RETURN KIT tab page.

Issue/Return Gage

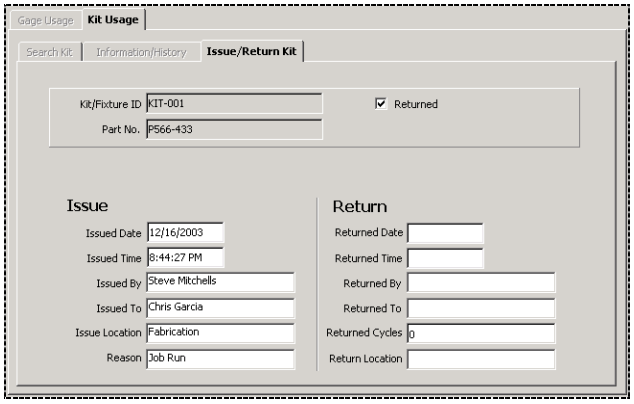
You can view the details of a specific usage cycle in this tab page. You can also record an issuance and the subsequent return from within this tab page. A set of non-editable fields is included in the tab page, and summarizes the information on the kit/fixture to which the usage cycle is ascribed.



Issue/Return Controls

Control	Description
Gage ID	This identifies the kit/fixture to which the usage cycle record is ascribed. This field is non-editable.
Returned	When checkbox is marked, it means the kit/fixture is currently available in the gage crib; when unmarked, gage is loaned out.
Part No.	This identifies part for which the kit/fixture is used. This is useful in tracking gage usage during part recall.
Issue Date and Time	Enter in these fields the date and time when kit/fixture is issued. By default, these fields are populated with the current system date and time.
Issued By	Enter who issued the kit/fixture.
Issued To	Enter to whom the kit/fixture was returned.
Issue Location	Enter new location of the kit/fixture while loaned out.

Control	Description
Reason	Enter the reason why the kit/fixture was issued.
Return Date and Time	Enter in these fields the date and time when kit/fixture is returned. By default, these fields are populated with the current system date and time.
Returned By	Enter who return the kit/fixture.
Returned To	Enter to whom the kit/fixture is returned.
Return Cycles	Enter the number of cycles used or parts measured by the kit/fixture. This value is added to the previous total, which is then used by ProGAGE ISO to calculate the next *Calibration Due Date*.
Return Location	Enter where the kit/fixture is stored.



Issue Kit

To record an issuance of a kit/fixture:

1 Do any of the following:

- On the toolbar, click NEW RECORD button .
- Choose EDIT > NEW RECORD.
- Press the shortcut key: CTRL+N.
- From the Records Listing pane of INFORMATION/HISTORY tab page , open the right-click context menu, and choose ISSUE KIT.

2 Enter Issued By.

3 Enter Issued To.

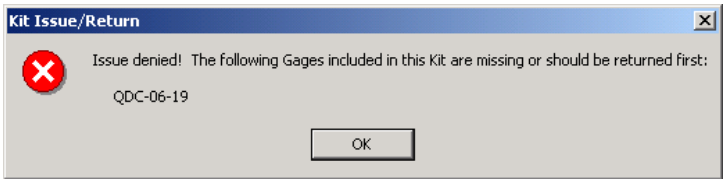
4 Enter Issue Location.

5 Enter Reason.

6 Save usage cycle record by doing any of the following:

- On the toolbar, click SAVE RECORD button .
- Choose EDIT > SAVE RECORD.
- Press the shortcut key: CTRL+S.

You cannot issue a kit/fixture if at least one of the gages belonging to is not available (missing or currently loaned out). ProGAGE ISO will prompt you and identify the unavailable gage/s.



To record the subsequent return of kit/fixture:

1 Select the most recent usage cycle record from INFORMATION/HISTORY tab page.

2 Open the right-click context menu, and choose RETURN KIT. Issue/Return Kit tab page opens.

3 Enter Returned Cycles.

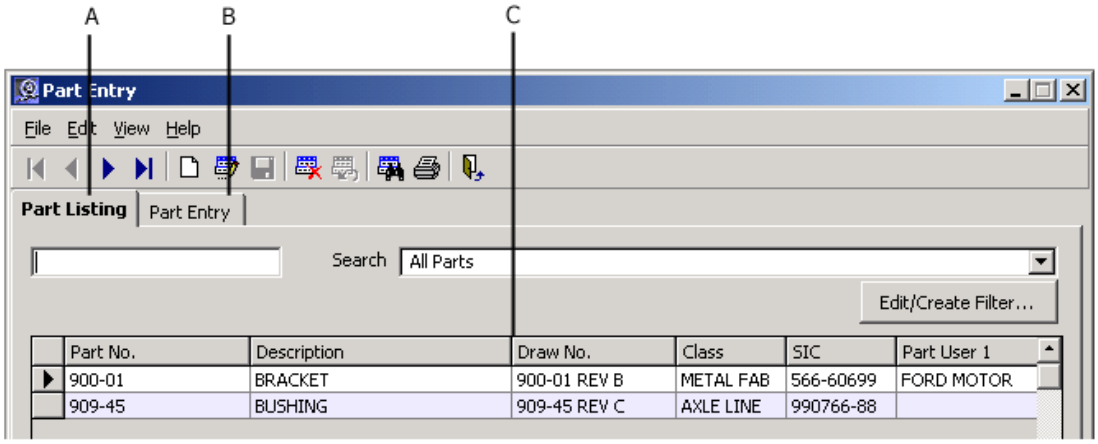
4 Close and save usage cycle record by doing any of the following:

- On the toolbar, click SAVE RECORD button .
- Choose EDIT > SAVE RECORD.
- Press the shortcut key: CTRL+S.

The program assumes that the person who loaned the kit/fixture is also the one returning it, and that the gage is returned to its storage location. If you edit a record from within ISSUE/RETURN KIT tab page, ProGAGE ISO assumes that you want to return a kit/fixture when the most recent usage cycle record is incomplete (only an issuance is recorded).

Chapter 9: Parts Records

The Parts Module is used in tracking parts and in setting lists of gage requirements (list of gages that can be used in inspecting a specific part). With this module, you can easily generate a "parts recall list," when a gage is found to be defective.



About the Part Module Work Area

A. Part Listing tab folder **B.** Part Entry tab Folder **C.** Records Listing Pane

Part Listing

The Part Listing tab folder contains a Records Listing pane that lists all of your Part records. Details of a specific Part record are outlined in the corresponding Part Entry tab folder.

To open a Part record:

1 Select *<record>* from the Records Listing Pane.

2 Click PART ENTRY tab.

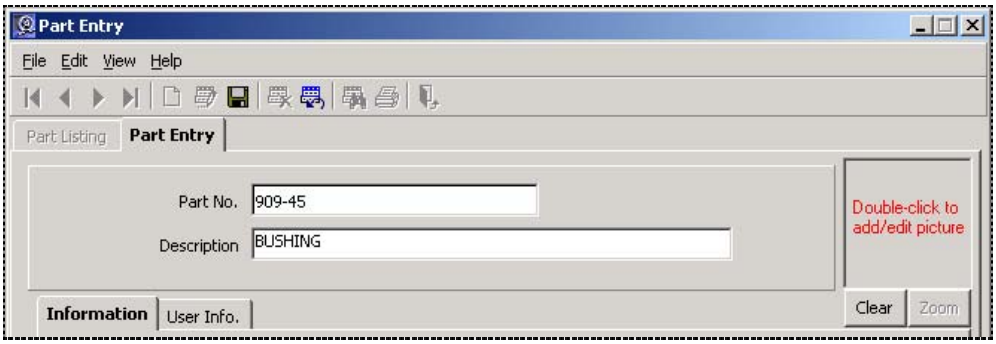
To create a Part Entry:

Do any of the following:

- In the toolbar, click NEW RECORD button .
- Choose EDIT > NEW RECORD.
- Press the shortcut key: CTRL+N.
- From the Records Listing pane, open the left-click context menu, and choose NEW PART.

Part Entry

Details of a specific Part record are encoded in its individual PART ENTRY tab folder. A PART ENTRY tab folder, meanwhile, further contains two tab pages: INFORMATION and USER INFO. A specific Part record is identified from other records by the following controls:



Part Entry Controls

Control	Description
Part No.	Enter a unique identification of the Part. It is suggested that you use the identification assigned by the manufacturer, or one that complies with your company's internal identification system.
Description	Enter the name of the part or a description that accompanies the Part No. given by the manufacturer.

You can also display a picture of the part by linking the image file to ProGAGE ISO. The Image file has to be in one of the following standard formats: Joint Photographic Export Group (JPEG) compression format, Tagged Image File (TIF) Format, Bitmap (BMP), and Graphics Interchange Format (GIF). Your choice of image format may depend on file size requirement – GIFs are usually smaller than TIF and BMP.

Click the ZOOM button to open a larger image in a separate window.

To link an image while editing Part Entry:

1 Double-click on the picture box. The SELECT AN IMAGE FILE... dialog opens.

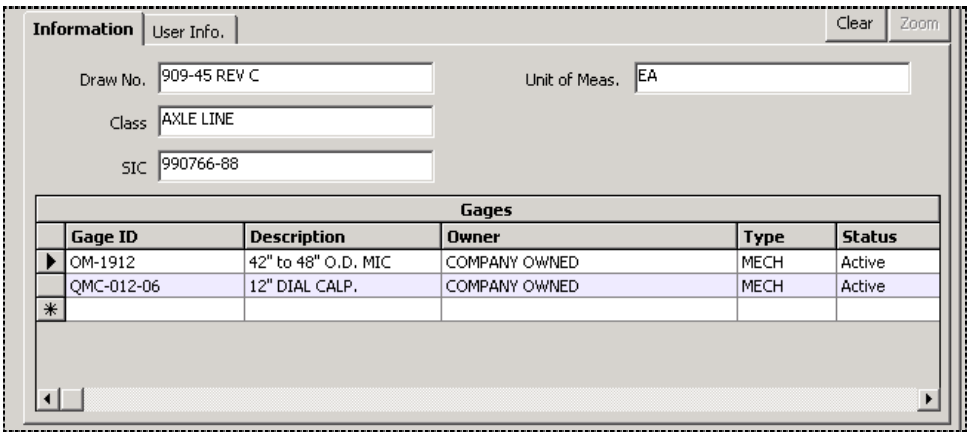
2 Locate the folder that contains the image file.

3 Select *<image file>* and Click OPEN button.

4 If you want to change the image, click the CLEAR button first before doing Steps **1-3**.

Part Entry—Information

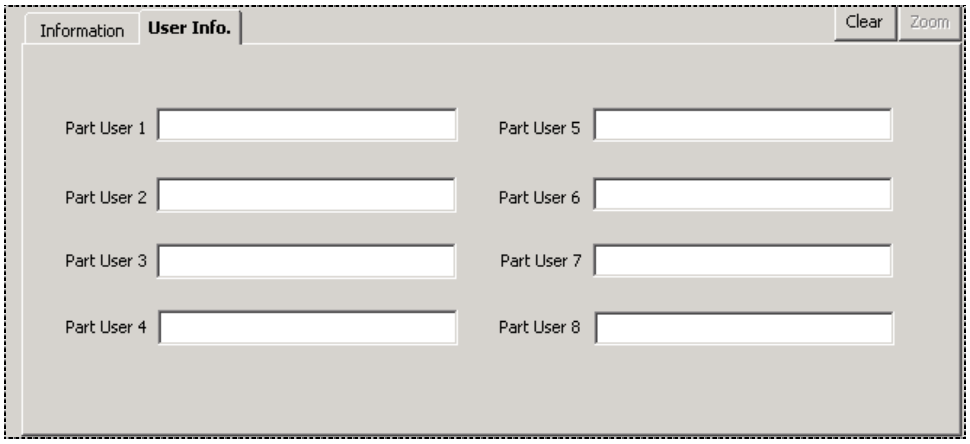
Use this tab page to ascribe the gages that can be used in inspecting this part, and to record common attributes of the part.



Part Entry-Information Controls

Control	Description
Draw No.	Enter in this field the drawing number of the part's blueprint.
Class	Enter in this field the class of the part or material. For example, you may want to classify the degree of inspection required for the part, and indicate it in this field.
SIC	Enter in this field the Standard Industry Classification (SIC) code for the part.
Unit of Meas.	Enter in this field the unit of measurement that applies to the part.
Gages	This Records Listing pane enumerates the gages used in inspecting this part. A gage can be assigned as long as it has a corresponding Gage Master Record. To ascribe a gage, open the Gage ID field drop-down list of the active "record" (row), and choose from the available options. The rest of the entries (Description, Owner, Type, and Status) are then automatically populated. For a description of gage record entries, see "Chapter 3: Entering Gage Records" on page 19.

Part Entry—User Info.

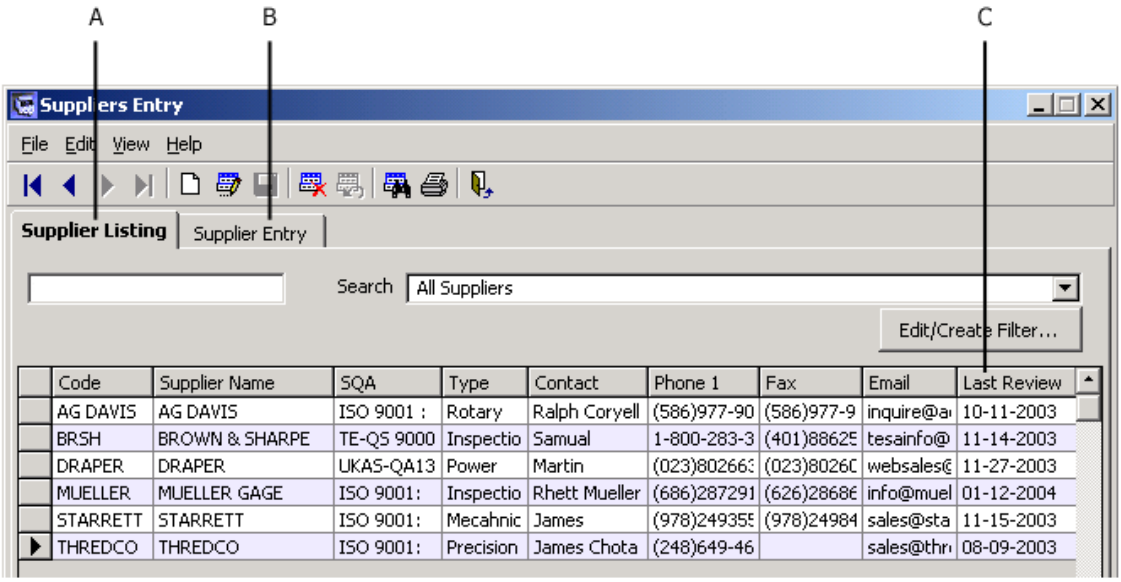


This tab page contains eight user-defined fields to accommodate other attributes related to parts. You can change the labels of the fields if the Label Editor Module is installed.

(See "Chapter 5: Changing Control Labels" of the System Administrator's Guide on page 181.)

Chapter 10: Supplier Records

Use the Suppliers Module to record comprehensive information on your gage and parts suppliers. A Supplier Entry record is useful in facilitating smooth and prompt supply reorder and/or replacement.



About the Suppliers Module Work Area

A. Supplier Listing tab folder **B.** Supplier Entry tab Folder **C.** Records Listing pane

Supplier Listing

The SUPPLIER LISTING tab folder contains a Records Listing pane that lists all of your Supplier records. Details of a specific Supplier record is outlined in its corresponding SUPPLIER ENTRY tab folder

To open a Supplier record:

1 Select *<record>* from the Records Listing pane.

2 Click the SUPPLIER ENTRY tab.

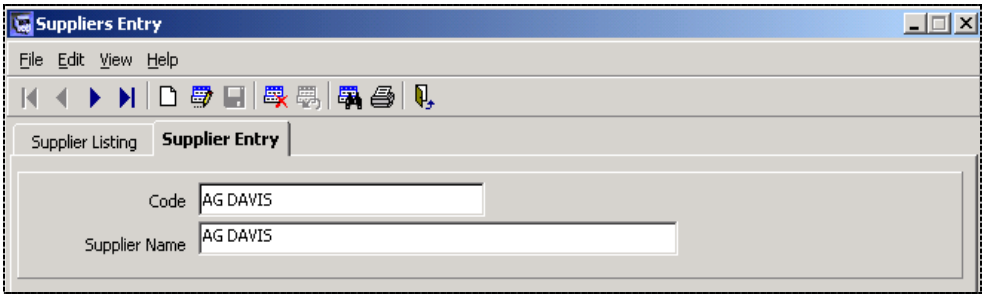
To create a Supplier Entry

Do any of the following:

- On the toolbar, click NEW RECORD button  .
- Choose EDIT > NEW RECORD.
- Press the shortcut key: CTRL+N.
- From the Records Listing pane, open the left-click context menu, and choose NEW SUPPLIER.

Supplier Entry

Details of a particular Supplier record are recorded in its individual SUPPLIER ENTRY tab folder. A SUPPLIER ENTRY tab folder further contains three tab pages: INFORMATION, USER INFO, and GAGES. A specific Supplier record is identified by the following fields:

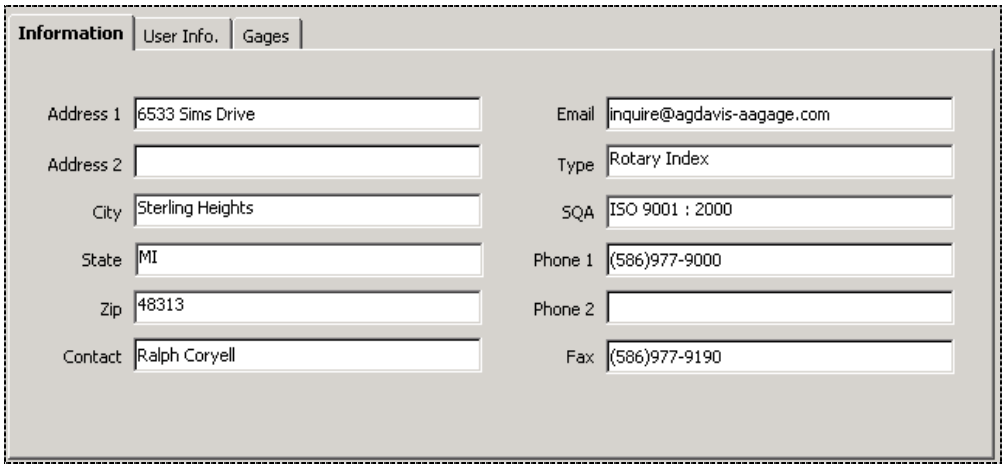


Supplier Entry Controls

Field	Description
Code	Enter in this field a unique Code to identify the supplier.
Supplier	Enter in this field the complete name of the supplier.

Supplier Entry—Information

Use this tab page to record related information on the supplier.

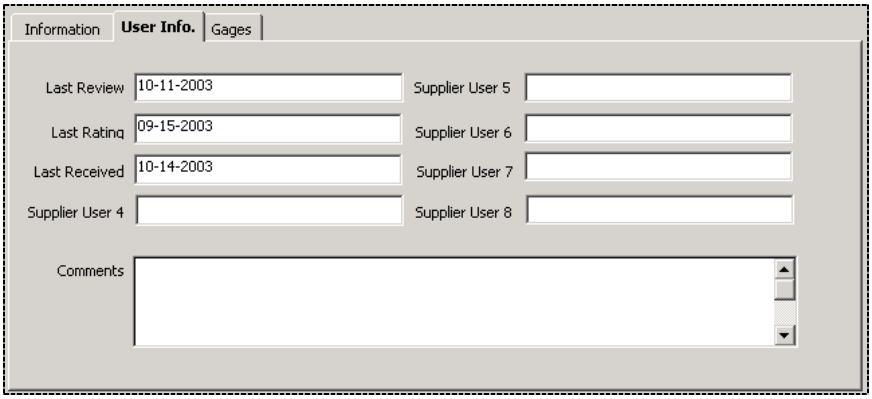


Supplier Entry—Information Controls

Control	Description
Address 1, Address 2, City, State, Zip	Enter in these fields the complete address of the supplier. The first two fields are allotted for the Street address.

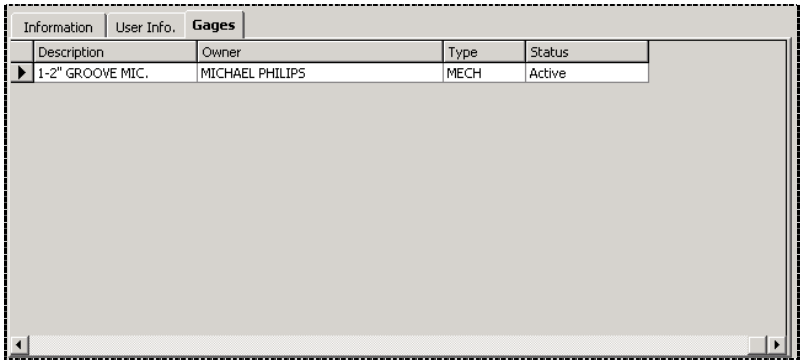
Contact	Enter in this field the name of the contact person from this supplier.
Email	Enter in this field the complete e-mail address of the contact person.
Type	Enter in this field the type of gages rendered by this supplier.
SQA	Enter in this field the Quality Assurance Standard of the supplier.
Phone 1 & 2	Enter in these fields the phone numbers of the contact person.
Fax	Enter in this field the fax machine number of the contact person.

Supplier Entry—User Info.



This tab page contains eight fields that can be defined by users and are designed to accommodate other attributes related to the Supplier. For example, you may want to indicate the date when you conducted the last review for suppliers, or the date when last shipment was received from the supplier. You can change the labels of the fields using the Label Editor Module. (See "Chapter 5: Changing Control Labels" on page 181 of the System Administrator's Guide.) You may also add any comment about this supplier in the Comments textbox.

Supplier Entry—Gages



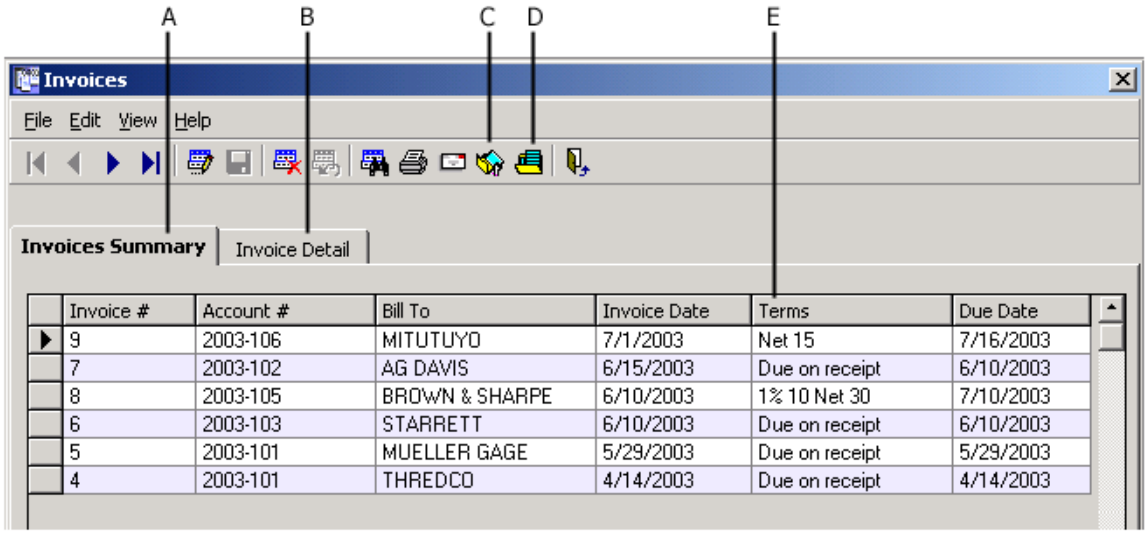
You can also list the gages acquired from this supplier, provided that gages have their corresponding Gage Master records. To ascribe a gage, open the Gage ID field drop-down list of the active "record" (row), and choose from the available options (these are your gage master records). The rest of the entries (Description, Owner, Type, and

Status) are then automatically populated. For a description of gage record entries, see "Chapter 3: Entering Gage Records" on page 19.

Chapter 11: Invoices

Using the new Invoice Utility, you can instruct ProGAGE ISO to generate invoices and related records whenever you create a new calibration or R&R study record.

To activate the Generate Invoice feature, you need to go to SETTINGS, and mark the GENERATE INVOICE checkbox in the Information tab folder. When the feature is enabled, ProGAGE ISO will generate an invoice record (which you can view in the Invoice Utility) whenever you create a new calibration or an R&R Study record, provided that you enter an Account Number to it. And just like most ProGAGE ISO modules, Invoices is divided into two tab folders: INVOICES SUMMARY and INVOICE DETAIL.



About the Invoices Module Work Area

A. Invoice Summary tab folder **B.** Invoices Detail tab Folder **C.** Terms Entry button **D.** Export Invoice Data to File… button **E.** Records Listing Pane

Invoices—Invoices Summary

The INVOICES SUMMARY tab folder contains a Records Listing pane that lists all of your Invoice records. Details of a particular Invoice record is outlined in the INVOICE DETAIL tab folder.

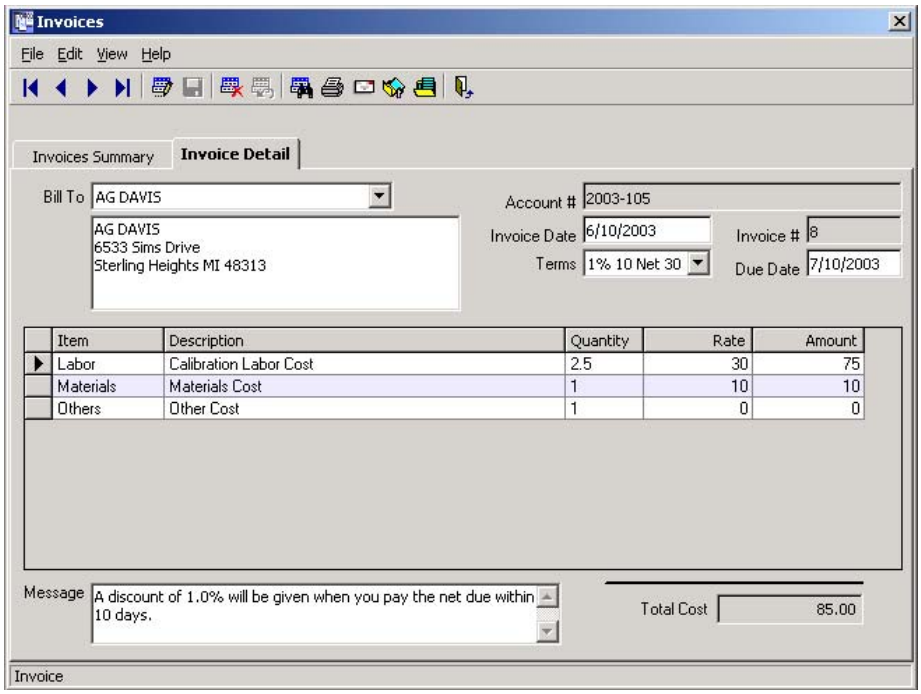
To open an Invoice record:

1 Select *<record>* from the Records Listing pane

2 Click the INVOICE DETAIL tab.

Invoices—Invoice Detail

Details of a particular Invoice are contained in its individual INVOICE DETAIL tab folder.



Invoice Detail Controls

Control	Description
Bill To	Select from the dropdown list to whom this Invoice is billed. The Billing Address will appear on the textbox immediately below the field, provided that entry in linked Suppliers record is available. (See "Chapter 9: Entering Supplier Records" on page 73).
Account #.	This field indicates the Account # charged for the invoice, this is the same Account Number entered in the related calibration or R&R Study Record.
Invoice Date	Enter when this invoice is generated. By default, the system date when the invoice has been generated is automatically reflected in the field.
Invoice #	This field indicates the Invoice Number, assigned automatically by ProGAGE ISO. This field is non-editable.
Terms	Select from drop-down list the Terms of Payment that applies to this transaction or account. Aside from pre-defined terms of payment methods, you can use and define other terms of payment options applicable to your transaction needs.
Due Date	This field indicates when payment is due. This is automatically generated and determined based from Invoice Date and Terms.
Item	This field enumerates services and other billable items included in the invoice.
Description	This field describes a particular service or billable item.
Quantity	This field indicates the amount (as fraction of whole units) of service or billable item included in the Invoice.
Rate	This field indicates the cost per unit of a billed item. You can edit entries in this field.
Amount	This field indicates the cost of every item charged in the invoice.
Message	This field describes the terms of payment that applies to this transaction or account. This field is non-editable.
Total Cost	This indicates the total cost of items billed in this particular invoice.

To edit an Invoice:

1 Do any of the following:

- On the toolbar, click EDIT RECORD button .
- Choose FILE > EDIT RECORD.
- Press the shortcut key: CTRL+T.

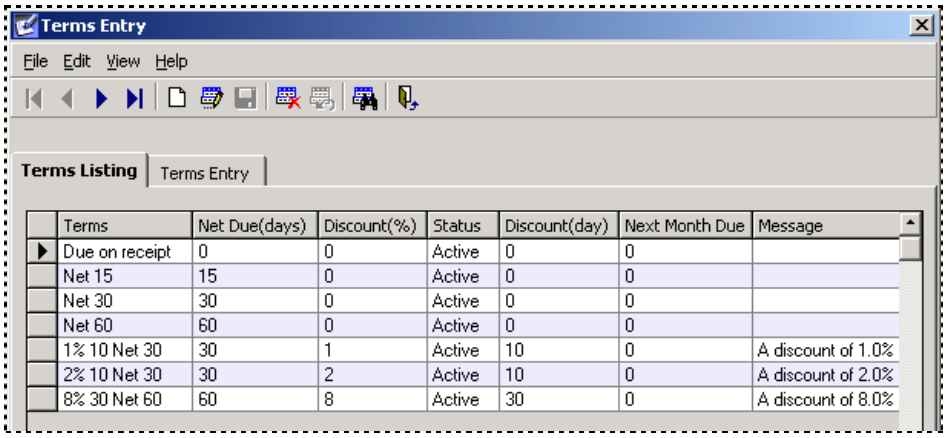
2 Fill-up Kit Entry

3 Save the record by doing any of the following:

- On the toolbar, click the SAVE RECORD button .
- Choose FILE > SAVE RECORD.
- Press the shortcut key: CTRL+S.

Defining a Terms of Payment Option

Aside from the seven pre-defined terms of payment options, you can define and use other terms of payment options that are applicable to your transaction needs. Define a terms of payment option using the Terms Entry feature, which you can access by clicking TERMS ENTRY button on main toolbar.



Terms	Net Due(days)	Discount(%)	Status	Discount(day)	Next Month Due	Message
Due on receipt	0	0	Active	0	0	
Net 15	15	0	Active	0	0	
Net 30	30	0	Active	0	0	
Net 60	60	0	Active	0	0	
1% 10 Net 30	30	1	Active	10	0	A discount of 1.0%
2% 10 Net 30	30	2	Active	10	0	A discount of 2.0%
8% 30 Net 60	60	8	Active	30	0	A discount of 8.0%

Terms Entry—Terms Listing

The terms of payment options are listed in this tab folder. Details of a particular Terms of Payment record is outlined in the TERMS ENTRY tab folder.

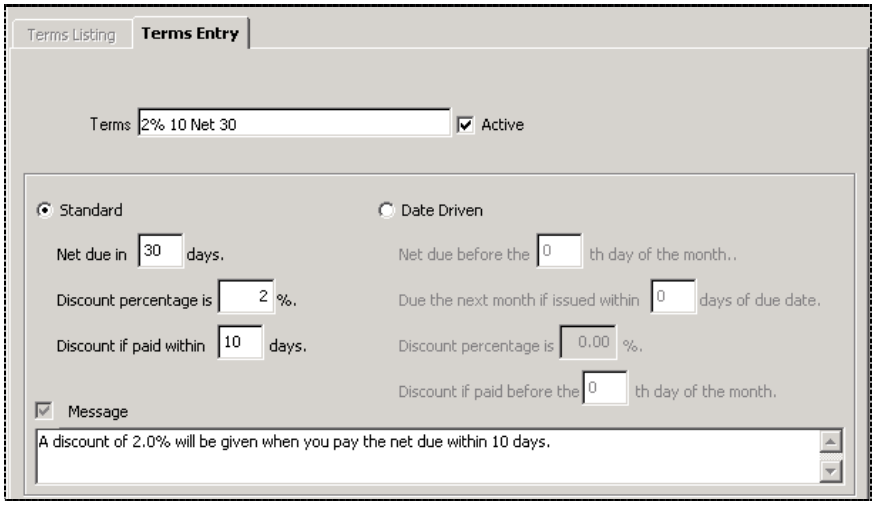
To open an Terms of Payment record:

1 Select *<record>* from the Records Listing pane.

2 Click the TERMS ENTRY tab folder.

Terms Entry—Terms Entry

Details of a particular Invoice are contained in its individual Terms Entry tab folder.



Creating Standard Terms of Entry Option

Terms Entry Controls

Control	Description
Terms	Enter in this field the name of the new Terms of Payment option; it should be formulated in a logical pattern so users can easily comprehend the elements of the term. For example, *Net 30* would mean that payment is due in a daily cycle; but *2% 10 Net 30* will still indicate the same 30 days cycle, however, with 2% discount if payment is made within 10 days after invoice date.
Active	Mark this checkbox to make available this terms of payment option.
Standard	Choose this radiobutton if the term of payment is based on Standard Days Cycle. Enter the Days cycle in the first field; Enter discount rate in the second field (gray, but editable); and Enter number of days the discount option is effective in the third field. Keep the second and third fields blank if the term does not include a discount term.
Date Driven	Choose this radiobutton if the term of payment is based on a monthly cycle. Enter in the first field when (day of the month) payment is due; Enter discount rate in the third field (gray, but editable); Enter the number of days the discount option is effective in the fourth field; and On the second field, indicate the number of days before the current month's due date, during which any billing made is automatically due to the following month's due date. For example, if you enter 5 in this field with due date set on the 15th of the month, any invoice made on the 11th to the 14th of the current month will be automatically due on the 15th of the following month. Keep the third and fourth fields blank, if the term does not include a discount option.
Message	This textbox describes the term of payment. ProGAGE ISO generates this automatically.

To create and define a term of payment option based on Standard Days Cycle:

1 Do any of the following:

- On the toolbar, click NEW RECORD button  .
- Choose EDIT > NEW RECORD.
- Press the shortcut key: CTRL+N.

2 Enter Term.

3 Mark Active checkbox.

4 Choose Standard.

5 Enter *<days cycle>* in first field. If discount term is not available, skip Steps 5 and 6.

6 Enter *<discount rate>* in second field.

7 Enter *<number of days>* in the third field.

8 Save the record by doing any of the following:

- On the toolbar, click the SAVE RECORD button  .
- Choose FILE > SAVE RECORD.
- Press the shortcut key: CTRL+S.

To create and define a terms of payment option based on Monthly Cycle:

1 Do any of the following:

- On the toolbar, click NEW RECORD button  .
- Choose EDIT > NEW RECORD.
- Press the shortcut key: CTRL+N.

2 Enter Term.

3 Mark Active checkbox.

4 Choose Date Driven.

5 Enter *<day of the month>* in first field. If discount term is not available, skip Steps 5 and 6.

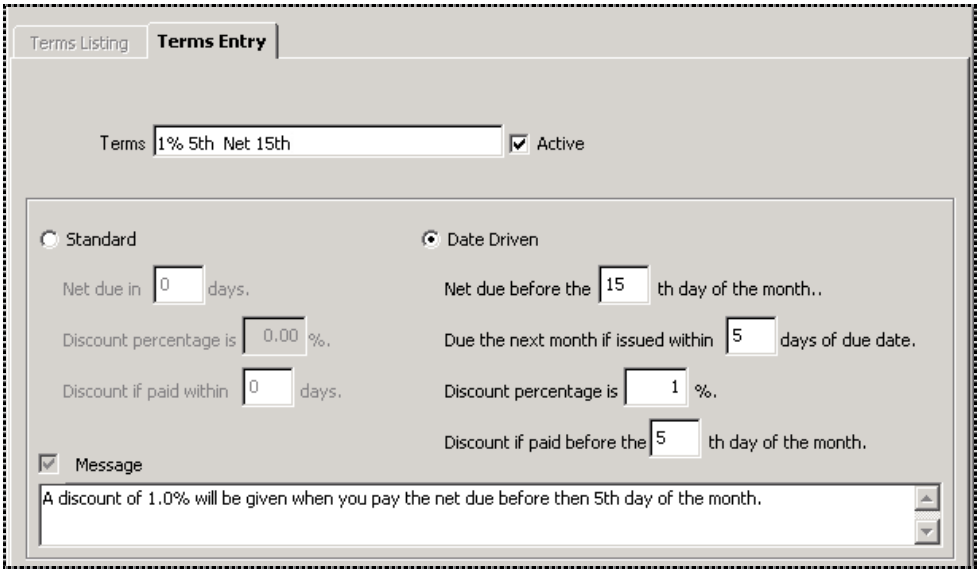
6 Enter *<discount rate>* in third field.

7 Enter *<number of days>* in fourth field.

8 Enter *<number of days>* in second field.

9 Save the record by doing any of the following:

- On the toolbar, click SAVE RECORD button .
- Choose FILE > SAVE RECORD.
- Press the shortcut key: CTRL+S.



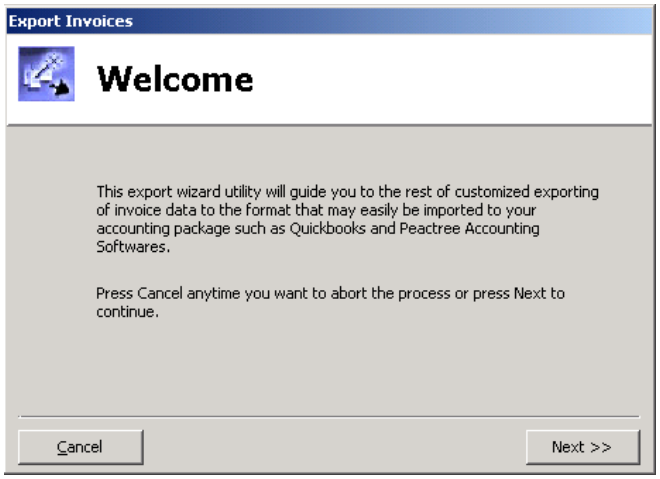
Creating a Date-Driven Terms of Entry Option

Export Invoice Detail

Another new feature embedded in the new Invoice Utility is the Invoice Data Export Wizard. This easy-to-use and convenient feature allows you to export invoice records and related data in a format compatible with accounting packages such as Quickbooks and Peactree Accounting Softwares.

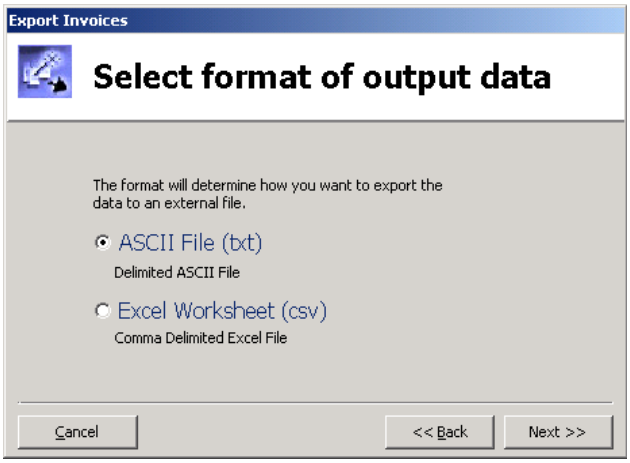
To export invoice data:

1 On the Invoice toolbar, click EXPORT INVOICE DATA TO FILE button . The Export Invoice wizard opens.



2 Click on the NEXT button to continue.

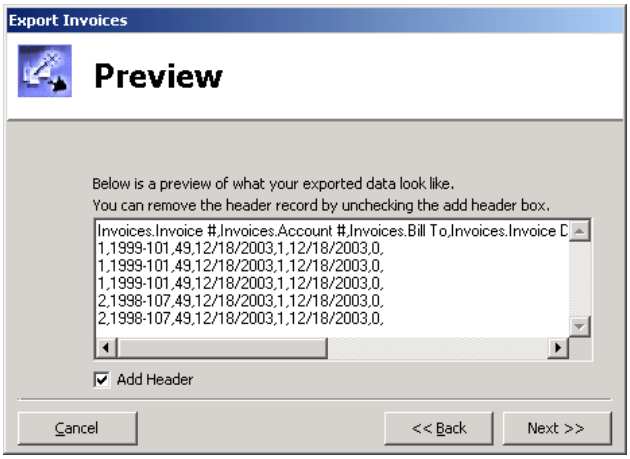
3 Select how you wish to format your invoice data by choosing the appropriate radiobutton; options are: ASCII Text File and Excel Worksheet. If you selected ASCII Text File format, you need to specify the field delimiter for your data. Click NEXT.



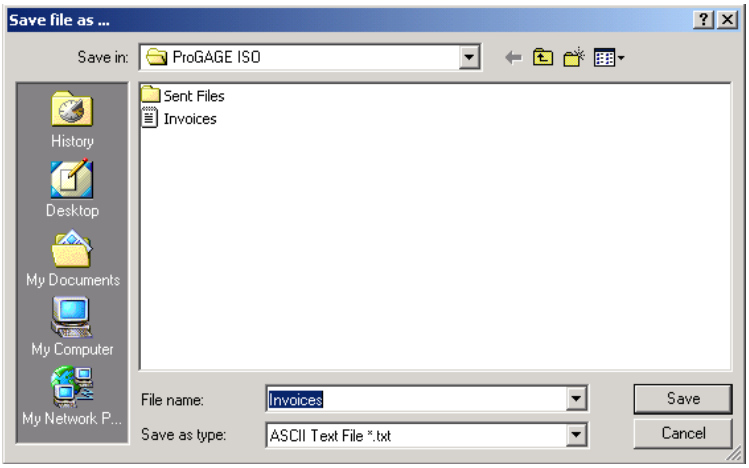
4 Select Table that contains fields you wish to export. Fields contained in chosen table populates the adjacent Available Fields textbox list.

5 Select a field and click on the > button. You may select more than one field; if you want to select all the fields belonging to that table, click >> button.

6 Click the NEXT>> button to preview your exported data. By default, a header is included; unmark Header checkbox to remove header.

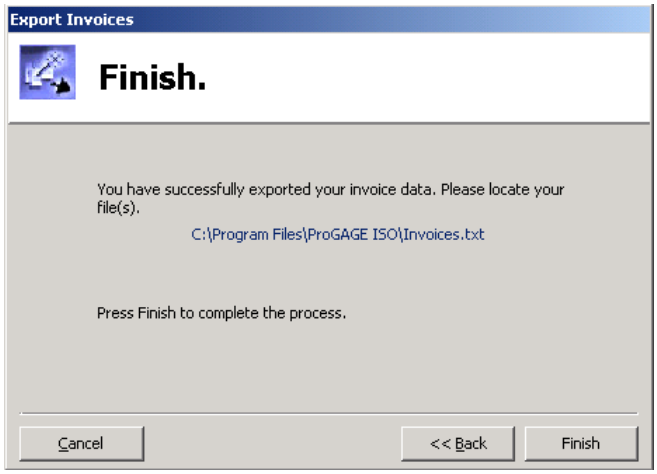


7 Click the NEXT button; The SAVE FILE AS dialog appears.



8 Specify a filename and the directory to where you wish to export your data.

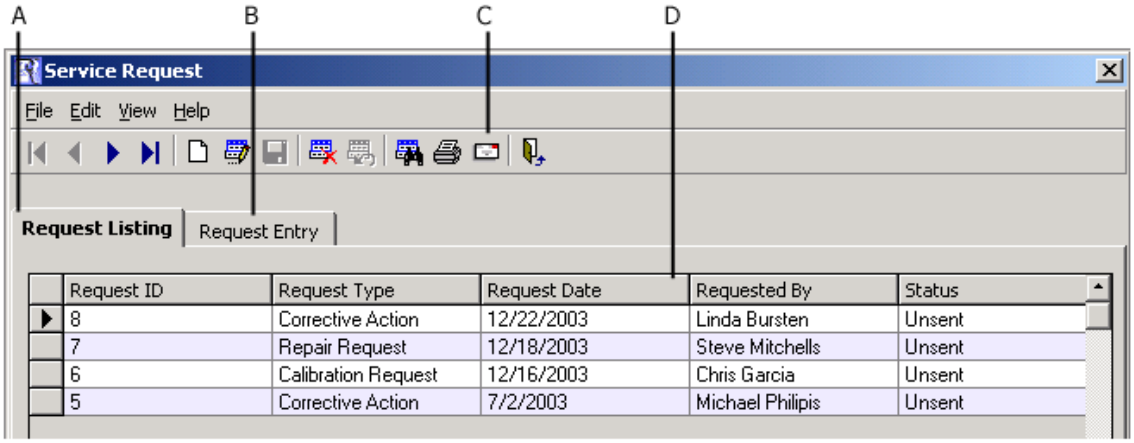
9 Click SAVE button. ProGAGE ISO displays a message informing you of the success of the file transfer.



10 Click FINISH button to terminate wizard.

Chapter 12: Service Request Records

Create and manage comprehensive records of gage-related service requests using the new Service Request Utility. You can create a service request for the following: Calibration Request, Corrective Action, and Repair Request.



About the Service Request Work Area

A. Request Listing tab folder **B.** Request Entry tab Folder **C.** Send button **D.** Records Listing Pane

Request Listing

This contains a Records Listing Pane that lists all of generated service requests records. Details of a particular service request are outlined in the corresponding Request Entry tab folder.

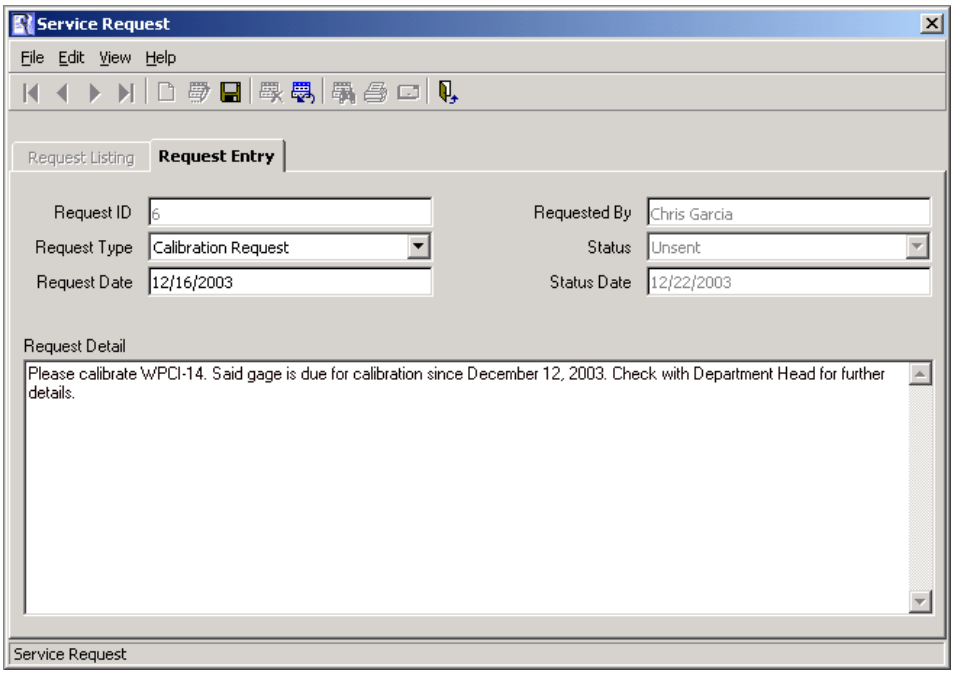
To view details of a service request:

1 Select *<record>* from the Records Listing pane.

2 Click the REQUEST ENTRY tab page.

Request Entry

This tab folder contains the details of a particular service request, including corresponding related information: request ID, the date when request was made, the user who made the request, the status of the request, and when latest status finding was made.



Request Entry Controls

Control	Description
Request ID	Enter in this field a unique identification for the service request following your internal identification scheme. ProGAGE ISO will automatically assign an ID to the service request, if Automatic Numbering feature is enabled. (For details, see Automatic Numbering on page 171).
Request Type	Select service type from drop-down list. Options are: Calibration Request, Corrective Action, and Repair Request.
Request Date	The current system date appears in this field; change date if desired.
Requested By	This field indicates who created the service request. This field becomes editable after the service request report is sent.
Status	This field indicates the status of the of the service request. To update status, open drop-down list and select from following: Unsent (default), Sent, and Close. This field becomes editable after the service request report is sent.
Status date	This field indicates when latest status update is made. The system date appears in this field; edit if necessary. This field becomes editable after the service request report is sent.
Request Detail	Enter details of service request in this textbox.

To create a service request:

1 Do any of the following:

- On the toolbar, click NEW RECORD button .
- Choose EDIT > NEW RECORD.
- Press the shortcut key: CTRL+N.

2 Enter Request ID.

3 Enter Request Type.

4 Change Date, if desired.

5 Save service request by doing any of the following:

- On the toolbar, click SAVE RECORD button  .
- Choose EDIT > SAVE RECORD.
- Press the shortcut key: CTRL+S.

Sending Service Request

Once service request record is created, you can send service request report to concern technician or personnel.

To send service request:

1 Select *<record>* from the Records Listing pane.

2 Click SEND button  . The EMAIL FORMAT dialog opens.

3 Select *<format>*.

4 Click EXPORT.

5 Before sending, check if email address is correct.

The status of the service request changes from Unsent to Sent after service request report is sent.

Closing Service Request record

Requested by, Status, and Status Date can be edited once service request report is sent. You can close a service request record, as long its service request report is already sent to the concerned technician or employee.

To close service request:

1 Select *<record>* from the Records Listing pane.

2 Do any of the following:

- On the toolbar, click EDIT RECORD button  .
- Choose EDIT > NEW RECORD.
- Press the shortcut key: CTRL+T.

3 Open Status, and select Close.

4 Change Status Date, if desired.

5 Save updates by doing any of the following:

- On the toolbar, click SAVE RECORD button  .
- Choose EDIT > SAVE RECORD.
- Press the shortcut key: CTRL+S.

Chapter 13: Gage R&R (MSA 3) Entry

GAGE R&R/MSA STUDIES facilitates the assessment of your measurement system using the statistical test procedures of repeatability, reproducibility, bias, stability and linearity – collectively known as "gage studies". It is based on the techniques ascribed in the AIAG MSA Guide and other industry publications.

Before you perform SPC, capability studies or any other repetitive measurement studies, it is recommended that you use Gage Study Entry to ensure the reliability of your measurement system. Instructions for performing studies on your measurement system are given in this chapter.

This section will only teach you how to operate the software, and should not be construed as an authoritative guide in conducting, analyzing, and interpreting your gage studies. Although this manual describes gage study procedures, these are simply views documented by several respected industry publications used as references for this manual. The software is simply a means for storing data, calculating results, generating and printing reports and charts. It does not and cannot determine whether a measurement system is good or bad, which is your sole responsibility as a user.

> **Important:** The technical support available for this software is limited strictly to the operation of the software. AQS cannot provide advice or support on interpreting results or charts. If you have interpretation questions, please consult your customer, a statistician, or other qualified professionals.

Validating the Software

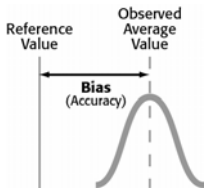
ProGAGE ISO v6 has been tested, validated and deemed suitable for release. Calculations were validated using test data with known results. However, it is suggested that you conduct your own calculations using known results, such as those calculated manually or those with published values. When comparing results with manually-computed figures, you may notice differences in the values due to rounding errors. The software uses up to 15 significant digits of precision in all its computations, rounding off only the final calculations.

Defining the Terms

This section provides a basic explanation of the terminology used in this module.

Bias (Accuracy)

The difference between the observed average of measurements and the reference value is known as bias (often called "accuracy"). The reference value (accepted reference value or master value) serves as an agreed-upon reference for the measured values. You can determine a reference value by using a higher level of measuring equipment (either with layout equipment or in a metrology lab) to average several measurements.



Linearity

Linearity is the difference in the bias (accuracy) values through the gage's estimated operating range.

Precision

The bull's eye target is used to illustrate the following three examples of precision:

Accurate but not precise. Notice that the average of all the readings would be in the center of the target (no bias). A measuring instrument like this would have a significant amount of error.

Precise but not accurate. You can see that the readings are all close to each other, but are biased in the upper right region of the target. Statistically, this amounts to a histogram with a small spread with the average of the measurements differing from the true value.

Precise and accurate. In this—the best condition—the readings are all close to each other and centered.

Repeatability (Equipment Variation)

Gage repeatability is the measurement variation that occurs when one appraiser uses the same gage to measure identical characteristics of the same parts.

Reproducibilty (Appraiser Evaluation)

When different appraisers use the same gage to measure identical characteristics on the same parts, the variation in the average of these measurements is known as gage reproducibility.

Stability

When using a measurement system to evaluate the same characteristic on a master or part over an extended period of time, the total variation in the measurements is known as stability (or drift).

Variation Components

Equipment Variation (EV): The equipment variation is the component of the total study error that the measurement device causes. A worn-out gage or a non-rigid fixture on the gage may contribute to a large EV.

Appraiser Variation (AV): The appraiser variation is the part of the total study error that is caused by the appraiser's measurement method. If the appraiser uses a poor measurement technique or doesn't know how to read the measurement instrument, he/she can cause a large AV.

Part Variation (PV): The part variation is the part of the total study error that is due to the parts being measured.

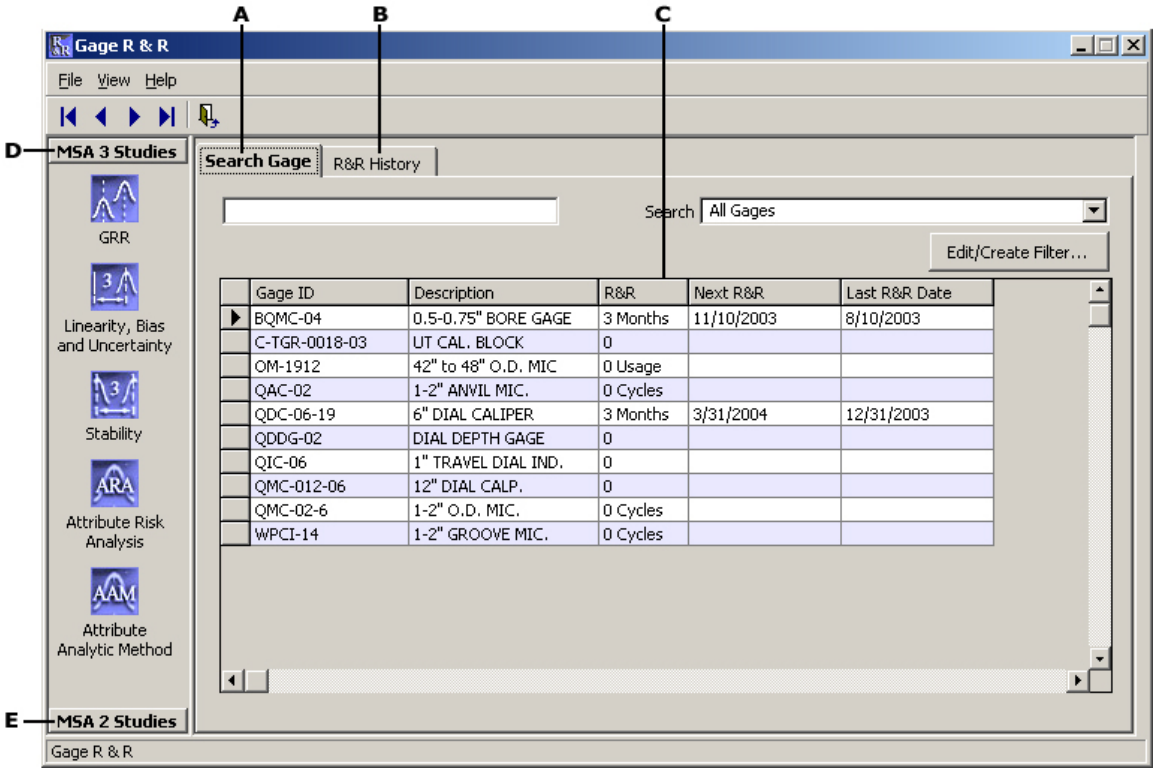
Total Variation (TV): The total variation is the sum of the equipment variation, appraiser variation, and the part variation. In general, the TV should be less than 10% of the total tolerance. If the TV is within 20% to 30%, try to decrease it by using cost-effective methods, such as training, to decrease the error. Beyond 30% TV, you should work to correct the measurement error. A TV larger than 30% causes problems because it might cause you to judge good parts unacceptable and mistakenly accept bad parts.

Interaction (INT): Interaction is short for Appraiser × Part Interaction, used when you want to refer to it by initials.

Gage Repeatability and Reproducibility (GRR): Gage Repeatability and Reproducibility is the RSS (root-sum-square) sum of the equipment variation, appraiser variation, and interaction. Usually referred to as GRR, GR&R, or Gage R&R.

Accessing Gage R&R

Click on the R&R icon from the Main Menu to display the two groups of studies: MSA 2 and MSA 3. The display automatically defaults to MSA 3, which includes 5 study types: GRR; Linearity, Bias, and Uncertainty; Stability; Attribute Risk Analysis; and Attribute Analysis Method. These studies will be discussed in detail in the succeeding pages.



Gage R&R screen

A. Search Gage tab **B.** R&R History tab **C.** Records Listing pane **D.** MSA 3 Studies **E.** MSA 2 Studies

The old MSA 2 studies are still incorporated in ProGAGE ISO. To access these studies, click on the *MSA2 Studies* button from the Gage R&R bar menu. Similarly, there are 5 different studies you can perform on a gage to assess statistical repeatability and reproducibility of measurements; these are: AIAG, ANOVA, Linearity, Stability and Short Attribute.

Search Gage

This tab contains a Records Listing pane that lists all of your gages and their corresponding information on R& R frequency, schedule of next R&R, and when latest R&R study was conducted. The history of R&R studies conducted for a particular gage is outlined in the corresponding R&R HISTORY tab folder.

To view history of R&R studies:

1 Select *<record>* from Records Listing pane.

2 Click the R&R HISTORY tab.

R&R History

This tab folder provides a listing of all the studies performed on a particular gage. Each study record is accompanied by descriptions on the type of study, when the study was performed, part number, brief descriptions of results, as well as comments. A set of fields—Gage ID, Description, R&R Frequency, the R&R Last Date and the Next R&R—identify the gage and is automatically filled up by ProGAGE ISO based from entries in other modules.

MSA 3 Studies

To create a new MSA 3 record, do any of the following:

- Select desired study from the MSA 3 menu list bar.
- From the R&R History Records Listing pane, open the right-click context menu, and select NEW STUDY SUMMARY > MSA VERSION 3 followed by the *<study type>.*

GRR Module

Analysis of Variance (ANOVA)

This method gives the most information when conducting your study. If GRR % of TV is unsatisfactory, you can review EV, AV, INT, and PV and determine what should be done. This method is usually conducted with two or three Trials and two or three Appraisers, and 10 parts.

Range Method (Short Method)

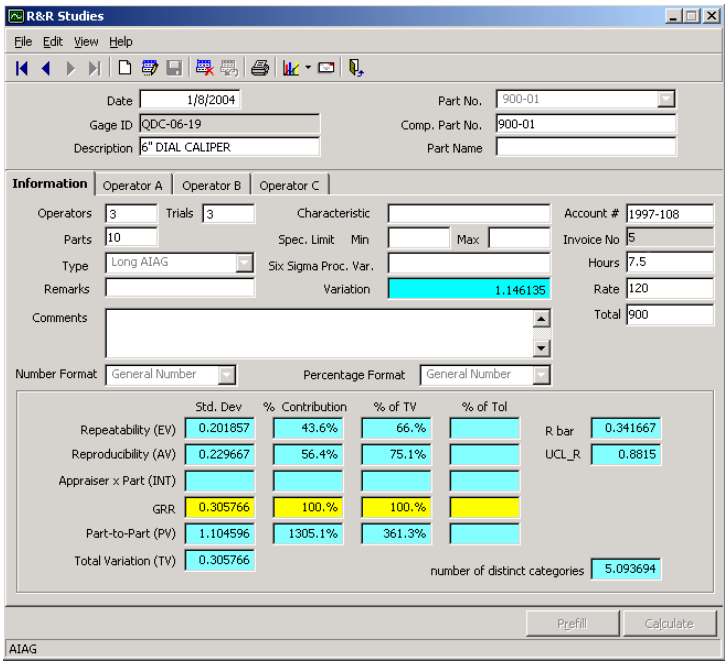
The Range method (also called the "Short" method) offers a quick estimate of measurement variability. It provides an overall picture of the measurement system, but it doesn't break down the variability into repeatability and reproducibility.

It typically uses two appraisers and five parts—although you can use more parts. Both appraisers measure each part once. The range for each part is the absolute difference between the measurement obtained by Appraiser A and the measurement obtained by Appraiser B. Next, find the sum of the ranges, then calculate the average range ($\overline{R}$). To find the total measurement variability, multiply the average range by $5.15/d_2^*$. You should also calculate what percentage of the process variation (or tolerance) the measurement variation consumes. To convert the R&R to a percentage, multiply by 100 and divide by the process variation (or tolerance).

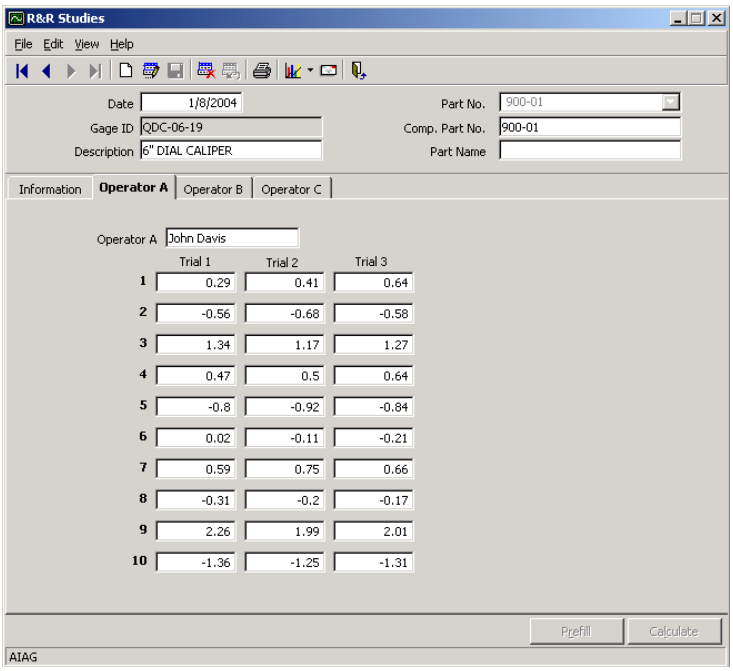
Note: The formula for d_2^* is based on the number of appraisers and parts used in the study.

Average and Range Method (Long AIAG)

The Average and Range method helps you pinpoint the reasons for measurement system error. In contrast to the Range method, it allows you to break down the measurement system into repeatability and reproducibility.



When you are ready to start entering your R&R measurements, click the tab for OPERATOR A and enter the appraiser's name in the Operator A area. Next, click your cursor in the first cell for Trial 1. After you enter the measurement, click the TAB or ENTER key and the next cell will be activated. Follow the same procedure for Operators B and C.



Average and Range Study Controls

Control	Description
Date	Date the study was made (defaults to the current date).
Gage ID	Identifies the selected gage. This field is non-editable.
Description	The name of the gage or measurement device.
Part No.	Related part number, such as the customer or supplier part number.
Part Name	The description or name of the part.
Operators	Number of Operators (either 2 or 3).
Trials	Enter the number of measurement tests that each operator performed (maximum of 3 per operator).
Parts	Select a related part number, such as the customer or supplier part number.
Type	Select the type of study (Long, or Short, or ANOVA).
Remarks	Enter any remark.
Characteristic	Enter the characteristic that you're evaluating in the study.
Spec Limit (Min and Max)	Enter the minimum and maximum Specification Limit values, otherwise, the software can't calculate the %tolerance values for your study.
Six Sigma Proc Var	If you know the 6-Sigma Process Variation of the characteristic that you're measuring, enter it here. This causes the program to use this value instead of estimating part variation from your sample of study parts. If you know the standard deviation of the characteristic (from SPC or Capability studies), multiply it by six and enter the result in this field.
Comments	Enter any comments/note that you wish to record.
Number Format	Choose from the drop-down list on how you want the numbers report formatted.
Percentage Format	Choose from the drop-down list on how you want the percentage report formatted.
Account #	The tracking number associated with the calibration cost, such as job, purchase order, invoice, customer, or department number.

Control	Description
Invoice No	Indicates the Invoice Number associated with the calibration cost. This field is automatically populated up by ProGAGE ISO if you activated the Generate Invoice option in the Settings Utility. (See "Chapter 2: Program Settings" on page 161 of the System Administrator's Guide.)
Hours	Enter the number of hours spent on the study.
Rate	Enter the hourly labor rate.
Total	This field indicates the total labor rate.
Prefill	If most of your measurements begin with the same numbers (such as 1.1651, 1.1650, and 1.1658), you can save time by prefilling the measurements with those digits. In this case, click the Prefill button, then enter a prefill value of 1.165. Now you need to enter only the last digit of each measurement. Before using *Prefill*, enter the number of trials and appraisers for the study.
Calculate	Click this button to calculate EV, AV, PV, TV, RR,%Tols, %TV, R Bar, UCL-R values.

Note: Since all measurements must be eight digits or less, you might need to code the data to fit it into the measurement fields. For example, suppose the actual measurements consist of 2223.11221, 2223.12373, and 2223.10312, with a drawing specification of 2223.10 +/- .05. The measurements exceed the eight-digit limit, so you must code them. To code the data, use only the last eight digits of the measurements. For 2223.11221, the coded measurement would be 23.11221. Coding the specifications results in 23.10 +/- .05 (USL = 23.15 and LSL= 23.05). The resulting percentage values calculated for the study (%R&R, %EV, and %AV) will still be correct.

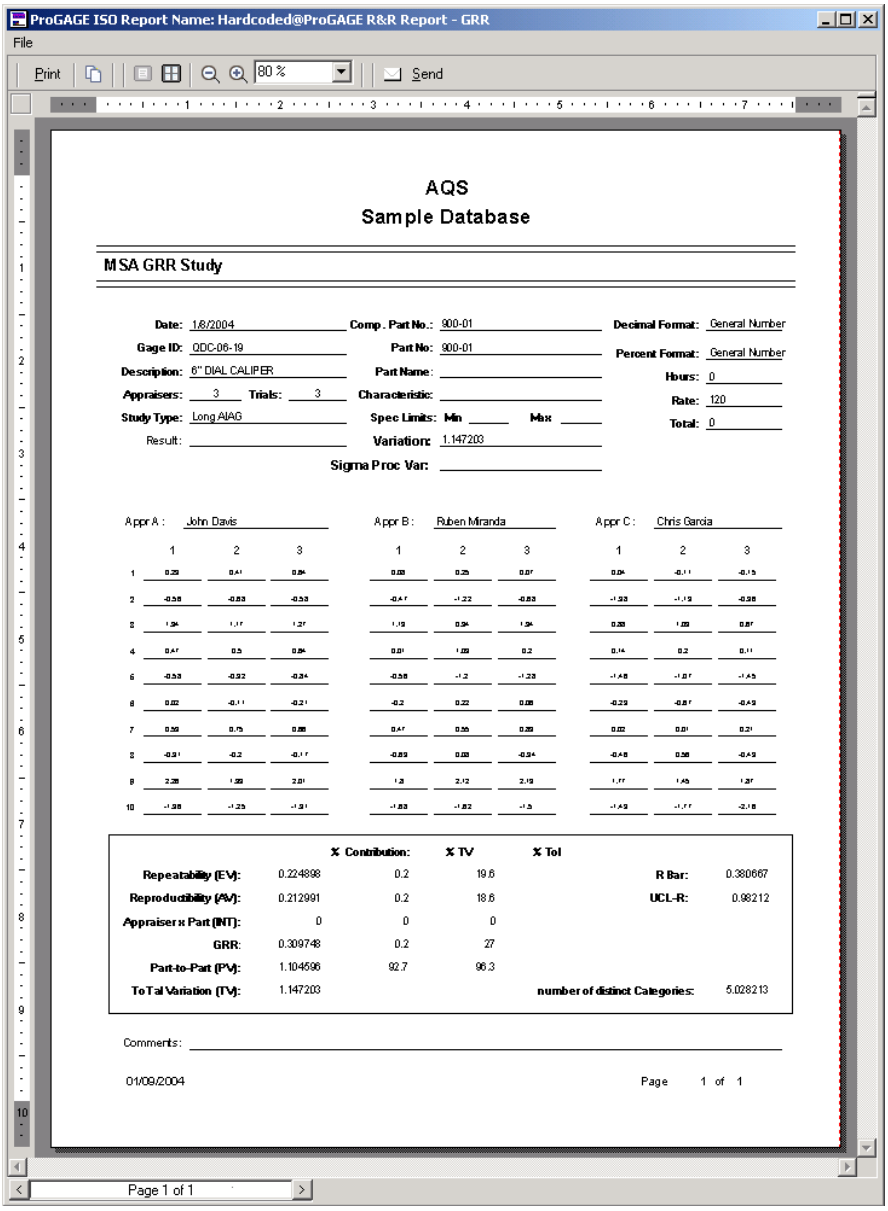
The program calculates these fields when you click the Calc button:

Field Name	Description
EV	Equipment variation (Repeatability).
% Tol	Percent of tolerance consumed by EV.
% TV	Percent of total variation that EV contributes.
AV	Appraiser variation (Reproducibility).
% Tol	Percent of tolerance consumed by AV.
% TV	Percent of total variation that AV contributes.
PV	Part Variation—the portion of variation contributed by the parts.
% Tol	Percent of tolerance consumed by PV.
%TV	Percent of total variation that PV contributes.
TV	Total variation resulting from both gage variation and part variation.
R-bar ($\bar{R}$)	The overall average range value.
UCL-R	The upper control limit for ranges. Any trial that have a range value that exceeds the Upper Control Limit for Ranges (UCL-R) will be marked with a red flag, as shown below. You should review these values to see if there has been a typing error—a common cause for out-of-control range values.
GRR	Overall gage R&R variation.
% Tol	Percent of tolerance consumed by R&R.
% TV	Percent of total variation that R&R contributes.
Variation	Similar to Total Variation.
Number of Distinct Categories	Indicates the number of distinct categories that can be reliably distinguished by the measurement system.

Printing the Study

To print the study:

1 Click the PRINT RECORD button. PRINT PREVIEW window opens.



You can now zoom in and zoom out the printing document, and inspect all the pages by clicking on the PAGE UP and PAGE DOWN buttons on the toolbar.

2 Click PRINT button.

Average and Range Method Interpretation

To interpret an Average and Range method study, look at the percentage of the part tolerance that measurement system error consumes or the percentage of total variation that's due to measurement system error.

As with the Range method study, no strict rules exist for determining what percentage amount you should consider acceptable or unacceptable. Generally, manufacturers accept the guidelines below (percentages expressed as a percent of the total variation or as a percent of part tolerance).

If the R&R percentage is:

- under 10%–the measurement system is acceptable.
- between 10% and 30%–depending on costs, criticality of use, and other factors, you might need to perform further analysis to find the source of the measurement system error.
- over 30%–the measurement system needs improvement; you should perform additional studies to find the source of the error.

If the error component of the reproducibility is large (perhaps twice as much as the repeatability), you might reduce error by training the appraisers on using and reading the gage and ensuring the gage face or readout is legible to the appraisers.

If the error component of repeatability is large (perhaps twice as much as the reproducibility), you might reduce gaging error by cleaning and repairing the gage (such as sticking parts) and/or redesigning the gage and fixture to be more rigid.

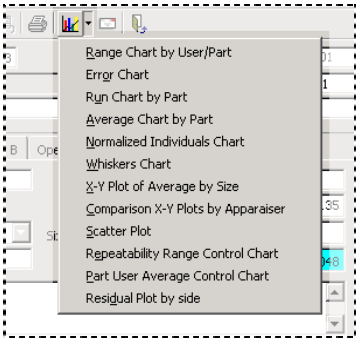
Generating Charts

The R&R module offers an extensive variety of charts to help you determine the causes of measurement error.

To generate a chart from your Average and Range method study,

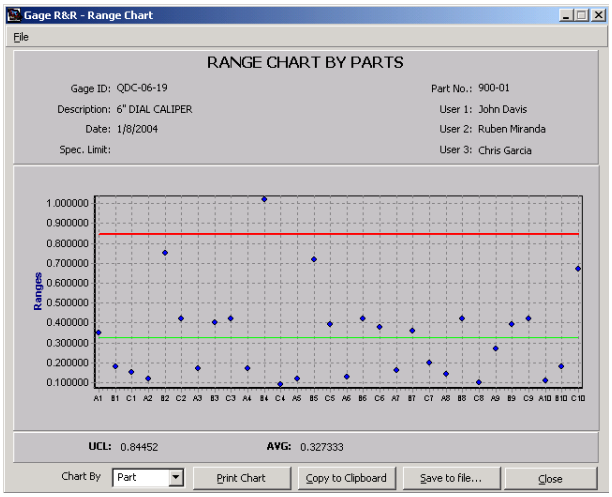
1 Click the Charts drop-down menu,

2 Select from the available charts menu.



Range Chart by Appraiser/Part (and by Part/Appraiser)

Using a standard range chart, this chart plots the ranges of each appraiser's readings, including the average range and control limits. You can choose to plot the data grouped by part or grouped by appraiser.



Range Chart by Parts

The Range chart can help you determine both statistical control with regards to repeatability and consistency of the measurement process among appraisers for each part. You won't see lines connecting the range data points because this data is not ordered. Neither chart should show patterns in the data relative to the appraisers or parts. You can determine stability by a point or points outside the control limit, within appraiser or within part patterns.

Error Chart

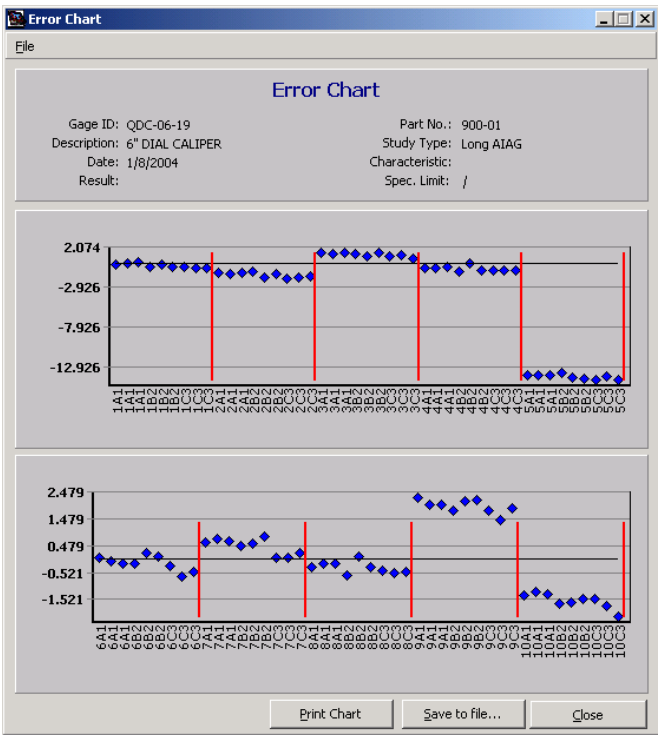
The Error chart shows the individual deviations from the accepted reference values. PROGAGE ISO calculates the individual deviation or error for each part according to the following formula:

- Error = Observed Value – Reference Value, or
- Error = Observed Value – Average Measurement of the Part

Before you do any other statistical analysis, you should thoroughly screen the deviations for clear causes of variations that you can ascribe to specific factors.

Look for any uniform patterns in your Error chart, including the following:

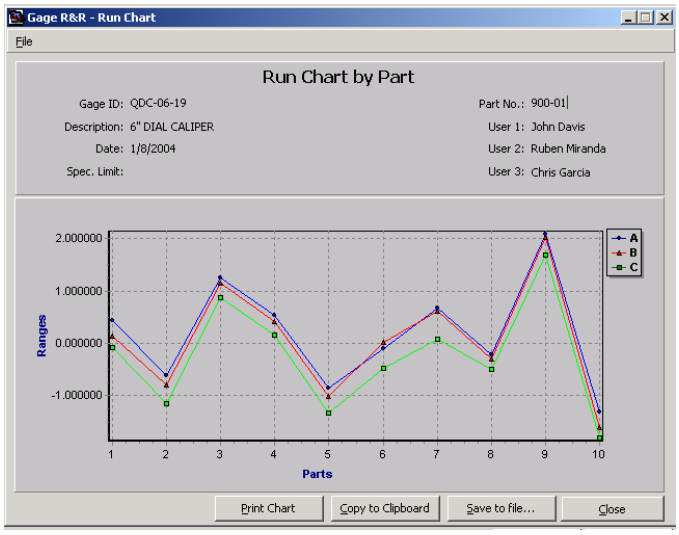
- one appraiser's second (or third) set of readings is consistently higher than his first;
- one appraiser's average is higher than the other appraisers' averages;
- and/or one part standing out as more difficult to measure consistently.



Error Chart

Run Chart by Part

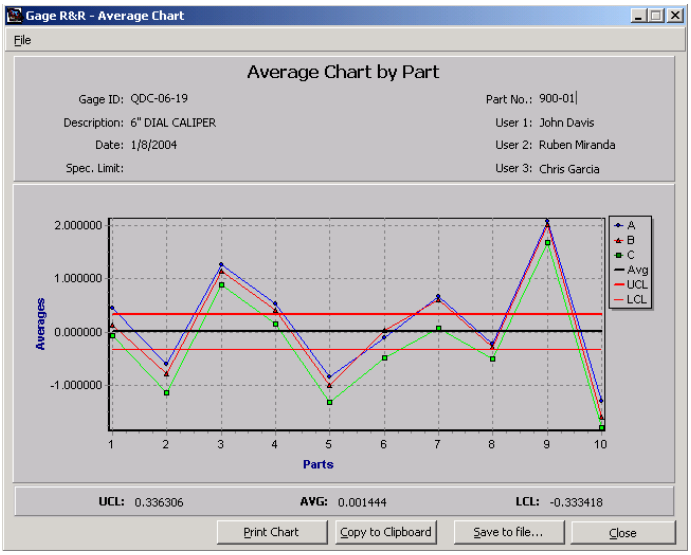
This chart plots the averages of each appraiser's various readings, using part number as an index. The Run chart can help you determine the consistency among appraisers.



Run Chart by Part

Average Chart by Part

The Average chart is much like the RUN chart, except that it also calculates the overall average and control limits. From this chart, you can determine the measurement system's acceptability.

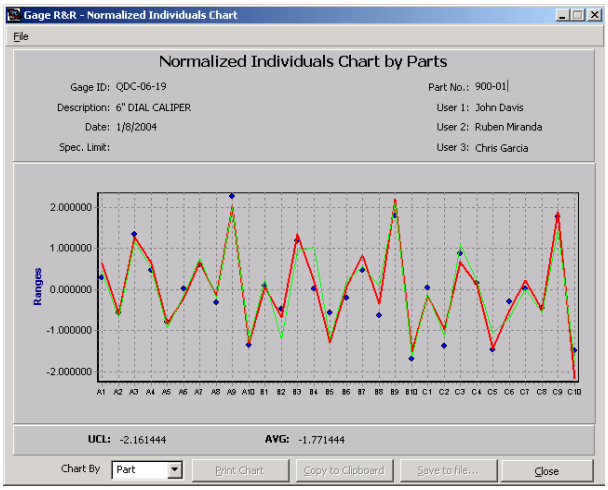


Average Chart by Part

The measurement discrimination, or noise, is represented by the area within the control limits. If the group of parts used in the study represents the process variation, about half or more of the averages should be outside the control limits. If the chart shows this pattern, then the measurement system should be able to reveal part-to-part variation; it can also provide useful information for analyzing and controlling the process. If less than half the averages are outside the control limits, it might be because the measurement system isn't able to thoroughly distinguish differences, or because the part sample doesn't represent the expected process variation.

Normalized Individuals Chart (by Part/Appraiser and by Appraiser/Part)

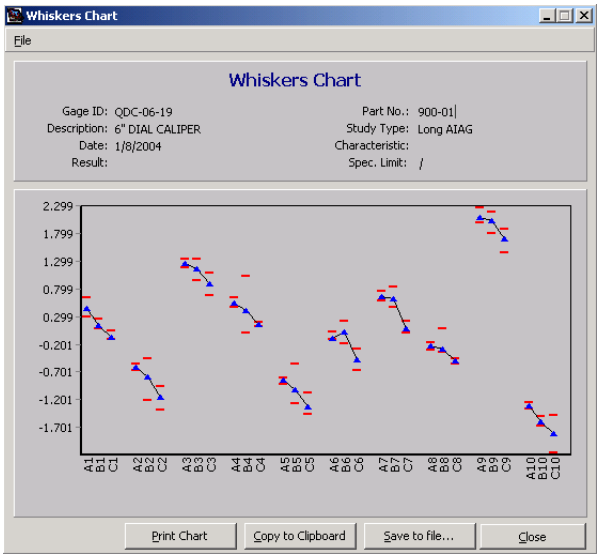
In this chart, the plotted data consists of the individual readings minus the overall average of the readings. The normalized data is plotted and grouped by appraiser or part number. This chart can help you determine reproducibility, consistency among appraisers, occurrences of abnormal readings, and the interaction between the parts and appraisers.



Normalized Individuals Chart by Parts

Whiskers Chart

The Whiskers chart plots and connects the high and low data values and the average by part by appraiser. This chart helps you see consistency among appraisers, occurrences of abnormal readings, and the interaction between the parts and the appraisers.



Whiskers Chart

X–Y Plot of Averages by Size

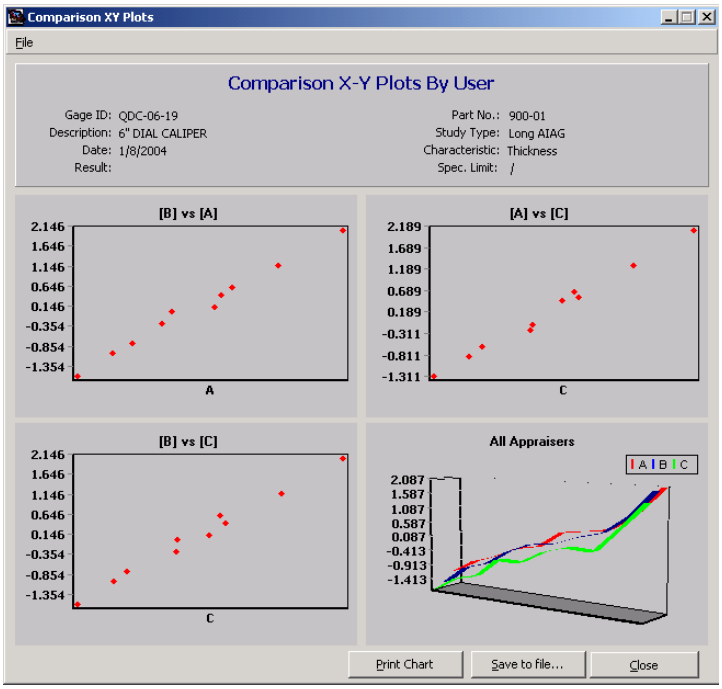
This chart plots the averages of each appraiser's various readings for each part, using the reference value (or overall part average, if you do not enter a reference value) as the index. This plot can help you determine linearity (if you use the reference value), and the consistency in linearity between appraisers.

XY Plot of Average by Size

Comparison X–Y Plots

In a COMPARISON X–Y PLOT, the averages of each appraiser's readings on each part are plotted against each other, using appraiser as an index. This plot compares one

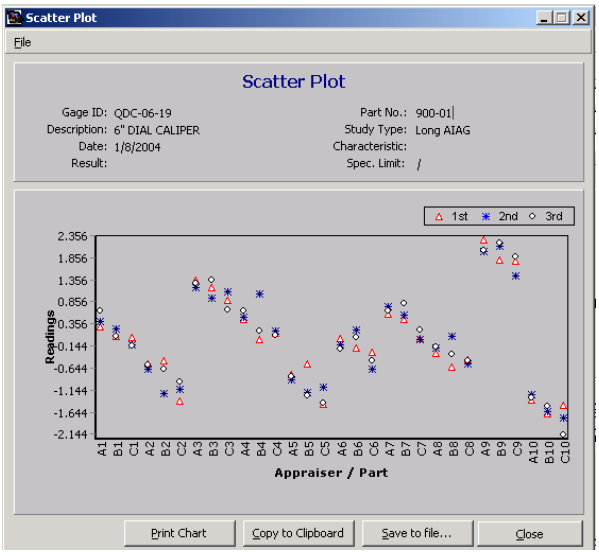
appraiser's readings to those of another appraiser. If the appraisers' readings match perfectly, the plotted points will form a straight line that is oriented 45 degrees to the axis.



Comparison X-Y Plots by User

Scatter Plot

The Scatter Plot charts individual readings by part by appraiser to help you determine the consistency between appraisers, occurrences of abnormal readings (outliers), and the interaction between the parts and appraisers.



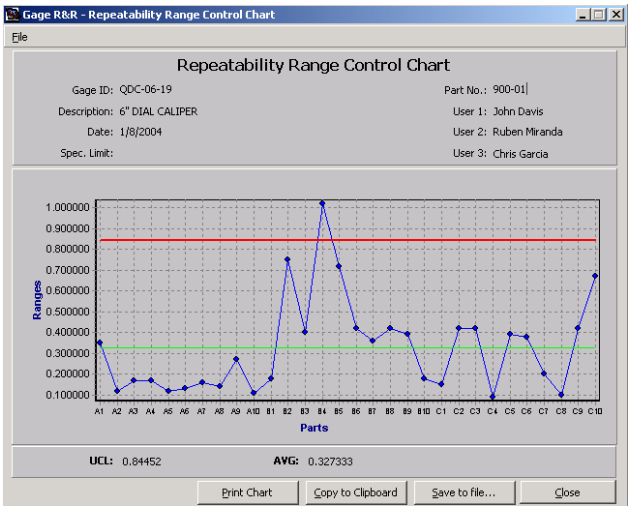
XY Plot of Average by Size

Repeatability Range Control Chart

This chart plots the ranges of the readings by each appraiser, for every part, including the average range and control limits. The data is grouped in terms of appraiser, and lines connect points for each appraiser.

The Range Control chart shouldn't show data patterns relative to the appraisers or have any out-of-control points. An in-control Range Control chart is a sign that the appraisers are consistent and use the gage in the same way.

With the Range Control chart, you can determine consistency of the measurement process among appraisers for each part and statistical control with regards to repeatability.

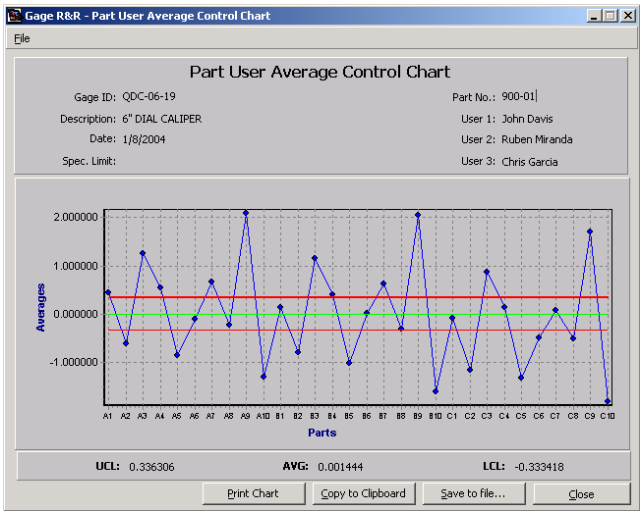


Repeatability Range Control Chart

Part User Average Control Chart

Using a standard average chart, the averages of each appraiser's readings for each part are plotted, including the overall average and control limits. The data is grouped in terms of appraiser with lines connecting each appraiser's points.

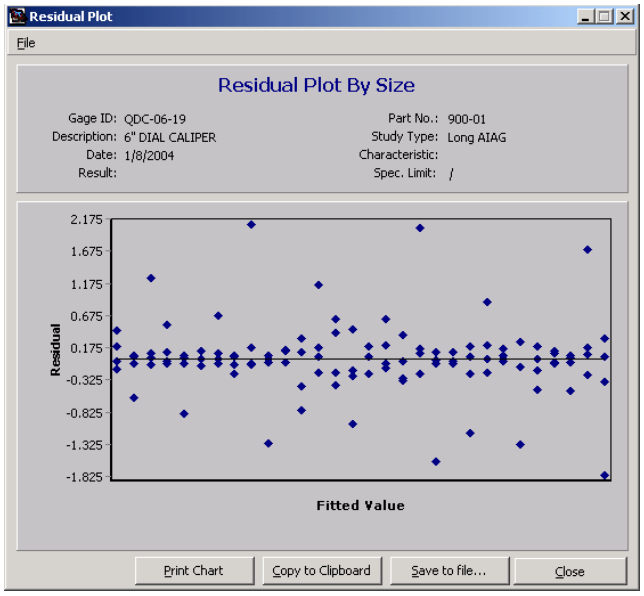
If half or more of the points are outside of the control limits, then the measurement system should be able to detect *part-to-part* variation. If less than half of the points are outside the control limits, it might be because the measurement system isn't able to thoroughly distinguish differences or because the part sample doesn't represent the expected process variation.



Repeatability Range Control Chart

Residual Plot By Size

The Residual Plot By Size chart checks whether the gage error is a random variable from a normal distribution. The residuals, which are the differences between the observed readings, are plotted against the fitted values, which are the average of the repeated readings for each appraiser for each part. If the residuals are not randomly scattered above and below the horizontal reference line, it might be because the gage error is NOT a random variable; further investigation of the data is suggested.



Residual Plot by Size

Average and Range Formulas

Range (Short Form) Method

Values of d_2^*

Parts	1	2	3	4	5	6	7	8	9	10
2 Appr's	1.41	1.28	1.23	1.21	1.19	1.18	1.17	1.17	1.16	1.16
3 Appr's	1.91	1.81	1.77	1.75	1.74	1.73	1.73	1.72	1.72	1.72

EV = Not calculated

AV = Not calculated

R&R = $5.15 \div d_2^* \times \bar{R}$

% R&R = $(100 \times R\&R) \div TOL$

or

%R&R = $(100 \times R\&R) \div PV$

where PV is the Process Variation

Note: When calculating R&R, the Short Form Ford method uses 6.00 instead of 5.15: $6.00 \div d_2^* \times \bar{R}$.

AIAG Average and Range Method (Long Form)

Equipment Variation (EV)—Repeatability

Trials	2	3
K_1	4.56	3.05

$EV = \bar{R} \times K_1$

$\%EV = 100 \times (EV \div TV)$

or, if comparing to tolerance:

$\%EV = 100 \times (EV \div Tolerance)$

Appraiser Variation (AV)—Reproducibility

Appr's	2	3
K_2	3.65	2.70

$AV = \sqrt{\left[(\bar{X}_{diff} \times K_2)^2 - (EV^2 \div n \times r)\right]}$

where n = # of parts, r = # of trials

Note: If a negative value results under the square root, the AV is reported as "0".

$\%AV = 100 \times (AV \div TV)$

or, if comparing to tolerance:

$\%AV = 100 \times (AV \div Tolerance)$

Repeatability & Reproducibility (R&R)

$R\&R = \sqrt{(EV^2 + AV^2)}$

$\%R\&R = 100 \times (R\&R \div TV)$

or, if comparing to tolerance:

$\%R\&R = 100 \times (R\&R \div Tolerance)$

Part Variation (PV)

Parts	2	3	4	5	6	7	8	9	10
K_3	3.65	2.70	2.30	2.08	1.93	1.82	1.74	1.67	1.62

$$PV = R_p \times K_3$$

$$R_p = \text{Max}\,\bar{X}_p - \text{Min}\,\bar{X}_p$$

$\bar{X}_p$ values are the averages of each measured part

Note: If you know the 6-Sigma Process Variation (from SPC or Capability studies), enter it into the *Proc. Var.* field.

If entered into the Gage R&R Study form, the software will calculate TV as:

$$TV = 5.15(6 - \text{SigmaProc.Var.} \div 6)$$

and calculate PV as:

$$PV = \sqrt{(TV^2 - R\&R^2)}$$

Total Variation (TV)

$$TV = \sqrt{R\&R^2 + PV^2}$$

General Motors and Chrysler Long Form Method

Equipment Variation (EV)—Repeatability

Trials	2	3
K_1	4.56	3.05

$$EV = \bar{R} \times K_1$$

$$\%EV = EV \div TOL$$

Appraiser Variation (AV)—Reproducibility

Appr's	2	3
K_2	3.65	2.70

$$AV = \sqrt{(\bar{X}_{DIFF} \times K_2)^2 - (EV^2/nr)}$$

where n = # of parts, r = # of trials

Note: If a negative value results under the square root, the AV is reported as "0".

$$\%AV = (100 \times AV) \div TOL$$

Repeatability & Reproducibility (R&R)

$$R\&R = \sqrt{(EV^2 + AV^2)}$$

$$\%R\&R = (100 \times R\&R) \div TOL$$

Ford Long Form Method

Equipment Variation (EV)—Repeatability

Appr's	2	3
K1	4.56	3.05

$$EV = \bar{R} \times K_1$$

$$\%EV = 100 \times EV^2 \div R\&R \times TOL$$

Appraiser Variation (AV)—Reproducibility

Appr's	2	3
K_2	3.65	2.70

$$AV = \sqrt{\left(\bar{X}_{DIFF} \times K_2\right)^2 - \left(EV^2/nr\right)}$$

$$\%AV = 100 \times AV^2 \div R\&R \times TOL$$

Repeatability & Reproducibility (R&R)

$$R\&R = \sqrt{(EV^2 + AV^2)}$$

$$\%R\&R = \%EV + \%AV$$

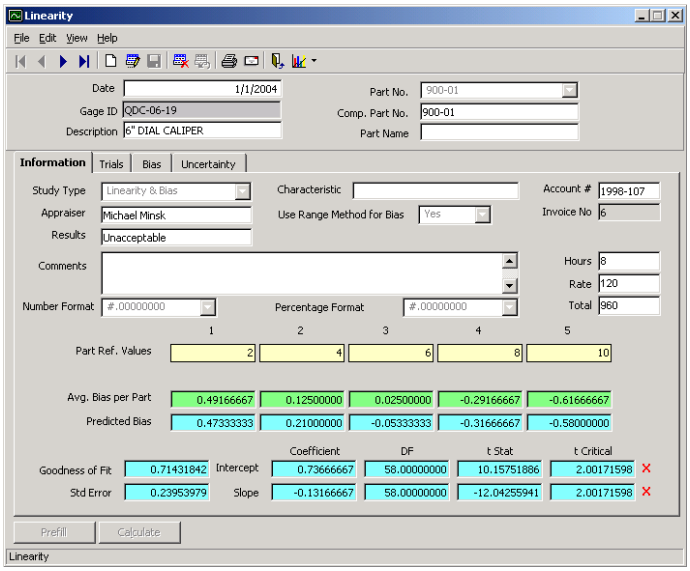
Linearity Study

Linearity expresses the correlation of multiple and independent bias errors over the operating range.

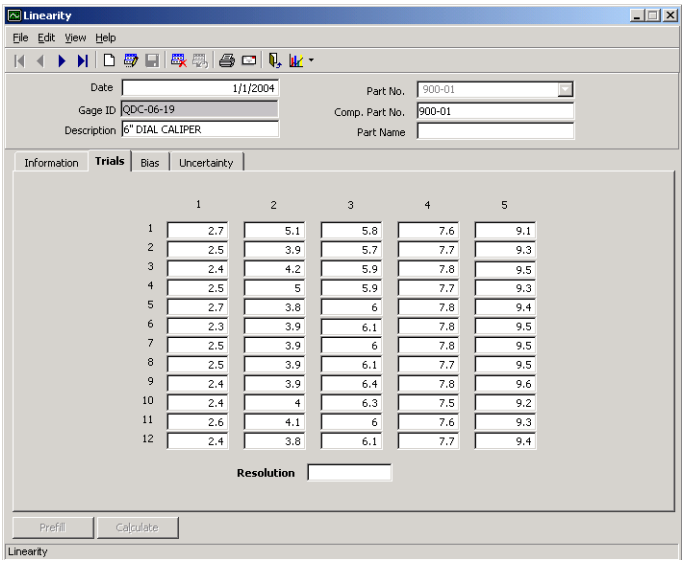
To determine linearity, choose parts throughout the gage's operating range. The difference between the reference value and the observed average measurement of a particular part is the part's bias. The slope of the regression line that best fits the bias average versus reference values, multiplied by the process variation (or the tolerance) of the parts, is an index that can represent the linearity of the gage. To convert gage linearity to a percentage of process variation (or tolerance), multiply by 100 and divide by the process variation (or the tolerance). As with stability, the recommended analysis technique is graphical–a scatter diagram with a best-fit line.

You can use tool room or layout inspection equipment to determine the reference values of the parts. The software then calculates the bias. The linearity graph plots biases and reference values throughout the operating range. If the graph shows that a straight line could represent the plotted points, then a best-fit linear regression line between biases and reference values represents the linearity between the two parameters.

Entering Linearity Study Record



Enter the five part sizes in the yellow part reference area. The smallest part size should be entered in #1 and the largest part size entered in #5. Click the TRIALS tab to begin entering the part measurements for each size part. Start with Part 1. Click the TAB or ENTER key to advance to the next measurement for Part 1 until all 12 measurements have been recorded or encoded. Follow the same procedure for the rest of the part measurements.



Linearity Study controls

Control	Description
Date	Enter when the study was made (defaults to the current date).
Gage ID	This identifies the selected gage. This field is non-editable.
Description	The name of the gage or measurement device.

Control	Description
Part No.	Related part number, such as the customer or supplier part number.
Comp. Part No.	Enter Company Part Number.
Part Name	The description or name of the part.
Study Type	Select the type of study (Linearity and Bias, or Bias only).
Appraiser	Enter the name of the Appraiser.
Results	Enter the result of the Study.
Comments	Enter any comment, note, or remark.
Characteristic	Enter the characteristic that you're evaluating in the study.
Use Range Method for Bias	Select *Yes* to use the range method in computing for Bias, or *No* to not.
Number Format	Indicates the number of decimal places used in reporting results.
Percentage Format	Indicates the format of decimal places used in reporting percentage results.
Account #	The tracking number associated with the calibration cost, such as job, purchase order, invoice, customer, or department number.
Invoice No	This indicates the Invoice Number associated with the calibration cost. This field is automatically filled up by ProGAGE ISO if you activated the Generate Invoice option in the Settings Utility. (See "Chapter 2: Program Settings" on page 161 of the System Administrator's Guide.)
Hours	Enter number of hours spent on the study.
Rate	Enter hourly labor rate.
Total	This indicates total labor rate.
Prefill	If most of your measurements begin with the same numbers (such as 1.1651, 1.1650, and 1.1658), you can save time by prefilling the measurements with those digits. In this case, click the Prefill button, then enter a prefill value of 1.165. Now you need to enter only the last digit of each measurement. Before using *Prefill*, enter the number of trials and appraisers for the study.
Calculate	Click this button to calculate analytic values.

Linearity Analysis Fields

Field Name	Description
Average Bias per Part	Average bias of measurements for a particular field.
Predicted Bias	Predicted bias of measurements for a particular field.
Goodness of Fit (R^2)	The value that represents how well the regression line fits the data points (the closer this value is to 1, the better the fit is).
Std Error	Standard Error.
Intercept	Intercept (Graphical analysis of result).
Coefficient	Coefficient of the intercept.
DF	Degrees of Freedom of the Intercept (*gm*-2).
T Stat	*t*-statistic for the intercept.
T Critical	Critical Value of the intercept at α=.05, gm-2, and a proportion of 0.975.
Slope	Slope value of the regression line for the plotted data (a slope of zero is best when plotting bias versus reference values).
Coefficient	Coefficient of the slope.
DF	Degrees of Freedom of the Intercept (*gm*-2).
T Stat	*t*-statistic for the slope.
T Critical	Critical Value of the slope at α=.05, gm-2, and a proportion of 0.975.

You must click the CALC button to calculate the following:

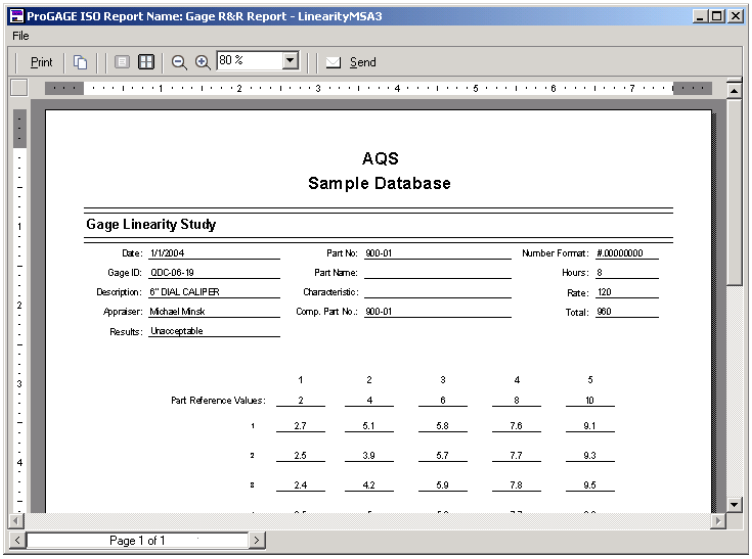
Part Bias, Average and Range Fields

Field Name	Description
Avg. Bias	Average measured value of the reference part.
Std. Error	Standard error of mean.
LSL	Lower 95% confidence bound of the bias.
USL	Upper 95% confidence bound of the bias.
DF	Degrees of Freedom.
Std. Dev	Repeatability Standard Deviation.

Printing the Linearity Study

To print Linearity study:

1 Click the PRINT RECORD button. The PRINT PREVIEW window opens.

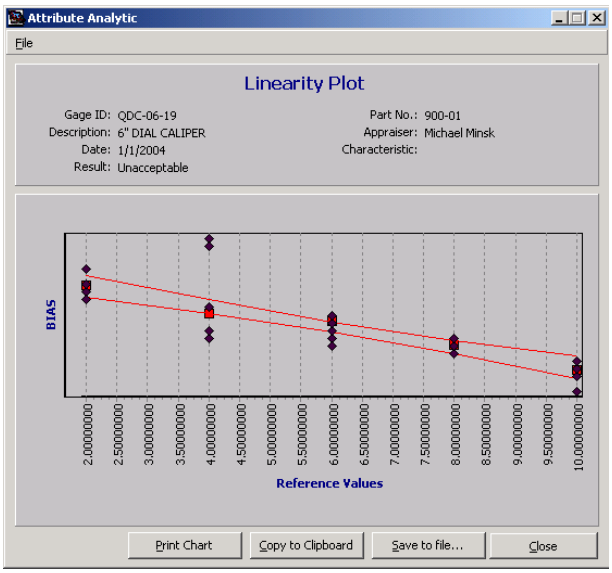


You can zoom in and out the printing document, and inspect all the pages by clicking on the PAGE UP and PAGE DOWN buttons on the toolbar.

2 Click PRINT button.

Linearity Chart

To generate a Linearity chart, click on the CHART button. You'll see a plot chart of the Bias versus Reference Value for each point, as well as a best-fit linear regression line.



Linearity Plot

To print chart:

1 Click the PRINT CHART button. The PRINT dialog opens.

2 Set the printing specifications.

3 Click on the PRINT button.

Linearity Study Interpretation

The Goodness of Fit value (R^2) of the linear regression line determines whether the biases and reference values have a good linear relationship. This value is a number between zero and one; the closer it is to one, the better the linear relationship is.

You can also evaluate Goodness of Fit by looking at the chart. If the fit is adequate then apply three criteria:

- The horizontal zero bias line on the chart should fit within the confidence limits.
- The absolute value of the *t*-Statistic for Slope should not be larger than *t* Critical.
- The absolute value of the *t*-Statistic for Intercept should not be larger than *t* Critical.

If the regression line does not fit well, do not apply the above criteria. Study the chart for evidence of non-linearity. Non-linearity can be acceptable if bias per part is always near zero.

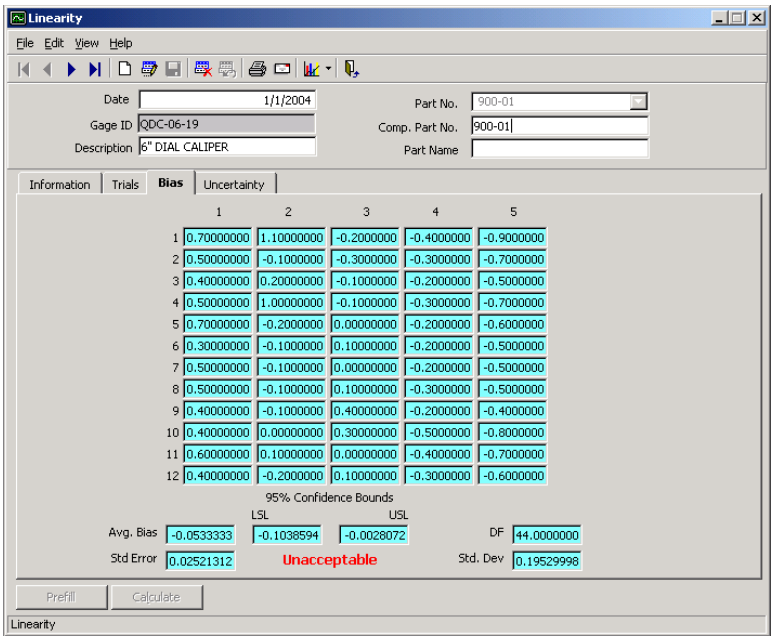
If a measurement system has significant linearity error, look for these possible causes:

- gage not calibrated properly at lower and upper ends of the operating range,
- error in the minimum or maximum master,
- worn instrument,
- internal instrument design characteristics, and
- mistakes in measurement or typographical errors.

If there is significant linearity error that cannot be eliminated you may be able to use the gage by using the regression equation to correct future measurements. In the automotive industry this requires customer permission.

Bias Tab Folder

From within this tab, you can analyze the bias for Linearity & Bias, as well as Bias only studies. Enter Study Type and Part Reference Values on the LINEARITY TAB, and then enter data in the TRIALS tab before going to the BIAS tab.

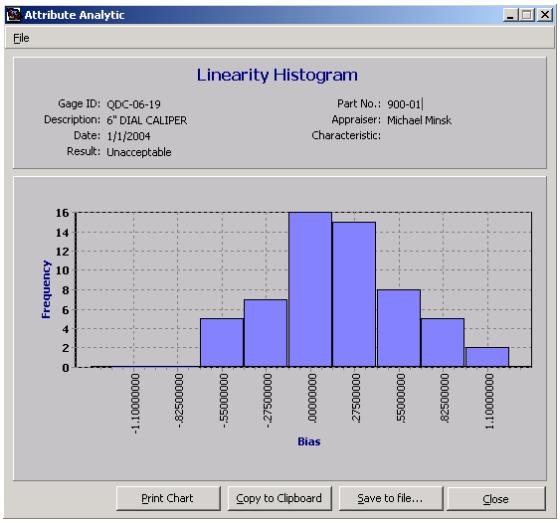


The BIAS tab calculates the following fields:

Field/Button	Description
1-12 or 1-60	Individual Bias estimates for each trial in the study. For a Linearity and Bias study they are labeled 1-12 in each of 5 columns. For a Bias Only Study they are labeled 1-60.
Avg Bias	The average of all the Bias estimates.
Lower	The Lower 95% Confidence Limit. (Must not be greater than zero).
Upper	The Upper 95% Confidence Limit. (Must not be less than zero).
DF	Degrees of Freedom
St Dev	Standard Deviation, the variability of the individual Bias estimates.
St Error	Standard Error, The variability of Average Bias.

Histogram

This chart is used to show the central tendency, spread, and shape of the distribution of Bias values.



Interpretation of Bias

To be acceptable, the lower 95% confidence limit must not be greater than zero and the upper 95% confidence limit must not be less than zero. If it's not acceptable then, the Histogram may identify outliers or patterns that provide clues. Possible causes are:

- Gage not calibrated properly at lower and upper ends of the operating range
- Error in the minimum or maximum master
- Worn instrument
- Internal instrument design characteristics
- Mistakes in measurement or typos

Uncertainty Tab

Uncertainty refers to the potential variation of gage error that accumulates in the chain of calibrations from NIST through various intermediate calibration labs to the final calibration of a "working gage" and its use in a production environment. At each intermediate stage of calibration, the uncertainty increases because the input uncertainty will be combined with new uncertainty contributors to create an output uncertainty that is always larger. Each uncertainty along the way is communicated to the next link in the chain by a calibration certificate or test report. Each certificate maintains "traceability" to the original NIST calibration by citing the NIST number. This system of traceability is important because without it, uncertainty would inevitably grow to the point where customers and suppliers could not trust each other's measurements. To quote from ISO 17025:

> "Reasonable estimation [of uncertainty] shall be based on knowledge of the performance of the method and on the scope and shall make use of, for example, previous experience and validation data. Sources contributing to the uncertainty include, but are not necessarily limited to, the reference standards and reference materials used, methods and equipment used, environmental conditions, properties and condition of the item being tested or calibrated, and the operator."

The uncertainty contributors to be included are selected on the basis of judgment and knowledge of the measurement method. Items selected are designated as "Type A," which

means it is derived from an MSA study, or "Type B," which indicates some other source such as a certificate, or an experience-based educated guess.

Keep in mind that uncertainty is not an estimate of gage error; it is the potential variability in gage error (i.e., The extent to which gage error is unknown).

Here are some examples of potential uncertainty contributors, and where they come from. This is not an extensive list.

Uncertainty of Calibration (Type A)

Uncertainty Contributors	Available
Linearity	In this module.
Resolution	In this module.
Repeatability or GRR	In this module.
Stability (of the reference standard)	In the Stability module (if the reference standard is a variable gage).
Consistency (of the reference standard)	In the Stability module (if the reference standard is a variable gage).
Hysteresis	This is a side study that is similar to linearity, but easy to do manually.

Uncertainty of Measurement (Type A)

These apply to working use of a gage, after calibration, for variable measurements.

Uncertainty Contributors	Available
GRR (or its components *EV*, *AV*, and *INT*)	In the GRR module.
Stability (of the gage)	In the Stability module.
Consistency (of the gage)	In the Stability module.

General Uncertainty Contributors (Type B)

These may apply to both uncertainty of calibration and uncertainty of measurement.

Uncertainty Contributors	**Basis**
Reference Standard	Certificate
Temperature Difference	Experience
Parallax Error	Experience

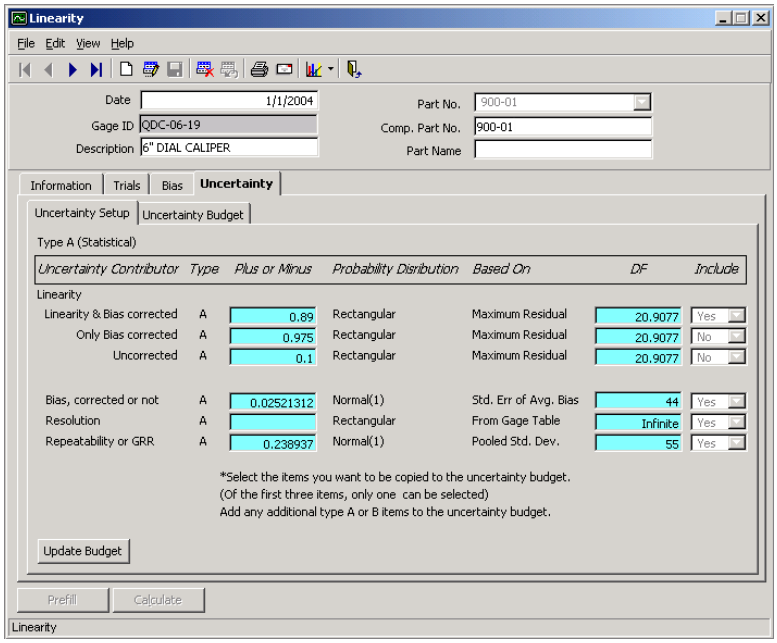
Details about each of these potential uncertainty contributors are discussed later in the "Background on Uncertainty Contributors" section on page 119.

The Type A or Type B classification depends on whether you do a statistical study (A) or not (B). Thus, if you estimate stability error without doing a study, it becomes Type B instead of Type A. Likewise, if you do a statistical study to determine the uncertainty of temperature difference it becomes Type A instead of Type B.

The task of determining uncertainty for a calibration or a laboratory measurement involves deciding which uncertainty contributors are to be included and listing them on a form called an Uncertainty Budget or error budget. This form combines all the contributors for you, using RSS root-sum-square addition, and calculates Expanded Uncertainty for use on certificates or test reports.

Uncertainty Setup Sub-Tab

The function of this tab page is to help you make decisions as to what Uncertainty Contributors should be included in the Uncertainty Budget.



The columns are explained in the table below.

Column	Description
Uncertainty Contributor	The type of measurement error variation to be considered as a contributor.
Type	Everything on this sub-tab is "Type A," meaning it was determined from observation and statistics.
Plus or Minus	The amount of plus or minus variation that was observed, expressed as a maximum deviation or a standard deviation.
Probability Distribution	The assumed pattern of variation for each type of error. See *Background on Probability Distributions*.
Based on	The information or calculation that was used to determine the Plus or Minus value.
DF	Degrees of Freedom. Think of DF as the "effective sample size" of the Plus or Minus value. This will be less than the actual sample size, depending on the method of calculation. The Uncertainty Budget will use DF to determine a "*t*-Statistic."
Include?	Select *Yes* or *No* to determine whether an item is to be included in the Uncertainty Budget. This is the only column that you can define.

The question of when to include an Uncertainty Contributor in the Uncertainty Budget is discussed in the following table:

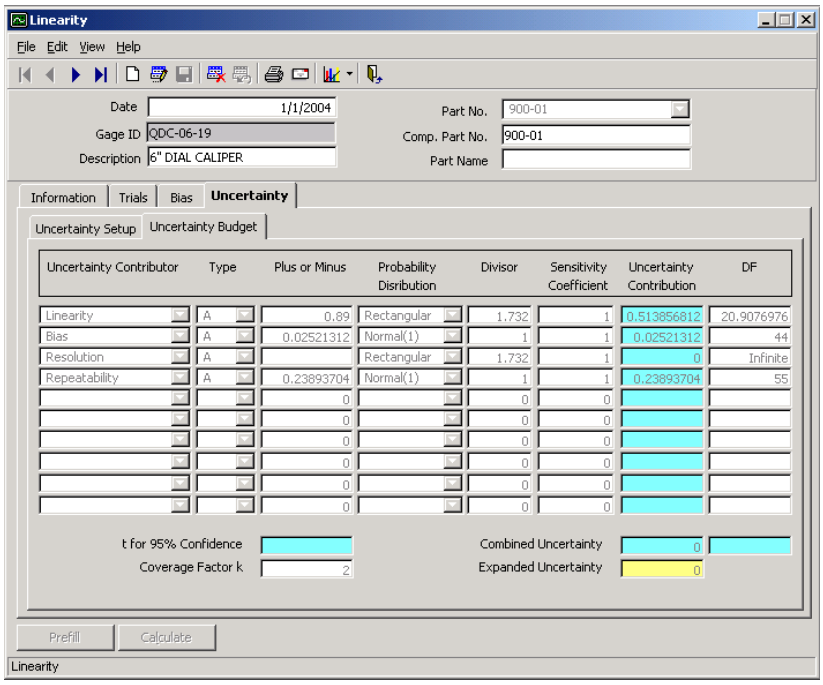
Row	**When to include**
Linearity, with Linearity and Bias corrected	If Linearity was unacceptable, use this estimate. (Even if you will not actually make a correction.) This estimate has been corrected for systematic error. You may use this choice at all times, but the next two choices are also available.
Linearity, with Only Bias corrected	If Linearity was acceptable and Bias was unacceptable, you may substitute this estimate for the first choice (even if you will not actually make a

Row	When to include
	correction). This estimate has been partially corrected for systematic error, and is more conservative than the first choice.
Linearity, Uncorrected	If Linearity and Bias were both acceptable you may substitute this estimate for the first choice. This estimate is not corrected for systematic error, and is more conservative than the first choice. Note: If you believe Linearity error is negligible and not relevant, you may select No for all three Linearity choices.
Bias, corrected or not	Include, unless it is not relevant.
Resolution	Include, unless it is not relevant.
Repeatability, or GRR	Include, unless it is not relevant. This would be GRR if there is more than one appraiser. For example if this study will apply to a family of gages you could use a different gage for each reference value. Another example would use one technician for half the trials, and another technician for the rest.

When your choices have been made, click on the *Update Budget* button. This will partially fill out the Uncertainty Budget.

Uncertainty Budget Sub-tab

Up to four rows will already have been filled according to the choices you have made in Uncertainty Setup. You may edit these choices, and doing so will not change Uncertainty Setup. To enter additional Uncertainty Contributors, select from the drop-down list in an empty row.



The columns in this tab page are described in the table below:

Column	Description
Uncertainty Contributor	Select the type of measurement error to be included, or type in a new one.
Type	Choose Type A if the Plus or Minus value will be based on statistical observations. Choose type B if this is based on certificates, or experience.

Column	Description
Plus or Minus	Enter the Plus or Minus variation caused by this contributor.
Probability Distribution	Select a Probability Distribution from the drop-down list or key in a new one. See Background on Probability Distributions below.
Divisor	ProGAGE ISO will fill this in, if it recognizes the Probability Distribution. You may change it. See *Background on Probability Distributions*, below.
Sensitivity Coefficient	If the Plus or Minus value is in the proper units, and applies directly, then use the default value of one. If the units must be converted, or adjusted, insert the proper multiplier here. For example, the Plus or Minus value might be in temperature units, and you wish to use length and the coefficient of thermal expansion for this material to convert it to millimeters.
Uncertainty Contribution	This is the "standard uncertainty," or standard uncertainty multiplied to the Sensitivity Coefficient. It will appear when you click on the Calc button. You cannot change it.
DF	For Type A items, insert the Degrees of Freedom here. If unknown, you may leave it blank (blanks will be considered as infinite DF). Degrees of Freedom for Type B items are Infinite by default.

Click on the Calculate button and ProGAGE ISO automatically calculates these fields.

Field/Button Name	Description
t for 95% Confidence	This is a multiplier that could be used to convert Combined Uncertainty to a 95% confidence limit. It is based on the *DF* for Combined Uncertainty. It is here for comparison to Coverage Factor*, k*.
Coverage Factor K	This multiplier is used to convert Combined Uncertainty to Expanded Uncertainty. Most, but not all, calibration certificates use a Coverage Factor of k = 2 for "approximately 95% confidence." You can change the Coverage Factor, *k* if you wish. Values of 1 or 3 are sometimes used, or a value equal to t for 95% Confidence. Coverage Factor k should be stated on calibration certificates.
Combined Uncertainty	This is the total of the Uncertainty Contributors, added by the RSS root-sum-square method, i.e. the values are squared, summed, and the square root is taken.
DF for Combined Uncertainty	This is also called "effective degrees of freedom." It is used to calculate *t*, for 95% Confidence. It is a good idea to include this DF on calibration certificates.
Expanded Uncertainty	This is the value to be included on applicable calibration certificates. Coverage Factor, *k*, should also be included. DF (of Combined Uncertainty) is good to include also.

Background on Probability Distributions

Normal Distribution

The bell-shaped probability distribution occurs very frequently that it is named "Normal." When a quantity is influenced by a large number of variables (as is usually true) the pattern of variation will tend to be Normal. The Plus or Minus variability of this distribution is expressed as some multiple of the standard deviation, such as 1σ, 2σ, or 3σ. When entering these Plus or Minus values, choose Normal (1), Normal (2), or Normal (3), and ProGAGE ISO will select the appropriate Divisor to be used to convert to a standard uncertainty ($1\ \sigma$). When you run into something different, like $1.96\ \sigma$, just enter Normal for Probability Distribution, and 1.96 for divisor. When you run into total variation like 6σ, or 5.15σ, you can enter Normal, and specify a divisor of, say, 5.15.

You can also divide by two before entering the Plus or Minus value, and enter a Divisor of 2.576. Note that ProGAGE ISO currently displays and prints GRR value as 1 σ, but other versions, or old printouts of ProGAGE ISO GRR studies, may have been using 5.15 σ.

Rectangular Distribution

This is the distribution of choice when you have no idea what the real distribution is. It occurs when something varies between limits, from one extreme to the other. An example would be temperature as controlled by a thermostat. Enter the plus or minus value as one-half the difference between the extremes. PROGAGE ISO will select a Divisor of $\sqrt{3}$ = 1.732.

Triangular Distribution

This distribution occurs when two Rectangular distributions combine to form a third distribution. An example would be summing a pair of dice. Choose this distribution when you believe a distribution is "not quite Normal." Enter the Plus or Minus value as one-half the difference between the extremes. ProGAGE ISO will choose a Divisor of $\sqrt{6}$ = 2.449.

U-Shaped Distribution

This distribution occurs when a quantity is extremely sensitive to misalignment or mistuning. An example would be static on an old radio. Choose this when you believe that the extremes are more likely than values at the center. Enter the Plus or Minus value as one-half the difference between the extremes. PROGAGE ISO will use a Divisor of $\sqrt{2}$ = 1.414.

Background on Uncertainty Contributors

The following do not enumerate complete uncertainty contributors:

Uncertainty of Calibration (Type A)

Uncertainty Contributor	Details
Linearity	Use the maximum residual as a Plus or Minus value. This means the maximum of (observed value minus the reference value minus any systematic error). The Probability Distribution is Rectangular.
Bias	Use the Standard Error of the Average Bias. The Probability Distribution is Normal (1).
Resolution	Use the smallest increment by which a measurement with this gage could increase or decrease. The Probability Distribution is Rectangular.
Repeatability or GRR	For Linearity & Bias studies, use the pooled standard deviation. For Bias Only Studies, use the Standard Deviation of Bias. The Probability Distribution is Normal (1). GRR Studies are not ordinarily used for this, but they can be. The Probability Distribution is Normal (1) for an updated study, otherwise use Normal with a Divisor of 5.15. Linearity & Bias studies can be designed to use multiple gages from a gage family, in which case the result will be GRR rather than Repeatability. Both Linearity & Bias, and Bias Only can be designed to use more than one appraiser. For example by having two appraisers do six trials each.

Hysteresis	Use the maximum difference between upscale and downscale readings on the same artifacts. This test should cover the full range of the gage. For example, gently add weights to a scale, one at a time, until you get to the full range, then gently remove the weights one at a time. Record readings at each step. The weights don't have to be known values. The Probability Distribution is Rectangular.
Stability (of the reference standard)	Include this item if the reference standard is a variable gage, and if a Stability study shows instability of the *X bar* chart. See the next table for instructions. The Probability Distribution is Rectangular.
Consistency (of the reference standard)	Include this item if the reference standard is a variable gage, and if a Stability study shows instability of the *s* chart. See the next table for instructions. The Probability Distribution is Normal (1).

Uncertainty of Measurement (Type A)

These apply to working measurements made after calibration.

Uncertainty Contributor	Details
GRR (or its components *EV*, *AV*, and *INT*)	These are available in GRR studies. In this version of ProGAGE ISO the Probability Distribution is Normal (1). Other sources, or old printouts, may require a Divisor of 5.15.
Stability (of the gage)	Include this item when a Stability study shows instability. Use the maximum shift or drift that occurs on an *X bar* chart. This can be done by ignoring where the centerline of the limits is currently drawn on the chart, and imagining the limits were centered around the variation at the beginning of the chart. Then imagining that the limits were centered around the variation at the point of maximum shift or drift. Use the difference between the two imaginary centerlines as the Plus or Minus value. The Probability Distribution is Rectangular.
Consistency (of the gage)	Follow the instructions for Stability, but do it with the *s* chart, when the *s* chart is unstable. The Probability Distribution is Normal (1).

General Uncertainty contributors (Type B)

These apply both to uncertainty of calibration, and uncertainty of measurement.

Uncertainty Contributor	Details
Reference Standard	Use the Expanded Uncertainty from the reference standards' incoming calibration certificate. Expanded Uncertainties are usually Type B, and the Probability Distribution is usually Normal (2). Look for the Coverage Factor *k*, and DF. Use k as the Divisor. If DF is furnished, enter it and consider choosing Type A.
Temperature Difference	There are multiple kinds of uncertainty that result from materials and gages not being exactly at 20°C (68°F). Estimate the Plus or Minus values based on experience, and calculate a Sensitivity Coefficient using the length and coefficient of thermal expansion. The probability Distribution is usually Rectangular.
Parallax	This variable occurs when a pointer or indicator mark is not in the same plane as the dial face or scale, and the dial face or scale is not perpendicular to the appraisers' line of site (recall trying to read a speedometer from the passenger seat). The Probability Distribution is usually Rectangular.

More information on Uncertainty

For detailed and authoritative information about uncertainty, you may consult the NIST Technical Note TN1297. It meets all applicable ISO and ANSI Standards and is more specific than the standards. Lots of examples are good too, and for that we recommend European Accreditation Publication EA-4/02. Information on how to calculate Plus or

Minus values for specific Uncertainty Contributors comes from the NIST/ SEMATECH e-Handbook of Statistical Methods. See "Other Techniques/References" on page 146 for details on how to download or view these free publications.

Linearity Formulas

x = reference value

y = observation - x

b = intercept

a = slope

m = subgroup size

g = number of subgroups

$\hat{y}$ = predicted bias

R^2 = goodness of fit

SE = standard error of linearity

df = degrees of freedom

$$a = \frac{\Sigma xy - \left(\Sigma x \frac{\Sigma y}{gm}\right)}{\Sigma x^2 - \frac{(\Sigma x)^2}{gm}}$$

$$b = \Sigma \frac{y}{gm} - a \times \left(\Sigma \frac{x}{gm}\right)$$

$$SE = \sqrt{\frac{\Sigma y^2 - b\sum y - a\sum xy}{gm - 2}}$$

df = gm-2

$$t\,Stat_a = \frac{|a|}{\frac{SE}{\sqrt{\sum_1^{gm} (x - \bar{x})^2}}}$$

$$t\,Stat_b = \frac{|b|}{SE \times \left(\frac{1}{gm} + \frac{\bar{x}^2}{\sum_1^{gm} (x - \bar{x})^2}\right)}$$

$$\hat{y} = b + a \times x$$

confidence bands for x_0:

$$= b + a \times x_0 \pm \left(t_{gm-2,0.025} \times SE \times \sqrt{\frac{1}{gm} + \frac{(x_0 - \bar{x})^2}{\sum_{1}^{gm} (x - \bar{x})^2}} \right)$$

$$R^2 = \frac{\left[\Sigma xy - \Sigma x \frac{\Sigma y}{gm} \right]^2}{\left[\Sigma x^2 - \left(\frac{(\Sigma x)^2}{gm} \right) \right] \times \left[\Sigma y^2 - \left(\frac{(\Sigma y)^2}{gm} \right) \right]}$$

Bias Formulas

y = observation - x

SE_B = standard error of bias

$\hat{\sigma}$ = repeatability

$$\text{Avg. Bias} = \bar{\bar{y}}$$

$$\hat{\sigma} = \sqrt{\frac{\sum (y - \bar{\bar{y}})^2}{gm - 1}}$$

df = gm-1

$$SE_B = \hat{\sigma} / \sqrt{gm}$$

Confidence Bounds

$$= Bias \pm SE_B \times t_{df,0.025}$$

when range method is specified for bias:

$$\hat{\sigma} = \overline{R} / d_2^*$$

df = from d_2^* table

Confidence Bounds

$$= Bias \pm \frac{d_2}{d_2^*} \times SE_B \times t_{df,0.025}$$

d_2^* Table (g.1 row is *df*, g.2 row is d_2^*)

	m										
G	2	3	4	5	6	7	8	9	10	11	12
1.1	1	2	2.9	3.8	4.7	5.5	6.3	7	7.7	8.3	9
1.2	1.41421	1.91155	2.23887	2.48124	2.67253	2.82981	2.96288	3.07794	3.17991	3.26909	3.35016
2.1	1.9	3.8	5.7	7.5	9.2	10.8	12.3	13.8	15.1	16.5	17.8
2.2	1.27931	1.80538	2.15069	2.40484	2.60438	2.76779	2.90562	3.02446	3.12869	3.22134	3.30463
3.1	2.8	5.7	8.4	11.1	13.6	16.0	18.3	20.5	22.6	24.6	26.5
3.2	1.23105	1.76858	2.12049	2.37883	2.58127	2.74681	2.88628	3.00643	3.11173	3.20526	3.28931
4.1	3.7	7.5	11.2	14.7	18.1	21.3	24.4	27.3	30.1	32.7	35.3
4.2	1.20621	1.74989	2.10522	2.36571	2.56964	2.73626	2.87656	2.99737	3.10321	3.19720	3.28163

5.1	4.6	9.3	13.9	18.4	22.6	26.6	30.4	34.0	37.5	40.8	44.0
5.2	1.19105	1.73857	2.09601	2.35781	2.56263	2.72991	2.87071	2.99192	3.09808	3.19235	3.27701
D_2	1.12838	1.69257	2.05875	2.32593	2.53441	2.70436	2.84720	2.97003	3.07751	3.17287	3.25846

g	13	14	15	16	17	18	19	20
1.1	9.6	10.2	10.8	11.3	11.9	12.4	12.9	13.4
1.2	3.42378	3.49116	3.55333	3.61071	3.66422	3.71424	3.76118	3.80537
D_2	3.33598	3.40676	3.47193	3.53198	3.58788	3.64006	3.68896	3.73500

Uncertainty Formulas

p = plus or minus value

d = divisor

c =sensitivity coefficient

u_i = individual uncertainty contribution

df_i = individual degrees of freedom

u_c = combined uncertainty

df_c = combined (effective) degrees of freedom

k = coverage factor

U = expanded uncertainty

$$u_i = {}^{p}\!/_{d} \times c$$

$$u_c = \sqrt{\sum u_i^2}$$

$$df_c = {u_c^4}\Big/{\sum \frac{u_i^4}{df_i}}$$

$$U = u_c \times k$$

df *for uncertainty of linearity are not specified in the usual literature. PROGAGE ISO uses the* df *from* d_2^* *row 1.1 as a reasonable estimate. The following Weibull approximation of* df *from* d_2^* *row 1.1 is used for gm > 20:*

$$df = (gm - 1) \times e^{-\left(\frac{gm-3}{54.69}\right)^{0.888}}$$

Stability Study

When thinking about measurement system stability, you must distinguish between measurement system stability (the amount of total variation in the bias of the system over time on a particular part or master part) and statistical stability. Statistical stability is the more common term used to describe stability, repeatability, bias, and processes.

Two different measurement systems could measure the same master part, and both could show statistical stability, yet one system might have much higher variation in its bias over time than the other. From a statistical point of view, they're equally stable. However, from a traditional gage stability point of view, the system with the lower bias variation over time is more stable than the one with higher bias variation. You can quantify these total bias variations, but not until you can demonstrate that both systems are statistically stable.

Control Charts

You can use control charts to determine statistical stability. Control charts help you differentiate common cause variation (variation due to causes affecting all measurement results) from special cause variation (variation that is the result of specific conditions).

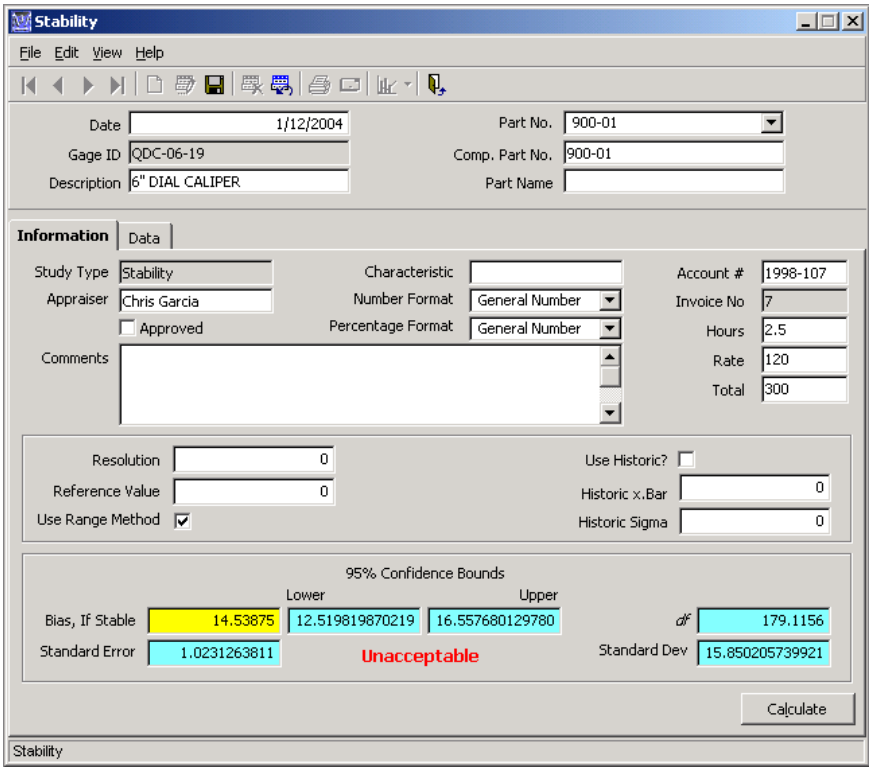
When using control charts, you should look for both points that fall beyond the control limits and for other special cause indicators, such as trends and centerline hugging. The existence of these factors indicates out-of-control or unstable conditions. You can find control charting methods and interpretation guidelines in texts on quality and statistical process control (SPC).

The method presented here for studying measurement system stability is to plot the average and range of repeated master or master part readings on a *regular basis*. For example, you might conclude from this analysis that an out-of-control signal is a sign that you need to calibrate your measurement system. Calibration of the system without any out-of-control signals is likely to increase the variation of your readings. If the master or master part is dirty, you might see an out-of-control signal. Your knowledge of the process is the basis for your interpretation of the control signals.

To determine the sample size and the frequency for a measurement system control chart, you should have an in-depth knowledge of the system and focus on the conditions to which the system is exposed during its use. For example, don't take samples before the warm-up period if you are certain that the system's users allow for sufficient warm-up time before using it. Also, when you're designing a measurement system control chart, make sure that the time at which you take the samples of master or reference value isn't introducing bias into the results. For example, samples taken only after morning calibration might not represent the usual conditions to which the measurement system is exposed. As with any control chart, out-of-control signals might exist because of problems in the sample size and frequency, so it's important to carefully design your control-charting techniques. As mentioned before, to find more information on control chart design, look in SPC publications.

You don't need to calculate a measurement system stability number. You can use indices to measure progress, but you can use a control chart to view the system's progress. The elimination of special causes from a process might improve it, making it more stable. You can see more improvement in the reduction in the width of control limits, which indicates that you've lowered the system's common cause variation. Training and education on statistical process control theory and practice will help you better understand control chart patterns.

Entering Stability Study Record



Stability Study Controls

Control	Description
Date	Enter date the study was made (defaults to the current date).
Gage ID	Identifies the selected gage. This field is non-editable.
Description	This indicates the name of the gage or measurement device.
Part No.	Select from the drop-down list related part number, such as the customer or supplier part number.
Comp. Part No.	Enter Company Part Number.
Part Name	Enter the description or name of the part.
Study Type	ProGAGE ISO automatically sets this field to "Stability."
Appraiser	Enter the name of the Appraiser.
Approved	Mark the checkbox to indicate that the gage passed the Stability Study.
Characteristic	Enter the characteristic that you're evaluating in the study.
Number Format	This indicates the number of decimal places used in reporting results.
Percentage Format	This indicates the number of decimal places.
Comments	Enter any comment or note about the study.
Account #	The tracking number associated with the calibration cost, such as job, purchase order, invoice, customer, or department number. This is automatically generated by ProGAGE ISO. (See "Chapter 2: Program Settings" on page 161 of the System Administrator's Guide.)
Invoice No	Indicates the Invoice Number associated with the calibration cost. ProGAGE ISO automatically fills up this field if you activated the Generate Invoice option in the Settings Utility.

Control	Description
Hours	Enter number of hours spent on the study.
Rate	Enter hourly labor rate.
Total	This indicates total labor rate.
Calculate	Click this button to calculate analytic values.
Resolution	This indicates the capability of a measurement system to detect and faithfully indicate even small changes of the measured characteristic.
Reference Value	This indicates a measured value that is recognized and serves as an agreed upon reference or master value for comparison.
Use Range Method	Mark this checkbox if using the Range Method in calculating stability.
Use Historic	Mark this checkbox if using Historic average and reference value in calculating stability.
Historic x.bar	Enter Historic Average.
Historic Sigma	Enter Historic Reference Value.

The program calculates the following fields when you click the CALC button:

Fields	Description
Bias, If Stable	Bias of the measurement system.
Standard Error	Standard Error of Mean.
95% Confidence Bound	The upper and lower limits of the 95% confidence bound.
DF	Degrees of Freedom.
Standard Dev	Standard Deviation of the Measuring Process.

Adding Stability Sub-Groups

To add stability sub-group measurements, click on the first row in the Sub-Group table. Each sub-group row represents the values of the repeated master (or master part) measurements that you make. You must use the same number of readings for each sub-group of measurements.

The sub-group record fields are explained below (use the table's horizontal scroll bar to view the fields on the rightmost side of the table).

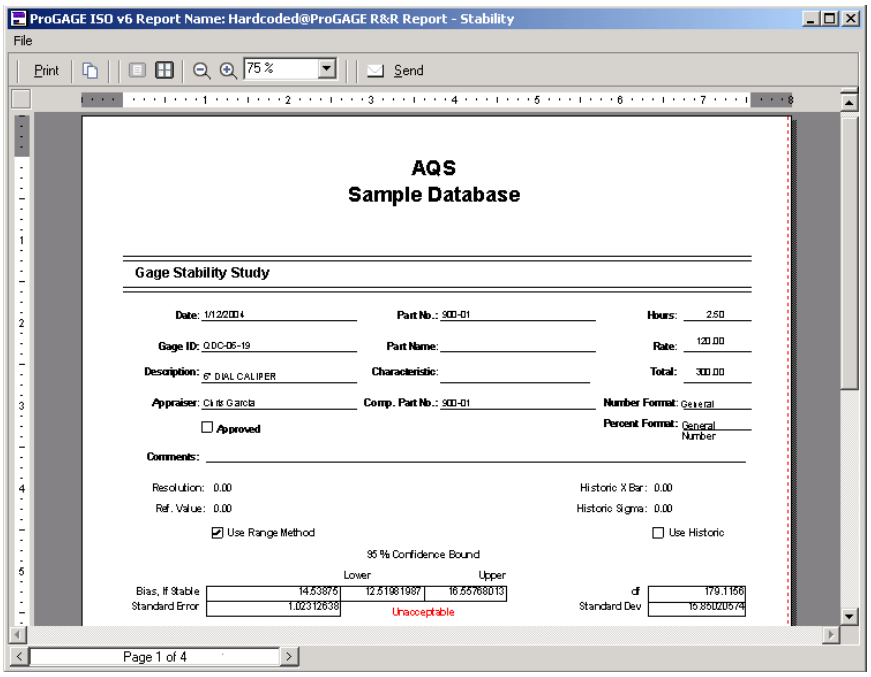
Control	Description
Sub. No.	Use this number to identify the subgroup—usually you will start with 1, then go to 2, then 3, and keep using consecutive numbering. However, you can also use an alphanumeric system (i.e., "M-100," "M-200," then "M-300,"…).
Date	Enter in this field the date on which you measured the repeated readings. The format of the date is MM/DD/YYYY.
1 through 10	Enter the actual measurements taken on the master (or master part). For example, if you're taking a sample size of five repeated readings, enter the first reading in field 1, the second in field 2, the third in field 3. Remember that a blank field is different from a field with 0 (zero) as value. In this example, fields 4 to 10 remain blank.
R	Range of measurements for a particular sub group (the largest reading minus the smallest reading). This value is calculated; you cannot change it.
S	Standard deviation of measurements for a particular subgroup. ProGAGE ISO automatically calculates the standard deviation for the sub group (only when the sub group size is five or more). You can't edit this value.

Control	Description
Xbar ($\bar{X}$)	The average (arithmetic mean) for the sub group. This value is calculated; you can't change it.
Notes	Record any comment or note about the subgroup in this field.

Printing the Stability Study

To print Stability study record:

1 Click the PRINT RECORD button. The PRINT PREVIEW window opens.



You can zoom in and zoom out the printing document and inspect all the pages by using the navigation buttons.

2 Click on the PRINT button.

Generating Stability Control Charts

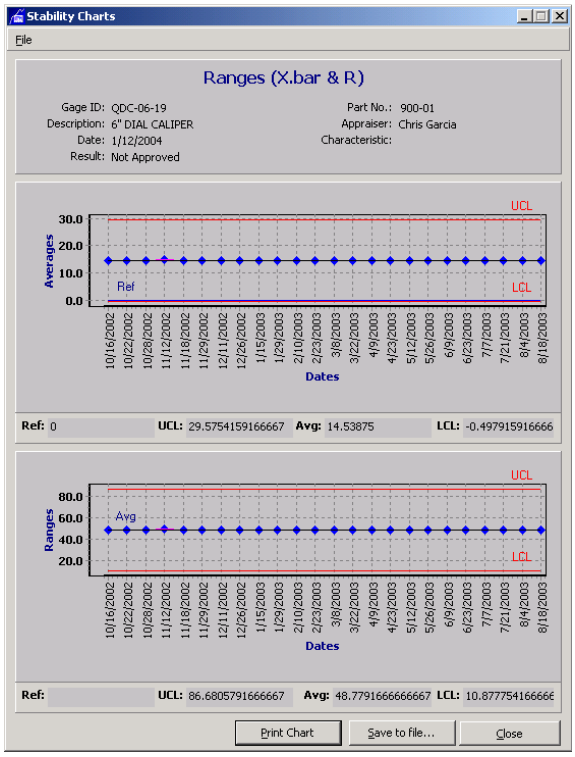
To generate a Stability Control chart:

1 Click the CHART button.

You'll see two control charts. The top contains a control chart of averages, and the bottom contains a control chart of ranges. For easier interpretation, the program draws control limits and average lines on each chart.

X bar & R charts (Average and Range Charts)

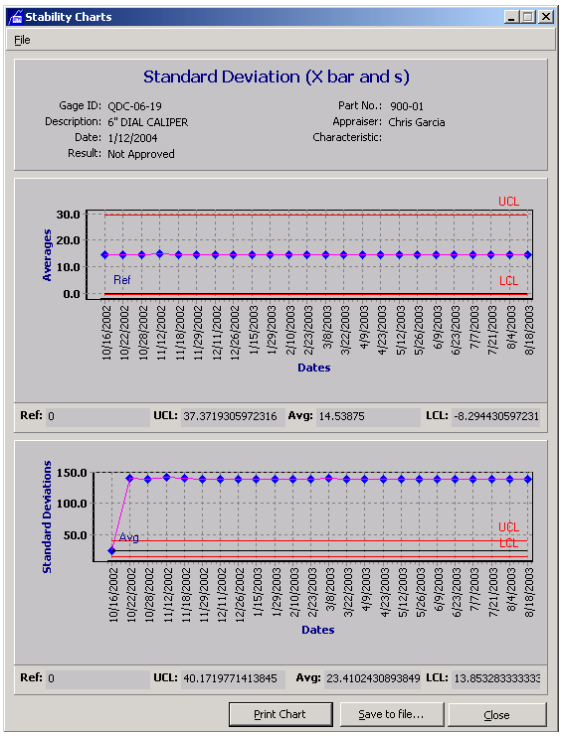
These charts will be familiar to many users because they are used extensively in manufacturing. They work best for small subgroup sizes, and are not recommended for subgroup sizes of 9 or 10. They do not work for a subgroup size of 1.



X bar & R charts (Average and Range Charts)

X bar & s Charts (Average and Standard Deviation Charts)

These charts work well for subgroup sizes of 2 and up, but not for a subgroup size of 1.

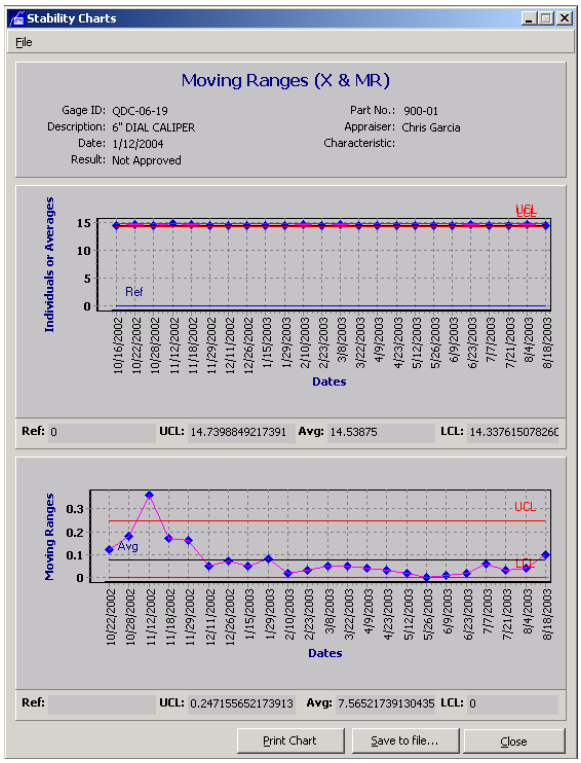


X bar & R charts (Average and Range Charts)

X & MR Charts (Individual and Moving Range Charts)

These charts work for a subgroup size of at least 1. Control limits are based on variation between subgroups rather than variation within subgroups. The ability to use a subgroup size of one allows use for destructive or non-replicable measurements. See Chapter 4 of Measurement Systems Analysis, Third Edition (MSA3) for more information and for other applications. For subgroups sizes larger than 1, the other charts are usually preferred but if their limits seem too tight or too loose then use X & MR.

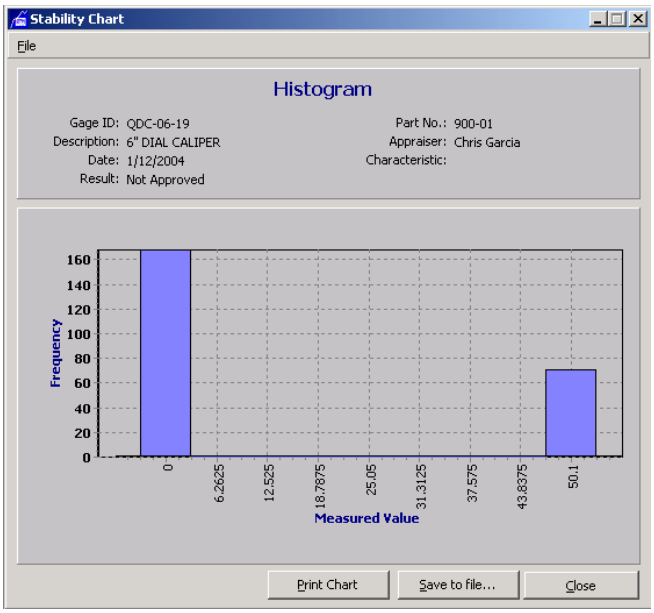
Note: Despite the name "Individual Chart," averages are plotted when the subgroup size is greater than 1.



X & MR Charts (Individual and Moving Range Charts)

Histogram

This chart is used to show the central tendency, spread, and shape of the distribution.



Histogram

The following values are calculated and included in the Stability Charts:

Field Name	Description
UCL	Upper control limit for the averages or ranges.
AVG	The average (arithmetic mean) of the average values and ranges of all subgroups.
LCL	Lower control limit for the averages or ranges.

Stability Formulas

n = sample size (number of observations in sub group)

X = individual sample measurement

R = Range

$\bar{x}$ = Sub group average

A_2, D_3, D_4 = control chart constants based on value of *n*, as shown in the table below:

n	A_2	D_3	D_4
2	1.880	0	3.267
3	1.023	0	2.575
4	0.729	0	2.282
5	0.577	0	2.115
6	0.483	0	2.004
7	0.419	0.076	1.924
8	0.373	0.136	1.864
9	0.337	0.184	1.816
10	0.308	0.223	1.777
11	0.285	0.256	1.744
12	0.266	0.284	1.716
13	0.249	0.308	1.692
14	0.235	0.329	1.671

15	0.223	0.348	1.652

$\bar{X} = \Sigma X / n$

$R = \text{Max } X - \text{Min } X$

$\bar{R} = \Sigma R / \text{no. of subgroups}$

$UCL_R = \bar{R} \times D_4$

$LCL_R = \bar{R} \times D_3$

$\bar{\bar{X}} = \Sigma \bar{X} / \text{no. of subgroups}$

$UCL_{\bar{X}} = \bar{\bar{X}} + (A_2 \times \bar{R})$

$LCL_{\bar{X}} = \bar{\bar{X}} - (A_2 \times \bar{R})$

Control Chart Formulas

m = subgroup size (number of observations in sub group)

g = number of subgroups

X = individual sample measurement

X_0 = reference value

R = Range

$\bar{x}$ = subgroup average

s = subgroup standard deviation

$\hat{\sigma}$ = repeatability standard deviation

SE = standard error of bias

A_2,A_3, B_3, B_4, C_4, d_2, D_3, D_4 = control chart constants based on value of *m*, as shown in the table below:

M	A_2	A_3	D_3	D_4	c_4	B_3	B_4
2	1.87997	2.658679	0	3.267	0.797885	0	3.267
3	1.02333	1.954410	0	2.574	0.886227	0	2.568
4	0.72860	1.628102	0	2.282	0.921318	0	2.266
5	0.57682	1.427299	0	2.115	0.939986	0	2.089
6	0.48325	1.287128	0	2.004	0.951533	0.030	1.970
7	0.41928	1.181916	0.076	1.924	0.959369	0.118	1.882
8	0.37253	1.099096	0.136	1.864	0.965030	0.185	1815
9	0.33670	1.031661	0.184	1.816	0.969311	0.239	1.761
10	0.30826	0.975350	0.223	1.777	0.972659	0.284	1.716

$\bar{X}$ & R Charts	$\bar{X}$ & s Charts	X & MR Charts
$\bar{X} = \Sigma X / m$ $R = \text{Max } X - \text{Min } X$ $\bar{R} = \Sigma R / g$	$\bar{X} = \Sigma X / m$ $s = \sqrt{\frac{\sum (X - \bar{X})^2}{m-1}}$	$\bar{X} = \Sigma X / m$ $MR = \lvert \text{This } \bar{X} - \text{Previous } \bar{X} \rvert$

$UCL_R = \overline{R} \times D_4$

$LCL_R = \overline{R} \times D_3$

$\overline{\overline{X}} = \Sigma \overline{X} / g$

$UCL_{\overline{X}} = \overline{\overline{X}} + (A_2 \times \overline{R})$

$LCL_{\overline{X}} = \overline{\overline{X}} - (A_2 \times \overline{R})$

$Bias = \overline{\overline{X}} - X_0$

for $m > 1$:

$\hat{\sigma} = \overline{R} / d_2^*$

df = from d_2^* table

$SE = \hat{\sigma} / \sqrt{g \times m}$

Confidence Bounds

$= Bias \pm \frac{d_2}{d_2^*} \times SE \times t_{df,0.025}$

$\overline{s} = \Sigma s / g$

$UCL_s = \overline{s} \times B_4$

$LCL_s = \overline{s} \times B_3$

$\overline{\overline{X}} = \Sigma \overline{X} / g$

$UCL_{\overline{X}} = \overline{\overline{X}} + (A_3 \times \overline{s})$

$LCL_{\overline{X}} = \overline{\overline{X}} - (A_3 \times \overline{s})$

$Bias = \overline{\overline{X}} - X_0$

$\hat{\sigma} = \sqrt{\frac{\sum (X - \overline{\overline{X}})^2}{(g \times m) - 1}}$

$df = (g \times m) - 1$

$SE = \hat{\sigma} / \sqrt{g \times m}$

Confidence Bounds

$= Bias \pm SE \times t_{df,0.025}$

$\overline{MR} = \Sigma MR / (g - 1)$

$UCL_{MR} = \overline{MR} \times 3.267$

$LCL_{MR} = \overline{MR} \times 0$

$\overline{\overline{X}} = \Sigma \overline{X} / g$

$UCL_{\overline{X}} = \overline{\overline{X}} + (2.65868 \times \overline{MR})$

$LCL_{\overline{X}} = \overline{\overline{X}} - (2.65868 \times \overline{MR})$

$Bias = \overline{\overline{X}} - X_0$

for $m = 1$ (note subgroup size for MR is 2, for any m):

$\hat{\sigma} = \overline{MR} / d_2^*$

df = from d_2^* table

$SE = \hat{\sigma} / \sqrt{g}$

Confidence Bounds

$= Bias \pm \frac{d_2}{d_2^*} \times SE \times t_{df,0.025}$

d_2^* Table (g.1 row is *df*, g.2 row is d_2^*)

	M								
G	2	3	4	5	6	7	8	9	10
1.1	1.0	2.0	2.9	3.8	4.7	5.5	6.3	7.0	7.7
1.2	1.41421	1.91155	2.23887	2.48124	2.67253	2.82981	2.96288	3.07794	3.179905
2.1	1.9	3.8	5.7	7.5	9.2	10.8	12.3	13.8	15.1
2.2	1.27931	1.80538	2.15069	2.40484	2.60438	2.76779	2.90562	3.02446	3.12869
3.1	2.8	5.7	8.4	11.1	13.6	16.0	18.3	20.5	22.6
3.2	1.23105	1.76858	2.12049	2.37883	2.58127	2.74681	2.88628	3.00643	3.11173
4.1	3.7	7.5	11.2	14.7	18.1	21.3	24.4	27.3	30.1
4.2	1.20621	1.74989	2.10522	2.36571	2.56964	2.73626	2.87656	2.99737	3.10321
5.1	4.6	9.3	13.9	18.4	22.6	26.6	30.4	34.0	37.5
5.2	1.19105	1.73857	2.09601	2.35781	2.56263	2.72991	2.87071	2.99192	3.09808
6.1	5.5	11.1	16.7	22.0	27.0	31.8	36.4	40.8	45.0
6.2	1.18083	1.73099	2.08985	2.35253	2.55795	2.72567	2.86680	2.98829	3.09467
7.1	6.4	12.9	19.4	25.6	31.5	37.1	42.5	47.6	52.4
7.2	1.17348	1.72555	2.08543	2.34875	2.55460	2.72263	2.86401	2.98568	3.09222
8.1	7.2	14.8	22.1	29.2	36.0	42.4	48.5	54.3	59.9
8.2	1.16794	1.72147	2.08212	2.34591	2.55208	2.72036	2.86192	2.98373	3.09039
9.1	8.1	16.6	24.9	32.9	40.4	47.7	54.5	61.1	67.3
9.2	1.16361	1.71828	2.07953	2.34370	2.55013	2.71858	2.86028	2.98221	3.08896

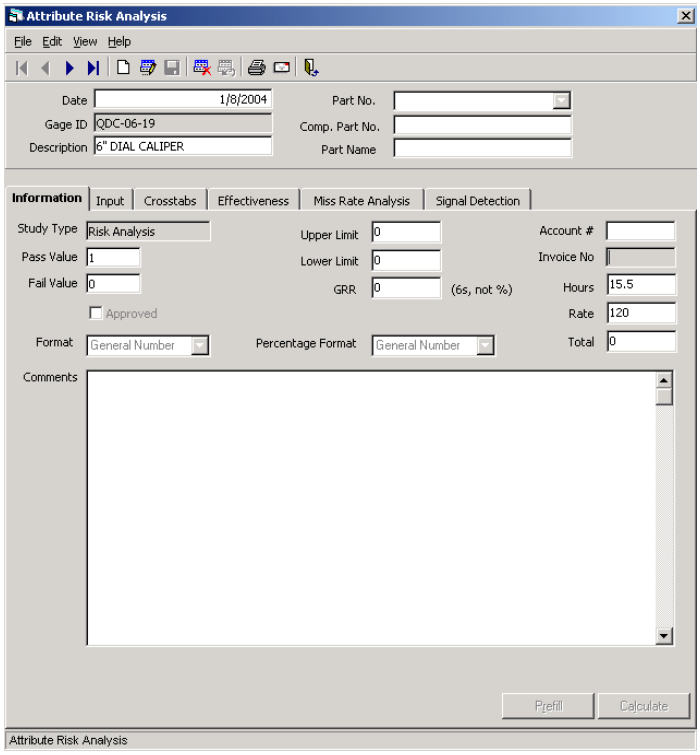
10.1	9.0	18.4	27.6	36.5	44.9	52.9	60.6	67.8	74.8
10.2	1.16014	1.71573	2.07746	2.34192	2.54856	2.71717	2.85898	2.98100	3.08781
11.1	9.9	20.2	30.4	40.1	49.4	58.2	66.6	74.6	82.2
11.2	1.15729	1.71363	2.07577	2.34048	2.54728	2.71600	2.85791	2.98000	3.08688
12.1	10.7	22.0	33.1	43.7	53.8	63.5	72.6	81.3	89.7
12.2	1.15490	1.71189	2.07436	2.33927	2.54621	2.71504	2.85702	2.97917	3.08610
13.1	11.6	23.8	35.8	47.3	58.3	68.7	78.6	88.1	97.1
13.2	1.15289	1.71041	2.07316	2.33824	2.54530	2.71422	2.85627	2.97847	3.08544
14.1	12.5	25.7	38.6	51.0	62.8	74.0	84.7	94.9	104.6
14.2	1.15115	1.70914	2.07213	2.33737	2.54452	2.71351	2.85562	2.97787	3.08487
15.1	13.4	27.5	41.3	54.6	67.2	79.3	90.7	101.6	112.1
15.2	1.14965	1.70804	2.07125	2.33661	2.54385	2.71290	2.85506	2.97735	3.08438
16.1	14.3	29.3	44.1	58.2	71.7	84.5	96.7	108.4	119.5
16.2	1.14833	1.70708	2.07047	2.33594	2.54326	2.71237	2.85457	2.97689	3.08395
17.1	15.1	31.1	46.8	61.8	76.2	89.8	102.8	115.1	127.0
17.2	1.14717	1.70623	2.06978	2.33535	2.54274	2.71190	2.85413	2.97649	3.08358
18.1	16.0	32.9	49.5	65.5	80.6	95.1	108.8	121.9	134.4
18.2	1.14613	1.70547	2.06917	2.33483	2.54228	2.71148	2.85375	2.97613	3.08324
19.1	16.9	34.7	52.3	69.1	85.1	100.3	114.8	128.7	141.9
19.2	1.14520	1.70480	2.06862	2.33436	2.54187	2.71111	2.85341	2.97581	3.08294
20.1	17.8	36.5	55.0	72.7	89.6	105.6	120.9	135.4	149.3
20.2	1.14437	1.70419	2.06813	2.33394	2.54149	2.71077	2.85310	2.97552	3.08267
D_2	1.12838	1.69257	2.05875	2.32593	2.53441	2.70436	2.84720	2.97003	3.07751
cd	0.8760	1.8150	2.7378	3.6230	4.4658	5.2673	6.0305	6.7582	7.4539

For g > 20 use d_2, and estimate *df* with the constant difference, *cd*.

Attribute Risk Analysis

Attribute measurement systems are the class of measurement systems where the measurement value is one of a finite number of categories. The most common of these is the go/no go gage, which has only two measurement values. Attribute (or go/no-go) gages evaluate parts according to whether or not these parts meet a particular standard; any part that doesn't meet this standard fails the test. These gages don't measure the degree of a part's success or failure; these attribute gages only judge whether the part meets the established limits. The two most common used Risk Analysis methods are: Hypothesis Test Analyses and Signal Detection Theory.

Entering Attribute Risk Analysis Record

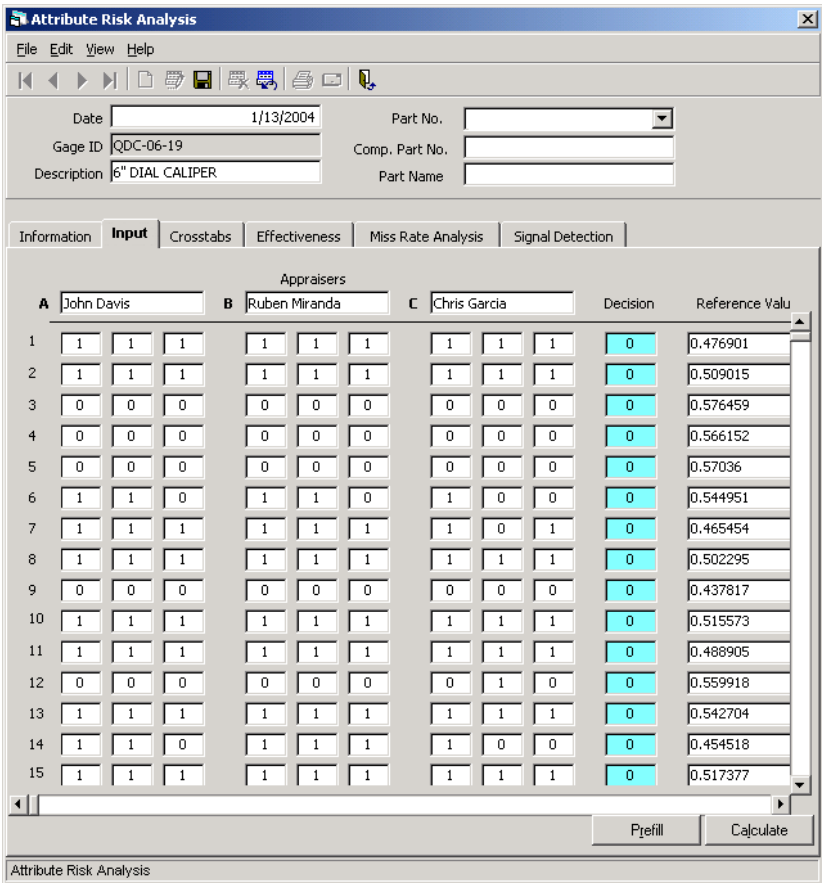


Attribute Study Controls

Control	Description
Date	Enter when the study was made (defaults to the current date).
Gage ID	Identifies the selected gage. This field is non-editable.
Description	Enter a description of the gage or measurement device.
Part No.	Select from drop-down list the Related part number, such as the customer or supplier part number.
Comp. Part No.	Enter company Part Number.
Part Name	Enter description or name of the part.
Study Type	This field is set automatically to "Risk Analysis".
Pass Value	Enter a numeral indicating that the decision on the appraisal of a particular part is accepted; default is One (1).
Fail Value	Enter a numeral indicating that the decision on the appraisal of a particular part is rejected; default is Zero (0).
Appraiser	Enter the name of the Appraiser.
Approved	Mark the checkbox to indicate that the gage passed the Attribute Risk Analysis Study.
Number Format	Indicates the number of decimal places used in reporting results.
Percentage Format	Indicates the number of decimal places.
Upper Limit	Upper 95% confidence interval bound.
Lower Limit	Lower 95% confidence interval bound.
GRR	GRR for attribute gage.
Comments	Enter any comment or note about the study.

Control	Description
Account #	The tracking number associated with the calibration cost, such as job, purchase order, invoice, customer, or department number.
Invoice No	Indicates the Invoice Number associated with the calibration cost. ProGAGE ISO automatically fills up this field if you activated the Generate Invoice option in the Settings Utility.
Hours	Enter the number of hours spent on the study.
Rate	Enter hourly labor rate in this field.
Total	This field indicates the total labor rate.
Prefill	If most of your measurements begin with the same numbers (such as 1.1651, 1.1650, and 1.1658), you can save time by prefilling the measurements with those digits. In this case, click the Prefill button, then enter a prefill value of 1.165. Now you need to enter only the last digit of each measurement.
Calculate	Click this button to calculate analytic values.

After entering the Pass and Fail values, click on the INPUT tab. Commonly, as in this example, an acceptable decision is designated with one (1) and an unacceptable decision with zero (0). Enter the (three) decisions of each appraiser on every part. The cursor automatically moves to the next white field on the same row after pressing the ENTER key; once all the decision fields in a row are filled, the cursor moves to the Reference Value Field; press ENTER again and the cursor moves to the next row beginning with the first decision field of the first appraiser. The reference decision, the code (whether go/no go, or mixed), and the appraiser signal for each part are automatically calculated after you click the CALCULATE button.



PROGAGE ISO reflects "in" in the Code fields to indicate that the particular part is within target, "out" to indicate that appraisals are outside the confidence bound, and "near limit" if appraisals for the part lie within the gray areas (*%GRR*) associated with measurement systems.

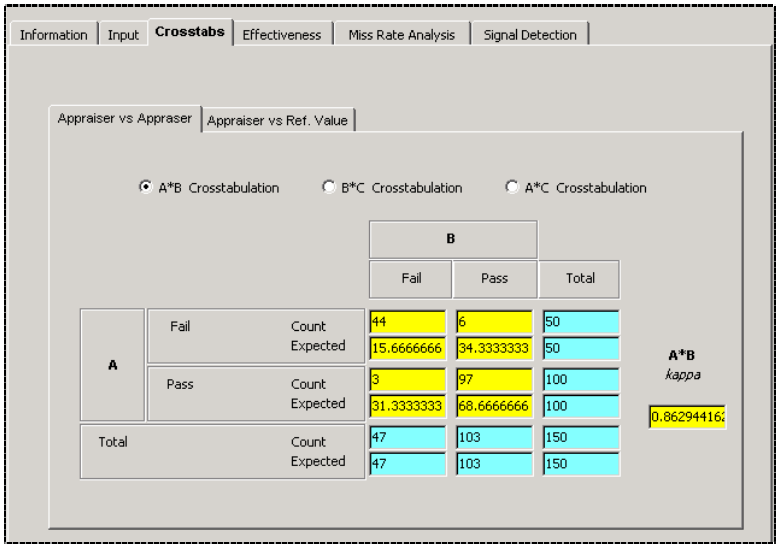
Hypothesis Test Analysis (Cross Tab Method)

Cross-tabulations comparing each of the appraisers to the others are especially useful when reference decision for the parts of a go/no go gage are unknown. These cross-tabulation tables determine the extent of agreement among the appraisers, using the (Cohen's) kappa value, which measures the agreement between the decisions of two raters when both are rating the same object. When the kappa value is 1, the agreement is perfect; when 0, it means that the agreement is no better than coincidence; a value greater than 0.75 generally indicates good to excellent agreement; less than 0.4, poor agreement. PROGAGE ISO automatically completes cross tabulations—appraiser vs. appraiser and appraiser vs. reference value—after clicking the CALCULATE button.

Appraiser vs. Appraiser Tab

PROGAGE ISO allows the cross tabulation of two appraisers. Select the appropriate radiobutton to view the cross-tabulation result of two appraisers; three combinations are possible: Appraiser A vs. Appraiser B, Appraiser B vs. Appraiser C, and Appraiser A vs. Appraiser C. In the following example, the **A*B kappa** value for the cross-tabulation of

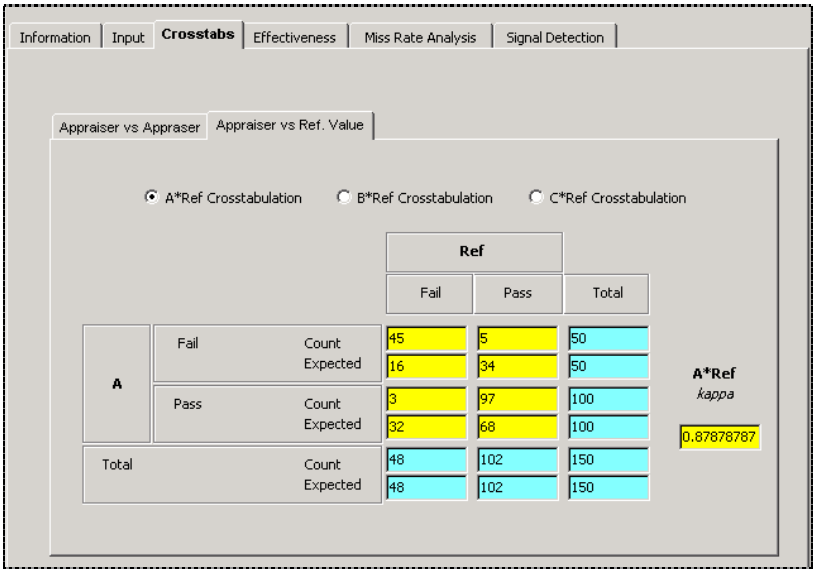
Appraiser A and Appraiser B is 0.86, which means that the agreement between the appraisers is good.



Crosstabs — Appraiser A vs. Appraiser B

Appraiser vs. Reference Value Tab

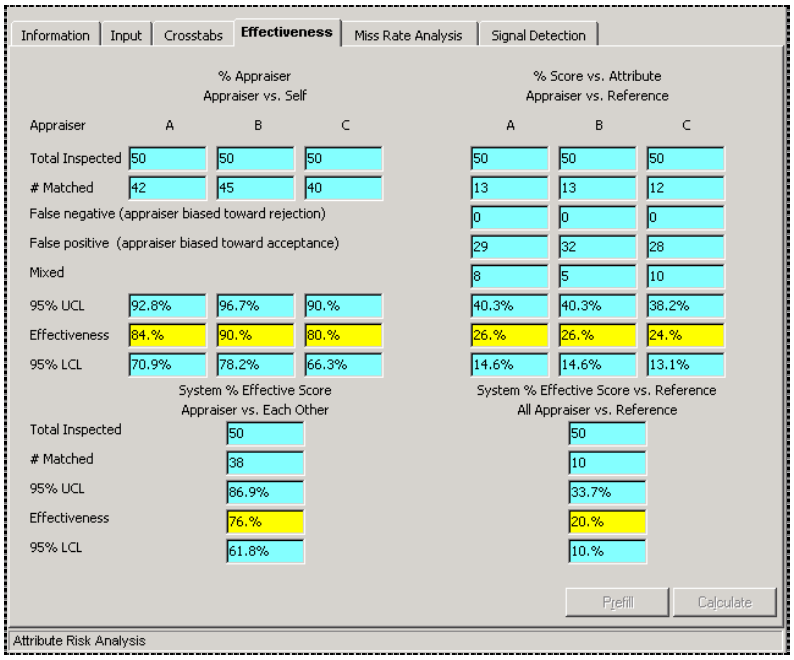
ProGAGE ISO also allows the cross tabulation of an appraiser's decision *vis-à-vis* the reference value (when available). Select the appropriate radio button to from the three possible combinations: Appraiser A vs. Reference Value (*A*Ref Crosstabulation*), Appraiser B vs. Reference Value (*B*Ref Crosstabulation*), and Appraiser C vs. Reference Value (*C*Ref Crosstabulation*). In the following example, the **A*Ref *kappa*** value for the cross-tabulation of Appraiser A and the Reference Value is 0.88, which means that the agreement is good.



Crosstabs — Appraiser A vs. Reference Value

Effectiveness

After you have measured the kappa values between two appraisers and between an appraiser and reference value, the effectiveness of the measurement system can then be calculated. Effectiveness is the ratio of the number of correct decisions to the total opportunities for a decision.



Effectiveness

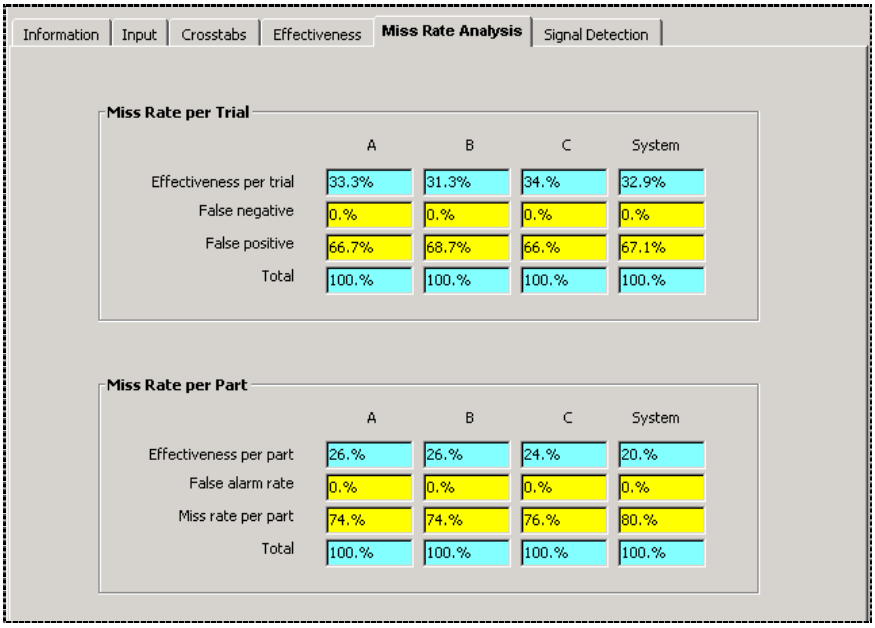
Effectiveness Tab Controls

Control	Description
% Appraiser	Appraiser agrees with himself on all trials.
Total Inspected	Number of parts inspected by an appraiser.
# Matched	Number of parts that matched the appraiser.
95% UCI	Upper 95% confidence interval bound.
Calculated Score	Calculated score.
95% LCI	Lower 95% confidence interval bound.
% Score vs Attribute	Appraiser agrees on all trials with the known standard.
Total Inspected	Number of parts inspected by an appraiser.
# Matched	Number of parts measured by a particular appraiser that matched the reference value.
False Negative	Number of parts measured by a particular appraiser that are biased towards rejection.
False Positive	Number of parts measured by a particular appraiser that are biased towards acceptance.
95% UCI	Upper 95% confidence interval bound.
Calculated Score	Calculated score.
95% LCI	Lower 95% confidence interval bound.
System % Effective Store	All appraisers agreed within and between themselves.
Total Inspected	Number of parts inspected by an appraiser.

Control	Description
# Matched	Number of parts measured by all appraisers that matched the other appraisers.
95% UCI	Upper 95% confidence interval bound.
Calculated Score	Calculated effectiveness.
95% LCI	Lower 95% confidence interval bound.
System % Effective Score vs Reference	All appraisers agreed within and between themselves, and agreed with the reference value.
Total Inspected	Number of parts inspected by an appraiser.
# Matched	Number of parts measured by all appraisers that matched the reference value.
95% UCI	Upper 95% confidence interval bound.
Calculated Score	Calculated effectiveness.
95% LCI	Lower 95% confidence interval bound.

Miss Rate Analysis

For further analysis, the miss and false alarm rates are also measured.



Miss Rate Analysis

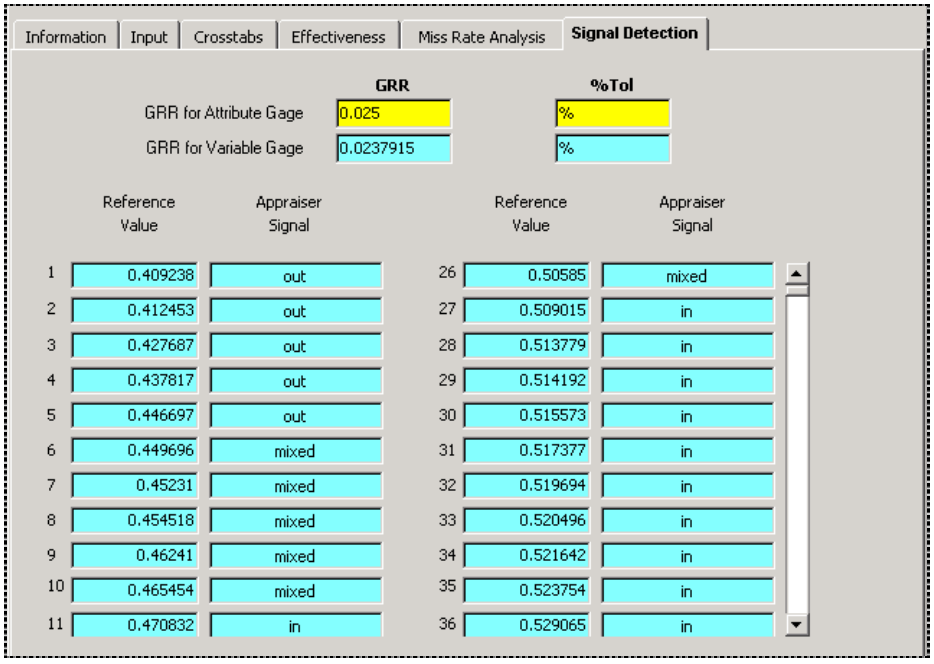
Miss Rate Analysis Tab Controls

Field	Description
Effectiveness per Trial	This field indicates the effectiveness, the ratio of the number of correct decisions to the total opportunities for a decision, per trial.
False Negative	This field indicates the percentage of parts measured by a particular appraiser that are biased towards rejection.
False Positive	This field indicates the percentage of parts measured by a particular appraiser that are biased towards acceptance.
Total	Total expressed in percentage.
Effectiveness per Trial	This field indicates the effectiveness, the ratio of the number of correct decisions to the total opportunities for a decision, per part.

Field	Description
False alarm rate	This field indicates the false alarm rate per part.
Miss Rate per Part	This field indicates the miss rate per part.
Total	Total express in percentage.

Signal Detection Theory

The Signal Detection Theory is used in approximating the width of the gray areas associated with the measurement system, which in turn, will be used in calculating the measurement system GRR.



Signal Detection

Signal Detection tab controls

Field/Button Name	Description
GRR for Attribute Gage	The actual %GRR of the measurement system.
GRR for Variable Gage	The estimated %GRR of the measurement system based on the Signal Detection Theory.
Reference Value	The reference value of a particular part measured.
Appraiser Signal	Appraisal signal of the part measured. May be one of the following: in (within the 95% confidence interval bound), out (outside the 95% confidence interval), and mixed (the gray areas associated with the measurement system).

Crosstabulation Formulas

OC = observed count

EC = expected count

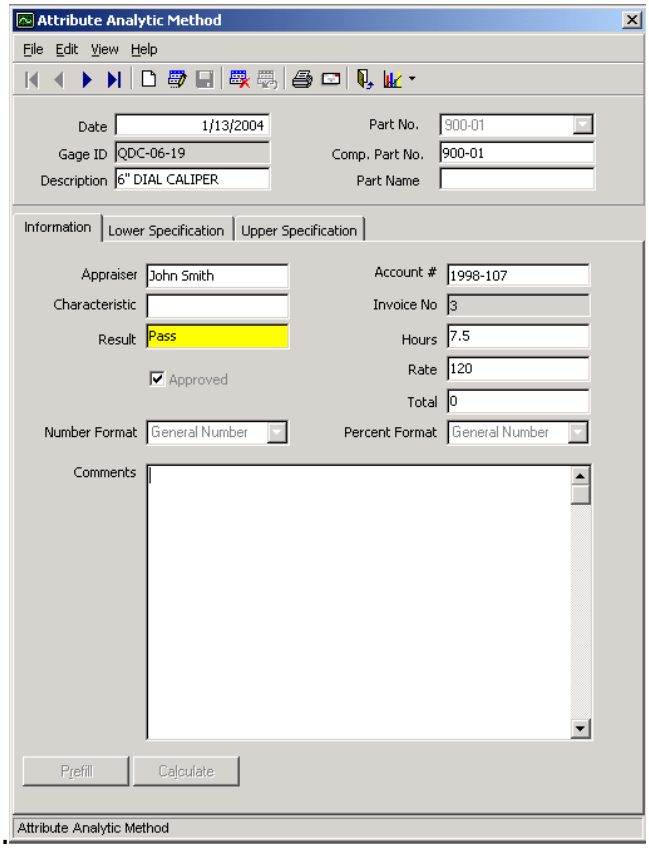
$$\text{EC} = \frac{\sum OC(row) \times \sum OC(column)}{\sum OC(all)}$$

$$\text{kappa} = \frac{OC(agree) - EC(agree)}{\text{EC(disagree)}}$$

Attribute Analysis Method

A Gage Performance Curve is used in studying an attribute measurement system. The said technique is used for assessing the repeatability and the bias of the measurement system. The attribute measurement system involves the determination of the probability of either accepting or rejecting a part of some reference value. From these, the repeatability and bias is then determined, thus making it possible to calculate the probability of accepting a part of some reference value when the attribute system is being used.

Gage theory tells you that a gage with no bias should have a fifty-fifty probability of accepting a part that was made exactly on a specification limit. That is true of both attribute and variable gages. It is also true for both types of gages; because of repeatability problems, parts just inside the limit will have a probability of acceptance that gradually increases to 100%, and parts just outside the limits will have a probability of acceptance that gradually decreases to 0%.

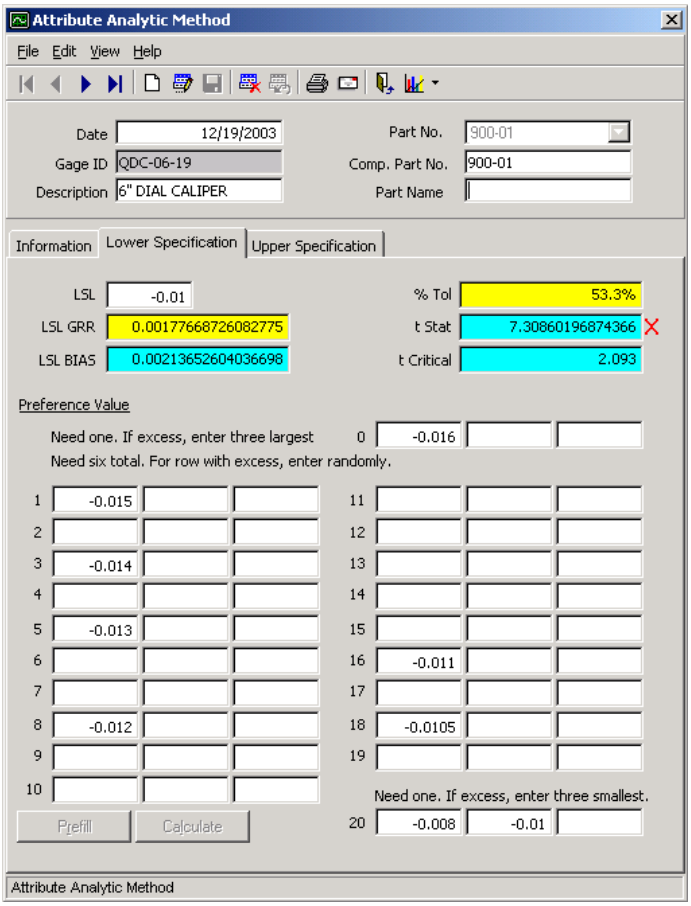


Attribute Analysis Controls

Control	Description
Date	Enter when the study was made (defaults to the current date).
Gage ID	This identifies the selected gage. This field is non-editable.
Description	Enter the name of the gage or measurement device.
Part No.	Select from the drop-down list related part number, such as the customer or supplier part number.
Comp. Part No.	Enter Company Part Number.
Part Name	Enter the description or name of the part.
Appraiser	Enter the name of the appraiser.
Characteristic	Enter the characteristic that you're evaluating in the study.
Result	This indicates the result of the study. ProGAGE ISO automatically generates this.
Account #	This indicates the tracking number associated with the calibration cost, such as job, purchase order, invoice, customer, or department number.
Invoice No	This indicates the Invoice Number associated with the calibration cost. ProGAGE ISO automatically fills up this field if you activated the Generate Invoice option in the Settings Utility. (See "Chapter 2: Program Settings" on page 161 of the System Administrator's Guide.)
Hours	Enter n.
Rate	Enter hourly labor rate.
Total	This indicates total labor rate.
Number Format	This indicates the number of decimal places used in reporting results.
Percentage Format	This indicates the format of decimal places used in reporting percentage results.

To conduct an Attribute Analytic Study, you first need to select eight parts at almost equidistant intervals. These parts must be evaluated (m) through the gage for twenty times, and the number of accepts (a) recorded. The smallest part should have a value of $a = 0$; the largest, $a=20$; the six other parts, $1 \leq a \leq 19$. If these criteria are not met, more parts with known reference value must be evaluated through the gage until the aforementioned criteria are satisfied. The probabilities of acceptance are then calculated for each part using binomial adjustments. A best-fit line is determined from the graph of the reference values of parts selected against the probabilities of acceptance. The resulting equation of the best-fit line is used to estimate the reference value at 50.0% probability of acceptance, which, in turn, is subtracted from the value of the lower limit to determine bias. Repeatability, on the other hand, is estimated from the ratio of the difference of the reference values corresponding to 99.5% and 0.5% probabilities of acceptance, to the adjustment factor, 1.08. Given the bias and repeatability, a t test is conducted, and if the result is greater than 2.093 it is considered that the *bias* is very different from zero.

The Attribute Analysis Method can be used on both single and double limit measurement systems. For a double limit measurement system, only one limit needs to be examined with the assumptions of linearity and uniformity of error.



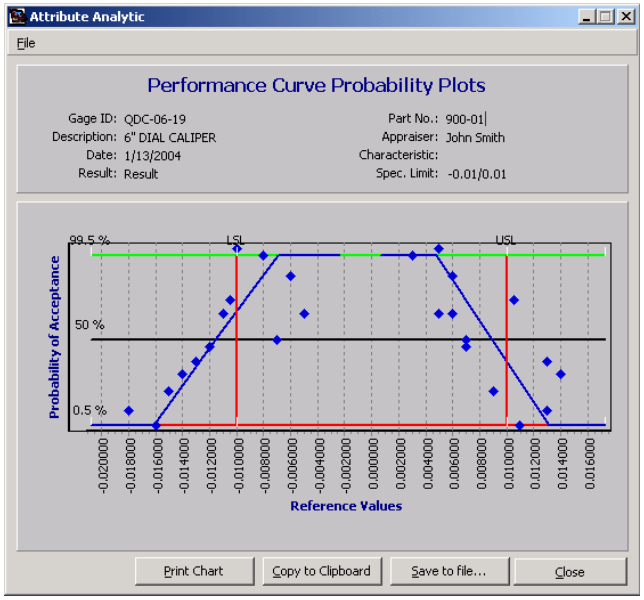
To conduct an Attribute Analysis Method Study using the lower limit of the measurement system, access the LOWER SPECIFICATION tab. The LOWER SPECIFICATION and the UPPER SPECIFICATION tab screens contain the same fields and buttons except for the LSL and USL Fields, which indicates the tolerance of the attribute gage. The LOWER SPECIFICATION tab contains the following controls (fields and button):

Control	Description
LSL	The Negative (lower) Tolerance value.
LSL GRR	Indicates the repeatability of the measurement system.
LSL Bias	Indicates the bias of the measurement system.
% Tol	Percentage of Tolerance Consumed by R&R.
t Stat	*t* Statistic equal to the ratio OF the product of 3.13 and the absolute value of the bias to the Repeatability.
t Critical	Equal to 2.093.
Reference Value	The reference value of the selected parts. Enter the reference value of the lowest part (a=0) on field 0; the reference value of the largest (a=20), on field 20. If there are excess reference values for a=20 and a=0, enter only the three largest (a=0) and the three smallest (a=20).
Prefill	If most of your measurements begin with the same numbers (such as 1.1651, 1.1650, and 1.1658), you can save time by prefilling the measurements with those digits. In this case, click the Prefill button, then enter a prefill value of 1.165. Now you need to enter only the last digit of each measurement. Before using *Prefill*, enter the number of trials and appraisers for the study.

Control	Description
Calculate	Calculates analytic values.

Performance Curve Probability Plots

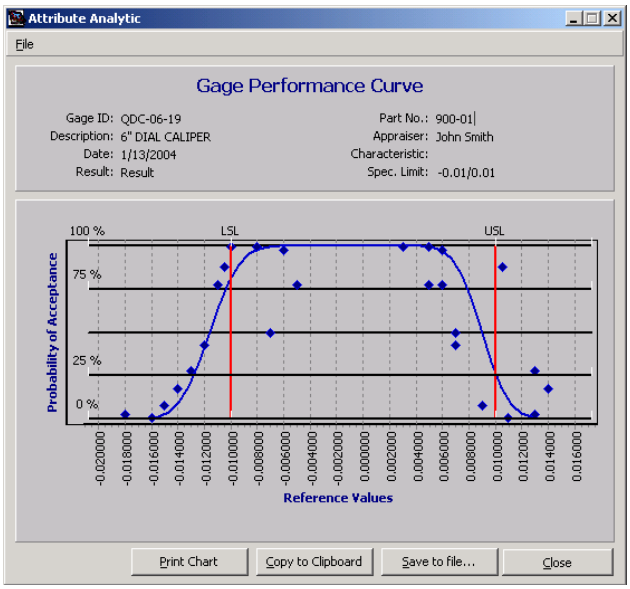
The probabilities of acceptance are calculated for each of the eight parts used. A best-fit line is determined from the graph of the reference values of parts selected against the probabilities of acceptance. The resulting equation of the best-fit line is then used to estimate bias and acceptability.



Performance Curve Probability Plot

Gage Performance Curve

To generate a Gage Performance Curve, click on the CHART button. The following example and the one preceding it are based on a double limit measurement system.



Gage Performance Curve

Attribute Analysis Formulas

C = acceptance count

P = probability of a particular acceptance count

x = normal score (plots on vertical scale, in this case)

y = variable measurement (plots on horizontal scale, in this case)

$\hat{y}$ = predicted variable measurement

b = intercept

a = slope (horizontal/vertical, in this case)

n = sample size

Adjustment for discrete data

Adding or subtracting 0.5, to make the number closer to 10, adjusts each acceptance count to calculate P values that convert well to normal scores. For example, P(0) = (0 + 0.5)/20 = 0.025. A table of the normal distribution will show that the corresponding normal score is –1.96.

Table of Counts, Probabilities, and Normal scores

C	0	1	2	3	4	5	6	7	8	9
P	0.025	0.075	0.125	0.175	0.225	0.275	0.325	0.375	0.425	0.475
X	-1.96	-1.44	-1.15	-0.93	-0.76	-0.60	-0.45	-0.32	-0.19	-0.06

10	11	12	13	14	15	16	17	18	19	20
0.5	0.525	0.575	0.625	0.675	0.725	0.775	0.825	0.875	0.925	0.975
0.00	0.06	0.19	0.32	0.45	0.60	0.76	0.93	1.15	1.44	1.96

Note: When there are multiple parts with a count of zero (or twenty), only the one closest to the average will be used in the linear regression. The extra parts will be plotted on the charts, but will not affect calculations.

Separate linear regressions are done for upper and lower specification limits. The custom for these charts is opposite of the usual practice: x, or P, will plot on the vertical scale, and y will plot on the horizontal scale.

$$\hat{y} = b + a \times x$$

$$a = \frac{\Sigma xy - \left(\Sigma x \frac{\Sigma y}{n}\right)}{\Sigma x^2 - \frac{(\Sigma x)^2}{n}}$$

$$b = \Sigma \frac{y}{n} - a \times \left(\Sigma \frac{x}{n}\right)$$

Bias = Specification Limit - b

$$GRR = \frac{\hat{y}(\text{at } x = 2.576/1.08) - \hat{y}(\text{at } x = -2.576/1.08)}{5.152}$$

The 1.08 empirical correction factor compensates for the adjustment that was made above to the P values. On the probability plot, the regression line ends at ± 2.576/1.08.

Other Techniques/References

PROGAGE ISO includes the basic measurement system analysis (MSA) techniques. These rely on proven statistical tools such as Confidence Interval Determination, Control Charting, Performance Curve Plotting, and ANOVA. For more information on how the tools work, see, especially NIST/SEMATECH, Duncan, or Box in the list below. To see alternative or special purpose applications for MSA, see AIAG, or NIST/SEMATECH. For examples using uncertainty to summarize MSA studies, see EA-4/02 and NIST/SEMATECH, (where websites are referenced, the publications can be freely viewed online, downloaded, or both).

We used the following publications as references in developing MSA studies; we recommend them to expand your understanding of measurement system analysis:

AIAG, *MSA Measurement Systems Analysis Reference Manual,* Third Ed., DaimlerChrysler, Ford, General Motors, 2002 (*highly recommended*—to order a copy, call AIAG at (248) 358-3570 and ask for document number "MSA").

ASTM, Special Technical Publication 15D, Manual on *Presentation of Data and Control Chart Analysis,* 1976.

BOX, G. E. P., Hunter, W. G., Hunter J. S., *Statistics for Experimenters*, John Wiley & Sons, New York, 1978.

DUNCAN, A.J., *Quality Control and Industrial Statistics*, Fourth Ed., Richard D. Irwin, Inc., Homewood, Illinois, 1974.

EA-4/02, *Expression of the Uncertainty of Measurement in Calibration*, 1999, www.european-accreditation.org/pdf/EA-4-02ny.pdf.

GRUBBS, F. E., "Errors of Measurement, Precision, Accuracy and the Statistical Comparison of Measuring Instruments, Technometrics", Vol. 15, February 1973.

HICKS, C. R., *Fundamental Concepts in the Design of Experiments*, Holt, Rinehart and Winston, New York, 1973.

ILAC, G17:2002, Introducing the Concept of Uncertainty of Measurement in Testing in Association with the Application of the Standard ISO/IEC 17025, 2002, www.ilac.org.

ISO, Guide to the Expression of Uncertainty in Measurement, 1993, (Revised 1995).

NIST, TN 1297, *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, 1994, www.nist.gov/public_affairs/pubs.htm

NIST/SEMATECH, *e-Handbook of Statistical Methods*, www.itl.nist.gov/div898/handbook/

WESTERN ELECTRIC, *AT&T Statistical Quality Control Handbook*, Charlotte, NC, Delmar Printing Company, 1984.

Appendix A: Calibration Label Kit

Installing the Label Printer and Windows Software

To install Label Printer and Windows software

1 Attach the Brother P-Touch PC printer's serial port and cables, and then put the tape cartridge into the printer.

2 Install the *P-Touch PC Editor for Microsoft Windows* software. See the enclosed Brother booklets for more detailed instructions. The printer driver need to be installed before you can view labels for printing.

Printing Calibration Labels

To create printing labels, see "Creating Labels in Report Editor" on page 218.

Appendix B: Gage Calibration and Control

Purpose of Calibration

Gages, test equipment, and measurement standards are all susceptible to deterioration in accuracy during use and storage. To maintain accuracy in your measurements, you need to maintain a calibration system.

Calibration Terminology

Calibration

The terminology associated with calibration control is not universally standardized. Typically, the term "calibration" means placing a gage, measurement standard, or test instrument into a state of accuracy. Calibration is also called "re-calibration" or "reconditioning".

Calibration Practice

To ensure consistency in your calibration techniques, it is advisable that you develop procedure manuals of calibration practices. These should include tolerances for accuracy; standards; temperature and humidity controls (if needed); time cycles; human technique; and other important factors.

After calibration, ensure that the equipment is tamper-proof—use sealed adjusting screws, lead-sealed lock wires, stamps, and other devices if possible.

Record the results of your calibration checks and any required adjustments or repairs. As basic procedure, record the following information:

- Date when calibration was checked.
- Person that checked/performed calibration.
- Any deficiencies seen in the equipment.
- Accuracy data (if able to measure accuracy).
- Causes for out-of-calibration conditions.
- Repair time and calibration time.

Review this information periodically to see if you should reduce checks on stable equipment; increase checks on unstable equipment; or redesign/replace the measurement equipment.

Calibration Schedules

Calibration schedules are usually determined by the gages' classification. You can establish initial calibration schedules by expected usage, engineering judgment, and bargaining. As you gather actual calibration information, you might need to adjust the schedules.

The primary objective of a calibration schedule is to detect accuracy deterioration *prior* to intolerable levels of accuracy. While gage usage is often the primary cause of accuracy deterioration, the length of time the gage has been use may also be a factor.

The most common methods for determining calibration schedules are:

- Elapsed calendar time—the most popular method, it establishes a fixed calendar time, such as 90 days, as checking interval.
- Actual amount of usage (time and cycles)—based on counting the number of days (or operating cycles) for which the gage was used (you can keep this count manually or automatically).
- Actual operating time—an excellent method for electrically driven gages (a device used for measuring actual operating time is called a "coulometer").

Gage (or Gauge)

This term applies to a large number of measurement inspection devices, including fixed-limit (attribute or go/no-go) and variable (actual numeric measurement) gages. Usually, your company calibrates this type of equipment internally, using either working or precision standards. You can calibrate fixed-limit gages by using working standards or dimensional layout. For simplicity throughout this manual, the term "gage" is used to refer to all measurement equipment.

Inventory and Classification

To begin your gage control system, take an inventory of your gages. The initial inventory— usually the most difficult—determines the origins, locations, types, and calibration schedules, and then assigns identification numbers and collects additional information to classify your gages.

Purchased Precision Standards

High accuracy measurement standards—such as gage blocks or standard load cells—represent the highest degree of accuracy in a company and are purchased from outside sources. In most cases, the only form of calibration control on one of these standards is your supplier's certification that the standard is traceable to the U.S. Department of Commerce's National Institute of Standards and Technology (NIST—formerly the National Bureau of Standards). Your supplier, an independent laboratory, or the NIST must perform any subsequent calibrations on these standards.

Purchased Working Standards

These standards are used to check calibration internally before gages or test equipment are used. However, these are not as accurate as precision standards and are also less expensive. The standards are usually sent to an outside source for calibration, though these may also be calibrated in-house.

Test Equipment

The term "test equipment" covers a variety of measuring equipment, including some working standards. These are used to check your products and manufacturing processes. Always check test equipment for calibration before you use it, even if the equipment is brand new.

Test Materials

Test materials are consumable standards, such as films or liquids, used in calibrating test equipment. Since variability in these materials can affect your measurements and calibrations, this information is usually provided by your suppliers.

References

The following books and publications discuss gage calibration and control:

JURAN, J.M., Juran's Quality Control Handbook, Fourth Ed., 1988.

JURAN, J.M., Quality Planning and Analysis, Second Ed., 1980.

FARAGO, Francis T., *Handbook of Dimensional Measurement,* Second Ed., 1982.

National Conference of Standards Laboratories (NCSL), *Establishment and Adjustment of Calibration Intervals (RP-1),* Second Ed., 1989.

U.S. Dept. of Defense, MIL-STD-45662A, Calibration System Requirements, 1988.

Resources for Books, Publications, and Reference Materials

American Society for Quality Control (ASQC)
310 W. Wisconsin Ave., Milwaukee, WI 53203
Phone numbers: (800) 952-6587 or (414) 272-8575

National Conference of Standards Laboratories (NCSL)
1800 30th St., Suite 305B, Boulder, CO 80301
Phone number: (303) 440-3339

National Institute of Standards and Technology (NIST)
Bldg. 411 Rm. A112, Gaithersburg, MD 20899

American National Standards Institute (ANSI)
1430 Broadway, New York, NY 10018

American Society for Testing and Materials (ASTM)
1916 Race St., Philadelphia, PA 1910

The Naval Publications and Forms Center
5801 Tabor Ave., Philadelphia, PA 1912

ProGAGE™ ISO 6

Calibration Management Software

System Administrator's Guide

Chapter 1: Installing ProGAGE ISO 6

System Requirements

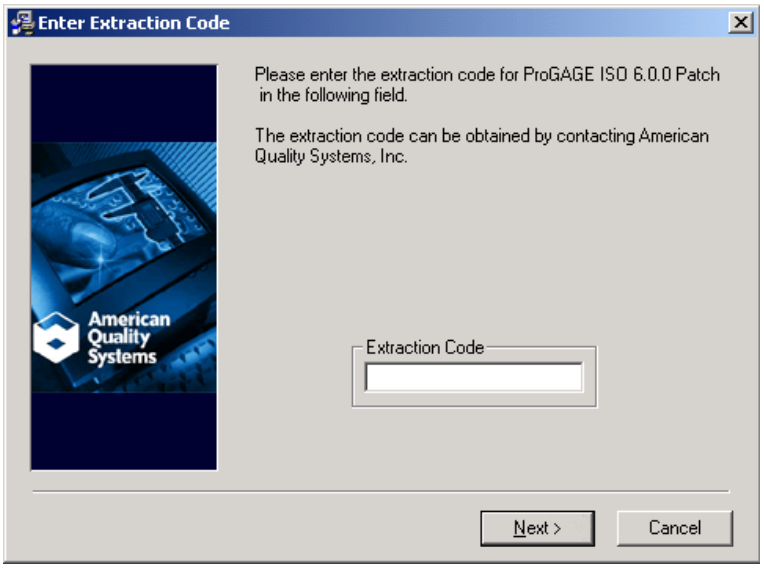
- Microsoft Windows 98SE, Windows 2000 or Windows XP
- Hard disk with 60 MB of free space for program files and a typical database
- At least 128 MB RAM
- CD ROM or DVD Drive
- DCOM 98 for Windows 98
- MDAC v2.5 or higher
- Windows 2000 Service Pack 3 for Windows 2000 platform
- MSDE/SQL Server (7.0 or higher) if you want to use SQL Server for data storage

Installation

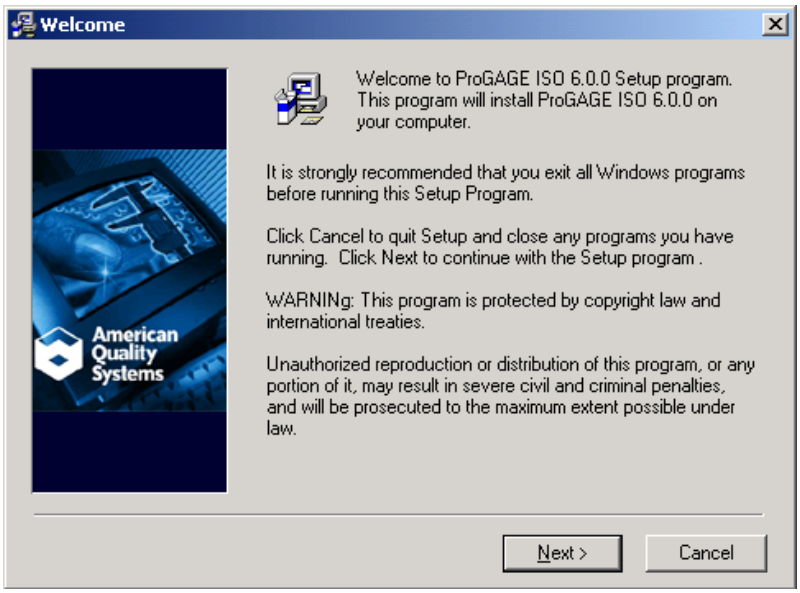
It is highly recommended that you close all applications first before installation. To begin, insert the CD into the drive and follow the steps below:

1 Click on the INSTALL button.

2 Enter the Extraction Code (Contact American Quality Systems or your local distributor for this) and then click NEXT>.

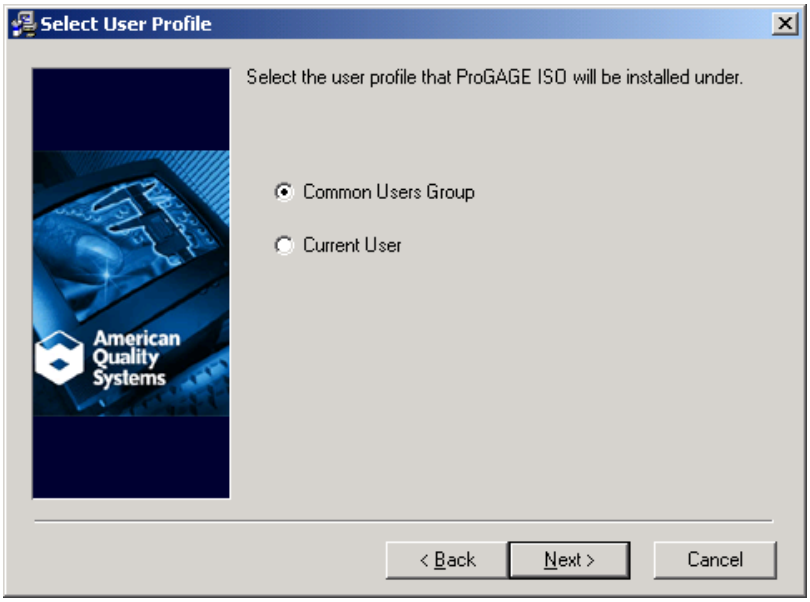


3 The SETUP WIZARD will appear and guide you through the rest of the process.

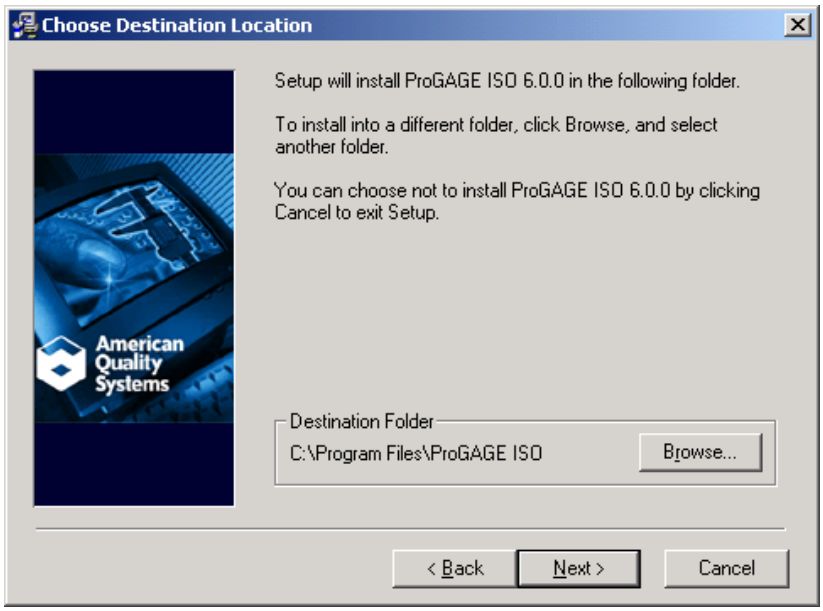


4 Continue the installation by clicking NEXT>.

5 Define the Microsoft Windows User Profile where the program will be installed.

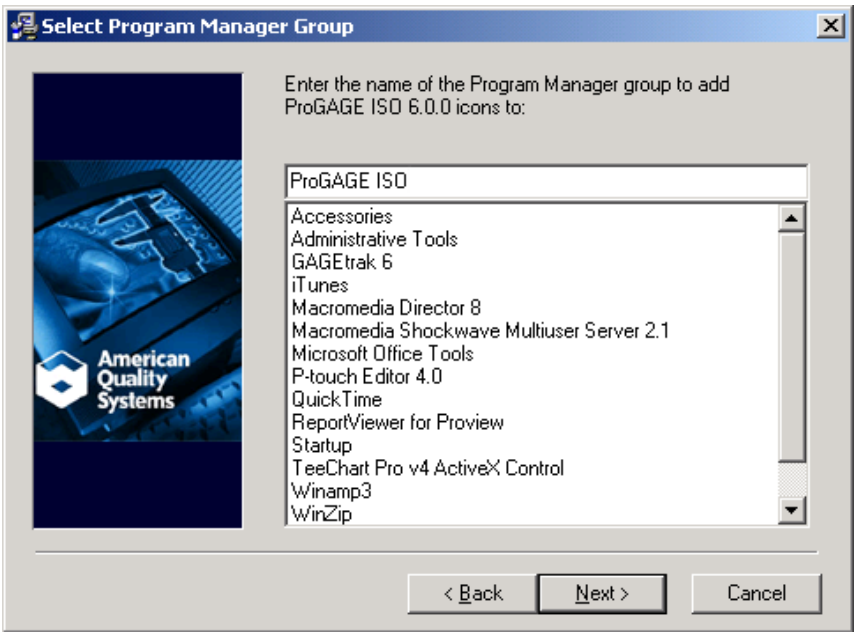


6 In the screen below, the SETUP WIZARD will prompt you where the program will be installed. The default is C:\Program Files\ProGAGE ISO 6.

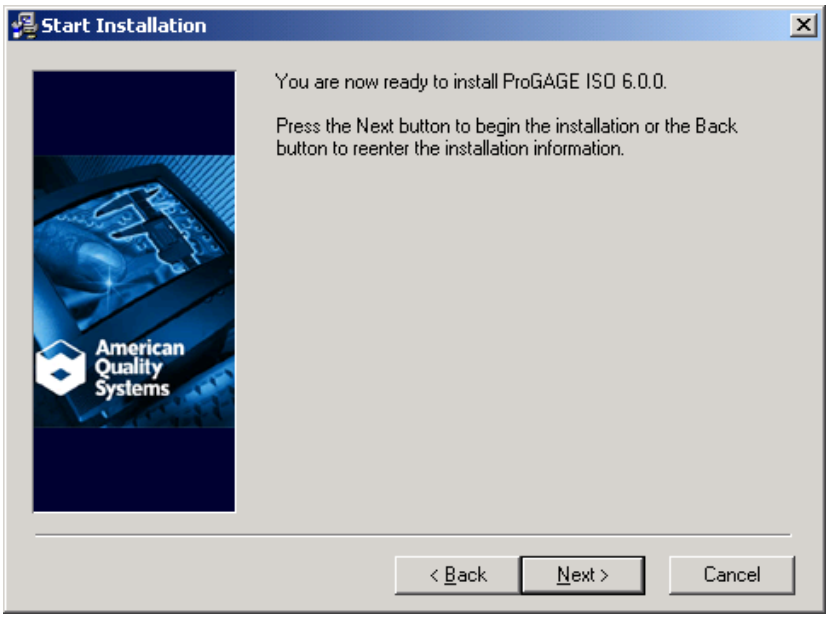


Although it is highly recommended that you accept the default, you can also specify a different destination folder by clicking on the BROWSE button. The program will then ask you to select a Program Manager group to which you want to add ProGAGE ISO 6 icons.

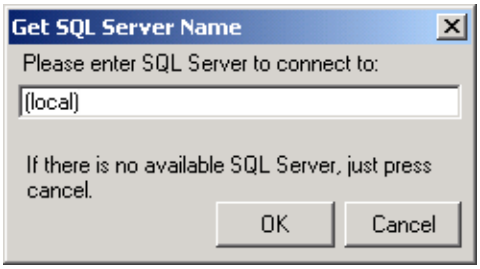
Once you have made your selection, click NEXT> to continue.



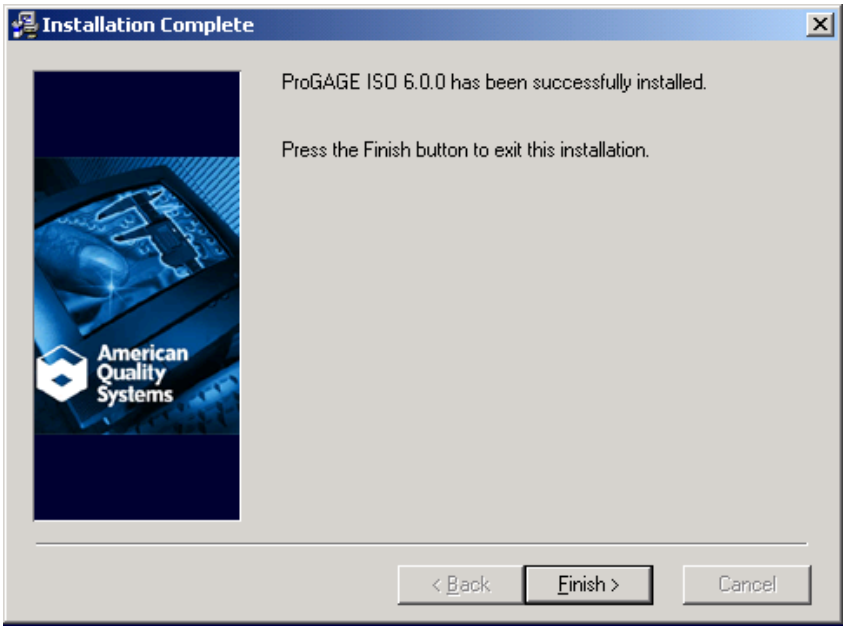
7 The SETUP WIZARD will prompt you that the program will now be installed. Click NEXT> to begin; CANCEL to abort the installation process.



8 In this screen, indicate the SQL Server you want to connect to and press OK. Select CANCEL if there is no available SQL Server.



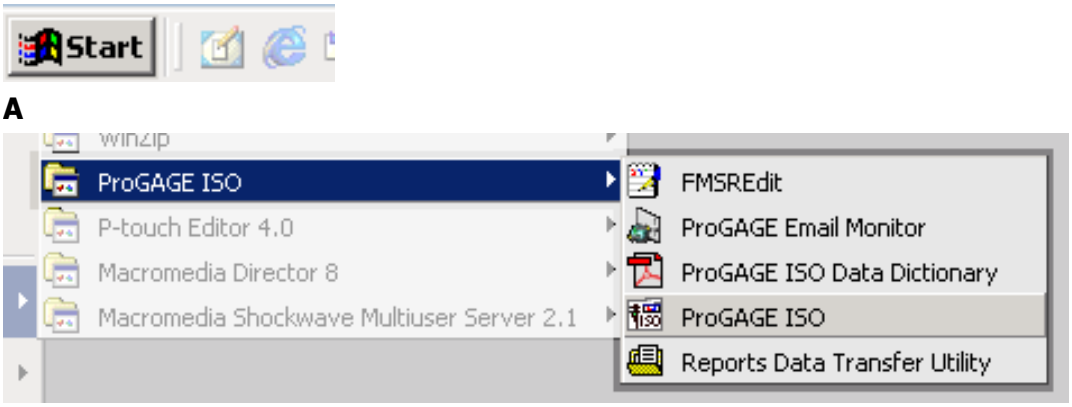
9 Installation will then be completed. A message box will appear if the process is successful. Click FINISH to exit.



Running ProGAGE ISO 6

To start an initial ProGAGE ISO 6 Session:

1 Click the Start button and select PROGRAMS > PROGAGE ISO > PROGAGE ISO.



A

B

Opening ProGAGE ISO

A START button **B** Selecting ProGAGE ISO

2 Register your copy of the program by entering your Company Name and the License Serial Number (indicated on the cover of the CD) in the respective fields.

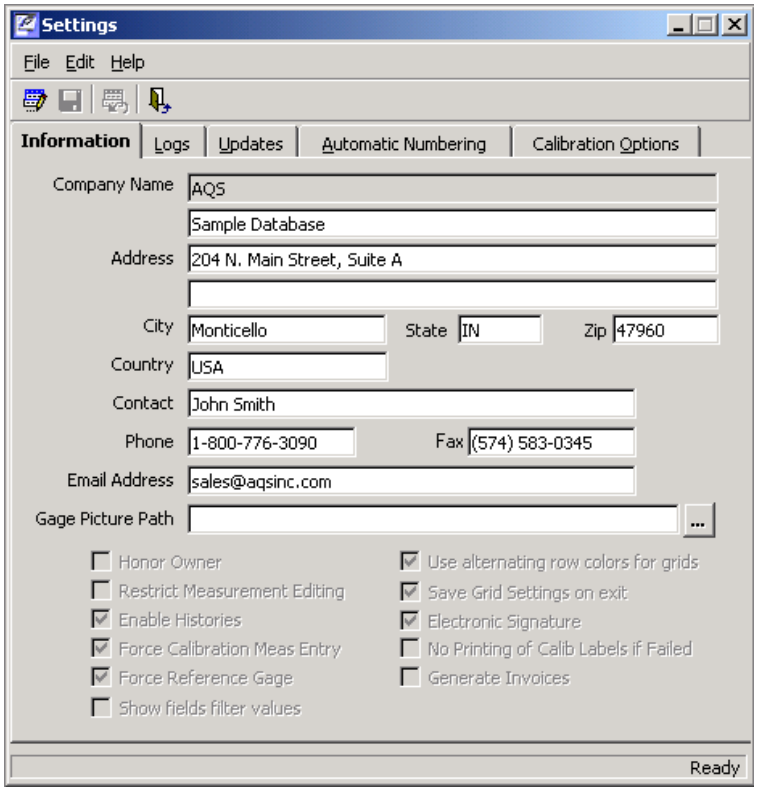
Click REGISTER. A message box indicating successful installation will appear. It will also indicate the allowed number of users for the program.

If you choose not to register, you will automatically get the trial version of the program and this window will pop up every time you run the program.

Note: To secure your database, it is recommended that the system administrator set authorized users and their passwords in the Setup module in the initial ProGAGE session. (See "Chapter 3: Entering User Records" on page 175). Once Users and Passwords have been established, the login window (below) will appear in the succeeding ProGAGE ISO 6 sessions.

Chapter 2: Program Settings

To customize your program preferences and enter information, select SETTINGS from the UTILITIES MENU. The SETTINGS utility is divided into five tab folders: Information, Logs, Updates, Automatic Numbering, and Calibration Options.



Settings Module Work Area

Information

Use the INFORMATION tab folder to enter your company's information and set-up your program preferences.

To enter company information and/or setup program preference:

1 Do any of the following:

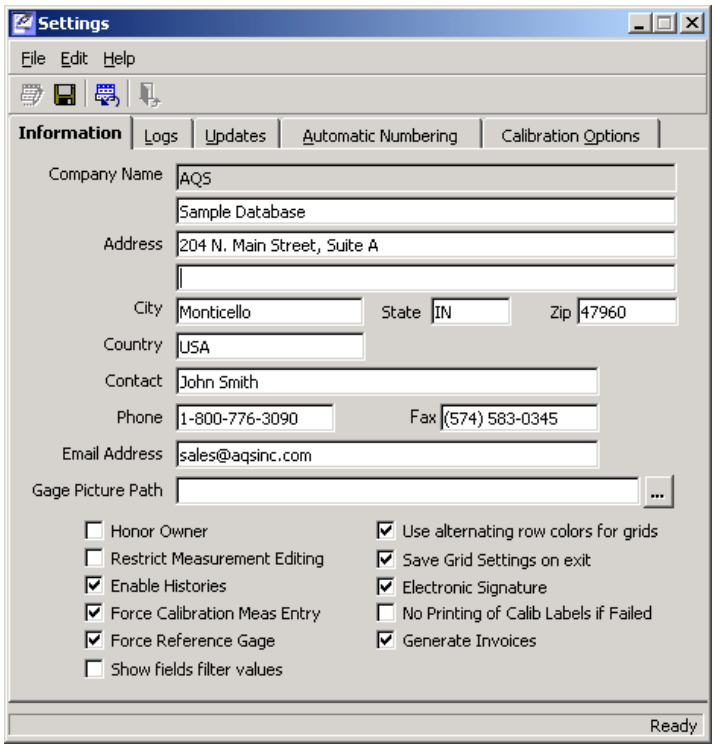
- On the toolbar, click the EDIT RECORD button .
- Choose FILE > EDIT RECORD.
- Press the shortcut key: Ctrl+T.

2 Enter relevant information on controls.

3 Select the preferences that you want by marking corresponding *<checkbox name>*.

4 Save information and settings by doing any of the following:

- On the toolbar, click the SAVE RECORD button .
- Choose FILE > SAVE RECORD.
- Press the shortcut key: Ctrl+S.



Enter company information and setup program preference in this screen.

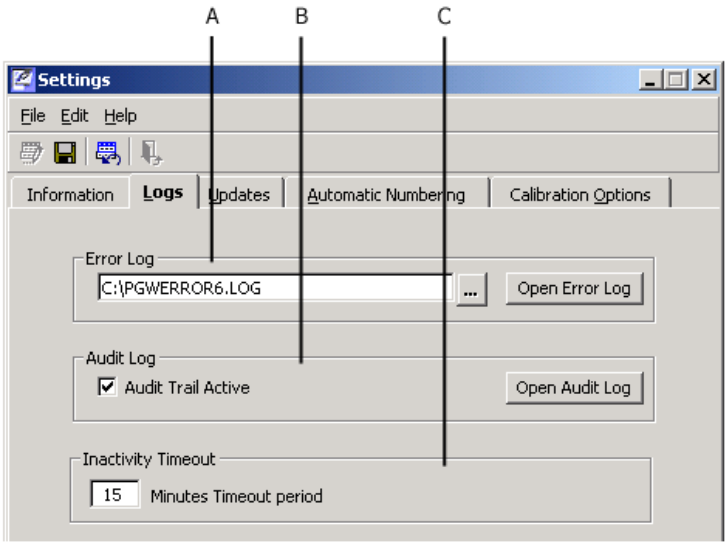
Information Controls

Control	Description
Company Name	This indicates your company's name. This field is non-editable, and the name reflected is the one entered during Registration.
Address, City, State, Zip, Country	Enter in these related fields your company's complete address. Two fields are provided for your street address—one for the City, another one for the State Initials; one for the Zip Code, and another for the Country.
Contact	Enter your name or department identification in this field.
Phone	Enter in this field your company's phone number.
Fax	Enter in this field your company's fax machine number.
E-Mail Address	Enter in this field your company's email address, e.g., johndoe@yourcompany.com. Make sure that you enter the complete email address; all e-mail notifications that will be generated by ProGAGE ISO 6 will be directed to this address.
Gage Picture Path	Click on the BROWSE (...) button to map and specify the picture path. This allows you to link and access the image without having to save it in your database.
Honor Owner	Mark this checkbox to honor only the authorized user/owner of the gage. This means that only the authorized user/owner of that gage can edit and calibrate it, unless the current user has the access rights of an administrator.

Control	Description
Restrict Measurement Editing	Mark this checkbox to restrict users—except those with access rights of an administrator—from changing the standards taken from a Gage Master record to a Calibration record.
Enable Histories	Mark this checkbox to open a History Textlist box whenever a field is accessed or a value is being entered on it. A History Textlist box enumerates all values entered previously in a particular field, offering users options to choose from.
Force Calibration Meas Entry	Mark this checkbox to enable the Force Calibration Measurement feature. This will require you to enter measurements before saving a new calibration record.
Force Reference Gage	Mark this checkbox to enable the Force Reference Gage feature. This feature will require you to enter a reference gage for your calibration measurements before a Calibration record is saved.
Use alternating row colors for grids	Mark this checkbox to set rows with alternate colors for convenient viewing of data.
Save Grid Settings on exit	Mark this checkbox to maintain custom changes (such as column resize) on the Records Listing pane.
Electronic Signature	Mark this checkbox to enable the electronic signature feature, which will require users to sign a Log-in form whenever they save updates and changes made on records.
No Printing of Calib Labels if Failed	Mark this checkbox to instruct ProGAGE ISO 6 to refrain from printing labels if the gage fails calibration.
Generate Invoices	Mark this checkbox to generate invoice records whenever a Calibration or R&R Study record is created.

Logs

The Logs tab folder contains three important features: Error Log, Audit Log, and Inactivity Timeout.



Setting features in Logs tab folder

A. Error Log **B.** Audit Log **C.** Inactivity Timeout

Error Log

This feature automatically logs any error made while using ProGAGE ISO 6. The default error log, PGWERROR6.log, is saved automatically in the root directory.

To view and print error log:

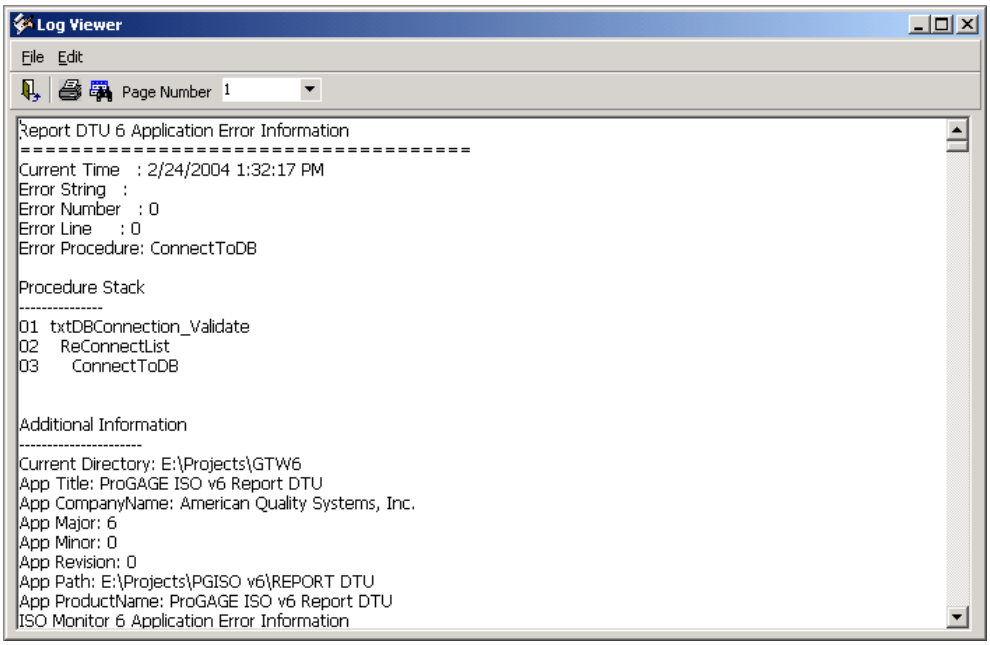
1 Click BROWSE (…) button. The ERROR LOG FILE dialog opens.

2 Map and locate PGWERROR6.log. Click OPEN.

3 Click OPEN ERROR LOG button. The Log Viewer appears.

4 To print, do any of the following:

- On the toolbar, click the PRINT button  .
- Choose FILE > PRINT.
- Press the shortcut key: Ctrl+P.



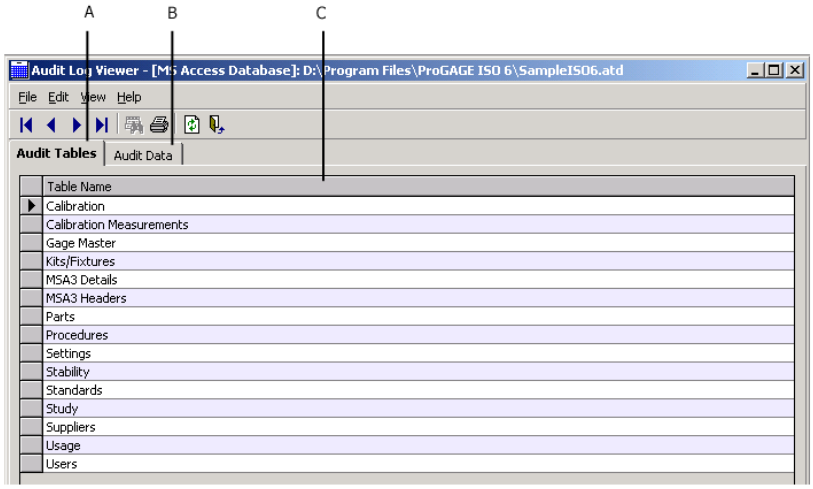
View and print error log

Audit Log

This feature automatically records all actions (such as record update or deletion) performed, the user who performed each action, and the date and time when the action was made. The Audit Trail Log lists every action and the corresponding user who performed each action. To enable this feature, mark the Audit Trail Active checkbox.

The Audit Log Viewer

The Audit Log Viewer is divided into two tab folders: AUDIT TABLES and AUDIT DATA. The AUDIT TABLE has a Records Listing pane that contains 15 tables of ProGAGE ISO 6. You may access any of this table, and view all actions performed, with corresponding details, in that table by opening the AUDIT DATA tab folder.



Setting features in Logs tab folder

A. Audit Tables **B.** Audit Data **C.** Records Listing Pane

To view actions performed in a particular table:

1 Click OPEN AUDIT LOG button. The Audit Log Viewer opens.

2 Select <Table Name> in Audit Tables tab folder.

3 Open Audit Data tab folder.

Inactivity Timeout

Enter on this field the length (in number of minutes) of inactivity before ProGAGE ISO 6 automatically terminates a user session.

To set and save length of inactivity timeout:

1 Do any of the following:

- On the toolbar, click the EDIT RECORD button  .
- Choose FILE > EDIT RECORD.
- Press the shortcut key: CTRL+T.

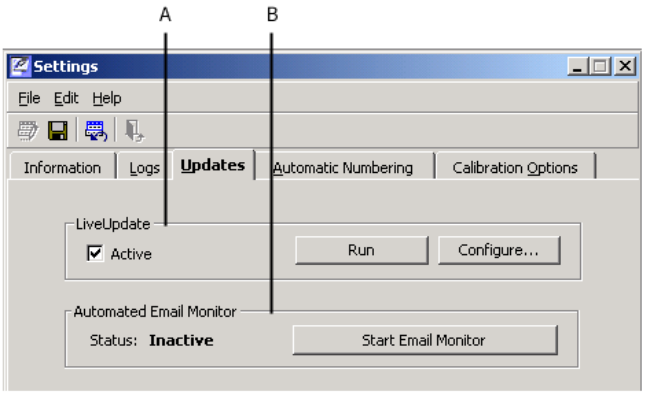
2 Enter value *<number>* in Minutes Timeout Period field.

3 Do any of the following:

- On the toolbar, click the SAVE RECORD button  .
- Choose FILE > SAVE RECORD
- Press the shortcut key: CTRL+S.

Updates

Use the UPDATES tab folder to activate Live Update and configure the E-Mail Monitor features.



Setting features in Updates tab folder

A. LiveUpdate **B.** Automated Email Monitor

LiveUpdate

The LiveUpdate feature allows you to receive notification whenever your ProGAGE ISO 6 system becomes out-to-date—such as when new installers are found in the AQS download site. The LiveUpdate feature is enabled when the Active checkbox is marked; to operate, click the RUN button.

Setting Up LiveUpdate

You can activate this feature by clicking the CONFIGURE... button.

To activate LiveUpdate whenever Windows and program starts:

1 Click CONFIGURE... button. The LiveUpdate Configuration form opens.

2 Open Time Zone, and select *<time zone>* from options.

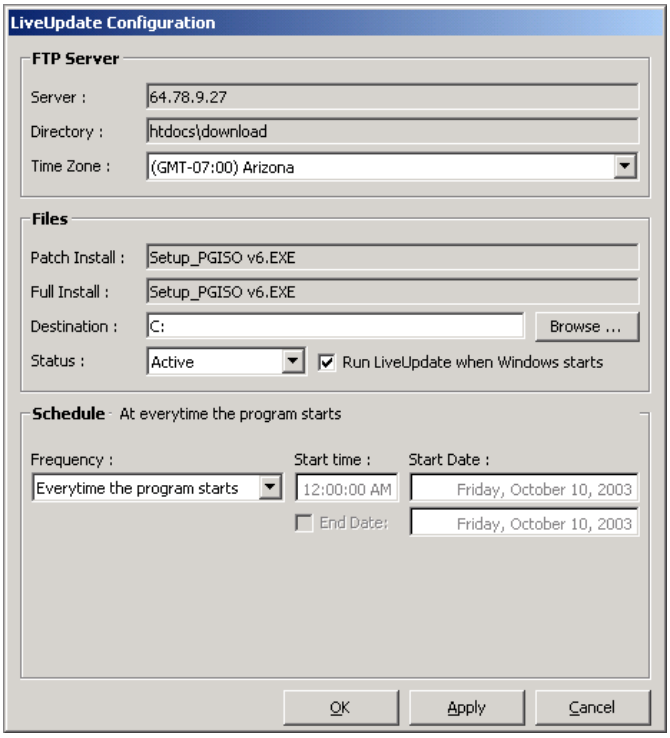
3 Enter path of destination folder in Destination.

4 In the Status field, select Active from the drop-down list.

5 Mark Run LiveUpdate When Windows Starts.

6 In the Frequency field, select Everytime the program starts from the drop-down menu.

7 Click OK.



Configuring LiveUpdate

LiveUpdate Configuration Controls

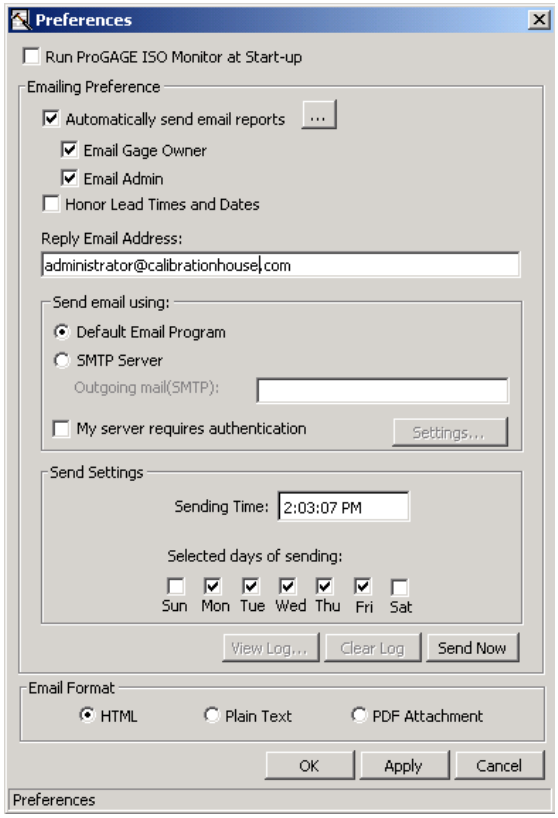
Control	Description
Server	This field indicates the AQS Download Site Server, and is non-editable.
Directory	This field indicates the directory from the download site that is checked by the LiveUpdate feature for new downloads and updates. This field is non-editable.
Time Zone	Select from the drop-down list the Time Zone that will be followed by LiveUpdate.
Patch Install	This field indicates the application set-up file that is fully installed in your system, and is non-editable.
Full Install	This field indicates the application set-up file that is fully installed in your system, and is non-editable.
Destination	This field indicates the path of the destination folder for your new downloads and updates. Click the BROWSE (…) button to map and specify the destination folder.
Status	Select from the drop-down list the status—whether Active or Inactive—of the LiveUpdate feature.
Run LiveUpdate when Windows Starts	Mark this checkbox to run LiveUpdate When Windows Starts.
Frequency	Select from the dropdown menu the frequency of running the LiveUpdate. If you select a frequency other than "Every time the program starts," you can specify the Start Time, Start Date, End Date, and other related fields to further define the configuration of LiveUpdate.
OK	Click this button to apply settings and close the window.
Apply	Click this button to apply settings.
Cancel	Click this button to cancel LiveUpdate configuration.

E-Mail Monitor

The Email Monitor feature instructs ProGAGE ISO 6 to send email reports to the Administrator and/or the Gage Owner whenever there is a gage due for calibration, for R&R Study and for usage, and/or when a gage fails calibration.

Setting Preference for the E-mail Monitor

To set the preferences for the Email Monitor, make sure that the Status of the feature is Active. When the feature is activated, an icon appears on the desktop toolbar. Click on the icon to start setting Preferences.



Preferences Controls

Control	Description
Run ProGAGE ISO Monitor at Start- up	Mark this checkbox to run ProGAGE ISO 6 E-Mail Monitor at Start-up.
Automatically Send Email Reports	Mark this checkbox to instruct ProGAGE ISO 6 to send electronic reports automatically. Mark the appropriate checkboxes to specify the recipient of electronic reports: either the Gage Owner or Administrator. By default, e-mail notifications will be sent to Administrator and Authorized User/Owner whenever a gage is due or past due for calibration. Click the BROWSE (...) button to open and define Email Settings. (See "E-mail Settings" on page 169 .). When this option is selected, Reply Email Address, Send Settings, and related controls become active.
Honor Lead Times and Dates	Mark this checkbox to instruct ProGAGE ISO 6 to recognize Lead Times and Dates.
Reply Email Address	Enter in this field the complete reply e-mail address (e.g., johndoe@yourcompany.com).

Control	Description
Send Email Using	Activate the appropriate radiobutton to instruct ProGAGE ISO 6 how to send e-mail. Options are: Default Email Program and SMTP Server. If you choose SMTP Server, you need to indicate the outgoing SMTP server on the corresponding field.
My Server Requires Authentication	Mark this checkbox to instruct ProGAGE ISO 6 to require an electronic signature before sending an E-mail notification. Click the SETTINGS... button to set Mail Server Settings; requires you to enter Account Name and Password.
Sending Time	Enter in this field the time when ProGAGE ISO 6 sends the e-mail report.
Selected Days of Setting	Mark the corresponding checkboxes of the days when sending of E-mail notification is allowed. The time when you open Preferences becomes the default entry in this field.
View Log	Click this button to view the log that lists E-mail notifications sent.
Clear Log	Click this button to clear the log that lists E-mail notifications sent.
Send Now	Click this button to send the E-mail notification now.
Email Format	Select and activate the appropriate button to indicate the file format of the e-mail reports that will be sent. You can choose one from the following: HTML, Plain Text, and PDF Attachment.
OK	Click this button to apply settings and close Preference.
Apply	Click this button to apply settings.
Cancel	Click this button to close Preference without applying new settings.

To set E-Mail Monitor to send e-mail reports to Administrator and owner using the default e-mail Program whenever a gage is due for calibration, but only during regular office days:

1 On the Desktop toolbar, click E-MAIL MONITOR icon  . The Preferences window opens.

2 Mark Automatically Send Email Reports.

3 Enter complete e-mail address on Reply E-Mail Address.

4 Choose Default E-mail Program.

5 Enter value on Senting Time; value should be of HHMMSSXX format

where:

HH stands for hour (from 01 to 12),
MM for minutes (from 00 to 60),
SS for seconds (from 00 to 60), and
XX for either AM or PM.

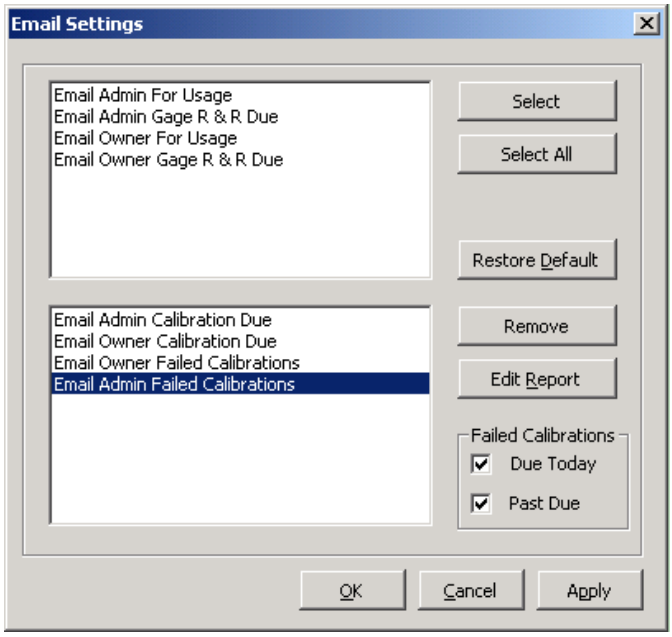
6 Mark the corresponding checkboxes for Mon, Tue, Wed, Thu, and Fri.

7 Choose *<Email Format>* .

8 Click OK.

E-mail Settings

You can access the Email Settings when you click on the BROWSE (...) button in Preferences. With E-mail Settings, you can specify when and to whom to send electronic reports. By default, an e-mail notification is sent to the Administrator and Owner whenever a gage is due or past due for calibration.



Email Settings Controls

Control	Description
Upper Textbox List	This textbox list contains the following options: Email Admin Failed Calibrations — Send e-mail report to the Administrator about a failed calibration. Email Admin for Usage—Send e-mail report to the Administrator about a gage due for usage. Email Admin Gage R&R Due —Send e-mail report to the Administrator about a gage due for R&R study. Email Owner Failed Calibrations — Send e-mail report to Owner about a failed calibration. Email Owner for Usage—Send e-mail report to Owner about a gage due for usage. Email Owner Gage R&R Due —Send e-mail report to Owner about a gage due for R&R study. To choose an option, position the pointer over it and click mouse button; to un-choose, click again.
Lower Textbox List	This textbox list indicates the selected options for Email settings notification (what event and to whom). By default, the following are selected: Email Admin Calibration Due — Send e-mail notification to the Administrator about a gage due for calibration. Email Owner Calibration Due — Send e-mail report to Owner about a gage due for calibration.
Select	Click this button to select option/s chosen from Textbox list.
Select All	Click this button to select all options in Textbox list.
Restore Default	Click this button to restore default Email Settings.
Remove	Click this button to remove option/s in.
Edit Report	Click this button to first edit report before sending it.

Control	Description
Due Today	This checkbox is dependent on the chosen option on the Lower Textbox List. For example, Email Admin Calibration Due is chosen, mark this checkbox if you want ProGAGE ISO 6 to send email report, the same day when a gage is due for calibration.
Past Today	This checkbox is dependent on the chosen option on the Lower Textbox List. For example, Email Admin Calibration Due is chosen, mark this checkbox if you want ProGAGE ISO 6 to send email report to the Administrator on all gages that are past due for calibration.
Ok	Click this button to apply settings and close Email Settings.
Cancel	Click this button to apply settings.
Apply	Click this button to close Email Settings without applying new settings.

To send e-mail reports to the Administrator and gage owner about gages that failed calibration, aside from the default Email Settings options:

1 Click BROWSE (…) button in Preference. The Email Settings dialog opens.

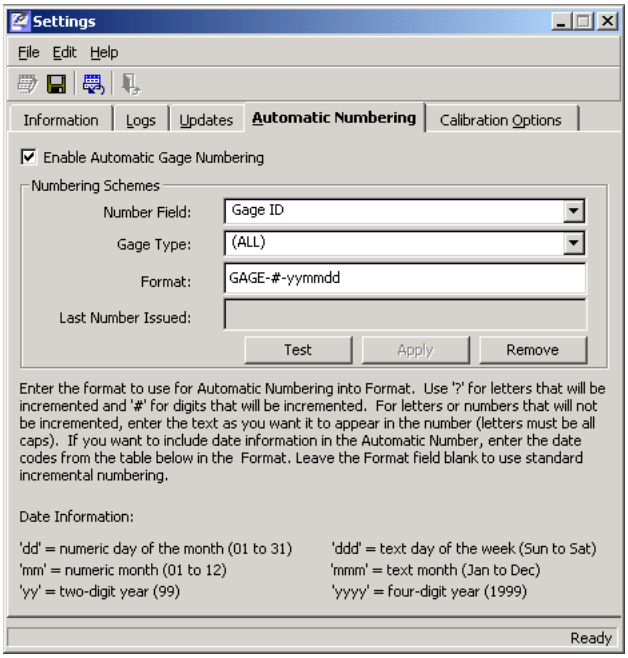
2 Choose Email Admin Failed Calibrations and Email Owner Failed Calibrations.

3 Click Select.

4 Click OK.

Automatic Numbering

ProGAGE ISO 6 also features a convenient Automatic Numbering option. When this setting is enabled, ProGAGE ISO 6 automatically assigns an ID for a new gage entry and/or service request, based from a user-defined increment and alphanumeric format. The numbering scheme can be defined from the AUTOMATIC NUMBERING tab folder. Automatic numbering scheme is supported for both gages and service requests.



Automatic Numbering Controls

Control	Description
Enable Automatic Gage Numbering	Mark this checkbox to enable the automatic numbering scheme.
Number Field	Select either the GAGE ID or Service Request No. from this drop-down list.
Gage Type	Enter the type of gage to which you will apply the automatic numbering system. You may select the default option (ALL) to apply the numbering scheme to all types of gages.
Format	Enter the alphanumeric format of the numbering scheme following the succeeding conditions: Use capital letters or numerals for constant elements of the alphanumeric format. Use "#" for variant (increasing integer at constant increment beginning from 1) element of the alphanumeric format. Use pre-defined syntax to indicate date when the ID is issued. "dd"— numeric day of the month (01 to 31) "mm"— ordinal month (01 to 12) "yy"— last two digit of the year "ddd"— day of the week (Sun, Mon, Tue, …, Sat) "mmm"— month (Jan, Feb, Mar, …, Dec) "yyyy"— year (full four digits) Following the numbering format GAGE-#-yymmdd, issued on September 30, 2003, the first gage entry will carry the ID, GAGE-1-030930.
Last Number Issued	Indicates the most recent ID issued by ProGAGE ISO 6. This field is non-editable.
Test	Click this button to verify if ProGAGE ISO 6 issues and follows the defined format. A dialogue box indicating the Next ID will appear.
Apply	Click this button to apply the numbering scheme.
Remove	Click this button to remove the existing numbering scheme.

To apply an automatic numbering scheme for all gages:

1 Do any of the following:

- On the toolbar, click EDIT RECORD button  .
- Choose FILE > EDIT RECORD.
- Press the shortcut key: CTRL+T.

2 Mark Enable Automatic Gage Numbering.

3 Open Number Field, and select Gage Numbering.

4 Open Gage Type, and select ALL.

5 Enter *<value>* on Format.

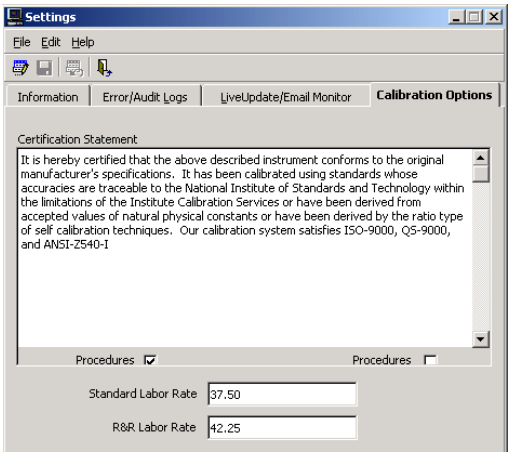
6 Click Apply.

7 Do any of the following:

- On the toolbar, click SAVE RECORD button  .
- Choose FILE > SAVE RECORD.
- Press the shortcut key: CTRL+S.

Calibration Options

Use the CALIBRATION OPTION tab folder to create a Calibration Certificate Statement that is reflected in the calibration reports. The Standard Labor Rate and the R & R Labor Rate are also recorded here.



To create a Calibration Certificate Statement and record standard Labor and R&R rates:

1 Do any of the following:

- On the toolbar, click EDIT RECORD button .
- Choose FILE > EDIT RECORD.
- Press the shortcut key: CTRL+T.

2 Enter text of calibration certificate in Certification Statement textbox.

3 Enter value *<numeric>* in Standard Labor Rate.

4 Enter value *<numeric>* in R&R Labor Rate.

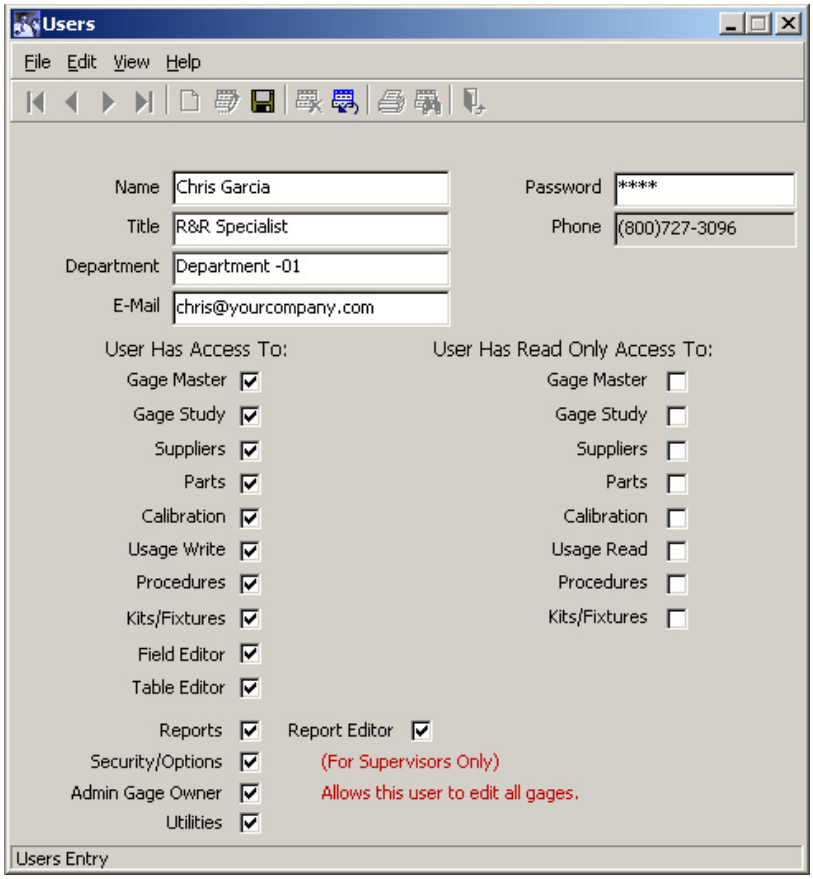
5 Do any of the following:

- On the toolbar, click SAVE RECORD button .
- Choose FILE > SAVE RECORD.
- Press the shortcut key: CTRL+S.

Chapter 3: Entering User Records

The first time you run the program, you are not prompted for a user name and password because the user's information on the security section has not been entered. As long as there is no user data, the program will continue to open without any security settings, i.e. no login window for user name and password. However, this makes the system vulnerable to unauthorized data entry and changes. To prevent this, setup the users and their passwords in the Users window.

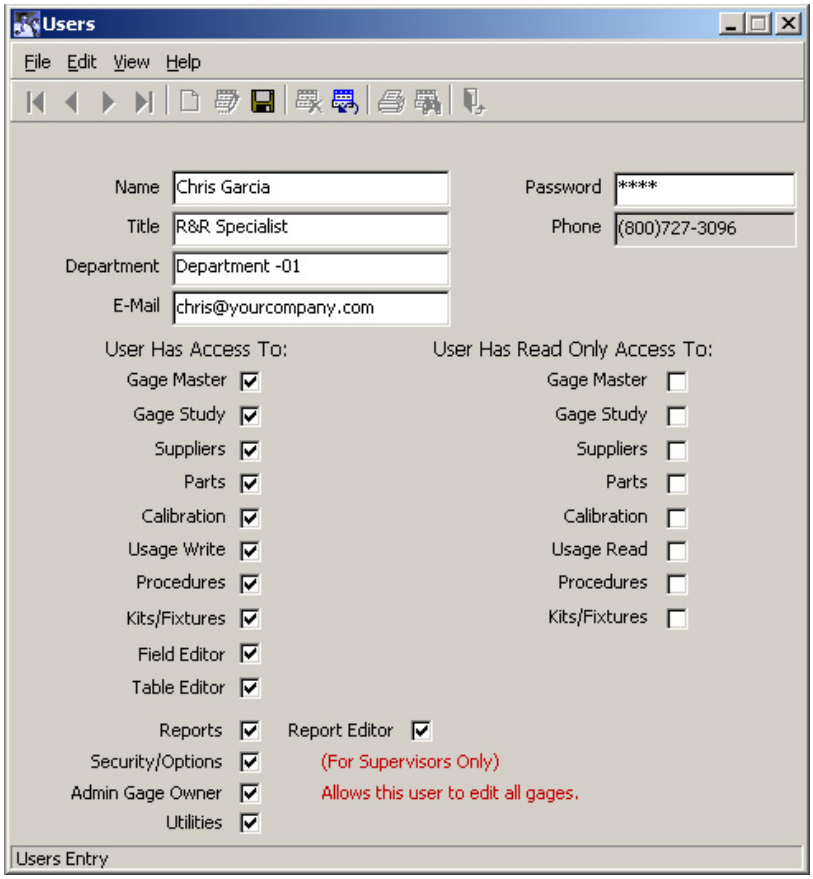
To open this utility, click on the USERS icon from the UTILITIES MENU.



To create a new user, follow the steps below:

1 From the USERS window, select EDIT > NEW RECORD.

2 Fill up the fields in the blank Users screen.



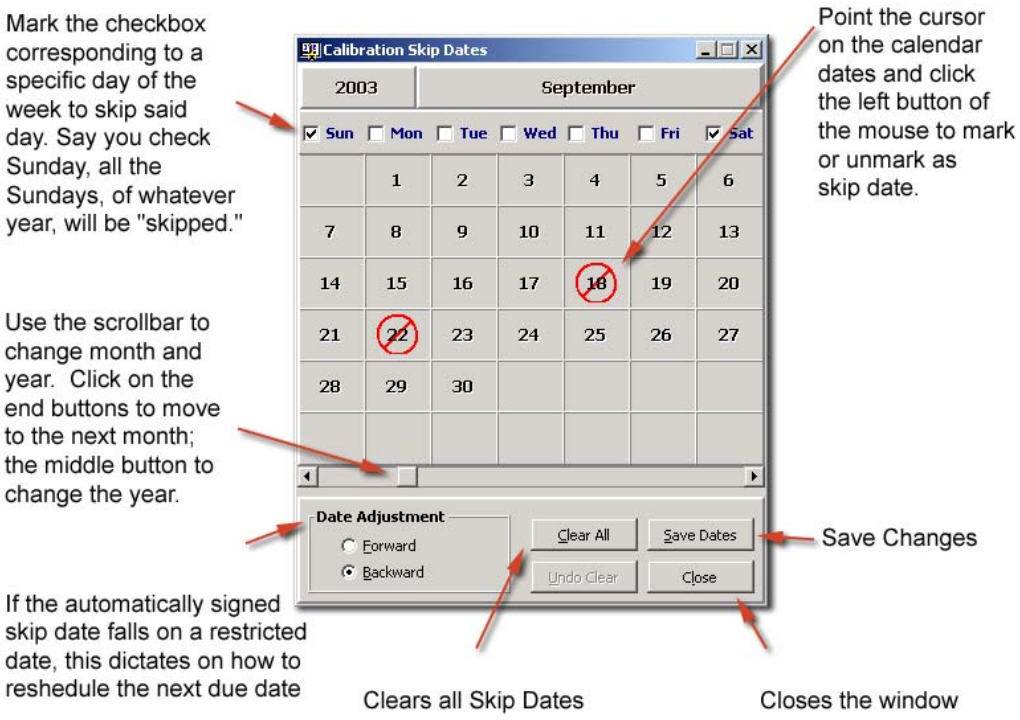
Users Controls

Control	Description
User Name	Enter the name of person authorized to use the program.
Title	Enter title of user.
Department	Enter department the user belongs to.
Email Address	Enter email address of user.
Password	Enter password. Limited to a combination of 8 valid characters. Valid characters are numbers 0-9, letters A-Z , underscore, and space. The program automatically rejects all other characters. **Note:** You only have one entry session for the password and the dialog box uses a password mask for all characters entered, i.e., there is no confirmation for the

Control	Description
	entered password. Please remember your password.
Phone	Enter contact telephone number of the user.
User Has Access	Mark these checkboxes to give the user full access to the areas listed. It allows you to add, edit and delete records once this feature is activated. **Note:** For security reasons, only one option can be selected, i.e., User Has Access is unselected if *User Has Read Only Access* is selected and vice-versa.
User Has Read Only Access	Mark these checkboxes to give the user read-only access to the areas listed. You can only view records but you can't alter or remove them.
Reports	Mark this checkbox to enable the user to view or print reports.
Security/Options	Mark this checkbox only for supervisors. This enables the user to edit security settings and other maintenance options.
Admin Gage Owner	This overrides all access settings above and gives full access to all features of the program. It also gives you permission to edit all gages. If you purchase the *Automatic Emailer* feature of ProGAGE ISO, the user with this feature will receive email alerts of all due and past due calibration schedules. **Note:** The indication For supervisors only refers to the Security options and Admin Gage Owner checkboxes.
Utilities	Mark this checkbox to allow access to the UTILITIES MENU.
Report Editor	Mark this checkbox to allow access to the REPORT EDITOR feature under Reports.

Chapter 4: Skip Dates Utility

ProGAGE ISO allows you to record how often a gage needs to be calibrated (e.g., every three months). It also calculates when the gage needs a new calibration. The Skip Dates Utility allows you to identify specific dates or days of the week when you **do not want** calibrations to take place. With this utility, you can skip non-working days (for example, your company is closed on weekends) and/or dates (like a holiday or vacation day) when it's impossible to perform calibration tasks. Access the Skip Date Utility from the Utilities Menu.

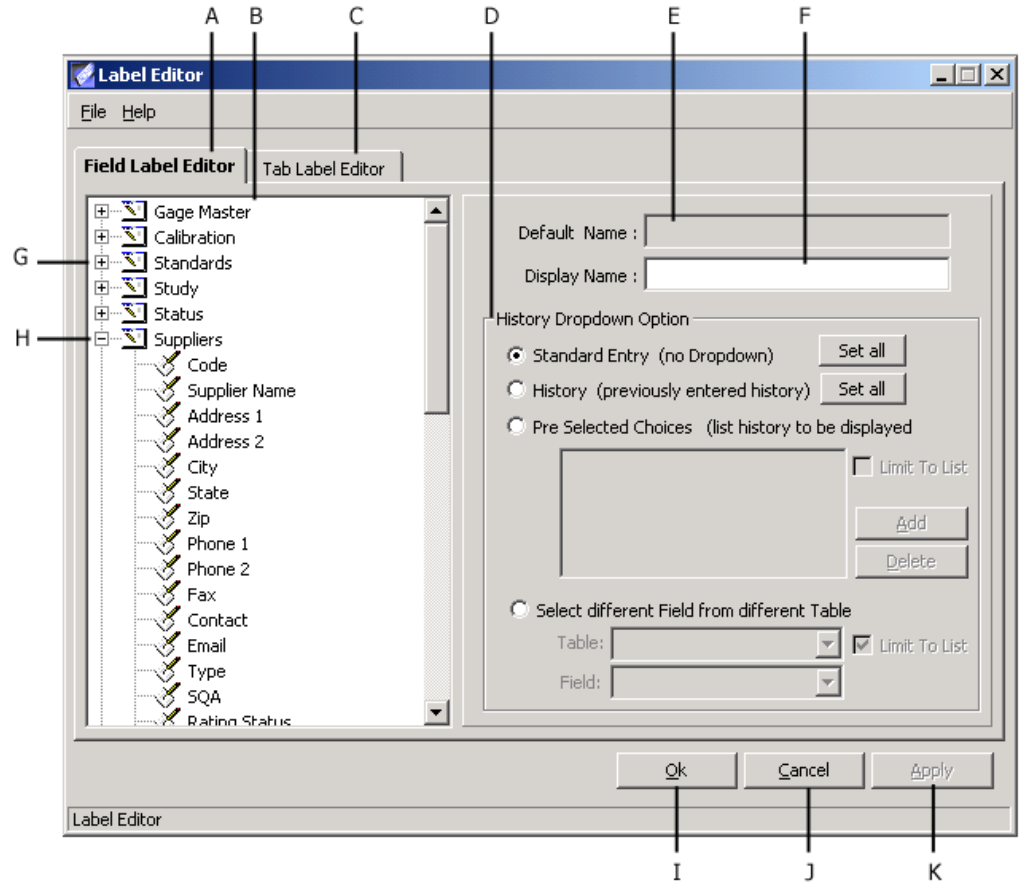


Chapter 5: Changing Control Labels

The LABEL EDITOR Module allows you to change labels of control fields, tab folders, and tab pages. Changes are reflected not only on the screen-interface but also in printed reports. This is very useful especially if you want to translate the label controls in a different language or to designate apt labels for user-defined fields. To access the LABEL EDITOR module, click on the corresponding icon from the UTILITIES MENU bar list. The module is divided into two tab folders: FIELD LABEL EDITOR and TAB LABEL EDITOR.

Field Label Editor

You can change labels of control fields, as well as define the history drop-down option of fields, using the FIELD LABEL EDITOR tab.



Label Editor screen

A. Field Label Editor tab **B.** Explorer pane **C.** Tab Label Editor **D.** History Drowpdown option **E.** Default Name field **F.** Display Name field **G.** Expand Node **H.** Collapse Node **I.** OK button **J.** Cancel button **K.** Apply button

Field Label Editor Controls

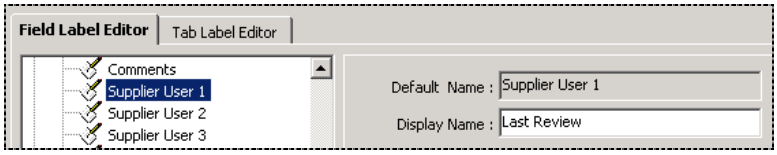
Control	Description
Explorer pane	This contains a tree list view of all your tables and all their corresponding fields. To access field labels of a particular table, expand node identified by plus (+) sign. To hide fields, click on the node (now identified by minus [-] sign) again.
Default Name	This indicates the default label of the field chosen from the Explorer pane.
Display Name	Enter in this field the new label for the chosen field.
History Dropdown Option	Use this option to define the history dropdown option of a field.
OK	Click this button to apply change and close Label editor module.
Apply	Click this button to apply change.
Cancel	Click this button to cancel action.

To change label of a field:

1 Map Explorer Pane, and select field *<label>*. The default label of the chosen field is reflected on Default Name.

2 Enter new label in Display Name.

3 Click APPLY.



History Dropdown Option

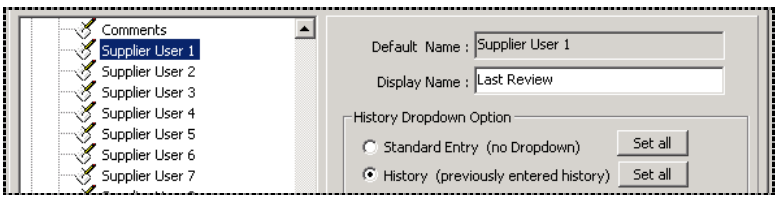
When a field's History Dropdown Option is activated, a drop-down list of options—usually from previously entered values (hence, history)—appears. You can use the FIELD LABEL editor to specify the options from the drop-down list to come from any of the following: (1) previous inputs to the field; (2) pre-identified values; and (3) records from different tables. You can only apply the History Dropdown Option for user-defined fields in selected modules.

To activate History Dropdown Option with list of previous inputs to the field:

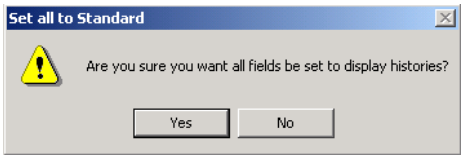
1 Map Explorer Pane, and select user-defined field *<label>*.

2 Activate History (previously entered History) radiobutton.

3 Click APPLY.



If you want to activate History Dropdown Option for all your ProGAGE ISO 6 control fields, click the adjacent SET ALL button, and click YES in the ensuing confirmation dialog.



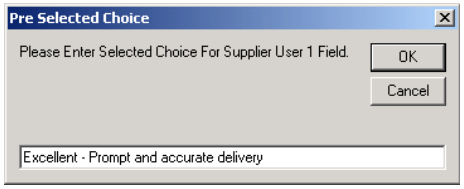
To activate History Dropdown Option with list of pre-identified values to the field:

1 Map Explorer pane, and select user-defined field *<label>*.

2 Activate Pre-Selected Choices radiobutton.

3 Click ADD button. The PRE-SELECTED CHOICE dialog opens.

4 Enter *<option>* in PRE-SELECTED CHOICE dialog and click OK. Observe *<option>* added in the textbox list.

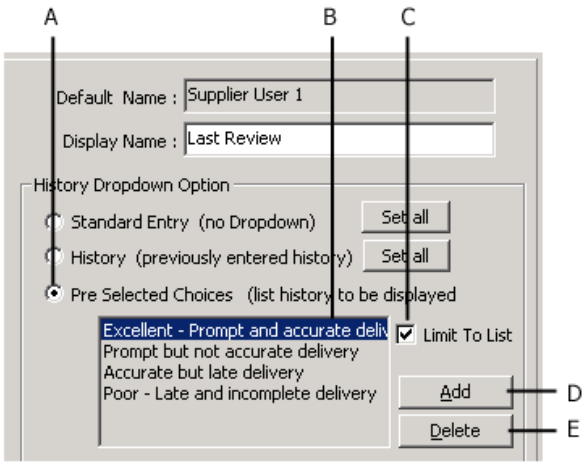


5 Repeat Steps 3 and 4 to add another option.

6 To remove previously added option, select *<option>* from the textbox list and click to the now-available DELETE button becomes available. Observe *<option>* expunged from the textbox list.

7 Click APPLY.

If you want inputs to the field to be restricted to the pre-identified options, mark Limit to List checkbox.



History Dropdown Option window

Pre Selected Choices radiobutton **B.** Pre Selected Choices list

C. Limit To List checkbox **D.** Add button E. Delete button

To activate History Dropdown Option with list coming from field entries of another table:

1 Map Explorer pane, and select user-defined field *<label>*.

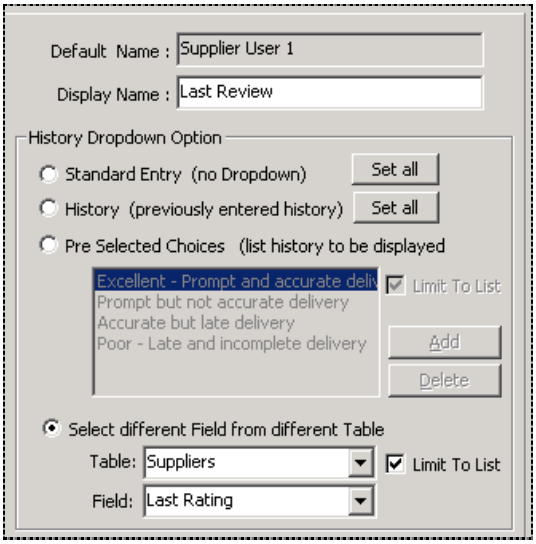
2 Choose Select Different Field from Different Table radiobutton.

3 Open Table, and select *<table>* that contains the field.

4 Open Field, and select *<field>* from drop-down list.

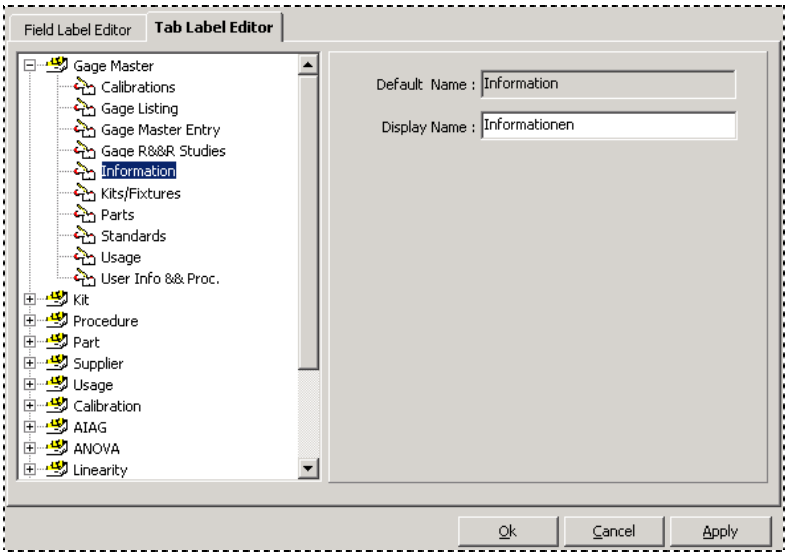
5 Click APPLY.

6 Mark the adjacent Limit to List checkbox if you want to limit drop-down list options to the field entries.



Tab Label Editor

Use TAB LABEL EDITOR to change labels of tab folders and pages.



Tab Label Editor Controls

Control	Description
Explorer Pane	This contains a tree list view of all ProGAGE ISO 6 modules and their corresponding tab folders and pages. To access tab folders and pages of a particular module, expand node identified by plus (+) sign. To hide tab folders and pages, click on the node again, which is now identified by minus (-) sign.
Default Name	This indicates the default label of the tab folder or page chosen from the Explorer Pane.
Display Name	Enter in this field the new label for the chosen tab folder or page.
OK	Click this button to apply change and close LABEL EDITOR module.
Apply	Click this button to apply change.
Cancel	Click this button to cancel action.

To change label of a field:

1 Map Explorer pane, and select field<label>. The default label of the chosen field is reflected on Default Name.

2 Enter new label in Display Name.

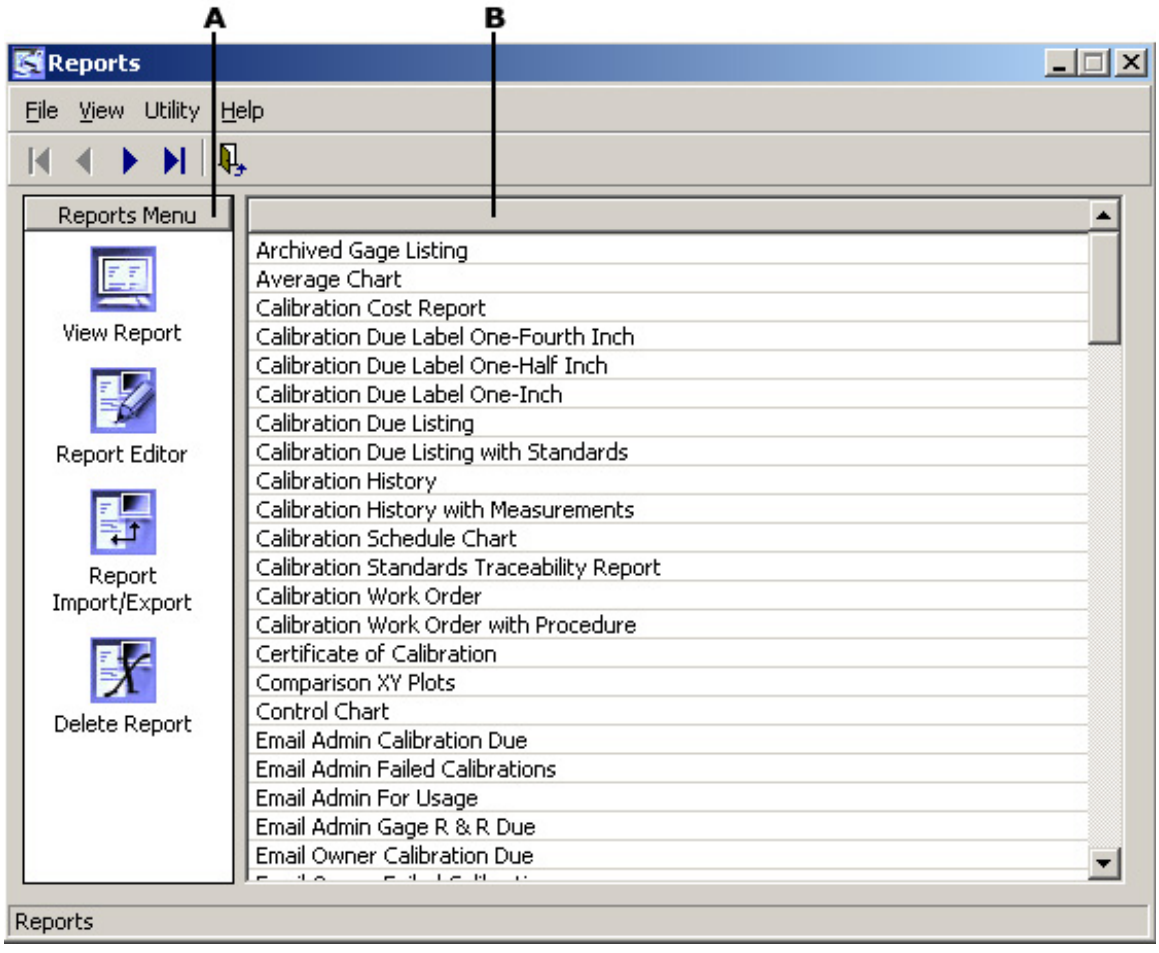
3 Click APPLY.

Chapter 6: Report Editor

The REPORT EDITOR module provides you with a selection of reports you can customize to meet your needs. It also allows you to create your own report template for use in presenting your data. Apart from reports, this module also features labels templates and lets you design your own.

It uses the Microsoft Jet database engine - a database management system that retrieves data from and stores data in user and system databases. The Microsoft Jet database engine can be thought of as a data manager component with which other data access systems, such as Microsoft Access and Visual Basic, are built.

To begin, select the REPORTS icon from the MAIN MENU to open the REPORTS window.



Reports window

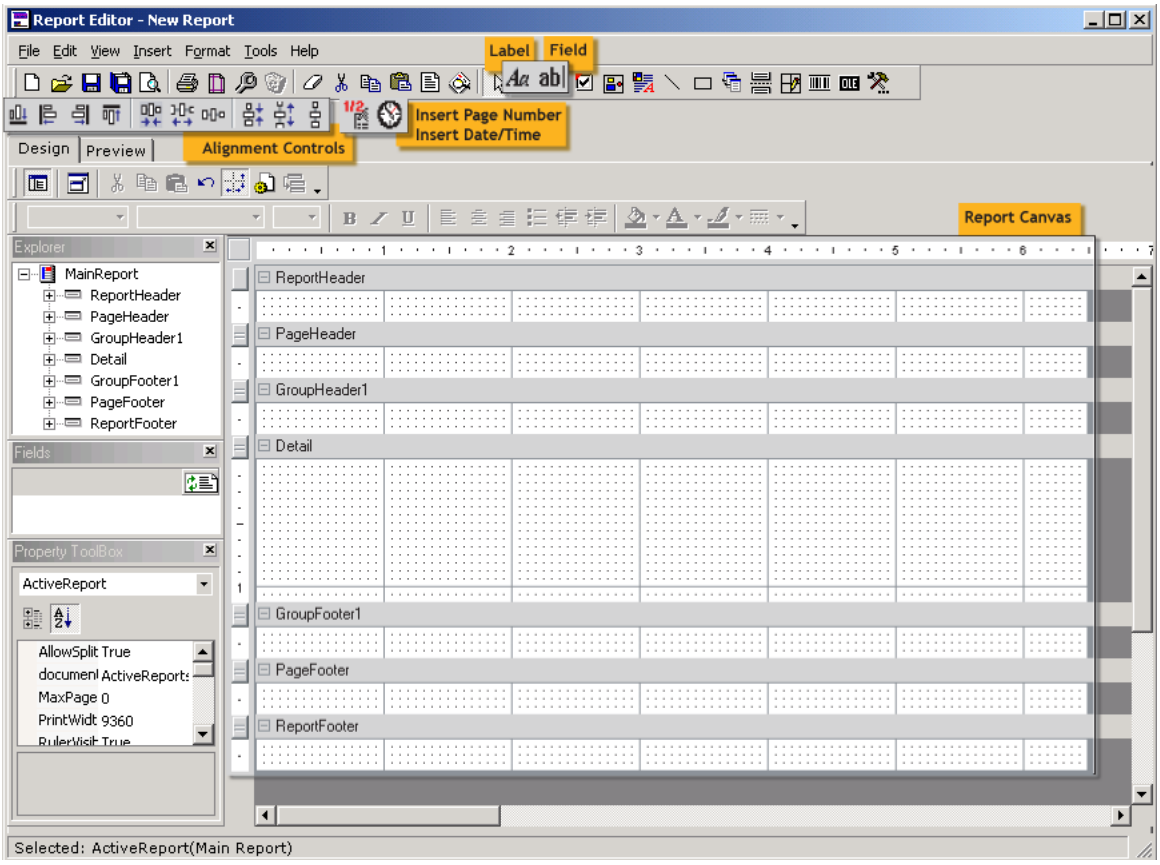
A. Reports Menu **B.** Report Listing

Then click on the REPORT EDITOR icon from the menu on the left. The REPORT EDITOR canvas will appear.

Working with Report Editor

Before you start creating and modifying your reports, familiarize yourself first with the components of this module.

The REPORT EDITOR screen is composed of 3 major sections:



Report Editor window

A. Button/Menu bar **B.** Information boxes **C.** Canvas

Report Editor Controls

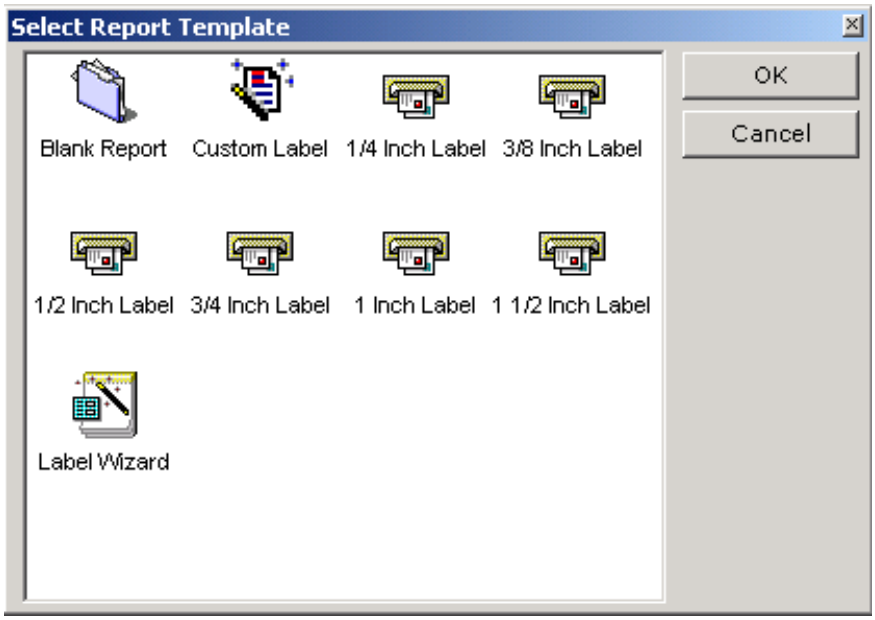
Control	Description
Button/Menu bar	Contains the commands and actions for manipulating report information, objects and elements.
Information Boxes	Provides quick-access to report properties such as fields and properties.
Canvas	Area where in you create, modify, and work with reports, report objects, and report elements.

Report Editor Canvas Controls

Field	Description
Header	Contains additional report information such as report title, date, etc.
Details	Contains the body of the report.
Footer	Contains additional report information such as page numbers, author and copyright information.

The 2 tabs DESIGN and PREVIEW in the upper left portion of the screen allow you to view the report in design or preview mode.

To begin creating your report, select the report template you want to use by clicking on the NEW REPORT DEFINITION button in the button/menu bar or by clicking on FILE > NEW. The screen below will appear:

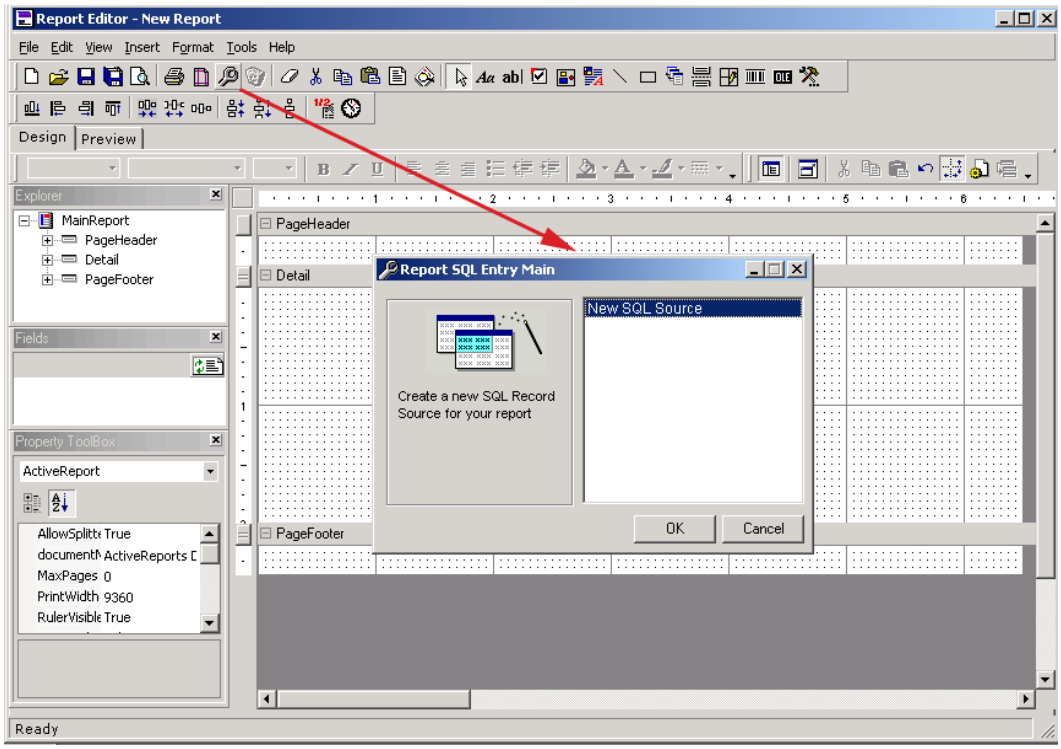


Opening a Data Source

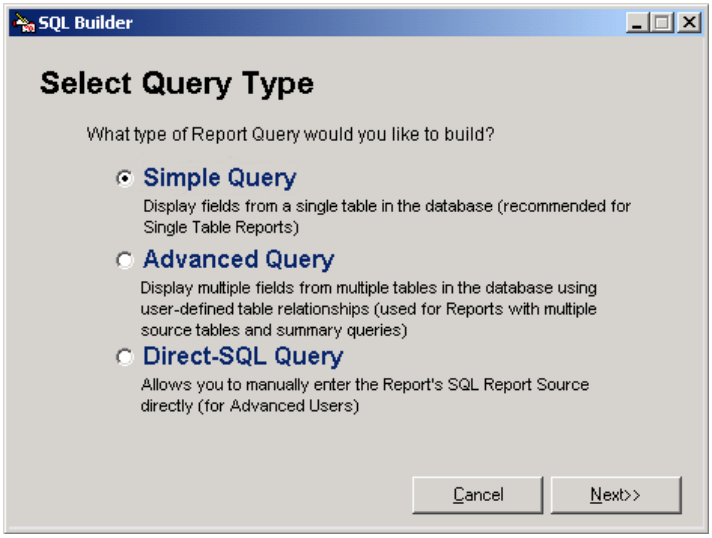
In creating a report, you have to connect to a data source first. The fields in your report will come from this data source.

To open a data source:

1 Click on the SET OR BUILD SQL SOURCE FOR THE REPORT button in the toolbar as shown below. Currently, this is the only available method of connecting to a data source. Click OK.



2 Choose from any of the 3 types of queries available. For Simple and Advanced Queries, a wizard will guide you through the process. However, you have to know the syntax in creating SQL commands if you choose Direct-SQL Query.

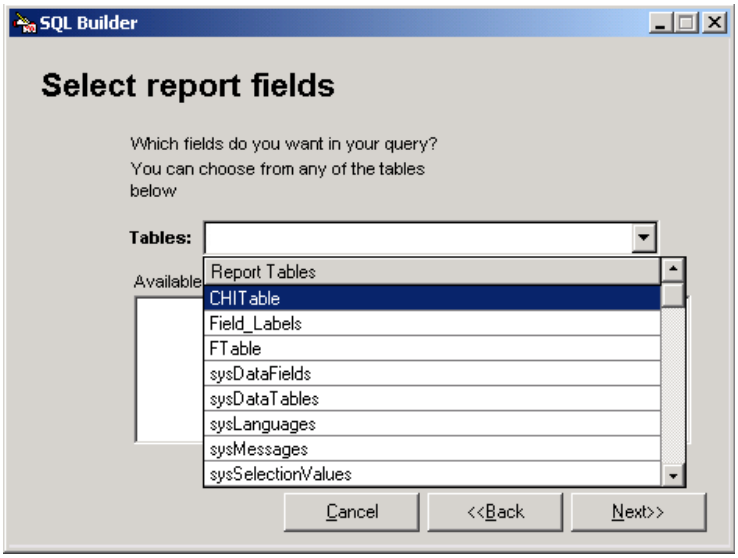


Simple Query

Select this option if you have only one data source, or table, for your report. Activate the radio button and click NEXT>>.

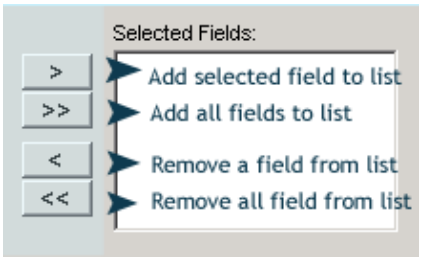
Using Simple Query:

1 Click on the drop-down button on the right hand side of the Tables field, and select from the list of all available tables in your database. If you know the table name, you can type it directly on the field.

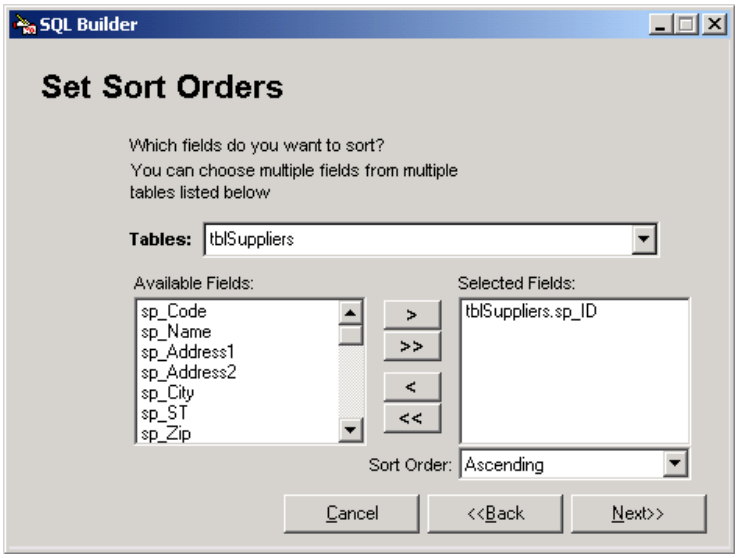


2 Once you have selected a table, the list of available fields for the table you specified will be displayed in the Available Fields list box.

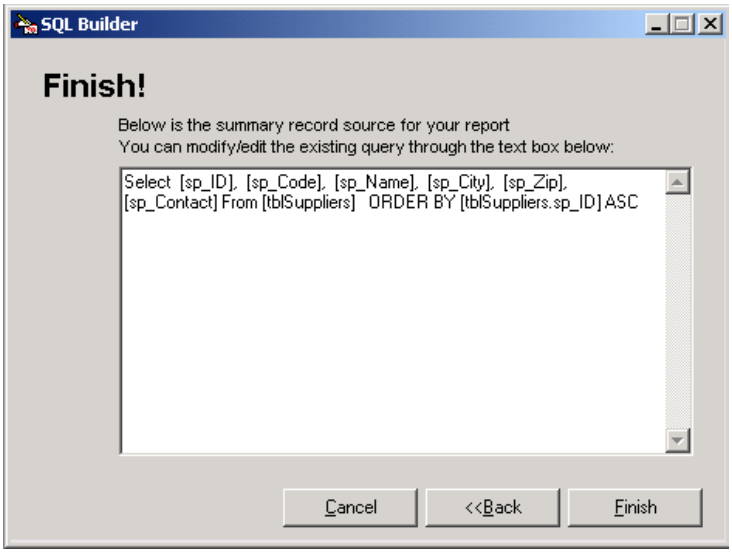
3 Highlight the fields you want to use for your reports then click the selection buttons. Click NEXT>> when you're done.



4 Sort or arrange the fields you have selected in the same way you selected these entries. You can also choose not to sort your records and present them as they appear in the original records. Click NEXT>>.



5 The actual SQL statement the program will use to get the data source for your report will be displayed in the text box. You can modify the query by changing this statement provided that you know the right syntax for creating SQL statements. Otherwise, you will get an error message so it's best not to edit this. Click FINISH when you're done.

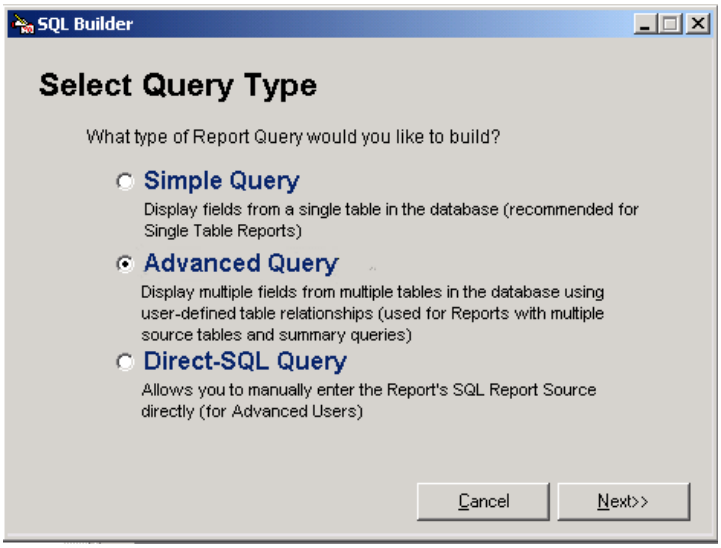


Advanced Query

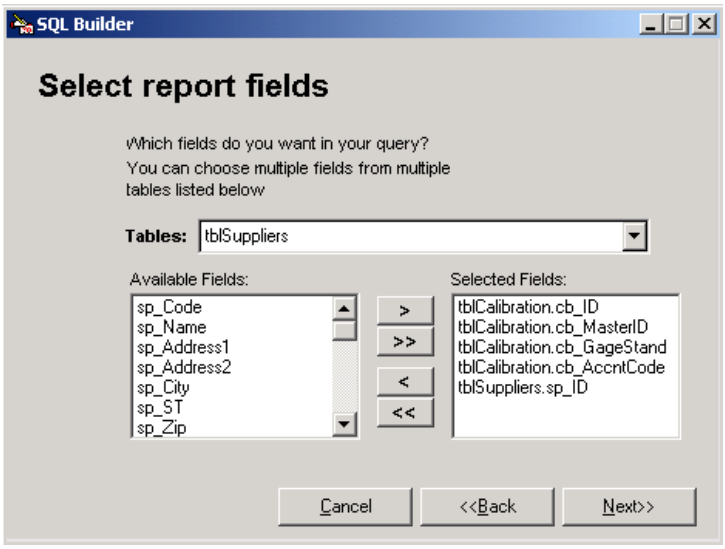
This query type is suitable for creating reports with multiple tables. This option allows you to utilize fields from the different tables you select, and the tables can be connected by links you specify. However, it is imperative that you know the structure of the tables and the types of fields beforehand because you cannot link two tables using different fields. For example, you cannot connect a text field containing Gage IDs to a date field showing calibration dates. The linked field should be common to both tables. To be on the safe side, ask your system administrator for the properties of your tables.

Using Advanced Query:

1 On the Select Query Type window, activate the radio button for Advanced Query and click NEXT>>.



2 Choose the tables and fields you want to use in the report in the same way you'd choose these elements in the Simple Query option. In this option, you are not limited to the fields of just one table as you can add as many tables as you want. Tables from different fields are then added to the Selected Field list. Click NEXT>> to open the Table Links window.



Note: In the field listing, the string of characters before the period indicates the table name, after, the field name. Take note here that you have two different tables for the field list: tblCalibration and tblSecurity.

Note: Fields that will be used to link the tables in your report will not be displayed in the Selected Fields window. It is suggested that you choose a link field from the table containing all the fields that will be used for the report. For example, you have 2 tables: one for gage calibrations (which does not include every detail of each gage) and another table listing all gage information. To create a report that will include all filtered gages and their corresponding descriptions, you can link the two tables through the Gage ID field.

Creating Table Links

Once you have selected the fields from different tables, you then have to establish the link/s between the tables so as to keep the information on a specific record together. To begin creating table links:

1 Specify the tables and fields that will be linked and type of link that will be used. Populate these fields by selecting entries from the drop-down menu.

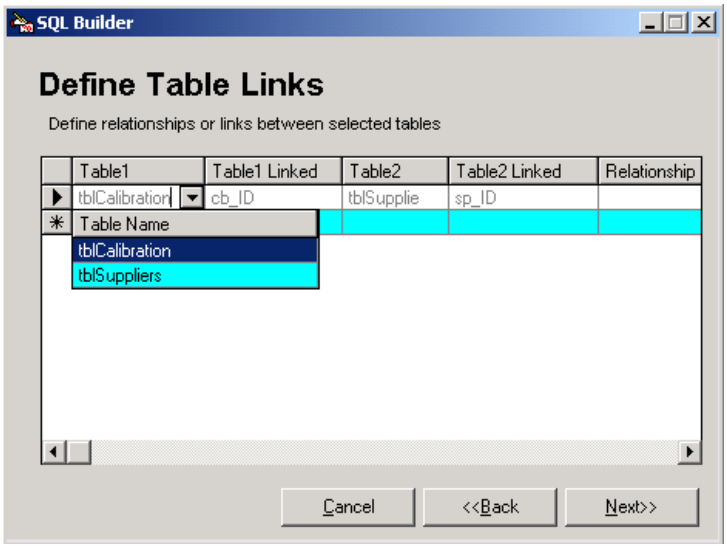
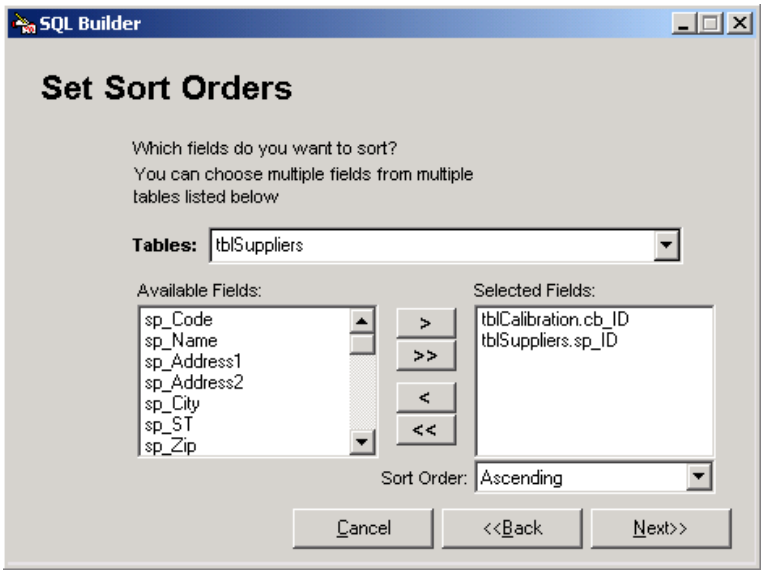


Table Links Controls

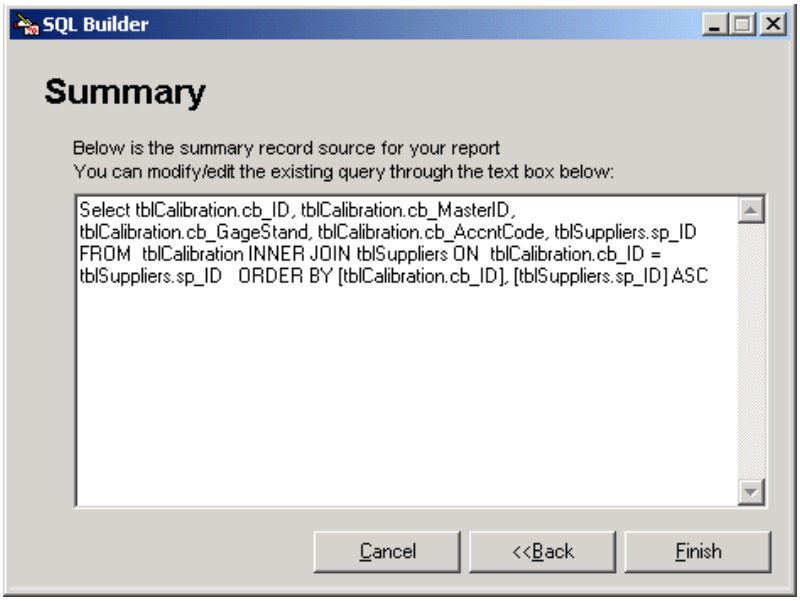
Control	Description
Table 1	Name of the table containing all of the records to be reflected in the report. "All records" may mean all records subjected to filter, if any. Links may also act as filters.
Table 1 Linked Field	This is a field common in type and contents between the two linked tables. The names and field sizes may vary but it will only link with exactly the same record.
Table 2	Name of the table linked with table 1. Not all its records (even if subjected to filter) will be included in the report.
Table 2 Linked Field	Same description as Table 1 Linked Field.
Relationship	There are three types of relationship as described in figure number 3 on the previous page. It is a good practice to use the convensions described for *Table 1* and *Table 2* above but this two tables can actually be interchanged as described in selection 2 and 3 of the Join Properties option.

2 Once you have specified the tables and fields to be linked, click on NEXT>> to display the relationship window. In this window, activate the radiobutton for your selection and click OK.

3 Now, set the sort order or arrangement of data in your report by specifying the table and field which will determine the order. Keep in mind that you are not limited to just one table and field. Then, arrange the records in Ascending or Descending order. Click NEXT >> when you're done.



4 The Summary screen will display the actual SQL statement that will be used to open your data source.

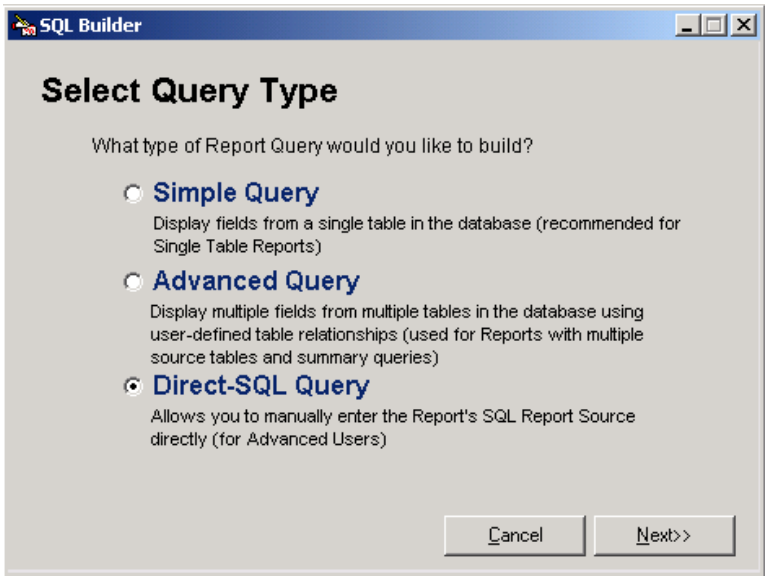


Direct-SQL Query

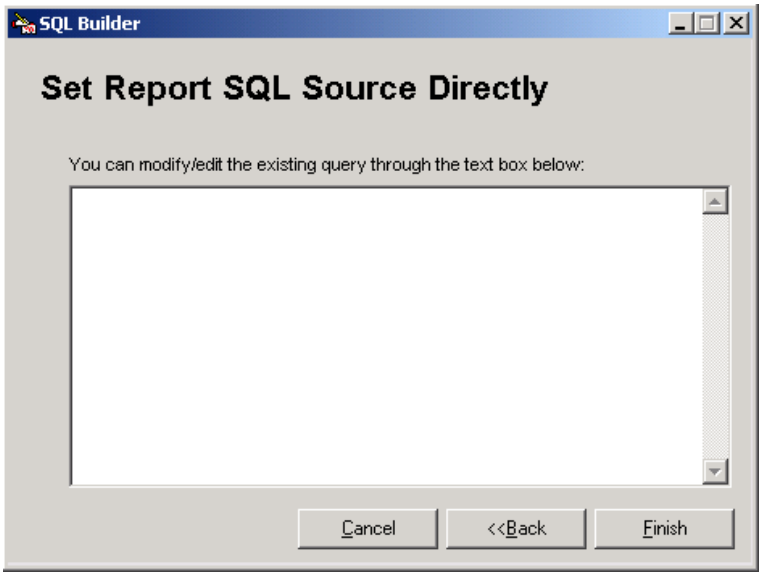
Users who know the full syntax in creating SQL statements can enter the statements directly in the third type of query preparation. The basics for creating SQL statements and statement structures are included to help you get started.

Using Direct-SQL Query:

1 Activate the Direct-SQL Query button and click NEXT >>.



2 The Set Report SQL Source Directly window will appear.



Use this window to set up your data source. Below is a brief syntax explanation which instructs Microsoft Jet database engine to return information from the database as a set of records. Use this as a guide in creating your data source.

Syntax

SELECT [predicate] { * | table.* | [table.]field1 [AS alias1] [, [table.]field2 [AS alias2] [, ...]]}
FROM tableexpression [, ...] [IN externaldatabase]
[WHERE...]
[GROUP BY...]
[HAVING...]
[ORDER BY...]
[WITH OWNERACCESS OPTION]

Set Report SQL Source Directly Controls

Control	Description
Predicate	One of the following predicates: ALL, DISTINCT, DISTINCTROW, or TOP. You use the predicate to restrict the number of records returned. If none is specified, the default is ALL.
*	Specifies that all fields from the specified table or tables are selected.
Table	The name of the table containing the fields from which records are selected.
field1, field2	The names of the fields containing the data you want to retrieve. If you include more than one field, they are retrieved in the order listed.
alias1, alias2	The names to use as column headers instead of the original column names in table.
Tableexpression	The name of the table or tables containing the data you want to retrieve.
Externaldatabase	The name of the database containing the tables in tableexpression if they are not in the current database.

Note: To perform this operation, the Microsoft Jet database engine searches the specified table or tables, extracts the chosen columns, selects rows that meet the criterion, and sorts or groups the resulting rows into the order specified.

The minimum syntax for a SELECT statement is:

SELECT *fields* FROM *table*

You can use an asterisk (*) to select all fields in a table. The following example selects all of the fields in the Employees table:

SELECT * FROM *Employees*;

If a field name is included in more than one table in the FROM clause, precede it with the table name and the . (dot) operator. In the following example, the Department field is in both the Employees table and the Supervisors table. The SQL statement selects departments from the Employees table and supervisor names from the Supervisors table:

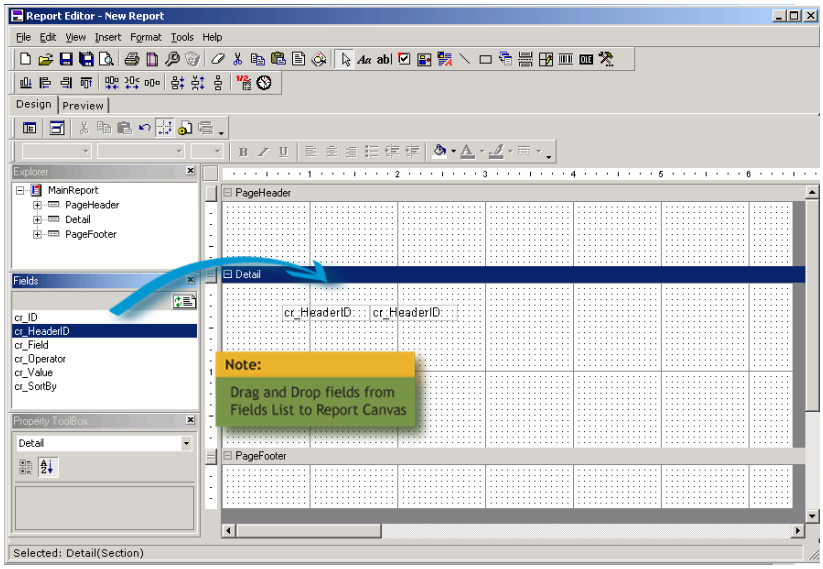
SELECT Employees.Department, Supervisors.SupvName

FROM Employees INNER JOIN Supervisors

WHERE Employees.Department = Supervisors.Department;

Creating Your Layout

Once you have set up your data source, you can now proceed with the layout for your report. Notice that the FIELDS box now contains the fields you have selected in the previous sections. Click on the field, then drag and drop it on the canvas.



While you can drag and drop as many fields as you want in the canvas, keep in mind that the canvas working area is the actual edge to edge size of the printing paper. The top of the PAGE HEADER and the bottom of the PAGE FOOTER mark the upper and lower boundaries of the paper.

A simple report format features a PAGE HEADER and FOOTER, which are automatically displayed in all the pages of your report, and the DETAILS section, which contains the body of the report.

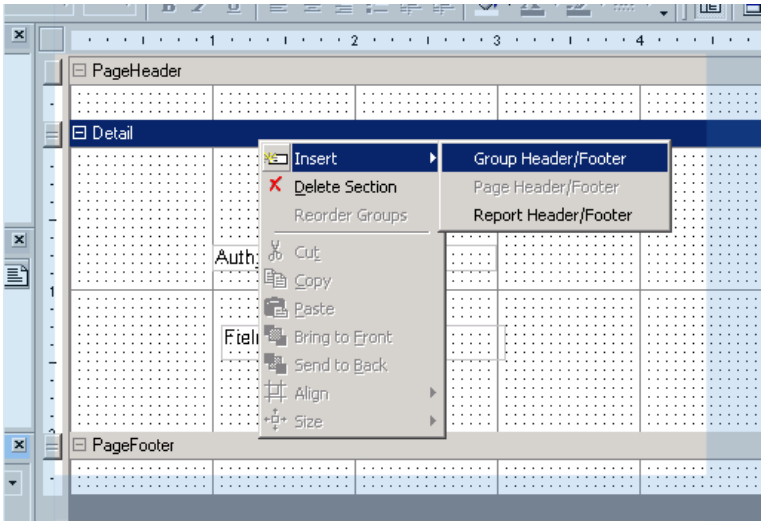
Grouping Data

Some reports require that you group data to create a special section in your document, such as the header or footer, to separate data from the rest of the report. This means that common record information is printed in one row while succeeding rows will contain other varying details of the records. For example, you create a Calibration History on Gages report, the group header will contain the Gage ID numbers while the rows beneath the header will enumerate past calibrations (including the name of the calibrator and the date the calibration was performed) for each gage. The remainder of the report will include specific information about the equipment.

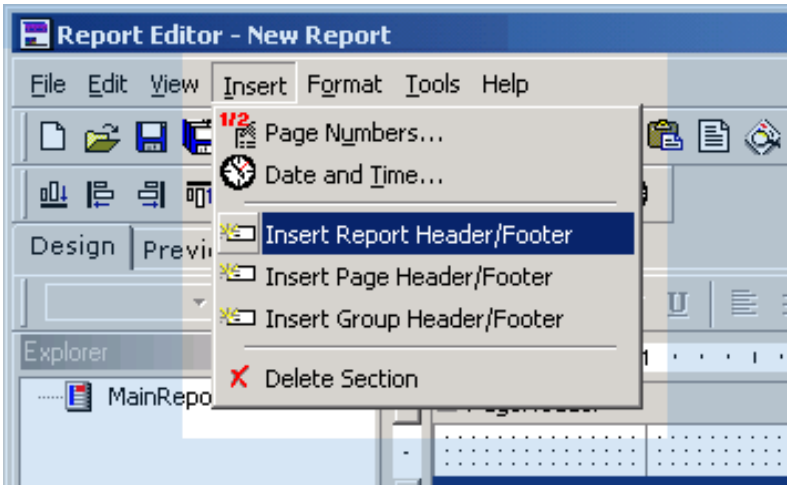
To group data:

1 In the Detail section, do any of the following:

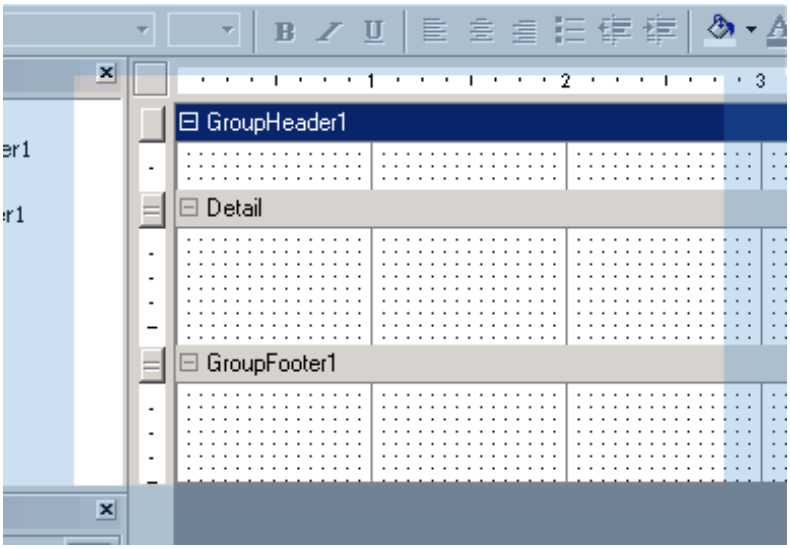
- Right-click on an area in the design canvas and select Insert Group Header/Footer from the context menu.



- Click Insert > Insert Group Header/Footer.

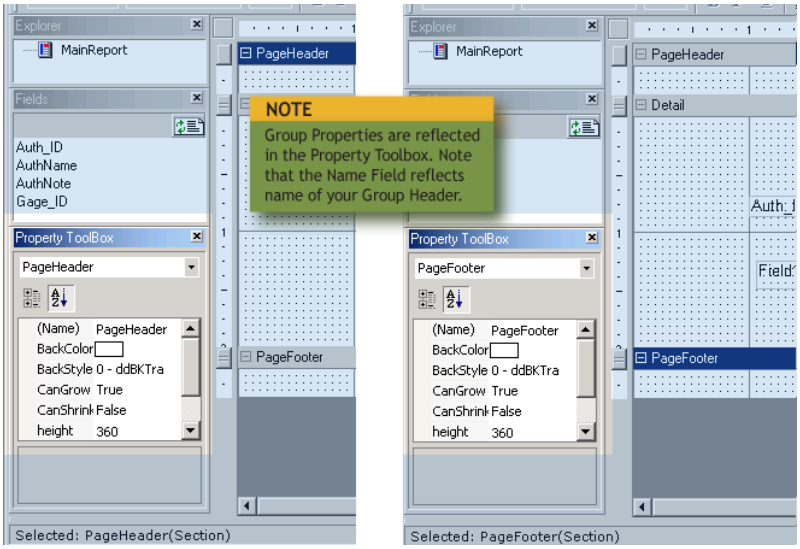


2 A new section will appear in the canvas – a GROUP HEADER section with a corresponding group footer. The default labels for these are Group HeaderN and Group FooterN, where N is an integer.



Labels and other properties can be modified in the PROPERTIES TOOLBOX to your left.

4 Select the date field you will group on. If you know the name of the field, you can type it directly into the field or select from the drop-down list. It is advised that you change the group header and footer labels to the name of the field you group on. This change will be reflected in the headers and footers of all the pages in your report. You can add as many groups as you want.



To add fields to your group, just drag and drop fields from the FIELDS frame. Make sure that you include the field defining the group.

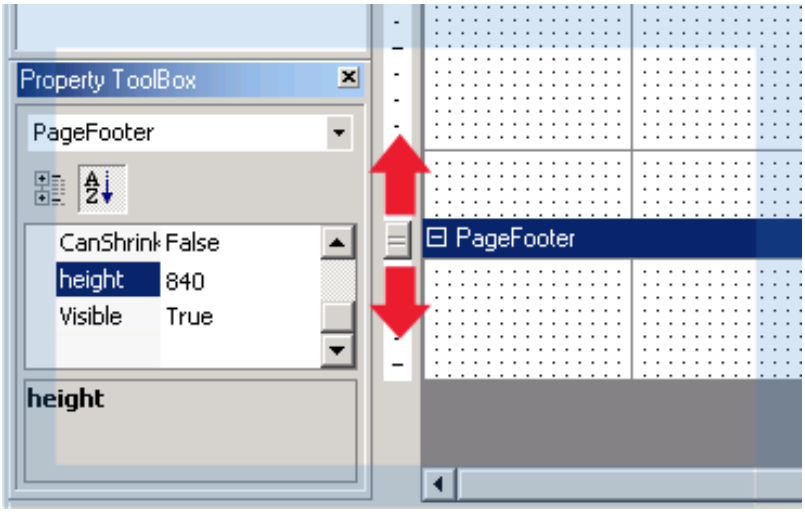
Working on the Details

You can drag and drop as many fields as you want into the design canvas. You can arrange them in rows or columns; modify row height by dragging the button beside the row header up and down.

To change row height:

1 Go to the PROPERTY TOOLBOX, select Height from the drop-down menu.

2 Enter the corresponding value.



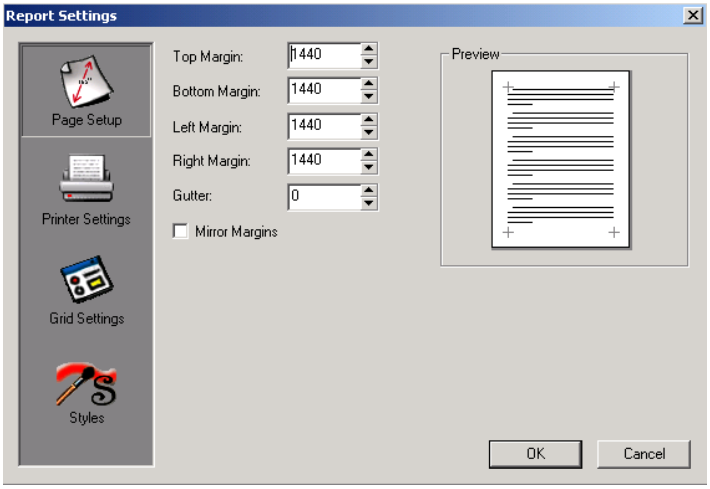
ProGAGE ISO 6 uses twips, which is explained in the succeeding section, in its measurements.

Changing Report Settings

The settings utility enables you to set margins, printer and grid settings, and styles in building your report.

To modify report settings:

1 Select the PRINT SETUP button from the button bar to open the Report Settings screen.



Page Setup

The margin is the distance from the edges of the paper to the coverage of the design canvas, indicating the nonprintable area on the fringe of the main body of your report. By default, the parameter margins are set to 1440 twips (1 inch). You can change the margins by manually entering the value in the corresponding fields, or by clicking on the UP ARROW or DOWN ARROW buttons of the margin you want to change. Clicking on the UP ARROW/DOWN ARROW will add or subtract 360 twips (1/4 inch) from the margin.

The gutter serves as a buffer to your inside margin width and is very useful in increasing the nonprintable area of your document (such when you bind your report using a ring binder). Thus, if you bind your report using a ring binder, you may want to add a gutter of ¼" to ½" to accommodate the holes. To change the gutter, you may either manually enter the desired gutter width on the corresponding fields, or you may click the UP ARROW/DOWN ARROW buttons that correspond to the Gutter field to add or subtract 360 twips (1/4 inch) from the Gutter.

Converting from Inches or Centimeter to Twips

INCHES

Margin = 1440 x n

CENTIMETERS

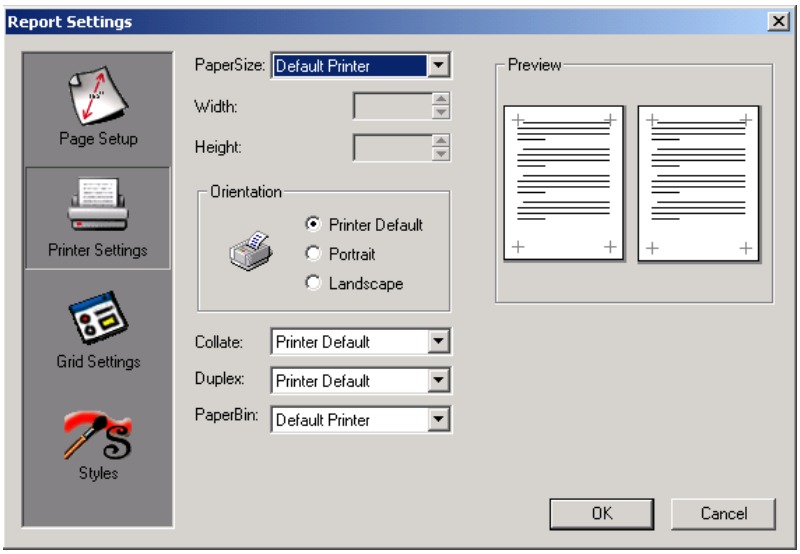
Margin = 567 x n

; where n is your desired margin in inches or centimeters

To preserve the layout while printing reports on both sides of the page, mark the Mirror Margins checkbox. This will automatically set the values for your inner and outer margins equal, as if the pages are reflected in a mirror. Once this option has been marked, the Preview area will display 2 pages with 'mirrored' margins.

Printer Settings

Your report automatically follows the default printer settings. To change this, select the PRINTER SETTINGS icon from the REPORT SETTINGS window.



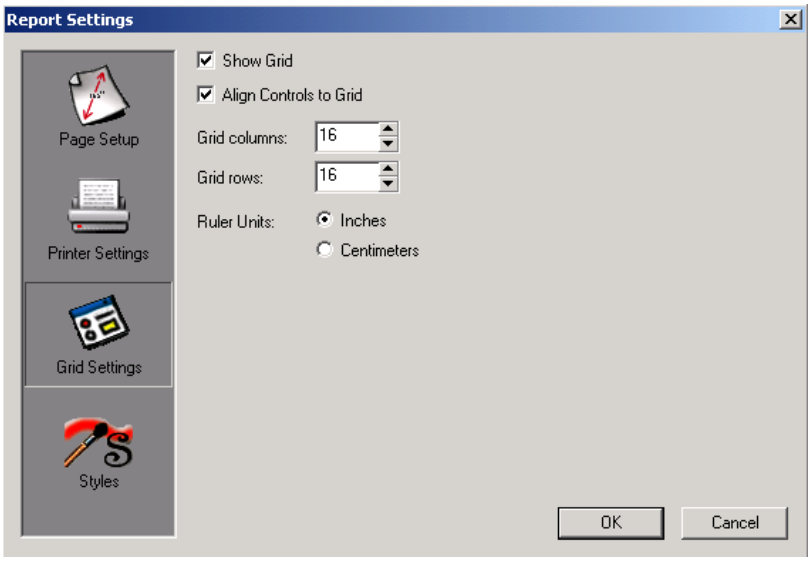
Printer Settings Controls

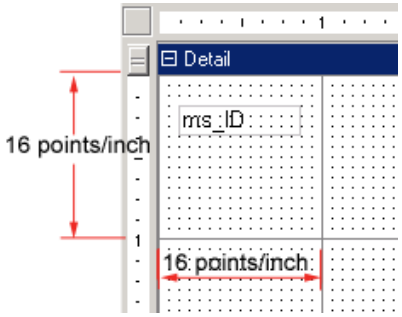
Control	Description
Paper Size	Select from the drop-down list field the size of the paper your will be printing your report on. It is suggested that you set this option prior to creating your report to ensure that the contents fall within the boundaries of the paper size. Some printers have set default margins or nonprintable edges. Consult your printer's manual for these settings.
Width and Height	These values are set in twips. (See "Converting from Inches or Centimeters to Twips" on page 203).
Orientation	Select from the 3 available options: Printer Default, Portrait or Landscape. Portrait orientation means the width is narrower than the height, and vice versa for Landscape. If you choose Printer Default, check these settings in the Printer control panel.
Collate	Ideal for printing reports running more than a page, this feature groups pages by page number, printing all first pages initially, then the succeeding pages. If you choose Don't Collate, the report is printed in its entirety before the second copy is printed out.
Duplex	This option lets you print on both sides of the paper—two consecutive pages on one sheet—although this feature is dependent on whether your printer has duplexing capability or not. Since not all documents need to be printed back to back, you can choose to activate this option if and when the need arises.
Paper Bin	By default, a printer has at least one universal paper bin that handle all paper sizes your printer can use. Some have multiple paper bins (one for each paper size), allowing you to set the paper source for your printer. If, for example, you want to use a paper with a special letterhead for your reports, you can stack them on one of the bins and select that bin for this session.

Grid Settings

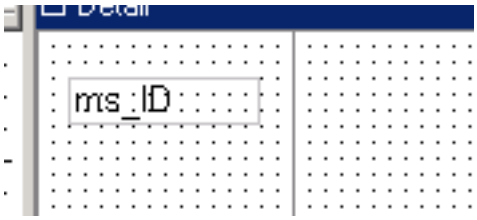
The Canvas Grid—comprised by coplanar points that are evenly distributed on the canvas—serves as your guide in designing your reports and will not appear in the printed documents. Grid settings for columns and rows depend on the ruler settings.

The unit of measurement is the number of dots for each unit in inches or centimeters. The default is 16 dots per square inch for both rows and columns.

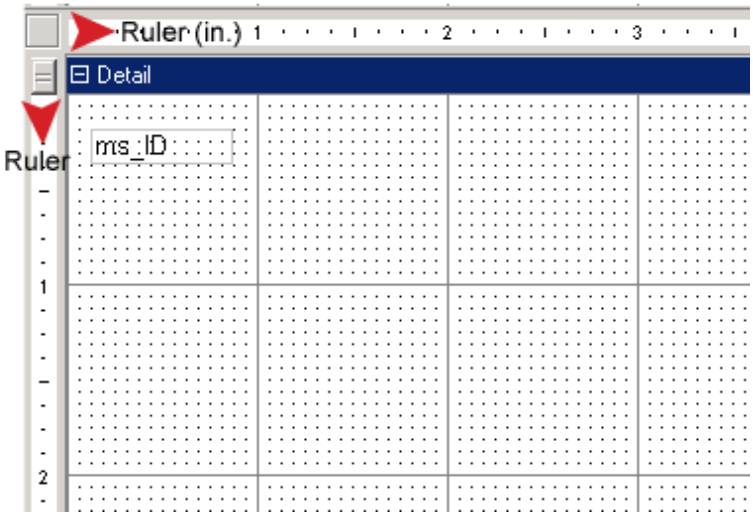




If you mark the Align Controls to Grid checkbox, every element you put in the design canvas will automatically snap to the grid.

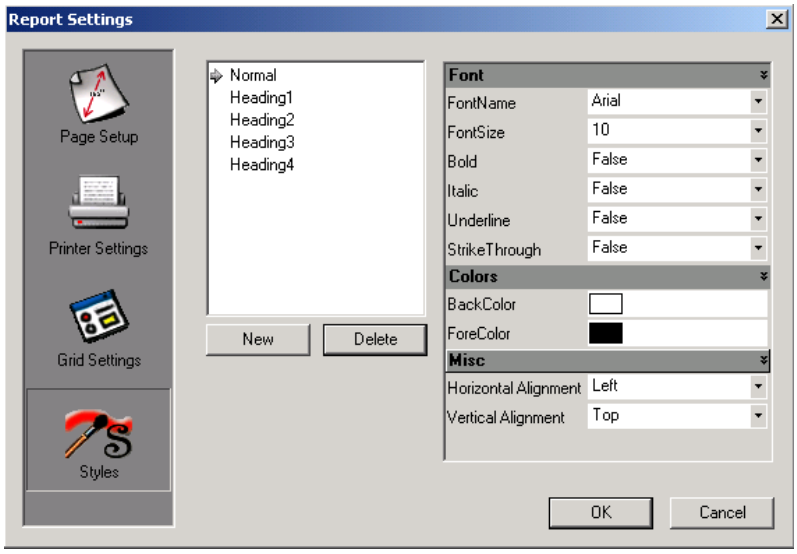


Modifying ruler units will also affect the ruler and grid of the design canvas. If you change the unit of measurement to centimeters, make sure that you change grid values as well as you might end up with too many dots on the screen.



Styles

The STYLES option from the REPORT SETTINGS window allows you to set the style for your report. REPORT EDITOR provides you with 5 pre-defined styles: Normal, Heading 1, Heading 2, Heading 3 and Heading 4.

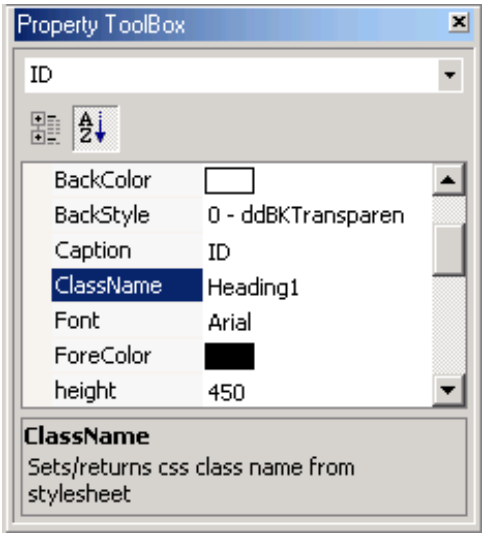


You can change the font type, color, size, typeface and alignment, create and define new styles or delete existing ones depending on your report.

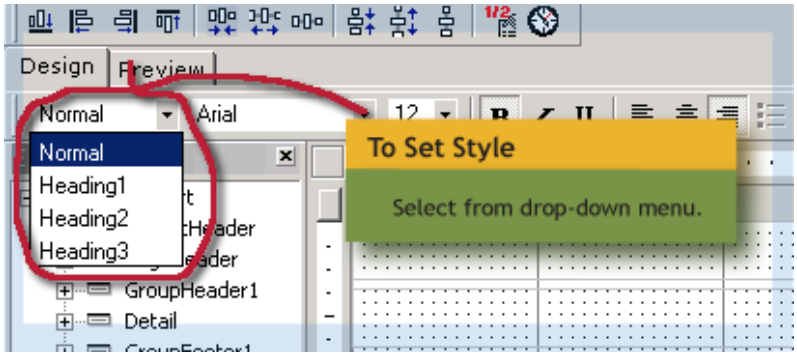
To use styles:

1 Select a field or label and do any of the following:

- In the PROPERTY TOOLBOX, change field beside Classname. For example, to change default Normal to Heading 1, type in Heading1 in the field to the right of Classname.

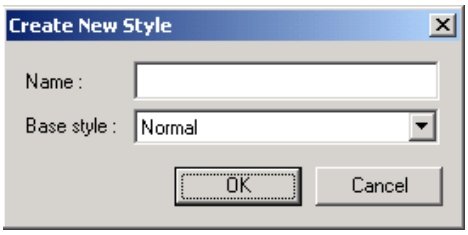


- In the Style bar right above the ruler, select Heading1 from the drop-down list.



To create a style:

1 Click the NEW button to display the CREATE NEW STYLE window.

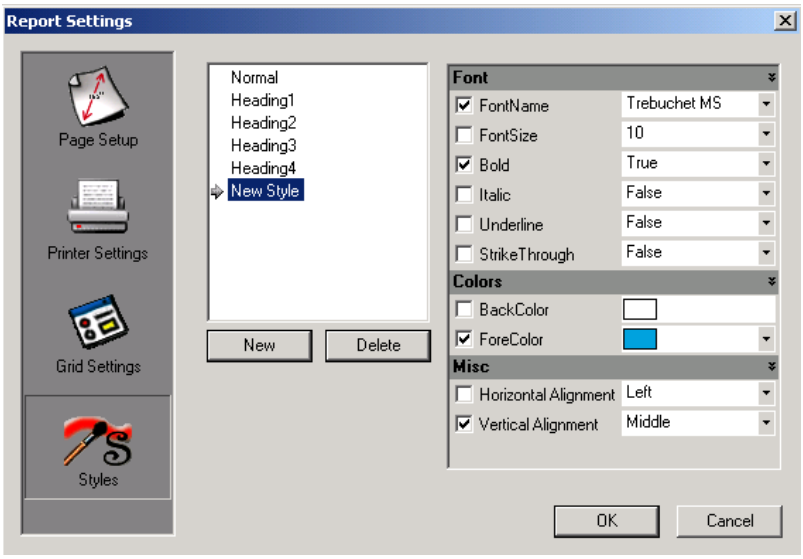


2 Enter the name of the new style in the field.

3 Select a pre-defined style to serve as basis for the new style from the drop-down list.

4 Click OK.

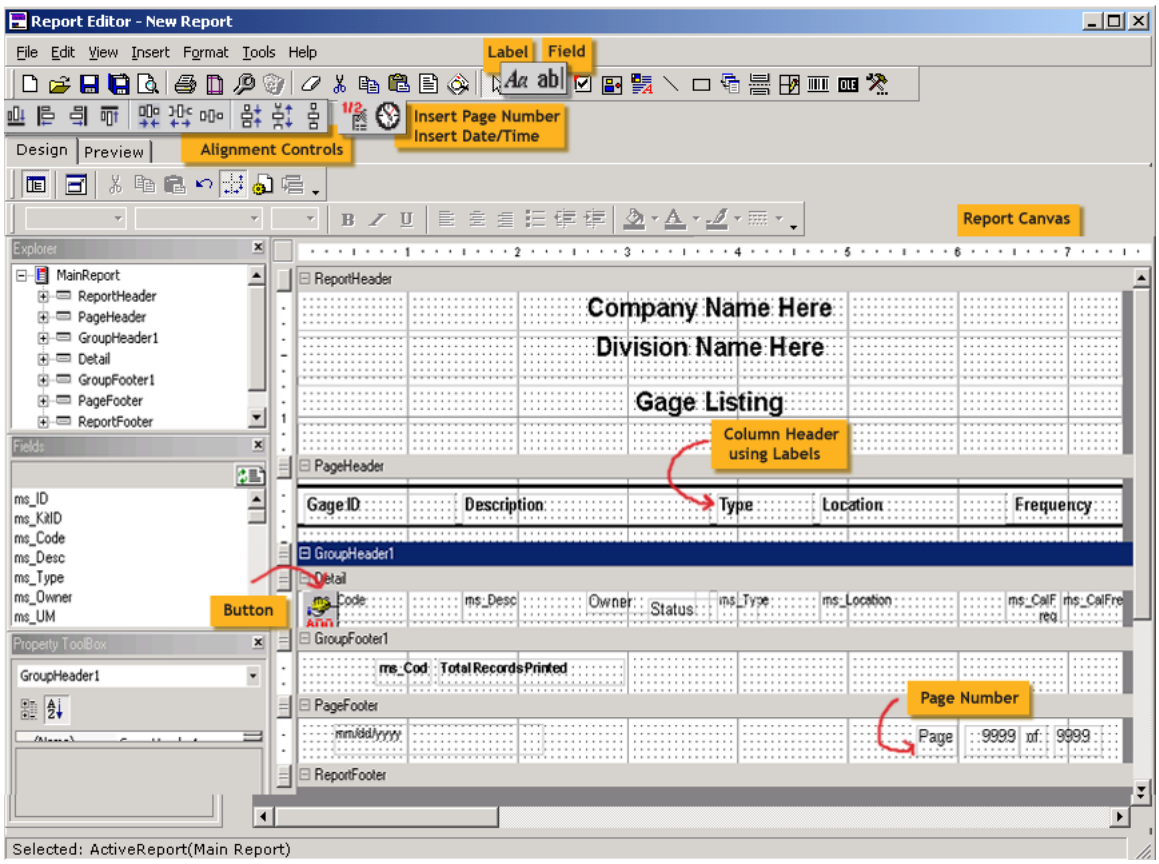
5 The new style will be added, and will initially display the properties of the base style. From the STYLES window in REPORT SETTINGS, select the style you have created and then change its elements.



To delete a style, highlight your selection, then click DELETE. A message box will appear confirming the action. Choose YES to remove the style from the list; NO to cancel the action.

Finishing the Report Layout

To make it easy to check report or chapter title and pages, you must include a page header and footer. The page header usually contains the report and column titles, while the footer indicates the page number. These are created using the LABEL button, and PROGAGE ISO 6 includes INSERT PAGE NUMBER and INSERT DATE/TIME FIELD buttons. Just click on the button you want to add, and then drag to a canvas area where you want it to appear. When you're done, don't forget to save your report.

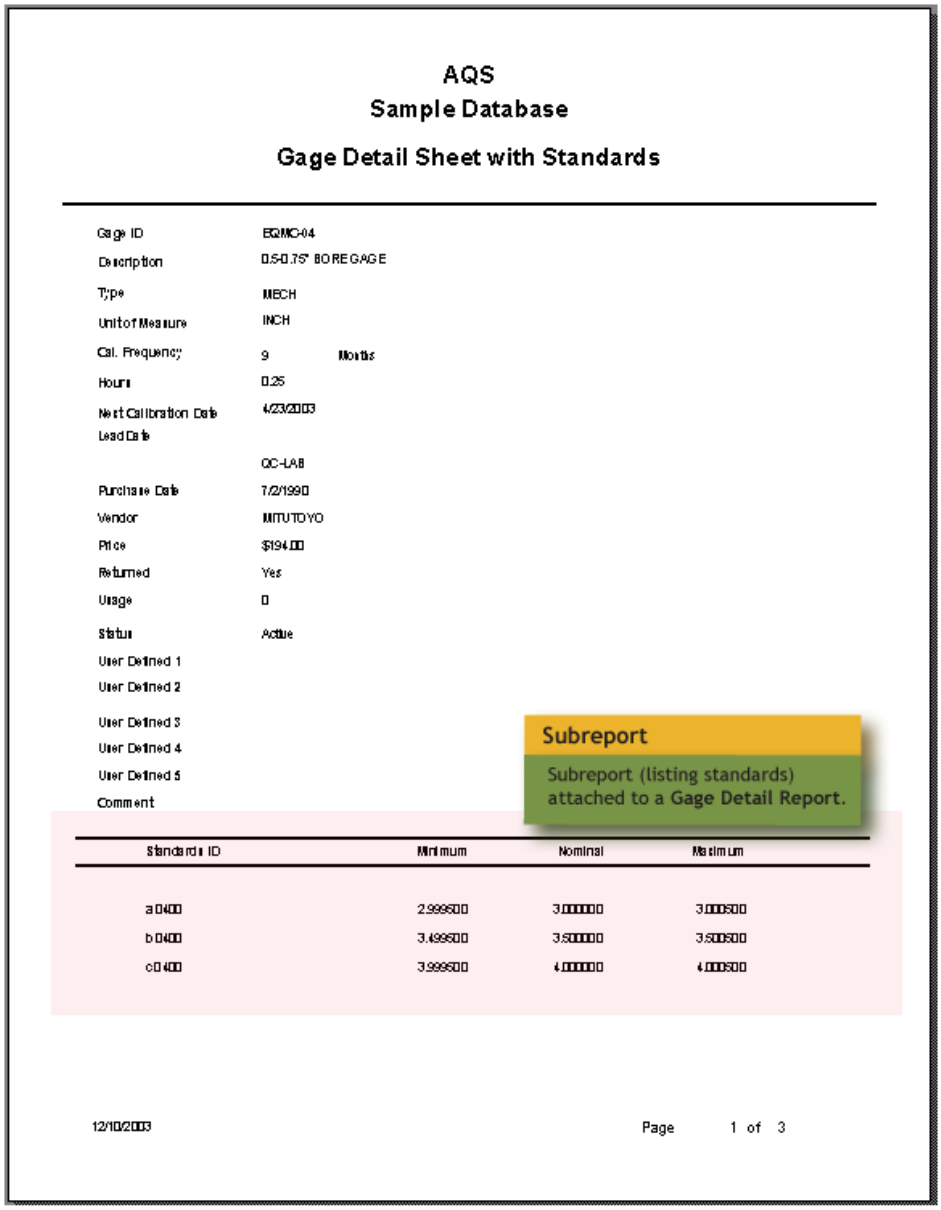


Note: You can select multiple elements and change their common property all at once (e.g. font). To do this, you can either drag the cursor while holding the left mouse key on the canvas to highlight your selection or simply hold the control button while clicking on the items you want to include in your selection.

Creating Sub-Reports

A Sub-Report is a report within a report, and each Sub-Report pertains to a record in the main report. It is very useful when you want to your report to contain more details in your report but cannot include additional tables for details in the main SQL statement.

Sub-Reports are designed in a separate canvas and then linked to the main report document.



AQS
Sample Database

Gage Detail Sheet with Standards

Gage ID	EQMC-04	
Description	0.5-0.75" BORE GAGE	
Type	MECH	
Unit of Measure	INCH	
Cal. Frequency	9	Months
Hours	0.25	
Next Calibration Date	4/23/2003	
Lead Date		
	QC-LAB	
Purchase Date	7/2/1990	
Vendor	MITUTOYO	
Price	$194.00	
Returned	Yes	
Usage	0	
Status	Active	
User Defined 1		
User Defined 2		
User Defined 3		
User Defined 4		
User Defined 5		
Comment		

Subreport

Subreport (listing standards) attached to a **Gage Detail Report.**

Standards ID	Minimum	Nominal	Maximum
a 0400	2.999500	3.000000	3.000500
b 0400	3.499500	3.500000	3.500500
c 0400	3.999500	4.000000	4.000500

12/10/2003 Page 1 of 3

Building A Sub-Report

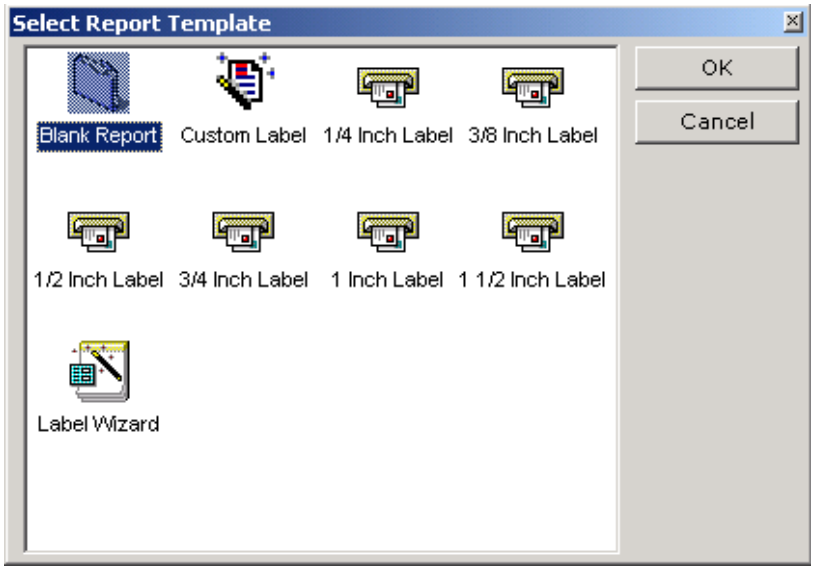
Sub-Reports are similar to any other reports you create. The only major difference it you don't add Page Headers to sub-reports since it will share that field with the main report.

Creating a Sub-Report:

1 From REPORT EDITOR screen, do any of the following:

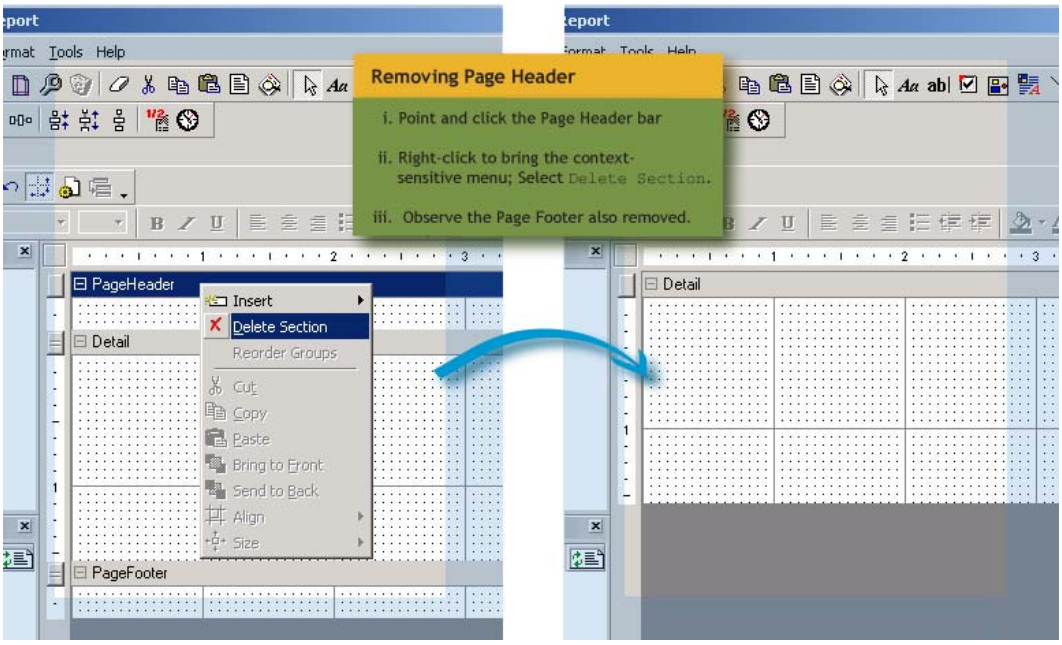
- Select FILE > NEW.
- Press CTRL+N

Then choose Blank Report from the SELECT REPORT TEMPLATE screen.



2 Open your data source. (See "Opening A Data Source" on page 189).

3 Once you have set up your data source, remove the PAGE HEADER (and PAGE FOOTER) from the design canvas. To do so, highlight the PAGE HEADER title bar, then choose Delete Selection from the right-click context menu.



This leaves you with the details section, which will contain the fields for your sub-report.

4 Insert a Group Heading. The data field that you will choose for the heading should be the field you will use to link the sub-report to the main report. While it is not important that the heading reflect the contents of the field, makes sure you set the linked field in the PROPERTY TOOLBOX > DATAFIELD.

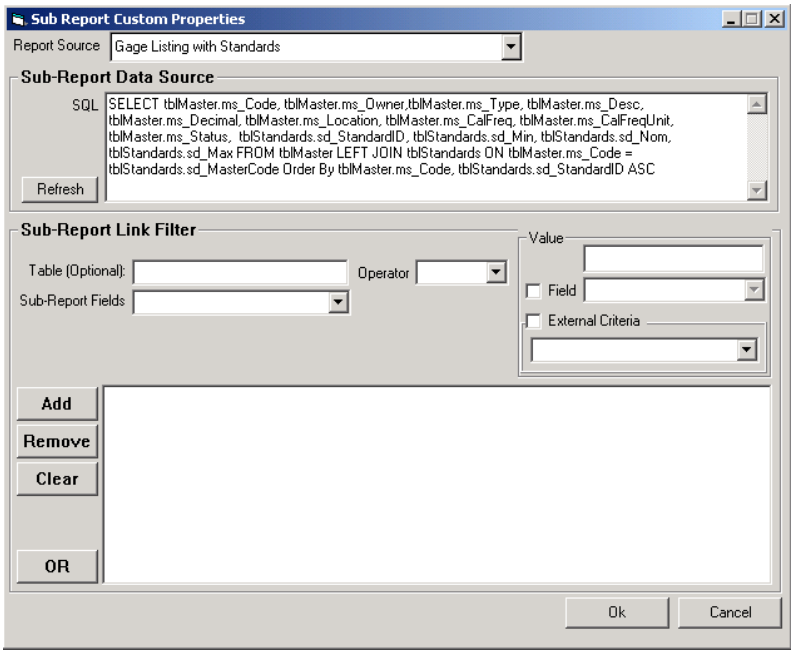
You can add more groups to your sub-report, but the topmost group should contain the link field.

When you're done, save your sub-report under an appropriate filename. It might be better if you indicate in the filename that the document is a sub-report since it will not have its own Page Header.

Adding Sub-Reports

1 Click on the Subreport  button from the button bar and then drag an area in the canvas wherein the sub-report will be placed.

2 Now that you have set your sub-report "container", edit the link to the actual sub-report you have created in the previous discussion. Click on the EDIT SUBREPORT LINKS  button to open the SUB REPORT CUSTOM PROPERTIES window.



Sub Report Custom Properties Controls

Field	Description
Report Source	This is a drop-down list of all available reports. Select the Sub-Report you will use from the list.
SQL	The SQL statement used in opening the data source of your Sub-Report. This is a non-editable field and is provided here so you can immediately see the tables and fields that are used in your sub report. This is particularly helpful in finding out if the field you need to use for the link is contained only in one table or in multiple tables.
Refresh **button**	Refreshes the SQL screen.
Table (Optional)	If your link field is contained in more than one table in your source, you have to specify the table to use for your field. If you have only one table as source, this need not be filled.
Sub-Report Fields	The name of the link field from your sub report.
Operator	The operator for comparing the link field to a value.
Value	You have 3 choice for filter value: ▪ Fixed value – your report will be limited to only the value ▪ Field – this drop down list is taken from all the available fields of your master report ▪ External
Add, Remove and Clear **buttons**	Click ADD button to add criterion. Select a criterion from the list and click on REMOVE to delete selected criterion. The CLEAR button erases the whole criteria.
Or **button**	By default, criterions are linked with "AND" connector. Select the "Or" button before adding a criterion to use "OR" instead of "AND".
Ok **button**	If you are satisfied with you criteria, click "OK" to affect changes.
Cancel **button**	Discards all changes if any.

In this screen, define the Report Source or the name of the Sub-Report. After the source has been selected, you will be able to view the SQL statement that opens the data source of the main report. Next, you have to create a link filter to connect the sub-report to the main report.

Connecting the Sub-report to the Main Report:

1 Select from the sub-report the field you will use as the link.

2 In cases wherein there is more than one table with the field you have identified as the link, specify the table name. Otherwise, the table field is optional.

3 In the Sub-Report Fields, select from the drop-down list the fields you want displayed in your sub-report.

4 Select the operator that will be used in comparing the field to a value.

5 Specify your filter values, which can any of the following:

- Value – a specified fixed value
- Field – a link to a current field value of the main report
- External Criteria – indicated by the contents of a field in the sub-report

6 Add the criterion to the list by clicking on the ADD button. Repeat these steps to add another criterion.

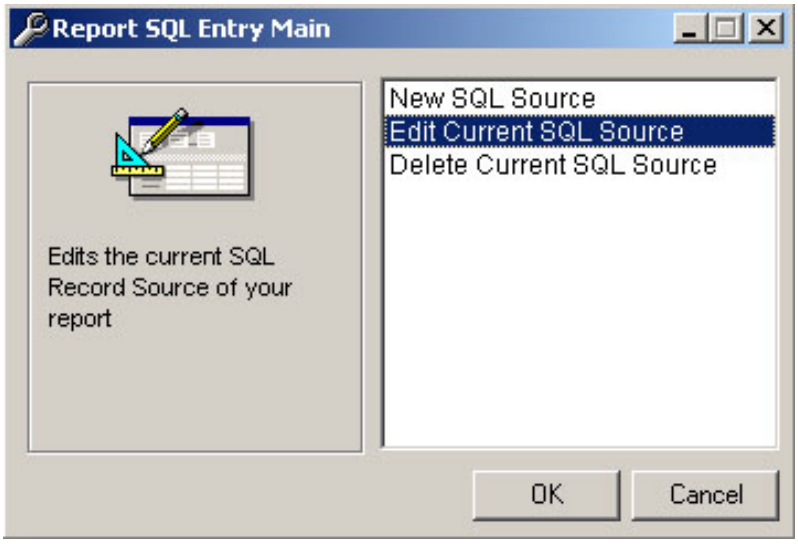
Affixing Bar Codes

A bar code is simply another type of font that appears as a series of vertical bars representing the numbers 1 to 9. To facilitate your inventory process, you can convert Gage IDs to bar codes by simply adding the terminator (*) character before and after a code, then viewing the bar code using the bar code font.

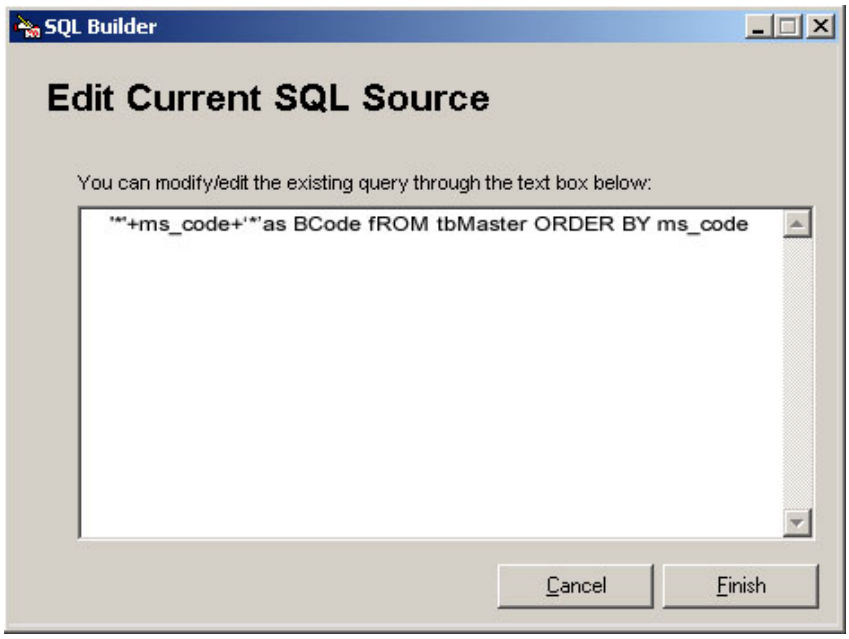
Bar codes are created from field data. If you are familiar with SQL statements, the most practical way of creating bar codes is by modifying the SQL statement for your data source and adding a new field containing the terminator characters and the code field, then giving it an alias, such as "BCode".

Creating A Bar Code:

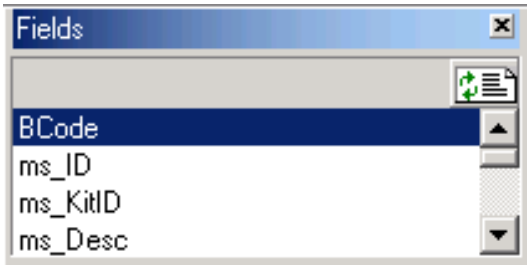
1 Click on the SET OR BUILD SQL SOURCE FOR THE REPORT  button, then choose Edit Current SQL Source.



2 Edit the SQL statement for the source in the edit field as shown below:

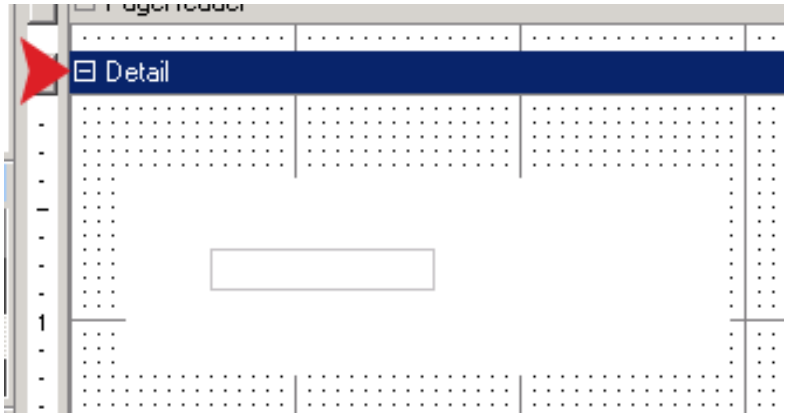


In the screenshot above, a field was added after the fields from the table tbMaster were included. The part of the statement `'*'+ms_code+'*'as BCode…` contains the "+" symbol also known as the concatenator symbol ads the "*" symbol in the beginning and end of the code and then given the alias "Bcode". This new field name would now be included in the REPORT FIELDS window.



3 To add a bar code to your report, click on the BAR CODE  button, then drag a rectangle ares in the canvas where you want to put the bar code.

4 Click on the title bar of the area where you want to put the bar code. In the example below, the bar code will be located in the Details section.



5 To link the bar code item to the bar code field "Bcode", open the Script Window through the VIEW SCRIPT  button. Then, follow the syntax below to setup your script for linking the barcode to the barcode field.

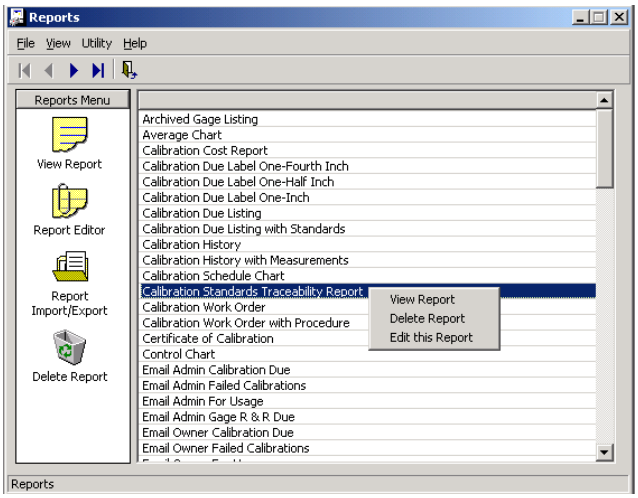
```
Sub OnFormat
rpt.Sections(2).Controls("Field10").Caption =  rpt.Sections(2).Controls("DataControl1").Recordset.
Fields("BCode").Value
End Sub
```

In this example, "Field10" is the name of the bar code field you have created in your report and "BCode" is the data field you created in setting up your data source. The above is the VBScript. Just copy the script and remember to keep the command in one row (between Sub and End Sub). For illustration purposes, the script has been divided into 3 parts to fit the margins.

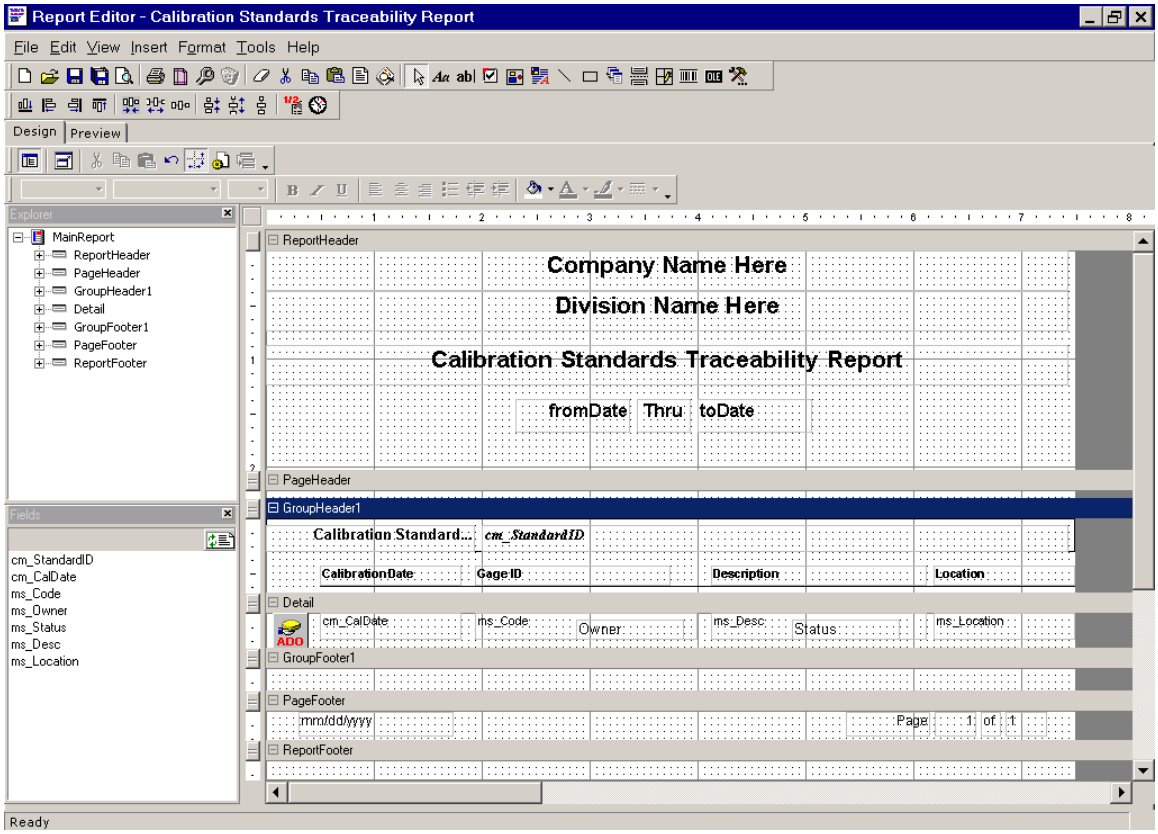
Opening and Modifying a Report

In some instances, you will be required to update your reports or create a report from an existing PROGAGE ISO 6 report template.

In the REPORTS screen, all the available report templates are listed in the right side of the screen. Highlight a report you want to modify, then select Edit this Report from the right-click context menu. Exercise caution when editing these reports as some fields may contain critical links you would not want to change.



Add, edit, and delete elements from your reports in the REPORT EDITOR canvas. You can also modify SQL statements in this screen.



Creating Labels in Report Editor

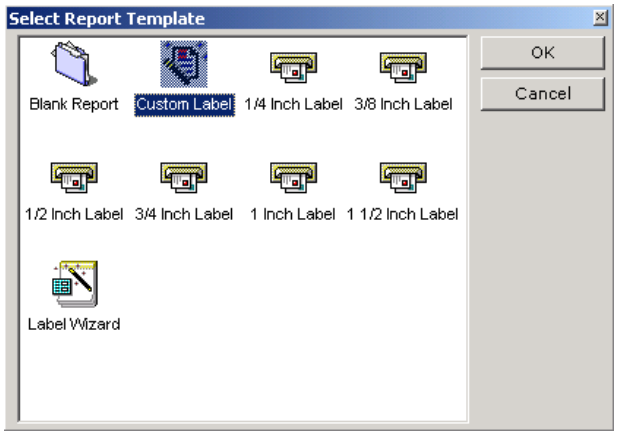
Apart from report templates, the REPORT EDITOR module also includes predefined templates for labels, a custom label designer and a label wizard.

To ensure that the labels are printed properly, you should have a printer label installed, such as Brother's PT-2500PC label printer, which is compatible with ProGAGE ISO 6 Report Editor.

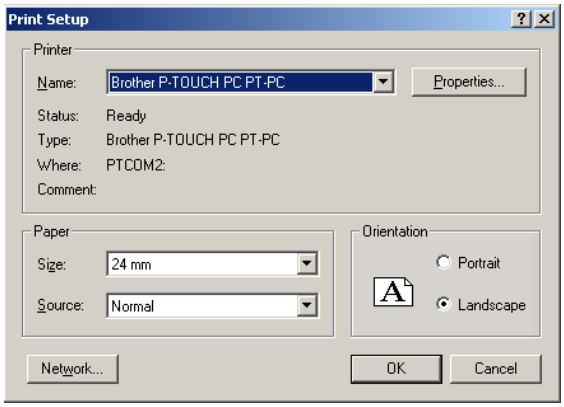
Creating labels is similar to creating reports – setting up a data source, dragging and dropping fields in the canvas, etc. You can also include bar codes.

Custom Labels

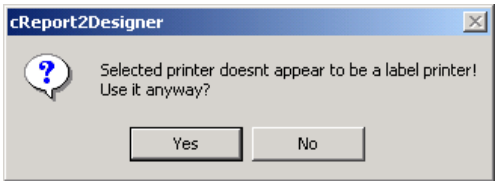
In the Report Editor canvas, select FILE > NEW > CUSTOM LABELS.



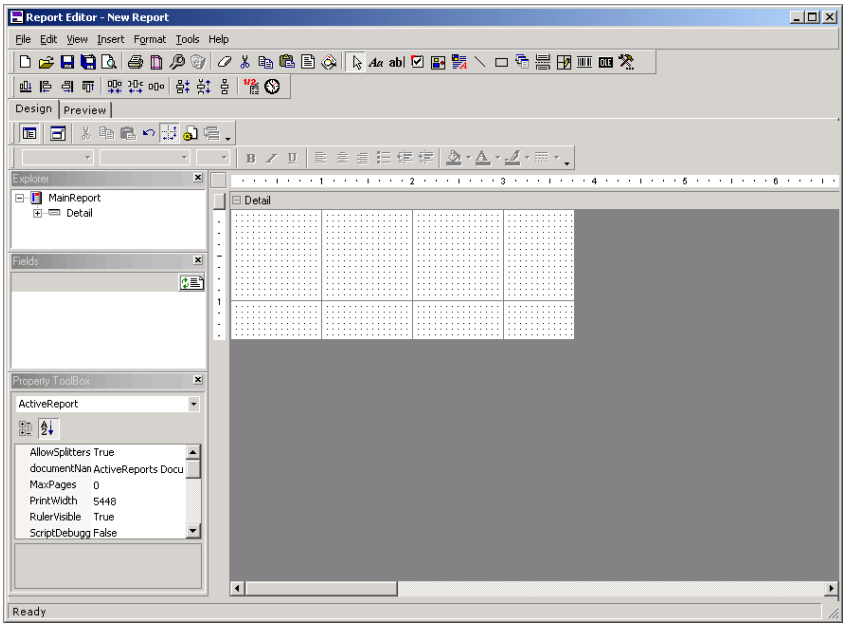
Your selection will prompt you for a PRINT SETUP. Specify the label printer and label size properly. If your default printer is not a label printer, a message box will ask you if you want still want to use the default printer. If you click YES, the program will then attempt to set the canvas size to the smallest possible area your printer can accommodate.



When you click OK, an error message may come up stating that it does not have a proper label size to use. Just click YES to so you can start creating your labels.



Create your labels as you would a report. In the designer canvas, only the Detail field is available since you won't need to use headers and footers for labels.



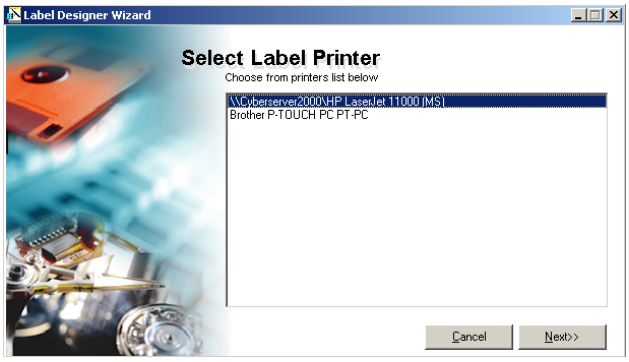
Label Wizard

The LABEL WIZARD provides step-by-step instructions in creating your labels. Before you begin, however, you need to identify the label printer you will be using, then the label size, table to use, and the fields, which will be included in your labels.

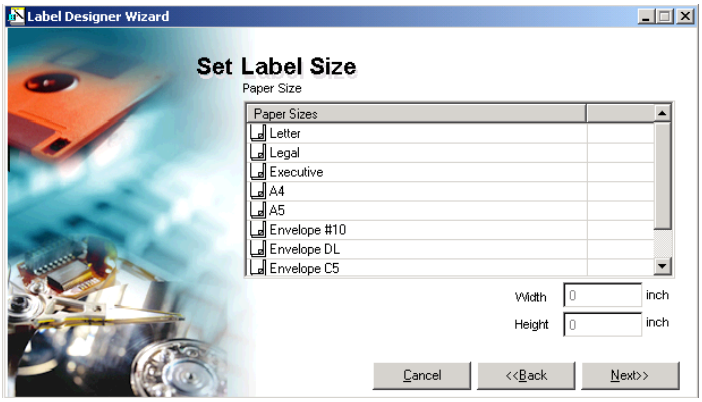
Running Label Wizard:

To run the Wizard, select LABEL WIZARD from the SELECT REPORT template window. The process is illustrated below:

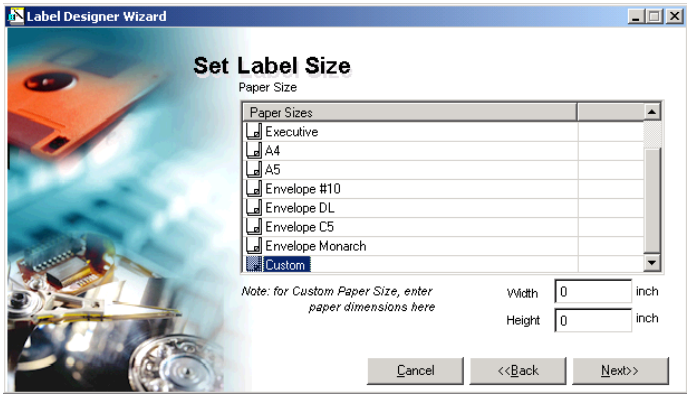
1 Select a Label Printer – Select from the list of available printers. You should have at least one. If there is none, the program will approximate the smallest possible printable size for your printer.



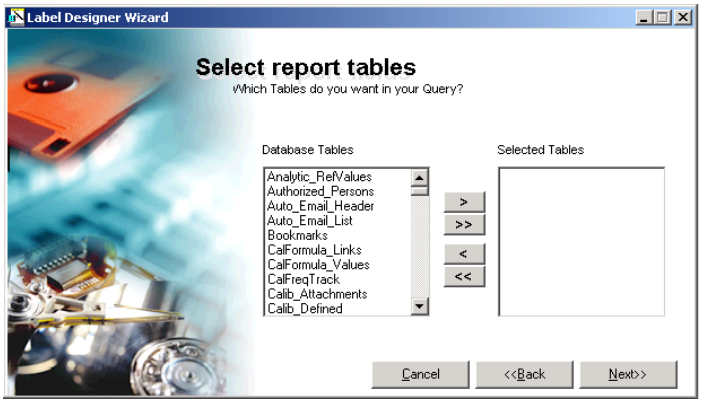
2 Select Label Size – Choose the label size from the list of paper sizes supported by your printer. The list is generated automatically from your printer information file. You can see the actual label measurements in inches in the Width and Height fields in the lower portion of the screen.



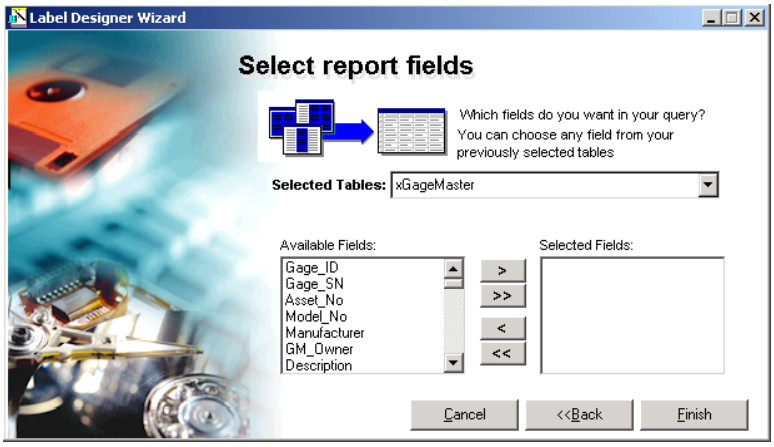
For Custom Label sizes, you have to manually enter the width and height (in inches) in these fields.



3 Select Report Tables – Choose from all available tables in your database by highlighting your selection and pressing ">". You can select multiple tables, but since the links will not be established, you have to make sure that the tables you have selected have at least one field in common. Only matching records will be shown so it is recommended that you choose only one table for your labels.

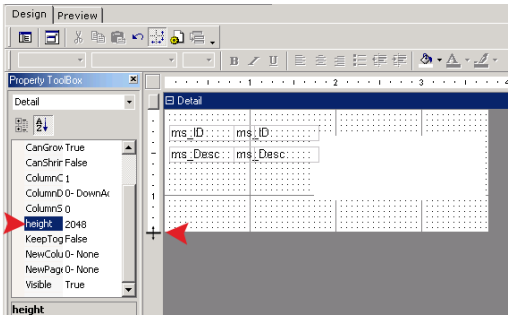


4 Select Report Fields – Pick from the list of fields generated from your table selection those you will need for creating your labels. When you are done, select the FINISH button to open the label editor window.

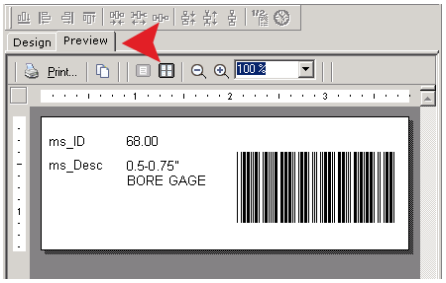


The Label Wizard automatically generates your data source SQL statement and arranges all the labels and fields in the Detail section of your canvas. In some cases, the height of the DETAIL section is greater than the settings you set for your label printer. Remember that the height value is in twips and 1 inch is equal to 1440 twips. A 6mm label is approximately 340 twips or about ¼ inch.

In some systems, the DETAIL section height will expand to allow at least most of the fields and labels to be viewed. As discussed in the paragraph above, the LABEL WIZARD automatically puts all available fields and labels on the canvas, one set label and field at a time. If you think that not all of your fields are displayed on the canvas due to height limitations, you can adjust the height to expand your view.



Once all the labels and fields are displayed, arrange them on the canvas, then click the Preview tab to check if all of your data are within the confines of the canvas. Remember to change the height back to 340 twips, which is the height label prior to previewing your work.



Preview of a bar code

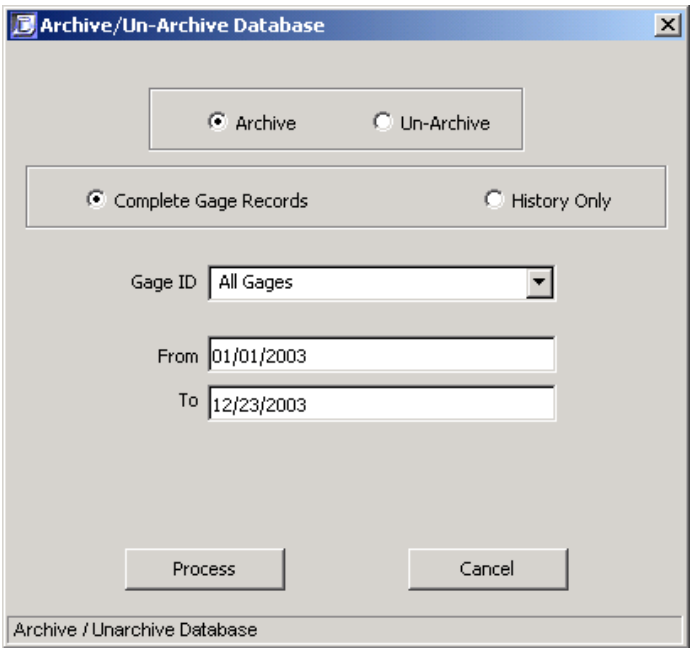
Chapter 7: Database Utilities

Archive Database

You can archive your gage master and related calibration records for all gages or a particular gage, generated during a particular period of time. ARCHIVE DATABASE moves your records from the current group and puts them in a storage location within the database. This makes your current group of records smaller and your database faster. Take note that an archive is not the same as a backup.

Note: Always make a backup copy of your database file before you archive.

Access the Archive Database Utility from the Utilities menu bar.



Archive/Un-Archive Database Utility

Control	Description
Archive	Choose this radiobutton if you want to archive gage records.
Unarchive	Choose this radiobutton if you want to un-archive gage records.
Complete Gage Records	Choose this radiobutton if you intend to archive complete gage records.
History Only	Choose this radiobutton if you intend to archive only the history of gage master records.
Gage ID	Select from this drop-down list the gage that you want to archive. Select ALL GAGES to archive all gage master records.
From	Enter in this field the start of the period.

Control	Description
To	Enter in this field the end of the period.
Process	Click this button to start archiving or un-archiving records.
Cancel	Click this button to abort action. This changes to DONE when archiving or un-archiving is completed; click to close the utility.

To archive records:

1 Choose Archive.

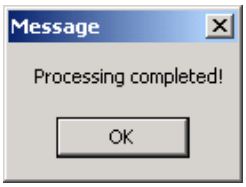
2 Choose either Complete Gage Records or History Only.

3 Open Gages ID, and select *<gage>*.

4 Enter <beginning of period> in From.

5 Enter *<end of period>* in To.

6 Click PROCESS. A message appears when archiving is completed.



7 Click OK.

To unarchive records:

1 Choose Unarchive.

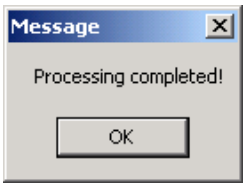
2 Choose either Complete Gage Records or History Only.

3 Open Gages ID, and select <gage>.

4 Enter <beginning of period> in From.

5 Enter <end of period> in To.

6 Click Process. A message appears when archiving is completed.



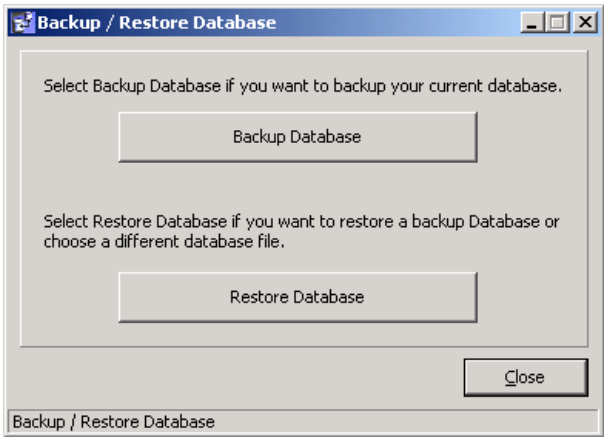
7 Click OK.

Backup/Restore Database

You should periodically back up your ProGAGE ISO database file (it is suggested that you do so every day). You can use ProGAGE's built-in BACKUP/RESTORE DATABASE UTILITY to backup data if you do not have a specialized backup program (such as Colorado Backup, Zip Drive, or another network backup utility).

The BACKUP/RESTORE DATABASE UTILITY works only with MS Access databases. If you are using an MS SQL database, you must use backup and restore utilities designed for it. See your System Administrator, to know more about this.

Open the Backup/Restore Database Utility from the Utilities menu list bar.

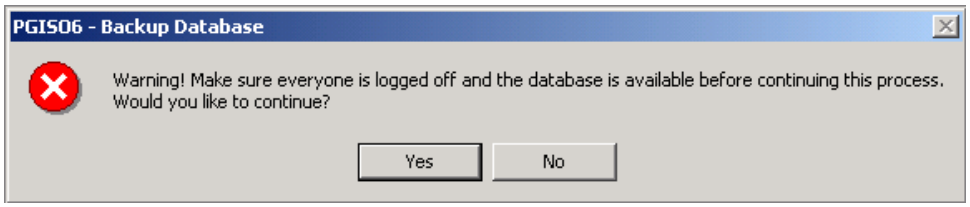


Backup Database

The BACKUP/RESTORE DATABASE UTILITY will create a backup of the database that you are currently connected to.

To Backup Data:

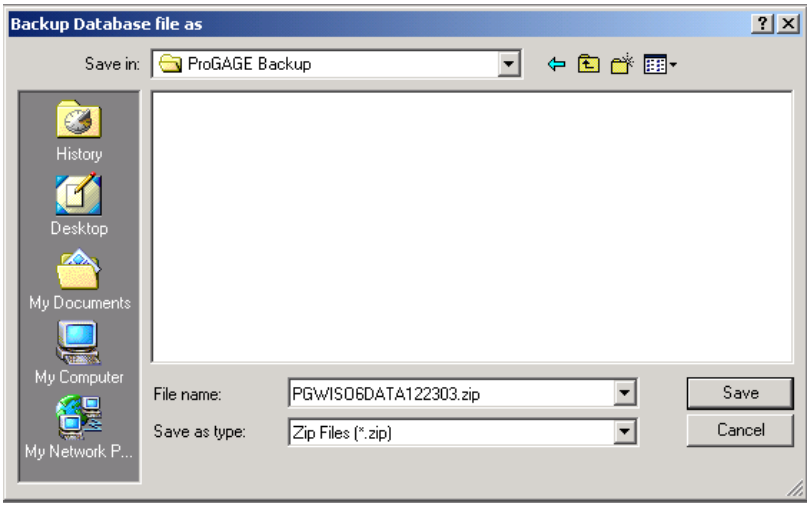
1 Click on the BACKUP DATABASE button. The following dialog opens:



2 Click YES to continue. The BACKUP DATABASE FILE AS dialog opens.

3 Open Save in, and select disk or network drive to which you want to save the backup file.

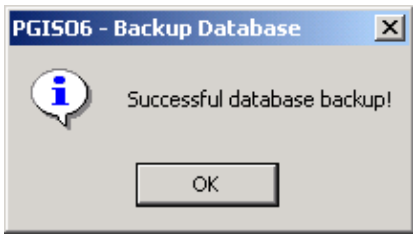
4 ProGAGE ISO 6 will automatically assign a filename to the backup file. The filename has an extension that indicates the date today (or when the backup is made). For example, if you back-back up PGWISO6DATA.mdb on December 12, 2003, the suggested filename of the backup will be PGWISO6DATA122303.mdb. Change the file name, if desired, but make sure that the filename will indicate when backup is made.



5 Click Save.

6 Click Close.

Back-up process will then start, and a progress meter will show you the percentage of completion. When the backup is finished, you'll see this message:



7 Click OK.

Your data is now backed up. For future reference, clearly label the backup diskette(s) with the date (or day of the week) and diskette number.

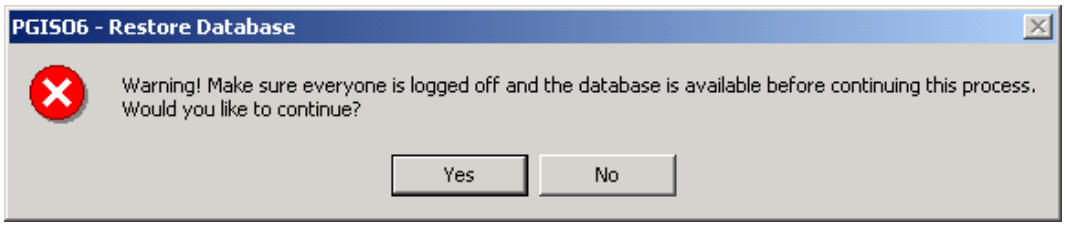
The resulting backup files will be compressed in the industry standard ZIP format. This means that you can use other utilities, such as PKZIP, PC-Tools, WinZip, or Norton, to restore your backup file.

Restore Database Using its Backup

The Backup/Restore Database Utility will restore a backup database and save it to the directory of the database to which you are currently connected to.

To restore database

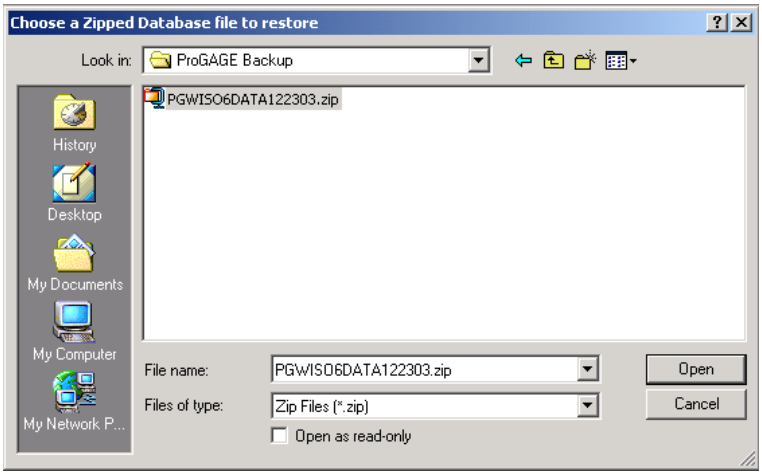
1 Click on the RESTORE DATABASE button. The following dialog opens:



2 Click YES to continue. The CHOOSE A ZIPPED DATABASE FILE TO RESTORE DIALOG opens.

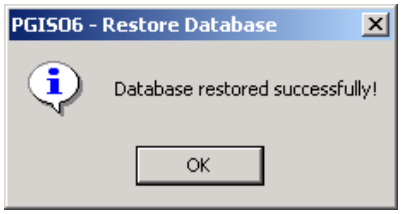
3 Open Save in, and select disk or network directory where the backup file is located.

4 Specify back-up file.



5 Click Save.

Restore process will start; a progress meter will show you the percentage of completion. When the restore is completed, you'll see this message:



6 Click OK.

7 Click Close.

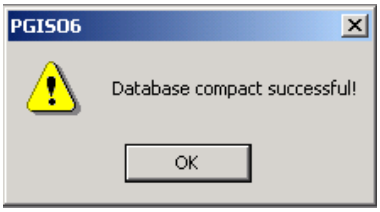
Compact Database

Whenever you delete a record, the program doesn't actually delete the record—it only marks it as deleted and then re-uses it whenever you add new records (i.e., your data file size does not decrease). If you delete many records, you should compact your data file so that the program actually removes these records, decreasing the size of the data file. You can do this by running COMPACT DATABASE UTILITY.

To compact a database:

1 Click Compact Database Utility icon from the Utilities menu list bar. The COMPACT DATABASE? dialog opens.

2 Click YES when all users are logged-off. Compact process will then start. When the restore is completed, you'll see this message:



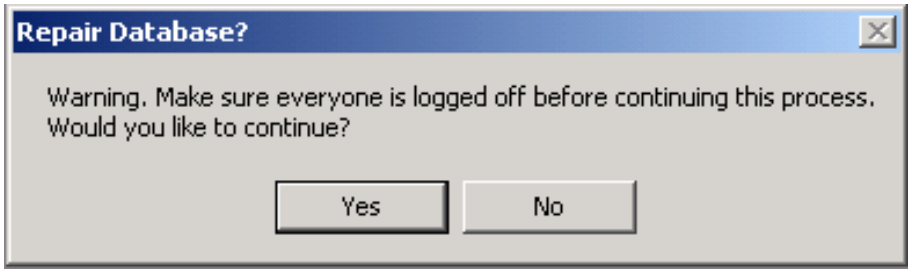
3 Click OK.

Repair Database

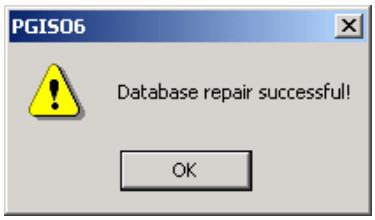
If your database is corrupted, use the REPAIR UTILITY to amend and restore it.

To compact a database:

1 Click REPAIR DATABASE from the UTILITIES MENU. The Repair Database? dialog opens.



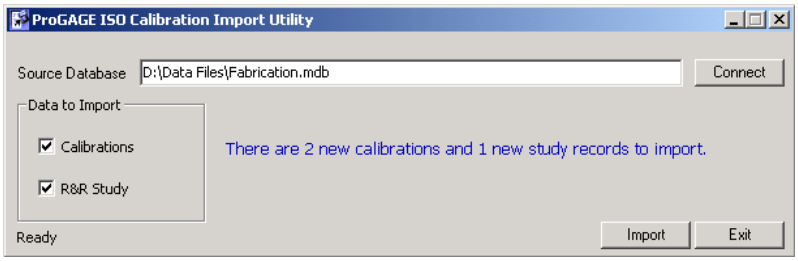
2 Click YES when all users are logged-off. Compact process will then start. When the restore is completed, you'll see this message:



3 Click OK.

Data Import Utility

The DATA IMPORT UTILITY allows you to import Calibration records and R&R Studies data from a specific source database.



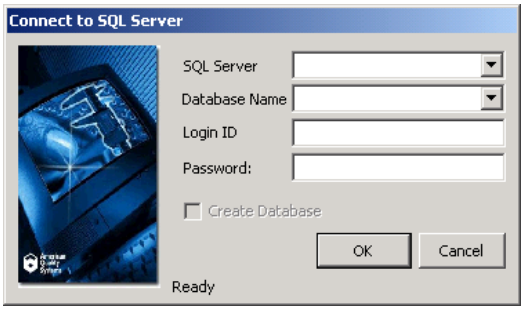
Data Import Utility Controls

Control	Description
Source Database	Enter the path of the database containing the calibration records and R&R Studies data that you want to import. Click Connect button to map and specify the database.
Calibrations	Mark this checkbox if you intend to import Calibration records Data.
R&R Study	Mark this checkbox if you intend to import R&R Studies Data.
Import	Click this button to begin importing data. This becomes available when you are connected to a database.
Exit	Click this button to exit Data Import Utility.

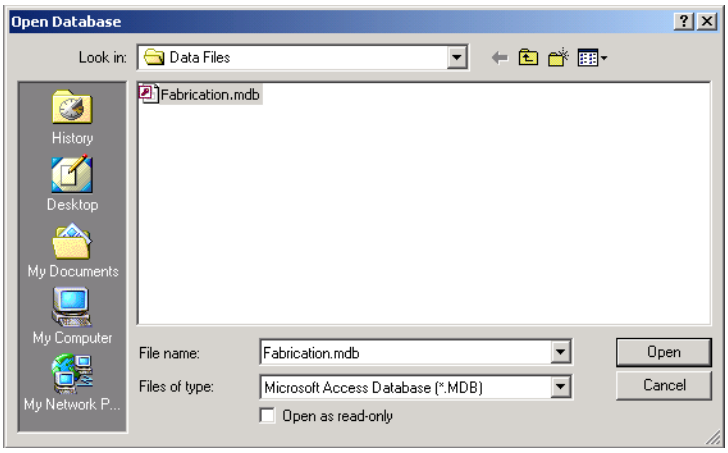
To import calibration and R&R Study Data:

1 Click CONNECT button to connect to the database containing the calibration and R&R Study data that you want to import.

If your current database is stored in an SQL Server, ProGAGE ISO 6 will ask you to select a database in the currently connected SQL Server. You may also specify another SQL Server by selecting from the SQL Server field dropdown menu. A valid <Login ID> and a correct <Password> may also be required. Click the OK button to continue the import process. Or click the CANCEL button, if you wish to connect to an MS Access database.



The Open Database window will then appear. Specify *<filename>* of the database that you wish to connect to, and click the OK button. You will be reverted to the ProGAGE ISO 6 Calibration Import Utility window.



2 Mark <type of data>.

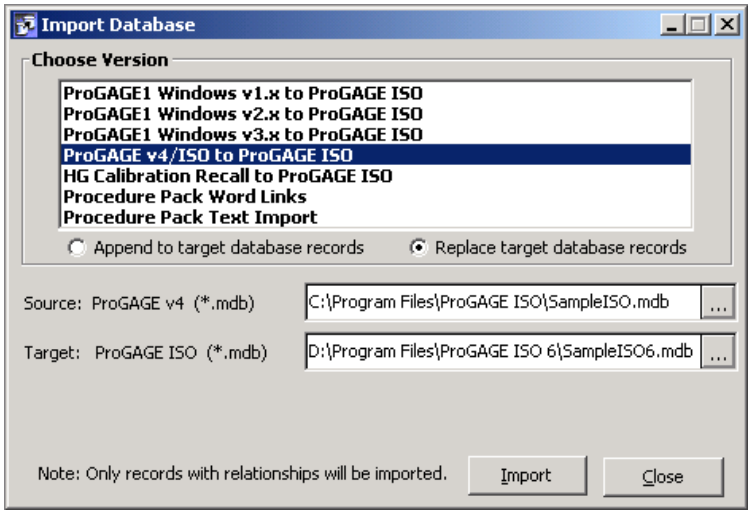
3 Click the IMPORT button. ProGAGE ISO 6 will prompt you with a dialog when importing is successful.

Appendix A: Importing Data

ProGAGE ISO offers the capabilities of importing data from previous versions and converting compatible databases.

Importing Databases from Previous Versions

To begin importing databases from previous version of ProGAGE ISO, choose IMPORT DATABASE from the UTILITIES Menu.



Import Database Controls

Control	Description
Choose Version	This textbox list contains previous versions of ProGAGE ISO.
Append to target database records	Choose this radiobutton to import and add the records of an old database into the ProGAGE ISO 6 database. Only records with relationships to the new database will be imported.
Replace target database records	Choose this radiobutton to import the old database and replace the ProGAGE ISO database with it.
Source: Old version	This field indicates the path of the source database. Click the BROWSE (…) button to locate and specify the (old) database that you want to import.
Target: ProGAGE ISO (*.mdb)	This field indicates the path of the target database. Default target database is the current database. If you want another database to be the target file, click the BROWSE (…) button to locate and specify the (new) database that you are updating or replacing.
Import	Click this button to trigger the import process. This becomes available only when paths of both source and target databases are specified.
Close	Click this button to close IMPORT DATABASE UTILITY.

To import and add records of old database into new target database:

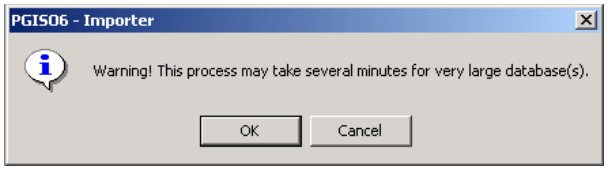
1 Choose <previous database> from Choose Version textbox list.

2 Activate Append to Target Database Records radiobutton.

3 Enter <path> on Source: Old Version field.

4 Enter <path> on Target: ProGAGE ISO field.

5 Click IMPORT. A dialog will appear warning you that the process may more than a few minutes.



6 Click OK. The import process begins. When done, you will be informed of the success of the project.

7 Click OK.

8 Click CLOSE.

To import and add records of old database into new target database:

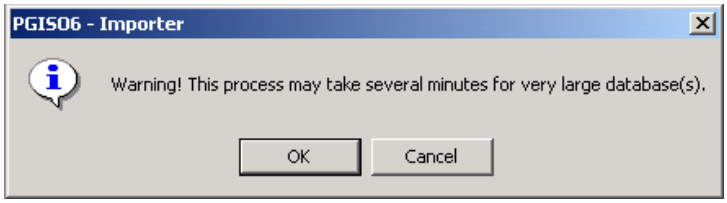
1 Choose <previous database> from Choose Version textbox list.

2 Activate Replace Target Database Records radiobutton.

3 Enter <path> on Source: Old Version field.

4 Enter <path> on Target: ProGAGE ISO field.

5 Click Import. A dialog window will appear warning you that the process may take more than a few minutes.



6 Click OK. The import process begins. When done, you will be informed of the success of the process.

7 Click OK.

8 Click CLOSE.

When importing database from previous versions, only records with relationships to the source database will be imported. A "relationship" between tables is established with a common field from both. Appendix B: Table Definitions on page 239 summarizes the tables in ProGAGE ISO 6; each table is accompanied by a brief description, the lists of controls it contains, and the name of module to which it is attached.

Importing Procedure Pack Documents

You need to install the Procedure Pack Documents before you can import linked Document Files or import Text Files. A default directory, C:/PGCAL, is created and will contain procedure files processed in MS Word®. A subdirectory, C:/PGCAL/WORDPERF/, will also be created and will contain procedure documents processed in WordPerfect®.

To import procedure pack link documents:

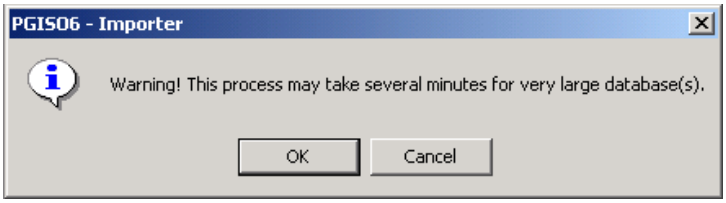
1 Select Procedure Pack Word Links from Choose Version textbox list.

2 Choose Append to Target Database Records radiobutton.

3 Check if C:/PGCAL is entered in Source: Old Version field.

4 Enter <path> on Target: ProGAGE ISO field. Accept default suggestion.

5 Click Import. A dialog will appear warning you that the process may take more than a few minutes.



6 Click OK. The import process begins. When done, you will be informed of the success of the project.

7 Click OK.

8 Click CLOSE.

When you import linked document files, only the document filename and the actual file path are imported. To view the procedure in PROCEDURES MODULE, click on the OPEN DOC button and observe the corresponding document opens in a separate window.

To import procedure pack text files:

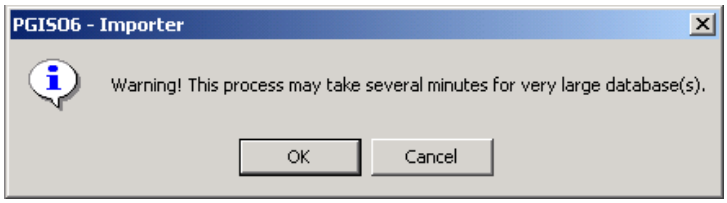
1 Select Procedure Pack Text Import from Choose Version textbox list.

2 Choose Append to Target Database Records radiobutton.

3 Check if C:/PGCAL is entered in Source: Old Version field.

4 Enter <path> on Target: ProGAGE ISO field. Accept default suggestion.

5 Click IMPORT. A dialog will appear warning you that the process may take more than a few minutes.



6 Click OK. The import process begins. When done, you will be informed of the success of the project.

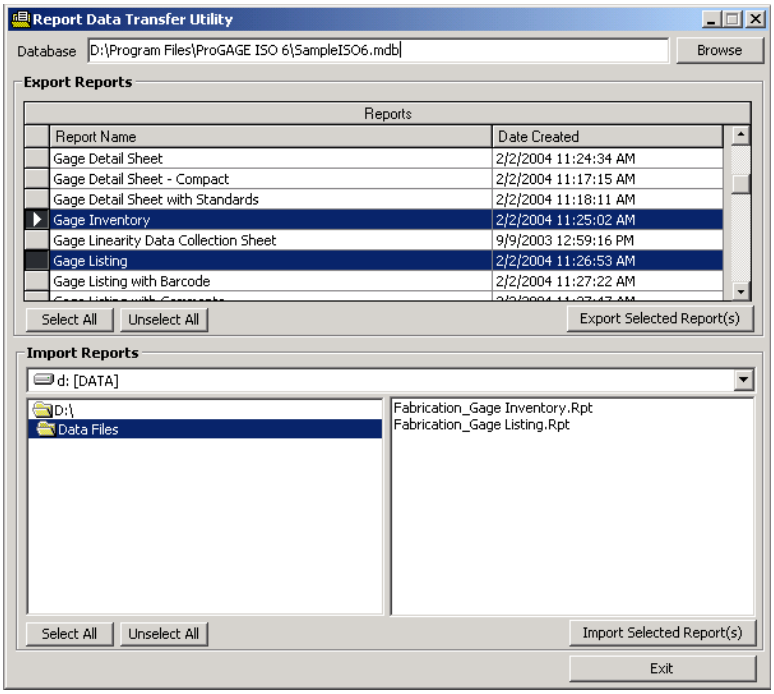
7 Click OK.

8 Click CLOSE.

The contents of the text files are imported into a memo field in the target database. The procedure can then be edited in the Procedures Module by clicking the of the Edit button of its Procedure Entry record.

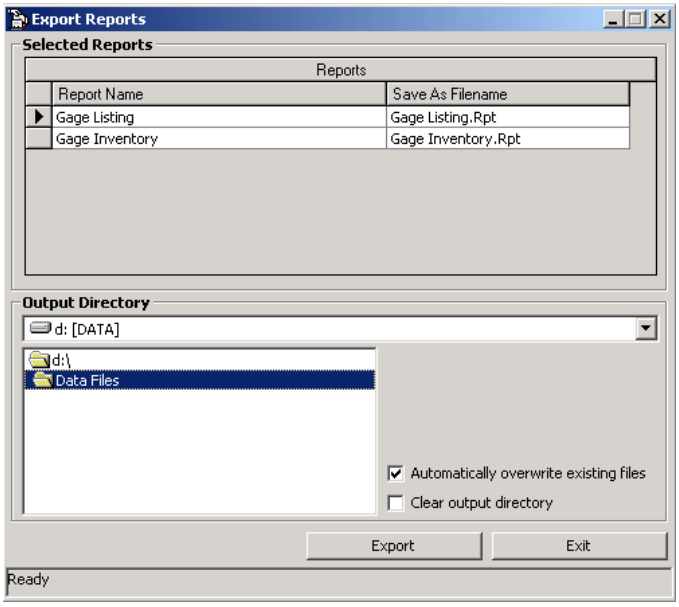
Report Import/Export Utility

Use the REPORT IMPORT/EXPORT UTILITY to standardize your company's information-reporting procedures. ProGAGE ISO 6 allows you to easily share—import and export—reports encrypted in a proprietary .RPT format.



Control	Description
Database	This database indicates the path of your active reports database. Click Browse (..) button to map and specify a different reports database.
Reports	This Records Listing Pane enumerates the available reports (and when each was generated) in your active reports database.
Select All	Click this button to select all reports from active reports database.
Unselect All	Click this button to deselect all reports from active reports database.
Export Selected Report(s)	Click this button to export selected reports.
Import Reports	Select from this drop-down list the disk or network drive that contains the source folder. The Source folder, in turn, contains the reports that you wish to import.
Bottom-Left Explorer Pane	Use this explorer pane to map and specify your active reports source folder.
Bottom-Right Textbox List	This textbox list indicates the contents of your active (source) folder.
Select All	Click this button to select all reports from active folder
Unselect All	Click this button to deselect all reports from active folder
Import Selected Report(s)	Click this button to import selected reports from the active folder into the active reports-database.
Exit	Click this button to exit the Report Import/Export utility

Export Reports



Export Reports Controls

Control	Description
Reports	This Records Listing pane reflects the reports that you've selected for export in REPORT IMPORT/EXPORT module.
Output Directory Dropdown	Select disk or network drive that contains the destination folder of the folder you wish to export reports to.
Output Directory Explorer Pane	Use this to map and specify the destination folder.
Automatically Overwrite Existing Files	Mark this checkbox to overwrite existing files in the output directory.
Clear Output Directory	Mark this checkbox to delete all existing files in the output folder.
Export	Click this button to export selected reports into the identified destination folder.
Exit	Click this button to close Export Report dialog.

To export reports (from within Report Export/Import module):

1 Make sure that active reports database contains the reports that you wish to export.

2 Choose <report> from Reports Record Listing pane. Selected <report> will be highlighted in blue.

3 To add another, choose one more <report> from Reports.

4 Click Export Selected Report(s). The Export Reports dialog opens.

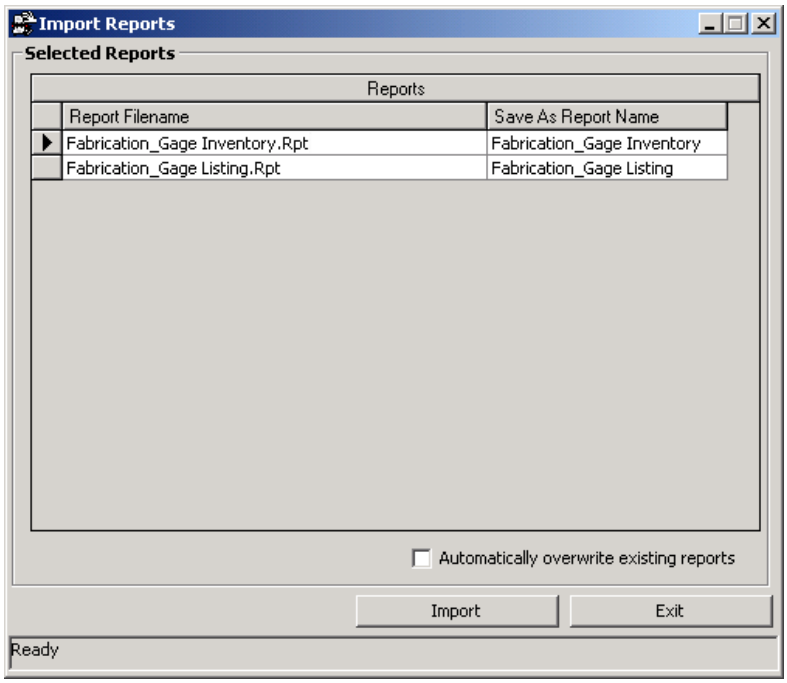
5 Observe selected reports listed in the Records Listing Pane.

6 Open Output Directory, and select <option> from drop-down list.

7 Map and specify destination folder in Output Directory Explorer Pane.

8 Click Export. ProGAGE ISO 6 prompts a message indicating the number of reports exported successfully.

Import Reports



Import Reports Controls

Control	Description
Reports	This Records Listing Pane reflects the reports that you've selected for import in Report Import/Export Module.
Automatically Overwrite Existing Files	Mark this checkbox to overwrite existing files in the reports database with the imported reports.
Export	Click this button to import selected reports into the active reports database.
Exit	Click this button to close Export Report dialog.

To import reports (from within Report Export/Import module):

1 Open Import Reports, and select <disk or network drive> from drop-down list.

2 Map and specify <source folder> in Bottom-Left Explorer Pane.

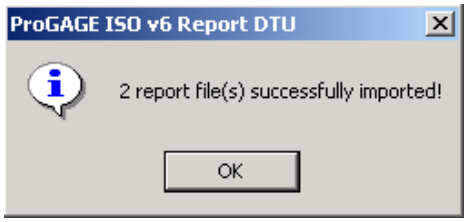
3 Choose <report> from Bottom-Right Textbox List. Selected <report> will be highlighted in blue.

3 To add another, choose one more <report> from Reports.

4 Click IMPORT SELECTED REPORT(S). The Import Reports dialog opens.

5 Observe selected reports listed in the Records Listing pane.

6 Click IMPORT. ProGAGE ISO 6 will display a message indicating the number of reports imported successfully.



Appendix B: Table Definitions

The following are the Tables used in **ProGAGE ISO 6**.

Note: A complete list of all table definitions can be found in your ProGAGE installation CD and the American Quality Systems website.

Table: tblCalibration
Description: Holds calibration header data
Module Attached to: Calibrations

Name	Type	Size
cb_AccntCode	Text	50
cb_ActionReq	Text	50
cb_AsFound	Text	50
cb_CalBy	Text	50
cb_CalDate	Date/Time	8
cb_CalStatus	Text	50
cb_CertNo	Text	50
cb_Comment	Memo	0
cb_EventID	Long Integer	4
cb_GageStand	Text	50
cb_Humd	Text	50
cb_ID	Long Integer	4
cb_InvoiceNo	Long Integer	4
cb_LaborCost	Double	8
cb_LaborHrs	Double	8
cb_LinkedDoc	Text	125
cb_MasterCode	Text	50
cb_MasterID	Long Integer	4
cb_MaterialCost	Double	8
cb_NextDate	Date/Time	8
cb_Other	Text	50
cb_OtherCost	Double	8
cb_OverAll	Double	8
cb_Pass	Text	25
cb_Pressure	Text	50
cb_ReferNo	Text	50
cb_Results	Text	60
cb_Temp	Text	50
cb_TotalCost	Double	8
cb_User1	Text	80
cb_User2	Text	80

cb_User3	Text	80
cb_User4	Text	80
cb_User5	Text	80
cb_User6	Text	80
cb_User7	Text	80
cb_User8	Text	80

Table: tblCalMeas
Description: Holds calibration measurement data
Module Attached to: Calibrations

Name	Type	Size
Cm_AccAft	Double	8
Cm_AccBef	Double	8
Cm_ActAft	Double	8
Cm_ActBef	Double	8
Cm_Allowedit	Yes/No	1
Cm_Attribute	Text	50
Cm_CalDate	Date/Time	8
Cm_CalibID	Long Integer	4
Cm_Comments	Memo	-
Cm_ID	Long Integer	4
Cm_MasterID	Long	4
Cm_Max	Double	8
Cm_Min	Double	8
Cm_Nom	Double	8
Cm_OTAft	Text	5
Cm_OTBef	Text	5
Cm_RefID	Long	4
Cm_RefMasterID	Text	50
Cm_SDID	Long	4
Cm_StandardID	Text	50
Cm_Uncert	Double	8
Flag	Yes/No	1

Table: tblMaster
Description: Holds Gage info data
Module Attached to: Gage Master

Name	Type	Size
ms_AccntCode	Text	255
ms_CalDateLast	Date/Time	8
ms_CalFreq	Long Integer	4
ms_CalFreqUnit	Text	50
ms_CalHours	Double	8
ms_CalType	Long Integer	4
ms_Code	Text	50

ms_Comments	Memo	-
ms_Decimal	Integer	2
ms_Desc	Text	50
ms_EOM	Yes/No	1
ms_ID	Long Integer	4
ms_KitID	Long Integer	4
ms_LeadDate	Date/Time	8
ms_Leadtime	Long	4
ms_Location	Text	50
ms_NextCalib	Date/Time	8
ms_NextRR	Date/Time	8
ms_Owner	Text	30
ms_Picture	OLEObject	-
ms_PictureFile	Text	255
ms_PurchDate	Date/Time	8
ms_PurchPrice	Double	8
ms_Returned	Yes/No	1
ms_RRFreq	Long Integer	4
ms_RRFreqType	Long Integer	4
ms_RRFreqUnits	Text	50
ms_RRHours	Double	8
ms_RRLastDate	Date/Time	8
ms_SchedType	Text	50
ms_Status	Text	50
Ms_StatusID	Long Integer	4
Ms_Storage	Text	50
Ms_SupplierID	Long Integer	4
Ms_Type	Text	30
Ms_UM	Text	30
Ms_Usage	Long Integer	4
Ms_User1	Text	80
Ms_User10	Text	80
Ms_User2	Text	80
Ms_User3	Text	80
Ms_User4	Text	80
Ms_User5	Text	80
Ms_User6	Text	80
Ms_User7	Text	80
Ms_User8	Text	80
Ms_User9	Text	80
Ms_Vendor	Text	50

Index

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PART # PGWV6UM-0604
PRINTED IN THE USA