

Predator Gage Crib™ – White Paper

Features and benefits for automating and organizing a gage crib

Abstract

This paper outlines the specific features and benefits of implementing Predator Gage Crib software to manage gages and automate quality processes for manufacturers worldwide. Predator Gage Crib can be configured to address the unique requirements of each manufacturer with an off the shelf shrink-wrapped software based solution. Every feature, menu, toolbar button and dialog can be configured with a set of permissions per user. Combine this with support for three database platforms; Microsoft Access, SQL Server and Oracle to provide flexibility during the implementation process and an upgrade path as your needs grow.

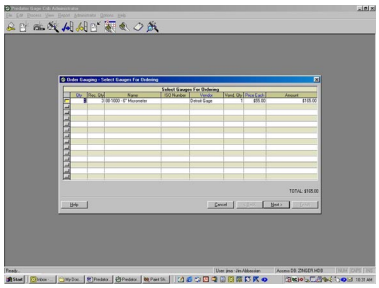
Predator Gage Crib runs stand alone or fully integrated with Predator Tool Crib™, Predator Travelers™, Predator MDC™, Predator DNC™ or Predator Desktop™. Predator Gage Crib is a member of a suite of applications all designed to share data and resources. They all share a common design and philosophy based on our unique understanding of manufacturing processes. Collectively they are known as Predator SFC™ or shop floor control.

Predator SFC is designed to manage the manufacturing details of every shop floor and can be integrated with a manufacturer's higher level ERP or MES systems to form a seamless management system.

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This document is based on features in Predator Gage Crib v1.3.



32 bit Windows based application

What is Predator Gage Crib?

Predator Gage Crib is a software application that creates, organizes, and manages gages automatically to maintain ISO and QS certifications. With the motto “You can only improve what you organize”, Predator Gage Crib helps improve manufacturing processes by empowering metrologists, gage crib attendants, shop floor personnel, manufacturing engineers and management with an automated, interactive method of gage management that runs 24x7x365.

Predator Gage Crib provides real-time answers to many manufacturer’s toughest quality questions, including:

- What gages do we already have and what can they measure?
- Where are all of our gages?
- When do we need to certify each gage?
- Who is accountable for lost, broken, repaired and scrapped gages?
- What is the history of each gage?
- How many gages do we need to order?
- What gages are used for specific parts?

Answers to all of the above can be solved with Predator Gage Crib and displayed from any PC with the ability to drill down to any level of detail at any of your manufacturing facilities. For example, a manufacturing engineer in the United States can query the status of gages in Mexico and find out the current inventory of gages and then plan an improved inspection method to be rolled out in the next three months. Details are kept indefinitely and current gage crib activities or gage statuses can be compared with previous methods or practices. Real-time gaging answers leveraged against actual production history of gage usage are becoming critical as enterprises rely more on their engineering and manufacturing resources as they go global. Answers based on actual gaging details facilitate faster decisions and increase productivity for every manufacturer.

What gages do we already have and what can they measure?

Often an excess of gaging is ordered and then maintained simply because nobody knows how many gages are on hand and certified for use. In addition, manufacturing engineers often have no idea what range of measurements can be made and with what level of accuracy can be achieved with their existing gages. So, again more new gages are ordered.

Predator Gage Crib provides an accurate inventory of every gage and can identify where individual serial numbered gages should be at any time. Finally, individual gage measurement capabilities can be recorded and easily queried by engineers from their PCs. By simply checking the gage crib’s existing inventory and capabilities, most manufacturers save 10 - 15% of their gaging costs.

Where are all our gages?

Often gages are scattered about the shop floor, kept in individual toolboxes, out for repair or certification with only a token effort in tracking their location. Valuable production hours can be held up or wasted searching for valid certified gages throughout the shop floor.

Predator Gage Crib provides an accurate inventory down to the serial number of every gage and can identify where each individual serial numbered gage should be at any time. An unlimited number of crib and shop floor locations can be managed with check out responsibility to both a shop floor location and to appropriate individuals.

Finally, the current state of every individual serial number is maintained and managed over time with full historical record. These gage states include: available, calibration due, checked out, conditional use, failed calibration, in rework, inactive, IRR review, lost, on order, scrapped and many others. Predator Gage Crib automatically maintains and updates these gages states as gages expire and other processes occur. Easy to use wizards walk quality and shop floor personnel though the appropriate processes. Over 90 reports and charts provide immediate insight to the current gage states, quantities, and processes.

When do gages need to be re-certified for use?

Gages need to be periodically re-certified or re-calibrated. Predator Gage Crib insures that your gage and part quality standards will be maintained by adhering to ISO and known best practices. Predator Gage Crib will automatically identify which gages by specific serial numbers need calibration or certification. Predator Gage Crib maintains step-by-step work instructions that can include reference drawings, pictures and even video clips. These file attachments include support for Microsoft Word™, Excel™, PowerPoint™, AutoCAD™, and Predator Virtual CNC™. Industry standard file formats such as HTML, PDF, BMP, TIFF, GIF, RTF, and ASCII text are also supported. Work instructions can be broken down to specific steps for initial and periodic calibration with some steps being required and other being optional. Metrologists can add or modify certification instructions as needed, and a series of reports tracks certifications and all calibration processes.



Who is accountable for lost, broken, repaired or scrapped gages?

Predator Gage Crib tracks lost, broken, reworked, repaired and scrapped gages. A history of lost gages, who reported them being lost, who last checked them out, and where they should physically be found is maintained. Gages can be found and returned to the gage crib and become available for future use. Broken and scrapped gages are officially scrapped only after an official IRR (Inspection Rejection Report) process is completed. One of the many items recorded by the IRR process is the last known checked out location. This allows an inspector to check parts from that last location to see if the out of tolerance gage passed any parts that it should have failed.

IRR processes provide a tracking mechanism for every failed calibration or certification. Repairing or re-calibrating an out of tolerance gage can be performed in-house or by outsourcing. Predator Gage crib date and time stamps every step within the IRR process. It even supports a conditional use mechanism to allow gaging to be used for a limited amount of time to complete a specific run or job prior to completing the IRR process. Finally, if all else fails gages can be scrapped with an appropriate sign off procedure. Since nothing is truly final, gages can even be un-scrapped and repaired for use.

What is the history of each gage?

Predator Gage Crib automatically date and time stamps every significant quality and shop floor event for each serial number. These historical logs are maintained forever and can be easily reported, charted and graphed. For example, every value for every calibration step is even recorded. Every machinist that every checked out a gage is recorded. History is maintained so trends can be spotted, quality improvements can be made and cost savings reached over time.

How many gages do we need to order?

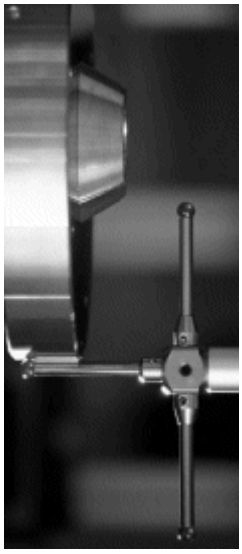
Predator Gage Crib maintains a minimum re-order level for every gage number, it then compares this with the current inventory levels and a wizard automates the re-order process. History is maintained and gaging costs and vendor performance can be analyzed over time.

What gages are used for specific parts?

Manufacturing engineers or shop floor personnel can use Predator Gage Crib to maintain lists of reference gages to be used for specific part numbers. New personnel can quickly capitalize on proven manufacturing and inspection processes. With a few mouse clicks these reference reports can quickly identify preferred gages per part number. Finally as gages fail calibration, these reports can be run to identify which part numbers will be affected by the lack of available gages.

Why use Predator Gage Crib?

Historically, manufacturers rely on the memory of personnel, sheets of paper in a clipboard, an Excel file, an ERP/MRP inventory system, or some custom application. Predator Gage Crib is a shrink-wrapped, open architecture database application that organizes and maintains your gages and gaging processes. Traditional paper or file-based methods tend to be easy to create, but very difficult to maintain. For example, it is not uncommon for manufacturers to try and manage thousands of individual gages and certification processes with pencil and paper or 3x5 cards. With hundreds or thousands of gages, how does one improve a gaging process or document an engineering change? Typically these systems quickly fall behind what is really happening on the shop floor and only stay up-to-date by very dedicated and motivated personnel. Larger companies that have implemented an MRP/ERP system often try to classify gages as a standard inventory item. This typically fails due to gage's constant use, the need for gaging to be checked in and out of inventory, lack of usage tracking, etc. Often this compounds with additional cards, paper, files, or processes to complete the level of detail required.



Predator Gage Crib uses a highly relational database, which introduces structure and simplified input. It automates gaging processes to swiping bar codes and a few mouse clicks. New gaging, revisions to existing gaging, and every gaging related process can be done simultaneously by multiple personnel in real-time with Predator Gage Crib on a Windows-based PC. Interfaces between Predator Gage Crib and MRP/ERP systems can be developed and implemented on a time and material basis.

Shop floor personnel are empowered by simplifying check in and check out reporting of lost or broken gages to insure that actual activities and shop floor feedback is reported correctly. By adding bar code readers, gaging processes can be automated to the point of simply swiping bar codes.

With a few mouse clicks, manufacturing engineers can query the status of gages, identify gages for specific parts right from their PC. Engineers can continue to design and document improved gaging methods and processes that will be used in the future.

Management or administrators can automate ordering of gages, performing inventories, scrapped gaging reports, gage certifications, and many other processes.

How does Predator Gage Crib work?

Predator Gage Crib organizes and maintains all of your gaging processes. The following flow diagram provides an overview to Predator Gage Crib.



Traditionally, gaging processes are managed using a variety of manual or semi-automatic methods become very difficult to maintain over time. If a physical gage crib or centralized area is not used, manufacturing personnel are forced to store gaging within individual toolboxes and workspaces. By implementing Predator Gage Crib thousands of dollars of excess gaging can be saved with a centralized inventory and re-order process. Predator Gage Crib simplifies all gaging processes and gage crib maintenance to a few mouse clicks. For example, ordering a new gage is a simple process, which has been automated with the use of wizards. Additional wizards automate the process of receiving gages, certifying gages, checking gages in and out, etc.

Optionally, each user can be responsible for specific areas. For example, Bob heads up the quality department and can be the only one that can create or edit new gage numbers. John is a Metrologist and he has ownership of gage certification and calibration processes within Predator Gage Crib. Crib attendants on different shifts are responsible for crib locations, check in/out and marking gages for calibration.

Predator Gage Crib also allows users to assign any electronic file as a reference attachment to specific gage types, sub-types or numbers. For example, a streaming video clip of general gage handling instructions can be associated as a reference attachment. Any operator working with any gage could then watch the common handling instructions as well as those for either specific or particular type of gage. This is

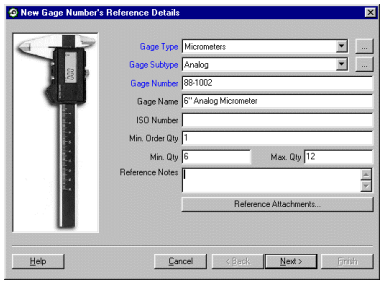
because Predator Gage Crib also supports specific attachments. For example, a bitmap of the certified gage can be associated as a specific attachment only when the particular gage is calibrated.

Gages can be revised as engineering changes are made with complete date and time based history. Alternate gages can be created to facilitate expedited or backup manufacturing methods. All of these processes can be implemented enterprise-wide with date and time based histories automatically completed with just a few mouse clicks.

Predator Gage Crib can make dramatic changes to a shop's most basic quality processes. Instead of maintaining a gage list per part number in a file or setup sheet, Predator Gage Crib can optionally print a gage list report, export an HTML file, or even an Excel spreadsheet. In a paperless environment, an operator (using the Predator Gage Crib Client) can view gages with a few mouse clicks. Should a manufacturing engineer desire to stop using an old gage and start using a new gage, Predator Gage Crib can advise the engineer on which part numbers would be affected based on the knowledge built by using Predator Gage Crib within the shop. Depending on the number of gages that must be maintained, Predator Gage Crib can save weeks as manufacturing processes are improved and tens of thousands of dollars by lowering gaging costs and inventory levels.

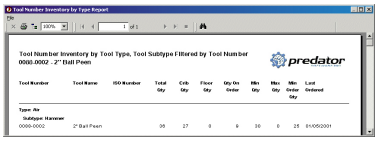
Finally, a complete history of changes is maintained for the lifetime of each individual serialized gage. The history of changes provides a complete audit trail of every gaging process.

What specific data does Predator Gage Crib organize?



Predator Gage Crib is designed to track and organize every aspect of gages. At a minimum, standard gaging information is recorded and tracked in a series of step-by-step wizards or operations. Highlights include:

- Gage Types and Sub-Types
- Gage Number and Name
- Serial Numbers
- Gage Status
- Calibration Frequency Information
- First Issue Date and Last Calibration Date
- Reference Dimensions
- Part References
- Multi-Media Attachments
- Notes
- Multiple Vendors with Catalog Numbers and Costs
- ISO Number
- Crib Locations
- Minimum and maximum inventory levels
- Checked out location and user



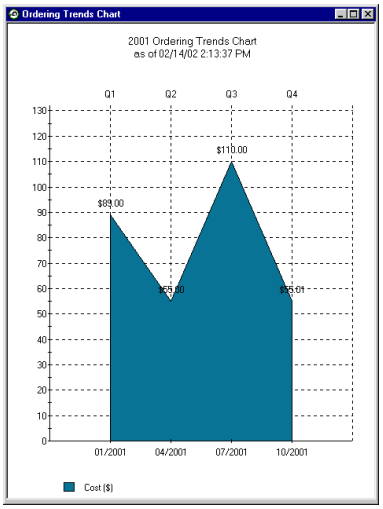
What kinds of reports are included with Predator Gage Crib?

78 reports are included standard with Predator Gage Crib. Highlights include:

- Gage Lists and Serial Number Lists
- 3 Gage History Reports
- 2 Checked Out Gage Reports
- Lost Tools and Scrapped Gage Reports
- Rework Information and IRR Reports
- 2 Part Reference Reports
- 8 Work Summary Reports
- 4 Gage Ordering Reports
- 6 Gage Calibration Reports
- 2 Inventory Reports
- 8 Security Reports
- 20 Component Reports
- 20 Component History Reports

NOTE: Each of the above reports has numerous options and filters to drill down to the appropriate data. For example, the Gage List Report can be filtered to a specific department, location, group, machine, and 12 other items.

All reports can be exported to Microsoft Excel or HTML documents for further analysis or processing. Additional Predator Gage Crib Clients can be licensed just for the manufacturing engineers to view specific Gage Crib reports. Custom reports and graphs are available via several third party report and charting applications such as Microsoft Access, Crystal Reports or Oracle Reports.



What kinds of charts are included with Predator Gage Crib?

13 charts and graphs are included standard with Predator Gage Crib. Highlights include:

- Calibration Summary Chart
- Crib Transaction Summary Chart
- IRR Summary Chart
- Purchase Order Summary Chart
- Lost vs. Found Chart
- Active vs. Inactive Chart
- 3 Gage Inventory Charts
- Vendor Purchases Chart
- Ordering Trends Chart
- Consumption Trends Chart
- Periodic Calibration Trends Chart

NOTE: Each of the above charts has numerous options and filters to drill down to the appropriate data. For example, the Ordering Trends Chart can be filtered to a specific

gage type, sub-type, and number with results for both cost and quantities.

All charts can be copied to the clipboard and saved as JPEG graphics. Additional Predator Gage Crib Clients can be licensed just for the manufacturing engineers to view specific Gage Crib charts. Custom charts and graphs are available via several third party report and charting applications such as Microsoft Access, Crystal Reports or Oracle Reports.

One of many



Predator Gage Crib is a stand-alone database driven application built on Predator's common database platform. This common platform is a shared foundation to an entire suite of Predator applications. Shared common data improves overall productivity and minimizes implementation time when adding additional applications. For example, edit a machine's properties and every Predator application is immediately updated including Predator Tool Crib, Predator MDC, Predator DNC, Predator Desktop, Predator Gage Crib and Predator Travelers.

Predator's common database platform is an open architecture structure and independent of the actual database server. Currently, it supports Microsoft Access, SQL Server and Oracle depending on the customer's requirements. Predator's common database platform is fully relational and supports powerful object-based design to support an unlimited number of gages, parts, personnel, machines, departments, locations, etc.

What are the main features of Predator Gage Crib?



- Multiple simultaneous users from any Windows based networked PC.
- Powerful database design to support an unlimited number of gage numbers, serial numbers, calibrations, crib locations, etc.
- Multiple manufacturing plants can be supported within a single Predator Gage Crib database with reports and charts that span the enterprise or drill down to each plant.
- Open architecture design with native database and SQL query support for Microsoft Access, SQL Server and Oracle.
- Supports gage ordering, re-ordering, receiving, initial certification, check in, check out, calibration, scrapped, lost, found, and IRR gaging processes.
- Complete gage tracking and history.
- Common components include gage types, gage sub types, departments, crib locations, groups, work instructions, machines, parts, and all associated files and media.
- Comprehensive ISO 900x compatible history of edits/changes.
- Easy to use wizards for all gaging processes.
- Edit common components with automatic updates. For example, change gage number details and every related serial numbered gage that has the same gage number is updated.
- Query and print reports based on current statuses. For example, display all checked out gages.

- Linked multimedia can include any file on the network with additional viewers for Microsoft Excel, Word, PowerPoint, RTF, AutoCAD, DXF, HTML, PDF, text and bitmaps included with Predator Gage Crib.
- Predator Gage Crib includes a *secure* browser for access to corporate Intranets.
- Automatic database integration with:
  - Predator DNC
  - Predator Desktop
  - Predator PPM – Parametric Part Manufacturing
  - Predator Travelers
  - Predator Tool Crib
  - Predator MDC - Manufacturing Data Collection
- Includes 78 standard gage management reports.
- Includes 13 standard gage management charts.
- Custom reports and graphs are available via several third party applications.
- User and group permissions for features, menus, toolbars and dialogs.
- Comprehensive HTML based on-line help that leads the industry.
- Automatic database migration as each software version is released.
- Real-time transaction based processing to minimize database corruption with automatic rollback when power is restored.
- Flexible licensing including SIMs, network cards and floating network licenses.

For More Information

For the latest information on Predator Gage Crib, check out our World Wide Web site at http://www.predator-software.com